Future Airspace Strategy Implementation South (FASI-S) Cardiff Airport

Gateway documentation:

Stage 2 Develop & Assess

2B (ii) Initial Options Appraisal



Sign-Off

Action	Role	Date
Produced	Airspace Change Specialist	28/01/2022
Reviewed Approved	NATS Cardiff General Manager	28/01/2022
Reviewed Approved	Cardiff Head of Airfield Operations	28/01/2022

Publication History

Issue	Date	Comments
Issue 1.0	28/01/2022	First issue submitted to the CAA

Contents

Introduction	3
Runway 12 SIDs	4
Runway 30 SIDs	12
Cardiff Airport Hold Options	20
Safety Assessment	25
Conclusion and Next Steps	25

Introduction

This document forms part of the document set in accordance with the requirements of CAP1616 airspace change process. It aims to provide adequate evidence to satisfy *Stage 2 Develop and Assess Gateway, Step 2B Options Appraisal (Phase I Initial),* including a Safety Assessment.

This document has been submitted to the CAA to satisfy the requirements for Stage 2 alongside the *Design Options* and *Design Principle Evaluation* documentation which can also be found on the portal (link).

This Initial Options Appraisal is the first of three options appraisals as part of CAP1616. The design options presented herein all passed the required criteria of the Stage 2A Design Principle Evaluation.

This Initial Options Appraisal builds on the Design Principle evaluation and identifies the key impacted audiences of the design options and a qualitative assessment of each. This assessment takes into consideration feedback received from stakeholders during the Stage 2 engagement activities alongside operational knowledge of the ACP design team.

The changes proposed in Cardiff Airport's ACP will impact flights below 7,000ft. Hence in accordance with the Levels as defined in CAP1616, it has been categorised as a Level 1 change. In line with the requirements for a Level 1 change, this Initial Options Appraisal contains a qualitative environmental impact assessment which has been conducted on the basic of CO_2 emissions and noise impact.

The baseline (do nothing) option would not deliver any improvement or modernisation from today's operations and is used as the benchmark against which the benefits of the proposed change can be measured. The Design Principles are either not met or met by default for this option, i.e., 'no change'. As such, this option is not being progressed.

The detailed makeup of the baseline option and the Hold/ SID options, including evaluation is detailed in Stage 2 Develop and Assess: *Stage 2A(i) Design Options* and *Stage 2A(ii) Design Principle Evaluation*.

Following on from the Design Principle Evaluation, Cardiff Airport is progressing the following different design options which form the focus of this Initial Options Appraisal:

- 8 options for Runway 12 SIDs
- 8 options for Runway 30 SIDs
- 5 options for a Hold

Runway 12 SIDs

Runway 12 SID C1



Group	Impact
Communities	Noise impact on health and quality of life
All of the intial climb up to 7,000	Oft is over water therefore no impact for ground-based stakeholders.
Any re-alignment from the curre	ent NPR could overfly new communities.
Communities	Air quality
Departing aircraft will still climb	at aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the ge much from today however, there may be a slight re-alignment of the current Noise Preferential Route work.
Wider society	Greenhouse gas impact
	ntinuous Climb Operation) may not be achievable above 7,000ft, due to a potential location of Cardiff's Hold/ e increase the greenhouse gas impact and contribution.
Wider society	Capacity/ resilience
	ipated to be frequently used as a large percentage of traffic flies to/ from southern locations. for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
Minimal impact – positioned ov	er the water at lower levels and within existing CAS (Controlled Airspace).
General Aviation/ commercial airlines	Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commercial airlines	Fuel Burn
Direct route however, CCOs ma account.	y not be possible which would increase fuel burn for airlines. Fuel planning would have to take this into
Commercial airlines	Training costs
	change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if nticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are forese	een.
Airport/ ANSP	Infrastructure costs
	o change airport or ANSP infrastructure, beyond the initial deployment phase which would require some ts (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expected to	o change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
This proposal is expected to rec use of the NATS simulator facili	uire air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with ties at both locations.
to be recorded and reported etc operational controllers during the service delivery.	n the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs . Some staff may only require briefings. There may be occasions where the reduced availabilty of neir conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation will also	o require updating.



Group	Impact
Communities	Noise impact on health and quality of life
All of the intial climb up	to 7,000ft is over water therefore no impact for ground-based stakeholders.
Any re-alignment from t	ne current NPR could overfly new communities.
Communities	Air quality
Departing aircraft will st	tates that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. Ill climb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the to change much from today however, there may be a slight re-alignment of the current NPR subject to further desigr
Wider society	Greenhouse gas impact
	ntly flown and slightly longer than option C1 (covered above). Also, CCOs above 7,000ft may not be achievable, due t ardiff's Hold/ transitions.
This could therefore incr	ease the greenhouse gas impact and contribution of this design option.
Wider society	Capacity/ resilience
Good alignment with the	 anticipated to be frequently used as a large percentage of traffic flies to/ from southern locations. network route structure. Also, should be suitable for lower performance aircraft types. plored for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
	oned over the water at lower levels and primarily contained within existing CAS (Controlled Airspace). It may require nal CAS to the west of the current Berry Head CTA but this should be above 7,000ft.
General Aviation/ comm airlines	ercial Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ comm airlines	ercial Fuel Burn
Longer than currently flo take into account addition	own and CCOs may not be possible which would increase fuel burn for airlines. Fuel planning would therefore have to onal track miles.
Commercial airlines	Training costs
	edures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if is not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs ar	e foreseen.
Airport/ ANSP	Infrastructure costs
	ected to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some endments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not exp	ected to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
	d to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with or facilities at both locations.
to be recorded and repo operational controllers of service delivery.	ed to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs rted etc. Some staff may only require briefings. There may be occasions where the reduced availability of luring their conversion training could mean operational rostering becomes a factor when considering continuous will also require updating.



