Gatwick Airport Limited Route 4

ACP-2018-086
Full Options Appraisal

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1 Introduction

1.1 About this Document

This document contains the full options appraisal of the Gatwick Airport Limited Route 4 Airspace Change Proposal (ACP) and is a formal deliverable for Stage 3 of the CAP1616 process.

1.2 Introduction

The UK's airspace designed in the 1950's is nearing its breaking point. To keep pace with growing demand, the government's Airspace Modernisation Strategy[1] charts a course for modernisation. Key to this plan is replacing outdated ground-based beacons with cutting-edge satellite navigation technology. All airports, including Gatwick Airport Limited (GAL), are busy adapting their departure routes to integrate this revolutionary technology, which will reduce complexity and deliver quicker, quieter and cleaner routes, improving efficiency and capacity within UK airspace.

GAL are currently progressing an Airspace Change Proposal (ACP) to re-design an Area Navigation (RNAV) Standard Instrument Departure (SID) route known as Route 4. Route 4 is a departure route for aircraft taking off from London Gatwick toward the west. Soon after take-off, aircraft turn 180 degrees round to the right and head east before routing towards their final destination.

1.2.1 Background

Gatwick Airport currently utilises a single runway for its operations. This is predominantly its southern, main runway, designated 26L/08R. Gatwick also operates its northern runway, designated 26R/08L, but this is only used when the main runway is unavailable. Aircraft departing Gatwick are required to follow specific flight paths called Noise Preferential Routes (NPRs) unless directed otherwise by ATC. NPRs are set by the Government and were designed to minimise noise disturbance to local communities. Aircraft routes are designed to comply with the published NPR route until they climb above a specific altitude. NPRs do not form part of this consultation.

In 2013 GAL sought the CAA's approval to introduce RNAV1 procedures to all nine departure routes from the Main Runway (Runway 26L/08R) and all arrival routes to either runway. These changes were approved by the CAA in August 2013, following an airspace consultation.

After approving revised routes, the CAA would track how things go in practice. They check if the predicted benefits (like efficiency and noise reduction) actually materialise. In 2015, they reviewed Gatwick Airport's nine revamped departure routes, approving most. However, the CAA suggested that the Route 4 procedure did not adequately replicate the conventional route, which was the original intent. Following the CAA's finding on the redesigned Route 4, GAL submitted an amended Route 4 proposal in 2016. The CAA ratified the amended Route 4 in their Post Implementation Review in April 2017.

[1] Airspace Modernisation Strategy

In 2018, a community group sought a judicial review that challenged the CAA's Post Implementation Review decision on the grounds that the correct process had not been followed. Following investigations, the CAA asked the court to quash their previous decision. The formal letter issued to GAL by the CAA[2] in 2018 stated that 'it became apparent that magnetic drift was not the predominant factor causing displacement of Route 4 from the Noise Preferential Route (NPR). The CAA considered that it could not allow its decision to stand where such a decision was based upon a misunderstanding of the relevant facts'. This information was not previously available to either the CAA or GAL. Therefore, because the CAA considered that a proper consultation could not have been conducted in 2016, it could not allow its decision to stand.

In 2018, GAL commenced this ACP (ACP-2018-86) under CAP 1616 to re-introduce the RNAV SIDs on Route 4.

In May 2020 the CAA subsequently published CAP 1912 Post Implementation Review Report[3]. In this, the CAA confirmed the requirement for GAL to remove all temporary Route 4 RNAV1 SID routes. Subsequently, all changes required by CAP 1912 were implemented on 25 February 2021.

In July 2022, Stage 1 was completed which defined the design principles that form the framework against which airspace change design options can be evaluated. In October 2022, Stage 2 was completed with a shortlist of options that have been carried forward to Stage 3. All materials from previous stages are available on the airspace change portal here:

Airspace change proposal public view

Any changes resulting from the Northern Runway Project submission are not considered as part of this ACP. In addition, the Noise Preferential Routes are out of scope of this ACP and do not form part of this consultation.

1.3 Full Options Appraisal

As part of the design principles evaluation, feedback received from stakeholders was not to depart from the current published NPR, whilst dispersing traffic as much as possible within it.

In Stage 2 documentation associated with this ACP, stakeholders were presented with the shortlist of options numbered as 0-8. It was necessary to renumber the options following the CAA imposed baseline change. Details of the changes made to the numbering of the options can be found in the initial options appraisal document, which can be found on the airspace change portal for this ACP.

To allow stakeholders to properly identify the options in this full options appraisal and to avoid any confusion associated with previous naming/numbering, following Stage 2 we have re-named the four shortlisted options that will be taken forward. The shortlisted options are listed below with their new nomenclature in **bold:**

[2] Letter to GAL from CAA dated 9th February 2018

[3] Report of the CAA's Decision on the Post Implementation Review of London Gatwick's Airspace Change Proposal – Runway 26 Route 4 RNAV-1 Standard Instrument Departure Procedures.

- **Option A –** the Do Minimum option, referred in Stage 2 as Option 0
- **Option B –** referred in Stage 2 as Option 2
- **Option C –** referred in Stage 2 as Option 4
- **Option D –** referred in Stage 2 as Option 8

The new descriptors will be used from this point forward in all Stage 3 documentation. There have been no changes to the design of these procedures to the descriptions that were presented at Stage 2.

2 Assessment Criteria and Methodology

2.1 CAP1616 Options Appraisal Requirements

The options appraisal process is carried out in accordance with the guidance in CAP1616i - Environmental Assessment Requirements and Guidance for Airspace Change Proposals, and in conjunction with The Green Book[4] and the Department of Transport's (DfT) TAG[5] workbook, which constitute best practice in options appraisal.

Options appraisal is used as a tool throughout the CAP1616 process to help refine the options from an initial longlist, down to a short list and a final set of preferred options. The process is iterative, with an initial options appraisal being used to whittle down the longlist in Stage 2; a full options appraisal (this document) of the shortlist takes place in Stage 3 for consultation; and the final options appraisal will support the final submission of the ACP application to the CAA at the end of Stage 4.

The options appraisals build the evidence base as the proposal matures. This iterative process ensures that the detail of the design options matures in line with the proposal, and that a reasonable evidence base is made available to all stakeholders early on and increasingly throughout the process.

2.2 Assessment Criteria

The options appraisals deliver clear and comparable evidence about a range of factors, so that, for a given proposal, different airspace design options can be compared and assessed on a similar basis. Change sponsors are required to use the list of criteria shown below in Table 1 in their options appraisals. Assessments of the potential costs/ benefits against each of the criteria in this table provide the information necessary to make comparisons between each of the design options and provide the basis on which the preferred airspace change alternative(s) can be assessed.

[4] The Green Book: Appraisal and Evaluation in Central Government;
https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government
[5] DfT transport analysis guidance TAG:
https://www.gov.uk/guidance/transport-analysis-guidance-tag

Affected Group	Impact	Level	Description for Full OA
Communities	Noise	Quantified and monetised	Noise exposure contours above 51 dB LAeq,16h daytime and 45 dB LAeq,8h night-time and evaluated by Department for Transport's transport analysis guidance (TAG) for impacts on health and quality of life. The costs and benefits derived from this analysis must be imported into the options appraisal. • Number above contours: N65 for daytime and N60 for night-time noise. • Overflight contours. • Operational diagrams. • Other noise metrics if relevant.
Communities	Local Air Quality	Quantified and monetised	Explicit consideration of and evaluated by Department for Transport's transport analysis guidance (TAG) where necessary. The costs and benefits derived from this analysis must be imported into the options appraisal.
Wider Society	Greenhouse Gas Emissions	Quantified and monetised	Annual CO_2e totals and evaluated by Department for Transport's transport analysis guidance (TAG). The costs and benefits derived from this analysis must be imported into the options appraisal.
Wider Society	Tranquillity	Qualitative, and where possible, quantified	Explicit consideration of impacts on locally identified tranquillity areas, and assessment using operational diagrams or overflight contours.
Wider Society	Biodiversity	Qualitative, and where possible, quantified	Explicit consideration of impacts on locally identified biodiversity areas, and assessment using operational diagrams or overflight contours.
Wider Society	Capacity and resilience	Quantified and monetised	Change sponsors should qualitatively assess the effect of the proposal on the overall UK infrastructure. Dependent upon the scope of the proposed change, the CAA may require quantitative methodologies that allows monetisation of the impact, including impact on air passengers' time.

Affected Group	Impact	Level	Description for Full OA
General Aviation	Access	Quantified and monetised	Change sponsors should qualitatively assess the effect of the proposal on the overall UK infrastructure. Dependent upon the scope of the proposed change the CAA may require quantitative methodologies that allows monetisation of the impact.
General Aviation / commercial airlines	Economic impact from increased effective capacity	Quantified	Forecast change in air transport movements and estimated passenger numbers or cargo tonnage carried.
General Aviation / commercial airlines	Fuel burn	Quantified and monetised	Fuel costs and the relative efficiency of aircraft are readily obtainable from market data. Change sponsors must quantify and monetise these costs based on its assumptions of the fleets in operation.
Commercial airlines	Training costs	Quantified and monetised	Where a proposal would lead to a need for retraining, this should be quantified and monetised.
Commercial airlines	Other costs	Qualitative, and where possible, quantified and monetised	Where there are likely to be other costs imposed on commercial aviation, these should be described. Where these costs are quantifiable, an assessment should be made.
Airport / Air navigation service provider	Infrastructure costs	Quantified and monetised	Where the proposal requires a change in the infrastructure, this should be monetised.
Airport / ANSP	Operational costs	Quantified and monetised	Where a proposal will lead to changes in operational costs, these should be monetised.
Airport / ANSP	Deployment costs	Quantified and monetised	Where a proposal would lead to a need for retraining and other deployment costs, this should be quantified and monetised.
Airport / ANSP	Other costs	Qualitative, and where possible, quantified and monetised	Where there are likely to be other costs imposed on airports/air navigation service provider, these should be described. Where these costs are quantifiable, an assessment should be made.

Table 1 Assessment Criteria for Level 1 Change

2.3 Full Options Appraisal: CAP 1616 Requirements and Metrics

2.3.1 Overview

The full options appraisal requires an assessment against the costs and benefits contained in Table 1 above, building on the analysis completed in the initial options appraisal. A number of qualitative, quantitative and monetised measures need to be produced, requiring a range of environmental assessments and metrics; these are described in more detail below.

2.3.2 Tools and Software

The calculation of noise contours, fuel burn and emissions have been performed by the Environmental Research and Consultancy Department (ERCD) of the CAA using the UK civil aircraft noise model, ANCON 2.4. The noise modelling was carried out in line with the Category A requirements of CAP 2091, using the following data:

- ICAO datasets for noise data (i.e. Noise-Power-Distance curves) modified by summer 2023 local noise data for all types.
- Flight profiles of height, speed and thrust, produced from summer 2023 local radar data for all ANCON aircraft types.
- Mean tracks from summer 2023 local radar data (for the baseline cases).

The model calculates the emission and propagation of noise from arriving and departing air traffic. The noise exposure metric used is the Equivalent Continuous Sound Level (L_{Aeq}), and in particular $L_{Aeq,16h}$ (07:00-23:00 local time) and $L_{Aeq,8h}$ (23:00-07:00 local time), which is calculated over the 92-day summer period from 16 June to 15 September.

Noise exposure is depicted in the form of noise contours, i.e. lines joining places of constant L_{Aeq}. Noise exposure is assessed above the Lowest Observed Adverse Effect Level (LOAEL), 51 dB $L_{Aeq,16h}$ daytime and 45 dB $L_{Aeq,8h}$ night-time, as defined in the Government's Airspace and Noise Policy. Day time $L_{Aeq,16h}$ contours are plotted from 51 dB to 72 dB, in 3 dB steps, and night-time $L_{Aeq,8h}$ contours are plotted from 45 dB to 72 dB, in 3 dB steps.

Day and night contours using the supplementary noise metrics N65 16-hour and N60 8-hour respectively have also been produced. N65 and N60 contours indicate the number of aircraft noise events exceeding a maximum sound level (L_{Amax}) of 65 and 60 dB respectively at a given location.

Overflight contours are a means of defining and portraying the pattern and dispersion of aircraft below 7,000 feet, and the frequency that they occur. They are based upon a perception of overflight – they do not illustrate noise impacts. The CAA publication CAP 1498 presents a definition of overflight based on the angle of elevation between a person on the ground and an aircraft in the sky, suggesting two elevation angles, 60° and 48.5°. CAP 1616 states that change sponsors must use a 48.5° angle to represent overflight. Day and night overflight contours have been produced that indicate the number of daily overflight events at each location.

Forecast summer day and night contours for 2027 and 2036 have been produced for the Gatwick Route 4 ACP using the $L_{Aeq,16h}$, $L_{Aeq,8h}$, N65 and N60 metrics and using the same modelling assumptions and data for each assessment. Overflight contours were also produced by ERCD separately. This assessment used the same proposed Route 4 departure tracks and swathe boundary data as supplied for the noise assessment. The modelling assumptions and data for the overflight contours are consistent with those used for the L_{Aeq}

contours. Traffic forecasts were provided by GAL, which assumed 297,500 annual movements in 2027 (Year 1) and 316,200 annual movements in 2036 (Year 10).

The environmental methodology used the current day (2023) contours, and baseline and the options contours for the forecast years 2027 (year 1) and 2036 (year 10). The modelling used busy day forecast schedules for 2027 and 2036 provided by GAL. The 2027 and 2036 aircraft traffic totals for the average summer 16-hour day and 8-hour night periods are summarised in Table 2 below:

Forecast Year	Day Departures	Day Arrivals	Total day	Night Departures	Night Arrivals	Total Night
2027	414	398	812	57	81	138
2036	415	399	814	57	81	137

Table 2 Forecast 2027 and 2036 Movements

The daytime contours were modelled assuming the 20-year (2004-2023) average runway modal split of 75% west / 25% east. For night, runway data prior to 2014 were not available, thus the 10-year (2014-2023) average runway modal split of 71% west / 29% east was used. All modelling was conducted based on single runway operations from the Main Runway (26L/08R) only.

The noise contours and modelling results shown later in this document all consider Gatwick Airport operations in total and do not just consider Route 4 operations. This is because the noise from Route 4 will interact with noise from other departure routes and arrivals, so cumulative effects from whole airport operations must be considered. The greenhouse gas modelling results only consider Route 4 departure operations. Although modelling whole airport emissions would provide some context to the change in Route 4 emissions relative to the airport total, it would not be proportionate when the key outcome from the assessment, the TAG results, only needs the change in emissions. Therefore, only emissions from Route 4 have been considered by the assessment. The TAG analysis was conducted using the latest DfT aviation noise TAG workbook (May 2024) to assess the monetary value of the health impacts arising from each option.

2.3.3 Noise Requirements

In accordance with CAP 1616i, noise contours have been produced for the $L_{Aeq,16h}$, $L_{Aeq,8h}$, N65, N60 and overflight metrics for the Baseline case and the Route 4 option scenarios for the implementation year (2027) and 10 years post-implementation (2036), as summarised below:

- 2027 average summer day $L_{Aeq,16h}$, N65 and overflight
- 2027 average summer night $L_{Aeq,8h}$, N60 and overflight
- 2036 average summer day $L_{Aeq,16h}$, N65 and overflight
- 2036 average summer night $L_{Aeq,8h}$, N60 and overflight

In order to explain the noise data, tables have been produced that show the area, population, households and estimates of noise sensitive buildings (community buildings, hospitals, schools and places of worship) for each of the 3dB intervals for the L_{Aeq} contours and for the N65 and N60 contours. Population counts for the number of overflight events

have also been included in tabular form for comparative purposes. Population and household estimates are given to the nearest 100, and based on 2023 population data updated from the 2021 Census supplied by CACI Ltd. Estimates have also been made of the numbers of noise sensitive buildings situated within the contours, using the PointX 'Points of Interest' (2023) database.

A snapshot of each of the contours produced for the baseline and 4 options for 2036 only have been included in the relevant section for each scenario (Sections 4 – 8) that show the likely impact in the area affected by Route 4 operations. These snapshots are focused on the area where changes as a result of Route 4 operations are likely to occur. The areas of the contours not affected by Route 4 operations will not change between the Baseline scenario and each option, as shown in Figure 1 below. The Baseline contours (black) and the options contours (blue, purple, orange and red) have been overlaid to demonstrate changes in impact. To the west of the airport, in the vicinity of Oakwood Hill and Ellen's Green, and to the east of the airport, the contours are overlaid each other indicating no change in the impact.

The full contour diagrams and tables of results have been included in Appendices A1 to A5 for the Baseline and each option.

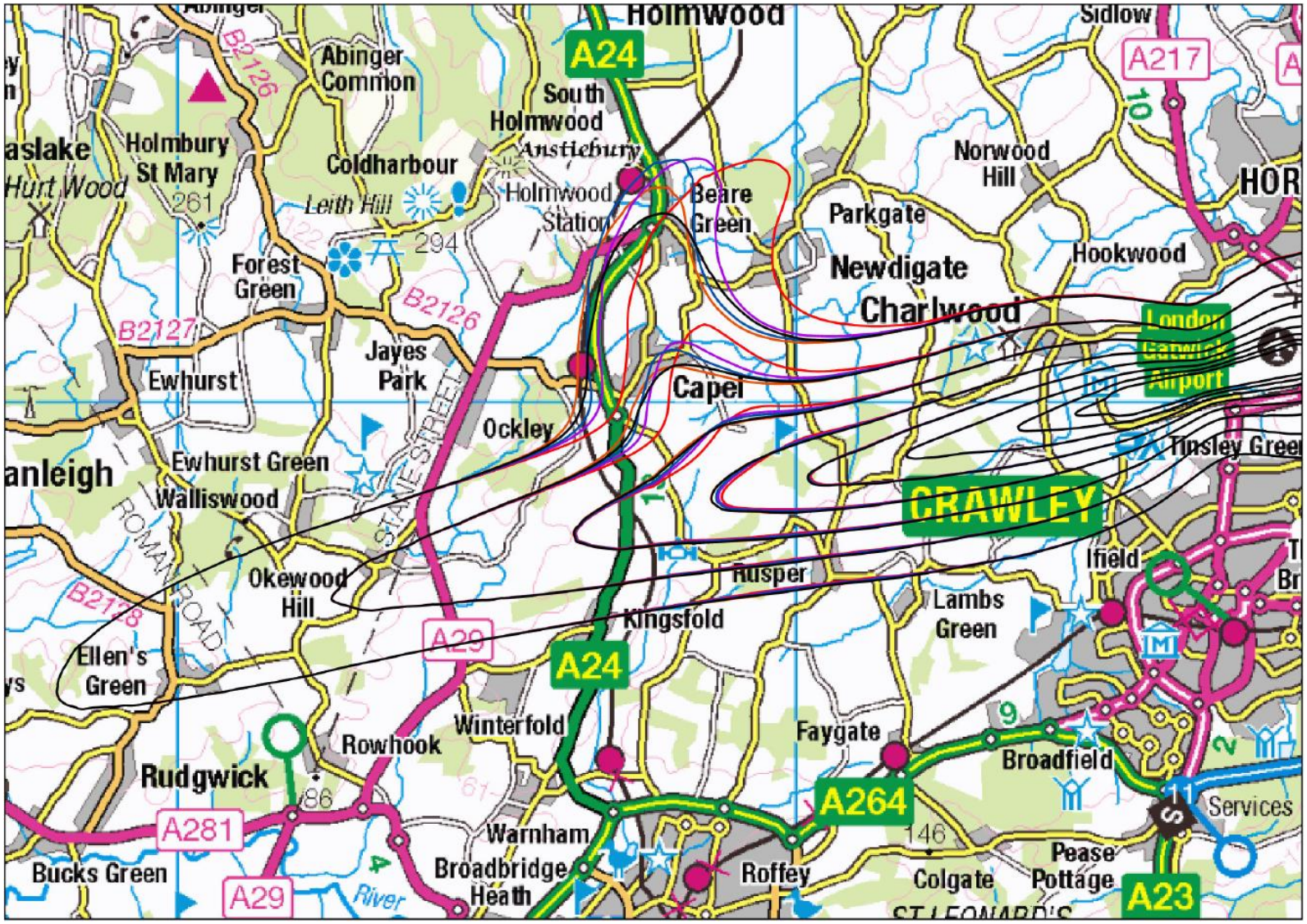


Figure 1 Summer Day LAeq,16h Contour Comparison Example

Results from the noise modelling are input into the TAG workbook and the tool uses embedded formulae to calculate a monetary value of the noise impacts to allow a comparison of options.

The results of the TAG analysis can be found in the relevant section for each scenario (Sections 5 – 8) and a comparison of each option against the Baseline can be found in Section 9. A positive figure indicates a net benefit to society versus the Baseline.

2.3.4 Calculating Mass of Fuel Burn and Greenhouse Gas Emissions

Change sponsors must consider and demonstrate how the design and operation of the design options will impact greenhouse gas emissions. A greenhouse gas emissions model of the traffic on Route 4 was created according to best practice, using IMPACT version 3.393 and BADA 3.154, to estimate total annual fuel burn and mass of carbon dioxide equivalent (CO2e) emissions in metric tonnes, for the following scenarios:

- Current Day (2023)
- Year of implementation (2027) without the ACP (Baseline)
- Year of implementation (2027) with each design option
- 10 years after implementation (2036) without the ACP (Baseline)
- 10 years after implementation (2036) with each design option

For the purposes of the DfT's TAG workbook, the estimated fuel consumption was converted into carbon dioxide equivalent (CO_2e) emissions using the relevant and latest conversion factors published for UK Government conversion factors for company reporting of greenhouse gas emissions, published by Department for Energy Security and Net Zero (DESNZ) and Department for Environment, Food and Rural Affairs (DEFRA). CO_2e is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO_2e signifies the amount of carbon dioxide (CO_2) which would have the equivalent global warming impact. The impacts of greenhouse gas emissions have been monetised as an annual cost over the 10-year appraisal period and the output is the net present value of the change in greenhouse emissions. All greenhouse gas emissions have been presented in tCO_2e, split by traded sector and non-traded sector[6].

The results for the greenhouse gas modelling can be found in the relevant section for each scenario (Sections 5 – 8) and a comparison of each option against the Baseline can be found in Section 9.

