Edinburgh Airport Airspace Change Programme 2022

Stage 2 Develop and Assess

Virtual Engagement Content

Document control

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Edinburgh Airport: Airspace Change Programme
Stage 2: Develop and Assess
ACP-2019-32

Virtual Engagement Content

Edinburgh Airport: Airspace Change Proposal

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Frequently Asked Questions
January 2022

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Edinburgh Airport: Airspace Change Proposal

ACP-2019-32

Frequently Asked Questions

Airspace

What is airspace?

Airspace is in effect the sky above us. Infrastructure has been developed to allow aircraft to operate safely as they arrive and depart at larger airports and indeed smaller airfields. The airspace is divided into controlled and uncontrolled airspace. The basic difference is that in controlled airspace air traffic controllers are there to issue instructions and advice to enable the safe operation of air traffic. Edinburgh Airport lies in the Scottish Terminal Manoeuvring Area (STMA) which is class D airspace. To fly inside this airspace aircraft need to carry a minimum of equipment and need to obtain a clearance from Air traffic Control (ATC). In uncontrolled airspace there is a wide variety of aviation happening from microlight activity, to paradropping and military operations. ATC may still operate here but aircraft are not required to carry certain equipment and there is more freedom of operation here for pilots. More information about the classes of airspace and the differences between them can be found here.

What is the airspace change process?

The airspace change process is the regulatory process required for changing airspace design. This can involve changes to controlled airspace dimensions, classification of airspace and changes to the flightpaths and routes that aircraft take. The Department for Transport (DfT) are responsible for all aviation policy in the UK and the Civil Aviation Authority (CAA) are responsible for its regulation and the approval of any airspace change plans. Edinburgh Airport is responsible for the airspace up to a height of 7000 feet and National Air Traffic services (NATS) take responsibility above 7000 feet. Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information can be found in CAP 1616.

What is CAP1616?

CAP 1616 (Civil Aeronautical Publication 1616) is the guidance to be followed to enable the airspace change process to be carried out to completion. It is a public document and available on the CAA website here. The document details the 7 stage process for airspace change implementation and is outlined in the answer to the next question.

Who are ACOG?

ACOG are the Airspace Change Organising Group, and they are the team tasked with coordinating the redesign of the UK's airspace (FASI-N & FASI-S programmes). ACOG work under the direction of the DfT and they also work closely with the CAA in order to guide and assist airspace change sponsor and help them deliver their airspace change as part of a the national Airspace Modernisation Strategy. They are owners of the airspace change masterplan and have just published iteration 2 which can be found here.

What is FASI-N? (Future Airspace Implementation)

FASI-N and indeed FASI-S are programmes to redesign airspace in the south and north of the UK, including upper airspace structures. These are complex airspace design programmes that require coordination between the different 'sponsors' of airspace changes. These sponsors are airports and NERL, (NATS En Route Limited, which mainly manages upper airspace and its design).

The Directions require the CAA to make airspace change decisions (i.e. decide whether or not to approve the sponsor's proposed airspace design) in accordance with:

- the CAA's airspace change process (CAP1616)
- the CAA's strategy and plan for airspace modernisation (the AMS, CAP1711)

The AMS overall and the airspace change process (CAP1616) apply to all airspace change proposals, whether they are in FASI-S or FASI-N or neither programme.

Is there a public consultation?

There will be a public consultation as part of this process and this takes place during Stage 3 which will probably be in the Spring of 2023.

What stage in the process is Edinburgh Airport?

Edinburgh Airport are currently at Stage 2 of the process and need to submit for the Stage 2 develop and assess gateway in July 2022. Stage 1, Define, was successfully completed in July 2021 after the project was restarted in May 2021. The project had been paused in March 2020 due to the |Covid pandemic. More information on our stage 1 submission can be found at CAA Airspace Portal here. This includes how our design principles were developed and the engagement process undertaken to arrive at the final 16 design principles which will inform our decision making process as we move through the Stages of CAP 1616.

See the figure below taken from CAP 1616.

Our design principles are detailed after this figure.


Stage 1
DEFINE
Step 1A
Assess requirement
Step 1B
Design principles
DEFINE GATEWAY
Stage 2
DEVELOP
and ASSESS
Step 2A
Option development
Step 2B
Options appraisal
DEVELOP AND ASSESS GATEWAY
Stage 3
CONSULT
Step 3A
Consultation preparation
Step 3B
Consultation approval
CONSULT GATEWAY
Step 3C
Commence consultation
Step 3D
Collate & review responses
Stage 4
UPDATE and SUBMIT
Step 4A
Update design
Step 4B
Submit proposal to CAA
Stage 5
DECIDE
Step 5A
CAA assessment
Step 5B
CAA decision
DECIDE GATEWAY
Stage 6 IMPLEMENT
Step 6
Implement
Stage 7 PIR
Step 7
Post-implementation review

What are Edinburgh Airport's design principles?

Category	Number	Design principle
Safety (core)	FDP1	The airspace design and its operation must be as safe or safer than it is today.
Safety (core)	FDP2	Flight paths must be flyable and technically supported by air traffic control and airport technical management systems.
Operational (core)	FDP3	Flight paths must be designed to allow modern aircraft to use performance-based navigation (PBN) in line with CAA's modernisation strategy
Operational (core)	FDP4	Routes to/from Glasgow and Edinburgh airports must be procedurally deconflicted from the ground to a preferred level in coordination with NATS Prestwick.
Operational (core)	FDP5	The predictability of flight tracks must be maximised for consistency of operations.
Operational (core)	FDP6	Collaborate with other Scottish airports and NATS to ensure that the airspace design options are compatible with the wider programme of lower altitude and network airspace changes and accords with the CAA's published Airspace Modernisation Strategy (CAP 1711) and any current or future plans associated with it.
Health and wellbeing	FDP7	Flight paths should be designed to minimise the total adverse effect on health and quality of life created by aircraft noise and emissions.
Health and wellbeing	FDP8	For flightpaths at or above 4,000ft to below 7,000ft, the environmental priority should continue to be minimising the impact of aviation noise in a manner consistent with the government's overall policy on aviation noise, unless this would disproportionately increase CO_2 emissions.
Health and wellbeing	FDP9	Flight paths should be designed to minimise population overflown below 4,000ft and, between 4,000ft and 7,000ft, taking into account any potential adverse impact, due to those overflown having protected characteristics, as defined by the Equalities Act 2010.
Health and wellbeing	FDP10	Flight paths should be designed to minimise overflying sensitive locations and noise-sensitive receptors (for example, the zoo, retirement complexes, green spaces, historic heritage sites, and others).
Health and wellbeing	FDP11	Flight paths should be designed to include track concentration and/or track dispersal options to provide noise respite.
Operational	FDP12	Flight paths should be designed with routes that minimise track miles and fuel burn.
Operational	FDP13	Flight paths should be designed to ensure efficient and effective route management.
Technical	FDP14	Requirements of airspace users should be taken into account when designing flight paths.
Environment	FDP15	Flight paths should be designed to minimise adverse local air quality impacts.
Economy	FDP16	Airspace should be designed to maximise capacity in order to contribute economic benefits to Scotland, including tourism and trade.

Technical

What are the aims of airspace change at Edinburgh Airport?

There are 3 aims or drivers of Airspace Change at Edinburgh Airport. These are to modernise the airspace, to increase airspace capacity and to minimise environmental impact.

What is the Airspace Modernisation Strategy (AMS) and how does Performance-based Navigation (PBN) fit in to this?

The AMS aims to optimise future airspace designs to take account of modern aircraft performance and functional capabilities and make them more efficient – saving time and fuel and reducing emissions.

Key to achieving this is through the application of PBN. In parallel, the UK navigation infrastructure can also be optimised to take advantage of the lateral navigation accuracy from Global Navigation Satellite Systems (GNSS) while retaining adequate conventional ground-based navigation aids to ensure both resilience and contingency measures.

The availability of PBN employed within an appropriate redesign of terminal airspace will allow instrument flight procedures to be designed that maximise the ability of aircraft to execute Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO). This in turn will maximise overall efficiency with consequential environmental benefits. Therefore, where practicable, all new PBN-based Standard Arrivals and runway transitions should aim to apply Continuous Descent Operations (CDO) and all new PBN-based Standard Instrument Departures should aim to apply Continuous Climb Operations (CCO). No change will be made to operating procedures without an assessment of environmental impact as required by national procedures and processes.

Learn more about the AMS here.

Learn more about PBN here.

What are the benefits of airspace change and what is Edinburgh Airport proposing ?

Airspace change gives us an opportunity to improve the situation inside Edinburgh's controlled airspace in a number of ways. We intend to modernise the airspace, which removes reliance on ground based beacons by using PBN. This means that we can utilise navigation a more up to date navigation system provided by satellites and fly flight paths more accurately. We also need to increase capacity in order to reduce delays and therefore accommodate more efficiencies as traffic grows in the future, and we will also take the opportunity to establish flightpaths that improve the quality of life and health benefits for our local communities as much as is possible.

Why is Edinburgh Airport an Airspace Change sponsor and what is Edinburgh proposing?

Edinburgh Airport submitted a Statement of Need to the CAA detailing its requirements in this airspace change. As mentioned in previous answers, these are to modernise our airspace by introducing PBN routes, increase capacity by more systemisation and/or the more efficient design of departure routes and finally to introduce environmental benefits by enabling more efficient flightpaths, reducing track miles flown, reducing any delays on the ground and the looking at dispersal and respite options. There is a lot here to consider and we must follow the CAP 1616 process. What is very important here is the engagement process and arriving at the right solutions to take through the various stages in order to achieve compliance and implementation. The sooner we can implement this change the sooner the environmental benefits will be apparent.

Are communities affected by airspace change?

Communities are affected by airspace change when the flight paths and flight profiles are changed. This may mean that previously overflown communities may have an improvement in their situation in that they are overflown less by aircraft. Our design principles include minimising the effect of aviation noise and also minimising the effect on health and quality of life by reducing the number of people overflown, if we can.

What are the environmental benefits?

We are looking to be guided by our design principles as we try to introduce environmental benefits through our airspace design. These will include less delays on the ground for departing aircraft, so less carbon produced and less noise. This should also improve air quality in and around the airport. We also want to overfly less people so the reduction in noise should provide health benefits as well as reducing the number of people overflown as mentioned previously. We have 6 design principles which directly affect health and wellbeing so we intend to do what we can to maximise the benefit of all of them. They also include avoiding the overflight of sensitive areas and introducing respite or dispersal to bring benefit.

Which airlines will be affected?

All airlines flying in and out of Edinburgh will be affected. We are replacing the current flight paths with new ones that involve flying them using different navigational systems. All based aircraft are currently capable of using the new methods (RNAV) as well as still utilising current methods until they are replaced.

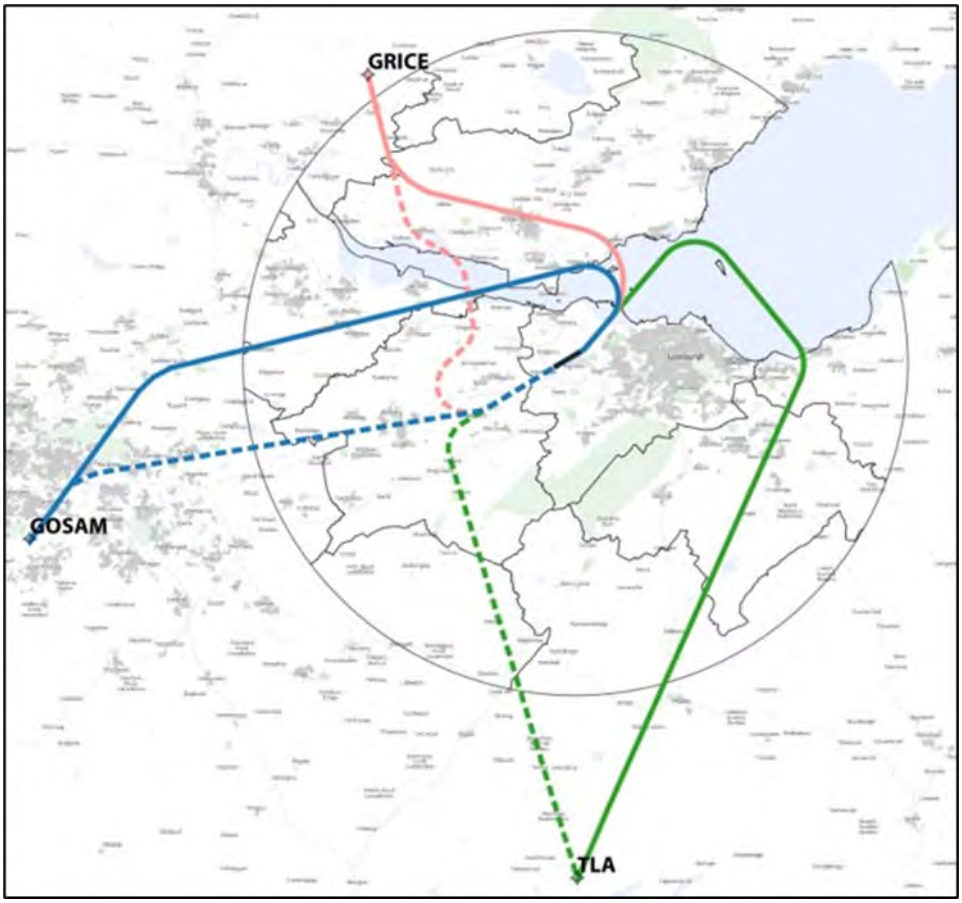
Are other airspace users affected?

