AIRSPACE MODERNISATION AIRSPACE CHANGE PROPOSAL

STEP 2B
INITIAL OPTIONS APPRAISAL

APPENDIX C

VECTORED ARRIVALS
PART 2

Heathrow

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All airspace design options in this document are subject to change throughout the airspace change process, as options are matured in detail and refined in accordance with safety requirements, design principles, appraisals and stakeholder engagement and consultation.

Initial Options Appraisal

Vectored Arrivals

Runway 27L

All airspace design options in this document are subject to change throughout the airspace change process, as options are matured in detail and refined in accordance with safety requirements, design principles, appraisals and stakeholder engagement and consultation.

Version 1.0 (July 2023)

Vectored Arrivals – RWY 27L Option D

Option Description

This option has a vectoring area with Runway 27L Final Approach joining points between 11 and 15nm.

Communities – Noise impact on health & quality of life

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA_{eq}, 16h)	581,700	+35,500
Population above Partial LOAEL (night-time, LA_{eq}, 8h)	866,900	-13,300
Population experiencing at least one event of N65 (daytime)	2,588,500	-603,000
Population experiencing at least one event of N60 (night-time)	3,331,700	+880,700

Communities - Air Quality

As there is no change to track distribution below 1000ft, there is no effect on Air Quality from this option.

Wider Society – Greenhouse Gas Impact

Metric	Option Value
Overall Track Miles of the option (nm)	Not possible to assess at this time, owing to uncertainty in new stack locations.

Wider Society – Tranquillity & Biodiversity

Metric	Option Value	Difference to Baseline
Total Area of AONBs/National Parks (NPs) overflown between 0-7000ft once a day on average (daytime)	114km^2	+82km^2
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	0km^2	No change
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km^2	Less than 1km^2
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-1640ft which observe a potential change in location overflown	0	No change
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-3000ft which observe a potential change in location overflown	0	No change

Wider Society – Capacity/Resilience

The ability to constrain the vectoring area to joining final approach to within just a 4nm window is untested at Heathrow. There is a chance that the loss of flexibility could result in a degradation in landing rate, as an over delivery of arrivals will result in needing to extend arrival beyond the 4nm swathe.

Assuming that can be managed or occasional excursions from the small vectoring area is allowed, there is no other evidence to suggest an optimal landing rate cannot be achieved with this length final.

Heathrow's capacity for this ACP is limited by the existing 480,000 movement cap.

General Aviation – Access

No additional CAS envisaged.

Option would not facilitate the release of CAS.

Option not expected to impact existing helicopter routes.

General Aviation / Commercial Airlines – Economic impact from increased effective capacity

No economic effect expected on GA operations.

Assuming a smaller vectoring area has no negative effect on capacity, vectoring to final approach is expected to deliver the required landing rate.

Commercial Airlines – Training costs

Option does not require any re-equipage or upgrade costs for airlines. No training costs required for airlines.

Airport/ANSP – Infrastructure costs

No changes to infrastructure costs envisaged.

Airport/ANSP – Deployment costs

There will be considerable costs associated with deployment in terms of operational training and system upgrades which will be quantified in Stage 3. However, there is not expected to be any differences in these costs between the different options.

Safety

No IFP Design issues identified.

Although new or revised safety assurances may be needed, an acceptable safety argument is envisaged to be achievable.

Interdependencies, Conflicts & Trade-Offs

Option may restrict CCO/CDO to/from 7000ft for London City, Biggin Hill, Gatwick and Farnborough.

General Aviation / Commercial Airlines – Fuel Burn

Change in Fuel Burn (compared to the Baseline - annual - tonnes)	Not able to quantify at this time, owing to uncertainty in new stack locations.

Commercial Airlines – Other costs

None identified.

Airport/ANSP – Operational costs

This option is not anticipated to change airport or ANSP operational costs.

Option may lead to a change in the number of properties eligible for the noise insulation scheme which could lead to a change in operational costs for the airport.

Adherence to AMS

Supports the AMS by enabling an efficient flow of traffic, accommodating demand and providing system resilience to the benefit of airspace users, where a sole reliance on PBN Arrivals is not expected to achieve this.

Outcome of Vectored Arrival RWY27L Option D

All vectored arrival options have been retained into Stage 3 to allow us to determine if it would be beneficial and/or feasible to use different vectoring areas during different periods to provide respite or relief from noise. This will be informed by our Concept work during Stage 3 system assembly.

OPTION CARRIED FORWARD TO STAGE 3

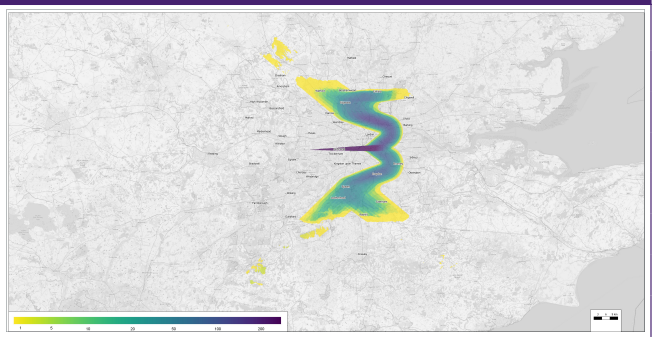
VECTOR Arrivals – RWY 27L Option D (Day)

07:00 - 23:00

Overflight

Rate	Population Overflown	
	Baseline	Option D
≥ 1	7,438,600	4,616,400
≥ 5	5,415,000	4,166,900
≥ 10	4,440,400	3,738,400
≥ 20	3,348,800	3,190,900
≥ 50	1,528,700	1,847,400
≥ 100	353,100	599,900
≥ 200	218,500	276,900