Group	Impact
Communities	Noise impact on health and quality of life
impact for ground-based	for some early morning departures (low demand). All of the intial climb up to 7,000ft is also over water therefore no I stakeholders. The current NPR could overfly new communities.
Communities	Air quality
Government guidance st Departing aircraft will sti	ates that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. Il climb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the o change much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
	n today (cuts the corner) however, CCOs above 7,000ft may not be possible due to a potential location of Cardiff's buld therefore lessen a reduction in greenhouse gas impact and contribution.
Wider society	Capacity/ resilience
Supports growth for the Does not currently align	d as an early morning offload route for departures joining southerly Atlantic tracks or southern Europe destinations. se destinations however, low demand initially anticipated. with the network route structure, further work would be required. plored for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
Minimal impact – may c	limb outside of CAS for a short amount of time but this would only be early in the morning.
General Aviation/ comm airlines	ercial Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ comm airlines	ercial Fuel Burn
	urn for airlines as this option would cut the corner slightly when compared to today's route. However, CCOs above evable, due to a potential location of Cardiff's Hold/ transitions. This could therefore impact the fuel burn saving.
Commercial airlines	Training costs
	dures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if s not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are	e foreseen.
Airport/ ANSP	Infrastructure costs
	ected to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some ndments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expe	ected to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulat Support staff are require to be recorded and repor operational controllers d service delivery.	d to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with or facilities at both locations. d to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs ted etc. Some staff may only require briefings. There may be occasions where the reduced availability of uring their conversion training could mean operational rostering becomes a factor when considering continuous will also require updating.



Group	Impact
Communities	Noise impact on health and quality of life
impact for ground-based	for some early morning departures (low demand). All of the intial climb up to 7,000ft is also over water therefore no stakeholders. e current NPR could overfly new communities.
Communities	Air quality
Government guidance st Departing aircraft will stil	ates that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. I climb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the o change much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
CCOs above 7,000ft may greenhouse gas impact a	not be possible due to a potential location of Cardiff's Hold/ transitions. This could therefore increase the and contribution.
Wider society	Capacity/ resilience
Supports growth for these Does not currently align v	as an early morning offload route for departures joining southerly Atlantic tracks or southern Europe destinations. e destinations however, low demand initially anticipated. with the network route structure, further work would be required. plored for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
A significant amount of a airspace users.	dditional CAS would be required. However, as this would be over water there would be minimal impact on other
General Aviation/ commo airlines	Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commo airlines	ercial Fuel Burn
CCOs may not be possib	le which would fuel planning would therefore have to take into account.
Commercial airlines	Training costs
	dures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if s not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are	foreseen.
Airport/ ANSP	Infrastructure costs
	cted to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some ndments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expe	cted to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulate Support staff are require to be recorded and repor operational controllers de service delivery.	d to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with or facilities at both locations. d to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs ted etc. Some staff may only require briefings. There may be occasions where the reduced availability of uring their conversion training could mean operational rostering becomes a factor when considering continuous vill also require updating.



Group	Impact
Communities	Noise impact on health and quality of life
Potential to impact nev	w communities around Cardiff City.
Any re-alignment from	the current NPR could overfly new communities.
Communities	Air quality
Departing aircraft will s	states that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. still climb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the y to change much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
More direct route than	currently flown therefore, reduced impact for greenhouse gas contribution.
Wider society	Capacity/ resilience
Good alignment with the However, there may be	ts – this would formalise a tactical procedure which is currently used in the operation. he network route structure. e an increase in operational complexity as this route would depart towards adjacent CAS. explored for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
This route option would reducing the area they	d require a small amount of additional CAS to the north-west of Cardiff Airport. This could impact GA access by can operate within.
General Aviation/ com airlines	mercial Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ com airlines	mercial Fuel Burn
More direct route than	currently flown therefore, a reduction in fuel burn for airlines.
Commercial airlines	Training costs
	cedures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if al is not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs a	are foreseen.
Airport/ ANSP	Infrastructure costs
	pected to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some nendments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not ex	pected to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
	ted to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with ator facilities at both locations.
to be recorded and rep operational controllers service delivery.	ired to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs ported etc. Some staff may only require briefings. There may be occasions where the reduced availability of a during their conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation	n will also require updating.



