



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

For

**The Commission for Aviation
Regulation**

**Report No. 2 – Review of Terminal 2
Non Construction Costs**

10th May 2007

rogersonreddan
project, construction and cost managers



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Job Nr.	Rev	Status	Date Issued	Drafted	Team Leader	Changes since previous revision	Issued to
0651	1	Issued	10 th May 2007	PW	JH	None	CAR

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 Terminal 2 (T2) non construction costs as included within the Davis Langdon PKS (DLPKS) T2 & Pier E cost plan dated 1st September 2006.

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

- DLPKS T2 & Pier E Cost Plan dated 1st September 2006
- Responses to queries provided by DAA & DLPKS at a meeting with RR&V on 13th April 2007 and follow up responses received from DLPKS dated 17th April 2007
- Responses to queries from 13th April meeting received from DAA in CD format on Thursday 19th April 2007
- DAA e-mail dated 24th April 2007, timed at 17.00 enclosing benchmarking data
- DAA e-mail dated 26th April 2007, timed at 12.56 enclosing information re risk analysis
- DAA e-mail dated 30th April 2007 timed at 11.10 & 16.27, addressing final outstanding T2 queries
- Planning details in relation to T2 obtained from Fingal County Council website
- T2 Project Management and Design Commission Briefing Document

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 8th 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.

Note: Within this report, references to information provided by the **DAA**, etc. should be taken as including information provided by the DAA, and / or their Programme Managers, **Healy Kelly Turner & Townsend (HKTT)** and / or the T2 Cost Consultants, **Davis Langdon PKS (DLPKS)**.

2. Executive Summary:

This report is based on a high level review of the non construction elements of the Terminal 2 cost plan. Our main findings can be summarised as follows:

1. **Enabling Works, Site Logistics & Phasing/ Temporary Works:**

Where the information was of sufficient detail to allow a review of the costs under this heading, the costs appeared realistic. In relation to services diversions however it was not possible to definitively verify costs with the information provided.

2. **Public Art:**

The costs included against this item do not appear excessive.

3. **Other Costs**

.....

4. **Planning & Design Fees @ 10%:**

The overall fee level is likely to increase to c. 15% to include for site supervision. This level of fee is relatively high. Verification was not provided due to considerations of commercial sensitivity. CAR may review further additional information in this regard.

5. **Capital Contributions @ €114/ Sq M of new building:**

Generally reasonable, further clarification may be sought from the DAA in relation to an apparent minor anomaly in these costs.

6. **Project Contingency:**

The overall amount included for contingency appears high relative to project stage. An independent risk review may verify the appropriateness or otherwise of this level of contingency.

3. Scope of Review:

The RR&V brief included a review of T2 non construction costs. This review is based on a review of the DLPKS Cost Plan No.1, titled "Terminal 2 and Pier E, Dublin Airport", and dated 1st September 2006.

We would define the relevant costs to be examined as costs which are not directly associated with the construction costs of T2 and Pier E buildings, but which are ancillary but necessary for the provision of these facilities.

The overall cost plan summary for T2 is contained in Appendix A to this report. The elements of this cost plan which are the subject of this review are as follows:

	<u>Total Cost</u>
	<u>Excl. VAT</u>
1. Enabling Works, Site Logistics & Phasing/ Temporary Works	€5,546,760
2. Public Art	€70,000
3. Planning & Design Fees @ 10% of construction cost	€47,446,092
4. Other Costs	€1,500,000
5. Capital Contributions @ €114/ Sq M of new building	€11,768,334
6. Project Contingency	€74,119,000
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Total value to be reviewed	€140,450,186

The value to be reviewed in this report represents 23% of the overall cost plan total.

4. Review of Costs

The approach adopted in compiling this report was to undertake a high level review of the relevant cost elements, with a view to determining whether the costs stated by the DAA would be considered reasonable for a project as described. Generally, this comprised a review and verification, where possible, of the scope and extent of the works included, and a comparison with the estimated cost for these works, relative to what would be expected on a project such as this.

