Published Draft Report
May 2019

Dublin Airport CIP2020 Efficiency Assessment

Commission for Aviation Regulation
Our ref: 23502001

steer

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Executive Summary

Overview

Steer was appointed by the Commission for Aviation Regulation ("Commission" or "CAR") to review Dublin Airport's Capital Investment Plan (CIP) proposals for the period 2020-2024, also referred to as CIP2020, and to propose alternative capital expenditure estimates where appropriate. This is our Draft Report for publication alongside the draft determination of the maximum level of airport charges at Dublin Airport 2020+. We will update the report based on responses to the Commissions' consultation.

Our scope follows the Commission's Terms of Reference: SRFT 5/2018 and is applied to each of the 117 projects in the CIP2020 presented in Dublin Airport's proposed 'Capital Investment Programme 2020+' document, dated February 2019. The requirements are to:

- Assess the specification of each project given the output it is intended to deliver, to determine whether they are over or under specified;
- Highlight any instances of inefficient project phasing;
- Highlight any incidents of double-counting across other projects within this plan, or indeed from either the 2014 determination or the 2018 Interim Review in relation to the PACE projects; and
- Review the proposed costings to determine whether or not they are reasonable and efficient for the project.

The issue of whether the proposed projects are necessary and desired by users is not included in the scope. This will be separately assessed by CAR.

Approach

This review was undertaken based on expert opinion and the information supplied to us by CAR and Dublin Airport. To further inform our review we made use of our own and publicly available benchmarking data.

We have reviewed the efficiency of specifications and costings of each project individually and also considered them in aggregate to assess whether any synergies can be assumed, or whether double counting exists. More specifically, for each project we have:

- Reviewed the efficiency of the project's specifications, with specific attention paid to:
  - effectiveness and quality of scope;
  - project phasing and synergies with other projects;
  - existing asset conditions; and
  - alternative scopes.
- Assessed potential synergies and double counting with:
  - other projects within CIP2020;
  - projects within the 2014-2019 CIP; and
  - the PACE projects.
- Reviewed Dublin Airport's cost estimates and developed our own independent cost estimates, adjusted for assessed inefficiencies, inconsistencies, synergies, double counting and considering our own cost benchmarks.

We have developed a RAG (Red/ Amber/ Green) assessment methodology to assist in summarising our views on each of the projects. This RAG assessment has been applied

separately to each project to consider whether the cost assumptions are efficient in our opinion. The RAG categories are defined as follows:

Coding	Definition
Green	We assess that the difference between the cumulative sum estimated by Dublin Airport and a likely project cost outturn will be up to +/- 7.5% of the Dublin Airport estimates.
Amber	We assess that the difference between forecast cost and actuals will be between +/- 7.5% and 10% of the Dublin Airport estimates.
Red	We assess that the difference between forecast cost and actuals will be more than +/-10% of the Dublin Airport estimates.

Key Findings

Regarding the overall cost assessment, the table below provides a summary of our findings. We have identified a €146.7m cost savings opportunity across the projects examined, equating to a potential reduction of 8.1%.

Appendix	CIP Number	daa cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)	Cost diff. (%)
A	Asset Care - CSF	181.9	170.7	-11.2	-6.2%
B	Asset Care - M&E	102.8	100.9	-1.9	-1.9%
C	Capacity	1,231.1	1,108.3	-122.8	-10.0%
D	Commercial	130.0	117.6	-12.4	-9.5%
E	Information Technology	78.6	78.2	-0.4	-0.5%
F	Security	56.4	57.5	1.1	2.0%
G	Others	22.0	22.7	0.8	3.5%
	Total	**1,802.7**	**1,656.0**	**-146.7**	**-8.1%**

*Note the overall Dublin Airport capex cost of €1,802.7m is about €5.3m higher than the CIP document figure of €1,797.4m. This is due to three adjustments Dublin Airport have since provided us: Firstly, the surface area of the long term car park in 20.04.005 was underestimated in the CIP, incorrectly basing its estimates on 29,000sqm rather than 50,000sqm. This has now been corrected, increasing the project by about €4.3m. Secondly, a discrepancy in the CIP report where project 20.03.052 is reported at €51.0m when in fact the individual cost built up totals to €51.6m, thus increasing the CIP by a further €0.6m. Thirdly the cost of the observation room (€0.3m) has been added back into the CIP 20.03.018.

The individual cost assessments for each project, including RAG assessment, are presented at the beginning of each of the seven cost category chapters later in this report.

Glossary

Acronym	Definition
AADT	Annual Average Daily Traffic
AGL	Airfield Ground Lighting
ALCMS	Airfield Lighting Control & Management System
AOS	Airport Operations System
APU	Auxiliary Power Unit
ARI	Aer Rianta International
ASIAS	Aviation Security in Airport Development
ASP	Airport Security Programme
ASTO	Aviation Security Training Organisation
ATC	Air Traffic Control
ATM	Air Traffic Movement
ATRS	Automated Tray Return System
ATV	Average Transaction Value
ATRS	Automatic Tray Return System
AVD	Airfield Visual Display
A-CDM	Airport Collaborative Decision Making
A-VDGS	Advanced Docking Guidance system
BILS	Baggage Image Location System
BRS	Baggage Reconciliation System
B2C	Business to Customer
Capex	Capital Expenditure
CAR	Commission for Aviation Regulation or the “Commission”
CBP	US Customs and Border Protection – a US Federal Agency
CCC	Construction Consolidation Compounds
CCTV	Closed-Circuit Television
CIP	Capital Investment Programme
CSA	Central Screening Area
CSF	Civils, Structures and Fleet
CUSS	Common Use Self Service (at airport check in)
CUPP	Common Use Passenger Processing
CWP	Controller Working Positions
DAAD	Deviation Acceptance and Action Document
DCS	Departure Control System
EASA	European Aviation Safety Agency
ECAC	European Civil Aviation Conference
EDD	Explosive Detection Dogs
ETD	Explosive Threat Detection System
ERP	Enterprise Resource Planning

Acronym	Definition
FBSS	Full Body Scanning Systems
FEGP	Fixed Electrical Ground Power
FIDS	Flight Information Displays
FOD	Foreign Object Debris
FTG	Follow-The-Green
F&B	Food and Beverage
GDPR	General Data Protection Regulation
GSE	Ground Support Equipment
GTC	Ground Transport Centre
HBS	Hold Baggage Screening
HGV	Heavy Goods Vehicles
HHMD	Hand Held Metal Detector
HR	Human Resources
HVAC	Heating, Ventilation, and Air Conditioning
H & S	Health and Safety
IAA	Irish Aviation Authority
iAOP	Initial Airport Operations Plan
ICAO	International Civil Aviation Organization
ICE	Internal Combustion Engines
IDL	International Departure Lounge
IT	Information Systems
ILCMS	Individual Lamp Control & Monitor System
IoT	Internet of Things
KPI	Key Performance Indicator
LAG	Liquids, Aerosols and Gels
LEDS	Liquid Explosive Detection System
LEV	Low Emission Vehicles
LSS	Life Safety Systems
LVP	Low Visibility Procedures
MARS	Multi Aircraft Ramp System
mppa	Million Passengers per Annum
MV	Medium Voltage
MRO	Maintenance Repair and Overhaul
MSCP	Multi Storey Car Park
M&E	Mechanical and Electrical
OCTB	Old Central Terminal Building
Opex	Operating Expenditure
PAS	Publicly Available Specification

Acronym	Definition
PACE	Dublin airport's supplementary capital investment programme dated December 2017 and named 'Programme of Airport Campus Enhancement'
PE	Physical Edge
PBB	Passenger Boarding Bridge
PBZ	Passenger Boarding Zone, or Pre-Boarding Zone
PCI	Payment Card Industry
PDC	Primary Data Centre
POS	Points Of Scale
PRM	Passengers with Reduced Mobility
PM	Project Management
QMS	Queue Management System
Q&A	Questions & answers process between Steer and Dublin Airport on the projects covered in the CIP2020 document
RAG	Red/Amber/Green assessment methodology
SAC	Sort Allocation Computer
SBR	Small Business Requests
SCADA	Supervisory Control And Data Acquisition
SeMS	Security Management System
SESAR	Single European Sky ATM Research
SI	Snow and Ice
SSK	Self-Serve (check-in) Kiosk
SWIM	System Wide Information Management
SQL	Structured Query Language
TSA	Transportation Security Administration – the agency of the U.S. Department of Homeland Security which is responsible for the additional passenger and baggage screening for the US flights
TSAT	Target Start-up Approval Time
TOBT	Target Off Block Time
ULD	Unit Load Device
VCC	Vertical Circulation Core (e.g. Stairways, Ramps, Lifts and Escalators)
VCP	Vehicle Check Point (or Control Post)
WAN	Wide Area Network
WTMD	Walk Through Metal Detector

1 Introduction

This Report

1.1 Steer was appointed by the Commission for Aviation Regulation ("CAR") to provide an independent review of the "Capital Investment Programme 2020+" (CIP2020) document developed by Dublin Airport, covering proposed capital investment at the airport for the period 2020-2024.

1.2 This document presents our Draft Report for publication alongside the draft determination of the maximum level of airport charges at Dublin Airport 2020+. We will update the report based on responses to the Commission's Consultation.

Background

Traffic

1.3 Dublin Airport is Ireland's busiest airport and is currently ranked #13 in Europe by volume. In 2018, the airport maintained its recent robust growth in traffic, handling 31.5 million passengers - a growth of +6.5% versus 2017.

1.4 The airport is served by two dependent runways (runway 10/28: 2.637m; runway 16/34: 2.072m). A third (Northern) runway is under construction and currently planned to be completed in 2021 so that operations can commence in 2022. Passengers are processed through two terminals, 1 and 2.

1.5 Much of the recent traffic growth has been driven by the addition of capacity by incumbent LCC Ryanair and value carrier Aer Lingus (part of the IAG group), but also through new entrant long haul carriers such as Qatar and Hainan. In 2018 nearly three quarters of the total airline seat capacity at Dublin was provided by Ryanair and Aer Lingus.

Scope of Review

1.6 This review focuses on the 117 CIP projects set out in Dublin Airport's Capital Investment Programme 2020+ document, dated 6 February 2019. In aggregate, the projects presented in the CIP document had a combined proposed Capital Expenditure (Capex) of €1,802.7 million. The list of projects comprises proposed spending split into seven key functions:

Table 1.1: CIP2020 – Project Grouping

Appendix	Group	No. of Projects	Capex (€m)
A	Asset Care – Civils, Structures and Fleet (CSF)	29	181.9
B	Asset Care – Mechanical and Electrical (M&E)	11	102.8
C	Capacity	25	1,231.1
D	Commercial	18	130.0
E	Information Technology (IT)	16	78.6
F	Security	14	56.4
G	Other	4	22.0
	Total	**117**	**1,802.7**

1.7 The full list of the 117 projects is in Appendix A.

1.8 For each of the projects we have:

- Assessed its specification given the output it is intended to deliver, to determine whether it is over or under specified;
- Reviewed the proposed costings to determine if they are reasonable and efficient for the project;
- Identified incidences of potentially inefficient phasing; and
- Highlighted any incidents of double-counting across projects.

1.9 The approach to 'how' each project was assessed for each of the above is covered in Chapter 2.

1.10 The issue of whether the proposed projects are necessary and desired by users is not included in our scope of work, as this will be separately assessed by the Commission.

2 Approach

Introduction

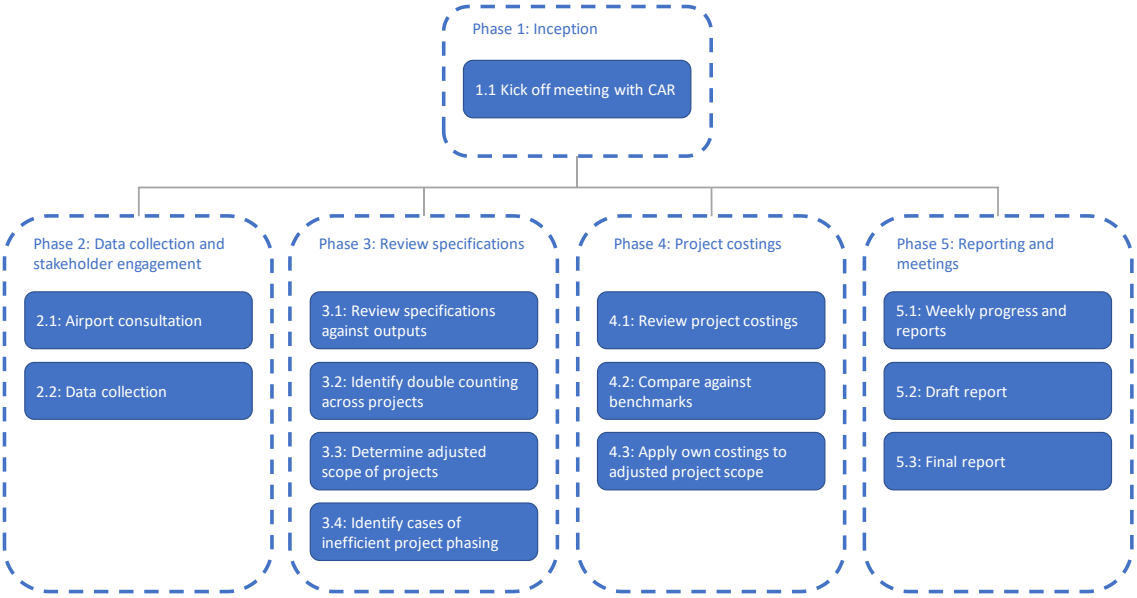
2.1 In line with the earlier stated objectives, our review has addressed the requirements as per the Terms of Reference set out in SRFT 5/2018. These are to:

- Assess the efficiency of the specifications of each CIP project with respect to the outputs expected to be delivered;
- Assess the efficiency of Dublin Airport's cost estimates for each of the projects of the CIP and obvious inefficiencies in project planning or phasing;
- Identify any incidences of double counting across the projects, against the previous CIP (2014-2019) and the PACE projects; and
- Review the proposed costings to determine whether or not they are reasonable and efficient for the project.

Methodology

2.2 We have followed the approach outlined in Figure 2.1, including iterations as needed to ensure that all review objectives are consistently met for each project.

Figure 2.1: Assessment methodology



Phase 1 – Kick Off Meeting

2.3 The kick off meeting took place in Dublin on 17 January 2019 with CAR and Dublin Airport. Presentations were delivered by Dublin Airport, providing the context to the projects, at that time 108 in number, and a tour of the airport was undertaken to provide a better understanding of the projects.

Phase 2 – Data Collection

2.4 We received the interim CIP documents in December 2018, and the final version with 117 projects in February 2019. This document outlined the projects' objectives, specifications and included high-level (Level 1 and 2) cost estimates for all 117 projects.

2.5 On request, Dublin Airport also shared the following data over the course of February and March 2019 for each project, including:

- Detailed project specifications;
- Engineering drawings; and
- Level 3 cost estimates.

2.6 Additional information was provided through a questions & answers (Q&A) process between Steer and Dublin Airport.

2.7 Finally, Steer used benchmarking data as part of our assessment, as and where appropriate.

Phases 3 and 4 – Reviews

2.8 All 117 projects have been analysed separately to assess their respective specifications and cost estimates, as well as in aggregate to identify potential synergies in planning along with double counting.

Specifications review

2.9 We firstly assessed the comprehensiveness of the scope of each project. We then assessed each project's specification efficiency in achieving the required outputs, taking note of:

- The scope's effectiveness in achieving the objective of the project;
- Whether there are any alternatives that could be considered;
- The quality of the specification;
- Phasing and synergies with other projects;
- Relationship with existing asset conditions and lifecycles; and
- Any evidence of double counting.

2.10 Where we identified significant potential changes to the scope, either through improved specification change, or alternative suggestions, these were fed through to the Steer cost assessment.

Cost estimate review

2.11 The other key step involved the assessment of the efficiency of the Level 1 project cost estimates provided by Dublin Airport. This was undertaken using a bottom-up approach, starting from Dublin Airport's Level 3 cost estimates which were analysed using a range of cost benchmarks.

2.12 The applied unit rates, design and management cost multipliers, associated indirect costs and contingency assumptions were benchmarked using data collected from other assessments and industry knowledge.

2.13 The cost review has, furthermore, considered efficiencies identified from the specifications review, taking account of any additional cost impacts from proposed changes to specification, project clustering, and incidences of double counting.

2.14 Some costs are at a very early stage of development, and some projects are still at the feasibility stage. For these projects there was less information available to review. In these circumstances it has not been possible to assess the project at a granular level, and we have

therefore assessed the project at a more holistic level, testing the project cost for reasonableness.

2.15 For the IT section, we have aggregated the whole suite of IT projects and compared the IT capex in totality, comparing the total spend metrics against other European airport benchmarks.

Double counting review

2.16 We reviewed the 117 projects' cost estimates for double counting with:

- Other projects from the 2020 CIP;
- Projects included in the previous 2014-2019 CIP; and
- Against the PACE projects from 2018.

2.17 Any double counting identified has been accounted for in our cost estimate review.

Phase 5 – Results and report

2.18 Based on our review, we have developed a Steer Level 3 cost estimate for each individual project, against which the costs assumed by Dublin Airport have been compared.

2.19 These have then been aggregated up to Level 2 and Level 1 costs for this report.

2.20 We have additionally developed a RAG (Red/Amber/Green) assessment methodology to assist in summarising our views on each of the projects. This RAG assessment has been applied separately to consideration of whether the cost assumptions are efficient in our opinion. The RAG categories are defined as follows:

Table 2.1: RAG Assessment Methodology

Coding	Definition
Green	We assess that the difference between the cumulative sum estimated by Dublin Airport and a likely project cost outturn will be up to +/- 7.5% of the Dublin Airport estimates.
Amber	We assess that the difference between forecast cost and actuals will be between +/- 7.5% and 10% of the Dublin Airport estimates.
Red	We assess that the difference between forecast cost and actuals will be more than +/-10% of the Dublin Airport estimates.

3 Conclusion

Key Results

3.1 Our summary level results for overall proposed capex expenditure are presented in Table 3.1. These highlight the cost variance calculated for each of the seven groups of projects.

3.2 At the beginning of each of the 7 cost group chapters, we also provide a table showing the RAG critique for each individual project, for both the cost and the specification/scope assessments.

3.3 Our assessment concludes that there is a cost reduction potential of €146.7m, or 8.1% as the table below indicates.

Table 3.1: Cost summary for Dublin CIP2020

Appendix	CIP Number	daa cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)	Cost diff. (%)
A	Asset Care - CSF	181.9	170.7	-11.2	-6.2%
B	Asset Care - M&E	102.8	100.9	-1.9	-1.9%
C	Capacity	1,231.1	1,108.3	-122.8	-10.0%
D	Commercial	130.0	117.6	-12.4	-9.5%
E	Information Technology	78.6	78.2	-0.4	-0.5%
F	Security	56.4	57.5	1.1	2.0%
G	Others	22.0	22.7	0.8	3.5%
	Total	**1,802.7**	**1,656.0**	**-146.7**	**-8.1%**

**Note the overall Dublin Airport capex cost of €1,802.7m is about €5.3m higher than the CIP document figure of €1,797.4m. This is due to three adjustments Dublin Airport have since provided us: Firstly, the surface area of the long term car park in 20.04.005 was underestimated in the CIP, incorrectly basing its estimates on 29,000sqm rather than 50,000sqm. This has now been corrected, increasing the project by about €4.3m. Secondly, a discrepancy in the CIP report where project 20.03.052 is reported at €51.0m when in fact the individual cost built up totals to €51.6m, thus increasing the CIP by a further €0.6m. Thirdly the cost of the observation room (€0.3m) has been added back into the CIP 20.03.018.

3.4 Where we have found potential cost differences, we have included them above.

4 Project Reviews – CIP2020 Appendix A - Asset Care (CSF)

Summary

Table 4.1: Appendix A - Asset Care (CSF) – Summary

CIP Number	Project Title	RAG Costs	Dublin Airport cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)
CIP.20.01.001	Southern Runway (R10R/28L) Delethalisation Programme	0.0%	2.2	2.2	0.0
CIP.20.01.002	Apron Rehabilitation Programme	-16.8%	37.0	30.8	-6.2
CIP.20.01.003	Airfield Taxiway Rehabilitation Programme	-8.5%	19.0	17.4	-1.6
CIP.20.01.004	Apron Road Rehabilitation Programme	-15.6%	4.6	3.9	-0.7
CIP.20.01.006	Airfield Southern Perimeter Road Upgrade Programme	-13.0%	4.6	4.0	-0.6
CIP.20.01.008	Runway Approach Lighting Mast Improvement Programme	0.0%	11.1	11.1	0.0
CIP.20.01.009	Aerodrome Ground Lighting (AGL) Improvement Programme	0.0%	4.7	4.7	0.0
CIP.20.01.010	Airfield Lighting Control & Management System Improvement Programme	0.0%	4.9	4.9	0.0
CIP.20.01.012	AGL Substation T Development Programme	0.0%	3.7	3.7	0.0
CIP.20.01.015	High Mast Lighting Improvement	0.0%	0.7	0.7	0.0
CIP.20.01.016	Airfield Maintenance Base Improvement Programme	-2.8%	4.5	4.4	-0.1
CIP.20.01.018	Campus Buildings Critical Maintenance	0.0%	1.5	1.5	0.0
CIP.20.01.020	Terminal 1 Façade, Roof & Spirals	-2.5%	25.8	25.2	-0.6
CIP.20.01.022	Terminal 1 Storm Water Drainage System	-0.9%	1.1	1.1	0.0
CIP.20.01.023	Piers & Terminals Critical Maintenance	-12.5%	1.9	1.7	-0.2
CIP.20.01.024	Skybridge Rehabilitation	0.0%	1.2	1.2	0.0
CIP.20.01.034	Campus Roads Critical Maintenance	-8.9%	6.8	6.2	-0.6
CIP.20.01.039	Airport Roads Critical Maintenance	-5.1%	5.1	4.9	-0.3
CIP.20.01.046	Staff Car Parks Critical Maintenance	-7.6%	1.7	1.6	-0.1
CIP.20.01.049	Public Carpark Critical Maintenance	-2.9%	2.4	2.3	-0.1
CIP.20.01.056	Campus Facilities & Landside Snow Base Upgrade	-0.9%	2.9	2.8	0.0

CIP Number	Project Title	RAG Costs	Dublin Airport cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)
CIP.20.01.065	Airport Heavy Fleet & Equipment Replacement	0.0%	11.0	11.0	0.0
CIP.20.01.069	Airport Light Vehicle Fleet Replacements and Augmentation	0.0%	2.4	2.4	0.0
CIP.20.01.071	Electric Charger Network Facilities	0.0%	1.6	1.6	0.0
CIP.20.01.074	Advance Visual Docking Guidance System (5G, Pier 1 & Pier 2)	1.8%	5.3	5.4	0.1
CIP.20.01.087	AGL Fibre Optic Communication Network Improvement Programme	0.0%	2.0	2.0	0.0
CIP.20.01.099	RWY 16/34 Lighting for Low Visibility Procedures (LVP)	0.0%	5.5	5.5	0.0
CIP.20.07.013	Airfield Redesignation	0.0%	1.5	1.5	0.0
CIP.20.07.032	Unit Load Device (ULD) Storage	2.6%	5.0	5.1	0.1
Total		**-6.2%**	**181.9**	**170.7**	**-11.2**

4.1 Our estimates for Asset Care CSF suggest that the overall cost envelope could be reduced by €11.2m.

4.2 Individual reports for the projects in this Appendix of CIP2020 are presented below.

CIP.20.01.001 – Southern Runway Delethalisation Programme

Introduction

4.3 Delethalisation is constructing buried structures such as plinths, runway ends, paved taxiway edges within the graded area of the runway strip, in such a way 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.

Figure 4.1: Southern Runway Delethalisation Programme

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.4 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.

4.5 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.

Context

4.6 The delethalisation of buried vertical surfaces within the runway strip is referred to in EASA Regulations to minimise hazards to aircraft running off the runway (GM1 ADR-DSN.B.165 Objects on Runway Strips). The recent works to resurface the southern runway did not encompass the full scope of delethalisation and therefore this work is proposed to complete delethalisation.

Scope

4.7 The project scope lists:

- 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; and
- Works to be carried out in discrete portions to minimise operational disruption.

Stage

4.8 Feasibility designs completed.

Key project metrics

Table 4.2: Southern Runway Delethalisation Programme – Key project metrics

Metric	Value
Construction cost estimate	€1,481,040
Surface area	8,500 m^2
Cost per square metre	174 €/m^2

Specifications review

Table 4.3: Southern Runway Delethalisation Programme – Specifications review

Subject	Comments
Effectiveness of scope	The scope of delethalisation presented in Dublin Airport drawing D14014-C-000-109 appears to meet regulatory requirements and is therefore effective.
Alternative scopes	Traditionally delethalisation within runway clear and graded areas has incorporated bound materials such as lean concrete. This has been questioned with Dublin Airport and from the data received in response to our question it is understood that Dublin Airport is using unbound sub-base materials and/or recycled planning's in lieu of the traditionally used lean concrete. Further savings might potentially also be realised if consideration is taken of pits and features that are redundant. Such features can be broken down to minimum 450mm below the adjacent ground level, then backfilled with unbound sub-base materials, thereby avoiding the need to provide delethalisation.
Quality of specifications	The specification indicates that an effective use of planings in lieu of bound materials has been adopted.
Phasing and synergies with other projects	This programme, scope and location of works for delethalisation does not provide any opportunity for synergies with other projects within the programme.
Existing asset conditions	Not applicable – new installation.
Double counting	No double counting has been identified within the data provided. Documentation received notes that the delethalisation already carried out as part of the southern runway rehabilitation works only covers a proportion of works and that CIP2020 will include the remaining works. The drawings provided under CIP2020 indicate 26,600m^2 of delethalisation to be carried out overall. The Level 3 costs indicate an area of 8,500m^2 to be carried out under CIP2020, so this does suggest that a large proportion, approximately two thirds, has already been carried out under the runway works.

4.9 In overall terms, the conclusion is that the project is effective and efficient.

Cost estimate review

Table 4.4: Southern Runway Delethalisation Programme – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 177,725	€ 177,725	€ 0
Construction Costs	€ 1,481,040	€ 1,481,040	€ 0
Escalation, Contingency & Design Variability	€ 544,490	€ 544,490	€ 0
Total	**€ 2,203,254**	**€ 2,203,254**	**€ 0**

Table 4.5: Southern Runway Delethalisation Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	12%	€ 177,725	12%	€ 177,725
Total			**€ 177,725**		**€ 177,725**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 1,481,040	n/a	€ 1,481,040
Total			**€ 1,481,040**		**€ 1,481,040**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 544,490	33%	€ 544,490
Total			**€ 544,490**		**€ 544,490**

4.10 Additional information and drawings that have been provided by Dublin Airport was insufficient for us to validate the quantity of 8,500 m^2 for delethalisation treatment. We will continue to work with Dublin Airport in order to validate these quantities and update the analysis for the final report. The rate included in our Level 3 estimate is based on the unbound material specification included by Dublin Airport. They have provided a build-up to their rate, which we believe is reasonable.

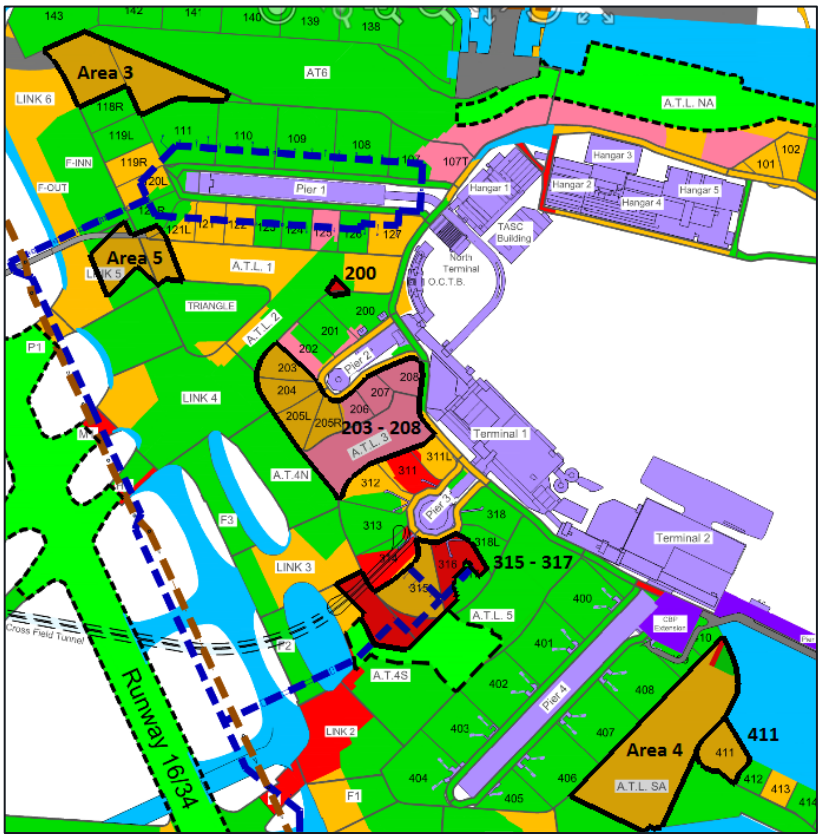
CIP.20.01.002 – Apron Rehabilitation Programme

Introduction

4.11 The project proposes to rehabilitate critical areas of the existing apron pavement.

4.12 The programme of apron rehabilitation will reportedly focus on areas located adjacent to Piers 2 & 3. Apron rehabilitation around Pier 3 will primarily replace apron to the East and South of the Pier but will also include Stand 311 with this element of the project acting as an enabler for project "Enablement of Pier 3 for Pre-Cleared US Bound Passengers" (20.03.033) at a cost of €8m.

Figure 4.2: Apron Rehabilitation Programme



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.13 To rehabilitate the airfield aprons to make sure they still provide facilities for aircraft to manoeuvre, park and be serviced.

Context

4.14 Many of the main aircraft aprons at Dublin Airport date back to before the 1960's and in a number of cases, are reported by Dublin Airport to have reached the end of their useful life. Condition reports commissioned by Dublin Airport have noted that areas of the aircraft pavement are in poor condition and need rehabilitation.

4.15 It has been proposed by Dublin Airport to carry out circa 66,671m^2 of pavement rehabilitation between 2020-2024 in a planned manner on a priority basis to replace damaged pavement before they become a business interruption or health & safety risk. Dublin Airport confirm that 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.

Scope

4.16 The project scope lists:

- Full reconstruction of failed pavement in PQ concrete or bituminous material where appropriate (note – Dublin Airport has confirmed that reconstruction will be 325mm PQC, 175mm dry lean, 150mm granular base and 250mm stone base);
- 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; and
- Costs based on recent apron reconstruction projects.

4.17 The location scope within Dublin Airport's Project Details Summary is also reported as being:

- South Apron;
- Airfield Stands, Piers 2 and 3;
- Apron Taxiway 1, 3 and 6; and
- Pavement Joint Replacement Programme.

4.18 Whilst the scope description provided by Dublin Airport does not appear to include Apron Taxiway 6 or the south apron rehabilitation, Dublin Airport has confirmed that the western section of Apron Taxiway 6 immediately adjacent to Link 6 is included in this project. The south apron rehabilitation does appear in the Level 3 costs, but Taxiway 6 appears not to.

4.19 From Dublin Airport's RAG map, which we understand is based on a PCI evaluation, it can be seen that the areas in question have reached a condition noted as 'degraded' and requiring replacement within 2-7 years.

4.20 It is considered that the specification for rehabilitation at stands 203, 204, 205L and 205R could be reduced in standard, given that apron pavements with a 'degraded' status will be subject to much lower traffic frequency when compared to the taxiways and taxilanes onto which they abut.

Stage

4.21 Feasibility designs not yet completed.

Key project metrics

Table 4.6: Apron Rehabilitation Programme – Key project metrics

Metric	Value
Construction cost estimate	€27,801,921
Apron area	66,671m^2
Cost per square metre	417 €/m^2

Specifications review

Table 4.7: Apron Rehabilitation Programme – Specifications review

Subject	Comments
Effectiveness of scope	The scope addresses the functional requirement identified by Dublin Airport to address the need to re-life pavements in areas critical to safe operations and apron capacity that are showing a degraded status. The western portion of apron taxilane 6 is included within the scope but appears to be missing from the Level 3 cost data.
Alternative scopes	The asset life is stated as 20 years. We would expect a minimum 30-40-year life to be applied to such pavements, particularly concrete pavements as confirmed. We consider that the specification for rehabilitation at stands 203, 204, 205L and 205R could potentially be reduced in standard, given that apron pavements with a 'degraded' status will be subject to much lower traffic frequency when compared to the taxiways and taxilanes onto which they abut. This alternative is for consideration, pending better definition of the project, and is not in our cost estimates.
Quality of specifications	The specification is very high level.
Phasing and synergies with other projects	This programme of works needs to be undertaken on a phased basis due to usage and location. Dublin Airport have identified that this pavement rehabilitation will be undertaken between 2020-2024. This is considered sensible, and achievable. Apron rehabilitation around Pier 3 will primarily address the need to replace apron to the East and South of the Pier but will also include Stand 311 with this element of the project acting as an enabler for project "Enablement of Pier 3 for Pre-Cleared US Bound Passengers" (20.03.033) at a cost of €8m. Carrying out these works in conjunction with project CIP.20.01.004, Apron Roads Rehabilitation Programme, should be considered where possible, especially at Pier 2 while adjacent stands are closed, as savings may be made on preliminaries such as traffic management.
Existing asset conditions	The condition has been identified by Dublin Airport as 'degraded' and requiring intervention within the period 2-7 years.
Double counting	No double counting has been identified within the data provided.

4.22 In overall terms, the conclusion is that this project is effective, but detailed evaluation of pavement condition surveys and development of synergies with the apron road project may yield efficiencies.

Cost estimate review

Table 4.8: Apron Rehabilitation Programme – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 2,780,192	€ 2,312,495	-€ 467,697
Construction Costs	€ 27,801,921	€ 23,124,948	-€ 4,676,973
Escalation, Contingency & Design Variability	€ 6,417,887	€ 5,341,863	-€ 1,076,024
Total	**€ 37,000,000**	**€ 30,779,306**	**-€ 6,220,694**

Table 4.9: Apron Rehabilitation Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 2,780,192	10%	€ 2,312,495
Total			**€ 2,780,192**		**€ 2,312,495**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 27,801,921	n/a	€ 23,124,948
Total			**€ 27,801,921**		**€ 23,124,948**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	21%	€ 6,417,887	21%	€ 5,341,863
Total			**€ 6,417,887**		**€ 5,341,863**

4.23 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.10: Apron Rehabilitation Programme – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Pavement Works - Stand 203 208 & Apron Taxiway 3	**Redacted Cost Information**			€ 250
Pavement Works - Area 4: South Apron A.T.L SA				€ 250
Pavement Works - Stand 315-Stand 317				€ 250
Pavement Works - Stand 200				€ 250

4.24 We have checked the quantities included by Dublin Airport in their Level 3 estimate and we believe that the project does not cover the total area of each stand. Dublin Airport has responded by providing a document that contains quantities that are aligned with its Level 3 estimate. However, we are not able to validate these quantities based on the information provided. We will continue to seek its validation with a view to updating our analysis for the final report.

4.25 We have reduced the rate for the pavement works as it is too high for the level of specification required.

CIP.20.01.003 – Airfield Taxiway Rehabilitation Programme

Introduction

4.26 The project proposes to rehabilitate critical areas of the existing taxiway network pavement.

4.27 The programme of taxiway rehabilitation will reportedly focus on:

- Taxiway M2;
- Taxiway F1 & Link 2 (partial);
- Taxiway F-Outer & Link 6 (partial); and
- Taxiway B1 and E1 (partial).

Figure 4.3: Airfield Taxiway Rehabilitation Programme

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.28 Dublin Airport claim thius project is required to rehabilitate critical taxiway pavements to ensure they continue to provide facilities for aircraft to manoeuvre between runway 1 and all piers. This project represents a continuation of the annual airfield taxiway rehabilitation programme and addresses taxiways with a remaining life of between 1 and 5 years.

Context

4.29 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 reported by Dublin Airport to be approaching the end of their useful life.

4.30 Independent condition reports commissioned by Dublin Airport 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.

Scope

4.31 The focus of this project will be Taxiway F1, Taxiway F-Outer, Taxiway B1, Taxiway E1 and Taxiway M2. This scope assumes that the North Runway re-development of Taxiway G will proceed, the PACE taxiway redevelopments will proceed and the apron 5H redevelopment of North Apron will proceed.

4.32 Dublin Airport notes that structural bituminous overlay will be used where possible to avoid need for full reconstruction, but full reconstruction has been used for the current cost estimate. Other assumptionsw include:

- No surface water attenuation;
- Night time working;
- Multi construction phasing to minimise route interruptions for taxiing aircraft; and
- Based on recent pavement overlay and reconstruction projects.

Stage

4.33 Feasibility designs not yet completed.

Key project metrics

Table 4.11: Airfield Taxiway Rehabilitation Programme – Key project metrics

Metric	Value
Construction cost estimate	€ 14,596,671
Taxiway surface area	37,538m^2
Cost per square metre	467 €/m^2

Specifications review

Table 4.12: Airfield Taxiway Rehabilitation Programme – Specifications review

Subject	Comments
Effectiveness of scope	The scope addresses the functional requirements of addressing Dublin Airport's identified need to re-life pavements in areas critical to safe operations and taxiway capacity that are showing a degraded status. Dublin Airport have confirmed that the western portion of Apron taxilane 6 is included within the scope of project CIP20.01.002 Apron Refurbishment.
Alternative scopes	The nature of the pavement rehabilitation is not noted in the Level 3 costs. We would suggest that a possible alternative might be to adopt overlays in lieu of reconstruction. Additionally, it may be possible to focus on the middle third of the taxiway width unless there is a need to upgrade the PCN of the whole width. Where taxiways and links can be closed, and aircraft rerouted, rather than handback of works areas each morning, consideration could be given to rehabilitation using rigid concrete pavements in lieu of asphalt to provide longer life and resistance to deformation under high frequency traffic. The asset life is stated as 20 years. 20 years life for the surface would be considered too short. We would expect a minimum 30-40-year life to be applied to such pavements.

Subject	Comments
Quality of specifications	The specification is high level. Without a full pavement evaluation and maintenance options study, which has been requested and not received from Dublin Airport, the current quality of specification cannot be viewed as robust or reliable.
Phasing and synergies with other projects	A number of taxiways were overlaid as part of the Runway 10-28 overlay project, however there are a number of additional taxiways identified by Dublin Airport as needing rehabilitation within the next 5-7 years.
Existing asset conditions	Dublin Airport's assessment concluded: The condition of taxiways Foxtrot-Outer, Link Taxiway 6, Taxiway Bravo 1 and Echo 1 has been identified as 'degraded' and requiring intervention within the period 2-7 years. The condition of taxiways Mike 2 and link taxiway 2 has been identified as 'unsatisfactory' and in need of rehabilitation within the immediate planning period.
Double counting	Within the PACE suite of projects, project SCP 17.3.001 includes the following taxiways: Link 6, Link 3, Realigned Taxiway A and Dual Taxiway F. In addition, project SCP 17.3.004 includes a link 6 taxiway extension. It therefore appears that there may be some potential for double counting, although without detailed drawings of the proposed project areas. This cannot be verified.

4.34 In overall terms, the conclusion is that this project is effective, but detailed evaluation of pavement condition surveys and targeting of any proposed reconstruction may yield efficiencies, and the use of rigid pavements may yield whole life cost benefits.

Cost estimate review

Table 4.13: Airfield Taxiway Rehabilitation Programme – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 1,459,667	€ 1,305,720	-€ 153,947
Construction Costs	€ 14,596,671	€ 13,057,202	-€ 1,539,469
Escalation, Contingency & Design Variability	€ 2,943,662	€ 3,016,214	€ 72,552
Total	**€ 19,000,001**	**€ 17,379,136**	**-€ 1,620,865**

Table 4.14: Airfield Taxiway Rehabilitation Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	10%	€ 1,459,667	10%	€ 1,305,720
Total			**€ 1,459,667**		**€ 1,305,720**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 14,596,671	n/a	€ 13,057,202
Total			**€ 14,596,671**		**€ 13,057,202**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	18%	€ 2,943,662	21%	€ 3,016,214
Total			**€ 2,943,662**		**€ 3,016,214**

4.35 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.15: Airfield Taxiway Rehabilitation Programme – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Pavement Works	Redacted Cost Information			€ 250
Pavement Works				€ 250
General Prelims & Management and Staff at 20%				20%

4.36 The project does not state whether the plan is for the rehabilitation of the total area of each of the taxiways in question or just a portion of them. We have checked the quantities included by Dublin Airport in their Level 3 estimate and our view is that they do not cover the total area of the taxiways in question. Dublin Airport has responded by providing a document that contains quantities that are aligned with its Level 3 estimate. However, we are not able to validate these quantities as the information provided by Dublin Airport is insufficient to allow such an exercise. We will continue to work with Dublin Airport to seek validation of the quantities with a view to updating our analysis for the final report.

4.37 We have reduced the rate for the pavement works as displayed above.

CIP.20.01.004 – Apron Road Rehabilitation Programme

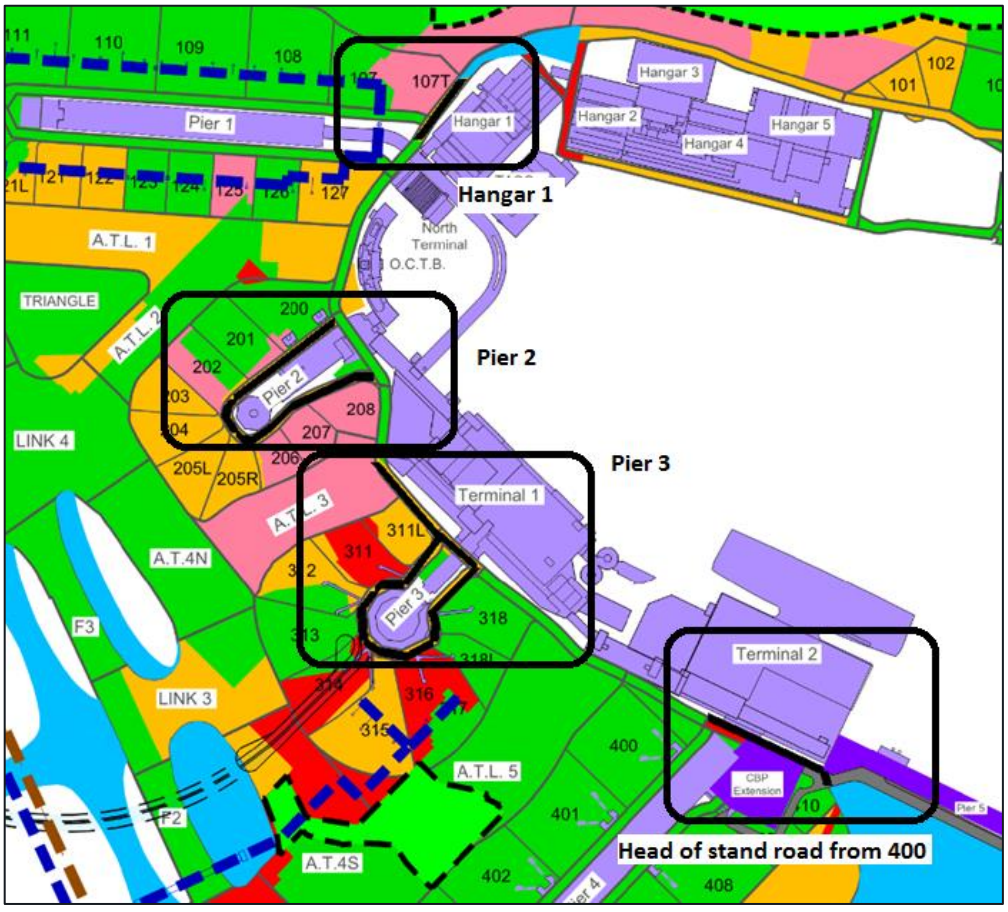
Introduction

4.38 The project proposes to rehabilitate critical areas of the apron road network pavement, concentrating on predominantly head-of-stand roadways.

4.39 The programme of taxiway rehabilitation will reportedly focus on:

- Head of stand road from stand 400;
- Pier 3;
- Pier 2; and
- Hangar 1.

Figure 4.4: Apron Road Rehabilitation Programme



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.40 To rehabilitate critical head-of-stand road pavements to make sure they still provide facilities for circulation of airside vehicles.

Context

4.41 Much of the apron roadway was constructed before 1960 when the adjoining apron was constructed. A condition report commissioned by Dublin Airport has identified areas of the apron road which are about to fail or have already reached the end of their functional life.

Scope

4.42 The project focuses on four key roadway areas, as listed above, which from inspection of the condition assessment are all either in a 'degraded' state (requiring repair within 7 years) or have an 'unsatisfactory' status requiring immediate attention.

4.43 Dublin Airport notes that structural bituminous overlay used where possible to avoid need for full reconstruction, but full reconstruction has been used for the current cost estimate. The scope assumes:

- 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; and
- Works to be carried out in discrete portions to minimise operational disruption.

Stage

4.44 Detailed designs not yet completed (Q4 2019 target).

Key project metrics

Table 4.16: Apron Road Rehabilitation Programme – Key project metrics

Metric	Value
Construction cost estimate	€ 3,305,785
Area 1 – From stand 400	1,810 m^2
Area 2 – Pier 3	4,254 m^2
Area 3 – Pier 2	2,995 m^2
Area 4 – Hangar 1	696 m^2
Total Road Rehabilitation area	9,755 m^2
Square area value	339 €/ m^2

Specifications review

Table 4.17: Apron Road Rehabilitation Programme – Specifications review

Subject	Comments
Effectiveness of scope	The high-level scope addresses the functional requirements of addressing the identified need to re-life pavements in areas critical to safe operations and maintaining traffic flow around and onto aircraft stands.
Alternative scopes	The nature of the pavement rehabilitation is not noted in the Level 3 costs. We would suggest that a possible alternative might be to adopt overlays in lieu of reconstruction. Rigid pavement reconstruction has been proposed within the schedule of costs. However, head of stand roads are routinely constructed using asphalt or composite pavements which are less expensive, and more amenable to overlay and inlay. Adopting rigid concrete pavements is possibly forcing Dublin Airport to consider reconstruction, and it is suggested that this be reviewed as it may be an inefficient method of rehabilitation. This alternative is for consideration, pending better definition of the project and is not included min the cost assessment.

Subject	Comments
Quality of specifications	The specification is very high level. Without a full pavement evaluation and maintenance options study, which has been requested and not received from Dublin Airport, the current quality of specification cannot be confirmed as robust or reliable. Full reconstruction has been assumed in all areas for cost estimation purposes. However, reconstruction of head of stand roads appears excessive, and unless strengthening by pavement thickening is required, it is considered that more use of asphalt overlays (where levels permit) or inlays is explored.
Phasing and synergies with other projects	Where possible, there may be savings to be realised by combining the roadway works within this project with works being carried out to adjacent stands under project CIP.20.01.002. This could allow roadway diversions through stands which are otherwise closed for rehabilitation. Such diversions may need to be moved at least once.
Existing asset conditions	The project focuses on four key roadway areas, as listed above, which from inspection of the condition assessment are all either in a 'degraded' state (requiring repair within 7 years) or have an 'unsatisfactory' status requiring immediate attention. Based on the criticality of these roadways, planning for their refurbishment within the next 5 years is considered prudent. The need to rehabilitate the length of roadway to be replaced adjacent to stand 400 has been questioned. Dublin Airport has responded stating that "*the majority of the road segment between Piers 3 & 4 has recently been replaced and the segment has been given a 'green' condition as a result. However, the adjacent segment and the overlap between the road segments are in very poor condition and in urgent need of rehabilitation. The area of the roadway included in this project have already reached the end of their useful life*".
Double counting	Within the PACE projects, SCP 17.2.004 "*Hangar 1 and Hangar 2 Stands*", it is possible that there has been double counting with the proposed hangar 1 roadway works as this project included within its scope the "Rerouting of Head of stand road". It therefore appears that there may be some potential for double counting, although without detailed drawings of the proposed project areas, this cannot be verified.

4.45 In overall terms, the conclusion is that this project is effective, but detailed evaluation of pavement condition surveys and targeting of any proposed reconstruction may yield efficiencies, and the use of flexible asphalt pavement solutions may yield cost savings. There is also potential for double counting at Hangar 1.

Cost estimate review

Table 4.18: Apron Road Rehabilitation Programme – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 495,868	€ 418,491	-€ 77,377
Construction Costs	€ 3,305,785	€ 2,789,938	-€ 515,848
Escalation, Contingency & Design Variability	€ 798,347	€ 673,770	-€ 124,577
Total	**€ 4,600,000**	**€ 3,882,198**	**-€ 717,802**

Table 4.19: Apron Road Rehabilitation Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	15%	€ 495,868	15%	€ 418,491
Total			**€ 495,868**		**€ 418,491**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 3,305,785	n/a	€ 2,789,938
Total			**€ 3,305,785**		**€ 2,789,938**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	21%	€ 798,347	21%	€ 673,770
Total			**€ 798,347**		**€ 673,770**

4.46 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.20: Apron Road Rehabilitation Programme – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport quantity	Dublin Airport rate	Steer quantity	Steer rate
Head of stand road from stand 400 - to stand	**Redacted Cost Information**					€ 250
Pier 3 - Roads, Paths and Pavings						€ 250
Pier 2 - Roads, Paths and Pavings						€ 250

4.47 The rates for the road construction have been aligned with rates used in other projects within the CIP. In response to our request for clarity around the extent of roads that have been measured, Dublin Airport has provided a marked up drawing that we have reviewed and quantified. The quantities we measured vary somewhat from what Dublin Airport has included in its estimate and we have amended the quantities in our Level 3 estimate to reflect this.

CIP.20.01.006 – Airfield Southern Perimeter Road Upgrade Programme

Introduction

4.48 This project proposes to:

- Upgrade and partial widening of the perimeter and 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; and

- 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.

Figure 4.5: Airfield Southern Perimeter Road Upgrade Programme

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.49 To reduce FOD and strengthen the roadway.

4.50 The Southern airfield perimeter road and Airfield Maintenance Facility access roads are now more than 30 years old and, according to Dublin Airport, life expired. Dublin Airport report that 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 reported as high as the roads are near the operational pavement.

4.51 The roadway is reportedly under strength and does not benefit from a positive drainage system.

Context

4.52 The roadway is stated as being life expired and presenting a FOD risk and hazard to vehicles through poor drainage and loss of alignment.

Scope

4.53 The project includes the following scope:

- 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 areas 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 of the roadway to be strengthened to 20 tonnes to meet usage requirements;
- 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;
- Pavement markings to be replaced; and
- Temporary bypass options during construction to be made available.

Stage

4.54 Feasibility designs not yet completed.

Key project metrics

Table 4.21: Airfield Southern Perimeter Road Upgrade Programme – Key project metrics

Metric	Value
Construction cost estimate	€ 3,037,498
Metric 1	8,900 m^2
Metric 2	518 €/ m^2

Specifications review

Table 4.22: Airfield Southern Perimeter Road Upgrade Programme – Specifications review

Subject	Comments
Effectiveness of scope	It is noted that the rehabilitation of the perimeter road is designed for a life of 15 years. This would appear to tie in with the usual cycle of asphalt surfacing life. The scope addresses the functional requirements of addressing FOD risk and a lack of structural capacity.
Alternative scopes	If roadway failure is predominantly due to poor drainage, consideration could be given to drainage improvements plus resurfacing rather than full reconstruction, pending full structural evaluation. The Level 3 costs indicate full depth reconstruction to 500mm in all areas. For a perimeter road this would seem excessive, and consideration should be given to targeted reconstruction, but with a preference to overlaying in asphalt in order to retain existing materials, avoid disposal and reduce programme. Other than pavement design optimisation above, the carefully planned installation would appear to be an optimum solution and it is difficult to envisage a more appropriate solution.
Quality of specifications	The specification is high level. Without a full pavement evaluation or feasibility study, which has been requested and not received from Dublin Airport, the current quality of specification cannot be confirmed as robust or reliable.
Phasing and synergies with other projects	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.

Subject	Comments
	Dublin Airport is taking the opportunity to carry out a partial replaced and upgraded security fence along the airfield boundary immediately North of Southern Runway (incl. replacement of one airfield Gate) at the same time as the southern perimeter road works.
Existing asset conditions	One of the project outputs is declared as a "full pavement evaluation to confirm remaining structural life and schedule for rehabilitation". If this remains incomplete, it is not understood how the final extent, nature and scope of rehabilitation has been defined.
Double counting	No double counting has been identified within the data provided.

4.55 In overall terms, while the full pavement evaluation has yet to be carried out, the overall conclusion is that this project is effective, but detailed evaluation of pavement condition surveys may yield efficiencies.

Cost estimate review

Table 4.23: Airfield Southern Perimeter Road Upgrade Programme – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 455,625	€ 396,597	-€ 59,027
Construction Costs	€ 3,037,498	€ 2,643,982	-€ 393,516
Escalation, Contingency & Design Variability	€ 1,117,799	€ 972,985	-€ 144,814
Total	**€ 4,610,922**	**€ 4,013,565**	**-€ 597,357**

Table 4.24: Airfield Southern Perimeter Road Upgrade Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	15%	€ 455,625	15%	€ 396,597
Total			**€ 455,625**		**€ 396,597**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 3,037,498	n/a	€ 2,643,982
Total			**€ 3,037,498**		**€ 2,643,982**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	32%	€ 1,117,799	32%	€ 972,985
Total			**€ 1,117,799**		**€ 972,985**

4.56 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.25: Airfield Southern Perimeter Road Upgrade Programme – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Disposal of excavated material, 10% contaminated – Area 2	Redacted Cost Information			€ 95
Disposal of excavated material, 90% uncontaminated – Area 1				€ 55
Disposal of excavated material, 90% uncontaminated – Area 2				€ 55
Disposal of excavated material, 10% contaminated – Area 5				€ 95
Disposal of excavated material, 10% contaminated – Area 1				€ 95
Disposal of excavated material, 90% uncontaminated – Area 4				€ 55

4.57 We consider that the rate for the disposal of uncontaminated material is higher than we would expect, and we have reduced it accordingly. Dublin Airport has confirmed that the rate is an allowance based on previous projects, but we still consider that it is too high. While our review of the specification suggests that further savings could be made if more targeted reconstruction is applied to this project, we have not reduced the rates for the road surfacing works as the extent of this cannot be determined at this stage.

CIP.20.01.008 – Runway Approach Lighting Mast Improvement Programme

Introduction

4.58 The project proposes to upgrade the approach light masts in order to meet regulatory requirements.

4.59 Approach lights 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. Runway 16 and 34 approach masts were installed in 1994 and 2004 respectively.

Figure 4.6: Runway Approach Lighting Mast Improvement Programme - (Existing left, typical proposed right)

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.60 To replace non-compliant, non-frangible and obsolete approach lighting towers to enable Dublin Airport to meet its regulatory obligations.

Context

4.61 Runway approach light provision is critical to meeting the safe operational needs of airlines, meeting licencing requirements and meeting obligations under EASA requirements. At Dublin Airport it is apparent that the existing towers are both obsolete and non-frangible. This poses a risk to operations in that only a certain number of approach lights can be out of operation at any one time, and this means it is important that Dublin Airport can rely upon timely supplier support and availability of replacement fittings should maintenance be required.

4.62 The lack of frangibility could be addressed with the IAA through a continued dispensation, through a Deviation Acceptance and Action Document (DAAD). However, given the matter of obsolesce, such a continued dispensation may become increasingly difficult to justify.

Scope

The project scope lists:

- Full replacement of SMA/3 Masts with modern frangible masts, including:
  - Runway 10 Approach masts;
  - Runway 28 Approach masts and circuits;
  - Runway 16 Approach masts and circuits;
  - Runway 34 Approach masts and circuits.

- Inspection of plinths and replacement where required (note – Dublin Airport has confirmed that all approach light towers will require new plinths);
- 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; and
- Works to be carried out in discrete portions to minimise operational disruption;

Stage

4.63 Feasibility designs not yet completed.

Key project metrics

Table 4.26: Runway Approach Lighting Mast Improvement Programme – Key project metrics

Metric	Value
Construction cost estimate	€7,653,203
Number of approaches	4 runway approaches
Cost per approach	1,913,300 €/approach (average)

Specifications review

Table 4.27: Runway Approach Lighting Mast Improvement Programme – Specifications review

Subject	Comments
Effectiveness of scope	The scope addresses the regulatory needs of this particular project.
Alternative scopes	Re-use of existing plinths and ducting where possible – it is noted that Dublin Airport propose to inspect each plinth to determine if this is possible. In response to our question on this, Dublin Airport has stated that all approach lights will require new plinths although it is unclear if this decision is as a result of a formal inspection of each foundation.
Quality of specifications	The specification is clear and appears to meet the scope.
Phasing and synergies with other projects	There may be cost benefits available by purchasing and installing the approach lights to the new North Runway as part of a combined package with these replacements of towers on existing approaches.
Existing asset conditions	The type of mast currently 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. The SMA/3 Masts and the FAE light fittings on all runways are now obsolete and no longer supported by the manufacturer.
Double counting	No double counting has been identified within the data provided.

4.64 In overall terms, the conclusion is that this project is effective in meeting the stated objectives.

Cost estimate review

Table 4.28: Runway Approach Lighting Mast Improvement Programme – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 956,650	€ 956,650	€ 0
Construction Costs	€ 7,653,203	€ 7,653,203	€ 0
Escalation, Contingency & Design Variability	€ 2,515,283	€ 2,515,283	€ 0
Total	**€ 11,125,136**	**€ 11,125,136**	**€ 0**

Table 4.29: Runway Approach Lighting Mast Improvement Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	13%	€ 956,650	13%	€ 956,650
Total			**€ 956,650**		**€ 956,650**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 7,653,203	n/a	€ 7,653,203
Total			**€ 7,653,203**		**€ 7,653,203**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 2,515,283	29%	€ 2,515,283
Total			**€ 2,515,283**		**€ 2,515,283**

4.65 There is insufficient detail available to allow an analysis of this project to be undertaken. We requested that Dublin Airport provide a build-up to the frangible lattice items, but their response only stated that it is based on historic project data. However, this data has not been provided so we cannot validate this, but prior to completing our final report , we will examine this with Dublin Airport to allow us to conclude our analysis. Dublin Airport has also included new plinths for lighting masts. If some or all of the existing plinths could be reused this would realise a significant reduction to the cost of the project. The quantities for this project have been validated based on a schematic drawing provided by Dublin Airport.

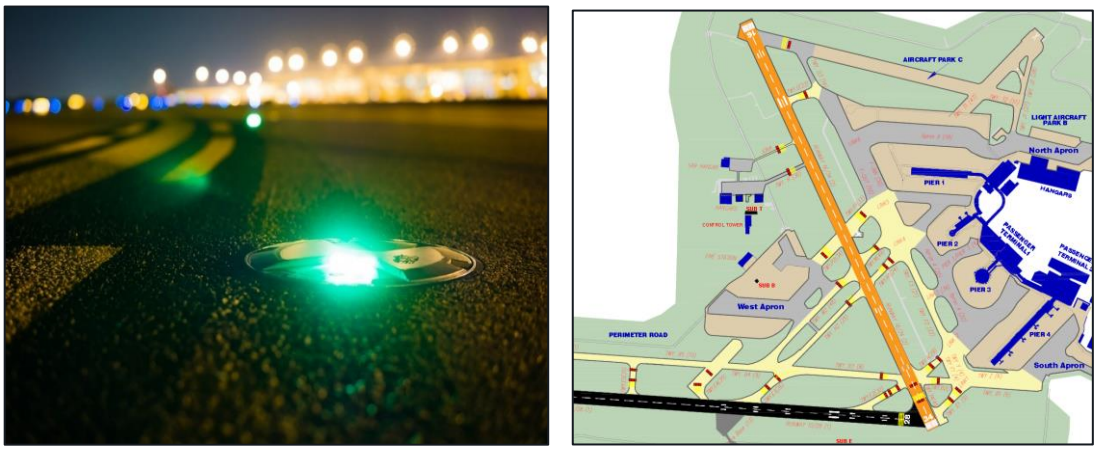
CIP.20.01.009 – Aerodrome Ground Lighting (AGL) Improvement Programme

Introduction

4.66 The project proposes to replace AGL fittings and taxiway signs at the end of their operating lives. Dublin Airport also proposes works to substations constructed in 1988 which now require continual work to their roofs and a need to replace their oil storage due to poor condition.

4.67 Runway 16 inset approach light replacement is required due to obsolescence.

Figure 4.7: Aerodrome Ground Lighting (AGL) Improvement Programme



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.68 This project proposes to upgrade existing airfield lighting, signage and sub-stations. Dublin Airport proposes 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

Context

4.69 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.

4.70 According to Dublin Airport, 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.

Scope

4.71 The project scope lists:

- Taxiway AGL Upgrades;
- Airfield Signage Upgrades;
- Substation Upgrades;
- Runway 16 inset approach light replacement;
- Substation Equipment Replacement; and
- New electrical fittings and equipment.

Stage

4.72 Feasibility designs not yet completed.

Key project metrics

Table 4.30: Aerodrome Ground Lighting (AGL) Improvement Programme – Key project metrics

Metric	Value
Construction cost estimate	€3,254,595

Specifications review

Table 4.31: Aerodrome Ground Lighting (AGL) Improvement Programme – Specifications review

Subject	Comments
Effectiveness of scope	The scope appears to address the regulatory and asset replacement needs identified by Dublin Airport.
Alternative scopes	We would propose re-use of the existing pit and duct network unless it represents a safety hazard to maintenance operatives.
Quality of specifications	The specification appears to meet the scope albeit it does not identify individual taxiways within the costings.
Phasing and synergies with other projects	Approach mast for Runway 16 is replaced under a separate project (CIP20.01.008), but Dublin Airport report that the programme of replacement of the obsolete inset approach lights will be coordinated with the mast replacement project. End of life signage will be replaced on a priority basis in coordination with taxiway re-designation and other airfield projects. It is recommended that Dublin Airport will also coordinate other taxiway and apron rehabilitation projects with the need to upgrade AGL under this project.
Existing asset conditions	Dublin Airport state that 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. 15 years is a reasonable replacement cycle for AGL. However, when replacing halogen lights with LED, consideration must be given to multiple circuit replacement as having both on the same CCRs can cause operational issues. Regarding cabling, primary circuits where originally installed 1988 and the condition is reported as being not very good due to the age of the circuit. The pit and duct system is reported to have poor drainage. However, this is not uncommon in AGL P&D and we have questioned the suggested need for a new P&D system on this basis alone. It is noted that new pits and ducts are not called up within the Level 3 costs. In response to our questions, Dublin Airport has confirmed that the existing pit and duct system is to be reused where possible, but an allowance has been made for the replacement of sections of the system (ducts, pits and cables) when it cannot be reused.
Double counting	Individual taxiways are not identified within the Level 3 costs. However, the replacement strategy drawing suggests there may be some double counting of AGL replacement at both the Link 2 taxiway and taxiway Mike 2. Further assessment is required to establish the effect on cost.

4.73 In overall terms, the conclusion is that this project is effective in meeting the stated objectives and is based on a robust assessment of condition and obsolescence. However, there appears to be some double counting of AGL replacement at both the Link 2 taxiway and taxiway Mike 2.

Cost estimate review

Table 4.32: Aerodrome Ground Lighting (AGL) Improvement Programme – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 260,368	€ 260,368	€ 0
Construction Costs	€ 3,254,595	€ 3,254,595	€ 0
Escalation, Contingency & Design Variability	€ 1,153,787	€ 1,153,787	€ 0
Total	**€ 4,668,749**	**€ 4,668,749**	**€ 0**

Table 4.33: Aerodrome Ground Lighting (AGL) Improvement Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 260,368	8%	€ 260,368
Total			**€ 260,368**		**€ 260,368**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 3,254,595	n/a	€ 3,254,595
Total			**€ 3,254,595**		**€ 3,254,595**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 1,153,787	33%	€ 1,153,787
Total			**€ 1,153,787**		**€ 1,153,787**

4.74 Dublin Airport has provided a revised Level 3 estimate. The rates for the measured works items included in the estimate are all reasonable. There are still some lump sum allowances included in the estimate but they for a much smaller proportion of the works and while we do not have a build-up to those sums, for the works that they are deemed to cover they appear to be reasonable based on our experience working on similar projects. While Dublin Airport has also provided some design information to review, due to the scale of the drawings and the lack of detailed legend on them it is difficult to fully validate the quantities. However, based on the scale of the works required the quantities included in the estimate do not seem unreasonable.

4.75 Dublin Airport was asked to demonstrate where they measured the quantities from and to provide a breakdown for the lump sum allowances included in the Level 3 estimate. There is insufficient information to allow any further analysis to be undertaken at this time, but we will continue to work with Dublin Airport to validate the quantities prior to publication of the final report.

CIP.20.01.010 – Airfield Lighting Control & Management System Improvement Programme

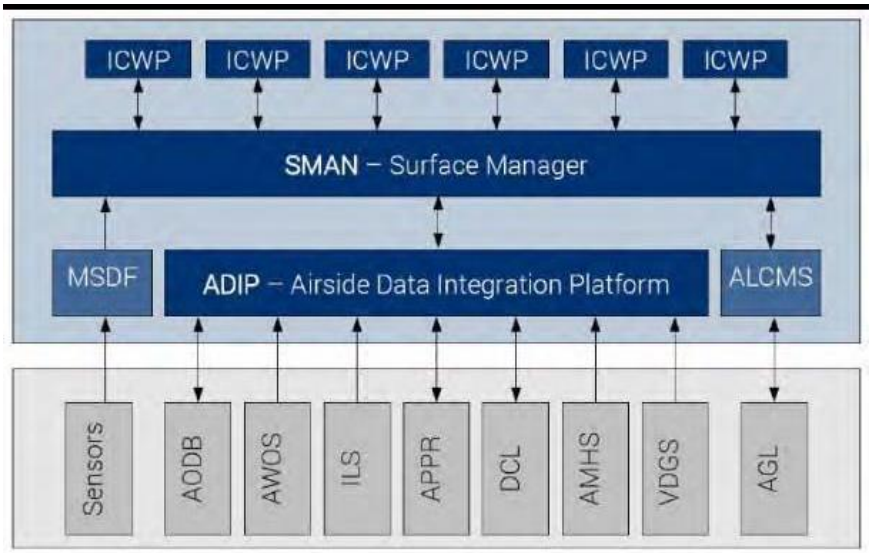
Introduction

4.76 The existing Airfield Lighting Control & Management System (ALCMS) has been in service since 2006, and during this time the system has been significantly expanded. Dublin Airport state that these modifications have created issues in terms of its speed of operation and expansion capabilities.

4.77 The project proposes to replace the existing AGL control system with a new one. This is supported by specialist reporting commissioned by Dublin Airport which concluded that 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).

4.78 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.

Figure 4.8: Airfield Lighting Control & Management System Improvement Programme



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.79 This project proposes to improve the existing Airfield Lighting Control & Management System (ALCMS) to bring the system in line with modern control standards and technology. The project aims to deliver:

- Modern Airfield Lighting Control and 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; and
- System capable of supporting future integration of FTG.

Context

4.80 The existing airfield lighting control management system (ALCMS) at Dublin Airport has been in service since 2006, and during this time the system has been significantly expanded to meet

the need of the business. Dublin Airport state that these modifications have created issues in terms of its operating speed of operation and ongoing expansion capabilities. Further additions to the system will slow it further.

4.81 Dublin Airport states the current system is not capable of incorporating the Northern Runway (NR) substations and the new ATC Control Tower in its current form.

Scope

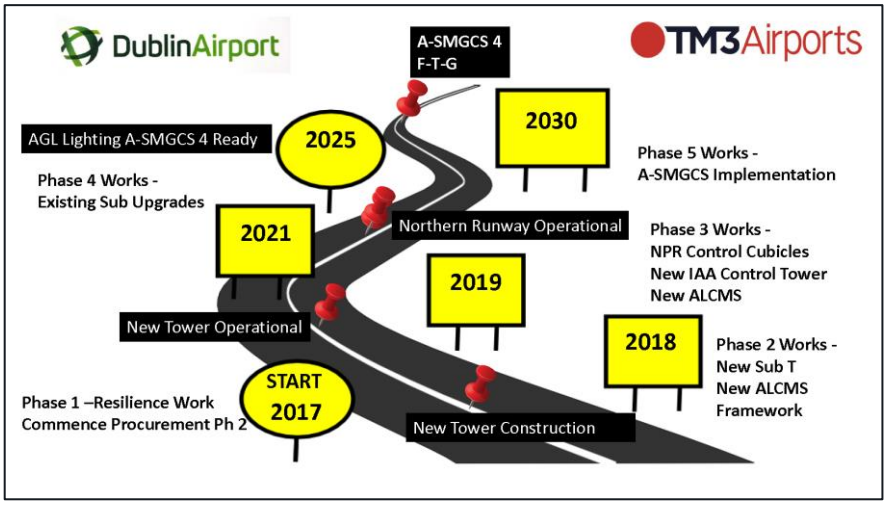
4.82 The Level 3 project scope lists:

- ALCMS Infrastructure for 8-11 Controller working Positions (CWP) in Main Tower and 3 Positions in Contingency Tower including initial building block for A-SMGCS system;
- ALCMS Control Infrastructure for Control of 2 Runways and Taxiway Network, PLC or PC based; and
- ALCMS Supplier Engineering Costs, PM Costs, Installation of Control Hardware, Commissioning for Phase 3 (1C) works.

Stage

4.83 Feasibility designs completed by TM3 Airports. Detailed designs not yet completed.

Figure 4.9: Airfield Lighting Control & Management System Improvement Programme



Source: Extract from Feasibility Study Showing Timeline of Affected Developments

Key project metrics

Table 4.34: Airfield Lighting Control & Management System Improvement Programme – Key project metrics

Metric	Value
Construction cost estimate	€3,400,000

Specifications review

Table 4.35: Airfield Lighting Control & Management System Improvement Programme – Specifications review

Subject	Comments
Effectiveness of scope	The scope appears to be well thought out and addresses the regulatory and asset replacement needs identified in this project.
Alternative scopes	None identified.

Subject	Comments
Quality of specifications	The specification presented within the feasibility study is detailed and appears to meet the scope and objectives.
Phasing and synergies with other projects	Dublin Airport state 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. Therefore, it will be imperative that this is procured and commissioned prior to the opening of the new North parallel runway. The project will also need to be carefully phased alongside the AGL replacement project ref. CIP.20.01.009. The Project delivery timeline provided by Dublin Airport within the Capital Investment Programme 2020 + submission to CAR appears to support this approach.
Existing asset conditions	As set out by Dublin Airport, the existing ALCMS has been in service since 2006, and during this time the system has been significantly expanded. These modifications have created issues in terms of its speed of operation and expansion capabilities. With the current system, any further changes and upgrades to the system will only slow the system operation. The current system is not capable of incorporating the Northern Runway substations and the new ATC Control Tower.
Double counting	None identified.

4.84 In overall terms, the conclusion is that this project is effective in meeting the stated objectives and is based on a robust assessment of need, condition and obsolescence.

Cost estimate review

Table 4.36: Airfield Lighting Control & Management System Improvement Programme – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 255,000	€ 255,000	€ 0
Construction Costs	€ 3,400,000	€ 3,400,000	€ 0
Escalation, Contingency & Design Variability	€ 1,199,754	€ 1,199,754	€ 0
Total	**€ 4,854,754**	**€ 4,854,754**	**€ 0**

Table 4.37: Airfield Lighting Control & Management System Improvement Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 255,000	8%	€ 255,000
Total			**€ 255,000**		**€ 255,000**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 3,400,000	n/a	€ 3,400,000
Total			**€ 3,400,000**		**€ 3,400,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 1,199,754	33%	€ 1,199,754
Total			**€ 1,199,754**		**€ 1,199,754**

4.85 It has not been possible to undertake a detailed analysis of this project as the Level 3 estimate is built up with a series of lump sums. Dublin Airport have provided us with a copy of a feasibility study that has been undertaken by TM3 Airports for this project. That report does contain some budget cost information which forms the basis of the Level 3 estimate. However, those costs are high level allowances with no build-up provided, thus providing no additional detail on which we can comment further or provide a comparable estimate at this time. There are no quantities provided within the estimate to be validated. We will therefore continue to work with Dublin Airport with a view to breaking down the lump sums and establishing a validated set of rates and quantities.

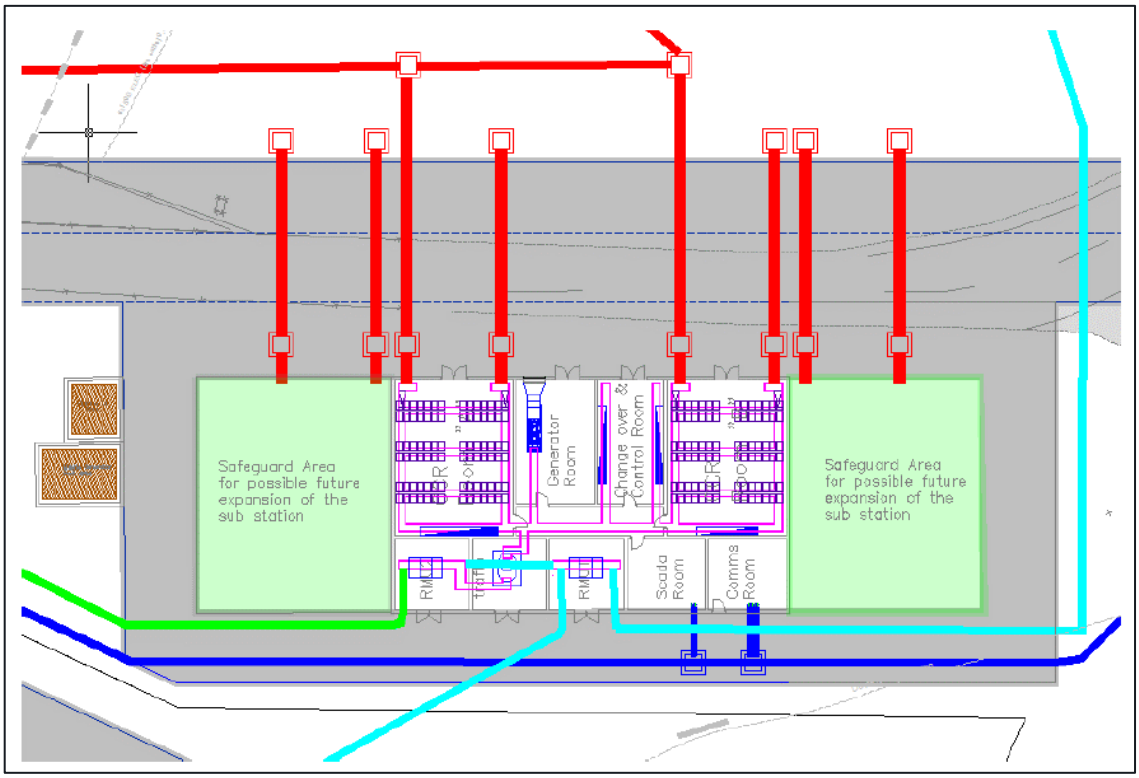
4.86 This project relates to a specialist piece of work for which facility level benchmark data does not exist, so it is not possible to propose a credible comparable cost estimate.

CIP.20.01.012 – AGL Substation T Development Programme

Introduction

4.87 Dublin Airport have identified the need to increase the capacity of this airfield substation due to historic and future expansion of the airfield. This project proposes to develop a new central airfield AGL Substation T in advance of a number of other critical airfield projects.

Figure 4.10: AGL Substation T Development Programme – Layout of Proposed New Sub T



Source: Dublin Airport's Interim Review of AGL Requirements at Dublin Airport (October 2017)

Objective

4.88 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 and Management System (ALCMS).

Context

4.89 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.

4.90 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.

Scope

4.91 The proposed scope of this project includes:

- New Mid-Field AGL Substation;
- Connectivity with Airfield MV, Comms and AGL systems; and
- All surrounding infrastructure include accommodation for fuel tanks, mobile generators and maintenance vehicles.

Stage

4.92 Detailed design is due for completion in Q4 2019. This project is necessarily shown as being completed in advance of all other airfield projects in the CIP.