Group	Impact
Communities	Noise impact on health and quality of life
track distance than what	l climb is over water then the route is specifically positioned to avoid communities (resulting in a slightly longer is currently flown). e current NPR could overfly new communities.
Communities	Air quality
Departing aircraft will still	ates that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. climb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the o change much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
Slightly longer track dista	nce than currently flown which could increase the greenhouse gas impact and contribution.
Wider society	Capacity/ resilience
However, there may be a	- similar to current route and good alignment with the network route structure. n increase in operational complexity as this route would depart towards adjacent CAS. lored for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
Minimal impact – a smal	chance that the CAS base would require lowering but otherwise, contained within existing CAS.
General Aviation/ comme airlines	rcial Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ comme airlines	rcial Fuel Burn
Slightly longer track dista additional track miles into	nce than what is currently flown therefore, slight increase in fuel burn for airlines. Fuel planning would have to take account.
Commercial airlines	Training costs
	dures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if s not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are	foreseen.
Airport/ ANSP	Infrastructure costs
	cted to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some ndments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expe	cted to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
	to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with or facilities at both locations.
to be recorded and report operational controllers du service delivery.	It to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs ed etc. Some staff may only require briefings. There may be occasions where the reduced availability of iring their conversion training could mean operational rostering becomes a factor when considering continuous vill also require updating.



Group	Impact
Communities	Noise impact on health and quality of life
Positioned to purposeful	ly overfly water therefore no impact for ground-based stakeholders.
Any re-alignment from th	ne current NPR could overfly new communities.
Communities	Air quality
Departing aircraft will sti	ates that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. Il climb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the o change much from today however, there may be a slight re-alignment of the current NPR subject to further desigr
Wider society	Greenhouse gas impact
Shorter track distance th	an today therefore this would reduce the greenhouse gas impact and contribution.
Wider society	Capacity/ resilience
performance aircraft typ However, this design opt	 should support an expected increase in future traffic to eastern destinations alongside being suitable for lower es. It would also have good alignment with the network structure. ion would require increased collaboration with Bristol Airport due to the potential impact on Bristol arrivals. plored for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
No impact – designed to	be contained within existing CAS.
General Aviation/ comm airlines	
No effect on capacity.	
General Aviation/ comm airlines	ercial Fuel Burn
Shorter track distance th	an currently flown therefore a reduction in fuel burn for airlines.
Commercial airlines	Training costs
	dures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if s not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are	e foreseen.
Airport/ ANSP	Infrastructure costs
	ected to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some indments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expe	ected to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulat Support staff are require to be recorded and repor	d to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with or facilities at both locations. d to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs ted etc. Some staff may only require briefings. There may be occasions where the reduced availability of uring their conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation	will also require updating.



Group	Impact
Communities	Noise impact on health and quality of life
	00ft is over water therefore no impact for ground-based stakeholders.
	rent NPR could overfly new communities.
Communities	Air quality
Departing aircraft will still clim	hat aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. b through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the
runway. This is unlikely to cha work.	nge much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
	reduction in its greenhouse gas contribution when compared to today's route. However, this could be reduced above 7,000ft due to a potential location of Cardiff's Hold/ transitions. This could be further lessened as this ng early morning hours.
Wider society	Capacity/ resilience
comply with network connecti It is also anticipated that it wo	sed to reduce pre-departure delay during first rotation (a known high demand period). However, it would not vity and further work would be required. uld increase workload for sector controllers when compared to today. I for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
	onal CAS would be required however this would have a minimal impact on GA access (particularly as this route
General Aviation/ commercial airlines	Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commercial airlines	Fuel Burn
	reduction in fuel burn for airlines, when compared to today's route. However, this could be reduced as CCOs 00ft due to a potential location of Cardiff's Hold/ transitions. Any potential saving could be further lessened as during early morning hours.
Commercial airlines	Training costs
	change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are fores	seen.
Airport/ ANSP	Infrastructure costs
	to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some ents (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expected	to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
This proposal is expected to re use of the NATS simulator fac	equire air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with ilities at both locations.
to be recorded and reported et	un the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs c. Some staff may only require briefings. There may be occasions where the reduced availabilty of their conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation will als	so require updating.

© 2022 Cardiff Airport Ltd. CAP1616-Stage2-Cardiff-OptionsAppraisal Issue 1.0

Public

Page | 11

Runway 30 SIDs

Runway 30 SID C10



Group	Impact
Communities	Noise impact on health and quality of life
All of the intial climb is over wate	er then avoids overflying any large populations therefore, no impact for ground-based stakeholders.
Any re-alignment from the curre	nt NPR could overfly new communities.
Communities	Air quality
Departing aircraft will still climb	at aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the e much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
	t to best avoid St Athan operations and CCOs may not be possible due to a potential location of Cardiff's enhouse gas emissions could slightly increase.
Wider society	Capacity/ resilience
Also, good alignment with netwo	pated to be frequently used as a large percentage of traffic flies to/ from southern locations. rk connectivity and similar to what is flown today. or suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
No impact – designed to be con	tained within existing CAS.
General Aviation/ commercial airlines	Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commercial airlines	Fuel Burn
	to best avoid St Athan operations and CCOs may not be possible due to a potential location of Cardiff's ne fuel planning would have to take into account additional track miles.
Commercial airlines	Training costs
	hange worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if ticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are forese	en.
Airport/ ANSP	Infrastructure costs
	change airport or ANSP infrastructure, beyond the initial deployment phase which would require some s (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expected to	change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulator facilit	
to be recorded and reported etc.	the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs Some staff may only require briefings. There may be occasions where the reduced availability of eir conversion training could mean operational rostering becomes a factor when considering continuous