2.3.5 Other Impact Assessments

CAP 1616i also requires an assessment of the effect of each option compared to the Baseline in terms of the following impacts:

Air Quality: Change sponsors must produce information on and monetise local air quality impacts only where there is the possibility of pollutants breaching legal limits and target values following the implementation of an airspace change proposal (or worsening an existing breach of legal limits and target values). It is deemed that this is only likely to become a possibility where:

- there is likely to be a change in aviation emissions (by volume or location) below 1,000 ft above aerodrome level (aal); and

[6] Traded emissions capture those that come from installations covered by the UK Emissions Trading Scheme (ETS), whereas non-traded emissions are those which do not fall within scope of the UK ETS. Currently, the UK ETS covers power generation, energy-intensive industries, and domestic aviation.

- the location of the emissions is within or adjacent to a designated Air Quality Management Area (AQMA).

An assessment of the impact on local air quality of each option compared to the baseline can be found in Appendix A6.

Tranquillity: The consideration of impacts upon tranquillity for airspace change proposals is with specific reference to National Parks, Areas of Outstanding Natural Beauty (AONB)[7], plus any local 'tranquil' areas that have been identified through community engagement and are subsequently reflected within an airspace change proposal's design principles.

An assessment of the impact on tranquillity of each option compared to the baseline can be found in Appendix A7.

Biodiversity: Biodiversity can be taken to mean "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".

Change sponsors must include the potential biodiversity implications associated with design options under consideration. Biodiversity receptors include locally identified biodiversity receptors and European sites such as:

- Special Areas of Conservation (SAC) and possible SACs
- Special Protection Areas (SPA) and potential SPAs
- Ramsar sites (wetlands of international importance) and proposed Ramsar sites
- Compensatory habitats (areas secured to compensate for damage to SACs, SPAs and Ramsar sites)

Change sponsors must consider a habitats regulations assessment as part of full options appraisal. The overall aim should be to eliminate as many adverse effects on European sites as practicable, prior to the CAA's consideration of the final proposal at Stage 5.

In order to ascertain whether an airspace change proposal is likely to have a significant effect on a European site (and therefore whether an appropriate assessment of the potential adverse effects of the proposal on that site is needed), change sponsors must undertake a screening exercise. GAL have conducted this early screening exercise and the answers in the early screening criteria form can be found in Appendix A8.

[7] Now known as National Landscapes

3 Current Day Impact

3.1 Gatwick Airport Operations

Gatwick Airport currently utilises a single runway for its operations. This is predominantly its southern, main runway, designated 26L/08R. Gatwick also operates its northern runway, designated 26R/08L, but this is only used when the main runway is unavailable. Aircraft departing Gatwick are required to follow specific flight paths called Noise Preferential Routes (NPRs) unless directed otherwise by ATC. NPRs are set by the Government and were designed to minimise noise disturbance to local communities. Aircraft routes are designed to comply with the published NPR route until they climb above a specific altitude. The Gatwick SID routes, with their associated NPRs, are illustrated in Figure 2 below.

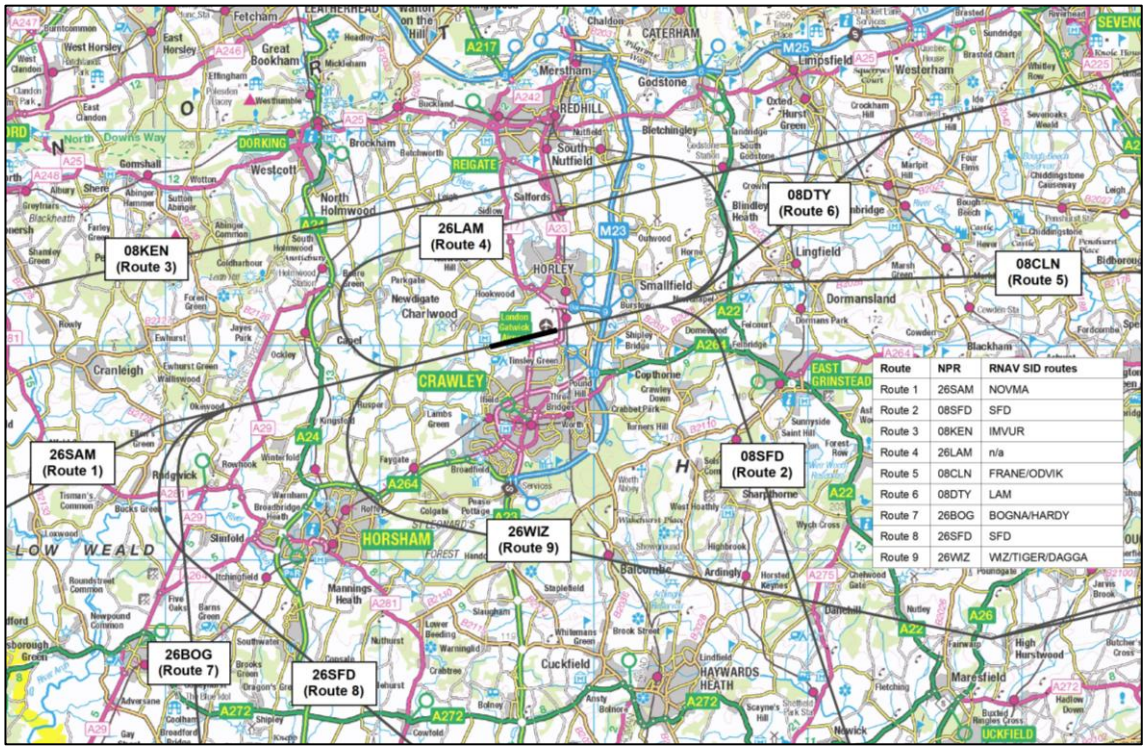


Figure 2 Gatwick Airport SID Routes

Source: ERCD Report 2402.

In the 2023 calendar year there were approximately 257,000 aircraft movements at Gatwick Airport. Figure 3 below shows a 24-hour sample of radar flight tracks for both arriving and departing aircraft.

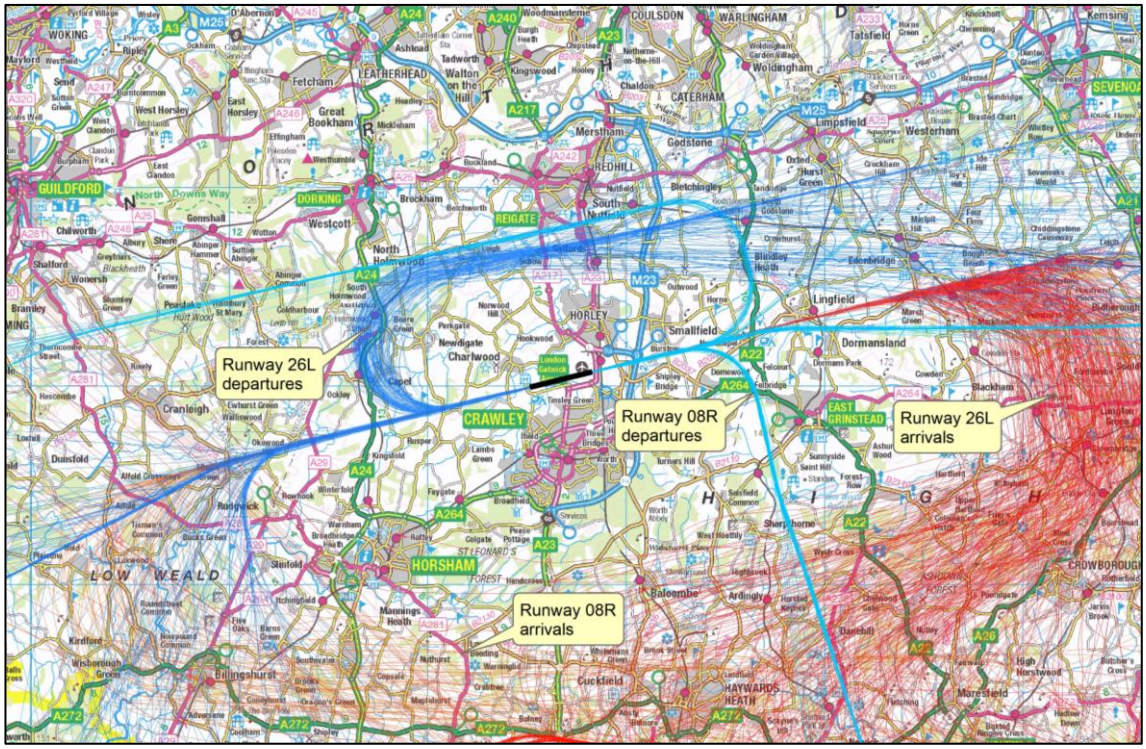


Figure 3 Current Day Typical Arrival and Departure Tracks

3.2 Noise Contours

Each year ERCD calculates the noise exposure around London Gatwick Airport and produces an annual report detailing the results[8]. The UK civil aircraft noise model ANCON, validated with noise measurements, is used to estimate the noise exposure. The model calculates the emission and propagation of noise from arriving and departing air traffic. The noise exposure metric used is the Equivalent Continuous Sound Level (L_{Aeq}), and in particular $L_{Aeq,16h}$ (07:00-23:00 local time) and $L_{Aeq,8h}$ (23:00-07:00 local time), which is calculated over the 92-day summer period from 16 June to 15 September.

Noise exposure is depicted in the form of noise contours, i.e. lines joining places of constant L_{Aeq}. Noise exposure is assessed above the Lowest Observed Adverse Effect Level (LOAEL), 51 dB $L_{Aeq,16h}$ daytime and 45 dB $L_{Aeq,8h}$ night-time, as defined in the Government's Airspace and Noise Policy. Day time $L_{Aeq,16h}$ contours are plotted from 51 dB to 72 dB, in 3 dB steps, and night-time $L_{Aeq,8h}$ contours are plotted from 45 dB to 72 dB, in 3 dB steps.

Day and night contours using the supplementary noise metrics N65 16-hour and N60 8-hour respectively have also been produced. N65 and N60 contours indicate the number of aircraft noise events exceeding a maximum sound level (L_{Amax}) of 65 and 60 dB respectively at a given location.

Estimates were made of the numbers of people and households (to the nearest 100) enclosed within the noise contours. The population data used in this report for the summer contours are a 2023 update of the 2021 Census supplied by CACI Limited. Estimates have also been made of the numbers of noise sensitive buildings situated within the contours, using the PointX 'Points of Interest' (2023) database. The noise sensitive buildings that

[8] Noise Exposure Contours for Gatwick Airport 2023 – ERCD REPORT 2402

have been considered are community buildings, hospitals, schools (including nurseries) and places of worship.

The Gatwick 2023 summer day $L_{Aeq,16h}$ noise contours, generated with the actual runway modal split (82% West / 18% East) are shown in Figure 4 below. Cumulative estimates of the areas, populations, households and noise sensitive buildings within the 2023 summer day actual contours are provided in Table 3.

The Gatwick 2023 summer night $L_{Aeq,8h}$ noise contours, generated with the actual runway modal split (81% West / 19% East) are shown in Figure 4 below. Cumulative estimates of the areas, populations, households and noise sensitive buildings within the 2023 summer night actual contours are provided in Table 4.

Contours using the supplementary noise metric N65 have been produced for the 2023 summer day period using the actual runway modal split (82% West / 18% East) are shown in Figure 6 below. N65 contours show the number of aircraft noise events exceeding 65 dB L_{Amax} and are plotted at 20, 50, 100, 200 and 500-event levels. The red line in Figure 6 shows the 2022 20-event level contour for comparison. Cumulative estimates of the areas, populations, households and noise sensitive buildings within the N65 contours are provided in Table 5.

Contours using the supplementary noise metric N60 have been produced for the 2023 summer night period using the actual runway modal split (81% West / 19% East) are shown in Figure 7 below. N60 contours show the number of aircraft noise events exceeding 60 dB L_{Amax} and are plotted at 10, 20, 50 and 100-event levels. The red line in Figure 7 shows the 2022 10-event level contour for comparison. Cumulative estimates of the areas, populations, households and noise sensitive buildings within the N60 contours are provided in Table 6.

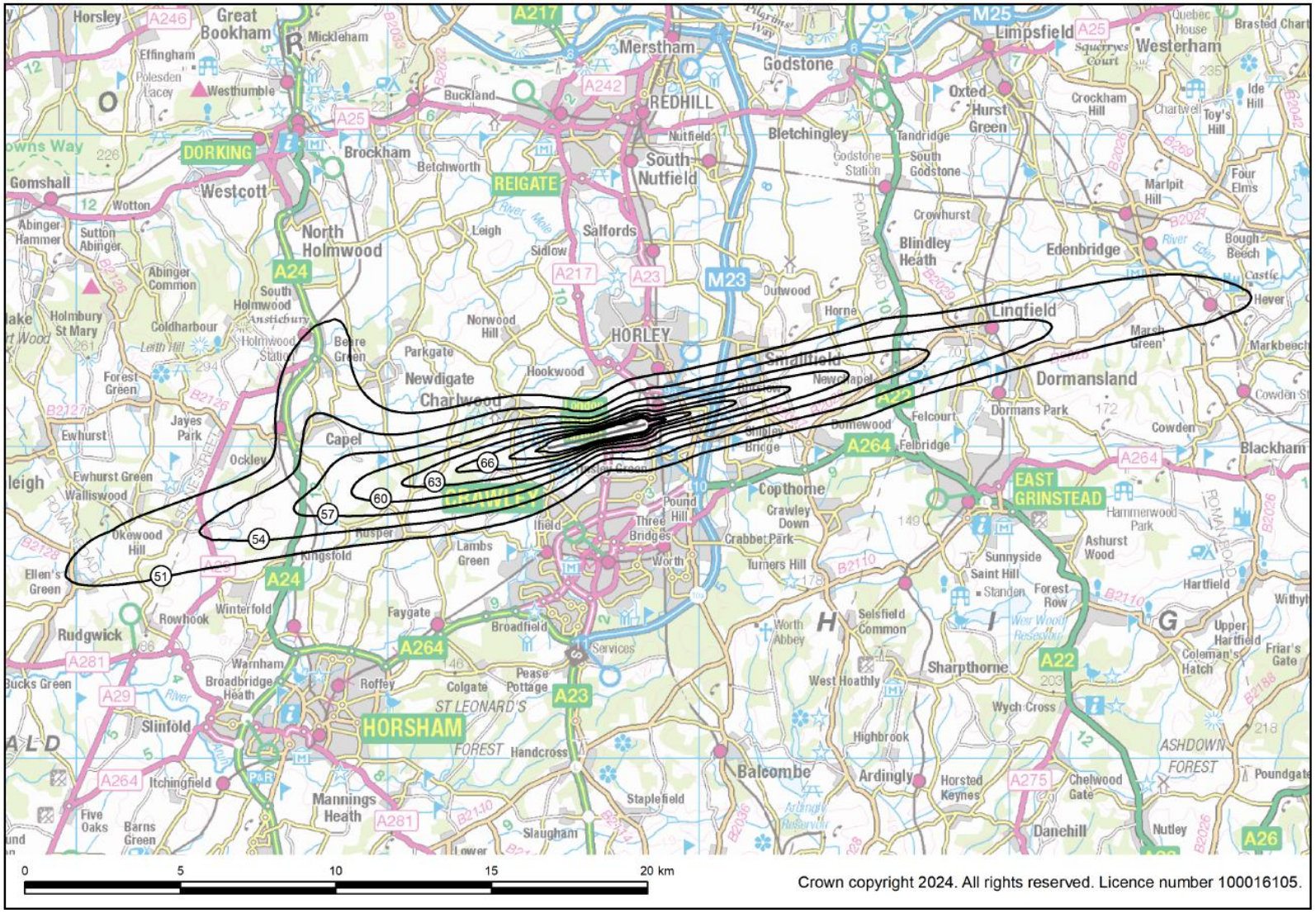


Figure 4 Gatwick 2023 Summer Day Actual Modal Split (82% W / 18% E) LAeq,16h Contours

Source: ERCD Report 2402.

$L_{Aeq,16h}$ (dB)	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	112.8	16,300	6,800	11	1	24	17
>54	58.5	6,700	2,900	3	0	16	11
>57	32.1	1,800	700	1	0	4	3
>60	18.0	700	300	0	0	2	3
>63	9.7	300	100	0	0	2	3
>66	4.9	100	< 100	0	0	0	1
>69	2.4	0	0	0	0	0	0
>72	1.4	0	0	0	0	0	0

Table 3 Gatwick 2023 Summer Day Actual $L_{Aeq,16h}$ Data

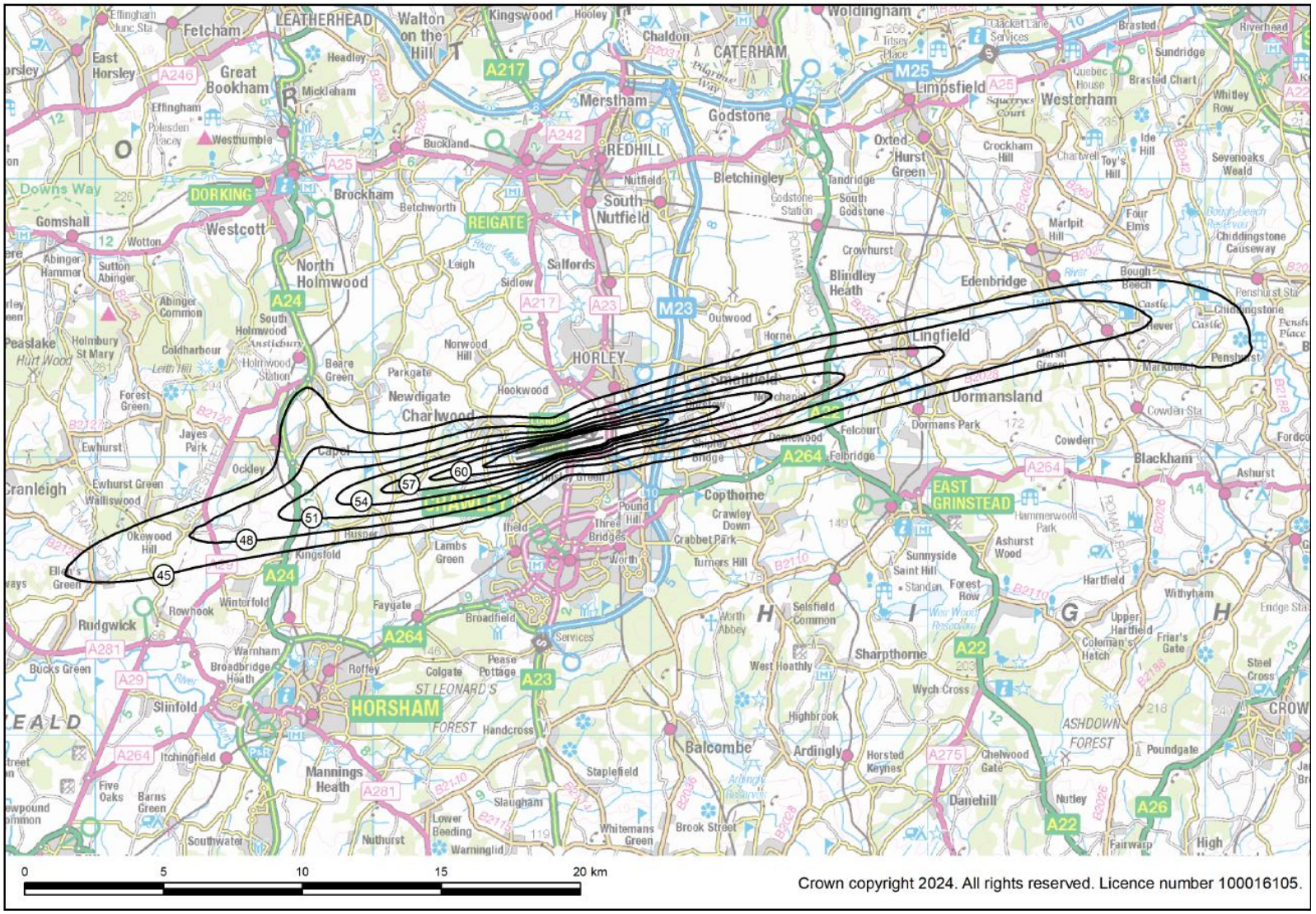


Figure 5 Gatwick 2023 Summer Night Actual Modal Split (81% W / 19% E) LAeq,8h Contours

Source: ERCD Report 2402.