Other airspace users are affected in that these new flightpaths will mean aircraft utilising other parts of the airspace in and around Edinburgh. As part of the airspace change we will be looking at flight paths and seeing if we can modify the dimensions of our controlled airspace to benefit other airspace

users. We need to look at the final design of our proposal and then work to see what airspace dimensions we can change, either vertically or horizontally, for the benefit of all. We have information from the CAA about the requirements of other Airspace users and will look to incorporate some or all of this at a later date (when our design progress permits). We will also work with Glasgow airport to see if improvements can be made to the buffer zone that currently exists.

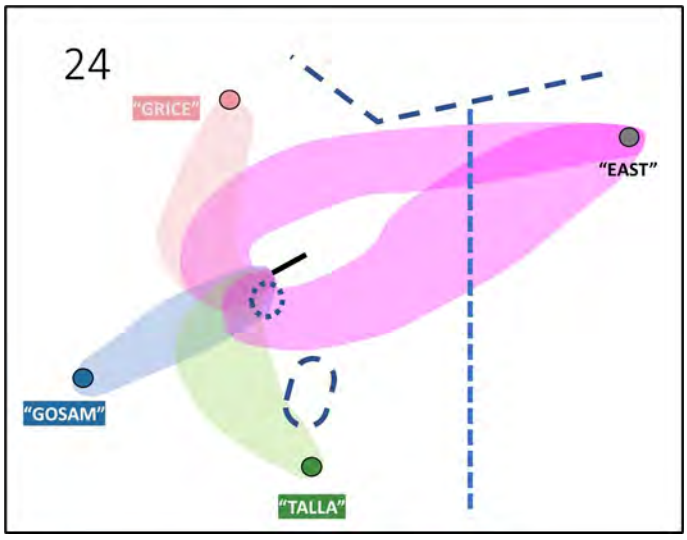
What are the departure options?

Our current departure route system is detailed below. We have 3 routes that are utilised via GOSAM, GRICE and TALLA. This gives us routes to the North, West and South.

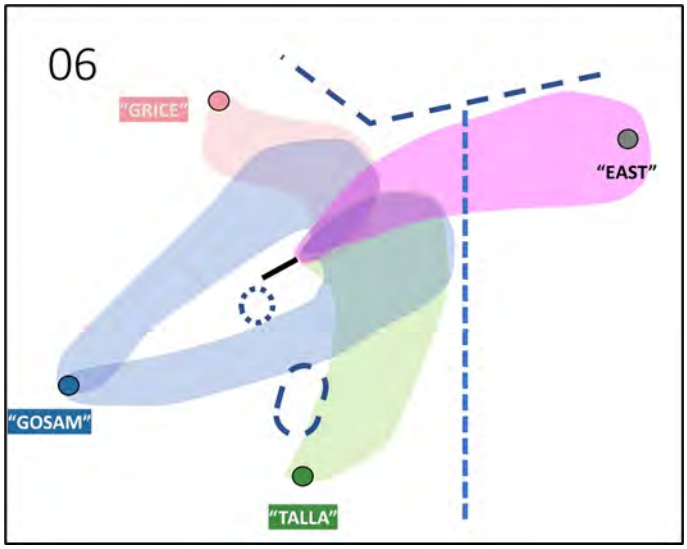


We have identified during discussions with airlines and our parent air traffic control centre at Prestwick that there are great benefits to be had with a route to the east. What we propose to do is look at the current system and exit points to see if the routings can be improved. This would involve analysis of the current track and seeing if we can make adjustments to this in order to fly over less people and noise sensitive areas. We are also looking to improve the network so there is the possibility that GOSAM, GRICE and TALLA could also move from where they currently are. We would need to see tangible benefits for this though. For example, we could move GOSAM closer to Edinburgh so southbound aircraft could turn to the south earlier in their flight, but this needs to be coordinated and approved working with Prestwick Centre.

Route to the east from Rwy 24



Route to the east from Rwy 06

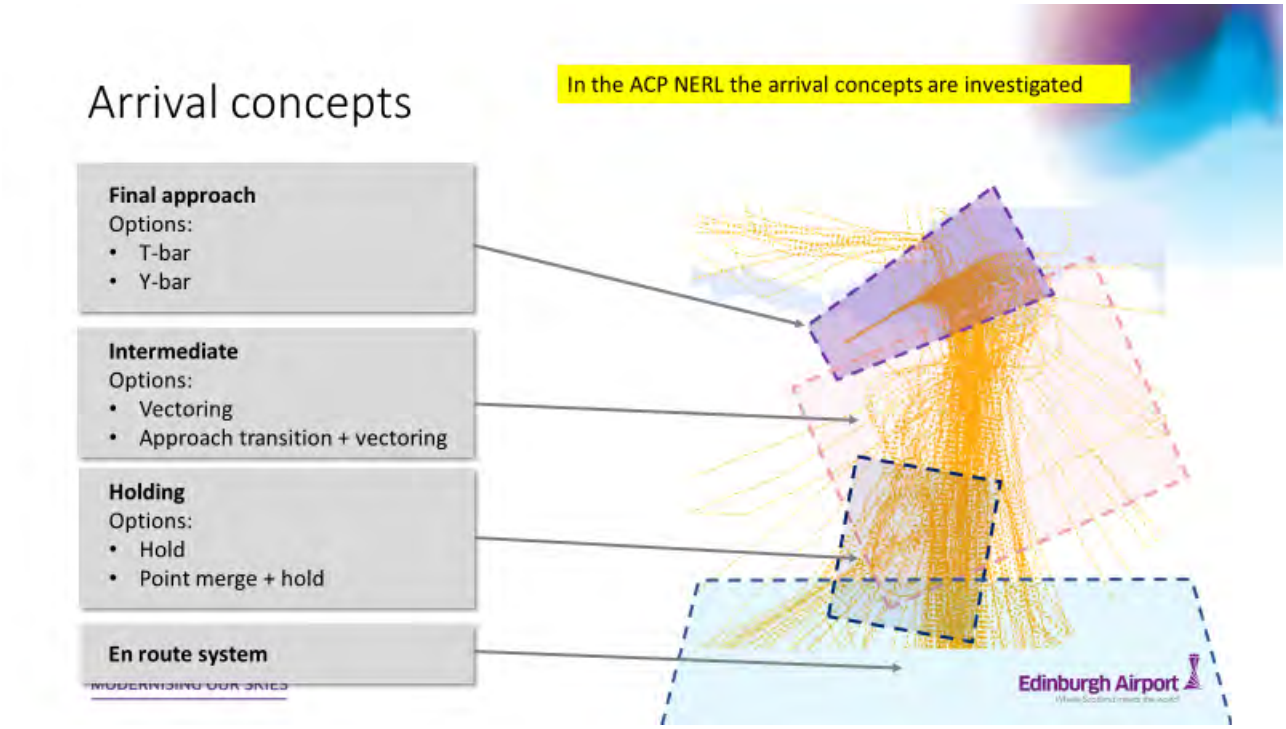


The route to the east is generally known as the "Forth" option as it routes down the Firth of Forth and has the benefits of overflying water, so reducing noise impact, giving an alternative route, so increasing capacity, and reducing track miles for aircraft utilising it, for instance routes to Demark and other Scandinavian states.

What are the arrival options?

Aircraft arriving at Edinburgh are directed in from the parent Air Traffic centre at Prestwick and begin to talk to Edinburgh Approach Controllers once they are within about 25 nautical miles of the airfield. This distance varies depending on the direction the aircraft is approaching from and the traffic

situation at the time. There are currently two arrival holds. One at STIRA to the north of the airfield and one at TARTN to the south. These holds are utilised when necessary, usually during busy periods and aircraft arriving and being put in to the hold are burning fuel and causing delay.



We are looking at a number of arrival concepts and will introduce them here, but they do need further analysis both in looking at route track mileage and also the benefit of their implementation.

The four concepts we have are as follows:

Do nothing with the procedures and leave them as they are in the present day. This involves the aircraft arriving from Prestwick and being positioned to one of the holds if necessary – or on a direct track to final approach by an air traffic controller. This is the way approach traffic has been worked for a good number of years and is effective but can be unpredictable in the way that aircraft arrive and their routings to holds or on direct tracks. It also requires a relatively high workload from the controller and pilot in assessing tracks and turning aircraft at the correct time.

The second option would be to utilise a T bar on final approach. This would reduce the controllers workload at a critical stage of flight and is one step towards systemisation.

The third option would be to have a mix of systemisation and vectoring from the hold utilising approach transitions, so an aircraft could in fact be detailed to fly a transition and approach and there would be no vectoring from the controller as the aircraft would fly on a particular and published flight path. This would concentrate arrivals in a particular part of the sky and the tracks would not be as dispersed as illustrated in the picture above.

Finally, we could have complete systemisation involving a point merge and holds. This would in effect put an aircraft on an established route for its journey into Edinburgh with vectoring by the controller in exceptional circumstances.

All four of these options are under discussion with Edinburgh ATC and NATS at Prestwick. We also need to engage with the airlines and decide the best solution after simulation and further analysis. It may be that our choices are restricted because of the volume of airspace or traffic distribution.

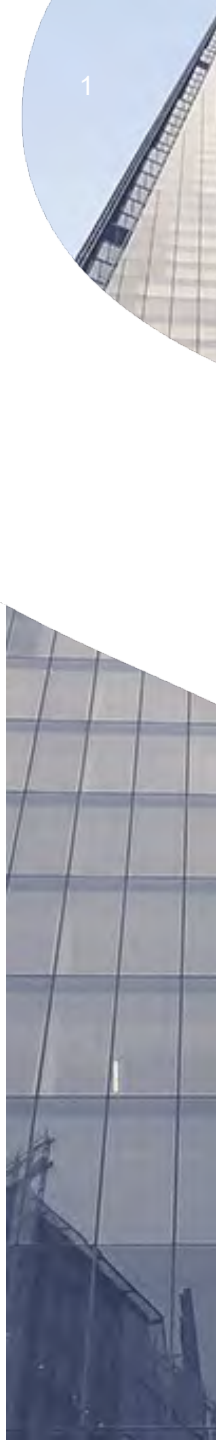
What is point merge?

Point merge is a way of holding aircraft and then feeding them into an arrivals system that converges all aircraft to a point and enables them to be an accurate distance apart for arrival. This system usually requires a large volume of controlled airspace and has been discussed as an arrival option, being included in out long list. We need to do more analysis to see if we shall take the idea forward and more information on point merge can be found here.

ACP - THE APPROACH TO NOISE ASSESSMENT

The noise assessment will follow a proportionate approach, building an evidence base as the proposal matures. This allows reasonable evidence base to be made available to stakeholders early on and increasingly through the process

CAP1616 Stage	Description of Noise information
Stage 2B	Qualitative: initial appraisal of options of likely noise impacts, such as overflights, population density and aircraft climb/descent profiles
Stage 3A	Quantitative: full appraisal of option(s) using noise contours and metrics such as noise exposure, change and number of events. Use of webTAG evaluate cost benefit of options
Stage 4A	Quantitative: final appraisal of updated design using Stage 3A assessment metrics
Stage 5A	Quantitative: technical details or minor amendments to support CAA decision



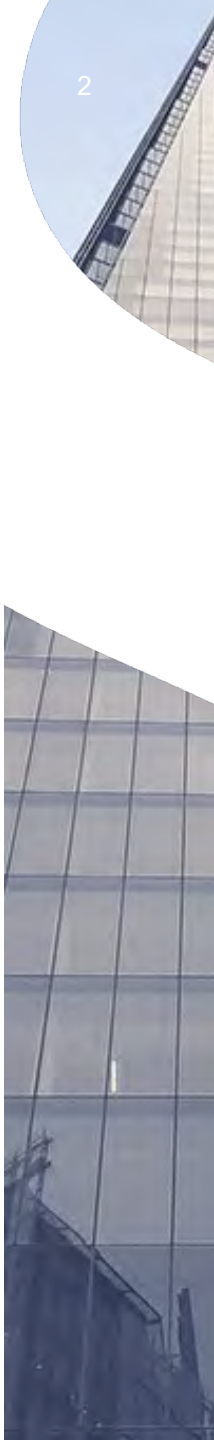
ACP - THE APPROACH TO NOISE ASSESSMENT

Altitude-based Priorities for Environmental Impacts

- Up to 4000ft, Government's environmental priority is to limit and, where possible reduce the total adverse effect on people
- Between 4000-7000ft, environmental priority should continue to be minimising the impacts of aviation noise….. unless there is evidence that this would disproportionately increase CO_2 emissions
- Above 7000ft, priority is to reduce CO_2 emissions. Minimising noise is no longer a priority
- Below 7000ft, routes should seek to avoid flying over AONBs and National Parks