Aoise impact on health and quality of life en avoids overflying any large populations therefore, no impact for ground-based stakeholders. PR could overfly new communities. Air quality rcraft flying above 1,000ft are unlikely to have a significant impact on local quality. ugh 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the uch from today however, there may be a slight re-alignment of the current NPR subject to further design Greenhouse gas impact botential location of Cardiff's Hold/ transitions. Therefore, greenhouse gas emissions could slightly Capacity/ resilience ed to be frequently used as a large percentage of traffic flies to/ from southern locations. ed as it would currently align with an opposite aligned network route. uitability of applying reduced departure separations, thus reducing pre-departure delay. ever minimal impact on GA operations.
PR could overfly new communities. Air quality rcraft flying above 1,000ft are unlikely to have a significant impact on local quality. ugh 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the uch from today however, there may be a slight re-alignment of the current NPR subject to further design Greenhouse gas impact cotential location of Cardiff's Hold/ transitions. Therefore, greenhouse gas emissions could slightly Capacity/ resilience ed to be frequently used as a large percentage of traffic flies to/ from southern locations. ed as it would currently align with an opposite aligned network route. uitability of applying reduced departure separations, thus reducing pre-departure delay. Access
Air quality rcraft flying above 1,000ft are unlikely to have a significant impact on local quality. ugh 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the uch from today however, there may be a slight re-alignment of the current NPR subject to further design Greenhouse gas impact Dotential location of Cardiff's Hold/ transitions. Therefore, greenhouse gas emissions could slightly Capacity/ resilience ed to be frequently used as a large percentage of traffic flies to/ from southern locations. ed as it would currently align with an opposite aligned network route. uitability of applying reduced departure separations, thus reducing pre-departure delay.
rcraft flying above 1,000ft are unlikely to have a significant impact on local quality. ugh 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the uch from today however, there may be a slight re-alignment of the current NPR subject to further design Greenhouse gas impact botential location of Cardiff's Hold/ transitions. Therefore, greenhouse gas emissions could slightly Capacity/ resilience ed to be frequently used as a large percentage of traffic flies to/ from southern locations. ed as it would currently align with an opposite aligned network route. uitability of applying reduced departure separations, thus reducing pre-departure delay. Access
ugh 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the uch from today however, there may be a slight re-alignment of the current NPR subject to further design Greenhouse gas impact botential location of Cardiff's Hold/ transitions. Therefore, greenhouse gas emissions could slightly Capacity/ resilience ed to be frequently used as a large percentage of traffic flies to/ from southern locations. ed as it would currently align with an opposite aligned network route. uitability of applying reduced departure separations, thus reducing pre-departure delay.
cotential location of Cardiff's Hold/ transitions. Therefore, greenhouse gas emissions could slightly Capacity/ resilience ed to be frequently used as a large percentage of traffic flies to/ from southern locations. ed as it would currently align with an opposite aligned network route. uitability of applying reduced departure separations, thus reducing pre-departure delay.
Capacity/ resilience ed to be frequently used as a large percentage of traffic flies to/ from southern locations. ed as it would currently align with an opposite aligned network route. uitability of applying reduced departure separations, thus reducing pre-departure delay.
ed to be frequently used as a large percentage of traffic flies to/ from southern locations. ed as it would currently align with an opposite aligned network route. uitability of applying reduced departure separations, thus reducing pre-departure delay.
ed as it would currently align with an opposite aligned network route. uitability of applying reduced departure separations, thus reducing pre-departure delay.
uitability of applying reduced departure separations, thus reducing pre-departure delay.
Access
ever minimal impact on GA operations.
conomic impact from increased effective capacity
uel Burn
potential location of Cardiff's Hold/ transitions therefore, airline fuel burn could slightly increase and fuel account.
raining costs
ge worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if bated to require additional training costs for airlines.
)ther costs
nfrastructure costs
nge airport or ANSP infrastructure, beyond the initial deployment phase which would require some nternal ATC system adaptation changes only).
Derational costs
nge airport or ANSP operational costs.
Deployment costs
air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with at both locations.
simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs me staff may only require briefings. There may be occasions where the reduced availabilty of conversion training could mean operational rostering becomes a factor when considering continuous uire updating.