Key project metrics

Table 4.38: AGL Substation T Development Programme – Key project metrics

Metric	Value
Construction cost estimate	€ 2,956,432

Specifications review

Table 4.39: AGL Substation T Development Programme – Specifications review

Subject	Comments
Effectiveness of scope	The scope appears to be effective in meeting the requirement to develop enhanced capacity and resilience at Substation T.
Alternative scopes	None identified.
Quality of specifications	The specifications appear advanced and consistent with the objectives of the project.
Phasing and synergies with other projects	The AGL section of the substation is now reportedly at capacity and can no longer accommodate new infrastructure that will be needed for the North Runway, the proposed R16/34 LVP Taxiway (CIP.20.01.099), the improved Airfield Lighting Control System (CIP.20.01.010) and any of the new elements of infrastructure currently being planned. The projected construction completion is Q2 2020. The project delivery timeline provided by Dublin Airport within the Capital Investment Programme 2020 + submission to CAR appears to support the above approach, needing to be in advance of the before mentioned projects.
Existing asset conditions	Substation T: • Contains various LV distribution boards which are either life expired or approaching the end of their life; • Has a main distribution board that also supplies the ATC Centre. Any maintenance works on this board is reported by Dublin Airport to be problematic and subject to a significant number of restrictions; and • Imposes additional time to resolve faults due to airside/landside commute via airfield, security posts, landside roads and IAA security post. In late 2016, the existing 30-year-old internally housed Dublin Airport standby generator became problematic and a feasibility study concluded that it should be replaced with an equivalent externally mounted unit which could be easily re-located in the future if required.
Double counting	None identified.

4.93 In overall terms, the conclusion is that this project is effective.

Cost estimate review

Table 4.40: AGL Substation T Development Programme – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 250,000	€ 250,000	€ 0
Construction Costs	€ 2,956,432	€ 2,956,432	€ 0
Escalation, Contingency & Design Variability	€ 496,997	€ 496,997	€ 0
Total	**€ 3,703,429**	**€ 3,703,429**	**€ 0**

Table 4.41: AGL Substation T Development Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 250,000	8%	€ 250,000
Total			**€ 250,000**		**€ 250,000**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 2,956,432	n/a	€ 2,956,432
Total			**€ 2,956,432**		**€ 2,956,432**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	16%	€ 496,997	16%	€ 496,997
Total			**€ 496,997**		**€ 496,997**

4.94 Dublin Airport has provided a statement regarding the various lump sums included in the Level 3 estimate. While the breakdown that they have provided is essentially a further list of smaller sums, the sums in question appear to be reasonable for the works described, although we have not been provided with any evidence demonstrating how the rates in the feasibility estimate were based on framework supplier rates or rates from previous projects.

4.95 While the Level 3 estimate contains a lot of detail, the drawings provided by Dublin Airport contain insufficient detail to allow the quantities in the Dublin Airport estimate to be validated.

4.96 Dublin Airport has also stated that it is not possible to provide any further breakdown at this stage until further design work is undertaken. This is a reasonable statement to make bearing in mind the early stage of the development of the project.

CIP.20.01.015 – High Mast Lighting Improvement

Introduction

4.97 This project seeks to complete the programme of replacing non-sustainable halogen lanterns with LED alternatives. Dublin Airport confirms that this project includes high mast lights on:

- Pier 1;
- Pier 4; and
- West Apron.

Figure 4.11: High Mast Lighting Improvement

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.98 The objectives of the project include:

- Reduction in energy costs of approx. €80k/annum once the full LED replacement programme is rolled out; and
- Replacement of older generation sodium lamps in order to meet sustainability targets.

Context

4.99 Dublin Airport state the wider High Mast Lighting Upgrade programme is required for Dublin Airport's transition application from the existing national aerodrome licence to the EASA European Certificate.

4.100 This programme of work addressed a non-compliance associated with existing lux-levels on 71 high mast lights to ensure Dublin Airport followed EASA standards and therefore retaining its operating certificate. This project reflects work to 60 of those masts.

Scope

4.101 The project scope lists:

- Removal of old sodium SON-T fittings and replacement with LED fittings;
- Increasing the stand lux levels averages from 20 to 30 lux;
- New electrical fittings; and
- Works to be carried out in discrete portions to minimise operational disruption.

4.102 Dublin Airport has confirmed that the Level 3 quantities relate to the number of HMLs at Pier 1, Pier 4 and the West Apron.

Stage

4.103 Feasibility designs completed. Detailed designs not due for completion until Q1 2023.

Key project metrics

Table 4.42: High Mast Lighting Improvement – Key project metrics

Metric	Value
Construction cost estimate	€627,750
Number of masts	60 HMLs upgraded
Cost per mast	10,462 €/HML

Specifications review

Table 4.43: High Mast Lighting Improvement – Specifications review

Subject	Comments
Effectiveness of scope	The scope addresses the requirements of meeting the objectives of upgrading the HMLs to more sustainable LED lanterns.
Alternative scopes	There are no meaningful alternative scopes.
Quality of specifications	The specification is very high level. However, the Level 3 costs appear consistent with the objective.
Phasing and synergies with other projects	This programme of works will be carried out in clusters. The HML upgrades are largely independent of the other projects within the CIP.
Existing asset conditions	The condition and age of the existing masts is not known. However, having questioned this with Dublin Airport, it has been confirmed by Dublin Airport that the project will not entail the upgrading of lanterns onto masts that require replacement, stating that this project is for the replacement of lanterns onto masts that do not need to be replaced.
Double counting	No double counting has been identified within the data provided. There was no allowance for this project in the 2015–2019 CIP, as Dublin Airport did not envisage it at that time.

4.104 In overall terms, the conclusion is that this project is effective, and the re-use of existing masts is efficient.

Cost estimate review

Table 4.44: High Mast Lighting Improvement – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 47,081	€ 47,081	€ 0
Construction Costs	€ 627,750	€ 627,750	€ 0
Escalation, Contingency & Design Variability	€ 67,483	€ 67,483	€ 0
Total	**€ 742,314**	**€ 742,314**	**€ 0**

Table 4.45: High Mast Lighting Improvement – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 47,081	8%	€ 47,081
Total			**€ 47,081**		**€ 47,081**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 627,750	n/a	€ 627,750
Total			**€ 627,750**		**€ 627,750**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	10%	€ 67,483	10%	€ 67,483
Total			**€ 67,483**		**€ 67,483**

4.105 The rates for this project appear to be reasonable. Escalation is deemed to be included within the costs of the project and Dublin Airport has confirmed that it is included in the individual rates. We cannot validate the quantities for this project due to the level of design information provided in response to our query to Dublin Airport, but will continue to work with them with a view to validating the quantities prior to the publication of the final report.

CIP.20.01.016 – Airfield Maintenance Base Improvement Programme

Introduction

4.106 This project proposes to extend and renew existing airfield maintenance base facilities. It includes the construction of additional storage facilities for winter equipment, movement of the potassium acetate tanks to a strategic better position and more circulation yard space for larger equipment to be moved safely.

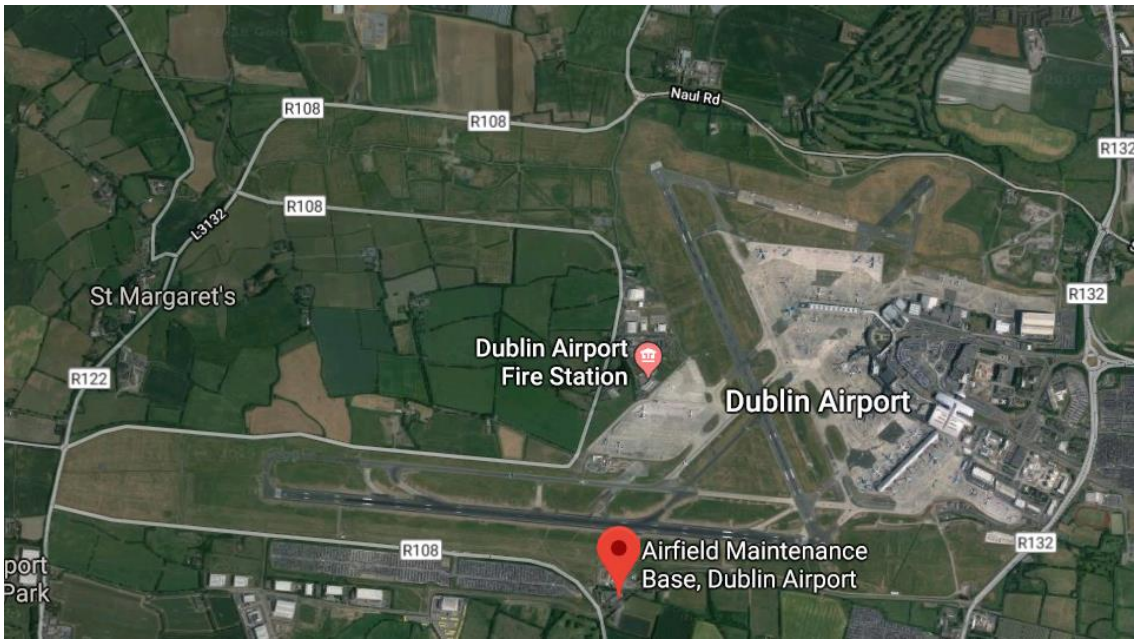
Objective

4.107 The objective of this project is to improve the airfield maintenance base facilities to be fit for purpose in the future as the existing facilities are deemed inadequate.

Context

4.108 Dublin Airport state that the current maintenance base is too small, storage for large snow and ice (SI) equipment is inadequate, circulation space is inadequate for manoeuvring equipment/washing down and the potassium acetate storage is an environmental risk.

Figure 4.12: Airfield Maintenance Base Improvement Programme - Location of Airfield Maintenance Base



Source: Google Maps

Scope

4.109 The scope includes the following works:

- Upgrade the overall facility;
- Move the potassium acetate tanks into a new purpose build bunded area;
- Construct additional storage facilities;
- Increase the circulation yard space; and
- Provide a wash-down facility.

Stage

4.110 The project currently seems to be at a planning stage. The outlined procurement route is:

- Detail Design Complete Q4 2020
- Procurement Complete Q2 2021
- Construction Commence Q2 2021
- Project Handover Q3 2023

4.111 This is efficient, but if planning permission is required then an allowance should be made in the procurement program.

Key project metrics

Table 4.46: Airfield Maintenance Base Improvement Programme – Key project metrics

Metric	Value
Construction cost estimate	€ 3,102,812
Dublin Airport estimation method	Level 3 cost estimate included in CIP 2020 Final
Cost per square metre	Rates for elements are provided

Specifications review

Table 4.47: Airfield Maintenance Base Improvement Programme – Specifications review

Subject	Comments
Effectiveness of scope	The overall scope is adequate for a high-level concept proposal. However, the level of planning information and the lack equipment data does not allow a full validation of scope.
Alternative scopes	The construction of the North runway and future Western satellite and stands may require a review of the most appropriate location for a new maintenance base which could impact on the provisions of the current proposal.
Quality of specifications	The specifications provided in Level 3 costs provide enough details for the concept stage.
Phasing and synergies with other projects	Insufficient information provided to comment. It is assumed that the project will be phased to minimise disruption to airport maintenance operations.
Existing asset conditions	The residual life is 20 years which is what we would expect for a facility of this nature.
Double counting	None identified.

4.112 More information on design requirements (e.g. type of equipment, parking area, circulation area, etc.) would allow us to assess the scope of this project. The project is proposed as a short-term solution. A review of the future 50mppa masterplan would validate the selection of this site as the best option to develop.

Cost estimate review

Table 4.48: Airfield Maintenance Base Improvement Programme - Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 232,711	€ 226,311	-€ 6,400
Construction Costs	€ 3,102,812	€ 3,017,479	-€ 85,333
Escalation, Contingency & Design Variability	€ 1,161,829	€ 1,129,877	-€ 31,953
Total	**€ 4,497,352**	**€ 4,373,666**	**-€ 123,686**

Table 4.49: Airfield Maintenance Base Improvement Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 232,711	8%	€ 226,311
Total			**€ 232,711**		**€ 226,311**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 3,102,812	n/a	€ 3,017,479
Total			**€ 3,102,812**		**€ 3,017,479**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	35%	€ 1,161,829	35%	€ 1,129,877
Total			**€ 1,161,829**		**€ 1,129,877**

4.113 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.50: Airfield Maintenance Base Improvement Programme – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Slotted drain along front of building	**Redacted Cost Information**			€ 100
Allowance for access road to front of building				€ 250

4.114 The rates for the slot drain and the road construction are higher than we would expect, and we have reduced them accordingly. Dublin Airport was asked to provide a build-up for various rates in the estimate and in response they have stated that they have included allowances for various items of work, but that further work is required to firm up on these allowances. Until this work is done, it is not possible to make further comment on the project at this time. We have not validated the quantities for this project due to a lack of design information to review, so we will continue to work with Dublin Airport with a view to updating our analysis and validating the quantities prior to the publication of the final report.

CIP.20.01.018 – Campus Buildings Critical Maintenance

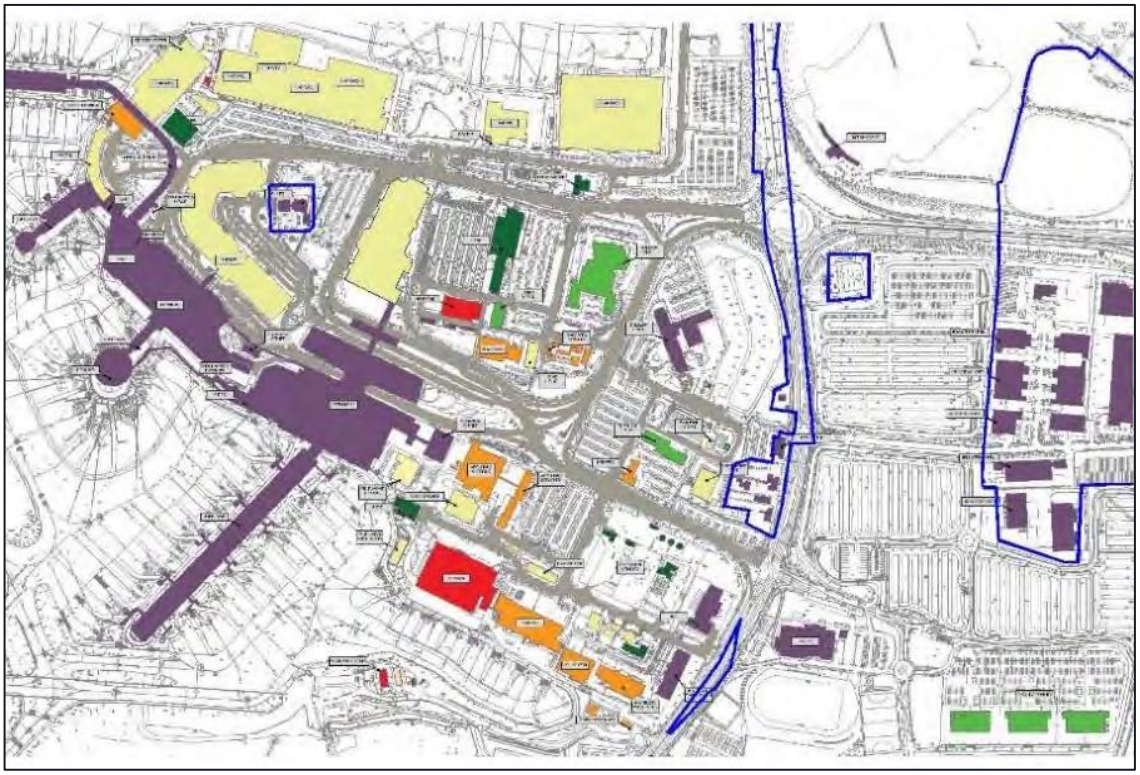
Introduction

4.115 This 'project' is not a specific building repair, but provision of funds to spend on the critical repair/maintenance of buildings within the airport campus.

Objective

4.116 To provide funds to extend the life of existing buildings by continuous upgrading, maintenance and repair. It includes demolition, land fencing and restoration of farmlands.

Figure 4.13: Campus Buildings Critical Maintenance - Overview of Campus Buildings



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Figure 4.14: Campus Buildings Critical Maintenance -

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

Context

4.117 The age of campus buildings ranges from the late 1940s to present day. The work envisaged includes re-roofing, structural improvement, cladding repairs, storage buildings, demolition, walkway repairs, maintenance of protected buildings etc, as well as maintenance of M & E systems.

Scope

4.118 The scope of the project cannot be defined in specific building maintenance projects as they are not identified. However, the scope specifically mentions buildings and areas that 'are included' namely:

- Corballis Park;
- South Apron;
- Eastlands;
- Castlemoate;
- OCTB;
- Westlands; and
- Westpoint.

Stage

4.119 The project is ongoing throughout the CIP period 2020 – 2024.

Key project metrics

Table 4.51: Campus Buildings Critical Maintenance – Key project metrics

Metric	Value
Construction cost estimate	€ 1,450,000
Dublin Airport estimation method	It is not explained how the total capex requirement has been estimated/calculated.
Cost per square metre	Not relevant.

Specification review

Table 4.52: Campus Buildings Critical Maintenance –Specification review

Subject	Comments
Effectiveness of scope	Because of the varied nature of the maintenance/ refurbishments anticipated in this project it is not possible to comment on the scope.
Alternative scopes	Not relevant.
Quality of specifications	Insufficient information provided to comment on the quality as each refurbishment will be different.
Phasing and synergies with other projects	Only relevant if specific maintenance projects identified.
Existing asset conditions	Since the assets are generally at the end of their economic life the extended asset life will be dependent on several factors, such as cost, anticipated use life etc.
Double counting	Insufficient information to comment.

4.120 The allocated capex of € 1.5m could be more accurately justified with a property condition audit.

Cost estimate review

Table 4.53: Campus Buildings Critical Maintenance - Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 22,500	€ 22,500	€ 0
Construction Costs	€ 1,450,000	€ 1,450,000	€ 0
Escalation, Contingency & Design Variability	€ 47,250	€ 47,250	€ 0
Total	**€ 1,519,750**	**€ 1,519,750**	**€ 0**

Table 4.54: Campus Buildings Critical Maintenance – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	2%	€ 22,500	2%	€ 22,500
Total			**€ 22,500**		**€ 22,500**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 1,450,000	n/a	€ 1,450,000
Total			**€ 1,450,000**		**€ 1,450,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	3%	€ 47,250	3%	€ 47,250
Total			**€ 47,250**		**€ 47,250**

4.121 Dublin Airport has provided a new Level 3 estimate within which there is a breakdown of the roofing costs on a per building basis. While we are not able to validate the quantities included in the estimate based on all the information provided, the rates for the works appear to be reasonable.

CIP.20.01.020 – Terminal 1 Façade, Roof and Spirals

Introduction

4.122 This project provides for roof repair, façade renewal and structural concrete renewal of T1, constructed in the 1970's.

Figure 4.15: Terminal 1 Façade, Roof and Spirals -

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.123 The objective is to provide a relatively maintenance free façade, address defects to the roof covering/drainage and degradation of the concrete structure of the vehicular access spirals. In the case of the terminal building façade this is an end of life renewal with a new facade, in the case of the roof defects it is the renewal of the waterproof membrane and installation of thermal insulation and in the case of the spirals it is a repair to prevent further structural decay.

Context

4.124 The terminal building was constructed circa 1970 and is now nearly 50 years old (48 years) and Dublin Airport claim some elements of this asset have come to the end of their economic life. This renewal is partly as a result of the architectural design of the building when exposed concrete (the fins and spirals) were very much in vogue 50 years ago, irrespective of the environment in which they were built. Bare concrete is more suited to drier climates as it is not waterproof without additives and protection.

4.125 Building environmental performance and sustainability is now top of the list for building fabric designers so it is appropriate that if you are providing a new efficient weathering envelope that levels of thermal insulation are also increased, as specified for the roof. The documents make no mention of thermal insulation to the new façade, but we assume that this will also be the case.

4.126 The spirals provide vehicular access for some staff car parking spaces on level 4 as well as service deliveries and fire escape. Demolition has been considered but rejected on the grounds of prohibitive cost to provide replacement access and fire escape routes.

Scope

4.127 The scope of the project covers the issues that are identified by Dublin Airport as needing attention or renewal; additional items are also included such as relocation of Telecom Antennae towers and creating more office space from an unused balcony are valuable additions to the scope.

Stage

4.128 The project stage is currently at initial concept ideas, with outline design to be completed Q3 2020 and handover Q1 2023. The outlined procurement route of:

- Feasibility/Outline design complete Q3 2020
- Planning complete Q3 2020
- Detailed design complete Q4 2020
- Procurement compete Q2 2021
- Construction commence Q1 2021
- Project handover Q3 2023

suggests that there is a lack of urgency, but once the program starts the dates are quite condensed i.e. Detailed design is completed 3 months after Outline design, and Procurement requires 6 months, yet is completed only after Construction commences. This does not seem to make sense.

Given the lead up time available, it would be more cost effective to accurately survey the existing roof(s) and façade and resolve all construction details before work starts on site.

4.129 We conclude that the procurement route proposed does not seem efficient and risk free.

Key project metrics

Table 4.55: Terminal 1 Façade, Roof and Spirals - Key project metrics

Metric	Value
Construction cost estimate	€ 17,397,619
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 Final.
Cost per square metre	Rates for all elements provided.

Specifications review

Table 4.56: Terminal 1 Façade, Roof and Spirals - Specifications review

Subject	Comments
Effectiveness of scope	The scope is effective for a high-level concept appraisal, and in identifying the work to be carried out in outline format. From the information available the full extent of the façade re-cladding is unclear. However, because of the nature of the work it is not possible to cover all scope issues until either work starts on site, or a detailed survey is carried out.
Alternative scopes	With regard to the roof resurfacing there is not an alternative to re-surfacing; careful selection of the most appropriate system is critical. The façade renewal or repair does present a choice. An alternative scope would be to repair the defective concrete fins, but it is doubtful if this could be fully effective for 20 years and cost effective. Such an exercise would not achieve the same

Subject	Comments
	outcome – an enhanced the appearance of the building, waterproof envelope and thermal insulation as well as a long asset life of 20 years or more. Concrete degradation of the spirals presents a difficult choice, but demolition and replacement access/fire escape provision has been considered and discounted on cost grounds, so alternative solutions have been considered.
Quality of specifications	Specifications provided in Level 3 costs provide sufficient detail for outline design stage.
Phasing and synergies with other projects	Construction work on T1 needs to be co-ordinated with the other renewal projects to avoid on site clashes and inefficient working: 20 01 022 T1 Storm Water Drainage System 20 01 023 Piers & Terminals critical Maintenance.
Scope and specifications account for asset conditions and residual life?	T1 is nearly 50 years old; renewal of the envelope waterproofing with a 20-year asset life will ensure the residual life of T1. Extending the life of T1 beyond 70 years needs to be addressed in the light of the long-term masterplans.
Double counting	None identified.

4.130 The scope for this type of project is difficult to assess with the same accuracy as a new build, however with the long lead in time we would expect to see a clearer indication of cost based on extensive survey of the existing façade leading to the selection the most economically beneficial new cladding system.

Cost estimate review

Table 4.57: Terminal 1 Façade, Roof and Spirals – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 2,604,723	€ 2,538,771	-€ 65,951
Construction Costs	€ 17,397,619	€ 16,957,943	-€ 439,676
Escalation, Contingency & Design Variability	€ 5,828,159	€ 5,683,879	-€ 144,280
Total	**€ 25,830,501**	**€ 25,180,593**	**-€ 649,908**

Table 4.58: Terminal 1 Façade, Roof and Spirals – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	15%	€ 2,604,723	15%	€ 2,538,771
Total			**€ 2,604,723**		**€ 2,538,771**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 17,397,619	n/a	€ 16,957,943
Total			**€ 17,397,619**		**€ 16,957,943**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 5,828,159	29%	€ 5,683,879
Total			**€ 5,828,159**		**€ 5,683,879**

4.131 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.59: Terminal 1 Façade, Roof and Spirals – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Strip out of existing Services to Roof	Redacted Cost Information			€ 75
Allowance for new roof level balustrade (edge protection)				€ 300
Allowance for New Louvres				€ 550

4.132 Dublin Airport has provided an updated Level 3 estimate that contains further detail for some elements of the works. However, we have not been able to validate the quantities for this project as while Dublin Airport have provided various design studies, photos and survey results, it is not clear which of the various options provided the quantities relate to. In general, where rates for measured items have been included, they appear to be reasonable

4.133 We have reduced the rates for louvres, balustrades and strip out works as the rates were higher than we would expect. Dublin Airport have responded to our request for a breakdown of the lump sums within the estimate by stating that the allowances are based on other recent projects undertaken at the airport. We have not been provided with sufficient information to validate this at this time, but we will continue to work with Dublin Airport to validate these items and update our analysis for the final report based on this.

CIP.20.01.022 – Terminal 1 Storm Water Drainage System

Introduction

4.134 This project proposes to survey, carry out a feasibility study and implement the preferred option for the upgrade of the existing T1 roof water drainage system.

Figure 4.16: Terminal 1 Storm Water Drainage System - T1 Roof

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.135 The objective is to provide a surface water drainage system that does not leak into the building.

Context

4.136 The terminal building was constructed circa 1970 and is now nearly 50 years old. The original catchment area of the drainage system was the 8-bay terminal building. It was originally designed according to design criteria set in the 70´s and for a 1 in 100-year storm event.

4.137 Since then, T1 has been extended including additional piers. Therefore, the catchment area has increased significantly. According to Dublin Airport, due to the increased area of T1, the drainage system is unable to cope with the volumes of water during heavy rainfall events.

4.138 It is not clear from the project description if the additional roof areas of the 6 bay, T1X, Piers 2 & 3, P2 Link street and other areas, have added rain water volume, which cannot be drained away in the below ground drainage system, or, if the existing above ground system is just undersized, causing a backing up and leaking in the building.

Scope

4.139 The project scope covers the basic activities required to upgrade/rehabilitate the old drainage system and address the current problem of water leaking into the building which include:

- Carryout an in-depth CCTV survey of the internal surface water drainage network;
- Survey the drainage network and create a 3D map throughout the building;
- Understand the sub-optimal location and configuration of the drainage network;

- Complete a feasibility study resulting in a preferred solution, whether to continue with gravity drainage or install symphonic drainage system; and
- Following feasibility study, install preferred option.

4.140 However, the budget allowed in the Level 3 costing is an estimate and does not reflect the estimated cost of an unknown-solution pending results of the CCTV survey

Stage

4.141 The project is currently at Feasibility stage with the period of spend from Q4 2020 – Q1 2022. The outlined procurement route of:

- 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

suggests that there is lack of urgency with a construction commencement date of Q1 2021 for resolving water ingress into the building. We are not sure why planning consent is needed for a maintenance project.

Key project metrics

Table 4.60: Terminal 1 Storm Water Drainage System – Key project metrics

Metric	Value
Construction cost estimate	€ 750,000
Dublin Airport estimation method	Level 3 cost estimate included in CIP 2020 Final, but it has not been explained on what basis the construction costs have been estimated.
Cost per square metre	Not relevant.

Specifications review

Table 4.61: Terminal 1 Storm Water Drainage System – Specification review

Subject	Comments
Effectiveness of scope	The scope is effective for a high-level concept appraisal. The scope is efficient for outlining the approach to tackle this problem, but since main part of the scope is a CCTV survey to enable the problem to be identified the extent of the construction work is not scoped efficiently.
Alternative scopes	Not relevant.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for an outline methodology for carrying out work.
Phasing and synergies with other projects	The outlined work needs to be coordinated with the other renewal projects to avoid on-site clashes and inefficient working: 20 01 020 Terminal 1 Façade, Roof and Spirals 20 01 023 Piers & terminals critical Maintenance
Existing asset conditions	The internal drainage system (downpipes) has been almost unchanged since T1 was built in the 1970´s and the asset has come to the end of its economic life. In keeping with the renewal of roof finishes (20 01 020) which have an asset life of 20 years, this project should be for the same duration.
Double counting	None identified.

4.142 This clearly is a useful project to upgrade the storm water drainage system for today's needs. We assume, that Level 3 costs provided are very high-level since surveys and feasibility study have not been finished yet. After carrying out the studies and defining a preferred option, Level 3 costs can then be more specific.

Cost estimate review

Table 4.62: Terminal 1 Storm Water Drainage System - Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 120,000	€ 112,500	-€ 7,500
Construction Costs	€ 750,000	€ 750,000	€ 0
Escalation, Contingency & Design Variability	€ 254,162	€ 251,971	-€ 2,191
Total	**€ 1,124,162**	**€ 1,114,471**	**-€ 9,691**

Table 4.63: Terminal 1 Storm Water Drainage System – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	16%	€ 120,000	15%	€ 112,500
Total			**€ 120,000**		**€ 112,500**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 750,000	n/a	€ 750,000
Total			**€ 750,000**		**€ 750,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 254,162	29%	€ 251,971
Total			**€ 254,162**		**€ 251,971**

4.143 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.64: Terminal 1 Storm Water Drainage System – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Design & management 15%	**Redacted Cost Information**			15%

4.144 Dublin Airport has updated its Level 3 estimate by replacing the lump sum allowances with a single measured item. While the rate included is reasonable, we have no means of validating the quantity as no design information has been provided. Due to the stage the project is at, Dublin Airport have explained that the costs in the Level 3 estimate are only allowances at this stage and that the project intends to undertake surveys and a feasibility study to develop possible solutions for the project. This indicates that further design information is not available at this early stage in the project and this is not unreasonable.

CIP.20.01.023 – Piers & Terminals Critical Maintenance

Introduction

4.145 This project is for the general maintenance of T1 and T2 including piers, but the scope is specific for floors, doors and wall panels.

Figure 4.17: Piers and Terminals Critical Maintenance

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.146 The objective is to maintain a high visual standard in the terminals.

Context

4.147 The context are the passenger terminals. Terminal 1 is approximately 50 years old and according to Dublin Airport some finishes are worn out. T2 is approximately 10 years old and it is claimed that increasing maintenance will be required.

Scope

4.148 The project scope states that ongoing maintenance is required in T1 and T2 and the piers and specifically mentions the following maintenance items:

- Floor covering replacements;
- Wall panelling replacement;
- Door replacements; and
- Back of house floor replacement.

Stage

4.149 The project is ongoing throughout the CIP period 2020 – 2024.

Key project metrics

Table 4.65: Piers & Terminals Critical Maintenance – Key project metrics

Metric	Value
Construction cost estimate	€ 1,440,000
Dublin Airport estimation method	Level 3 cost estimate included in CIP 2020 final, but it is not explained on what basis the construction costs have been estimated.
Cost per square metre	€ 200/m^2 for replacement floors. Other items not covered.

Specifications review

Table 4.66: Piers & Terminals Critical Maintenance – Specifications review

Subject	Comments
Effectiveness of scope	The scope is effective for a high-level concept appraisal. However, it cannot be assessed in detail, because the extent of the work items is not identified.
Alternative scopes	Not relevant.
Quality of specifications	Insufficient information provided to comment on the quality.
Phasing and synergies with other projects	Work needs to be co-ordinated with the other projects at T1 and T2 to avoid any on-site clashes and inefficient working.
Existing asset conditions	We would expect an asset life of 20 years to match other renewal projects in T1. For T2, 20 years would also be realistic.
Double counting	None identified.

4.150 This project´s task is to maintain piers and terminal buildings. The scope needs to be described in more detail to assess it accurately.

Cost estimate review

Table 4.67: Piers & Terminals Critical Maintenance - Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 216,000	€ 189,000	-€ 27,000
Construction Costs	€ 1,440,000	€ 1,260,000	-€ 180,000
Escalation, Contingency & Design Variability	€ 256,680	€ 224,595	-€ 32,085
Total	**€ 1,912,680**	**€ 1,673,595**	**-€ 239,085**

Table 4.68: Piers & Terminals Critical Maintenance – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	15%	€ 216,000	15%	€ 189,000
Total			**€ 216,000**		**€ 189,000**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 1,440,000	n/a	€ 1,260,000
Total			**€ 1,440,000**		**€ 1,260,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	16%	€ 256,680	16%	€ 224,595
Total			**€ 256,680**		**€ 224,595**

4.151 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.69: Piers & Terminals Critical Maintenance – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Replacement of Floors in T1/T2 (remove/level/screed/install) allowance	**Redacted Cost Information**			€ 150

4.152 Dublin Airport has provided an updated Level 3 estimate that includes quantities for carrying out isolated repairs. The quantities appear to be provisional based on previous project experience at Dublin Airport, and the rates for these items are reasonable. We have reduced the rate for the replacement of flooring as we believe that it is higher than we would expect. However, there is no further information available to allow any more meaningful analysis to be undertaken, but we will continue to work with Dublin Airport with a view to obtaining additional information for validation prior to the final report.

CIP.20.01.024 – Skybridge Rehabilitation

Introduction

4.153 This project is for a full structural assessment of the Skybridge supporting cables and expansion joints. The budget includes preliminary estimated costs for remedial work.

Figure 4.18: Skybridge Rehabilitation - Skybridge at Dublin Airport / Corrosion at Steel Structure / Cracks in Terrazzo Floor

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.154 The objective is to restore structural integrity and present undamaged floors in the Skybridge by identifying the cause of the damage and then carrying out the work.

Context

4.155 Dublin Airport conducted an investigation of the structural integrity of the suspended curved section of the Skybridge, which was built in 2007. Two issues were identified, the first is the

suspended nature of the Skybridge with its expansion joints would appear to have suffered from flex beyond the tolerance of the expansion joints, with the result that the floor finish (terrazzo) is cracking. The second issue identified is the weather protection to the steel ties has failed and needs attention.

Scope

4.156 The project scope covers both the structural survey and the repair work which is specified as:

- Remedial work to steel suspension ties
- Repairing/replacing expansion joints
- Replacing defective terrazzo flooring

4.157 It is not explained how the repair work to steel ties and expansion joints has been valued as the structural survey work has not been carried out. It is assumed that the terrazzo repair has been estimated, on the basis of a visual inspection

Stage

4.158 It is assumed that the defects have been identified at a high level in order to prepare the CIP budget. We also assume that the Outline Design Stage is the structural survey stage which is planned for Q1 2021, followed by the 'Design Stage' in Q3 2021 and Procurement in Q4 2021. The time line of one year to identify the problem and tender the work, followed by another year to carry out the work indicates that this is not an urgent project.

4.159 The outlined procurement route is:

- Feasibility / Outline Design complete: Q1 2021
- Detail Design Complete: Q3 2021
- Procurement Complete: Q4 2021
- Construction Commence: Q1 2022
- Project Handover: Q4 2022

Key project metrics

Table 4.70: Skybridge Rehabilitation – Key project metrics

Metric	Value
Construction cost estimate	€ 827,500
Dublin Airport estimation method	Level 2 estimate included in CIP 2020 Final.
Cost per square metre	Not relevant.

Specification review

Table 4.71: Skybridge Rehabilitation – Specification review

Subject	Comments
Effectiveness of scope	The outlined scope is effective for a high-level concept appraisal. The procurement time line is inefficient and an accurate assessment of the floor area to be re-placed, steel ties repaired and expansion joints to be replaced, would enable the budget allowance to be validated.
Alternative scopes	Not relevant.
Quality of specifications	The specifications in Level 3 costs provide enough detail for a concept stage assessment.

Subject	Comments
Phasing and synergies with other projects	This is a stand-alone project; however, the expansion joint renewal and repair of floor finishes will impact on the operational use of the Skybridge and these works will have to be carried out at less busy times which will impact on the cost.
Existing asset conditions	The Skybridge is approx. 11 years old and with a remaining asset life of 30 years. We would expect the structural repairs to have a 30-year life and not 20 years as specified.
Double counting	None identified.

4.160 The high-level scoping of this project has been identified correctly, however structural deflection clearly has caused damage to the terrazzo floor finishes, so we consider the structural repairs need to be addressed with more urgency. The CIP report also mentions a leaking roof membrane and the need for regular monitoring 'due to its nature'. We assume that this is a reference to the suspended structure and potential ongoing problems.

Cost estimate review

Table 4.72: Skybridge Rehabilitation - Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 103,438	€ 103,438	€ 0
Construction Costs	€ 827,500	€ 827,500	€ 0
Escalation, Contingency & Design Variability	€ 271,964	€ 271,964	€ 0
Total	**€ 1,202,902**	**€ 1,202,902**	**€ 0**

Table 4.73: Skybridge Rehabilitation – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	12.5%	€ 103,438	12.5%	€ 103,438
Total			**€ 103,438**		**€ 103,438**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 827,500	n/a	€ 827,500
Total			**€ 827,500**		**€ 827,500**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 271,964	29%	€ 271,964
Total			**€ 271,964**		**€ 271,964**

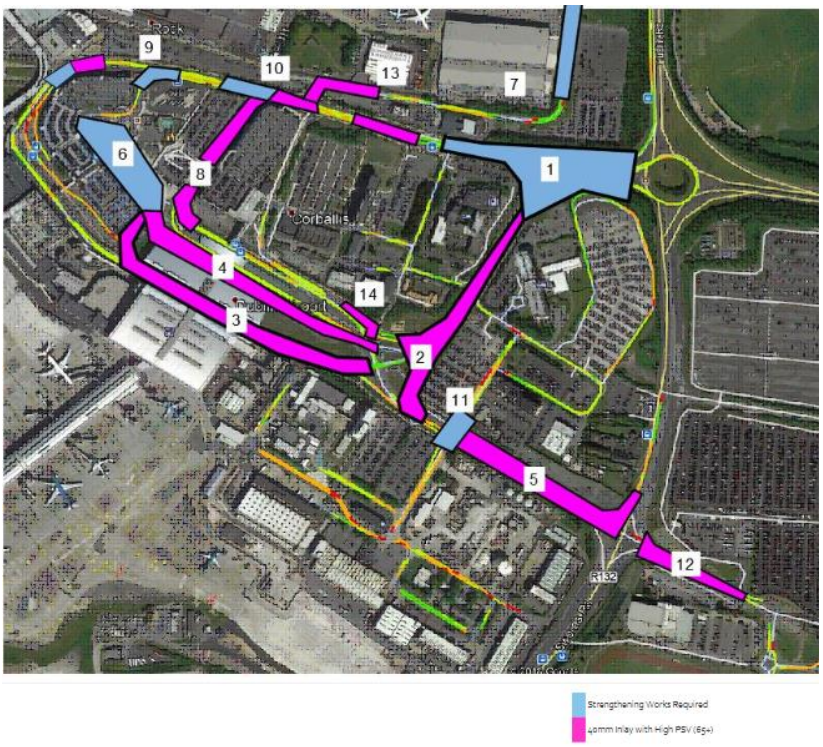
4.161 Dublin Airport has provided a copy of a report that contains budget information for the [redacted] quotation for the installation of stays to the bridge. While this demonstrates a robustness in Dublin Airport's approach to this project, there is no build-up to the sum included to allow further comment to be made at this time. For this reason we will continue to work with Dublin Airport to obtain additional detail that will enable us to validate this and update our analysis prior to the final report. Dublin Airport has also provided a drawing that demonstrates the extent of repairs required to the screed and terrazzo flooring in the bridge. The rate for the repair work is reasonable.

CIP.20.01.034 – Campus Roads Critical Maintenance

Introduction

4.162 This project provides road improvement, rehabilitation and upgrade works to the internal campus roads.

Figure 4.19: Campus Roads Critical Maintenance - Campus road



Source: Dublin Airport's Capital Investment Programme Campus Roads Project Planner

Objective

4.163 The objective is to provide a road network that is sustainable with passenger/traffic growth while ensuring safety for all road users and compliance with current regulatory and safety standards.

Context

4.164 The context of this project is that the road network incorporates approximately 26 kilometres of roads and Dublin Airport are responsible for the provision, maintenance and operation of internal public use campus roads.

4.165 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 south-bound direction. Heavy Goods Vehicles (HGV's) make up approximately 1.7% of the total daily flow amounting to circa 200 HGVs per lane per day.

Scope

4.166 Two kilometres of pavement have been identified by Dublin Airport as having very low skid resistance which will need immediate re-surfacing. A further seven and a half kilometres of pavement have been identified by Dublin Airport as requiring resurfacing works within this 2020-2024 CIP period. Dublin Airport also identified the need for the replacement and/or

upgrade of footpaths. In addition, rehabilitation of Cargo Bridge Road, Road Furniture Upgrades, road surface markings will be included in this maintenance project.

Stage

4.167 The project is currently at initial concept ideas, with work to be carried out between Q1 2020 and completed in Q4 2024, with the exception of Cargobridge Road, due to be completed by Q3 2020.

Key project metrics

Table 4.74: Campus Roads Critical Maintenance - Key project metrics

Metric	Value
Construction cost estimate	€ 4,428,056
Cost per m^2	Various rates given.

Specifications review

Table 4.75: Campus Roads Critical Maintenance - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the range and nature of work to be carried out in outline format. However greater definition of the individual work packages is necessary to fully assess the scope.
Alternative scopes	None.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage, but clarity of location of each work package is necessary to fully assess proper coverage.
Phasing and synergies with other projects	The work packages need to be co-ordinated with the other renewal projects to avoid on site clashes and inefficient working: CIP.20.01.039 Airport Roads Optimisation CIP.20.01.046 & CIP.20.01.049 Car Park Upgrade.
Existing asset conditions	The majority of the roads around the terminal area are built around 2009 and are approximate 10 years old; renewal of critical roads will extent the asset life with another 15-20 years from the moment of being renewed.
Double counting	None identified.

4.168 The scope of this project is efficient in identifying the need for the road improvement works and the level of detail in the Level 3 cost report is adequate for this stage of procurement.

Cost estimate review

Table 4.76: Campus Roads Critical Maintenance – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 664,208	€ 605,325	-€ 58,883
Construction Costs	€ 4,428,056	€ 4,035,502	-€ 392,554
Escalation, Contingency & Design Variability	€ 1,671,536	€ 1,523,352	-€ 148,184
Total	**€ 6,763,801**	**€ 6,164,179**	**-€ 599,621**

Table 4.77: Campus Roads Critical Maintenance – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	15%	€ 664,208	15%	€ 605,325
Total			**€ 664,208**		**€ 605,325**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 4,428,056	n/a	€ 4,035,502
Total			**€ 4,428,056**		**€ 4,035,502**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 1,671,536	33%	€ 1,523,352
Total			**€ 1,671,536**		**€ 1,523,352**

4.169 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.78: Campus Roads Critical Maintenance – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Disposal of excavated material, 90% uncontaminated - Atrium Roads 1-4 Rehabilitation	**Redacted Cost Information**			€ 55
Disposal of excavated material, 10% contaminated - Corballis Rd South (Fuel Farm) Inlay Works				€ 95
Disposal of excavated material, 90% uncontaminated - Corballis Rd North Rehabilitation & Inlay				€ 55
Disposal of excavated material, 10% contaminated - Atrium Roads 1-4 Rehabilitation				€ 95
Disposal of excavated material, 90% uncontaminated - Corballis Rd South / Corballis Park Junction Upgrade Works				€ 55
Disposal of excavated material, 90% uncontaminated - Corballis Rd North/ Eastlink Road Rehabilitation (Strengthening works)				€ 55
Disposal of excavated material, 10% contaminated - West Link Road Inlay				€ 95
Disposal of excavated material, 90% uncontaminated - Corballis Rd North/ Eastlink Road Rehabilitation (Inlay)				€ 55

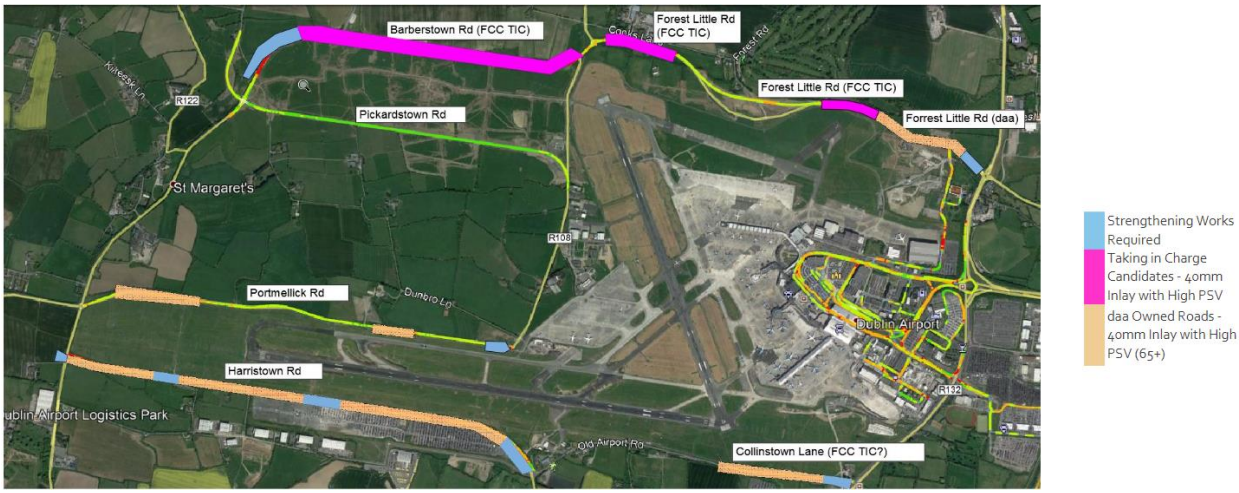
4.170 From our review of the rates, the rate for the disposal of contaminated and uncontaminated materials appears to be higher than we would expect, and we have reduced it accordingly. Dublin Airport has not provided any further information to support the allowance for street furniture included in the Level 3 estimate. However, they have advised that the contractors preliminaries allowance at 25% also includes provision for traffic management. This is a reasonable provision for this item. The quantities included in the Level 3 estimate have been validated.

CIP.20.01.039 – Airport Roads Critical Maintenance

Introduction

4.171 This project provides for road improvement, rehabilitation and upgrade works to the external roads owned by Dublin Airport.

Figure 4.20: Airport Roads Critical Maintenance



Source: Dublin Airport's Capital Investment Programme External Roads Project Planner

Objective

4.172 The main objective is to ensure all external roads meet current regulatory and safety standards and upgrade end of life pavements.

Context

4.173 The context of this project is the road network that incorporates approximately 14km of public roads owned by Dublin Airport around the airport boundary.

4.174 These roads are currently in a reasonable state of repair and account for a high percentage of Annual Average Daily Traffic (AADT). The combined total AADT 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 traffic using the Northern Diversion Road.

Scope

4.175 This project will focus on 6 kilometres of road, which, according to Dublin Airport, require immediate resurfacing due to low skid resistance. Dublin Airport state a further 3 kilometres will require re-strengthening within the 2020 – 2024 period and several other sections (not specified) will need improvement to meet regulatory standards.

Stage

4.176 This project is currently at initial concept ideas, with specific work projects identified to be carried out at the following dates:

- Forrest Little Road 2020
- Barberstown Road 2020
- Pickardstown Road not identified
- Portmellick Road 2020
- Harristown Road 2021 - 2024
- Collinstown Lane 2021

Key project metrics

Table 4.79: Airport Roads Critical Maintenance - Key project metrics

Metric	Value
Construction cost estimate	€ 3,542,068
Cost per m^2	Various rates given

Specifications review

Table 4.80: Airport Roads Critical Maintenance - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the range and nature of work to be carried out at each location (except Pickardstown Rd) in outline format.
Alternative scopes	None.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage.
Phasing and synergies with other projects	The work packages need to be co-ordinated with the other renewal projects to avoid on site clashes and inefficient working: CIP.20.01.034 Campus Roads Optimisation CIP.20.01.046 & CIP.20.01.049 Car Park Upgrade.
Existing asset conditions	On the basis of the airport development since the 1980's we can assume that the external roads are probably nearly 40 years old, so it is reasonable to expect an asset renewal program with a 15-year life is required.
Double counting	None identified.

4.177 The scope of this project is efficient to address the identified need for road improvement works and the level of detail in the Level 3 cost report is adequate for this stage of procurement.

Cost estimate review

Table 4.81: Airport Roads Critical Maintenance – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 442,759	€ 420,273	-€ 22,486
Construction Costs	€ 3,542,068	€ 3,362,182	-€ 179,886
Escalation, Contingency & Design Variability	€ 1,164,127	€ 1,105,006	-€ 59,121
Total	**€ 5,148,954**	**€ 4,887,461**	**-€ 261,493**

Table 4.82: Airport Roads Critical Maintenance – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	13%	€ 442,759	13%	€ 420,273
Total			**€ 442,759**		**€ 420,273**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 3,542,068	n/a	€ 3,362,182
Total			**€ 3,542,068**		**€ 3,362,182**

Escalation, Contingency & Design Variability	Quantity	% of Dublin Airport DM-C + C-C	Dublin Airport cost estimate	% of Steer DM-C + C-C	Steer cost estimate
Escalation, Contingency & Design Variability	n/a	29%	€ 1,164,127	29%	€ 1,105,006
Total			**€ 1,164,127**		**€ 1,105,006**

4.178 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.83: Airport Roads Critical Maintenance – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Disposal of excavated material, 90% uncontaminated - Portmellick road	**Redacted Cost Information**			€ 55
Disposal of excavated material, 90% uncontaminated - Barberstown road				€ 55
Disposal of excavated material, 10% contaminated - Portmellick road				€ 95
Disposal of excavated material, 10% contaminated - Barberstown road				€ 95
Disposal of excavated material, 90% uncontaminated - Forest Little road (Dublin Airport)				€ 55
Disposal of excavated material, 10% contaminated Forest Little road (FCC TIC)				€ 95
Disposal of excavated material, 10% contaminated - Collinstown lane				€ 95

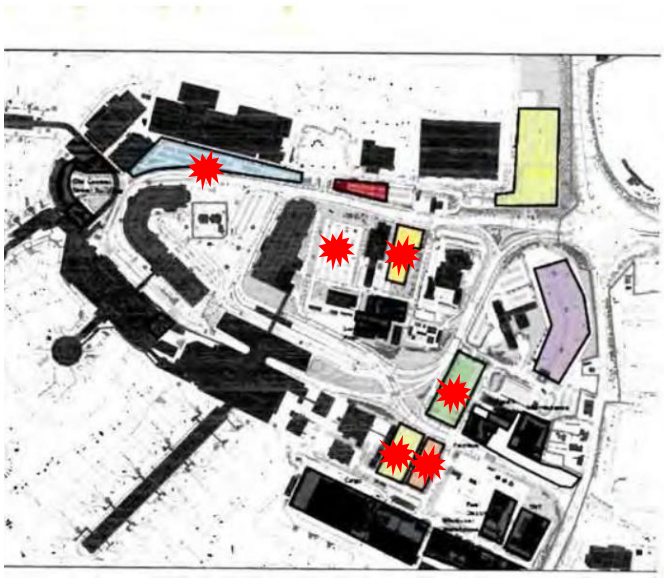
4.179 The rate for the disposal of contaminated and uncontaminated materials appears to be higher than we would expect, and we have reduced it accordingly. Dublin Airport has not provided any further information to support the allowance for street furniture included in the Level 3 estimate. However, they have advised that the contractors preliminaries allowance at 25% also includes provision for traffic management. This is a reasonable provision for this item. The quantities contained within the Level 3 estimate have been validated.

CIP.20.01.046 – Staff Car Parks Critical Maintenance

Introduction

4.180 This project is for the re-surfacing of existing staff car parks and the spine roads.

Figure 4.21: Staff Car Parks Critical Maintenance



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

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.181 Dublin Airport report that the condition of the staff car parks is fair, however it is assessed that some car park surfaces, and spine roads are in need of re-surfacing and some drainage issues need addressing to mitigate potential health and safety claims and extend the asset life.

Context

4.182 The context of this project is that here are currently 12 No. staff car parks within the internal airport campus providing 2,827 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.

Scope

4.183 The scope of the project covers the re-surfacing of some car park paved areas and in 2 cases the spine road (Purple Car Park) is covered in the costing and in the project description the spine road in the Silver Car Park is covered, but not mentioned in the costing. The scope appears to cover existing staff car parks (marked thus ✸ on the figure above) which are scheduled for de-commissioning as a result of planned development.

4.184 Requirement for these works has been identified via visual inspections by Dublin Airport staff. Each pavement is rated (visual assessment) based on visible pavement defects to visually rate pavement surface condition. There are four categories of flexible road surface defects on urban flexible roads as follows:

- Surface Defects
  - Ravelling
  - Bleeding
- Pavement Deformation
  - Rutting
  - Surface Distortion (shoving, settlement/heave, depressions, bumps, sags, etc)

- Cracks
  - Alligator Cracking
  - Edge Breakup and Cracking
  - Other cracking (longitudinal, transverse, reflection, meander, slippage, etc.)
- Surface Openings
  - Patching and Utility Repairs
  - Potholes
  - Manhole/Ironworks defects

4.185 For an accurate assessment of the scope to made, an audit showing total paved areas of each car park to be retained and total areas to be re-surfaced would be required for further analysis.

Stage

4.186 The project is currently at initial concept stage, with spend allocated to the period of Q1 2020 to Q4 2024. Key milestones:

- Drainage improvements Q1 2020 – Q4 2024
- Staff Car Parks Spine Road Improvements Q1 2020 – Q4 2024

Key project metrics

Table 4.84: Staff Car Parks Critical Maintenance - Key project metrics

Metric	Value
Construction cost estimate	€ 1,161,647
Dublin Airport estimate	Level 3 estimate included in CIP 2020 Final.
No of car parks	12 car parks.
Area of car parks in m^2	Area not provided.

Specifications review

Table 4.85: Staff Car Parks Critical Maintenance - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the nature of work to be carried out in outline format, but insufficient to gauge the quantum of work necessary.
Alternative scopes	None identified.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage.
Phasing and synergies with other projects	The work packages need to be co-ordinated with the other similar projects to avoid on site clashes and inefficient working: • CIP.20.01.034 Campus Roads Optimisation • CIP.20.01.039 Airport Roads Optimisation • CIP.20.01.049 Car Park Upgrade.
Existing asset conditions	On the basis of the re-surfacing information provided in the Level 3 cost estimate we assume that all, or, some of the car parks are reaching their end of life. Effectively the project work outlined will extent the asset life for 15 years.
Double counting	Clarification of which car parks to be retained and up-graded would avoid false investment in a car park to be de-commissioned.

4.187 The scope for this project seems efficient.

Cost estimate review

Table 4.86: Staff Car Parks Critical Maintenance – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 145,206	€ 134,156	-€ 11,049
Construction Costs	€ 1,161,647	€ 1,073,252	-€ 88,395
Escalation, Contingency & Design Variability	€ 381,784	€ 352,732	-€ 29,052
Total	**€ 1,688,637**	**€ 1,560,140**	**-€ 128,496**

Table 4.87: Staff Car Parks Critical Maintenance – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	12.5%	€ 145,206	12.5%	€ 134,156
Total			**€ 145,206**		**€ 134,156**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 1,161,647	n/a	€ 1,073,252
Total			**€ 1,161,647**		**€ 1,073,252**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 381,784	29%	€ 352,732
Total			**€ 381,784**		**€ 352,732**

4.188 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.88: Staff Car Parks Critical Maintenance – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Disposal of excavated materials	**Redacted Cost Information**			€ 55
Disposal of excavated materials				€ 55

4.189 In general, most of the rates for this project appear to be reasonable and we have no reason to amend them. The rate for the disposal of materials is higher than we would expect, and we have reduced it accordingly. In response to our request, Dublin Airport have provided a drawing that illustrates the extent of the car park works that are to be undertaken. The quantities for this project have been validated.

CIP.20.01.049 – Public Car Parks Critical Maintenance

Introduction

4.190 This project is for the re-surfacing of spine roads in surface car parks and structural repairs, replacing movement joints and repairing waterproofing membranes in the T1 and T2 Multi-Storey Car Parks (MSCP's) and other minor upgrades.

Figure 4.22: Public Car Parks Critical Maintenance

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.191 Carry out repairs to extend the life of both surface car parks and MSCP's.

Context

4.192 Dublin Airport operate and maintain;

- 4,000 short term spaces in two MSCP; and
- 18,600 long term spaces in three remote car parks.

Scope

4.193 The scope of the project covers the re-surfacing of spine roads in surface car parks and structural repairs to the MSCP's.

4.194 For an accurate assessment of the scope to made, an audit showing total paved areas of spine roads/areas to be re-surfaced and a structural survey of the MSCP's would be required.

Stage

4.195 The project is currently at initial concept stage, with spend to be allocated to the period Q1 2020 and Q4 2024. Project delivery key milestones:

- Drainage Improvements Q1 2021 – Q4 2024
- Spin Road Upgrades Long Term Car Park Q1 2021 – Q4 2024
- Multi-Storey Car Park Optimisation Q1 2020 – Q4 2024

Key project metrics

Table 4.89: Public Car Parks Critical Maintenance - Key project metrics

Metric	Value
Construction cost estimate	€ 1,819,647
Dublin Airport estimate	Level 3 estimate included in CIP 2020 Final
Area of surface car parks	Not provided
Area of MSCP's	Not provided

Specifications review

Table 4.90: Public Car Parks Critical Maintenance - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the work to be carried out in outline format. MSCP's do not require resurfacing works. According to Dublin Airport, joints have reached the end of their useful life and need to be replaced. Spine road improvements include the Blue carpark, red car park and green carpark. The structural repairs apply to the 2 T1 MSCP's and 1 T2 MSCP.
Alternative scopes	No realistic alternative to structural repairs of the MSCP's.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage.
Phasing and synergies with other projects	The work packages need to be co-ordinated with the other renewal projects to avoid on site clashes and inefficient working: • CIP 20 04 006 MSCP additional floors T1 MSCP • CIP 20 04 007 MSCP additional floors T2 MSCP • CIP.20.01.034 Campus Roads Optimisation • CIP.20.01.039 Airport Roads Optimisation.
Existing asset conditions	T1 MSCP built & upgraded 1991, 1994 & 1996. T2 MSCP build and upgraded 2010 & 2015. On the basis of the re-surfacing information provided in the Level 3 cost estimate we assume that all, or, some of the car parks are reaching their end of life. Effectively the project work outlined will extend the asset life for 15 years.
Double counting	None identified but structural repairs to the MSCP's could easily be brought into the scope for the additional floor construction at each MSCP.

4.196 The scope for this project seems efficient. Structural repairs are required on the MSCP's as some have reached their end of useful life and need to be replaced.

Cost estimate review

Table 4.91: Public Car Parks Critical Maintenance – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 168,214	€ 162,169	-€ 6,045
Construction Costs	€ 1,819,647	€ 1,771,288	-€ 48,359
Escalation, Contingency & Design Variability	€ 421,375	€ 405,482	-€ 15,893
Total	**€ 2,409,236**	**€ 2,338,939**	**-€ 70,297**

Table 4.92: Public Car Parks Critical Maintenance – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	9%	€ 168,214	9%	€ 162,169
Total			**€ 168,214**		**€ 162,169**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 1,819,647	n/a	€ 1,771,288
Total			**€ 1,819,647**		**€ 1,771,288**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	21%	€ 421,375	21%	€ 405,482
Total			**€ 421,375**		**€ 405,482**

4.197 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.93: Public Car Parks Critical Maintenance – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Disposal of excavated materials	**Redacted Cost Information**			€ 55
Disposal of excavated materials				€ 55
Disposal of excavated materials				€ 55
Disposal of milled materials				€ 55

4.198 There is a lot of detail in Dublin Airport's Level 3 estimate. The rates for the disposal of material are higher than we would expect, and we have reduced them accordingly. The remaining rates appear to be reasonable for the works required. Dublin Airport have not provided any further information to support the allowance for street furniture included in the Level 3 estimate. Dublin Airport have provided drawings to demonstrate the extent of works required and which support the quantities that they have included in their Level 3 estimate.

CIP.20.01.056 – Campus Facilities & Landside Snow Base Upgrade

Introduction

4.199 This project proposes providing a new purpose-built Campus Facility and Snow Base at Castlemoate for the snow clearance and maintenance of landside roads.

Figure 4.23: Campus Facilities & Landside Snow Base Upgrade - Aerial view campus Facilities & Landside Snow Base

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.200 To provide a new snow clearance and road maintenance base for all landside roads/facilities to ensure landside operations can be maintained.

Context

4.201 The existing base is a 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.

Scope

4.202 The scope of the project is to provide a new purpose-built Campus Facility and Snow Base at Castlemoate. The scope outline is comprehensive covering:

- A new building for salt storage;
- Equipment storage/snow equipment storage;
- Vehicle wash station;
- New yard, fencing, entrance and task lighting;
- Welfare facilities; and
- Future expansion.

Stage

4.203 The project is currently at initial concept stage. The Design Stage is due to be complete in Q4 2020 followed by completion of Procurement stage in Q2 2021 followed by Construction commencement in Q3 2021. Handover is scheduled 6 months later in Q1 2022. We would comment that the construction and handover of the facility is during the winter months when

the salt spreading, and snow clearing is required just at the time when the facility has been dismantled for re-construction. The outlined procurement route is:

- Feasibility/Outline design complete Q1 2020
- Planning complete Q4 2020
- Design complete Q4 2020
- Procurement compete Q2 2021
- Construction commence Q3 2021
- Project handover Q1 2022

Key project metrics

Table 4.94: Campus Facilities & Landside Snow Base Upgrade - Key project metrics

Metric	Value
Construction cost estimate	€ 1,904,768
Dublin Airport estimate	Level 3 estimate included in CIP 2020 Final.
No of vehicles to be stored Floor area in m^2 Cost per m^2	Information not supplied Not given Various rates provided.

Specifications review

Table 4.95: Campus Facilities & Landside Snow Base Upgrade - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the work to be carried out in outline format.
Alternative scopes	None.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage.
Phasing and synergies with other projects	Not relevant, but please refer to note above regarding construction during the winter months.
Existing asset conditions	After renewal the asset should be able to have a life span of approximate 60 years.
Double counting	None identified.

4.204 The scope is efficient for the replacement of the facility, however, the procurement strategy and timing does not seem ideal as the snow base would be under construction during the winter period when there may be a need for snow removing equipment and/or salt and grit.

Cost estimate review

Table 4.96: Campus Facilities & Landside Snow Base Upgrade – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 304,763	€ 285,715	-€ 19,048
Construction Costs	€ 1,904,768	€ 1,904,768	€ 0
Escalation, Contingency & Design Variability	€ 645,492	€ 639,928	-€ 5,565
Total	**€ 2,855,024**	**€ 2,830,412**	**-€ 24,612**

Table 4.97: Campus Facilities & Landside Snow Base Upgrade – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	16%	€ 304,763	15%	€ 285,715
Total			**€ 304,763**		**€ 285,715**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 1,904,768	n/a	€ 1,904,768
Total			**€ 1,904,768**		**€ 1,904,768**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 645,492	29%	€ 639,928
Total			**€ 645,492**		**€ 639,928**

4.205 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.98: Campus Facilities & Landside Snow Base Upgrade – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Design & management at 15%	**Redacted Cost Information**			15%

4.206 Dublin Airport has provided a more detailed breakdown of the items that constitute the construction works for this project. While this detail is not included in the Level 3 estimate, there are measured quantities and rates included in that breakdown that are reasonable. However, that breakdown also contains a number of smaller lump sums within it that we are unable to validate at this time, and so we will continue to work with Dublin Airport by requesting additional granular information with a view to validating the contents of these lump sums prior to the final report.

4.207 The project is also an airport specific piece of work for which no facility level benchmark data exists due to the relatively small nature of the works required.

CIP.20.01.065 – Airport Heavy Fleet & Equipment Replacement

Introduction

4.208 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.

Figure 4.24: Airport Heavy Fleet & Equipment Replacement

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.209 The stated objective is to replace and augment the heavy vehicle fleet in order to maintain the mandatory regulatory requirements for firefighting, the provision of a larger snow fleet and updating ancillary vehicles associated with grounds maintenance.

Context

4.210 The Dublin Airport Heavy Fleet Vehicles fleet comprises 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.

Scope

4.211 The project scope lists:

- To replace 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; and
- Purchase additional glycol collection sweepers, friction tester and maintenance equipment due to the introduction of additional airfield pavement.

Stage

4.212 Receipt of the replacement vehicles will be between Q1 2020 – Q4 2024.

Key project metrics

Table 4.99: Airport Heavy Fleet & Equipment Replacement – Key project metrics

Metric	Value
Construction cost estimate	€11,040,000
Number of vehicles	18 vehicles

Specifications review

Table 4.100: Airport Heavy Fleet & Equipment Replacement – Specifications review

Subject	Comments
Effectiveness of scope	The scope addresses the functional requirements of addressing the need to replace operationally critical vehicles, some of which are mandatory under licencing of the aerodrome.
Alternative scopes	There are no alternative scopes, other than on a specific vehicle purchase basis, and therefore Dublin Airport should be encouraged to carry out an assessment of best value within the vehicle fleet purchase process, including ease of maintenance.
Quality of specifications	These appear reasonable.
Phasing and synergies with other projects	There are no phasing or other project synergies relevant to this asset replacement programme, other than the increase in vehicle numbers required for the expansion of the airfield obviously only becoming applicable once the northern parallel runway is operational.
Existing asset conditions	Dublin Airport declares that vehicles for replacement are 'selected based on fitness for purpose, whole life cost efficiency and standardisation'. The details of this assessment have not been witnessed. For expensive items such as foam carrying fire appliances, which can have a life of 15 years or more, or ladder trucks with a life of up to 25 years, it is important to understand the current residual life of each appliance.
Double counting	No double counting has been identified within the data provided.

4.213 In overall terms, the conclusion is that this project is effective, but Dublin Airport should be encouraged to carry out an assessment of best value within the vehicle fleet purchase process, including after care.

Cost estimate review

Table 4.101: Airport Heavy Fleet & Equipment Replacement – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 11,040,000	€ 11,040,000	€ 0
Escalation, Contingency & Design Variability	€ 0	€ 0	€ 0
Total	**€ 11,040,000**	**€ 11,040,000**	**€ 0**

Table 4.102: Airport Heavy Fleet & Equipment Replacement – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 11,040,000	n/a	€ 11,040,000
Total			**€ 11,040,000**		**€ 11,040,000**

Escalation, Contingency & Design Variability	Quantity	% of Dublin Airport DM-C + C-C	Dublin Airport cost estimate	% of Steer DM-C + C-C	Steer cost estimate
Escalation, Contingency & Design Variability	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**

4.214 Dublin Airport has provided a spreadsheet that lists the items included in the Level 3 estimate along with the proposed cost for those vehicles. Dublin Airport has confirmed that these allowances are based on discussions with suppliers or historic costs from previous vehicle procurement activities. The approach taken by Dublin Airport is correct and the allowances for the various vehicles are reasonable. We are not able to validate if the number of vehicles required is correct or not.

CIP.20.01.069 – Airport Light Vehicle Fleet Replacements and Augmentation

Introduction

4.215 This project proposes to maintain mobility within the airport wide campus by rolling replacement of the Dublin Airport Light Vehicle Fleet that meets the needs of the airport police, security, fire service, operations staff and maintenance units.

Figure 4.25: Airport Light Vehicle Fleet Replacements and Augmentation - Airport Light Vehicle Fleet

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.216 Dublin Airport have identified the need to replace life-expired vehicles on a rolling basis, to upgrade to Low Emissions Vehicles (LEVs) and to augment the current vehicle fleet to cater for the development of the new north parallel runway.

Context

4.217 The Dublin Airport Light Vehicle Fleet comprises 100 road going vehicles with gross vehicle weights of less than 3,500kgs. The vehicles are used for supporting such functions as Airport Police, Fire Service, ASU, Airport Operations & Asset Care.

4.218 Dublin Airport states that the Light Fleet will need to be increased to allow for the introduction of the North Runway and the extended airfield operations and maintenance.

4.219 Dublin Airport reports that 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 Dublin Airport Sustainability Policy with the prioritized used of LEVs.

Scope

4.220 The project scope lists:

- Fleet size growth to 111 vehicles;
- Fleet Optimisation Plan will be kept under review in line with the introduction of new infrastructure and growth in aircraft movements; and
- Low Emission Vehicles (LEV) will be prioritized.

Stage

4.221 Receipt of the replacement vehicles will be between Q1 2020 – Q4 2024.

Key project metrics

Table 4.103: Airport Light Vehicle Fleet Replacements and Augmentation – Key project metrics

Metric	Value
Construction cost estimate	€2,408,000
Number of vehicles	70 vehicles
Cost per vehicle	34,400 €/vehicle

Specifications review

Table 4.104: Airport Light Vehicle Fleet Replacements and Augmentation – Specifications review

Subject	Comments
Effectiveness of scope	The scope addresses the Dublin Airport identified requirements of replacing the light vehicle fleet on a 6-year rolling cycle, upgrading to LEV where possible and increasing the fleet size to cater for the expanded airfield.
Alternative scopes	There are no alternative scopes, other than on a specific vehicle purchase basis, and therefore Dublin Airport should be encouraged to carry out an assessment of best value within the vehicle fleet purchase process, including ease of maintenance.
Quality of specifications	The specification is very high level with no data on individual vehicle residual life, potential for LEV replacement or specific function. However, the 6-year rolling cycle of replacement would seem optimal for such vehicles.
Phasing and synergies with other projects	There are no phasing or other project synergies relevant to this asset replacement programme, other than the increase in vehicle numbers required for the expansion of the airfield obviously only becoming applicable once the northern parallel runway is operational.
Existing asset conditions	The light vehicle fleet is 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.
Double counting	No double counting has been identified within the data provided.

4.222 In overall terms, the conclusion is that this project is effective.

Cost estimate review

Table 4.105: Airport Light Vehicle Fleet Replacements and Augmentation – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 2,408,000	€ 2,408,000	€ 0
Escalation, Contingency & Design Variability	€ 0	€ 0	€ 0
Total	**€ 2,408,000**	**€ 2,408,000**	**€ 0**

Table 4.106: Airport Light Vehicle Fleet Replacements and Augmentation – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**

Construction Costs (C-C)	Quantity	Dublin Airport rate	Dublin Airport cost estimate	Steer rate	Steer cost estimate
Fittings / Furnishings & Equipment	1	n/a	€ 2,408,000	n/a	€ 2,408,000
Total			**€ 2,408,000**		**€ 2,408,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**

4.223 Dublin Airport has provided a spreadsheet that lists the items included in the Level 3 estimate along with the proposed cost for those vehicles. Dublin Airport has confirmed that these allowances are based on discussions with suppliers or historic costs from previous vehicle procurement activities. The approach taken by Dublin Airport is correct and the allowances for the various vehicles are reasonable. We are not able to validate if the number of vehicles required is correct or not.

CIP.20.01.071 – Electric Charger Network Facilities

Introduction

4.224 This project is a proposal to provide publicly accessible, electrical vehicle charging facilities across the Airport Campus.

Figure 4.26: Electric Charger Network Facilities

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.225 Dublin Airport plans to introduce publicly accessible electric vehicle charging network infrastructure system providing accessible charging stations across the airport campus to facilitate the charging of electric vehicles. This charging infrastructure will provide for public transport and private vehicles as well as a growing fleet of electric powered maintenance and Airport operational vehicles. It will also encourage busing providers to consider shifting away from Internal Combustion Engine powered vehicles and help facilitate government and EU targets for growth in the use of electric vehicles.

Context

4.226 In May 2017 the Irish government published its policy for transport in Ireland 2017 to 2030. This set out the target that by 2030 all new cars and vans sold in Ireland will be zero emissions (or zero emission capable). Dublin Airport's plan is to support this through the provision of publicly accessible electric vehicle charging infrastructure across the airport campus.

Scope

4.227 This scope of the project is to provide the infrastructure for electric vehicle charging points across the airport campus. The scope of the proposed network will cover electric vehicle charging for both public transport vehicles, private vehicles and fleet vehicles as well as Airport operational vehicles.

Stage

4.228 The project needs to carry out a feasibility study to evaluate the provision of the underground power network cabling and associated cable ducting needed as well as identify the most effective location of electric vehicle charging points to create an efficient charging point network. The project includes all civil works and the associated electric charger network facilities.

4.229 The project duration 4 years from Q1 2020 to Q4 2024

Key project metrics

Table 4.107: Electric Charger Network Facilities – Key project metrics

Metric	Value
Construction cost estimate	€ 1,077,090
Dublin Airport estimation method	Costs based on supplier project costs for the charging points at the landside maintenance base.

Specifications review

Table 4.108: Electric Charger Network Facilities - Specifications review

Subject	Comments
Effectiveness of scope	The full scope of the EV charging network is still to be evaluated. The CIP currently is based on outline scope derived from previous EV charger project. There is a feasibility study planned which should determine the full scope of the EV charging network as well as the location of EV charging points.
Alternative scopes	Not possible until feasibility study is complete.
Quality of specifications	No specification has been prepared to date. The cost has been derived based on a previous project. Once the feasibility study is complete this will provide better project definition needed to support the specification of EV project requirements.
Phasing and synergies with other projects	There is no phasing identified – It is likely this will be determined during the feasibility study.
Existing asset conditions	These are planned as new assets and the existing EV charging in the landside maintenance area will be integrated with this new project.
Double counting	None identified.

Cost estimate review

Table 4.109: Electric Charger Network Facilities – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 161,564	€ 161,564	€ 0
Construction Costs	€ 1,077,090	€ 1,077,090	€ 0
Escalation, Contingency & Design Variability	€ 406,588	€ 406,588	€ 0
Total	**€ 1,645,242**	**€ 1,645,242**	**€ 0**

Table 4.110: Electric Charger Network Facilities – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	15%	€ 161,564	15%	€ 161,564
Total			**€ 161,564**		**€ 161,564**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 1,077,090	n/a	€ 1,077,090
Total			**€ 1,077,090**		**€ 1,077,090**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 406,588	33%	€ 406,588
Total			**€ 406,588**		**€ 406,588**

4.230 There is insufficient information to be able to undertake an analysis of this project. Dublin Airport were asked to provide build-up to the lump sums and the rates included in the Level 3 estimate. Their response was that the sums included in the estimate are based on discussions with potential suppliers. However, no further detailed information has been provided so we are unable to validate these sums at this stage. The project is also an airport specific piece of work for which no facility level benchmark data exists due to the relatively small nature of the works required.

CIP.20.01.074 – Advance Visual Docking Guidance System (5G, Pier 1 & Pier 2)

Introduction

4.231 This project entails the installation of Advanced Visual Docking Guidance System (A-VDGS) technology to aircraft parking stands on Pier 1, Pier 2 and Apron 5G.

4.232 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 A-CDM operational data (TOBT, TSAT, etc.) and in turn automatically distribute accurate, real-time data over the IT network.

Figure 4.27: Advance Visual Docking Guidance System – Advance Visual Docking Guidance System

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.233 The implementation of A-VDGS, along with the introduction of A-CDM at Dublin Airport will result in a more efficient turnaround operation for users and more efficient use of stand infrastructure.

4.234 Dublin Airport's drivers for investing in A-VDGS are:

- More Efficient use of stand Infrastructure;
- Enhanced safety at gates; and
- Environmental.

Context

4.235 This is a continuation of the PACE project reference SCP 17.2.009.

Scope

- 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; and

- All units networked and connected to Dublin Airport - Airport Operations System (AOS).

Stage

4.236 Installation of the A-VDGS is programmed for Q1 2020 – Q1 2024. However, the combined project delivery timeframes diagram indicates the A-VDGS installation is already underway. It is assumed that this refers to projects under the PACE project suite which also included A-VDGS.

Key project metrics

Table 4.111: Advance Visual Docking Guidance System – Key project metrics

Metric	Value
Construction cost estimate	€3,652,583
Number of units	23 units
Cost per unit	158,800 €/unit installed

Specifications review

Table 4.112: Advance Visual Docking Guidance System – Specifications review

Subject	Comments
Effectiveness of scope	The scope addresses the functional requirements relating to the need to install A-VDGS on all contact stands.
Alternative scopes	The Level 3 costs indicate significant amounts of pavement breakout in order that foundations for the mast-support A-VDGS can be installed. Consideration could be given to mounting the A-VDGS onto the Façade of the terminal or pier in order to avoid works on the apron.
Quality of specifications	The specification is very high level. Given the project is at a feasibility stage, the quality of specifications and drawings received, while high level, are sufficiently detailed to describe the proposed works and give a satisfactory indication of scope. The project has been the subject of a detailed feasibility study by Dublin Airport.
Phasing and synergies with other projects	Where relevant, this project should be phased to coincide with the apron stand and FEGP delivery, thereby reducing impacts on operational stands. For example, it is noted that the Level 3 costs for the A-VDGS include for significant breakout of apron pavements for foundations. This work should be coordinated with the apron refurbishment projects
Existing asset conditions	This is a new asset.
Double counting	It is understood that this project is a continuation of the PACE project reference SCP 17.2.009. However, while it is possible that double counting between these projects exists, it cannot be verified or discounted without detailed plans showing locations.