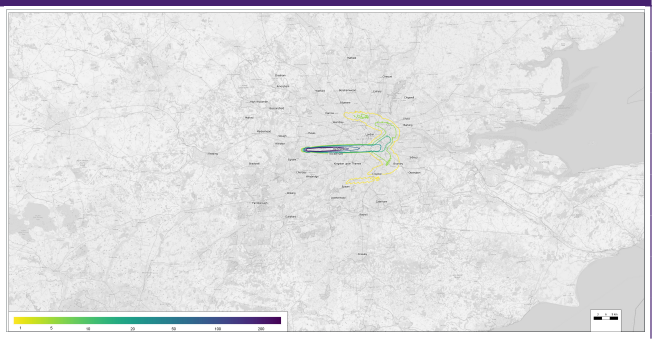
Overflight (0-7000 ft) contour map



Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day	
	Baseline	Option D
≥ 1	3,191,500	2,588,500
≥ 5	1,235,200	1,352,500
≥ 10	693,800	762,200
≥ 20	445,400	541,500
≥ 50	177,500	178,200
≥ 100	105,300	105,700
≥ 200	84,900	86,300

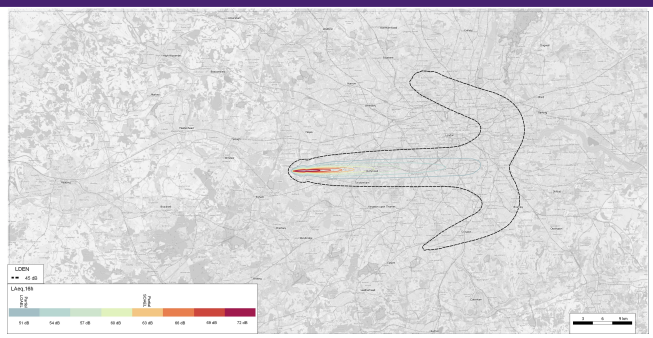
N65 events contour map



Noise Exposures

Population count	Baseline	Option D
Estimated total population above WHO Threshold (>45 dB L_{den})	3,160,200	3,022,000
Total population within Partial LOAEL (>51 dB $L_{Aeq,16h}$)	546,200	581,700

Partial LOAEL contour map



Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL
Partial LOAEL	5,700 (of which 5,700 brought out of Partial LOAEL by Option)	540,300	41,400 (of which 41,300 brought into Partial LOAEL by Option)

Change in noise exposure map

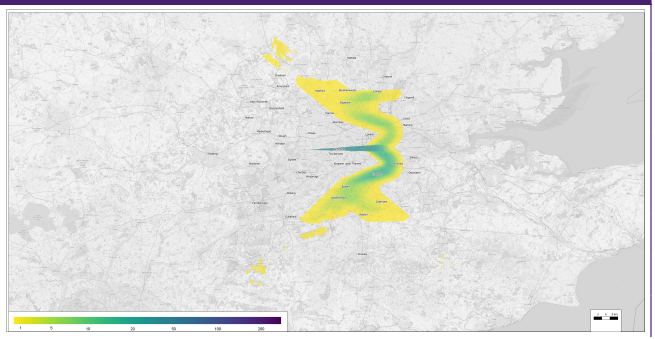
VECTOR Arrivals – RWY 27L Option D (Night)

23:00 - 07:00

Overflight

Rate	Population Overflown	
	Baseline	Option D
≥ 1	3,800,500	3,653,100
≥ 5	1,172,300	1,340,200
≥ 10	546,400	578,700
≥ 20	295,800	302,100
≥ 50	0	0
≥ 100	0	0
≥ 200	0	0

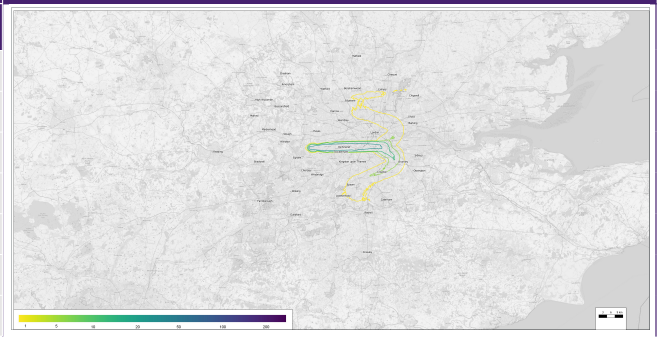
Overflight (0-7000 ft) contour map



Aircraft Noise Events

Rate	Population experiencing noise events above N60 each day	
	Baseline	Option D
≥ 1	2,451,100	3,331,700
≥ 5	1,142,200	1,210,000
≥ 10	881,700	846,300
≥ 20	416,800	423,700
≥ 50	0	0
≥ 100	0	0
≥ 200	0	0

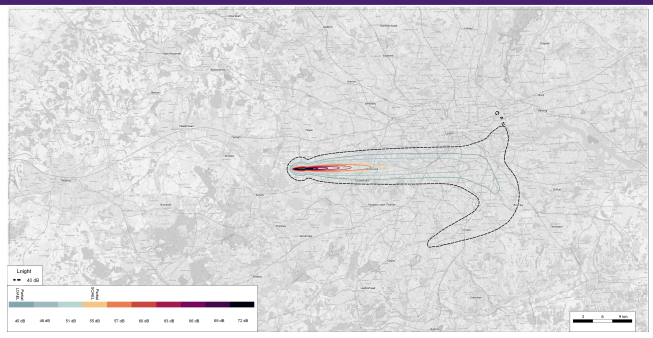
N60 events contour map



Noise Exposures

Population count	Baseline	Option D
Estimated total population above WHO Threshold (>40 dB L_{night})	1,835,500	1,898,900
Total population within Partial LOAEL (>45 dB $L_{Aeq,8h}$)	880,200	866,800

Partial LOAEL contour map



Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL
Partial LOAEL	88,000 (of which 72,900 brought out of Partial LOAEL by Option)	785,500	66,200 (of which 59,500 brought into Partial LOAEL by Option)

Change in noise exposure map

Vectored Arrivals – RWY 27L Option E

Option Description

This option has a vectoring area with Runway 27L Final Approach joining points between 12 and 16nm.