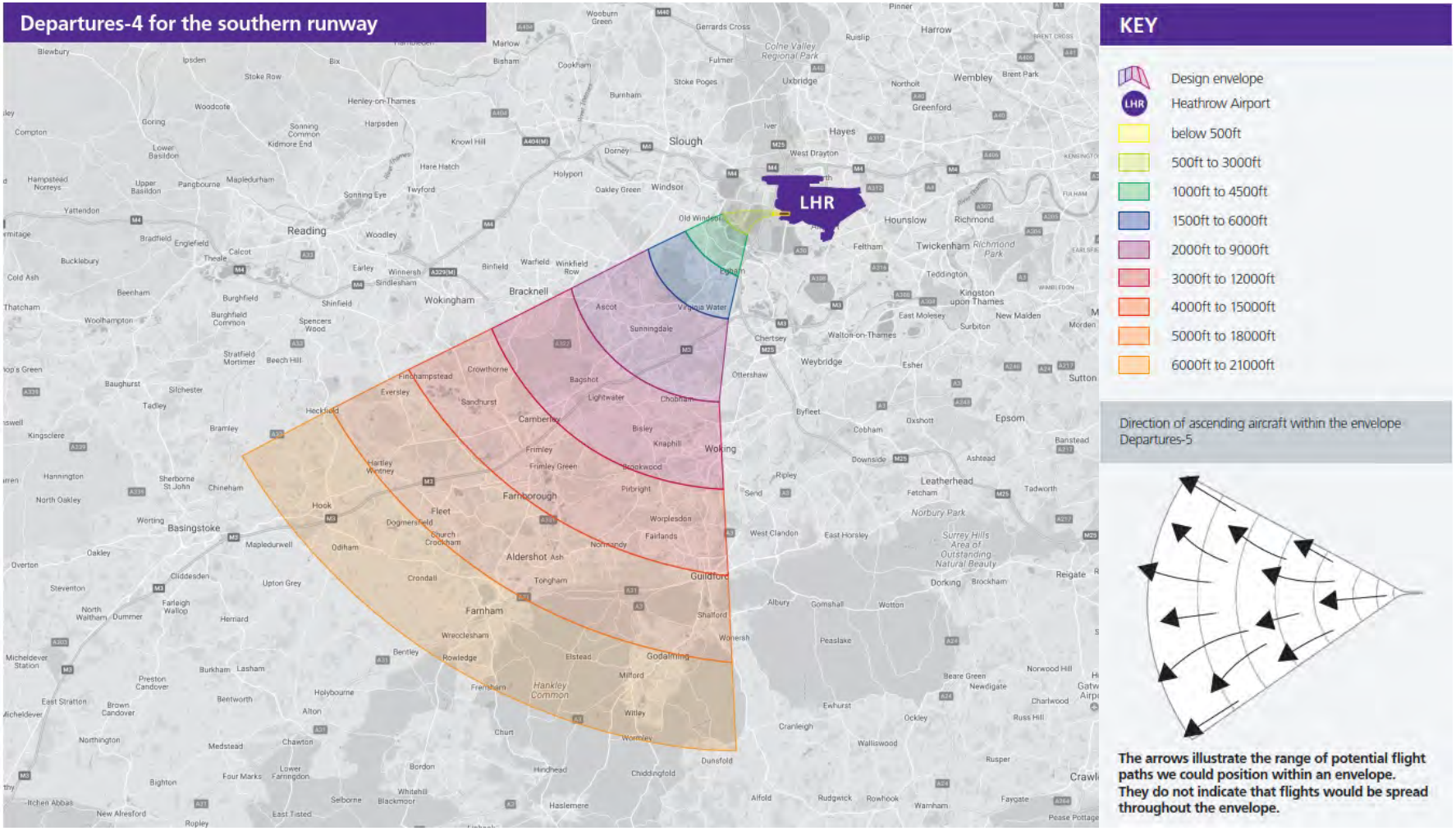
WebTAG and Noise

- WebTAG is a tool which allows for monetising certain aspects of the noise impacts – both positive and negative, to support the cost benefit analysis of options
- It links noise exposure and health impacts on populations based on latest evidence (World Health Organisation and Defra studies)
- WebTAG noise workbook uses average (L_{Aeq}) noise contours to monetise impacts
- CAP1616 recognises this may not capture all elements of potential noise impact therefore supplementary noise metrics and qualitative assessments also inform CAP1616 process



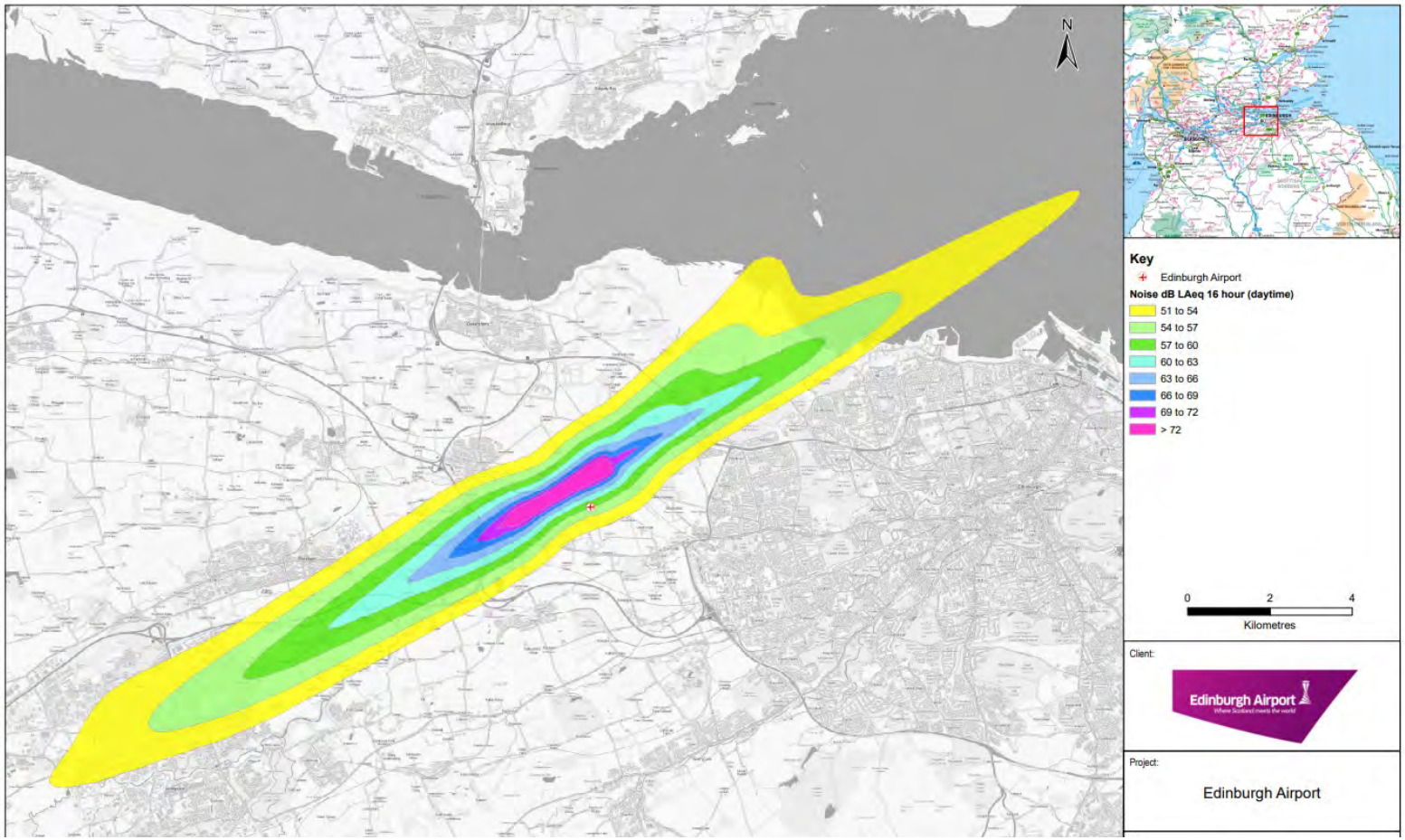
ACP - THE APPROACH TO NOISE ASSESSMENT

Example Noise Information



ACP - THE APPROACH TO NOISE ASSESSMENT

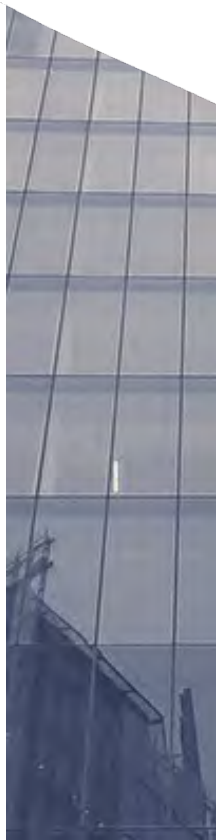
Example Noise Information



ACP - THE APPROACH TO AIR QUALITY ASSESSMENT

The air quality assessment follows a proportionate approach, building an evidence base as data is collected and the proposal matures. This allows a robust evidence base to be made available to stakeholders early on and increasingly through the process.

CAP1616 Stage	Description of Air Quality information
Stage 2B	Qualitative: initial appraisal of likely air quality impacts relating to design options, such as overflights, population density and aircraft climb/descent profiles
Stage 3A	Quantitative: full appraisal of option(s) using dispersion modelling to appraise options against air quality standards. Use of WebTAG to evaluate cost benefit of options
Stage 4A	Quantitative: final appraisal of updated design using Stage 3A assessment metrics
Stage 5A	Quantitative: technical details or minor amendments to support CAA decision



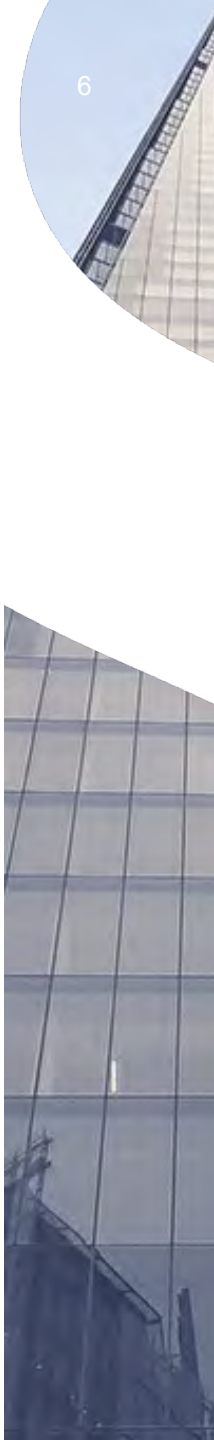
ACP - THE APPROACH TO AIR QUALITY ASSESSMENT

Local Air Quality Priorities for Environmental Impacts

- Oxides of nitrogen (NO_x) emissions from runways have been shown to disperse rapidly beyond the immediate runway area
- Due to the effects of mixing and dispersion, emissions from aircraft above 1,000 ft are unlikely to have a significant impact on local air quality
- Whilst noise impacts may be a priority for aircraft below 4,000 ft and on the ground, this should not come at the expense of local air quality
- Impacts on air quality from current and future operations are considered