$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	128	17,300	7,300	9	1	25	19
>48	73	8,500	3,600	3	1	16	10
>51	37	4,000	1,800	2	0	10	7
>54	20	1,100	500	1	0	2	3
>57	11	500	200	0	0	2	2
>60	6	100	< 100	0	0	0	2
>63	3	100	< 100	0	0	0	1
>66	2	0	0	0	0	0	0
>69	1	0	0	0	0	0	0
>72	1	0	0	0	0	0	0

Table 4 Gatwick 2023 Summer Night Actual $L_{Aeq,8h}$ Data

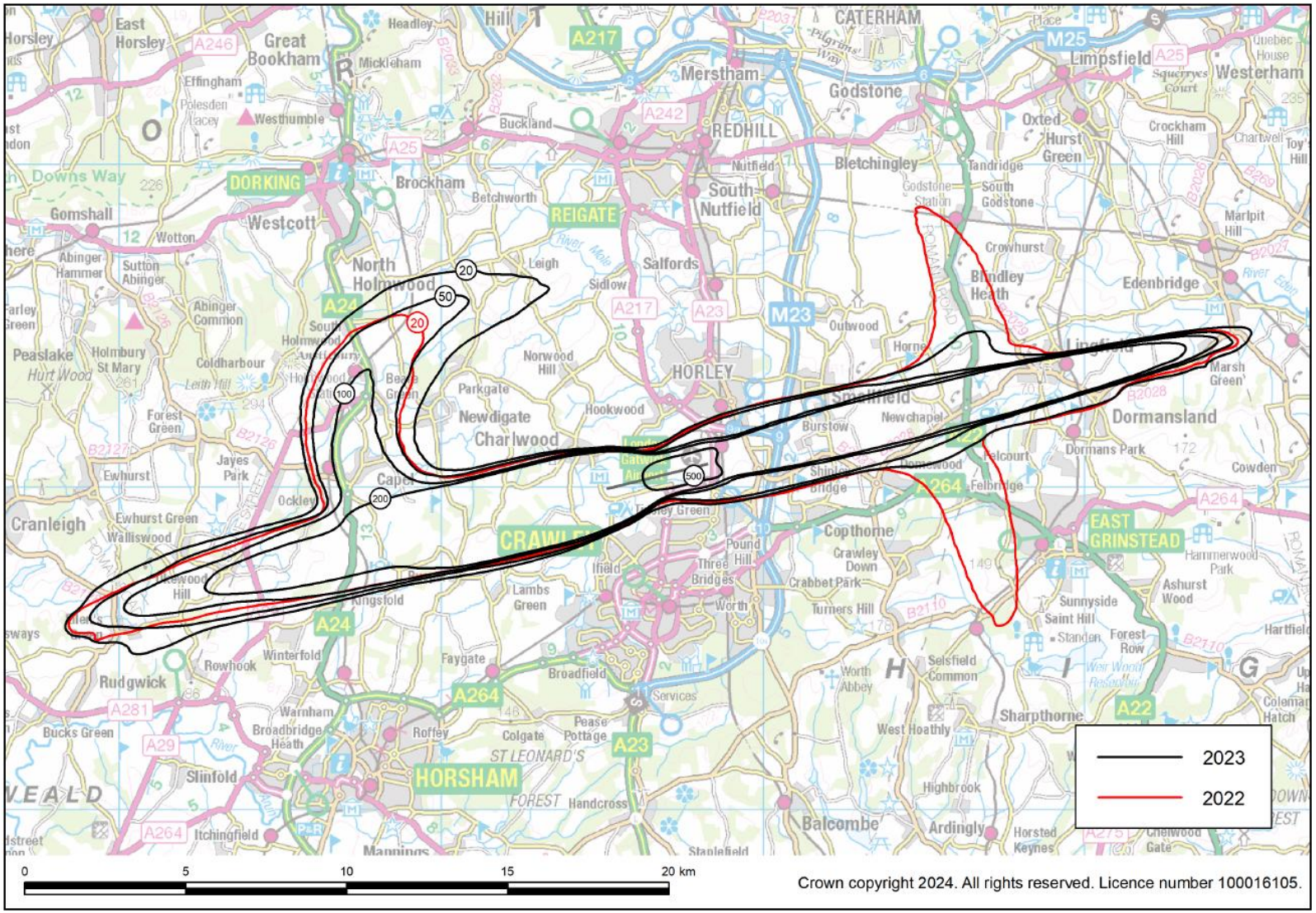


Figure 6 Gatwick 2023 Summer Day Actual Modal Split (82% W / 18% E) N65 Contours

Source: ERCD Report 2402.

N65 Contour (Number of Events)	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>20	122	14,800	6,300	8	0	21	16
>50	93	11,700	5,100	7	0	19	13
>100	67	8,100	3,600	4	0	14	11
>200	50	4,900	2,200	3	0	10	8
>500	2	0	0	0	0	0	1

Table 5 Gatwick 2023 Summer Day Actual N65 Data

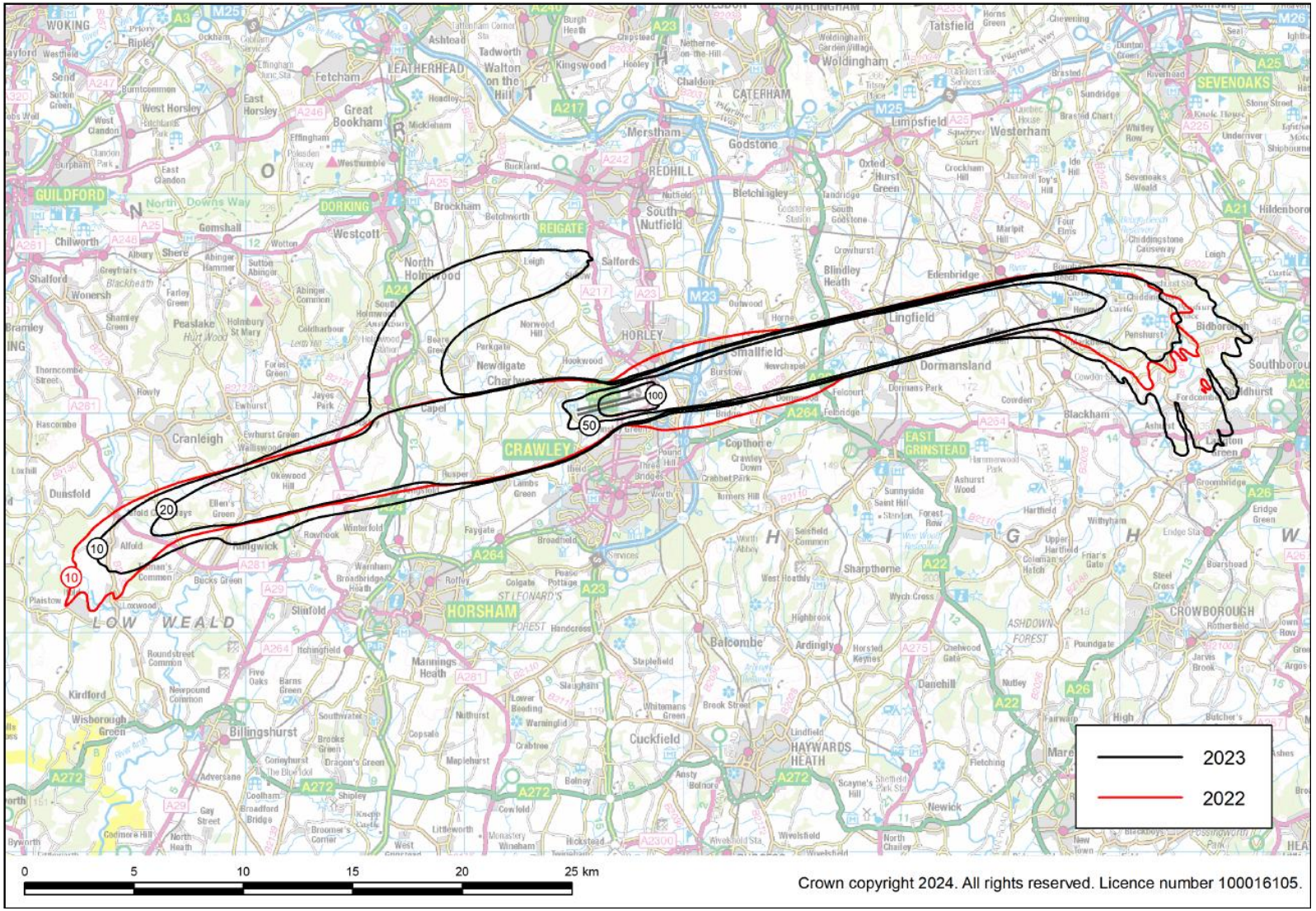


Figure 7 Gatwick 2023 Summer Night Actual Modal Split (81% W / 19% E) N60 Contours

Source: ERCD Report 2402.

N60 Contour (number of events)	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>10	215	25,500	10,700	20	2	33	27
>20	129	13,400	5,600	11	1	22	15
>50	49	7,600	3,200	3	1	16	9
>100	3	0	0	0	0	0	1

Table 6 Gatwick 2023 Summer Night Actual N60 Data

4 Baseline Do Minimum Assessment

4.1 Baseline Overview

In accordance with CAP 1616f, the change sponsor must undertake an assessment of the impacts of the future scenario without the airspace change so that a comparison can be made against the impacts of the design options. This future scenario is known as the Baseline, against which the potential impacts of each design option will be assessed to understand the impacts of the various options so that a comparison can be made.

During Stage 2, the baseline was redefined to reflect the current operation where each airline executes the existing conventional LAM 6M, 6V procedure using a Flight Management System (FMS) coded overlay procedure through the process defined as RNAV Substitution in CAA's CAP1781 and CAP1926. This procedure is intended to replicate, as closely as possible, the existing LAM 6M, 6V procedure. As previously stated in Stage 2, use of the conventional LAM 6M, 6V procedure, which is in use today and is published on the UK Aeronautical Information Publication (AIP), is an unviable option as it is based on ground-based navigation aids (LAM and DET VORs), which shall soon be withdrawn from service. The consequence of which is that aircraft would be unable to utilise the SID, an unacceptable outcome if the integrity of the Gatwick Airport operation is to be maintained.

4.2 Full Options Appraisal of the Baseline

Table 7 contains the assessment of the Baseline in opening year 2027, the date the changes are planned for implementation; and in the forecast year 2036, ten years after implementation.

Affected Group	Impact	Level	Assessment	Difference to Current Operations
Communities	Noise	Quantified and monetised	A snapshot of each of the contours produced for the Baseline are shown in Figures 7 – 12 below. These show the likely impact in the area affected by Route 4 operations. The full contour diagrams and tables of results for the Baseline have been included in Appendix A1.	No Change
Communities	Local Air Quality	Quantified and monetised	Aircraft currently departing on Route 4 will depart in a westerly direction to achieve an altitude of not below 1,500 ft above mean sea level (1,300 ft aal) before commencing a right-hand turn. The closest Air Quality Management Areas are the Crawley Borough Council AQMA (immediately south of the airport) and the Reigate & Banstead Borough Council AQMA No. 3 (immediately south of the airport). Aircraft departing on Route 4 do not overfly these AGMA's. (see Appendix A6).	No Change
Wider Society	Greenhouse Gas Emissions	Quantified and monetised	A greenhouse gas emissions model of the traffic on Route 4 has estimated the total annual fuel burn and mass of carbon dioxide equivalent (CO_{2e}) emissions in metric tonnes for the year of implementation (2027) and 10 years post-implementation (2036).	Calculated mass of CO_2 emitted by the Baseline option in opening year (2027) is 1,218,301 metric tonnes Calculated mass of CO_2 emitted in forecast year (2036) is 1,229,681 metric tonnes

Affected Group	Impact	Level	Assessment	Difference to Current Operations
Wider Society	Tranquillity	Qualitative	Aircraft departing on Route 4 overfly the most easterly section of the Surrey Hills National Landscape and the most westerly section of the Kent Downs National Landscape. Aircraft will be between 1,500 ft and 3,200 ft whilst overflying the eastern portion of the Surrey Hills National Landscape during the initial turn and will be between 4,000 ft and 5,000 ft whilst overflying the western portion of the Kent Downs National Landscape. The noise contours shown in Figures 7-10 below show that a small area of the Surrey Hills National Landscape is contained within the noise contours and hence aircraft departing on Route 4 will have a small impact on this area.	No Change
Wider Society	Biodiversity	Qualitative	In terms of terrestrial ecosystems, aircraft departing on Route 4 overfly areas occupied by Ancient Woodland, European Protected Species and Bird Conservation Targeting Areas. However, there is no anticipated adverse impact on these areas. Aircraft departing on Route 4 do not pass over any major water courses such as major rivers, lakes, or reservoirs. Consequently, there is no known adverse impact on water-based ecosystems.	No Change
Wider Society	Capacity and resilience	Quantified and monetised	Route 4 operations support the current Gatwick Airport capacity cap and equally offer the same level of resilience in the Gatwick Airport operation in the event of an issue with another departure procedure.	No Change
General Aviation	Access	Quantified and monetised	General Aviation (GA) aircraft may arrive and depart from the aerodrome along published VFR routes, or routes agreed between the aircraft Captain and Gatwick Airport Air Traffic Control (ATC). These VFR routes are not the subject of this airspace change project and no changes are proposed to the way GA aircraft operate at Gatwick Airport.	No Change

Affected Group	Impact	Level	Assessment	Difference to Current Operations
General Aviation / commercial airlines	Economic impact from increased effective capacity	Quantified	Current operations enable the full use of the current capacity at Gatwick Airport.	No Change
General Aviation / commercial airlines	Fuel burn	Quantified and monetised	A greenhouse gas emissions model of the traffic on Route 4 has estimated the total annual fuel burn and mass of carbon dioxide equivalent (CO_{2e}) emissions in metric tonnes for the year of implementation (2027) and 10 years post-implementation (2036).	Calculated total fuel burn for the Baseline in the opening year (2027) is 383,311 metric tonnes Calculated total fuel burn for the forecast year (2036) is 386,891 metric tonnes
Commercial airlines	Training costs	Quantified and monetised	No additional training predicted.	No Change
Commercial airlines	Other costs	Qualitative	There are no additional costs associated within the Baseline.	No Change
Airport / Air navigation service provider	Infrastructure costs	Quantified and monetised	There are no additional infrastructure costs associated within the Baseline.	No Change

Affected Group	Impact	Level	Assessment	Difference to Current Operations
Airport / ANSP	Operational costs	Quantified and monetised	There are no additional operational costs associated within the Baseline.	No Change
Airport / ANSP	Deployment costs	Quantified and monetised	There are no additional deployment costs associated within the Baseline.	No Change
Airport / ANSP	Other costs	Qualitative	There are no other costs associated within the Baseline.	No Change

Table 7 Full Options Appraisal of the Baseline

4.3 Current Noise Impact for Communities

Appendix A1 contains the full contours and associated population data for the baseline scenario for the implementation year (2027) and 10 years post-implementation (2036). The contours (and associated population data) produced are summarised below:

- 2027 average summer day $L_{Aeq,16hr}$, N65 and overflight.
- 2027 average summer night $L_{Aeq,8hr}$, N60 and overflight.
- 2036 average summer day $L_{Aeq,16hr}$, N65 and overflight.
- 2036 average summer day $L_{Aeq,8hr}$, N60 and overflight

For ease of comparison against the design options, Figure 8 to Figure 13 on the following pages contain a snapshot of each of the contours produced for the baseline for 2036 only that show the likely impact in the area affected by Route 4 operations.