Communities – Noise impact on health & quality of life

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA_{eq}, 16h)	627,600	+81,400
Population above Partial LOAEL (night-time, LA_{eq}, 8h)	907,300	+27,100
Population experiencing at least one event of N65 (daytime)	2,279,000	-912,500
Population experiencing at least one event of N60 (night-time)	3,096,100	+645,100

Communities - Air Quality

As there is no change to track distribution below 1000ft, there is no effect on Air Quality from this option.

Wider Society – Greenhouse Gas Impact

Metric	Option Value
Overall Track Miles of the option (nm)	Not possible to assess at this time, owing to uncertainty in new stack locations.

Wider Society – Tranquillity & Biodiversity

Metric	Option Value	Difference to Baseline
Total Area of AONBs/National Parks (NPs) overflown between 0-7000ft once a day on average (daytime)	125km^2	+93km^2
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	0km^2	No change
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km^2	Less than 1km^2
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-1640ft which observe a potential change in location overflown	0	No change
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-3000ft which observe a potential change in location overflown	0	No change

Wider Society – Capacity/Resilience

The ability to constrain the vectoring area to joining final approach to within just a 4nm window is untested at Heathrow. There is a chance that the loss of flexibility could result in a degradation in landing rate, as an over delivery of arrivals will result in needing to extend arrival beyond the 4nm swathe.

Assuming that can be managed or occasional excursions from the small vectoring area is allowed, there is no other evidence to suggest an optimal landing rate cannot be achieved with this length final.

Heathrow's capacity for this ACP is limited by the existing 480,000 movement cap.

General Aviation – Access

No additional CAS envisaged.

Option would not facilitate the release of CAS.

Option not expected to impact existing helicopter routes.

General Aviation / Commercial Airlines – Economic impact from increased effective capacity

No economic effect expected on GA operations.

Assuming a smaller vectoring area has no negative effect on capacity, vectoring to final approach is expected to deliver the required landing rate.

Commercial Airlines – Training costs

Option does not require any re-equipage or upgrade costs for airlines. No training costs required for airlines.

Airport/ANSP – Infrastructure costs

No changes to infrastructure costs envisaged.

Airport/ANSP – Deployment costs

There will be considerable costs associated with deployment in terms of operational training and system upgrades which will be quantified in Stage 3. However, there is not expected to be any differences in these costs between the different options.

Safety

No IFP Design issues identified.

Although new or revised safety assurances may be needed, an acceptable safety argument is envisaged to be achievable.

Interdependencies, Conflicts & Trade-Offs

Option may restrict CCO/CDO to/from 7000ft for London City, Biggin Hill, Gatwick and Farnborough.

General Aviation / Commercial Airlines – Fuel Burn

Change in Fuel Burn (compared to the Baseline - annual - tonnes)	Not able to quantify at this time, owing to uncertainty in new stack locations.

Commercial Airlines – Other costs

None identified.

Airport/ANSP – Operational costs

This option is not anticipated to change airport or ANSP operational costs.

Option may lead to a change in the number of properties eligible for the noise insulation scheme which could lead to a change in operational costs for the airport.

Adherence to AMS

Supports the AMS by enabling an efficient flow of traffic, accommodating demand and providing system resilience to the benefit of airspace users, where a sole reliance on PBN Arrivals is not expected to achieve this.

Outcome of Vectored Arrival RWY27L Option E

All vectored arrival options have been retained into Stage 3 to allow us to determine if it would be beneficial and/or feasible to use different vectoring areas during different periods to provide respite or relief from noise. This will be informed by our Concept work during Stage 3 system assembly.

OPTION CARRIED FORWARD TO STAGE 3

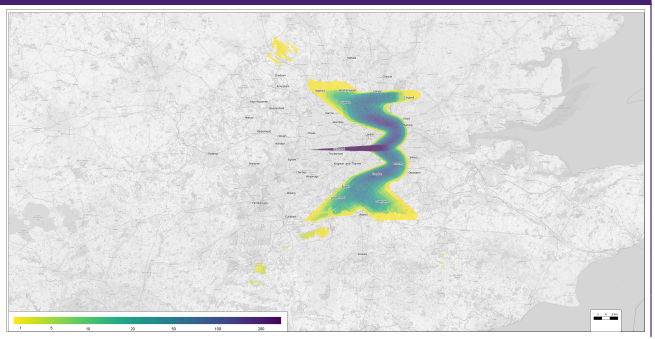
VECTOR Arrivals – RWY 27L Option E (Day)

07:00 - 23:00

Overflight

Rate	Population Overflown	
	Baseline	Option E
≥ 1	7,438,600	4,369,400
≥ 5	5,415,000	3,939,500
≥ 10	4,440,400	3,531,000
≥ 20	3,348,800	3,066,000
≥ 50	1,528,700	1,826,000
≥ 100	353,100	582,800
≥ 200	218,500	325,300