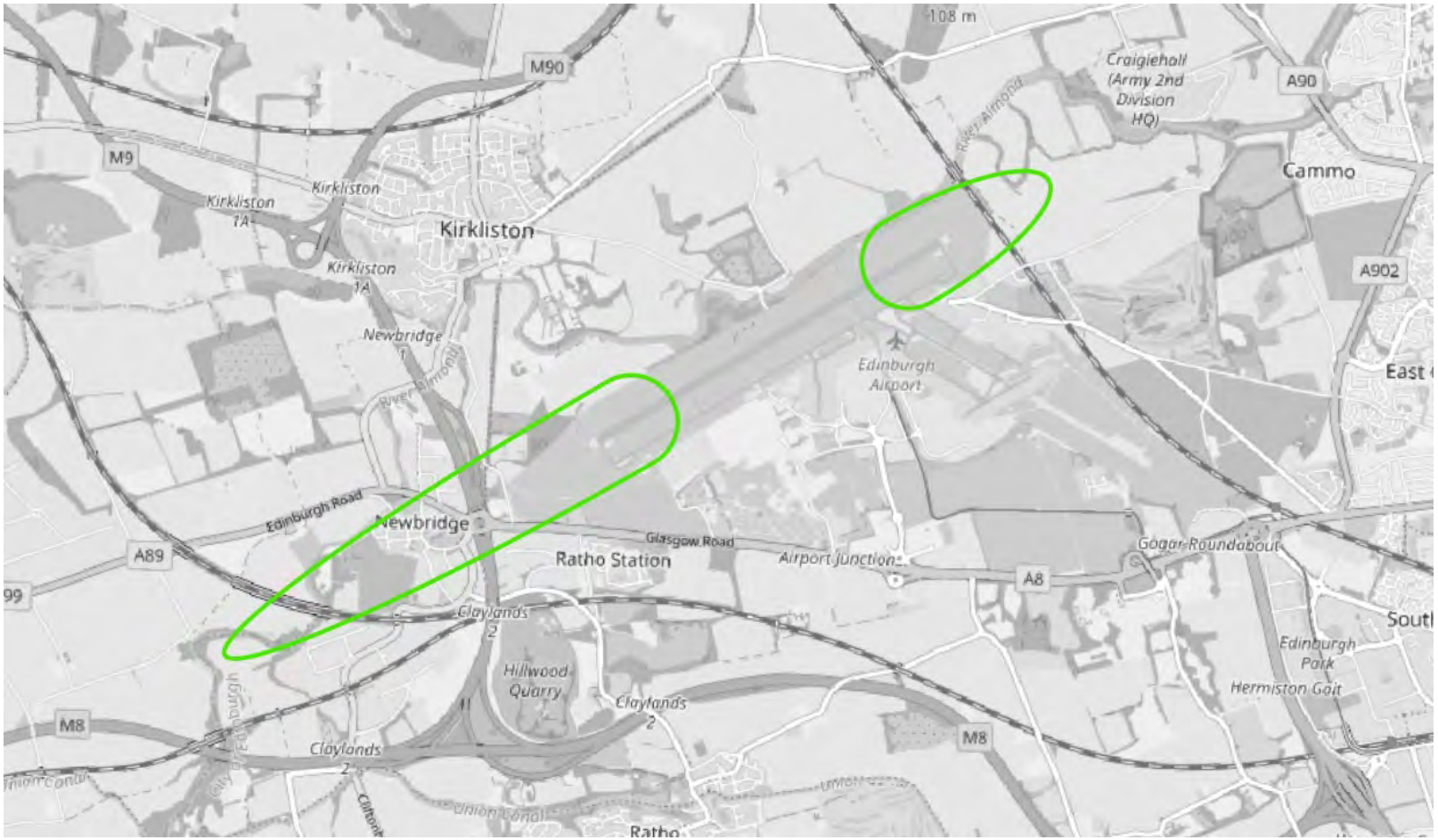
WebTAG and Air Quality

- WebTAG is a tool which allows for monetising certain aspects of the air quality impacts – both positive and negative, to support the cost benefit analysis of options
- WebTAG assessment for air quality are linked to the outputs from complex dispersion modelling detailing the exposure of people to concentrations of pollutants in ambient air
- WebTAG air quality workbook uses predicted concentrations of NO_x and particulate matter (PM) to monetise impacts



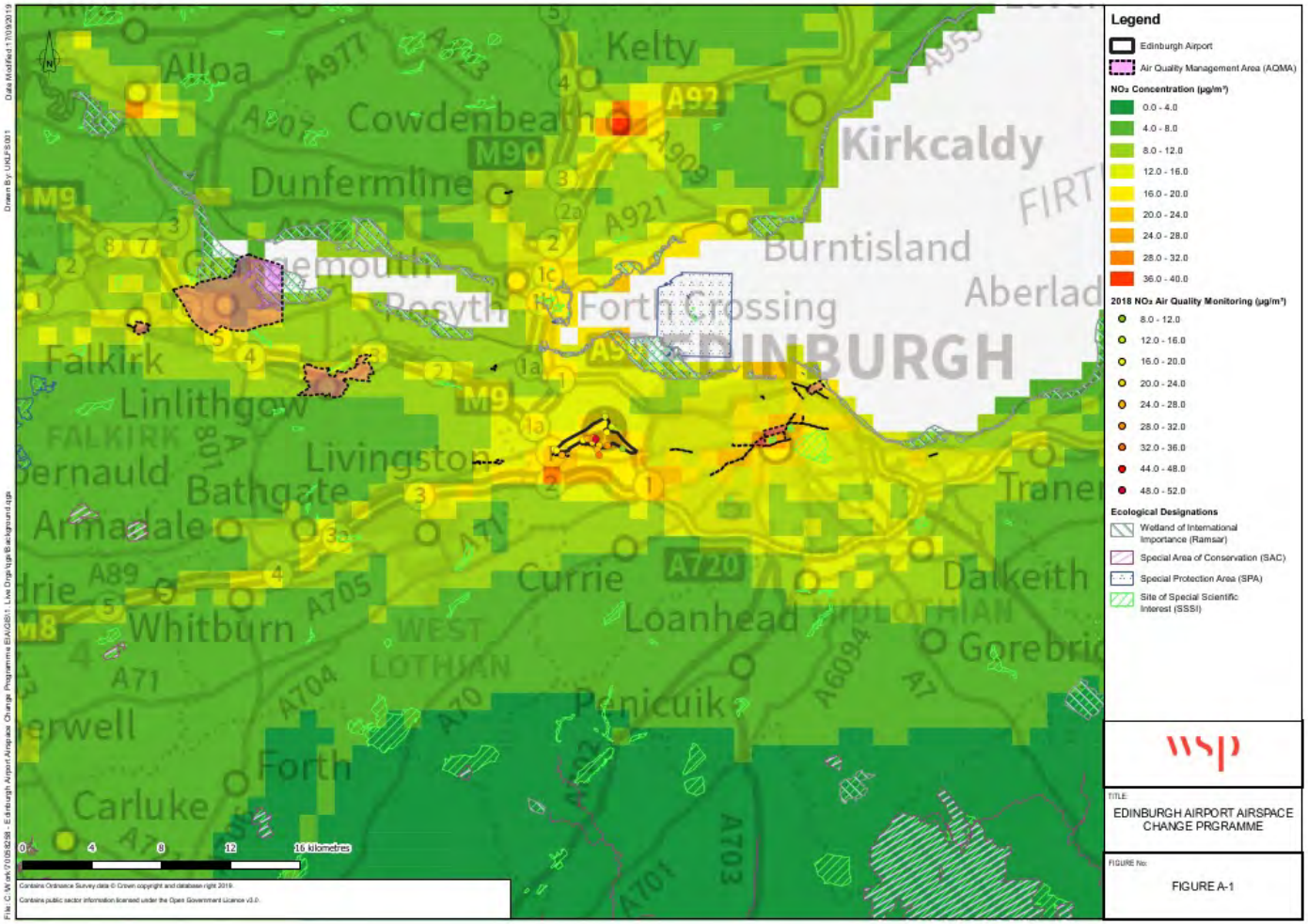
ACP - THE APPROACH TO AIR QUALITY ASSESSMENT

Hypothetical WebTAG Concept Air Quality Assessment Area



ACP - THE APPROACH TO AIR QUALITY ASSESSMENT

NO_2 Ambient Background Concentrations for 2019



Health

Approach to Screening

- Define study area
- Establish a baseline
- Identify vulnerable groups
- Identify health determinants

Health Impact Screening Assessment

The screening assessment identified groups within the study area population who have the potential to be particularly sensitive to changes caused by the proposed scheme. These include:

- Older people, children and young people;
- Disabled people;
- People in employment (particularly night shift workers);
- People living in poverty/people of low income; and
- People in remote, rural and/or island locations.

Health

Determinants of Health

Determinants of health are the range of social, environmental and economic factors that influence mental and physical health outcomes in a population.

The Health Screening Assessment identified health determinants likely to be impacted by the proposals, resulting in health effects in the study area population, particularly in the identified vulnerable groups:

- Exercise and physical activity;
- Learning and skills;
- Employment;
- Income and income inequality;
- Stress, resilience and community assets (specifically Tranquillity and Social Cohesion);
- Influence and sense of control;
- Natural space;
- Pollution (specifically Air and Noise);
- Climate change; and
- Transport and connections.

Health

Assessment of options

A qualitative assessment of the potential impacts of the proposed flight path options on the identified health determinants will be undertaken to determine the possible health effects.

Where the is the potential for disproportionate effects on vulnerable groups, informed by spatially mapping education, healthcare and recreational facilities, as well as other environmental constraints, this will be highlighted.

The assessment will follow best practice methodology for Health Impact Assessments (HIA), as well as guidance produced by the Scottish Health and Inequality Impact Assessment Network (SHIIAN).

wsp

Edinburgh Airport ACP Stage 2A

Final Design Principles

Category	Number	Design principle
Safety (core)	FDP1	The airspace design and its operation must be as safe or safer than it is today.
Safety (core)	FDP2	Flight paths must be flyable and technically supported by air traffic control and airport technical management systems.
Operational (core)	FDP3	Flight paths must be designed to allow modern aircraft to use performance-based navigation (PBN) in line with CAA's modernisation strategy
Operational (core)	FDP4	Routes to/from Glasgow and Edinburgh airports must be procedurally deconflicted from the ground to a preferred level in coordination with NATS Prestwick.
Operational (core)	FDP5	The predictability of flight tracks must be maximised for consistency of operations.
Operational (core)	FDP6	Collaborate with other Scottish airports and NATS to ensure that the airspace design options are compatible with the wider programme of lower altitude and network airspace changes and accords with the CAA's published Airspace Modernisation Strategy (CAP 1711) and any current or future plans associated with it.

These design principles were agreed and approved through an engagement process that took place in the latter half of 2019 and after Covid delays were accepted by the CAA in July 2021. This is when we passed through the Stage 1 gateway. FDP 6 has been amended at the CAA's request to incorporate our compliance with the CAA's modernisation strategy. FDP's 1 through to 6 are core to the final design and need to be strictly adhered to.

Health and wellbeing	FDP7	Flight paths should be designed to minimise the total adverse effect on health and quality of life created by aircraft noise and emissions.
Health and wellbeing	FDP8	For flightpaths at or above 4,000ft to below 7,000ft, the environmental priority should continue to be minimising the impact of aviation noise in a manner consistent with the government's overall policy on aviation noise, unless this would disproportionately increase CO_2 emissions.
Health and wellbeing	FDP9	Flight paths should be designed to minimise population overflown below 4,000ft and, between 4,000ft and 7,000ft, taking into account any potential adverse impact, due to those overflown having protected characteristics, as defined by the Equalities Act 2010.

Health and wellbeing	FDP10	Flight paths should be designed to minimise overflying sensitive locations and noise-sensitive receptors (for example, the zoo, retirement complexes, green spaces, historic heritage sites, and others).
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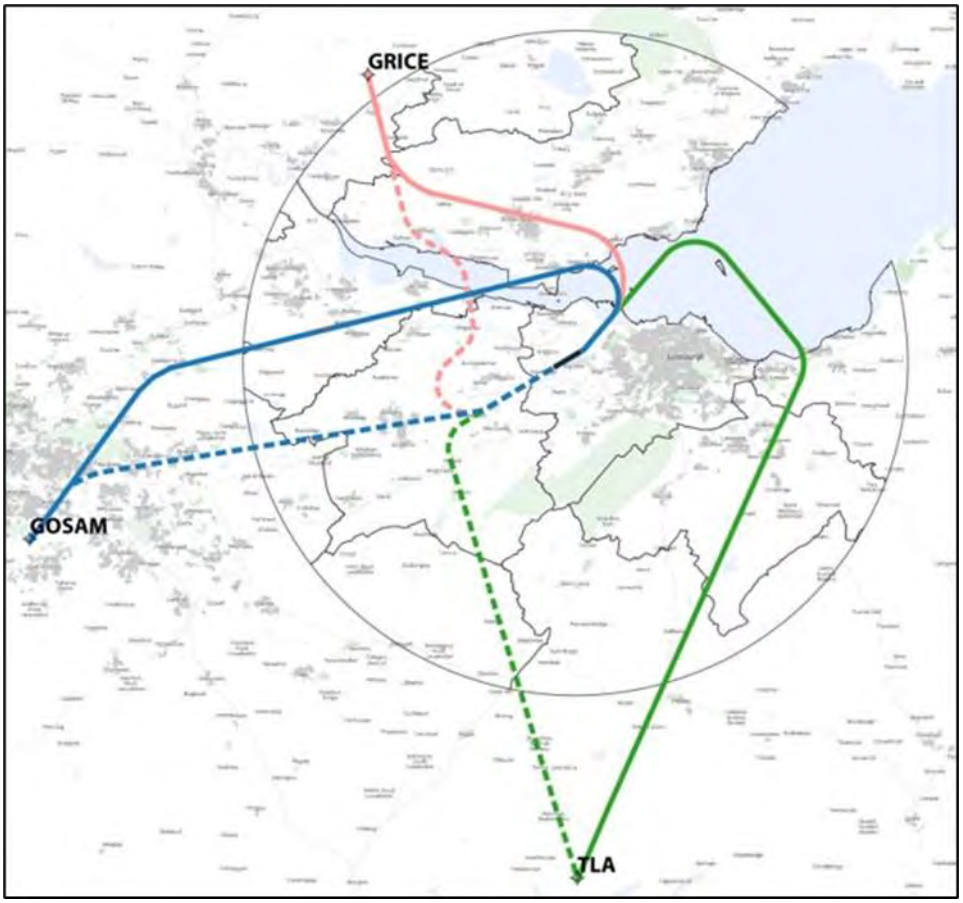
Operational	FDP12	Flight paths should be designed with routes that minimise track miles and fuel burn.
Operational	FDP13	Flight paths should be designed to ensure efficient and effective route management.
Technical	FDP14	Requirements of airspace users should be taken into account when designing flight paths.
Environment	FDP15	Flight paths should be designed to minimise adverse local air quality impacts.
Economy	FDP16	Airspace should be designed to maximise capacity in order to contribute economic benefits to Scotland, including tourism and trade.

