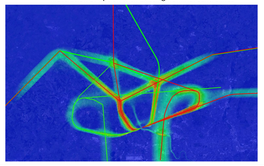
RAF Northolt ACP (ACP-2018-66)
Step 2A Appendix A - Design Principle Evaluation V1.0

DPE Summary Table

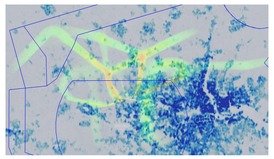
Option Name	DP1	DP2	DP3	DP4	DP5	DP6	DP7			Subject to the overriding design principle of maintaining a high standard of safety, the highest priority principle of this airspace change that cannot be discounted is that it accords with the CAA's published Airspace Modernisation Strategy (CAP 1711) and any current or future plans associated with it	Carried forward into IOA?
	Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes		
Do Nothing											No - as four or more 'should' DP categories have been evaluated as 'not met'. In addition doing nothing cannot accord with the AMS.
07 Arrv Option 1											Yes
07 Arrv Option 2											No - Discontinued as four or more 'should' DP categories have been evaluated as 'not met'
07 Arrv Option 3											No - Discontinued as does not meet DP2 (and four or more 'should' DP categories have been evaluated as 'not met')
25 Arrv Option 1											Yes
25 Arrv Option 2											Yes
25 Arrv Option 3											No - Discontinued as does not meet DP2 (and four or more 'should' DP categories have been evaluated as 'not met')
25 Arrv Option 4											Yes
07 Dep Option 1											Yes
07 Dep Option 2											Yes
07 Dep Option 3											No - Discontinued as does not meet DP2 (and four or more 'should' DP categories have been evaluated as 'not met').
07 Dep Option 4											No - Discontinued as does not meet DP2.
25 Dep Option 1											Yes
25 Dep Option 2											Yes
25 Dep Option 3											No - Discontinued as does not meet DP2.
25 Dep Option 4											No - Discontinued as does not meet DP2 (and four or more 'should' DP categories have been evaluated as 'not met').

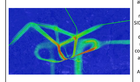
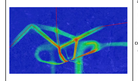
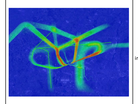
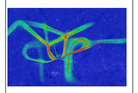
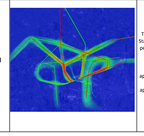
Do Nothing

Illustration of option with existing nominal centrelines



Option in relation to Population Density

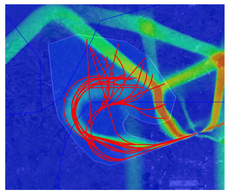


Option Name		Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS				
			1	2	3	4	5	6	7a	7b	7c	AMS				
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives
07 Departures		SIDs turn shortly after departure to the north. This allows the SIDs to climb straight to 3000ft by keeping laterally separated from Heathrow's existing northbound SIDs and their missed approaches. The SIDs then route to waypoints at Brookman's Park (BPK), BUZAD and HENTON (HEN) which generates dependencies on Luton and London City departures meaning that certain departures in certain runway configurations cannot be released by Terminal Control at the same time. Owing to proximity to the edge of the London CTR, RWY07 departures departing via Airways are to climb at a minimum 13.2% gradient to remain inside CAS. The non-airways departures climb to just 2000ft to leave CAS at the London CTR boundary.	RAF Northolt's existing operation is safe within existing standards and rulesets.	With the anticipated change to the surrounding airspace, RAF Northolt must change its airspace design accordingly. RAF Northolt were included in the minimum group of airports that CAA and NATS advised must take forward an airspace change to deliver on the AMS (see NATS Feasibility Report into Airspace Modernisation in the south of the UK and the CAA Assurance into the NATS Feasibility Report). However, while not optimal, at this stage this does not necessarily mean that doing nothing with RWY07 departures would not ensure continuation of military and governmental operational activity.	Doing nothing at RAF Northolt is expected to inhibit other airspace users from maximising benefit from FASI resulting in sub optimal routes for those airports. This could in turn Impact on GA or adjacent airport operations, restrict CCO/CDO for those airports and/or require more CAS for those airports.	Due to the rationalisation of the UK DVOR network, RAF Northolt's legacy SIDs are in the process of being replicated in RNAV1 to enable the continuation of flying. Replication is an interim measure ahead of the FASI ACP which will develop SIDs to meet RAF Northolt and AMS requirements and that are more compliant with PANS OPS.	RAF Northolt's SIDs are operationally efficient for Heathrow but have dependencies on Luton and London City. These dependencies between all three aerodromes generate delay for one another. Redesign is required to reduce these dependencies and the associated delay. No change to the airspace may also inhibit the wider FASI programme of change and AMS benefits associated with the programme.	Doing nothing with RAF Northolt's RWY07 departures will not enable reductions in fuel burn and greenhouse gas emissions.	Doing nothing will not change RAF Northolt's existing traffic patterns and will minimise numbers of people newly overflown. (Note that changes to adjacent routes could result in a change to vectoring practices of RAF Northolt's traffic which in itself could overfly new people but it is not possible to estimate what this would look like at this time).	Doing nothing will not see a reduction in the total number of people overflown which may be possible with a redesign of RAF Northolt's departure routes.	Doing nothing will not enable RAF Northolt to try and minimise overflight of communities with multiple routes to/from other airports, based on their new airspace design options. Overflight could be similar to today although that will depend on the final positioning by other airports.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
25 Departures		SIDs turn shortly after departure to the north. This allows the SIDs to climb straight to 3000ft by keeping laterally separated from Heathrow's existing north bound SIDs and their missed approaches. The SIDs then route to BPK, BUZAD and HEN which generates dependencies on Luton and London City departures meaning that certain departures in certain runway configurations cannot be released by Terminal Control at the same time. Owing to proximity to the edge of the London CTR, RWY07 departures departing via Airways are to climb at a minimum 10% gradient to remain inside CAS and also outclimb Denham's LFA. The non-airways departures climb to just 2000ft to leave CAS at the London CTR boundary however departures are not to overfly Denham ATZ below 1500ft.	Existing RAF Northolt operation is safe within existing standards and rulesets. It is worth noting here than Denham Aerodrome have expressed that if RAF Northolt's RWY25 SIDs could avoid Denham ATZ to a greater extent and allow an increase in size of their LFA it would enhance safety to Denham operations.	With the anticipated change to the surrounding airspace, RAF Northolt must change its airspace design accordingly. RAF Northolt were included in the minimum group of airports that CAA and NATS advised must take forward an airspace change to deliver on the AMS (see NATS Feasibility Report into Airspace Modernisation in the South of the UK and the CAA Assurance into the NATS Feasibility Report). However, while not optimal, at this stage this does not necessarily mean that doing nothing with RWY25 departures would not ensure continuation of military and governmental operational activity.	Doing nothing at RAF Northolt is expected to inhibit other airspace users from maximising benefit from FASI resulting in sub optimal routes for those airports. This could in turn Impact on GA or adjacent airport operations, restrict CCO/CDO for those airports and/or require more CAS for those airports.	Due to the rationalisation of the UK DVOR network, RAF Northolt's legacy SIDs are in the process of being replicated in RNAV1 to enable the continuation of flying. Replication is an interim measure ahead of the FASI ACP which will develop SIDs to meet Northolt and AMS requirements and that are more compliant with PANS OPS.	RAF Northolt's SIDs are operationally efficient for Heathrow but have dependencies on Luton and London City. These dependencies between all three aerodromes generate delay for one another. Redesign is required to reduce these dependencies and the associated delay. No change to the airspace may also inhibit the wider FASI programme of change and AMS benefits associated with the programme.	Doing nothing with RAF Northolt's RWY25 departures will not enable reductions in fuel burn and greenhouse gas emissions.	Doing nothing will not change RAF Northolt's existing traffic patterns and will minimise numbers of people newly overflown. (Note that changes to adjacent routes could result in a change to vectoring practices of RAF Northolt's traffic which in itself could overfly new people but it is not possible to estimate what this would look like at this time).	Doing nothing will not see a reduction in the total number of people overflown which may be possible with a redesign of RAF Northolt's departure routes.	Doing nothing will not enable RAF Northolt to try and minimise overflight of communities with multiple routes to/from other airports, based on their new airspace design options. Overflight could be similar to today although that will depend on the final positioning by other airports.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
07 Arrivals		Arrivals are vectored onto a PAR/SRA, joining final approach at c.4nm from touchdown. They can also perform a visual approach. Airways arrivals are kept inside CAS where possible. The short final approach to RWY 07 ensures that at least 3nm lateral radar separation can be provided against aircraft on final approach to RW09L at Heathrow enabling independent operations.	RAF Northolt's existing operation is safe within existing standards and rulesets however a longer final approach would be more desirable from a flight crew perspective.	With the anticipated change to the surrounding airspace, RAF Northolt must change its airspace design accordingly. RAF Northolt were included in the minimum group of airports that CAA and NATS advised must take forward an airspace change to deliver on the AMS (see NATS Feasibility Report into Airspace Modernisation in the South of the UK and the CAA Assurance into the NATS Feasibility Report). At the very least RAF Northolt expect there to be a change to vectoring practices for RWY07 arrivals below 7000ft that would be required to accommodate changes at adjacent airports. However, at this stage this does not necessarily mean doing nothing with RWY07 arrivals would not ensure continuation of military and governmental operational activity. Note that as highlighted in RAF Northolt's Stage 2A document, a Precision Approach replacement may be required for RWY07 arrivals which would need to be progressed should FASI not proceed in a timely manner.	Doing nothing at RAF Northolt is expected to inhibit other airspace users from maximising benefit from FASI resulting in sub optimal routes for those airports. This could in turn Impact on GA or adjacent airport operations, restrict CCO/CDO for those airports and/or require more CAS for those airports.	RAF Northolt's RWY07 arrivals rely on PAR/SRA/Visual. Doing nothing would not adopt a PBN arrival.	RAF Northolt's RWY07 arrivals are largely independent of adjacent FASI airports and do not generate delay for those airports. RAF Northolt arrivals can occasionally experience stack delay as a result of the Heathrow operation but not the other way around. RAF Northolt's RWY07 arrival configuration is less optimal for RAF Northolt, so as to reduce dependencies with Heathrow. However loss of PAR in the future would not provide RAF Northolt with a precision approach to RWY07 and would therefore lead of delays in adverse weather.	Doing nothing with RAF Northolt's RWY07 arrivals will not enable reductions in fuel burn and greenhouse gas emissions.	Doing nothing will not change RAF Northolt's existing traffic patterns and will minimise numbers of people newly overflown. (Note that changes to adjacent routes could result in a change to vectoring practices of RAF Northolt's traffic which in itself could overfly new people but it is not possible to estimate what this would look like at this time).	Doing nothing will not see a reduction in the total number of people overflown which may be possible with a redesign of RAF Northolt's arrival routes.	Doing nothing will not enable RAF Northolt to try and minimise overflight of communities with multiple routes to/from other airports, based on their new airspace design options. Overflight could be similar to today although that will depend on the final positioning by other airports.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2. Note that as highlighted in RAF Northolt's Step 2A document, a Precision Approach replacement may be required for RWY07 arrivals which would need to be progressed should FASI not proceed in a timely manner.
25 Arrivals		Arrivals are vectored onto a ILS (SRA and Visual Approach also available), joining final approach at c.8nm from touchdown. Airways arrivals are kept inside CAS where possible which is helped due to a 3.5° ILS.	RAF Northolt's existing operation is safe within existing standards and rulesets.	With the anticipated change to the surrounding airspace, RAF Northolt must change its airspace design accordingly. RAF Northolt were included in the minimum group of airports that CAA and NATS advised must take forward an airspace change to deliver on the AMS (see NATS Feasibility Report into Airspace Modernisation in the South of the UK and the CAA Assurance into the NATS Feasibility Report). At the very least RAF Northolt expect there to be a change to vectoring practices for RWY25 arrivals below 7000ft that would be required to accommodate changes at adjacent airports. However, at this stage this does not necessarily mean doing nothing at this time with RWY25 arrivals would not ensure continuation of military and governmental operational activity.	Doing nothing at RAF Northolt is expected to inhibit other airspace users from maximising benefit from FASI resulting in sub optimal routes for those airports. This could in turn Impact on GA or adjacent airport operations, restrict CCO/CDO for those airports and/or require more CAS for those airports.	RAF Northolt's RWY25 arrivals rely on SRA/Visual Approach and ILS. Doing nothing would not adopt a PBN arrival.	RAF Northolt's RWY25 arrivals are largely independent of adjacent FASI airports and do not generate delay for those airports. RAF Northolt arrivals can occasionally experience stack delay as a result of the Heathrow operation but not the other way around. However doing nothing with RWY25 arrivals may constrain adjacent airports' abilities to obtain maximum benefits from FASI.	Doing nothing with RAF Northolt's RWY25 arrivals will not enable reductions in fuel burn and greenhouse gas emissions.	Doing nothing will not change RAF Northolt's existing traffic patterns and will minimise numbers of people newly overflown. (Note that changes to adjacent routes could result in a change to vectoring practices of RAF Northolt's traffic which in itself could overfly new people but it is not possible to estimate what this would look like at this time).	Doing nothing will not see a reduction in the total number of people overflown which may be possible with a redesign of RAF Northolt's arrival routes.	Doing nothing will not enable RAF Northolt to try and minimise overflight of communities with multiple routes to/from other airports, based on their new airspace design options. Overflight could be similar to today although that will depend on the final positioning by other airports.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2.
Do Nothing as a whole		This option would see RAF Northolt maintaining the Status Que with its airspace design (the London CTR as per the Civil AIP) and its IFPs (as per the Military AIP). The high number of similar, illustrative tracks represent the many different types of types of approach that are being investigated including PBN to ILS, RNP APCH, offset approaches, straight in approaches and different final approach joining point locations.	RAF Northolt's existing operation is safe within existing standards and rulesets.	With the anticipated change to the surrounding airspace, RAF Northolt must change its airspace design accordingly. RAF Northolt were included in the minimum group of airports that CAA and NATS advised must take forward an airspace change to deliver on the AMS (see NATS Feasibility Report into Airspace Modernisation in the South of the UK and the CAA Assurance into the NATS Feasibility Report). At the very least RAF Northolt expect there to be a change to vectoring practices for RWY25 arrivals below 7000ft that would be required to accommodate changes at adjacent airports. However, at this stage this does not necessarily mean doing nothing at this time with would not ensure continuation of military and governmental operational activity. Note that as highlighted in RAF Northolt's Stage 2A document, a Precision Approach replacement may be required for RWY07 arrivals which would need to be progressed should FASI not proceed in a timely manner.	Doing nothing at RAF Northolt is expected to inhibit other airspace users from maximising benefit from FASI resulting in sub optimal routes for those airports. This could in turn Impact on GA or adjacent airport operations, restrict CCO/CDO for those airports and/or require more CAS for those airports.	Due to the rationalisation of the UK DVOR network, RAF Northolt's legacy SIDs are in the process of being replicated in RNAV1 to enable the continuation of flying. Replication is an interim measure ahead of the FASI ACP which will develop SIDs to meet Northolt and AMS requirements and that are more compliant with PANS OPS. Doing nothing for arrivals would not adopt PBN.	Doing Nothing will not enable reduced dependencies with Luton and London City which generates operational inefficiencies for all three aerodromes. It would also not replace the PAR to RWY07 and would therefore lead to delays in adverse weather. Doing nothing at RAF Northolt may constrain adjacent airports' abilities to obtain maximum benefits from FASI.	Doing nothing with RAF Northolt's airspace design will not enable reductions in fuel burn and greenhouse gas emissions for its own movements or the movements to/from adjacent airports.	Doing nothing will not change RAF Northolt's existing traffic patterns and will therefore minimise numbers of people newly overflown. (However, changes to adjacent routes could result in a change to vectoring practices of RAF Northolt's traffic which in itself could overfly new people but it is not possible to estimate what this would look like at this time and would not be 'Do Nothing').	Doing nothing will not see a reduction in the total number of people overflown which may be possible with a redesign of RAF Northolt's arrival and departure routes.	Doing nothing will not enable RAF Northolt to try and minimise overflight of communities with multiple routes to/from other airports, based on their new airspace design options. Overflight could be similar to today although that will depend on the final positioning by other airports.	RAF Northolt's existing operation is safe within existing standards and rulesets.	RAF Northolt's existing operation minimises impact to other airspace users by operating in a confined portion of the London CTR, a very short final to RWY07 and SIDs which turn north immediately with a low initial stop altitude. The high climb gradients on the SIDs permit a Denham LFA up to 1200ft however Denham have advised that changes to RAF Northolt's RWY25 departures could further reduce impact on their operation. For this reason this Design Principle (DP) is assessed as Partly Met.	Doing nothing will not enable reduced dependencies with Luton and London City which generates operational inefficiencies for all three aerodromes. It would also not replace the PAR to RWY07 and would therefore lead of delays in adverse weather. This DP is assessed as Partly Met in accordance with the methodology owing to the 'Met' assessment for RWY25 Arrivals.	Doing nothing can not be considered to reduce emissions or better manage noise however it would minimise numbers newly overflown and could result in less overflight of communities with multiple routes, should other airports move theirs away from RAF Northolt's.	With the anticipated change to the surrounding airspace, RAF Northolt must change its airspace design accordingly. RAF Northolt were included in the minimum group of airports that CAA and NATS advised must take forward an airspace change to deliver on the AMS (see NATS Feasibility Report into Airspace Modernisation in the South of the UK and the CAA Assurance into the NATS Feasibility Report). At the very least RAF Northolt expect there to be a change to vectoring practices for RWY25 arrivals below 7000ft that would be required to accommodate changes at adjacent airports. However, at this stage this does not necessarily mean doing nothing would not ensure continuation of military and governmental operational activity. Note that as highlighted in our Step 2A document, a Precision Approach replacement may be required for RWY07 arrivals which would need to be progressed should FASI	Discontinued - four or more 'should' DP categories have been evaluated as 'not met'. In addition doing nothing cannot accord with the AMS.
												AMS as a whole - Not Met				