Group	Impact
Communities	Noise impact on health and quality of life
New route intended only i impact for ground-based	for some early morning departures (low demand). Most of the intial climb is also over water therefore minimal stakeholders.
Any re-alignment from the	e current NPR could overfly new communities.
Communities	Air quality
Departing aircraft will still	ates that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. climb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the o change much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
above 7,000ft may not be	ouse gas contribution as this option would cut the corner slightly when compared to today's route. However, CCOs e achievable, due to a potential location of Cardiff's Hold/ transitions. en the reduction of greenhouse gas impact for this design option.
Wider society	Capacity/ resilience
Supports growth for these	as an early morning offload route for departures joining southerly Atlantic tracks or southern Europe destinations. e destinations however, low demand initially anticipated. vith the network route structure, further work would be required.
General Aviation	Access
	mb outside of CAS for a short amount of time but this would only be early in the morning.
General Aviation/ comme airlines	
No effect on capacity.	
General Aviation/ comme airlines	rcial Fuel Burn
7,000ft may not be achieved	rn for airlines as this option would cut the corner slightly when compared to today's route. However, CCOs above vable, due to a potential location of Cardiff's Hold/ transitions. This could therefore impact the fuel burn saving g would have to take into account.
Commercial airlines	Training costs
	dures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if s not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are	foreseen.
Airport/ ANSP	Infrastructure costs
	cted to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some adments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expe	cted to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
	to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with or facilities at both locations.
to be recorded and report	I to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs ed etc. Some staff may only require briefings. There may be occasions where the reduced availabilty of ring their conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation w	vill alea require undefing



Group	Impact
Communities	Noise impact on health and quality of life
Overflies minmal land and	no populated areas therefore minimal impact for ground-based stakeholders.
Any re-alignment from the	e current NPR could overfly new communities.
Communities	Air quality
Departing aircraft will still	tes that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. climb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the change much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
Direct track to the west in	troducing minimal greenhouse gas impact and contribution.
Wider society	Capacity/ resilience
destinations however, low Does not currently align w	for departures joining southerly Atlantic tracks or southern Europe destinations. Supports growth for these demand initially anticipated. with the network route structure, further work would be required.
	lored for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
	ditional CAS would be required for protection purposes and would likely impact upon GA access.
General Aviation/ commentairlines	rcial Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commen airlines	rcial Fuel Burn
Direct track to the west in	troducing minimal fuel burn for airlines.
Commercial airlines	Training costs
	ures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are	foreseen.
Airport/ ANSP	Infrastructure costs
	ted to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some dments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expec	ted to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulator Support staff are required	to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with r facilities at both locations. to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs ed etc. Some staff may only require briefings. There may be occasions where the reduced availability of
operational controllers du service delivery.	ring their conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation w	ill also require updating.



Group	Impact
Communities	Noise impact on health and quality of life
Small increase in noise impa	ct for new communities around Cowbridge.
Any re-alignment from the cu	irrent NPR could overfly new communities.
Communities	Air quality
Departing aircraft will still clir	that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. nb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the ange much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
More direct route than currer	tly flown therefore, reduced impact for greenhouse gas contribution.
Wider society	Capacity/ resilience
route structure. However, potential to conflict	is support growth for more western and transatlantic flights in the future. Good alignment with the network t with en route traffic in a known busy region of airspace. ed for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
This route option would likely	require additional CAS for protection purposes. The positioning of the route would have a significant impact ions around Brecon and potentially other GA users too.
General Aviation/ commercia airlines	Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commercia airlines	a Fuel Burn
More direct route than currer miles.	ntly flown therefore, reduced fuel burn for airlines. Fuel planning would take into account a reduction in track
Commercial airlines	Training costs
	es change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if t anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are for	eseen.
Airport/ ANSP	Infrastructure costs
	t to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some nents (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expected	to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulator fa Support staff are required to to be recorded and reported of	require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with cilities at both locations. run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs etc. Some staff may only require briefings. There may be occasions where the reduced availability of g their conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation will a	Ilso require updating.



Group	Impact
Communities	Noise impact on health and quality of life
track distance than what is	climb is over water then the route is specifically positioned to avoid communities (resulting in a slightly longer currently flown). current NPR could overfly new communities.
Communities	Air quality
Departing aircraft will still c	es that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. limb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the change much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
Slightly longer track distant	ce than currently flown which could increase the greenhouse gas impact and contribution.
Wider society	Capacity/ resilience
Also, possible further capa	etwork route structure however may interact with LTMA arrivals within this known busy region of airspace. city constraints from conflict with other Cardiff traffic such as slow departures. ored for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
Minimal impact – a small o	hance that the CAS base would require lowering but otherwise, contained within existing CAS.
General Aviation/ commerce airlines	cial Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commerce airlines	zial Fuel Burn
Slightly longer track distand have to take into account a	ce than what is currently flown therefore, slight increase in fuel burn for airlines. Fuel planning would therefore dditional track miles.
Commercial airlines	Training costs
	res change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are fo	preseen.
Airport/ ANSP	Infrastructure costs
	ed to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some Iments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expect	ed to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulator	
to be recorded and reported operational controllers duri service delivery.	o run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs d etc. Some staff may only require briefings. There may be occasions where the reduced availabilty of ng their conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation wil	i aiso require updating.