FDP's 7 through to 16 are of great importance and will be adhered to as much as possible when we create the final solution.

Edinburgh Airport ACP Stage 2A

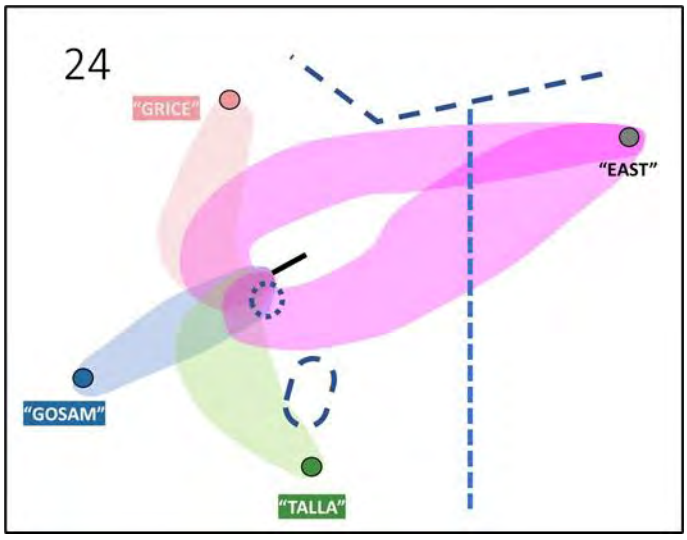
Departures

Our current departure route system is detailed below. We have 3 routes that are utilised via GOSAM, GRICE and TALLA. This gives us routes to the North, West and South.

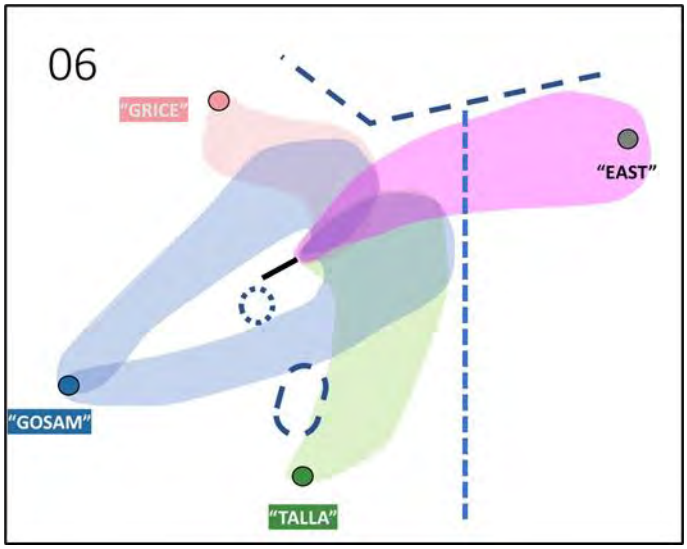


We have identified during discussions with airlines and our parent air traffic control centre at Prestwick that there are great benefits to be had with a route to the east. What we propose to do is look at the current system and exit points to see if the routings can be improved. This would involve analysis of the current track and seeing if we can make adjustments to this in order to fly over less people and noise sensitive areas. We are also looking to improve the network so there is the possibility that GOSAM, GRICE and TALLA could also move from where they currently are. We would need to see tangible benefits for this though. For example, we could move GOSAM closer to Edinburgh so southbound aircraft could turn to the south earlier in their flight, but this needs to be coordinated and approved working with Prestwick Centre.

Route to the east from Rwy 24



Route to the east from Rwy 06

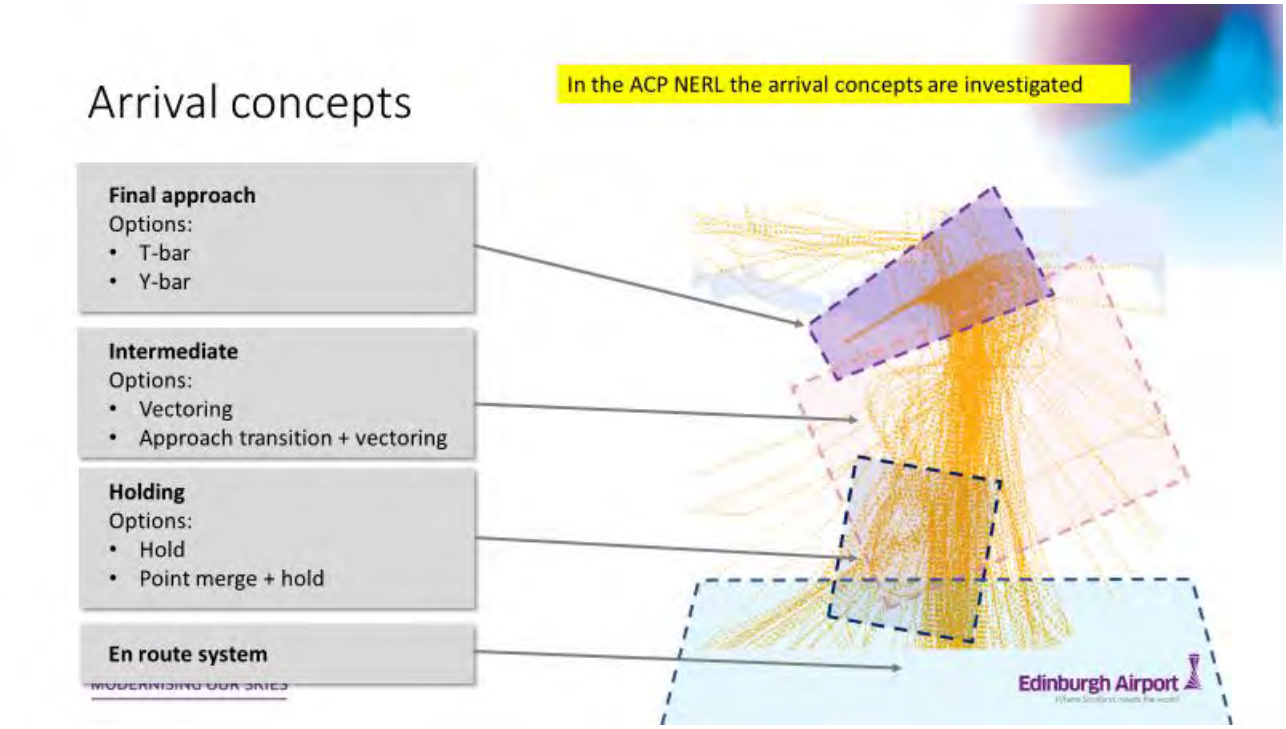


The route to the east is generally known as the “Forth” option as it routes down the Firth of Forth and has the benefits of overflying water, so reducing noise impact, giving an alternative route, so increasing capacity, and reducing track miles for aircraft utilising it, for instance routes to Demark and other Scandinavian states.

Edinburgh Airport ACP Stage 2A

Arrivals

Aircraft arriving at Edinburgh are directed in from the parent Air Traffic centre at Prestwick and begin to talk to Edinburgh Approach Controllers once they are within about 25 nautical miles of the airfield. This distance varies depending on the direction the aircraft is approaching from and the traffic situation at the time. There are currently two arrival holds. One at STIRA to the north of the airfield and one at TARTN to the south. These holds are utilised when necessary, usually during busy periods and aircraft arriving and being put in to the hold are burning fuel and causing delay.



We are looking at a number of arrival concepts and will introduce them here, but they do need further analysis both in looking at route track mileage and also the benefit of their implementation.

The four concepts we have are as follows:

Do nothing with the procedures and leave them as they are in the present day. This involves the aircraft arriving from Prestwick and being positioned to one of the holds if necessary – or on a direct track to final approach by an air traffic controller. This is the way approach traffic has been worked for a good number of years and is effective but can be unpredictable in the way that aircraft arrive and their routings to holds or on direct tracks. It also requires a relatively high workload from the controller and pilot in assessing tracks and turning aircraft at the correct time.

The second option would be to utilise a T bar on final approach. This would reduce the controllers workload at a critical stage of flight and is one step towards systemisation.

The third option would be to have a mix of systemisation and vectoring from the hold utilising approach transitions, so an aircraft could in fact be detailed to fly a transition and approach and there would be no vectoring from the controller as the aircraft would fly on a particular and published flight path. This would concentrate arrivals in a particular part of the sky and the tracks would not be as dispersed as illustrated in the picture above.

Finally, we could have complete systemisation involving a point merge and holds. This would in effect put an aircraft on an established route for its journey into Edinburgh with vectoring by the controller in exceptional circumstances.

All four of these options are under discussion with Edinburgh ATC and NATS at Prestwick. We also need to engage with the airlines and decide the best solution after simulation and further analysis. It may be that our choices are restricted because of the volume of airspace or traffic distribution.

More on point merge can be found here.

Edinburgh Airport ACP Stage 2A

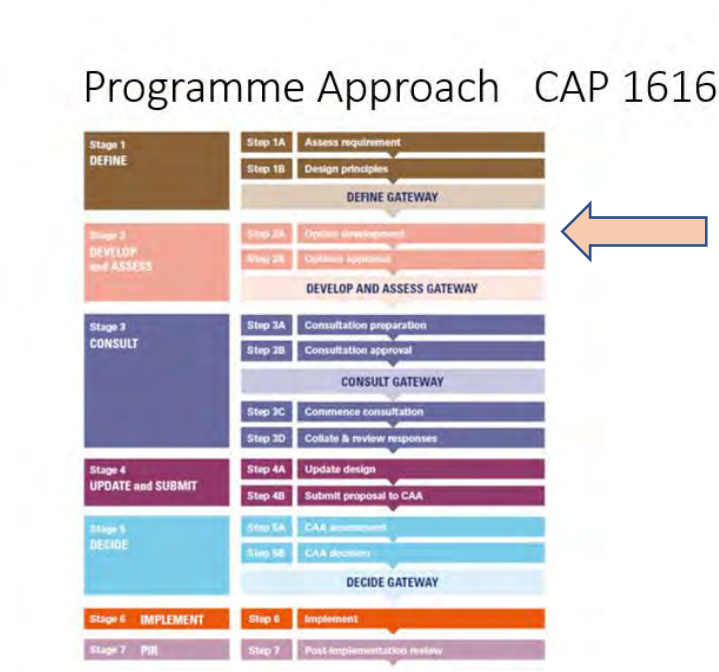
Statement of Need and CAP1616

Edinburgh's ACP is focused on a Statement of Need which was submitted to the CAA in July 2019. There are 3 main drivers for our sponsorship of the project, and these are:

1. "PBN"	Modernise airspace	*"to meet technical requirements"*
2.Airspace capacity	Reduce delays, prepare for future growth	*"can meet existing and future demand by increasing the capacity of its runways and allow flights to depart with fewer delays and environmental impacts ."*
3. Environment	May minise environmental impact	*"in terms of the total number of people overflown, as well as when and how often they are overflown – while also cutting average CO2 emissions."*

Whilst designing the new flight paths we shall endeavour to meet the needs described above whilst taking into account all of the design principles agreed in Stage 1 of the process.

What Stage are we at now?



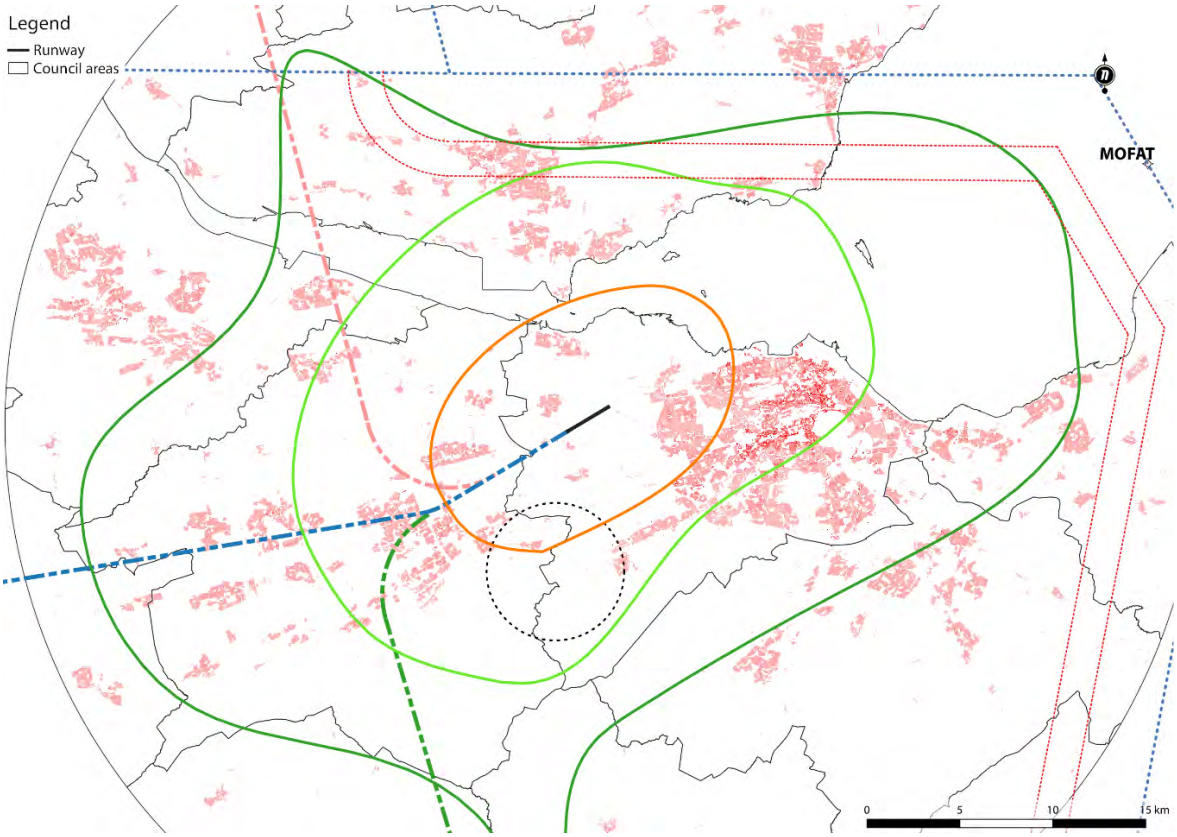
THE NEXT STEPS

We need to take away feedback from this engagement process at Stage 2A and look at applying all 16 of the design principles to come up with viable alternatives for flightpaths that satisfy the CAP 1616 process. Once we have engaged again with our flightpath ideas, we will carry out an initial options appraisal which should give some idea of the flightpaths to take forward for further analysis.