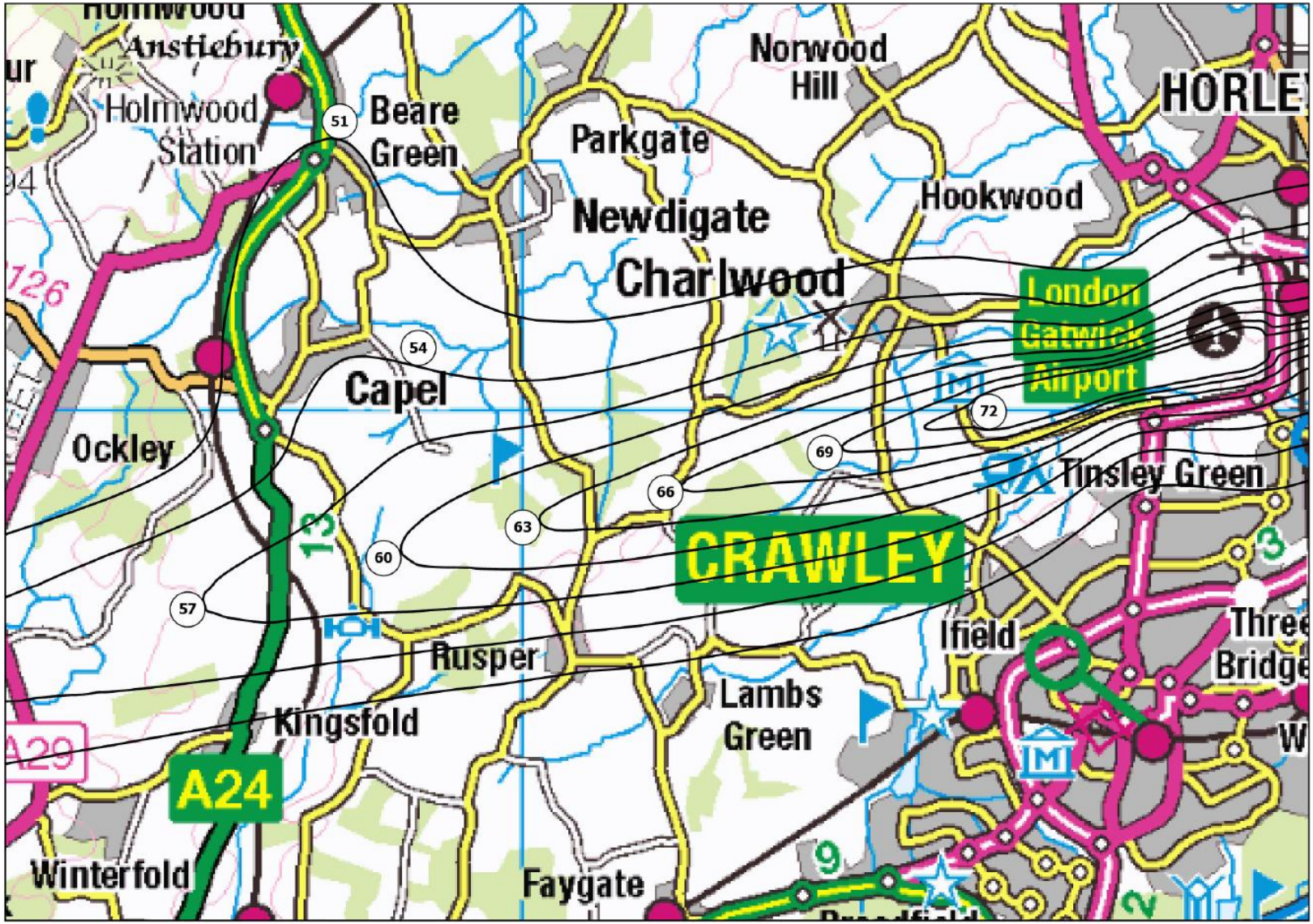


Figure 8 Baseline 2036 16hr Noise Contours above 51dBA $L_{Aeq\ 16hr}$

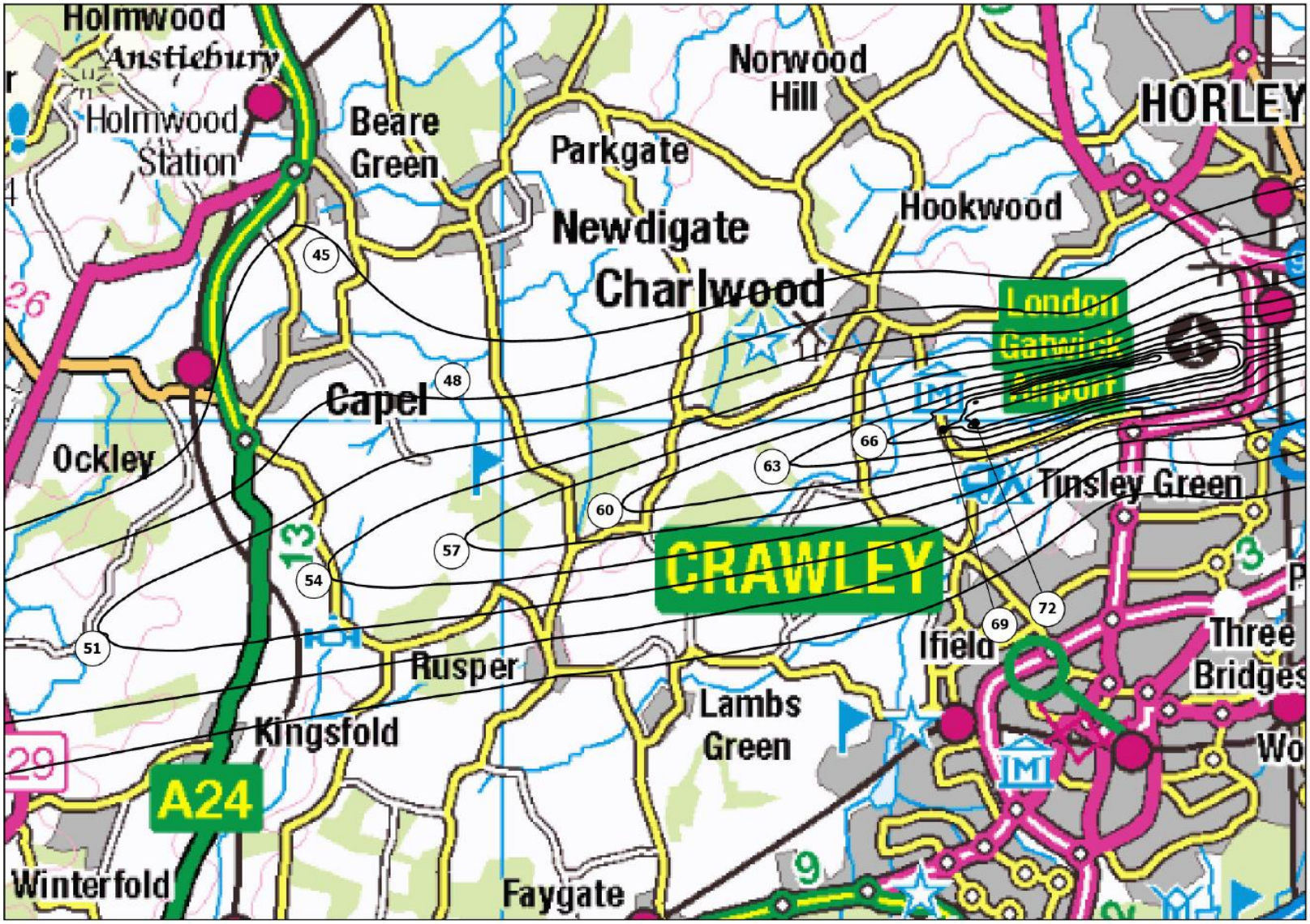


Figure 9 Baseline 2036 8hr Night Noise Contours above 45dBA $L_{Aeq\ 16hr}$

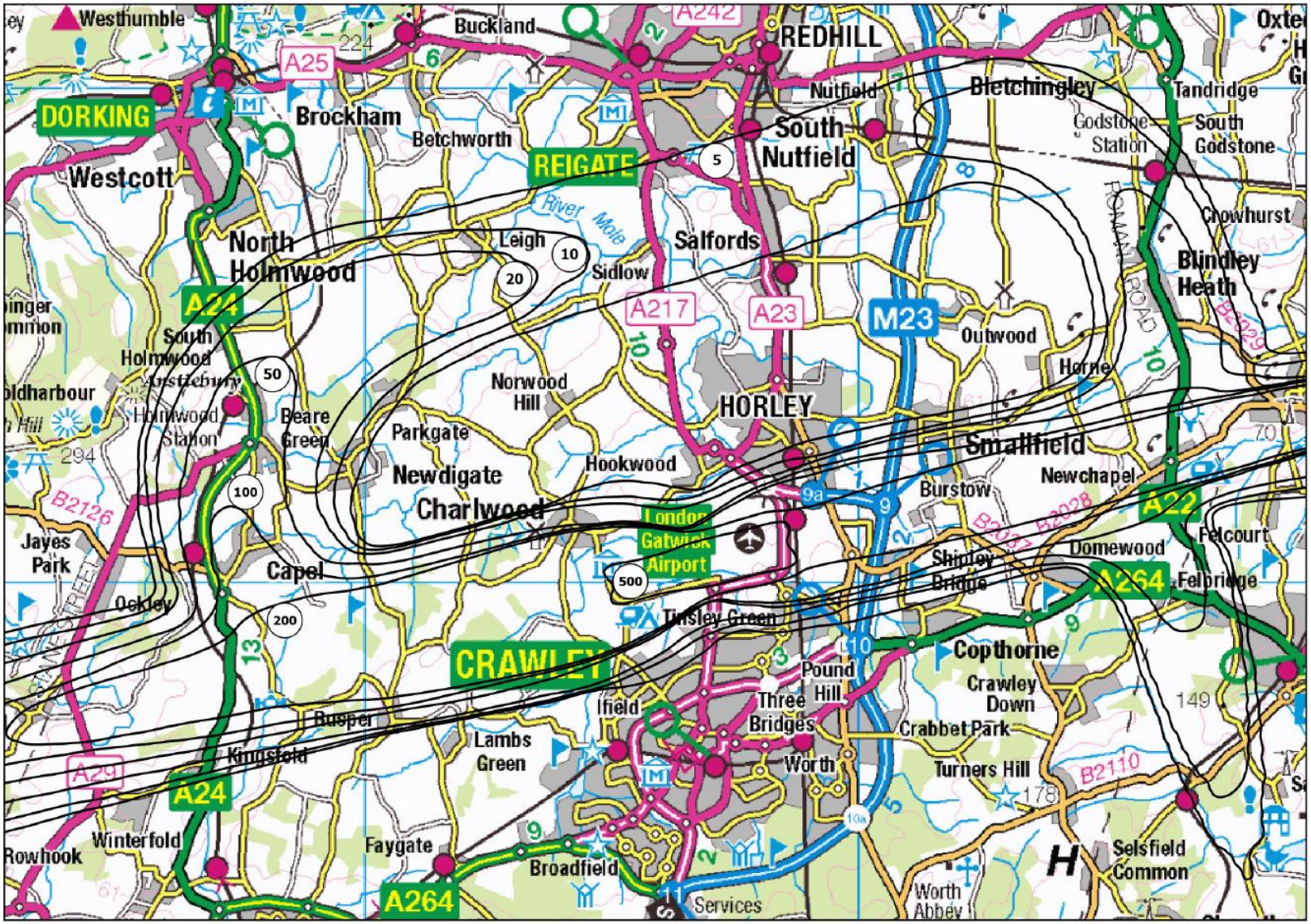


Figure 10 Baseline 2036 Summer Day N65 Contours

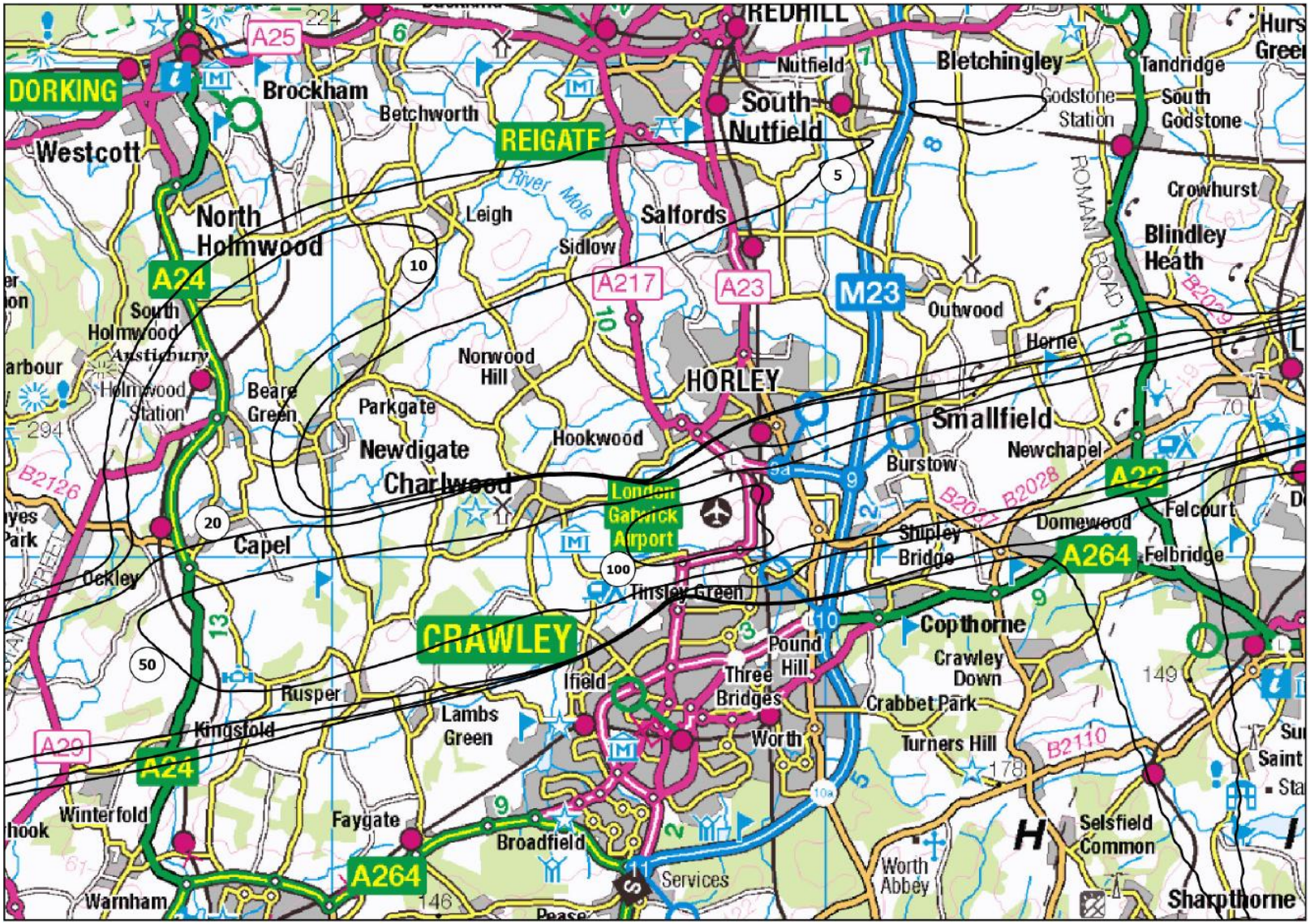


Figure 11 Baseline 2036 Summer Night N60 Contours

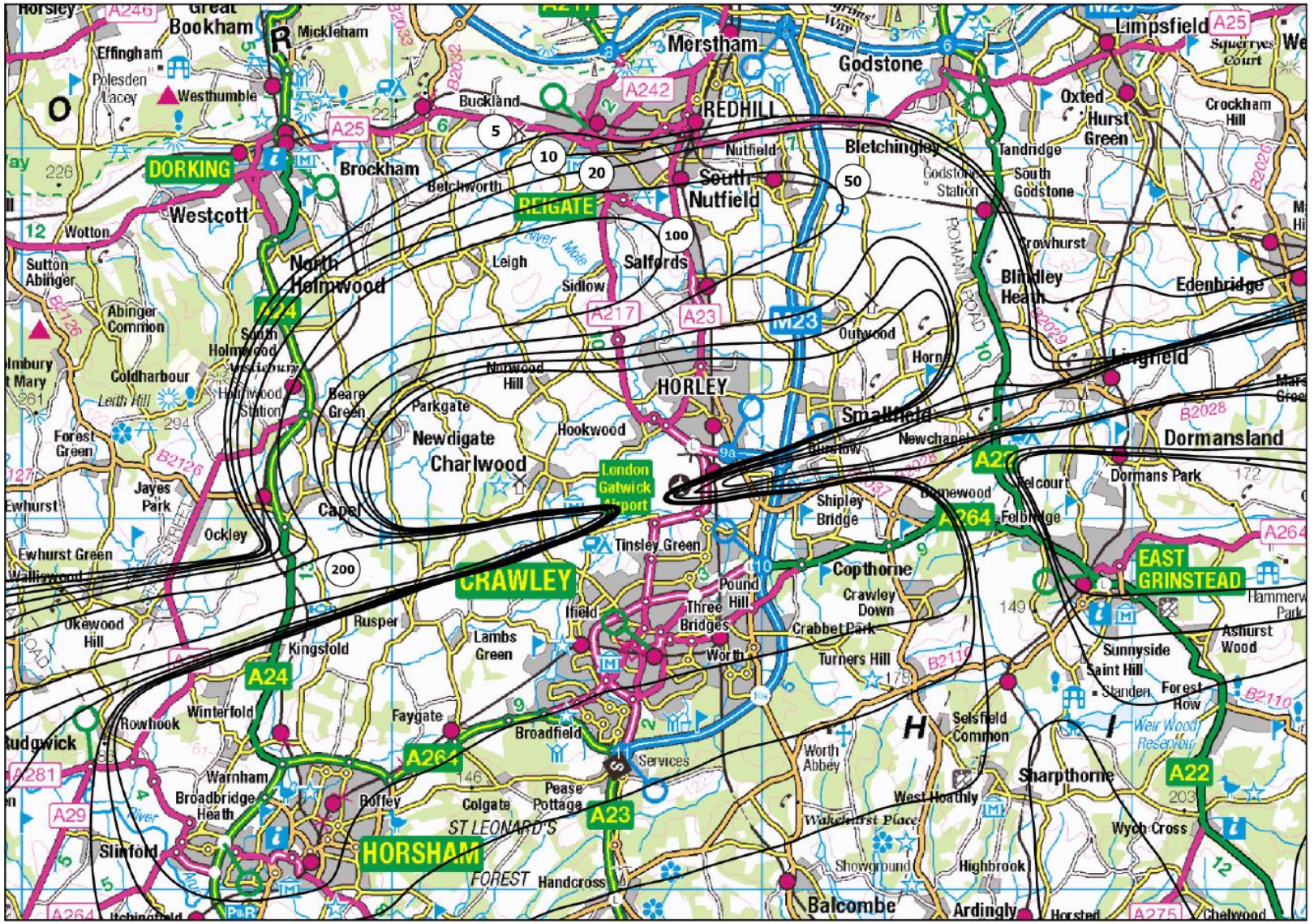


Figure 12 Baseline 2036 Summer Day Overflight Contours

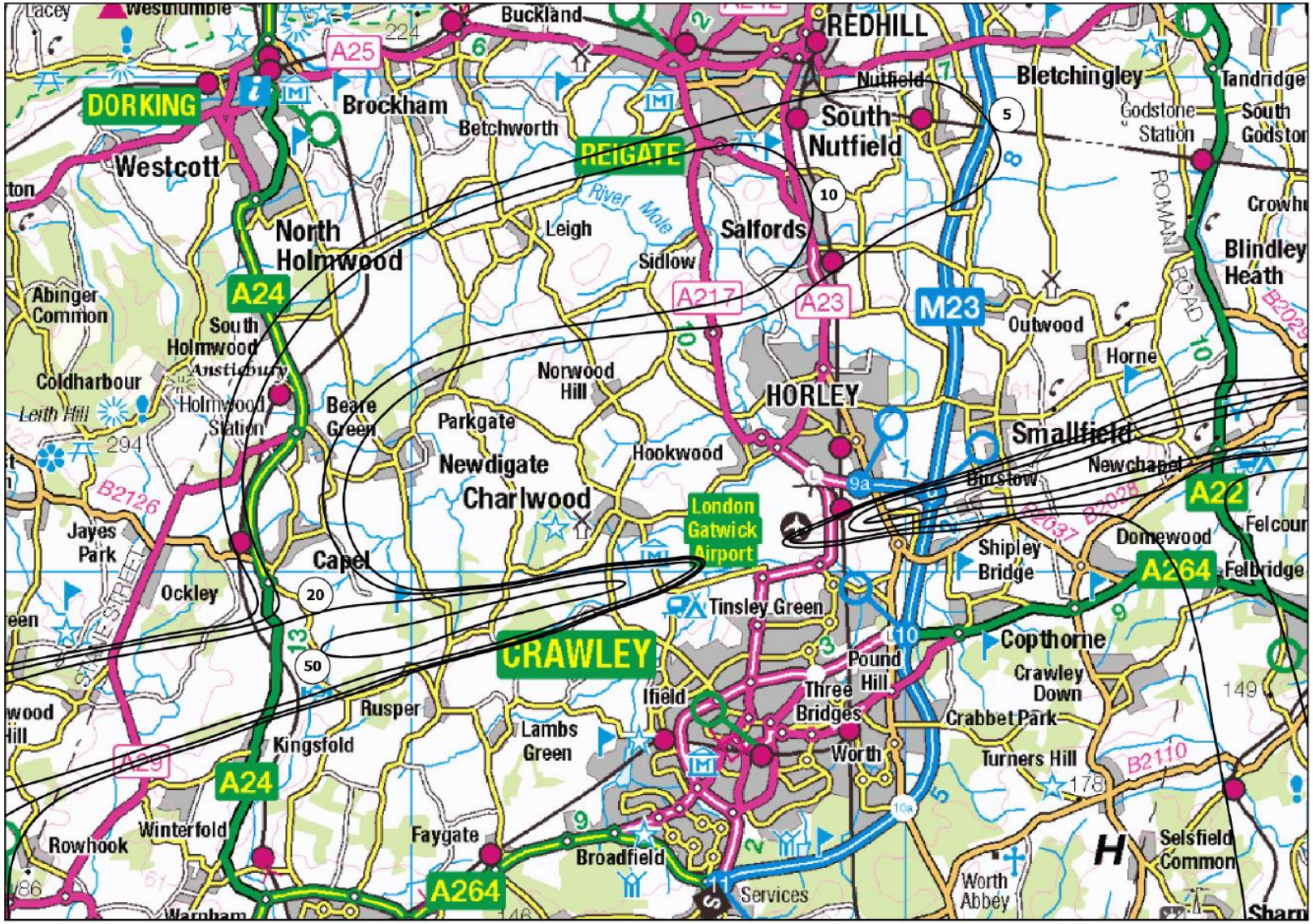


Figure 13 Baseline 2036 Summer Night Overflight Contours

4.4 Fuel Burn and CO_2

A greenhouse gas emissions model of the traffic on Route 4 was created to estimate total annual fuel burn and mass of carbon dioxide equivalent (CO_2e) emissions in metric tonnes for the current day (2023) and the Baseline in the year of implementation (2027) and 10 years post-implementation (2036).

The results are shown in Table 8 below.

Scenario	Total Fuel Burn (tonnes)	Total CO_2e (tonnes)	Traded CO_2e (tonnes)	Non-Traded CO_2e (tonnes)
Current day 2023	341,148	1,084,294	458,369	625,925
Baseline 2027	383,311	1,218,301	429,047	789,254
Baseline 2036	386,891	1,229,681	421,473	808,208

Table 8 Fuel Burn and CO_2 Calculations for the Baseline

5 Full Options Appraisal – Option A Compared to Baseline

5.1 Introduction

This section of the report presents the full options appraisal for Option A and presents a summary of the results. The complete analysis of Option A, including the $L_{Aeq,16hr}$, $L_{Aeq,8hr}$, N65, N60, overflight contours and the associated cumulative estimates of the areas, populations, households and noise sensitive buildings is contained in Annex A2 of this report.

For ease of comparison against the Baseline, Figure 14 to Figure 19 on the following pages contain a snapshot of each of the contours produced for Option A for 2036 only that show the likely impact in the area affected by Route 4 operations. The L_{Aeq} contour images also show the Baseline contours (in blue) for comparative purposes.

5.2 Option A

Group	Notes	Quantitative noise assessment results compared to Baseline	Assessment result
Communities	Noise	Individuals experiencing increased daytime noise in forecast year: 2036	664
Communities	Noise	Individuals experiencing reduced daytime noise in forecast year: 2036	461
Communities	Noise	Individuals experiencing increased night-time noise in forecast year: 2036	268
Communities	Noise	Individuals experiencing reduced night-time noise in forecast year: 2036	519
Communities	Noise	Net Present Value of change in noise	+£3,214

Group	Other Impact	Assessment compared to Baseline	Assessment result
Communities	Air Quality	No change versus Baseline as no changes are taking place to aircraft tracks below 1000ft	No Change
Wider Society	Greenhouse Gas impact. Negative figure = decrease versus Baseline	Change in CO_2 Equivalent emissions over 10-year appraisal period (tonnes)	+525
		Change in annual CO_2 Equivalent emissions in opening year (tonnes)	+51
	Greenhouse Gas CO_2e: positive figures are a benefit; negative are a cost to society	Overall Assessment NPV CO_2 Equivalent emissions	–£42,287
		NPV of traded sector CO_2 Equivalent emissions	–£57,930
Wider Society	Tranquillity	The nominal track for Option A overflies the most easterly section of the Surrey Hills National Landscape and the most westerly section of the Kent Downs National Landscape. Aircraft will be between 1,500 ft and 3,200 ft whilst overflying the eastern portion of the Surrey Hills National Landscape during the initial turn and will be between 4,000 ft and 5,000 ft whilst overflying the western portion of the Kent Downs National Landscape. This represents no difference between Option A and the Baseline scenario.	No Change
Wider Society	Biodiversity	There is no anticipated impact on any biodiversity receptors due the minimal changes made in terms of aircraft routing, when compared to the baseline. Some areas occupied by Ancient Woodland, European Protected Species and Bird Conservation Targeting Areas are overflown by this option, however this is the same as the baseline scenario.	No Change
Wider Society	Capacity and resilience	This option will support the current Gatwick Airport capacity cap. With regards to resilience, there is deemed to be no difference between this option and the baseline scenario.	No Change

Group	Other Impact	Assessment compared to Baseline	Assessment result
General Aviation (GA)	Access	No change when compared to the baseline scenario. GA users of Gatwick Airport will continue to arrive and depart under extant operational arrangements.	No change
GA / commercial airlines	Economic impact from increased effective capacity	This option is not designed to facilitate extra capacity but to enable the full use of the current capacity. Additionally, this option is not expected to reduce the flow of air traffic out of the airport overall.	No change
GA / commercial airlines	Fuel burn	Change in annual fuel burn in opening year versus Baseline (tonnes)	+16
		Change in annual fuel burn in forecast year versus Baseline (tonnes)	+17
Commercial airlines	Training costs	No additional training costs anticipated.	No change
Airport /ANSP	Other costs	No additional costs anticipated.	No change
Airport / ANSP	Infrastructure costs	No additional infrastructure costs anticipated.	No change
Airport / ANSP	Operational costs	No additional operational costs anticipated.	No change
Airport / ANSP	Deployment costs	This option is expected to incur deployment costs associated with amendments to the UK AIP.	-£60,000