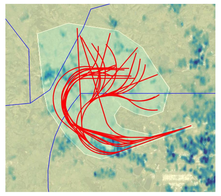
07 Arrivals Option 1 (N/NE)

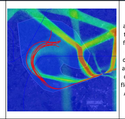
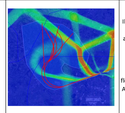
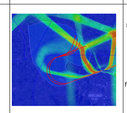
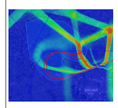
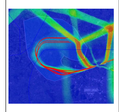
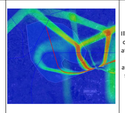
Illustration of Option 1

Option 1 shown against Do Nothing Swathes



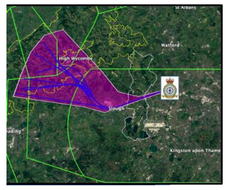
Option 1 in relation to Population Density



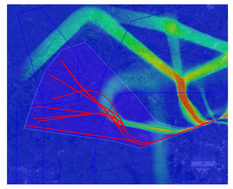
Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AM5				
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives
Group A		Illustrative tracks largely follow the areas overflown by arrivals today down to c.3000ft. However, these tracks join final approach at approximately 7-8nm, overflying Slough which is significantly different than today. This length of final approach would be optimal from a flight crew perspective and provide the most flexibility when designing PBN to ILS/RNP APCH. Arrivals from all directions could use these types of tracks.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY 09L at all times. This does not mean the design is not safe however additional work would be required to generate an acceptable safety case as new standards may be required to allow independent RAF Northolt/Heathrow operations. Alternatively a dependency could be introduced between arrivals.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity albeit there could be a dependency with Heathrow arrivals. This option would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	The track miles to the northern edge of the London CTR means a descent from 3000ft can be comfortably accommodated from that point. Routes avoid Denham and White Waltham ATZ. Tracks keep close to RAF Northolt, similar to today and so reduces the chances of trade off discussions with Luton.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	These tracks are less than 3nm from Heathrow RWY09L final approach which would result in a dependency between Heathrow and RAF Northolt which could generate delay for either/both aerodromes if safety assurances can't be generated for independent operations.	These tracks are similar in length to the existing arrival swathe and so track miles would not be expected to significantly change fuel and CO2 emissions compared to the baseline.	These tracks are significantly different to RAF Northolt's existing traffic patterns for RWY07 arrivals as they would need to route over Slough and possibly closer to Maidenhead to enable a longer final approach. This could be expected to significantly increase the number of people newly overflown.	The position of the tracks do not avoid overflight of areas of dense population where possible. The longer final approach would overfly more of Slough and parts of Maidenhead.	Given RAF Northolt's proximity of RWY07 arrivals to Heathrow's easterly arrivals, both now and in the future, and combined with the close relationship between these tracks and RAF Northolt's existing arrival swathes, it is expected that this option will result in similar overflight of communities by multiple routes compared to today.	See DP1	See DP 3	See DP5	See DP6 and 7	See DP2
Group B		Illustrative tracks follow different tracks to today and join final approach at approximately 7-8nm, overflying Slough which is significantly different than today. This length of final approach would be optimal from a flight crew perspective and provide the most flexibility when designing PBN to ILS/RNP APCH. Arrivals from just the north (BNN) would use these types of tracks.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times. This does not mean the design is not safe however additional work would be required to generate an acceptable safety case as new standards may be required to allow independent RAF Northolt/Heathrow operations. Alternatively a dependency could be introduced between arrivals.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity albeit there could be a dependency with Heathrow arrivals. This option would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	The track miles to the northern edge of the London CTR means a descent from 3000ft can be comfortably accommodated from that point. However these tracks track along the western boundary and by less than the distance required by the CAA CAS Containment Policy so more CAS could be required. Routes avoid Denham and White Waltham ATZ however lateral separation against the White Waltham ATZ/LFA will need investigation. These tracks route more directly from the Luton airport direction and so could increase the chances of trade offs.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	These tracks are less than 3nm from Heathrow RWY09L final approach which would result in a dependency between Heathrow and RAF Northolt which could generate delay for either/both aerodromes if safety assurances can't be generated for independent operations.	If approaching frem the north (BNN area), the track miles would be similar to today. RAF Northolt would not expect arrivals from the other directions to use these tracks.	These tracks are significantly different to RAF Northolt's existing traffic patterns for RWY07 arrivals as they would need to route over Slough and possibly closer to Maidenhead to enable a longer final approach. Before that the tracks overfly Beaconsfield and Wooburn Green that are not currently routinely overflown by arrivals. This could be expected to significantly increase the number of people newly overflown.	The position of the tracks do not avoid overflight of areas of dense population where possible. The longer final approach would overfly more of Slough and parts of Maidenhead.	Given RAF Northolt's proximity of RWY07 arrivals to Heathrow's easterly arrivals, both now and in the future, and combined with the close relationship between these tracks and RAF Northolt's existing arrival swathes RAF Northolt expects this option will result in similar overflight of communities by multiple Heathrow/RAF Northolt routes compared to today. However, the RAF Northolt tracks in this option are more likely to conflict with Luton's departure options which could require trade off discussions, likely resulting in increased overflight of communities in the Berkhamstead and Wendover areas by both RAF Northolt and Luton routes.	See DP1	See DP3	See DP5	See DP6 and 7	See DP2
Group C		Illustrative tracks follow different tracks to today and join final approach at approximately 7-8nm, overflying Slough which is significantly different than today. This length of final approach would be optimal from a flight crew perspective and provide the most flexibility when designing PBN to ILS/RNP APCH. Arrivals from all directions could use these types of tracks.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times. This does not mean the design is not safe however additional work would be required to generate an acceptable safety case as new standards may be required to allow independent RAF Northolt/Heathrow operations. Alternatively a dependency could be introduced between arrivals.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity albeit there could be a dependency with Heathrow arrivals. This option would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	The track miles to the northern edge of the London CTR means a descent from 3000ft can be comfortably accommodated from that point. However these tracks track along the western boundary and by less than the distance required by the CAA CAS Containment Policy so more CAS could be required. Routes avoid Denham and White Waltham ATZ however lateral separation against the White Waltham ATZ/LFA will need investigation. Tracks keep close to RAF Northolt, similar to today and so reduces the chances of trade off discussions with Luton.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	These tracks are less than 3nm from Heathrow RWY09L final approach which would result in a dependency between Heathrow and RAF Northolt which could generate delay for either/both aerodromes if safety assurances can't be generated for independent operations.	These tracks could accommodate arrivals from all directions with similar track miles to today.	These tracks are significantly different to RAF Northolt's existing traffic patterns for RWY07 arrivals as they would need to route over Slough and possibly closer to Maidenhead to enable a longer final approach. Before that the tracks overfly Beaconsfield and Wooburn Green that are not currently routinely overflown by arrivals. This could be expected to significantly increase the number of people newly overflown.	The position of the tracks do not avoid overflight of areas of dense population where possible. The longer final approach would overfly more of Slough and parts of Maidenhead.	Given RAF Northolt's proximity of RWY07 arrivals to Heathrow's easterly arrivals, both now and in the future, and combined with the close relationship between these tracks and RAF Northolt's existing arrival swathes, it is expected that this option will result in similar overflight of communities by multiple routes compared to today.	See DP1	See DP3	See DP5	See DP6 and 7	See DP2
Group D		Illustrative tracks follow different tracks to today and join final approach at approximately 7-8nm, overflying Slough which is significantly different than today. This length of final approach would be optimal from a flight crew perspective and provide the most flexibility when designing PBN to ILS/RNP APCH. Arrivals from all directions could use these types of tracks.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times. This does not mean the design is not safe however additional work would be required to generate an acceptable safety case as new standards may be required to allow independent RAF Northolt/Heathrow operations. Alternatively a dependency could be introduced between arrivals.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity albeit there could be a dependency with Heathrow arrivals. This options would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	The track miles to the Northern edge of the London CTR means a descent from 3000ft can be comfortably accommodated from that point. However these tracks track along the western boundary and by less than the distance required by the CAA CAS Containment Policy so more CAS could be required. Routes avoid Denham and White Waltham ATZ however lateral separation against the White Waltham ATZ/LFA will need investigation. Tracks keep close to RAF Northolt, similar to today and so reduces the chances of trade off discussions with Luton.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	These tracks are less than 3nm from Heathrow RWY09L final approach which would result in a dependency between Heathrow and RAF Northolt which could generate delay for either/both aerodromes if safety assurances can't be generated for independent operations.	These tracks could accommodate arrivals from all directions with similar track miles to today.	These tracks are significantly different to RAF Northolt's existing traffic patterns for RWY07 arrivals as they would need to route over Slough and possibly closer to Maidenhead to enable a longer final approach. Before that the tracks overfly Beaconsfield, Gerrards Cross and Wooburn Green that are not currently routinely overflown by arrivals. This could be expected to significantly increase the number of people newly overflown.	The position of the tracks do not avoid overflight of areas of dense population where possible. The longer final approach would overfly more of Slough and parts of Maidenhead.	Given RAF Northolt's proximity of RWY07 arrivals to Heathrow's easterly arrivals, both now and in the future, and combined with the close relationship between these tracks and RAF Northolt's existing arrival swathes, it is expected that this option will result in similar overflight of communities by multiple routes compared to today.	See DP1	See DP3	See DP5	See DP6 and 7	See DP2
Group E		Illustrative tracks which most closely replicate what happens today. These join final approach at c.4-5nm, as close as possible to where they join today, flying to the north of Slough where possible. RAF Northolt have considered straight in and offset approaches to look at different PBN options available which keep at least 3nm from Heathrow RWY09L arrivals. Arrivals from all directions could use these types of tracks.	Subject to the exact PBN specification, FAF position and whether it's a straight in or offset approach, RAF Northolt believe it is possible to have a PBN to Final Approach path that maintains 3nm separation from Heathrow RWY09L arrivals.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity. This options would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	These tracks could be contained within existing boundaries. Descent from 3000ft would be required crossing the London CTR boundary but the tracks move away from the boundary at all times so additional CAS is unlikely to be necessary. Routes avoid Denham and White Waltham ATZ. Tracks keep close to RAF Northolt, similar to today and so reduces the chances of trade off discussions with Luton.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	These tracks could accommodate arrivals from all directions with similar track miles to today.	The option is very closely aligned to RAF Northolt's existing traffic patterns and will minimise numbers of people newly overflown.	The position of the tracks do not avoid overflight of areas of dense population where possible as the routes would overfly High Wycombe (which is currently routinely overflown by RWY07 arrivals) although they would overfly a similar portion of Slough as today.	Given RAF Northolt's proximity of RWY07 arrivals to Heathrow's easterly arrivals, both now and in the future, and combined with the close relationship between these tracks and RAF Northolt's existing arrival swathes, it is expected that this option will result in similar overflight of communities by multiple routes compared to today.	See DP1	See DP 3	See DP5	See DP6 and 7	See DP2
Group F		Illustrative track replicates the last c.7nm of today's swathe joining final approach at c.4-5nm, as close as possible to where they join today but cuts the corner to avoid areas of dense population. Arrivals from the north and possibly east could use this type of track.	Subject to the exact PBN specification, FAF position and whether it's a straight in or offset approach, RAF Northolt believe it is possible to have a PBN to Final Approach path that maintains 3nm separation from Heathrow RWY09L arrivals. However the closure angle between this track and Heathrow RWY09L is more direct and this option would need further assurances, even if maintaining at least 3nm at all times.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity. This options would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	This track is slightly shorter from the edge of the London CTR boundary compared to those in Group E so it is unclear if the descent gradient would be catered for within existing CAS. Routes avoid Denham and White Waltham ATZ. This track routes more directly from the Luton airport direction and so could increase the chances of trade offs.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	If approaching from the north and east (BNN/LAM areas) the track miles would be less (BNN) or similar (LAM) than today. RAF Northolt would not expect arrivals from the other directions to use this track.	The option has some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements around Beaconsfield and Farnham Common.	The position of the tracks do avoid overflight of areas of dense population where possible as the track avoids High Wycombe (which is currently routinely overflown by RWY 07 arrivals) and also avoids as much of Slough as possible.	Given RAF Northolt's proximity of RWY07 arrivals to Heathrow's easterly arrivals, both now and in the future, and combined with the close relationship between these tracks and RAF Northolt's existing arrival swathes it is expected that this option will result in similar overflight of communities by multiple Heathrow/RAF Northolt routes compared to today. However, the RAF Northolt track in this option is more likely to conflict with Luton's departure options which could require trade off discussions, likely resulting in increased overflight of communities in the Berkhamstead and Wendover areas by both RAF Northolt and Luton routes.	See DP1	See DP3	See DP5	See DP6 and 7	See DP2
07 Arr Option 1 Overall DPE Outcome		This option would see arrivals approach RAF Northolt from the north and/or northeast of the aerodrome. There is scope to align tracks with the areas currently overflown with arrivals staying to the north of Slough with a short final approach or it may be possible to have a longer, more traditional final approach. The latter could introduce a dependency with Heathrow easterly arrivals.	The proximity to Heathrow RWY09L final approach will require detailed investigation however RAF Northolt have included illustrative tracks within this option which is expected to maintain 3nm radar separation from Heathrow RWY09L arrivals as well and tracks that do not. The latter would require an even more detailed safety investigation.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity. This option would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	There is scope within this option to operate within the existing LTMA and London CTR volumes whilst avoiding White Waltham and Denham ATZs but depending on the final track alignment there is potential for the option to have an impact on other airspace users which would require compromises/trade offs from RAF Northolt or other airspace users.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	There is scope within this option to operate without a Heathrow/RAF Northolt dependency however depending on the final track alignment there is potential for the option to have a dependency which could generate delay for either/both aerodromes.	At this time RAF Northolt consider that track miles would not be expected to significantly change for arrivals from all directions to be accommodated within this option.	Those options which join final approach at c.7-8nm could be expected to increase the number of people newly overflown however there is scope to keep tracks more closely aligned to what happens today.	There is scope within this option to avoid areas of dense population but there are some track alignments which would not do that.	The majority of illustrative tracks stay far enough from Luton to not increase cumulative overflight but some do. It is likely that communities in this general region will still experience overflight of both Heathrow and RAF Northolt arrivals below 7000ft but nothing to suggest that would be greater than today.	The proximity to Heathrow RWY09L final approach will require detailed investigation however RAF Northolt have investigated illustrative tracks within this option which is expected to maintain 3nm radar separation from Heathrow RWY09L arrivals.	There is scope within this option to operate within the existing LTMA and London CTR volumes whilst avoiding White Waltham and Denham ATZs but depending on the final track alignment there is potential for the option to have an impact on other airspace users. which would require compromises/trade offs from RAF Northolt or other airspace users	There is scope within this option to operate without a Heathrow/RAF Northolt dependency however depending on the final track alignment there is potential for the option to have a dependency which could generate delay for either/both aerodromes.	There are track alignments possible within this option which could better manage noise although early indications suggest similar track mileage for these arrivals based on information available at this stage.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity. This option would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	Carried forward into IOA.
												AMS as a whole - Partly Met				