Group	Impact
Communities	Noise impact on health and quality of life
All of the climb is over I	and with the potential to impact new stakeholders north of Cardiff City.
Any re-alignment from	the current NPR could overfly new communities.
Communities	Air quality
Departing aircraft will s	states that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. till climb through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the to change much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
	than today therefore this would reduce the greenhouse gas impact and contribution. rt arrivals could impact the potential for a continuous climb.
Wider society	Capacity/ resilience
simpler than the curren	s – should support an expected increase in future traffic to eastern destinations alongside being more direct and It departure route. It would also have good alignment with the network structure. xplored for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
No impact – designed	to be contained within existing CAS.
General Aviation/ comr airlines	nercial Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ comr airlines	nercial Fuel Burn
	than today therefore a reduction in fuel burn for airlines. rt arrivals could impact the potential for a continuous climb which fuel planning would have to take into account.
Commercial airlines	Training costs
	edures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if I is not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs a	re foreseen.
Airport/ ANSP	Infrastructure costs
	pected to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some nendments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not exp	pected to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
	ed to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with ator facilities at both locations.
to be recorded and repo operational controllers service delivery.	red to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs orted etc. Some staff may only require briefings. There may be occasions where the reduced availability of during their conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation	n will also require updating.



Group	Impact
Communities	Noise impact on health and quality of life
	ater and avoids overflying any large populations therefore minimal impact for ground-based stakeholders. rent NPR could overfly new communities.
Communities	Air quality
Departing aircraft will still clim	hat aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. b through 1,000ft on initial departure, between 2 and 4 nautical miles (about 4-7km) from either end of the nge much from today however, there may be a slight re-alignment of the current NPR subject to further design
Wider society	Greenhouse gas impact
Direct route with a significant r as this route would only be use	eduction in its greenhouse gas contribution when compared to today's route. However, this could be lessened ad during early morning hours.
Wider society	Capacity/ resilience
comply with network connectivity is also anticipated that it would be a set of the set o	sed to reduce pre-departure delay during first rotation (a known high demand period). However, it would not vity and further work would be required. uld increase workload for sector controllers when compared to today.
	for suitability of applying reduced departure separations, thus reducing pre-departure delay.
General Aviation	Access
	equired however this would have a minimal impact on GA access (particularly as this route will only be used he initial climb would occur within existing CAS.
General Aviation/ commercial airlines	Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commercial airlines	Fuel Burn
	eduction in fuel burn for airlines, when compared to today's route. Fuel planning would take into account this ver, this could be lessened as this route would only be used during early morning hours.
Commercial airlines	Training costs
	change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are fores	een.
Airport/ ANSP	Infrastructure costs
	to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some nts (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expected t	o change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
This proposal is expected to re use of the NATS simulator faci	quire air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with lities at both locations.
to be recorded and reported et operational controllers during t service delivery.	In the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs c. Some staff may only require briefings. There may be occasions where the reduced availability of their conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation will als	o require updating.

Cardiff Airport Hold Options



Hold 2A

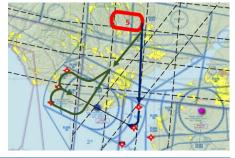
Communities Transitions would primarily be posit PBN routing will be used to minimis Communities Government guidance states that a Arriving aircraft will still descend the end of the runway. This is close to be	Air quality ircraft flying above 1,000ft are unlikely to have a significant impact on local quality. rough 1,000ft on final approach, between 2 and 4 nautical miles (about 4-7km) from touchdown at either anding, in the very final stages of the approach, and is no change from today. Greenhouse gas impact
Transitions would primarily be posit PBN routing will be used to minimis Communities Government guidance states that a Arriving aircraft will still descend the end of the runway. This is close to be	tioned over water and not overfly any large populations. se overflying population centres. Air quality ircraft flying above 1,000ft are unlikely to have a significant impact on local quality. rough 1,000ft on final approach, between 2 and 4 nautical miles (about 4-7km) from touchdown at either anding, in the very final stages of the approach, and is no change from today. Greenhouse gas impact
PBN routing will be used to minimis Communities Government guidance states that a Arriving aircraft will still descend the end of the runway. This is close to be	e overflying population centres. Air quality ircraft flying above 1,000ft are unlikely to have a significant impact on local quality. rough 1,000ft on final approach, between 2 and 4 nautical miles (about 4-7km) from touchdown at either anding, in the very final stages of the approach, and is no change from today. Greenhouse gas impact
Government guidance states that a Arriving aircraft will still descend the end of the runway. This is close to b	ircraft flying above 1,000ft are unlikely to have a significant impact on local quality. rough 1,000ft on final approach, between 2 and 4 nautical miles (about 4-7km) from touchdown at either anding, in the very final stages of the approach, and is no change from today. Greenhouse gas impact
Arriving aircraft will still descend the end of the runway. This is close to b	rough 1,000ft on final approach, between 2 and 4 nautical miles (about 4-7km) from touchdown at either anding, in the very final stages of the approach, and is no change from today. Greenhouse gas impact
Wider society	along to the circuit and the majority of arrivale are from the south and east. Eval planning does not have
to take into account additional track	close to the airport and the majority of arrivals are from the south and east. Fuel planning does not have k miles due to the location therefore no superfluous environmental impact. Net increase in CO ₂ emissions e employed for most arrivals (only when required for reasons such as delay absorption, or technical
Wider society	Capacity/ resilience
Removes Hold from the overhead th	oute structure and appropriate location for the majority of arrivals from the south and east. hus enabling more use of continuous climb operations (CCO) for departures. restriction on departures to the south due to the location of the transitions from the hold to the runway.
General Aviation	Access
Minimal impact – GA flights genera	Ily avoid this region due to high terrain. The Hold and transitions would be contained within existing CAS.
General Aviation/ commercial airlines	Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commercial airlines	Fuel Burn
	close to the airport and the majority of arrivals are from the south and east. Fuel planning therefore does onal track miles due to Hold location.
Commercial airlines	Training costs
	nge worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if ipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are foreseen.	
Airport/ ANSP	Infrastructure costs
	ange airport or ANSP infrastructure, beyond the initial deployment phase which would require some nternal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expected to cha	ange airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulator facilities Support staff are required to run the to be recorded and reported etc. So	e simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs ome staff may only require briefings. There may be occasions where the reduced availabilty of conversion training could mean operational rostering becomes a factor when considering continuous