Table 9 Full Options Appraisal of Option A

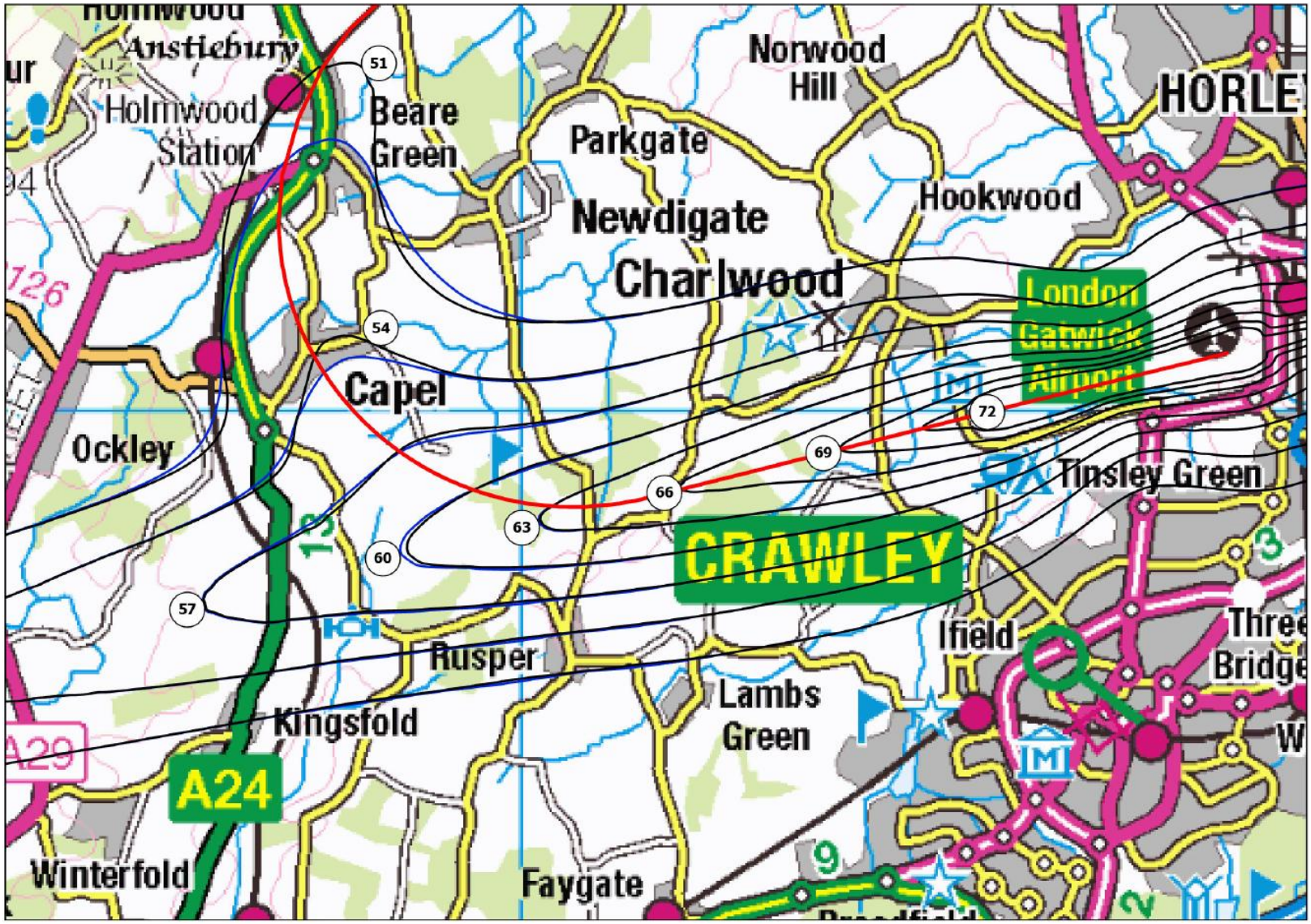


Figure 14 Option A 2036 16hr Noise Contours above 51dBA $L_{Aeq\ 16hr}$

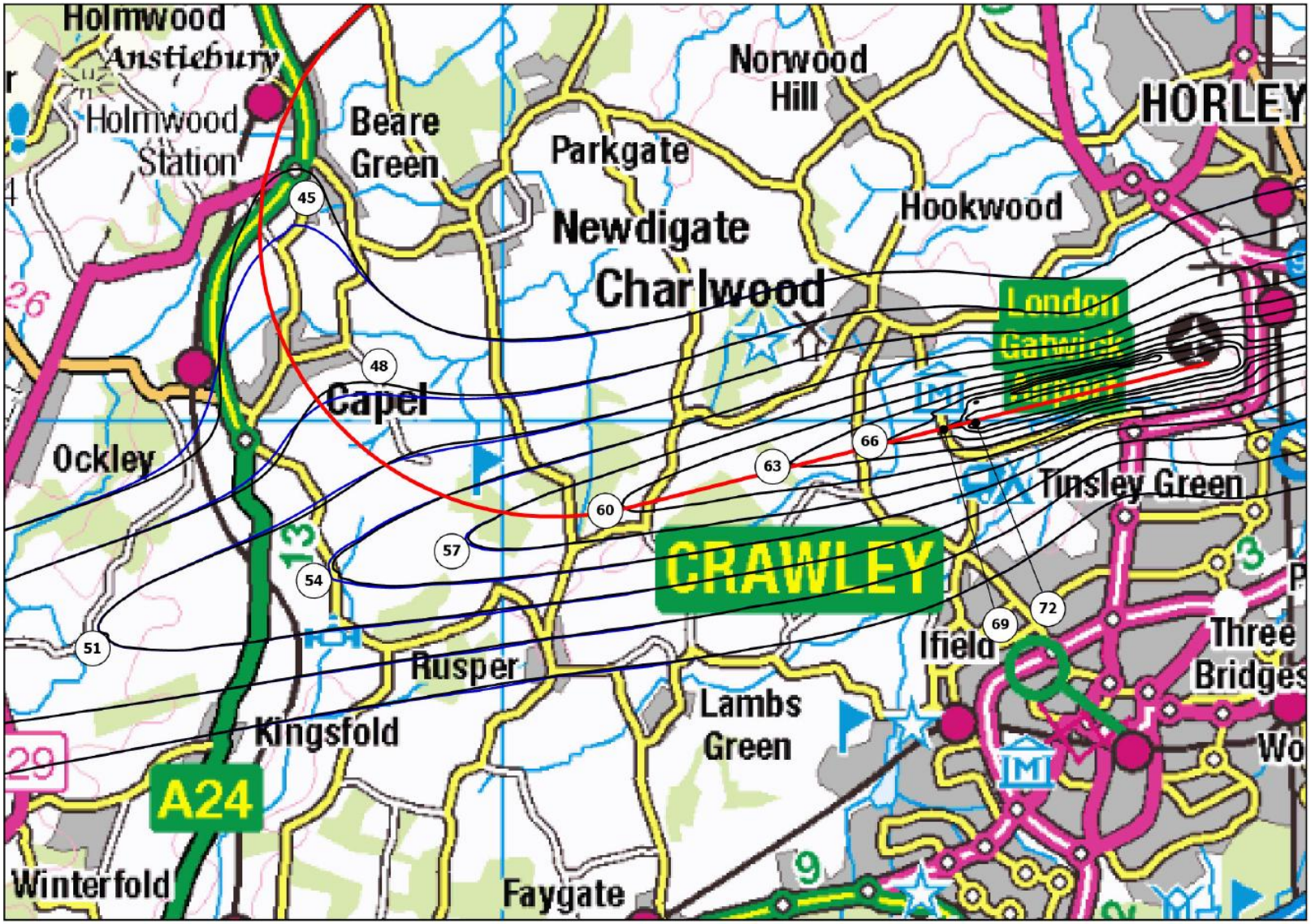


Figure 15 Option A 2036 8hr Night Noise Contours above 45dBA $L_{Aeq\ 16hr}$

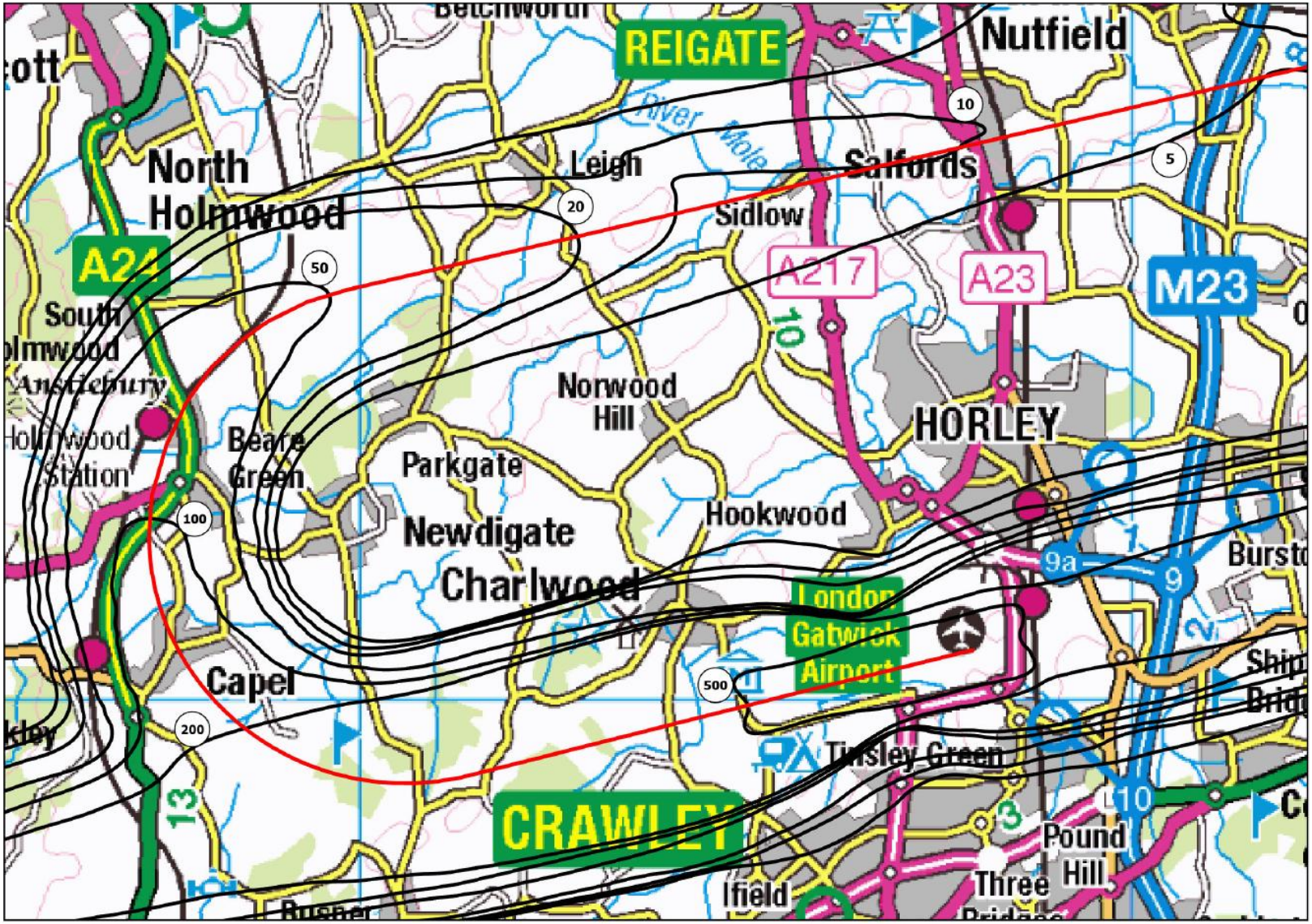


Figure 16 Option A 2036 Summer Day N65 Contours

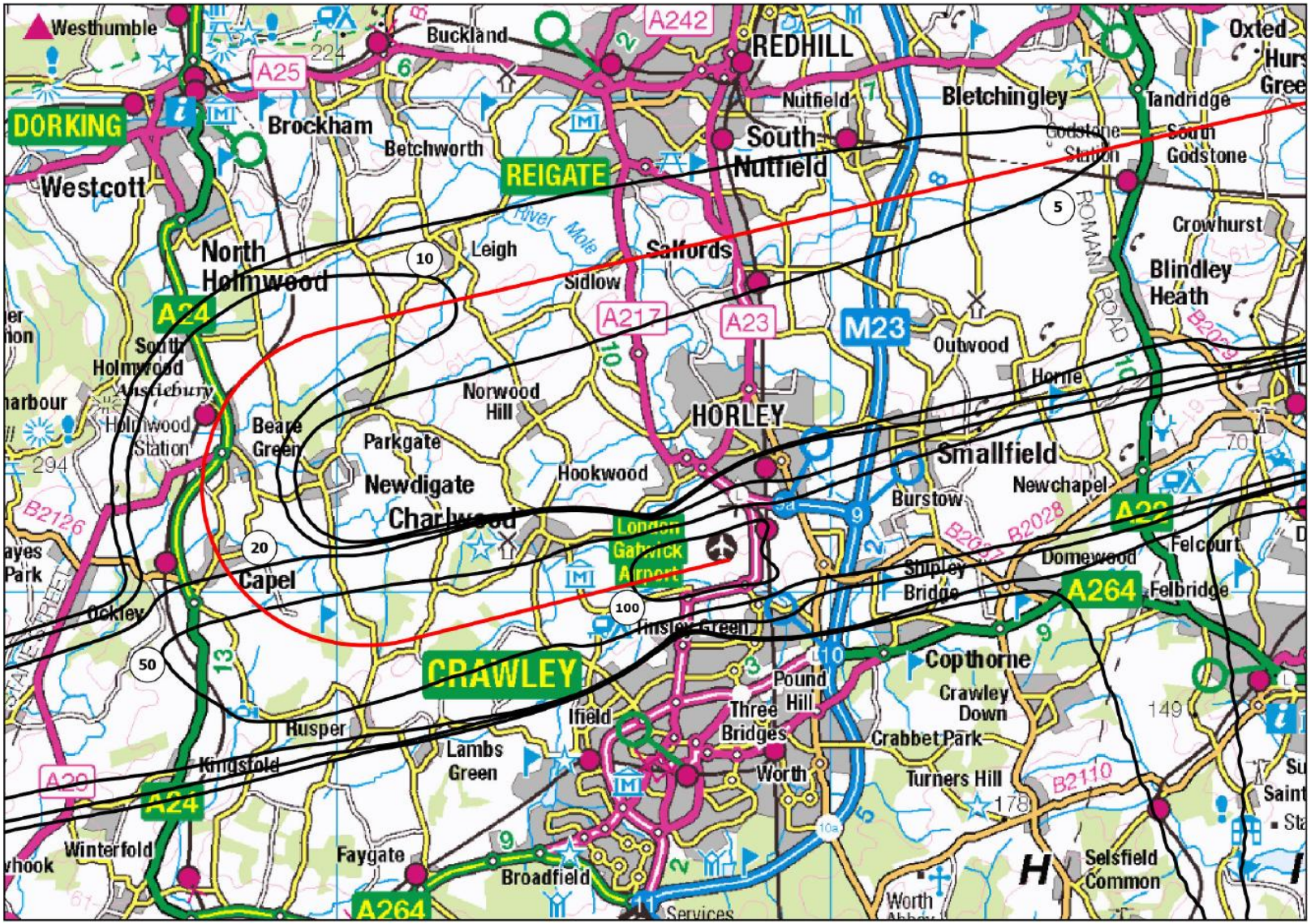


Figure 17 Option A 2036 Summer Night N60 Contours

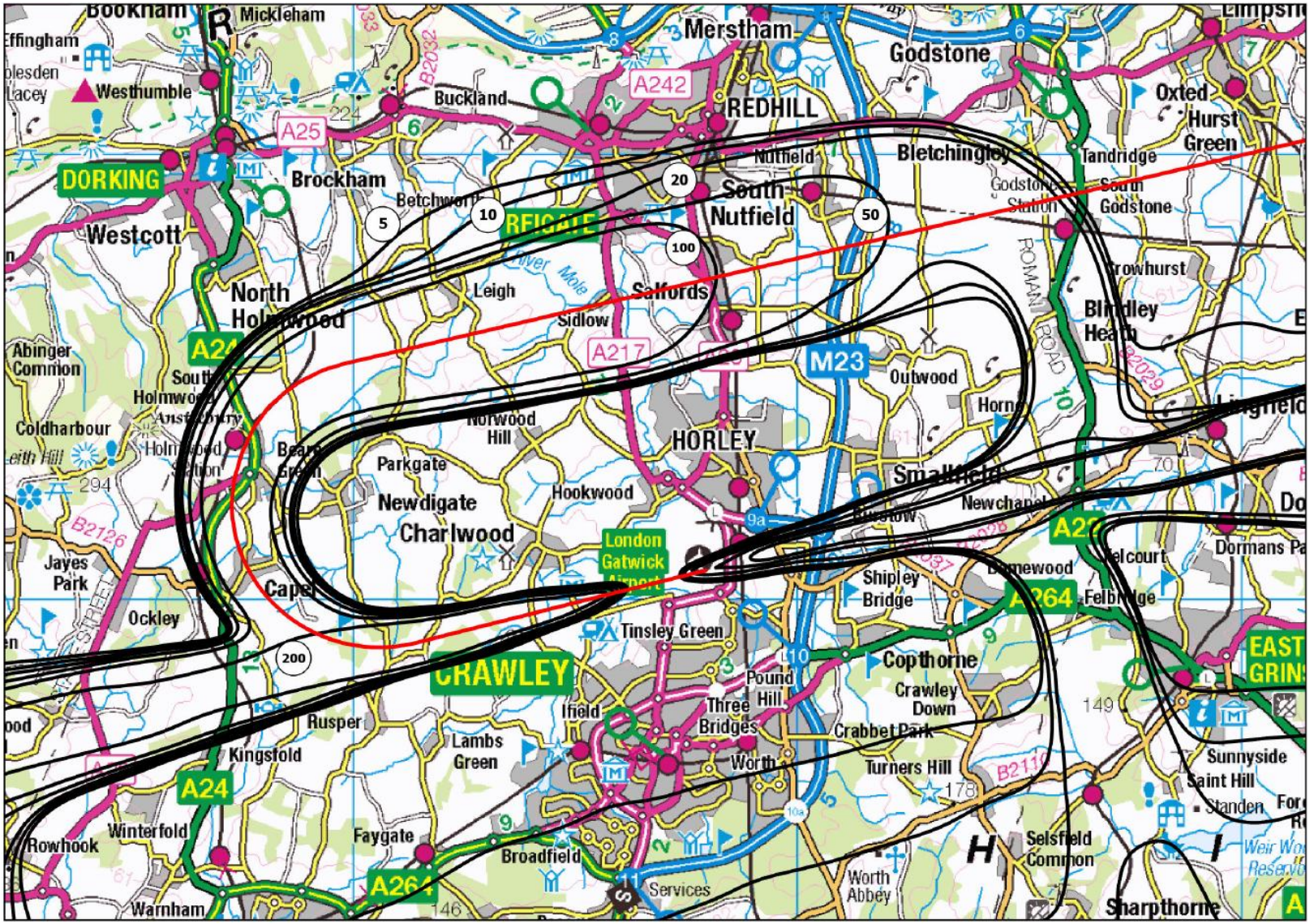


Figure 18 Option A 2036 Summer Day Overflight Contours

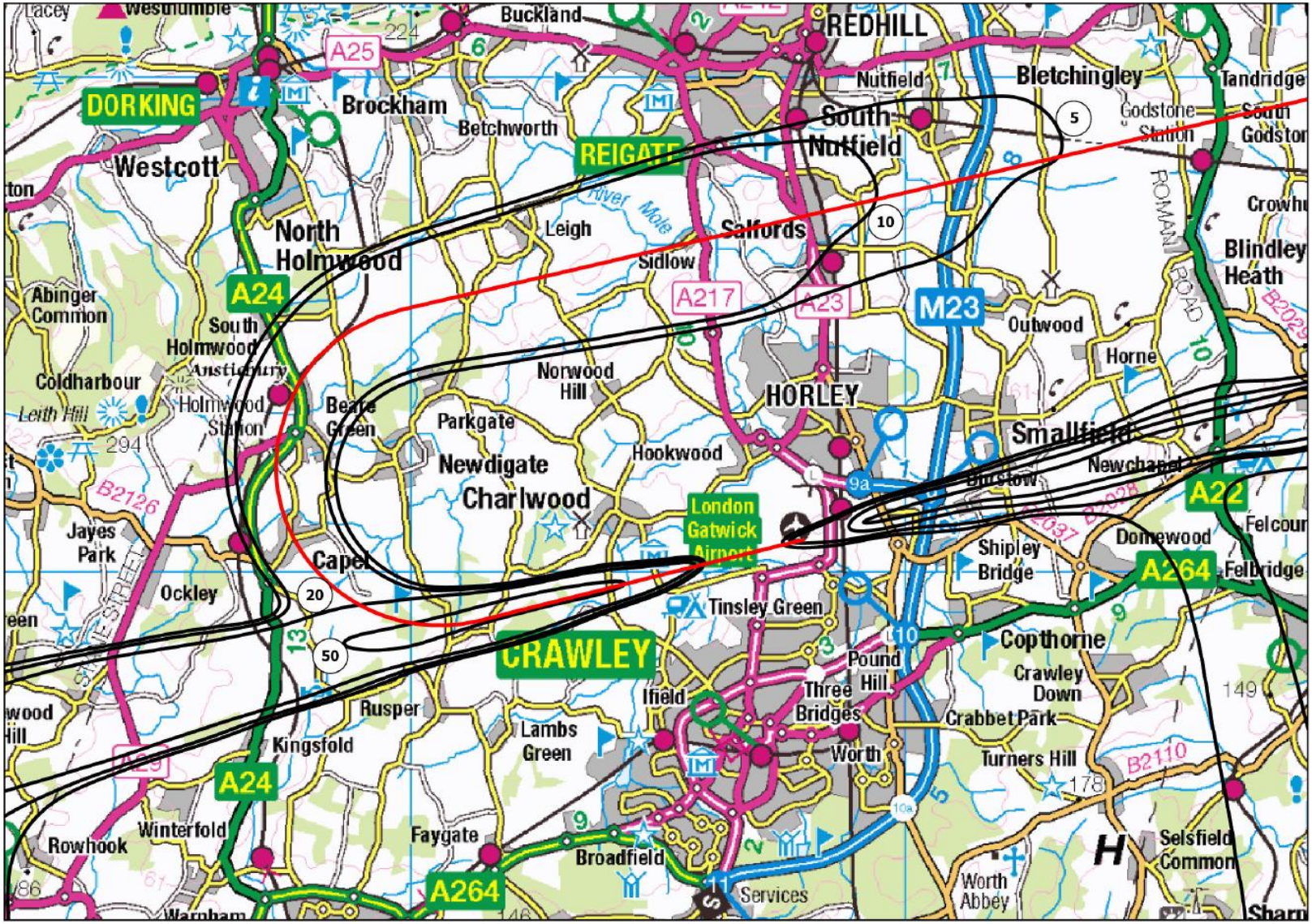


Figure 19 Option A 2036 Summer Night Overflight Contours

6 Full Options Appraisal – Option B Compared to Baseline

6.1 Introduction

This section of the report presents the full options appraisal for Option B and presents a summary of the results. The complete analysis of Option B, including the $L_{Aeq,16hr}$, $L_{Aeq,8hr}$, N65, N60, overflight contours and the associated cumulative estimates of the areas, populations, households and noise sensitive buildings is contained in Annex A3 of this report.

For ease of comparison against the Baseline, Figure 20 to Figure 25 on the following pages contain a snapshot of each of the contours produced for Option B for 2036 only that show the likely impact in the area affected by Route 4 operations. The L_{Aeq} contour images also show the Baseline contours (in blue) for comparative purposes.