07 Arrivals Option 2 (NW)

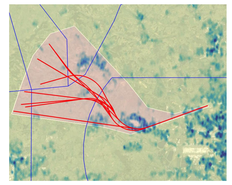
Illustration of Option 2

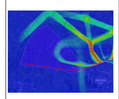
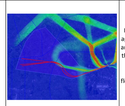
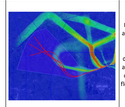


Option 2 shown against Do Nothing Swathes



Option 2 in relation to Population Density

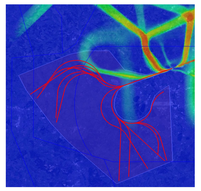


Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS					
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimizing the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives	
Group A		Illustrative tracks join final approach at approximately 7-8nm, overflying Henley-on-Thames, Maidenhead and Slough which is significantly different than today. This length of final approach would be optimal from a flight crew perspective and provide the most flexibility when designing PBN to ILS/RNP APCH.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times. This does not mean the design is not safe however additional work would be required to generate an acceptable safety case as new standards may be required to allow independent RAF Northolt/Heathrow operations. Alternatively a dependency could be introduced between arrivals.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity albeit there could be a dependency with Heathrow arrivals. This option would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	The track miles to the edge of the London CTR means a descent from 3000ft can be comfortably accommodated from that point. Track avoids Denham and would also be above the White Waltham ATZ.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	These tracks are less than 3nm from Heathrow RWY09L final approach which would result in a dependency between Heathrow and RAF Northolt which could generate delay for either/both aerodromes if safety assurances can't be generated for independent operations. These tracks may require RAF Northolt arrivals to be down at 3000ft earlier than in the baseline.	Arrivals from any of the four broad geographical areas of OCK/BIG/BNN/LAM would be required to fly well to the west of RAF Northolt before commencing an approach which would increase fuel burn and CO2. The majority of airways traffic to/from RAF Northolt routes to/from the north, south and east (not the west). In addition the arrivals would have to be lower even earlier than today which would have a negative effect on fuel burn.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	The position of the tracks do not avoid overflight of areas of dense population where possible as the track overflies Henley-on-Thames, Maidenhead and more of Slough than in the baseline.	The illustrative track in this option is more likely to conflict with Heathrow's arrivals at a lower altitude than today which could require trade off discussions, likely resulting in increased overflight of communities in the Henley on Thames area by both RAF Northolt and Heathrow routes. Those routes being Heathrow easterly arrivals and Heathrow's westerly departures	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group B		Illustrative tracks join final approach at approximately 7-8nm, overflying Marlow and Slough which is significantly different than today. This length of final approach would be optimal from a flight crew perspective and provide the most flexibility when designing PBN to ILS/RNP APCH.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times. This does not mean the design is not safe however additional work would be required to generate an acceptable safety case as new standards may be required to allow independent RAF Northolt/Heathrow operations. Alternatively a dependency could be introduced between arrivals.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity albeit there could be a dependency with Heathrow arrivals. This option would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	The track miles to the edge of the London CTR means a descent from 3000ft can be comfortably accommodated from that point. Track avoids Denham and White Waltham ATZ.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	These tracks are less than 3nm from Heathrow RWY09L final approach which would result in a dependency between Heathrow and RAF Northolt which could generate delay for either/both aerodromes if safety assurances can't be generated for independent operations. These tracks may require RAF Northolt arrivals to be down at 3000ft earlier than in the baseline.	Arrivals from any of the four broad geographical areas of OCK/BIG/BNN/LAM would be required to fly well to the west of RAF Northolt before commencing an approach which would increase fuel burn and CO2. The majority of airways traffic to/from RAF Northolt routes to/from the north, south and east (not the west). In addition the arrivals would have to be lower even earlier than today which would have a negative effect on fuel burn.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	The position of the tracks do not avoid overflight of areas of dense population where possible as the track overflies more of Slough than in the baseline.	The illustrative tracks in this option are more likely to conflict with Heathrow's arrivals at a lower altitude than today which could require trade off discussions, likely resulting in increased overflight of communities in the Marlow and Hambledon areas by both RAF Northolt and Heathrow routes. Those routes being Heathrow easterly arrivals and Heathrow's westerly departures	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group C		Illustrative tracks join final approach at approximately 7-8nm, routeing between Marlow and High Wycombe then overflying Slough which is significantly different than today. This length of final approach would be optimal from a flight crew perspective and provide the most flexibility when designing PBN to ILS/RNP APCH.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times. This does not mean the design is not safe however additional work would be required to generate an acceptable safety case as new standards may be required to allow independent RAF Northolt/Heathrow operations. Alternatively a dependency could be introduced between arrivals.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity albeit there could be a dependency with Heathrow arrivals. This options would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	The track miles to the edge of the London CTR means a descent from 3000ft can be comfortably accommodated from that point. Track avoids Denham and White Waltham ATZ.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	These tracks are less than 3nm from Heathrow RWY09L final approach which would result in a dependency between Heathrow and RAF Northolt which could generate delay for either/both aerodromes if safety assurances can't be generated for independent operations. These tracks may require RAF Northolt arrivals to be down at 3000ft earlier than in the baseline.	Arrivals from any of the four broad geographical areas of OCK/BIG/BNN/LAM would be required to fly well to the west of RAF Northolt before commencing an approach which would increase fuel burn and CO2. The majority of airways traffic to/from RAF Northolt routes to/from the north, south and east (not the west). In addition the arrivals would have to be lower even earlier than today which would have a negative effect on fuel burn.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	The position of the tracks do not avoid overflight of areas of dense population where possible as the track overflies more of Slough than in the baseline.	The illustrative tracks in this option are more likely to conflict with Heathrow's arrivals at a lower altitude than today which could require trade off discussions, likely resulting in increased overflight of communities in the Marlow and Lane End areas by both RAF Northolt and Heathrow routes. Those routes being Heathrow easterly arrivals and Heathrow's westerly departures	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
07 Arr Option 2 Overall DPE Outcome		This option would see arrivals approaching RAF Northolt from the west/northwest of the aerodrome to join final approach at c.7/8nm final. This would be a significantly different direction of arrival compared to today.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times. This does not mean the design is not safe however additional work would be required to generate an acceptable safety case as new standards may be required to allow independent RAF Northolt/Heathrow operations. Alternatively a dependency could be introduced between arrivals.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity albeit there could be a dependency with Heathrow arrivals. This option would cater for a PBN to ILS and RNP APCH procedure which provides for the predicted out of service date for PAR.	The track miles to the edge of the London CTR means a descent from 3000ft can be comfortably accommodated from that point. Tracks avoids Denham and would also be above or avoid the White Waltham ATZ. No reason for more CAS is envisaged.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	These tracks are less than 3nm from Heathrow RWY09L final approach which would result in a dependency between Heathrow and RAF Northolt which could generate delay for either/both aerodromes if safety assurances can't be generated for independent operations. These tracks may require RAF Northolt arrivals to be down at 3000ft earlier than in the baseline.	Arrivals from any of the four broad geographical areas of OCK/BIG/BNN/LAM would be required to fly well to the west of RAF Northolt before commencing an approach which would increase fuel burn and CO2. The majority of airways traffic to/from RAF Northolt routes to/from the north, south and east (not the west). In addition the arrivals would have to be lower even earlier than today which would have a negative effect on fuel burn.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown compared to the baseline arrival tracks.	The position of the tracks do not avoid overflight of areas of dense population where possible as the track overflies more of Slough than in the baseline.	Whilst Heathrow's future flight paths are not yet known at the time of this DPE, their RWY09 arrivals will inevitably be in the same region as the tracks in this option (out to the west of RAF Northolt). We can therefore say with some confidence that this option contains characteristics which could increase overflight of communities with multiple routes with those routes being Heathrow arrivals as well as Heathrow's westerly Departures.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times. This does not mean the design is not safe however additional work would be required to generate an acceptable safety case as new standards may be required to allow independent RAF Northolt/Heathrow operations. Alternatively a dependency could be introduced between arrivals.	This option is expected to have minimal impact on other airspace users as it is not thought to require more CAS or affect helireutes or adjacent ATZs.	All the illustrative tracks are less than 3nm from Heathrow RWY09L final approach which would result in a dependency between Heathrow and RAF Northolt which could generate delay for either/both aerodromes if safety assurances can't be generated for independent operations. These tracks may require RAF Northolt arrivals to be down at 3000ft earlier than in the baseline.	This option would likely result in greater fuel burn and CO2. The longer final approach would result in more populated parts of Slough and Maidenhead being overflown.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity albeit there could be a dependency with Heathrow arrivals. This options would cater for a PBN to ILS and RNP APCH procedure which provides for the forthcoming loss of PAR.	Discontinued - four or more 'should' DP categories have been evaluated as 'not met'.
												AMS as a whole - Partly Met					

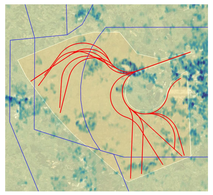
07 Arrivals Option 3 (S)

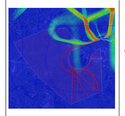
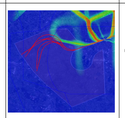
Illustration of Option 3

Option 3 shown against Do Nothing Swathes



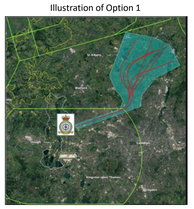
Option 3 in relation to Population Density



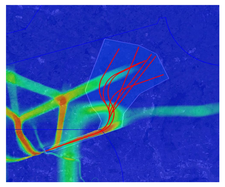
Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS					
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives	
Group A		These illustrative tracks see arrivals making an approach from the south of the RWY07 extended centreline. This would generate a much more direct arrival from the OCK/BIG directions.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY 09L at all times and both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of such an arrival structure would be significant. Each time there was a RAF Northolt arrival, Heathrow easterly arrivals would be suspended to ensure the Heathrow final approach and downwind streams of traffic are free for RAF Northolt traffic to use. These illustrative tracks could even result in some easterly Heathrow departures being suspended.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	These illustrative tracks would generate a much more direct arrival from the OCK/BIG directions. RAF Northolt wouldn't expect arrivals from the north to use these tracks. Overall RAF Northolt would expect a reduction in track mileage compared to the baseline.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	These illustrative approaches from the south would overfly more of Slough and now also Windsor at low altitude compared to the existing approach track that routes to the north of Slough.	Approaches from the south would mean that those communities to the north of RAF Northolt would not be overflown from arrivals and departures. However those communities to the south would be overflown by Heathrow and RAF Northolt easterly arrivals. This could be expected to result in more overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group B		These illustrative tracks see arrivals making an approach from the south of the RWY07 extended centreline with aircraft having to fly over Heathrow RWY09L final approach at similar altitudes as Heathrow arrivals.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times and both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of such an arrival structure would be significant. Each time there was a RAF Northolt arrival, Heathrow easterly arrivals would be suspended to ensure the downwind streams of traffic are free for RAF Northolt traffic to use. One solution for these tracks could be for the Heathrow or RAF Northolt arrivals to be lower than today but more CAS would be required and lead to significant loss of CDO.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	Arrivals from any of the four broad geographical areas of OCK/BIG/BNN/LAM would be required to fly well to the west of RAF Northolt before commencing an approach which would increase fuel burn and CO2.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	These illustrative approaches from the south would overfly more of Slough and now also Maidenhead at low altitude compared to the existing approach track that routes to the north of Slough.	Approaches from the south would mean that those communities to the north of RAF Northolt would not be overflown from arrivals and departures. However those communities to the south would be overflown by Heathrow and RAF Northolt easterly arrivals. This could be expected to result in more overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
07 Arr Option 3 Overall DPE Outcome		This option would see arrivals making an approach from the west and/or south of RWY07 extended centreline. This would generate a much more direct arrival from the OCK/BIG directions.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times and both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	Issues identified which would result in a detrimental impact on other airspace users to the point of significantly disrupting their operations compared to the baseline.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	There would be scope within this option to enable a reduction in track miles for RAF Northolt arrivals compared to the baseline however if approaching from the west (Group B) there could be an increase.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	The position of the option does not avoid overflight of areas of dense population where possible.	Approaches from the south would mean that those communities to the north of RAF Northolt would not be overflown from arrivals and departures. However those communities to the south would be overflown by Heathrow and RAF Northolt easterly arrivals. This could be expected to result in more overflight of communities with multiple routes.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY09L at all times and both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations although to the point that loss of capacity and complexity could make either or both operations not viable.	Issues identified which would result in a detrimental impact on other airspace users to the point of significantly disrupting their operations compared to the baseline.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	There would be scope within this option to enable a reduction in track miles for RAF Northolt arrivals compared to the baseline although there would be overflight of new communities as well as increased overflight of densely populated areas.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	Discontinued - does not meet DP2 (and four or more 'should' DP categories have been evaluated as 'not met').
												AMS as a whole - Partly Met					

25 Arrivals Option 1 (NE)

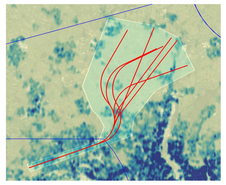
Illustration of Option 1

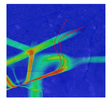
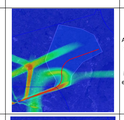
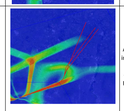
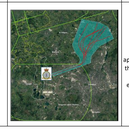


