



Stage 2 Summary Document Appendix A - Design Options Evolution

Stage 2 Develop and Assess

1. Design Options Evolution - V1

1.1 Introduction

Table 2 shows the evolution of our design options through Stages 2A and 2B of the CAP1616 process. The resulting shortlist of design options will be considered in the Full Options Appraisal (FOA) in Stage 3.

1.2 Design Options Report (DOR)

The first step in refining the list of design options was the consideration of viability, as presented in the Design Options Report (DOR). This exercise divided the design options into three categories, as shown below in table 1.

Classification	Criteria	Outcome
Unviable	Would not comply with the requirements of ICAO Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS 8168) or did not have a supporting safety justification for non-compliance.	These options were not designed, due to a lack of compliance with the required standards. As a result, no such options were progressed to the DPE.
Viable but poor fit	Fail to meet the requirements of the three design principles with which all design options ‘must’ comply (Safety, Policy and Demand).	These are identified as lettered options and were not progressed to full the DPE, although an initial evaluation against the three ‘must have’ design principles is included in the DPE.
Viable and good fit	Expected to meet the three design principles with which all design options ‘must’ comply (Safety, Policy and Demand).	These are identified as numbered options and were progressed to full the DPE.

Table 1 - Options Viability - Summary Table

This process is explained in full at section 2.2 of the DOR and section 16 of the Stage 2 Summary Document.

1.3 Design Principle Evaluation (DPE)

The Design Principle Evaluation (DPE) then considered all ‘viable and good fit’ design options in full, to measure their alignment against the design principles. Those options that best aligned with the design principles were accepted and progressed to the IOA. The acceptance/rejection process is described at section 4 of the DPE.

1.4 Initial Options Appraisal (IOA)

The IOA then assessed the merits of the accepted DPE design options compared to a baseline scenario. For the IOA required at Step 2B, the requirement is to determine the high-level criteria and then conduct a qualitative assessment against each route option. This IOA serves as the foundation for a more quantitative assessment later in the CAP1616 process. At Step 2B, the design options progressed to the IOA were tested against the criteria contained in CAP1616 (Appendix E, Table E2).

Following the completion of the IOA assessment, each design option was annotated with a RAG (red, amber, green) status. The classification of options was based on the professional judgement of the assessor /change sponsor, considering each design option’s overall performance against the defined criteria. The colouring of these options as Preferred, Favourable, Acceptable and Rejected is explained at section 2.5.2 in the IOA. Design options categorised as Preferred, Favourable or Acceptable formed the shortlist of design options.

RWY	Envelope	No.	Design Options Report	Design Principle Evaluation	Initial Options Appraisal
RWY 22 SID West A					
22	W	1A	Viable and good fit	Accept	Rejected
22	W	3A	Viable and good fit	Reject	-
22	W	5A	Viable and good fit	Reject	-
22	W	6A	Viable and good fit	Accept	Favourable
22	W	7A	Viable and good fit	Accept	Preferred
22	W	9A	Viable and good fit	Accept	Acceptable
22	W	16	Viable but poor fit	-	-
22	W	17	Viable but poor fit	-	-
22	W	18	Viable but poor fit	-	-
RWY 22 SID West B					
22	W	2B	Viable and good fit	Accept	Favourable
22	W	4B	Viable and good fit	Reject	-
22	W	8B	Viable and good fit	Accept	Preferred
22	W	10B	Viable and good fit	Reject	-
22	W	11B	Viable and good fit	Accept	Acceptable
22	W	12B	Viable and good fit	Reject	-
22	W	13B	Viable and good fit	Reject	-
22	W	14B	Viable and good fit	Reject	-
22	W	15B	Viable and good fit	Reject	-