6.2 Option B

Group	Notes	Quantitative noise assessment results compared to Baseline	Assessment result
Communities	Noise	Individuals experiencing increased daytime noise in forecast year: 2036	752
Communities	Noise	Individuals experiencing reduced daytime noise in forecast year: 2036	1210
Communities	Noise	Individuals experiencing increased night-time noise in forecast year: 2036	320
Communities	Noise	Individuals experiencing reduced night-time noise in forecast year: 2036	1090
Communities	Noise	Net Present Value of change in noise	+£109,812

Group	Other Impact	Assessment compared to Baseline	Assessment result
Communities	Air Quality	No change versus Baseline as no changes are taking place to aircraft tracks below 1000ft	No Change
Wider Society	Greenhouse Gas impact. Negative figure = decrease versus Baseline	Change in CO_2 Equivalent emissions over 10-year appraisal period (tonnes)	–495
		Change in annual CO_2 Equivalent emissions in opening year (tonnes)	–64
	Greenhouse Gas CO_2e: positive figures are a benefit; negative are a cost to society	Overall Assessment NPV CO_2 Equivalent emissions	+£67,465
		NPV of traded sector CO_2 Equivalent emissions	–£1,533
Wider Society	Tranquillity	The nominal track for Option B overflies the most easterly section of the Surrey Hills National Landscape and the most westerly section of the Kent Downs National Landscape. Aircraft will be between 1,500 ft and 3,200 ft whilst overflying the eastern portion of the Surrey Hills National Landscape during the initial turn and will be between 4,000 ft and 5,000 ft whilst overflying the western portion of the Kent Downs National Landscape. This represents no difference between Option B and the Baseline scenario.	No Change
Wider Society	Biodiversity	There is no anticipated impact on any biodiversity receptors due the minimal changes made in terms of aircraft routing, when compared to the baseline. Some areas occupied by Ancient Woodland, European Protected Species and Bird Conservation Targeting Areas are overflown by this option, however this is the same as the baseline scenario.	No Change
Wider Society	Capacity and resilience	This option will support the current Gatwick Airport capacity cap. With regards to resilience, there is deemed to be no difference between this option and the baseline scenario	No Change

Group	Other Impact	Assessment compared to Baseline	Assessment result
General Aviation (GA)	Access	No change when compared to the baseline scenario. GA users of Gatwick Airport will continue to arrive and depart under extant operational arrangements.	No change
GA / commercial airlines	Economic impact from increased effective capacity	This option is not designed to facilitate extra capacity but to enable the full use of the current capacity. Additionally, this option is not expected to reduce the flow of air traffic out of the airport overall.	No change
GA / commercial airlines	Fuel burn	Change in annual fuel burn in opening year versus Baseline (tonnes)	–20
		Change in annual fuel burn in forecast year versus Baseline (tonnes)	–11
Commercial airlines	Training costs	No additional training costs anticipated.	No change
Airport /ANSP	Other costs	No additional costs anticipated.	No change
Airport / ANSP	Infrastructure costs	No additional infrastructure costs anticipated.	No Change
Airport / ANSP	Operational costs	No additional operational costs anticipated.	No change
Airport / ANSP	Deployment costs	This option is expected to incur deployment costs associated with amendments to the UK AIP.	-£60,000

Table 10 Full Options Appraisal of Option B

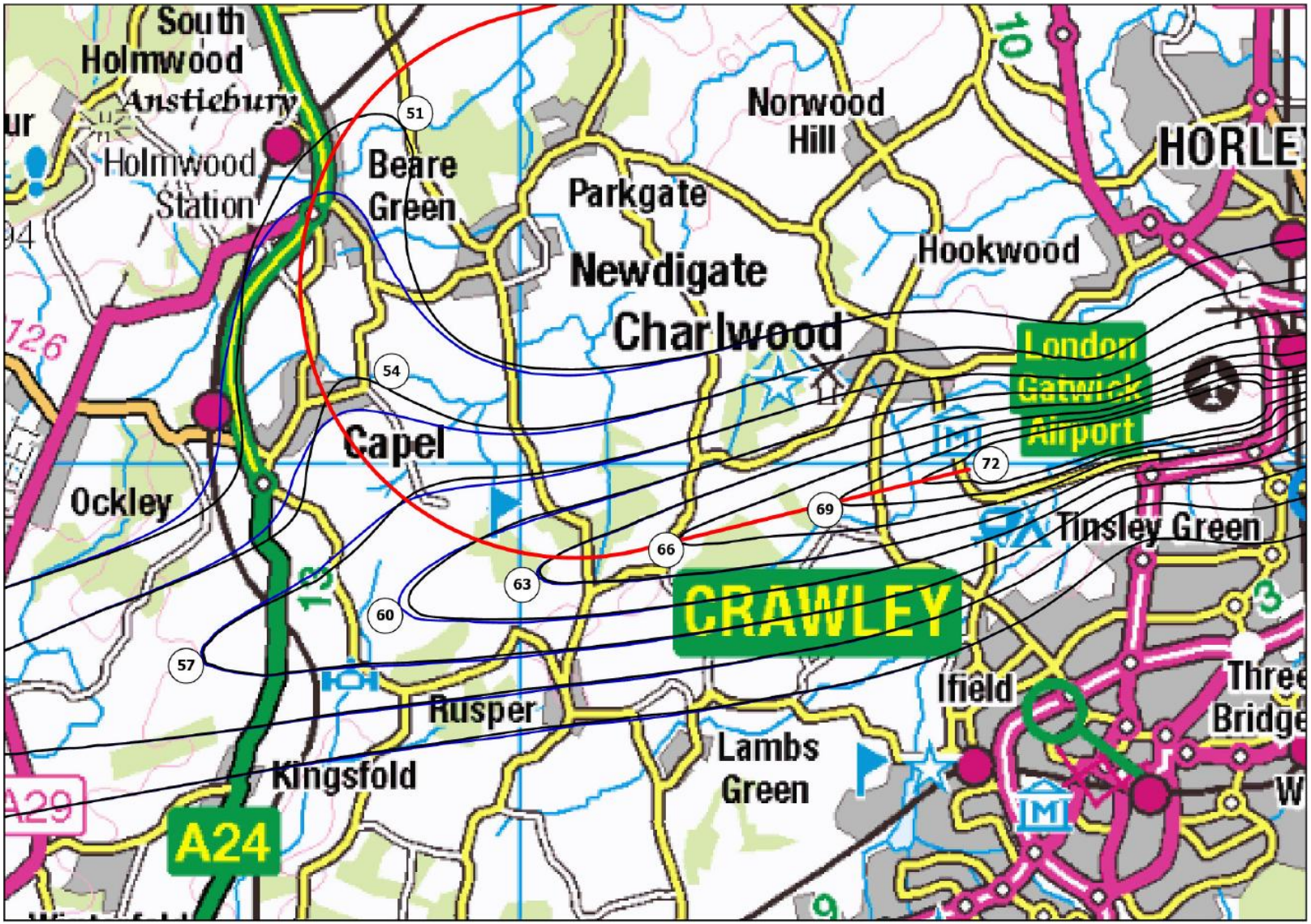


Figure 20 Option B 2036 16hr Noise Contours above 51dBA $L_{Aeq\ 16hr}$

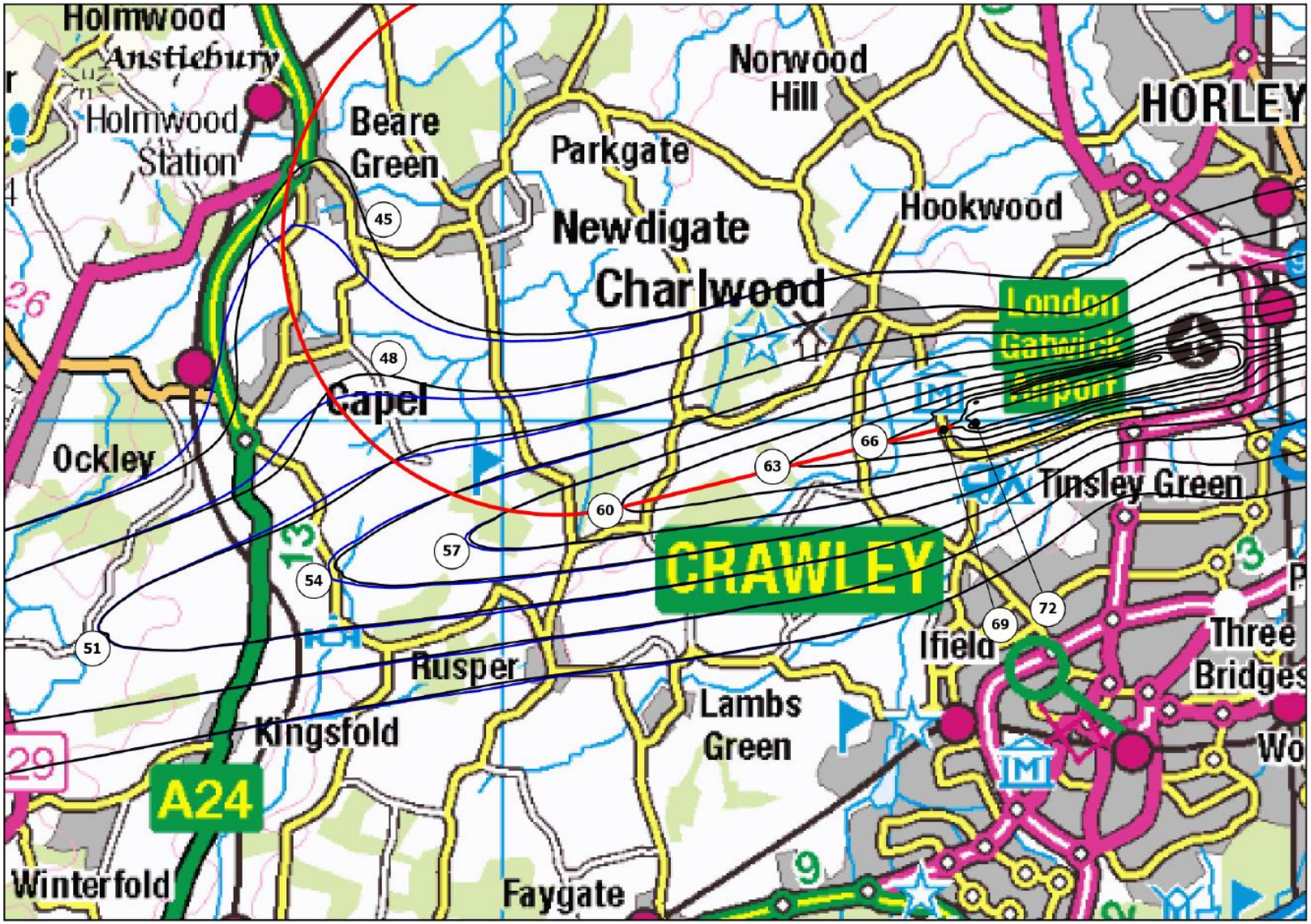


Figure 21 Option B 2036 8hr Night Noise Contours above 45dBA $L_{Aeq\ 16hr}$

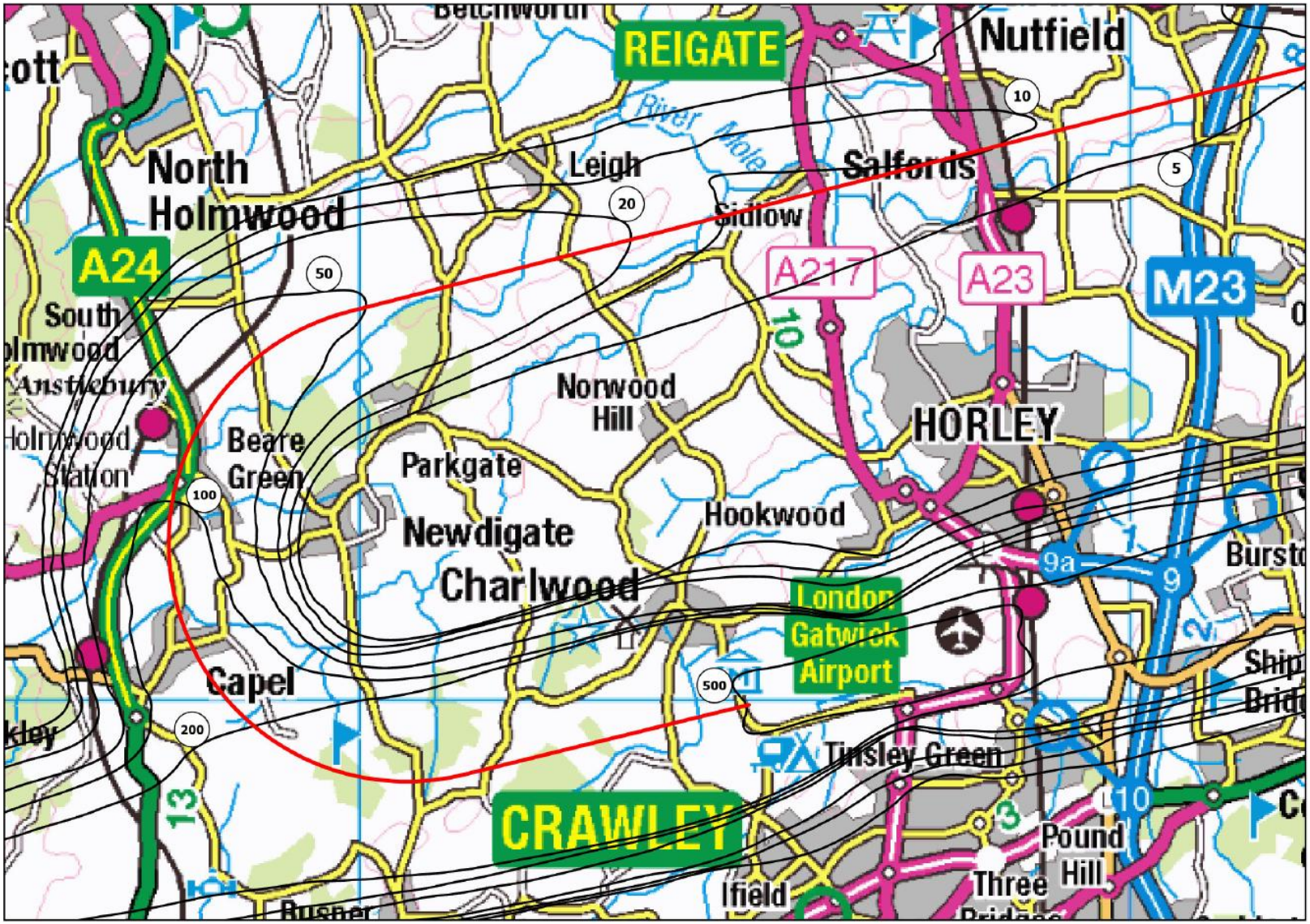


Figure 22 Option B 2036 Summer Day N65 Contours

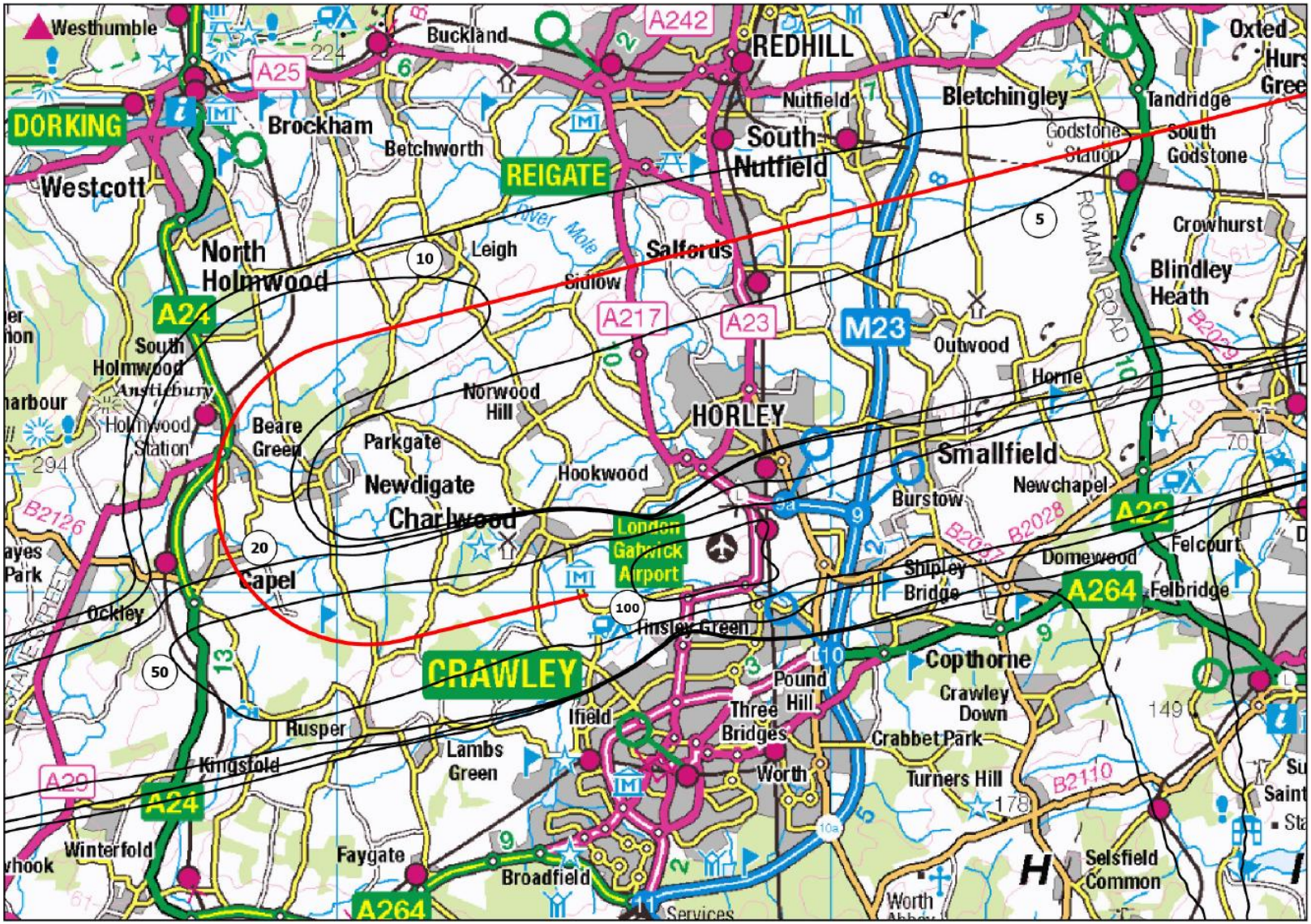


Figure 23 Option B 2036 Summer Night N60 Contours

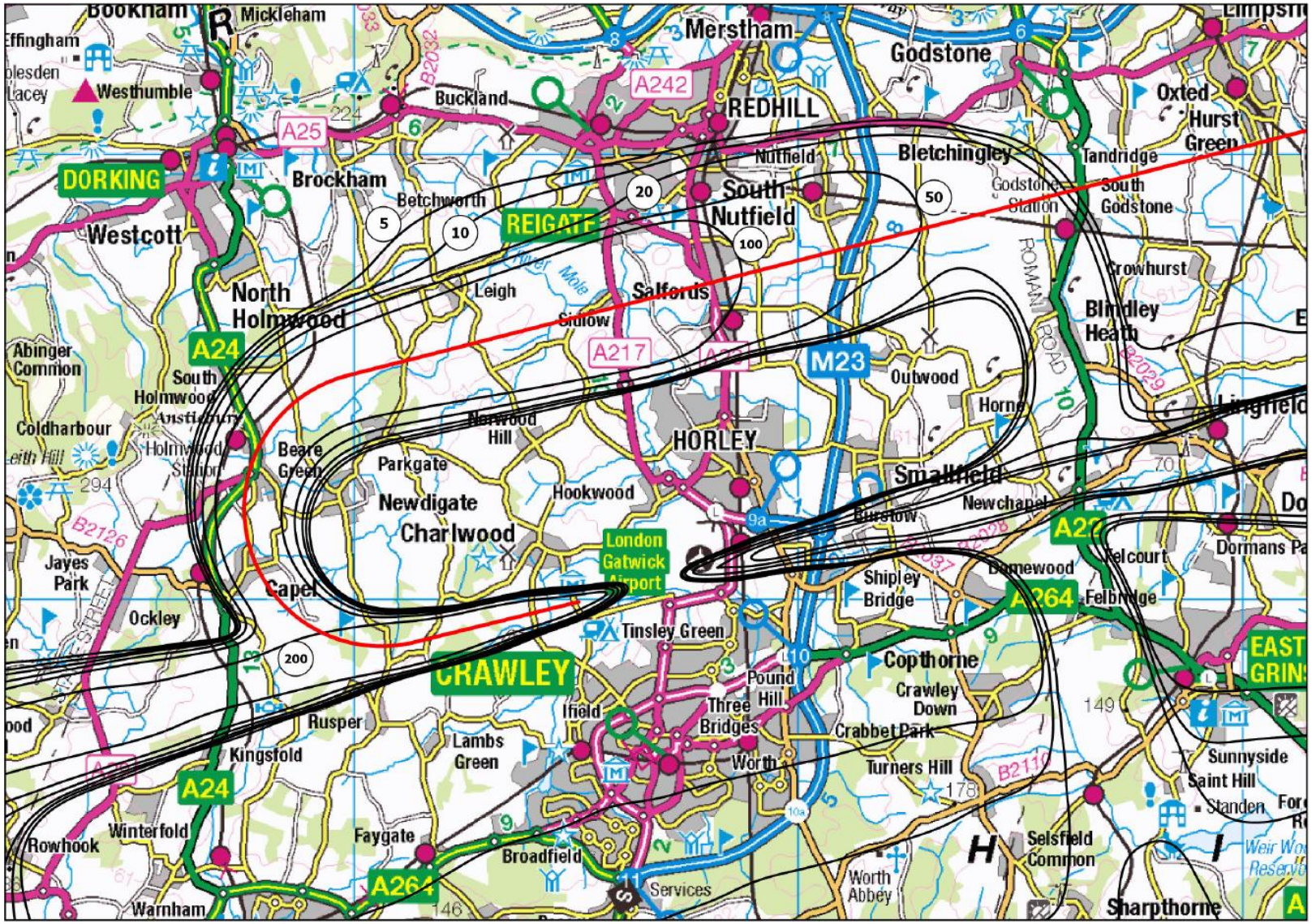


Figure 24 Option B 2036 Summer Day Overflight Contours

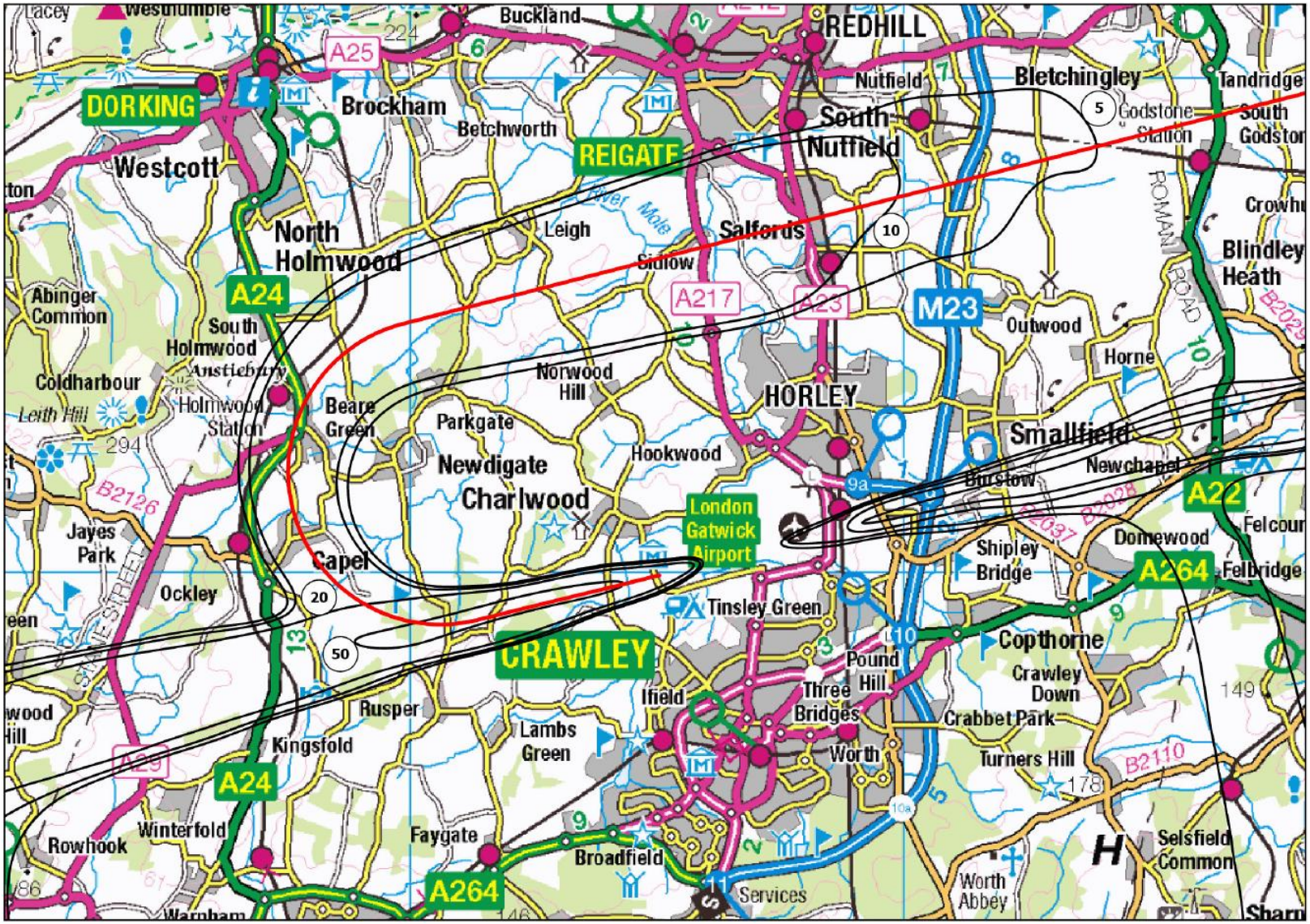


Figure 25 Option B 2036 Summer Night Overflight Contours

7 Full Options Appraisal – Option C Compared to Baseline

7.1 Introduction

This section of the report presents the full options appraisal for Option C and presents a summary of the results. The complete analysis of Option C, including the $L_{Aeq,16hr}$, $L_{Aeq,8hr}$, N65, N60, overflight contours and the associated cumulative estimates of the areas, populations, households and noise sensitive buildings is contained in Annex A4 of this report.