Option 1 shown against Do Nothing Swathes



Option 1 in relation to Population Density

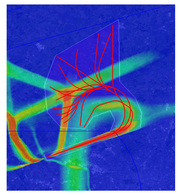


Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS					
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives	
Group A		Arrival from the BPK area to overfly the area overflown by departures today. Joins final approach at approximately 8-9nm, where the majority of arrivals are currently vectored onto final approach. RAF Northolt would expect arrivals from the north and east (BNN/LAM) to use these tracks.	No reasons identified as to why the tracks would be less safe than today subject to lateral and/or vertical separation being achieved from other routes.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	It is likely that RAF Northolt's own departure routes, London City, Luton traffic and/or Heathrow traffic will continue to be operating in the vicinity of BPK in the future. Therefore compromises/trade offs would be required. The existing 3.5° Glideslope enables arrivals to be kept inside existing CAS however this angle may not be possible for all types of approaches (e.g. Baro VNAV) so it's not yet clear if more CAS would be required.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels. With arrivals coming from the north, they would almost certainly be interacting with Luton departures and so compromises/trade offs from RAF Northolt or other airspace users would be required to avoid delay.	Based on the assumption that arrivals will continue to arrive from the broad geographic region of BNN/LAM this option is expected to increase track miles flown for RAF Northolt arrivals, compared to today as aircraft would need to fly c.20nm to the northeast of RAF Northolt before positioning to land. RAF Northolt would not expect arrivals from the south to use these types of tracks.	The tracks have some elements aligned to RAF Northolt's existing traffic patterns, particularly up to 3-4000ft but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	The position of the tracks do not avoid overflight of areas of dense population where possible as the routes would overfly Potters Bar, which is not currently routinely overflown by RWY25 arrivals.	It is likely that RAF Northolt's own departure routes, Luton, London City, Heathrow and possibly Stansted traffic will continue to be operating in the vicinity of BPK in the future. Therefore this option is not considered to minimise overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group B		Arrival from south of the BPK area to join final approach at approximately 8-9nm, where the majority are currently vectored onto final approach. RAF Northolt would expect arrivals from the east (LAM area) to use this type of track.	No reasons identified as to why the tracks would be less safe than today subject to lateral and/or vertical separation being achieved from other routes.	Nothing identified as to why the track would not ensure the continuation of military and governmental operational activity.	It is likely that RAF Northolt's own departure routes, London City, Luton traffic and/or Heathrow traffic will continue to be operating in the vicinity of BPK in the future. Therefore compromises/trade offs would be required. The existing 3.5° Glideslope enables arrivals to be kept inside existing CAS however this angle may not be possible for all types of approaches (e.g. Baro VNAV) so it's not yet clear if more CAS would be required.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Track has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	Based on the assumption that arrivals will continue to arrive from the broad geographic region of LAM this option is expected to increase track miles flown for RAF Northolt arrivals, compared to today as aircraft would need to fly c.20nm to the northeast of RAF Northolt before positioning to land. RAF Northolt would not expect arrivals from the south to use these types of tracks.	The track has some elements aligned to RAF Northolt's existing traffic patterns, particularly up to 3-4000ft but could result in some overflight of communities not currently overflown by RAF Northolt's movements	The position of the track does not avoid overflight of dense population where possible as the track overflies Broxbourne, Cheshunt and Potters Bar.	It is likely that RAF Northolt's own departure routes, Luton, London City, Heathrow and possibly Stansted traffic will continue to be operating in the vicinity of BPK in the future. Therefore this option is not considered to minimise overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group C		Arrival from the BPK area to route direct in to join final approach at approximately 8nm close to where the majority are currently vectored onto final approach. RAF Northolt would expect arrivals from the north and east (BNN/LAM) to use these tracks.	No reasons identified as to why the tracks would be less safe than today subject to lateral and/or vertical separation being achieved from other routes.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	It is likely that RAF Northolt's own departure routes, London City, Luton traffic and/or Heathrow traffic will continue to be operating in the vicinity of BPK in the future. Therefore compromises/trade offs would be required. The existing 3.5° Glideslope enables arrivals to be kept inside existing CAS however this angle may not be possible for all types of approaches (e.g. Baro VNAV) so it's not yet clear if more CAS would be required.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels. With arrivals coming from the north, they would almost certainly be interacting with Luton departures and so compromises/trade offs from RAF Northolt or other airspace users would be required to avoid delay.	Based on the assumption that arrivals will continue to arrive from the broad geographic region of BNN/LAM this option is expected to increase track miles flown for RAF Northolt arrivals, compared to today as aircraft would need to fly c.20nm to the northeast of Northolt before positioning to land. RAF Northolt would not expect arrivals from the south to use these types of tracks.	The track has some elements aligned to RAF Northolt's existing traffic patterns, particularly up to 3-4000ft but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	The position of the tracks do avoid overflight of dense population where possible, avoiding overflight of Potter's Bar, Cheshunt and Enfield.	It is likely that RAF Northolt's own departure routes, Luton, London City, Heathrow and possibly Stansted traffic will continue to be operating in the vicinity of BPK in the future. Therefore this option is not considered to minimise overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
25 Arr Option 1 Overall DPE Outcome		This option would see arrivals approaching RAF Northolt from the northeast, BPK direction to join final approach at approximately 8-9nm, where the majority are currently vectored onto final approach. RAF Northolt would expect arrivals from the north and east (BNN/LAM) to use these tracks.	No reasons identified as to why the tracks would be less safe than today subject to lateral and/or vertical separation being achieved from other routes.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	Subject to the detailed final design of flight paths including approach angles, RAF Northolt cannot yet say there will be 'no impact' to other airspace users. There will almost certainly be trade offs required with adjacent airports' routes to the northeast of RAF Northolt.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels so long as RAF Northolt's arrivals can be vertically deconflicted from adjacent airports' routes.	Based on the assumption that arrivals will continue to arrive from the broad geographic region of BNN/LAM this option is expected to increase track miles flown for RAF Northolt arrivals, compared to today as aircraft would need to fly c.20nm to the northeast of RAF Northolt before positioning to land. RAF Northolt would not expect arrivals from the south to use these types of tracks.	The tracks have some elements aligned to RAF Northolt's existing traffic patterns, particularly upto 3-4000ft but could result in some overflight of communities not currently overflown by RAF Northolt's arrivals.	It may be possible to have a final track position to avoid areas of dense population further back than on baseleig, subject to the network interactions. However it is not possible to avoid the dense populations currently overflown on base leg around Barnet, New Barnet, Whetstone, North Finchley and along final approach.	It is likely that RAF Northolt's own departure routes, Luton, London City, Heathrow and possibly Stansted traffic will continue to be operating in the vicinity of BPK in the future. Therefore this option is not considered to minimise overflight of communities with multiple routes.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes.	Subject to the detailed final design of IFPs and approach angle, RAF Northolt cannot yet say there will be 'no impact' to other airspace users. If there is, there may be ways to minimise it.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	There are track alignments possible within this option which could better manage noise although early indications suggest arriving from a BPK direction is not likely to be optimal for CO2 compared to today.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	Carried forward into IOA.
												AMS as a whole - Partly Met					

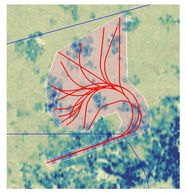
25 Arrivals Option 2 (NW/SW)

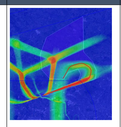
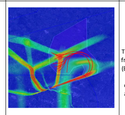
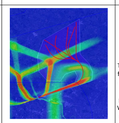
Illustration of Option 2

Option 2 shown against Do Nothing Swathes



Option 2 in relation to Population Density

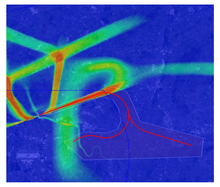


Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS				
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives
Group A		This illustrative track replicates the existing arrival swathe from the south. RAF Northolt would not expect arrivals from the north to approach from the south.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	The existing 3.5° Glideslope enables arrivals to be kept inside existing CAS however this angle may not be possible for all types of approaches (e.g. Baro VNAV) so it's not yet clear if more CAS would be required. As this illustrative track is in line with the existing swathe, RAF Northolt would expect no further impact on other airspace users subject to the statement above.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	This illustrative tracks could accommodate arrivals from the south with similar track miles to today.	The option is very closely aligned to RAF Northolt's existing traffic patterns and will minimise numbers of people newly overflown.	The position of the option does not avoid overflight of areas of dense population where possible as it overflies Borehamwood which could be avoided with a wider pattern.	Given RAF Northolt's proximity of RWY25 arrivals to westerly arrivals to Heathrow both now and in the future and combined with the close relationship between these tracks and RAF Northolt's existing arrival swathes it is expected that this option will result in similar overflight of communities by multiple routes compared to today.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group B		These illustrative tracks cater for arrivals from the south (DCK/BIG) and northwest (BNN) a with a wider pattern than today to avoid Boreham Wood which is overflown in the baseline. Some tracks avoid Watford, others overfly Watford which is currently overflown in the baseline.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	The existing 3.5° Glideslope enables arrivals to be kept inside existing CAS however this angle may not be possible for all types of approaches (e.g. Baro VNAV) so it's not yet clear if more CAS would be required. The slightly wider tracks to avoid Borehamwood would bring the arrivals slightly closer to Luton and just outside of the existing airspace volume RAF Northolt are required to stay within, which may increase the requirement for compromises/trade-offs from RAF Northolt or other airspace users.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	This illustrative tracks could accommodate arrivals from the south and northwest with similar track miles to today. RAF Northolt would not expect arrivals from the east (LAM) to use these types of tracks.	These illustrative tracks have some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	The position of the tracks do avoid overflight of dense population where possible by a wider arrival track to avoid Boreham Wood. As a consequence, this could lead to overflight of Watford however there could be scope to also avoid Watford subject to the wider LTMA design.	Given RAF Northolt's proximity of RWY25 arrivals to westerly arrivals to Heathrow both now and in the future and combined with the close relationship between these tracks and RAF Northolt's existing arrival swathes it is expected that this option will result in similar overflight of communities by multiple Heathrow/RAF Northolt routes compared to today. However, the RAF Northolt tracks in this option are more likely to overfly RAF Northolt's departure tracks owing to the wider pattern.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group C		These illustrative tracks cater for arrivals from the north with a wider pattern than today to avoid Boreham Wood which is overflown in the baseline. It may be possible to avoid Hatfield, St Albans and Watford with these tracks, subject to the requirements of the final LTMA design. RAF Northolt would expect only arrivals from the northwest (BNN area) to use such tracks.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	The existing 3.5° Glideslope enables arrivals to be kept inside existing CAS however this angle may not be possible for all types of approaches (e.g. Baro VNAV) so it's not yet clear if more CAS would be required. With arrivals coming from the north, they would almost certainly be interacting with Luton departures and so compromises/trade offs from RAF Northolt or other airspace users would be required.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports (the interactions with Luton could be mitigated through CCO/CDO trade offs) however it would not be expected to increase delay compared to baseline levels.	Based on the assumption that arrivals will continue to arrive from the broad geographic region of BNN this option is expected to require a similar number of track miles to today.	These illustrative tracks have some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	The position of the tracks do avoid overflight of dense population where possible by a wider arrival track to avoid Boreham Wood and there is also scope to avoid Watford, St Albans and Hatfield subject to the wider LTMA design.	Given RAF Northolt's proximity of RWY 25 arrivals to westerly arrivals to Heathrow both now and in the future and combined with the close relationship between these tracks and RAF Northolt's existing arrival swathes it is expected that this option will result in similar overflight of communities by multiple Heathrow/RAF Northolt routes compared to today. However, the RAF Northolt tracks in this option are more likely to overfly RAF Northolt and Luton's departure tracks owing to the wider pattern.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
25 Arr Option 2 Overall DPE Outcome		This option would see arrivals approach RAF Northolt from the north, northwest and/or southwest of the aerodrome. There is scope to align tracks with the areas currently overflown or it may be possible to have wider pattern onto final approach to reduce population overflown.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	There is potential for the arrival to require an adjustment to the dimension of the London CTR to contain the arrival but this is not yet certain. There is scope in this option to keep the arrival track tight and close to RAF Northolt and reduce impacts on other airspace users but subject to the final positioning and requirements of the Network and Heathrow arrival function, there could also be scope for compromises/trade offs from RAF Northolt or other airspace users.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	At this time we consider that track miles would not be expected to significantly change for arrivals with this option.	There is scope within this option to keep tracks largely within existing arrival swathes but some positioning could result in some overflight of communities not currently overflown by RAF Northolt's movements.	There is scope within this option to avoid dense population subject to the wider network design.	There is scope within this option to minimise overflight of communities by multiple routes by keeping the arrival pattern close to RAF Northolt, aligned with today. However in order to meet other DPs such as reduce total population overflown, that could increase overflight overflight of communities by multiple routes.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes.	There is potential for the arrival to require an adjustment to the dimension of the London CTR to contain the arrival but this is not yet certain. There is scope in this option to keep the arrival track tight and close to RAF Northolt and reduce impacts on other airspace users but subject to the final positioning and requirements of the Network and Heathrow arrival function, there could also be scope for compromises/trade offs from RAF Northolt or other airspace users.	Tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	There is scope to keep track mileage for arrivals similar to today within this option. Understanding if there could be reductions in track miles is not possible without the Network and Heathrow designs. There is scope to reduce total population or reduce newly overflown or reduce overflight by multiple routes but probably not all three.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	Carried forward into IOA.
												AMS as a whole - Partly Met				

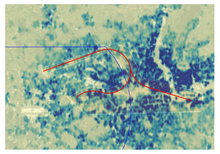
25 Arrivals Option 3 (S)

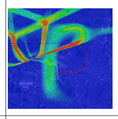
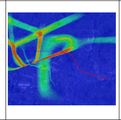
Illustration of Option 3

Option 3 shown against Do Nothing Swathes



Option 3 in relation to Population Density

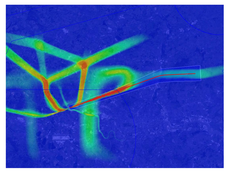


Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS					
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives	
Group A		This illustrative tracks sees arrivals making an approach from the south of the RWY25 extended centreline. This would generate a much more direct arrival from the OCK/BIG areas. RAF Northolt wouldn't expect arrivals from the north to use these types of tracks.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY27 and possibly London City RWY27 departures at all times and both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of such an arrival structure would be significant. Each time there was a RAF Northolt arrival, Heathrow westerly arrivals would be suspended to ensure the Heathrow final approach and downwind streams of traffic are free for RAF Northolt traffic to use. There would also be significant conflictions with London City operations.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt and/or London City.	These illustrative tracks would generate a more direct arrival from the south (BIG/LAM). As the majority of RAF Northolt's airways movements are from the south, RAF Northolt could expect to see an overall reduction in track mileage compared to the baseline.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	Whilst this tracks aims to take advantage of the relatively low population of Hampstead Heath, Greenwich and parts of the Thames, the surrounding areas are much more heavily populated than if approaching final from the north.	Approaches from the south would mean that those communities to the north of RAF Northolt would not be overflown from arrivals and departures. However those communities to the south would be overflown by Heathrow arrivals and departures, London City arrivals departures and RAF Northolt westerly arrivals. This could be expected to result in more overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group B		This illustrative tracks sees arrivals making an approach from the south of the RWY25 extended centreline. This would generate a much more direct arrival from the southeast (BIG) area.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY27 and possibly London City RWY27 departures at all times and both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of such an arrival structure would be significant. Each time there was a RAF Northolt arrival, Heathrow westerly arrivals would be suspended to ensure the Heathrow final approach and downwind streams of traffic are free for RAF Northolt traffic to use. There would also be significant conflictions with London City operations.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	The dependency on Heathrow and London City would generate significant delay for Heathrow, London City and/or RAF Northolt.	These illustrative tracks would generate a more direct arrival from the southeast (BIG) and provide a reduction in track mileage compared to the baseline. RAF Northolt would not expect arrivals from the south west (OCK) to use such a track.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	Whilst these tracks aim to take advantage of the relatively low population of Hampstead Heath, and parts of the Thames, the surrounding areas are much more heavily populated than if approaching final from the north.	Approaches from the south would mean that those communities to the north of RAF Northolt would not be overflown from arrivals and departures. However those communities to the south would be overflown by Heathrow arrivals and departures, London City traffic and RAF Northolt westerly arrivals. This could be expected to result in more overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
25 Arr Option 3 Overall DPE Outcome		This option would see arrivals making an approach from the south of the RWY25 extended centreline, rather than from the north. This would generate a much more direct arrival for traffic from the south (OCK/BIG).	This design would not maintain at least 3nm from Heathrow's arrivals to RWY27 and possibly London City RWY27 departures at all times and both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of such an arrival structure would be significant. Each time there was a RAF Northolt arrival, Heathrow westerly arrivals would be suspended to ensure the Heathrow final approach and downwind streams of traffic are free for RAF Northolt traffic to use. There would also be significant conflictions with London City operations.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	The dependency on Heathrow would generate significant delay for Heathrow, London City and/or RAF Northolt.	These illustrative tracks would generate a more direct arrival from the south and enable a reduction in CO2.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	Approaching RWY25 from the south would result in overflight of some of the most densley populated areas in the southeast of England.	The option does overlap with options developed by adjacent airports such as Heathrow and London City and the option also contains characteristics which could increase overflight of communities with multiple routes.	This design would not maintain at least 3nm from Heathrow's arrivals to RWY27 and possibly London City RWY27 departures at all times and both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The impact on Heathrow of such an arrival structure would be significant. Each time there was a RAF Northolt arrival, Heathrow westerly arrivals would be suspended to ensure the Heathrow final approach and downwind streams of traffic are free for RAF Northolt traffic to use. There would also be significant conflictions with London City operations.	The dependency on Heathrow would generate significant delay for Heathrow, London City and/or RAF Northolt.	There would be scope within this option to enable a reduction in track miles for RAF Northolt arrivals compared to the baseline although there would be overflight of new communities as well as increased overflight of densely populated areas.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	Discontinued - does not meet DP2 (and four or more 'should' DP categories have been evaluated as 'not met').
												AMS as a whole - Partly Met					

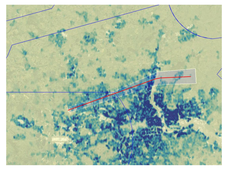
25 Arrivals Option 4 (E)

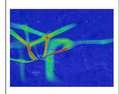
Illustration of Option 4

Option 4 shown against Do Nothing Swathes



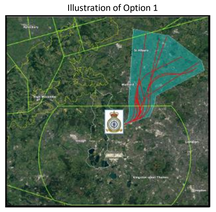
Option 4 in relation to Population Density