4.237 In overall terms, the project is considered effective for delivering AVDGS.

Cost estimate review

Table 4.113: Advance Visual Docking Guidance System – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 750,000	€ 547,887	-€ 202,113
Construction Costs	€ 3,652,583	€ 3,652,583	€ 0
Escalation, Contingency & Design Variability	€ 927,411	€ 1,227,125	€ 299,714
Total	**€ 5,329,994**	**€ 5,427,596**	**€ 97,602**

Table 4.114: Advance Visual Docking Guidance System – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	21%	€ 750,000	15%	€ 547,887
Total			**€ 750,000**		**€ 547,887**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 3,652,583	n/a	€ 3,652,583
Total			**€ 3,652,583**		**€ 3,652,583**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	21%	€ 927,411	29%	€ 1,227,125
Total			**€ 927,411**		**€ 1,227,125**

4.238 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 4.115: Advance Visual Docking Guidance System – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Escalation at 12.36%	**Redacted Cost Information**			€ 597,055
General Design and management @ 20.5%				15%

4.239 The rates for the works appear to be reasonable. However, for a project of this nature we consider that the allowance for design and management at 20.5% is too high, bearing in mind that there is a lot of repetition in the works required which should result in some efficiencies being realised. We have included a 15% allowance in our Level 3 estimate.

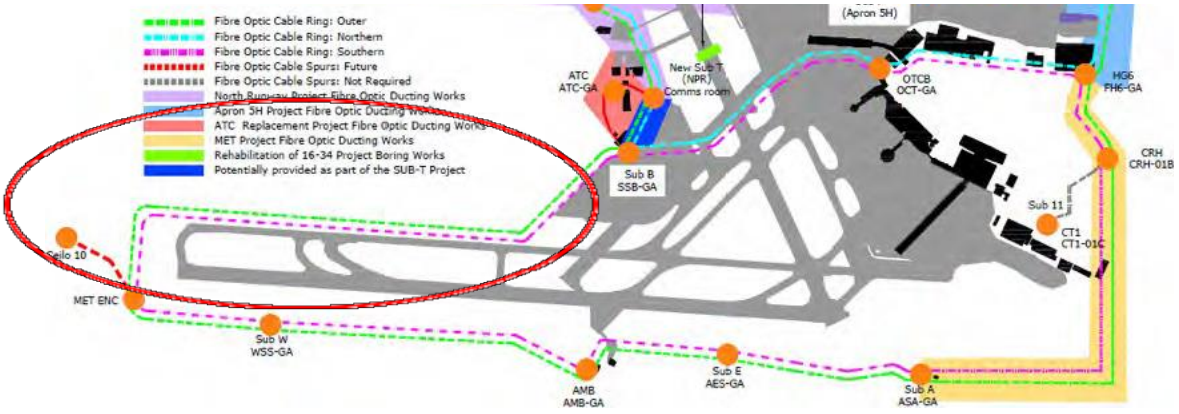
4.240 Dublin Airport's Level 3 estimate contains an arithmetical error in respect of the escalation calculation. They state that escalation has been included at 12.36%. However, the figure included in the Level 3 estimate is incorrect. We have not amended the Dublin Airport figure but the provision in our Level 3 estimate is correct.

CIP.20.01.087 – Airfield Ground Lighting (AGL) Fibre Optic Communications Network Improvement Programme

Introduction

4.241 This project creates a fibre optic network in a ring configuration for the airfield's AGL communications network, increasing the systems' overall robustness and resilience to failures and increasing safety integrity.

Figure 4.28: AGL Fibre Optic Communications Network Improvement Programme



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.242 This project is planning to complete the installation of a Fibre Optic cabling Pit, Duct and Fibre Cable Network system from the Sub-W to Sub-B at the ATC control tower to create a more resilient Fibre Optic network used for the control of the AGL system for the South Runway.

Context

4.243 The airfield ground lighting systems are controlled from the ATC control tower. The AGL control systems currently uses a Fibre optic cable network configured in a star network configuration with copper cable backup. The star network configuration presents a single point of failure in the West section should the cable get damaged. To alleviate this risk this project will create a ring network which will reduce risk to the AGL operation in the event of cable damage and eliminate the current single point failure characteristic of the current communication network.

Scope

- Installation of Pit Duct and Fibre Network between Sub-W on the south runway and Sub B near the ATC Tower;
- Installation of new Electrical and Fibre optic network equipment will be required; and
- The network management and operating systems will need to be reconfigured to operate as a communication network ring.

Stages

- Install Pit and Duct Systems Q1 2022 - Q1 2024
- Install Fibre Network Cable and Equipment Q1 2022 - Q1 2024
- Reconfigured the Fibre network Q1 2022 - Q1 2024

Key project metrics

Table 4.116: AGL Fibre Optic Network Improvement Programme – Key project metrics

Metric	Value
Construction cost estimate	€ 1,588,026
Dublin Airport estimation method	Costs have been estimated based on recent similar construction project works

Specifications review

Table 4.117: AGL Fibre Optic Network Improvement Programme - Specifications review

Subject	Comments
Effectiveness of scope	The scope of the works is clear, the cabling route is planned and would appear to present minimal construction risk and will create a higher resilience AGL network for the Airport.
Alternative scopes	The project planning, design and procurement processes will look at the most efficient cable routing to minimise costs and avoid any constraints caused by constructing near a live runway.
Quality of specifications	Detailed planning design and implementation specifications still need to be created, however Dublin Airport have obtained cost estimates based on similar works recently carried out.
Phasing and synergies with other projects	This project has a 4-year duration and will bring safety and resilience benefits to the AGL network and overall ATC runway operating environment. It will also support connection to the North runway AGL network when this completes construction.
Existing asset conditions	The current AGL network, whilst proven reliable, suffers a risk of single point of failure in the event of cable damage. This project will address this risk directly introducing a higher reliance to cable network and equipment damage.
Double counting	None identified.

4.244 This project will deliver much higher levels of AGL Network communications resilience and will provide a much-simplified network configuration capable of enabling the integration of the AGL communication network with the future AGL system on the Northern Runway AGL when it is completed. This seems an efficient, effective and reasonable approach to achieving the declared objective by Dublin Airport.

Cost estimate review

Table 4.118: AGL Fibre Optic Network Improvement Programme – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 79,401	€ 79,401	€ 0
Construction Costs	€ 1,588,026	€ 1,588,026	€ 0
Escalation, Contingency & Design Variability	€ 350,160	€ 350,160	€ 0
Total	**€ 2,017,588**	**€ 2,017,588**	**€ 0**

Table 4.119: AGL Fibre Optic Network Improvement Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	5%	€ 79,401	5%	€ 79,401
Total			**€ 79,401**		**€ 79,401**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 1,588,026	n/a	€ 1,588,026
Total			**€ 1,588,026**		**€ 1,588,026**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	21%	€ 350,160	21%	€ 350,160
Total			**€ 350,160**		**€ 350,160**

4.245 The rates for this project appear to be reasonable. Dublin Airport has provided a marked up drawing that illustrates where the quantities for this project have been measured from. However, there is insufficient detail within this drawing to allow us to fully validate the quantities. We will continue to ask more questions and work with Dublin Airport with a view to validating the quantities for the final report. They have also confirmed that the rate for the GRP terminations is a Dublin Airport IT framework rate.

CIP.20.01.099 – RWY 16/34 Lighting for Low Visibility Procedures (LVP)

Introduction

4.246 This project proposes to install LVP taxiing guidance lighting on Runway 16/34 to allow it to be used as a LVP Taxiway route.

Figure 4.29: RWY 16/34 Lighting for Low Visibility Procedures (LVP)

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.247 To achieve full LVP Taxiway Lighting on R16/34 and ancillary intersections.

Context

4.248 Runway 16/34 (R16/34) is Dublin Airport's secondary and crosswind runway, primarily used during dual operation and high cross wind 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.

Scope

4.249 The project scope lists:

- New primary cables along length of runway and connecting back to Sub T;
- New primary ducts and pit system to house the proposed primary cable system to Sub T;
- Pits able to accommodate transformers and ILCMS switches;
- Ducting system including LV control ducts for future ILCMS;
- New CCRs;
- New AGL control connections to existing system;
- New secondary cables; and
- New LED light fittings and pots.

Stage

4.250 Feasibility designs not yet completed.

Key project metrics

Table 4.120: RWY 16/34 Lighting for Low Visibility Procedures – Key project metrics

Metric	Value
Construction cost estimate	€ 4,142,447

Specifications review

Table 4.121: RWY 16/34 Lighting for Low Visibility Procedures – Specifications review

Subject	Comments
Effectiveness of scope	The scope provided is very high level. Nonetheless, the scope description appears to align with the outline brief of achieving full LVP Taxiway Lighting on R16/34 and ancillary intersections.
Alternative scopes	The requirements for the provision of LVP compliant lighting are tightly controlled by EASA regulatory standards and as such there are no meaningful alternative scopes available.
Quality of specifications	The specification is very high level. Albeit the project timescale suggests that the feasibility stage has not been completed, Dublin Airport has stated that secondary leads and light pots have already been installed.
Phasing and synergies with other projects	R16/34 pavement has already been improved under a separate project. It is advantageous to have carried out elements of these LVP lighting improvements prior to the pavement improvements (considering the new secondary leads and lighting pots). We understand that Dublin Airport deployed enabling works (secondary cables and pots) for R16/34 LVP centreline which was completed prior to new surface being installed. It is proposed that R16/34 be used as a principle North-South taxiway route and a central plank of the proposed airfield circulation plan following the completion of the North Runway. Therefore, it is desirable for this project to be completed prior to the opening of the North Runway.
Existing asset conditions	New assets.
Double counting	It is not clear if the costs for the enabling works elements, including secondary cables and pots, have already been included within maintenance budgets for the runway 16/34 pavement rehabilitation.

4.251 In overall terms, the conclusion is that this project is effective, but greater clarity on the scope of the project would be required.

Cost estimate review

Table 4.122: RWY 16/34 Lighting for Low Visibility Procedures – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 621,367	€ 621,367	€ 0
Construction Costs	€ 4,142,447	€ 4,142,447	€ 0
Escalation, Contingency & Design Variability	€ 714,572	€ 714,572	€ 0
Total	**€ 5,478,386**	**€ 5,478,386**	**€ 0**

Table 4.123: RWY 16/34 Lighting for Low Visibility Procedures – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	15%	€ 621,367	15%	€ 621,367
Total			**€ 621,367**		**€ 621,367**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 4,142,447	€ 4,142,447	€ 4,142,447
Total			**€ 4,142,447**		**€ 4,142,447**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	15%	€ 714,572	15%	€ 714,572
Total			**€ 714,572**		**€ 714,572**

4.252 Dublin Airport has provided a document to support its Level 3 estimate that contains a significant level of detail. It contains some quantities and rates and while we have not been able to validate the quantities due to a lack of design information, in general the rates appear to be reasonable for the works described. There are still, however, a number of lump sum allowances included in the document provided that we cannot validate at this time as no build-up has been provided. We will continue to work with Dublin Airport to establish the build-up to these lump sums, and we will update our analysis for the final report based on this. However, Dublin Airport's overall approach to the preparation of the estimate is sensible.

CIP.20.07.013 – Airfield Redesignation

Introduction

4.253 A project to provide new signage and markings across the Airport to suit an amended Taxiway network naming scheme.

Figure 4.30: Airfield Redesignation

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

4.254 To deliver the re-designation of the Taxiway network in line with recent proposals by the Airport following a review of the existing network.

Context

4.255 The project aims to rationalise the existing naming structure and reduce complexity for users.

Scope

4.256 The project scope includes:

- New signage and paint markings to all Taxiway & Taxi-lanes.

Stage

4.257 Outline Design – new designations have been determined. Final design and installation to be included in other Capital Projects.

Key project metrics

Table 4.124: Airfield Redesignation – Key project metrics

Metric	Value
Construction cost estimate	€ 1,125,000

Specifications review

Table 4.125: Airfield Redesignation – Specifications review

Subject	Comments
Effectiveness of scope	While the scope is minimal, the work required to complete it is also relatively minimal. This project scope can be treated as an over-arching statement of intent for works to be included in future projects. The CIP submission states that the Re-Designation planning exercise has already been completed, and therefore this scope only includes for the civil works.
Alternative scopes	There are no alternative scopes – but the re-use of existing signage equipment should be considered.
Quality of specifications	Specification is minimal, and there are no detailed costs – Dublin Airport has indicated that the sum for this project is an allowance rather than based on detailed design. The brief outline of the project suggests all new signage. There is no indication as to whether the re-use of existing signage has been considered or included – this would represent an efficiency as much of the signage will remain in-situ. The Level 2 costs do not reference paint marking and it is not clear if allowance has been made for new markings under this project, or if the intention is to include this in the "parent" projects under which the Re-Designation will occur.
Phasing and synergies with other projects	The project is intended to be completed as part of other projects.
Existing asset conditions	No indication is given that the existing signage is in anyway unfit for purpose. Only the designations require changing.
Double counting	None identified.

4.258 The scope is limited as an over-arching statement of intent for works to be carried out under other projects. In that regard it is effective, but with the caveat that the final design of the works is still to be carried out.

Cost estimate review

Table 4.126 Airfield Redesignation – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 150,000	€ 146,250	-€ 3,750
Construction Costs	€ 1,125,000	€ 1,125,000	€ 0
Escalation, Contingency & Design Variability	€ 225,000	€ 228,825	€ 3,825
Total	**€ 1,500,000**	**€ 1,500,075**	**€ 75**

Table 4.127: Airfield Redesignation – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	13%	€ 150,000	13%	€ 146,250
Total			**€ 150,000**		**€ 146,250**

Construction Costs (C-C)	Quantity	Dublin Airport rate	Dublin Airport cost estimate	Steer rate	Steer cost estimate
Fittings / Furnishings & Equipment	1	n/a	€ 1,125,000	n/a	€ 1,125,000
Total			**€ 1,125,000**		**€ 1,125,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	18%	€ 225,000	18%	€ 228,825
Total			**€ 225,000**		**€ 228,825**

4.259 Dublin Airport has provided a Level 3 estimate for the project. While there is not a lot of detail in it, they have provided a separate document that they state substantiates the large lump sum in the Level 3 estimate on the basis that this project needs to undertake twice the amount of work as a similar historic project did. The rates in that document appear to be reasonable but we have no means of validating the quantities in it due to the lack of design information provided. We will ask additional questions to establish the quantities in the lump sums, and we will update our analysis for the final report based on this.

4.260 Dublin Airport has stated that the sum included in the cost sheet is an allowance at present and that considerably more work is required to identify the exact scope of works to be completed.

CIP.20.07.032 – Unit Load Device (ULD) Storage

Objective

4.261 This project aims to provide new Unit Load Device Storage Stillage at Dublin Airport for use by the ground handlers and airlines as a key enabler for more efficient use of the airfield.

4.262 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; and
- 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.

Figure 4.31: Unit Load Device (ULD) Storage

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Context

4.263 Unit Load Devices (ULDs) are used to load luggage, freight, and mail on wide-body aircraft and specific narrow-body aircraft. ULDs allow a large quantity of cargo to be bundled into a single unit which leads to fewer units to load and saves on ground crews time and effort.

4.264 Currently when not in use ULDs are parked at Dublin Airport in dedicated zones away from other apron/airfield activity but within reach of airline and ground handler agents.

4.265 In recent years the space available for ULD parking at the airport has reduced significantly due to various construction projects and increases activity on the ramp due to greater passenger numbers which has resulted in an increase in Ground Service Equipment (GSE), ULD movements and static volumes.

4.266 As a result of the above challenges the airport and their stakeholders have recognised the need for more efficient use of airfield available space which can be achieved through the phased introduction of strategically location multilayer ULD stillage.

Scope

4.267 The provision of ULD Stillage.

Key project metrics

Table 4.128: Unit Load Device (ULD) Storage – Key project metrics

Metric	Value
Construction cost estimate	€ 3,750,000
Dublin Airport estimation method	Dublin Airport feedback to questions raised have determined that this is project allowance only which will need to be developed with users over the CIP period.

Specifications Review

Table 4.129: Unit Load Device (ULD) Storage - Specifications review

Subject	Comments
Effectiveness of scope	This project scope will deliver ULD stillage.
Alternative scopes	The project planning, design and procurement processes for this project will need to be reviewed and evaluated to determine if alternative product/supplier options are possible once the scope is sufficiently developed.
Quality of specifications	No specifications.
Phasing and synergies with other projects	Whilst not directly related the Unit Load Device Storage - Stillage have synergies with the aspects of the works planned in Runway, Taxiways, Apron and Pier redevelopments.
Existing asset conditions	None declared at present.
Double counting	At this early stage of the project planning, design and procurement processes for this project it has not been possible to determine any double counting.

4.268 In the context of the information provided: This Unit Load Device Storage Stillage project scope appears to be effective in meeting the objective and efficient in its scope.

Cost estimate review

Table 4.130: Unit Load Device (ULD) Storage – Level 1 Costs

	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 500,000	€ 299,216	-€ 200,784
Construction Costs	€ 3,750,000	€ 3,740,196	-€ 9,804
Escalation, Contingency & Design Variability	€ 750,000	€ 931,084	€ 181,084
Total	**€ 5,000,000**	**€ 4,970,496**	**-€ 29,504**

Table 4.131: Unit Load Device (ULD) Storage – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	13%	€ 500,000	15%	€ 299,216
Total			**€ 500,000**		**€ 299,216**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 3,750,000	€ 3,740,196	€ 3,740,196
Total			**€ 3,750,000**		**€ 3,740,196**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	18%	€ 750,000	19%	€ 931,084
Total			**€ 750,000**		**€ 931,084**

4.269 Dublin Airport has provided a Level 3 estimate for the project. It contains a rate of [redacted] per ULD storage system but no substantiation to this rate has been provided. The rate for the concrete base for the unit is reasonable. We have not been able to validate the quantity of 8 nr ULD's at this stage. We will therefore continue to work with Dublin Airport with a view to validating the quantities and updating our analysis ahead of the final report.

5 Project Reviews – CIP2020 Appendix B - Asset Care (M&E)

Summary

Table 5.1: Appendix B - Asset Care (M&E) – Summary

CIP Number	Project Title	RAG Costs	Dublin Airport cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)
CIP.20.02.001	Medium Voltage (MV) Electrical Network	0.0%	6.3	6.3	0.0
CIP.20.02.002	Second Medium Voltage (MV) Connection Point	-0.4%	1.0	1.0	0.0
CIP.20.02.004	Passenger Boarding Bridges (Maintenance & P3 Enhancement) & FEGP	-4.9%	18.1	17.2	-0.9
CIP.20.02.005	Lift Upgrade Programme - Terminal and Multi-Storey	0.0%	6.2	6.2	0.0
CIP.20.02.006	Airport Water & Foul Sewer Upgrade	-1.1%	5.0	4.9	-0.1
CIP.20.02.007	Life Safety Systems (LSS) Upgrade Programme Terminal and MSCP Buildings	0.0%	10.1	10.1	0.0
CIP.20.02.008	Terminal Buildings HVAC Upgrade	0.0%	17.8	17.8	0.0
CIP.20.02.009	Campus Buildings: Mechanical, Electrical & LSS Upgrade	-0.3%	9.5	9.4	0.0
CIP.20.02.010	Pier 3 Life Extension Works - Mech, Elec and Foul Drainage	0.0%	14.0	14.0	0.0
CIP.20.02.013	Small Energy Projects	12.4%	4.8	5.4	0.6
CIP.20.07.030	Large Energy Project - Photovoltaic Farm	-15.5%	10.0	8.5	-1.5
Total		**-1.9%**	**102.8**	**100.9**	**-1.9**

5.1 Overall our estimates for Asset Care M&E suggests that the cost envelope could reduce by €1.9m.

5.2 Individual reports for the projects in this Appendix are presented below.

CIP.20.02.001 – Medium Voltage Electrical Network

Introduction

5.3 This project includes the upgrade, maintenance and end of life replacement of some cable sections and equipment components of the Medium Voltage (MV) Electrical Power Distribution Network, which Dublin Airport states are required to ensure continuity of power supply and distribution across Dublin Airport.

Figure 5.1: Medium Voltage Electrical Network

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

5.4 The MV Electrical Distribution Network is a system which is critical to the safety and operation of the airport. In order to ensure that the MV network maintains its high reliability and operational resilience, Dublin Airport advises a need to upgrade and replace some major equipment and assets of the MV Electrical distribution system.

Context

5.5 Following a hazard and operability (HazOps) Study commissioned by Dublin Airport and several Asset Health Review Workshops, a set of projects have been identified to address the maintenance and end of life issues of some major components of the Medium Voltage Electrical Distribution Network. This includes deteriorating MV distribution cables, transformers and monitoring and control systems.

Scope

- Replace end of life sections of cable on the existing MV network;
- Testing has been undertaken to determine performance and degradation of the existing cables, these tests have identified several sections of cable need replacement;
- Replace end of life substation switchgear and transformers; and
- Replacement of the MV SCADA system
  - The SCADA system was installed in 2008 & 2009. It requires complete replacement as SCADA system vendor has advised Dublin Airport that the existing system software will not be fully supported after 2020.

Stages

• Airfield MV ring upgrade	Q3 2021
• Replace Switch gear substations 6,9,10&11	Q4 2020
• Replace Transformers substations 5&19 and Switchgear in Substation 19	Q4 2020
• Replace Transformers substations 1,8,6 Bay & Hangar 6	Q2 2023
• MV SCADA System	Q3 2023

Key project metrics

Table 5.2: Medium Voltage Electrical Network – Key project metrics

Metric	Value
Construction cost estimate	€ 4,530,907
Dublin Airport estimation method	The detailed work specifications are still to be prepared. The itemised costs that are provided are based on recently completed similar projects and consultation with MV specialists. At this stage in the project and the level of scope detail provided, the approach to cost estimation seems reasonable given that detailed works specifications and planning are still to be progressed.

Specifications review

Table 5.3: Medium Voltage Electrical Network – Specifications review

Subject	Comments
Effectiveness of scope	The scope of this work would appear necessary and reasonable.
Alternative scopes	The detailed project planning, design and procurement processes will need to identify any options or alternative scopes.
Quality of specifications	There are no detailed specifications for the work at this stage.
Phasing and synergies with other projects	The project will be phased over 2 years completing Q3 2021.
Existing asset conditions	The existing assets are, reportedly, end of life and in some cases showing signs of deterioration. Dublin Airport has conducted several workshops and have deemed specific parts of the MV system in need of replacement. The SCADA system product supplier has advised Dublin Airport that software will not be supported after 2020.
Double counting	No evidence of double counting.

5.6 The scope of work is based on Dublin Airport's AMD's condition surveys. This seems like an effective, efficient and reasonable approach to identifying the critical MV assets that need to be replaced in this CIP period.

Cost estimate review

Table 5.4: Medium Voltage Electrical Network – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 339,818	€ 339,818	€ 0
Construction Costs	€ 4,530,907	€ 4,530,907	€ 0
Escalation, Contingency & Design Variability	€ 1,422,934	€ 1,422,934	€ 0
Total	**€ 6,293,659**	**€ 6,293,659**	**€ 0**

Table 5.5: Medium Voltage Electrical Network – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 339,818	8%	€ 339,818
Total			**€ 339,818**		**€ 339,818**

Construction Costs (C-C)	Quantity	Dublin Airport rate	Dublin Airport cost estimate	Steer rate	Steer cost estimate
Electricity Distribution to External Plant and Equipment.	1	n/a	€ 2,423,100	n/a	€ 2,423,100
Telecommunications and other Communication System Connections	1	n/a	€ 1,175,000	n/a	€ 1,175,000
Main Contractors Preliminaries	1	n/a	€ 539,715	n/a	€ 539,715
Other Development Costs	1	n/a	€ 393,092	n/a	€ 393,092
Total			**€ 4,530,907**		**€ 4,530,907**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 1,422,934	29%	€ 1,422,934
Total			**€ 1,422,934**		**€ 1,422,934**

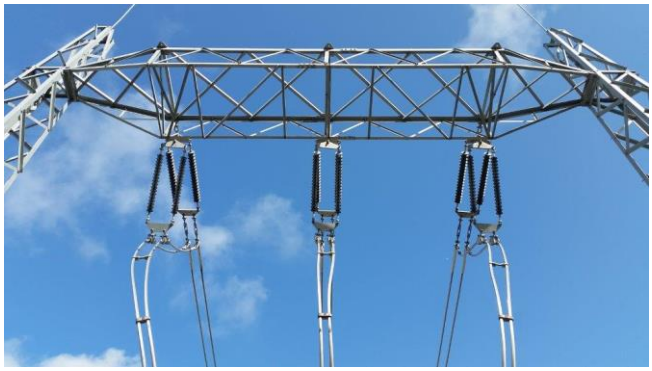
5.7 In general, the rates for this project are reasonable. In response to our queries Dublin Airport has provided an explanation for the €220,000 lump sum which equates to €44,000 per substation for switchgear replacement. This figure appears reasonable for the work involved. It has also explained that the 2-way duct item includes for excavation, bedding and backfilling. The quantities also seem reasonable, although cannot be fully validated as detailed specifications of works have still to be prepared.

CIP.20.02.002 – Second Medium Voltage (MV) Connection Point

Introduction

5.8 This is a feasibility study for the provision of a geographically separate second electrical supply point at Dublin Airport. Currently all electrical supply to the airport is concentrated at a single location connection point at Dardistown Substation making this a single point of failure for the airport.

Figure 5.2: Second Medium Voltage (MV) Connection Point



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

5.9 A feasibility study to establish the viability, risks, issues and benefits of increasing the resilience of Dublin airport in the event of power failure at the airport's current main incomer connection point located at Daradistown 110Kv substation. This will evaluate providing a geographically separate locations for the two main incoming Electrical supplies from the ESB grid to improve the power supply resilience at the airport.

Context

5.10 In the UK and Europe, the provision of more than one main power supply incomer connection point to critical infrastructure and industries is common to ensure airport business continuity. For example, Heathrow, Gatwick and Bournemouth airports these have two electrical incomer connection points. The existing Single location of Daradistown 110Kv substation for the two incomer supplies to Dublin Airport has been identified as a business continuity risk as a single point.

Scope

- Conduct a feasibility study into the risks, issues and benefits of geographically separating the two 110 KV incomer connection points currently both located at Daradistown 110Kv substation; and
- Investigate a suitable location for a second 110Kv incomer connection point to serve the airport.

Stages

5.11 Second MV connection point feasibility study - Q1 2022

Key project metrics

Table 5.6: Second Medium Voltage Connection Point – Key project metrics

Metric	Value
Construction cost estimate	€ 1,000,000

Metric	Value
Dublin Airport estimation method	The detailed scope of this feasibility study has not been identified in full. The costs will be associated with a professional services fee for completing the feasibility study. They have been estimated from similar previous feasibility studies. The approach to cost estimation seems reasonable given that there is no detailed project scope define at this stage.

Specifications review

Table 5.7: Second Medium Voltage Connection Point - Specifications review

Subject	Comments
Effectiveness of scope	The Scope for the feasibility study will be to evaluate the risks issue and benefits of providing two geographically separate locations for the 100KV incoming electrical supplies to the airport.
Alternative scopes	The project feasibility study will need to look options and alternatives.
Quality of specifications	The brief for the feasibility study is still to be approved.
Phasing and synergies with other projects	The Feasibility study will be completed in Q1 2022.
Existing asset conditions	The current 110kv Incomers both connect at Daradistown 110Kv substation. This is a potential single point of failure. The existing backup power generation system is only intended to provide power for up to 2 hours and only to critical airport systems. There is a risk to the airport's business continuity.
Double counting	No evidence of double counting.

5.12 This feasibility study will establish the options available to Dublin Airport and achieve the objective of establishing the most efficient and effective approach for Dublin Airport to take.

Cost estimate review

Table 5.8: Second Medium Voltage Connection Point – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 1,000,000	€ 1,000,000	€ 0
Escalation, Contingency & Design Variability	€ 0	€ 0	€ 0
Total	**€ 1,000,000**	**€ 1,000,000**	**€ 0**

Table 5.9: Second Medium Voltage Connection Point – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 0	8%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Services	1	n/a	€ 1,000,000	n/a	€ 1,000,000
Total			**€ 1,000,000**		**€ 1,000,000**

Escalation, Contingency & Design Variability	Quantity	% of Dublin Airport DM-C + C-C	Dublin Airport cost estimate	% of Steer DM-C + C-C	Steer cost estimate
Escalation, Contingency & Design Variability	n/a	29%	€ 0	29%	€ 0
Total			**€ 0**		**€ 0**

5.13 Dublin Airport has advised that the project is to deliver a feasibility study into the need for a second 110kV substation. They also provided a report prepared by Aecom that Dublin Airport states has identified the design cost for the works at €7.5m and that 10% of this sum will be required to complete the feasibility study. While that logic is sound we have no means of validating the total design cost of €7.5m at this time.

CIP.20.02.004 – Passenger Boarding Bridges (Maintenance and P3 Enhancement) & Fixed Electrical Ground Power

Introduction

5.14 The project includes the refurbishment of Passenger Boarding Bridges (PBB), the provision of a new dual airbridge on Pier 3 and the expansion of Fixed Electrical Ground Power (FEGP.

Figure 5.3: Passenger Boarding Bridges (Maintenance and P3 Enhancement) & Fixed Electrical Ground Power

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objectives

5.15 This project is to refurbish the 27 PBBs at Dublin Airport. The refurbishment covers replacement of end of life flooring, weathering and external finishes upgrades to PBB control systems and replacement of cable looms.

The project also involves installation of a dual airbridge on Pier 3.

5.16 Further the project involves replacement of 27 old FEGP units with modern solid-state technology and installation of 33 new FEGP units on stands on Pier 1 and 2 and Apron 5G.

Scope

5.17 Passenger Boarding Bridges (PBBs)

- Replace end of life PBB flooring, weathering and external finishes to 6 PBBs on Pier 3;
- Mid-life control systems upgrade for 19 Pier 4 PBBs and 6 Pier 3 PBBs;
- Replace PBB flooring with improved slip resistance and replacement of cable looms in the 19 Pier 4 PBBs;
- Install a second dual airbridge docking solution to Pier 3 with fixed Electrical Ground Power (FEGP) provision;
- Replacement of 27 No Pier 4 FEGP units with modern solid-state technology; and
- The installation of 33 No FEGP units to stands on Pier 1, Pier 2 and Apron 5G.

Stages

- 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

Key project metrics

Table 5.10: Passenger Boarding Bridges (Maintenance and P3 Enhancement) & Fixed Electrical Ground Power - Key project metrics

Metric	Value
Construction cost estimate	€ 13,706,525
Dublin Airport estimation method	Detailed PBB and Works specifications still need to be prepared for the PBB and FEGP works. These works are asset replacement works for PBB's, installation of a dual Airbridge and both replacement and Augmentation and FEGP on PBB and stands. Costs have been itemised at high level based on the initial high-level anticipated scope of work required. The costs for PBBs have been based on recent costs for PBB replacement and similar upgrade works. The costs for FEGP's units based on recent tendered rates. The approach to cost estimation is reasonable given the level of scope definition and detailed specification at this stage.

Specifications review

Table 5.11: Passenger Boarding Bridges (Maintenance and P3 Enhancement) & Fixed Electrical Ground Power - Specifications review

Subject	Comments
Effectiveness of scope	The scope of this project will achieve the proposed outcomes.
Alternative scopes	The project planning, and procurement processes will need to look at alternative scopes.
Quality of specifications	The detailed work scope specifications still need to be prepared for each PBB upgrade. The FEGP upgrades still need to be specified for procurement from FEGP equipment vendors.
Phasing and synergies with other projects	The refurbishments will be a rolling programme of upgrades on both PBB's and FEGP and carried out progressively over CIP period 2020 – 2024.
Existing asset conditions	Dublin Airport state: • The existing PBBs require mid-life upgrades. PBB Control system reliability has been poor leading to delays for airlines and passengers; and • The FEGP units need replacing with more efficient solid state units.
Double counting	The PBB refurbishments and FEGP unit upgrades are being carried out on like for like basis. There is some augmentation of FEGP to stands and a new dual PBB for WB stands. There is no identified double counting for this equipment.

5.18 This project seems to be an efficient, effective and reasonable approach to extending PBB asset life and expanding and achieving Dublin Airport's objectives more efficient aircraft ground power provision at Dublin.

Cost estimate review

Table 5.12: Passenger Boarding Bridges (Maintenance and P3 Enhancement) & Fixed Electrical Ground Power – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 513,995	€ 488,870	-€ 25,125
Construction Costs	€ 13,706,525	€ 13,036,525	-€ 670,000
Escalation, Contingency & Design Variability	€ 3,846,651	€ 3,658,619	-€ 188,032
Total	**€ 18,067,171**	**€ 17,184,015**	**-€ 883,156**

Table 5.13: Passenger Boarding Bridges (Maintenance and P3 Enhancement) & Fixed Electrical Ground Power – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General allowance- Design & Management Costs	n/a	4%	€ 513,995	4%	€ 488,870
Total			**€ 513,995**		**€ 488,870**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Air Bridges	1	n/a	€ 7,203,000	n/a	€ 6,533,000
Electricity Distribution to External Plant and Equipment (incl. Telecommunications)	1	n/a	€ 4,915,950	n/a	€ 4,915,950
Minor Building Works & Ancillary Buildings	10	€ 2,500	€ 25,000	€ 2,500	€ 25,000
Main Contractors Preliminaries	1	n/a	€ 617,619	n/a	€ 617,619
Other Development Costs	1	n/a	€ 944,957	n/a	€ 944,957
Total			**€ 13,706,525**		**€ 13,036,525**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	27%	€ 3,846,651	27%	€ 3,658,619
Total			**€ 3,846,651**		**€ 3,658,619**

5.19 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 5.14: Passenger Boarding Bridges (Maintenance and P3 Enhancement) & Fixed Electrical Ground Power – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Refurbishment of existing airbridge to create a second dual airbridge docking solution	**Redacted Cost Information**			€ 200,000
New airbridge to create a second dual airbridge docking solution				€ 500,000

5.20 The cost of the new airbridge is high and we have reduced this in line with airbridge costs that we have from the main UK airports. In addition, the cost of the refurbishment of the existing airbridge is too high. We asked Dublin Airport to provide substantiation for the costs of the

new airbridges and to explain what scope of works was intended for the airbridge refurbishment. Dublin Airport advised that the airbridge costs were based on previous airbridge procurement in 2016. They have provided invoices from US based supplier to justify the rates included in their Level 3 estimate. However, based on our experience procuring airbridges from a European supplier, significant cost reductions could be achieved. We disagree with Dublin Airport's rates as we have recently procured airbridges at various UK airports that cost significantly less than Dublin Airport's proposal. We have reduced those rates in line with recent airbridge projects that we have data for.

5.21 Dublin Airport advised that the refurbished airbridges needed to be moved to a covered ventilated location off site so that they could be stripped out (including all services) and refurbished. Despite this response we still believe that their rates are too high, and we have reduced the allowance based on airbridge refurbishments undertaken at various UK airports.

5.22 We have not been able to validate quantities on this project as no design information has been provided at this time. We will therefore work with Dublin Airport, requesting further information to establish validation of the quantities prior to publication of the final report. The FEGP enabling works and Pier 2 substation rates are reasonable. A limited build-up for the lump sum for the fixed link has been provided and it appears to be reasonable for the works required.

CIP.20.02.005 – Lift Upgrade Programme – Terminal and Multi-Storey

Introduction

5.23 The reliable performance and availability of Lifts & Escalators and Travellators assets are critical to the airport maintaining passenger service levels. Dublin Airport report that many of these assets are due for end of life replacement in the upcoming CIP.

Figure 5.4: Lift Upgrade Programme – Terminal and Multi-Storey

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

5.24 Replacing end of life lifts, escalators and travellators in the terminal and car parks at Dublin Airport.

Context

5.25 The Airport has installed Lifts, Escalators and Travellators in Terminals and Multi Story Carparks to facilitate efficient vertical transportation and movement of passengers, staff baggage trolleys and goods etc. They are particularly important to meeting the vertical movement requirement of Passengers with Reduced Mobility (PRMs). In the next 5 years many of Terminal1's Lifts, Escalators and Travellators will have exceeded 25 years in service.

Scope

5.26 Complete phase 1 of a 2 phase Terminal 1 lift and escalator replacement programme. The project scope includes component upgrades for extended equipment life and to improve reliability and the refurbishment of lifts and escalators to extend asset life.

- Phase 1 requires the full replacement of 6 No lifts & 4 No Escalators including several shafts which will require altering to satisfy new EN standards.
- Installation of lift monitoring technology across terminals, carparks and campus buildings to allow for monitoring of lift performance, optimise maintenance and improve availability and enabling immediate notification of lift failures and passenger entrapment in lifts.

- Replace 13 sets of Lift Doors on Heavy Goods Lifts across both terminals and carry out door controller upgrades in T1.
- Full replacement of 7 lifts and 3 escalators in T1 Multi Story Car Park.

Stages

- 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

Key project metrics

Table 5.15: Lift Upgrade Programme – Terminal and Multi-Storey – Key project metrics

Metric	Value
Construction cost estimate	€ 4,920,000
Dublin Airport estimation method	The costs of equipment have been itemised together with some associated planning and design costs. This replacement programme will require planning and works specifications for each equipment's replacement. The lift escalator and travellator replacement costs have been based on costs estimated for previous similar projects and carried out at the airport. This seems a reasonable approach to take given the type of asset replacement work involved.

Specifications review

Table 5.16: Lift Upgrade Programme – Terminal and Multi-Storey – Specifications review

Subject	Comments
Effectiveness of scope	Each asset replacement will require detailed planning and works specification to finalise the scope of work and identify final costs.
Alternative scopes	None identified.
Quality of specifications	Detailed specification for the work is still to be prepared. Specifications will be needed for each item of equipment undergoing replacement.
Phasing and synergies with other projects	This will be a rolling programme of works through the CIP 2020-2024 period.
Existing asset conditions	The existing lifts and escalator assets are deemed end of life by Dublin Airport. Moreover, some lift shafts need to be reworking to be compliant with new EN standards for lifts.
Double counting	The asset replacement projects are existing end of life replacements on a like for like basis, and therefore there is no double counting.

5.27 This project will achieve Dublin Airport's objective for improved reliability and serviceability of all its aging lifts escalators and travellators.

Cost estimate review

Table 5.17: Lift Upgrade Programme – Terminal and Multi-Storey – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 369,000	€ 369,000	€ 0
Construction Costs	€ 4,920,000	€ 4,920,000	€ 0
Escalation, Contingency & Design Variability	€ 950,856	€ 950,856	€ 0
Total	**€ 6,239,856**	**€ 6,239,856**	**€ 0**

Table 5.18: Lift Upgrade Programme – Terminal and Multi-Storey – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 369,000	8%	€ 369,000
Total			**€ 369,000**		**€ 369,000**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Lifts & Enclosed Hoists	1	n/a	€ 2,990,000	n/a	€ 2,990,000
Escalators	1	n/a	€ 1,715,000	n/a	€ 1,715,000
Other Development Costs	1	n/a	€ 215,000	n/a	€ 215,000
Total			**€ 4,920,000**		**€ 4,920,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	18%	€ 950,856	18%	€ 950,856
Total			**€ 950,856**		**€ 950,856**

5.28 The rates included by Dublin Airport for both lifts and escalators are reasonable. The Level 3 estimate also includes reduced allowances for General Design and Management and Contingency. This is reasonable for a project of this nature as its main focus is on the like for like replacement of equipment. We have not validated the quantities on this project as no design information or asset condition information was provided. We will therefore ask for additional information from Dublin Airport to help us validate these quantities in time for the final report.

CIP.20.02.006 – Airport Water and Foul Sewer Upgrade

Introduction

5.29 This replacement, upgrade and refurbishment of critical Airport Campus Mains Water Utility and Foul Water services is an ongoing exercise for Dublin Airport and it aims to maintain the utility infrastructure of the airport in a safe operational state.

Figure 5.5: Airport Water and Foul Sewer Upgrade

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

5.30 The project objectives are the upgrade and refurbishment of Mains Water and Foul water infrastructure at the airport. The work involves the replacement of valves and hydrants and mains water pipework across the airport and upgrade and replacement of the end of life foul water ejector station and pumps and replacement of sewer junctions.

Context

5.31 The mains potable water system at Dublin Airport is supplied from Ballycoolin Reservoir, via a 600mm diameter trunk water main. From a connection on the 600mm trunk (owned by Dublin Airport) two-cell reservoir with a 14,500 m^3 capacity are supplied. The estimated length of potable water mains is 32.5km, containing approximately 550 sluice valves and 350 fire hydrants.

5.32 The foul water sewer system comprises a network of small sewer pipes leading from the two terminals and all campus building. These lead into a 450mm collector sewer and 900mm outfall sewer and in-turn enter the local authority owned swords road branch sewer.

5.33 The main collector and outfall sewers convey under gravity, there are 5 No. ejector stations and 17 No. pumps installed to boost and maintain flow to complete the system.

Scope

Mains Water

- Install underground pipework to complete the Mains water "Ring" between the terminals and the reservoir eliminating an existing network single point failure;
- Install a Reservoir Mains Bypass to allow direct feeding of the Mains Water Ring above eliminating risk of failure or pollution in the mains water reservoir;
- Install a mains water interconnection from the T2 Domestic Water Storage to the T1 Domestic Water storage tanks hence increasing T1 Water Storage capacity; and
- Replace end of life and defective sluice valves, fire hydrants and sections of underground water mains.

Foul Water

- End of life replacements of Ejector stations and pumping stations; and
- Replace sewer junctions at the South Apron to the main sewer outfall and an undersized junction between the ALSAA swimming pool and MC78.

Stages

• 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,	Q3 2020 – Q1 2022
• Completion of Ring at Hangar 6,	Q3 2020 – Q1 2022
• Replacement of mains water pipework	Q3 2020 – Q1 2022
• Replacement of valves at North Apron and Hangars	Q3 2020 – Q1 2022
• South Apron Complex Sewer	Q1 2021 – Q3 2021

Key project metrics

Table 5.19: Airport Water and Foul Sewer Upgrade – Key project metrics

Metric	Value
Construction cost estimate	€ 3,710,725
Dublin Airport estimation method	This is an asset replacement project based on upgrading and replacement of end of life assets. Dublin Airport has stated they estimate they will replace 10% of the installed Foul and Mains water asset base in this CIP. The costs have been estimated based on the anticipated scope of work and a feasibility study completed in 2018. They are based on tender returns form similar works delivered in the last 2 years. Dublin Airport has stated that no detailed specifications have been prepared consequently these costs will be initial estimates. Detailed specifications will need to be developed from asset condition surveys which will be needed to complete project implementation planning and to finalise costs. This would seem a reasonable approach given the stage of the project's development.

Specifications review

Table 2: Airport Water and Foul Sewer Upgrade - Specifications review

Subject	Comments
Effectiveness of scope	These projects are part of a maintenance and renewal and replacement programme. Dublin Airport state that the Mains and Foul water services asset replacements planned for this CIP will amount to a 10% replacement of the installed asset base. This would indicate a general asset life of 50years for Mains and foul water asset at the airport, which would appear to be a reasonable asset life for these services.
Alternative scopes	None identified at this time.
Quality of specifications	A feasibility study was carried out for the T1-T2 work in Q2 2018. No detailed specifications for either Mains or Foul water works has been prepared to date.

Subject	Comments
Phasing and synergies with other projects	There is no specific phasing of the Mains and Surface water and Fire Hydrant works. These upgrades occur throughout the CIP 2020 – 2024 period. The Water Resilience works will commence at the start of the CIP and foul water works in 2021.
Existing asset conditions	These existing mains water and foul water valve and sluice replacements are due to end of life conditions. The other works are aimed at increasing the general resilience of the potable mains water and foul water infrastructure assets. Dublin Airport state that they will be replacing Sluices and Hydrants that are beyond their useful life and are now 40-50 years old.
Double counting	The asset replacement projects are effectively combining end of life replacement with a process on increasing Foul and mains water network resilience. This is a part of an ongoing network upgrade and renewal process determined by DAM and condition surveys. Therefore, there is no double counting.

5.34 This project will deliver its objective of achieving a more resilient mains water and foul water network for the Airport increasing water storage capacity and maintaining a network through a general asset replacement. The overall asset replacement will be 10% of the installed infrastructure during this CIP which is indicating that Dublin Airport's mains water and foul water infrastructure has an average expected asset life of 50 years, which is a reasonable expectation. The asset replacement is based on asset condition surveys by Dublin Airport's AMD which should be an effective, efficient and reasonable approach to identifying the asset replacement works required.

Cost estimate review

Table 5.20: Airport Water and Foul Sewer Upgrade – Level 1 Costs

	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 296,858	€ 296,036	-€ 822
Construction Costs	€ 3,710,725	€ 3,667,700	-€ 43,025
Escalation, Contingency & Design Variability	€ 945,629	€ 935,283	-€ 10,346
Total	**€ 4,953,212**	**€ 4,899,019**	**-€ 54,193**

Table 5.21: Airport Water and Foul Sewer Upgrade – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 296,858	8%	€ 296,036
Total			**€ 296,858**		**€ 296,036**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Services - Water Mains Supply	1	n/a	€ 153,500	n/a	€ 153,500
Ex Works - Supply to Building	1	n/a	€ 2,605,000	n/a	€ 2,205,000
Ex Works - Fire mains & hydrant	1	n/a	€ 300,000	n/a	€ 670,000
Main Contractors Preliminaries	1	n/a	€ 458,775	n/a	€ 454,275
Other Development Costs	1	n/a	€ 193,450	n/a	€ 184,925
Total			**€ 3,710,725**		**€ 3,667,700**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	24%	€ 945,629	24%	€ 935,283
Total			**€ 945,629**		**€ 935,283**

5.35 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 5.22: Airport Water and Foul Sewer Upgrade – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
4 stage booster to BMS 90M3 per hour/6Bar (grundfos)	**Redacted Cost Information**			€ 30,000
Design Development at 5%				€ 184,925
D&M General Allowance				€ 296,036

5.36 The rates for the works in question are reasonable. Dublin Airport has provided a supplier quotation for 4 stage booster but it was half of the value of Dublin Airport's Level 3 estimate, so we have reduced this cost accordingly. We requested a build-up to the other lump sum allowances included in the Level 3 estimate but Dublin Airport has not provided this. Dublin Airport's Level 3 estimate did not state what percentage it had included for General Design and Management Costs and the Design Development costs. We have included 8.5% for General Design and Management and 5% for Design Development. There is insufficient detail in the information to allow us to validate quantities at this time. We will request further information from Dublin Airport to seek validation of the quantities, and we will update our analysis in the final report based on this.

CIP.20.02.007 – Life Safety Systems (LSS) Upgrade Programme – Terminal and MSCP Buildings

Introduction

5.37 The life safety systems upgrade programme covers the replacement, upgrade and refurbishment of Life Safety Systems (LSS) infrastructure across The Airport's Terminals, Piers and car parks (adjacent to T1 & T2).

Figure 5.6: Life Safety Systems (LSS) Upgrade Programme – Terminal and MSCP Buildings

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objectives

5.38 The stated key drivers for the LSS upgrades are to:

- maintain equipment operability;
- comply with regulatory requirements; and
- reducing opex and life cycle costs.

5.39 Whilst the Terminal 1 LSS have been upgraded over the previous 2 CIP Periods, Dublin Airport state this process needs to continue in-order to maintain equipment, system and technology supportability and ensure changes to regulatory and equipment functional requirements are implemented.

Context

5.40 The LSS systems at Dublin Airport include Fire Alarm, Sprinkler, PAVA and other Ancillary Systems associated with Fire Detection, control and evacuation. All Dublin Airport's LSS require continuous investment to ensure that Terminals continue to be fully compliant with fire and safety regulations. LSS are critical systems where non-compliance is a significant liability for the airport potentially invalidating insurance and opening the airport to criminal investigation in the event of injury or death following a fire incident.

Scope

- **Fire Alarm Replacement Programme** for end of supported and maintainable life for Fire Alarm Panels and devices in both terminals;
- **Fire and smoke damper replacement** as identified in Michael Slattery Fire Consultants Report, recommending work required to ensure complaint building fire compartmentation;
- **Smoke extract fan** replacement/upgrade for both terminals;
- **Static invertor** end of life replacement to ensure safe back-up power for Emergency lighting; and

- **PAVA** end of life replacement of all active equipment (amplifiers, desk microphones, control software) which are obsolete and unsupported.

Stages

- T1 Fire Alarm Replacement Q3 2022 – Q2 2024
- T2 Fire Alarm & 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

Key project metrics

Table 5.23: Life Safety Systems Upgrade Programme – Terminal and MSCP Buildings – Key Project Metrics

Metric	Value
Construction cost estimate	€ 7,260,895
Dublin Airport estimation method	This is an LSS device replacement programme for which the high-level scope of equipment replacement is identified for the project. It will run in parallel with other terminal refurbishment projects so that the LSS system are progressively upgraded over the CIP period. The cost estimates are based on previous project experience and cost benchmarks. Given the Level 3 itemised detail provided by Dublin Airport this cost estimate is based on asset condition survey(s) carried out by the Asset Management Department which will indicate the scope of the LSS equipment replacement required. Until detailed specifications and design are completed the final detailed cost will not be fully determined. The approach taken is reasonable given the level of planning and design at this stage.

Specifications review

Table 5.24: Life Safety Systems Upgrade Programme – Terminal and MSCP Buildings - Specifications review

Subject	Comments
Effectiveness of scope	The full scope of the LSS replacement programme includes the upgrade and replacement of LSS that are end of life and becoming unsupported. The works will ensure that the LSS maintain compliance with safety regulation and technology standards. The full detailed scope of the LSS replacement is still to be established however the works will be specified by Asset care in collaboration with Dublin Airport's asset management department (AMD).
Alternative scopes	The project planning, design and procurement will need to look at alternative scopes.
Quality of specifications	No specification has been prepared to date. These will be prepared in conjunction with Dublin Airport's AMD.
Phasing and synergies with other projects	There is no detailed phasing identified – However the works will be carried out in the last 2 years of the CIP period. There will be strong synergies with upgrade work planned for the terminal building where LSS fire sensors and devices will

Subject	Comments
	need replacement as a matter of course as the buildings are refurbished.
Existing asset conditions	These LSS are progressively coming to end of life and are becoming unsupported – further there is a need to upgrade to maintain regulatory compliance with Fire and safety standards.
Double counting	Since this is asset replacement of LSS on a like for like system capability basis (not individual devices) and will be determined by Dublin's AMD, there is no double counting.

5.41 This project will achieve Dublin Airport's objectives of upgraded LSS for both terminals and bring the existing system in line with the latest fire and safety regulations. The LSS systems will deliver higher levels of availability and functionality and will introduce new sensors and devices to aid detection reliability and reduce false alarm rates. Further they will assist in achieving a reduction in life cycle costs. This is an efficient, effective and reasonable approach to the upgrade of LSS at Dublin.

Cost estimate review

Table 5.25: Life Safety Systems Upgrade Programme – Terminal and MSCP Buildings – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 694,567	€ 694,567	€ 0
Construction Costs	€ 7,260,895	€ 7,260,895	€ 0
Escalation, Contingency & Design Variability	€ 2,151,953	€ 2,151,953	€ 0
Total	**€ 10,107,415**	**€ 10,107,415**	**€ 0**

Table 5.26: Life Safety Systems Upgrade Programme – Terminal and MSCP Buildings – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General allowance- Design & Management Costs	n/a	5%	€ 544,567	5%	€ 544,567
T1 Sprinkler System Capacity Review	n/a	1%	€ 150,000	1%	€ 150,000
Total			**€ 694,567**		**€ 694,567**
Construction Costs (C-C)	**Quantity**	**Rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Lighting Installation	1	n/a	€ 50,000	n/a	€ 50,000
Fire Fighting System (Other)	1	n/a	€ 7,033,800	n/a	€ 7,033,800
Other Development Costs	1	n/a	€ 177,095	n/a	€ 177,095
Total			**€ 7,260,895**		**€ 7,260,895**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	27%	€ 2,151,953	27%	€ 2,151,953
Total			**€ 2,151,953**		**€ 2,151,953**

5.42 Dublin Airport has provided a revised Level 3 estimate within which there are a number of lump sums for which no build-up to those allowances has been provided, so it is not possible to fully assess the project due to the lack of detail presented. However, the rates for the fire alarm panels, PAVA, fans and the rack mounted UPS are reasonable. Substantiation for the higher value rates is required to allow further comment to be made. We have not been able to

validate any of the quantities included in the level 3 estimate as no design information has been provided to review. We will request further information from Dublin Airport to seek validation of the quantities and of the lump sums, and we will update our analysis in the final report based on this.

CIP.20.02.008 – Terminal Buildings HVAC Upgrade

Objective

5.43 The Asset Care (M&E) – Terminal Buildings Heating, Ventilation and Air Conditioning (HVAC) Replacement investment is broad based, aimed at the upgrading of T1 Medium Temperature Hot Water (MTHW) and Building Management (BMS) Systems and replacement of End of Life Primary and Secondary HVAC Equipment.

5.44 Works required as part of this project include:

- T1 HVAC Programme;
- T1 Energy Centre Refurbishment;
- T2 HVAC system; and
- T2 Combined Heat and Power (CHP) Rebuild

Figure 5.7: Terminal Buildings HVAC Upgrade

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Context

5.45 The majority of the T1 MTHW HVAC distribution is 50 years old and has exceeded end of life. They are also incompatible with the T2 equivalent systems. To mitigate operation risk Dublin Airport needs to continue investing in the reliability, maintainability and durability of its Terminal Buildings to enhance user experience, reduce operational costs and ensure full compliance with regulatory requirements.

Scope

5.46 The Scope of the Terminal Buildings HVAC Replacement Project covers:

- T1 HVAC Programme - Continues the upgrade to the T1 Central MTHW HVAC systems with replacement of the boilers, water heaters and associated energy controls. This works also incorporates the replacement of end of life major and minor chillers plants, major pumps, ancillary equipment and continues the BMS upgrade programme started in the previous CIP;
- Refurbishment of the T1 Energy Centre - Involves the replacement of primary boilers, CHP, pumps, hot water generators and pipe work. The works will require the hiring of a temporary boiler and hot water generator equipment for the duration of the works;
- T2 HVAC Systems - Includes for the replacement of primary circulation pumps and end of life secondary equipment such as door curtains and fan coil units. The works also includes upgrades to the T2 BMS operating system and field controllers; and

- T2 CHP Rebuild - Requires a major rebuild as part of this project including upgrading of operating and control equipment.

Stage

5.47 The Hardware and Software upgrades are part of an ongoing programme of replacement in line with product lifecycle replacement/upgrade and are anticipated to extend from Q1 2020 through to Q3 2024.

Key project metrics

Table 5.27: Terminal Buildings HVAC Upgrade – Key project metrics

Metric	Value
Construction cost estimate	€ 13,366,125
Dublin Airport estimation method	Dublin Airport feedback to questions raised have determined: • MTHW primary energy centre upgrade estimate is based on circa 40,000m^2 at €100/m^2. • HVAC: End of Life replacement are like for like replacement and estimates are based on recent similar works. • BMS upgrade and common platform consolidation is inclusive of field device estimates and cost have been ascertained from discussion with BMS Solution Provider. • CHP upgrades are based on vendor provided budget cost.

Specifications review

Table 5.28: Terminal Buildings HVAC Upgrade – Specifications review

Subject	Comments
Effectiveness of scope	This project scope will effectively deliver the following benefits: • Replacement of End of Life Primary Plant; • Assured Compliant Hardware and Software; • Assured Vendor support of hardware and software for the Medium to Long Term; • Assured Compliance with the Code of Practice Guidelines for Infection Prevention and Control; • Improved System Reliability and Maintainability; • Improved System Efficiency & Environmental Control; • Reduced Stakeholder Complaints; • Reduced Energy & Maintenance Costs; and • Reduced Reactive Opex Costs.
Alternative scopes	Dublin Airport feedback to questions raised have determined that project planning, design and procurement processes for each element is not sufficiently developed to enable alternative product/supplier options to be considered at this juncture.
Quality of specifications	No specifications were forthcoming during this evaluation. Dublin Airport stated these project elements are high level scoped and leverage from specification of recently completed similar projects.
Phasing and synergies with other projects	Whilst not directly related, the HVAC, MTHW and CHP upgrade have synergies with the aspects of the works planned in the broader airport campus redevelopment and upgrade program which will need to be revisited as this and the associated project briefs become more developed. In particular BMS and the likely impacts in IT Servers and Storage - Lifecycle & Growth and IT Network Components - Lifecycle & Growth CIPs.

Subject	Comments
Existing asset conditions	• HVAC, MTHW, CHP & BMS - declared to be end of life; and • T1 & T2 BMS - declared incompatible and out of vendor support.
Double counting	None identified.

5.48 This project appears to be effective in meeting the objective and efficient in its scope. It has been developed from a "bottom up" perspective with rigour applied in the assessment of need for replacement, enhancements and or upgrades to ensure that the staff and passenger comfort is maintained consistently throughout this CIP period.

Cost estimate review

Table 5.29: Terminal Buildings HVAC Replacement – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 1,002,459	€ 1,002,459	€ 0
Construction Costs	€ 13,366,125	€ 13,366,125	€ 0
Escalation, Contingency & Design Variability	€ 3,412,539	€ 3,412,539	€ 0
Total	**€ 17,781,123**	**€ 17,781,123**	**€ 0**

Table 5.30: Terminal Buildings HVAC Replacement – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 1,002,459	8%	€ 1,002,459
Total			**€ 1,002,459**		**€ 1,002,459**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Domestic Water Distribution	1	n/a	€ 725,000	n/a	€ 725,000
Central Heating & Cooling: T1 MTHW upgrades (incl. T1 Energy Centre refurbishment)	1	n/a	€ 4,000,000	n/a	€ 4,000,000
Central Heating & Cooling: Other	1	n/a	€ 1,330,000	n/a	€ 1,330,000
Ventilation Systems: Central Ventilation	1	n/a	€ 250,000	n/a	€ 250,000
Ventilation Systems: Local & Specialist Ventilation	1	n/a	€ 201,000	n/a	€ 201,000
Ventilation Systems: BMS System	1	n/a	€ 3,300,000	n/a	€ 3,300,000
Elec: Mains & Sub mains distribution	1	n/a	€ 300,000	n/a	€ 300,000
Elec: Local Generation Systems	1	n/a	€ 1,250,000	n/a	€ 1,250,000
Minor Build Works and Ancillary Buildings	1	n/a	€ 525,000	n/a	€ 525,000
Main Contractor Preliminaries	1	n/a	€ 1,485,125	n/a	€ 1,485,125
Total			**€ 13,366,125**		**€ 13,366,125**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	24%	€ 3,412,538	24%	€ 3,412,539
Total			**€ 3,412,539**		**€ 3,412,539**

5.49 Dublin Airport has provided a revised Level 3 estimate. While there are some quantities and rates provided, a significant proportion of the cost remains made up of sizeable lump sum

allowances so there is insufficient information to be able to undertake a full detailed analysis of this project. Dublin Airport has provided some supplier quotes to back up some of the costs but the majority of the cost of the project requires further substantiation to allow an analysis to be undertaken. We have also been unable to validate the quantities for this project as no design information has been provided. We will therefore request further information from Dublin Airport to seek validation of the quantities and of the lump sums, and we will update our analysis in the final report based on this.

CIP.20.02.009 – Campus Buildings – Mechanical, Electrical & LSS Upgrade

Objective

5.50 The Campus Buildings – Mech, Elec & LSS Upgrade is a broad-based investment aimed at the upgrading of Mechanical, Electrical and Life Safety Systems of the airport campus buildings to ensure buildings are compliant with regulatory standards and facilities are fit for use.

5.51 Dublin Airport Existing Campus Buildings Overview:

- Corballis Park;
- South Apron;
- Eastlands;
- North Apron;
- Castlemoate;
- OCTB; and
- Westlands and Westpoint.

Figure 5.8: Campus Buildings – Mech, Elec & LSS Upgrade

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Scope

5.52 The scope of the Campus Buildings Upgrade Project covers:

- Life Safety Systems - An LSS survey conducted by Dublin Airport of tenant occupied buildings has identified that an extensive upgrade programme is required to ensure full Statutory Compliance with Life Safety Systems Regulations. This work also incorporates the replacement of Fire Alarm and Emergency Lighting Systems, and full integration of all Campus Buildings Fire Alarms to a single Airport Monitoring System;
- M&E Systems - Extends the Terminal Buildings M&E Replacements Program to the Campus building by replacing MTHW HVAC systems with replacement of the boilers, water heaters and associated energy controls. This work also incorporates the replacement of end of life Electrical Distribution Boards and local A/C and Heating Systems Upgrades; and
- Energy Upgrades e.g. replacement of incandescent lighting systems with LED solutions with local controls, and the installation of improved control solutions for HVAC Equipment.

Stage

5.53 The Hardware and Software upgrades are part of an ongoing programme of replacement in line with product lifecycle replacement/upgrade and are anticipated to extend from Q1 2020 thru Q4 2024.

Key project metrics

Table 5.31: Campus Buildings – Mechanical, Electrical & LSS Upgrade– Key project metrics

Metric	Value
Construction cost estimate	€ 7,262,086
Dublin Airport estimation method	Dublin Airport feedback to questions raised have determined: • Campus LSS has had a survey completed by consultants; • HVAC and Elec projects have been based on recently complete works, i.e. Boiler house upgrades and MDB replacements; and • Costs are based on previous projects completed in airport environment.

Specifications review

Table 5.32: Campus Buildings – Mechanical, Electrical & LSS Upgrade - Specification review

Subject	Comments
Effectiveness of scope	This project scope will effectively deliver the following benefits: • Replacement of End of Life Primary Plant; • Assured Compliant Hardware and Software; • Assured Vendor support of hardware and software for the Medium to Long Term; • Improved System Reliability and Maintainability; and • Improved System Efficiency & Environmental Control.
Alternative scopes	None identified.
Quality of specifications	No specifications were forthcoming during this evaluation. These project elements are high level scoped and leverage specification of recently completed similar projects.
Phasing and synergies with other projects	Whilst not directly related the Campus Buildings upgrade have synergies with the aspects of the works planned in Terminal Building and Pier 3 Life Extension Works.
Existing asset conditions	HVAC, MTHW, LAS & AC - declared to be end of life by Dublin Airport.
Double counting	No double counting has been identified.

5.54 This project is effective in meeting the objective and is efficient in its scope. It has been developed from a “bottom up” perspective with rigour applied in the assessment of need for replacement, enhancements and/or upgrades to these systems.

Cost estimate review

Table 5.33: Buildings – Mech, Elec & LSS Upgrade – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 573,705	€ 544,656	-€ 29,049
Construction Costs	€ 7,262,086	€ 7,262,086	€ 0
Escalation, Contingency & Design Variability	€ 1,640,619	€ 1,639,416	-€ 1,203
Total	**€ 9,476,410**	**€ 9,446,158**	**-€ 30,252**

Table 5.34: Campus Buildings – Mech, Elec & LSS Upgrade – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 573,705	7.5%	€ 544,656
Total			**€ 573,705**		**€ 544,656**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Campus Small Energy Projects	1	n/a	€ 1,250,000	n/a	€ 1,250,000
Campus building LSS replacement Projects	1	n/a	€ 1,100,000	n/a	€ 1,100,000
Campus building Elec MDB replacement programme	1	n/a	€ 500,000	n/a	€ 500,000
Lighting Upgrades to Campus Buildings	1	n/a	€ 500,000	n/a	€ 500,000
Landside Base Expansion	1	n/a	€ 500,000	n/a	€ 500,000
Collinstown House	1	n/a	€ 449,976	n/a	€ 449,976
Cloghran House	1	n/a	€ 432,800	n/a	€ 432,800
Others (31 other buildings)	1	n/a	€ 2,529,310	n/a	€ 2,529,310
Total			**€ 7,262,086**		**€ 7,262,086**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	21%	€ 1,640,618	21%	€ 1,639,416
Total			**€ 1,640,619**		**€ 1,639,416**

5.55 There is a reasonable level of detail included in the Level 3 estimate in terms of quantities, but no design information has been supplied by Dublin Airport to allow these quantities to be validated. The Level 3 estimate also includes a number of sizeable lump sum allowances. Dublin Airport has provided back up to the allowances for the campus small energy projects and they appear to be reasonable. The rates for the various M&E and LSS upgrades appear to be reasonable but there was no design information available to allow the scope to be validated against the rates. We will request further design information from Dublin Airport to help us to validate the quantities ahead of the final report.

5.56 We have included design and management costs at 7.5% of construction costs. However, our calculation results in a slightly lower allowance that in the Dublin Airport estimate.

CIP.20.02.010 – Pier 3 Life Extension Works - Mech, Elec & Foul Drainage

Objective

5.57 In this project, Dublin Airport proposes to extend the life of Pier 3, by:

- Replacing Primary HVAC Equipment and other Mechanical Services;
- Replacing of Primary Electrical Services; and
- Relocating the Foul Waste Retention Tank to an external location.

Figure 5.9: Pier 3 Life Extension Works - Mech, Elec & Foul Drainage

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Context

5.58 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.

5.59 One of the key drivers behind this upgrade project is the, reportedly, non-compliance of the existing Pier 3 central service core. The Pier 3 M&E services plant and equipment which have been in service since the early 1970's are outdated and have exceeded end of life. 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 deemed restrictive.

5.60 In addition, foul wastes are retained at Pier 3 and in an underground tank that is accessed via an internal 'bolted lid'. Dublin Airport reported that the contents possess a biological hazard as the foul waste becomes pressurised and local soiling occurrences have been reported. Current Building Regulations also categorise the tank as a confined space.

5.61 To mitigate operational risk, Dublin Airport proposes to continue investing in the reliability, maintainability and durability of Pier 3.

Scope

5.62 The Scope of the Pier 3 Life Extension Works Project covers:

- M&E – Plant and Equipment:
  - Proposed to replace and relocate all of the M&E equipment to space available on the roof of Pier 3. Connection between the new services location and the Pier will be via a new external services riser; and
  - All electrical services are also to be moved out of the core which will necessitate a full re-wire between the piers primary and secondary electrical services local distribution boards.
- Foul Waste;
  - Proposed to relocate foul waste service in Pier 3 to an external ramp secondary storage tank/ejector station and pumping station with connectivity to the main head of stand foul sewer; and
  - The installation of new foul waste lines between the pier and to external tank and the decommissioning and full sanitation of existing tank.

Stage

5.63 The Mechanical, Electrical and Foul Services upgrades are analogous to the wider ongoing programme of replacement in line with product lifecycle replacement/upgrade and statutory regulatory compliance are anticipated to extend from Q2 2021 thru Q3 2023.

Key project metrics

Table 5.35: Pier 3 Life Extension Works - Mech, Elec & Foul Waste– Key project metrics

Metric	Value
Construction cost estimate	€ 10,087,343
Dublin Airport estimation method	Dublin Airport feedback to questions raised have determined that the project elements are high level notional designs: • Mechanical & Electrical order of magnitude costings have been based on market rates per Sq. M uplifted to allow for: – maintaining service to an operational Pier, restricted working environment; – night time working, airside environment; and – works need to be completed within a confined space with limited access. • Foul estimate is an order of magnitude allowance which requires further design to determine civil works impacting head of stand road for storage tank and rising main.

Specifications review

Table 5.36: Pier 3 Life Extension Works - Mech, Elec & Foul Waste – Specification review

Subject	Comments
Effectiveness of scope	This project scope will effectively deliver the following benefits: • Replacement of End of Life Primary Plant; • Assured Compliant Hardware and Software; • Assured Vendor support of hardware and software for the Medium to Long Term;

Subject	Comments
	• Assured Compliance with the Code of Practice and regulatory Standards; • Improved Safe Access for Maintenance; • Improved Passenger Experience; • Improved System Reliability and Maintainability; • Improved System Efficiency & Environmental Control; and • Reduced Foul Odours experienced in Pier.
Alternative scopes	Dublin Airport feedback to questions raised have determined that project planning, design and procurement processes for each element is not sufficiently developed to enable alternative product/supplier options to be considered at this juncture.
Quality of specifications	No specifications were forthcoming during this evaluation. These project elements are high level scoped and will leverage specification of recently completed similar projects.
Phasing and synergies with other projects	Whilst not directly related the Pier 3 Life Extension works have synergies with the aspects of the works planned in Terminal Building M&E and Campus Building. Particular with respect to Pier Systems which are intended to integrate into centralised BMS and SCADA with sufficient contingency added to replicate systems in place across airport in relation to Essential and Non-Essential electrical supplies, emergency lighting systems etc.
Existing asset conditions	Mech, Elec & Foul - declared to be end of life, out of vendor support, none compliant with current statutory legislation.
Double counting	None identified.

5.64 This project is effective in meeting the objective and is efficient in its scope. It has been developed from a "bottom up" perspective with rigour applied in the assessment of need for Pier 3 upgrades that improve, reliability maintainability and durability.

Cost estimate review

Table 5.37: Pier 3 Life Extension Works - Mech, Elec & Foul Waste – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 1,260,918	€ 1,260,918	€ 0
Construction Costs	€ 10,087,343	€ 10,087,344	€ 1
Escalation, Contingency & Design Variability	€ 2,695,212	€ 2,695,212	€ 0
Total	**€ 14,043,473**	**€ 14,043,474**	**€ 1**

Table 5.38: Pier 3 Life Extension Works - Mech, Elec & Foul Waste – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	13%	€ 1,260,918	13%	€ 1,260,918
Total			**€ 1,260,918**		**€ 1,260,918**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
T1 Pier 3 HVAC Replacement	1	n/a	€ 4,504,800	n/a	€ 4,504,800
T1 Pier 3 Electrical Replacement	1	n/a	€ 3,284,750	n/a	€ 3,284,750
T1 Pier 3 Drainage /Foul Sewer Upgrade inc Sump/Pumps and Lines	1	n/a	€ 750,000	n/a	€ 750,000
Main Contractor Preliminaries	1	n/a	€ 1,067,444	n/a	€ 1,067,444
Design Development	1	n/a	€ 480,350	n/a	€ 480,350
Total			**€ 10,087,343**		**€ 10,087,344**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	24%	€ 2,695,212	24%	€ 2,695,212
Total			**€ 2,695,212**		**€ 2,695,212**

5.65 Based on the nature of the works in question and the duration of the project indicated in the CIP document, careful phasing of the works is required in order to successfully deliver them. Dublin Airport has not provided any build-up to the various lump sums included in their Level 3 estimate, so it has not been possible to undertake any form of analysis on them.

5.66 The rates for the removal and reinstatement of the apron and the installation of new pipework are reasonable. No build-up to the rates for the main mechanical ventilation and electrical items has been provided to allow an analysis of them to be undertaken. The quantities noted in the level 3 estimate have not been validated as no design information has been provided to allow us to do so. We will request more detail on the rates and quantities from Dublin Airport in order to fully validate the sums in this project ahead of the final report.

CIP.20.02.013 – Small Energy Projects

Objective

5.67 The small energy investments have been identified via the ISO 50001 Register of Opportunities and 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.

5.68 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.

Works in this project include:

- Terminals Lighting Upgrades;
- Campus & Road Lighting Upgrades;
- Electrical Demand Management;
- Thermal Demand Management; and
- Gas & Water.

Figure 5.10: Small Energy Projects

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Scope

5.69 The Scope of the Small Energy Project covers:

- Terminals Lighting Upgrades - Continues the conversion of the Terminal buildings to full LED lighting systems;
- Campus and Road Lighting Upgrades - Upgrading of the road and street lighting around the campus to latest LED technology;

- Electrical Demand Management - Provisions for technology and control systems to reduce Time of Use (TOU) electrical tariffs at peak times on campus and includes the use of battery storage systems and microgrid management;
- Thermal Demand Management - Continues improvement of thermal infrastructure across the stand-alone campus buildings and includes both the retrofitting of oil to natural gas heating and thermal stores and improved BMS to maximise efficiency and reduce Opex; and
- Gas & Water monitoring and Power Generation - Introduces telemetry and automatic monitoring systems to ensure more exacting control of energy usage across the wider campus alongside localised small power distributed and generating systems to minimise reliance on the main electrical network.

Stage

5.70 Small Energy Project Works - The Small Energy Project are analogous to the wider ongoing programme of replacement in line with product lifecycle replacement/upgrade and are anticipated to extend from Q1 2020 thru Q4 2024.

Key project metrics

Table 5.39: Small Energy Projects – Key project metrics

Metric	Value
Construction cost estimate	€ 4,494,656
Dublin Airport estimation method	Dublin Airport feedback to questions raised have determined that the project's costs have been based on actual costs for similar projects spanning 2016-2018.

Specifications review

Table 5.40: Small Energy Projects - Specifications review

Subject	Comments
Effectiveness of scope	This project scope will effectively deliver the following benefits: • Replacement of End of Life Primary Plant; • Assured Compliant Hardware and Software; • Assured Vendor support of hardware and software for the Medium to Long Term; • Improved Monitoring and Targeting to meet Energy and Sustainability targets; • Improved System Reliability and Maintainability; • Improved System Efficiency & Environmental Control; • Improved lighting levels and compliance with road lighting standards; and • Reduction in Carbon Emissions and Primary Energy.
Alternative scopes	Dublin Airport feedback to questions raised have determined that project planning, design and procurement processes for each element is not sufficiently developed to enable alternative product/supplier options to be considered at this juncture.
Quality of specifications	No specifications were forthcoming during this evaluation. Dublin Airport has stated that specific specifications for these projects have not been completed for the CIP submission, however adequate data based on recently completed projects and data available from same has allowed the cost to be identified and budget quotes received where possible.

Subject	Comments
	Dublin Airport has also leveraged data from ESB their collaborative partner in preparation CIP.
Phasing and synergies with other projects	Whilst not directly related the Small Energy upgrades have synergies with the aspects of the works planned in Terminal Building M&E and Campus Building M&E CIPs. In particular elements that fall within the Terminals will require integration to BMS.
Existing asset conditions	Small Energy Devices and Control Systems - declared to be end of life and/or Regulatory Standards None compliance and/or both.
Double counting	None identified.

5.71 In the context of the information provided: This project is effective in meeting the objective and is efficient in its scope. It has been developed from a "bottom up" perspective with rigour applied in the assessment of need for replacements.

Cost estimate review

Table 5.41: Small Energy Projects – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 337,099	€ 337,099	€ 0
Construction Costs	€ 4,494,656	€ 4,494,656	€ 0
Escalation, Contingency & Design Variability	€ 0	€ 597,205	€ 597,205
Total	**€ 4,831,755**	**€ 5,428,960**	**€ 597,205**

Table 5.42: Small Energy Projects – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 337,099	8%	€ 337,099
Total			**€ 337,099**		**€ 337,099**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Campus Lighting LED upgrades	1	n/a	€ 500,000	n/a	€ 500,000
Terminals LED Upgrades	1	n/a	€ 750,000	n/a	€ 750,000
Electrical Demand Management	1	n/a	€ 1,000,000	n/a	€ 1,000,000
Thermal Demand Management Projects	1	n/a	€ 750,000	n/a	€ 750,000
Power Generation	1	n/a	€ 550,000	n/a	€ 550,000
External Street Lighting Systems	1	n/a	€ 255,000	n/a	€ 255,000
Main Contractor Prelims	1	n/a	€ 475,625	n/a	€ 475,625
Other Development Costs	1	n/a	€ 214,031	n/a	€ 214,031
Total			**€ 4,494,656**		**€ 4,494,656**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	0%	€ 0	12.4%	€ 597,205
Total			**€ 0**		**€ 597,205**

5.72 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 5.43: Small Energy Projects – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Escalation	**Redacted Cost Information**			€ 597,205

5.73 Dublin Airport has provided a revised Level 3 estimate. However, there remains insufficient detail in it to allow a full analysis of this project to be undertaken as the majority of the items, that also account for a significant proportion of the costs, are lump sums or large items with no definition or design detail to support them. No design information has been provided so we cannot validate any of the quantities. We will request more detail on the rates and quantities from Dublin Airport for these items, in order to fully validate the sums in this project ahead of the final report.

5.74 The luminaire rates for project 2 are reasonable as are the external street lighting system rates. We also note that the Level 3 estimate excludes an escalation provision, despite the fact that the CIP document indicates that the project will be ongoing until 2024. We have added escalation into our Level 3 estimate at 12.36%.

5.75 In response to our query on escalation, Dublin Airport has stated that these projects will have no escalation costs as they will be delivered by the Dublin Airport Energy Team. While they also state that the cost of some capital equipment is decreasing, this alone is not sufficient reason to exclude escalation from the estimate. Even if this was the case for all equipment, there is likely to be labour cost inflation, so we believe that escalation should be included in the estimate.

CIP.20.07.030 – Large Energy Project - Photovoltaic Farm

Objective

5.76 This investment entails developing and integrating a Solar PV Farm to supply electricity to Dublin Airport to reduce its onsite import of peak cost electricity. Dublin Airport state the installation will provide opex cost reduction, facilitate long term price certainty, revenue generation capacity and compliance with regulatory energy and carbon emissions targets.

Figure 5.11: Large Energy Project – Photovoltaic Farm

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Scope

5.77 This project entails developing and integrating a Solar PV Farm and Energy Storage facilities on airport owned land of low commercial value to supply 4.5% of overall energy and 9.3% of its electrical requirements.

