



**Review of Dublin Airport Authority  
Capital Expenditure Programme  
(CIP 04)**

**For**

**The Commission for Aviation  
Regulation**

**Report No. 1 – Review of DAA  
Cost Benchmarks**

**10<sup>th</sup> May 2007**

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in response to queries

**Note:** This document has been prepared by Rogerson Reddan & Associates Ltd, in conjunction with Vector Management Ltd., (RR&V), in accordance with the terms of RR&V's appointment to the Commission for Aviation Regulation. This document is prepared for the sole use and reliance of the Commission for Aviation Regulation. RR&V accepts no liability for any use of this document other than by its Client, and only for the purposes for which it was prepared.

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## 1. Introduction / Basis of Report:

Rogerson Reddan & Associates Ltd., in conjunction with Vector Management Ltd., (RR&V), have been commissioned by the Commission for Aviation Regulation, (CAR), to undertake a review of the Cost Benchmarks used by the Dublin Airport Authority (DAA), as set out in the DAA report entitled "DAA CIP04 - Cost Benchmarking Report, dated 3<sup>rd</sup> January 2007.

This review was undertaken based on the information provided by the DAA to the Commission, and directly to RR&V which consisted of:

- DAA CIP04 - Cost Benchmarking Report, dated 3<sup>rd</sup> January 2007.
- Presentation and responses to queries provided by DAA & Healy Kelly Turner & Townsend (HKTT) at meeting with RR&V 19<sup>th</sup> April 2007.
- DAA e-mail dated 24<sup>th</sup> April 2007 (17:00) setting out responses to RR&V queries and enclosing further clarification in relation to selection criteria and background details for projects to be benchmarked.
- Review of source data for sample of benchmark projects, and further clarification provided by DAA & HKTT at meeting with RR&V 25<sup>th</sup> April 2007, (as summarised by RR&V e-mail dated 26<sup>th</sup> April 2007, (08:18).
- DAA e-mails dated 26<sup>th</sup> April 2007, timed at 17.05 & 17.10 enclosing further clarification in respect of issues discussed at meeting on 25<sup>th</sup> April 2007.

RR&V were appointed in early April 2007, with a timescale requiring completion of the review and reporting by end of April 2007 (subsequently extended to 8<sup>th</sup> May 2007).

It should be noted that in any review such as this, carried out to a tight timescale, we are dependant on being provided with comprehensive and accurate information by the parties involved. We have relied in the performance of our services upon information and documentation provided to us by the DAA and other parties engaged by the DAA. We have relied on the DAA to check properly beforehand that any information provided is complete, current, true, fair and accurate and not misleading. We have, as far as it remains within our expertise, considered and relied upon such information provided by the DAA, the content of which we have reviewed in the context of our role under this appointment.

However it is not possible to warrant that such information is correct. In certain cases relatively little information has been made available and consequently this report should be read on the strict understanding that it is issued on that basis.

## 2. Executive Summary:

We have reviewed in so far as possible the DAA Benchmark report dated January 2007, and the origins of the data contained therein. We have also reviewed the cost definitions for the current CIP projects which are referenced in the Benchmark report.

We have not reviewed the multi-storey car parking element of the report in detail as this type of project constitutes a small proportion of the overall CIP, and we believe the benchmark study for this element is in line with general expectations for this type of project.

We have reviewed all other aspects of the benchmarking report in as much detail as possible. Following our review, and based on information provided, and source material reviewed, we are in a position to conclude as follows:

- The DAA, and their professional team have carried out a detailed benchmarking study, covering the main project types included in the current CIP. In general we have found the approach adopted and methodology used to be comprehensive, appropriate and professional.
- We sought to obtain verification of the source data, and having regard to the practicalities and confidentiality concerns, together with the time constraints applying to the review, we were given reasonable verification in relation to UK projects used by HKTT in relation to the report. Less detail was provided in relation to Terminal projects originating from DLPKS, and local DAA projects. However, if further time were available, we believe further details would have been obtainable.
- A number of apparent anomalies have become apparent in the course of our review of the benchmark data for terminal buildings. These originated in a document provided at a relatively late stage in the review process, and it has not been practicable to obtain clarification prior to completing this report. We would suggest that this may require further discussion with the DAA, as the anomaly could have a significant effect on the mean benchmark rate quoted for terminal buildings.
- A number of the project costs quoted by the DAA in relation to current CIP projects have been revised by the DAA, following clarifications on foot of queries raised as part of our review. We believe that some further adjustment is required to these costs to fully incorporate the contingency provisions included within the relevant cost

plans. The main changes would apply to Terminal 2 and Pier E, where based on our definition of cost, the quoted cost per sqM for these projects would increase by c. 14%. This would have an impact on the comparison between the actual project cost and the quoted benchmarks.

All of the above should be considered in the context of the significant limitations on the use of benchmarking as set out in section 5 of this report. These limitations are particularly relevant where projects have developed beyond early design stages.

### 3. Scope of Review:

The DAA Cost Benchmarking Report dated January 2007 (“the DAA report”) was prepared by the DAA in response to a Statutory Information Request from the Commission. The report sets out the benchmarking of costs undertaken by the DAA and their cost consultants in relation to a number of key project types, relative to the current Capital Investment Programme (CIP). The project types studied by the DAA report are:

- Taxiways
- Aprons / Stands
- Multi Storey Car Parking
- Piers
- Terminals

The DAA report notes that these project types comprise c. 75% of the total CIP.

We note that of the five project types noted above, multi-storey car parking is not an airport specific project type, and this type of project represents only 2.3% of the current CIP.

Specifically, relating to multi-storey car parking, the benchmark costs appear to be broadly based, credible, and the data appears to have been suitably adjusted for inflation and currency conversion. Furthermore the mean benchmark cost and the cost per space for the proposed DAA project were found to be broadly in line with our findings as part of our 2005 review of the DAA CIP. Therefore cost benchmarks for multi-storey car parks were not examined further as part of our review.

#### 4. Methodology

The approach adopted in preparing this review was as follows:

- Clarification of the selection criteria adopted by the DAA in relation to the projects selected for use as part of the benchmarking study.
- Review and verification, where possible, of the adjustments applied to the source data by the DAA.
- Review of the Cost Definitions used by the DAA benchmarking report, and comparison with the Cost Definitions used in the comparable DAA CIP projects.
- A review of how this benchmark data has been compared to the DAA proposed CIP projects, and commentary on how these comparisons are modified as a result of clarifications provided during the review.

This process is described in more detail in sections 6 to 11 of this report. Our conclusions are set out in section 2 of this report (executive summary).

Note: Within this report, references to the **DAA Report** and **the DAA**, should be taken as including both the DAA and their programme managers Healy Kelly Turner & Townsend (HKT) who acted on the DAA's behalf in both preparing the DAA report, and in liaising with Rogerson Reddan & Vector in relation to this issue.

## 5. Relevance of Cost Benchmarks

The DAA report notes that “cost benchmarking information is an integral part of the overall governance process applied by the DAA throughout the lifecycle of capital projects”.

Cost Benchmarking in the form usually applied in relation to construction and infrastructure projects is the process of comparing anticipated project costs with a range of “benchmark” out-turn costs from previously completed comparable projects. Typically benchmarking consists of a high level review of costs at overall project cost level, and is based on comparisons made on a unit cost basis, (for example the cost of a building expressed as a cost per SqM of floor area), or a functional unit cost basis (for example the cost of a car park expressed as a cost per car park space). Benchmarking is frequently used in the early stages of project design, as a means of determining whether the costs for a given project are in line with typical costs for similar projects.