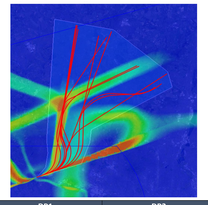
Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS					
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives	
Group A		This illustrative track follows the existing straight in approach from LAM. RAF Northolt would not expect arrivals from the other directions to use such a track.	No reasons identified as to why the tracks would be less safe than today subject to lateral and/or vertical separation being achieved from other routes.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	The existing 3.5° Glideslope enables arrivals to be kept inside existing CAS however this angle may not be possible for all types of approaches (e.g. Baro VNAV) so it's not yet clear if more CAS would be required. As this illustrative track is in line with the existing swathe, RAF Northolt would expect no further impact on other airspace users subject to the statement above. This option could require trade offs with London City northbound SIDs.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Track has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	This illustrative track could accommodate arrivals from the east (LAM) with similar track miles to today.	The option is very closely aligned to RAF Northolt's existing traffic patterns and will minimise numbers of people newly overflown.	This track does not seek to avoid areas of dense population as it seeks to replicate today's swathe and minimise newly overflown.	The option does overlap with options developed by London City and likely Heathrow but overflight from multiple routes could expected to be similar today.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
25 Arr Option 4 Overall DPE Outcome		This option would see arrivals making an approach from the east to replicate the existing flow of traffic from the LAM direction.	No reasons identified as to why the tracks would be less safe than today subject to lateral and/or vertical separation being achieved from other routes.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	The existing 3.5° Glideslope enables arrivals to be kept inside existing CAS however this angle may not be possible for all types of approaches (e.g. Baro VNAV) so it's not yet clear if more CAS would be required. As this illustrative track is in line with the existing swathe, RAF Northolt would expect no further impact on other airspace users subject to the statement above. This option could require trade offs with London City northbound SIDs.	Design uses PBN specifications and assumes RNAV1/RNP1 transition to ILS as well as to RNP APCH. RNP-AR has not been proposed for RAF Northolt due to the lack of Military equipage and approvals.	Track has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	This illustrative track could accommodate arrivals from the east (LAM) with similar track miles to today.	The option is very closely aligned to RAF Northolt's existing traffic patterns and will minimise numbers of people newly overflown.	This track does not seek to avoid areas of dense population as it seeks to replicate today's swathe and minimise newly overflown.	The option does overlap with options developed by London City and likely Heathrow but overflight from multiple routes could expected to be similar today.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes.	The existing 3.5° Glideslope enables arrivals to be kept inside existing CAS however this angle may not be possible for all types of approaches (e.g. Baro VNAV) so it's not yet clear if more CAS would be required. As this illustrative track is in line with the existing swathe, RAF Northolt would expect no further impact on other airspace users subject to the statement above. This option could require trade offs with London City northbound SIDs.	Track has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	Track mileage for this arrival is expected to be similar to today however it does go over densely populated areas whilst minimising numbers newly overflown.	Nothing identified as to why the tracks would not ensure the continuation of military and governmental operational activity.	Carried forward into IOA.
												AMS as a whole - Partly Met					

07 Departures Option 1 (NE)

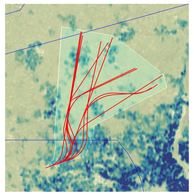
Illustration of Option 1

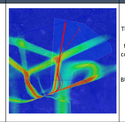
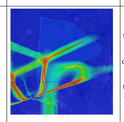
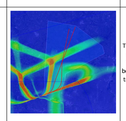
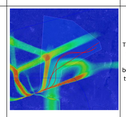


Option 1 shown against Do Nothing Swathes



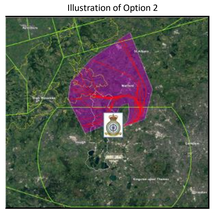
Option 1 in relation to Population Density



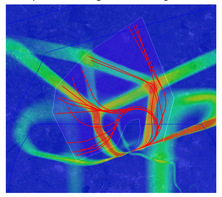
Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS				
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives
Group A		These illustrative tracks turn to the north as soon as possible after departure as today, although the exact turning point could differ slightly due to PANS OPS PBN requirements. These tracks would broadly replicate the existing RWY07 BUZAD departure vectored swathe to the north (TNT) and/or east/southeast (DAGGA).	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes. Turning to the north quickly is most likely to enable lateral separation from future Heathrow northbound SIDs.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Steep climb gradients would be used similar to today to ensure CAS containment. It is likely that RAF Northolt SID tracks to the northeast will continue to interact with London City, Luton and Heathrow traffic and compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Illustrative tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions around the BPK area in a future design. Routing to the north of BPK in this example may increase conflictions with Luton but decrease conflictions with Heathrow and London City.	RAF Northolt would expect tracks in this direction would service northbound (TNT) and/or east/southeast (DAGGA) departures. The TNT departures would experience similar track miles to today whereas the DAGGA departures could experience an increase. Therefore, overall we could see an increase compared to today.	Illustrative tracks have some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	A SID which turns north immediately is likely to minimise overflight of Harrow and keep tracks closer to Pinner which is expected to have lower numbers of total population overflown compared to flying over Harrow. Beyond this, these illustrative tracks overfly St Albans or Hatfield so departures in this direction would not avoid overflight of areas of dense population where possible.	A RWY07 departure with the earliest turn to the north will best minimise overflight of communities with multiple routes. The tracks in this illustration avoid the RWY25 arrival swathe and a northerly track will reduce the chances of interaction with future Heathrow northbound SIDs. However these tracks do overlap with options developed by Luton and London City and will most likely interact with future Heathrow northbound departures.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group B		These illustrative tracks turn to the north as soon as possible after departure as today, although the exact turning point could differ slightly due to PANS OPS PBN requirements. These tracks would broadly replicate the existing RWY07 MATCH departure swathe after Watford and would service the DAGGA direction.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes. Turning to the north quickly is most likely to enable lateral separation from future Heathrow northbound SIDs.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Steep climb gradients would be used similar to today to ensure CAS containment. It is likely that RAF Northolt SID tracks to the northeast will continue to interact with London City, Luton and Heathrow traffic and compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Illustrative tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as we expect there still to be multiple interactions around the BPK area in a future design.	RAF Northolt would expect tracks in this direction would service east and south eastbound (DAGGA) departures and the illustrative tracks do not vary significantly from today's directions. The option is therefore not expected to significantly change fuel and greenhouse gases compared to the baseline.	Illustrative tracks are very closely aligned to RAF Northolt's existing traffic patterns and will minimise numbers of people newly overflown.	A SID which turns north immediately is likely to minimise overflight of Harrow and keep tracks closer to Pinner which is expected to have lower numbers of total population overflown compared to flying over Harrow. Beyond this, these illustrative tracks route between St Albans and Borehamwood which do avoid areas of dense population.	A RWY07 departure with the earliest turn to the north will best minimise overflight of communities with multiple routes. The tracks in this illustration avoid the RWY25 arrival swathe and a northerly track will reduce the chances of interaction with future Heathrow northbound SIDs. However these tracks do overlap with options developed by Luton and London City and will most likely interact with future Heathrow northbound departures.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group C		These illustrative tracks turn to the north slightly later than today to follow the first part of the RWY25 arrival swathe before heading northeast. These types of tracks could service the TNT and DAGGA directions.	The later turn north on departure would be closer to today's Heathrow's northbound SIDs so subject to where Heathrow future SIDs are, a later turn on RAF Northolt departures is likely to need additional safety assurances.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Steep climb gradients would be used similar to today to ensure CAS containment although a slightly later turn would provide more track length, requiring a slightly shallower gradient to remain inside CAS. It is likely that RAF Northolt SID tracks to the north east will continue to interact with London City, Luton and Heathrow traffic and compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Illustrative tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions around the BPK area in a future design.	RAF Northolt would expect tracks in this direction would service north (TNT) and/or east/ southeast (DAGGA) departures. The later turn to the north increases miles for northbound traffic. The later turn to the east to DAGGA would increase track miles for those departures.	Illustrative tracks have some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	These illustrative tracks would result in more overflight of Harrow compared to today.	The option does overlap with options developed by adjacent airports and the option also contains characteristics which could increase overflight of communities with multiple routes because the further east of today's track the new route goes, the closer they will be to Heathrow and London City departure tracks. The later turn could also result in more overflight of the same places as RWY25 arrivals.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group D		These illustrative tracks turn to the north slightly later than today to follow the first part of the RWY25 arrival swathe before heading east, south of BPK. These types of tracks could service the DAGGA direction.	The later turn north on departure would be closer to today's Heathrow's northbound SIDs (even more than in Group C) so subject to where Heathrow future SIDs are, a later turn on RAF Northolt departures is likely to need additional safety assurances.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Steep climb gradients would be used similar to today to ensure CAS containment although a slightly later turn would provide more track length, requiring a slightly shallower gradient to remain inside CAS. It is likely that RAF Northolt SID tracks to the northeast will continue to interact with London City, Luton and Heathrow traffic and compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Illustrative tracks have no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions around the BPK area in a future design. Routing to the south of BPK in this example may reduce conflictions with Luton but increase conflictions with Heathrow and London City.	RAF Northolt would expect tracks in this direction would service east and south eastbound (DAGGA) departures. These tracks are a little more direct towards DAGGA and so RAF Northolt would expect a reduction in fuel and greenhouse gas emissions.	Illustrative tracks have some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	These illustrative tracks would result in more overflight of Harrow compared to today.	The option does overlap with options developed by adjacent airports and the option also contains characteristics which could increase overflight of communities with multiple routes because the further east of today's track the new route goes, the closer they will be to Heathrow and London City departure tracks. The route south of BPK will increase the chances of overflight of communities by both Heathrow and RAF Northolt traffic at relatively low altitudes. The later turn could also result in more overflight of the same places as RWY25 arrivals.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
07 Dep Option 1 Overall DPE Outcome		This option would see departures from RWY07 turning to the north within c. 4nm from the end of the runway and joining the network in the approximate vicinity of BPK.	If the 07 Departures turn north in a similar location as today, it could be expected to maintain or potentially reduce lateral interaction with future Heathrow northbound SIDs. A later turn could be possible though subject to Heathrow SID positioning. Any lateral interaction is likely to be lower than today with a delayed turn on RAF Northolt's SIDs which could require additional safety assurances.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Steep climb gradients would be used similar to today to ensure CAS containment although a slightly later turn would provide more track length, requiring a slightly shallower gradient to remain inside CAS. It is likely that RAF Northolt SID tracks to the northeast will continue to interact with London City, Luton and Heathrow traffic and compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as we expect there still to be multiple interactions around the BPK area in a future design.	There is scope within this option to reduce mileage however some groups also have the potential to increase track mileage. On balance, overall the option is not expected to significantly change fuel burn and greenhouse gas emissions compared to the baseline.	The option has some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	There is scope within this option to avoid dense population where possible. This would require a first turn as similar to today and then tracks which avoid St Albans and/or Harrow.	The option does overlap with options developed by adjacent airports and so overflight by multiple routes could expected to be similar or even worse than today depending on the final tracks chosen by all airports.	If the 07 Departures turn north in a similar location as today, it could be expected to reduce lateral interaction with future Heathrow northbound SIDs. A later turn could be possible subject to Heathrow SID positioning. Any lateral interaction is likely to be lower than today with a delayed turn on RAF Northolt's SIDs which could require additional safety assurances.	Steep climb gradients would be used similar to today to ensure CAS containment although a slightly later turn would provide more track length, requiring a slightly shallower gradient to remain inside CAS. It is likely that RAF Northolt SID tracks to the north east will continue to interact with London City, Northolt and Heathrow traffic and compromises/trade offs from RAF Northolt or those other airports will be required.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as we expect there still to be multiple interactions around the BPK area in a future design.	The option is not expected to significantly change fuel burn and greenhouse gas emissions compared to the baseline. If RAF Northolt can largely replicate the existing centreline, that would appear to offer the lowest population overflown however at this stage of the ACP the exact track of such a departure cannot be chosen but will be subject to the trade off deliberations in Stage 3. PBN and systemisation would be expected to reduce total numbers overflown overall.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Carried forward into IOA.
												AMS as a whole - Partly Met				

07 Departures Option 2 (NW)

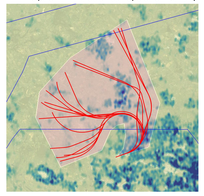
Illustration of Option 2

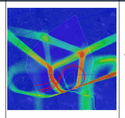
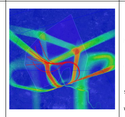
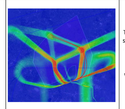
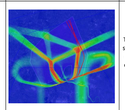


Option 2 shown against Do Nothing Swathes



Option 2 in relation to Population Density

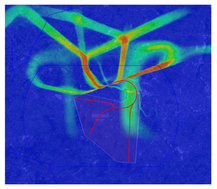


Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS					
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives	
Group A		These tracks all turn to the north at a fixed point but a little later than today due to PANS OPS PBN requirements. They would then track to the west into the area of relatively low population density. These tracks could be used to service west and southwest (CPT) departures.	The later turn north on departure would be closer to today's Heathrow's northbound SIDs, so subject to where Heathrow future SIDs are, a later turn on Northolt departures is likely to need additional safety assurances.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Steep climb gradients would be used, as they are today, to ensure CAS containment and climb above the Elstree ATZ. The later turn north, compared to today, could interact more closely with Heathrow departures but the turn back to the west would then minimise interaction with London City and Luton. This would however then begin to conflict with Heathrow easterly arrivals which would restrict CCO. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	By the tracks heading to the west to gain height it will reduce interactions with Luton and London City at low altitude, potentially enabling some free-flow and reduced delays to all three aerodromes.	The end of these tracks would conflict with Heathrow arrivals so tracks could not go direct to CPT from this point but would need to track northwest first. This would increase track miles compared to today.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	The position of the illustrative tracks do avoid overflight of dense population where possible by routing south of Watford and tracking west of central London.	The option does not currently overlap with options developed by Luton and London City and has characteristics that could result in less overflight of communities by multiple routes. RAF Northolt would expect this option to overlap with Heathrow options but they are not available at this time.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group B		These tracks all turn to the north at a fixed point but a little later than today due to PANS OPS PBN requirements. They would then track to the west/northwest to follow the existing RWY25 swathe to the northwest over slightly higher population density but staying south of BNN and Luton's SIDs. These tracks could be used to service west/southwest (CPT) and north (TNT) departures.	The later turn north on departure would be closer to today's Heathrow's northbound SIDs, so subject to where Heathrow future SIDs are a later turn for RAF Northolt departures is likely to need additional safety assurances.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Steep climb gradients would be used, as they are today, to ensure CAS containment and climb above the Elstree ATZ. The later turn north, compared to today, could interact more closely with Heathrow departures but the turn back to the west, and staying south of BNN, would then minimise interaction with London City and Luton. This would however then begin to conflict with Heathrow easterly arrivals which would restrict CCO. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	By the tracks heading to the west to gain height it will reduce interactions with Luton and London City at low altitude, potentially enabling some free-flow and reduced delays to all three aerodromes.	The tracks used for CPT departures are expected to be slightly shorter than today's, however the TNT tracks would be slightly longer. Overall RAF Northolt expect similar fuel burn and greenhouse gas emissions compared to the baseline.	The option has some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	The position of the illustrative tracks do avoid overflight of dense population where possible by routing south of Watford and tracking west of central London.	The option does not currently overlap with options developed by Luton and London City and has characteristics that could result in less overflight of communities by multiple routes. RAF Northolt would expected this option to overlap with Heathrow options but they are not available at this time.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group C		These tracks would turn to the north as soon as possible to try and replicate the existing first turn and then follows the existing swathe towards HEN. These tracks could be used to service west/southwest (CPT) and north (TNT) departures.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes. Turning to the north quickly is most likely to enable lateral separation from future Heathrow northbound SIDs.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Steep climb gradients would be used, as they are today, to ensure CAS containment and climb above the Elstree ATZ. The early turn could interact minimally with Heathrow departures and the turn to the northwest would then minimise interaction with London City and Heathrow arrivals. However this would then begin to conflict with Luton departures. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as we expect there still to be multiple interactions in a future design. Routing towards BNN in this example may increase conflictions with Luton but decrease conflictions with Heathrow and London City.	Track miles to CPT would be similar to today but track miles to TNT would be slightly longer.	The option is very closely aligned to RAF Northolt's existing traffic patterns and will minimise numbers of people newly overflown.	The position of the illustrative tracks do not avoid overflight of areas of dense population where possible as they continue to fly over Watford.	The option does overlap with options developed by Luton but overflight from multiple routes could expected to be similar to today. RAF Northolt would expected this option to overlap with Heathrow options but they are not available at this time.	See DP2	See DP3	See DP5	See DP6 and DP7	See DP2	
Group D		These tracks would turn to the north as soon as possible to try and replicate the existing first turn and then follows the existing swathe towards BUZAD. These tracks could be used to service north (TNT) departures.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes. Turning to the north quickly is most likely to enable lateral separation from future Heathrow northbound SIDs.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Steep climb gradients would be used, as they are today, to ensure CAS containment and climb above the Elstree ATZ. The early turn could interact minimally with Heathrow departures and the northerly track would then begin to conflict with Luton departures and potentially be held down by Heathrow departures. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as we expect there still to be multiple interactions in a future design. Routing north in this example is unlikely to reduce interactions.	The track lengths will be broadly similar to day on these illustrative tracks towards TNT.	The option has some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	The position of the illustrative tracks do avoid overflight of dense population where possible by routing east of Watford and between Hemel Hempstead and St Albans.	The option does overlap with options developed by Luton but overflight from multiple routes could expected to be similar to today. RAF Northolt would expected this option to overlap with Heathrow options but they are not available at this time.	See DP2	See DP3	See DP5	See DP6 and DP7	See DP2	
07 Dep Option 2 Overall DPE Outcome		This option would see departures turning to the north shortly after departure to then track north and/or northwest.	If the 07 Departures turn north in a similar location as today, it could be expected to minimise lateral interaction with future Heathrow northbound SIDs. A later turn could be possible though subject to Heathrow SID positioning. Any lateral interaction with less distance than today could require additional safety assurances.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Assuming steep climb gradients can ensure CAS containment then impact on GA is no worse than today. Any departure from RAF Northolt to the northwest is going to require compromises/trade offs from RAF Northolt or adjacent FASI airports.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	There is scope within this option to reduce low level interactions with Heathrow, Luton and London City which could enable free flow operations and reduce delay. However the ability to do this is depends on the overall wider LTMA design and could come at the expense of longer track miles for RAF Northolt departures.	There is scope within this option to reduce mileage on some routes but that would lead to increases in others. Overall, the option is not expected to significantly change fuel burn and greenhouse gas emissions compared to the baseline.	There is scope within this option to minimise but also increase the numbers of people newly overflown subject to the final track alignments.	There is scope within this option to avoid some population densities at the expense of increasing newly overflown by avoiding Watford.	There is scope within this option to laterally deconflict RAF Northolt's SIDs from some routes to/from adjacent airports but it is highighy unlikely there will be no overflight of some paces by multiple routes.	If the 07 Departures turn north in a similar location as today, It could be expected to reduce lateral interaction with future Heathrow northbound SIDs. A later turn could be possible though subject to Heathrow SID positioning. Any lateral interaction is likely to be lower than today with a delayed turn on RAF Northolt's SIDs which could require additional safety assurances.	Assuming steep climb gradients can ensure CAS containment then impact on GA is no worse than today. Any departure from RAF Northolt to the northwest is going to require compromises/trade offs from RAF Northolt or adjacent FASI airports.	There is scope within this option to reduce low level interactions with Heathrow, Luton and London City which could enable free flow operations and reduce delay. However the ability to do this is depends on the overall wider LTMA design and could come at the expense of longer track miles for RAF Northolt departures.	There is scope within this option to reduce interactions with adjacent airports but at the expense of extra track miles and there is also scope to have similar fuel burn and greenhouse gas emissions compared to the baseline but interactions could be similar to today. Subject to the final track alignments and trade off discussions, there would be more or less people newly overflown. RAF Northolt expect a reduction in total population overflown due to PBN but the routes could still overfly densely populated areas.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Carried forward into IOA.
												AMS as a whole - Partly Met					