Stage

5.78 The Photovoltaic Farm Project is analogous to the wider ongoing programme of improvement, upgrade and regulatory compliance are anticipated to implement as follows:

- Initial Set-up Q3 2020
- Planning Permission Q3 2021
- Construction Commence Q1 2022
- Construction complete Q4 2023

Key project metrics

Table 5.44: Large Energy Project – Photovoltaic Farm – Key project metrics

Metric	Value
Construction cost estimate	€ 8,450,000
Dublin Airport estimation method	Dublin Airport feedback to questions raised have determined that this project is at Concept Design Stage and costs/projections are based on learnings from existing PV installation and leveraging off of existing Collaborative Agreements with ESB and Enel X.

Specifications review

Table 5.45: Large Energy Project – Photovoltaic Farm - Specifications review

Subject	Comments
Effectiveness of scope	This project scope will deliver the stated outcomes efficiently.
Alternative scopes	None identified.
Quality of specifications	No specifications were forthcoming during this evaluation however Dublin Airport IT stated that leveraging of existing Collaborative Agreements with ESN and Enel X concept specifications had been developed to allow initial scoping of this CIP submission.
Phasing and synergies with other projects	Whilst not directly related, the Large Energy Project – Photovoltaic Farm has synergies with the aspects of the works planned in Terminals, Pier Life Extension Works, and Campus Buildings upgrade.
Existing asset conditions	Not applicable.
Double counting	At this early stage of the project planning, design and procurement processes for this project it has not been possible to identify any double counting.

5.79 This Photovoltaic Farm project scope is effective in meeting the objective and is efficient in its scope.

Cost estimate review

Table 5.46: Large Energy Project – Photovoltaic Farm – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 640,909	€ 536,250	-€ 104,659
Construction Costs	€ 8,450,000	€ 7,150,000	-€ 1,300,000
Escalation, Contingency & Design Variability	€ 909,091	€ 768,625	-€ 140,466
Total	**€ 10,000,000**	**€ 8,454,875**	**-€ 1,545,125**

Table 5.47: Large Energy Project – Photovoltaic Farm – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 640,909	8%	€ 536,250
Total			**€ 640,909**		**€ 536,250**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Construction Costs	1	n/a	€ 8,450,000	n/a	€ 7,150,000
Total			**€ 8,450,000**		**€ 7,150,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	10%	€ 909,091	10%	€ 768,625
Total			**€ 909,091**		**€ 768,625**

5.80 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 5.48: Large Energy Project – Photovoltaic Farm – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Supply & Installation of 1kw PV panel and ancillaries (8m2 panel)	**Redacted Cost Information**			€ 1,100

5.81 There is insufficient information in the Level 3 estimate and the CIP document to be able to undertake a full analysis of this project and no design information has been provided. We will request more detail on the quantities from Dublin Airport in order to fully validate the project ahead of the final report. It is not clear what level of works is required to support the installation and therefore what is built into the rate of [redacted]. In response to our request for a breakdown of the rate for the photovoltaic panels Dublin Airport stated that the project was a feasibility estimate and that no further breakdown was available. Our experience indicates that PV panels generally cost around [redacted] so we have reduced the overall allowance in our Level 3 estimate.

6 Project Reviews – CIP2020 Appendix C - Capacity

Summary

Table 6.1: Appendix C - Capacity – Summary

CIP Number	Project Title	RAG Costs	Dublin Airport cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)
CIP.20.03.004	Gate Post 9 Expansion (West Lands)	-8.1%	9.2	8.5	-0.7
CIP.20.03.006	Terminal 1 Kerbs	-0.4%	13.6	13.6	-0.1
CIP.20.03.011A	Terminal 1 Check-In (Partial shoreline)	-15.0%	30.2	25.7	-4.5
CIP.20.03.012	Terminal 1 Central Search - Relocation to Mezz Level	-32.4%	42.6	28.8	-13.8
CIP.20.03.013	Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation	-33.2%	42.4	28.3	-14.1
CIP.20.03.015	Terminal 1 Baggage Reclaim Upgrade & Alterations	-14.3%	22.2	19.0	-3.2
CIP.20.03.016	Terminal 1 - Rapid Exit Arrivals	-13.3%	2.2	1.9	-0.3
CIP.20.03.017	Terminal 1 Shuttle, bus lounges and injection points	-34.0%	2.8	1.9	-1.0
CIP.20.03.018	Terminal 1 - Immigration Hall	-0.4%	1.8	1.8	0.0
CIP.20.03.020	Terminal 2 Check-in Area Optimisation	-10.6%	14.8	13.2	-1.6
CIP.20.03.021	Terminal 2 Central Search Area Expansion	-16.7%	5.6	4.7	-0.9
CIP.20.03.028	Terminal 2 Early bag store and transfer lines	0.0%	27.9	27.9	0.0
CIP.20.03.029	New Pier 5 (T2 and CBP Enabled)	-10.7%	323.6	289.0	-34.7
CIP.20.03.030	Expansion of US Pre-Clearance Facilities	8.4%	50.3	54.5	4.2
CIP.20.03.031	South Apron Expansion (Remote Stands, Taxiway and Apron)	-21.5%	89.8	70.5	-19.3
CIP.20.03.033A	Enablement of Pier 3 for Precleared US bound passengers	-14.3%	8.5	7.3	-1.2
CIP.20.03.034	Pier 3 Immigration (Upgrade & Expansion)	-18.8%	5.7	4.7	-1.1
CIP.20.03.036	North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ	-9.5%	175.3	158.6	-16.7
CIP.20.03.043A	Terminal 1 Piers - New Airbridges (6NBE / 3WB)	-31.2%	33.9	23.3	-10.6
CIP.20.03.049	De-icing pad at Runway 10R	0.1%	5.0	5.0	0.0
CIP.20.03.051B	West Apron Vehicle Underpass - Pier 3 Option	-1.2%	171.1	169.0	-2.1

CIP Number	Project Title	RAG Costs	Dublin Airport cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)
CIP.20.03.052	Surface Water Environmental Compliance	0.0%	51.6	51.6	0.0
CIP.20.03.054	New Remote Apron 5M - 17 NBEs	-1.6%	72.1	71.0	-1.1
CIP.20.03.057	Airside GSE Charging Facilities (Ground Handlers)	-2.0%	5.0	4.9	-0.1
CIP.20.03.071	Hydrant Enablement - Pier 2 & 3	0.0%	23.7	23.7	0.0
Total		**-10.0%**	**1,231.1**	**1,108.3**	**-122.8**

6.1 Overall our estimates for the projects in the Capacity envelope suggest that the overall costs could be reduced by €122.8m.

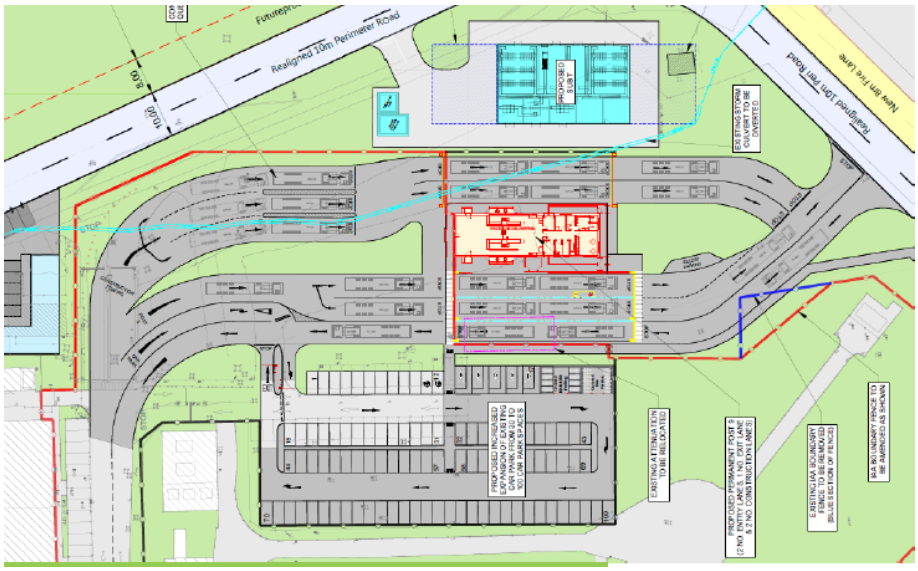
6.2 Individual reports for the projects in this Appendix are presented below.

CIP.20.03.004 – Gate Post 9 Expansion (West Lands)

Introduction

6.3 Dublin Airport proposes the construction of a new vehicular security check point similar to the existing gate post 4 with a 5 lane Vehicle Check Point (VCP).

Figure 6.1: Gate post 9 Expansion (West Lands)



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.4 The objective is to increase the capacity for security checked vehicular access to the western campus development.

Context

6.5 The existing security checked vehicular access was a temporary solution in 2016 and continues to operate under a temporary permit.

Scope

6.6 The scope covers the construction of roads, car park, and the 5 lane VCP in outline format including the following:

- 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; and
- A car park and equipped staff facilities.

Stage

6.7 The project is currently at initial concept stage. The Design Stage is due to be complete in Q1 2019 followed by completion of Procurement stage in Q2 2019 and then Construction commencement in Q2 2019. However, Handover is scheduled a year later in Q2 2020. For a relatively simple project this is a long construction time given the urgency of demand.

- Feasibility/Outline design complete Q3 2018

- Planning complete Q2 2019
- Design complete Q1 2019
- Procurement compete Q2 2019
- Construction commence Q2 2019
- Project handover Q2 2020

Key project metrics

Table 6.2: Gate post 9 Expansion (West Lands) - Key project metrics

Metric	Value
Construction cost estimate	€ 5,950,000
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 final
No of vehicle check lanes	5

Specifications review

Table 6.3: Gate post 9 Expansion (West Lands)- Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the work to be carried out in outline format.
Alternative scopes	None.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage.
Phasing and synergies with other projects	None identified.
Existing asset conditions	The asset life of the current facility had an intended life of 7-8 months and is now operating on a temporary permit. The asset life of the new facility is 20 years.
Double counting	None identified.

6.8 The proposed project is considered efficient in scope.

Cost estimate review

Table 6.4: Gate post 9 Expansion (West Lands) – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 1,190,000	€ 1,094,199	-€ 95,801
Construction Costs	€ 5,950,000	€ 5,470,994	-€ 479,006
Escalation, Contingency & Design Variability	€ 2,090,000	€ 1,917,955	-€ 172,045
Total	**€ 9,230,000**	**€ 8,483,148**	**-€ 746,852**

Table 6.5: Gate post 9 Expansion (West Lands) – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 1,190,981	20%	€ 1,094,199
Total			**€ 1,190,000**		**€ 1,094,199**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Facilitation & Demolition Works	1	n/a	€ 738,314	n/a	€ 549,850
Substructure	1	n/a	€ 96,784	n/a	€ 72,000
Superstructure - Frame	1	n/a	€ 125,819	n/a	€ 75,880
Superstructure - Others	1	n/a	€ 471,990	n/a	€ 351,125
Internal Finishes	1	n/a	€ 120,980	n/a	€ 90,000
Fitting /Furnishings & Equipment	1	n/a	€ 48,392	n/a	€ 36,000
Services	1	n/a	€ 696,509	n/a	€ 518,150
External Works	1	n/a	€ 3,656,118	n/a	€ 2,377,000
Main Contractors Preliminaries	1	Incl.	Incl.	€ 1,400,989	€ 1,400,989
Total			**€ 5,950,000**		**€ 5,470,994**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 2,087,600	29%	€ 1,917,955
Total			**€ 2,090,000**		**€ 1,917,955**

6.9 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.6: Gate post 9 Expansion (West Lands) – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Roads; including excavation, hardcore, bitumen macadam; exceeding 300mm wide	**Redacted Cost Information**			€ 250
Allowance for intumescent painting to steel. Increased allowance in cast this needs to be 90min rated				€ 680

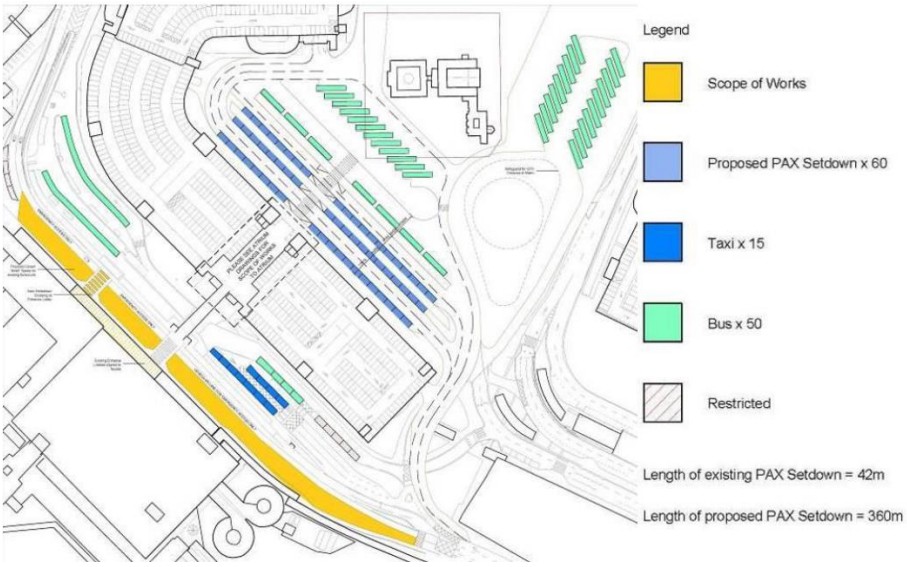
6.10 The majority of the rates in the Level 3 estimate are reasonable. The exceptions to this are the rates for fire protection and road construction, both of which are higher than we would expect, and have therefore reduced to the levels that we would expect. While Dublin Airport has responded to our query and provided an explanation as to what is included in the rate for the road construction, we do not accept that it justifies the proposed rate that has been included for this element. The quantities for this project have been validated.

CIP.20.03.006 – Terminal 1 Kerbs

Introduction

6.11 This project moves the departures drop off kerbs away from terminal T1 to the other side of the MSCP. It also provides a new entrance to T1 and re-modelled MSCP atrium.

Figure 6.2: Terminal 1 Kerbs



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.12 The objective of this project is to increase departures kerb drop off capacity and safeguard the set off distance from a terminal building to a public road. It also provides a new entrance to T1.

Scope

6.13 The scope covers the construction/re-construction of a public departures set down kerb located on the other side of the MSCP away from T1. The outline format will include the following:

- Relocation of Terminal 1 departures drop-off kerb for public access/vehicles;
- Existing re-configured forecourt for registered vehicles only;
- Re-configuration of public roads/pedestrian paths to and from the Ground Transport Centre (GTC) and T1;
- Retrofitting the MSCP atrium to become the new main entrance/exit to/from T1;
- New set down/pickup for coaches in horseshoe plan; and
- Re-configured pedestrian routing to/from T1.

Stage

6.14 The project is currently at outline design stage (Q4 2018). The Design Stage is due to be complete in Q4 2019 followed by completion of Procurement stage in Q4 2020 followed by Construction commencement straightaway in Q4 2020. The construction period is reasonable considering that this area is probably the most densely trafficked part of the airport and it is reasonable to expect the work to be carried out in phases.

- Feasibility/outline design complete Q4 2018

- Detailed design complete Q4 2019
- Planning complete Q1 2020
- Procurement complete Q4 2020
- Construction commence Q4 2020
- Construction complete Q4 2021
- Project handover Q2 2022

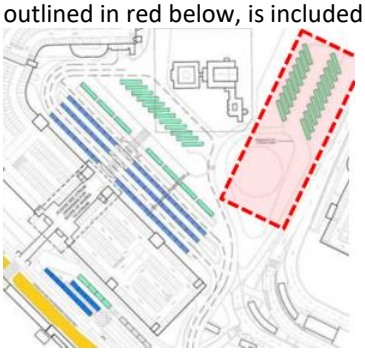
Key project metrics

Table 6.7: Terminal 1 Kerbs - Key project metrics

Metric	Value
Construction cost estimate	€ 8,559,996
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 Final
Drop-off kerb length	360m
No. of bus spaces	50
No. of taxi spaces	15

Specifications review

Table 6.8: Terminal 1 Kerbs - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the work to be carried out in outline format but there is insufficient information to gauge the full scope of the many components which make up this project.
Alternative scopes	None identified.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage.
Phasing and synergies with other projects	The work packages need to be co-ordinated with the other projects to avoid on site clashes and inefficient working: CIP 20 04 006 T1 MSCP; CIP.20.01.039 Airport Roads Optimisation; and CIP 20 01 034 Campus Roads Critical Maintenance. It is not clear if the re-location of the existing car park shown outlined in red below, is included in this project. 
Existing asset conditions	The asset life of 15 years is reasonable given the nature of this development and the likely future increase in demand requiring further re-modelling.
Double counting	None identified.

6.15 Based on the provided information this project seems to be efficient, but the full scope needs to be validated as noted above as it is multifaceted project. Phased construction could add to the cost.

Cost estimate review

Table 6.9: Terminal 1 Kerbs – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 1,711,999	€ 1,704,947	-€ 7,052
Construction Costs	€ 8,559,996	€ 8,524,737	-€ 35,259
Escalation, Contingency & Design Variability	€ 3,371,783	€ 3,357,894	-€ 13,889
Total	**€ 13,643,778**	**€ 13,587,579**	**-€ 56,199**

Table 6.10: Terminal 1 Kerbs – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 1,711,999	20%	€ 1,704,947
Total			**€ 1,711,999**		**€ 1,704,947**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Roads Paths & Paving's	1	n/a	€ 4,669,587	n/a	€ 4,672,855
Atrium Works	1	n/a	€ 3,890,409	n/a	€ 3,851,882
Total			**€ 8,559,996**		**€ 8,524,737**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 3,371,783	33%	€ 3,357,894
Total			**€ 3,371,783**		**€ 3,357,894**

6.16 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.11: Terminal 1 Kerbs – Main Level 3 variances

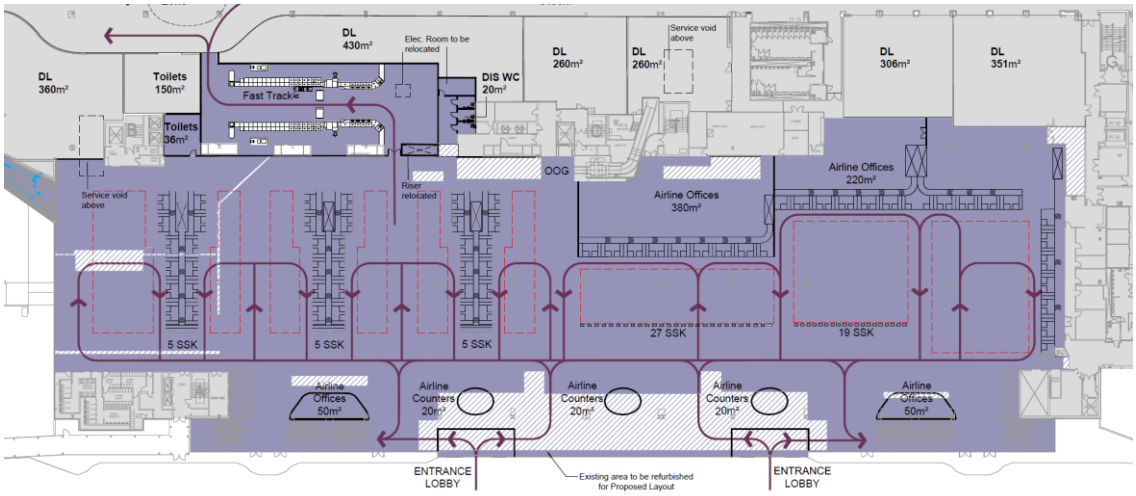
Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Replace louvres with alternative cladding/wall finish	**Redacted Cost Information**			€ 600
Infill external corners of building with new cladding or similar				€ 600
Demolition of section of retail area to level 10				€ 150

6.17 The Level 3 estimate contains a reasonable level of detail for the project. Dublin Airport has responded to the queries we raised and has provided an explanation of what is included in the fit out rate and the allowance for signage, line markings and bollards. The rate for the strip out of the existing retail area is slightly higher than we would expect, and we have reduced it accordingly. The rates for louvre replacement and new cladding to corners of buildings are also higher than we would expect, and we have reduced them. The remaining rates for this project are reasonable. We have not validated the quantities for the project as no design information has been provided for review. We will examine this with Dublin Airport to allow us to conclude our analysis prior to completing the final report.

CIP.20.03.011A – Terminal 1 Check-In (Partial shoreline)

Introduction

Figure 6.3: Proposed alternative layout of check in hall in Terminal 1 (Partial shoreline)



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.18 This project aims to deliver the reconfiguration and modification of the Terminal 1 check-in hall to improve check-in capacity, extend the restricted queuing area and to enhance passenger experience through better circulation within the hall and provision of more self-service options. Passenger flows and wayfinding need also to be modified since the project will form an integrated solution with CIP.20.03.12 T1 Central Search – Relocation to Mezzanine level.

Scope

6.19 The check-in hall will be transformed by reinstating check-in island 1 and by reconfiguration of three check-in islands into a linear shoreline (in total only 2 additional check-In/bag-drop units, however 25 to be renewed). The scope also includes the anticipated changes to the baggage handling system, additional SSKs (59 new), 2 fast track security lanes, new landside toilets as well as the relocation of airline offices and the alignment of entrance lobbies with the façade.

Stage

6.20 Project stage is currently at concept design with feasibility/outline design complete. Construction will commence in Q3 2021 with completion by Q2 in 2023.

Key project metrics

Table 6.12: Terminal 1 Check-In (Partial shoreline) – Key project metrics

Metric	Value
Construction cost estimate	€ 18,968,000
Cost per square metre	Not disclosed

Specifications review

Table 6.13: Terminal 1 Check-In (Partial shoreline) – Specifications review

Subject	Comments
Effectiveness of scope	The project objectives will be met by the proposed scope.
Alternative scopes	Alternative scopes could be considered for projects CIP.20.03.011A-13 (T1 Check-In, T1 Central Search, T1 Departure Lounge) which could improve passenger experience and flows: • Option without relocation of central search to mezzanine level with more SSKs/bag-drops and fewer check-in counters to improve capacity of existing space; • Option with additional VCCs behind the islands to improve flow and wayfinding; and • Option with fast track security next to the CSA.
Quality of specifications	Level 3 costs only partly provide a reasonably detailed breakdown of the specification of the works. Quantities (sqm) cannot be verified from drawings or are given as a lump sum (BHS).
Phasing and synergies with other projects	Construction works need to be phased and aligned with other T1 projects due to dependencies and possible synergies: • CIP.20.03.012 - Terminal 1 Central Search - Relocation to Mezz Level; – Island 1 and landside F&B or fast track security can only be installed after relocation of central search to mezzanine level; – Slab fill of mezzanine level will affect utilisation of check-in island 2 during construction; – CIP.20.04.018 – Fast Track Improvements; and – Fast track improvements for security T1 to be combined with new fast track security lanes.
Existing asset conditions	T1 is nearly 50 years old and refurbishments will be required in the future. Information on the asset life of existing equipment (counters, BHS, etc.) has not been provided, however, it can be assumed that reconfiguration works would require replacement of parts of the existing equipment.
Double counting	None identified. No double counting with PACE CUSS Project.

6.21 The scope and specification for achieving the objectives is efficient.

Cost estimate review

Table 6.14: Terminal 1 Check-In (Partial shoreline) – Level 1 Costs

	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 3,794,000	€ 3,223,491	-€ 570,509
Construction Costs	€ 18,968,000	€ 16,117,454	-€ 2,850,546
Escalation, Contingency & Design Variability	€ 7,471,000	€ 6,348,665	-€ 1,122,335
Total	**€ 30,233,000**	**€ 25,689,610**	**-€ 4,543,390**

Table 6.15: Terminal 1 Check-In (Partial shoreline) – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 3,793,542	20%	€ 3,223,491

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
Total			**€ 3,794,000**		**€ 3,223,491**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fit-out Works	1	€ 18,967,710	€ 18,967,710	€ 16,117,454	€ 16,117,454
Total			**€ 18,968,000**		**€ 16,117,454**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 7,471,381	33%	€ 6,348,665
Total			**€ 7,471,000**		**€ 6,348,665**

6.22 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.16: Terminal 1 Check-In (Partial shoreline) – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Baggage Handling System	**Redacted Cost Information**			€ 4,300,000
Extra over for full Fit out of the area previously occupied by security to create new check in area				€ 1,750
Extra over allowance for Provision of new airline offices				€ 1,200

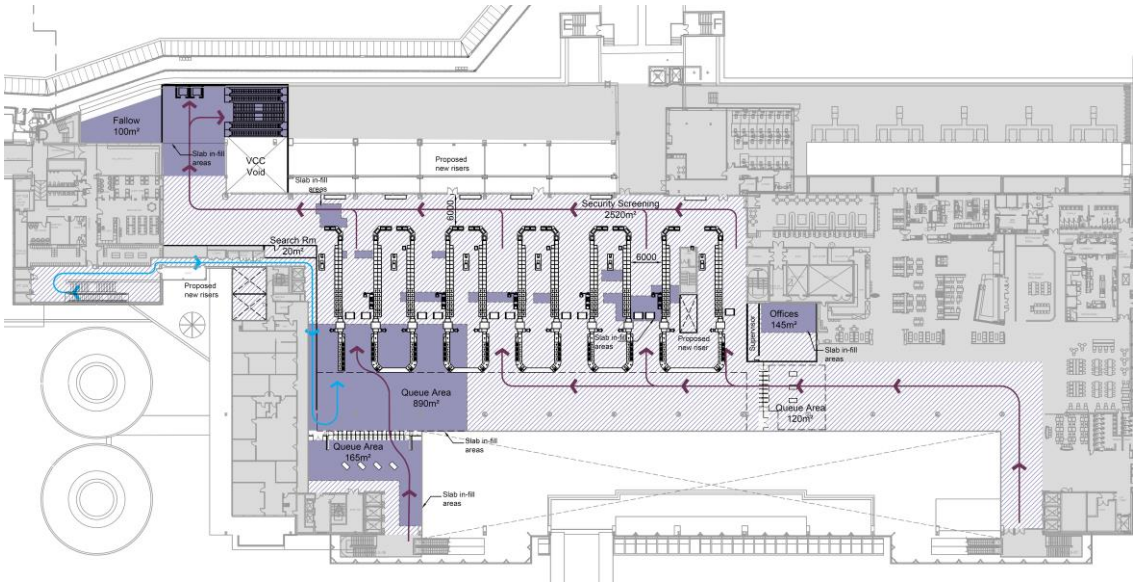
6.23 The new baggage system has been costed as a lump sum with input from a baggage specialist. While the lack of detailed technical information makes it difficult to benchmark that sum, the logic used by Dublin Airport to arrive at this figure is sensible and we have not amended it. Dublin Airport has subsequently provided some further detail on the baggage allowance which they have broken down into 3 lump sums against each of the 3 zones in which work is to be undertaken. However, one of the zones they have identified - Zone 0 Option - is not required and we have omitted it. There is insufficient detail to allow any further comment to be made on the other zones, but we will request further information from Dublin Airport to conclude our analysis prior to the final report. The rates for check in desks, the fit out of the new airline offices and the area previously occupied by security are higher than we would expect, and as such we have reduced them.

6.24 Dublin Airport has provided a build up to its rates for the fit out of the check in area but, having reviewed it, we still believe that it is too high for the works required. Dublin Airport has also provided an explanation for what is included in their check in desk rates. As this item in the level 3 estimate contains more work than just the desk itself we accept that Dublin Airport's rate for this item is reasonable.

CIP.20.03.012 – Terminal 1 Central Search - Relocation to Mezzanine Level

Introduction

Figure 6.4: Terminal 1 Central Search - Relocation to Mezz Level – Proposed layout



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.25 The T1 central search is to be expanded to meet the 40mppa facility requirements and is proposed to be relocated to mezzanine level to provide sufficient space for the expansion of T1 check-in and the departure lounge. The main objectives are to increase security processing capacity, upgrade security screening equipment to EDS C3 standard, safeguard space for future implementation of FBSS and to enhance the passenger experience for searching, queuing and approaching the lanes.

Context

6.26 No further space is available to extend the CSA on the same level.

Scope

6.27 The mezzanine level will be enlarged through the infill of floor slabs to provide space for screening and queuing areas. The scope also includes relocation of risers, back of house offices and the T1 lounge, the demolition of escalators, the introduction of a new vertical circulation core at the rear to access the IDL, new search room and supervisor office as well as the reconfiguration of the self-connect route from the baggage reclaim hall.

Stage

6.28 Project stage is currently at concept design with feasibility/outline design complete. Construction will commence in Q4 2020 with completion by Q4 2021.

Key project metrics

Table 6.17: Terminal 1 Central Search - Relocation to Mezzanine Level – Key project metrics

Metric	Value
Construction cost estimate	€ 26,740,000

Metric	Value
	Costs exclude new security equipment
25m ARTS lanes	11
Cost per square metre	Not disclosed

Specifications review

Table 6.18: Terminal 1 Central Search - Relocation to Mezzanine Level – Specifications review

Subject	Comments
Effectiveness of scope	The scope is effective in meeting the project objectives.
Alternative scopes	Alternative scopes might be considered for projects CIP.20.03.011A-13 (T1 Check-In, T1 Central Search, T1 Departure Lounge) to improve passenger experience and flows (see alternative scopes for CIP.20.03.011A).
Quality of specifications	Level 3 costs only partly provide a sufficiently detailed breakdown of the specification of the works. Quantities (sqm) cannot be verified from drawings or are given as a lump sum (e.g. upgrade of self-connect route).
Phasing and synergies with other projects	Construction works need to be phased and aligned with other T1 projects due to dependencies and possible synergies: • CIP 20.03.011 – T1 Check-In; – Relocation of central search need to be completed before T1 check-in can be expanded into the available space. • CIP 20.03.013 – T1 Departure Lounge; – Relocation of central search need to be completed before T1 departure lounge can be expanded into the available space; – New VCC cannot be built unless an interim bypass will be constructed in departure lounge; and – Staff entrance with security to be relocated. • CIP.20.06.001 – Cabin-Baggage X-Ray Replacement & EDS Upgrade: – New C3 machines to be implemented from the beginning to reach desired throughput. • CIP.20.06.041 – Security Screening Equipment - End of Life: – New security equipment to be implemented at same time; otherwise all existing equipment needs to be relocated from old to new checkpoint overnight. • CIP.20.06.042 – ATRS - Central Search Areas: – New ATRS lanes to be installed as part of the project.
Existing asset conditions	T1 is nearly 50 years old and refurbishments will be required in the future. Security screening equipment (LED, ETD, HHMD and WTMD) will reach end of life in the next CIP period according to Dublin Airport(see also CIP.20.06.041).
Double counting	None identified.

6.29 The scope and specification of the project is considered as efficient.

Cost estimate review

Table 6.19: Terminal 1 Central Search - Relocation to Mezz Level – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 5,350,000	€ 3,688,524	-€ 1,661,476
Construction Costs	€ 26,740,000	€ 17,862,620	-€ 8,877,380
Escalation, Contingency & Design Variability	€ 10,540,000	€ 7,264,548	-€ 3,275,452
Total	**€ 42,630,000**	**€ 28,815,692**	**-€ 13,814,308**

Table 6.20: Terminal 1 Central Search - Relocation to Mezz Level – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 5,348,574	20%	€ 3,688,524
Total			**€ 5,350,000**		**€ 3,688,524**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Refurbishment to Mezzanine	1	n/a	€ 19,920,600	n/a	€ 11,789,094
Vertical Circulation Core	1	n/a	€ 3,566,430	n/a	€ 2,884,733
Structural Infill	1	n/a	€ 3,255,840	n/a	€ 3,188,793
Equipment	1	n/a	By Security	n/a	By Security
Total			**€ 26,740,000**		**€ 17,862,620**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 10,534,016	34%	€ 7,264,548
Total			**€ 10,540,000**		**€ 7,264,548**

6.30 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.21: Terminal 1 Check-In (Island 1 & 2) – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Refurbishment of existing mezzanine level for new security operation (equipment excluded)	**Redacted Cost Information**			€ 1,750

6.31 There is little information contained in the Level 3 cost for this project. Most of the items are included as lump sums. Dublin Airport has provided a build up to the rate for the mezzanine level refurbishment, but is higher than we would expect, so we have reduced it accordingly.

6.32 In response to queries raised about possible scope that Dublin Airport had not included in its estimate but which is required, they have confirmed that the removal of escalators and signage and wayfinding are all included in this project. Dublin Airport advised that the relocation of risers is covered in the €2.5m allowance in the T1 IDL project.

6.33 Based on the build-up for the VCC provided for one of the other CIP projects, the lump sum included here is reasonable. The quantities for the measured items have been validated. We have not received build-ups to the lump sums for the new VCC, the floor finishes upgrade and the creation of the temporary lounge to allow further analysis to be undertaken. We will request further information from Dublin Airport and update our analysis for the final report.

CIP.20.03.013 – Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation

Introduction

6.34 This project provides, vertical circulation down from the new passenger screening facility on the Mezzanine floor, larger orientation space at IDL level and more space in the IDL.

Figure 6.5: Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation – proposed layout

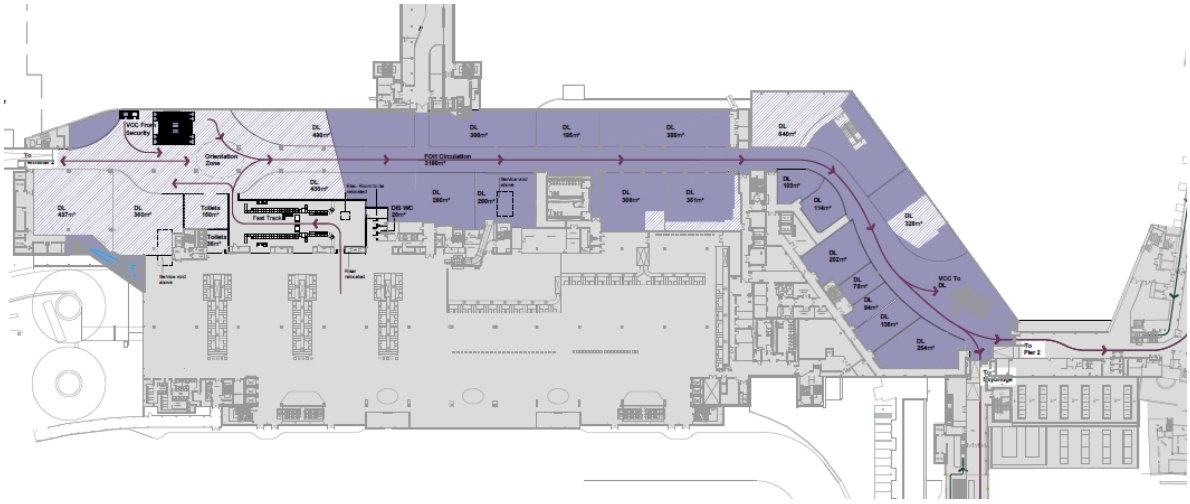
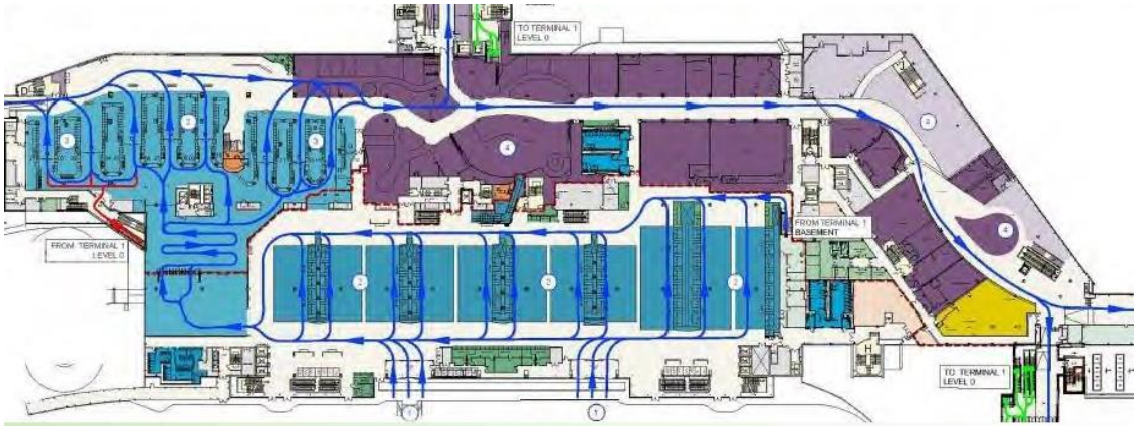


Figure 6.6: Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation – existing layout



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.35 To create 3,315m^2 more space in the IDL.

6.36 Another project objective is to enhance the passenger experience by 'refreshing' finishes and easier way finding. We can see that the plan improves the way finding, but there is insufficient information to comment on the proposals for refreshing the finishes.

Context

6.37 The context of this project is the T1 IDL, perhaps more appropriately called the Airside Departure Concourse.

6.38 The driver for this project is stated as 'capacity improvement' as well as enhancement of passenger experience. It would appear that the need to increase the capacity of the Check-in

Concourse and the review of Central screening, which lead to the re-location of screening at the Mezzanine level probably triggered the re-modelling of this part of the terminal.

Scope

6.39 The scope of the project in planning terms meets the stated objectives.

Stage

6.40 Is currently at concept design with outline procurement program for delivery in 1st quarter 2022. The outlined procurement route of:

- Feasibility/Outline design complete Q4 2018
- Planning complete Q1 2020
- Detailed design complete Q4 2019
- Procurement compete Q2 2020
- Construction commence Q4 2020
- Construction complete Q1 2022
- Project handover Q1 2022

6.41 The project is efficient and straightforward, the planning stage appears to take a long time for what is in effect an internal terminal re-organisation. 12 months is a long time for a shell and core re-modelling detail design stage.

6.42 The key linkage of this project is with the new passenger screening project on the mezzanine floor, which is scheduled to complete in Q4 2021. Therefore, dovetailed phasing will be critical to ensure that passengers can use the new vertical circulation down from the passenger screening to access the IDL which is still technically a partial construction site.

Key project metrics

Table 6.22: Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation- Key project metrics

Metric	Value
Construction cost estimate	€ 26,590,000
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 Final
Cost per square metre	Rates for all elements provided
Additional floor area	3,315 m^2

Specifications review

Table 6.23: Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient.
Alternative scopes	The option studies indicated a number of different solutions; however, the essence of this project is the location of the vertical circulation from the passenger screening on the Mezzanine floor which dictates the basic plan. Alternative scopes are probably possible but would require a holistic review of the 3 main functions in T1 at this level, check-in, passenger screening, flowing into the IDL.
Quality of specifications	Specifications provided in Level 3 costs provide sufficient detail for outline design stage.
Phasing and synergies with other projects	As noted above this project has a direct synergy with the new passenger Screening project/Central search, 20 03 012 and is

Subject	Comments
	also indirectly linked with the T1 Check-in (Partial Shoreline), 20 03 011A.
Scope and specifications account for asset conditions and residual life?	T1 is undergoing a number of asset sweating/re-lifing projects and within this context 15-year asset life is reasonable.
Double counting	None identified.

6.43 The scope of work is efficient, but the cost build-up lacks clarity.

Cost estimate review

Table 6.24: Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation – Level 1 Costs

	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 5,320,000	€ 3,555,077	-€ 1,764,923
Construction Costs	€ 26,590,000	€ 17,775,387	-€ 8,814,613
Escalation, Contingency & Design Variability	€ 10,480,000	€ 7,001,725	-€ 3,478,275
Total	**€ 42,390,000**	**€ 28,332,189**	**-€ 14,057,811**

Table 6.25: Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 5,318,586	0%	€ 3,555,077
Total			**€ 5,320,000**		**€ 3,555,077**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Strip Out Existing Security Area	1	€ 19,454,715	€ 19,454,715	€ 11,338,618	€ 11,338,618
New IDL Wait for Gate / F&B	1	€ 1,386,945	€ 1,386,945	€ 993,346	€ 993,346
Refurbishment Existing Retail / F&B	1	€ 3,073,770	€ 3,073,770	€ 2,943,423	€ 2,943,423
Risk Allowance for Works to Risers	1	€ 2,677,500	€ 2,677,500	€ 2,500,000	€ 2,500,000
Total			**€ 26,590,000**		**€ 17,775,387**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 10,474,955	33%	€ 7,001,725
Total			**€ 10,480,000**		**€ 7,001,725**

6.44 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.26: Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Strip out existing security Area and provide new fitted out retail / F&B	**Redacted Cost Information**			€ 2,000
New IDL Wait Gate / F&B				€ 2,500

6.45 There is very little detail in the Level 3 estimates. The rates for the new IDL Wait Gate/F&B and the strip out and fit out of the former security areas are higher than we would expect, and we have reduced these rates. We would not expect Dublin Airport to include the cost of fitting out

retail or F&B space as these costs should be borne by the concessionaire, and this reduction is reflected in our assessment of the rate.

6.46 We note that a [redacted] risk allowance has been included for works to the existing risers. In response to a query on this item Dublin Airport has advised that this scope will include the diversion of a significant number of mechanical and electrical services. It also includes allowance for the riser relocation works associated with the Terminal 1 Central Search project. Dublin Airport has also provided a document explaining in reasonable detail for this stage the works that are required or that need to be considered. While there is still a level of uncertainty as to exactly what will ultimately be required, this is undoubtedly a significant cost item and so the allowance is not unreasonable at this early stage of the project. We have checked the quantities for this project and made a minor adjustment to the area of the retail refurbishment space.

CIP.20.03.015 – Terminal 1 Baggage Reclaim Upgrade & Alterations

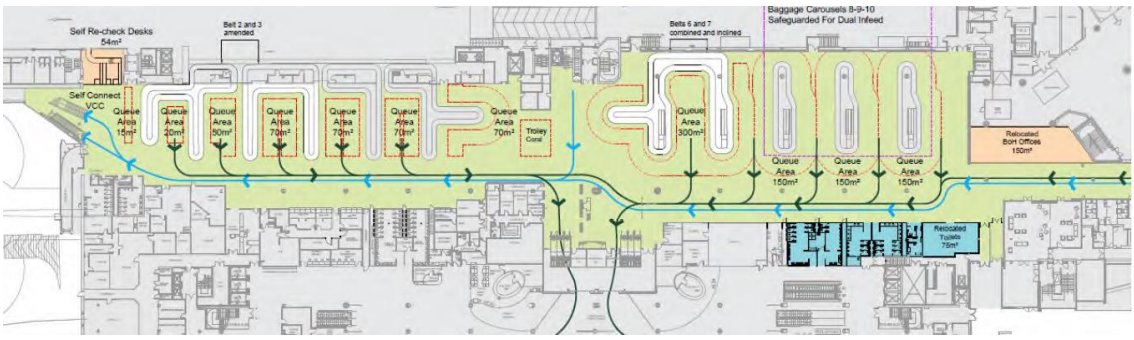
Objective

6.47 This investment aims to deliver a redesigned T1 Baggage Reclaim capability with additional queuing space around belts and widened circulation areas to further reduce passenger congestion, also increasing combined reclaim length from 520m post PACE to 580m overall to, according to Dublin Airport, accommodate the 40mppa peak arrivals demand.

6.48 Dublin Airport proposes the reconfiguration of the baggage reclaim to provide:

- Increased reclaim belt lengths;
- Additional queuing space;
- Improved circulation; and
- General refurbishment.

Figure 6.7: Terminal 1 Baggage Reclaim Upgrade & Alterations



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Context

6.49 Planned capacity post PACE is 1,300sqm, whereas Dublin Airport claim the required 40mppa space is 1,800sqm.

Scope

6.50 This project will deliver a redesigned hall increasing available reclaim belt lengths by:

- Combining belts 6 and 7 to a single reclaim;
- Removal of belt 1; and
- Lengthening and layout amendment of belts 2 and 3.

Belts 3 – 5 and 8 – 10 will remain with minor retrofitting works.

6.51 Queuing space around belts and widened circulation areas is also intended to further reduce passenger congestion resulting in the need for the relocation of landside wall (immigration hall). Plus, at the hall's eastern end, a self-connect product is provided to allow passengers check-in their transfer bags immediately after belt collection via a single check-in desk.

Stage

6.52 The T1 Arrivals Project is anticipated to be implemented as follows:

- 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

Key project metrics

Table 6.27: Terminal 1 Baggage Reclaim Upgrade & Alterations – Key project metrics

Metric	Value
Construction cost estimate	€ 13,910,000
Dublin Airport estimation method	Dublin Airport feedback to questions raised has determined that the T1 baggage reclaim upgrades costs were developed in conjunction with external consultants based upon similar projects they have undertaken in other airports.

Project Specifications

Table 6.28: Terminal 1 Baggage Reclaim Upgrade & Alterations – Specifications review

Subject	Comments
Effectiveness of scope	This project scope is effective to deliver the envisaged output.
Alternative scopes	None identified.
Quality of specifications	No specifications were available during this evaluation. Dublin Airport stated that the project was still at feasibility level of design which had identified the benchmarked costings for implementation to support Scenario 2 selection which is the basis of this CIP submission.
Phasing and synergies with other projects	Whilst not directly related the T1 Baggage Reclaim Upgrade & Alteration have synergies with the aspects of the works planned in Terminal and Pier redevelopments.
Existing asset conditions	Not applicable.
Double counting	None identified.

6.53 In the context of the information provided: The Terminal 1 Baggage Reclaim Upgrade & Alterations project scope appears to be effective in meeting the objective and efficient in its scope. It has been developed from a "bottom up" perspective with rigour applied in the assessment of need for upgrading and refurbishment focusing particularly on the current assets fitness-of purposes, improving passenger experience and functional dynamics both from the perspective of the current and future demand throughout this CIP period.

Cost estimate review

Table 6.29: Terminal 1 Baggage Reclaim Upgrade & Alteration – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 2,780,000	€ 2,383,174	-€ 396,826
Construction Costs	€ 13,910,000	€ 11,915,872	-€ 1,994,128
Escalation, Contingency & Design Variability	€ 5,480,000	€ 4,693,662	-€ 786,338
Total	**€ 22,170,000**	**€ 18,992,708**	**-€ 3,177,292**

Table 6.30: Capacity - Terminal 1 Baggage Reclaim Upgrade & Alteration – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 2,782,532	20%	€ 2,383,174
Total			**€ 2,780,000**		**€ 2,383,174**

Construction Costs (C-C)	Quantity	Dublin Airport rate	Dublin Airport cost estimate	Steer rate	Steer cost estimate
Refurbishment of Baggage Hall & Circulation Space	1	€ 3,598,024	€ 3,598,024	€ 3,173,488	€ 3,173,488
Refurbishment / Construction of new toilets	1	€ 1,121,000	€ 1,121,000	€ 1,048,600	€ 1,048,600
Construction of BOH offices	1	€ 799,457	€ 799,457	€ 854,496	€ 854,496
Allowance for new floor and ceiling finishes to baggage hall	1	€ 5,074,081	€ 5,074,081	€ 3,290,978	€ 3,290,978
Relocation of VCC	1	€ 2,142,000	€ 2,142,000	€ 2,289,353	€ 2,289,353
Equipment	1	€ 1,178,100	€ 1,178,100	€ 1,258,956	€ 1,258,956
Total			**€ 13,910,000**		**€ 11,915,872**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 5,480,197	33%	€ 4,693,662
Total			**€ 5,480,000**		**€ 4,693,662**

6.54 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.31: Capacity - Terminal 1 Baggage Reclaim Upgrade & Alteration CIP.20.03.015 – Main Level 3 variances

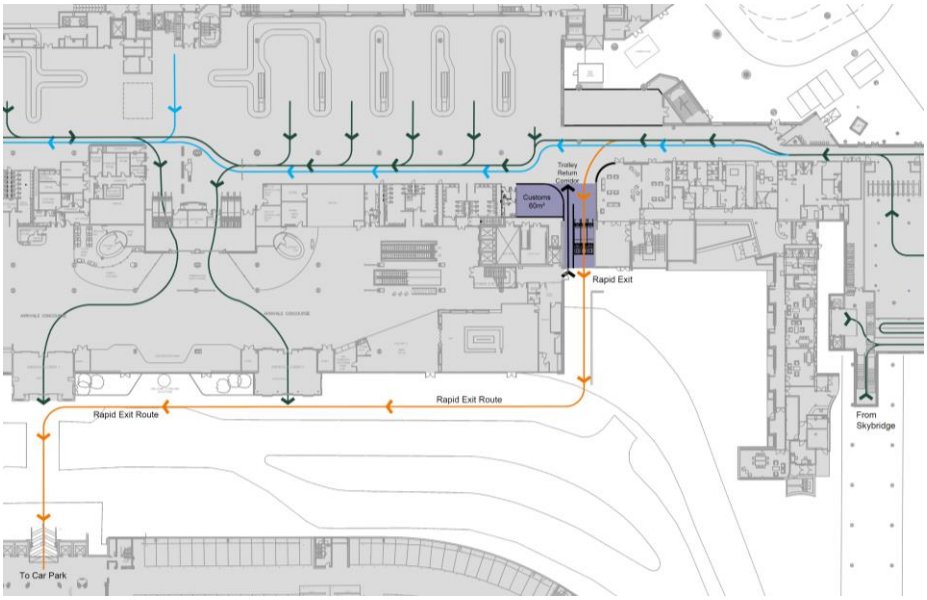
Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Allowance for new floor and ceiling finishes to baggage hall	Redacted Cost Information			€ 550
Preliminaries				18%
Refurbishment of baggage hall & circulation space, including widening of corridor				€ 4,000
Refurbishment / Construction of new toilets				€ 3,000

6.55 There is a limited amount of detail in the Level 3 estimate. The quantities included in the Level 3 estimate have been validated. Dublin Airport has provided a build-up for the baggage hall refurbishment and the BOH office space. These rates are higher than we would expect, and we have reduced them. We have reduced the rate for the toilets to align it with the rates used in other projects in the CIP document. The rate for the refurbishment of the baggage hall is close to that for new terminal construction so we have reduced it. The rate for the new floor and ceiling finishes in the baggage hall is also higher than we would expect, even allowing for the minor demolition works that Dublin Airport has stated is included within it and we have reduced it accordingly. Conversely the percentage allowance for preliminaries is very low and we have increased this to a more sensible level. Additional build-up to the lump sums for the VCC relocation and the baggage handling equipment would be required to allow further analysis to be undertaken. We will continue to work with Dublin Airport to obtain additional information to enable us to validate these two items in advance of the final report.

CIP.20.03.016 – Terminal 1 - Rapid Exit Arrivals

Introduction

Figure 6.8: Rapid Exit Arrivals



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.56 The project aims to reduce congestion in the baggage reclaim hall as well as to provide smoother passenger movement and better wayfinding through a rapid exit bypass for passengers with carry-on only luggage. Objectives are also to shortcut the existing passenger journey and to improve the passenger experience.

Context

6.57 The new rapid exit is proposed to provide a bypass for carry-on luggage only passengers and to exit to the kerb without passing through the baggage reclaim area.

Scope

6.58 This project scope includes construction of a new external connection to arrivals with anti-backtrack doors, modification of the trolley return corridor as well as placement of a new customs checkpoint and back of house offices.

Stage

6.59 Project stage is currently at concept design with feasibility/outline design complete. Construction will commence in Q3 2021 with completion until 3rd quarter 2023.

Key project metrics

Table 6.32: Terminal 1-Rapid Exit Arrivals– Key project metrics

Metric	Value
Construction cost estimate	€ 1,390,000
Cost per square metre	Not disclosed

Specifications review

Table 6.33: Terminal 1-Rapid Exit Arrivals– Specifications review

Subject	Comments
Effectiveness of scope	The project is effective in delivering the proposed scope.
Alternative scopes	The exit could be modified in a way that arriving passengers using the rapid exit route will be led into the public arrivals hall. Therefore, the existing corridor with an entrance from the north can be utilized and requires some modifications.
Quality of specifications	Level 3 costs only partly provide a reasonably sufficient breakdown of the specification of the works. Quantities (sqm) cannot be verified from drawings or are given as a lump sum (e.g. new external connection to arrivals).
Phasing and synergies with other projects	Construction works need to be phased and aligned with other projects due to dependencies and possible synergies: • CIP.20.04.016 Platinum Services Upgrade Works – Press Suite will be refurbished and needs also to be modified by the rapid exit arrivals; work should be carried out at the same time.
Existing asset conditions	T1 is nearly 50 years old.
Double counting	Overlapping exists with CIP.20.03.015 Terminal 1 Baggage Reclaim Upgrade & Alterations: • Relocated toilets (75 sqm) occupy the same space as the customs office.

6.60 The proposed scope for the rapid exit arrivals can meet the objectives in an efficient way.

Cost estimate review

Table 6.34: Terminal 1-Rapid Exit Arrivals– Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 280,000	€ 241,500	-€ 38,500
Construction Costs	€ 1,390,000	€ 1,207,500	-€ 182,500
Escalation, Contingency & Design Variability	€ 550,000	€ 475,634	-€ 74,366
Total	**€ 2,220,000**	**€ 1,924,634**	**-€ 295,366**

Table 6.35: Terminal 1-Rapid Exit Arrivals– Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 277,725	20%	€ 241,500
Total			**€ 280,000**		**€ 241,500**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Internal Refurbishment	1	€ 784,875	€ 784,875	€ 617,279	€ 617,279
New External Connection to Arrivals	1	€ 603,750	€ 603,750	€ 590,221	€ 590,221
Total			**€ 1,390,000**		**€ 1,207,500**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	39%	€ 546,979	39%	€ 475,634
Total			**€ 550,000**		**€ 475,634**

6.61 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.36: Terminal 1-Rapid Exit Arrivals– Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Internal refurbishment works to create new rapid exit route within existing footprint of T1	**Redacted Cost Information**			€ 1,750

6.62 There is limited information in the Level 3 estimate for this project. Dublin Airport were asked to provide build-ups to the rate for the internal refurbishment works and the lump sum for the external connection to arrivals. They provided an explanation of the scope that was included in the rate for the internal refurbishment works but not an actual build-up of the rate. However, this rate is too high for the works required and we have reduced it. Dublin Airport did not provide any response in respect of the lump sum for the new external connection to arrivals so we have been unable to comment further on this item. We will request further information for these two items from Dublin Airport and will update our analysis for the final report. The quantities in the estimate have been validated.

CIP.20.03.017 – Terminal 1 Shuttle, bus lounges and injection points

Introduction

6.63 This project is for the refurbishment of the ground floor of the Old Central Terminal Building (OCTB) to create bussing lounges, new OCTB bus parking kerbs and arrivals injection point into T1.

Figure 6.9: T1 Shuttle, bus lounges and injection points

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.64 The objective is to provide additional capacity of departures holding lounges and arrivals terminal injection points for the airport's bussing operation.

Context

6.65 T1 provides bus gate capability at Pier 1 and Pier 2.

6.66 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 for passengers departing from T1 and arriving passenger from the N Apron PBZ. OCTB holding area is for Departing Passengers and the T1 Injection point is for Arriving/ Transferring passengers.

Scope

6.67 The scope meets the requirements of the objective to provide more bussing capacity for T1 departures. The OCTB will be used as a shuttle lobby with low bus dwell time. In total, 3 bus bays are required to ensure head way can be maintained at peak times. The project has a number of elements including the following:

- Refurbishment of the ground floor of the OCTB to provide departures bussing lounges;
- Bus parking/manoeuvring road and re-positioning of blast screens by OCTB;
- Glazed canopies/walkways from gates to bus parking; and
- Arrivals bussing injection point/hall into T1.

Stage

6.68 The project stage is currently at initial concept ideas, with construction to be completed Q2 2023 and handover Q2 2023. The outlined procurement timeline is:

- 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

Key project metrics

Table 6.37: T1 Shuttle, bus lounges and injection points- Key project metrics

Metric	Value
Construction cost estimate	€ 1,780,000
No of bussing lounges/gates	Not provided
Floor area provided	961m²

Specifications review

Table 6.38: T1 Shuttle, bus lounges and injection points- Specifications review

Subject	Comments
Effectiveness of scope	The scope is effective in delivering the proposed scope.
Alternative scopes	None.
Quality of specifications	Specifications provided in Level 3 costs do not appear to cover the cost of T1 injection point.
Phasing and synergies with other projects	This project has a direct synergy with the N Apron Pier 1 (Module1) and PBZ as both projects start construction in Q3 2022. This project is handed over 1½ years earlier than the N Apron/Pier/PBZ. The bus parking bays and walkway canopies are all airside requiring phasing with airside operations and stand re-alignment.
Existing asset conditions	The OCTB is a listed building with no declared asset life. As this is a listed building the asset life is irrelevant. However, the N Apron PBZ and Pier 1 Module have asset lives of 25 years. Since this is essentially a fitting out project a 15-year asset life is reasonable. The T1 injection point is a new structure, albeit small, so we would expect a 25-year life.
Double counting	None identified.

6.69 The scope for this type of project is efficient however, the detail of its exact functionality, supporting data and delivery date suggest more thought could be given to its co-ordination with the N Apron project. The option plans indicated that space for bus manoeuvring is a challenge; greater detail of the final plan layout (busses) would support the validation.

Cost estimate review

Table 6.39: Terminal 1 Shuttle, bus lounges and injection points – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 360,000	€ 235,230	-€ 124,770
Construction Costs	€ 1,780,000	€ 1,176,151	-€ 603,849
Escalation, Contingency & Design Variability	€ 700,000	€ 463,286	-€ 236,714
Total	**€ 2,840,000**	**€ 1,874,667**	**-€ 965,333**

Table 6.40: Terminal 1 Shuttle, bus lounges and injection points – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 356,370	20%	€ 235,230
Total			**€ 360,000**		**€ 235,230**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Refurbishment	1	€ 1,211,395	€ 1,211,395	€ 770,596	€ 770,596
Building Works	1	€ 570,454	€ 570,454	€ 405,555	€ 405,555
Glazed Canopy	1	n/a	n/a	n/a	n/a
Covered walkway	1	EXCL.	EXCL.	n/a	n/a
Total			**€ 1,780,000**		**€ 1,176,151**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 701,870	33%	€ 463,286
Total			**€ 700,000**		**€ 463,286**

6.70 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.41: Terminal 1 Shuttle, bus lounges and injection points – Main Level 3 variances

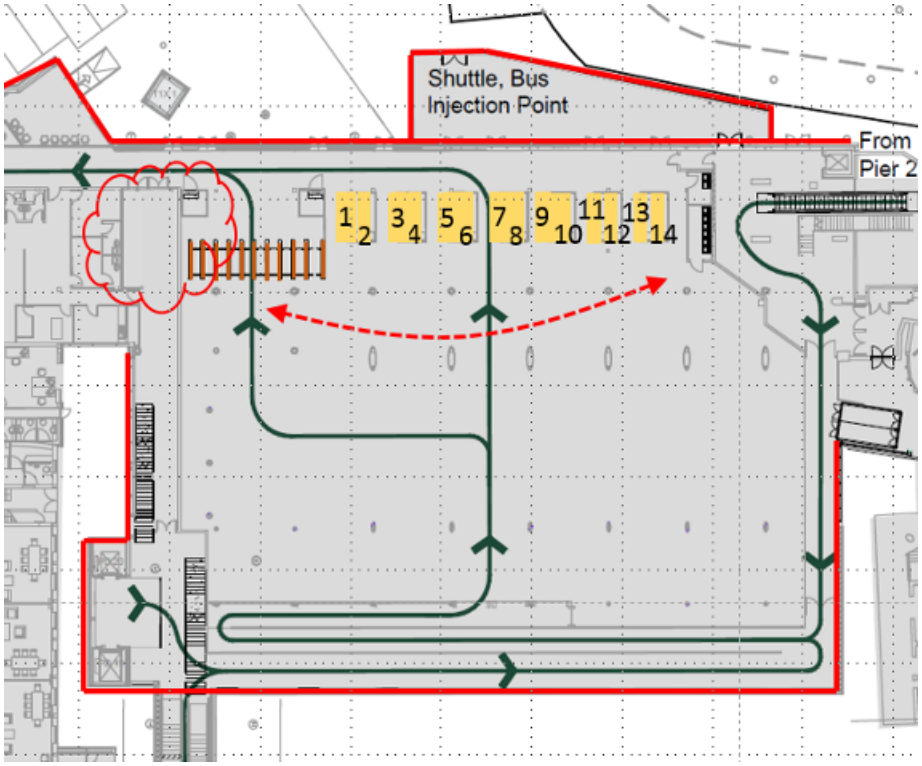
Item	Variance	% of total variance	Dublin Airport rate	Steer rate
General allowance for refresh works within OCTB (new paint, renew floor finishes)	**Redacted Cost Information**			€ 500

6.71 There is limited information in the Level 3 estimate for this project. The refresh rate of [redacted] is very high for what is in essence a cosmetic upgrade to the space and it has been reduced. Dublin Airport have confirmed that the external works element of this project has not yet been developed, so the sum of €250,000 is only a provisional sum at this stage. On the basis that Dublin Airport have also stated that this sum is to include for new ramps, balustrades, pavement alterations, external lighting, signage and line markings the allowance is reasonable at this stage of the project. The quantities for this project have been validated.

CIP.20.03.018 – Terminal 1 - Immigration Hall

Introduction

Figure 6.10: Terminal 1 - Immigration Hall



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.72 This project's aim it to increase the processing capacity of the hall for a 40mppa airport, to reorganize for facilitating optimum e-gate usage and to reduce queuing times at T1 immigration.

Context

6.73 An approved PACE project provides expansions of T1 immigration in 2 phases only. A reorganization of the space is aimed to improve e-gate usage and visibility for EU nationals from Pier 1.

Scope

6.74 The scope of this project includes replacement of the existing 11 booths with 14 new booths, relocation of e-gates to the pier 1 side and of the observation room to the north. As a result of this expansion, the existing staff bypass airlock and office area need modifications.

Stage

6.75 Project stage is currently at concept design with feasibility/outline design complete. Construction will commence in Q4 2021 with completion by Q2 2023.

Key project metrics

Table 6.42: Terminal 1 – Immigration Hall – Key project metrics

Metric	Value
Construction cost estimate	€ 930,000
Number of e-gates	10 (existing relocated)
Number of booths	14 (all new)
Cost per square metre	Not disclosed

Specifications review

Table 6.43: Terminal 1 – Immigration Hall – Specifications review

Subject	Comments
Effectiveness of scope	Project objectives will be met by the suggested scope.
Alternative scopes	A layout without relocation of existing e-gates should be considered for cost savings.
Quality of specifications	Level 3 costs provide a reasonably detailed breakdown of the specification of the works. The following item is missing in the Level 3 costs: • Reconfiguration of observation room as shown in the drawing (70sqm x 2,750€/sqm to be added according Dublin Airport).
Phasing and synergies with other projects	Construction works need to be phased and aligned with other T1 projects due to dependencies and possible synergies: • CIP.20.04.018 Fast track improvements – A new fast track will be introduced at immigration and will affect the layout of the queuing area; both projects should be aligned and carried out at the same time.
Existing asset conditions	Information on asset life of existing immigration booths which will be replaced has not been provided. However, the replacement is necessary for this project due to a reduced width of the new booths. The existing 10 e-gates which have been installed in 2017 will be relocated.
Double counting	None identified. No double counting with PACE Immigration Project.

6.76 The objectives can be fulfilled by the suggested scope and the additional processing facilities. However, the relocation of the e-gates would not necessarily improve their usage and therefore cannot be considered as an efficient initiative. An alternative layout without relocation of the e-gates might be developed and evaluated to realise cost savings.

6.77 The reconfiguration of observation room has been added to the costs as it was missing. This was confirmed by Dublin Airport.

Cost estimate review

Table 6.44: Terminal 1 – Immigration Hall – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 225,000	€ 225,000	€ 0
Construction Costs	€ 1,125,000	€ 1,125,000	€ 0
Escalation, Contingency & Design Variability	€ 450,900	€ 443,138	-€ 7,763
Total	**€ 1,800,900**	**€ 1,793,138**	**-€ 7,763**

Table 6.45: Terminal 1 – Immigration Hall – Level 2 Costs

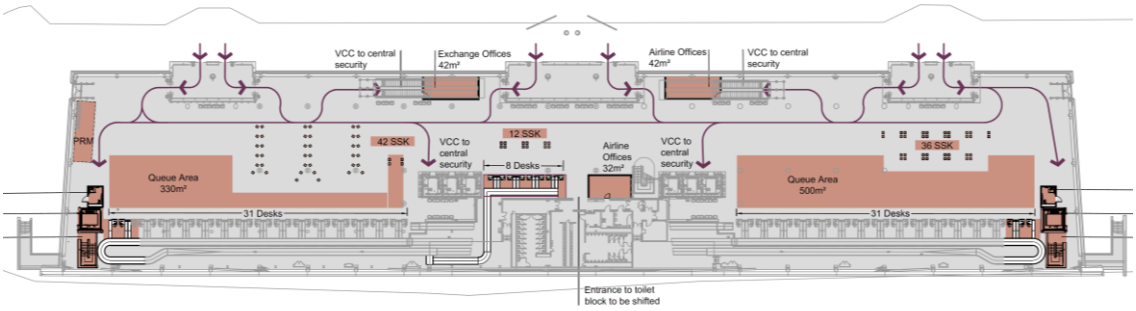
Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 225,000	20%	€ 225,000
Total			**€ 225,000**		**€ 225,000**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Refurbishment / Alterations	1	€ 1,125,000	€ 1,125,000	€ 1,125,000	€ 1,125,000
Total			**€ 1,125,000**		**€ 1,125,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 450,900	33%	€ 443,138
Total			**€ 450,900**		**€ 443,138**

6.78 The staging allowance equates to almost 30% of the construction cost for the project. Based on the works required and the location in which they are taking place this is not unreasonable. We have added an allowance for the reconfiguration of the observation room to our Level 3 estimate. This was originally not included in the Dublin Airport estimate, but has since been added in.

CIP.20.03.020 – Terminal 2 Check-in Area Optimisation

Introduction

Figure 6.11: Terminal 2 Check-in Area Optimisation



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.79 This project proposes the upgrade of the Terminal 2 check-in hall infrastructure to facilitate on-going passenger growth with technology upgrades and new installations. The main objectives are to improve capacity within the existing footprint to meet the 40mppa facility requirements, to better utilize the existing floor area and to improve passenger experience through technology and improved circulation spaces.

Context

6.80 Phase 3 of the Common Use Self Service "CUSS" project is now being implemented and improves space utilisation through a common-use 2 step bag-drop process. However, Dublin Airport state that the future passenger growth requires additional check-in facilities (check-in positions, bag drops and SSKs) to meet the anticipated demand.

Scope

6.81 The project scope includes installation of additional facilities (6 check-in desks, 8 bag drops and 14 Self Service Kiosks (SSKs), modification & lengthened of collector belts, relocation of existing functions (airline offices, exchange offices, toilets at both sides), a new PRM office as well as alteration of the lift and stair access at both sides.

Stage

6.82 Project stage is currently at concept design with feasibility/outline design complete. Construction will commence in Q1 2022 with completion until Q1 2023.

Key project metrics

Table 6.46: Terminal 2 Check-in Area Optimisation – Key project metrics

Metric	Value
Construction cost estimate	€ 9,270,000
Total number of bag drop/check-in desks	70 (56 existing + 14 new)
Total number of SSKs	90 (76 existing + 14 new)
Cost per square metre	Not disclosed

Specifications review

Table 6.47: Terminal 2 Check-in Area Optimisation – Specifications review

Subject	Comments
Effectiveness of scope	All project objectives can be met by the suggested scope and layout.
Alternative scopes	None.
Quality of specifications	Level 3 costs only partly provide a reasonably detailed breakdown of the specification of the works. Some items are provided in a lump sum and cannot be properly assessed (e.g. baggage system alterations). The cost of SSKs seem to be missing in the Level 3 costs.
Phasing and synergies with other projects	No synergies with other projects identified.
Existing asset conditions	T2 is only 8 years old and hence the assets affected by this project do not need to be replaced in the coming CIP period. Existing check-in desks and SSKs will be further utilized.
Double counting	None identified. No double counting with PACE CUSS Project.

6.83 With the proposed scope all objectives can be accomplished in an efficient and effective way.

Cost estimate review

Table 6.48: Terminal 2 Check-in Area Optimisation – Level 1 Costs

	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 1,850,000	€ 1,639,518	-€ 210,482
Construction Costs	€ 9,270,000	€ 8,337,591	-€ 932,409
Escalation, Contingency & Design Variability	€ 3,650,000	€ 3,229,031	-€ 420,969
Total	**€ 14,770,000**	**€ 13,206,140**	**-€ 1,563,860**

Table 6.49: Terminal 2 Check-in Area Optimisation – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 1,854,342	20%	€ 1,639,518
Total			**€ 1,850,000**		**€ 1,639,518**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Refurbishment / Relocations	1	€ 4,837,771	€ 4,837,771	€ 4,325,869	€ 4,325,869
Check-in & SSK's	1	€ 899,640	€ 899,640	€ 894,344	€ 894,344
Baggage Modifications	1	€ 3,534,300	€ 3,534,300	€ 3,117,378	€ 3,117,378
Total			**€ 9,270,000**		**€ 8,337,591**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 3,652,127	32%	€ 3,229,031
Total			**€ 3,650,000**		**€ 3,229,031**

6.84 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.50: Terminal 2 Check-in Area Optimisation – Main Level 3 variances

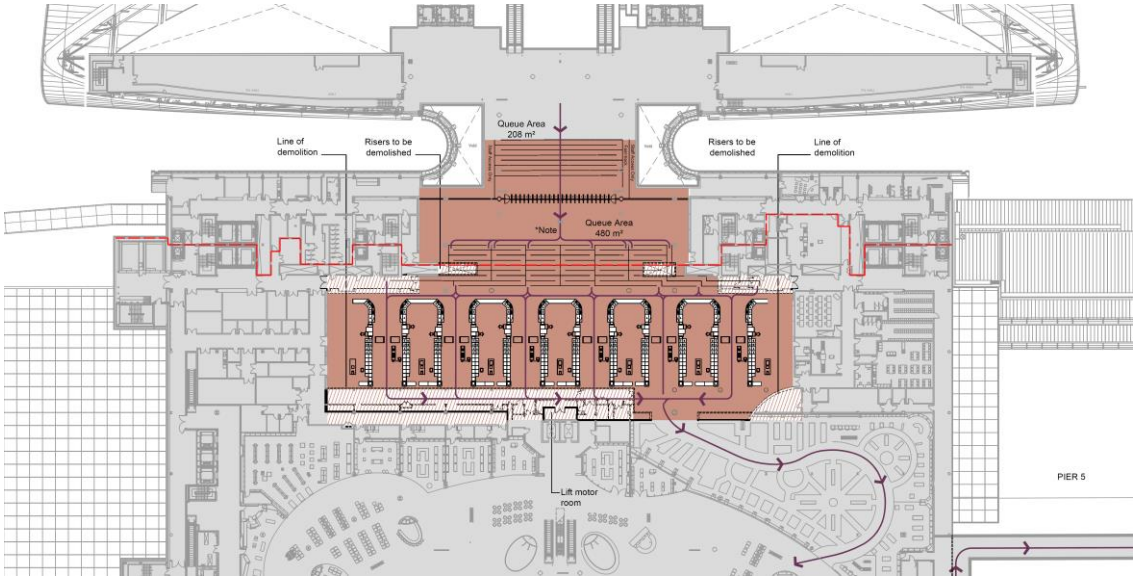
Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Allowance for alterations to WC's	Redacted Cost Information			€ 4,000
Allowance for relocating Airline offices				€ 2,000
8 new Check in desks (centre of the building)				€ 50,000
Provide 6 New Check in desks (3 either side of the Hall)				€ 50,000
Allowance for relocating PRM offices				€ 2,000
Allowance for relocating the Exchange Offices				€ 2,000

6.85 Dublin Airport has provided a breakdown of the lump sum for the check in desks. However, the allowance in this project is higher than in other projects in the CIP so we have reduced the allowance to €50,000 per desk including all services connections, IT and phasing. Dublin Airport also provided a high level breakdown of the lump sum for baggage alterations that was prepared with input from a baggage specialist. A buildup for the VCC alterations lump sum has been provided and the allowance included is reasonable for the works involved. The allowances for the various office reloactions are also higher than we would expect so we have reduced them. The quantities for this project have been validated.

CIP.20.03.021 – Terminal 2 Central Search Area Expansion

Introduction

Figure 6.12: Terminal 2 – Central Search Area Expansion



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.86 The main objectives are to meet the anticipated increased demand for T2 security processing capacity, to provide Automated Tray Return System (ATRS) lanes and upgrade screening equipment to EDS C3 standard, to safeguard space for future implementation of full body scanners and other potential changes and to enhance passenger experience for queuing, accessibility and security processes.

Scope

6.87 The scope of the project includes the relocation of boarding card representation and landside dividing screens, a partial removal of risers, a reduction of the retail area to the line of lift core including the removal of the retail back of house corridor, generally making good of finishes and the installation of walls to core on side of queuing area along with to the entry to departure lounge.

Stage

6.88 Project stage is currently at concept design with feasibility/outline design complete. Construction will commence in Q1 2022 with completion until Q1 2023.

Key project metrics

Table 6.51: Terminal 2 Central Search Area Expansion – Key project metrics

Metric	Value
Construction cost estimate	€ 3,540,000
17m ARTS lanes	11
Cost per square metre	Not disclosed

Specifications review

Table 6.52: Terminal 2 Central Search Area Expansion – Specifications review

Subject	Comments
Effectiveness of scope	The project objectives will be fully met by the suggested scope in an effective and efficient manner.
Alternative scopes	None identified.
Quality of specifications	Level 3 costs only partly provide a reasonably detailed breakdown of the specification of the works. Quantities (sqm) cannot be justified by drawings or are given as a lump sum (e.g. upgrades to existing risers).
Phasing and synergies with other projects	Construction works need to be phased and aligned with other T2 projects due to dependencies and possible synergies: • CIP.20.04.018 – Fast Track Improvements; – Fast track improvements for security T2 to be combined with new fast track security lane. • CIP.20.06.001 – Cabin-Baggage X-Ray Replacement & EDS Upgrade; – New C3 machines to be implemented from the beginning to reach desired throughput. • CIP.20.06.041 – Security Screening Equipment - End of Life; – New security equipment can be implemented at same time. • CIP.20.06.042 – ATRS - Central Search Areas; – Existing ATRS lanes from T1 incl. remote screening to be installed as part of the project; T1 central search therefore has to be already relocated. • CIP.20.06.031 Autopass - T1 Replacement & T2 Install; – New autopass installation should be carried out within this project since boarding card presentation will be moved to the bridge area.
Existing asset conditions	T2 is only 8 years old and hence the CSA area does not require any major refurbishments. Dublin Airport state security screening equipment (LED, ETD, HHMD and WTMD) will reach end of life in the next CIP period (see also CIP.20.06.041).
Double counting	None identified.

6.89 With the proposed scope all objectives can be accomplished in an efficient and effective way. However, future expansion of the central search area would require further reduction of retail or office space and costly refurbishments.

Cost estimate review

Table 6.53: Terminal 2 Central Search Area Expansion – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 710,000	€ 589,489	-€ 120,511
Construction Costs	€ 3,540,000	€ 2,947,446	-€ 592,554
Escalation, Contingency & Design Variability	€ 1,390,000	€ 1,160,999	-€ 229,001
Total	**€ 5,640,000**	**€ 4,697,933**	**-€ 942,067**

Table 6.54: Terminal 2 Central Search Area Expansion – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 708,467	20%	€ 589,489
Total			**€ 710,000**		**€ 589,489**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Facilitation & Demolition Works	1	n/a	€ 123,165	n/a	€ 94,889
Refurbishment Security Area & Queue Space	1	n/a	€ 3,419,168	n/a	€ 2,852,557
Total			**€ 3,540,000**		**€ 2,947,446**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 1,395,325	33%	€ 1,160,999
Total			**€ 1,390,000**		**€ 1,160,999**

6.90 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.55: Terminal 2 Central Search Area Expansion – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport quantity	Dublin Airport rate	Steer quantity	Steer rate
Allowance for the New Fit out to the above mention area	**Redacted Cost Information**					€ 2,000
Allowance for minor demolition works to allow for the works to commence						€ 150
Allowance for Refurbishment of the Boarding Card Presentation Area						€ 1,500

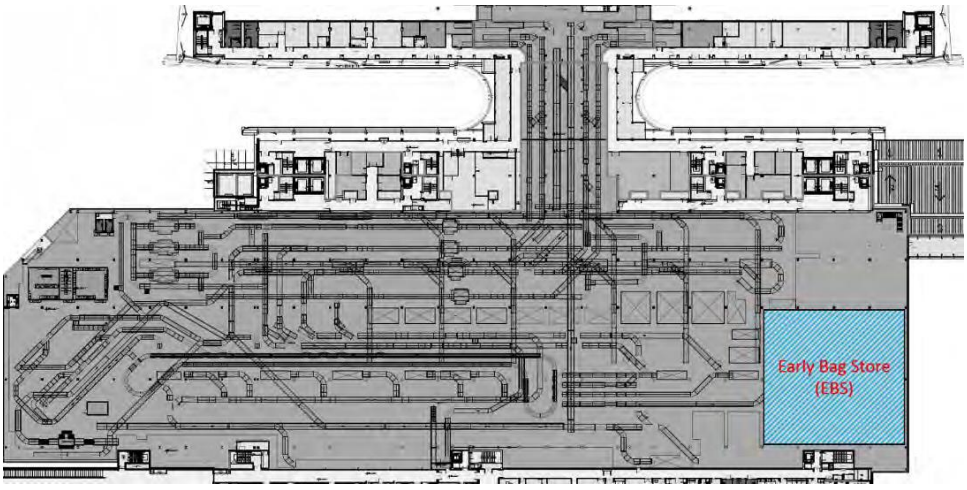
6.91 The rate for the demolition works is higher than we would expect, and we have reduced it accordingly. In addition, the fit out rate is high and has been reduced to align with the allowances we have included in other projects in the CIP. We have checked the quantities for the project and have amended them in line with our measurement of them. In response to queries raised, Dublin Airport has advised that a large number of services will need to be diverted as a result of the riser relocation. They have also provided a document that details the various services and other works that need to be addressed as part of the project. Based on the information provided, the allowance included is reasonable but there is insufficient detail to fully assess it, so we will work with Dublin Airport to obtain additional detail to fully validate this cost in advance of the final report. Dublin Airport has also confirmed that their estimate does include provision for dividing screens, wayfinding and signage within the fit out rate, so the additional items that we initially added to our level 3 estimate have been omitted.