Our findings, in relation to each element of cost reviewed, are set out hereunder:

Enabling Works, Site Logistics & Phasing/ Temporary Works:

This section can be subdivided as follows:

a. **Survey Works**

An amount of €... is included within the current cost plan for all survey works. This amount was queried and a detailed breakdown of all anticipated surveys was provided by DAA. This detailed survey list includes all potential surveys which were suggested by the design team. Surveys to the value of €..... are either complete, appointed, or deemed an absolute necessity. Further surveys for which the scope and likelihood of their requirements were not known at October 06 are also included on the survey list. These additional surveys have potential estimated cost in the range of €..... - which brings the overall potential cost of surveys to a range of €.....-

Following a review of the full list of surveys, we understand the T2 design team decided to include an overall allowance of €..... for all surveys associated with T2, including the surveys completed, appointed, and deemed an absolute necessity.

We would acknowledge the difficulty in accurately estimating cost for works of this nature, however the process carried out in the estimation of the surveys required and their costs appears to be logical, and the overall cost allowance of €..... for all survey works does not appear excessive.

b. Services Diversions

A total amount of €3,000,000 is included within the current cost plan for services diversions. A breakdown and backup of this amount was requested. The DAA provided backup in the form of existing services drawings and an “estimate summary” of the services diversions was provided as follows:

Telecoms (based on discussions with Arup IT team)	[.....]
ESB	[.....]
GAS	[.....]
DAA Services	[.....]
Watermains	[.....]
Utility charges for diversions – ESB, GAS & Telecom	[.....]

Sub-total	[.....]
Foul sewer diversion	[.....]

Total	€3,000,000
	=====

Having reviewed the drawings and information provided by DAA, it was not possible to determine the scope and extent of services diversions included, as the drawings provided related only to existing services and did not indicate the proposed diversions. A further request was issued to DAA for drawings indicating the actual extent of services diversions upon which the allowance above was based and also for the detail behind the “Estimate Summary”. DAA have confirmed that the detail as requested is not available. It is difficult therefore to provide a definitive comment on the above costs.

We note that as part of the responses to our queries, the DAA have advised that these preliminary estimates have subsequently been confirmed by quotations and tenders. However this information was not provided (we assume this is due to the quotations and tenders originating post October 2006).

c. Removal of existing roadways

An amount of €..... is included within the current cost plan for removal of existing tarmacadam roadways. This item was queried with the DAA and further information was provided in the form of site phasing drawings and the overall quantity included for these works.

While the exact extent of roadways to be removed is not clearly identifiable from the drawings provided, RR&V have estimated the areas. Based on this global estimate of the works, the amount included in the current cost plan does not appear excessive.

d. Temporary roads

An amount of €..... is included within the current cost plan for the provision of temporary roadways. This item was queried with the DAA and site phasing drawings as noted above were provided by way of substantiation. While the exact extent of temporary roadways is not clearly identifiable from the drawings provided, RR&V have estimated the areas. Based on this global estimate of the works, the amount included in the current cost plan does not appear excessive.

Public Art

An allowance of €70,000 is included within the current cost plan for public art. This amount is 0.01% of the overall budget and appears low given the scale and nature of this project.

Design Fees @ 10%

The planning and design fees contained within the cost plan are calculated at 10% of the construction cost, and amount to €47,446,092. RR&V requested supporting details for this total fee allowance. DAA provided a memo setting out the procedure followed in the appointment of design and cost consultancy services for T2. The tendering and appointment of design and cost consultancy services for T2 went through full open and competitive OJEU process which resulted in the appointment of a design team consortium lead by Arups, and separately DLPKS as cost consultants.

The DAA advise the Design Team fee allowance of 10% is based on the outcome of this tendering process. Due to considerations of commercial sensitivity, DAA were not in a position to provide RR&V with details of the fee bids received. The DAA have committed to providing further backup and information in this regard directly to CAR if deemed necessary.

RR&V have previously been provided with a document entitled "Terminal 2 Project Management & Design Commission Briefing Document". This document requested that fee proposals for site supervision should be included as a separate cost as part of fee bids for T2.

DAA advised that this site supervision fee was requested for information purposes only, and the above fee allowance of 10% does not include for site supervision. DAA advise that an additional 4.8% (c. €20M) for site supervision is included within the general preliminaries in respect of anticipated site supervision works by the design team.

The CAR may wish to review any further detail that DAA can provide in relation to the fee bids received, and the additional costs in respect of site supervision. The combined fee % equates to c. 15% which seems high, having regard to the scale of the project. Due cognizance should also be given to the fact that there is a separate Programme Manager involved, on a separate and additional fee.