In our view, cost benchmarking is a useful tool to apply, to measure in broad terms, the cost effectiveness of a proposed project. However, it has significant limitations, which should be considered when interpreting the results of benchmarking studies. These would include:

- **Unique nature of construction projects:** It is unusual for two construction projects to be truly comparable. Most designs are unique, Client’s precise requirements will differ, and factors such as site circumstances, procurement process, building regulations and local economic conditions will cause variances in cost, even for buildings with otherwise similar functional requirements and scale.
- **Selection of comparator projects:** The results of a benchmarking study may be distorted by the selection of comparator projects. If projects are not selected in a logical manner, or if projects are selected deliberately to reflect a particular emphasis, the outcome of the study may be accidentally or deliberately distorted.
- **Reliability of Data:** The level of reliability of data will vary from project to project, depending on the level of detailed analysis carried out by the contributor of the source data.
- **Age of Data:** While a benchmarking study will always update cost data to reflect inflation, there is a risk with older data that the inflationary adjustment becomes less

accurate over long timescales, and / or that changes in construction methods / regulations will distort the comparisons between projects.

- **Programme:** The construction programme will have an impact on costs. For example a project with a “fast-track” programme, or requiring a high proportion of out-of-hours work will cost more than an otherwise comparable scheme constructed without these constraints.

Having regard to all of the above, it is our view that while cost benchmarking is a useful checking mechanism to be applied during the early stages of a project’s development, particularly in the absence of detailed design proposals, there are significant limitations to the reliability of the process, and there are significant limitations to the conclusions which can be drawn from such a process.

## 6. Selection Criteria

The projects selected for the DAA's report are as set out in Appendix A. The numbers of projects selected and their locations are as follows:

- Taxiways: Seven projects (3 Ireland / 4 UK)
- Aprons / Stands: Five projects (2 Ireland / 3 UK)
- Piers: Five Projects (all 5 UK)
- Terminals: Ten Projects (all 10 UK)

None of the projects selected were from outside Ireland and the UK.

The DAA clarified in response to our queries that projects were selected for inclusion in their report in accordance with the following criteria:

- Projects of comparable scale and complexity
- Projects with comparable supply chain characteristics
- Projects in operational international airports
- Projects completed under similar legislative criteria

The DAA have, in response to our queries on this subject identified a range of further projects for which data was available, but which were not selected for inclusion in the report. These further projects are also listed in Appendix A, together with the stated reasons for not including them in the report.

The typical reasons stated for the non inclusion of projects in the DAA study were as follows:

- Lack of confidence in the data
- Abnormal labour costs
- Lack of information on scale and complexity of project
- Extension to existing facility and therefore not directly comparable
- "Unsure" of project details
- Benchmark data only available in form of cost plan data (i.e. not outturn costs)
- Project from region with "no planning control, poor Health & Safety legislation"
- Not comparable as project was on "greenfield site"

While all of the above could be considered to be reasonable selection criteria, we would note that “age of project” is not included as one of the selection criteria. We would note that for the reasons mentioned in section 5, above, projects where the construction date is in excess of say 10 – 15 years will be less reliable comparators. In this regard, we would note that while the majority of projects selected are less than 15 years old, some date back to the 1980’s (Gatwick North, Heathrow T4, Manchester T2).

In relation to the selection process in general, there is a school of thought which suggests that a benchmarking study should include all available comparators, and should acknowledge that there will be significant differences between project costs, but that there may well be valid reasons for these differences. The project being benchmarked may not be consistent with the mean of the comparators, but any such variance should be rationalised and understood as part of the benchmarking exercise. This approach does not appear to have been adopted here. Indeed, as noted later in this report, much of the data used in the benchmark study originated in a comprehensive 2003 benchmarking report prepared by / on behalf of the British Airports Authority (BAA). We understand that this report is confidential and not available for publication. We were, however, provided with an opportunity to review this report at the DAA offices. It is worth noting that this report includes a wider range of samples than the DAA report (for example the terminal building benchmarks include projects in Madrid, Manila, Chicago, Denver, Zurich, Oman, Hong Kong, and indeed Shannon (Ireland), in addition to UK airports.