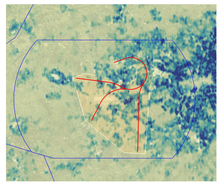
07 Departures Option 3 (S)

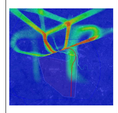
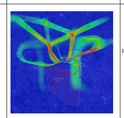
Illustration of Option 3

Option 3 shown against Do Nothing Swathes



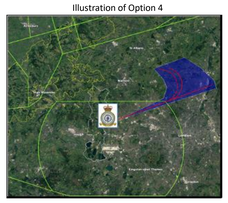
Option 3 in relation to Population Density



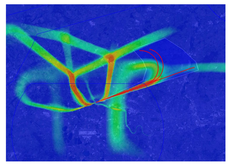
Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS				
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimizing the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives
Group A		A departure track from RWY07 that would turn direct to the south to avoid flying all the way around Heathrow.	This design would not be able to maintain separation from Heathrow traffic as both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of this RAF Northolt departure track would be significant. Each time there was a RAF Northolt departure, Heathrow northbound and possibly even southbound departures would be suspended.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	This illustrative track would significantly reduce fuel and greenhouse gases for RAF Northolt's southeast and southbound departures which currently have to route around Heathrow.	The option is significantly different to RAF Northolt's existing departure traffic patterns. It does initially overfly the same areas as arrivals (but at low altitude) however it then overflies new, highly populated, areas and therefore it would be expected to significantly increase the number of people newly overflown.	Turning south from RWY07 can be expected to significantly increase the number of people affected by noise owing to much greater population density compared to the north of RAF Northolt.	Departures to the south would mean that those communities to the north of RAF Northolt would not be overflown from the departures. However those communities to the south would be overflown by Heathrow arrivals and departures, possibly London City traffic and RAF Northolt westerly arrivals. This could be expected to result in more overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group B		Illustrative departure tracks from RWY07 that would turn more directly to the south west to avoid flying all the way around Heathrow.	This design would not be able to maintain separation from Heathrow traffic as both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of these RAF Northolt departure tracks would be significant. Each time there was a Northolt departure, Heathrow northbound departures would be suspended. The RAF Northolt routes would also conflict with Heathrow easterly arrivals.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	The illustrative tracks would significantly reduce fuel and greenhouse gases for RAF Northolt's southbound departures which currently have to route around Heathrow.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	Turning south from RWY07 can be expected to significantly increase the number of people affected by noise owing to much greater population density compared to the north of RAF Northolt.	Departures to the south would mean that those communities to the north of RAF Northolt would not be overflown from the departures. However those communities to the south would be overflown by Heathrow arrivals and departures, possibly London City traffic and RAF Northolt westerly arrivals. This could be expected to result in more overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
07 Dep Option 3 Overall DPE Outcome		This option would see departures from RWY07 turning much more direct to the south to avoid flying all the way around Heathrow.	This design would not be able to maintain separation from Heathrow traffic as both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of these RAF Northolt departure tracks would be significant leading to significant operational disruption for both.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	The illustrative tracks would significantly reduce fuel and greenhouse gases for RAF Northolt's southbound departures which currently have to route around Heathrow.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown.	Turning south from RWY07 can be expected to significantly increase the number of people affected by noise owing to much greater population density compared to the north of RAF Northolt.	The option does contain characteristics which could increase overflight of communities with multiple routes.	This design would not be able to maintain separation from Heathrow traffic as both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The impact on Heathrow of such RAF Northolt departure tracks would be significant leading to significant operational disruption for both.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	This option would significantly reduce fuel and greenhouse gases for RAF Northolt's southbound departures and they could weave around some areas of dense population however it would increase the numbers of people newly overflown as well as the communities overflown by multiple routes. PBN and systemisation would be expected to reduce total numbers overflown overall.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	Discontinued - does not meet DP2 (and four or more 'should' DP categories have been evaluated as 'not met').
												AMS as a whole - Partly Met				

07 Departures Option 4 (Straight ahead)

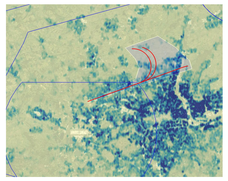
Illustration of Option 4

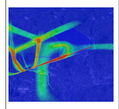
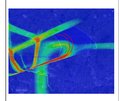


Option 4 shown against Do Nothing Swathes



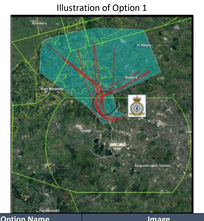
Option 4 in relation to Population Density



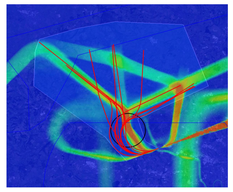
Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS				
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimizing the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives
Group A		A RWY07 departure heading straight to the east northeast to fly down RWY25 final approach to reduce numbers newly and total overflown and reduce track miles for departures to the east and southeast.	The straight ahead departure, rather than turning to the north, would lead to greater dependencies between RAF Northolt, Heathrow and London City compared to today. This may require safety assurances. This does not mean the design is not safe but there would be a significant dependency between this RAF Northolt departure and north bound Heathrow and London City departures.	The dependencies that would be required between RAF Northolt, Heathrow and London City would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	Climbing straight ahead would cater for a shallower climb gradient to remain inside the London CTR but such a departure route could be expected to require compromises/trade offs from London City against their northbound departures, made worse by lack of CCO for RAF Northolt which will be severely restricted by Heathrow's northbound departures. This is likely to result in a dependency between RAF Northolt, Heathrow and London City which would significantly disrupt operations.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on London City would generate significant delay for both London City and/or RAF Northolt. RAF Northolt departures would be held down at c.2-3000ft by future Heathrow departures for quite some time.	This illustrative track would reduce track miles for departures to DAGGA compared to the baseline.	This illustrative track is very closely aligned to RAF Northolt's existing arrival traffic patterns and will minimise numbers of people newly overflown however those people will be overflown more frequently.	Whilst this track overflies densely populated areas, it would minimise numbers overflown overall as overflight of RWY25 final approach cannot be avoided and communities under the existing RWY07 departure swathe would be avoided.	The option does overlap with options developed by London City and it will also overlap with Heathrow's northbound departures. It also overflies RWY25 final approach so those communities would be overflown by both RAF Northolt arrivals and departures.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
Group B		A RWY07 departure heading straight to the east northeast to fly down RWY25 final approach before turning north to reduce numbers newly and total overflown. Such tracks would service the north (TNT) and west/southwest (CPT) directions.	The straight ahead departure and later turn north would lead to greater dependencies between RAF Northolt, Heathrow and London City compared to today. This may require safety assurances. This does not mean the design is not safe but there would be a significant dependency between this RAF Northolt departure and northbound Heathrow and London City departures.	The dependencies that would be required between RAF Northolt, Heathrow and London City would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	Climbing straight ahead would cater for a shallower climb gradient to remain inside the London CTR but such a departure route could be expected to require compromises/trade offs from London City against their northbound departures, made worse by lack of CCO for RAF Northolt which will be severely restricted by Heathrow's northbound departures. This is likely to result in a dependency between RAF Northolt, Heathrow and London City which would significantly disrupt operations.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on London City would generate significant delay for both London City and/or RAF Northolt. RAF Northolt departures would be held down at c.2-3000ft by future Heathrow departures for quite some time.	These illustrative tracks would increase track miles for all of Northolt's TNT and CPT departures compared to the baseline.	These illustrative tracks are very closely aligned to RAF Northolt's existing arrival traffic patterns at low altitude and will minimise numbers of people newly overflown however those people will be overflown more frequently. Above those altitudes it could result in some overflight of communities not currently overflown by RAF Northolt's movements.	Whilst these tracks overfly densely populated areas, it would minimise numbers overflown overall as overflight of RWY25 final approach cannot be avoided. These tracks would then also overfly base-leg to RWY25 and communities under the existing RWY07 departure swathe would be avoided.	The option does overlap with options developed by London City and it will also overlap with Heathrow's northbound departures. It also overflies RWY25 final approach so those communities would be overflown by both RAF Northolt arrivals and departures.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
07 Dep Option 4 Overall DPE Outcome		This option would see RWY07 departures climbing straight ahead for much longer than today to minimise numbers of people newly overflown and total population overflown.	The straight ahead departure and later turn north would lead to greater dependencies between RAF Northolt, Heathrow and London City compared to today. This may require safety assurances. This does not mean the design is not safe but there would be a significant dependency between this RAF Northolt departure and northbound Heathrow and London City departures.	The dependencies that would be required between RAF Northolt, Heathrow and London City would generate such complexities and inefficiences that it would not ensure continuation of military and governmental operational activity.	Climbing straight ahead would cater for shallower climb gradient to remain inside the London CTR but such a departure route could be expected to require compromises/trade offs from London City against their northbound departures, made worse by lack of CCO for RAF Northolt which will be severely restricted by Heathrow's northbound departures. This is likely to result in a dependency between RAF Northolt, Heathrow and London City which would significantly disrupt operations.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on London City would generate significant delay for both London City and/or RAF Northolt. RAF Northolt departures would be held down at c.2-3000ft by future Heathrow departures for quite some time.	Track miles could reduce to the east/southeast but increase to the north west/west/southwest and would therefore not expect to offer significant reductions in emissions overall.	This option is very closely aligned to RAF Northolt's existing arrival swathe and will minimise numbers of people newly overflown at low altitude however those people will be overflown more frequently by both arrivals and departures. Above those altitudes it could result in some overflight of communities not currently overflown by RAF Northolt's movements	Whilst this option overflies densely populated areas, it would minimise numbers overflown overall as overflight of RWY25 final approach cannot be avoided and communities under the existing RWY07 departure swathe would be avoided.	The option does overlap with options developed by London City and it will also overlap with Heathrow's northbound departures. It also overflies RWY25 final approach so those communities would be overflown by both RAF Northolt arrivals and departures.	No reasons identified as to why the tracks would be less safe than today subject to lateral and or vertical separation being achieved from other routes.	Climbing straight ahead would cater for shallower climb gradient to remain inside the London CTR. Such a departure route could be expected to require compromises/trade offs from London City against their northbound departures, made worse by lack of CCO for RAF Northolt which will be held down by Heathrow's northbound departures. This is likely to result in a dependency between RAF Northolt and London City which would significantly disrupt the London City operation.	The dependency on London City would generate significant delay for both London City and/or RAF Northolt. RAF Northolt departures would be held down by c.3000ft by Heathrow departures for quite some time.	It is likely that this option would increase emissions from RAF Northolt's easterly departures however there is scope in the option to reduce total numbers of people overflown and newly overflown.	The dependencies that would be required between RAF Northolt, Heathrow and London City would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	Discontinued - does not meet DP2.
												AMS as a whole - Partly Met				

25 Departures Option 1 (Turn North ASAP)

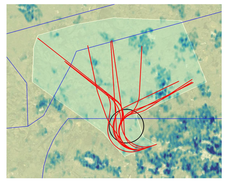
Illustration of Option 1

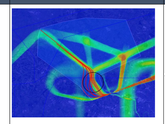
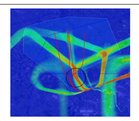
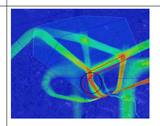
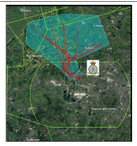


Option 1 shown against Do Nothing Swathes (Denham ATZ in black)



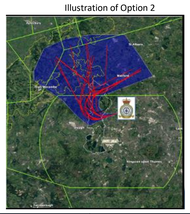
Option 1 in relation to Population Density