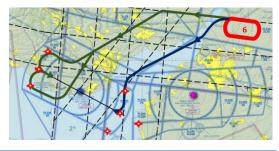
Group	Impact
Communities	Noise impact on health and quality of life
	y be positioned over water and not overfly any large populations. o minimise overflying population centres.
Communities	Air quality
Arriving aircraft will still de	tes that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. escend through 1,000ft on final approach, between 2 and 4 nautical miles (about 4-7km) from touchdown at either close to landing, in the very final stages of the approach, and is no change from today.
Wider society	Greenhouse gas impact
to take into account additi	is Hold is close to the airport and the majority of arrivals are from the south and east. Fuel planning does not have onal track miles due to the location therefore no superfluous environmental impact. Net increase in CO ₂ emissions will not be employed for most arrivals (only when required for reasons such as delay absorption, or technical
Wider society	Capacity/ resilience
	network route structure and appropriate location for the majority of arrivals from the south and east.
	verhead thus enabling more use of continuous climb operations (CCO) for departures. aint on capacity if departures have to be held beneath the Hold.
General Aviation	Access
Minimal impact – GA fligh	ts generally avoid this region due to high terrain. The Hold and transitions would be contained within existing CAS.
General Aviation/ commer airlines	cial Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commer airlines	rcial Fuel Burn
	is Hold is close to the airport and the majority of arrivals are from the south and east. Fuel planning therefore does unt additional track miles due to Hold location.
Commercial airlines	Training costs
	ures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are f	ioreseen.
Airport/ ANSP	Infrastructure costs
	ted to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some dments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expec	ted to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulator Support staff are required	to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with facilities at both locations. to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs ed etc. Some staff may only require briefings. There may be occasions where the reduced availabilty of
service delivery.	ring their conversion training could mean operational rostering becomes a factor when considering continuous
Internal documentation wi	ii aiso require upoating.





Group	Impact
Communities	Noise impact on health and quality of life
will investigate whether t	¹ 12 would descend over and significantly impact upon new populations (not impacted today). Further design work his could be mitigated by extending the transition further to the south. However it is likely that this would have a al impact from increased track miles.
	to minimise overflying population centres where possible.
Communities	Air quality
Arriving aircraft will still d	ates that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. lescend through 1,000ft on final approach, between 2 and 4 nautical miles (about 4-7km) from touchdown at eithe s close to landing, in the very final stages of the approach, and is no change from today.
Wider society	Greenhouse gas impact
other Hold design options required for reasons such	or arrivals from the south. This would have a negative impact on greenhouse gas emissions when compared to s. Net increase in CO ₂ emissions would be small as holding will not be employed for most arrivals (only when n as delay absorption, or technical troubleshooting). Flights will however have to plan fuel loading to take into olding facility; for flights from the south, this would require higher fuel load planning compared with a hold to the higher fuel burn.
Wider society	Capacity/ resilience
	rom a large percentage of arrivals, particularly from the south. impact on Bristol operations requiring tactical intervention to deconflict, or a restriction on movements in order to
General Aviation	Access
Transitions likely to confl would be contained withi	ict with gliders which operate in this Class D region of airspace. Minimal impact otherwise – Hold and transitions n existing CAS.
General Aviation/ comme airlines	Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ comme airlines	ercial Fuel Burn
Not an optimal location for the locatic	or a significant percentage of arrivals, particularly those from the south. Airlines would have to carry excessive fuel n of the Hold.
Commercial airlines	Training costs
	dures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if s not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are	foreseen.
Airport/ ANSP	Infrastructure costs
	cted to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some ndments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expe	cted to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulate Support staff are required to be recorded and repor operational controllers de service delivery.	d to require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with or facilities at both locations. d to run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, output ted etc. Some staff may only require briefings. There may be occasions where the reduced availability of uring their conversion training could mean operational rostering becomes a factor when considering continuous vill also require updating.