While we did not examine the selection criteria applied in the BAA Benchmarking report in detail, it is significant to note that based on our review of the report, and subsequent clarification provided by the DAA, it does not appear to be the case that the exclusion of those projects from outside Ireland and the UK, had the effect of significantly distorting the overall mean benchmark cost. The mean benchmark cost for terminal buildings in the DAA report is noted at €4,018/sqM. The BAA report overall mean cost for terminal buildings (when updated for consistency) is €4,396/sqM. The mean cost per sqM for the projects outside the UK, taken from the BAA report is €4,490/sqM.

However, following the review of the BAA data, we received on 26<sup>th</sup> April 2007, a separate document entitled “Terminal Buildings – Completed Projects (UK) 26/04/2006”. This was provided by the DAA in response to a request to provide verification / source material for the quoted terminal benchmarks which were attributed to Davis Langdon PKS (DLPKS) in the DAA report. Significantly this includes twelve UK projects, and notes a mean cost of stg £2,414/sqM, which when updated for inflation and currency equates to €3,546 /sqM at 2006

costs. This is significantly lower than the average cost /sqM noted in the DAA report. It is significant that of the twelve projects on this sheet all are carried forward into the DAA report, except for the two least expensive projects, (Luton & Southampton). The mean value noted in the DAA report is €4,018 – some 11.7% more than would appear to be the case based on the overall sample shown as part of the source data. The DAA document listing reasons for excluding certain projects does not refer to these projects. There may well be a valid explanation for the omission of these two projects, (most likely on the basis that they were not considered suitable comparators due to their not being of similar complexity to Dublin), but this has not been provided by the DAA. If this is the case, we would note that for consistency, that Heathrow T4 should also possibly be omitted from the sample, as there were, we understand, particular factors relating to that project which may have contributed to it costing more than the mean. If all three projects were excluded from the analysis, the mean cost per sqM would be €3,607/sqM, some 9% less than the mean value noted in the DAA report. Unfortunately, it has not been possible in the time available to revert for clarification on these points.

We would recommend that this issue may require further discussions with the DAA, to determine if there is a reasonable explanation.

## 7. Means of Adjusting Cost Data

It is critical in any benchmarking study that the source data is appropriately updated to allow comparison with the project(s) being benchmarked. We have reviewed the process applied by the DAA and spot checked a representative sample of their adjustments. There are four main criteria for which cost data might be updated or adjusted as part of a benchmarking study such as this:

### (A) Complexity of Facility

The DAA have confirmed to us that no adjustments have been made in respect of the differing complexity of projects and airports from which cost benchmarks are taken. This is probably appropriate, given the difficulty of calculating an appropriate adjustment factor. It should be noted in this regard, that in selecting projects for inclusion in the study, several projects were discounted and omitted from the study on the basis that they were not of a comparable complexity to the proposed Dublin projects. No projects (to our knowledge) were discounted on the basis of their being significantly more complex than the proposed Dublin projects. There is an inherent assumption in the report therefore that the Dublin projects, and Dublin Airport generally, is of comparable complexity with airports such as London Heathrow, Gatwick and Stansted, from where many of the comparator projects were sourced.

### (B) Inflation

The DAA report takes data from both the internal database(s) of the DAA's cost consultants, and from previous benchmark reports prepared for other Clients where the DAA's consultants have sufficient confidence in the data. The base date of this data varies. All cost information is updated to mid 2006, for consistency with the CIP. Two principal indices are used to make this adjustment.

All UK data is updated based on the UK Building Cost Information Services (BCIS) tender price index from source date to Q2 2006. We have reviewed this index at source, and confirm that adjustment has been appropriately calculated provided the base dates as noted in the DAA report are correct.

All Irish data is updated based on the HKTT tender price index, a copy of which is included as an appendix to the DAA report, from source date to Q2 2006. The HKTT index is based on the Society of Chartered Surveyor's (SCS) published Tender Price Index, with HKTT projections for the periods after the last SCS published historic information. In this regard that HKTT tender price index uses actual data from the SCS index up to the end of 2005, and projects an index value of 150.0 up to mid 2006. The latest SCS tender price index (published December 2006) indicates that the actual index value at mid point 2006 is 146.7, which indicates that actual tender price inflation for this period was slightly less than that projected by HKTT and used in the DAA report. However this actual data would not have been available at October 2006, (the date of publication of the CIP). Given the relatively small number of Irish projects in the Benchmark study, this variance would have a limited overall impact on the findings of the study.