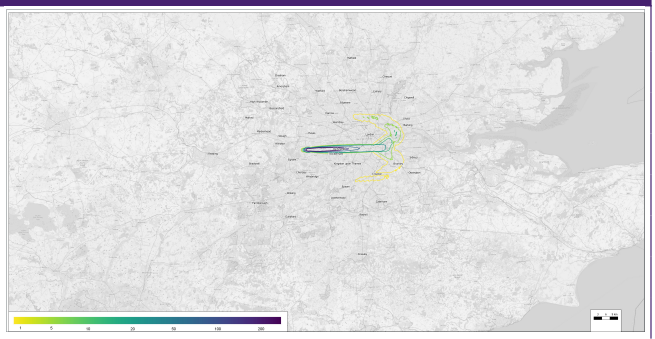
Overflight (0-7000 ft) contour map



Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day	
	Baseline	Option E
≥ 1	3,191,500	2,279,000
≥ 5	1,235,200	1,150,400
≥ 10	693,800	746,700
≥ 20	445,400	593,200
≥ 50	177,500	178,200
≥ 100	105,300	105,700
≥ 200	84,900	86,300

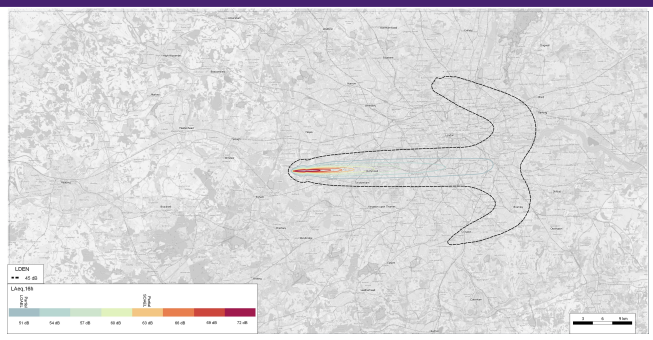
N65 events contour map



Noise Exposures

Population count	Baseline	Option E
Estimated total population above WHO Threshold (>45 dB L_{den})	3,160,200	2,829,500
Total population within Partial LOAEL (>51 dB $L_{Aeq,16h}$)	546,200	627,600

Partial LOAEL contour map



Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL
Partial LOAEL	5,800 (of which 5,800 brought out of Partial LOAEL by Option)	509,500	118,000 (of which 87,200 brought into Partial LOAEL by Option)

Change in noise exposure map

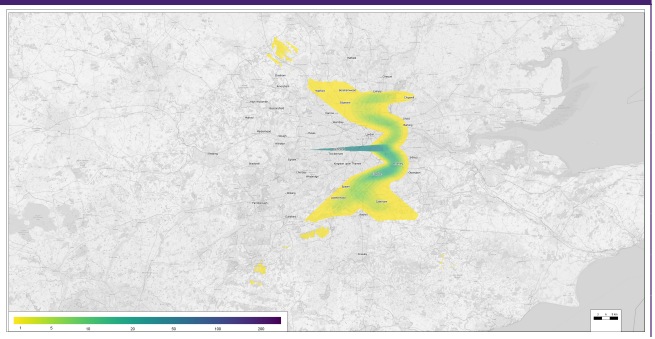
VECTOR Arrivals – RWY 27L Option E (Night)

23:00 - 07:00

Overflight

Rate	Population Overflown	
	Baseline	Option E
≥ 1	3,800,500	3,424,500
≥ 5	1,172,300	1,229,800
≥ 10	546,400	604,500
≥ 20	295,800	352,200
≥ 50	0	0
≥ 100	0	0
≥ 200	0	0

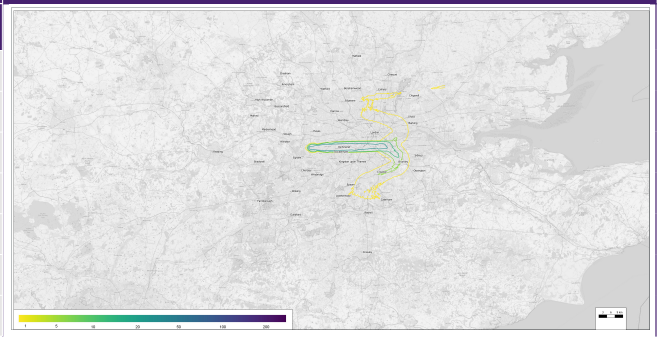
Overflight (0-7000 ft) contour map



Aircraft Noise Events

Rate	Population experiencing noise events above N60 each day	
	Baseline	Option E
≥ 1	2,451,100	3,096,100
≥ 5	1,142,200	1,199,000
≥ 10	881,700	902,600
≥ 20	416,800	467,800
≥ 50	0	0
≥ 100	0	0
≥ 200	0	0

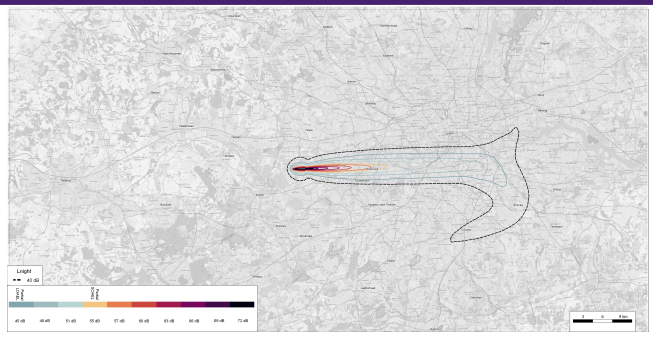
N60 events contour map



Noise Exposures

Population count	Baseline	Option E
Estimated total population above WHO Threshold (>40 dB L_{night})	1,835,500	1,784,500
Total population within Partial LOAEL (>45 dB $L_{Aeq,8h}$)	880,200	907,300

Partial LOAEL contour map



Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL
Partial LOAEL	25,100 (of which 25,100 brought out of Partial LOAEL by Option)	855,100	52,100 (of which 52,100 brought into Partial LOAEL by Option)

Change in noise exposure map

Vectored Arrivals – RWY 27L Option F

Option Description

This option has a vectoring area with Runway 27L Final Approach joining points between 13 and 17nm.