For ease of comparison against the Baseline, Figure 26 to Figure 31 on the following pages contain a snapshot of each of the contours produced for Option C for 2036 only that show the likely impact in the area affected by Route 4 operations. The L_{Aeq} contour images also show the Baseline contours (in blue) for comparative purposes.

7.2 Option C

Group	Notes	Quantitative noise assessment results compared to Baseline	Assessment result
Communities	Noise	Individuals experiencing increased daytime noise in forecast year: 2036	285
Communities	Noise	Individuals experiencing reduced daytime noise in forecast year: 2036	315
Communities	Noise	Individuals experiencing increased night-time noise in forecast year: 2036	163
Communities	Noise	Individuals experiencing reduced night-time noise in forecast year: 2036	297
Communities	Noise	Net Present Value of change in noise	+£24,977

Group	Other Impact	Assessment compared to Baseline	Assessment result
Communities	Air Quality	No change versus Baseline as no changes are taking place to aircraft tracks below 1000ft	No Change
Wider Society	Greenhouse Gas impact. Negative figure = decrease versus Baseline	Change in CO_2 Equivalent emissions over 10-year appraisal period (tonnes)	+879
		Change in annual CO_2 Equivalent emissions in opening year (tonnes)	+90
	Greenhouse Gas CO_2e: positive figures are a benefit; negative are a cost to society	Overall Assessment NPV CO_2 Equivalent emissions	–£79,904
		NPV of traded sector CO_2 Equivalent emissions	–£78,232
Wider Society	Tranquillity	The nominal track for Option C overflies the most easterly section of the Surrey Hills National Landscape and the most westerly section of the Kent Downs National Landscape. Aircraft will be between 1,500 ft and 3,200 ft whilst overflying the eastern portion of the Surrey Hills National Landscape during the initial turn and will be between 4,000 ft and 5,000 ft whilst overflying the western portion of the Kent Downs National Landscape. This represents no difference between Option C and the Baseline scenario.	No Change
Wider Society	Biodiversity	There is no anticipated impact on any biodiversity receptors due the minimal changes made in terms of aircraft routing, when compared to the baseline. Some areas occupied by Ancient Woodland, European Protected Species and Bird Conservation Targeting Areas are overflown by this option, however this is the same as the baseline scenario.	No Change
Wider Society	Capacity and resilience	This option will support the current Gatwick Airport capacity cap. With regards to resilience, there is deemed to be no difference between this option and the baseline scenario	No Change

Group	Other Impact	Assessment compared to Baseline	Assessment result
General Aviation (GA)	Access	No change when compared to the baseline scenario. GA users of Gatwick Airport will continue to arrive and depart under extant operational arrangements.	No change
GA / commercial airlines	Economic impact from increased effective capacity	This option is not designed to facilitate extra capacity but to enable the full use of the current capacity. Additionally, this option is not expected to reduce the flow of air traffic out of the airport overall.	No Change
GA / commercial airlines	Fuel burn	Change in annual fuel burn in opening year versus Baseline (tonnes)	+28
		Change in annual fuel burn in forecast year versus Baseline (tonnes)	+27
Commercial airlines	Training costs	No additional training costs anticipated.	No change
Airport /ANSP	Other costs	No additional costs anticipated.	No change
Airport / ANSP	Infrastructure costs	No additional infrastructure costs anticipated.	No Change
Airport / ANSP	Operational costs	No additional operational costs anticipated.	No change
Airport / ANSP	Deployment costs	This option is expected to incur deployment costs associated with amendments to the UK AIP.	-£60,000