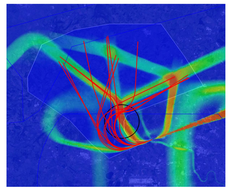
Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS				
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives
Group A		After the first turn, these tracks follow the existing swathe to HEN and could be used to service the north (TNT) and west/southwest (CPT) directions.	These RWY25 SIDs are assessed as anticipated to be safe, however additional work would be required to generate an acceptable safety case. This is due to the interactions with Heathrow SIDs and Heathrow's RWY27R Missed Approach as well as consideration of Denham's operation. Any delay to the first turn could, depending on Heathrow's final design, move the interactions closer together than today.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	An early first turn to the north in keeping with today would continue to interact with Denham in a similar way to today which requires Denham to stay within an LFA within the ATZ. Likewise, any turn that is even slightly later than today could interact more closely with Heathrow. Steep climb gradients would be used similar to today to ensure CAS containment. Departures to the northwest towards HEN are likely to interact with Heathrow and Luton options. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design. Routing to the HEN in this example may iwell as conflictions with Luton so it is possible that the final proposed design may see a track to the south of the swathe to stay laterally separated from Luton's west bound departures although this may come at the expense of being held down at low altitude by Heathrow SIDs.	RAF Northolt would expect tracks in this direction would service west/south (CPT) and possibly northbound (TNT) departures and the illustrative tracks do not vary significantly from today's directions. The option is therefore not expected to significantly change fuel and greenhouse gases compared to the baseline as routes would continue to have to fly around Heathrow before heading west and south.	These tracks aim to replicate the existing swathe to HEN and therefore minimise the number of people newly overflown. Note however there may be difficulties exactly replicating the first turn and the exact path cannot be determined until Stage 3 in close collaboration with adjacent sponsors and their shortlists.	The existing track to the northwest overflies Amersham which is what has been replicated here, which does not purposefully avoid dense population.	A RWY25 SID that turns to the north as soon as possible will better keep away from any future Heathrow flight paths, keep away from RAF Northolt RWY07 arrivals and best facilitate CCO. However owing to the proximity of RAF Northolt, Heathrow, Luton and London City there will inevitably still be overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
Group B		After the first turn, these tracks illustrate the differences between various northbound tracks that either follow the existing swathe to BUZAD or go to the east or west of that track. These tracks could be used to service the north (TNT) direction.	These RWY25 SIDs are assessed as anticipated to be safe, however additional work would be required to generate an acceptable safety case. This is due to the interactions with Heathrow SIDs and Heathrow's RWY27R Missed Approach as well as consideration of Denham's operation. Any delay to the first turn could, depending on Heathrow's final design, move the interactions closer together than today.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	An early first turn to the north in keeping with today would continue to interact with Denham in a similar way to today which requires Denham to stay within an LFA within the ATZ. Likewise, any turn that is even slightly later than today could interact more closely with Heathrow. Steep climb gradients would be used similar to today to ensure CAS containment. Departures to the north towards HEN are likely to interact with Heathrow and Luton options. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design. Routing north towards Luton in this example will increase conflictions with Luton so would only enable free-flow if RAF Northolt's departures can climb quickly to at least 6000ft. This is unlikely with the Transition Altitude remaining at 6000ft owing to interactions with Heathrow so dependencies with Luton would continue to exist.	RAF Northolt would expect tracks in this direction would service northbound (TNT) departures and the illustrative tracks do not vary significantly from today's directions. The option is therefore not expected to significantly change fuel and greenhouse gases compared to the baseline as RWY25 northbound routes today are already direct.	These tracks aim to replicate the existing swathe to the north and therefore minimise the number of people newly overflown. Note however there may be difficulties exactly replicating the first turn and the exact path cannot be determined until Stage 3 in close collaboration with adjacent sponsors and their shortlists.	There is scope to avoid densely populated areas such as Amersham, Berkhamsted and Hemel Hempstead with these tracks.	A RWY25 SID that turns to the north as soon as possible will better keep away from any future Heathrow flight paths, keep away from RAF Northolt RWY07 arrivals and best facilitate CCO. However owing to the proximity of RAF Northolt, Heathrow, Luton and London City there will inevitably still be overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
Group C		After the first turn, these tracks largely follow the existing swathe to BPK or south of BPK. These tracks could be used to service the east and southeast (DAGGA) direction.	These RWY25 SIDs are assessed as anticipated to be safe, however additional work would be required to generate an acceptable safety case. This is due to the interactions with Heathrow SIDs and Heathrow's RWY27R Missed Approach as well as consideration of Denham's operation. Any delay to the first turn could, depending on Heathrow's final design, move the interactions closer together than today.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	An early first turn to the north in keeping with today would continue to interact with Denham in a similar way to today which requires Denham to stay within an LFA within the ATZ. Likewise, any turn that is even slightly later than today could interact more closely with Heathrow. Steep climb gradients would be used similar to today to ensure CAS containment. Departures to the northeast towards BPK are likely to interact with Heathrow, Luton and London City options. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design. Routing to the south of BPK would decrease conflictions with Luton although this may come at the expense of being held down at low altitude by Heathrow SIDs and being closer to London City SIDs.	RAF Northolt would expect tracks in this direction would service east and southeast bound departures (DAGGA) and the illustrative tracks do not vary significantly from today's directions. The option is therefore not expected to significantly change fuel and greenhouse gases compared to the baseline, as RWY25 eastbound routes today are already direct and south east traffic is expected to have to continue to route around Heathrow before turning towards DVR.	These tracks aim to replicate the existing swathe to the BPK direction and therefore minimise the number of people newly overflown. Note however there may be difficulties exactly replicating the first turn and the exact path cannot be determined until Stage 3 in close collaboration with adjacent sponsors and their shortlists.	The existing track to the northeast overflies Watford which does not purposefully avoid dense population. Owing to the proximity of Watford, St Albans and Hemel Hempstead avoiding dense population is unlikely.	A RWY25 SID that turns to the north as soon as possible will better keep away from any future Heathrow flight paths, keep away from Northolt RWY07 arrivals and best facilitate CCO. However owing to the proximity of RAF Northolt, Heathrow, Luton and London City there will inevitably still be overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
25 Dep Option 1 Overall DPE Outcome		Precisely replicating the existing first turn within PANS OPS could be challenging. This option would see a 'Turn at altitude' which means that the SID instruction would require aircraft to start the turn on reaching a particular altitude, rather than at a specific waypoint. This should result in an early turn, closer to today's turn, as a PBN waypoint can't be positioned close enough to replicate the existing turn. This is the earliest turn RAF Northolt would be able to do to replicate what happens today and keep away from Heathrow as much as possible. As a result, this option would see some dispersion on the ground because climb gradients vary, but slightly less certainty on exactly where the turn would be, which could generate issues assuring against Heathrow, depending on their final route structure. The illustrations suggest a delayed turn, some of which avoid Denham ATZ, but that would be rare - with slow climbing aircraft only. These options would most likely not avoid the Denham ATZ and be more in keeping with what happens today at low altitude.	These RWY25 SIDs are assessed as anticipated to be safe, however additional work would be required to generate an acceptable safety case. This is due to the interactions with Heathrow SIDs and Heathrow's RWY27R Missed Approach as well as consideration of Denham's operation. Any delay to the first turn could, depending on Heathrow's final design, move the interactions closer together than today.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	An early first turn to the north in keeping with today would continue to interact with Denham in a similar way to today which requires Denham to stay within an LFA within the ATZ. Likewise, any turn that is even slightly later than today could interact more closely with Heathrow. Steep climb gradients would be used similar to today to ensure CAS containment. Departures to the northwest, north and northeast are likely to interact with Heathrow, Luton and London City options. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design which will not be able to be overcome with a 6000ft Transition Altitude.	This option would continue to see all RAF Northolt's west (CPT), southwest (CPT), and southeast (DAGGA) departures having to route around Heathrow with broadly similar track miles as today. Northbound traffic (TNT) is already routing direct so we would expect to see Fuel burn and Greenhouse gas emissions similar to today. Profile may be improved but RAF Northolt cannot yet determine that until we see the final LTMA design. Savings could be available for CPT departures by routing to the south of HEN towards CPT.	This option aims to replicate the first turn and then existing swathes however there may be difficulties exactly replicating the first turn and the exact path cannot be determined until Stage 3 in close collaboration with adjacent sponsors and their shortlists.	Depending on the final track positioning, it may be possible to better avoid some populations in some directions however owing to the proximity of Heathrow, Luton and London City in conjunction with large population densities, it may not be possible to avoid all those populations.	A RWY25 SID that turns to the north as soon as possible will better keep away from any future Heathrow flight paths, keep away from RAF Northolt RWY07 arrivals and best facilitate CCO. However owing to the proximity of RAF Northolt, Heathrow, Luton and London City there will inevitably still be overflight of communities with multiple routes.	All options for RWY25 SIDs are assessed as anticipated to be safe, however additional work would be required to generate an acceptable safety case. This is due to the interactions with Heathrow SIDs and Heathrow's RWY27R Missed Approach as well as consideration of Denham's operation. Any delay to the first turn could, depending on Heathrow's final design, move the interactions closer together than today.	An early first turn to the north in keeping with today would continue to interact with Denham in a similar way to today which requires Denham to stay within an LFA within the ATZ. Likewise, any turn that is even slightly later than today could interact more closely with Heathrow. Steep climb gradients would be used similar to today to ensure CAS containment, hopefully avoiding more CAS. Departures to the northwest, north and northeast are likely to interact with Heathrow, Luton and London City options. Compromises/trade-offs from RAF Northolt or those other airports will be required.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design which will not be able to be overcome with a 6000ft Transition Altitude.	The option is not expected to significantly change fuel burn and greenhouse gas emissions compared to the baseline. If RAF Northolt can largely replicate the existing centrelines, that would appear to offer the lowest population (there may be scope to avoid Amersham in some directions subject to other trade-offs) overflown however at this stage of the ACP the exact track of such a departure cannot be chosen but will be subject to the trade off deliberations in Stage 3. PBN and systemisation would be expected to reduce total numbers overflown overall.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Carried forward into IOA.
												AMS as a whole - Partly Met				

25 Departures Option 2 (Turn North at fixed point)

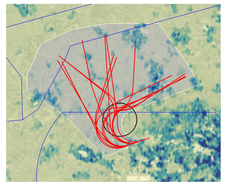
Illustration of Option 2

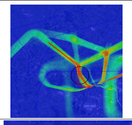
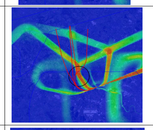
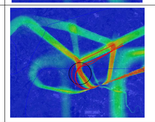
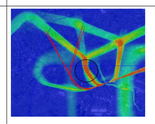
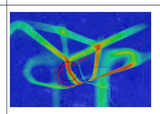
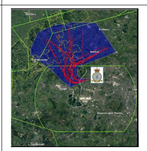


Option 2 shown against Do Nothing Swathes (Denham ATZ in black)



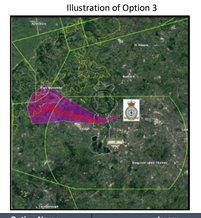
Option 2 in relation to Population Density



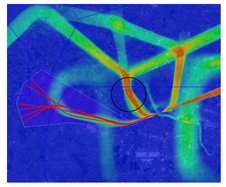
Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS				
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives
Group A		The first turn on these illustrative tracks would turn at a fixed point which would be slightly later than today. These tracks do not aim to avoid the Denham ATZ completely but the later turn would mean aircraft would be slightly higher than today when crossing the ATZ boundary. The selection of routes then route northeast towards HEN and could be used to service the north (TNT) and west/southwest (CPT) directions.	These RWY25 SIDs are assessed as anticipated to be safe, however additional work would be required to generate an acceptable safety case. This is due to the interactions with Heathrow SIDs and Heathrow's RWY27R Missed Approach as well as consideration of Denham's operation. Any delay to the first turn could, depending on Heathrow's final design, move the interactions closer together than today.	Nothing identified as to why the illustrative tracks would not ensure the continuation of military and governmental operational activity.	Even a very slightly later first turn to the north could help to reduce interaction with Denham provide them with more flexibility and potentially a larger LFA. However such a turn could interact more closely with Heathrow. Steep climb gradients would be used similar to today to ensure CAS containment. Departures to the north are likely to interact with Heathrow and Luton options. Compromises/trade-offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design. Routing to HEN in this example may increase conflictions with Luton so it is possible that the final proposed design may see a track to the south of the swathe to stay laterally separated from Luton's westbound departures although this may come at the expense of being held down at low altitude by Heathrow SIDs.	RAF Northolt would expect tracks in this direction would service west/south (CPT) and possibly northbound (TNT) departures and the illustrative tracks do not vary significantly from today's directions. The option is therefore not expected to significantly change fuel and greenhouse gases compared to the baseline as CPT routes would continue to have to fly around Heathrow before heading west and south.	The slightly later first turn would overfly some new population within Uxbridge but then it maybe possible to follow the existing swathe towards HEN.	These illustrative tracks do not avoid dense population as it continues to route over Amersham in order to minimise population newly overflown.	A RWY25 SID that turns to the north in a similar position to today (albeit very slightly later) could be expected to keep away from future Heathrow flight paths, keep away from RAF Northolt RWY07 arrivals and best facilitate CCO. However owing to the proximity of RAF Northolt, Heathrow, Luton and London City there will inevitably still be overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
Group B		The first turn on these illustrative tracks would turn at a fixed point which would be slightly later than today. These tracks do not aim to avoid the Denham ATZ completely but the later turn would mean aircraft would be slightly higher than today when crossing the ATZ boundary. The selection of routes then route north towards TNT .	These RWY25 SIDs are assessed as anticipated to be safe, however additional work would be required to generate an acceptable safety case. This is due to the interactions with Heathrow SIDs and Heathrow's RWY27R Missed Approach as well as consideration of Denham's operation. Any delay to the first turn could, depending on Heathrow's final design, move the interactions closer together than today.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Even a very slightly later first turn to the north could help to reduce interaction with Denham provide them with more flexibility and potentially a larger LFA. However such a turn could interact more closely with Heathrow. Steep climb gradients would be used similar to today to ensure CAS containment. Departures to the north are likely to interact with Heathrow and Luton options. Compromises/trade- offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design. Routing north towards Luton in this example will increase conflictions with Luton so would only enable free flow if RAF Northolt's departures can climb quickly to at least 6000ft. This is unlikely with the Transition Altitude remaining at 6000ft owing to interactions with Heathrow so dependencies with Luton would continue to exist.	RAF Northolt would expect tracks in this direction would service northbound (TNT) departures and the illustrative tracks do not vary significantly from today's directions. The option is therefore not expected to significantly change fuel and greenhouse gases compared to the baseline as RWY25 northbound routes today are already direct.	The option has some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	There is scope to avoid densely populated areas such as Amersham, Berkhamsted and Hemel Hempstead with these tracks.	A RWY25 SID that turns to the north in a similar position to today (albeit very slightly later) could be expected to keep away from future Heathrow flight paths, keep away from RAF Northolt RWY07 arrivals and best facilitate CCO. However owing to the proximity of RAF Northolt, Heathrow, Luton and London City there will inevitably still be overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
Group C		The first turn on these illustrative tracks would turn at a fixed point which would be slightly later than today. These tracks do not aim to avoid the Denham ATZ completely but the later turn would mean aircraft would be slightly higher than today when crossing the ATZ boundary. The selection of routes then route to the northeast (DAGGA).	These RWY25 SIDs are assessed as anticipated to be safe, however additional work would be required to generate an acceptable safety case. This is due to the interactions with Heathrow SIDs and Heathrow's RWY27R Missed Approach as well as consideration of Denham's operation. Any delay to the first turn could, depending on Heathrow's final design, move the interactions closer together than today.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	A later first turn to the north to reduce interaction with Denham would provide them with more flexibility and potentially a larger LFA. However such a turn could interact more closely with Heathrow. Steep climb gradients would be used similar to today to ensure CAS containment but a later turn could cater for a shallower gradient. Departures to the northeast are likely to interact with Heathrow, Luton and London City options. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design. Routing to the south of BPK would decrease conflictions with Luton although this may come at the expense of being held down at low altitude by Heathrow SIDs and being closer to London City SIDs.	RAF Northolt would expect tracks in this direction would service east and south eastbound departures (DAGGA) and the illustrative tracks do not vary significantly from today's directions. The option is therefore not expected to significantly change fuel and greenhouse gases compared to the baseline as RWY25 eastbound routes today are already direct and southeast traffic is expected to have to continue to route around Heathrow before turning towards DVR.	The slightly later first turn would overfly some new population within Uxbridge but then it maybe possible to follow the existing swathe towards BPK or integration with the network could require overflight south of Watford, such as Moor Park and Bushey.	These tracks to the northeast overfly Watford which does not purposefully avoid dense population. Owing to the proximity of Watford, St Albans and Hemel Hempstead avoiding dense population is unlikely.	A RWY25 SID that turns to the north in a similar position to today (albeit very slightly later) could be expected to keep away from future Heathrow flight paths, keep away from Northolt RWY07 arrivals and best facilitate CCO. However owing to the proximity of RAF Northolt, Heathrow, Luton and London City there will inevitably still be overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
Group D		The first turn on these illustrative tracks would turn at a fixed point which would be later than today. These tracks do aim to avoid the Denham ATZ completely. The selection of routes then route to the north (TNT) and/or CPT.	These RWY25 SIDs are assessed as anticipated to be safe, however additional work would be required to generate an acceptable safety case. This is due to the interactions with Heathrow SIDs and Heathrow's RWY27R Missed Approach as well as consideration of Denham's operation. Any delay to the first turn could, depending on Heathrow's final design, move the interactions closer together than today. As the turn on these tracks avoid Denham, they would require even more scrutiny against Heathrow's RWY27R Missed Approach and Heathrow's new SIDs, as this is a considerable shift to the west for RAF Northolt.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	A later first turn to the north to reduce interaction with Denham would provide them with more flexibility and potentially a larger LFA. However such a turn could interact more closely with Heathrow. Steep climb gradients would be used similar to today to ensure CAS containment but a later turn could cater for a shallower gradient. Departures to the northeast are likely to interact with Heathrow, Luton and London City options. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design. Routing to the HEN in this example may increase conflictions with Luton so it is possible that the final proposed design may see a track to the south of the swathe to stay laterally separated from Luton's westbound departures although this may come at the expense of being held down at low altitude by Heathrow SIDs.	RAF Northolt would expect tracks in this direction would service west/south (CPT) and northbound (TNT) departures. Track miles to CPT would be broadly similar whereas tracks to TNT would be a slightly longer due to the later turn.	Completely avoiding Denham ATZ would be a significant change to the baseline departure track however there are areas of low population density that would keep newly overflown to a minimum and communities to the west of Denham ATZ are already overflown by RWY07 arrivals to RAF Northolt.	These illustrative tracks do avoid dense population where possible, going either side of Amersham.	A later turn to minimise impact on Denham is likely to increase overflight of communities with multiple routes either by flying where RAF Northolt's RWY07 arrivals could be positioned, or by flying closer to Heathrow and therefore closer to their northbound departures.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
Group E		The first turn on these illustrative tracks would turn at a fixed point which would be later than today. These tracks do aim to avoid the Denham ATZ completely (assuming the aircraft would be 2000ft+ by when crossing the ATZ boundary). The selection of routes then route to the north east (DAGGA).	These RWY25 SIDs are assessed as anticipated to be safe, however additional work would be required to generate an acceptable safety case. This is due to the interactions with Heathrow SIDs and Heathrow's RWY27R Missed Approach as well as consideration of Denham's operation. Any delay to the first turn could, depending on Heathrow's final design, move the interactions closer together than today. As the turn on these tracks avoid Denham, they would require even more scrutiny against Heathrow's RWY27R Missed Approach and Heathrow's new SIDs as this is a considerable shift to the west for RAF Northolt.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	A later first turn to the north to reduce interaction with Denham would provide them with more flexibility and potentially a larger LFA. However such a turn could interact more closely with Heathrow. Steep climb gradients would be used similar to today to ensure CAS containment but a later turn could cater for a shallower gradient. Departures to the northeast are likely to interact with Heathrow, Luton and London City options. Compromises/trade offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels as RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design. Routing to the south of BPK would decrease conflictions with Luton although this may come at the expense of being held down at low altitude by Heathrow SIDs and being closer to London City SIDs.	RAF Northolt would expect tracks in this direction would service east and south eastbound departures (DAGGA). There would be extra miles to DAGGA owing to the later turn back east in order to avoid Denham.	Completely avoiding Denham ATZ would be a significant change to the baseline departure track however there are areas of low population density that would keep newly overflown to a minimum or the track towards the BPK area could replicate the existing northeast swathe. Communities to the west of Denham ATZ are already overflown by RWY07 arrivals to RAF Northolt.	The tracks to the northeast overfly Watford which does not purposefully avoid dense population. Owing to the proximity of Watford, St Albans and Hemel Hempstead avoiding dense population is unlikely.	A later turn to minimise impact on Denham is likely to increase overflight of communities with multiple routes either by flying where RAF Northolt's RWY07 arrivals could be positioned, by flying closer to Heathrow and therefore closer to their northbound departures.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2
25 Dep Option 2 Overall DPE Outcome		This option would give more certainty about where departures turn north, although that turn would most likely be slightly later than in Option 1. With this option it would be possible to have a later turn than today which could avoid the Denham ATZ altogether, however this will bring the aircraft close to Heathrow, so the feasibility of this is not yet known.	Any RWY25 departure with a delayed turn to minimise the impact on Denham will bring the route closer to Heathrow's SIDs and Missed Approaches. They currently provide a 3nm separation so any shift to the west by RAF Northolt will require additional safety assurances and changes to Heathrow's procedures.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	A later first turn to the north to reduce interaction with Denham would provide them with more flexibility and potentially a larger LFA. However such a turn could interact more closely with Heathrow. Completely avoiding the ATZ may not be possible as it depends on Heathrow interactions including their Missed Approach. Steep climb gradients would be used similar to today to ensure CAS containment but a later turn could cater for a shallower gradient. Departures to the northeast are likely to interact with Heathrow, Luton and London City options. Compromises/trade-offs from RAF Northolt or those other airports will be required.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels. RAF Northolt expect there still to be multiple interactions with Heathrow, Luton and London City routes in a future design which require collaboration and trade offs.	Within this is option we have investigated tracks which avoid Denham and don't avoid Denham. Some scenarios would increase track miles but some would be broadly similar to today. Overall, across all departures the option is not expected to significantly change CO2 impacts compared to the baseline.	The option has some elements aligned to RAF Northolt's existing traffic patterns but could result in some overflight of communities not currently overflown by RAF Northolt's movements.	It will be possible to avoid areas of dense population to the north but less so to the northeast towards BPK as avoiding Watford, St Albans and Hemel Hempstead avoiding dense population is not possible.	Within this is option RAF Northolt have investigated tracks which avoid Denham and don't avoid Denham. Two groups would increase overflight of communities with multiple routes, and three groups would maintain a similar level of overflight to today. On balance, overall the option is most likely to maintain similar levels of cumulative overflight to today based on the above grouping and the respective group performance in this DPE.	Any RWY25 departure with a delayed turn to minimise the impact on Denham will bring the route closer to Heathrow's SIDs and Missed Approaches. They currently provide a 3nm separation so any shift to the west by RAF Northolt will require additional safety assurances and changes to Heathrow's procedures.	A later first turn to the north to reduce interaction with Denham would provide them with more flexibility and potentially a larger LFA. However such a turn could interact more closely with Heathrow. Completely avoiding the ATZ may not be possible as it depends on Heathrow interactions including their Missed Approach. Steep climb gradients would be used similar to today to ensure CAS containment but a later turn could cater for a shallower gradient. Departures to the northeast are likely to interact with Heathrow, Luton and London City options. Compromises/trade offs from RAF Northolt or those other airports will be required.	Option has no specific characteristics which would minimise delay for RAF Northolt and/or adjacent FASI airports however it would not be expected to increase delay compared to baseline levels.	Departures to the north do not appear to offer significant track mileage reductions as today's northbound tracks are already quite direct. From RWY25 population density is quite low excluding Watford and Amersham. It may be possible to avoid Amersham with a future design. Delaying the first turn will result in overflight of new communities. PBN and systemisation would be expected to reduce total numbers overflown overall.	Nothing identified as to why the option would not ensure the continuation of military and governmental operational activity.	Carried forward into IOA.
												AMS as a whole - Partly Met				