RWY	Envelope	No.	Design Options Report	Design Principle Evaluation	Initial Options Appraisal
22	W	19	Viable but poor fit	-	-
22	W	20	Viable but poor fit	-	-
22	W	21	Viable but poor fit	-	-
RWY 22 SID South-West					
22	SW	1	Viable and good fit	Accept	Rejected
22	SW	2	Viable but poor fit	-	-
22	SW	3	Viable and good fit	Accept	Preferred
22	SW	4	Viable and good fit	Accept	Rejected
22	SW	5	Viable and good fit	Accept	Acceptable
22	SW	6	Viable and good fit	Accept	Favourable
22	SW	7	Viable but poor fit	-	-
22	SW	8	Viable but poor fit	-	-
22	SW	9	Viable but poor fit	-	-
22	SW	10	Viable but poor fit	-	-
RWY 22 SID South					
22	S	0	Viable and good fit	Accept	Rejected
22	S	1	Viable and good fit	Accept	Rejected
22	S	2	Viable and good fit	Accept	Acceptable
22	S	3	Viable and good fit	Accept	Favourable
22	S	4	Viable and good fit	Accept	Rejected
22	S	5	Viable and good fit	Accept	Rejected
22	S	6	Viable and good fit	Accept	Preferred
22	S	7	Viable but poor fit	-	-
22	S	8	Viable but poor fit	-	-
22	S	9	Viable but poor fit	-	-
RWY 22 SID South-East					
22	SE	0	Viable and good fit	Accept	Rejected
22	SE	1	Viable and good fit	Accept	Rejected
22	SE	2	Viable and good fit	Accept	Acceptable
22	SE	3	Viable and good fit	Accept	Preferred
22	SE	4	Viable and good fit	Accept	Rejected
22	SE	5	Viable and good fit	Accept	Favourable
22	SE	6	Viable but poor fit	-	-
22	SE	7	Viable but poor fit	-	-
22	SE	8	Viable but poor fit	-	-
RWY 22 SID East					
22	E	0	Viable and good fit	Accept	Rejected
22	E	1	Viable and good fit	Accept	Preferred
22	E	2	Viable and good fit	Accept	Favourable
22	E	3	Viable and good fit	Accept	Acceptable

RWY	Envelope	No.	Design Options Report	Design Principle Evaluation	Initial Options Appraisal
22	E	4	Viable but poor fit	-	-
22	E	5	Viable but poor fit	-	-
22	E	6	Viable but poor fit	-	-
RWY 22 SID North					
22	N	0	Viable and good fit	Accept	Rejected
22	N	1	Viable and good fit	Accept	Rejected
22	N	2	Viable and good fit	Reject	-
22	N	3	Viable and good fit	Reject	-
22	N	4	Viable and good fit	Reject	-
22	N	5	Viable and good fit	Accept	Favourable
22	N	6	Viable and good fit	Reject	-
22	N	7	Viable and good fit	Accept	Acceptable
22	N	8	Viable and good fit	Accept	Preferred
22	N	9	Viable but poor fit	-	-
22	N	10	Viable but poor fit	-	-
22	N	11	Viable but poor fit	-	-
22	N	12	Viable but poor fit	-	-
RWY 22 SID North-East					
22	NE	1	Viable and good fit	Reject	-
22	NE	2	Viable and good fit	Reject	-
22	NE	3	Viable and good fit	Accept	Favourable
22	NE	4	Viable and good fit	Accept	Preferred
22	NE	5	Viable but poor fit	-	-
22	NE	6	Viable but poor fit	-	-
22	NE	7	Viable but poor fit	-	-
22	NE	8	Viable but poor fit	-	-
RWY 04 SID South					
04	S	0	Viable and good fit	Accept	Rejected
04	S	1	Viable and good fit	Accept	Rejected
04	S	2	Viable and good fit	Accept	Rejected
04	S	3	Viable and good fit	Accept	Acceptable
04	S	4	Viable and good fit	Accept	Preferred
04	S	5	Viable and good fit	Accept	Favourable
04	S	6	Viable and good fit	Accept	Rejected
04	S	7	Viable but poor fit	-	-
04	S	8	Viable but poor fit	-	-
04	S	9	Viable but poor fit	-	-
RWY 04 SID South-East					
04	SE	0	Viable and good fit	Accept	Rejected
04	SE	1	Viable and good fit	Accept	Favourable