Communities – Noise impact on health & quality of life

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA_{eq}, 16h)	665,300	+119,100
Population above Partial LOAEL (night-time, LA_{eq}, 8h)	931,300	+51,100
Population experiencing at least one event of N65 (daytime)	2,039,200	-1,152,300
Population experiencing at least one event of N60 (night-time)	2,828,100	+377,100

Communities - Air Quality

As there is no change to track distribution below 1000ft, there is no effect on Air Quality from this option.

Wider Society – Greenhouse Gas Impact

Metric	Option Value
Overall Track Miles of the option (nm)	Not possible to assess at this time, owing to uncertainty in new stack locations.

Wider Society – Tranquillity & Biodiversity

Metric	Option Value	Difference to Baseline
Total Area of AONBs/National Parks (NPs) overflown between 0-7000ft once a day on average (daytime)	133km^2	+101km^2
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	0km^2	No change
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km^2	Less than 1km^2
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-1640ft which observe a potential change in location overflown	0	No change
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-3000ft which observe a potential change in location overflown	0	No change

Wider Society – Capacity/Resilience

The ability to constrain the vectoring area to joining final approach to within just a 4nm window is untested at Heathrow. There is a chance that the loss of flexibility could result in a degradation in landing rate, as an over delivery of arrivals will result in needing to extend arrival beyond the 4nm swathe.

Assuming that can be managed or occasional excursions from the small vectoring area is allowed, there is no other evidence to suggest an optimal landing rate cannot be achieved with this length final.

Heathrow's capacity for this ACP is limited by the existing 480,000 movement cap.

General Aviation – Access

No additional CAS envisaged.

Option would not facilitate the release of CAS.

Option not expected to impact existing helicopter routes.

General Aviation / Commercial Airlines – Economic impact from increased effective capacity

No economic effect expected on GA operations.

Assuming a smaller vectoring area has no negative effect on capacity, vectoring to final approach is expected to deliver the required landing rate.

Commercial Airlines – Training costs

Option does not require any re-equipage or upgrade costs for airlines. No training costs required for airlines.

Airport/ANSP – Infrastructure costs

No changes to infrastructure costs envisaged.

Airport/ANSP – Deployment costs

There will be considerable costs associated with deployment in terms of operational training and system upgrades which will be quantified in Stage 3. However, there is not expected to be any differences in these costs between the different options.

Safety

No IFP Design issues identified.

Although new or revised safety assurances may be needed, an acceptable safety argument is envisaged to be achievable.

Interdependencies, Conflicts & Trade-Offs

Option may restrict CCO/CDO to/from 7000ft for London City, Biggin Hill, Gatwick and Farnborough.

General Aviation / Commercial Airlines – Fuel Burn

Change in Fuel Burn (compared to the Baseline - annual - tonnes)	Not able to quantify at this time, owing to uncertainty in new stack locations.

Commercial Airlines – Other costs

None identified.

Airport/ANSP – Operational costs

This option is not anticipated to change airport or ANSP operational costs.

Option may lead to a change in the number of properties eligible for the noise insulation scheme which could lead to a change in operational costs for the airport.

Adherence to AMS

Supports the AMS by enabling an efficient flow of traffic, accommodating demand and providing system resilience to the benefit of airspace users, where a sole reliance on PBN Arrivals is not expected to achieve this.

Outcome of Vectored Arrival RWY27L Option F

All vectored arrival options have been retained into Stage 3 to allow us to determine if it would be beneficial and/or feasible to use different vectoring areas during different periods to provide respite or relief from noise. This will be informed by our Concept work during Stage 3 system assembly.

OPTION CARRIED FORWARD TO STAGE 3

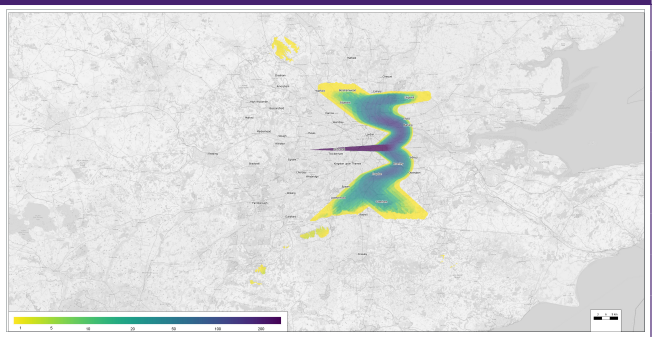
VECTOR Arrivals – RWY 27L Option F (Day)

07:00 - 23:00

Overflight

Rate	Population Overflown	
	Baseline	Option F
≥ 1	7,438,600	4,093,600
≥ 5	5,415,000	3,690,800
≥ 10	4,440,400	3,338,200
≥ 20	3,348,800	2,863,600
≥ 50	1,528,700	1,647,400
≥ 100	353,100	600,600
≥ 200	218,500	371,400

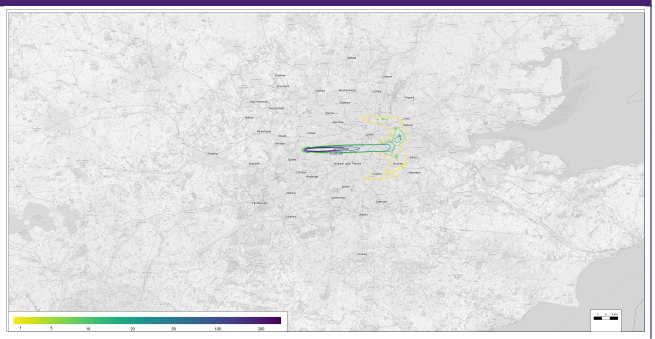
Overflight (0-7000 ft) contour map



Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day	
	Baseline	Option F
≥ 1	3,191,500	2,039,200
≥ 5	1,235,200	982,000
≥ 10	693,800	743,700
≥ 20	445,400	641,100
≥ 50	177,500	178,200
≥ 100	105,300	105,700
≥ 200	84,900	86,300