Capital Contributions

The following is a summary of the information received and reviewed by RR&V.

- The Cost plan provides for capital contribution of €11,768,334 (103,231 Sq M @ €114/ Sq M). This relates to the total new build area included within the cost plan of 103,231 Sq M.
- The Fingal County Council Grant of Planning Permission included total Contributions of €12,674,240. This apparent anomaly was queried to the DAA. The DAA explained that the Cost Plan relates only to phase 1 of T2, whereas the planning application relates to both phase 1 and phase 2 and that this would explain part of the variance between the cost plan total and the planning condition.
- From a review of the full development description published as part of the planning application detail on Fingal Co. Council website, it appears to note a total new build area of c. 121,150 Sq M for phase 1 & 2. On this basis the average rate/ Sq M applied in the planning permission would be €104.62 (€12,674,240/ 121,150 Sq M). If this assumption is correct, the proportion of the total contribution applicable to Phase 1 would be €10,800,027 (103,231 Sq M x €104.62). This is c. €1m less than the amount noted in the cost plan.

Further clarification should be sought from DAA in relation to this apparent anomaly.

Project Contingency

The current cost plan contains an overall project contingency of €74,119,000 amounting to 15.6% of the construction cost or 13.8% of the overall budget. In addition to this overall project contingency, general construction contingency of 5.2% (€24,646,944) is included within the measured work sections of the cost plan. This brings the overall level of contingency to €98,765,944 (20.8% of construction cost or 18.4% of the overall budget). The DAA have clarified in response to a query that the 5.2% contingency relates to "Design Development", whereas the €74,119,000 contingency relates to specific DAA related risks such as programme, planning adjudication and enabling works.

RR&V requested detail of the build-up of the project contingency amount of €74,119,000. DAA advised that risk workshops were established and a detailed risk assessment process undertaken by the DAA and the design team. During this process a risk register was established (see appendix B). We understand Risk analysis was carried out using the Latin Hypercube method, a commonly used quantitative risk analysis method. The 80th percentile probability level was adopted by the DAA (i.e. 80% chance that the contingency sum is sufficient, 20% chance that contingency sum is not sufficient) to produce the contingency amount of €74,119,000. The selection of the 80th percentile is common practice in analysis such as this.

This process is a suitable and appropriate method of risk modeling. However the outcome of such a process is dependent on the approach adopted in relation to the identification of risks and the quantification of their impacts. We would note that RR&V are not risk analysis experts and to fully and scientifically review this procedure and calculation, it may be useful to undertake an independent risk review by an independent expert. An independent risk review may examine, for example, the following:

- Validity of the inclusion of each risk and the logic behind its selection and inclusion on the risk register
- The level of probability applied with each risk and the validity or otherwise of the probabilities
- The validity and accuracy of the estimated costs applied to each risk.

At a more specific level, in relation to the risk register provided, we would question the inclusion of the following items / assumptions:

- Whether some of the risks included in overall risk register and overall project contingency should be deemed to be covered by the 5.2% construction contingency sum contained separately within the cost plan (e.g. “Uncertain ground condition results in additional cost of design changes and programme delays”).
- A number of risks included, where probability may be low e.g. “Change in legislation results in redesign costs and programme delays”
- Inclusion of risks in risk register that are not appropriate/ relevant in the context of the CIP e.g. “Construction inflation and CPI differential increases scheme cost”
- Risks included that may now be historical e.g. “Cost of moving/ rebuilding Corbalis House”

Notwithstanding the specific comments above, in our view, and based on our experience, contingency in this amount (€98.8M or 18.4% of overall budget) appears to be relatively high given the current stage of this project (planning application). An independent risk review may assist in verifying the appropriateness of the current level of contingency.

In overall terms, we would note that the project cost considered and compared to cost benchmarks should, in our opinion, include the full contingency allocation.

While the level of contingency will vary as the project develops, if it is a realistic allocation, the overall cost should bear comparison with out-turn costs for comparable projects, on the basis that out-turn costs will incorporate the “contingency” expenditure which was ultimately required in relation to those projects.

APPENDIX A
DLPKS Cost Plan Summary

APPENDIX B
Risk Register