Edinburgh Airport ACP Stage 2A

Environment

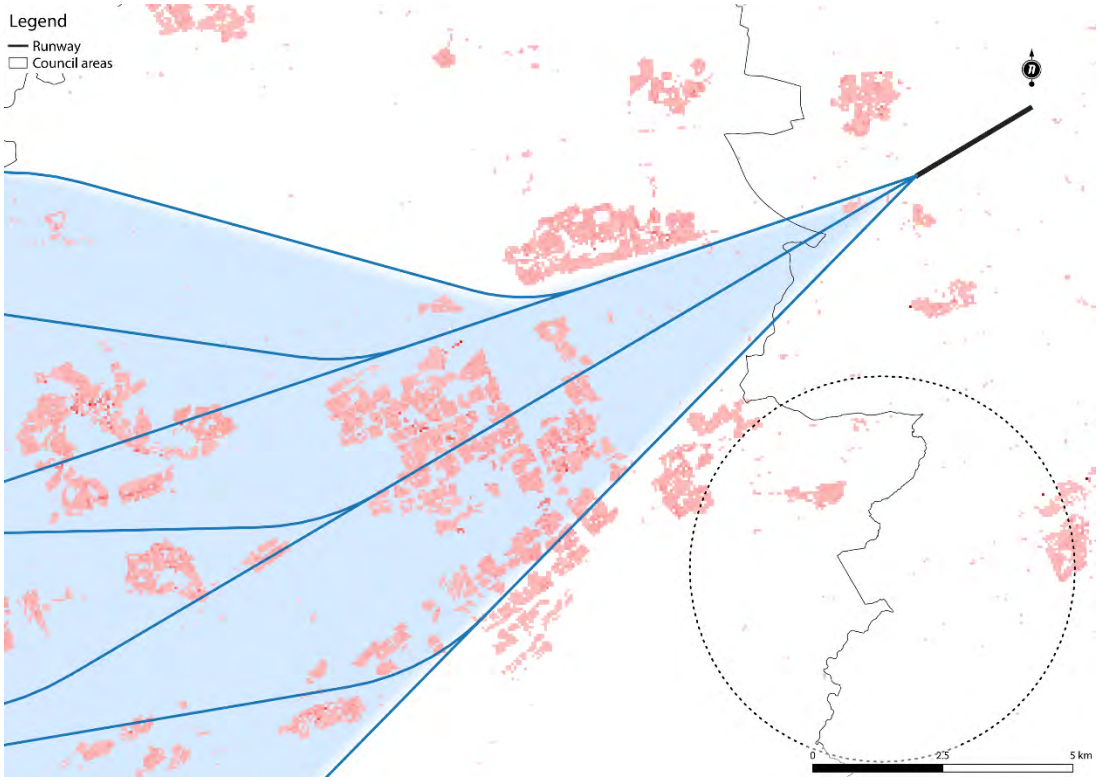
As part of our environmental appraisal, we need to look at issues such as noise, air quality and the number of people overflow. We have maps and statistical analysis to help us with this. The maps below have generated contours, for departing traffic at altitudes of 2000ft, 4000ft and 7000ft. These will help in deciding when to turn aircraft on a flightpath when we are able to, subject to altitude and noise considerations.



This example is for Rwy24 departures, and you can see that population centres are detailed. We can also overlay maps for areas with noise sensitive receptors and areas of future residential development. These maps are available to view in this virtual platform.

As an example of what we will present next we have overlayed some flightpaths on what we think could be a GOSAM SID from Rwy24. This still needs further analysis but could be an example of what is required in our next engagement sessions.

Draft swathe for illustrative purposes only. Rwy 24 to GOSAM.



Edinburgh Airport ACP Stage 2A

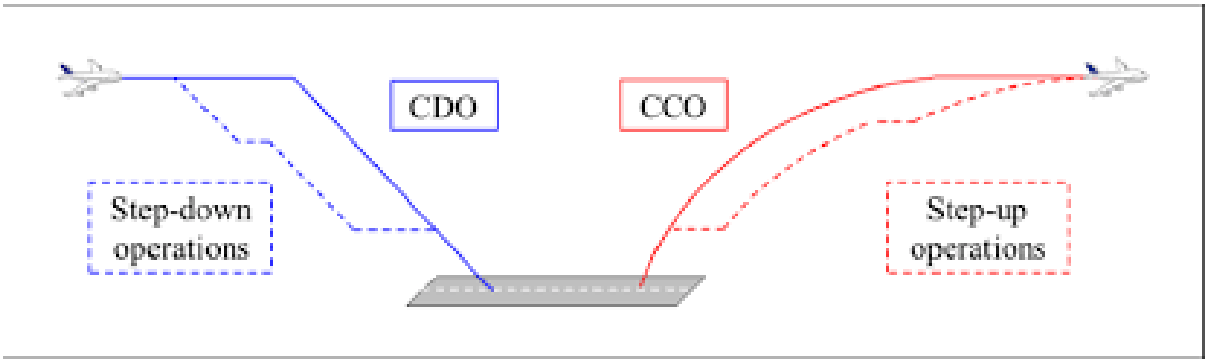
Modernisation and Performance based Navigation

What is the Airspace Modernisation Strategy (AMS) and how does Performance-based Navigation (PBN) fit in to this?

The AMS aims to optimise future airspace designs to take account of modern aircraft performance and functional capabilities and make them more efficient – saving time and fuel and reducing emissions.

Key to achieving this is through the application of PBN. In parallel, the UK navigation infrastructure can also be optimised to take advantage of the lateral navigation accuracy from Global Navigation Satellite Systems (GNSS) while retaining adequate conventional ground-based navigation aids to ensure both resilience and contingency measures.

The availability of PBN employed within an appropriate redesign of terminal airspace will allow instrument flight procedures to be designed that maximise the ability of aircraft to execute Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO). This in turn will maximise overall efficiency with consequential environmental benefits. Therefore, where practicable, all new PBN-based Standard Arrivals and runway transitions should aim to apply Continuous Descent Operations (CDO) and all new PBN-based Standard Instrument Departures should aim to apply Continuous Climb Operations (CCO). No change will be made to operating procedures without an assessment of environmental impact as required by national procedures and processes.



Periods of level flight during descent or climb out affect the amount of fuel used and also the noise footprint of particular flights. We aim to systemise the airspace to allow smooth descents and climb outs in order to reduce the noise impact, reduce inefficiencies in fuel consumption and also assist the workload of both the pilot and the air traffic controller. This happens because the flight path becomes predictable in systemise airspace. Another benefit is an increase in capacity of a particular volume of airspace.

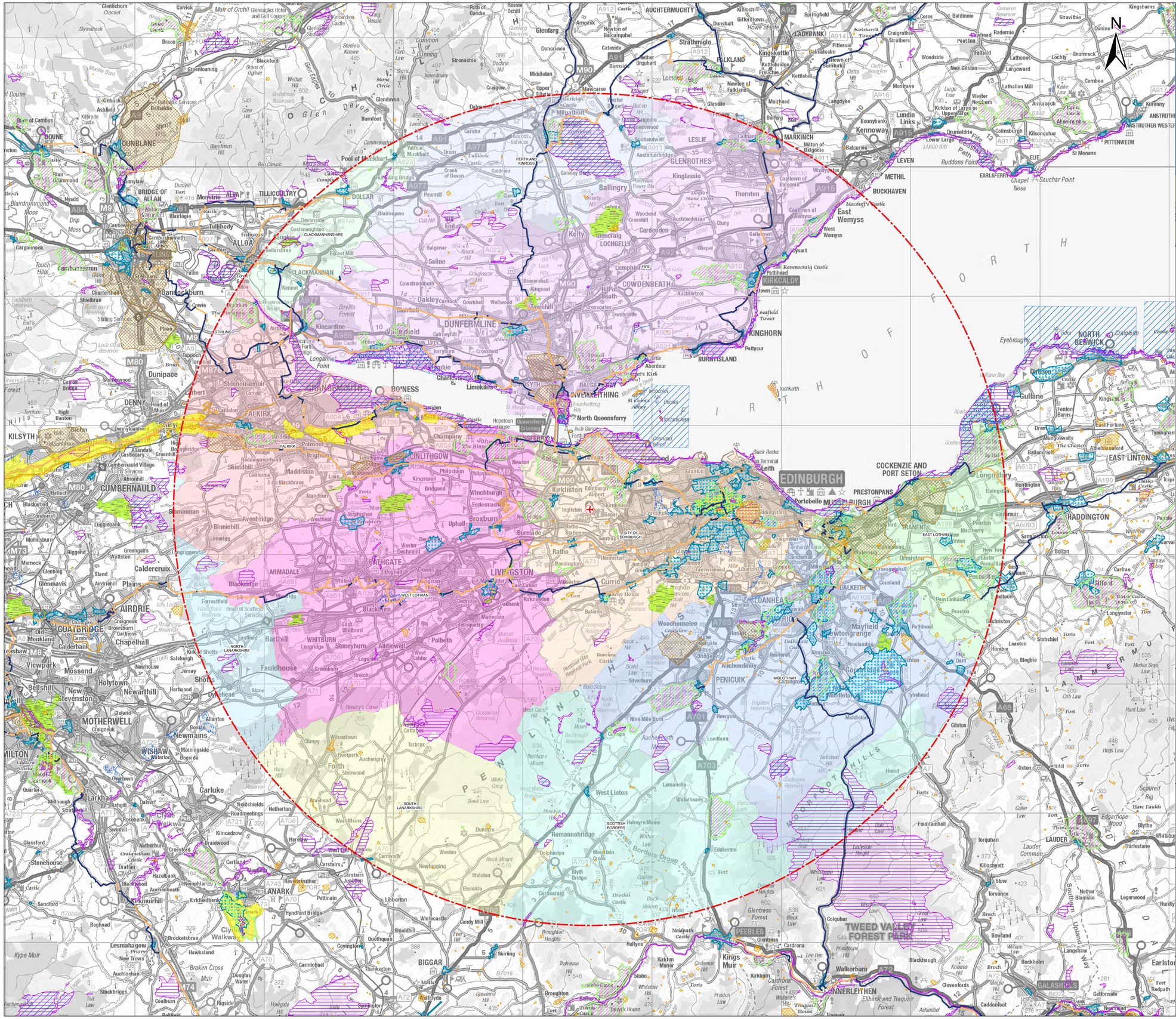
PBN represents a fundamental shift from sensor-based to performance-based navigation and offers a number of advantages over the sensor-specific method of developing airspace and obstacle clearance criteria, i.e.:

- reduces the need to maintain sensor-specific routes and procedures, and their associated costs;

- avoids the need for developing sensor-specific operations with each new evolution of navigation systems, which would be cost-prohibitive;
- allows for more efficient use of airspace (route placement, fuel efficiency and noise abatement);
- clarifies how RNAV and RNP systems are used; and
- facilitates the operational approval process for operators by providing a limited set of navigation specifications intended for global use.

Learn more about the AMS here.

Learn more about PBN here.