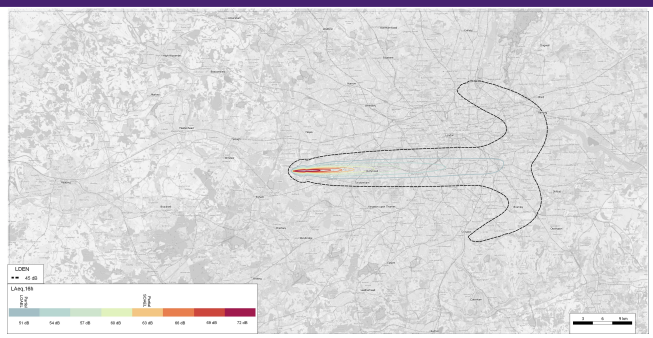
N65 events contour map



Noise Exposures

Population count	Baseline	Option F
Estimated total population above WHO Threshold (>45 dB L_{den})	3,160,200	2,524,700
Total population within Partial LOAEL (>51 dB $L_{Aeq,16h}$)	546,200	665,300

Partial LOAEL contour map



Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL
Partial LOAEL	5,300 (of which 5,300 brought out of Partial LOAEL by Option)	509,900	155,400 (of which 124,400 brought into Partial LOAEL by Option)

Change in noise exposure map

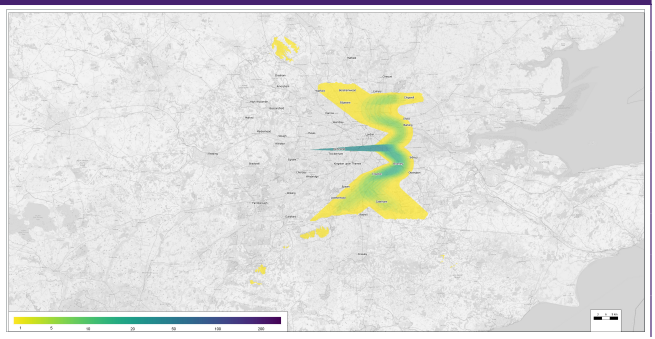
VECTOR Arrivals – RWY 27L Option F (Night)

23:00 - 07:00

Overflight

Rate	Population Overflown	
	Baseline	Option F
≥ 1	3,800,500	3,198,200
≥ 5	1,172,300	1,100,500
≥ 10	546,400	601,200
≥ 20	295,800	401,900
≥ 50	0	0
≥ 100	0	0
≥ 200	0	0

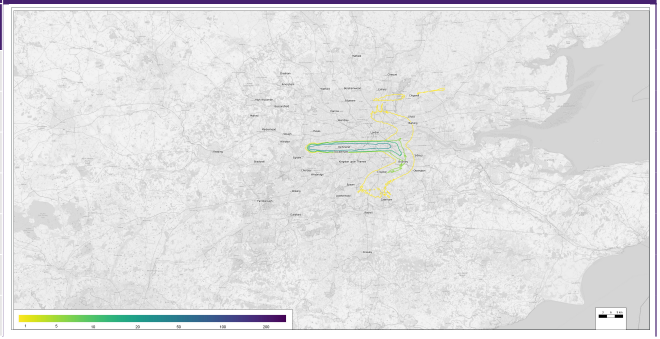
Overflight (0-7000 ft) contour map



Aircraft Noise Events

Rate	Population experiencing noise events above N60 each day	
	Baseline	Option F
≥ 1	2,451,100	2,828,100
≥ 5	1,142,200	1,155,300
≥ 10	881,700	938,000
≥ 20	416,800	499,800
≥ 50	0	0
≥ 100	0	0
≥ 200	0	0

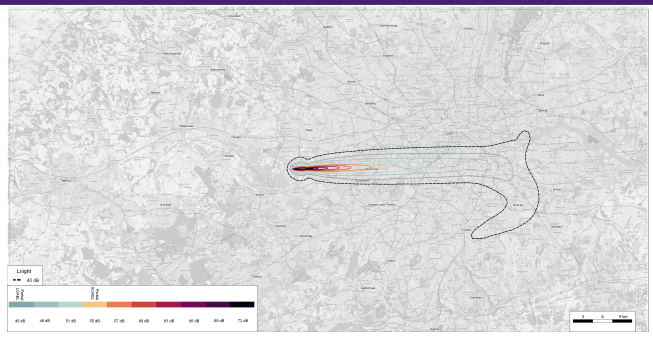
N60 events contour map



Noise Exposures

Population count	Baseline	Option F
Estimated total population above WHO Threshold (>40 dB L_{night})	1,835,500	1,696,400
Total population within Partial LOAEL (>45 dB $L_{Aeq,8h}$)	880,200	931,300

Partial LOAEL contour map



Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL
Partial LOAEL	15,700 (of which 15,700 brought out of Partial LOAEL by Option)	751,200	180,100 (of which 66,800 brought into Partial LOAEL by Option)

Change in noise exposure map

Vectored Arrivals – RWY 27L Option G

Option Description

This option has a vectoring area with Runway 27L Final Approach joining points between 14 and 18nm.

Communities – Noise impact on health & quality of life

Metric	Option Value	Difference to Baseline
Population above Partial LOAEL (daytime, LA_{eq}, 16h)	683,800	+137,600
Population above Partial LOAEL (night-time, LA_{eq}, 8h)	927,000	+46,800
Population experiencing at least one event of N65 (daytime)	1,744,300	-1,477,200
Population experiencing at least one event of N60 (night-time)	2,463,500	+12,500

Communities - Air Quality

As there is no change to track distribution below 1000ft, there is no effect on Air Quality from this option.