RWY	Envelope	No.	Design Options Report	Design Principle Evaluation	Initial Options Appraisal
04	SE	2	Viable and good fit	Accept	Rejected
04	SE	3	Viable and good fit	Accept	Acceptable
04	SE	4	Viable and good fit	Accept	Preferred
04	SE	5	Viable but poor fit	-	-
04	SE	6	Viable but poor fit	-	-
04	SE	7	Viable but poor fit	-	-
RWY 04 SID East					
04	E	0	Viable and good fit	Accept	Rejected
04	E	1	Viable and good fit	Accept	Acceptable
04	E	2	Viable and good fit	Accept	Rejected
04	E	3	Viable and good fit	Reject	-
04	E	4	Viable and good fit	Accept	Favourable
04	E	5	Viable and good fit	Accept	Preferred
04	E	6	Viable and good fit	Reject	-
04	E	7	Viable but poor fit	-	-
04	E	8	Viable but poor fit	-	-
04	E	9	Viable but poor fit	-	-
RWY 04 SID North-East					
04	NE	1	Viable and good fit	Accept	Rejected
04	NE	4	Viable and good fit	Accept	Acceptable
04	NE	5	Viable but poor fit	-	-
04	NE	6	Viable but poor fit	-	-
04	NE	7	Viable and good fit	Accept	Preferred
04	NE	8	Viable and good fit	Accept	Favourable
04	NE	9	Viable but poor fit	-	-
RWY 04 SID North					
04	N	0	Viable and good fit	Accept	Rejected
04	N	1	Viable and good fit	Reject	-
04	N	2	Viable and good fit	Accept	Rejected
04	N	3	Viable and good fit	Accept	Preferred
04	N	4	Viable and good fit	Accept	Acceptable
04	N	5	Viable and good fit	Accept	Rejected
04	N	6	Viable and good fit	Accept	Favourable
04	N	7	Viable and good fit	Reject	-
04	N	8	Viable but poor fit	-	-
04	N	9	Viable but poor fit	-	-
04	N	10	Viable but poor fit	-	-
04	N	11	Viable but poor fit	-	-
RWY 04 SID West A					
04	W	1A	Viable and good fit	Accept	Acceptable

RWY	Envelope	No.	Design Options Report	Design Principle Evaluation	Initial Options Appraisal
04	W	3A	Viable and good fit	Accept	Favourable
04	W	5A	Viable and good fit	Accept	Preferred
04	W	7A	Viable and good fit	Reject	-
04	W	9A	Viable and good fit	Accept	Rejected
04	W	10A	Viable and good fit	Reject	-
04	W	11	Viable but poor fit	-	-
04	W	12	Viable but poor fit	-	-
04	W	13	Viable but poor fit	-	-
RWY 04 SID West B					
04	W	2B	Viable and good fit	Accept	Acceptable
04	W	4B	Viable and good fit	Accept	Preferred
04	W	6B	Viable and good fit	Accept	Favourable
04	W	8B	Viable and good fit	Accept	Rejected
04	W	14	Viable but poor fit	-	-
04	W	15	Viable but poor fit	-	-
04	W	16	Viable but poor fit	-	-
Transitions RW 22 - 2,000ft (East)					
22	E	1	Viable and good fit	Reject	-
22	E	2b	Viable and good fit	Reject	-
22	E	3	Viable but poor fit	-	-
22	E	6	Viable but poor fit	-	-
22	E	7	Viable but poor fit	-	-
22	E	8	Viable and good fit	Accept	Preferred
22	E	10	Viable and good fit	Reject	-
22	E	11	Viable but poor fit	-	-
22	E	15	Viable but poor fit	-	-
22	E	19	Viable and good fit	Reject	-
22	E	20	Viable and good fit	Reject	-
22	E	21	Viable and good fit	Reject	-
22	E	22	Viable and good fit	Accept	Favourable
22	E	23	Viable and good fit	Reject	-
Transitions RW 22 - 2,000ft (West)					
22	W	2a	Viable and good fit	Reject	-
22	W	4	Viable and good fit	Reject	-
22	W	5	Viable and good fit	Reject	-
22	W	9	Viable and good fit	Accept	Preferred
22	W	12	Viable and good fit	Accept	Rejected
22	W	13	Viable and good fit	Reject	-
22	W	14	Viable and good fit	Accept	Rejected