Group	Impact
Communities	Noise impact on health and quality of life
will investigate whether thi detrimental environmental	2 would descend over and significantly impact upon new populations (not impacted today). Further design work s could be mitigated by extending the transition further to the south. However it is likely that this would have a impact from increased track miles.
-	minimise overflying population centres where possible.
Communities	Air quality
Arriving aircraft will still des	es that aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. Secend through 1,000ft on final approach, between 2 and 4 nautical miles (about 4-7km) from touchdown at either close to landing, in the very final stages of the approach, and is no change from today.
Wider society	Greenhouse gas impact
greenhouse gas emissions be employed for most arriv have to plan fuel loading to	a significant percentage of arrivals, particularly those from the south. This would have a negative impact on when compared to other Hold design options. Net increase in CO ₂ emissions would be small as holding will not als (only when required for reasons such as delay absorption, or technical troubleshooting). Flights will however take into account routing to the holding facility; for flights from the south, this would require higher fuel load hold to the south and corresponding higher fuel burn.
Wider society	Capacity/ resilience
	etwork route structure. cation from a large percentage of arrivals, particularly from the south. The location could also potentially constrain te runway changes being difficult to accommodate.
General Aviation	Access
	conflict with GA flights such as frequent cross-country flights which operate around the Cotswolds within Class urther exasperated if transitions require additional CAS.
General Aviation/ commerce airlines	cial Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commerce airlines	zial Fuel Burn
Flights will have to plan fue	a significant percentage of arrivals, particularly those from the south. Transitions are also excessively long. I loading to take into account routing to the holding facility; for flights from the south, this would require higher I with a hold to the south and corresponding higher fuel burn.
Commercial airlines	Training costs
	res change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if not anticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are f	preseen.
Airport/ ANSP	Infrastructure costs
	ed to change airport or ANSP infrastructure, beyond the initial deployment phase which would require some Iments (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expect	ed to change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulator Support staff are required to to be recorded and reporte	o require air traffic controller training for controllers and assistants at Cardiff Airport and NATS Swanwick with facilities at both locations. o run the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs d etc. Some staff may only require briefings. There may be occasions where the reduced availability of ng their conversion training could mean operational rostering becomes a factor when considering continuous



Hold 7

Group	Impact
Communities	Noise impact on health and quality of life
	e over water therefore, minimal impact.
PBN routing will be used to minir	nise overflying population centres where possible.
Communities	Air quality
Arriving aircraft will still descend	It aircraft flying above 1,000ft are unlikely to have a significant impact on local quality. through 1,000ft on final approach, between 2 and 4 nautical miles (about 4-7km) from touchdown at either to landing, in the very final stages of the approach, and is no change from today.
Wider society	Greenhouse gas impact
arrivals from the east when com	cant percentage of arrivals, particularly those from the south. However, slight increase in emissions for pared to other Hold locations. Net increase in CO ₂ emissions would be small as holding will not be employed irred for reasons such as delay absorption, or technical troubleshooting).
Wider society	Capacity/ resilience
-	< route structure. Appropriate location for a large number of arrivals. It on continuous climb operations for southerly departures from Cardiff runway 30 created by transitions to
General Aviation	Access
The transition to runway 30 is lik CAS. Mnimal impact on GA flight	ely to require additional CAS. Otherwise this design option would utilise a relatively quiet region of current s.
General Aviation/ commercial airlines	Economic impact from increased effective capacity
No effect on capacity.	
General Aviation/ commercial airlines	Fuel Burn
Appropriate location for a signific arrivals from the east when com	cant percentage of arrivals, particularly those from the south. However, slight increase in fuel planning for pared to other Hold locations.
Commercial airlines	Training costs
	nange worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if ticipated to require additional training costs for airlines.
Commercial airlines	Other costs
No other airline costs are foresee	en.
Airport/ ANSP	Infrastructure costs
	change airport or ANSP infrastructure, beyond the initial deployment phase which would require some s (internal ATC system adaptation changes only).
Airport/ ANSP	Operational costs
This proposal is not expected to	change airport or ANSP operational costs.
Airport/ ANSP	Deployment costs
use of the NATS simulator facilit Support staff are required to run to be recorded and reported etc.	the simulator – planning, training staff, data preparation and testing, pseudo pilots, safety analysts, outputs Some staff may only require briefings. There may be occasions where the reduced availability of eir conversion training could mean operational rostering becomes a factor when considering continuous

Safety Assessment

A qualitative safety assessment has been completed for each of the above design options and also includes those which were rejected as part of the *Step 2 - Stage 2A Design Principle Evaluation*.

This safety report documents the initial safety appraisal of the Cardiff Airport design options by providing a summary of potential safety implications and a qualitative statement for each design option.

The safety assessment has been summarised in a separate report and uploaded to the portal (link) alongside this document.

Conclusion and Next Steps

This proposal has been developed following the submission of the <u>linked</u> Statement of Need to the CAA Airspace Regulation. This summarised Cardiff Airport's requirement for an airspace change including and limiting the environmental impact of flights and better management of noise impact for ground-based stakeholders.

This document has described the design options which address the Statement of Need by the proposed introduction of new arrival and departure procedures. These options have been developed through engagement with Cardiff Airport's stakeholders including representatives from airlines and the GA/ MoD communities. Cardiff Airport thanks all of these stakeholders and looks forward to continuing the development of this proposal alongside them.

These design options have been qualitatively appraised and will be taken forward for further development and consultation. Subject to CAA approval at the *Stage 2 Develop and Assess* Gateway Assessment, this proposal will then move on to *Stage 3 Consult*.