Technical Summary of the *Methodology* to be used for the Assessment of the Current Handling Capacity of Dublin Airport

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1. INTRODUCTION

The Commission has retained William Hynes & Associates (WHA) to undertake a capacity assessment of Dublin Airport for purposes of determining the capital expenditure needs of the airport during the period of the next determination.

WHA has developed a capacity methodology for such purposes. This brief note explains the workings of that methodology. The methodology will be further explained at a workshop to be held on **Thursday 7th October at The Great Southern Hotel, Dublin Airport between the hours of 10 a.m. and 12 noon** and at future meetings with interested parties. At this workshop the basis, components and workings of the methodology will be clearly demonstrated through presentation and discussion.

2. TECHNICAL SUMMARY

The methodology that will be used to undertake a capacity analysis of Dublin Airport is termed the '*Integrated Planning Methodology for Airport Capacity Assessment*' [1] and is centred around assessing airport capacity based on the provision of a certain level of service at a given level of demand. The '*Planning Methodology*' allows for the determination of the capacity of the three components of the airport system, i.e. Terminal, Airside and Landside. This is achieved through the development of a series of individual component analytical models. These models are capable of determining the various capacity values of the elements within the components, and have been constructed in a manner that allows for these capacity measures to be integrated with each other.

The assessment of capacity within each of the '*Component Models*' is based on the provisions of acceptable '*levels of service*', to cater for determined '*levels of demand*', and the use of detailed analytical '*capacity assessment mathematical calculations*'. The '*Planning Methodology*' is based on extensions, modifications and advancements of existing capacity models/methods.

With the development of the '*Planning Methodology*', the requirement is to provide a level of service throughout the entire airport system that equates to an acceptable level of service. It is anticipated that the IATA '*Level of Service Framework*' will form the guide. The level of demand to be accommodated and provided for through the measurement of capacity requirements is based on the '*Busy Hour Rate*' (BHR)[2] of '*levels of demand*' assessment, and variations thereof.

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[1] The '*Integrated Planning Methodology for Airport Capacity Assessment'* has been developed by Dr. William Hynes through independent research at UCD. This '*Planning Methodology'* uses aviation industry wide standards and integrates these through a series of analytical component models.

[2] **Busy Hour Rate (BHR)** – this is considered a modification of the Standard Busy Rate (SBR) (Ashford, Stanton and Moore, 1997), and is the hourly traffic rate (generally refers to passenger traffic) at or below which 95% of the annual traffic can be handled at an airport without overcrowding areas and processes and, therefore, experience an acceptable '*level of service*'. The BHR method is at present widely used by the British Airports Authority (BAA).

The development, testing and demonstration of the '*Planning Methodology*' has been achieved by using Dublin Airport as a case study. The assessment of current handling capacity of Dublin Airport will update the data underlying the '*Planning Methodology*' both in terms of infrastructure capacity and the utilisation of this infrastructure. The information used includes flight schedules, hourly aircraft flows, passenger numbers, vehicle movement rates, and the results of numerous survey analyses, etc.

One of the key aspects of this capacity assessment methodology is that of '*integration*', so as to be capable of determining overall airport system capacity through the measurement of individual component capacity. Therefore, for this integration to be achieved the three '*Component Models*' for Terminal, Airside and Landside must be linked, i.e. the terminal must be linked to the airside, and the landside. The methodologies for linking these are centred on the assessment of '*levels of demand*', or more precisely, the determination of hourly flow rates through the airport system. Three types of flow rates are considered, i.e. aircraft, passenger and vehicle, and recorded demand information are used for all three.
The following sets out briefly the workings of the three separate component models of the '*Integrated Planning Methodology*':

2.1 Terminal Component Model

The '*Terminal Component Model*' can assess the capacity requirements of the areas and processes of the terminal component of an airport system that can sustain certain passenger demand over a given period of time, based on the determination of typical peak or typical busy hourly passenger flow rates. In addition, it is possible to determine the capacity of an existing level of areas and processes of the terminal component in relation to their handling capability based on a certain level of passenger demand movement rates, over a sustained hourly time period.

2.2 Airside Component Model

The principal function of the '*Airside Component Model*' is to determine the hourly number of aircraft movements that an airside component can sustain over a given period of time, based on an overall acceptable level of '*delay*'. This level of delay can be considered as the '*level of service*' to be provided to the movement of aircraft, based on a '*level of demand*' for aircraft movement. In addition, it is possible to determine the capacity of existing elements of the airside component in relation to their handling capability based on a certain level of aircraft and passenger demand movement rates, over a sustained hourly time period.

The '*Airside Component Model*' consists of three separate models, or sub-models, namely:

- Airside Stand Capacity Model;
- Airside Runway Capacity Model, and;
- Airside Delay and Capacity Model.

2.3 Landside Component Model

The '*Landside Component Model*' is capable of assessing the capacity requirements of certain elements of the landside component of an airport system that can sustain certain passenger based vehicular demand over a given period of time. This is related to the determination of typical peak or typical busy hourly passenger flow rates. In addition, it is possible to determine the capacity of existing elements of the landside component in relation to their handling capability based on a certain level of vehicular and passenger demand movement rates, over a sustained hourly time period. The landside component element assessed includes departures and arrivals kerb requirements, short- and long-term car parking space requirements, and coach parking space requirements.

3. SUMMARY

Through the application of the '*Integrated Planning Methodology for Airport Capacity Assessment*' it will be possible to assess the current handling capacity of Dublin Airport. All three component models' outputs of the '*Integrated Planning Methodology*' give both '*Capacity Demand*' and '*Capacity Supply*' figures, which allows for the determination of either a capacity '*shortfall*' or '*surplus*' when compared with each other. Based on these outputs it is possible to determine which component, or element of a component, is restricting the capacity of the airport system. Overall, the capacity assessment process will be robust and transparent, with interested parties being fully included in the process.