#### (C) Currency

The UK projects referenced in the DAA report all have their costs denominated in £ sterling. The DAA report converts these to Euro at the exchange rate which the report notes to have been current at Q2 2006, i.e. 1.45. We believe this is a reasonable approach, and the rate used is a reasonable approximation of the rates prevailing at that time.

#### (D) Location

The DAA report uses source data predominantly from the UK and Ireland. The UK Building Cost Information Service (BCIS) analyses and publishes regional cost adjustment factors for locations across the UK, but does not include the Republic of Ireland. We are not aware of any published and recognised adjustment factor which allows regional adjustment between UK costs and Republic of Ireland, or more specifically Dublin costs. The DAA have clarified for us in response to queries, that all UK cost data is adjusted to reflect the UK average (adjustment factor of 1.00) and that these costs are taken as being representative of costs for work at Dublin Airport, (following adjustment for inflation and currency). The DAA advise that a high level review of key construction element costs supports this view. We believe this is a reasonable approach, in the circumstances.

## 8. Cost Definitions

As the definition of “Construction Costs” and “Project Costs” can vary from project to project, it is important that any benchmarking study applies consistent definitions for the precise scope of cost to be included in the quoted costs.

The DAA report notes that “Construction costs including preliminaries and overheads” are included in the costs quoted for benchmark projects. The DAA have further clarified in response to our queries that in all cases specialist airport systems and equipment (e.g. baggage handling installations), and contingency allowances were included in the benchmarked costs but that Design and Professional Fees, External works, and Planning Contributions etc. are excluded.

In general, these definitions are reasonable and appropriate. It has not been possible to definitively determine whether or not these definitions apply to all the source data, however, from our review, we have no reason to believe that this is not the case.

There are some cases where the proposed CIP costs being benchmarked illustrate some variances from this definition, as noted in section 10 below.

## 9. Verification of Source Data

The DAA report noted the commercial confidentiality of the source data used for the benchmarking report. The report noted that while it was not appropriate to include source data in a formal submission, the DAA would provide this during an “organised visit to the consultant’s premises”. We had asked in our initial query list for access to review the source data, and we attended two separate meetings with the DAA for the purposes of reviewing this data, among other issues.

As we understand it, the source data used for the DAA report can be broken down into three broad categories, as follows:

- (1) Information provided by Healy Kelly Turner & Townsend from their internal database, and drawing on work previously undertaken by HKTT and others for BAA (in the form of a 2003 BAA report on cost benchmarks). We were provided with an opportunity to view extracts from the HKTT database, and were given an opportunity to review the noted BAA report. While this does not include the original “raw” data, the data presented appeared realistic, credible, and we are assured that the “raw” data exists. We are satisfied with the level of verification provided in this case, having regard to the time constraints for this review.
- (2) Information provided by DLPKS in relation to terminal costs. We understand that this information is sourced from DLPKS internal cost database. We have been provided with an enhanced spreadsheet dated 26<sup>th</sup> April 2004, which provided additional data on the relevant projects, and identifies the sources for some of the data (a number of which are trade journals). While the information is useful, and credible, it does not in itself allow verification of the original data. This document also raises some further queries as noted under section 6 above.
- (3) Information from DAA database of completed projects: We have requested verification / access to source data. To date we have been provided with a detailed breakdown of out-turn costs in relation to one project – “6 bay extension”.

While we are satisfied with the level of verification provided in relation to item (1), we would have more confidence in the overall study, if similar verification could be provided in relation to items (2) & (3) above.