Wider Society – Greenhouse Gas Impact

Metric	Option Value
Overall Track Miles of the option (nm)	Not possible to assess at this time, owing to uncertainty in new stack locations.

Wider Society – Tranquillity & Biodiversity

Metric	Option Value	Difference to Baseline
Total Area of AONBs/National Parks (NPs) overflown between 0-7000ft once a day on average (daytime)	139km^2	+107km^2
Total Area of AONBs/NPs overflown experiencing at least one event of N65 on average (daytime)	0km^2	No change
Total Area of Richmond Park overflown between 0-7000ft at least once a day on average (daytime)	0km^2	Less than 1km^2
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-1640ft which observe a potential change in location overflown	0	No change
Number of sites (RAMSAR, SAC, SPA, SSSI) overflown between 0-3000ft which observe a potential change in location overflown	0	No change

Wider Society – Capacity/Resilience

The ability to constrain the vectoring area to joining final approach to within just a 4nm window is untested at Heathrow. There is a chance that the loss of flexibility could result in a degradation in landing rate, as an over delivery of arrivals will result in needing to extend arrival beyond the 4nm swathe. Assuming that can be managed or occasional excursions from the small vectoring area is allowed, running a longer final approach could start to degrade the ability to consistently provide optimal spacing. This is due to the requirement to maintain more active/restrictive speed control on final approach, than on base-leg.

Heathrow's capacity for this ACP is limited by the existing 480,000 movement cap.

General Aviation – Access

No additional CAS envisaged.

Option would not facilitate the release of CAS.

Option not expected to impact existing helicopter routes.

General Aviation / Commercial Airlines – Economic impact from increased effective capacity

No economic effect expected on GA operations.

Running a longer final approach could start to degrade the ability to consistently provide optimal spacing. This is due to the requirement to maintain more active/restrictive speed control on final approach, than on base-leg.

This will be verified and quantified in Stage 3, should this option be favourable from an environmental and/or design perspective.

Commercial Airlines – Training costs

Option does not require any re-equipage or upgrade costs for airlines. No training costs required for airlines.

Airport/ANSP – Infrastructure costs

No changes to infrastructure costs envisaged.

Airport/ANSP – Deployment costs

There will be considerable costs associated with deployment in terms of operational training and system upgrades which will be quantified in Stage 3. However, there is not expected to be any differences in these costs between the different options.

Safety

No IFP Design issues identified.

Although new or revised safety assurances may be needed, an acceptable safety argument is envisaged to be achievable.

Interdependencies, Conflicts & Trade-Offs

Option may restrict CCO/CDO to/from 7000ft for London City, Biggin Hill, Gatwick and Farnborough. However, a consistently longer final approach could enable improved vertical profiles for London City departures to above 3000/4000ft.

General Aviation / Commercial Airlines – Fuel Burn

Change in Fuel Burn (compared to the Baseline - annual - tonnes)	Not able to quantify at this time, owing to uncertainty in new stack locations.

Commercial Airlines – Other costs

None identified.

Airport/ANSP – Operational costs

This option is not anticipated to change airport or ANSP operational costs.

Option may lead to a change in the number of properties eligible for the noise insulation scheme which could lead to a change in operational costs for the airport.

Adherence to AMS

Supports the AMS by enabling an efficient flow of traffic, accommodating demand & providing system resilience, where a sole reliance on PBN Arrivals is not expected to achieve this. A consistently longer final approach could impact landing rates. This will be assessed further in Stage 3 should this option be favourable from an environmental &/or design perspective.

Outcome of Vectored Arrival RWY27L Option G

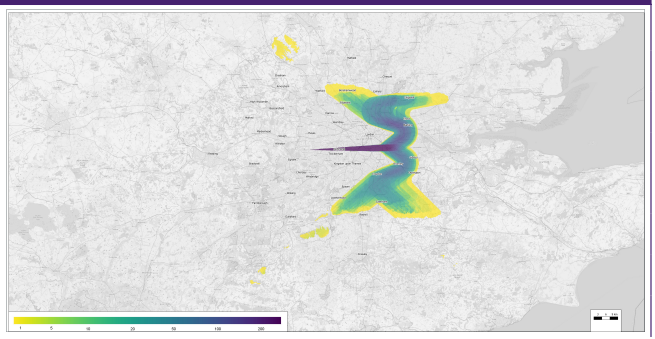
All vectored arrival options have been retained into Stage 3 to allow us to determine if it would be beneficial and/or feasible to use different vectoring areas during different periods to provide respite or relief from noise. This will be informed by our Concept work during Stage 3 system assembly.

OPTION CARRIED FORWARD TO STAGE 3

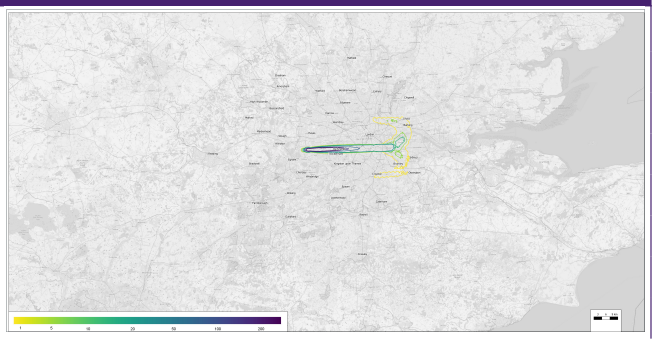
VECTOR Arrivals – RWY 27L Option G (Day)