CIP.20.03.028 – Terminal 2 Early Bag Store & Transfer Lines

Objective

6.92 This investment proposes the construction of an Early Bag Store (EBS) in Terminal 2 at Dublin Airport, and a 4th Transfer line.

Figure 6.13: Terminal 2 Early Bag Store & Transfer Lines – CIP.20.03.028



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Context

6.93 The transfer product at Dublin Airport is a significant area of growth, due in part to the presence of US CBP in Terminal 2 and other non-US long haul flights.

Scope

6.94 The investment proposes the construction of the EBS in the Hold Baggage Screening (HBS) mezzanine of Terminal 2 which will have a capacity of 950 bags. A 4th Transfer line will also be installed to increase inter-terminal capacity and resilience of the transfer system.

Stage

6.95 The project is analogous to the wider ongoing programme of improvement, upgrade and reduction in operational cost are anticipated to implement as follows:

- 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

Key project metrics

Table 6.56: Terminal 2 Early Bag Store & Transfer Lines - Key project metrics

Metric	Value
Construction cost estimate	€ 18,000,000
Dublin Airport estimation method	Dublin Airport stated that the cost estimates for the EBS arose from the competitive dialogue process and as such are subject to commercial privilege and they are unable to disclose them at this time.

Specifications review

Table 6.57: Terminal 2 Early Bag Store & Transfer Lines – Specifications review

Subject	Comments
Effectiveness of scope	This project scope will deliver the project objectives.
Alternative scopes	The project planning, design and procurement processes for each project should review and evaluate alternative product/supplier options. In particular ASR based EBS Technologies maybe a more viable investment when considering whole life ROI particularly in the case of individual bag retrievals from EBS to satisfy CBP passenger pre-clearance.
Quality of specifications	No specifications were forthcoming during this evaluation. Dublin Airport stated that: • The overarching constraints to the design supporting this CIP was to keep the Terminal 2 make-up operation within the available footprint to ensure maximum utilisation of existing space within the baggage hall; and • The interfacing required between the EBS and SAC has not been identified as part of the feasibility. Appropriate solutions for the operation and interface of the EBS and Baggage Systems SAC would need to develop as part of the design development phase of the EBS project.
Phasing and synergies with other projects	Whilst not directly related the Terminal 2 Early Bag Store & Transfer Line have synergies with the aspects of the works planned in IT - Baggage Systems, IT Servers and Storage - Lifecycle & Growth and IT Network Components - Lifecycle & Growth CIPs.
Existing asset conditions	Not applicable.
Double counting	None identified.

6.96 In the context of the information provided, the Terminal 2 Early Bag Store & Transfer Lines project appears to be effective in meeting the objective and efficient in its scope.

6.97 We note that the material presented in support of this CIP does not indicate the extent of optioneering that took place in feasibility to determine the selection of EBS concentrated lane based in preference to Single Location Storage Technologies. The latter delivering simplicity of single bag retrieval without the use of a sortation device external to the EBS.

Cost estimate review

Table 6.58: Terminal 2 Early Bag Store & Transfer Line – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 3,600,000	€ 3,600,000	€ 0
Construction Costs	€ 18,000,000	€ 18,000,000	€ 0
Escalation, Contingency & Design Variability	€ 6,310,000	€ 6,310,224	€ 224
Total	**€ 27,910,000**	**€ 27,910,224**	**€ 224**

Table 6.59: Terminal 2 Early Bag Store & Transfer Line – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 3,600,000	20%	€ 3,600,000
Total			**€ 3,600,000**		**€ 3,600,000**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Provision of Additional EBS Positions	1	n/a	€ 18,000,000	n/a	€ 18,000,000
Total			**€ 18,000,000**		**€ 18,000,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 6,310,000	29%	€ 6,310,224
Total			**€ 6,310,000**		**€ 6,310,224**

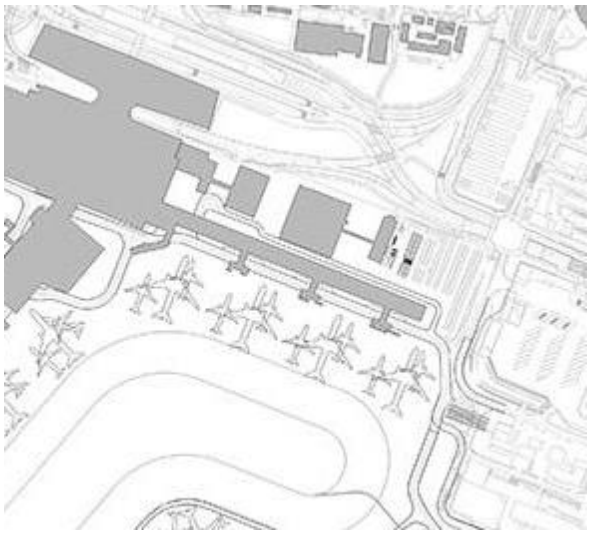
6.98 There is insufficient information in this project for us to be able to make any kind of assessment of the costs. Dublin Airport has stated in its response to various queries that the cost of this project has been developed in line with analysis that Dublin Airport has provided to us in response to queries raised. It has also subsequently provided further technical narrative to explain the scope required within the project. However, no build-up to the lump sums of [redacted] for the Early Bag Store and [redacted] for the Transfer Lines has been provided. We will therefore request further information on these items and update our analysis for the final report based on this.

CIP.20.03.029 – New Pier 5 (T2 & CBP Enabled) - Apron Works

Introduction

6.99 This project proposes the construction of a new Pier 5 (as part of the wider South Apron Development) incorporating 4 wide-body Multi Aircraft Ramp System (MARS) contact stands.

Figure 6.14: New Pier 5 (T2 & CBP Enabled)



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.100 The objectives of the new Pier are:

- To provide bus lounges for passenger transfer to all flights on the airfield;
- To accommodate side by side US Customs and Border Protection (CBP) and Non-CBP departures; and
- To facilitate access to aircraft both at apron level (walk on/off) and via airbridge.

Context

6.101 The new pier expands the gate and boarding options for Terminal 2. The proposed pier footprint encompasses an area of existing buildings, which are to be demolished as part of the works. The business and services therein are to be relocated to a purpose-built business and logistics park to the south-east.

Scope

6.102 The scope includes:

- Demolition of existing buildings and relocation of businesses;
- Construction of four storey pier with airbridges;
- Construction of 4x MARS stands to accommodate 4x Code E or 8x Code C aircraft; and
- Construction of a secure roadway to a determined termination point for future connection to logistics park.

Stage

6.103 Feasibility/outline design complete.

Key project metrics

Table 6.60: New Pier 5 (T2 & CBP Enabled) – Key project metrics

Metric	Value
Total construction cost estimate	€ 208,680,000
Construction (Airfield) cost estimate	€ 47,637,501
Airfield Works (Apron, Roads)	58,019 m^2
Airfield Works (Apron, Roads)	821 €/ m^2

Specifications review

Table 2: New Pier 5 (T2 & CBP Enabled) – Specifications review

Subject	Comments
Effectiveness of scope	The scope is effective in providing a new pier and wide-body stands to serve it. However, several observations have been made, but not included in the costings: • Costings provided list 9No. FEGP installations, which does not match up with the provision of 8No. stands (1 per Code C aircraft). These and related items appear to match the same listing in the costings for the South Apron Expansion CIP.20.03.031. 8No. installations would be expected; • Provision is made for 2No. Interceptors but is unclear if this is based on two outfalls. This provision may be improved by a single combined Interceptor; • Demolition of the existing PBZ is listed in the costings, however the potential relocation of the PBZ (modular building) is included in the South Apron Expansion project. If the building is to be relocated this can only occur once it has somewhere to go, therefore inclusion of the PBZ removal in this works package may not be appropriate; • In response to our queries, Dublin Airport has confirmed that "the existing PBZ (South Gates) is in good condition. Assessments have confirmed that OOM of A.) relocating the PBZ and B.) developing a new PBZ are similar (included in estimate). Further analysis is required. The operationally preferable option is currently the development of a new PBZ to allow for uninterrupted PBZ operations (zero down-time)"; and • There is an entry included for roadway to the PBZ which appears anomalous as the PBZ is relocated in a separate works package.
Alternative scopes	No alternative scopes have been identified.
Quality of specifications	Specifications are high level; however, Level 3 costings provide an indication of the proposed specification and are reasonable given the outline scope.
Phasing and synergies with other projects	The Pier 5 works tie in with the works to the South Apron Expansion (CIP.20.03.031). The Pier 5 stands are included on the South Apron Expansion drawings, and the phasing of the relocation/replacement of the PBZ suggests these should occur concurrently.

Subject	Comments
	The project provides for roadway enabling works to the future Logistics park (partially covered under CIP.20.06.014). Given that this park is intended to take the businesses/services removed to make way for the Pier works, it would be sensible for these projects to be concurrent.
Existing asset conditions	New construction.
Double counting	None identified.

6.104 The scope is effective in providing a new pier and wide-body stands to serve it. There are several areas where this project links into and relies upon other capital projects, and the phasing between these needs careful consideration.

CIP.20.03.029 (continued) – Terminal 2 New Pier 5 (T2 & CBP Enabled) and T2 Immigration Hall Reorientation

Introduction

6.105 This project provides 4 wide-body (WB), CBP enabled MARS stands operated from a new pier (Pier 5) which is a development planned as an expansion of T2. It is co-ordinated with the South Apron Development. It also provides for the stands to be operated as non CBP enabled and accessed from T1.

6.106 The project also includes alterations in the existing Arrivals Immigration Hall to enable arriving passengers from the new Pier 5 to access Immigration

Figure 6.15: New Pier 5 (T2 & CBP Enabled) and T2 Immigration Hall Reorientation

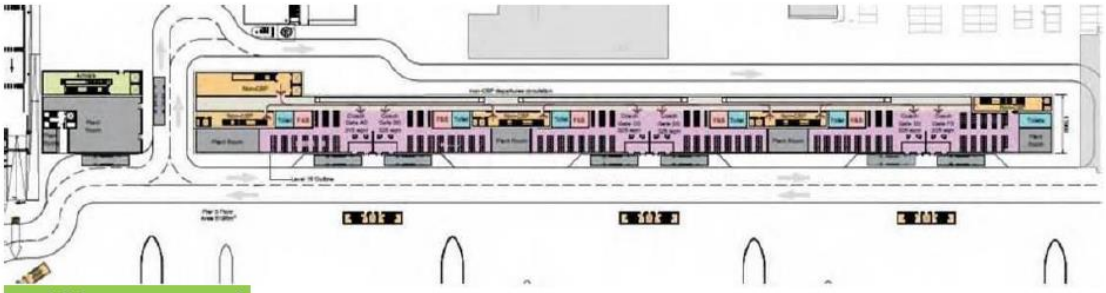


Exhibit 2. Apron Level

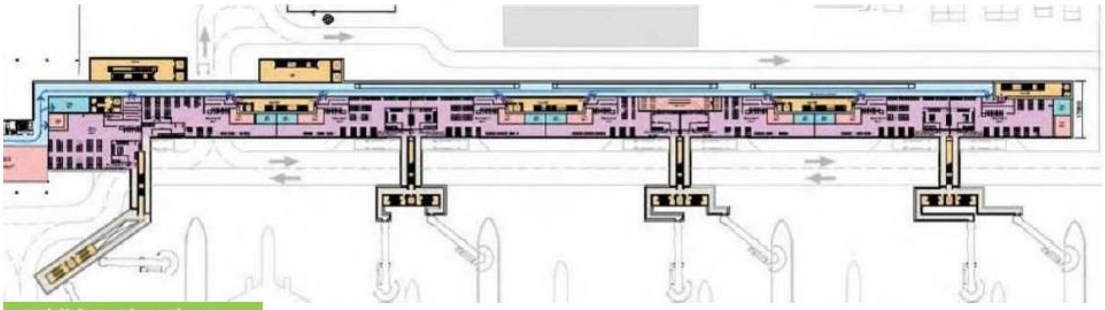


Exhibit 3. First Floor

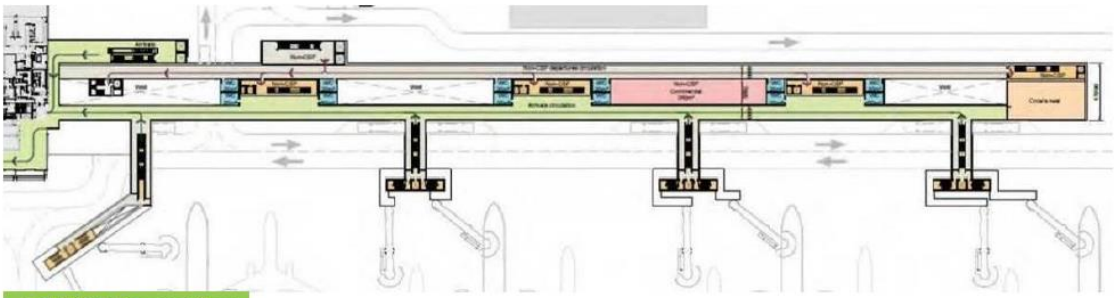


Exhibit 4. Second floor

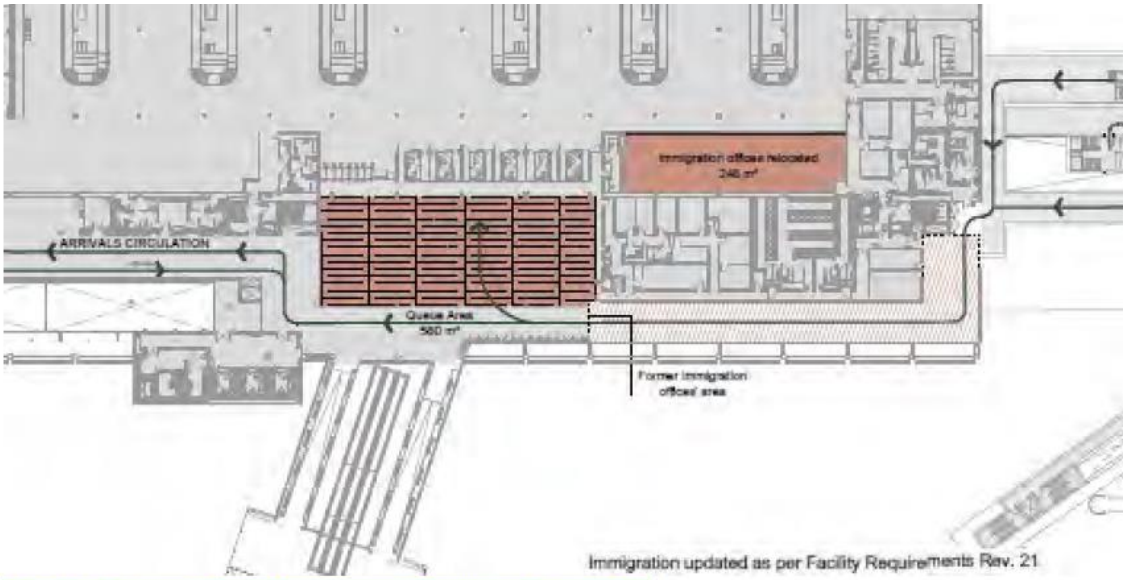


Exhibit 1. Proposed layout for immigration facilities at Terminal 2.

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.107 The project objective is to provide for the forecast growth in demand for CBP-enabled wide-body stands and the project provides 4x CBP enabled wide-body stands. However, the MARS stands also provide flexibility, allowing up to 8x narrow-body aircraft instead, for both CBP and non-CBP services.

Context

6.108 T2 occupies a highly developed part of the airport campus and therefore additional pier development will require creative planning as well as the removal of existing facilities. Because of these considerations it is only possible to develop a single sided pier, which is not the most economical solution.

6.109 The impact of additional passengers arriving from Pier 5 requires an access route to be provided through existing offices at the arrivals level in T2.

Scope

6.110 The scope of the project in planning terms meets the stated objective or *project need,* but in addition it provides a range of multi-functional gates and stands. Whilst these clearly add flexibility, it is not fully understood if they are necessary. In addition, this multi-functionality brings into play additional functional and regulatory requirements.

6.111 From a passenger perspective, it is not clear how the paired gate lounges work when the paired gate lounges are in CBP mode serving a WB flight. We assume that the paired lounges work as one lounge in this scenario, but there are 2 entrances to the paired lounge, each with pre-boarding facilities. Likewise, there are 2 entrances to the fixed links leading to 2 PBBs, so it is unclear how the economy and business class passengers are marshalled before boarding. We have been informed that this level of detail will be considered at a later stage.

6.112 The scope of work envisaged for the Immigration hall is straightforward for providing access from Pier 5, however the impact of the alterations means less trolley parking space in the Re-Claim Hall because this space is now taken up with the new immigration offices and the flow routes now envisaged from both Pier 5 and 4 do not provide any orientation space for

passengers to select which EU/Non-EU queue they should be joining; this could result in congestion.

Stage

6.113 The project stage is currently at outline design stage. Project delivery is scheduled for Q4 2022. The outlined procurement timeline is:

- Feasibility/Outline design complete Q4 2018
- Planning complete Q1 2020
- Detailed design complete Q1 2021
- Procurement compete Q3 2021
- Construction commence Q4 2020
- Construction complete Q4 2022
- Project handover Q4 2022

6.114 This is efficient, straightforward and condensed, but the programming suggests a fast track route focusing on contract documentation/tendering process for demolition, ground works, followed by superstructure before the envelope, services and finishing trades are fully designed, detailed and tendered. This process adds a margin of risk and increased project management costs.

6.115 The procurement route identified for the Immigration Hall re-organisation currently shows project handover in Q1 2024. Clearly this is too late and needs to be revised to coincide with the handover of Pier 5.

Key project metrics

Table 6.61: Terminal 2 New Pier 5 (T2 & CBP Enabled)- Key project metrics

Metric	Value
Total construction cost estimate	€ 208,680,000
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 Final
Cost per square metre	Rates for all elements provided
No of WB gates	4
No of NB gates with PBB	8
No of PBB	8
No of bussing gates	6

Specifications review

Table 6.62: Terminal 2 New Pier 5 (T2 & CBP Enabled) – Specifications review

Subject	Comments
Effectiveness of scope	Yes, for a high-level concept design as encapsulated in the CIP project sheet, drawings and PPT dated 6.12.18 The scope is efficient if the multifunctional nature of the project was clearly stated as the requirement.
Alternative scopes	The basic configuration of the project is determined by the physical constraints of the site and floor levels/circulation routes in T2, so it difficult to envisage a different configuration. However as noted above the scope appears to have been decided with the development of the project to embrace a multifunction capability.

Subject	Comments
	The configuration of the twin NB gate lounges and twin fixed links work for a NB flight embarkation, but we are not clear how the single WB gate lounge works as far as entry into the lounge from security/CBP clearance and how the embarkation process works when there are 2 gates each separated by a partition and the business lounge and each connected to a separate fixed link connecting with 1 PBB.
Quality of specifications	Specifications provided in Level 3 costs provide sufficient detail for outline design stage.
Phasing and synergies with other projects	Completion and operational dates need to be phased with the following projects to ensure smooth operations because they are interdependent, and all contribute to the capacity improvements of 40mppa mandated for 2022 completion: • 20 03 031 S Apron Expansion • 20 03 030 Expansion of CBP in T2 The T2 International Departures Lounge expansion, 20 03 022, allocated as an additional project for consideration, will interface with Pier 5; Pier 5 is not dependent upon this project.
Scope and specifications account for asset conditions and residual life?	The residual asset life of T2 is 30 years, however the new Pier 5 is specified as having an asset life of 25 years, so we are not clear what this is in reference to. We would expect the internal finishes and IT to be renewed several times within the life of the building, the services and envelope to have an asset life of circa 25 years and the structure 60 years. The Immigration Hall alterations have an asset life of 10 years. This should be changed to the same asset life as the Pier 5 internal finishes and IT.
Double counting	None identified.

6.116 This is a large project driven by the stated need for more WB Code E stands for pre-cleared US flights. It does in fact provide gates for only 4 WB stands with PBB access and is a single sided pier which means that this is not as economic as a double-sided pier, e.g. Pier 4.

6.117 The flexibility built into the design also enables the pier to operate for Code C, NB aircraft in both precleared US mode and non-precleared mode or, 4 Code E WB non-pre-cleared mode. 8 gates are provided for PBB access to aircraft and 6 gates provided for bussing/walk on access to aircraft. In spite of the fact that this multifunctional ability exceeds the stated brief and provides an enhanced solution, the project is efficient.

Cost estimate review (Apron Works and T2 Immigration Hall Reorientation)

Table 6.63: Terminal 2 New Pier 5 (T2 & CBP Enabled) – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 41,740,000	€ 37,462,575	-€ 4,277,425
Construction Costs	€ 208,680,000	€ 185,774,383	-€ 22,905,617
Escalation, Contingency & Design Variability	€ 73,220,000	€ 65,732,566	-€ 7,487,434
Total	**€ 323,640,000**	**€ 288,969,524**	**-€ 34,670,476**

Table 6.64: Terminal 2 New Pier 5 (T2 & CBP Enabled) – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 41,735,931	20%	€ 37,462,575
Total			**€ 41,740,000**		**€ 37,462,575**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
South Apron - Pier 5 & Immigration	1	n/a	€ 109,784,844	n/a	€ 92,169,717
South Apron - Demos & Relocations	1	n/a	€ 32,745,529	n/a	€ 29,023,454
South Apron - Airfield	1	n/a	€ 48,263,398	n/a	€ 46,695,326
South Apron - Cargo Village Enabling Works	1	n/a	€ 17,885,886	n/a	€ 17,885,886
Total			**€ 208,680,000**		**€ 185,774,383**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 73,222,953	29%	€ 65,732,566
Total			**€ 73,220,000**		**€ 65,732,566**

6.118 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.65: Terminal 2 New Pier 5 (T2 & CBP Enabled) – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Allowance for new airbridges	**Redacted Cost Information**			€ 500,000
Communication Systems				€ 200
Cargo Centre 1 - Workshop GF				€ 20
Cargo Centre 2 - Warehouse area				€ 20
AVDGS				€ 50,000
Roof Coverings; kalzip or similar finish on thermal insulation and purlins				€ 375
Allowance for intumescent painting to steel. Increased allowance in case this needs to be 90min rated				€ 680
F&B				€ 0
High Mast Lighting (15m)				€ 40,000
Road behind PBZ, including drainage				€ 250
Cargo Centre 1 - Office GF				€ 20
Road to front of pier 5				€ 250
Cargo Centre 1 - Office 1st floor				€ 20
Cargo Centre 1 - Office 2nd floor				€ 20
Old Ryanair Building - GF				€ 20
Old Ryanair Building - 1st				€ 20
Old Ryanair Building - 2nd				€ 20
Gate Post 4 - Vehicle canopy and fences and slab				€ 20
Cargo Centre 2 - End block GF				€ 20
South Apron Accommodation - GF				€ 20
South Apron Accommodation - 1st				€ 20
Gate Post 4 - Building				€ 20

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Cargo Centre 1 - Removal of ACMs	Redacted Cost Information			€ 20
Intumescent paint to structural steel				€ 680
Cargo Centre 2 - Removal of ACMs				€ 20
Soft Strip Works; strip out of Iolar House				€ 15
Finishes to Floors; carpet tile or similar to office areas				€ 35
Cargo Centre 2 - End block 1st				€ 20
Cargo Centre 2 - End block 2nd				€ 20
Gate Post 4 - Concrete walls				€ 20

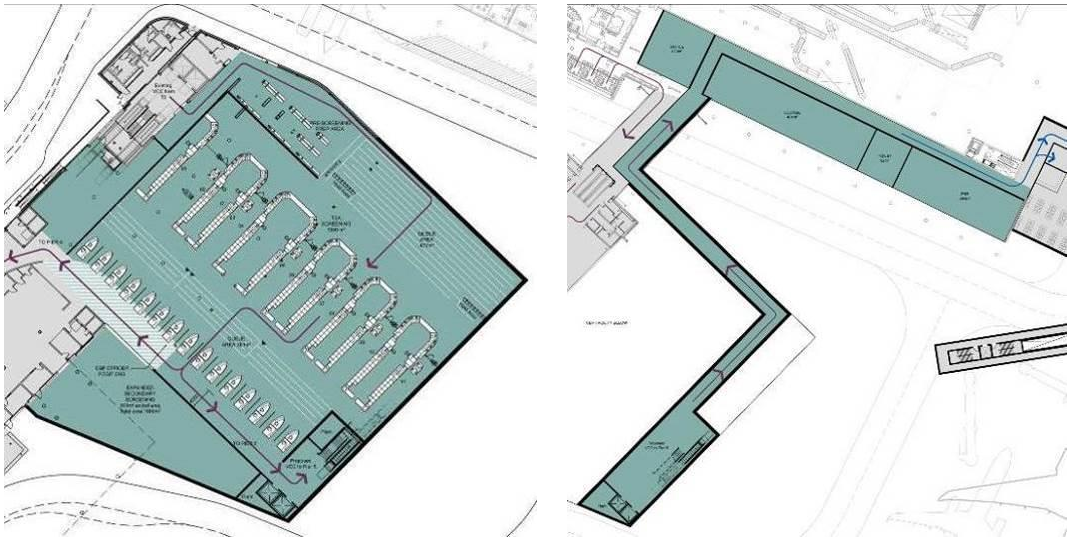
6.119 There is a lot of detail in the Level 3 estimate. We have checked the quantities from the drawings provided. The main issue that arose was a discrepancy on the gross internal floor area of the proposed pier which is less than Dublin Airport's figure. We have amended the quantities accordingly. While in general, the majority of the rates appear to be reasonable for the works described, there are a number of elements where the rates are higher than we would expect. We have reduced the rates for fire protection, Kalzip roofing, communications installation, road construction, high mast lighting, AVDGS, airbridges and demolition costs as they all higher than we would expect them to be. In addition, despite Dublin Airport advising that additional fit out costs are required prior to handover to concessionaires, we have omitted the cost of the fit out of the F&B space as we would expect that this should all be paid for by the concessionaire.

6.120 There are a number of lump sum allowances for items of scope including utilities provision, services diversions, reprovision of security posts and provision of airfield signage. While no detail or build-up to these sums has been provided, the sums included for these items are not unreasonable for a project of this scale and nature based on our experience from working on other major airport projects. There are also lump sum allowances included for contributions to the Cargo Village demolition and relocation works. We are unable to comment on the validity of these sums or the basis for their inclusion in the estimate.

CIP.20.03.030 – Expansion of US Pre-Clearance Facilities

Introduction

Figure 6.16: Expansion of US Pre-Clearance Facilities - Connection to Pier 5



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.121 This project proposes to reconfigure and expand the US preclearance facilities in pier 4 to increase capacity to meet passenger growth requirements. Objectives are also to increase efficiency and throughput by upgrading screening equipment, to safeguard for future expansion eastward by linking the new Customs and Border Protection (CBP) facilities to Pier 4 and new Pier 5 as well as to enhance passenger experience by improving service levels along with reducing queuing times. Additional objectives are to increase capacity of make-up positions for outbound US baggage needs and to increase flexibility for utilisation of Pier 4 gate rooms for US and non-US flights.

Context

6.122 The current configuration of the facilities limits further expansion and thus it is proposed to re-orient and increase the facility to provide more capacity.

Scope

6.123 The project scope consists of 4 parts: Expansion of CBP facility, Pier 5 connection, CBP baggage make-up expansion and Pier 4 gate flexibility.

6.124 The expansion of CBP facility includes installation of 11 new 19m Automatic Tray Return System (ATRS) lanes, 30 CBP officer positions as well as provision of an additional area for queuing, circulation, staff accommodation and secondary screening.

6.125 The connection to Pier 5 includes installation of a new vertical circulation core (VCC) from apron level to L15, a new connecting corridor to Pier 5 via T2 along which offices, toilets, F&B and a lounge will be provided in existing T2 spaces.

6.126 The CBP baggage make-up area extension includes 24 new make-up positions, a new entrance to baggage hall behind Pier 5 and modifications to the vehicle flow through the baggage hall.

6.127 The increased flexibility for Pier 4 gate room utilisation provides placement of an external corridor connecting two existing CBP gate hold rooms and the VCC on the ground floor of Pier 4.

Stage

6.128 Project stage is currently at concept design with feasibility/outline design complete. Construction will commence in Q4 2020 with completion until Q1 2022.

Key project metrics

Table 6.66: Expansion of US Pre-Clearance Facilities – Key project metrics

Metric	Value
Construction cost estimate	€ 32,440,000
19m ATRS Lanes	11
CBP Officer positions	30
New baggage make-up positions	24
Cost per square metre	Not disclosed

Specifications review

Table 6.67: Expansion of US Pre-Clearance Facilities – Specifications review

Subject	Comments
Effectiveness of scope	The project objectives for expansion of US preclearance facilities will be met by the suggested scope:
Alternative scopes	• EDS C3 screening equipment should be considered; and • Option for the link to Pier 5, providing a straight and shorter corridor for passengers with less impact to existing rooms in T2.
Quality of specifications	Level 3 costs provide sufficient detail for the concept stage, however, cannot be verified from the provided drawings. The CBP and TSA equipment cost is only provided as a lump sum (8 Mill. €) and requires further detail. Moreover, the measures for increased flexibility for Pier 4 gate room utilisation have not been priced separately and hence the costs for this independent project cannot be fully evaluated.
Phasing and synergies with other projects	The project needs to be phased and aligned with other projects due to dependencies and possible synergies: • CIP.20.03.029 New Pier 5 (T2 and CBP Enabled); – The expansion of US Pre-Clearance facilities incl. the connection to Pier 5 as well as the extension of CBP baggage make-up area need to be completed before the start-up of Pier 5. • CIP.20.03.033A “Enablement of Pier 3 for precleared US bound passengers”; – The expansion of US Pre-Clearance facilities needs to be completed before the shuttle service to Pier 3 can be provided; the shuttle lounge should be built as part of the refurbishment of the existing pre-clearance area. • CIP.20.06.36 “TSA-X-ray & FBSS Replacement”; – The replacement of the existing X-rays should be aligned to ensure efficiency of the expanded CBP pre-clearance facilities and to avoid double work.

Subject	Comments
Existing asset conditions	Information on asset life of existing equipment (except X-rays and FBSS which will be replaced in CIP.20.06.36) has not been provided. Therefore, it remains unclear what CPB/TSA-equipment can be re-used. The existing preclearance area is to be completely refurbished as part of the project even though the existing Pier 4 has only been opened in 2010.
Double counting	None identified.

6.129 The scope for expansion of US preclearance facilities can generally be considered as efficient and effective. Possible scope alterations - EDS C3 screening equipment, straight and shorter corridor to Pier 5 - should be considered.

Cost estimate review

Table 6.68: Expansion of US Pre-Clearance Facilities– Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 6,490,000	€ 7,031,978	€ 541,978
Construction Costs	€ 32,440,000	€ 35,159,888	€ 2,719,888
Escalation, Contingency & Design Variability	€ 11,400,000	€ 12,354,116	€ 954,116
Total	**€ 50,330,000**	**€ 54,545,981**	**€ 4,215,981**

Table 6.69: Expansion of US Pre-Clearance Facilities– Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 6,488,388	20%	€ 7,031,978
Total			**€ 6,490,000**		**€ 7,031,978**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Buildings	1	€ 31,574,921	€ 31,574,921	€ 34,399,442	€ 34,399,442
Airfield	1	€ 216,588	€ 216,588	€ 110,013	€ 110,013
Baggage Make Up	1	€ 650,433	€ 650,433	€ 650,433	€ 650,433
Total			**€ 32,440,000**		**€ 35,159,888**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 11,401,291	29%	€ 12,354,116
Total			**€ 11,400,000**		**€ 12,354,116**

6.130 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.70: Expansion of US Pre-Clearance Facilities– Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport quantity	Dublin Airport rate	Steer quantity	Steer rate
External Enclosing walls above ground Level; Metal cladding including secondary steel supports; approx. 80%	**Redacted Cost Information**					€ 450
Communication Systems; to new build area						€ 200

Item	Variance	% of total variance	Dublin Airport quantity	Dublin Airport rate	Steer quantity	Steer rate
External Enclosing walls above ground Level; glazed curtain walling including secondary supports; approx. 20%	Redacted Cost Information					€ 1,000
Standard Foundations; Assumed pad foundations with ground beams and 200mm thick reinforced concrete ground floor slab. No basement.						€ 250
Gen. Fittings Furnishings and Equipment						€ 100
Frame; allow 80kg/m^2 for standard UC UB structural steel frame (secondary steel measured elsewhere)						€ 2,500
Roof Structure; Suspended composite slabs; in-situ concrete on slab on profiled metal deck including fabric reinforcement; up to 150mm thick						€ 150
Roof Coverings; Allowance for flat room covering including insulation, waterproof barrier etc						€ 150
Communication Systems; to refurbished area						€ 50
Crash barrier around CBP building						€ 425
Electrical Installation Generally; to new area. Assumes slight enhancement for lighting						€ 400
Fire Fighting System; refurbished area						€ 33
Central Heating and Cooling; to new build						€ 322
Additional secondary steel support for roof at 30kg/m^2 of roof area						€ 2,500
Internal Doors; Refurbished						€ 20

6.131 Our Level 3 estimate for this project is higher than Dublin Airport's due a significant difference in some of the quantities measured from the drawings provided. The has had an impact on the costs of the substructure, superstructure and internal fit out works. A further review of the quantities is required with Dublin Airport to establish why these discrepancies exist. We will liaise with Dublin Airport to finalise these points in readiness for the final report.

6.132 In general, most of the rates included in the estimate are reasonable. However, the rates for intumescent paint, communication systems and crash barriers are higher than we would expect them to be and we have reduced them accordingly. Based on Dublin Airport's response to our query, the allowance for external works assumes that when alterations to pavement areas are made, the whole of the bay will have to be replaced. This assumption is not unreasonable at this early stage in the development of the project.

CIP.20.03.031 – South Apron Expansion (Remote Stands, Taxiway & Apron)

Introduction

6.133 The project proposes to construct new stands and apron, in conjunction with other works, served by a Dual Code E Taxi-lane.

Figure 6.17: South Apron Expansion (Remote Stands, Taxiway & Apron)

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.134 An increase in stand capacity by the demolition of existing infrastructure and the construction of new stands to serve Pier5 and the new PBZ. These areas are to be accessed by a re-marked Code E Dual Taxi-lane.

Context

6.135 The proposed works area is currently occupied by a varied range of buildings and infrastructure, which must be relocated to new accommodation where appropriate prior to works commencement.

6.136 The positioning of the existing infrastructure restricts the size of aircraft which can enter this area and park on the apron.

6.137 To the north of the works area is the proposed Pier 5 construction area, which is to be served by this taxi-lane.

6.138 A portion of the proposed works have previously been covered under the scope of the PACE submission.

6.139 Part of the existing apron serves a PBZ building which will be demolished or moved.

Scope

6.140 The scope includes:

- Remarking of existing apron to a Dual Code E taxi-lane;
- Construction of apron to serve the "relocated" PBZ;

- "Relocation" of the PBZ;
- Diversion of Cuckoo Stream and revision of attenuation tank; and
- Construction of GSE parking area.

Stage

6.141 Feasibility/Outline Design Complete.

Key project metrics

Table 6.71: South Apron Expansion (Remote Stands, Taxiway & Apron) – Key project metrics

Metric	Value
Construction cost estimate	€ 57,880,000

Specifications review

Table 6.72: South Apron Expansion (Remote Stands, Taxiway & Apron) – Specifications review

Subject	Comments
Effectiveness of scope	The scope, while high level, is effective in delivering an increase in stand capacity and opening the area to larger aircraft.
Alternative scopes	No alternative scopes have been identified.
Quality of specifications	The Level 3 costs provide a reasonably detailed breakdown of the specification of the works, however there are some queries raised from the quantities. The pavement entry appears listed as "Vehicle Hardstanding", and no other pavement is listed. The pavement construction shown (325mm PQC) is consistent with aircraft pavement and would be excessive for typical GSE/vehicle hardstanding. However, given that some of the pavement is proposed for wide-body aircraft, a thicker pavement construction would be anticipated. In response to questions, Dublin Airport has confirmed a lesser flexible construction for vehicular areas which confirms an efficient approach to this aspect.
Phasing and synergies with other projects	This project requires a diversion and protection of the Cuckoo stream. Further diversion of the Cuckoo stream is planned as part of the Surface Water Environmental Compliance project (CIP.20.03.052). If possible, diversion should be planned to match the later alignment, to avoid unnecessary work. The proposed works also require the reconfiguration of an existing attenuation tank, noted in the costs but absent from the scoping document. This requires additional storage to be provided elsewhere, and thus would benefit from coordination with CIP.20.03.052 to ensure the shortfall is made up, and there is no loss of storage capacity to the airport.
Existing asset conditions	The proposed works are located in an area currently occupied by a number of buildings and facilities, which are to be relocated. The existing South Apron pavement to the east of Pier 4 is noted as being "Degraded" under the assessment as part of CIP.20.01.002.

Subject	Comments
Double counting	Parts of this projectare already included in the allowances in the PACE submission, and as such, an allowance of about €25m has been removed from the Level 3 costs.

6.142 The scope is effective in delivering the desired expansion of space and capacity. While no alternative scopes exist, there are several areas where coordination is required to avoid the doubling of work and abortive construction.

Cost estimate review

Table 6.73: South Apron Expansion (Remote Stands, Taxiway & Apron) – Level 1 Costs

	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 11,580,000	€ 9,144,191	-€ 2,435,809
Construction Costs	€ 57,880,000	€ 46,950,585	-€ 10,929,415
Escalation, Contingency & Design Variability	€ 20,290,000	€ 14,390,498	-€ 5,899,502
Total	**€ 89,750,000**	**€ 70,485,274**	**-€ 19,264,726**

Table 6.74: South Apron Expansion (Remote Stands, Taxiway & Apron) – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 11,576,054	19%	€ 9,144,191
Total			**€ 11,580,000**		**€ 9,144,191**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Buildings	1	€ 14,628,048	€ 14,628,048	€ 13,199,968	€ 13,199,968
Airfield	1	€ 43,252,222	€ 43,252,222	€ 33,750,617	€ 33,750,617
Total			**€ 57,880,000**		**€ 46,950,585**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 20,290,971	26%	€ 14,390,498
Total			**€ 20,290,000**		**€ 14,390,498**

6.143 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.75: South Apron Expansion (Remote Stands, Taxiway & Apron) – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Electrical/AGL - AVDGS cost per stand	Redacted Cost Information			€ 50,000
Electrical/AGL - high mast lighting				€ 40,000
Communication Systems				€ 200
Access road realignment to south east of Cuckoo Stands and security gate				€ 250
Builders Work In connection with Services				€ 122,000

6.144 There is a reasonable level of detail in the Level 3 estimate. We have checked the quantities from the drawings provided and we have updated those that we believe are different from Dublin Airport's estimate. These have not been validated by Dublin Airport. The rates for intumescent paint, road construction, high mast lighting, AVDGS and communications systems

are higher than we would expect, and we have reduced those rates. The allowance for BWICS has also been reduced to equate to 5% of the total mechanical and electrical services costs.

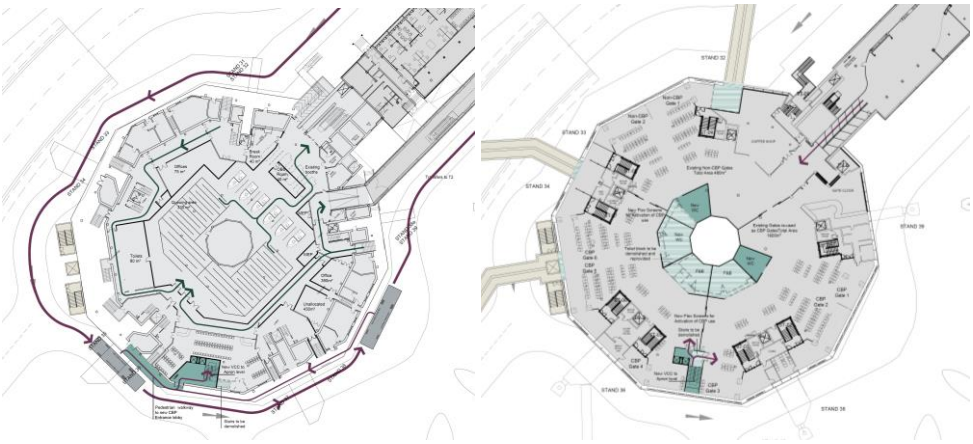
6.145 The deduction of €9m included by Dublin Airport for works included in PACE for the Southern Stands has been reviewed and increased by €15.7m to almost €25m following dialogue with Dublin Airport.

6.146 Dublin Airport provided a build-up for the allowance for the diversion of the Cuckoo Stream and this is reasonable. Dublin Airport also provided an explanation regarding the basis for their rates for AVDGS, high mast lighting and AGL installation. Dublin Airport has stated that their allowances have been based on benchmark data from Heathrow or historic projects at Dublin Airport. This is a sensible approach for the purposes of preparing a high level estimate, but that information has not been provided to us to review so we cannot comment on it. We will therefore work with Dublin Airport to validate these figures in advance of the final report. We stand by our assessment of the cost of the AVDGS and high mast lighting installations.

CIP.20.03.033A – Enablement of Pier 3 for Precleared US bound passengers

Introduction

Figure 6.18: Enablement of Pier 3 for Precleared US bound passengers



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.147 This project is proposed to enable Pier 3 to accommodate precleared US bound passengers and enables access by a shuttle bus service from Pier 4. The project objectives are to increase number of wide-body stands and gates for US flights, to provide flexibility for precleared and non-precleared operations for Pier 3 and to provide shuttle bus access of US precleared passengers from Pier 4 to Pier 3.

Context

6.148 Due to its close location to US Preclearance facilities and its wide-body stands capacity, Pier 3 is suitable for such US flights and also could be enabled as a satellite for US Preclearance activities in the future.

Scope

6.149 The scope for the shuttle bus operation of US precleared passengers from Pier 4 to Pier 3 includes introduction of a new bus waiting lounge in Pier 4 and its injection point in Pier 3 (demolition of existing stairs, placement of new VCC at apron level and construction of pedestrian walkway from bus to VCC) as well as bus parking positions at Pier 3 and 4.

6.150 Reconfiguration at departures level to enable simultaneous precleared and non-precleared operations includes six existing gates and separation of them into three zones by 3 new sets of glass screens with new toilet unit and new F&B in each zone, demolition of the existing toilets and general making good of floors, ceilings and walls.

Stage

6.151 Project stage is currently at concept design with feasibility/outline design complete. Construction will commence in Q1 2021 with completion until Q1 2023.

Key project metrics

Table 6.76: Enablement of Pier 3 for Precleared US bound passengers – Key project metrics

Metric	Value
Construction cost estimate	€ 5,330,000
Cost per square metre	Not disclosed

Specifications review

Table 6.77: Enablement of Pier 3 for Precleared US bound passengers – Specifications review

Subject	Comments
Effectiveness of scope	All project objectives will be met by the suggested scope in an effective way. The number of wide-body stands and gates enabled for US flights will be increased and sufficient flexibility of the pier will be provided.
Alternative scopes	Consideration of a fixed link from Pier 4 to Pier 3 or additional preclearance area in Pier 3.
Quality of specifications	Level 3 costs only partly provide a reasonably detailed breakdown of the specification of the works. Several quantities (sqm) cannot be verified from drawings or are given as a lump sum (e.g. general allowance for alterations required to the facade). Some quantities in drawings or differ from the quantities provided in Level 3 costs: • The size of the bus waiting lounge in pier 4 is different in drawings (97m²) and Level 3 cost sheet (112m²); and • Size of WCs, areas for paving, etc. are not provided in drawings.
Phasing and synergies with other projects	The project needs to be phased and aligned with other T2 projects due to dependencies and possible synergies: • CIP.20.06.51B West Apron Vehicle Underpass - Pier 3 Option; and • The installation of new VCCs and fixed links to the northern side of Pier 3 are associated to the construction of the West Apron Underpass; level 15 layout and the façade of Pier 3 need to be adapted as part of the CBP enablement of these gates.
Existing asset conditions	Information on the asset life of existing infrastructure and equipment has not been provided. Some refurbishments and replacements are expected due to the age of Pier 3.
Double counting	None identified.

6.152 The suggested scope provides an efficient and effective solution to further increase the number of gates enabled for US flights without constructing an additional preclearance area in Pier 3 or a fixed link from Pier 4 to Pier 3. Both alternatives would have much higher costs.

6.153 Costs have been adjusted for the smaller size of the bus waiting lounge.

Cost estimate review

Table 6.78: Enablement of Pier 3 for Precleared US bound passengers – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 1,070,000	€ 914,172	-€ 155,828
Construction Costs	€ 5,330,000	€ 4,570,861	-€ 759,139

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Escalation, Contingency & Design Variability	€ 2,100,000	€ 1,800,462	-€ 299,538
Total	**€ 8,500,000**	**€ 7,285,495**	**-€ 1,214,505**

Table 6.79: Enablement of Pier 3 for Precleared US bound passengers – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 1,065,848	20%	€ 914,172
Total			**€ 1,070,000**		**€ 914,172**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Pier 4 Works	1	n/a	€ 706,247	n/a	€ 220,078
Pier 3 Alterations	1	n/a	€ 4,379,433	n/a	€ 4,170,730
Airfield Works	1	n/a	€ 243,558	n/a	€ 180,053
Total			**€ 5,330,000**		**€ 4,570,861**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 2,099,187	33%	€ 1,800,462
Total			**€ 2,100,000**		**€ 1,800,462**

6.154 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.80: Enablement of Pier 3 for Precleared US bound passengers – Main Level 3 variances

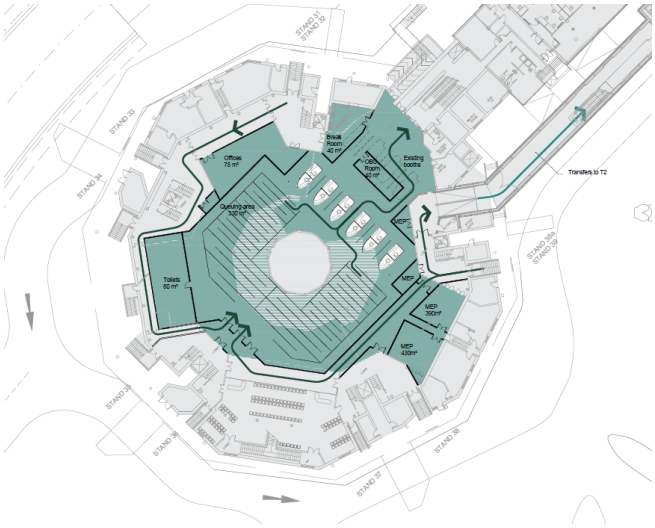
Item	Variance	% of total variance	Dublin Airport quantity	Dublin Airport rate	Steer quantity	Steer rate
Construction of new CBP bus waiting lounge in Pier 4	**Redacted Cost Information**					€ 750
Allowance for New WC's						€ 4,000
Crash Barrier						€ 425
Allowance for Demolition of existing stairs						€ 350

6.155 The level 3 estimate contains a significant number of lump sum allowances. Dublin Airport has provided a build-up for the allowance for the new VCC and that allowance is reasonable. Dublin Airport has advised that the demolition works allowance is based on a previous project for a PBZ at Dublin Airport, but we have not been provided with any means of validating that statement. Build-up for the other lump sums in the estimate, e.g. facade alterations, Pier 3 minor internal alterations have not been provided so they cannot be assessed. Dublin Airport did provide a document that provided a further explanation of the likely scope for the project, but no breakdown of the lumps sums was provided so they have not been assessed. The rates for the construction of the new bus lounge is comparable with the benchmark for a new terminal building, so we have reduced this allowance to a more realistic level. The cost of the new toilets is also high, so that rate has also been reduced. Based on the information provided some of the quantities have been validated. However, the drawings provided do not substantiate some of the quantities included in the estimate. We will request further information from Dublin Airport to update our analysis and validate the remaining lump sums and quantities for the final report.

CIP.20.03.034 – Pier 3 Immigration (Upgrade & Expansion)

Introduction

Figure 6.19: Pier 3 Immigration (Upgrade & Expansion)



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.156 This project is proposed as a short-term plan to increase the capacity of the Pier 3 Immigration through 2 additional booths and 4 optional e-gates. It includes enlarging three queuing spaces and adding passenger facilities (washrooms). It also aims to improve transfer passenger routes and processes to T2 as well as passenger flows and perception.

Scope

6.157 The scope includes the provision of 6 relocated booths (all new booths, 2 net increases), removal of the existing central core spaces to improve line of sight to the booths and add queuing space, installation of new washrooms and Mechanical, Electrical, Plumbing (MEP) area, relocation of offices and other rooms surrounding the centre of the hall and reconfiguration of circulation corridors including a new bypass for transfer passengers.

Stage

6.158 Project stage is currently at concept design with feasibility/outline design complete. Construction will commence in Q2 2020 with completion until 2nd quarter 2021.

Key project metrics

Table 6.81: Pier 3 Immigration (Upgrade & Expansion) – Key project metrics

Metric	Value
Construction cost estimate	€ 3,600,000
Cost per square metre	Not disclosed

Specifications review

Table 6.82: Pier 3 Immigration (Upgrade & Expansion)– Specifications review

Subject	Comments
Effectiveness of scope	The scope of the project is effective to deliver the envisaged output.

Subject	Comments
Alternative scopes	Space for installation of the optional 4 e-gates should be provided from the beginning to reduce costs at a later stage.
Quality of specifications	Level 3 costs only partly provide a reasonably detailed breakdown of the specification of the works.
Phasing and synergies with other projects	No synergies with other projects identified.
Existing asset conditions	Information on asset life of existing infrastructure and equipment has not been provided. Some refurbishments and replacements are needed due to the age of Pier 3. All existing immigration booths will be replaced.
Double counting	None identified.

6.159 The project objectives can be met effectively and efficiently. Capacity requirements for 40mppa and hence reduced maximum queuing times cannot be fulfilled immediately since the required 4 e-gates will not be provided, although the space is being safeguarded.

Cost estimate review

Table 6.83: Pier 3 Immigration (Upgrade & Expansion) – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 710,000	€ 583,801	-€ 126,199
Construction Costs	€ 3,600,000	€ 2,919,005	-€ 680,995
Escalation, Contingency & Design Variability	€ 1,420,000	€ 1,149,796	-€ 270,204
Total	**€ 5,730,000**	**€ 4,652,602**	**-€ 1,077,398**

Table 6.84: Pier 3 Immigration (Upgrade & Expansion) – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 719,318	20%	€ 583,801
Total			**€ 710,000**		**€ 583,801**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Refurbishment & Building Works	1	n/a	€ 3,596,588	n/a	€ 2,919,005
Total			**€ 3,600,000**		**€ 2,919,005**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 1,416,696	33%	€ 1,149,796
Total			**€ 1,420,000**		**€ 1,149,796**

6.160 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.85: Pier 3 Immigration (Upgrade & Expansion) – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Allowance for alterations to the Queue space	**Redacted Cost Information**			€ 1,500
Allowance for electrical rooms				€ 1,000

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Allowance for New Toilets	Redacted Cost Information			€ 4,000
Demolishing existing rooms around central core				€ 150

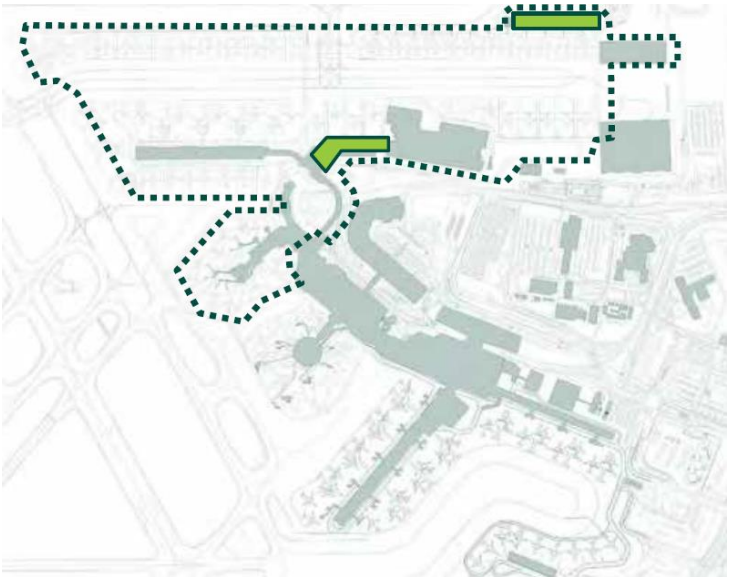
6.161 The rate for the demolition work and the toilets was higher than we would expect and have been reduced. The rate for the alterations to the queue space is high for what is internal refurbishment works. This rate has been reduced. The rate for the electrical rooms is also very high for what we assume is a plant room, so we have reduced it accordingly. Dublin Airport has confirmed that their estimate includes provision for the reconfiguration of circulation corridors and signage and wayfinding so the items that we had added to our estimate, on the basis that we initially did not believe that they were included, have been omitted. The quantities for this project, other than for the lump sum allowances, have been validated.

CIP.20.03.036 – North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ

Introduction

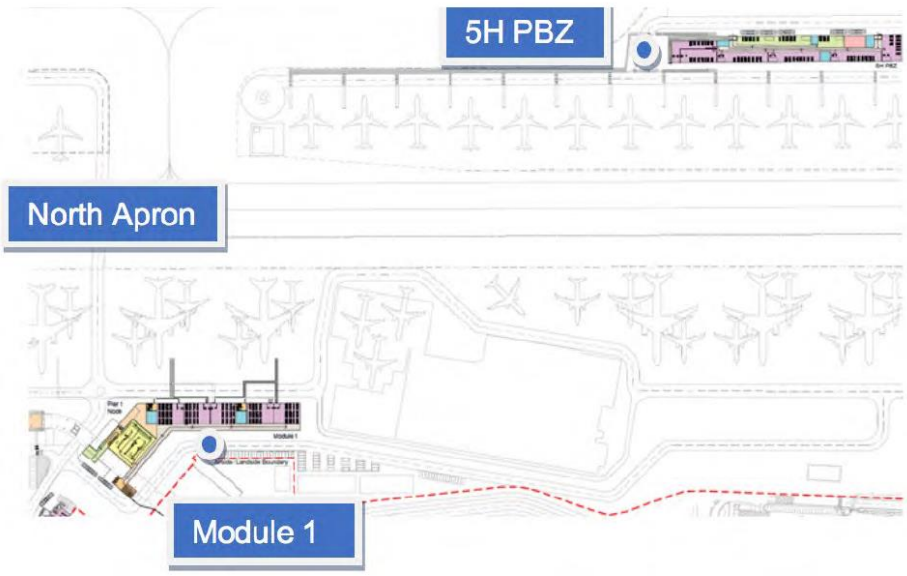
6.162 This project aims to provide more walk on contact stands for LCC flights and by implication additional gates/gate lounges accessed from T1, the provision of a new Pier accessed from the Skybridge and a new Passenger Boarding Zone building (PBZ) accessed by shuttle bus.

Figure 6.20: North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Figure 6.21: North Apron Zone served by Pier 1 and 2 for LCC and Location of proposed new Pier (Module 1) and PBZ



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.163 The project objective is to provide LCC walk on contact stands, which is in effect a requirement for providing contact gates with walk on access to contact stands. To provide the additional gates this project identifies 2 sites on the North Apron, one for a new pier connected to the Skybridge, the other on the North side for a remote gate building called a Passenger Boarding Zone (PBZ).

6.164 In essence, both buildings perform the same function of providing gates with walk on access to contact stands on one side of the building; airbridges are not required, so a first floor is not required, but the new pier is a double height building, whereas the PBZ is a single storey building. Because of the similar function required of both buildings it raises the question why it is not a common modular building type proposed to generate cost savings through repetition and a standardised design.

6.165 In addition, since the stands are for LCC aircraft which are normally narrow-body (NB), it is not clear why MARS stands are provided enabling wide-body (WB) aircraft to be parked at these stands.

Context

6.166 The physical context is that the North sector is already highly developed part of the airport campus and therefore additional gate/pier development will require careful planning as well as the removal of existing facilities to create the space for the new stands and gates.

Scope

6.167 The scope of the project in planning terms meets the stated objective or project need, however it appears in the case of the PBZ and its associated stands that the apron planning has also contributed to define the scope as it appears that the PBZ serves 7 Code C contact stands with a covered walkway beyond the end of the building (350m to the last stand). Functionally this could be challenging if the airlines are escorting different flights simultaneously to different stands.

Stage

6.168 The stage is currently at the Outline Design completed last Q4 2018. The Design Stage is due to be complete in Q3 2021 followed by completion of Procurement stage in Q3 2021. There is then a 12-month gap before the Construction period is scheduled from Q3 2022 to Q4 2024.

6.169 The outlined procurement timescales are:

- Feasibility/Outline design complete Q4 2018
- Planning complete Q2 2020
- Design complete Q3 2020
- Procurement compete Q3 2021
- Construction commence Q3 2022
- Construction complete Q4 2024
- Project handover Q4 2024.

This is efficient up to the completion of the Procurement process in Q3 2021. From the end of the Procurement process the process appears not to be efficient; there is a 12-month gap before construction commences on site in Q3 2022.

6.170 Dublin Airport has confirmed that site clearance, including the demolition of Hangar 1 and 2 and various other small buildings, occur in the construction duration time of 2 years.

Key project metrics

Table 6.86: North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ – Key project metrics

Metric	Value
Construction cost estimate	€ 116,930,000
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 Final
Cost per square metre	Rates for all elements provided
Module 1 gates (walk on)	5
PBZ gates (walk on)	5 giving access to 5 stands
PBZ gates (walk on)	1 giving access to 7 stands

Specifications review

Table 6.87: North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ – Specifications review

Subject	Comments
Effectiveness of scope	The project scope is effective in delivering the objectives.
Alternative scopes	The basic configuration of the project appears to be determined by the physical constraints of the site. The scope appears to have been decided with the development of the project and the decision to include flexibility for wide body (WB) stands. Alternative locations for the PBZ could have been looked at to provide improved walk on access to a greater proportion of the 12 Code C stands.
Quality of specifications	Specifications provided in Level 3 costs provide sufficient detail for outline design stage.
Phasing and synergies with other projects	It is assumed that this project handover date of Q4 2024 is linked to the N Apron Works handover. There is insufficient information on the Apron works to make a qualified observation.
Scope and specifications account for asset conditions and residual life?	The residual asset life of Pier 1 is 30 years, however the new Pier Module 1 and the PBZ is specified as having an asset life of 25 years, so we are not clear what this is in reference to. We would expect the internal finishes and IT to be renewed within the life of the building, but the services and envelope to have an asset life of circa 25 years and the structure 40 years.
Double counting	None identified.

6.171 This is a large project with the object of delivering more LCC walk on contact stands, and the scope is considered effective and efficient.

6.172 The project requires the demolition of existing hangars and other buildings, the construction of a new apron and taxiways as well as the gate lounge buildings i.e. the new Module 1 pier and the remote PBZ. The functionality for both buildings is the same (single sided contact stand access) and yet both buildings are of different designs; the Module 1 pier is 2 storeys, whilst the PBZ is single storey. There could be economies in standardising the design for both buildings. In addition, the new South Apron configuration requires the existing PBZ to be moved to the new location. This may not be the most economical solution and we consider whether this PBZ could also be of an identical standardised design.

Cost estimate review

Table 6.88: North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 15,820,000	€ 14,537,518	-€ 1,282,482
Construction Costs	€ 116,930,000	€ 104,895,855	-€ 12,034,145
Escalation, Contingency & Design Variability	€ 42,560,000	€ 39,204,005	-€ 3,355,995
Total	**€ 175,310,000**	**€ 158,637,377**	**-€ 16,672,623**

Table 6.89: North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	14%	€ 15,817,540	14%	€ 14,537,518
Total			**€ 15,820,000**		**€ 14,537,518**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
North Apron - Module 1	1	n/a	€ 23,542,024	n/a	€ 21,318,569
North Apron - PBZ 5H	1	n/a	€ 19,434,711	n/a	€ 18,239,609
North Apron - Airfield Works	1	n/a	€ 36,110,965	n/a	€ 33,129,409
North Apron - North Apron Relocations	1	n/a	€ 37,846,767	n/a	€ 32,208,267
Total			**€ 116,930,000**		**€ 104,895,855**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	32%	€ 42,558,271	33%	€ 39,204,005
Total			**€ 42,560,000**		**€ 39,204,005**

6.173 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.90: North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport quantity	Dublin Airport rate	Steer quantity	Steer rate
Demo of Hangar 1; Incl. Office Block (currently used by Dublin Airport IT)	Redacted Cost Information					€ 20
Annex demo Includes Old Fire Station and Workshops						€ 20
Demo of Hangar 2; complete						€ 20
Head of stand road to apron 5G, plus access road to security gate post						€ 250
Communication Systems						€ 200
Allowance for brise soleil - south facing elevation						€ 300
New access road to rear of Module 1, and to SW of skybridge 6m width. Including cost of drainage.						€ 250
Demolition of Sim Building; Sim Building only; assumes no contaminated material or ACM's present						€ 20
New GSE access road to rear of PBZ 5H, 6m width.						€ 250

Item	Variance	% of total variance	Dublin Airport quantity	Dublin Airport rate	Steer quantity	Steer rate
Demolition of North Terminal	Redacted Cost Information					€ 30
Communication Systems						€ 200
AVDGS						€ 50,000
External Enclosing walls above ground Level; Metal cladding including secondary steel supports; to all elevations except for elevation facing airfield						€ 400
AVDGS						€ 50,000
High Mast Lighting (15m)						€ 40,000
Electrical Installation Generally						€ 340
Central Heating & Cooling						€ 300
Standard Foundations; Assumed pad foundations with ground beams and 200mm thick reinforced concrete ground floor slab. No basement.						€ 250
Allow 100kg/m2 for standard UC UB structural steel frame (excludes secondary steel measured elsewhere)						€ 2,500
Allowance for other reinforced concrete core walls for structural stability and tying in to existing building / skybridge						€ 250,000
High Mast Lighting (15m)						€ 40,000

6.174 We have checked the quantities from the drawings provided and this has resulted in an amendment to some of the quantities in our Level 3 estimate compared to those in Dublin Airport's estimate. This accounts in part for the reduction in the overall cost of the project. The rates for roads, AVDGS, high mast lighting and communication systems are high and have been reduced in line with other projects in the CIP based on our benchmark data. Dublin Airport's proposed demolition costs of the hangar and other buildings are far higher than we would expect them to be. While we assume that the hangars will contain asbestos that will cost money to address, the rates used do not take into account the potential scrap value of materials that could be recycled. We have reduced these rates to a level that we consider to be more realistic for buildings of this type. Dublin Airport has acknowledged that there was an error in their Level 3 estimate in respect of the brise soleil. This has been amended in our Level 3 estimate in line with the response provided by Dublin Airport.

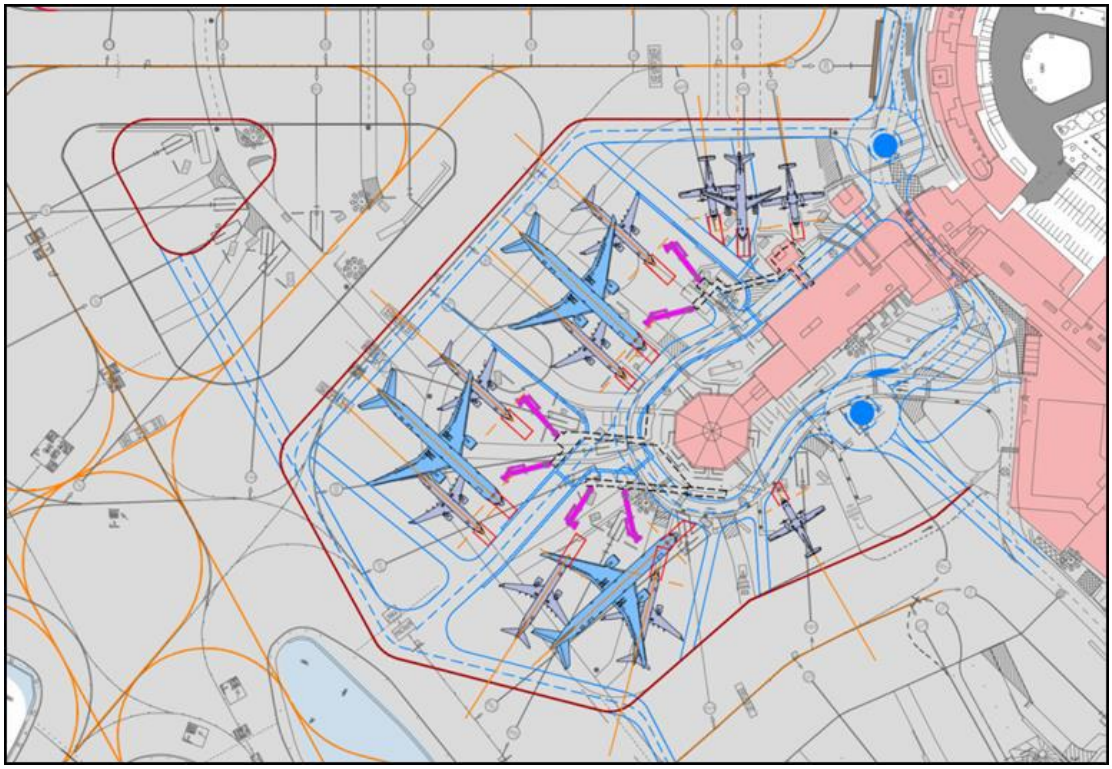
6.175 Build-ups for other lump sum allowances (minor demolitions and external works) have not been provided so we cannot assess them. The lump sum of €2,500,000 for the provision of 800 staff parking spaces (linked to Project 20.04.009- Staff Car Park) equates to rate of [redacted]/space which is line with other surface car park projects included in the CIP.

CIP.20.03.043A – Terminal 1 Piers - New Airbridges (6NBE / 3WB)

Introduction

6.176 Proposals for re-alignment of the taxi-lane and stands serving Pier 2 to enable the servicing of wide-body aircraft on contact stands with airbridges. Additionally, upgrades are proposed to the Pier 2 building to create new gates for the wide-body aircraft.

Figure 6.22: Terminal 1 Piers - New Airbridges (6NBE / 3WB)



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.177 Provision of wide-body contact stands and gates at Pier 2. Re-alignment of existing taxi-lanes to accommodate the additional depth of stand.

Context

6.178 The existing stand serves narrow-body aircraft arranged around the existing Rotunda of Pier 2. These include a mix of Push Back and Self-manoeuvre stands, all walk on/off.

6.179 To the north of the existing stands is an area of remote narrow-body stands which fall within the area of the proposed taxiway re-alignment, access by roadway.

6.180 The stated requirement is now to serve an increase in wide-body aircraft traffic, for which these stands and the pier are not currently suited. The change also necessitates the requirement for airbridges which are better suited for boarding wide-body aircraft.

Scope

6.181 The Project scope includes:

- Modification & refurbishment of Pier 2 to suit new gates;
- Additional Construction to Pier 2 for fixed links; and
- Airbridge installation.

Stage

6.182 Early feasibility.

Key project metrics

Table 6.91: Terminal 1 Piers - New Airbridges (6NBE / 3WB) – Key project metrics

Metric	Value
Construction cost estimate	€ 21,270,000

Specifications review

Table 6.92: Terminal 1 Piers - New Airbridges (6NBE / 3WB) – Specifications review

Subject	Comments
Effectiveness of scope	The scope is high level but provides sufficient detail to understand the intent of the project. The scope of the project is therefore considered effective and efficient. The proposed drawings appear to provide an effective solution to creating MARS stands around Pier 2.
Alternative scopes	Beside the inclusion of pavement works into this project, there are no viable alternatives to achieve the required output.
Quality of specifications	The Level 3 costs adequately demonstrate the intended works, albeit these are absent any works to the apron itself.
Phasing and synergies with other projects	The documentation for this project explicitly states it excludes pavement works, with these to be carried out under the Apron Rehab project. For this reason, the Apron Rehabilitation project should be co-ordinated with this project, to ensure optimal phasing and minimal downtime of these stands.
Existing asset conditions	The existing pavement is stated as being unsuitable for the proposed aircraft loading and needs to be replaced. Pier 2 remains suitable for the intended use, with minor refurbishment to be undertaken as part of this project.
Double counting	None identified.

6.183 The proposed scope of works is effective in providing the desired wide-body servicing provision at Pier 2. The proposal is generally efficient; however, the programming of associated pavement works should be very carefully considered to ensure no loss of use of the facility.

Cost estimate review

Table 6.93: Terminal 1 Piers - New Airbridges (6NBE / 3WB) – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 4,250,000	€ 2,925,462	-€ 1,324,538
Construction Costs	€ 21,270,000	€ 14,627,311	-€ 6,642,689
Escalation, Contingency & Design Variability	€ 8,380,000	€ 5,761,698	-€ 2,618,302
Total	**€ 33,900,000**	**€ 23,314,471**	**-€ 10,585,529**

Table 6.94: Terminal 1 Piers - New Airbridges (6NBE / 3WB) – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 4,253,556	20%	€ 2,925,462

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
Total			**€ 4,250,000**		**€ 2,925,462**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Demolitions & Alterations	1	n/a	€ 102,638	n/a	€ 97,065
Works to Existing Piers	1	n/a	€ 12,376,875	n/a	€ 5,117,543
New Fixed links and Airbridges	1	n/a	€ 8,788,268	n/a	€ 9,412,703
Total			**€ 21,270,000**		**€ 14,627,311**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 8,377,379	33%	€ 5,761,698
Total			**€ 8,380,000**		**€ 5,761,698**

6.184 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.95: Terminal 1 Piers - New Airbridges (6NBE / 3WB) – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Airbridges	**Redacted Cost Information**			€ 500,000
VCC				€ 1,000,000
Fit out of the F&B Areas				€ 0
Fit out of offices				€ 500
New Toilets				€ 4,000
New Build construction to the Existing Pier (located beside ne build toilets)				€ 3,500

6.185 As with other airbridge projects in the CIP, the cost of the airbridges in the Dublin Airport estimate is higher than we would expect. Dublin Airport has provided a build-up for the cost of the VCC. However, that allowance appears to be based on the VCC's inside the terminal building which will cost more than in the piers based on the scope indicated on the drawings. Therefore, we have reduced this allowance. Dublin Airport has also provided further detail to explain what the lump sum for dualling is to include, but no breakdown of the lump sum has been provided so we cannot comment on it. We will request further information from Dublin Airport to validate this lump sum allowance for the final report.

6.186 The rates for toilet provision and the new build construction works are high and have been reduced in line with other projects in the CIP.

6.187 Despite Dublin Airport advice to the contrary, we would expect the F&B concessionaire to pay for all the fit out of this space, and hence we have removed the F&B fit out costs from our estimate. In response to our queries, Dublin Airport has confirmed that the refurbishment of the existing lounges and gate rooms only includes the wall, floor and ceiling finishes. As a result, we consider their rate to be too high and we have reduced it. Dublin Airport has also confirmed that the fit out of the offices only allows for the wall finishes so this rate has also been reduced.

6.188 The quantities for this project have been validated.

CIP.20.03.049 – De-Icing Pad at Runway 10R

Introduction

6.189 A project to provide a de-icing pad on the proposed taxiway at the western end of Runway 10R/28L.

Figure 6.23: De-Icing Pad at Runway 10R

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.190 To provide a de-icing pad for aircraft requiring additional (or initial) de-icing prior to departure from Runway 10R.

Context

6.191 De-icing currently occurs on stand, and in particularly cold weather or during congested periods aircraft waiting to reach the runway may require further de-icing before they can depart. This currently involves returning to stand.

6.192 Under PACE a by-pass taxiway will be constructed to the North of the threshold of Runway 10R to provide additional capacity for aircraft lining up for departure. The proposed de-icing pad is planned as an addition to this new pavement.

6.193 An existing public roadway, and the existing airside roadway run along the airfield boundary through the work site. A diversion of both roads and the boundary has been proposed under PACE for the 10R Line-Up Points. Further diversion is necessary to accommodate the wider pavement needed for the de-icing pad.

Scope

6.194 The scope includes the following:

- Construction of a de-icing pad; and
- Construction of drainage and holding tanks for de-icing fluid.

Stage

6.195 Feasibility.

Key project metrics

Table 6.96: De-Icing Pad at Runway 10R – Key project metrics

Metric	Value
Construction cost estimate	€ 3,140,000
Size of pad	4,500 m^2
Cost per square metre	1,111 €/ m^2

Specifications review

Table 6.97: De-Icing Pad at Runway 10R – Specifications review

Subject	Comments
Effectiveness of scope	The scope, while high level, is effective in detailing a bespoke de-icing solution. The proposal makes use of a pre-existing works package to improve efficiency.
Alternative scopes	A reduction in pavement thickness may be applied at the edges of the de-icing pad where only vehicles may traffic the pavement. A more ambitious de-icing solution could be considered to drastically reduce the requirement to de-ice on stand. A pad with capacity for concurrent de-icing of multiple aircraft may provide increased efficiencies, in addition to the ability to collect de-icing fluid in discrete locations (reference CIP.20.03.052 Surface Water Environmental Compliance).
Quality of specifications	The Level 3 costs provide a reasonably detailed breakdown of the specification of the works. The pavement thickness specified is 325mm PQC which would be considered thin for fully laden Code E WB aircraft as proposed for this pad. Some averaging of thickness could be achieved where vehicle pavements at the edge could be thinned, however this is not apparent in these costs.
Phasing and synergies with other projects	This project is stated as being associated with a previously proposed PACE project and can only be constructed as part of those works. In consideration of the upgrade of the Heavy Vehicle fleet (CIP20.01.065) glycol sweepers are included in the proposed purchases. It may be that the construction of a dedicated de-icing pad may reduce the need for sweepers and reduce the purchases required. While CIP.20.03.052 excludes this project from its calculations of storage capacity, there may be scope to include it in the proposed volume as the design of that work progresses.
Existing asset conditions	New construction.
Double counting	None identified.

6.196 The proposal is effective in delivering the requirement for additional de-icing as a compliment to existing on-stand de-icing procedures.

6.197 A more ambitious de-icing solution could be considered to drastically reduce the requirement to de-ice on stand. A pad with capacity for concurrent de-icing of multiple aircraft may provide increased efficiencies.

6.198 The scope includes storage tanks for waste Glycol, however no solution is proposed for how this is to be disposed of or treated. It should be noted that CIP 20.03.052 specifically highlights this project as being outside the scope of its treatment, and thus further allowances may be needed for treatment or other solutions aty this location. This may require additional specific cut off drainage and foul drainage for first flush, including attenuation.