25 Departures Option 3 (West)

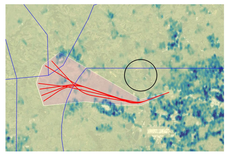
Illustration of Option 3

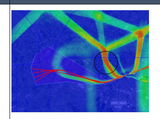
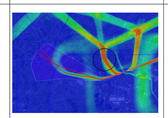


Option 3 shown against Do Nothing Swathes (Denham ATZ in black)



Option 3 in relation to Population Density

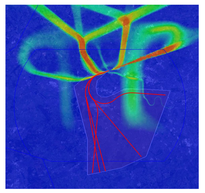


Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS					
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimizing the number of people newly overflown	b. Minimizing the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives	
Group A		RWY25 departure which follows the RWY07 arrival swathe north of Slough to then route south of Marlow. RAF Northolt would expect these tracks to service west/southwest (CPT) departures.	These SIDs will increase interaction with Heathrow departures and RWY27R Missed Approach considerably. If these were in use today, the RAF Northolt SIDs would need to be capped at 2000ft underneath Heathrow's northbound SIDs. This option would only be viable with Heathrow SIDs that track west, potentially even south, until 4000ft before turning north to make room for a RWY27R missed approach to enable RAF Northolt to climb to 3000ft and above the MSA. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations although to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of the RAF Northolt departure track would be significant. Each time there was a RAF Northolt departure, Heathrow arrivals and departures would need to be suspended.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	RAF Northolt would expect these tracks to service west/southwest (CPT) departures. This option would reduce track miles, although at the expense of CCO.	This option would follow the RWY07 arrival swathe and minimise newly overflown in that region but once west of the London CTR, there would be newly overflown communities by RAF Northolt departures.	The position of the tracks do avoid overflight of dense population where possible by routing north of Slough and then south of Marlow.	These illustrative tracks do not minimise overflight of communities with multiple routes as it mirrors the RWY07 arrival swathe and would also underfly Heathrow's northbound departures as well as Heathrow's easterly arrival stream.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group B		RWY25 departure which follows the RWY07 arrival swathe north of Slough towards Marlow before turning north. RAF Northolt would expect these tracks to service west/southwest (CPT) departures.	These SIDs will increase interaction with Heathrow departures and RWY27R Missed Approach considerably. If these were in use today, the RAF Northolt SIDs would need to be capped at 2000ft underneath Heathrow's northbound SIDs. This option would only be viable with Heathrow SIDs that track west, potentially even south, until 4000ft before turning north to make room for a RWY27R missed approach to enable RAF Northolt to climb to 3000ft and above the MSA. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations although to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of the RAF Northolt departure track would be significant. Each time there was a RAF Northolt departure, Heathrow arrivals and departures would need to be suspended.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	RAF Northolt would expect these tracks to service west/southwest (CPT) departures. This option would reduce track miles, although at the expense of CCO.	This option would follow the RWY07 arrival swathe and minimise newly overflown in that region but once west of the London CTR, there would be newly overflown communities by RAF Northolt departures.	The position of the tracks do avoid overflight of dense population where possible by routing north of Slough and the in between Marlow and High Wycombe.	These illustrative tracks do not minimise overflight of communities with multiple routes as it mirrors the RWY07 arrival swathe and would also underfly Heathrow's northbound departures as well as Heathrow's easterly arrival stream.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
25 Dep Option 3 Overall DPE Outcome		This option would see RWY25 departures following the existing RWY07 arrival swathe, north of Slough towards Marlow before continuing west or turning north. RAF Northolt would expect these tracks to service west/southwest (CPT) departures.	These SIDs will increase interaction with Heathrow departures and RWY27R Missed Approach considerably. If these were in use today, the RAF Northolt SIDs would need to be capped at 2000ft underneath Heathrow's northbound SIDs. This option would only be viable with Heathrow SIDs that track west, potentially even south, until 4000ft before turning north to make room for a RWY27R missed approach to enable RAF Northolt to climb to 3000ft and above the MSA. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations although to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiences that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of the RAF Northolt departure track would be significant. Each time there was a RAF Northolt departure, Heathrow arrivals and departures would need to be suspended due to SID asnd Missed Approach interactions.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	RAF Northolt would expect these tracks to service west/southwest (CPT) departures. This option would reduce track miles, although at the expense of CCO.	This option would follow the RWY07 arrival swathe and minimise newly overflown in that region but once west of the London CTR, there would be newly overflown communities by RAF Northolt departures.	The position of the tracks do avoid overflight of dense population where possible by routing north of Slough and the in between Marlow and High Wycombe.	These illustrative tracks do not minimise overflight of communities with multiple routes as it mirrors the RWY07 arrival swathe and would also underfly Heathrow's northbound departures as well as Heathrow's easterly arrival stream.	These SIDs will increase interaction with Heathrow departures and RWY27R Missed Approach considerably. If these were in use today, the RAF Northolt SIDs would need to be capped at 2000ft underneath Heathrow's northbound SIDs. This option would only be viable with Heathrow SIDs that track west, potentially even south, until 4000ft before turning north to make room for a RWY27R missed approach to enable RAF Northolt to climb to 3000ft and above the MSA. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations although to the point that loss of capacity and complexity could make either or both operations not viable.	The impact on Heathrow of such RAF Northolt departure track would be significant. Each time there was a RAF Northolt departure, Heathrow arrivals and departures would need to be suspended due to SID and Missed Approach interactions.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	This option could reduce track miles significantly for west/southwest departures although at the expense of CCO and it could also avoid areas of dense population. It would not minimise newly overflown or avoid overflying communities with multiple routes.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	Discontinued - does not meet DP2.
												AMS as a whole - Partly Met					

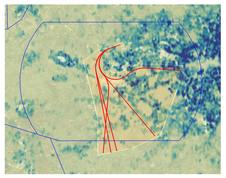
25 Departures Option 4 (S)

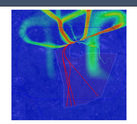
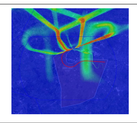
Illustration of Option 4

Option 4 shown against Do Nothing Swathes



Option 4 in relation to Population Density



Option Name	Image	Description	DP1	DP2	DP3	DP4	DP5	DP6	DP7			AMS					
			Must be safe	Must ensure continuation of military and governmental operational activity	Should minimise impact on other airspace users	Should facilitate design using modern navigational technology	Should facilitate operational efficiencies to maximise benefits to as many stakeholders as possible	Should minimise fuel and greenhouse gases	a. Minimising the number of people newly overflown	b. Minimising the total number of people affected by noise	c. Where possible minimise overflight of communities with multiple routes	Maintain and enhance high aviation safety standards	Secure the efficient use of airspace and enable integration	Avoid flight delays by better managing the airspace network	Improve environmental performance by reducing emissions and by better managing noise	Facilitate defence and security objectives	
Group A		Departure tracks from RWY25 that would turn direct to the south to avoid flying all the way around Heathrow. RAF Northolt would expect these tracks to service southbound departures.	This design would not be able to maintain separation from Heathrow traffic as both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of the RAF Northolt departure track would be significant. Each time there was a RAF Northolt departure, Heathrow arrivals and departures would need to be suspended.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	This illustrative track would significantly reduce fuel and greenhouse gases for RAF Northolt's southbound (CPT) departures which currently have to route around Heathrow.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown at low altitude.	These illustrative tracks do seek to avoid population where possible, overflying Heathrow Airport and staying west of Kingston upon Thames but would still be expected to increase total population overflown as the areas to the south of RAF Northolt are more densely populated than to the north.	Departures to the south would mean that those communities to the north of RAF Northolt would not be overflown by the departures. However those communities to the south would be overflown by Heathrow arrivals and departures. This could be expected to result in more overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
Group B		Illustrative departure tracks from RWY25 that would turn more directly to the southeast to avoid flying all the way around Heathrow. RAF Northolt would expect these tracks to service southeast departures.	This design would not be able to maintain separation from Heathrow traffic as both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of the RAF Northolt departure track would be significant. Each time there was a RAF Northolt departure, Heathrow arrivals and departures would need to be suspended.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	This illustrative track would significantly reduce fuel and greenhouse gases for RAF Northolt's southeast departures (DAGGA) which currently have to route around Heathrow.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown at low altitude.	This illustrative track would be expected to significantly increase the total population overflown compared to the baseline by overflying central London.	Departures to the south would mean that those communities to the north of RAF Northolt would not be overflown by the departures. However those communities to the south would be overflown by Heathrow arrivals and departures. This could be expected to result in more overflight of communities with multiple routes.	See DP1	See DP3	See DP5	See DP6 and DP7	See DP2	
25 Dep Option 4 Overall DPE Outcome		This option would see departures from RWY25 turning much more direct to the south to avoid flying all the way around Heathrow.	This design would not be able to maintain separation from Heathrow traffic as both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations to the point that loss of capacity and complexity could make either or both operations not viable.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	The impact on Heathrow of the RAF Northolt departure track would be significant. Each time there was a RAF Northolt departure, Heathrow arrivals and departures would need to be suspended.	Design uses PBN specifications. There is scope for both RNAV1 and/or RNP1+RF.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	This illustrative track would significantly reduce fuel and greenhouse gases for RAF Northolt's south (CPT) and southeast (DAGGA) departures which currently have to route around Heathrow.	The option is significantly different to RAF Northolt's existing traffic patterns and would be expected to significantly increase the number of people newly overflown at low altitude.	It is not possible to avoid dense population when turning south from RAF Northolt RWY25.	Departures to the south would mean that those communities to the north of RAF Northolt would not be overflown by the departures. However those communities to the south would be overflown by Heathrow arrivals and departures. This could be expected to result in more overflight of communities with multiple routes.	This design would not be able to maintain separation from Heathrow traffic as both Heathrow and RAF Northolt traffic would need the same volume of airspace. This does not mean the design is not safe but there would be a significant dependency between RAF Northolt/Heathrow operations although to the point that loss of capacity and complexity could make either or both operations not viable.	The impact on Heathrow of such RAF Northolt departure track would be significant. Each time there was a RAF Northolt departure, Heathrow arrivals and departures would need to be suspended.	The dependency on Heathrow would generate significant delay for Heathrow and/or RAF Northolt.	This option would significantly reduce emissions for RAF Northolt's southbound departures but would increase number newly overflown and overfly more communities with multiple routes.	The dependencies that would be required between Heathrow and RAF Northolt would generate such complexities and inefficiencies that it would not ensure continuation of military and governmental operational activity.	Discontinued - does not meet DP2 (and four or more 'should' DP categories have been evaluated as 'not met').
												AMS as a whole - Partly Met					