07:00 - 23:00

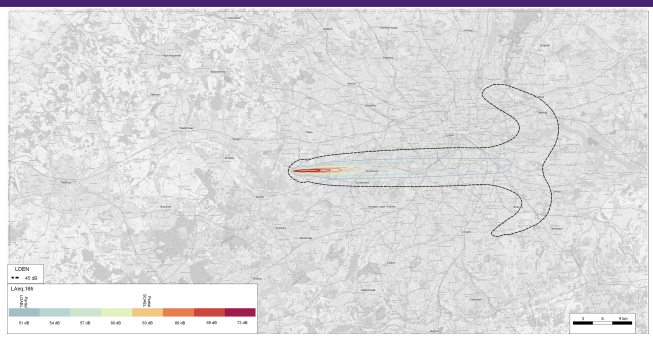
Overflight

Rate	Population Overflown		Overflight (0-7000 ft) contour map
	Baseline	Option G	
≥ 1	7,438,600	3,901,100	
≥ 5	5,415,000	3,625,700	
≥ 10	4,440,400	3,281,000	
≥ 20	3,348,800	2,779,700	
≥ 50	1,528,700	1,447,000	
≥ 100	353,100	520,900	
≥ 200	218,500	407,600	

Aircraft Noise Events

Rate	Population experiencing noise events above N65 each day		N65 events contour map
	Baseline	Option G	
≥ 1	3,191,500	1,744,300	
≥ 5	1,235,200	937,500	
≥ 10	693,800	776,900	
≥ 20	445,400	663,200	
≥ 50	177,500	178,200	
≥ 100	105,300	105,700	
≥ 200	84,900	86,300	

Noise Exposures

Population count	Baseline	Option G	Partial LOAEL contour map
Estimated total population above WHO Threshold (>45 dB L_{den})	3,160,200	2,300,300	
Total population within Partial LOAEL (>51 dB $L_{Aeq,16h}$)	546,200	683,800	

Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL	Change in noise exposure map
Partial LOAEL	5,000 (of which 5,000 brought out of Partial LOAEL by Option)	509,900	173,900 (of which 142,600 brought into Partial LOAEL by Option)	

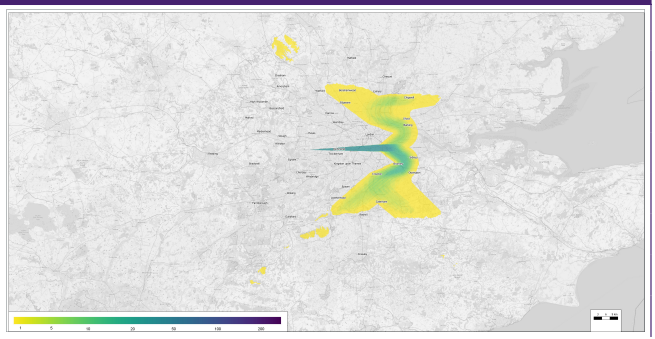
VECTOR Arrivals – RWY 27L Option G (Night)

23:00 - 07:00

Overflight

Rate	Population Overflown	
	Baseline	Option G
≥ 1	3,800,500	3,225,200
≥ 5	1,172,300	995,500
≥ 10	546,400	582,300
≥ 20	295,800	448,500
≥ 50	0	0
≥ 100	0	0
≥ 200	0	0

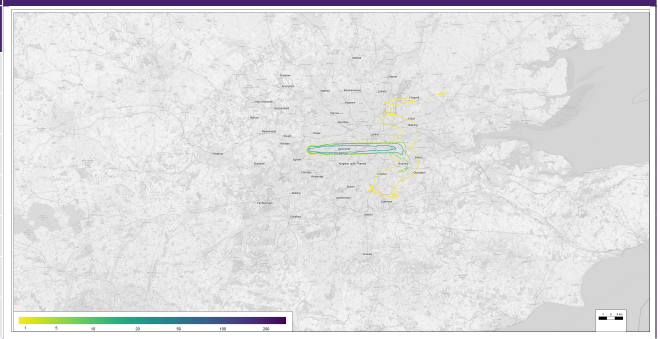
Overflight (0-7000 ft) contour map



Aircraft Noise Events

Rate	Population experiencing noise events above N60 each day	
	Baseline	Option G
≥ 1	2,451,100	2,463,500
≥ 5	1,142,200	1,130,400
≥ 10	881,700	951,600
≥ 20	416,800	523,000
≥ 50	0	0
≥ 100	0	0
≥ 200	0	0

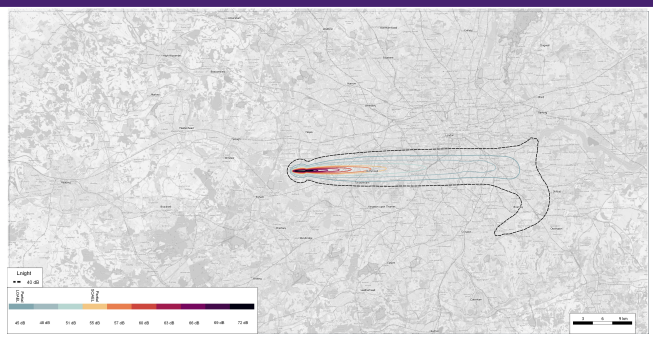
N60 events contour map



Noise Exposures

Population count	Baseline	Option G
Estimated total population above WHO Threshold (>40 dB L_{night})	1,835,500	1,673,000
Total population within Partial LOAEL (>45 dB $L_{Aeq,8h}$)	880,200	927,000

Partial LOAEL contour map



Noise Exposure Change

Change in Noise Exposure	Population experiencing at least 1 dB reduction within partial LOAEL or brought out of partial LOAEL	Population experiencing no change in noise exposure within partial LOAEL	Population experiencing at least 1 dB increase within partial LOAEL or brought into partial LOAEL
Partial LOAEL	22,400 (of which 22,100 brought out of Partial LOAEL by Option)	742,200	184,700 (of which 69,000 brought into Partial LOAEL by Option)

Change in noise exposure map