Cost estimate review

Table 6.98: De-Icing Pad at Runway 10R – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 620,000	€ 627,807	€ 7,807
Construction Costs	€ 3,140,000	€ 3,139,035	-€ 965
Escalation, Contingency & Design Variability	€ 1,240,000	€ 1,236,466	-€ 3,534
Total	**€ 5,000,000**	**€ 5,003,308**	**€ 3,308**

Table 6.99: De-Icing Pad at Runway 10R – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 627,807	20%	€ 627,807
Total			**€ 620,000**		**€ 627,807**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Site Clearance	1	n/a	€ 630,874	n/a	€ 458,763
Airfield	1	n/a	€ 2,372,364	n/a	€ 1,725,150
Cabin	1	n/a	€ 135,797	n/a	€ 955,123
Total			**€ 3,140,000**		**€ 3,139,035**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 1,236,466	33%	€ 1,236,466
Total			**€ 1,240,000**		**€ 1,236,466**

6.199 The rates for this project appear to be reasonable and as a result we have not amended any of them in our Level 3 estimate. There are, however, minor rounding differences between Dublin Airport's and our estimate.

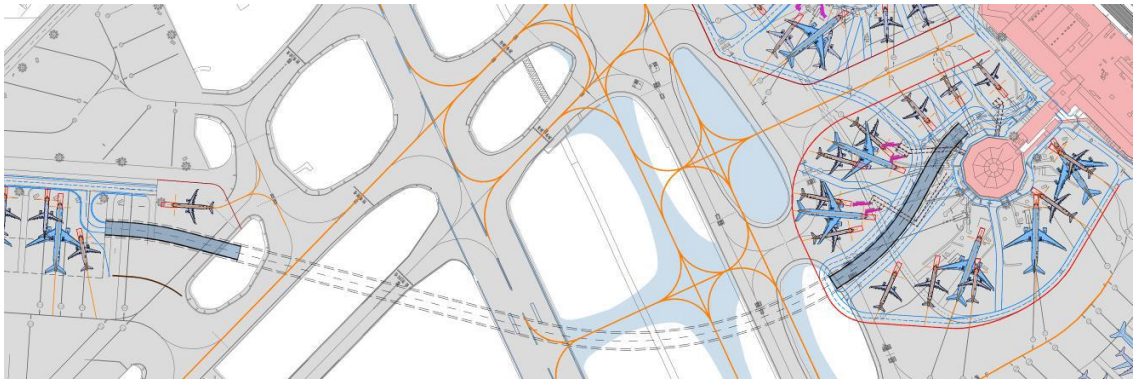
6.200 Dublin Airport has advised that the allowances for attenuation and the cabin structure are based on benchmark data from previous projects, but we have received no information to validate that information. However, the approach that Dublin Airport has taken in establishing these allowances is appropriate. The quantities for this project have not been validated as the design information, although requested, has not been provided. We will examine the quantities again with Dublin Airport to allow us to conclude our analysis prior to the final report.

CIP.20.03.051B – West Apron Vehicle Underpass - Pier 3 Option

Introduction

6.201 The project proposes the construction of an underpass connecting the West Apron with Pier 3 for vehicle traffic.

Figure 6.24: West Apron Vehicle Underpass - Pier 3 Option



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.202 To provide a vehicle link to the West Apron, avoiding conflict with aircraft traffic on the surface taxiway network.

Context

6.203 The West Apron and the future area of development on the western side of the airport is separated from the eastern portion by Runway 16/34 running approximately north/south. Vehicle access from east to west is facilitated either by crossing the runway using the aircraft taxiway network, by using the airside roads which circumnavigate the runway to the north or the south, or via the landside road network passing through the security gate posts.

6.204 Under PACE a proposal was put forward for a surface access road across Runway 16/34 to access the West Apron, intended as an interim solution until the underpass could be built.

6.205 The proposed route crosses multiple taxiways and the Runway 16/34. It also crosses several services including drainage, fuel main and existing watercourses.

6.206 Runway 16/34 is currently active for use as a runway.

Scope

6.207 The scope includes the following:

- Underpass connecting the West Apron & Pier 3 – includes ramps, roadways and ventilation; and
- Reconfiguration of the stands around Pier 3.

Stage

6.208 Feasibility.

Key project metrics

Table 6.100: West Apron Vehicle Underpass - Pier 3 Option – Key project metrics

Metric	Value
Construction cost estimate	€ 103,300,000

Specifications review

Table 6.101: West Apron Vehicle Underpass - Pier 3 Option – Specifications review

Subject	Comments
Effectiveness of scope	The scope is effective in delivering an underpass in the desired location to provide suitable vehicle access.
Alternative scopes	None identified.
Quality of specifications	The Level 3 costs provide a reasonably detailed breakdown of the specification of the works.
Phasing and synergies with other projects	The dig for the underpass cuts across M2 Taxiway, which is designated as in need of rehabilitation work under CIP.20.01.003. These works could be phased together to allow for joined up construction while M2 is closed. This project requires limited diversions of the Cuckoo Stream. To avoid abortive work the diversion of the Cuckoo stream outside the works area, as proposed under CIP.20.03.052, should occur first, removing the need to diversion under this package. Reconfiguration of the Pier 3 stands is reliant on the completion of the Link 3 Extension Taxiway submitted under PACE, as the adjusted stands extend into the existing Taxilane. Multiple areas of the Pier 3 stands are also noted as "Unsatisfactory" under CIP.20.01.002 – rehabilitation of this pavement should account for Code E WB traffic. The proposed CIP2020 Fuel System Extension, as identified on drawing reference CIP20-03-AIR-OVER-STD-000-01-0020, crosses the path of the West Apron Vehicle Underpass (CIP.20.03.051b) with the fuel line being completed early in the construction period. Given that working around live fuel lines is not desirable, consideration might be given to altering this leg of the route to the north such that the interdependency between projects can be avoided.
Existing asset conditions	Mike 2 taxiway is in need of rehabilitation work, including in the area crossed by the underpass works. Other pavements in the works area are not in immediate need of rehabilitation works.
Double counting	None identified.

6.209 The proposed works are effective in delivering direct vehicle access from east to west, albeit the chosen method will result in significant disruption to aircraft surface movements during the construction period.

Cost estimate review

Table 6.102: West Apron Vehicle Underpass - Pier 3 Option – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 20,660,000	€ 20,396,614	-€ 263,386
Construction Costs	€ 103,300,000	€ 101,983,070	-€ 1,316,930
Escalation, Contingency & Design Variability	€ 47,110,000	€ 46,588,724	-€ 521,276
Total	**€ 171,070,000**	**€ 168,968,409**	**-€ 2,101,591**

Table 6.103: West Apron Vehicle Underpass - Pier 3 Option – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 20,659,495	20%	€ 20,396,614
Total			**€ 20,659,495**		**€ 20,396,614**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Main Underpass Section	1 item	n/a	€ 76,495,965	n/a	€ 76,495,965
East Ramp	1 item	n/a	€ 8,329,585	n/a	€ 8,329,585
West Ramp	1 item	n/a	€ 5,527,222	n/a	€ 5,527,222
Plant Rooms	1 item	n/a	€ 1,700,934	n/a	€ 1,695,319
Works to Pier 3	1 item	n/a	€ 11,243,771	n/a	€ 9,934,980
Total			**€ 103,297,476**		**€ 101,983,070**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	38%	€ 47,106,860	38%	€ 46,588,724
Total			**€ 47,110,000**		**€ 46,588,724**

6.210 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 6.104: West Apron Vehicle Underpass - Pier 3 Option – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Airbridges	**Redacted Cost Information**			€ 500,000
Fixed link bridges				€ 3,500

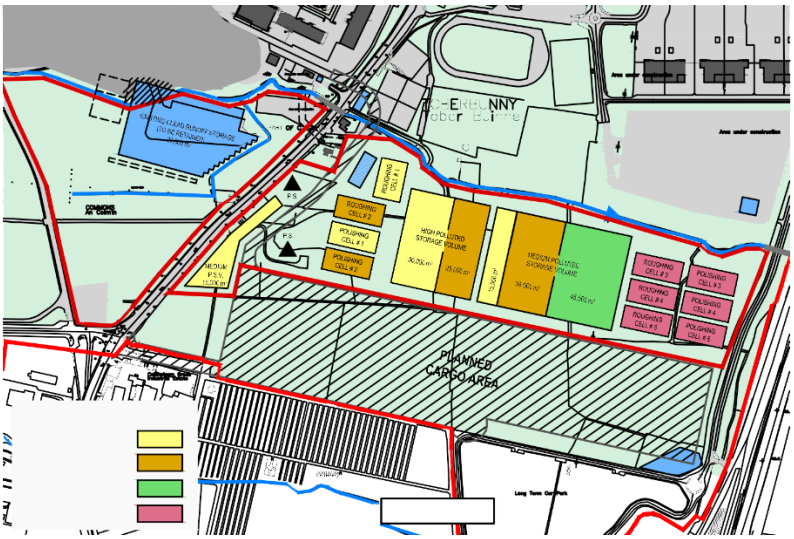
6.211 There is a lot of detail in the Level 3 estimate and in general the rates for the tunnelling work appear to be reasonable for the works required. The rates for the fixed links and the airbridges are higher than we would expect, and we have reduced them in line with adjustments that we have made to similar items within other projects in the CIP. The quantities for this project have not been validated as no design information has been provided. We will request additional information regarding the quantities from Dublin Airport in order to validate this point ahead of the final report.

CIP.20.03.052 – Surface Water Environmental Compliance

Introduction

6.212 The first phase of a water storage and pollution treatment solution for the airport as a whole. The initial phase focuses on the Cuckoo Stream and associated catchments.

Figure 6.25: Surface Water Environmental Compliance



Source: CIP20-03-DRA-DRA-DRA.001-DRA01.01-L00-108-R1

Objective

6.213 To manage the expected increase in surface water pollution from increased movements and anticipate stricter regulation on pollutant discharge.

Context

6.214 The existing drainage network does not currently sufficiently separate clean and polluted water, with a level of pollutants being discharged to local water courses. The current pollution management system is also reported as being insufficiently robust to make efficient use of the available storage during pollution events.

Scope

6.215 The scope of the proposal includes:

- Construction of storage and treatment facilities;
- Construction of stream diversion;
- Construction of pipelines and reconfiguration of existing network;
- Installation of monitoring points; and
- Roof water drainage installation and connection to network.

Stage

6.216 Early Feasibility.

Key project metrics

Table 6.105: Surface Water Environmental Compliance – Key project metrics

Metric	Value
Construction cost estimate	€ 33,390,000
Lagoon Construction Cost	€ 20,124,673

Specifications review

Table 6.106: Surface Water Environmental Compliance – Specifications review

Subject	Comments
Effectiveness of scope	The proposed scope appears effective in delivering a suitable solution for the assessment, collection and treatment of surface water at the airport, with consideration to an expected increase in traffic, activity and pavement.
Alternative scopes	The current proposed solution would appear to be the most viable. No alternative viable options can be proposed.
Quality of specifications	Drawings lay out the high level pipe work and layout of the proposed lagoons. This is logical based on the intended purpose and is consistent with the feasibility data. Dublin Airport has been asked to provide details of the design basis for sizing of storage and treatment structures and this has been received.
Phasing and synergies with other projects	The lagoon area is to be served by the secure road crossing of the R132, which is intended to also serve the proposed Cargo/Logistics park. The road link is to be built as part of the Pier 5 works. Multiple projects in this CIP submission require short lengths of diversion of the Cuckoo Stream to suit the localised changes in infrastructure. Phasing of the diversion works under this package should be considered to avoid considerable double handling of the stream diversion, and multiple lengths of abortive culvert works. It is noted in the feasibility data that not all future projects under CIP can be encompassed under this polluted water treatment solution. The De-Icing Pad at Rwy 10R (CIP.20.03.049) in particular is noted as potentially requiring its own dedicated treatment solution.
Existing asset conditions	Not applicable.
Double counting	None identified.

6.217 The proposed works provide a suitable scope for the collection and treatment of polluted surface water in a single location serving the entire catchment. This is an efficient solution with allowance for future expansion.

Cost estimate review

Table 6.107: Surface Water Environmental Compliance – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 6,680,000	€ 6,678,090	-€ 1,910
Construction Costs	€ 33,390,000	€ 33,390,451	€ 451
Escalation, Contingency & Design Variability	€ 11,540,000	€ 11,539,740	-€ 260
Total	**€ 51,610,000**	**€ 51,608,281**	**-€ 1,719**

Table 6.108: Surface Water Environmental Compliance – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 6,678,090	20%	€ 6,678,090
Total			**€ 6,680,000**		**€ 6,678,090**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Storage & Treatment Plant	1	n/a	€ 13,020,622	n/a	€ 13,020,622
Cuckoo Stream Diversion Works	1	n/a	€ 9,664,198	n/a	€ 9,664,198
Roof & Surface Water Diversion Works	1	n/a	€ 10,147,953	n/a	€ 10,147,953
Pollution Control	1	n/a	€ 557,678	n/a	€ 557,678
Total			**€ 33,390,000**		**€ 33,390,451**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 11,539,740	29%	€ 11,539,740
Total			**€ 11,540,000**		**€ 11,539,740**

6.218 Initially there was no level 3 estimate for this project. Dublin Airport has responded to our request and has provided further cost information that includes build up to the quantities and the rates for a lot of the items included in the estimate. While it is not possible to validate all of the data contained within the information provided, the volume and detail of information provided demonstrates that a robust approach has been taken in preparing the estimate. The rates for the various elements in question appear to be reasonable.

6.219 Costs that are presented in the Level 1 and 2 costings are €0.6m higher than those presented in the CIP2020 document (€51.6m vs €51.0m).

CIP.20.03.054 – New Remote Apron 5M - 17 NBEs

Introduction

6.220 A project to construct a new remote apron as part of the westward expansion of the airport, aimed primarily at overflow and cargo aircraft.

Figure 6.26: New Remote Apron 5M

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.221 This proposal aims to provide additional stands, initially for non-passenger aircraft, freeing up stands on the eastern side of the airport. This is in conjunction with utilisation of the existing West Apron.

Context

6.222 The proposed site is currently greenfield and provides little restriction on apron size or shape. In its current form the area is not served by a taxiway link, however the proposal assumes the prior construction of Runway 10L/28R and its parallel taxiway network, onto which it will connect.

6.223 The R108 public road follows the airfield boundary and runs through the site. This road will require to be diverted to provide a continuous airside area. This re-alignment is likely to encompass other land areas marked for use in other airside projects.

Scope

6.224 The scope includes the following:

- Construction of Taxi-lane links to future parallel taxiway;
- Construction of 13 narrow-body aircraft stands;
- Construction of 2 MARS stands (2WB, 4NB);
- Construction of roadway link to airside road network; and
- Realignment of R108 road.

Stage

6.225 Feasibility/Outline Design Complete.

Key project metrics

Table 6.109: New Remote Apron 5M – Key project metrics

Metric	Value
Construction cost estimate	€ 45,225,000
Apron and Airside Road Pavements area	88,548 m^2

Specifications review

Table 6.110: New Remote Apron 5M – Specifications review

Subject	Comments
Effectiveness of scope	The scope, while high level, demonstrates an effective delivery of the required objective to deliver further stand space.
Alternative scopes	No alternative scopes have been identified.
Quality of specifications	The Level 3 costs provide a reasonably detailed breakdown of the specification of the works. The costs include for a pavement thickness of 325mm PQC. While this could be considered sufficient for Code C NB aircraft, a thicker pavement would be expected for Code E WB aircraft – particularly if fully loaded. As the whole pavement is to be safeguarded for future WB usage, the pavement specification is considered to be too thin.
Phasing and synergies with other projects	The proposal assumes the construction of the parallel taxiways associated with future Runway 10L/28R. This is required in order for the Apron to be accessed. The initial stated purpose of the Apron is for non-passenger aircraft, as currently served by the West Apron. Project CIP.20.04.021 proposes welfare facilities for cargo and line operators specifically to encourage further business in this area. It is expected for this welfare facility to service the new apron, but similarly a dedicated purpose-built facility might also be beneficial.
Existing asset conditions	New construction on greenfield site.
Double counting	None identified.

6.226 The proposal is effective in delivering the required expansion in capacity, albeit review is required of the proposed pavement thickness.

Cost estimate review

Table 6.111: New Remote Apron 5M – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 9,046,000	€ 8,903,339	-€ 142,661
Construction Costs	€ 45,225,000	€ 44,516,693	-€ 708,307
Escalation, Contingency & Design Variability	€ 17,814,000	€ 17,535,125	-€ 278,875
Total	**€ 72,085,000**	**€ 70,955,157**	**-€ 1,129,843**

Table 6.112: New Remote Apron 5M – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 9,045,014	20%	€ 8,903,339
Total			**€ 9,046,000**		**€ 8,903,339**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Facilitation & Demolition Works	1	n/a	€ 10,261,760	n/a	€ 7,984,563
Airfield	1	n/a	€ 13,822,421	n/a	€ 10,755,074
Roads Paths & Pavings	1	n/a	€ 21,140,888	n/a	€ 25,777,056
Total			**€ 45,225,000**		**€ 44,516,693**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 17,814,155	33%	€ 17,535,125
Total			**€ 17,814,000**		**€ 17,535,125**

6.227 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Road diversion allowance assuming 6m road width, at €315/m^2 which is inclusive of excavation, disposal, fill, drainage, surfacing, kerbs and road markings	**Redacted Cost Information**			€ 1,500
Interceptor				€ 40,000

6.228 The drawing that was provided does not contain sufficient information to allow us to check the quantities for this project, so our Level 3 estimate is based on Dublin Airport's quantities. We will request further supporting information from Dublin Airport regarding these quantities, in order to validate them ahead of the final report. The rates for this project are reasonable and in line with what we would expect. The exceptions to this are the road diversion and surface water and foul drainage interceptors' rates that are higher than we would expect and have been amended. While no build-up to the lump sum allowances for signage and the diversion and excavation around services has been provided, the sums in question do not look unreasonable for a project of this nature and scale.

CIP.20.03.057 – Airside GSE Charging Facilities (Ground Handlers)

Introduction

6.229 A proposal to develop charging facilities for electric Ground Support Equipment (GSE) and airside vehicles.

Figure 6.27: Airside Charging GSE Facilities

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.230 To provide charging points across the airport, at as yet unspecified locations, for electric GSE and airside vehicles.

Context

6.231 As the GSE fleet is not yet converted to electric, the charging needs and distribution of charging points is not yet known.

Scope

6.232 The scope includes the following:

- Provision of GSE charging points.

Stage

6.233 Feasibility complete – evidence not provided.

Key project metrics

Table 6.113: Airside Charging GSE Facilities – Key project metrics

Metric	Value
Construction cost estimate	€ 3,150,000

Specifications review

Table 6.114: Airside Charging GSE Facilities – Specifications review

Subject	Comments
Effectiveness of scope	The effectiveness of the scope cannot be assessed as little to no scope exists.
Alternative scopes	No alternative scopes have been identified.

Subject	Comments
Quality of specifications	Specification is minimal, with Level 3 costs only providing an allowance. While this is stated as intentional within the CIP submission, it results in no assessable detail.
Phasing and synergies with other projects	Provision of GSE charging points should be coordinated with the upgrade of the airport vehicle fleets, such that these can benefit from the electric charging points (CIP.20.01.065 & 069). Given the number of apron projects included within the CIP submission, consideration should be given to including or safeguarding GSE charging points within these works, based on the high number of GSE vehicles used in these locations.
Existing asset conditions	Not applicable.
Double counting	None identified.

6.234 The submission states that this is project serves as a placeholder for future design development.

Cost estimate review

Table 6.115: Airside Charging GSE Facilities – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 630,000	€ 481,340	-€ 148,660
Construction Costs	€ 3,150,000	€ 3,208,931	€ 58,931
Escalation, Contingency & Design Variability	€ 1,240,000	€ 1,211,331	-€ 28,669
Total	**€ 5,000,000**	**€ 4,901,602**	**-€ 98,398**

Table 6.116: Airside Charging GSE Facilities – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 630,000	15%	€ 481,340
Total			**€ 630,000**		**€ 481,340**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Facilitation & Demolition Works	1	n/a	n/a	n/a	n/a
GSE Charging Facilities incl. Electrical	1	n/a	€ 3,150,000	n/a	€ 3,208,931
Civil Works	1	Incl.	Incl.	Incl.	Incl.
Total			**€ 3,150,000**		**€ 3,208,931**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 1,240,000	33%	€ 1,211,331
Total			**€ 1,240,000**		**€ 1,211,331**

6.235 Dublin Airport has provided a new level 3 estimate for the sum of €4,901,602.37. This includes design and management costs, contingency and escalation allowances. While Dublin Airport have responded to our request for more detail by providing a cost summary that lists the items required along with their quantities, we cannot validate the quantities as no design information has been provided. Within the cost schedule there is a lump sum for additional civils works that we cannot validate as no detail has been provided. There are also lump sums for civils works in connection with each of the 33 rapid charge stations and the trickle charge

stations that we cannot validate as no design detail has been provided to allow us to do so. We will request further supporting information from Dublin Airport regarding these lump sums and quantities, in order to validate them ahead of the final report.

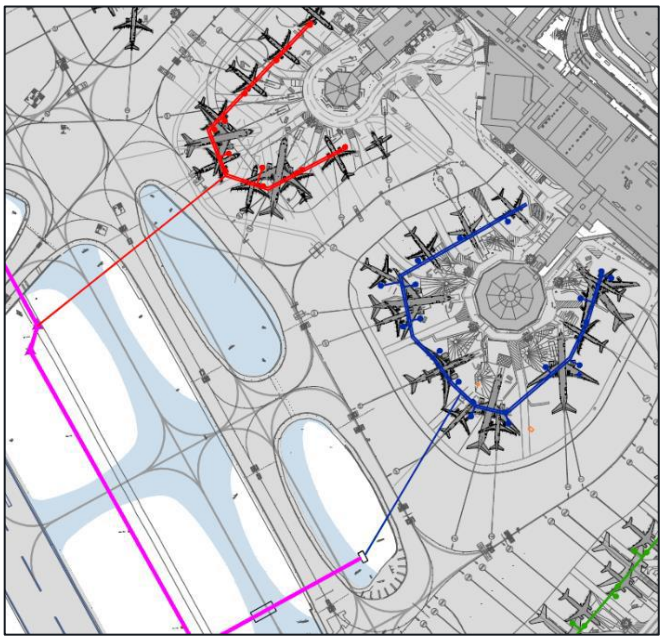
6.236 The rates for the rapid charge stations and the trickle charge stations included in the cost summary are reasonable.

CIP.20.03.071 – Hydrant Enablement – Pier 2 & Pier 3

Introduction

6.237 This proposed Pier 2 & 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.

Figure 6.28: Hydrant Enablement – Pier 2 & Pier 3



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

6.238 To provide a fuel hydrant system on Piers 2 and 3.

Context

6.239 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 airbridges on Pier 3 to serve wide-body aircraft, many long-haul carriers have been allocated to this pier. Dublin Airport reports that this has increased the amount and complexity of turnaround operations in a very congested area. It is understood that the installation of fuel hydrants around this pier would improve its operational performance noticeably on both capacity and safety grounds.

6.240 Similarly, the installation of fuel hydrants in Pier 2 is intended to improve operational performance and improve the level of service of the existing Pier. This project proposes to expand the fuel hydrant system to further stands in Pier 3.

Scope

6.241 The project scope lists:

- Fuel pipeline around Pier 3; and
- Fuel hydrants at the following stands;
  - 200L-C-R, 201, 202, 203L-C-R, 205L-T-R, 206T, 207T
  - 311C, 312, 313C, 314, 315C, 317 and 318L, 318C, 318R

Stage

6.242 The Hydrant Enablement construction phase is Q1-Q3 2020. Apron refurbishment project (ref. CIP.20.01.002) starts on site from Q2 2020 onwards. It will therefore be necessary to coordinate the fuel hydrant enablement project with the initial apron refurbishment projects, in order that refurbished pavements are not subsequently dug up in order to install a fuel main or hydrant.

Figure 6.29: Apron Refurbishment areas at Piers 2 and 3

Source: Dublin Airport

Key project metrics

Table 6.117: Hydrant Enablement – Pier 2 & Pier 3 – Key project metrics

Metric	Value
Construction cost estimate	€14,860,000

Specifications review

Table 6.118: Hydrant Enablement – Pier 2 & Pier 3 – Specifications review

Subject	Comments
Effectiveness of scope	The scope addresses the functional requirements of installing the new hydrant system into the aprons at Pier 2 and Pier3, including measure to bring the feed fuel main across the airfield.
Alternative scopes	The project appears to require directional drilling across the airfield along two routes, one towards Pier 2 and the other towards Pier 3. It is questioned whether this could be rationalised into a single route, with a single receiving chamber that then serves both piers from spur mains from the single chamber.
Quality of specifications	The specification is very high-level. More detail on the route of the fuel main, particularly within the apron areas, has been requested from Dublin Airport, but this has not been

Subject	Comments
	forthcoming, within the exception of very high-level drawings. From the Level 3 costs the scope of the project is witnessed. It is noted that the asset life is declared as 20 years. For fuel pipelines we would suggest this is too low and should be at least the same design life as the pavements above and therefore closer to 40 years.
Phasing and synergies with other projects	The fuel main project consists principally of works to bring the fuel line across the airfield towards the Central Terminal area, followed by works to install hydrants and hydrant mains within the Pier 2 and Pier 3 aprons. It is proposed to bring the receiving main under the airfield and taxiways by directional drilling. This is an expensive but effective way to avoid operationally detrimental taxiway closures and open excavations. Albeit detailed drawings are not available to corroborate the fuel main route on the apron, there does appear to be a clear overlap between this project and the apron rehabilitation project CIP.20.01.002. There may be cost savings if the two projects can be phased such that where the fuel main passes through apron that is to be rebuilt, these are carried out at the same time to minimise costs of breakout and operational disruption. The proposed CIP2020 Fuel System Extension, as identified on drawing reference CIP20-03-AIR-OVER-STD-000-01-0020, crosses the path of the West Apron Vehicle Underpass (CIP.20.03.051b) with the fuel line being completed early in the construction period. Given that working around live fuel lines is not desirable, consideration might be given to altering this leg of the route to the north such that the interdependency between projects can be avoided.
Existing asset conditions	This is a new asset.
Double counting	No double counting has been identified within the data provided.

6.243 In overall terms, the conclusion is that this project is effective, but detailed evaluation of combining phases of the fuel main into phases of the apron refurbishment project should be considered, in addition to rationalisation of lengths of main requiring installation by directional drilling.

Cost estimate review

Table 6.119: Hydrant Enablement – Pier 2 & Pier 3 – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 2,970,000	€ 2,971,411	€ 1,411
Construction Costs	€ 14,860,000	€ 14,857,053	-€ 2,947
Escalation, Contingency & Design Variability	€ 5,850,000	€ 5,852,193	€ 2,193
Total	**€ 23,680,000**	**€ 23,680,657**	**€ 657**

Table 6.120: Hydrant Enablement – Pier 2 & Pier 3 – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	20%	€ 2,971,411	20%	€ 2,971,411
Total			**€ 2,970,000**		**€ 2,971,411**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Phase 1	1	n/a	€ 1,984,349	n/a	€ 1,544,000
Phase 2	1	n/a	€ 1,682,789	n/a	€ 1,309,360
Fuel Main, connections, valves, etc	1	n/a	€ 11,189,915	n/a	€ 12,003,693
West Apron	1	excl.	excl.	excl.	excl.
Total			**€ 14,860,000**		**€ 14,857,053**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 5,852,193	33%	€ 5,852,193
Total			**€ 5,850,000**		**€ 5,852,193**

6.244 The rates for this project are reasonable and in line with what we would expect so we have no reason to amend any of them. There are minor rounding differences between Dublin Airport's and our estimate. We have been unable to validate the quantities included in Dublin Airport's Level 3 estimate as the drawing that was provided in response to our request contained insufficient information to allow quantities to be checked. The level of detail in the Dublin Airport Level 3 estimate is not commensurate with the lack of detail on the drawing. We will request further supporting information from Dublin Airport regarding these quantities, in order to validate them ahead of the final report.

7 Project Reviews – CIP2020 Appendix D - Commercial

Summary

Table 7.1: Appendix D - Commercial – Summary

CIP Number	Project Title	RAG Costs	Dublin Airport cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)
CIP.20.04.001	Car Parking Management System (Maintenance & upgrade)	10.4%	3.1	3.4	0.3
CIP.20.04.002	Car Hire Consolidation Centre	-2.8%	14.0	13.6	-0.4
CIP.20.04.003	New Food & Beverage Fit out (T1X)	-56.6%	2.1	0.9	-1.2
CIP.20.04.004	Digital Advertising Infrastructure	0.0%	2.2	2.2	0.0
CIP.20.04.005	Long Term Car Parking - Eastland's (2000 spaces)	-8.0%	10.2	9.4	-0.8
CIP.20.04.006	Terminal 1 Multi-Storey Car Park Block B (466 spaces)	-7.6%	18.8	17.4	-1.4
CIP.20.04.007	Terminal 2 Multi-Storey Car Park (680 spaces)	-1.0%	15.1	14.9	-0.1
CIP.20.04.009	Staff Car Park	-3.8%	6.0	5.8	-0.2
CIP.20.04.016	Platinum Services Upgrade Works	0.0%	2.1	2.1	0.0
CIP.20.04.017	Airline Lounges - Expansion, Upgrade & New	-0.3%	11.4	11.4	0.0
CIP.20.04.018	Fast Track Improvements	0.0%	1.7	1.7	0.0
CIP.20.04.021	West Apron - Accommodation & Welfare Facilities	-15.4%	4.5	3.8	-0.7
CIP.20.04.023	Food & Beverage Provision & Fit out – Post CBP	-57.6%	3.2	1.4	-1.9
CIP.20.04.025	Commercial Property Refurbishment	-25.0%	8.0	6.0	-2.0
CIP.20.04.030	New Kitchen in Terminal 2	-24.7%	3.0	2.3	-0.7
CIP.20.07.010	Office Consolidation & Refurbishment (primarily Level 4 & 5, Terminal 1)	-21.0%	15.0	11.9	-3.1
CIP.20.08.001	Retail Refurbishments, Upgrades and New Developments	0.0%	8.0	8.0	0.0
CIP.20.08.002	Retail Marketing & Media Installation	0.0%	1.5	1.5	0.0
Total		**-9.5%**	**130.0**	**117.6**	**-12.4**

7.1 Overall our estimates for the projects in the Commercial envelope suggest that there may be a potential cost reduction of €12.4m.

7.2 Individual reports for the projects in this Appendix are presented below.

CIP.20.04.001 – Car Parking Management System (Maintenance & upgrade)

Introduction

7.3 This project provides for the installation of new technology to monitor, manage and collect revenue with smart technology.

Figure 7.1: Car Parking Management System

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Scope

7.4 The scope of 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; and
- Provision of new sensor technology hardware (focus on specific sections of short-term car parks for premium paying customers).

7.5 This project will give the airport the ability to connect into new sales channels and payment methods, sensor technology to enhance customer experience and increase reporting and insight into space utilisation, revenue controls and audits.

Stage

7.6 Project stage is currently at initial concept stage. The Design Stage is due to be complete in Q1 2021 followed by Procurement and Construction commencement in Q4 2021 and a project handover in Q2 2022. The outlined procurement route of:

- Feasibility/ Outline design complete Q2 2020
- Detailed Design Complete Q1 2021
- Procurement Complete Q4 2021
- Construction commence Q4 2021
- Project handover Q1 2022

Key project metrics

Table 7.2: Car Parking Management System – Key project metrics

Metric	Value
Construction cost estimate	€ 2,500,000
Entry/exit stations	20 new entry and exit terminals
Pay stations	21 new pay stations

Specifications review

Table 7.3: Car Parking Management System – Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the work to be carried out in outline format. The project sheets incorrectly states 24 entry and 16 exit terminals are required, but dialogue with Dublin Airport has identified this as being incorrect. The correct number is 20 entry and 20 exit terminals, but still totals 40 units. Given that the entry and exit terminals are priced the same, this has nil impact on the costings.
Alternative scopes	None
Quality of specifications	Specifications provided in Level 3 costs/CIP description lack consistency to be able to validate what is to be provided.
Phasing and synergies with other projects	Installation work in the car parks need to be co-ordinated with the other renewal projects to avoid on site clashes and inefficient working: CIP.20.04.005 Long Term Car Park Capacity CIP.20.04.006 T1 MSCP CIP.20.04.007 T2 MSCP.
Existing asset conditions	Existing system dates from 2006. 10 years is a normal economic life for IT systems such as this.
Double counting	None identified

7.7 Based on the information available at this early stage, the scope for this type of project appears to effectively meet the objective and does so in an efficient manner.

Cost estimate review

Table 7.4: Car Parking Management System (Maintenance & upgrade) – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 187,500	€ 187,500	€ 0
Construction Costs	€ 2,500,000	€ 2,780,000	€ 280,000
Escalation, Contingency & Design Variability	€ 416,563	€ 459,963	€ 43,400
Total	**€ 3,104,063**	**€ 3,427,463**	**€ 323,400**

Table 7.5: Car Parking Management System (Maintenance & upgrade) – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 187,500	8%	€ 187,500
Total			**€ 187,500**		**€ 187,500**

Construction Costs (C-C)	Quantity	Dublin Airport rate	Dublin Airport cost estimate	Steer rate	Steer cost estimate
Fittings / Furnishings & Equipment	1	n/a	€ 2,500,000	€ 2,780,000	€ 2,780,000
Total			**€ 2,500,000**		**€ 2,780,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	16%	€ 416,563	16%	€ 459,963
Total			**€ 416,563**		**€ 459,963**

7.8 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.6: Car Parking Management System (Maintenance & upgrade) – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport quantity	Steer quantity
Paystations	€ 280,000	86.6%	14	21

7.9 There is insufficient transparency in the level 3 lumps sums costs to be able to confidently state that the costs reflect the scope described in the CIP.

7.10 Dublin Airport has stated that the lump sums for lane equipment and entry/exit terminals are taken from supplier prices provided over the past 3 years and that the lump sum for sensor technology has been validated with numerous suppliers. This is a sensible approach. However, we have not validated these statements made by Dublin Airport as, other than providing a trade report document that only restated the figures already included in the Level 3 estimate, they have not provided any backup information from suppliers to support them or that allows us to comment further on the validity of those rates. We will therefore request further supporting information from Dublin Airport regarding these rates, in order to validate them ahead of the final report.

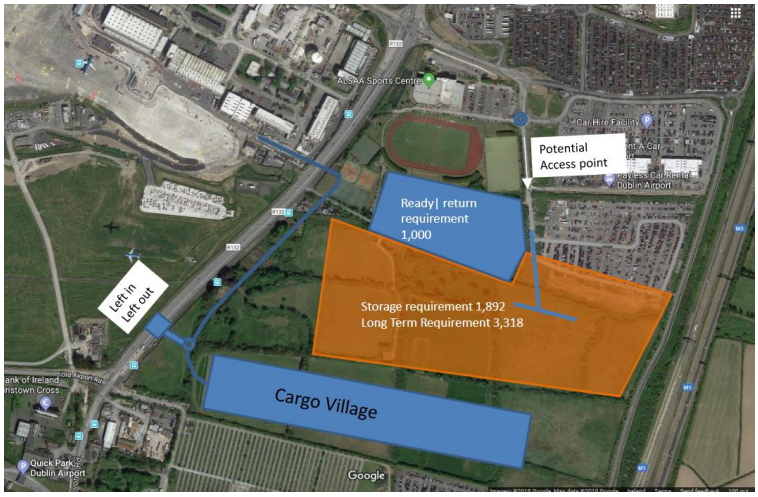
7.11 The specific equipment (including quantities) listed in the CIP is not reflected in the Level 3 cost. The paystation costs appear reasonable but we have increased the quantity to 21. Dublin Airport has subsequently confirmed this quantity.

CIP.20.04.002 – Car Hire Consolidation Centre

Introduction

7.12 This project is for the expansion of existing car hire facilities.

Figure 7.2: Car Hire Consolidation Centre



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.13 The objective of this project is to increase capacity at the car hire parking spaces with approximate 3,000 additional spaces and additional service/sales facilities.

Context

7.14 Car rental facilities consist of car rental spaces, customer service desks, administration offices, shuttle bus pick up zones and processing facilities (including fuel pumps, maintenance bays and wash bays). Dublin Airport state there is a shortage of 1,000-1,500 car hire parking spaces which has resulted in congestion, inefficiencies and operators having to supplement with offsite facilities.

7.15 By 2022, Dublin Airport's forecast demand for car rental will exceed the actual capacity of all parts of the facilities (spaces, desks, admin area, pick up zones and processing facilities).

Scope

7.16 The scope covers the construction of 3,000 car parking spaces and additional sales/service facilities including the following:

- Fuel Pumps;
- Maintenance Bays;
- Wash Bays;
- Customer counters;
- Admin areas;
- Pick up zones; and
- Processing facilities.

Stage

7.17 The project is currently at initial concept stage. The Design Stage is due to be complete in Q3 2020 followed by completion of Procurement stage in Q3 2020 followed by Construction commencement straightaway in Q4 2020. The outlined procurement route of:

- Feasibility/ Outline Design Complete Q2 2019
- Planning Complete Q3 2020
- Detailed Design Complete Q3 2020
- Procurement Complete Q3 2020
- Construction Commence Q4 2020
- Construction Complete Q2 2022
- Project Handover Q2 2022

Key project metrics

Table 7.7: Car Hire Consolidation Centre – Key project metrics

Metric	Value
Construction cost estimate	€ 13,344,000
Car parking spaces	3,000 car rental spaces (75,000m^2)
Maintenance bays/Fuelling points	8
Washing bays	5

Specifications review

Table 7.8: Car Hire Consolidation Centre – Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient as we have not identified any cost elements which are not required to deliver the project outcome as set out by Dublin Airport.
Alternative scopes	None.
Quality of specifications	Specifications provided in Level 3 costs/CIP description provide enough detail for outline design stage.
Phasing and synergies with other projects	Phasing will be required with the operational use of existing car hire facilities.
Existing asset conditions	For new facilities we would expect a 20-year asset life as specified. For the existing facilities there is approximately 7 years economic life remaining, however the nature of this facility would suggest that re-lifing is possible.
Double counting	None identified.

7.18 The scope for this type of project is efficient.

Cost estimate review

Table 7.9: Car Hire Consolidation Centre – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 13,344,000	€ 12,969,000	-€ 375,000
Escalation, Contingency & Design Variability	€ 667,200	€ 648,450	-€ 18,750
Total	**€ 14,011,200**	**€ 13,617,450**	**-€ 393,750**

Table 7.10: Car Hire Consolidation Centre – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management (deemed included below)	n/a	0%	€ 0	0%	
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Car Park Spaces	3000	€ 3,000	€ 9,000,000	€ 3,000	€ 9,000,000
Maintenance Bays + Fuelling Point	8	€ 200,000	€ 1,600,000	€ 200,000	€ 1,600,000
Wash bays	5	€ 250,000	€ 1,250,000	€ 175,000	€ 875,000
Counter Fit out & Office Area	1	n/a	€ 1,494,000	n/a	€ 1,494,000
Total			**€ 13,344,000**		**€ 12,969,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	5%	€ 667,200	5%	€ 648,450
Total			**€ 667,200**		**€ 648,450**

7.19 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.11: Car Hire Consolidation Centre – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Wash Bays	**Redacted Cost Information**			€ 175,000

7.20 There is no design and management cost or contractors' preliminaries included in the Dublin Airport Level 3 cost, although they are noted as being included. Dublin Airport has restated that these costs are included in the estimate but has not demonstrated that this is the case in its response to our queries. The unit rate of [redacted] for car park spaces appears to be reasonable and is in line with benchmark data. The rate for the wash bays appears to be high and we have reduced it. The quantities for this project have been validated.

CIP.20.04.003 – New Food & Beverage Fit out (T1X)

Introduction

7.21 This project provides a shell and core for the fitting out by a concessionaire of a new quality Food and Beverage (F&B) outlet that enables fresh food to be prepared in a new kitchen. Existing retail outlets will be removed to provide the space required.

Figure 7.3: New Food & Beverage Fit out (T1X)

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

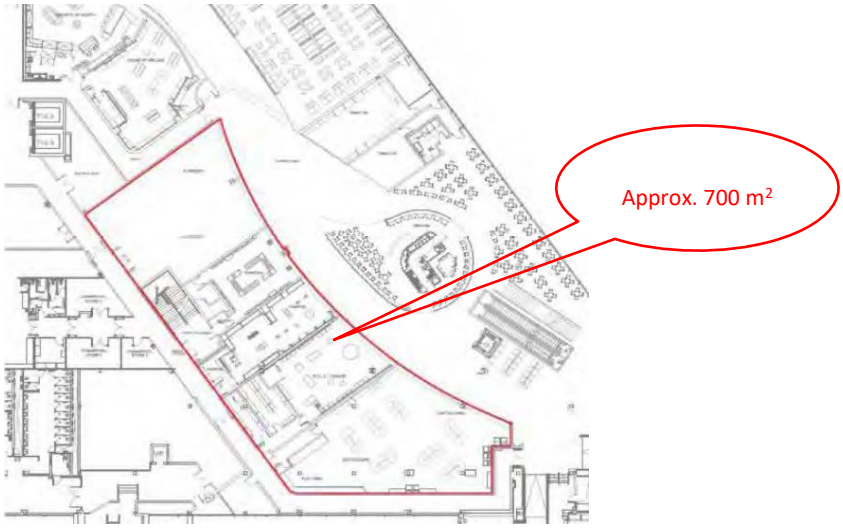
7.22 The project objective is to create more F&B space in the T1 IDL.

Context

7.23 The context of this project is the heavily used IDL, perhaps more appropriately called the Airside Departure Concourse, which has seen various 'improvements' over the years in what is effectively an old terminal building.

7.24 The driver for this project is stated as 'capacity improvement' as well as providing an improved F&B offer.

Figure 7.4: New Food & Beverage Fit out (T1X)



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Scope

7.25 The scope of the project in planning terms meets the stated objectives.

Stage

7.26 The project stage is currently at initial feasibility determining location, overall floor area and high-level costs. Outline Design is scheduled to be complete Q1 2020 and the project handed over in Q1 2022. Since this is a 'shell and core project' we assume that the handover is for the shell and core only. The outlined procurement route of:

- Feasibility/Outline design complete Q1 2020
- Planning complete Q2 2021
- Detailed design complete Q3 2021
- Procurement compete Q3 2021
- Construction commence Q3 2021
- Project handover Q1 2022

7.27 The scope is efficient and straightforward, but the Planning stage appears to take a long time for what is in effect an internal terminal re-organisation. 18 months is a long time for a shell and core re-modelling from detailed design through to commencing construction. Dublin Airport has confirmed the time line is under review to synchronise with other projects.

7.28 Detailed design completion, Procurement and Commencing construction all happen simultaneously according to the CIP, which is unrealistic and needs to be adjusted to consider a tendering/bidding process. Dublin Airport has confirmed that this will be reviewed.

Key project metrics

Table 7.12: Terminal 1 New Food and Beverage Fit out (T1X) – Key project metrics

Metric	Value
Construction cost estimate	€ 1,645,000
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 Final
Floor area provided	700m^2 including a 300m2 kitchen

Specifications review

Table 7.13: Terminal 1 New Food and Beverage Fit out (T1X) – Key specifications

Subject	Comments
Effectiveness of scope	The scope of the project is efficient. The scope would be made even clearer if the plans showed an outline design proposal for the new F&B facility.
Alternative scopes	None identified.
Quality of specifications	Specifications provided in Level 3 costs/CIP description provide enough detail for outline design stage.
Phasing and synergies with other projects	Concern over the phasing of design completion, procurement completion and construction commencement all appearing to take place in Q3 2021.

Subject	Comments
	Completion and operational dates need to be phased with the following projects to ensure minimum disruption to passenger flow in this busy part of the terminal: 20 03 013 T1 IDL expansion and Re-modelling 20 08 001 Retail refurbishments, Upgrades and New developments 20 08 002 Retail Marketing and Media Installation.
Scope and specifications account for asset conditions and residual life?	The asset life is stated as 20 years which is reasonable given the remaining asset life of T1 is 20 years, however Retail and F&B trends may well dictate that a shorter asset life is acceptable, nearer 10 years.
Double counting	None identified.

7.29 The scope of the project is efficient.

Cost estimate review

Table 7.14: Terminal 1 New Food and Beverage Fit out (T1X) – Level 1 costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 123,375	€ 56,000	-€ 67,375
Construction Costs	€ 1,645,000	€ 700,000	-€ 945,000
Escalation, Contingency & Design Variability	€ 366,938	€ 170,850	-€ 196,088
Total	**€ 2,135,313**	**€ 926,850**	**-€ 1,208,463**

Table 7.15: Terminal 1 New Food and Beverage Fit out (T1X) – Level 2 costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 123,375	8%	€ 56,000
Total			**€ 123,375**		**€ 56,000**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	700	€ 2,350,000	€ 1,645,000	€ 1,000	€ 700,000
Total			**€ 1,645,000**		**€ 700,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	21%	€ 366,938	23%	€ 170,850
Total			**€ 366,938**		**€ 170,850**

7.30 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.16: Terminal 1 New Food and Beverage Fit out (T1X)

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
F&B refurbishment, grey box construction costs only.	**Redacted Cost Information**			€ 1,000

7.31 We requested the build-up rates, but the response simply stated that it was based on feasibility estimates from previous projects undertaken. Dublin Airport has confirmed that it

has not included the fit out of the space in its estimate. On the basis that the new F&B facility is being created within the existing terminal the unit rate for the works appears to be too high even allowing for the fact that Dublin Airport has confirmed that preliminaries are included within the rate at 20% of the construction cost. We have reduced this rate accordingly.

CIP.20.04.004 – Digital Advertising Infrastructure

Introduction

7.32 Dublin Airport aims to update, expand and future proof the digital advertising infrastructure at Dublin Airport.

Figure 7.5: Digital Advertising Infrastructure

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Scope

7.33 Creating a fully operational Digital inventory network integrated with the existing network using digital LED technologies. They will be delivered via larger digital displays & formats. These digital advertising assets will be deployed in the following locations:

- 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; and
- Upgrade and expansion of existing digital AerPods network.

Stages

- Feasibility Outline Design: Q1 2020
- Planning Complete: Q1 2020
- Detailed Design Complete: Q3 2020
- Procurement Completed: Q4 2020
- Construction Commences: Q4 2020
- Handover: Q3 2021

Key project metrics

Table 7.17: Digital Advertising Infrastructure – Key project metrics

Metric	Value
Construction cost estimate	€ 1,789,000

Metric	Value
Dublin Airport estimation method	Dublin Airport states that the costs estimates are based on a supplier estimates to complete the scope of work outline above in project scope. Dublin Airport has in the Q&A stated that existing Digital Advertising assets will be integrated with the new Advertising system to create an even greater digital foot print from which they can monetise the benefits.

Specifications review

Table 7.18: Digital Advertising Infrastructure – Specifications review

Subject	Comments
Effectiveness of scope	The scope of the project efficiently delivers the intended additional digital advertising installations.
Alternative scopes	None identified.
Quality of specifications	Detailed planning, design and implementation specifications still need to be developed. Dublin Airport has obtained cost estimates from the supplier market based on the outlined SoW they have proposed.
Phasing and synergies with other projects	There is a combination of continuous investments planned during the CIP 2020-2024 as well as a specific project that will be completed in phases.
Existing asset conditions	Current existing Digital inventory Assets are planned to be integrated with a new Digital Advertising Network system.
Double counting	The project is the provision of digital display hardware across the campus with integration of old hardware and the installation of a software management solution. The system will be integrated with commercial and EPR systems for the exchange of data and information between systems. No double counting has been identified.

7.34 This Digital Advertising project will achieve Dublin Airport's objective expanding the digital advertising infrastructure.

Cost estimate review

Table 7.19: Digital Advertising Infrastructure – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 89,450	€ 89,450	€ 0
Construction Costs	€ 1,789,000	€ 1,789,000	€ 0
Escalation, Contingency & Design Variability	€ 291,160	€ 291,160	€ 0
Total	**€ 2,169,610**	**€ 2,169,610**	**€ 0**

Table 7.20: Digital Advertising Infrastructure – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	5%	€ 89,450	5%	€ 89,450
Total			**€ 89,450**		**€ 89,450**

Construction Costs (C-C)	Quantity	Dublin Airport rate	Dublin Airport cost estimate	Steer rate	Steer cost estimate
Large LED Digital - T1	1	n/a	€ 500,000	n/a	€ 520,085
Large LED Digital - T2	1	n/a	€ 500,000	n/a	€ 520,085
Upgrade existing AerPods	1	n/a	€ 189,000	n/a	€ 165,403
Expansion of AerPods	5	€ 10,000	€ 50,000	€ 10,000	€ 50,000
Upgrade existing key static site - T1	1	n/a	€ 300,000	n/a	€ 312,197
Upgrade existing key static site - T2	1	n/a	€ 150,000	n/a	€ 150,000
Power, Cabling & Trays	1	n/a	€ 100,000	n/a	€ 71,230
Total			**€ 1,789,000**		**€ 1,789,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	16%	€ 291,160	16%	€ 291,160
Total			**€ 291,160**		**€ 291,160**

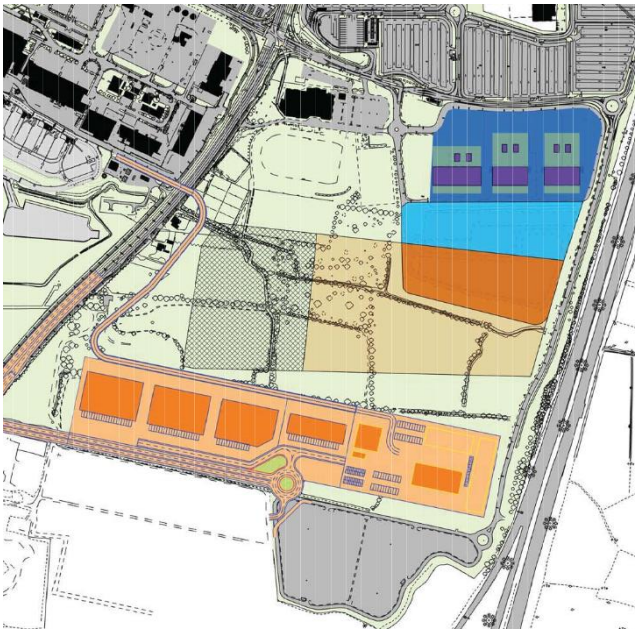
7.35 There is a reasonable level of data in the Level 3 estimate that is quite specific. Dublin Airport has confirmed that their rates are based on budget estimates provided by ADXBA that we have been provided with. We have reviewed that information and believe that the sums included are reasonable for the works described. The quantities for this project have not been validated as no design information has been provided for review. We will request further information from Dublin Airport to confirm these quantities ahead of the final report.

CIP.20.04.005 – Long Term Car Parking - Eastland's

Introduction

7.36 This project is for the expansion of existing car parking and car hire facilities.

Figure 7.6: Long Term Car Park Capacity



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.37 The objective of this project is to add an additional 2,000 new car parking spaces to the existing Express Red car park.

Scope

7.38 The scope of the project consists of 2,000 car parking spaces in Eastland's with connectivity to the current Express Red car park. The following items are included in the scope:

- 2,000 car parking spaces;
- Car Park lighting;
- Passenger kerbs and signage; and
- Bussing facilities.

Stage

7.39 The project is currently at initial concept stage. The Design Stage is due to be complete in Q4 2020 followed by completion of Procurement stage in Q1 2021 followed by Construction Commencement in Q1 2021 and the project handover in Q1 2022. The outlined procurement route is as follows:

- 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

7.40 For a project that is going to be constructed on a greenfield site, the procurement route appears to be long.

Key project metrics

Table 7.21: Long Term Car Park Capacity – Key project metrics

Metric	Value
Construction cost estimate	€ 4,567,500
No of additional car parking spaces	2,000
Area	50,000 m²

Specifications review

Table 7.22: Long Term Car Park Capacity - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the work to be carried out in outline format. The new car parking/ hire facility will be constructed next to the existing Express Red Car Park, this would mean that the Eastland's Car Hire Compound will be transformed into car parking spaces.
Alternative scopes	As stated above, without this project, a higher amount of capital expenditure will be required Car Hire Development project (CIP.20.04.002).
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage. In the cost plan a specification for car parking spaces is provided. Nevertheless, the following items are not included/ mentioned: car park lighting, passenger kerbs and signage and bussing facilities. In addition, the area for car parking spaces is given by Dublin Airport: 50,000sqm. With 2,000 spaces this would mean that every car parking space is 25sqm including any circulation or access/egress roads. This seems reasonable at this stage.
Phasing and synergies with other projects	Construction work of the car hire centre will most likely not need to be co-ordinated with any other projects as the area designated for this project is greenfield. However, this project reduces the capital expenditure requirement of the Car Hire Development project (CIP.20.04.002) which would need a higher allowance to accommodate storage demands in the event this project does not proceed.
Existing asset conditions	For new facilities we would expect a 20-year asset life as specified. The current Express Red Car Park has been refurbished in 2015.
Double counting	None identified.

7.41 The scope is efficient in identifying the work to be carried out in outline format. As mentioned above, 25sqm per car parking space is a common benchmark used and includes circulation or access/egress roads.

7.42 Car park space in the original Level 3 costs assumed only 29,000sq m, compared to the correct requirement of 50,000. This has now been corrected in Dublin Airport's new costings.

Cost estimate review

Table 7.23: Long Term Car Parking – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 984,375	€ 1,035,000	€ 50,625
Construction Costs	€ 7,875,000	€ 7,117,500	-€ 757,500
Escalation, Contingency & Design Variability	€ 1,373,203	€ 1,263,638	-€ 109,566
Total	**€ 10,232,578**	**€ 9,416,138**	**-€ 816,441**

Table 7.24: Long Term Car Parking – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	12.5%	€ 984,375	12.5%	€ 1,035,000
Total			**€ 984,375**		**€ 1,035,000**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Car Park Spaces	50,000 m^2	€ 125	€ 6,250,000	€ 120	€ 6,000,000
Main Contractor Prelims	1	n/a	€ 1,250,000	n/a	€ 900,000
Other Development Costs	1	n/a	€ 375,000	n/a	€ 217,500
Total			**€ 7,875,000**		**€ 7,117,500**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	15.5%	€ 1,373,203	15.5%	€ 1,263,638
Total			**€ 1,373,203**		**€ 1,263,638**

7.43 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.25: Long Term Car Parking – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
General Management and Staff Prelims 20%	**Redacted Cost Information**			15%
Car Park Space 5mx2.5m allow 25m2 total per space @ 2000no				€ 120
Allowance for Design Development				€ 217,500

7.44 In general, the cost for this project appears to be reasonable. However, the overall area of the car park has been increased to 50,000m^2 in line with what Dublin Airport has stated in the CIP document. Dublin Airport has acknowledged this and has submitted a revised Level 3 estimate that has been incorporated into this report. The unit rate of [redacted] is higher than the rate used for the Car Hire Consolidation project. We would expect this rate to be the same for both projects, and so we have reduced it to €120/m^2, our recommended rate.

7.45 In response to our query on the need for a design development allowance in this project, Dublin Airport has justified its inclusion on the basis that the local planning authorities will have a focus on this project. As a result, we have added this allowance back into our Level 3 estimate.

7.46 In response to our query, Dublin Airport has also stated that an allowance of 20% for preliminaries is reasonable for airport projects. In general terms, we do not disagree that preliminaries at this level are being seen more widely in airport construction projects. However, this is in more complex environments than this project presents. Therefore, we have reduced preliminaries to 15%.

CIP.20.04.006 – Terminal 1 Multi-Storey Car Park Block B

Introduction

7.47 This project is for the provision of additional short-term car parking spaces at the existing Terminal 1 (Block B) Multi-Storey Car Park (MSCP).

Figure 7.7: Terminal 1 Multi-Storey Car Park Block B

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.48 Increase capacity of the short term car park at T1.

Scope

7.49 The scope of the project is to provide two new floors at the existing T1 ST Block B car park (c. 480 spaces). The increased capacity will be built on top of Block B car park. 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.

Stage

7.50 Project stage is currently at initial concept design stage, with Construction Commencement in Q2 2022 and completion in Q3 2023. The design and procurement stage of 2 years is a relatively long time before construction commences on site. We note that the construction time is a year shorter than the 2 floors being added to T2 MSCP.

- Feasibility/ Consultation Q2 2020
- Planning complete Q3 2021
- Detail Design complete Q4 2021
- Procurement complete Q1 2022
- Construction commence Q2 2022
- Project handover (phased) Q3 2023

Key project metrics

Table 7.26: Terminal 1 Multi-Storey Car Park Block B - Key project metrics

Metric	Value
Construction cost estimate	€ 14,187,636

Metric	Value
No of car park spaces added	480
Floor area provided	14,227 m²

Specifications review

Table 7.27: Terminal 1 Multi-Storey Car Park Block B - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the work to be carried out in outline format.
Alternative scopes	None
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage.
Phasing and synergies with other projects	The work packages need to be co-ordinated with the other projects to avoid on site clashes and inefficient working: • CIP 20 04 007 T2 MSCP • CIP.20.01.039 Airport Roads Optimisation • CIP 20 01 034 Campus Roads Critical Maintenance.
Existing asset conditions	The asset life is stated as 25 years.
Double counting	There is the potential to economise on contractors' overheads if the 2 MSCP extensions are let as a single contract.

7.51 The scope appears efficient and should effectively meet the objective. However, we question why the 2 MSCP multi-floor extensions are treated as 2 separate projects. We recognise that the 2 MSCP's are of differing construction and built at different dates, but the construction commencement dates are the same for both projects, even though the completion dates are different. The added value of one contract could be economies of scale for a structural system and consolidation of contractor's overheads.

7.52 For this reason, a reduction in preliminary costs has been made in the figures below.

Cost estimate review

Table 7.28: Terminal 1 Multi-Storey Car Park Block B – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 2,128,145	€ 1,966,768	-€ 161,377
Construction Costs	€ 14,187,636	€ 13,111,785	-€ 1,075,851
Escalation, Contingency & Design Variability	€ 2,528,946	€ 2,337,176	-€ 191,770
Total	**€ 18,844,727**	**€ 17,415,728**	**-€ 1,428,999**

Table 7.29: Terminal 1 Multi-Storey Car Park Block B – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	15%	€ 2,128,145	15%	€ 1,966,768
Total			**€ 2,128,145**		**€ 1,966,768**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Facilitation & Demolition Works	1	n/a	€ 71,135	n/a	€ 71,135
Substructure	1	n/a	€ 2,845,390	n/a	€ 2,134,043
Superstructure - Frame	14227 m2	€ 380	€ 5,406,241	€ 380	€ 5,406,241
Superstructure - Others	1	n/a	€ 1,496,402	n/a	€ 1,496,402
Internal Finishes	1	n/a	€ 702,198	n/a	€ 702,198
Fitting /Furnishings & Equipment	1	n/a	€ 123,794	n/a	€ 123,794
Services	1	n/a	€ 1,116,586	n/a	€ 1,116,586
External Works	1	n/a	€ 61,284	n/a	€ 61,284
Main Contractors Preliminaries	1	n/a	€ 2,364,606	n/a	€ 2,000,103
Total			**€ 14,187,636**		**€ 13,111,785**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	15%	€ 2,528,946	15%	€ 2,337,176
Total			**€ 2,528,946**		**€ 2,337,176**

7.53 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.30: Terminal 1 Multi-Storey Car Park Block B – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Specialist Foundations - Allowance for additional foundation supports to take weight of additional two floors	**Redacted Cost Information**			€ 150
General Management and Staff Prelims 20%				18%

7.54 The Level 3 estimate contains a reasonable level of detail including quantities. Dublin Airport has confirmed that rates included in the estimate are based on rates from previous similar projects undertaken at the airport. We requested substantiation of substructure and superstructure rates, but no further detail has been provided. No design information has been provided so we are unable to validate any of the quantities included in the Level 3 estimate. This is not unexpected, given the early development stage of the project, but despite this, we will continue to seek additional information from Dublin Airport to help us to validate these quantities ahead of the final report.

7.55 Overall the cost of the proposed extension to the car park is approximately [redacted]. This looks high, bearing in mind that the costs presented do not include for the construction of new access/egress ramps. We acknowledge the complexity of building on top of an existing structure and the specific strengthening works that will be required to support the additional decks. However, we would still expect the overall cost per space to be in the region of €15,000 - €20,000/space. Without seeing the proposed design solution, it is difficult to identify where the cost could be reduced at this stage although we suspect that it is probably in the substructure and superstructure works. It may also be due to the inefficiency of the space

being created. We have reviewed the cost of the enhancements to the existing foundations and we believe they equate to the cost of the substructure for a new build car park. While there is undoubtedly complexity in strengthening the existing foundations, we consider that the cost included is high and we have reduced it.

CIP.20.04.007 – Terminal 2 Multi-Storey Car Park

Introduction

7.56 This project is for the provision of additional short-term car parking spaces at the existing Terminal 2 Multi-Storey Car Park.

Figure 7.8: T2 Multi Storey Car Park

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.57 Increase capacity of T2 short term car park.

Scope

7.58 The scope is to 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.

Stage

7.59 Project stage is currently at initial concept design stage, with Construction Commencement in Q2 2022 and completion in Q1 2024. The design and procurement stage of 3 years is a long time before construction commences on site.

- Feasibility/ Consultation Q3 2019
- Design & Planning Application Q3 2020
- Design & Procurement Q4 2021
- Construction commence Q2 2022
- Project handover Q1 2024

Key project metrics

Table 7.31: T2 Multi Storey Car Park – Key project metrics

Metric	Value
Construction cost estimate	€ 11,355,798
No of car park spaces added	680
Floor area provided	18,164 m^2

Specifications review

Table 7.32: T2 Multi Storey Car Park - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the work to be carried out in outline format.
Alternative scopes	None.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage.
Phasing and synergies with other projects	The work packages need to be co-ordinated with the other projects to avoid on site clashes and inefficient working: CIP 20 01 006 T1 MSCP CIP.20.01.039 Airport Roads Optimisation CIP 20 01 034 Campus Roads Critical Maintenance.
Existing asset conditions	The asset life is stated as 25 years. We would expect the asset life of an MSCP to be 50 years, which in this case means that there is 40-year life remaining.
Double counting	There is the potential to economise on contractors' overheads if the 2 MSCP extensions are let as a single contract

7.60 The scope appears efficient and should effectively meet the objective. However, we question why the 2 MSCP multi-floor extensions are treated as 2 separate projects. We recognise that the 2 MSCP's are of different construction and built at different dates, but the construction commencement dates are the same for both projects, even though the completion dates are different. The added value of one contract could be economies of scale for a structural system and consolidation of contractor's overheads.

7.61 For this reason, a reduction in preliminary costs has be made.

Cost estimate review

Table 7.33: T2 Multi Storey Car Park – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 1,703,370	€ 1,686,741	-€ 16,629
Construction Costs	€ 11,355,798	€ 11,244,940	-€ 110,858
Escalation, Contingency & Design Variability	€ 2,024,171	€ 2,004,411	-€ 19,760
Total	**€ 15,083,339**	**€ 14,936,092**	**-€ 147,247**

Table 7.34: T2 Multi Storey Car Park – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	15%	€ 1,703,370	15%	€ 1,686,741
Total			**€ 1,703,370**		**€ 1,686,741**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Major Demolition Works	1	n/a	€ 2,338,574	n/a	€ 2,338,574
Superstructure - Frame	18164 m2	€ 190	€ 3,451,171	€ 190	€ 3,451,171
Superstructure - Floor, Roof, Walls	1	n/a	€ 1,557,221	n/a	€ 1,557,221
Internal Finishes	1	n/a	€ 775,202	n/a	€ 762,705
Fitting /Furnishings & Equipment	1	n/a	€ 179,474	n/a	€ 179,474
Services	1	n/a	€ 1,291,914	n/a	€ 1,291,914
External Works	1	n/a	€ 30,000	n/a	€ 30,000
Main Contractors Preliminaries	1	n/a	€ 1,732,240	n/a	€ 1,633,880
Total			**€ 11,355,798**		**€ 11,244,940**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	16%	€ 2,024,171	16%	€ 2,004,411
Total			**€ 2,024,171**		**€ 2,004,411**

7.62 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.33: T2 Multi Storey Car Park – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
General Management and Staff Prelims 18%	**Redacted Cost Information**			17%

7.63 The Level 3 estimate contains a reasonable level of detail including quantities, which have been validated. Overall the cost of the proposed extension to the car is approximately [redacted]. This is much closer to the order of magnitude of cost that we would expect and that we set out in our comments on the Terminal 1 Multi Storey Car Park project. Without seeing more detail around the proposed design, which was requested, it is difficult to make comment on the efficiency of the cost of this project, particularly in respect of the strengthening to the existing frame. We will request further design information from Dublin Airport to help validate the quantities ahead of the final report.

7.64 The cost of the ceiling in the VCC is slightly higher than we would expect, and we have reduced that rate. We have also reduced the preliminaries allowance as we believe that economies of scale should be achieved if the project is run alongside the T1 MSCP project (20.04.006).

CIP.20.04.009 – Staff Car Park

Introduction.

7.65 This project is capacity driven to provide additional car parking for staff and replacement spaces for some existing staff car parking inside the central campus which will be removed due to other developments.

Figure 7.9: Staff Car Park

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.66 The objective is to provide 2,280 staff car park spaces in one location (Eastlands) with good bus connections to the central terminal areas.

Context

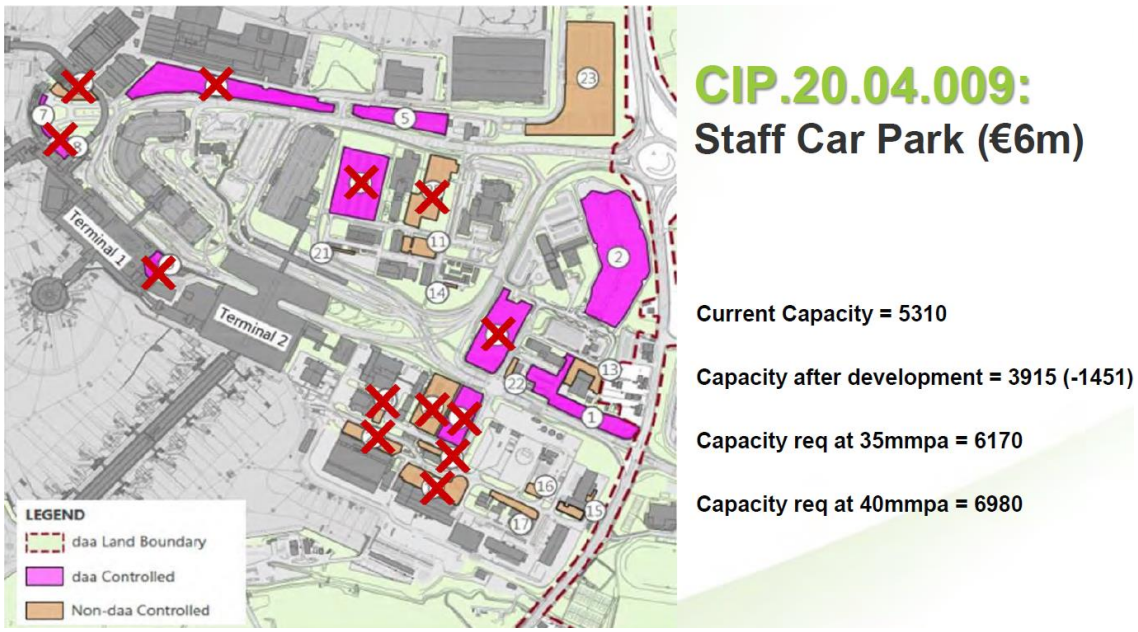
7.67 The site that has been selected is the existing public car parking site known as LT Green Car Park. It is assumed that the €6.0m budget is for the construction of the new public car park in Eastlands.

Scope

7.68 The scope of the project requires more clarity of which car park is which and the work required to both provide the staff car park (in the existing public car park) and the new public car park.

7.69 The audit plan (below) shows a significant number of staff car parks are being closed in the central campus area due to capacity expansion development.

Figure 7.10: Staff Car Park



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Stage

7.70 Planning is due in Q4 2019 and detail design, procurement and construction commencement in 6 months for Q2 2020. However, completion is a year later in Q2 2021.

- Construction commence Q2 2020
- Enabling Works Completed (incl. access & services) Q3 2020
- Pavement & Drainage Complete Q3 2020
- Line Markings and Electrical Works Complete Q4 2020
- Relocate Staff to New Car Park Q1 2021
- Upgrade existing LT Green for staff complete Q2 2021
- Project Handover Q2 2021

Key project metrics

Table 7.35: Staff Car Park - Key project metrics

Metric	Value
Construction cost estimate	€ 4,500,000
Dublin Airport estimate	Level 2 cost estimate included in CIP 2020 Final
Cost per car space	Not given
Number of car spaces to be provided	2,280 staff car spaces.

Specifications review

Table 7.36: Staff Car Park - Specifications review

Subject	Comments
Effectiveness of scope	The scope for this type of project appears to meet the objective.
Alternative scopes	None identified at this time.
Quality of specifications	Insufficient information provided to comment on the quality.
Phasing and synergies with other projects	Insufficient information provided to comment, but it is assumed this project will need to be phased with the loss of central campus staff car parking and phased with the provision of new public car parking elsewhere on the campus. The exact amount of spaces to be provided for is 2,280. The cost of providing 1,480 spaces is included in this project (20.04.009) and the remaining 800 are being provided for under project no. 20.03.036 (North Apron - Demolition and Relocations) which includes an amount of €2.5m (ex. overheads) to cover these spaces. The final project sheet for 20.04.009 should have cross referenced this provision.
Scope and specifications account for asset conditions and residual life?	The residual life is 20 years which is what we would expect for a facility of this nature.
Double counting	None identified.

7.71 The scope for this type of project appears to meet the objective.

Cost estimate review

Table 7.37: Staff Car Park – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 600,000	€ 555,000	-€ 45,000
Construction Costs	€ 4,500,000	€ 4,440,000	-€ 60,000
Escalation, Contingency & Design Variability	€ 900,000	€ 774,225	-€ 125,775
Total	**€ 6,000,000**	**€ 5,769,225**	**-€ 230,775**

Table 7.38: Staff Car Park – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	10%	€ 600,000	12.5%	€ 555,000
Total			**€ 600,000**		**€ 555,000**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Major Demolition Works	1	n/a	€ 4,500,000	n/a	€ 4,440,000
Total			**€ 4,500,000**		**€ 4,440,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	15%	€ 900,000	16%	€ 774,225
Total			**€ 900,000**		**€ 774,225**

7.72 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.39: Staff Car Park – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Staff car parks	**Redacted Cost Information**			€ 3,000

7.73 The costs for this project are generally in line with the other surface car park projects. However, we have reduced the unit rate to [redacted] to align with our proposed rate of [redacted] in line with the adjustments that we have made in the other surface car park projects. We note the lack of inclusion of a design development allowance in this project which further supports our view as stated in the Long Term Car Parking - Eastlands that a design development allowance is not required. The quantities for the project have been validated in respect of the number of spaces being provided versus the quantity included by Dublin Airport in its Level 3 estimate.

CIP.20.04.016 – Platinum Services Upgrade Works

Introduction

Figure 7.11: Platinum Services Upgrade Works

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.74 This project comprises two sections: platinum upgrades of existing products, and platinum capacity increase.

Scope

7.75 The scope of the upgrade work includes new soft furnishings, fixtures, lighting, design features and kitchen upgrade (replacing existing back-of house kitchen), while the scope to increase capacity includes dividing Suite 3 into 2 suites and introduction of a new communal area for General Aviation passengers in the airside porch. The scope also includes expansion of the security screening area for more queuing space, larger area for redress post screening and future installation of new Liquids, Aerosols and Gels (LAGS) screening machines.

Stage

7.76 Project stage is currently at concept design with procurement to be completed in Q4 2021 and delivery in 3rd quarter 2023.

Key project metrics

Table 7.40: Platinum Services Upgrade Works – Key project metrics

Metric	Value
Construction cost estimate	€ 1,956,942
Upgraded area (as per Level 3 costs)	878 m^2
Cost per square metre	2,396 €/m^2

Specifications review

Table 7.41: Platinum Services Upgrade Works – Specifications review

Subject	Comments
Effectiveness of scope	All project objectives will be met by the suggested scope in an effective way.
Alternative scopes	None identified.
Quality of specifications	Specs as shown in Level 3 costs provide sufficient detail for the concept stage.
Phasing and synergies with other projects	There are dependencies and possible synergies with other projects: • CIP.20.03.016 Terminal 1 - Rapid Exit Arrivals; – Press Suite will be refurbished and needs also to be modified by the rapid exit arrivals; BoH corridor of Platinum Services will be demolished; work should be carried out at the same time. • CIP.20.06.041 - Security Screening Equipment; – LAGS screening machines can be implemented after expansion of the screening area.
Existing asset conditions	Not identified.
Double counting	None identified.

7.77 The suggested scope for upgrade works of the Platinum Services will enable Dublin Airport to meet the defined project objectives in an effective and efficient way. All improvement will utilise the existing space without the need for structural expansions of the building.

Cost estimate review

Table 7.42: Platinum Services Upgrade Works – Level 1 Costs

	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 146,771	€ 146,771	€ 0
Construction Costs	€ 1,956,942	€ 1,956,942	€ 0
Escalation, Contingency & Design Variability	€ 0	€ 0	€ 0
Total	**€ 2,103,712**	**€ 2,103,712**	**€ 0**

Table 7.43: Platinum Services Upgrade Works – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	7%	€ 146,771	8%	€ 146,771
Total			**€ 146,771**		**€ 146,771**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fit out: Porch	120 m^2	€ 6,000	€ 720,948	€ 6,000	€ 720,948
Fit out: Press Suite	286 m^2	€ 1,400	€ 400,801	€ 1,400	€ 400,801
Fit out: Other	1	n/a	€ 835,193	n/a	€ 835,193
Total			**€ 1,956,942**		**€ 1,956,942**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability (Deemed included above)	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**

7.78 In response to our request to provide a build-up to the rate for the Porch, Dublin Airport has confirmed that the rate of [redacted] includes for the construction and fit out of the Porch. While the Level 3 estimate suggested that the rate was only for the fit out of the space, based on Dublin Airport's response, we consider that that rate is reasonable for the works to be undertaken.

7.79 There is inconsistency with how this project is presented compared to most others as the contingency and escalation is deemed to be included. We asked Dublin Airport to demonstrate where and how much has been included for the contractor's preliminaries. While Dublin Airport has confirmed that they have included 20% for preliminaries within the overall rate, they have not demonstrated this by providing a build-up to the rate.

7.80 The quantities for the various suites have been validated.

CIP.20.04.017 – Airline Lounges - Expansion, Upgrade & New

Introduction

Figure 7.12: Airline Lounges - Expansion, Upgrade & New

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.81 This project proposes several improvements to existing products, to add capacity with new lounge offerings in optimum locations and also an arrival product for long-haul passengers.

Scope

7.82 The scope for upgrades of the existing T2 and 51st&Green Lounges includes minor refreshments of the entire lounge areas. Additional capacities will be provided by introduction of the following new lounges at already defined locations: Pier 3 Lounge, T2 Level 35 Lounge, T2 Arrivals Lounge, Pier 1 Lounge. The project also provides allowance for a full fit out of the relocated new T1 Lounge.

Stage

7.83 The lounge projects will commence in Q4 2019 and be completed until Q4 2024. No specific milestones for planning, procurement and construction have been provided yet.

Key project metrics

Table 7.44: Airline Lounges - Expansion, Upgrade & New – Key project metrics

Metric	Value
Construction cost estimate	€ 8,200,000
Area for upgrade of 51st&Green Lounge and T2 Lounge	1,193 m^2 (875 m^2+ 318 m^2)
Cost per square meter for lounge upgrades	840 €/m^2
Area for relocated T1 Lounge fit out	805 m^2
Cost per square meter for relocated new T1 Lounge fit out	1,500 €/m^2

Metric	Value
Area for new lounges (Pier 3 Lounge, T2 Level 35 Lounge, T2 Arrivals Lounge, Pier 1 Lounge)	2000 m^2 (625 m^2 + 360 m^2 + 210 m^2 + 804 m^2)
Cost per square meter for new lounges	3,000 €/m^2

Specifications review

Table 2: Airline Lounges - Airline Lounges - Expansion, Upgrade & New – Specifications review

Subject	Comments
Effectiveness of scope	The defined objectives have been addressed by the lounge projects.
Alternative scopes	None identified.
Quality of specifications	• Level 3 costs and a breakdown of the specification of the works have not been provided.
Phasing and synergies with other projects	Information on phasing and project milestones for the lounge projects is not available. The new T1 Lounge fit out needs to be phased and aligned with other projects due to dependencies and possible synergies: • CIP.20.03.012 Terminal 1 Central Search - Relocation to Mezz Level; – T1 interim lounge will be built as part of this project; a new T1 Lounge can only be constructed after relocation of the CSA to mezzanine level. • CIP 20.03.013 – T1 Departure Lounge; – Core and shell for the new T1 Lounge are part of the IDL project; T1 lounge fit out needs to be aligned with that project.
Existing asset conditions	Dublin Airport states that the existing lounges are worn and need to be upgraded due to increased utilisation over recent years.
Double counting	None identified.