## 10. Adjustments to DAA CIP 04 Project Costs

During our review of the benchmarking report, and based on queries generated, it became clear that a number of the costs quoted in the DAA benchmark report contained some anomalies and would require revision. The DAA have confirmed the following revisions:

### Terminal 2 (terminal building)

Cost /sqM quoted in Benchmarking report: €4,182 /sqM  
DAA proposed revised cost /sqM: **€4,187 /sqM**  
Reason for change: recalculation – minor adjustment only.

RR&V Comment: This cost per sqM does not include a proportion of the overall project contingency noted in the T2 and Pier E cost plan. To be consistent with the cost definitions as noted above, we believe this should be included in the stated cost per sqM. If included, the cost per sqM would increase to **€4,767/sqM**.

### Pier E

Cost /sqM quoted in Benchmarking report: €3,743 /sqM  
DAA proposed revised cost /sqM: **€3,870 /sqM**  
Reason for change: recalculation – minor adjustment only.

RR&V Comment: This cost per sqM does not include a proportion of the overall project contingency noted in the T2 and Pier E cost plan. To be consistent with the cost definitions as noted above, we believe this should be included in the stated cost per sqM. If included, the cost per sqM would increase to **€4,406/sqM**.

**Pier D**

Cost /sqM quoted in Benchmarking report: €3,900 /sqM

DAA proposed revised cost /sqM: **€4,231 /sqM**

Reason for change: recalculation in response to RR&V queries. Original calculation did not include allowance for contingency.

RR&V Comment: This cost per sqM includes an allowance of 7.5% in respect of contingency. It does not however reflect the full extent of contingency as indicated separately in details provided in relation to Pier D (12%) If adjusted to include a total provision of 12% for contingency the cost per sqM would increase to **€4,408/sqM**.

**Terminal 1 Extension**

Cost /sqM quoted in Benchmarking report: €4,500 /sqM

DAA proposed revised cost /sqM: **€5,499 /sqM**

Reason for change: Recalculation in response to RR&V queries. Original calculation did not include allowance for contingency or airport systems.

RR&V Comment: we believe the adjusted cost of **€5,499/sqM** is a more realistic comparator for this project.

## 11. Comparisons with DAA CIP 04 Projects

The table below summarises the findings of the DAA benchmarking report, and notes how the actual costs of comparable projects in the current CIP (when adjusted as noted above) compare with the noted benchmarks

Benchmark		DAA Comparison with CIP Projects				Comparison with RR&V adjusted CIP costs	
Type of Project	Mean Value - € / SqM	Proposed Dublin CIP Project	DAA Original Stated Cost€ /sqM	DAA updated Cost / SqM	% Variance	RRA Adjusted Cost/ SqM	% Variance
Terminals	4,018	T2 - Terminal Building	4,182	4,187	4%	4,767	19%
		T1 Extension	4,500	5,499	37%	5,499	37%
Piers	5,642	Pier D	3,900	4,231	-25%	4,408	-22%
		Pier E	3,743	3,870	-31%	4,406	-22%
Taxiways	366	Mike 2	221	N.A.	-40%	N.A.	N.A.
		North Apron Infill	355	N.A.	-3%	N.A.	N.A.
Stands / Aprons	308	Apron 6a, b & c	294	N.A.	-5%	N.A.	N.A.
		Apron 5a	230	N.A.	-25%	N.A.	N.A.

The benchmark values noted above, are as per the DAA report, and have not been adjusted.

As noted based on this analysis all pier, taxiway and apron projects in the current CIP fall within the relevant benchmarks. However the terminal buildings exceed the benchmark figures by varying percentages, depending on the approach to cost definition adopted.