RWY	Envelope	No.	Design Options Report	Design Principle Evaluation	Initial Options Appraisal
22	W	16	Viable and good fit	Accept	Favourable
22	W	17	Viable and good fit	Accept	Acceptable
22	W	18	Viable and good fit	Reject	-
Transitions RW 04 - 2,000ft (East)					
04	E	1	Viable and good fit	Reject	-
04	E	2b	Viable and good fit	Reject	-
04	E	3	Viable but poor fit	-	-
04	E	6	Viable but poor fit	-	-
04	E	7	Viable but poor fit	-	-
04	E	8	Viable and good fit	Accept	Preferred
04	E	10	Viable and good fit	Reject	-
04	E	11	Viable but poor fit	-	-
04	E	15	Viable but poor fit	-	-
04	E	19	Viable and good fit	Reject	-
04	E	20	Viable and good fit	Reject	-
04	E	21	Viable and good fit	Reject	-
04	E	22	Viable and good fit	Accept	Favourable
04	E	23	Viable and good fit	Reject	-
Transitions RW 04 - 2,000ft (West)					
04	W	2a	Viable and good fit	Reject	-
04	W	4	Viable and good fit	Reject	-
04	W	5	Viable and good fit	Reject	-
04	W	9	Viable and good fit	Accept	Preferred
04	W	12	Viable and good fit	Accept	Rejected
04	W	13	Viable and good fit	Reject	-
04	W	14	Viable and good fit	Accept	Rejected
04	W	16	Viable and good fit	Accept	Favourable
04	W	17	Viable and good fit	Accept	Acceptable
04	W	18	Viable and good fit	Reject	-
Transitions RW 22 - 2,500ft (East)					
22	E	1	Viable and good fit	Accept	Rejected
22	E	2b	Viable and good fit	Accept	Preferred
22	E	3	Viable but poor fit	-	-
22	E	6	Viable but poor fit	-	-
22	E	7	Viable but poor fit	-	-
22	E	8	Viable but poor fit	-	-
22	E	10	Viable and good fit	Accept	Preferred
22	E	11	Viable but poor fit	-	-
22	E	19	Viable and good fit	Accept	Favourable
22	E	20	Viable and good fit	Accept	Acceptable