7.84 Overall the scope can be considered as efficient.

Cost estimate review

Table 7.45: Airline Lounges - Expansion, Upgrade & New – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 615,000	€ 613,145	-€ 1,855
Construction Costs	€ 8,200,000	€ 8,175,260	-€ 24,740
Escalation, Contingency & Design Variability	€ 2,575,214	€ 2,567,445	-€ 7,769
Total	**€ 11,390,214**	**€ 11,355,849**	**-€ 34,365**

Table 7.46: Airline Lounges - Expansion, Upgrade & New – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 615,000	8%	€ 613,145
Total			**€ 615,000**		**€ 613,145**

Construction Costs (C-C)	Quantity	Dublin Airport rate	Dublin Airport cost estimate	Steer rate	Steer cost estimate
Lounge upgrade	1	n/a	€ 2,200,000	€ 2,175,260	€ 2,175,260
Lounge Expansion	1	n/a	€ 6,000,000	€ 6,000,000	€ 6,000,000
Total			**€ 8,200,000**		**€ 8,175,260**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	29%	€ 2,575,214	29%	€ 2,567,445
Total			**€ 2,575,214**		**€ 2,567,445**

7.85 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.47: Airline Lounges - Expansion, Upgrade & New – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Kitchen and food prep	**Redacted Cost Information**			€ 4,000

7.86 The cost of the lounge upgrade works appears to be reasonable and in line with the outturn costs for airline lounge fit out projects that have data for. We did request that Dublin Airport provide build-up for the various rates that they included for the lounge works but this has not been provided. We would expect the cost of a new airline lounge to be in the region of €5,000 – 6,000/m^2 based on full fit out including the complete strip out of the existing lounges, new M&E services throughout, kitchen and catering, toilet and shower facilities. The fit out of the kitchen works is higher than we would expect, and we have reduced that rate accordingly. The quantities for this project have been validated.

CIP.20.04.018 – Fast Track Improvement

Introduction

Figure 7.13: Fast Track Improvement- Existing fast track

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.87 This project proposes augmenting the product and visual appearance of the existing departures fast track facility at central search areas as well as the extension of the product to arrivals by installation of new fast track lanes at immigration.

Scope

7.88 The upgrade to existing security fast track includes the introduction of a Barista bar at the end of the security lane with automatic drink selection, pre-screening, improvements of visual appearance as well as access control by alternative technology. Additionally, 2 arrivals fast tracks will be introduced to the immigration at both terminals (unspecific scope).

Stage

7.89 The Fast Track projects will commence in Q1 2020 and be completed until Q4 2024. No specific milestones for planning, procurement and construction have been provided yet.

Key project metrics

Table 7.48: Fast Track Improvement – Key project metrics

Metric	Value
Construction cost estimate	€ 1,500,000
Cost for existing fast tracks at security	€ 1,000,000
Cost for fast tracks arrivals	€ 500,000

Specifications review

Table 7.49: Fast Track Improvement – Specifications review

Subject	Comments
Effectiveness of scope	All project objectives will be met by the suggested scope. However, its effectiveness and efficiency cannot be fully

Subject	Comments
	assessed since details of the scope, especially for arrivals have not yet been specified.
Quality of specifications	Level 3 costs do not provide a breakdown of the specification of the works and only include lump sums for fast track upgrade and for fast track arrivals.
Phasing and synergies with other projects	Information on phasing and project milestones for the project is not available. Fast Track improvements should be phased and aligned with other projects due to dependencies and possible synergies: • CIP.20.03.011A Terminal 1 Check-In; – New fast track lanes will be installed behind the check-in islands; the upgrade project should be part of this project to be carried out in an efficient way. • CIP.20.03.021 Terminal 2 Central Search Area Expansion; – The fast track lane will be relocated and the overall queuing areas at central search be modified; the upgrade project should be part of this project to be carried out in an efficient way. • CIP.20.03.018 Terminal 1 - Immigration Hall; – The queuing area will be redesigned and hence the fast track project needs to be carried out at the same time; the Fast Track Arrivals could be part of this project to be carried out in an efficient way. • CIP.20.03.029 New Pier 5 (T2 and CBP Enabled); – The queuing area of immigration T2 will be affected by this project due to new arrival flows from Pier 5; the Fast Track Arrivals should be aligned with Pier 5.
Existing asset conditions	Existing fast tracks will be relocated/renewed.
Alternative scopes	Options for Fast Track Arrivals still need to be developed and evaluated.
Double counting	None identified.

7.90 The scope for Fast Track Arrivals has not been fully defined. Immigration areas will be redesigned as part of capacity projects CIP.20.03.018 and CIP.20.03.029 and therefore the project scopes need to be aligned.

7.91 A conclusion on the overall efficiency and effectiveness of the scope is therefore not possible at this stage.

Cost estimate review

Table 7.50: Fast Track Improvement – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 1,500,000	€ 1,500,000	€ 0
Escalation, Contingency & Design Variability	€ 185,400	€ 185,400	€ 0
Total	**€ 1,685,400**	**€ 1,685,400**	**€ 0**

Table 7.51: Fast Track Improvement – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fast track arrivals channel	1	n/a	€ 500,000	n/a	€ 500,000
Fast track product improvements	1	n/a	€ 1,000,000	n/a	€ 1,000,000
Total			**€ 1,500,000**		**€ 1,500,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	12%	€ 185,400	12%	€ 185,400
Total			**€ 185,400**		**€ 185,400**

7.92 There is inconsistency with how this project is presented compared to most others as the contingency and escalation is deemed to be included. In addition, while Dublin Airport has provided a revised Level 3 estimate with square meterage and rates, there is still very little information provided to assess. A breakdown of the rate [redacted] is required in order to fully understand what scope has been included within the estimate. It is still not clear the degree of works to be delivered and the provision for preliminaries and contingency within the Level 3 estimate. We will request further information from Dublin Airport regarding the breakdown of the rates and areas in order to fully validate this ahead of the final report.

CIP.20.04.021 – West Apron - Accommodation & Welfare Facilities

Introduction

7.93 Proposal for a new building to provide accommodation and welfare facilities for ground handling staff working on the West Apron.

Figure 7.14: West Apron - Accommodation & Welfare Facilities

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.94 The proposal objective is to deliver accommodation and welfare facilities to cater for the needs of an expected increase in ground handling staff associated with Cargo, Maintenance and Parking on the West Apron.

Context

7.95 The remote location of the West Apron means that it is isolated from the facilities provided in the rest of the airport.

7.96 The proposed site does not sit on the West Apron itself, instead it its positioned on the small Apron/Hangar campus to the north served by Taxiway Romeo. It is connected by a road link to the Apron.

Scope

7.97 The proposal includes:

- Construction of a 1,666m² accommodation and welfare facility; and
- Full fit out of half the internal space.

Stage

7.98 Early feasibility

Key project metrics

Table 7.52: West Apron - Accommodation & Welfare Facilities – Key project metrics

Metric	Value
Construction cost estimate	€ 3,531,920
Building Footprint	1,666 m^2
Cost	2,690 €/ m^2

Specifications review

Table 7.53: West Apron - Accommodation & Welfare Facilities – Specifications review

Subject	Comments
Effectiveness of scope	The project is at an early feasibility stage, and therefore the scope is limited in detail. However,despite the scope not being defined in detail, it is sufficient to see the intent of the proposal and suggests it would be effective.
Alternative scopes	A modular or easily adjusted building solution would be preferable given that the future projects (Apron 5M) etc. may significantly change the operation of the surrounding infrastructure within the design life of the building.
Quality of specifications	The specification is limited, but this is to be expected given the early feasibility stage of the proposal. Additionally, the specification moving towards construction is likely to be driven by the proposed tenants and their requirements.
Phasing and synergies with other projects	The proposed Apron 5M to be constructed to the east is stated as being provided initially for non-passenger services. In response to questions, Dublin Airport has confirmed that this facility will provide welfare services for this new apron.
Existing asset conditions	The existing location is only partially developed but does include buildings related to an existing Hangar.
Double counting	None identified.

7.99 While the scope is not defined in detail, it is sufficient to see the intent of the proposal and suggests it would be effective. The detail of the specification and the fit out of the building is likely to be further defined by the eventual tenants. The context of the surrounding infrastructure is likely to change within the lifetime of the asset and this should be considered in its design.

Cost estimate review

Table 7.54: West Apron - Accommodation & Welfare Facilities – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 455,590	€ 374,850	-€ 80,740
Construction Costs	€ 3,531,920	€ 2,998,800	-€ 533,120
Escalation, Contingency & Design Variability	€ 492,856	€ 416,983	-€ 75,873
Total	**€ 4,480,366**	**€ 3,790,633**	**-€ 689,733**

Table 7.55: West Apron - Accommodation & Welfare Facilities – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	13%	€ 455,590	13%	€ 374,850
Total			**€ 455,590**		**€ 374,850**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
General Allowance for Construction	1,666 m^2	€ 2,120	€ 3,531,920	€ 1,800	€ 2,998,800
Total			**€ 3,531,920**		**€ 2,998,800**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	12%	€ 492,856	12%	€ 416,983
Total			**€ 492,856**		**€ 416,983**

7.100 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.56: West Apron - Accommodation & Welfare Facilities – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
General Allowance for Construction	**Redacted Cost Information**			€ 1,800

7.101 There is insufficient information to allow a detailed analysis to be undertaken on this project. We asked Dublin Airport to provide a build-up to the rate so that we could understand what scope was included in the project, but they responded by stating that the rates were based on benchmark rates. Until such a build-up is provided we also cannot validate Dublin Airport's statement that preliminaries and contingency are included in the rates. We will pursue this with Dublin Airport in advance of the final report. However, the all up rate for the project is close to that for new office facilities rather than welfare accommodation, so we have reduced the rate for this item.

CIP.20.04.023 – Food & Beverage Provision & Fit out – Post CBP

Introduction

7.102 This project aims to provide a shell and core for the fitting out by a concessionaire of a new quality F&B outlet that enables an improved food offering for US bound passengers post CBP clearance. Existing underused apron accommodation will be converted to provide the space required.

Figure 7.15: Terminal 2 New Food and Beverage Provision and Fit Out

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.103 The project objective is to create more F&B space post CBP.

Scope

7.104 The scope of the project in planning terms meets the stated objectives.

Stage

7.105 Since this is a 'shell and core project' 12 months for completion of design is a long time, followed by Commencement of Construction 6 months later. The outlined procurement route, below, is straightforward but not very efficient for a relatively simple project:

- Feasibility/Outline design complete Q3 2020
- Detailed design complete Q3 2021
- Procurement compete Q1 2022
- Construction commence Q1 2022
- Project handover Q4 2022

7.106 We note that there is no date for a planning consent for internal terminal alterations; we have queried the fact that planning is required for similar internal alteration projects.

Key project metrics

Table 7.57: Terminal 2 New Food and Beverage Provision and Fit Out – Key project metrics

Metric	Value
Construction cost estimate	€ 2,478,000
Dublin Airport Estimate	Level 3 cost estimate included in CIP 2020 Final
Cost per square metre	Various rates provided
Floor area provided	700 m^2

Specifications review

Table 7.58: Terminal 2 New Food and Beverage Provision and Fit Out - Specifications review

Subject	Comments
Effectiveness of scope	Although there is a lack of planning detail, the scope of the project is efficient.
Alternative scopes	No evidence of consideration of options or alternative scopes identified on the basis of location of suitable space or, existing contracts nearing maturity.
Quality of specifications	Specifications provided in Level 3 costs/CIP description provide enough detail for outline design stage.
Phasing and synergies with other projects	No other projects dependant, other than the capacity increases proposed for T2/Pier 5
Scope and specifications account for asset conditions and residual life?	The asset life is stated as 20 years which is reasonable given the remaining asset life of T2 is 40 years, however, Retail and F&B trends may well dictate that a shorter asset life is acceptable, nearer 10 years.
Double counting	None identified.

7.107 In spite of the lack of planning detail, the scope of the project is efficient.

Cost estimate review

Table 7.59: Terminal 2 New Food and Beverage Provision and Fit Out - Post CBP – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 185,850	€ 78,750	-€ 107,100
Construction Costs	€ 2,478,000	€ 1,050,000	-€ 1,428,000
Escalation, Contingency & Design Variability	€ 552,749	€ 234,216	-€ 318,533
Total	**€ 3,216,599**	**€ 1,362,966**	**-€ 1,853,633**

Table 7.60: Terminal 2 New Food and Beverage Provision and Fit Out - Post CBP – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 185,850	8%	€ 78,750
Total			**€ 185,850**		**€ 78,750**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Gen. Fittings Furnishings and Equipment	700	€ 3,540	€ 2,478,000	€ 1,500	€ 1,050,000
Total			**€ 2,478,000**		**€ 1,050,000**

Escalation, Contingency & Design Variability	Quantity	% of Dublin Airport DM-C + C-C	Dublin Airport cost estimate	% of Steer DM-C + C-C	Steer cost estimate
Escalation, Contingency & Design Variability	n/a	21%	€ 552,749	21%	€ 234,216
Total			**€ 552,749**		**€ 234,216**

7.108 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.61: Terminal 2 New Food and Beverage Provision and Fit Out - Post CBP – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Gen. Fittings Furnishings and Equipment	**Redacted Cost Information**			€ 1,500

7.109 We would expect that Dublin Airport would only be liable for the shell and core costs associated with this project. The fit out of the food and beverage offerings would be paid for by the concessionaire. In response to our request for a build-up to the rate of [redacted], Dublin Airport has advised that the rate is based on benchmark rates. They stated that this rate is for the construction of shell & core space for the food and beverage area. We consider that this rate is too high for the works required and we have reduced it accordingly. The quantities for this project have not been validated as no design information has been provided for review. We will request further information regarding the quantities and will update our analysis for the final report.

CIP.20.04.025 – Commercial Property Refurbishment

Introduction

7.110 This 'project' is not a specific building refurbishment, but provision of funds to spend on the upgrading of commercial property as needed when a new tenant(s) has been identified. A cost per m^2 rate has been identified and a total budget of €8.0m.

Figure 7.16: Commercial Property Refurbishment

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.111 The objective is to have in place approved funds for commercial property refurbishment. This 'project' does not identify any particular building or facility, merely to recognise the increasing demand for good quality commercial property in a campus where many of the buildings may require refurbishment.

Context

7.112 The proportion of facilities that this project targets is:

- Hangars MRO 52%;
- Catering and Cargo 24%;
- Offices 17%; and
- Stores 7%.

7.113 The refurbishments within the scope of this project are typically required 'immediately' when a commercial operator has agreed lease terms. This fact alone will attract a higher cost from a contractor asked to perform 'tomorrow' and complete in a short time.

Scope

7.114 The scope of the project cannot be defined in specific building refurbishments terms as they are not known at the time of this report. Given that a nominal €8.0m has been allocated and a rate for refurbishment of €2,000/m^2 this will allow for circa 4,000m^2 of commercial space to be upgraded.

7.115 A commercial building asset register that identifies each building, its age, last refurbishment, current occupiers, length of current lease, anticipated age-related upcoming refurbishment and anticipated tenant demand, would be helpful to enable some forward planning to be outlined.

7.116 It is noted that there is no reference to airfield maintenance buildings, or airport equipment/maintenance buildings.

Stage

7.117 The stage as stated refurbishments within this project respond to tenant demand and at the time of writing this report specific tenants had not been identified. However, the period of spend is 2020 – 2024.

Key project metrics

Table 7.62: Commercial Property Refurbishment - Key project metrics

Metric	Value
Construction cost estimate	€ 6,000,000
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 Final
Cost per square metre	€ 2,000

Specifications review

Table 7.63: Commercial Property Refurbishment - Specifications review

Subject	Comments
Effectiveness of scope	Because of the varied nature of the refurbishments anticipated in this project it is not possible comment on the scope of individual projects, but the overall scope is effective for budget purposes.
Alternative scopes	Not relevant.
Quality of specifications	Insufficient information provided to comment on the quality as each refurbishment will be different, but the overall specification is adequate.
Phasing and synergies with other projects	It is assumed that each refurbishment will be a standalone project and phased to minimise disruption to adjoining tenants.
Scope and specifications account for asset conditions and residual life?	The residual life is 7 years and presumably assessed on the basis of the average lease term.
Double counting	None identified.

7.118 The allocated capex of €8.0m could be more accurately justified with a property condition audit, however, given the nature of this project, i.e. it is nonspecific, it is efficient for setting a budget.

Cost estimate review

Table 7.64: Commercial Property Refurbishment – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 450,000	€ 337,500	-€ 112,500
Construction Costs	€ 6,000,000	€ 4,500,000	-€ 1,500,000
Escalation, Contingency & Design Variability	€ 1,521,942	€ 1,141,457	-€ 380,486
Total	**€ 7,971,942**	**€ 5,978,957**	**-€ 1,992,986**

Table 7.65: Commercial Property Refurbishment – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 450,000	8%	€ 337,500
Total			**€ 450,000**		**€ 337,500**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Gen. Fittings Furnishings and Equipment	3000 m^2	€ 2,000	€ 6,000,000	€ 1,500	€ 4,500,000
Total			**€ 6,000,000**		**€ 4,500,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	24%	€ 1,521,942	24%	€ 1,141,457
Total			**€ 1,521,942**		**€ 1,141,457**

7.119 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.66: Commercial Property Refurbishment – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Gen. Fittings Furnishings and Equipment	**Redacted Cost Information**			€ 1,500

7.120 Our assessment is that the rate of [redacted] for the refurbishment of the office space is too high. We asked Dublin Airport to provide a build-up to the rate, but none was provided and their response to our query merely stated that the rate was for the works set out in the project sheet. As a result, we have also been unable to validate Dublin Airport's position that preliminaries are deemed to be included in the overall rate. The CIP documents indicates that refurbishment works will only include limited mechanical and electrical services and this reinforces our view that the rate is too high, so it has been reduced accordingly.

CIP.20.04.030 – New Kitchen in Terminal 2

Introduction

7.121 This project is intended to provide a new kitchen in T2 so that Dublin Airport can provide a flagship F&B offering in this terminal. Currently Dublin Airport state that the kitchens already located in the Slaney Bar and Chocolate Lounge are inadequate for this purpose.

Figure 7.17: New Kitchen in Terminal 2

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.122 The objective is to provide a new shell and core for a Concessionaire fit out of a new kitchen for a new F&B offer occupying the space currently occupied by the Slaney Bar and Chocolate Lounge.

Scope

7.123 The scope of the project in planning terms meets the stated objectives. The scope includes stripping out the existing Slaney Bar and Chocolate Lounge as well as the toilets and re-locating them (toilets) elsewhere (location not identified).

Stage

7.124 The project stage is currently at initial feasibility determining location, overall floor area and high-level costs. Detailed Design is scheduled to be complete Q2 2020 and the project handed over in Q2 2021. The outlined procurement route (below) is efficient and straightforward, however it is not completely evident when the tenant fitting out takes place.

- Feasibility/Outline design complete Q1 2020
- Detailed design complete Q2 2020
- Procurement compete Q3 2020
- Construction commence Q1 2021
- Project handover Q2 2021

Key project metrics

Table 7.67: Terminal 2 New Kitchen - Key project metrics

Metric	Value
Construction cost estimate	€ 1,982,152
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 Final
Cost per square metre	Various rates provided
Floor area provided	Not stated

Specifications review

Table 7.68: Terminal 2 New Kitchen - Specifications review

Subject	Comments
Effectiveness of scope	Although there is a lack of planning detail for this high level project, the scope is efficient.
Alternative scopes	None identified
Quality of specifications	Specifications provided in Level 3 costs/CIP description provide enough detail for outline design stage.
Phasing and synergies with other projects	None identified.
Scope and specifications account for asset conditions and residual life?	The asset life is stated as 20 years which is reasonable given the remaining asset life of T2 is 40 years, however F&B trends may well dictate that a shorter asset life is acceptable, nearer 10 years.
Double counting	None identified.

7.125 In spite of the lack of planning detail for a high-level project, the scope is efficient.

Cost estimate review

Table 7.69: Terminal 2 New Kitchen – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 356,787	€ 268,598	-€ 88,190
Construction Costs	€ 1,982,152	€ 1,492,210	-€ 489,942
Escalation, Contingency & Design Variability	€ 683,298	€ 514,402	-€ 168,895
Total	**€ 3,022,237**	**€ 2,275,210**	**-€ 747,027**

Table 7.70: Terminal 2 New Kitchen – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	12%	€ 356,787	18%	€ 268,598
Total			**€ 356,787**		**€ 268,598**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Gen. Fittings Furnishings and Equipment	1144 m^2	€ 1,733	€ 1,982,152	€ 1,492,210	€ 1,492,210
Total			**€ 1,982,152**		**€ 1,492,210**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	23%	€ 683,298	29%	€ 514,402
Total			**€ 683,298**		**€ 514,402**

7.126 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.71: Terminal 2 New Kitchen – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Strip out of existing Slaney Bar Area, Existing Kitchen and Toilets including services to return area to Shell & Core Finish ready for future tenant fit out	**Redacted Cost Information**			€ 250

7.127 The cost of the strip out works is high and despite the location of the area in question, we would expect that this cost should be a lot lower than is currently stated. We note that the Level 3 description refers to returning the area to shell and core. Our rate is higher than a basic strip out rate in acknowledgement of this fact. We asked Dublin Airport to provide a build-up to the rate of [redacted], but they have not provided one and have only advised that the rate is based on a benchmark rate.

7.128 We have been unable to validate the quantities included in the Level 3 estimate as no drawings have been provided for this project. We will request further information from Dublin Airport to validate these quantities ahead of the final report.

CIP.20.07.010 – Office Consolidation & Refurbishment (Level 4 & 5 Terminal 1)

Introduction

7.129 This project is for the refurbishment of floor levels 4 and 5 in T1, formerly used as car parking, to create office accommodation. The project also includes minor refurbishment of Cargo 6 prior to letting.

Figure 7.18: Office Consolidation & Refurbishment (Level 4 & 5 Terminal 1)

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.130 The objective is to create more office space for Dublin Airport management employees to be located in a consolidated position i.e. T1.

Context

7.131 One driver for this project is the airport capacity development projects requiring the demolition of existing buildings (e.g. Cargo 1 and the North Terminal) currently partially, or, fully occupied by Dublin Airport management/front line staff.

7.132 Because of the amount of space available on level 4 and 5 that can be upgraded into office accommodation it enables Dublin Airport to double the office space currently in use in T1. This will enable Dublin Airport to move staff from Cloghran House and Cargo 6 into T1 and release this accommodation for commercial letting.

Scope

7.133 The scope of the project i.e. the floor area being refurbished is stated as 10,100m^2.

Stage

7.134 The project stage is currently at Feasibility stage with the period of spend from Q4 2020 – Q1 2023. The outlined procurement route (below) is quite generous for a relatively simple project. 9 months for Design followed by 9 months for Procurement is not efficient. The completion date is 6 months after the commencement of Pier 1 Module 1 project which requires the demolition of Cargo 1 and North Terminal, so that the occupants of these 2

buildings scheduled to move to the new refurbished offices on Level 4 and 5, will require temporary accommodation unless the program can be revised.

- Feasibility/Outline design complete Q4 2020
- Planning complete Q1 2022
- Design complete Q3 2021
- Procurement complete Q2 2022
- Construction complete Q1 2023

Key project metrics

Table 7.72: Office Consolidation & Refurbishment (Level 4 & 5 Terminal 1) – Key project metrics

Metric	Value
Construction cost estimate	€ 10,802,052
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 Final
Cost per square metre	Various rates provided
Floor area to be provided	10,100m^2 (Note the cost estimate refers to an area of 6,583m^2)

Specifications review

Table 7.73: Office Consolidation & Refurbishment (Level 4 & 5 Terminal 1) - Specifications review

Subject	Comments
Efficiency of scope	Despite the high level nature of the information due to the early stage of the project, he scope appears to provide an effective solution.
Alternative scopes	None identified.
Quality of specifications	Insufficient information provided to comment on the quality of specification. Level 3 generic information provided, but the floor areas and wall areas are all the same. There is no cost reference to the minor refurbishment of Cargo 6.
Phasing and synergies with other projects	Refurbishment work needs to be co-ordinated with the other renewal projects to avoid on site clashes and inefficient working: 20 01 020 Terminal 1 Façade, Roof and Spirals 20 01 022 T1 Storm Water Drainage System 20 01 023 Piers & Terminals critical Maintenance.
Scope and specifications account for asset conditions and residual life?	T1 is nearly 50 years old; refurbishment of space for office use with a 25-year asset life will ensure the residual life of T1. Extending the life of T1 beyond 70 years needs to be addressed in the light of the long-term masterplans.
Double counting	None identified, but similarity of floor and wall areas in m^2 raises the question of what has actually been measured.

7.135 The scope delivers a consolidated office space for Dublin Airport staff, utilising former car park space in T1 and appears to be an effective solution.

Cost estimate review

Table 7.74: Office Consolidation & Refurbishment (Level 4 & 5 Terminal 1) – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 1,620,308	€ 1,280,819	-€ 339,489
Construction Costs	€ 10,802,052	€ 8,538,793	-€ 2,263,259
Escalation, Contingency & Design Variability	€ 2,577,640	€ 2,037,570	-€ 540,070
Total	**€ 15,000,000**	**€ 11,857,182**	**-€ 3,142,818**

Table 7.75: Office Consolidation & Refurbishment (Level 4 & 5 Terminal 1) – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	11%	€ 1,620,308	15%	€ 1,280,819
Total			**€ 1,620,308**		**€ 1,280,819**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Superstructure	6,583 m^2	€ 41	€ 271,013	€ 41	€ 271,013
Internal Finishes	6,583 m^2	€ 349	€ 2,299,560	€ 259	€ 1,704,609
Fittings/furnishing and equipment	6,583 m^2	€ 120	€ 788,814	€ 120	€ 788,814
Services	6,583 m^2	€ 917	€ 6,033,703	€ 708	€ 4,660,603
Prelims	1	n/a	€ 1,408,963	n/a	€ 1,113,756
Total			**€ 10,802,052**		**€ 8,538,793**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	17%	€ 2,577,640	21%	€ 2,037,570
Total			**€ 2,577,640**		**€ 2,037,570**

7.136 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 7.76: Office Consolidation & Refurbishment (Level 4 & 5 Terminal 1) – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Power Installation	**Redacted Cost Information**			€ 300
Central Heating & Cooling				€ 375
Finishes to Ceilings				€ 75
Painting & Decorating				€ 20

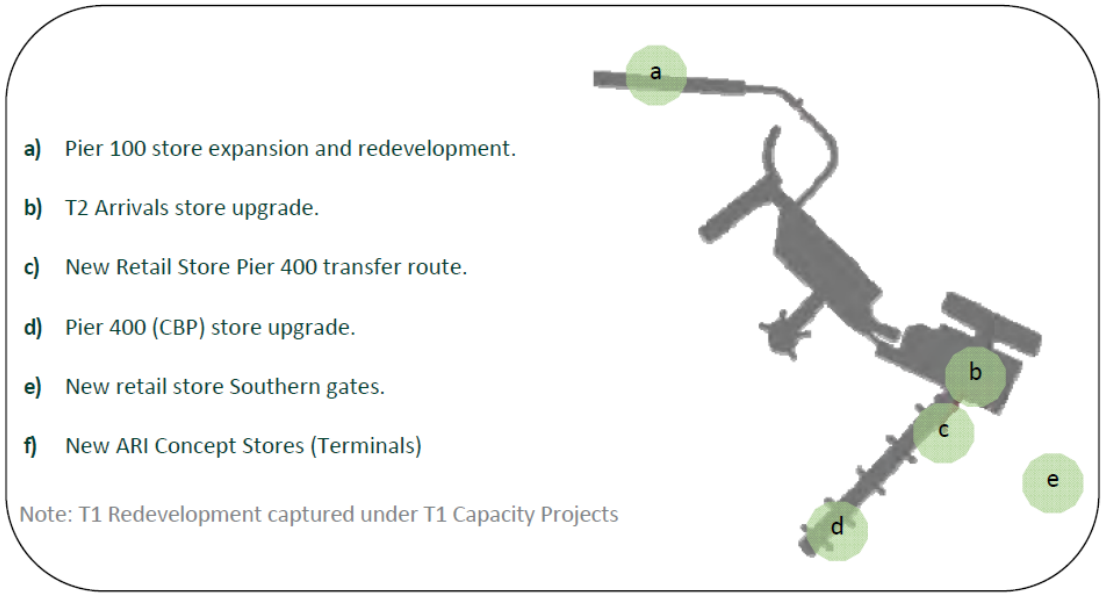
7.137 The costs for ceiling finishes, decoration and mechanical and electrical services are all higher than we would expect for work of this nature and we have reduced our rates for these items. The floor finishes item also appears to be very high and we would expect the cost of this item could potentially be reduced. However, this is dependent on the type of floor finishes to be installed. We would expect this to be a carpet finish in which case the rate would reduce to between €30 - €40/m^2. Due to the lack of clarity on specification we have not reduced the floor finishes rate. We have not validated the quantities contained in the Level 3 estimate as no drawings have been provided for this project. We will continue to work with Dublin Airport to gain sufficient information to validate these quantities ahead of the final report.

CIP.20.08.001 – Retail Refurbishments, Upgrades and New Developments

Introduction

7.138 This project is for the expansion and upgrade, or, new retail outlets in piers 1 and 4, arrivals outlet in T2 and gate outlet in the South PBZ, in addition to new ARI concept stores in the terminals.

Figure 7.19: Retail Refurbishments, Upgrades and New Developments



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.139 The project objective is to provide targeted retail outlets positioned in the passenger circulation routes, including locations closer to the gates, arrivals retail upgrade and an outlet in Pier 4 transfer route as well as ARI's (Aer Rianta International) new concept stores.

Scope

7.140 The scope of the project identifies specific locations for the new/enlarged outlets (please refer above) but gives no detail of the nature/plan size of the outline design for each of the outlets identified.

Stage

7.141 The project stage is currently at initial concept stage locating which outlets to be upgraded or new outlets to be provided. The period of spend is Q1 2020 – Q4 2024. The procurement route is not stated, other than completion between Q1 2020 and Q4 2024.

Key project metrics

Table 7.77: Retail Refurbishments, Upgrades and New Developments - Key project metrics

Metric	Value
Construction cost estimate	€ 8,000,000
Dublin Airport estimate	Level 3 cost estimate provided. It is not clear if the costs cover full fit out or shell and core only.

Metric	Value
Cost per square metre	Various rates provided.
Store locations	Pier 1 store expansion and redevelopment T2 Arrivals store upgrade Pier 4 new store in transfer route Pier 4 CBP store upgrade PBZ S gates new store Various new ARI concept stores.

Specifications review

Table 7.78: Retail Refurbishments, Upgrades and New Developments - Specifications review

Subject	Comments
Effectiveness of scope	Insufficient information provided to comment on the scope for each retail outlet listed above. The location and extent of the ARI concept stores unclear.
Alternative scopes	None identified
Quality of specifications	Specifications provided lack sufficient detail to properly assess the scope.
Phasing and synergies with other projects	It is assumed that each retail outlet will be a standalone project and phased to minimise disruption to passengers.
Scope and specifications account for asset conditions and residual life?	The residual life is 5 years and assessed on the basis of current retail trends in the industry.
Double counting	None identified.

7.142 The project is a mixture of expanding existing pier outlets, creating new outlets and providing new ARI concept stores; it is not clear where the new ARI concept stores are to be located, or what size they are.

7.143 To establish if this project is efficient, it would be useful to see more specific plans of all the proposed outlets and to have greater clarity of the design/procurement/fitting out program.

Cost estimate review

Table 7.79: Retail Refurbishments, Upgrades and New Developments – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 8,000,000	€ 8,000,000	€ 0
Escalation, Contingency & Design Variability	€ 0	€ 0	€ 0
Total	**€ 8,000,000**	**€ 8,000,000**	**€ 0**

Table 7.80: Retail Refurbishments, Upgrades and New Developments – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
Design & Management Costs (Deemed included below)	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Pier 100	1	n/a	€ 347,090	n/a	€ 346,090
T2 Arrivals Store	1	n/a	€ 151,890	n/a	€ 151,890
Pier 400	1	n/a	€ 335,622	n/a	€ 335,430
CBP	1	n/a	€ 217,160	n/a	€ 217,160
South Gates	1	n/a	€ 156,770	n/a	€ 156,770
Operational Contingency	1	n/a	€ 1,250,000	n/a	€ 1,250,000
Logistic Infrastructure	1	n/a	€ 140,340	n/a	€ 140,340
50/50 cost share vendor installations	1	n/a	€ 1,044,800	n/a	€ 1,044,800
Concept Stores	1	n/a	€ 4,356,328	n/a	€ 4,357,520
Total			**€ 8,000,000**		**€ 8,000,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability (Deemed included above)	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**

7.144 While the Level 3 estimate contains a lengthy list of items that are part of the estimate, there is insufficient detail within the CIP document to be able to understand what most of these items actually relate to. We asked to Dublin Airport to provide more detailed explanation of the items within the estimate and while some further information was provided, it was not sufficient to allow a detailed analysis to be undertaken. Dublin Airport has not provided a build-up to the [redacted] rate that is included in the Level 3 estimate but has said that it is based on benchmark rates. Due to the lack of build-up we are not able to comment on the validity of the rate. Dublin Airport has stated that the 50% vendor funding items are for the construction and fit out of new high end shops where the vendor will contribute 50% of the funding. We would expect that the retailer would pay for the cost of the fit out and that the airport would pay for the cost of providing the shell and core works required to facilitate the fit out works.

7.145 There are items in the Level 3 estimate that have been quantified but no drawing information has been provided so we have been unable to validate any of the quantities.

7.146 No specific allowance has been included for design and management costs although the Level 3 estimates does include various sums for consultants. The estimate also excludes provision for contingency and escalation. As Dublin Airport has not provided a build-up to the rates included in the Level 3 estimate we cannot validate whether or not there is provision included in the costs for this.

7.147 We will continue to work with Dublin Airport to gain sufficient quantity and rate information to allow us to conclude our analysis prior to the final report.

CIP.20.08.002 – Retail Marketing and Media Installation

Introduction

7.148 This project is to provide screens for digital retail marketing alongside media and flight information.

Figure 7.20: Retail Marketing and Media Installation

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

7.149 Dublin Airport state that the project objective is to improve the revenue per passenger from the retail outlets.

Scope

7.150 The scope of the project covers:

- Mixed media screens in T1 re-development; and
- Mixed media screens in T1 and T2 piers.

However, it is not clear where the screens are to be located and how many are required apart from a site in T2 (location unclear).

Stage

7.151 The period of spend is Q1 2020 – Q4 2024 but specific projects have not been identified within this time frame.

Key project metrics

Table 7.81: Retail Marketing and Media Installation - Key project metrics

Metric	Value
Construction cost estimate	€ 1,500,000
Dublin Airport estimate	Level 3 cost estimate included in CIP 2020 Final
Cost per square metre	Not applicable

Specifications review

Table 7.82: Retail Marketing and Media Installation - Specifications review

Subject	Comments
Efficiency of scope	We cannot yet fully determine whether the scope is efficient as there is insufficient information provided.
Alternative scopes	Not relevant.
Quality of specifications	There is no specification apart from one site in T2 where the screen locations and size are identified. For the other sites there is insufficient information.
Phasing and synergies with other projects	It is assumed that each installation will be a standalone project and phased to minimise disruption to passengers.
Scope and specifications account for asset conditions and residual life?	The residual life is 5 years and assessed on the basis of current media trends in the industry.
Double counting	None identified.

7.152 We cannot yet fully determine whether the scope is efficient as there is insufficient information provided.

Cost estimate review

Table 7.83: Retail Marketing and Media Installation – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 1,500,000	€ 1,500,000	€ 0
Escalation, Contingency & Design Variability	€ 0	€ 0	€ 0
Total	**€ 1,500,000**	**€ 1,500,000**	**€ 0**

Table 7.84 : Retail Marketing and Media Installation – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
Design & Management Costs (Deemed included below)	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Marketing & Media	1	n/a	€ 1,500,000	n/a	€ 1,500,000
Total			**€ 1,500,000**		**€ 1,500,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability (Deemed included above)	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**

7.153 The costs included in the Level 3 estimate are all lump sum allowances. Dublin Airport has responded to our request to provide a build-up to the lump sums included in the level 3 estimate by providing an area (3,265m2) and a rate [redacted] for the T1, T2 MTB & Piers item worth [redacted]. Dublin Airport has also provided a supplier quote for a smaller project in T2 that equated to a rate of [redacted]. On that basis, the rate for the T1, T2 MTB & Piers appears

to be reasonable. However, we have no means of validating the area of 3,265m2 or the other lump sums included in the level 3 estimate. In addition, there is no provision within the cost estimate for design and management costs, contingency and escalation. We have not been able to validate whether these costs are included elsewhere in the estimate.

7.154 We will request further information from Dublin Airport to validate the area and other lump sums ahead of the final report.

8 Project Reviews – CIP2020 Appendix E - IT

Summary

Table 8.1: Appendix E - IT – Summary

CIP Number	Project Title	RAG Costs	Dublin Airport cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)
CIP.20.05.001	Airfield Optimization	-5.1%	5.9	5.6	-0.3
CIP.20.05.002	Digital Passenger Experience	0.0%	1.8	1.8	0.0
CIP.20.05.003	Integrations and Data	0.0%	5.1	5.1	0.0
CIP.20.05.004	Baggage Systems	0.0%	1.3	1.3	0.0
CIP.20.05.005	Business Efficiency	0.0%	6.2	6.2	0.0
CIP.20.05.006	Commercial Systems	0.0%	2.3	2.3	0.0
CIP.20.05.007	Reliability, Safety, Security & Compliance	0.0%	8.2	8.2	0.0
CIP.20.05.008	Operational Devices (Support & Maintenance)	0.0%	1.8	1.8	0.0
CIP.20.05.009	Network Components - Lifecycle & Growth	-1.2%	6.9	6.8	-0.1
CIP.20.05.010	Passenger Processing (excl. Security Screening)	0.0%	11.0	11.0	0.0
CIP.20.05.011	Security Technology Innovation (Biometrics & FOD Detection)	0.0%	5.0	5.0	0.0
CIP.20.05.012	Servers and Storage - Lifecycle & Growth	0.0%	5.6	5.6	0.0
CIP.20.05.014	User Devices (Desktops, Mobile, Telephone, Radio)	0.0%	3.7	3.7	0.0
CIP.20.05.015	New Data Centre Hosting Location	0.0%	4.0	4.0	0.0
CIP.20.05.016	Microsoft Enterprise	0.0%	6.0	6.0	0.0
CIP.20.05.020	Innovation Fund	0.0%	4.0	4.0	0.0
Total		**-0.5%**	**78.6**	**78.2**	**-0.4**

8.1 The IT capex proposals total €78.2m for the CIP2020.

8.2 In the case of two projects, we have identified rates that are higher than we would expect. We have therefore reduced the rate for AODB, AVD and AVDGS upgrades from €700,000 to €400,000 in project 20.05.001, and for access switches in project 20.05.009 from €1,700,000 to €1,625,000.

8.3 Other than these two items, the projects within the IT section have proven difficult to assess in their totality as a result of several costings not being split out into detail, and comparator benchmarks not proving to be robust.

8.4 The project analyses in this section appraise the projects as they currently stand, assessing their ability to meet the objective. However, it has proven difficult to assess the costings, given that many of the costs have yet to be split out into constituent elements, and comparator benchmarks are not suitable to assess the level of spend either.

8.5 Another approach, therefore, is to sense check the overall IT spend in its totality in two ways:

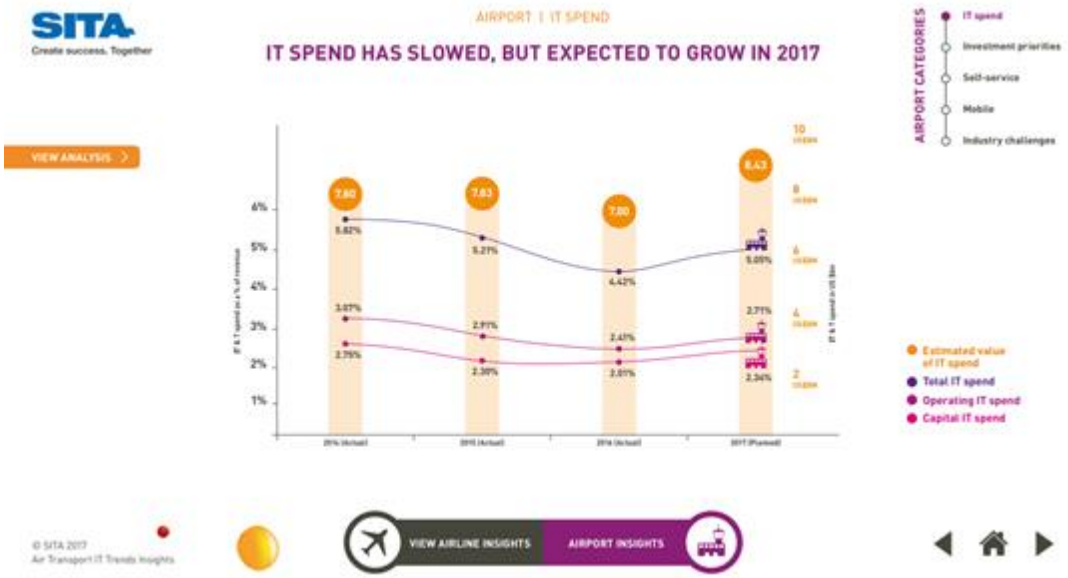
- IT Capex as a proportion of total revenue; and
- IT Capex as a proportion of total capex.

IT Capex as a proportion of revenue

8.6 IT Capex as a percentage of total revenue is a robust metric to use, as it takes account of the airport size, and is not influenced by other capital projects in the CIP.

8.7 Intelligence sourced from a SITA presentation (2017) estimates IT capex to be 2.34% of total airport revenues, as per figure 8.1 below.

Figure 8.1: IT expenditure as a percentage of airport revenues



8.8 Revenue for 2018 has yet to be published for Dublin Airport. Revenue in 2017 was €564m, on a base of 29.6m passengers, so a prorate revenue estimate for 2018 (31.5m passengers) would increase total revenue to about €600m.

8.9 An annual IT capex of €15.8m (78.6 split equally into 5 years), would therefore equate to 2.4% of total revenue, using 2018 as a benchmark for revenue, putting it close to the figure that SITA quoted in its 2017 report.

IT capex as a proportion of total capex

8.10 The total planned CIP investment is €1,802.7 million and the IT capital project envelope is €78.6million. This amounts to 4.36% of the total investment programme at Dublin which would be very reasonable and possibly a little low in comparison to other airport capital projects.

8.11 The most recent information we have for comparison is London Heathrow Terminal 2 (Queens building).

8.12 The table suggests that Dublin's IT capex proposals, as a percentage of overall capex, are lower than the Heathrow capex.

Table 8.2: Heathrow T2 vs Dublin CIP IT and Total Capex

Project	Overall Capex	IT Capex	IT as % of total
Dublin CIP2020	€1,803 million	€78 million	4.37%
Terminal 2 LHR (2013)	£2,500 million	£183 million	7.32%

8.13 A report produced by Frost and Sullivan in 2017 estimates that IT budgets make up 6-9% of total 'investment' for airports. It is unclear whether this is based simply on capex, or includes Opex as well, but on the basis that it is just the former, then the IT capex at Dublin would appear to be conservative.

8.14 However, this is clearly largely dependent on the make-up of the remainder of the Capex programme, which can of course vary significantly, depending on the degree of capacity projects and asset maintenance that is planned.

Conclusion

8.15 Based on these two methods of assessing the IT capex in its totality, with IT capex as a proportion of total capex, and of total revenue being in line with other benchmarks and industry averages, this would indicate that Dublin Airport is being quite efficient in the IT capex spend proposals, building on the investment in the previous CIP and introducing IT systems that are intended to improve the operating efficiency and effectiveness at the airport.

9 Project Reviews – CIP2020 Appendix F - Security

Summary

Table 9.1: Appendix F - Security – Summary

CIP Number	Project Title	RAG Costs	Dublin Airport cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)
CIP.20.06.001	Cabin-Baggage X-ray Replacement & EDS Upgrade	15.0%	14.6	16.8	2.2
CIP.20.06.007	Full Body Scanners	-9.7%	1.9	1.8	-0.2
CIP.20.06.009	ATRS – Additional Lane in Terminal 1	-7.5%	0.6	0.5	0.0
CIP.20.06.014	Screening and Logistics Centre	-1.1%	13.4	13.3	-0.1
CIP.20.06.015	Intrusion Detection Systems for Dublin Airport Boundaries	0.0%	4.0	4.0	0.0
CIP.20.06.016	Surface Road Blockers & Temporary Mobile Barriers	0.0%	1.0	1.0	0.0
CIP.20.06.022	Redevelopment of Training Facility (ASTO)	0.0%	1.2	1.2	0.0
CIP.20.06.025	Detection: Explosive Detection Dogs (EDD) and Mobile X Ray Unit	0.0%	0.2	0.2	0.0
CIP.20.06.030	VCP Automation to Enable Remote Screening	0.0%	0.7	0.7	0.0
CIP.20.06.031	Autopass - T1 Replacement & T2 Install	0.0%	1.8	1.8	0.0
CIP.20.06.036	TSA - X-ray & FBSS Replacement	6.7%	0.4	0.4	0.0
CIP.20.06.041	Security Screening Equipment - End of Life	0.0%	4.5	4.5	0.0
CIP.20.06.042	ATRS - Central Search Areas (T1 and T2)	-6.0%	11.7	11.0	-0.7
CIP.20.06.044	Replacement of T1 Controllers for Access Control System	0.0%	0.5	0.5	0.0
Total		2.0%	**56.4**	**57.5**	**1.1**

9.1 Overall our estimates for the projects in the Security envelope suggest that there may be a potential increase of €1.1m.

9.2 Individual reports for the projects in this Appendix are presented below.

CIP.20.06.001 – Cabin-Baggage X-Ray Replacement & EDS Upgrade

Introduction

Figure 9.1: Cabin-Baggage X-ray Replacement & EDS Upgrade - Security checkpoint

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.3 This project proposes a phased replacement of all existing single-view X-ray systems with Explosive Detection System (EDS) equipment in all search areas.

Context

9.4 It is stated that the existing single view X-ray systems will reach end-of-life during the 2020-2024 CIP period. It is a 20-year-old technology with minimum detection capabilities and no upgrade path to EDS. The new equipment provides improved throughput and efficiency.

Scope

9.5 The existing 53 X-ray systems will be replaced by standard C3 EDS equipment within the CIP period in 3 Phases: Phase 1- 15 in T1 (13 active + 2 redundant); Phase 2 -12 in T2 (10 active + 2 redundant) and Phase 3 – 20 in other area (3 transfer, 1 Platinum Service, 1 Pier 1 3rd State flights, 4 staff entries in terminals, 9 VCPs, 1 airfield maintenance base, 1 fire station).

Stage

9.6 Project stage is currently at concept level with feasibility/ requirements complete in Q3 2021 and project completion in Q4 2024.

Key project metrics

Table 9.2: Cabin-Baggage X-ray Replacement & EDS Upgrade – Key project metrics

Metric	Value
Equipment cost	€ 13,307,150
EDS equipment T1 (CSA + other)	19
EDS equipment T2 (CSA + other)	17
EDS equipment VCP and other	11

Specifications review

Table 9.3: Cabin-Baggage X-ray Replacement & EDS Upgrade – Specifications review

Subject	Comments
Effectiveness of scope	All project objectives will be met by the suggested scope in an effective way. Only C3 standard EDS machines would significantly reduce the number of trays per passenger to be screened and hence the throughput due to the fact that electronics and LAGs can remain inside the bags.
Alternative scopes	There is no alternative to C3 standard machines for T1 and T2 CSAs since C2 (LAGs cannot be left inside bags) will not fulfil the desired increase in efficiency/throughput. For other checkpoints (VCPs, Platinum Service, staff, etc.) C1 or C2 standard equipment could be sufficient and therefore needs to be evaluated by Dublin Airport as an alternative to reduce costs.
Quality of specifications	Level 3 costs provide a reasonably detailed breakdown of the specification of the works.
Phasing and synergies with other projects	Rollout of new EDS equipment needs to be phased and aligned with other projects due to dependencies and possible synergies: • CIP.20.03.012 Terminal 1 Central Search - Relocation to Mezz Level: – New EDS equipment to be installed at the same time to reach the desired throughput at new central search. – Rollout T1 (Phase 1) is currently planned for Q2 2024; while T1 CSA is complete in Q4 2021 (EDS equipment needs to be provided earlier); and – Old lanes incl. X-rays can only be closed after opening of new relocated lanes. • CIP.20.03.021 Terminal 2 Central Search Area Expansion: – New EDS equipment to be installed at the same time to reach the desired throughput at expanded central search with new ATRS lanes; and – Rollout T2 (Phase 2) is currently planned for Q1 2024 while T2 CSA is complete in Q1 2023 (EDS equipment needs to be provided earlier). • CIP.20.06.042 – ATRS - Central Search Areas: – New EDS equipment to be installed at the same time to reach the desired throughput at CSA and to avoid doing the same work twice; and – Old lanes incl. X-rays T1 can only be closed after opening of new relocated lanes T1. • CIP.20.06.030 VCP Automation to Enable Remote Screening: – New EDS equipment to be installed at the same time to avoid doing the same work twice.
Existing asset conditions	It is stated that all existing devices will reach end-of-life during the 2020-2024 CIP period.
Double counting	None identified.

9.7 The scope is effecetive and efficient in meeting the project objectives.

Cost estimate review

Table 9.4: Cabin-Baggage X-ray Replacement & EDS Upgrade – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 13,307,150	€ 13,307,150	€ 0
Escalation, Contingency & Design Variability	€ 1,330,715	€ 3,526,395	€ 2,195,680
Total	**€ 14,637,865**	**€ 16,833,545**	**€ 2,195,680**

Table 9.5: Cabin-Baggage X-ray Replacement & EDS Upgrade – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 13,307,150	n/a	€ 13,307,150
Total			**€ 13,307,150**		**€ 13,307,150**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	10%	€ 1,330,715	27%	€ 3,526,395
Total			**€ 1,330,715**		**€ 3,526,395**

9.8 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 9.6: Cabin-Baggage X-ray Replacement & EDS Upgrade – Main Level 3 Variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Escalation	Redacted Cost Information			€ 2,195,680

9.9 In response for our request for Dublin Airport to provide a build-up to the lump sums included in the Level 3 estimate, they have provided a statement explaining what the allowance for backend storage is deemed to include and stated that it costs [redacted]. However, whilst this appears reasonable, the information provided does not allow us to comment on its validity. In addition, Dublin Airport has provided an explanation as to how the [redacted] for system management has been assessed. Whilst the information provided does not allow us to comment on the validity of the sum, the process that Dublin Airport has followed in arriving at this figure is sensible. Dublin Airport has not included escalation in its estimate and it has stated that it does not believe that any provision for escalation is required as they intend to lock the costs of the various units into a 5 year framework agreement.

9.10 While Dublin Airport has a large amount of equipment to procure for this project, we have not seen any correspondence supporting their position that cost fixity has been achieved through the execution of a framework contract with the supplier. Therefore, at this stage we disagree with Dublin Airport's statement on escalation. Even if they can secure the supplier's costs for the equipment, we still anticipate that there will be escalation in respect of labour and any

builders works associated with the new installation. As a result, we are maintaining the provision of escalation in our Level 3 estimate.

9.11 The quantities for this project have been validated.

CIP.20.06.007 – Full Body Scanners

Introduction

Figure 9.2: Full Body Scanners

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.12 This project proposes a phased implementation of Full Body Scanners (FBSS).

Context

9.13 FBSS are proposed initially as a secondary screening methodology for alarm resolution at the walk-through-metal-detectors (WTMD) for selected lanes in Terminal 1 and 2 Central Search Area (CSA).

Scope

9.14 After a pilot for evaluation of existing certified FBSS technologies suitable for use at Dublin Airport, the project will be limited in the next CIP period to roll-out and commissioning of 4 FBSS.

Stage

9.15 Project stage is currently at concept level with feasibility/requirements/technology evaluation complete in Q2 2020 and project handover in Q3 2023.

Key project metrics

Table 9.7: Full Body Scanners – Key project metrics

Metric	Value
Construction cost	€ 1,644,200
No. of FBSS	4

Specifications review

Table 9.8: Full Body Scanners – Specifications review

Subject	Comments
Effectiveness of scope	All project objectives will be met by the suggested scope in an effective way.

Subject	Comments
Alternative scopes	None identified.
Quality of specifications	Level 3 costs provide a reasonably detailed breakdown of the specification of the works.
Phasing and synergies with other projects	Rollout of FBSS needs to be phased and aligned with other projects due to dependencies and possible synergies: • CIP.20.03.012 Terminal 1 Central Search - Relocation to Mezz Level: – FBSS to be installed at same time and should be operational when the relocated checkpoint opens. • CIP.20.03.021 Terminal 2 Central Search Area Expansion: – FBSS to be installed at the same time and should be operational when a relocated ATRS lane opens. • CIP.20.06.042 – ATRS - Central Search Areas: – FBSS to be installed at the same time or after a new or relocated ATRS lane opens; only the new or relocated ATRS lanes provide sufficient space for FBSS
Existing asset conditions	There are no existing assets.
Double counting	None identified.

9.16 The proposed scope is required to fulfil the set objectives.

9.17 Overall the scope meets the objectives in an efficient way.

Cost estimate review

Table 9.9: Full Body Scanners – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 123,315	€ 111,315	-€ 12,000
Construction Costs	€ 1,644,200	€ 1,484,200	-€ 160,000
Escalation, Contingency & Design Variability	€ 176,752	€ 159,552	-€ 17,200
Total	**€ 1,944,267**	**€ 1,755,067**	**-€ 189,200**

Table 9.10: Full Body Scanners – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 123,315	8%	€ 111,315
Total			**€ 123,315**		**€ 111,315**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 1,644,200	€ 1,484,200	€ 1,484,200
Total			**€ 1,644,200**		**€ 1,484,200**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	10%	€ 176,752	10%	€ 159,552
Total			**€ 176,752**		**€ 159,552**

9.18 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 9.11: Full Body Scanners – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
FBSS	Redacted Cost Information			€ 180,000

9.19 While we believed that the rate for body scanners was very high compared to costs for similar scanners that have been installed in UK airport, Dublin Airport has advised that the provision in the Level 3 estimate is based on budget cost information from a supplier. We have not seen any evidence of the discussions with any suppliers and while the approach that Dublin Airport has taken is sensible, we still believe that the cost of the units included in the Level 3 estimate is too high and we have included a reduced provision in our estimate.

9.20 Dublin Airport has also provided a breakdown of the lump sum for civil, mechanical and electrical works and the provision they have included is reasonable for the anticipated works.

9.21 The quantities for this project have been validated.

CIP.20.06.009 – ATRS – Additional Lane in Terminal 1

Introduction

9.22 The expansion and relocation of the Terminal 1 Central Search Area (CSA) to mezzanine level (CIP 20.03.012) is not due to be completed until Q4 2022. Dublin Airport have identified a need to provide an additional Automated Tray Return System (ATRS) lane as a temporary measure until the new CSA becomes operational. The proposal is to convert the existing staff entry/exit lane in the departures level of the T1 CSA to a new passenger ATRS lane to provide additional passenger screening capacity.

Figure 9.3: ATRS – Additional Lane in Terminal 1 Introduction

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.23 The conversion of the staff security lane to create an additional ATRS lane is primarily a risk mitigation project against exceeding queue times should there be delays in completing the CSA expansion project.

Scope

9.24 Provide an additional ATRS lane in Terminal 1 CSA by converting the existing staff search lane into a full ATRS Lane within the CSA in T1.

Stages

- Feasibility / Outline Design complete: Q1 2020
- Planning Design procurement complete: Q3 2020
- Construction Commence: Q3 2020
- Construction Completed Q3 2021
- Project Handover: Q3 2021

Key project metrics

Table 9.12: ATRS – Additional Lane in Terminal 1 – Key project metrics

Metric	Value
Construction cost	€ 400,702
Dublin Airport estimation method	Dublin Airport has not completed the feasibility study which will fully define the scope of this project.

Metric	Value
	The itemised costs provided are a high-level early estimate and include an estimate of the architectural, civil and structure works that will be needed to create the addition ATRS Lane. The cost for the new ATRS equipment required is based on the cost for the previous project for ATRS phase I for T1 in 2016. Given that the additional ATRS Lane feasibility study has still to be completed these estimates will be early high-level estimate of cost. Since these estimates are based on a previous ATRS project in 2016 it is likely are a reasonably good estimate of cost.

Specifications review

Table 9.13: ATRS – Additional Lane in Terminal 1 – Specifications review

Subject	Comments
Effectiveness of scope	This approach is effective and efficient and seems to be reasonable given the stage of project definition and development.
Alternative scopes	The project feasibility study which is still to be started will evaluate alternatives and better understand the consequential impact on staff security search.
Quality of specifications	A feasibility study still needs to be completed before the additional ATRS project can be fully defined in terms of what and how the project will be implemented.
Phasing and synergies with other projects	There is no detailed phasing identified. The works will be started in Q1 2020 with the feasibility and outline design study and the lane will be handed over in in Q3 2021. This will provide just over 1-year of augmented CSA capacity to accommodate growth until the Mezzanine CSA project is completed in Q4 2022. This project will be closely associated with CIP 20.03.012 which involve the expansion of the mezzanine in T1.
Existing asset conditions	Not applicable.
Double counting	None identified

9.25 The conversion of the staff search lane to provide an additional ATRS lane will provide augmented CSA capacity for a short period. However, there will remain the requirement to provide a staff search lane facilities which Dublin Airport has stated will be provided in the CSA area during periods of low demand where an existing lane will be switched to a staff search mode and in periods of peak demand staff will be directed to the arrivals staff search lane.

9.26 This project should deliver Dublin Airport objectives as stated.

Cost estimate review

Table 9.14: ATRS – Additional Lane in Terminal 1– Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 50,088	€ 46,338	-€ 3,750
Construction Costs	€ 400,702	€ 370,702	-€ 30,000
Escalation, Contingency & Design Variability	€ 106,368	€ 98,405	-€ 7,964
Total	**€ 557,158**	**€ 515,444**	**-€ 41,714**

Table 9.15: ATRS – Additional Lane in Terminal 1 – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	12.5%	€ 50,088	12.5%	€ 46,338
Total			**€ 50,088**		**€ 46,338**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 400,702	n/a	€ 370,702
Total			**€ 400,702**		**€ 370,702**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	24%	€ 106,368	24%	€ 98,405
Total			**€ 106,368**		**€ 98,405**

9.27 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 9.16: ATRS – Additional Lane in Terminal 1 - Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
ATRS Lanes - MDH costs - assumed to include civil, mechanical and electrical	**Redacted Cost Information**			€ 220,000

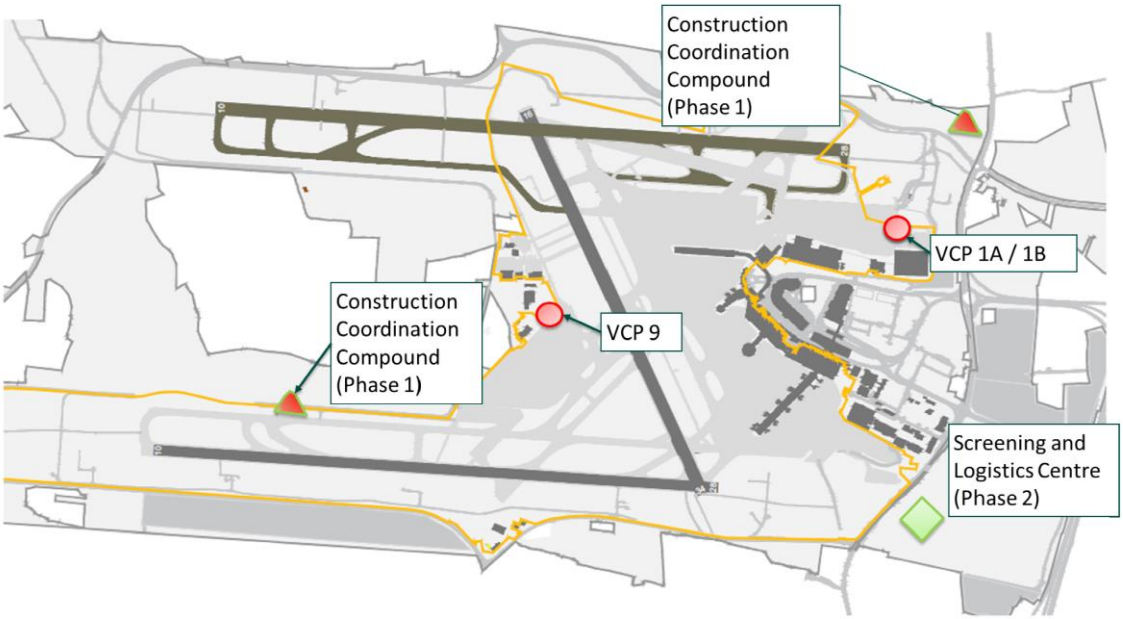
9.28 The cost of the ATRS lanes are slightly higher than we have seen for similar projects at major UK airports and so we have reduced it accordingly. The allowances for the supporting IT infrastructure costs are comparable with other similar projects in the UK. Dublin Airport has stated that the allowance for civil, electrical and mechanical costs is based on previous experience on similar projects at the airport. However, they have not provided any evidence to support this statement or to substantiate the allowance included.

9.29 The quantities for this project have not been validated as no design information has been provided to review. We were advised that this is because the full scope definition has yet to be completed, however, we will continue to work with Dublin Airport to seek additional information that will allow us to validate the quantities in this project ahead of the final report.

CIP.20.06.014 – Screening and Logistics Centre

Introduction

Figure 9.4: Screening and Logistics Centre - Location of construction compound



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.30 This 2-phased project is proposed to improve efficiency in airside logistics and to reduce risks in future construction projects. Dublin Airport advise the following:

9.31 The main objectives for the Construction Consolidation Compounds (phase 1) are to enhance efficiency for delivery of construction materials and reduce queues at VCPs, to reduce opex associated with airside access for both Dublin Airport and contractors and to reduce the impact from construction noise and traffic.

9.32 The main objectives for the Screening and Logistics Centre (phase 2) are to provide a consistent, optimised approach to the screening of airport suppliers and the examination of vehicles, to reduce the number of suppliers entering the security restricted area as well as to reduce airside traffic and congestion, to implement scheduling of vendor delivery slots and to improve reporting and data availability.

Context

9.33 The primary driver is the stated need for a more coordinated, controlled system for the delivery of construction materials and airport supplies to airside locations. A consolidated Screening and Logistics Centre is therefore proposed to be established in the coming CIP period. In the interim, it is proposed to establish two Construction Consolidation Compounds (CCC) as interim measures (Phase 1).

Scope

9.34 Scope of Phase 1 includes construction of 2 construction consolidation compounds (Compound 1 = 30,000sqm-on the north side of the airfield campus, compound 2 = 7,300sqm-on the north side existing runway 10-28) which include levelled and fenced sites with security gates, services (lightening, electricity, water), site fittings (smoking shelter, signage, CCTV, networked services, etc.) and gate security hut incl. WC.

9.35 Scope of Phase 2 includes construction of a consolidation centre on the east land, which comprises of a building on 1 level (3,000 sqm) with goods and vehicle screening and search areas, reception and driver screening area, storage areas, staff facilities and a detainee screening area with toilet. Additionally, the scope includes screening equipment (2 X-ray systems, trays and tables for baggage X-rays, 2 pallet scanners, 2 WTMDs, 3 ETDs, 1 LEDS,) and other equipment (IT infrastructure, office/staff equipment, vehicles/ forklifts, warehouse system, CCTV) as well as a fenced compound with road access, a security post, parking and offloading areas.

Stage

9.36 The project is currently at concept design stage with feasibility/planning and detailed design complete in Q1 2020. Development will commence in Q2 2020 with completion expected in Q2 2022. Separate milestones for phases 1 and 2 have not been provided.

Key project metrics

Table 9.17: Screening and Logistics Centre – Key project metrics

Metric	Value
Construction cost	€ 9,461,000
Cost phase 1 Construction compound 1 Construction compound 2	 € 1,303,487 € 453,851
Cost phase 2 Consolidated centre	 € 7,703,615

Specifications review

Table 9.18: Screening and Logistics Centre – Specifications review

Subject	Comments
Effectiveness of scope	All project objectives for the screening and logistics centre will be met by the suggested scope in an effective and efficient way.
Alternative scopes	None identified.
Quality of specifications	Level 3 costs provide a reasonably detailed breakdown of the specification of the works.
Phasing and synergies with other projects	The construction compounds need to be quickly realized since they are already needed for construction works starting in 2019. No synergies with other projects identified.
Existing asset conditions	New development.
Double counting	None identified.

9.37 The proposed scope for the 2 construction compounds (Phase 1) and the consolidated Screening and Logistics Centre (Phase 2) can meet the set objectives in an efficient way. However, size of facilities in phases 1 and 2 requires further justification. It should be possible to add additional space and screening capacity in accordance to changing demand to avoid bottlenecks at the compounds or the consolidated facility.

Cost estimate review

Table 9.19: Screening and Logistics Centre – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 1,227,000	€ 1,211,029	-€ 15,971

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Construction Costs	€ 9,461,000	€ 9,338,277	-€ 122,723
Escalation, Contingency & Design Variability	€ 2,740,000	€ 2,736,723	-€ 3,277
Total	**€ 13,428,000**	**€ 13,286,029**	**-€ 141,971**

Table 9.20: Screening and Logistics Centre – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 1,226,361	0%	€ 1,211,029
Total			**€ 1,227,000**		**€ 1,211,029**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Construction Compound 1	1	n/a	€ 1,303,487	n/a	€ 1,303,487
Construction Compound 2	1	n/a	€ 453,851	n/a	€ 453,851
Consolidation Centre	1	n/a	€ 7,703,615	n/a	€ 7,580,939
Total			**€ 9,461,000**		**€ 9,338,277**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	26%	€ 2,736,723	26%	€ 2,736,723
Total			**€ 2,740,000**		**€ 2,736,723**

9.38 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 9.21: Screening and Logistics Centre – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Composite Deck; 200mm thick	**Redacted Cost Information**			€ 150
Allowance for access road to front of building (20m only)				€ 250

9.39 The rates for upper floors and road construction are higher than we would expect and have been adjusted accordingly. The rates for a lot of the building works associated with compound 2 are based on the overall area of the building. However, without any design information it is difficult to validate the robustness of these rates. Dublin Airport has updated its Level 3 estimate to include the provision for site boundary fencing, but it has not provided a breakdown of the fit out rates included in the estimate. It has provided a basis for the allowance for the pallet, scanner which is based on initial discussion with Dublin Airport's preferred supplier. We have not validated any of the quantities provided as no design information has been provided to review. We will continue to work with Dublin Airport with a view to obtaining design information to help validate the quantities for the final report.

CIP 20.06.015 – Intrusion Detection Systems for Dublin Airport Boundaries

Introduction

9.40 In order to improve boundary security at the airport this project is proposed to improve airport boundary monitoring through the introduction of Automatic Intrusion Detection Systems.

Figure 9.5: Intrusion Detection Systems for Dublin Airport Boundaries

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objectives

9.41 The proposed introduction of Automatic Intrusion Detection Systems at Dublin Airport is anticipated to be based on automatic RADAR intrusion detection system technology which will constantly monitor the airport boundary. It will detect any attempt to breach the boundary and direct both CCTV and Airport Police responses to the specific area where the incident occurs.

Context

9.42 Currently Dublin Airport uses surveillance patrols and other physical controls to identify and deter suspicious behaviour and identify vulnerabilities that may be exploited to carry out unlawful behaviour on the airport. Currently Dublin Airport's perimeter surveillance is based on a patrol frequency stipulated by the IAA and informed by the evaluated risk. This project aims to use technology to help automate the detection process and provide a 24/7 monitoring of the airfield.

Scope

- Implementation of RADAR Based Intrusion Detection technology and CCTV cameras for airport boundaries;
- Supporting Civil and IT infrastructure; and
- Training.

Stages

- Feasibility / Outline Design complete: Q1 2022
- Planning, Design, procurement complete: Q3 2022
- Construction Completed Q1 2023
- Project Handover Q2 2023

Key project metrics

Table 9.22: Intrusion Detection Systems for Dublin Airport Boundaries – Key project metrics

Metric	Value
Construction costs	€2,619,661
Dublin Airport estimation method	Dublin Airport state that the system cost estimate is based on discussions with vendors who have implemented similar systems at airports. The scope definition of this project is high level and the project still requires a feasibility study to be completed to establish the most appropriate approach to achieving the objectives. The items of equipment identified in the cost estimate are a first pass high level estimate of the technology that will be required to achieve the objective. Once feasibility is completed the design process will finalise the detailed qualities of equipment systems and other infrastructure works required. This is a reasonable approach to cost estimation given that the project is not full defined and feasibility study will evaluate the benefits of using different technologies to achieve the objectives.

Specifications review

Table 9.23: Intrusion Detection Systems for Dublin Airport - Specifications review

Subject	Comments
Effectiveness of scope	This project should deliver Dublin Airport's objectives as stated. This seems to be an effective, efficient, and reasonable approach given the stage of project definition and development.
Alternative scopes	The project feasibility study which is still to be started and the planning, design and procurement will look at alternative scopes.
Quality of specifications	A feasibility study and full design still needs to be completed before the intrusion detection systems project can be fully defined in terms of what and how it needs to be implemented.
Phasing and synergies with other projects	There is no detailed phasing identified. However, the works will begin in Q1 2022 with feasibility and are planned to be completed and handed over Q2 2023.
Existing asset conditions	Not applicable.
Double counting	None identified

9.43 The introduction of intrusion detection will improve the surveillance of the airport boundary. This system will offer a superior approach to perimeter security and will provide 24/7 real time incident detection as well as the ability to accurately and instantly direct CCTV and other incident investigative capabilities to the area. This will reduce the frequency of patrols and allow better and more efficient deployment of security and police resources.

Cost estimate review

Table 9.24: Intrusion Detection Systems for Dublin Airport – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 392,949	€ 392,949	€ 0
Construction Costs	€ 2,619,661	€ 2,619,661	€ 0
Escalation, Contingency & Design Variability	€ 988,889	€ 988,889	€ 0
Total	**€ 4,001,499**	**€ 4,001,499**	**€ 0**

Table 9.25: Intrusion Detection Systems for Dublin Airport Programme – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	15%	€ 392,949	15%	€ 392,949
Total			**€ 392,949**		**€ 392,949**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 2,619,661	n/a	€ 2,619,661
Total			**€ 2,619,661**		**€ 2,619,661**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	33%	€ 988,889	33%	€ 988,889
Total			**€ 988,889**		**€ 988,889**

9.44 In response to our query regarding the cost of the PTZ cameras, Dublin Airport has advised that their allowances are all up rates that are based on cost information provided by their supplier. As a result, we have aligned our Level 3 estimate costs with Dublin Airport's as their approach and analysis of the information provided is robust. The remaining IT costs are not excessive and based on the information provided appear to be reasonable.

9.45 We have not validated the quantities for this project as no design information has been provided to review. This is not unsurprising given the high level status of the project, with feasibility and outline only being completed in 2022, but despite this, we will continue to work with Dublin Airport to examine the best way to validate the quantities ahead of the final report.

CIP.20.06.016 – Surface Road Blockers & Temporary Mobile Barriers

Introduction

9.46 This project provides for portable vehicle ramps and temporary mobile barriers at each of the four active Vehicle Check Points (VCPs), identified by Dublin Airport.

Figure 9.6: Surface Road Blockers & Temporary Mobile Barriers

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Context

9.47 At present 4 Vehicle Check Points (VCPs) are composed of non-armoured, raiseable, steel gates during opening hours and supplemented by steel-wire fence gates during out-of-hours. Dublin Airport advises that these elements of the VCP which are used to prevent breaches do not meet the PAS standards to reduce the risk of unauthorised access via vehicles "ramming" these security points.

Scope

9.48 The scope is to deploy 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, and provide emergency, solar powered, mobile replacement security gates for each post. 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.

Stage

9.49 Project stage is currently at initial concept ideas, with work to be carried out between Q2 2020 and completed in Q4 2020. The outlined procurement route of:

- Feasibility/ Consultation Q1 2020
- Design & Procurement Q2 2020
- Construction commence Q2 2020
- Project handover Q4 2020

Key project metrics

Table 9.26: Surface Road Blockers & Temporary Mobile Barriers - Key project metrics

Metric	Value
Equipment cost	€ 824,419
No of road blockers	4 sets of portable armoured ramps

Specifications review

Table 9.27: Surface Road Blockers & Temporary Mobile Barriers - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the range and nature of work to be carried out at each location in outline format.
Alternative scopes	None.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for outline design stage.
Phasing and synergies with other projects	The installation of the new road blockers and mobile barriers is a stand-alone project.
Existing asset conditions	Not applicable.
Double counting	None identified.

9.50 The replacement of the road barriers is considered efficient and necessary.

Cost estimate review

Table 9.28: Surface Road Blockers & Temporary Mobile Barriers – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 824,419	€ 824,419	€ 0
Escalation, Contingency & Design Variability	€ 127,785	€ 127,785	€ 0
Total	**€ 952,204**	**€ 952,204**	**€ 0**

Table 9.29: Surface Road Blockers & Temporary Mobile Barriers – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 824,419	n/a	€ 824,419
Total			**€ 824,419**		**€ 824,419**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	16%	€ 127,785	16%	€ 127,785
Total			**€ 127,785**		**€ 127,785**

9.51 The costs of the road blockers and crash barriers are reasonable. Dublin Airport has not provided any build-up to cost of the civils works. Dublin Airport has restated that design and management and contractors' preliminaries are included in the Level 3 estimate allowances, but they have not provided any information to demonstrate that this is the case. The quantities for this project have been validated.

CIP.20.06.022 – Redevelopment of Training Facilities

Introduction

9.52 This project aims to meet Dublin Airport's identified need for increased capacity in security training facilities on the airport campus.

Figure 9.7: Redevelopment of Training Facilities

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.53 The objective is to provide a security training centre, where Dublin Airport's Aviation Security Training Organisation (ASTO) will conduct training of Dublin Airport staff.

Scope

9.54 The scope is of this project is to improve and redevelop the existing training facilities. This project applies to the redevelopment of rooms within Castlemoate House and not an expansion to the building. The following items are included in this project:

- Facilities: Refurbishment of 2 additional rooms within Castlemoate House;
- 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); and
- 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).

Stage

9.55 Project stage is currently at initial concept ideas, with work to be carried out between Q4 2020 and completed in Q4 2021.

Key project metrics

Table 9.30: Redevelopment of Training Facilities - Key project metrics

Metric	Value
Construction cost	€ 900,434
Cost per m^2/unit	Various rates given

Specifications review

Table 9.31: Redevelopment of Training Facilities - Specifications review

Subject	Comments
Effectiveness of scope	The scope is efficient in identifying the range and nature of work to be carried out in outline format.
Alternative scopes	None identified.
Quality of specifications	Specifications provided in Level 3 costs provide enough detail for the purchase of equipment but lack any detail of the construction/re-modelling work to fully assess proper coverage.
Phasing and synergies with other projects	Construction/fitting out work does not have synergies with other projects, however phasing will need to be considered to ensure there is some training facility available at all times.
Existing asset conditions	Castlemoate House is a listed and old building that has been re-lifed. We would expect the new work to have an asset life of 20 years and the fitting out and equipment to have a 10-year asset life.
Double counting	None identified.

9.56 From the information available there is enough information to confirm that the scope is efficient for initial budgeting, however we would want to see more detail of the construction work planned, which is 75% of the total budget.