## APPENDIX A

## Appendix A – DAA Benchmarks – Selection Criteria

**Table A1 – Taxiways:**

Project	Included / Excluded from DAA Study	DAA stated reason for exclusion
Gatwick – Taxiway 2	Used in DAA study	
Stansted – Western Taxiway	Used in DAA study	
Heathrow – Northern Inner Taxiway	Used in DAA study	
Heathrow – Grass Area 12	Used in DAA study	
Shannon	Used in DAA study	
Dublin RET	Used in DAA study	
Dublin Link 2	Used in DAA study	
Dublin Mike 2	Used in DAA study	
Dublin North Apron Infill	Used in DAA study	
Saerkarto Hatta (Jakarta)	Excluded	No confidence in data – abnormal labour costs
Not disclosed, SE UK	Excluded	No info on scale, location, complexity

**Table A2 – Stands / Apron:**

Project	Included / Excluded from DAA Study	DAA stated reason for exclusion
Gatwick – Tower Stands	Used in DAA study	
Stansted – Delta Cul-de-Sac	Used in DAA study	
Heathrow – Grass Area	Used in DAA study	
Dublin Central Apron 4A	Used in DAA study	
Dublin Central Apron 4B	Used in DAA study	
Dublin Aprons 6A, B & C	Used in DAA study	
Dublin Apron 5A	Used in DAA study	
Saerkarto Hatta (Jakarta)	Excluded	No confidence in data – abnormal labour costs
Not disclosed, SE UK	Excluded	No info on scale, location, complexity

**Table A3 – Piers / Satellites:**

Project	Included / Excluded from DAA Study	DAA stated reason for exclusion
Stansted Satellite 3	Used in DAA study	
Gatwick Pier 6	Used in DAA study	
Gatwick Pier 4	Used in DAA study	
Heathrow Pier 5	Used in DAA study	
Heathrow Pier 6	Used in DAA study	
Dublin Pier E	Used in DAA study	
Dublin Pier D	Used in DAA study	
Heathrow Pier 5 ext	Excluded	Pier extension – not comparable
Heathrow Pier 4A development	Excluded	Not used – unsure on project details
Heathrow Pier 4A node building	Excluded	Node building only – not comparable
Gatwick Pier 4 ext.	Excluded	Pier extension – not comparable
Barajas (Madrid)	Excluded	No confidence in data
120's satellite	Excluded	Not used – unsure on project details
Europier	Excluded	Not comparable design / complexity
T2 Heathrow Airside dev	Excluded	Cost plan data only – project not complete – not comparable
T2 Heathrow Airside extension	Excluded	Cost plan data only – project not complete – not comparable
Glasgow stage 2 & connector	Excluded	Not used – unsure on project details

**Table A4 – Terminals:**

Project	Included / Excluded from DAA Study	DAA stated reason for exclusion
Bristol	Used in DAA study	
Edinburgh	Used in DAA study	
Glasgow	Used in DAA study	
Gatwick – North Terminal	Used in DAA study	
Heathrow T4	Used in DAA study	
Liverpool	Used in DAA study	
Manchester T2	Used in DAA study	
Manchester T3	Used in DAA study	
Newcastle	Used in DAA study	
Stansted	Used in DAA study	
Dublin T1 extension	Used in DAA study	
Dublin T2	Used in DAA study	
Gatwick – NT IDL, GAL	Excluded	Not used – International Departures Lounge – not comparable
Stansted – STIDL	Excluded	Not used – International Departures Lounge – not comparable
Gatwick Domestic	Excluded	Not used – domestic terminal only
Stansted Terminal Extension	Excluded	Not used – extension to existing terminal on one level in landside environment
T2 Airside Extension	Excluded	Not used – terminal extension
Seeb Int. (Oman)	Excluded	Not used – labour rates low, no Planning control, poor H&S legislation
Nino Acquino (Manila)	Excluded	Not used – no confidence in data
Saerkarto Hatta (Jakarta)	Excluded	Not used - labour rates low, no Planning control, poor H&S legislation
Barajas (Madrid)	Excluded	Not used – data not verified, Greenfield site
Hong Kong CLK	Excluded	Not used – scale and complexity not comparable – low labour rates
Chicago T5	Excluded	Not used – data not verified, not comparable design life
Denver	Excluded	Not used – data not verified, Greenfield site
Shannon terminal extension	Excluded	Not used – scale and complexity not comparable, extension only
Channel Islands	Excluded	Not used – scale and complexity not comparable
Johannesburg International	Excluded	Not used – labour rates low, poor H&S legislation

## APPENDIX B