- Edinburgh Airport
- Edinburgh Airport 20 mile buffer
- Scheduled Monuments
- SSSI
- Special Protection Area
- Gardens and Designed Landscapes
- Conservation Areas
- World Heritage Sites
- Registered Battlefield
- Country Park
- Gardens and Designed Landscapes
- Local Nature Reserve

National Cycle Network

- Traffic Free
- Ferry
- On Road

Council Region

- City of Edinburgh
- Clackmannanshire
- East Lothian
- Falkirk
- Fife
- Midlothian
- North Lanarkshire
- Perth and Kinross
- Scottish Borders
- South Lanarkshire
- Stirling
- West Lothian

0 5 10

Kilometres

Client: Edinburgh Airport — Where Scotland meets the world

Project: Edinburgh Airport

Title: Figure 1 Edinburgh Airport Environmental Constraints v3

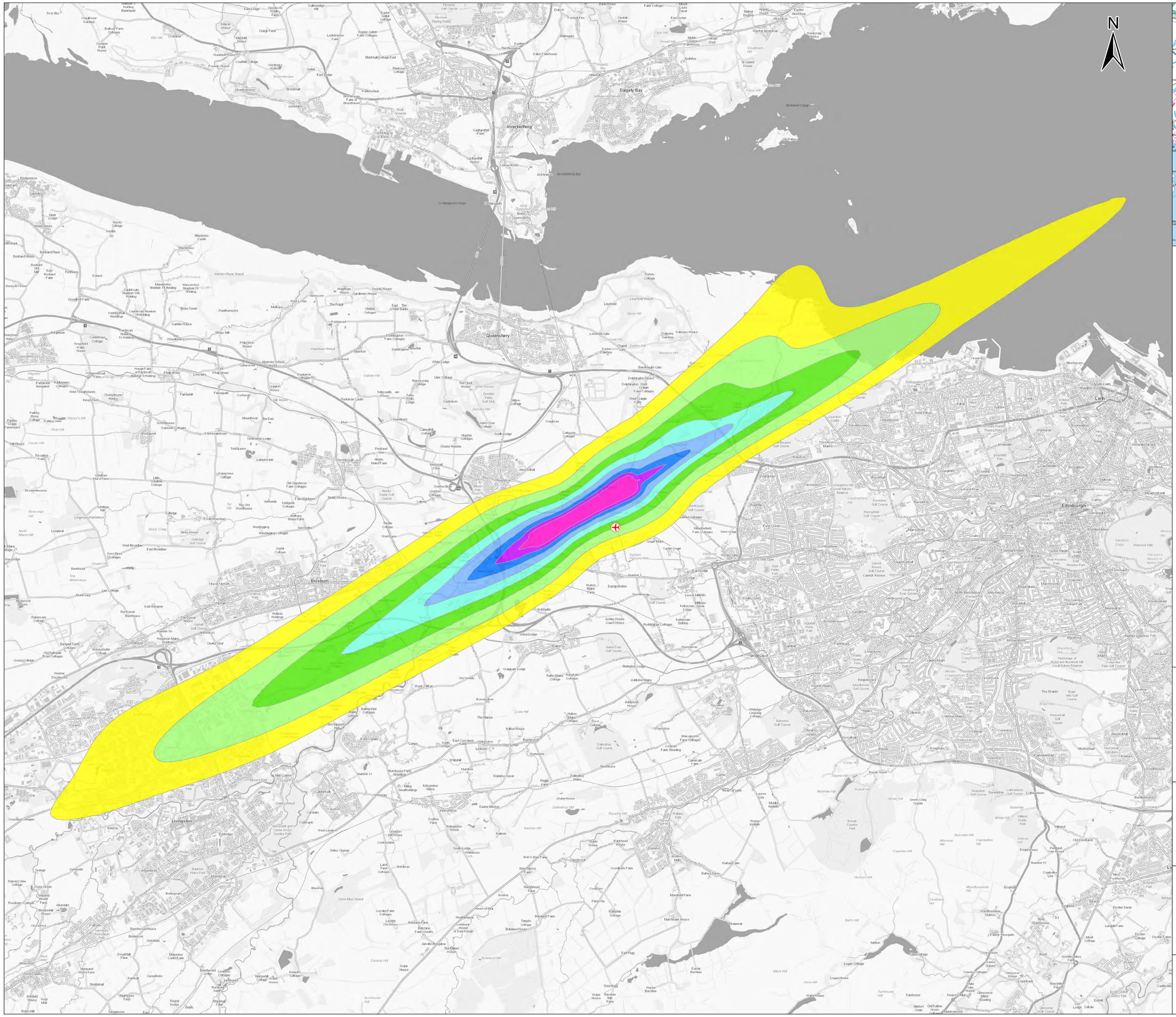
Date:	25/01/2022	Scale:	100,000 @ A0		
Drawn:	MM	Checked:	CE	Approved:	CS
Drawing No:	70058258 - GSS - 002				

Date Saved: 31/01/2020

Document Path: \\uk.wspgroup.com\central data\Projects\70058zx\70058258 - Edinburgh Airport Airspace Change Programme EIA\05 Drawings and Models\GIS\MXD\A0 Figure 1 - Edinburgh Airport Environmental Constraints v3.mxd

Date Saved: 06/12/2019

Document Path: \\uk.wspgroup.com\central data\Projects\70058xx\70058258 - Edinburgh Airport Airspace Change Programme EIA\05 Drawings and Models\GIS\MXD\A0 Figure 2 - Edinburgh Airport Noise Contours v2.mxd



Key

Edinburgh Airport

Noise dB LAeq 16 hour (daytime)

- 51 to 54
- 54 to 57
- 57 to 60
- 60 to 63
- 63 to 66
- 66 to 69
- 69 to 72
- > 72

0 2 4

Kilometres

Client: Edinburgh Airport – Where Scotland meets the world

Project: Edinburgh Airport

Title: Figure 2 Edinburgh Airport Noise Contours v2

Date:	25/01/2022	Scale:	30,000 @ A0		
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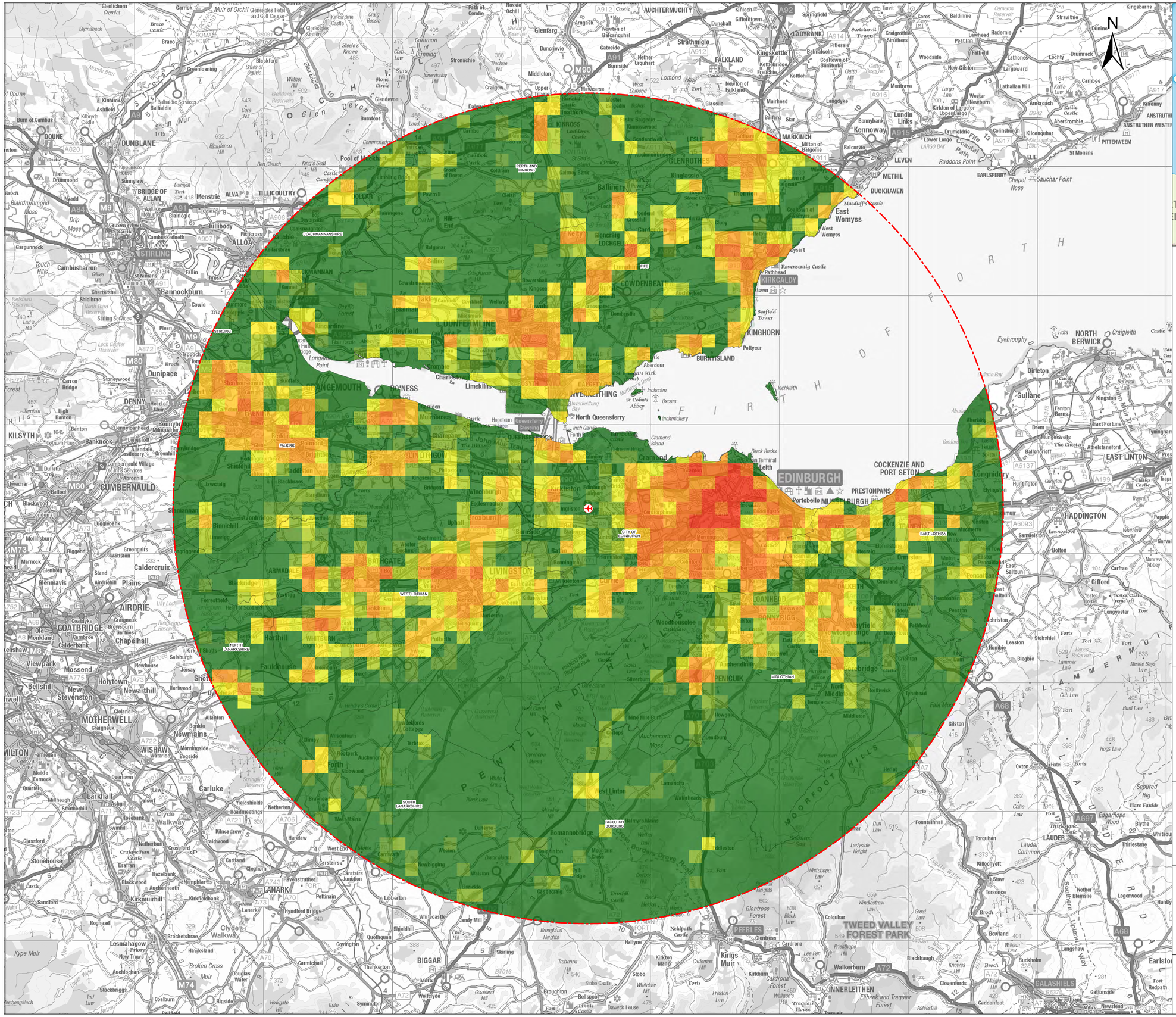

Key

- Edinburgh Airport
- Edinburgh Airport 20 mile buffer
- Local Authority Boundary

Population Density

- 0 to 25
- > 25 to 50
- > 50 to 100
- > 100 to 200
- > 200 to 500
- > 500 to 1000
- > 1000 to 2000
- > 2000 to 4000
- > 4000 to 8000
- > 8000 +

0 5 10

Kilometres

Client: Edinburgh Airport

Project: Edinburgh Airport

Title:

Figure 3
Edinburgh Airport
Population per 1km sq v2

Date:	25/01/2022	Scale:	2,000,000 @ A0		
Drawn:	MAL	Checked:	DT	Approved:	MG
Drawing No:	70058258 - GSS - 004				

Date Saved: 25/01/2022

Document Path: \\uk.wspgroup.com\central data\Projects\70058282xx\70058258 - Edinburgh Airport Airspace Change Programme EIA\05 Drawings and Models\GIS\MXD\A0 Figure 3 - Edinburgh Airport Population per 1kmsq v2.mxd

PERTH AND KINROSS
CLACKMANNANSHIRE
FIFE
STIRLING
FALKIRK
CITY OF EDINBURGH
EAST LOTHIAN
WEST LOTHIAN
NORTH LANARKSHIRE
MIDLOTHIAN
SOUTH LANARKSHIRE
SCOTTISH BORDERS

N

Edinburgh Airport

Population 50m2

- 0
- 0 - 5
- 5-10
- 10-25
- 25-50
- 50-100
- 100-200
- 200-400
- 400-600
- >600

0 5 10
Kilometres

Client:

Edinburgh Airport
Where Scotland meets the world

Project:

Edinburgh Airport

Title:

Figure 4:
Edinburgh Airport
Population per 50m2 v2

Date:	25/01/2022	Scale:	90,000 @ A0		
Drawn:	MAL	Checked:	DT	Approved:	MG
Drawing No:	70058258 - GSS - 007				

Key

- Edinburgh Airport
- Edinburgh Airport 20 mile buffer

Educational Receptors

- Children's nursery
- Primary school
- Secondary school
- College
- University
- Other educational establishment

Heathcare Receptors

- Primary care (GP Services)
- Secondary care (Hospitals)

Recreational Facilities

- Leisure/ Recreational Facility
- Park
- Zoo / Theme Park
- Heritage Centre

Remote Receptors

- Forth Islands

0 5 10

Kilometres

Client:

Edinburgh Airport
Where Scotland meets the world

Project:

Edinburgh Airport

Title:

Figure 5
Edinburgh Airport
Noise sensitive receptors v2

Date:	25/01/2022	Scale:	90,000 @ A0		
Drawn:	MAL	Checked:	DT	Approved:	MG
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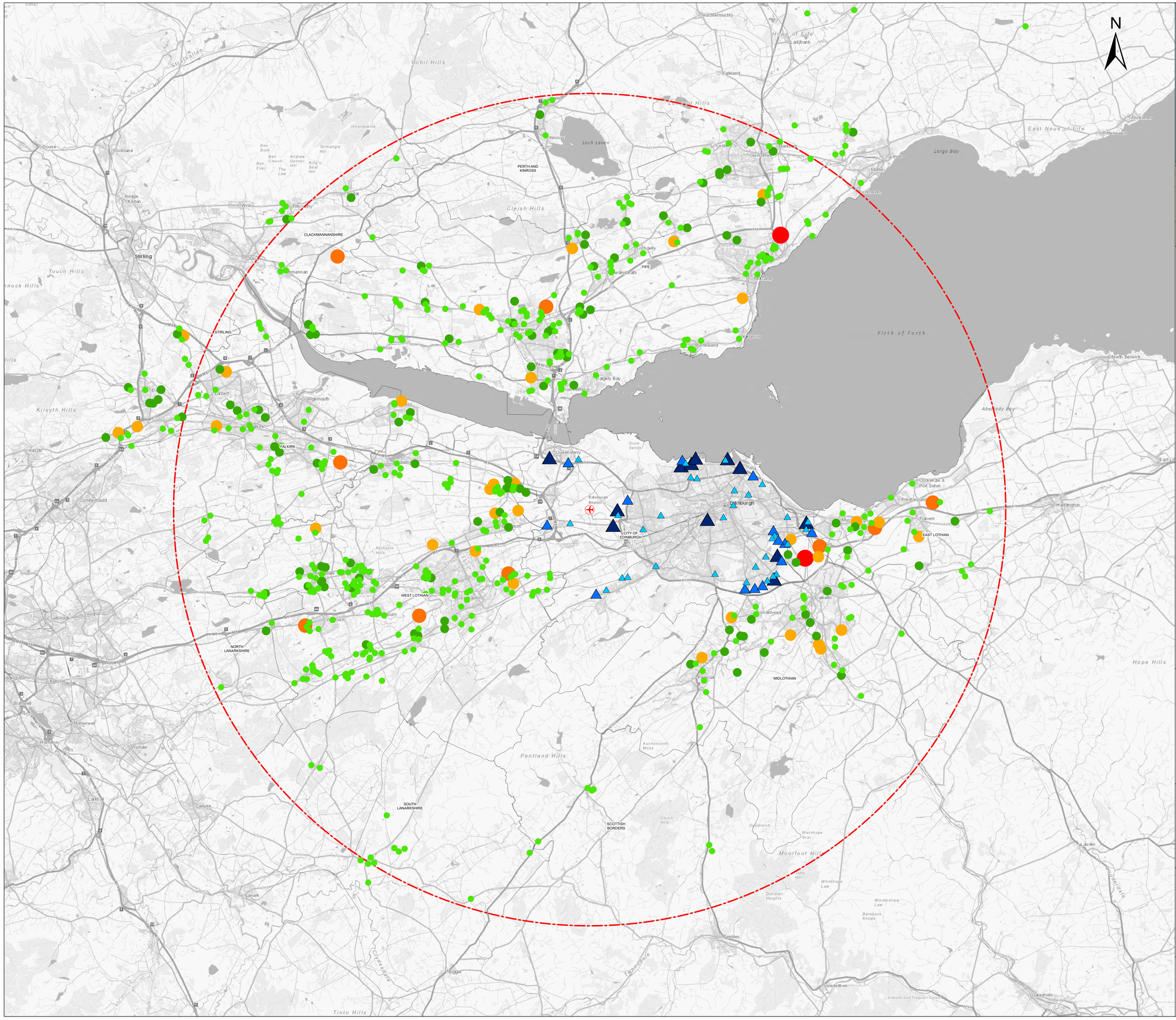


Key

- Edinburgh Airport
- Local Authority Boundary
- Edinburgh Airport 20 mile buffer

LDP Allocation Hectares

- 0-11
- 11-30
- 30-75

LDP Allocation Unit Size

- 0 - 125
- 126 - 410
- 411 - 1000
- 1001 - 2020
- 2021 - 3500

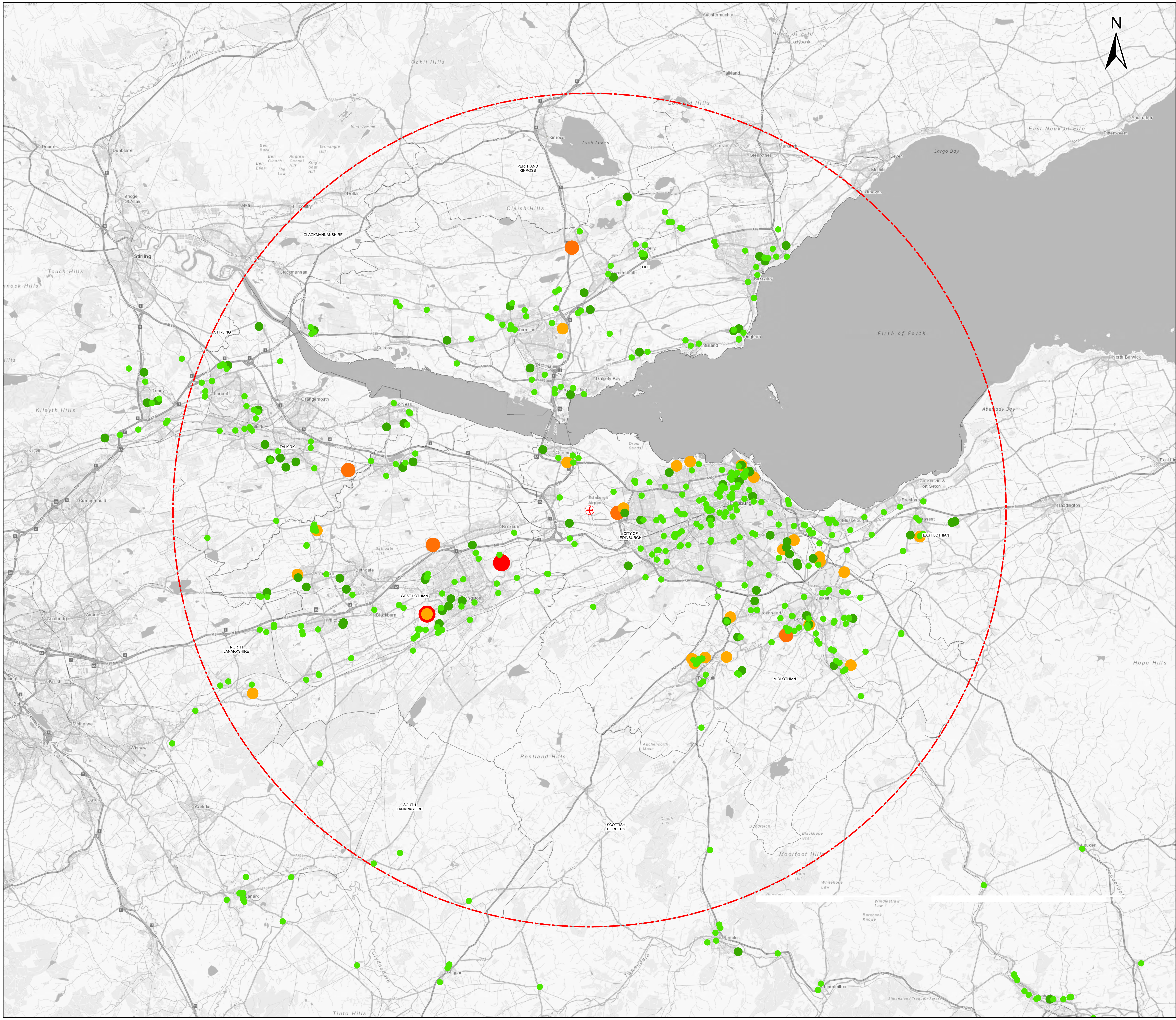
0 5 10
Kilometres

Client: Edinburgh Airport – Where Scotland meets the world

Project: Edinburgh Airport

Title: Figure 6
Edinburgh Airport
Local Development Plan Allocations
– Residential and Commercial

Date:	25/01/2022	Scale:	100,000 @ A0		
Drawn:	MAL	Checked:	DT	Approved:	MG
Drawing No:	70058258 - GSS - 006				



Key

- Edinburgh Airport
- Local Authority Boundary
- Edinburgh Airport 20 mile buffer

Planning Application Units

- 0 - 100
- 101 - 300
- 301 - 700
- 701 - 1500
- 1501 - 2985

0 5 10
Kilometres

Client:

Edinburgh Airport
Where Scotland meets the world

Project:

Edinburgh Airport

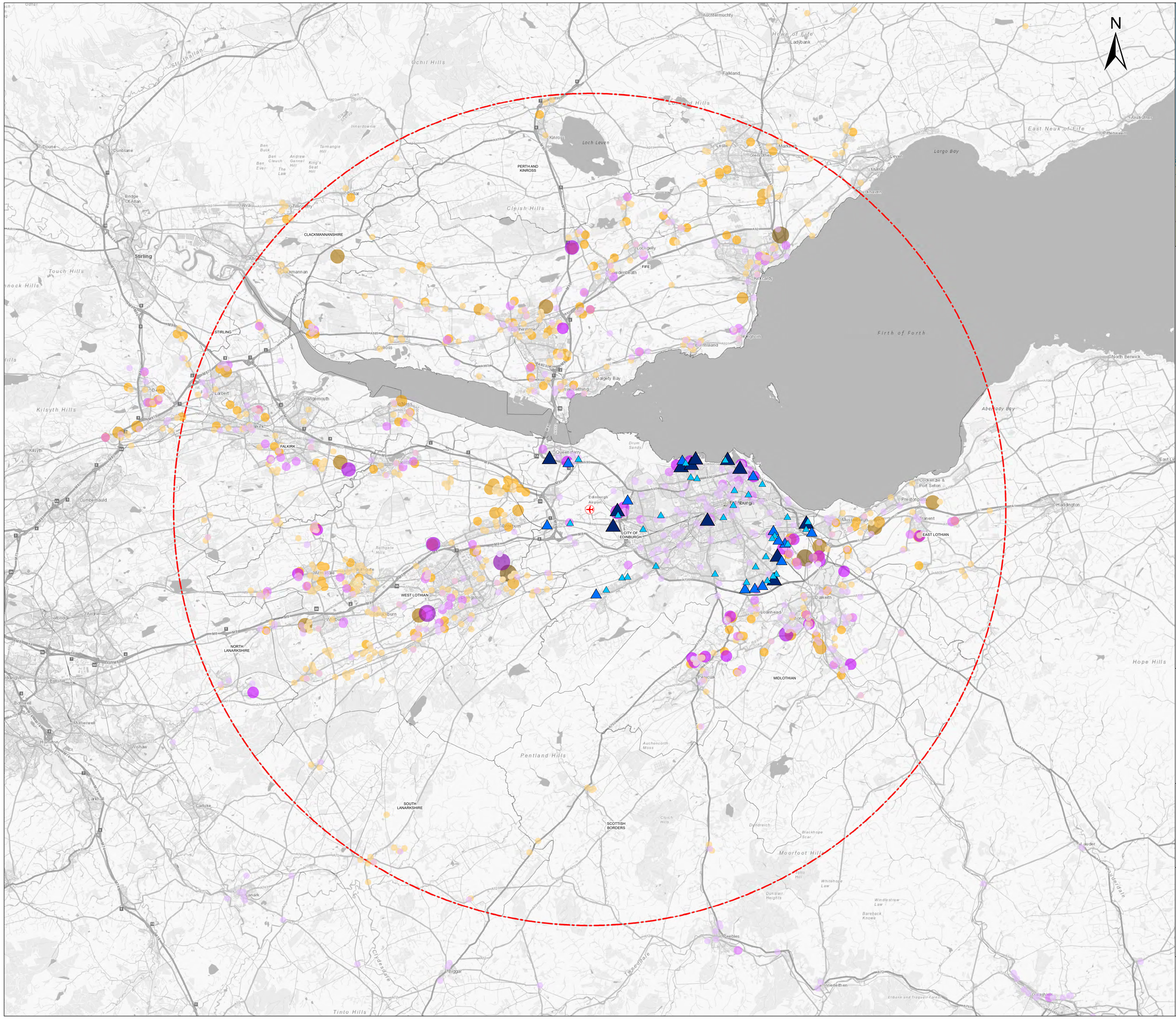
Title:

Figure 7
Edinburgh Airport
Planning Permissions – Residential

Date: 25/01/2022	Scale: 100,000 @ A0		
Drawn: MAL	Checked: DT	Approved: MG	
Drawing No: 70058258 - GSS - 006			

Date Saved: 25/01/2022

Document Path: \\uk.wspgroup.com\central data\Projects\700582xx\70058258 - Edinburgh Airport Airspace Change Programme EIA\05 Drawings and Models\GIS\MXD\A0 Figure 7 - Edinburgh Airport Planning Permissions – Residential.mxd



Key

- Edinburgh Airport
- Local Authority Boundary
- Edinburgh Airport 20 mile buffer

LDP Allocation Hectares

- 0-11
- 11-30
- 30-75

LDP Allocation Unit Size

- 0 - 125
- 126 - 500
- 501 - 1000
- 1001 - 2000
- 2001 - 3500

Planning Application Unit Size

- 0 - 100
- 101 - 300
- 301 - 700
- 701 - 1500
- 1501 - 2985

0 5 10 Kilometres

Client: Edinburgh Airport — Where Scotland meets the world

Project: Edinburgh Airport

Title: Figure 8
Edinburgh Airport
Local Development Plan and
Planning Permissions

Date:	25/01/2022	Scale:	100,000 @ A0		
Drawn:	MAL	Checked:	DT	Approved:	MG
Drawing No:	70058258 - GSS - 006				

Date Saved: 25/01/2022

Document Path: \\uk.wspgroup.com\central data\Projects\70058258 - Edinburgh Airport Airspace Change Programme EIA\05 Drawings and Models\GIS\MXD\A0 Figure 8 - Local Development Plan and Planning Permissions.mxd