Cost estimate review

Table 9.32: Redevelopment of Training Facilities – Level 1 Costs

	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 112,554	€ 112,554	€ 0
Construction Costs	€ 900,434	€ 900,434	€ 0
Escalation, Contingency & Design Variability	€ 157,013	€ 157,013	€ 0
Total	**€ 1,170,001**	**€ 1,170,001**	**€ 0**

Table 9.33: Redevelopment of Training Facilities – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	12.5%	€ 112,554	12.5%	€ 112,554
Total			**€ 112,554**		**€ 112,554**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 900,434	n/a	€ 900,434
Total			**€ 900,434**		**€ 900,434**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	16%	€ 157,013	16%	€ 157,013
Total			**€ 157,013**		**€ 157,013**

9.57 While there is a lot of detail in Dublin Airport's Level 3 estimate, there is a lack of detail in the individual item descriptions to allow us to understand what the individual items are, which in turn means that we are not able to comment on the validity of the project costs. We asked

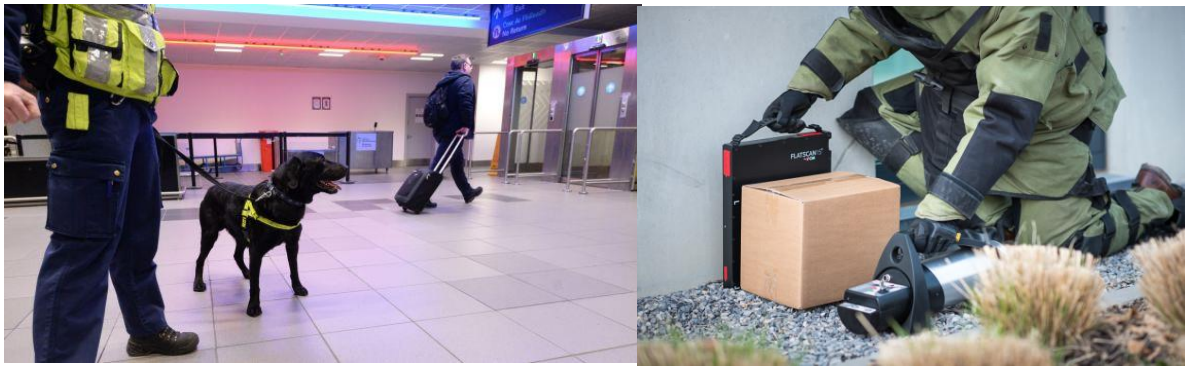
Dublin Airport to provide further detail on these items and they have subsequently provided a schedule that lists various items along with the unit cost of those items. We do not know whether these sums are Dublin Airport estimates or whether they are underpinned by supplier quotations. We will follow this up with Dublin Airport to help us to validate these costs ahead of the final report. Dublin Airport has stated that preliminaries are included within the costs, but they have not provided any further information to demonstrate that this is the case. We note that as most of the items in the Level 3 estimate appear to be items of equipment, we would expect that the preliminaries burden on this project would be very low.

CIP.20.06.025 – Detection: Explosive Detection Dogs (EDD) and Mobile X Ray Unit

Introduction

9.58 The existing Explosive Dog Detection units can be deployed rapidly across the airport campus when required as countermeasures to potential security threat at the airport. This project aims to refresh the facility.

Figure 9.8: Detection: Explosive Detection Dogs (EDD) and Mobile X Ray Unit



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objectives

9.59 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.

9.60 The provision of a Mobile X-ray capability enables inspection of suspicious items in situ.

Context

9.61 Augmenting the EDD capability enhances the ability to deploy randomised mobile search units at vulnerable locations around the airport. The use of mobile X-ray units aims to reduce the requirement for EDD by enabling the random examination of suspicious items.

Scope

9.62 The scope includes:

- Facilities for 3 explosive detection dog teams
- Build of kennels at handler's residence
- Procurement of 2 portable security X-rays
- Refurbish kennels at Castlemoate
- Dog and handler training Mobile X-ray Unit:
- Provide training

Stages

9.63 The stages are:

- EDD Capability - delivered Q3 2020
- Mobile X-ray Units - Procured Q3 2020

Key project metrics

Table 9.34: Detection: Explosive Detection Dogs (EDD) and Mobile X Ray Unit - Key project metrics

Metric	Value
Cost (excluding contingency)	€ 151,420
Dublin Airport estimation method	The scope of this project is clear and relatively simple to appreciate although no detailed survey of existing facilities has been identified by Dublin Airport. The cost estimates presented are based on off the shelf product costs of Mobile Ray Units. The cost estimates for the refurbishment of 3 kennels have been reasonably well itemised for this type of project. The cost estimates for training in the use of X-ray equipment have been identified.

Specifications review

Table 9.35: Detection: Explosive Detection Dogs (EDD) and Mobile X Ray Unit – Specifications review

Subject	Comments
Effectiveness of scope	This project scope is deemed effective in: • Providing 3 new kennels for Explosive Detection Dogs by refurbishing the existing house used by the EDD unit; • Providing some associated equipment for the EDD unit; and • Procuring 2 mobile X-ray devices along with associated police training in its use.
Alternative scopes	Not applicable.
Quality of specifications	There will need to be some simple refurbishment works to create the 3 new kennel facilities, and the purchase of the 2 Mobile X-ray will be off the shelf products.
Phasing and synergies with other projects	There is no phasing identified – planned to be completed Q3 2020.
Existing asset conditions	The existing Kennels need refurbishment. The mobile X-ray devices will be new equipment and officers will need device specific training.
Double counting	None identified.

9.64 This will enhance the security capabilities for the Airport Police providing randomly deployable Explosive Detection Dogs units which will improve deterrence and provide rapid mobilisation of countermeasure capabilities (dogs and mobile X-rays) to threats.

9.65 This project will deliver Dublin Airport objectives as stated. The approach seems to be effective, efficient and reasonable given the current state of project definition and development.

Cost estimate review

Table 9.36: Detection: Explosive Detection Dogs (EDD) and Mobile X Ray Unit - Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 151,420	€ 151,420	€ 0
Escalation, Contingency & Design Variability	€ 23,470	€ 23,470	€ 0
Total	**€ 174,890**	**€ 174,890**	**€ 0**

Table 9.37: Detection: Explosive Detection Dogs (EDD) and Mobile X Ray Unit – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 151,420	n/a	€ 151,420
Total			**€ 151,420**		**€ 151,420**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	16%	€ 23,470	16%	€ 23,470
Total			**€ 23,470**		**€ 23,470**

9.66 Dublin Airport has stated that the allowances for the refurbishment of the house and the provision of kennels is inclusive of 20% preliminaries allowance but it has not demonstrated this. It has not responded to our query regarding the provision of design and management costs. It has also stated that the remaining costs are for replacement of equipment and as such there will be no design and management costs. We accept that for the equipment replacement items this is a reasonable position. The cost of the Flatscan appears to be reasonable. The quantities for this project have not been validated as no design information was provided for us to review. We will request further information from Dublin Airport to validate these quantities ahead of the final report.

CIP.20.06.030 – VCP Automation to Enable Remote Screening

Introduction

9.67 Vehicle Check Point (VCP) automation involves the redesign of the X-ray screening system used in the Central Search Area in Terminal 1 to allow for remote image viewing. This will involve installing the remote screening capability at 4 VCPs (Gatepost 1 Alpha, 4, 9 and 32) around the airport.

Figure 9.9: VCP Automation to Enable Remote Screening

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.68 Dublin Airport intends to deploy redesigned components of the ATRS X-ray screening systems to create remote screening functionality at the 4 VCPs on Airport. Dublin Airport state this will significantly improve the VCP security screening consistency, ensure compliance with security regulation and improve operational efficiencies through the centralisation of X-ray screening at Dublin Airport.

Context

9.69 Dublin Airport has identified several transferable benefits of the ATRS X-ray screening systems deployed at Dublin T1 CSA that will improve the screening processes at 4 existing VCPs.

Scope

9.70 The scope includes:

- Deployment of remote screening to all 4 VCPs (Gateposts 1 Alpha, 4, 9 and 32)
- Staff Training and Reporting

Stages

9.71 The stages are:

- Feasibility / Outline Design complete: Q1 2020
- Planning, Design, procurement complete: Q2 2020
- Construction Completed Q1 2022
- Project Handover: Q2 2022

Key project metrics

Table 9.38: VCP Automation to Enable Remote – Key project metrics

Metric	Value
Construction cost	€ 595,100
Dublin Airport estimation method	There is no detailed scope definition for which the cost estimation has been developed.

Metric	Value
	Dublin Airport states the cost estimate is based on high level budgetary estimates provided by the vendor in 2018. The level of cost detail provide is reasonably well itemised given the early stage of project definition for this project.

Specifications review

Table 9.39: VCP Automation to Enable Remote Screening - Specifications review

Subject	Comments
Effectiveness of scope	The scope is effective and efficient in delivering the project objectives.
Alternative scopes	Any opportunity for alternation scope of this project will be identified in the feasibility study.
Quality of specifications	A feasibility study and full design still needs to be completed before the VCP automation project can be considered as having a full project scope definition which will identify the project activities and implementation. The scope of the project is focused on 4 VCPs around the airport (Gateposts 1 Alpha, 4, 9 and 32).
Phasing and synergies with other projects	There is no detailed phasing identified – however it is planned to be completed Q2 2022.
Existing asset conditions	The existing screening facilities at VCP do not offer the efficiencies that can be gained for the remote screening.
Double counting	None identified.

9.72 The VCP Automation will enhance the security capabilities at the VCP's, improving the screening consistency and efficiency. Much of the benefit is derived from the remote review of X-ray screening images in a centralised location where the productivity is significantly improved resulting in lower staffing costs.

9.73 This project should deliver Dublin Airport objectives as stated. The approach adopted seems to be effective, efficient and is reasonable given the stage of project definition and product development.

Cost estimate review

Table 9.40: VCP Automation to Enable Remote Screening – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 595,100	€ 595,100	€ 0
Escalation, Contingency & Design Variability	€ 92,241	€ 92,241	€ 0
Total	**€ 687,341**	**€ 687,341**	**€ 0**

Table 9.41: VCP Automation to Enable Remote Screening – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**

Construction Costs (C-C)	Quantity	Dublin Airport rate	Dublin Airport cost estimate	Steer rate	Steer cost estimate
Fittings / Furnishings & Equipment	1	n/a	€ 595,100	n/a	€ 595,100
Total			**€ 595,100**		**€ 595,100**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	16%	€ 92,241	16%	€ 92,241
Total			**€ 92,241**		**€ 92,241**

9.74 In response to our queries, Dublin Airport has stated that the allowances for civils and mechanical and electrical services are inclusive of 20% contractors' preliminaries, but they have not provided a breakdown of these figures to demonstrate this. Dublin Airport has stated that the design and management costs will be covered by the Security through its PMO which they also state is normal business practice for the procurement of additional or replacement equipment. There is insufficient information provided to allow us to undertake any further analysis of this project. The quantities for this project have not been validated. No design information has been provided for review. Whilst we understand that the full scope definition is yet to be completed, we will continue to work with Dublin Airport to identify the best way to validate the quantities ahead of the final report.

CIP.20.06.031 – Autopass - T1 Replacement &T2 Install

Introduction

9.75 The Autopass system is used for validating passenger boarding cards to allow entry to the Central Screening Area (CSA).

Figure 9.10: Autopass - T1 Replacement &T2 Install

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.76 The Autopass system in Terminal 1 is proposed for replacement with 15 new entry gate systems to the CSA. Terminal 2 has not previously had Autopass installed and in this period 10 new entry gate systems will be installed at Terminal 2.

Scope

9.77 The scope includes:

- Deployment of Autopass in Terminal 1 (15 entry gates to the CSA);
- Deployment of Autopass in Terminal 2 (10 entry gates to the CSA); and
- Staff Training.

Stage

9.78 The stages are:

- Feasibility / Outline Design complete: Q1 2021
- Planning, Design, procurement complete: Q1 2021
- Construction Completed Q2 2021
- Construction Completed & project Handover Q4 2021

Key project metrics

Table 9.42: Autopass - T1 Replacement &T2 Install - Key project metrics

Metric	Value
Construction cost	€ 1,441,992
Dublin Airport estimation method	Dublin Airport has based the cost estimated on the cost from the previous Autopass project in T1. The final scope of the project will not be known until the feasibility study is completed. Dublin Airport has provided a reasonable level of detail for the itemised cost of Autopass gates.

Metric	Value
	The cost estimation method seems to be reasonable given the declared stage of project definition and specification by Dublin Airport.

Specifications review

Table 9.43: Autopass - T1 Replacement &T2 Install - Specifications review

Subject	Comments
Effectiveness of scope	This should deliver Dublin Airport's objectives as stated. It appears to be an effective, efficient and a reasonable approach given the early stage of project definition and development.
Alternative scopes	The scope of the Autopass deployment would only be altered should the forecast passenger demand significantly differ from current expectations and require an increase/decrease in the number of gates required.
Quality of specifications	A feasibility study and full design still needs to be completed before a fully defined specification can be prepared for the replacement Autopass gate systems in Terminal 1 and New gates in Terminal 2.
Phasing and synergies with other projects	There is no detailed phasing identified – however the Autopass gate deployment is intended to be progressed very rapidly with the completion in Q4 2021 for both terminals.
Existing asset conditions	There is an existing Autopass system in Terminal 1 which Dublin Airport has declared as end of life. There is no Autopass system in Terminal 2. Currently Terminal 2 has manual checking of boarding passes on entry to the T2 CSA.
Double counting	None identified.

9.79 The Autopass systems offers benefits to the airport in terms of the management passenger into the CSA areas in both Terminal 1 and Terminal 2. It has a further benefit of reducing the number of airport staff needed to manage passenger access to the area. This will provide a commonality of service and process in both T1 and T2 which will benefit both airlines and passengers alike.

9.80 The project still requires a feasibility study to be completed so that the full scope of the Autopass gate deployment can be finalised.

9.81 This should deliver Dublin Airport's objectives as stated. It appears to be an effective, efficient and a reasonable approach given the early stage of project definition and development.

Cost estimate review

Table 9.44: Autopass - T1 Replacement &T2 Install – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 1,441,992	€ 1,441,992	€ 0
Escalation, Contingency & Design Variability	€ 340,253	€ 340,253	€ 0
Total	**€ 1,782,245**	**€ 1,782,245**	**€ 0**

Table 9.45: Autopass - T1 Replacement &T2 Install – Level 2 Costs

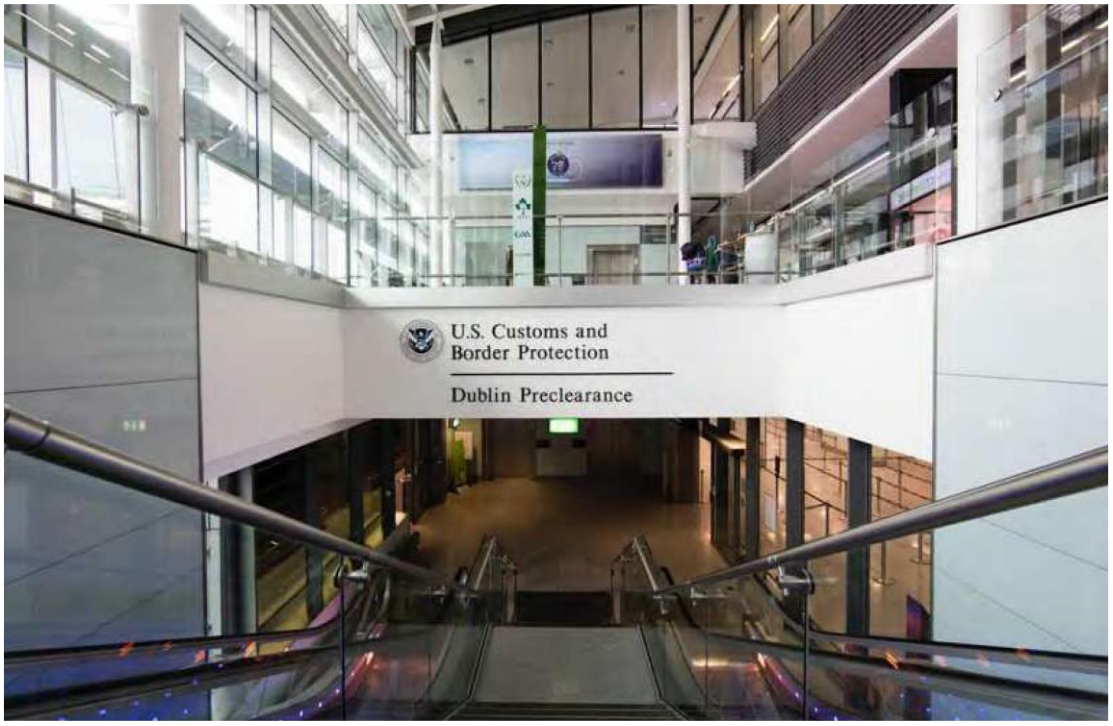
Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 1,441,992	n/a	€ 1,441,992
Total			**€ 1,441,992**		**€ 1,441,992**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	24%	€ 340,253	24%	€ 340,253
Total			**€ 340,253**		**€ 340,253**

9.82 As with the VCP Automation programme, Dublin Airport has stated that the design and management costs will be covered by the Security through its PMO which they also state is normal business practice for the procurement of additional or replacement equipment. Dublin Airport has also stated that the allowance for works to the glass panels is deemed to include contractors' preliminaries. However, they have not provided any additional information to substantiate this position. The information provided has not been in sufficient detail to allow us to undertake any further analysis of this project. The quantities for this project have not been validated as a feasibility study for full scope definition is still to be completed. Whilst we understand this, we will continue to work with Dublin Airport to identify the best way to validate the quantities ahead of the final report.

CIP.20.06.036 – TSA-X-Ray & FBSS Replacement

Introduction

Figure 9.11: TSA-X-ray & FBSS Replacement - US Pre-Clearance in pier 4



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.83 This project proposes to replace TSA screening equipment.

Context

9.84 The project driver is that the existing equipment (X-ray systems and full body scanning systems) will reach end-of-life in the next CIP period.

Scope

9.85 The scope of the project includes replacement of 1-unit full body screening system (FBSS) and 5 X-ray systems.

Stage

9.86 The X-ray system contracts and supply agreements will be in place in Q1 2020 and the rollout be completed in Q3 2024, while the full body scanning system contracts and supply agreements will be in place in Q1 2022 and the rollout be completed in Q3 2022.

Key project metrics

Table 9.46: TSA-X-ray & FBSS Replacement– Key project metrics

Metric	Value
Construction cost	€ 332,200
T5 X-ray system	1
Full Body Scanning System	5

Specifications review

Table 9.47: TSA-X-ray & FBSS Replacement – Specifications review

Subject	Comments
Effectiveness of scope	The project appears efficient and effective.
Alternative scopes	EDS standard C3 machines would need to be employed instead of X-rays if decided by TSA after completion of a review.
Quality of specifications	Level 3 costs provide a reasonably detailed breakdown of the specification of the works.
Phasing and synergies with other projects	Rollout of new equipment needs to be phased and aligned with other projects due to dependencies and possible synergies: • CIP.20.03.030 Expansion of US Preclearance facilities – – The expansion will be completed in Q1 2021. The replacement of the existing X-rays should be aligned to ensure efficiency of the expanded CBP preclearance facilities and to avoid work to be done twice.
Existing asset conditions	All existing network and power infrastructure can be re-used.
Double counting	None identified.

9.87 The project appears efficient and effective.

Cost estimate review

Table 9.48: TSA-X-ray & FBSS Replacement – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 332,200	€ 315,200	-€ 17,000
Escalation, Contingency & Design Variability	€ 33,220	€ 74,860	€ 41,640
Total	**€ 365,420**	**€ 390,060**	**€ 24,640**

Table 9.49: TSA-X-ray & FBSS Replacement – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 332,200	n/a	€ 315,200
Total			**€ 332,200**		**€ 315,200**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	10%	€ 33,220	24%	€ 74,860
Total			**€ 33,220**		**€ 74,860**

9.88 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 9.50: TSA-X-ray & FBSS Replacement – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Escalation at 12.5%	Redacted Cost Information			€ 43,340
FBSS				€ 120,000

9.89 The cost of the body scanner is higher than we would expect based on other UK airport projects. Our rate assumes that the existing infrastructure is reused. We have assumed that existing small power is used unaltered and that there are no remedial works that need to be undertaken. The rates for the other supporting IT provisions appear to be reasonable. There is no escalation included in the estimate. While Dublin Airport has stated that its estimate is based on vendor costs at 2018 prices, we have not been provided with this substantiation, so we cannot validate whether the vendor have agreed to hold their prices for the duration of the project which is due to run unto Q3 2024. Therefore, we have included a small provision for escalation in our estimate.

9.90 The quantities for this project have been validated.

CIP.20.06.041 – Security Screening Equipment - End of Life

Introduction

Figure 9.12: Security Screening Equipment - End of Life - Security lane

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.91 The objective of this project is to replace equipment which Dublin Airport have stated is end of life.

Context

9.92 The existing screening equipment for both primary and supplementary screening will reach end-of-life over the next CIP period. Additionally, it is Dublin Airport's strategy to reduce the number of radiological licenses in the airport campus.

Scope

9.93 Dublin Airport proposes to replace the following machines as they become end-of-life

- 15 liquid explosive detections systems (LEDs) (out of 15 deployed);
- 57 explosive threat detection systems (ETDs - out of 62 deployed);
- 23 walk-through metal detectors (WTMD - out of 37 deployed);
- 65 handheld metal detectors (HHMD - out of 65 deployed); and
- 97 mobile radios (out of 120 deployed).

Stage

9.94 Project is currently at tendering stage with contracts and supply agreements in place in Q1 2019. Rollout of new equipment will take place from Q1 2020 until the 4th quarter 2024.

Key project metrics

Table 9.51: Security Screening Equipment – Key project metrics

Metric	Value
Equipment cost	€ 4,060,750
No. of ETDs	57
No. of LEDS	15

Metric	Value
No. of WTMDs	23
No. of HHMDs	65
No. of Mobile Radios	97

Specifications review

Table 9.52: Security Screening Equipment – Specifications review

Subject	Comments
Effectiveness of scope	All project objectives will be met by the suggested scope in an effective way. The no. of ETDs and LEDS could be reduced when standard C3 EDS machines (CIP.20.06.001) will be deployed due to the fact that 10% additional random checks will not be needed any more. ETDs and LEDS will only be required for alarm resolution checks.
Alternative scopes	None identified.
Quality of specifications	Level 3 costs provide a reasonably detailed breakdown of the specification of the works.
Phasing and synergies with other projects	Rollout of new equipment needs to be phased and aligned with other projects due to dependencies and possible synergies: • CIP.20.03.012 Terminal 1 Central Search - Relocation to Mezz Level; – New equipment (ETDs, LEDS, WTMDs) should be installed at the same time since old lanes can only be closed after opening of new relocated lanes; otherwise all equipment needs to be relocated overnight. • CIP.20.06.001 Cabin-Baggage X-ray Replacement & EDS Upgrade; – Replacement of ETDs and LEDS should not be done before the EDS upgrade since less devices are needed when EDS C3 machines are in place.
Existing asset conditions	Many of the existing devices will become end-of-life during the 2020-2024 CIP period.
Double counting	None identified.

9.95 The proposed scope is required to fulfil the set objectives. Our opinion is that the volume of equipment (ETDs and LEDS) to be installed for each checkpoint could be reduced considering the deployment of EDS standard C3 machines. However, Dublin Airport has countered this assumption by stating that the existing complement of new equipment is still required for alarm resolution. We have not adjusted the costs to reflect a lower quantity.

Cost estimate review

Table 9.53: Security Screening Equipment – Level 1 Costs

	daa cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 4,060,750	€ 4,060,750	€ 0
Escalation, Contingency & Design Variability	€ 406,075	€ 406,075	€ 0
Total	**€ 4,466,825**	**€ 4,466,825**	**€ 0**

Table 9.54: Security Screening Equipment – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of daa C-C	daa cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**daa rate**	**daa cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 4,060,750	€ 4,060,750	€ 4,060,750
Total			**€ 4,060,750**		**€ 4,060,750**
Escalation, Contingency & Design Variability	**Quantity**	**% of daa DM-C + C-C**	**daa cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	10%	€ 406,075	10%	€ 406,075
Total			**€ 406,075**		**€ 406,075**

9.96 Dublin Airport has advised that the IT costs are based on historic data from its current suppliers. We have not been provided with this data to validate it but Dublin Airport's approach is sensible. Dublin Airport has also advised that design and management and contractors preliminary costs are not required in this project as it is effectively replacement of existing life expired assets.

CIP.20.06.042 – ATRS - Central Search Areas (T1 and T2)

Introduction

Figure 9.13: ATRS - Central Search Areas (T1 and T2) - ATRS lane in application

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.97 This project is proposed to deploy ATRS lanes and to expand remote screening facilities at central search area in both terminals.

Context

9.98 Dublin Airport has employed ATRS in T1 since 2016, delivering a significant increase in cabin baggage screening process rates.

Scope

9.99 Scope of the project is replacing the existing T1 17m ATRS lanes with new 25m lanes; transferring and reusing the replaced 17m lanes in T2 (which also requires staff training) and the expansion of the existing T1 remote screening facilities for T2 to standardise the operational process of both terminals.

Stage

9.100 Project stage is currently at concept level with feasibility/ outline design complete in Q2 2020 and project completion in 2nd quarter 2022.

Key project metrics

Table 9.55: ATRS - Central Search Areas (T1 and T2) – Key project metrics

Metric	Value
Construction cost	€8,990,595
25m ATRS lanes (new)	13
17m ATRS lanes (relocated)	12

Specifications review

Table 9.56: ATRS - Central Search Areas (T1 and T2) – Specifications review

Subject	Comments
Effectiveness of scope	All project objectives can be met by the suggested scope in an effective way. The number of ATRS lanes needed for T1 is 15 according to Level 3 costs.However, only 13 will be provided according to the drawings and project sheets, for contingency. There could therefore be scope to reduce this number, dependent on the risk appetite.
Alternative scopes	In case of T1 project delays, then the existing T1 lanes could reach end-of-life and hence parts or even whole lanes need to be replaced. New lanes for T2 would enable independent expansion of T2 central search with the latest ATRS technology. Dublin Airport is aware of this issue, has evaluated and accepted the associated risk and will not go for an alternative scope.
Quality of specifications	Level 3 costs provide a reasonably detailed breakdown of the specification of the works.
Phasing and synergies with other projects	Deployment of ATRS lanes needs to be phased and aligned with other projects due to dependencies and possible synergies: • CIP.20.03.012 Terminal 1 Central Search - Relocation to Mezz Level: – New ATRS lanes to be installed at the same time to reach the desired throughput at new central search; and – Old lanes can only be closed after opening of new relocated lanes. • CIP.20.03.021 Terminal 2 Central Search Area Expansion: – Existing ATRS lanes from T1 incl. remote screening to be installed as part of the project; New T1 central search therefore has to be already opened to free up ATRS lanes which will be relocated to T2. • CIP.20.06.001 – Cabin-Baggage X-ray Replacement & EDS Upgrade: – New EDS equipment to be installed at the same time to reach the desired throughput at central search areas and to avoid doing the same work twice.
Existing asset conditions	The existing T2 lanes reach end-of-life in the coming CIP period; The existing T1 lanes are still in good condition and will be reused in T2. However, since asset live is only 7 years (as stated in the CIP consultation document) T1 ATRS lanes would reach end-of-live in 2023 what could make the relocation to T2 obsolete.
Double counting	None identified

9.101 The proposed scope is required to fulfil the set objectives for T1 and T2. There is a risk for project delays in T2 due to dependencies on the T1 central search relocation and the reuse of ATRS lanes from T1.

9.102 Overall though, the scope can be considered as efficient.

Cost estimate review

Table 9.57: ATRS - Central Search Areas (T1 and T2) – Level 1 Costs

	daa cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 674,295	€ 633,654	-€ 40,641
Construction Costs	€ 8,990,595	€ 8,448,716	-€ 541,879
Escalation, Contingency & Design Variability	€ 2,029,627	€ 1,907,298	-€ 122,329
Total	**€ 11,694,516**	**€ 10,989,667**	**-€ 704,849**

Table 9.58: ATRS - Central Search Areas (T1 and T2) – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of daa C-C	daa cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	8%	€ 674,295	8%	€ 633,654
Total			**€ 674,295**		**€ 633,654**
Construction Costs (C-C)	**Quantity**	**daa rate**	**daa cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 8,990,595	€ 8,448,716	€ 8,448,716
Total			**€ 8,990,595**		**€ 8,448,716**
Escalation, Contingency & Design Variability	**Quantity**	**% of daa DM-C + C-C**	**daa cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	21%	€ 2,029,627	21%	€ 1,907,298
Total			**€ 2,029,627**		**€ 1,907,298**

9.103 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 9.59: ATRS - Central Search Areas (T1 and T2) – Main Level 3 variances

Item	Variance	% of total variance	daa rate	Steer rate
19m lanes	**Redacted Cost Information**			€ 220,000
Civil, Mechanical, Electrical for Remote Screening room				€ 1,580,567
Network Hardware				€ 97,490

9.104 The cost of the ATRS lanes are slightly higher than we have seen for similar projects at major UK airports and we have reduced this rate accordingly. The allowances for the supporting IT infrastructure costs are comparable with other similar projects in the UK. Dublin Airport has responded to our request for substantiation to various lump sums by stating that they are based on historical cost data from previous projects. Dublin Airport has provided back up information to these sums and in general they appear to be reasonable. That information has also resulted in a reduction to the provision for network hardware costs which has been reduced by just under €42,000.

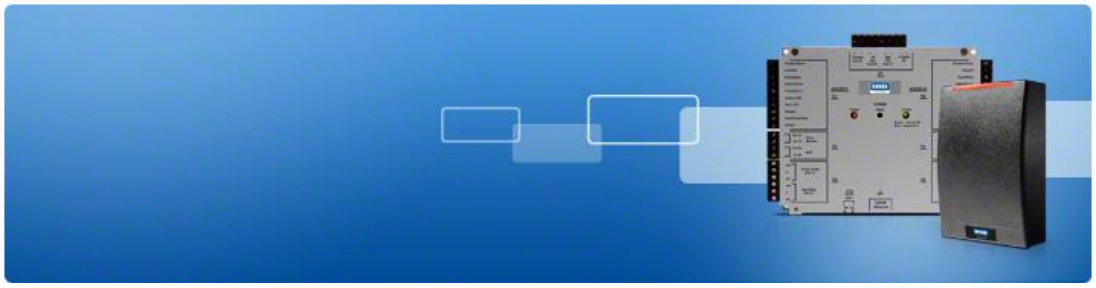
9.105 Dublin Airport has provided a high level build-up to the [redacted] lump sum for civil, mechanical and electrical for remote screening. When this is broken down to square metre rates, this indicates that the cost of the internal walls, the carpet tiles and the ceilings are higher than we would expect for works in these areas. As a result, we have reduced this allowance by €50,000. Dublin Airport has not demonstrated where it has included contractors preliminaries within its Level 3 estimate. The quantities for this project have been validated.

CIP.20.06.044 – Replacement of T1 Controllers for Access Control System

Introduction

9.106 The project proposes the replacement of T1 access controllers used in the Access Control System (ACS).

Figure 9.14: Replacement of T1 Controllers for Access Control System



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

9.107 Currently 155 Bed type controllers are used in Terminal 1 to control access to restricted areas of the building. Dublin Airport state that these controllers are approaching end of life and not compliant with newest readers now available on the market.

Context

9.108 Access control is the main method used in airports to control access to restricted areas/buildings/rooms across the airport campus. To allow an individual access to an area the units generally need to be able to read Access ID information from a radio frequency identification (RFID) card. The reader and controller technology and its reliability are very important for the efficient movement of people through the airport. Readers need replacing when security requirements change, or they become unreliable and/or the vendor technology is no longer supported.

Scope

9.109 Replacement of all 155 end of life Bed type controllers in 3 phases each phase approx. 50 controllers.

Stages

- Replacement of 155 Controllers used for access control Q2 2020

Key project metrics

Table 9.60: Replacement of T1 controllers for Access Control System - Key project metrics

Metric	Value
Construction cost	€ 402,341
Dublin Airport estimation method	Dublin Airport state scope and costs are based on site survey and existing vendor supplier proposals. The equipment type is restricted to the compatibility of the new bed controllers with existing ACS infrastructure.

Metric	Value
	Dublin Airport state that the work will be carried out by the existing ACS framework supplier which will ensure compatibility of system and equipment. The approach taken by Dublin Airport at this stage is reasonable to establish scope and cost of the project.

Specifications review

Table 9.61: Replacement of T1 Controllers for Access Control System – Specifications review

Subject	Comments
Effectiveness of scope	This project is effective.
Alternative scopes	The project planning, and installation will be carried out by the existing framework supplier however Dublin Airport will still need to select a compatible reader type to be used following the controller replacement.
Quality of specifications	This work will be carried out by the existing framework supplier. Dublin Airport has conducted a site survey to establish which controllers need to be replaced early and in which phase.
Phasing and synergies with other projects	There is no detailed phasing identified – however the upgrade is planned to be carried out in 3 phases of 50 controllers.
Existing asset conditions	Dublin Airport states that the existing Terminal 1 readers are unreliable and at end of life, that they need upgrading to maintain vendor supportability, and to ensure compatibility with the vendors' latest technology, hence the 155 controllers in T1 need replacement.
Double counting	None identified.

9.110 Dublin Airport advises that the replacement of the T1 Access control readers is essential to get completed since the existing reader technology is now becoming unreliable and causing access problems for stakeholders and maintenance problems for Dublin Airport.

9.111 Replacement of readers will present the opportunity to refresh the reader technology, improve ACS functionality, reliability and performance.

9.112 This project should deliver Dublin Airport's objectives as stated. The approach as described by Dublin Airport is effective, efficient and seems to be reasonable given the current stage of project definition and development.

Cost estimate review

Table 9.62: Replacement of T1 Controllers for Access Control – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 30,176	€ 30,176	€ 0
Construction Costs	€ 402,341	€ 402,341	€ 0
Escalation, Contingency & Design Variability	€ 102,057	€ 102,057	€ 0
Total	**€ 534,574**	**€ 534,574**	**€ 0**

Table 9.63: Replacement of T1 Controllers for Access Control System – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
General Design & Management	n/a	7.5%	€ 30,176	7.5%	€ 30,176
Total			**€ 30,176**		**€ 30,176**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Fittings / Furnishings & Equipment	1	n/a	€ 402,341	n/a	€ 402,341
Total			**€ 402,341**		**€ 402,341**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	24%	€ 102,057	24%	€ 102,057
Total			**€ 102,057**		**€ 102,057**

9.113 The information provided was not sufficient to be able to undertake a detailed review of this project. Dublin Airport has stated that there is no provision for contractors' preliminaries in its Level 3 estimate as the work involved is a like for like replacement of an existing system. We asked Dublin Airport to provide backup to the hardware and installation and commissioning costs, but none has been provided. The quantities for this project have not been validated due to a lack of design information provided to us to review. We will request further information from Dublin Airport in order to validate the hardware costs and quantities ahead of the final report.

10 Project Reviews – CIP2020 Appendix G - Others

Summary

Table 10.1: Appendix G - Others – Summary

CIP Number	Project Title	RAG Costs	Dublin Airport cost est. (€m)	Steer cost est. (€m)	Cost diff. (€m)
CIP.20.07.001	Programme Management	21.8%	4.0	4.9	0.9
CIP.20.07.002	Minor Projects	0.0%	12.5	12.5	0.0
CIP.20.07.004	Metro Coordination	59.3%	0.5	0.8	0.3
CIP.20.07.014	Terminal Operations Improvement Projects	-7.9%	4.9	4.5	-0.4
Total		3.5%	**22.0**	**22.7**	**0.8**

10.1 Overall our estimates for the projects in the 'Others' envelope suggest that the costs could increase by €0.8m.

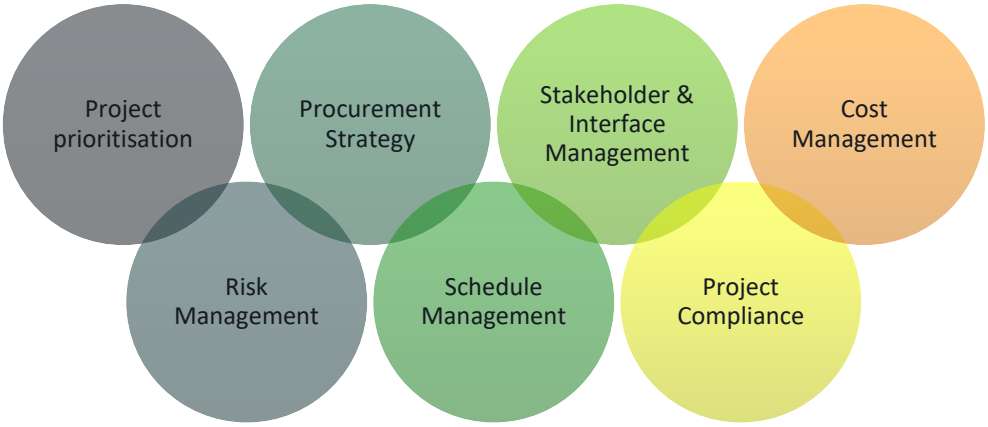
10.2 Individual reports for the projects in this Appendix are presented below.

CIP.20.07.001 – Programme Management

Introduction

10.3 This 'project' is an asset related project in the context of managing the process of delivering the projects within the CIP period. This requires a substantial management and programme governance team to define and oversee the implementation processes and will require substantial resources including project management, technical/specialists and support staff

Figure 10.1: Programme Management



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

10.4 Programme management activities are required to enable the management of individual project scope definitions, procurement, implementation, delivery and performance outcomes from capital investments in multiple interdependent projects. The objective is to ensure a consistent approach to the management and definition of each projects technical scope, cost, risk, change control, time, quality, safety, project reporting & monitoring and control. The programme management toolset uses the P30 management tool which brings together a set of principles, processes and techniques to help the programme team provide a balanced measurement of performance across the portfolio ensuring consistent approach to delivery projects and programmes across the business. Key objectives are:

- Optimisation and prioritisation of projects for delivery;
- Providing proactive stakeholder management;
- Reviewing/updating all procedures to meet ongoing requirements;
- Delivery of projects within budget and on time;
- Providing interface management to ensure minimal disruption to operations;
- Integration of cost and schedule through project control procedures and performance metrics;
- Management of risk and all the associated risk mitigation;
- Achieving compliance with programme and Project procedures to manage the ongoing capital spend;
- Providing appropriate procurement strategies to ensure best buy in the market;
- Providing dedicated environmental and H&S management.

Context

10.5 The projects in this CIP period involve a complex mix of projects consisting of a mix of asset renewal and replacement projects, IT infrastructure upgrades, software application upgrades, alongside projects associated with capacity enhancement and construction of new build assets. These projects being carried out simultaneously across all parts of the airport's operational campus in a relatively short space of time (2019 – 2024).

Scope

10.6 The scope of the programme management tasks and activities can be identified as covering the portfolio of projects to be managed by a Dublin Airport based programme management team. Dublin Airport currently estimate the resource allocation requirement to be around 9 staff mainly cost management administrative staff with technical, support and specialist staff being drawn from within the existing business or through external agencies.

10.7 We consider that the scope of responsibility of the programme management activities as currently envisaged by Dublin Airport is limited to a set of PMO activities. However, Dublin Airport state that they treat the responsibilities for much of the Project/programme management and project definition and associated technical activities as opex. Hence, we assume that these costs are not capitalised as part of the project costs provided in the project sheets.

10.8 The costs associated with Project Definition, Technical, and Project/Programme management are all associated with the various phases of project implementation and are typically treated as capitalised costs in other airports.

10.9 The table below identifies the difference between Dublin Airport's view and the steer view of capitalising project costs.

Project implementation phase	Dublin Airport basis for costing (See Q&A. 9 and 178)	Steer view of how these internal Dublin Airport implementation and management costs are typically allocated
1. Scoping and Definition (Initiation)	Opex	Capex
2. Requirements Specification	Opex	Capex
2. Procurement Phase	Opex	Capex
3. Design Phase	Capex	Capex
4. Implementation (Installation, Testing, Commissioning)	Capex	Capex
5. Training	Opex	Capex
6. IT Licensing - 1st Year Capex, remaining years	Opex	1st- Year Capex Subsequent Years - Opex
7.IT Maintenance and Support – Opex	Opex	Opex
8. IT Service Management Activities -	Opex	Opex

10.10 We consider that the overall scope of responsibility and resources identified for a programme management activity of this magnitude of capital investment spend is significantly under estimated and have several programme/project organisational and governance omissions in relation the FTE resources identified.

Stage

10.11 The programme management activities will be active for the whole CIP period 2019 -2024 commencing with an initial set up period in Q3 2019 leading into commencement of the activities in Q1 2020.

Key project metrics

Table 10.2: Programme Management - Key project metrics

Metric	Value
Project cost estimate	€ 4,000,000
Dublin Airport estimate	Dublin Airport estimate is based on 7 FTE staff employed over the full 5-year programme 5 Technical Staff@ €60kpa x 5years = €1.5m 2 Technical Staff@ €40kpa x 5years = €0.4m 2 Technical Staff@ €40kpa x 5years = €0.4m 1 Specialist Safety consultant @ €70kpa x 5years = €0.35m 1 Specialist Planning Consultant @ €200kpa x 5years = €1m Escalation & Contingency @8% = €350k Total €4m
Cost Metrics	This looks highly under resourced for a programme management team with responsibility for a 1.7billion programme of capital works.

Specifications review

Table 10.3: Programme Management - Specifications review

Subject	Comments
Effectiveness of scope	The FTE resource estimates appear to be low for a programme of capital investment of this magnitude. Dublin Airport has only covered the Programme Management Office (PMO) functions such as cost and task scheduling in the scope of programme management. Dublin Airport stated in the review meeting at Dublin they intended to draw on internal resources to cover technical/design management and technical assurance and other specialist activities (Stakeholder management etc) that will be associated with the works. The programme organisation and governance are not yet fully defined hence the programme management task scope currently does not cover other activities required such as: • Project definition, specification and prioritisation; • Procurement; • Stakeholder management; • Risk management; and • Technical and design assurance. These activities will be required for a capital programme of this magnitude.
Alternative scopes	Given the range of projects that need to be managed it will be vital to get the programme team embedded into the Dublin Airport organisation and for the Dublin Airport organisation to develop its processes and communication requirements so that

Subject	Comments
	the programme management team is facilitated to manage, organise and deliver the overall capital investment programme. The balance between outsourcing and direct employment of programme management staff is not yet determined. In response to our queries, Dublin Airport has confirmed that "this has not been dealt with at feasibility stage and will be defined further down the line". This definition should be the outcome of reviewing the benefits of obtaining an appropriate mix of internal and external appointments, such that key staff are retained and trained through multiple projects. These appointments are effectively an investment that Dublin Airport should look to retain, rather than lose on a 5-yearly cycle.
Quality of specifications	The scope is sufficiently comprehensive in that it covers the whole CIP portfolio of projects. There is little information relation to the organisation and structure of the programme team and how they will be organised to manage the following activities which will be key to the success of the programme: • Programme cost management and change control; • Programme scheduling (P30); • A Portfolio of project managers for each of the CIP projects; • Stakeholder management and engagement; • Project coordination and Interface management; • Design management and BIM; • Document management; • Programme and project requirements management; • Project procurement; • Design authority (technical approvals, technical change management); and • Technical assurance activities (requirements engineering and management, project acceptance and handover. Dublin Airport has confirmed that the terms of appointment of the programme manager have not yet been developed on the basis of not having yet defined the final programmes.
Phasing and synergies with other projects	The programme management team will need to be in place from the start of the CIP period. The proposed Q3 2019 initial set up period is very limited period for Programme team establishment for such as large programme of works. Typically, a programme team would expect to be in place and operating with a fully developed programme organisation and plan at the start of this CIP. Given the complexity, nature and wide range of disciplines required for each of these it would be expected that a significant organisation would already have been developed and operating to takeover and manage these projects when the CIP begins.
Existing asset conditions	Not applicable.
Double counting	No double counting has been identified within the data provided. However, on such commissions it is quite possible that there could be duplication of roles between any external partner and Dublin Airport. This would need a deeper assessment of personnel, accountabilities, roles and

Subject	Comments
	responsibilities once the terms of appointment have been defined.

10.12 This Programme management function will be a vitally important management capability needed by Dublin Airport to manage and oversee the CIP. With a combination of capacity expansion projects and asset renewal projects as well as business and commercially focused projects, this will be a complex set of multi-disciplined, technical and commercial activities. The current estimate of FTE programme management resources envisaged looks particularly light for the magnitude of investment planned over the 5 Year CIP period.

Cost estimate review

Table 10.4: Programme Management – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 3,650,000	€ 4,510,000	€ 860,000
Construction Costs	€ 0	€ 0	€ 0
Escalation, Contingency & Design Variability	€ 350,000	€ 360,800	€ 10,800
Total	**€ 4,000,000**	**€ 4,870,800**	**€ 870,800**

Table 10.5: Programme Management – Level 2 Costs

Design and Management Costs (DM-C) Quantity	Dublin Airport quantity	Dublin Airport cost estimate	Steer quantity	Steer cost estimate
Technical Staff	5	€ 1,500,000	6	€ 2,700,000
Support Staff	2	€ 400,000	2	€ 60,000
Safety Staff	2	€ 400,000	2	€ 400,000
Specialist Consultants (Environment)	1	€ 350,000	1	€ 350,000
Specialist Consultants (Planning)	1	€ 1,000,000	1	€ 1,000,000
Total		**€ 3,650,000**		**€ 4,510,000**

Construction Costs (C-C)	Quantity	Dublin Airport rate	Dublin Airport cost estimate	Steer rate	Steer cost estimate
n/a		€ 0	€ 0	€ 0	
Total			**€ 0**		**€ 0**

Escalation, Contingency & Design Variability	Quantity	% of Dublin Airport DM-C + C-C	Dublin Airport cost estimate	% of Steer DM-C + C-C	Steer cost estimate
Escalation, Contingency & Design Variability	n/a	8%	€ 350,000	8%	€ 360,800
Total			**€ 350,000**		**€ 360,800**

10.13 Based on our previous experience where we have worked on projects that have reported into a Programme Management function we consider that the cost provision for this project may need to increase. The allowance for support staff is excessive and can be reduced but the cost for the technical staff is less than we would anticipate. We would anticipate an annual cost of approximately [redacted] for staff. This compares to the figure of [redacted] per annum included in the Dublin Airport proposal. We asked Dublin Airport to provide more detail regarding the proposed structure of their proposed programme management team, but they have not been able to do so. They advised that as the programmes had not been fully defined, the structure of the team was still to be developed.

CIP.20.07.002 – Minor Projects

Introduction

10.14 This 'project' is not a specific building refurbishment or maintenance programme, but provision of funds to be spent on minor small projects when needed.

Figure 10.2: Minor Projects

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Objective

10.15 The objective of this project is to:

- Address day to day issues;
- Minimise operational disruption through ability to address unforeseen issues;
- Ability to respond to minor airline requirements; and
- Ability to respond to passenger requirements.

Context

10.16 The context of this project is that the cost in previous years has averaged €2.0m per annum for 30mppa airport. It is assumed that going forward this annual spend (budgeted for € 12.5m) will increase in alignment with the passenger throughput of up to 40mppa.

Scope

10.17 The project scope cannot be defined in specific minor projects, but generally they fall into one of the categories referred to below:

- General maintenance, both landside and airside;
- Efficiency e.g. replacing halogen lighting with LED's; and
- Airport operations e.g. maintaining H&S, security etc.

Stage

The project is ongoing throughout the CIP period 2020 – 2024.

Key project metrics

Table 10.6: Minor Projects – Key project metrics

Metric	Value
Project cost estimate	€ 12,540,000
Dublin Airport estimation method	Level 2 estimate included in CIP 2020 Final
Cost per square metre	Not relevant

Specifications review

Table 10.7: Minor Projects – Specifications review

Subject	Comments
Effectiveness of scope	The scope is effective for Level 2 budgeting. As this is a project driven by short term demand it is difficult to see how a more detailed budget could be allocated.
Alternative scopes	Not relevant.
Quality of specifications	Adequate.
Phasing and synergies with other projects	This is a stand-alone project; clearly the actual response work needs to be co-ordinated on the 'ground'.
Existing asset conditions	The actual response work needs to recognise the age of the asset being repaired.
Double counting	None identified.

10.18 A budget increase over and above previous years would seem reasonable on the basis that the airport is undertaking significant development in the next CIP period 2020 – 2024 and traffic is forecast to reach 40mppa.

Cost estimate review

Table 10.8: Minor Projects – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 0	€ 0	€ 0
Construction Costs	€ 12,540,000	€ 12,540,000	€ 0
Escalation, Contingency & Design Variability	€ 0	€ 0	€ 0
Total	**€ 12,540,000**	**€ 12,540,000**	**€ 0**

Table 10.9: Minor Projects – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
Design & Management Costs	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
General Maintenance	5 yr	€ 2,508,000	€ 12,540,000	€ 2,508,000	€ 12,540,000
Total			**€ 12,540,000**		**€ 12,540,000**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	0%	€ 0	0%	€ 0
Total			**€ 0**		**€ 0**

10.19 While Dublin Airport has not provided a level 3 estimate for this project, it has provided a summary of the costs that it has incurred for the 4 year period from 2015 to 2018. This indicates that on average, Dublin Airport has spent approximately €2.5m per year on minor projects. On this basis, the annual allowance that Dublin Airport has included for this project is reasonable.

CIP.20.07.004 – Metro Coordination

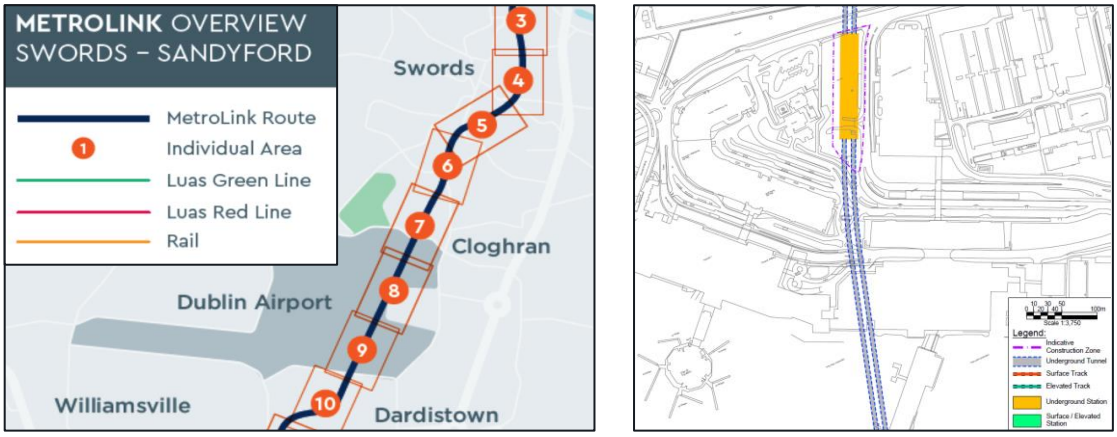
Introduction

10.20 This project is the provision of technical services to co-ordinate the planning, design and interface of the Metro with the airport.

Objective

10.21 The objective of the MetroLink project is to provide technical staff to coordinate and integrate the MetroLink project into the airport infrastructure and optimise the station design and other interfaces.

Figure 10.3: Metro Coordination



Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

10.22 The context of this project is very high-level at this stage. According to CIP and publicly available data the airport station(s) are just indicated along the railway line (see Figure 1 – Airport Stations 7, 8, 9 and Figure 2 – Central Airport station).

Scope

10.23 The project scope for the next 5 years is defined by the following resources identified as required:

- Metro interface 1 full time engineer
- Planning consultant part time
- Design consultant part time
- Site co-ordinator part time

10.24 Without knowing the scope and responsibilities of the Metro project it is difficult to validate the resourcing planned by Dublin Airport, however our judgement is that what has been budgeted for is inadequate.

Stage

10.25 This procurement route shows, that the MetroLink project is a major project and interfacing with this project will start by the end of the year. Construction of the new station will not be finished within the CIP period 2020 – 2024. The outline procurement route is as following:

- 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)

Key project metrics

Table 10.10: Minor Projects – Key project metrics

Metric	Value
Project cost estimate	€ 500,000
Dublin Airport estimation method	Level 2 estimate included in CIP 2020 Final
Cost per square metre	Not relevant

Specifications review

Table 10.11: Metro Coordination – Specifications review

Subject	Comments
Effectiveness of scope	The scope is effective for Level 1 high level budgeting, but for Level 3 greater definition is required to allocate an appropriate budget.
Alternative scopes	Not relevant.
Quality of specifications	More detail required as noted above.
Phasing and synergies with other projects	More information is needed to identify the precise location of the planned Metro stations, but clearly this project will need to be phased with both other airport projects and existing airport infrastructure.
Existing asset conditions	Not relevant, but the new Metro asset life is 40 years.
Double counting	None identified.

10.26 The project contains allocated fees purely associated with the coordination of the MetroLink project during design and construction phases. The scope for this type of project is difficult to assess at this time, however our view is that the budget allowed is insufficient.

Cost estimate review

Table 10.12: Metro Coordination - Level 1 Costs

	daa cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 500,000	€ 750,000	€ 250,000
Construction Costs	€ 0	€ 0	€ 0
Escalation, Contingency & Design Variability	€ 0	€ 46,370	€ 46,370
Total	**€ 500,000**	**€ 796,370**	**€ 296,370**

Table 10.13: Metro Coordination – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of daa C-C	daa cost estimate	% of Steer C-C	Steer cost estimate
Design & Management Costs	n/a	100%	€ 500,000	100%	€ 750,000
Total			**€ 500,000**		**€ 750,000**
Construction Costs (C-C)	**Quantity**	**daa rate**	**daa cost estimate**	**Steer rate**	**Steer cost estimate**
NA		€ 0	€ 0	€ 0	
Total			**€ 0**		**€ 0**
Escalation, Contingency & Design Variability	**Quantity**	**% of daa DM-C + C-C**	**daa cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	0%	€ 0	6%	€ 46,370
Total			**€ 0**		**€ 46,370**

10.27 We assess that the resource requirements for this role equate to 1 x FTE engineer and 3 part time support staff. As a result, our Level 3 estimate allowance has increased to €150,000 per annum compared to Dublin Airport's allowance of €100,000 per annum.

10.28 The escalation represents salary increases over the 5 year period at 3% per annum.

CIP.20.07.014 – Terminal Operations Improvements Projects

Objective

10.29 Over the 2020-2024 CIP period Dublin Airport plans to implement several small terminal operation improvement projects to improve the overall passenger experience.

10.30 Works intended as part of this proposed investment include:

- Washrooms;
- Seating;
- Luggage Trolleys;
- Barriers;
- Signage;
- Visual environment; and
- T2 OCS relocation.

Figure 10.4: Terminal Operations Improvements

Source: Dublin Airport's Capital Investment Programme 2020+ Consultation Document

Scope

10.31 The Scope of the Terminal Operations Improvements Projects covers:

- Washrooms;
  - The washrooms in Pier 1 & 2 are deemed sub-standard by Dublin Airportand are in need refurbishment.
- Seating;
  - Investment to improve seating in gate waiting and boarding in Piers 1, 2 and 3.
- Luggage Trolleys;
  - 3,000 new trolleys in T1 and T2 to replace existing trolleys and allow for increased passenger volumes.
- Barriers;
  - This project proposes the implementation of a standardised Dublin Airport tensile 'topped' barrier.
- Signage;
  - This is an ongoing investment throughout the CIP period in new way finding and light boxes (signs that are back lit) to ensure efficient passenger operations.
- Visual Environment;
  - Areas being considered for visual environment enhancement includes:
    - T1 Car parks;
    - T1Terminal Front Entrances;

    - T1 Mezzanine;
    - T1 Orientation Area;
    - T1 Immigration;
    - T1 CBP Departure Gates;
    - T1 airbridges; and
    - Pier 2 Departures.
- T2 OCS Relocation;
  – This investment proposes relocating the existing PRM reception to a new location beside washrooms/vending/bag wrap area in T2 Check in.

Stage

10.32 The Hardware and Software upgrades are part of an ongoing programme of enhancements/upgrade and are anticipated to extend from Q1 2020 thru Q4 2024.

Key project metrics

Table 10.14: Terminal Operations Improvements Projects – Key project metrics

Metric	Value
Construction costs	€ 3,794,316
Dublin Airport estimation method	Dublin Airport feedback to questions raised have determined: • Washrooms refurbishments are at feasibility stage, with commensurate level of definition of the locations and project proposals to determine a m^2 costing; • OCS concept design has been developed for the relocation and indicative costs obtained PC sum; and • Visual environment has been defined at a high-level with specific locations in need of improvement chosen to improve passenger areas PC sum. • Barriers, signage and trolleys are essential equipment costs per item basis.

Specifications review

Table 10.15: Terminal Operations Improvements Projects - Specifications review

Subject	Comments
Effectiveness of scope	This project scope will effectively deliver the following: • Replacement of end of life plant and services; • Assured compliance with the Code of Practice guidelines; • Improve space utilisation; • Improved customer experience; • Improved system reliability and maintainability; and • Improved system efficiency, environment and flow control.
Quality of specifications	No specifications were forthcoming during this evaluation, however Dublin Airport IT stated that high level project specifications had been prepared in line with the existing standard in T1 and T2 and had been included in the CIP submission: • Washroom refurbishments will be in line with the standards washrooms completed in the previous CIP in Piers 2 & 3, and T1 street area; • OCS relocation will involve amendments to the OCS setup but replicates existing OCS facility in line with the T2 standard specification of finishes; and

Subject	Comments
	• Visual environment will be in line with the standard of visual environment projects carried out in the terminals in recent years.
Phasing and synergies with other projects	Whilst not directly related, the Terminal Operations Improvements Projects have synergies with the aspects of the works planned in Terminals, Pier Life Extension Works, IT Servers and Storage - Lifecycle & Growth and IT Network Components - Lifecycle & Growth CIPs.
Existing asset conditions	• Washrooms - declared to be end of life. • Signage, Visual Environment & T2 OCS - deemed sub-optimal. • Seating, Luggage Trolleys & Barriers – deemed insufficient to meet business needs.
Alternative scopes	The project planning, design and procurement processes for each aspect of the project should review and evaluate alternative product/supplier options as the project brief is expanded.
Double counting	Dublin Airport feedback to questions raised have determined that project planning, design and procurement processes for each element is not sufficiently developed to enable alternative product/supplier options to be considered at this juncture. However, through the Q&As it was revealed that the Terminal Operations Terminal Operations Signage Visual Environments initiates anticipated increased network traffic have been included in the core and data centre layers and do therefore not form part of this CIP. {refer 'Phasing and synergies with other projects' above}

Cost estimate review

Table 10.16: Terminal Operations Improvements Projects – Level 1 Costs

Item	Dublin Airport cost estimate	Steer cost estimate	Cost difference
Design and Management Costs	€ 284,574	€ 284,574	€ 0
Construction Costs	€ 3,794,316	€ 3,471,396	-€ 322,920
Escalation, Contingency & Design Variability	€ 846,370	€ 779,364	-€ 67,006
Total	**€ 4,925,259**	**€ 4,535,334**	**-€ 389,926**

Table 10.17: Terminal Operations Improvements Projects – Level 2 Costs

Design and Management Costs (DM-C)	Quantity	% of Dublin Airport C-C	Dublin Airport cost estimate	% of Steer C-C	Steer cost estimate
Design & Management Costs	n/a	6%	€ 284,574	8%	€ 284,574
Total			**€ 284,574**		**€ 284,574**
Construction Costs (C-C)	**Quantity**	**Dublin Airport rate**	**Dublin Airport cost estimate**	**Steer rate**	**Steer cost estimate**
Washrooms/toilets (minor refurbishments)	1	n/a	€ 2,116,920	n/a	€ 1,794,000
Trolleys	2,249	€ 290	€ 652,210	€ 290	€ 652,210
Barriers	1,527	€ 118	€ 180,186	€ 118	€ 180,186
Signage	1	n/a	€ 100,000	n/a	€ 100,000
Visual Environment	1	n/a	€ 500,000	n/a	€ 500,000
OCS Relocation	1	n/a	€ 245,000	n/a	€ 245,000
Total			**€ 3,794,316**		**€ 3,471,396**
Escalation, Contingency & Design Variability	**Quantity**	**% of Dublin Airport DM-C + C-C**	**Dublin Airport cost estimate**	**% of Steer DM-C + C-C**	**Steer cost estimate**
Escalation, Contingency & Design Variability	n/a	17%	€ 846,370	21%	€ 779,364
Total			**€ 846,370**		**€ 779,364**

10.33 The variances in assumptions between Dublin Airport and Steer are mainly driven by the following Level 3 items:

Table 10.18: Terminal Operations Improvements Projects – Main Level 3 variances

Item	Variance	% of total variance	Dublin Airport rate	Steer rate
Pier 1 arrivals - male and female washrooms below gate 108 (165m^2)	**Redacted Cost Information**			€ 3,000
Pier 1 arrivals - male and female washrooms below gate 109 (165m^2)				€ 3,000
Pier 1 departures - 1 no. female at gate 109 (85m^2)				€ 3,000
Pier 1 departures - 1 no. male at gate 111 (72m^2)				€ 3,000
Pier 2 departures - 1 no. male at gate 202 (56m^2)				€ 3,000
Pier 2 departures - 1 no. female at gate 201 (55m^2)				€ 3,000

Other than the information contained in the level 3 estimate there is no other information available to review for this project, so we have not been able to validate any quantities. The unit rates for the trolley and the barriers are reasonable. The allowance for the refurbishment of the toilets is higher than we would expect and is also higher than the allowance for the refurbishment of other toilets elsewhere in the CIP. We have therefore reduced the allowance the toilet refurbishment to €3,000/m2. Dublin Airport has provided a breakdown for the visual environment lump sum of €500,000. While that breakdown is itself a further series of lump sums they are not unreasonable for the works in question. No build-up for the lump sums for signage or OCS Relocation has been provided so we cannot comment on the validity of these sums.

11 Appendices

Appendix i - List of Projects

Appendix A - Asset Care (CSF)		
CIP.20.01.001	Southern Runway (R10R/28L) Delethalisation Programme	€2,203,254
CIP.20.01.002	Apron Rehabilitation Programme	€37,000,000
CIP.20.01.003	Airfield Taxiway Rehabilitation Programme	€19,000,000
CIP.20.01.004	Apron Road Rehabilitation Programme	€4,600,000
CIP.20.01.006	Airfield Southern Perimeter Road Upgrade Programme	€4,610,924
CIP.20.01.008	Runway Approach Lighting Mast Improvement Programme	€11,125,135
CIP.20.01.009	Aerodrome Ground Lighting (AGL) Improvement Programme	€4,668,749
CIP.20.01.010	Airfield Lighting Control & Management System Improvement Programme	€4,854,754
CIP.20.01.012	AGL Substation T Development Programme	€3,703,429
CIP.20.01.015	High Mast Lighting Improvement	€742,314
CIP.20.01.016	Airfield Maintenance Base Improvement Programme	€4,497,352
CIP.20.01.018	Campus Buildings Critical Maintenance	€1,519,750
CIP.20.01.020	Terminal 1 Façade, Roof & Spirals	€25,830,500
CIP.20.01.022	Terminal 1 Storm Water Drainage System	€1,124,162
CIP.20.01.023	Piers & Terminals Critical Maintenance	€1,912,680
CIP.20.01.024	Skybridge Rehabilitation	€1,202,902
CIP.20.01.034	Campus Roads Critical Maintenance	€6,763,800
CIP.20.01.039	Airport Roads Critical Maintenance	€5,148,954
CIP.20.01.046	Staff Car Parks Critical Maintenance	€1,688,636
CIP.20.01.049	Public Carpark Critical Maintenance	€2,409,236
CIP.20.01.056	Campus Facilities & Landside Snow Base Upgrade	€2,855,024
CIP.20.01.065	Airport Heavy Fleet & Equipment Replacement	€11,043,750
CIP.20.01.069	Airport Light Vehicle Fleet Replacements and Augmentation	€2,408,625
CIP.20.01.071	Electric Charger Network Facilities	€1,645,241
CIP.20.01.074	Advance Visual Docking Guidance System (5G, Pier 1 & Pier 2)	€5,329,994
CIP.20.01.087	AGL Fibre Optic Communication Network Improvement Programme	€2,017,587
CIP.20.01.099	RWY 16/34 Lighting for Low Visibility Procedures (LVP)	€5,500,000
CIP.20.07.013	Airfield Redesignation	€1,500,000
CIP.20.07.032	Unit Load Device (ULD) Storage	€5,000,000
Appendix A Total		**€181,906,752**

Appendix B - Asset Care Mechanical & Electrical (M&E)		
CIP.20.02.001	Medium Voltage (MV) Electrical Network	€6,293,659
CIP.20.02.002	Second Medium Voltage (MV) Connection Point	€1,000,000
CIP.20.02.004	Passenger Boarding Bridges (Maintenance & P3 Enhancement) & Fixed Electrical Ground Power	€18,067,171
CIP.20.02.005	Lift Upgrade Programme -Terminal and Multi-Storey	€6,239,856
CIP.20.02.006	Airport Water & Foul Sewer Upgrade	€4,953,212
CIP.20.02.007	Life Safety Systems (LSS) Upgrade Programme Terminal and MSCP Buildings	€10,107,300
CIP.20.02.008	Terminal Buildings HVAC Upgrade	€17,781,123
CIP.20.02.009	Campus Buildings: Mechanical, Electrical & LSS Upgrade	€9,476,409
CIP.20.02.010	Pier 3 Life Extension Works - Mech, Elec and Foul Drainage	€14,043,473
CIP.20.02.013	Small Energy Projects	€4,831,755
CIP.20.07.030	Large Energy Project - Photovoltaic Farm	€10,000,000
Appendix B Total		**€102,793,958**

Appendix C - Capacity		
CIP.20.03.004	Gate Post 9 Expansion (West Lands)	€9,230,000
CIP.20.03.006	Terminal 1 Kerbs	€13,643,778
CIP.20.03.011A	Terminal 1 Check-In (Partial shoreline)	€30,233,000
CIP.20.03.012	Terminal 1 Central Search - Relocation to Mezz Level	€42,630,000
CIP.20.03.013	Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation	€42,390,000
CIP.20.03.015	Terminal 1 Baggage Reclaim Upgrade & Alterations	€22,170,000
CIP.20.03.016	Terminal 1 - Rapid Exit Arrivals	€2,220,000
CIP.20.03.017	Terminal 1 Shuttle, bus lounges and injection points	€2,840,000
CIP.20.03.018	Terminal 1 - Immigration Hall	€1,490,000
CIP.20.03.020	Terminal 2 Check-in Area Optimisation	€14,770,000
CIP.20.03.021	Terminal 2 Central Search Area Expansion	€5,640,000
CIP.20.03.028	Terminal 2 Early bag store and transfer lines	€27,910,000
CIP.20.03.029	New Pier 5 (T2 and CBP Enabled)	€323,640,000
CIP.20.03.030	Expansion of US Pre-Clearance Facilities	€50,330,000
CIP.20.03.031	South Apron Expansion (Remote Stands, Taxiway and Apron)	€89,750,000
CIP.20.03.033A	Enablement of Pier 3 for Precleared US bound passengers	€8,500,000
CIP.20.03.034	Pier 3 Immigration (Upgrade & Expansion)	€5,730,000
CIP.20.03.036	North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ	€175,310,000
CIP.20.03.043A	Terminal 1 Piers - New Airbridges (6NBE / 3WB)	€33,900,000
CIP.20.03.049	De-icing pad at Runway 10R	€5,000,000
CIP.20.03.051B	West Apron Vehicle Underpass - Pier 3 Option	€171,000,000
CIP.20.03.052	Surface Water Environmental Compliance	€51,000,000
CIP.20.03.054	New Remote Apron 5M - 17 NBEs	€72,085,000
CIP.20.03.057	Airside GSE Charging Facilities (Ground Handlers)	€5,000,000
CIP.20.03.071	Hydrant Enablement - Pier 2 & 3	€23,680,000
Appendix C Total		**€1,230,091,778**

Appendix D - Commercial		
CIP.20.04.001	Car Parking Management System (Maintenance & upgrade)	€3,104,062
CIP.20.04.002	Car Hire Consolidation Centre	€14,000,000
CIP.20.04.003	New Food & Beverage Fit-out (T1X)	€2,135,313
CIP.20.04.004	Digital Advertising Infrastructure	€2,169,609
CIP.20.04.005	Long Term Car Parking - Eastland's (2000 spaces)	€5,934,895
CIP.20.04.006	Terminal 1 Multi-Storey Car Park Block B (466 spaces)	€18,844,726
CIP.20.04.007	Terminal 2 Multi-Storey Car Park (680 spaces)	€15,083,338
CIP.20.04.009	Staff Car Park	€6,000,000
CIP.20.04.016	Platinum Services Upgrade Works	€2,103,712
CIP.20.04.017	Airline Lounges - Expansion, Upgrade & New	€11,390,214
CIP.20.04.018	Fast Track Improvements	€1,685,400
CIP.20.04.021	West Apron - Accommodation & Welfare Facilities	€4,480,317
CIP.20.04.023	Food & Beverage Provision & Fit-out – Post CBP	€3,216,599
CIP.20.04.025	Commercial Property Refurbishment	€7,971,942
CIP.20.04.030	New Kitchen in Terminal 2	€3,022,237
CIP.20.07.010	Office Consolidation & Refurbishment (primarily Level 4 & 5, Terminal 1)	€15,000,000
CIP.20.08.001	Retail Refurbishments, Upgrades and New Developments	€8,000,000
CIP.20.08.002	Retail Marketing & Media Installation	€1,500,000
Appendix D Total		**€125,642,364**

Appendix E - Information Technology		
CIP.20.05.001	Airfield Optimization	€5,900,000
CIP.20.05.002	Digital Passenger Experience	€1,750,000
CIP.20.05.003	Integrations and Data	€5,050,000
CIP.20.05.004	Baggage Systems	€1,300,000
CIP.20.05.005	Business Efficiency	€6,200,000
CIP.20.05.006	Commercial Systems	€2,300,000
CIP.20.05.007	Reliability, Safety, Security & Compliance	€8,230,000
CIP.20.05.008	Operational Devices (Support & Maintenance)	€1,750,000
CIP.20.05.009	Network Components - Lifecycle & Growth	€6,875,000
CIP.20.05.010	Passenger Processing (excl. Security Screening)	€11,000,000
CIP.20.05.011	Security Technology Innovation (Biometrics & FOD Detection)	€5,000,000
CIP.20.05.012	Servers and Storage - Lifecycle & Growth	€5,570,000
CIP.20.05.014	User Devices (Desktops, Mobile, Telephone, Radio)	€3,700,000
CIP.20.05.015	New Data Centre Hosting Location	€4,000,000
CIP.20.05.016	Microsoft Enterprise	€6,000,000
CIP.20.05.020	Innovation Fund	€4,000,000
Appendix E Total		**€78,625,000**

Appendix F - Security		
CIP.20.06.001	Cabin-Baggage X-Ray Replacement& EDS Upgrade	€14,637,865
CIP.20.06.007	Full Body Scanners	€1,944,267
CIP.20.06.009	ATRS – Additional Lane in Terminal 1	€557,158
CIP.20.06.014	Screening and Logistics Centre	€13,429,872
CIP.20.06.015	Intrusion Detection Systems forDublin Airport Boundaries	€4,001,499
CIP.20.06.016	Surface Road Blockers & Temporary Mobile Barriers	€952,204
CIP.20.06.022	Redevelopment of Training Facility (ASTO)	€1,170,001
CIP.20.06.025	Detection: Explosive Detection Dogs (EDD) and Mobile X Ray Unit	€174,890
CIP.20.06.030	VCP Automation to Enable Remote Screening	€687,341
CIP.20.06.031	Autopass - T1 Replacement & T2 Install	€1,782,245
CIP.20.06.036	TSA - X-Ray & FBSS Replacement	€365,420
CIP.20.06.041	Security Screening Equipment - End of Life	€4,466,825
CIP.20.06.042	ATRS - Central Search Areas (T1 and T2)	€11,694,516
CIP.20.06.044	Replacement of T1 Controllers for Access Control System	€534,573
Appendix F Total		**€56,398,676**

Appendix G - Others		
CIP.20.07.001	Programme Management	€4,000,000
CIP.20.07.002	Minor Projects	€12,540,000
CIP.20.07.004	Metro Coordination	€500,000
CIP.20.07.014	Terminal Operations Improvement Projects	€4,925,266
Appendix G Total		**€21,965,266**

TOTAL		**€1,797,423,793**

**Note the overall Dublin Airport capex cost now stands at €1,802.7m, which is about €5.3m higher than the CIP document figure above of €1,797.4m. This is due to three adjustments Dublin Airport have since provided us: Firstly, the surface area of the long term car park in 20.04.005 was underestimated in the CIP, incorrectly basing its estimates on 29,000sqm rather than 50,000sqm. This has now been corrected, increasing the project by about €4.3m. Secondly, a discrepancy in the CIP report where project 20.03.052 is reported at €51.0m when in fact the individual cost built up totals to €51.6m, thus increasing the CIP by a further €0.6m. Thirdly the cost of the observation room (€0.3m) has been added back into the CIP 20.03.018.

Appendix ii - List of Cost Assumptions

Provided information and approach

11.1 We received Level 3 estimates for all 114 of the 117 projects from Dublin Airport. The structure and level of detail of cost information that was provided to us by Dublin Airport varied from project to project. Some of the projects under review provided very detailed Level 3 estimates with quantities and rates for individual items included in the estimate. In some cases, design information was also supplied that allowed quantities to be checked.

However, there were also a significant number of projects where the Level 3 estimates were made up of large undefined lump sums with no supporting back up information provided to justify these sums, or design information for the projects to demonstrate what these sums were for.

Wherever the project did not possess enough information relating to quantities, rates or specification, additional questions were sent to Dublin Airport. In total, over 400 additional question were sent to Dublin Airport.

Whilst all questions were answered, many of them failed to provide additional granular information that would have allowed further analysis into the lump sums or quantities of a project, which meant that the costs of several projects could not be fully appraised.

Further to this, a final request for more information on lump sums was sent to Dublin Airport. Some additional information was returned, with varying degrees of use and granularity.

In many of these cases, the granular data simply does not exist as many projects are at an embryonic stage, and such costs are simply based on estimates.

Most of the estimates were presented in a consistent manner in terms of design and management costs, contractors preliminaries, contingency and escalation. However, there were some projects where the Level 3 estimate stated that these headings were deemed to be included elsewhere within the Level 3 estimate.

In reviewing the costs of the projects, we focused primarily on the elements of work that had been quantified. We have used the Dublin Airport Level 3 estimates for each project as the basis for our review.

Where we have relevant cost data or benchmark information, we have used what we consider to be a sensible provision is for the quantified items listed in the Dublin Airport build-ups. This allowed us to review and analyse the rates that Dublin Airport had included in their submission and compare them with equivalent cost data that we have from our extensive experience working in the aviation sector. We have predominantly used benchmarks from similar projects at South-East England airports. These airports are considered to be of similar size and complexity as Dublin Airport, particularly Gatwick Airport.

Main assumptions

11.2 **Consultants' fees and design and management costs**: 15% 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. Some of the estimates contain a higher allowance than this but in the main they were for more complex projects that justify a higher provision within the estimate. There were a small number of projects where we included a reduced provision for consultants' fees and management costs. This was generally on projects

where there was a lesser requirement for a full design team to provide input e.g. surface car parks and airfield projects generally require input from

11.3 **Escalation**: From the responses provided by Dublin Airport we have assumed escalation to be an inflationary allowance within the cost estimate, applied from the base date of the cost estimate to the mid-point of the construction programme.

11.4 Based on our recent experience in the UK and Irish markets we have seen annual inflationary increases of between 2.5% to 3.5%. Therefore, based on our review of the project estimates and in particular those where an escalation allowance has been included, we consider that the allowances included are reasonable. There were a small number of projects where escalation was excluded from the Level 3 estimate but where the programme stated that the project was going to run well into the CIP. In these instances, we have included provision for escalation within our Level 3 estimates.

11.5 **Contingency**: This 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. We would normally expect to see the following contingency allowances:

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

Our review of the projects submitted by Dublin Airport has been on this basis. There are some projects where we have seen a design development allowance included within the construction cost element of the project as well as a contingency allowance. Where the design development allowance was more than 5% we have reduced or omitted that allowance as we believe that this is a duplication of the contingency allowance contained within the estimate.

11.6 **Lump sum allowances**: Where only Level 2 lump sum allowances have been provided by Dublin Airport with no further Level 3 detail or tran3sparency to support them, it has not been possible to carry out any meaningful Level 3 analysis of the figures contained within them to establish how they have been calculated or whether they represent value for money. However, based on the overall view of the level 2 costs, we have, where possible, provided our own view on the validity of the cost allowances for the project in question.

11.7 **Exchange rates applied to our benchmarks**: As all the projects that we have used to source cost information to compare against Dublin Airport's costs are from UK airports, we have used a conversion factor of 1.14 Euros to the Pound.

11.8 **Level 3 cost variance table**: As per paragraph 11.5 above, contingency, design and escalation costs are normally based on a percentage of the construction costs, so they naturally generate a cost variance where construction costs increase or decrease. The Level 3 cost variance table, however only contains variances associated with quantity, rate or specification changes to the construction costs of a project, and does not contain the variances associated with contingency, design and escalation.

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Control Information

Prepared by

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Prepared for

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Steer project/proposal number

23502001

Client contract/project number

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Version control/issue number

V57

Date

05/May/2018

steer

QUALITY SYSTEM CERTIFICATION
DNV·GL
ISO 9001:2015

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