RWY	Envelope	No.	Design Options Report	Design Principle Evaluation	Initial Options Appraisal
22	E	21	Viable and good fit	Accept	Rejected
22	E	22	Viable but poor fit	-	-
22	E	23	Viable but poor fit	-	-
Transitions RW 22 - 2,500ft (West)					
22	W	2a	Viable and good fit	Reject	-
22	W	4	Viable and good fit	Reject	-
22	W	5	Viable and good fit	Reject	-
22	W	9	Viable but poor fit	-	-
22	W	12	Viable but poor fit	-	-
22	W	13	Viable and good fit	Reject	-
22	W	14	Viable and good fit	Accept	Favourable
22	W	15	Viable but poor fit	-	-
22	W	16	Viable and good fit	Accept	Preferred
22	W	17	Viable but poor fit	-	-
22	W	18	Viable but poor fit	-	-
Transitions RW 04 - 2,500ft (East)					
04	E	1	Viable and good fit	Accept	Rejected
04	E	2b	Viable and good fit	Accept	Preferred
04	E	3	Viable but poor fit	-	-
04	E	6	Viable but poor fit	-	-
04	E	7	Viable but poor fit	-	-
04	E	8	Viable but poor fit	-	-
04	E	10	Viable and good fit	Accept	Preferred
04	E	11	Viable but poor fit	-	-
04	E	19	Viable and good fit	Accept	Favourable
04	E	20	Viable and good fit	Accept	Acceptable
04	E	21	Viable and good fit	Accept	Rejected
04	E	22	Viable but poor fit	-	-
04	E	23	Viable but poor fit	-	-
Transitions RW 04 - 2,500ft (West)					
04	W	2a	Viable and good fit	Reject	-
04	W	4	Viable and good fit	Reject	-
04	W	5	Viable and good fit	Reject	-
04	W	9	Viable but poor fit	-	-
04	W	12	Viable but poor fit	-	-
04	W	13	Viable and good fit	Reject	-
04	W	14	Viable and good fit	Accept	Favourable
04	W	15	Viable but poor fit	-	-
04	W	16	Viable and good fit	Accept	Preferred
04	W	17	Viable but poor fit	-	-

RWY	Envelope	No.	Design Options Report	Design Principle Evaluation	Initial Options Appraisal
04	W	18	Viable but poor fit	-	-
Transitions RW 22 - 3,000ft (East)					
22	E	1	Viable and good fit	Reject	-
22	E	2b	Viable and good fit	Reject	-
22	E	3	Viable but poor fit	-	-
22	E	6	Viable but poor fit	-	-
22	E	7	Viable but poor fit	-	-
22	E	8	Viable but poor fit	-	-
22	E	10	Viable and good fit	Reject	-
22	E	11	Viable but poor fit	-	-
22	E	19	Viable but poor fit	-	-
22	E	20	Viable but poor fit	-	-
22	E	21	Viable but poor fit	-	-
22	E	22	Viable but poor fit	-	-
22	E	23	Viable but poor fit	-	-
Transitions RW 22 - 3,000ft (West)					
22	W	2a	Viable and good fit	Reject	-
22	W	4	Viable and good fit	Reject	-
22	W	5	Viable but poor fit	-	-
22	W	9	Viable but poor fit	-	-
22	W	12	Viable but poor fit	-	-
22	W	13	Viable but poor fit	-	-
22	W	14	Viable but poor fit	-	-
22	W	15	Viable but poor fit	-	-
22	W	16	Viable but poor fit	-	-
22	W	17	Viable but poor fit	-	-
22	W	18	Viable but poor fit	-	-
Transitions RW 04 - 3,000ft (East)					
04	E	1	Viable and good fit	Reject	-
04	E	2b	Viable and good fit	Reject	-
04	E	3	Viable but poor fit	-	-
04	E	6	Viable but poor fit	-	-
04	E	7	Viable but poor fit	-	-
04	E	8	Viable but poor fit	-	-
04	E	10	Viable and good fit	Reject	-
04	E	11	Viable but poor fit	-	-
04	E	19	Viable but poor fit	-	-
04	E	20	Viable but poor fit	-	-
04	E	21	Viable but poor fit	-	-
04	E	22	Viable but poor fit	-	-

RWY	Envelope	No.	Design Options Report	Design Principle Evaluation	Initial Options Appraisal
04	E	23	Viable but poor fit	-	-
Transitions RW 04 - 3,000ft (West)					
04	W	2a	Viable and good fit	Reject	-
04	W	4	Viable and good fit	Reject	-
04	W	5	Viable but poor fit	-	-
04	W	9	Viable but poor fit	-	-
04	W	12	Viable but poor fit	-	-
04	W	13	Viable but poor fit	-	-
04	W	14	Viable but poor fit	-	-
04	W	15	Viable but poor fit	-	-
04	W	16	Viable but poor fit	-	-
04	W	17	Viable but poor fit	-	-
04	W	18	Viable but poor fit	-	-

Table 2 - Design Options Evolution