Table 11 Full Options Appraisal of Option C

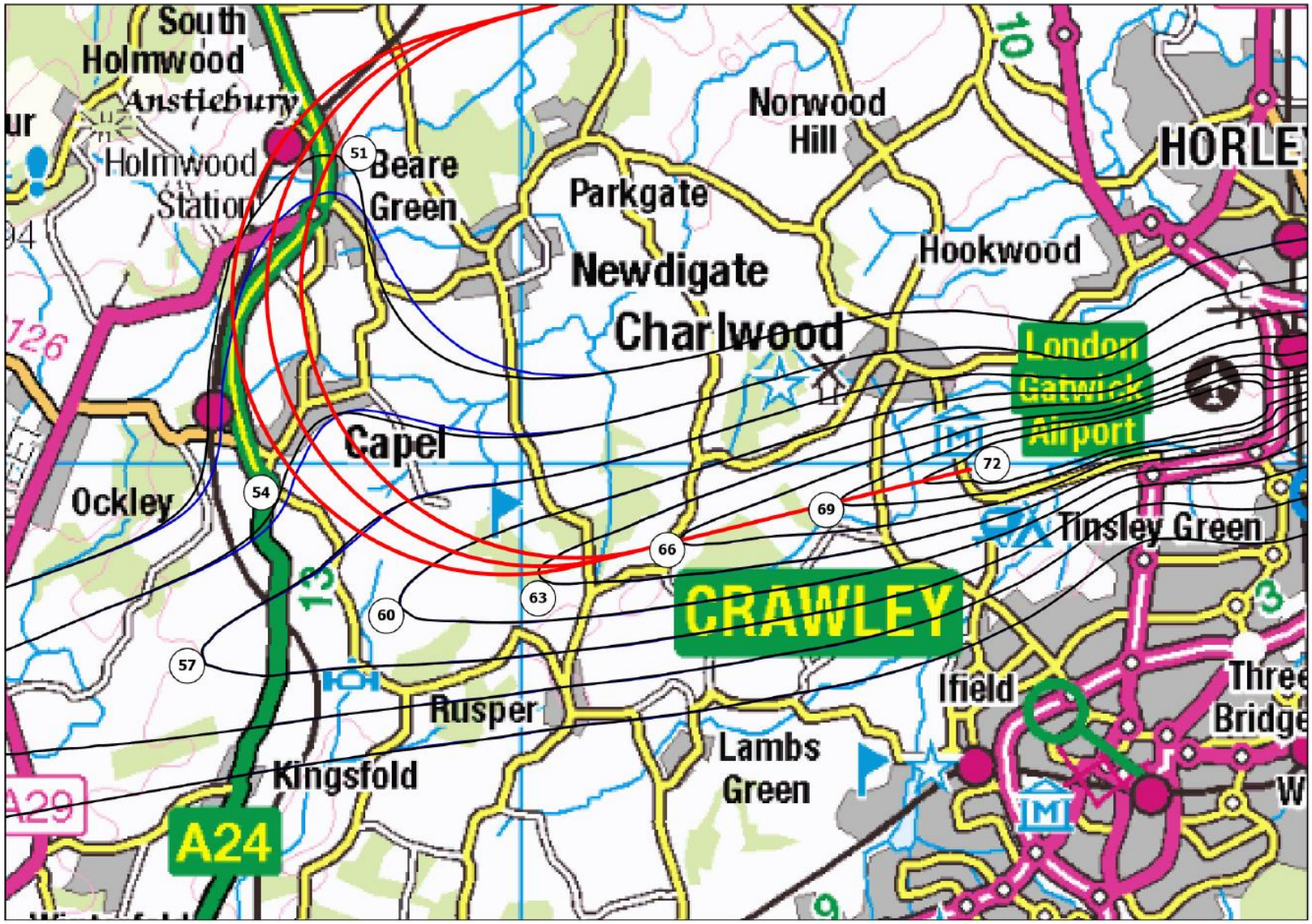


Figure 26 Option C 2036 16hr Noise Contours above 51dBA $L_{Aeq\ 16hr}$

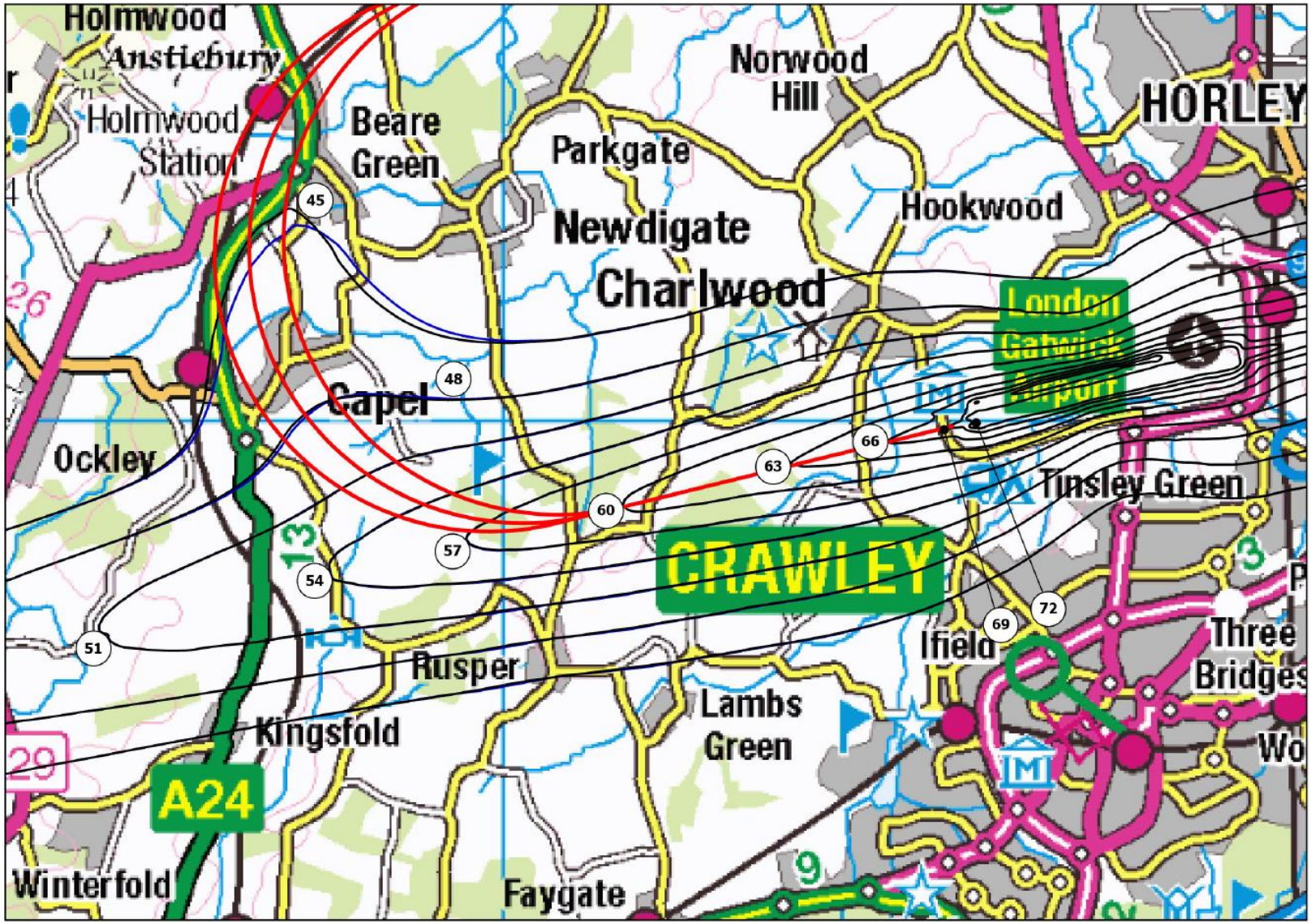


Figure 27 Option C 2036 8hr Night Noise Contours above 45dBA $L_{Aeq\ 16hr}$

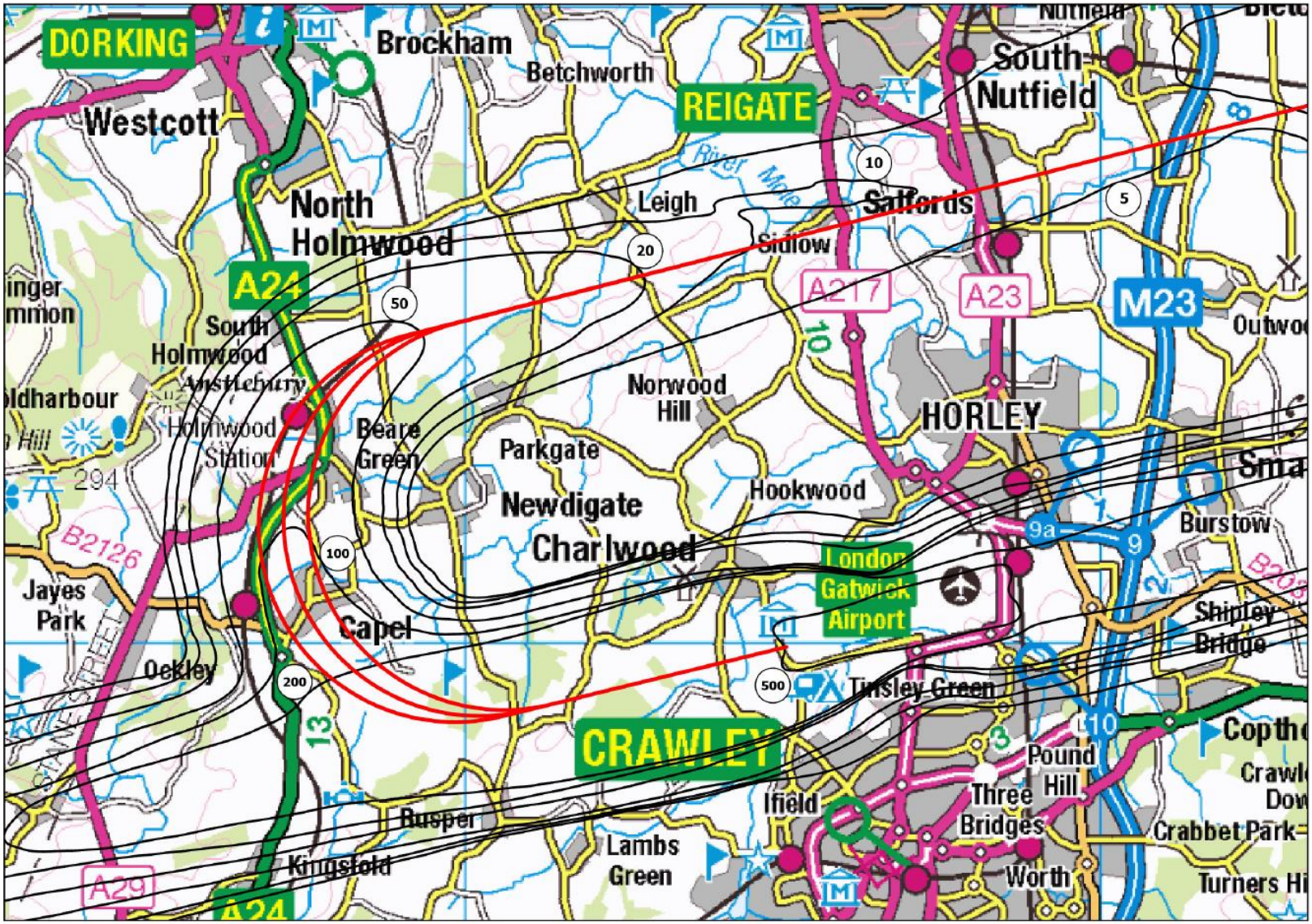


Figure 28 Option C 2036 Summer Day N65 Contours

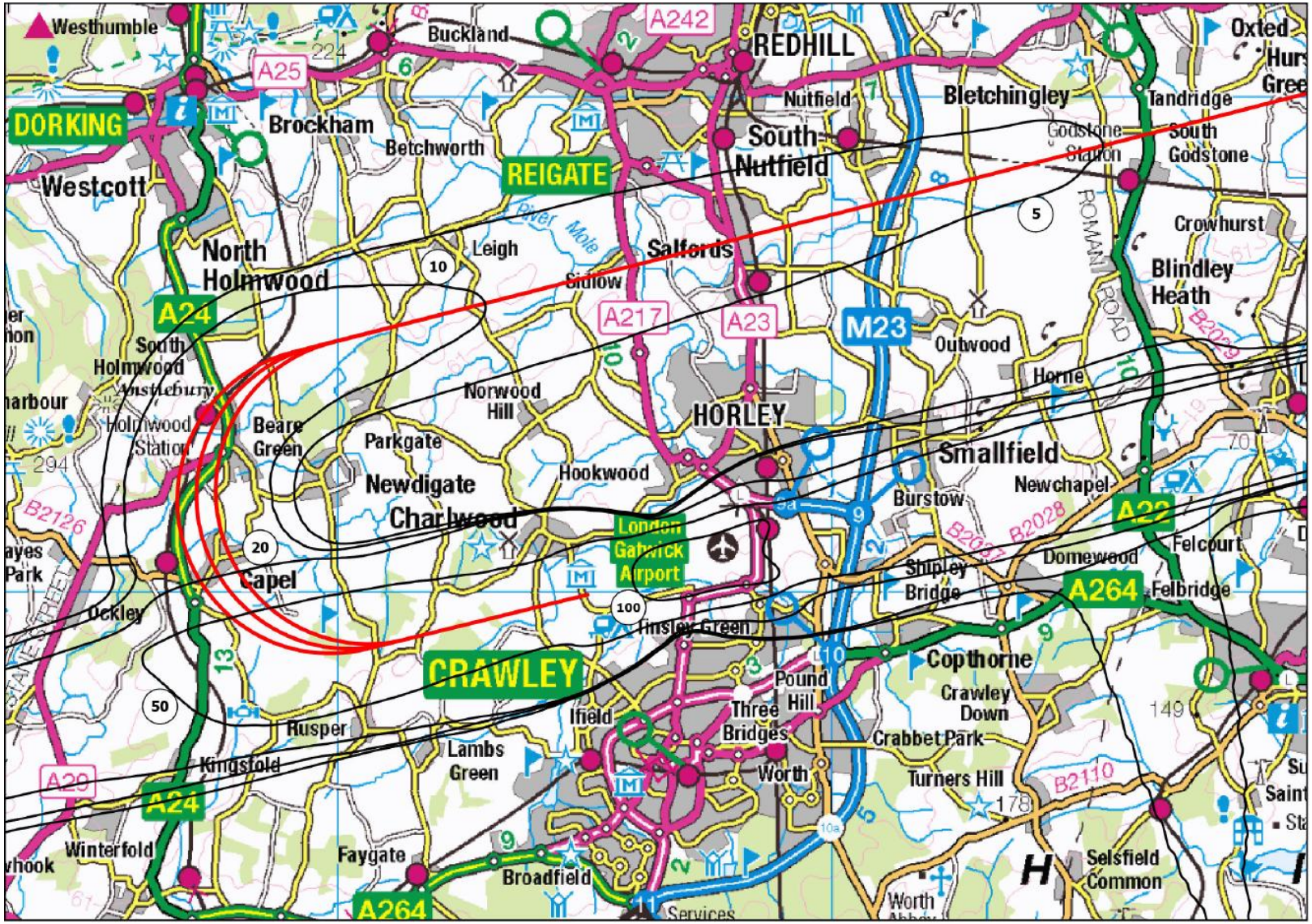


Figure 29 Option C 2036 Summer Night N60 Contours

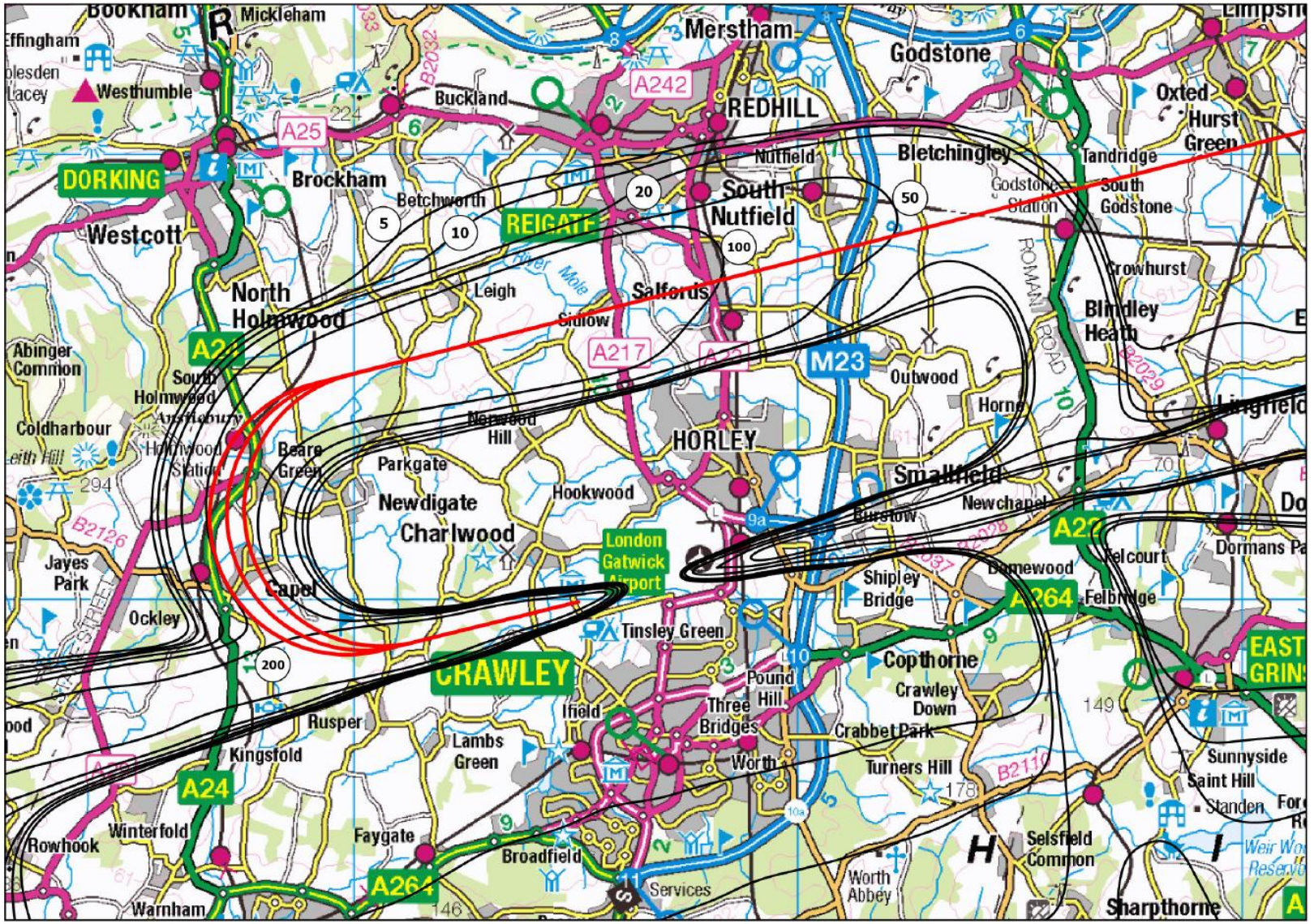


Figure 30 Option C 2036 Summer Day Overflight Contours

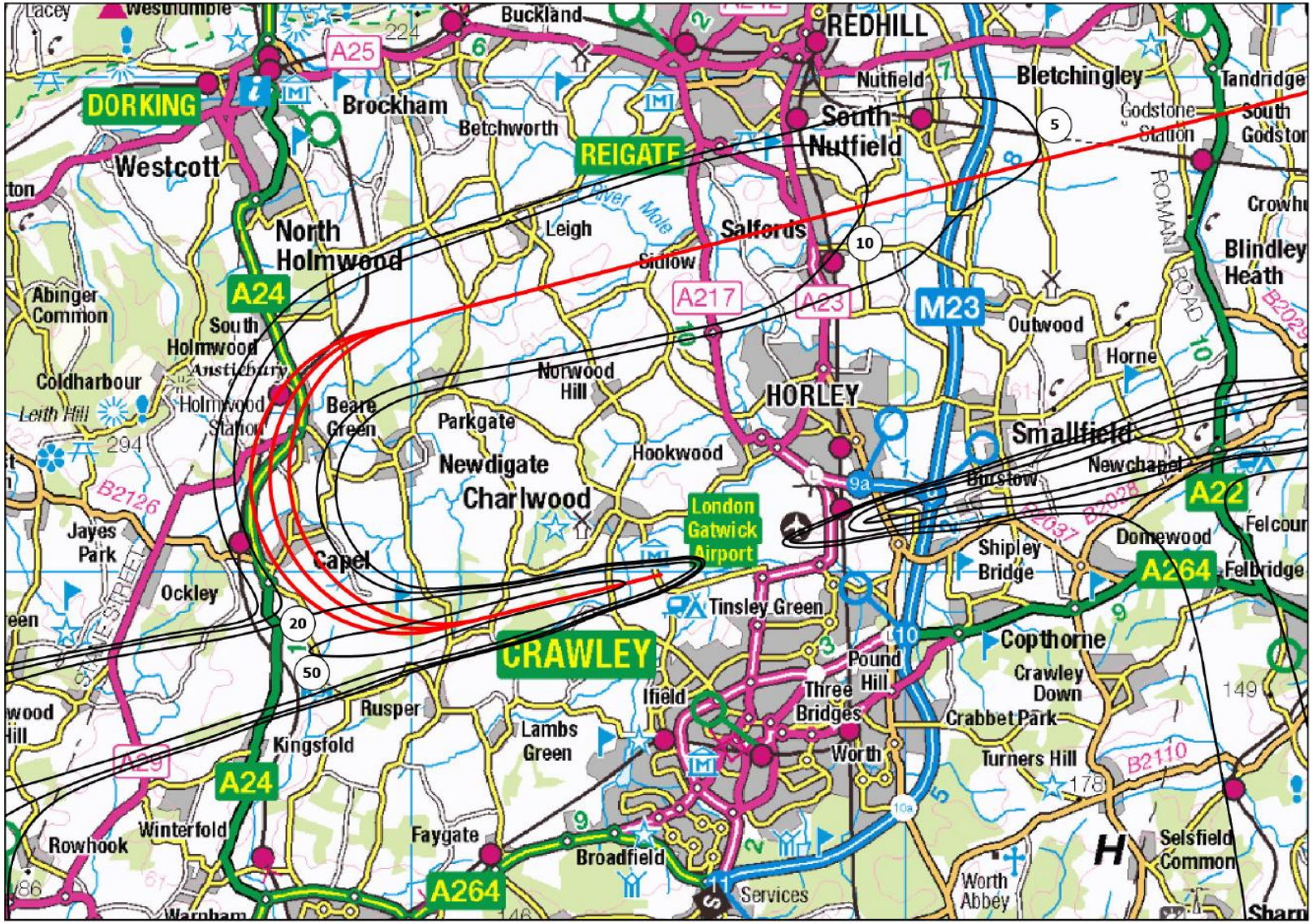


Figure 31 Option C 2036 Summer Night Overflight Contours

8 Full Options Appraisal – Option D Compared to Baseline

8.1 Introduction

This section of the report presents the full options appraisal for Option D and presents a summary of the results. The complete analysis of Option D, including the $L_{Aeq,16hr}$, $L_{Aeq,8hr}$, N65, N60, overflight contours and the associated cumulative estimates of the areas, populations, households and noise sensitive buildings is contained in Annex A5 of this report.

For ease of comparison against the Baseline, Figure 32 to Figure 37 on the following pages contain a snapshot of each of the contours produced for Option D for 2036 only that show the likely impact in the area affected by Route 4 operations.

8.2 Option D

Group	Notes	Quantitative noise assessment results compared to Baseline	Assessment result
Communities	Noise	Individuals experiencing increased daytime noise in forecast year: 2036	550
Communities	Noise	Individuals experiencing reduced daytime noise in forecast year: 2036	1449
Communities	Noise	Individuals experiencing increased night-time noise in forecast year: 2036	349
Communities	Noise	Individuals experiencing reduced night-time noise in forecast year: 2036	717
Communities	Noise	Net Present Value of change in noise	+£301,183

Group	Other Impact	Assessment compared to Baseline	Assessment result
Communities	Air Quality	No change versus Baseline as no changes are taking place to aircraft tracks below 1000ft	No Change
Wider Society	Greenhouse Gas impact. Negative figure = decrease versus Baseline	Change in CO_2 Equivalent emissions over 10-year appraisal period (tonnes)	–2,901
		Change in annual CO_2 Equivalent emissions in opening year (tonnes)	–329
	Greenhouse Gas CO_2e: positive figures are a benefit; negative are a cost to society	Overall Assessment NPV CO_2 Equivalent emissions	+£325,159
		NPV of traded sector CO_2 Equivalent emissions	+£132,553
Wider Society	Tranquillity	Although the nominal track for Option D remains outside of the boundary of the Surrey Hills National Landscape, it is likely due to dispersion in the turn, that aircraft will overfly the most easterly section of the Surrey Hills National Landscape between 1,500 ft and 3,200 ft during the initial turn. Aircraft will also the most westerly section of the Kent Downs National Landscape between 4,000 ft and 5,000 ft. This represents no difference between Option D and the Baseline scenario.	No Change
Wider Society	Biodiversity	There is no anticipated impact on any biodiversity receptors due the minimal changes made in terms of aircraft routing, when compared to the baseline. Some areas occupied by Ancient Woodland, European Protected Species and Bird Conservation Targeting Areas are overflown by this option, however this is the same as the baseline scenario.	No Change
Wider Society	Capacity and resilience	This option will support the current Gatwick Airport capacity cap. With regards to resilience, there is deemed to be no difference between this option and the baseline scenario	No Change
General Aviation (GA)	Access	No change when compared to the baseline scenario. GA users of Gatwick Airport will continue to arrive and depart under extant operational arrangements.	No change

Group	Other Impact	Assessment compared to Baseline	Assessment result
GA / commercial airlines	Economic impact from increased effective capacity	This option is not designed to facilitate extra capacity but to enable the full use of the current capacity. Additionally, this option is not expected to reduce the flow of air traffic out of the airport overall.	No change
GA / commercial airlines	Fuel burn	Change in annual fuel burn in opening year versus Baseline (tonnes)	–104
		Change in annual fuel burn in forecast year versus Baseline (tonnes)	–79
Commercial airlines	Training costs	No additional training costs anticipated.	No change
Airport /ANSP	Other costs	No additional costs anticipated.	No change
Airport / ANSP	Infrastructure costs	No additional infrastructure costs anticipated.	No change
Airport / ANSP	Operational costs	No additional operational costs anticipated.	No change
Airport / ANSP	Deployment costs	This option is expected to incur deployment costs associated with amendments to the UK AIP.	-£60,000

Table 12 Full Options Appraisal of Option C

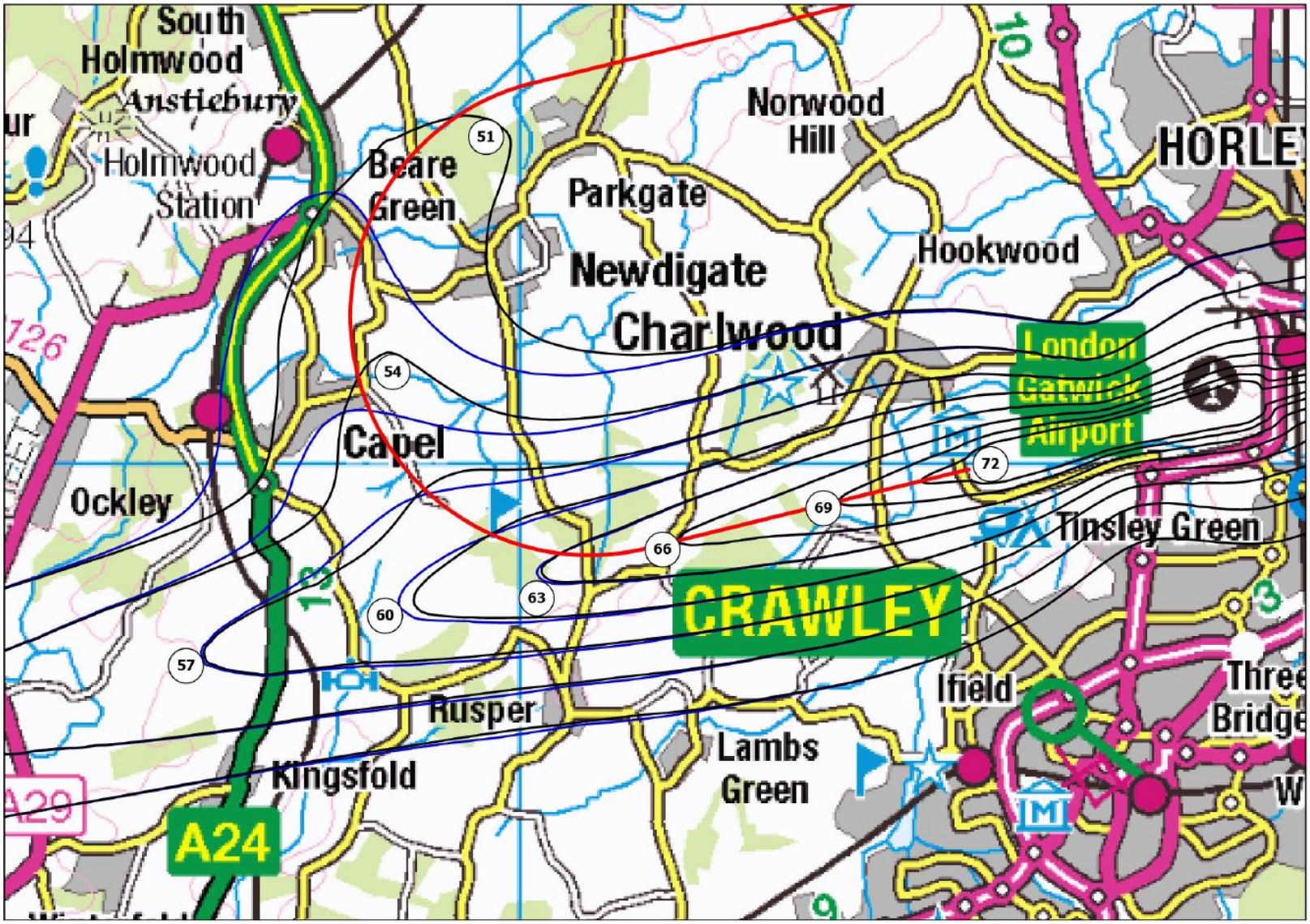


Figure 32 Option D 2036 16hr Noise Contours above 51dBA $L_{Aeq\ 16hr}$

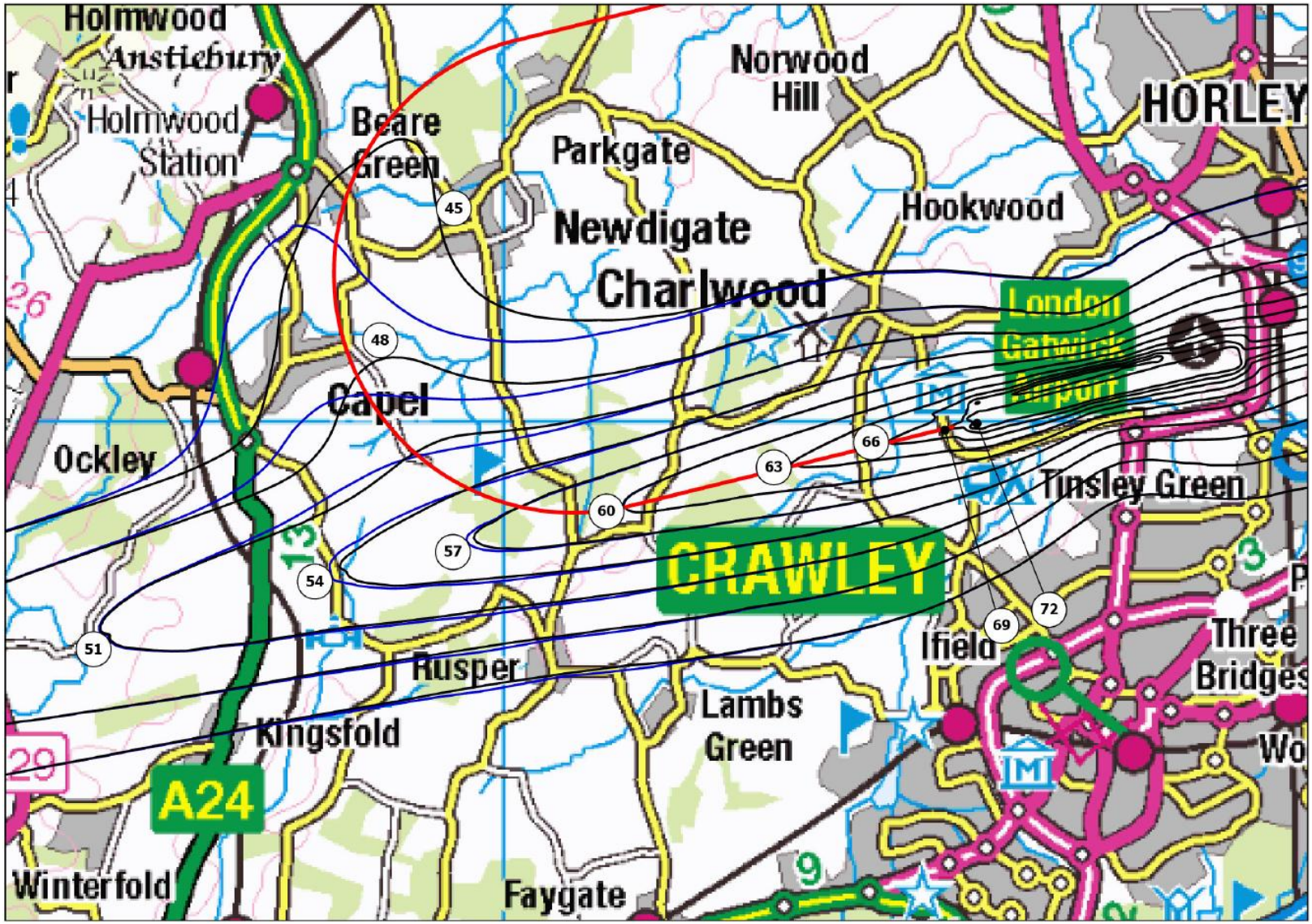


Figure 33 Option D 2036 8hr Night Noise Contours above 45dBA $L_{Aeq\ 16hr}$

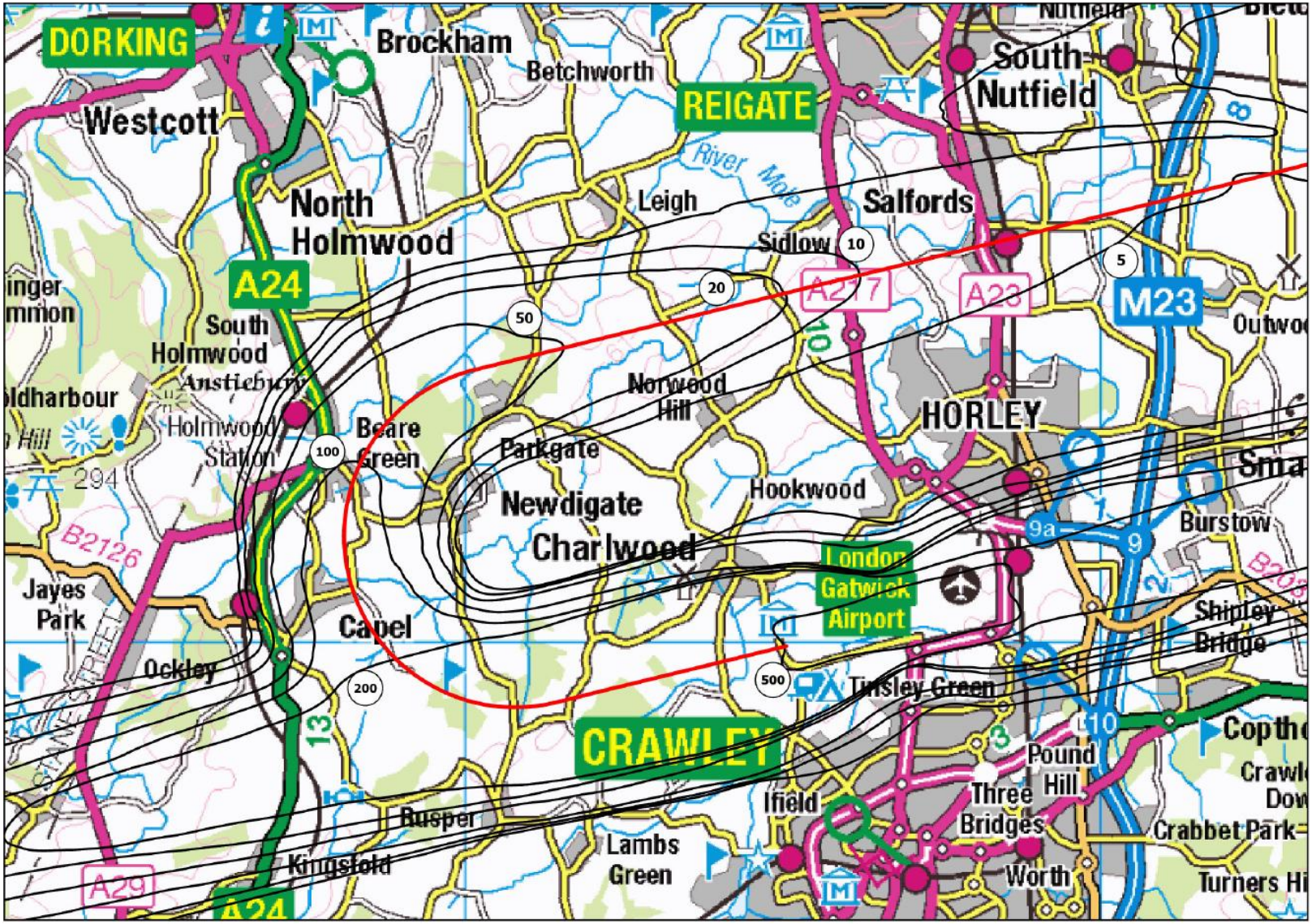


Figure 34 Option D 2036 Summer Day N65 Contours

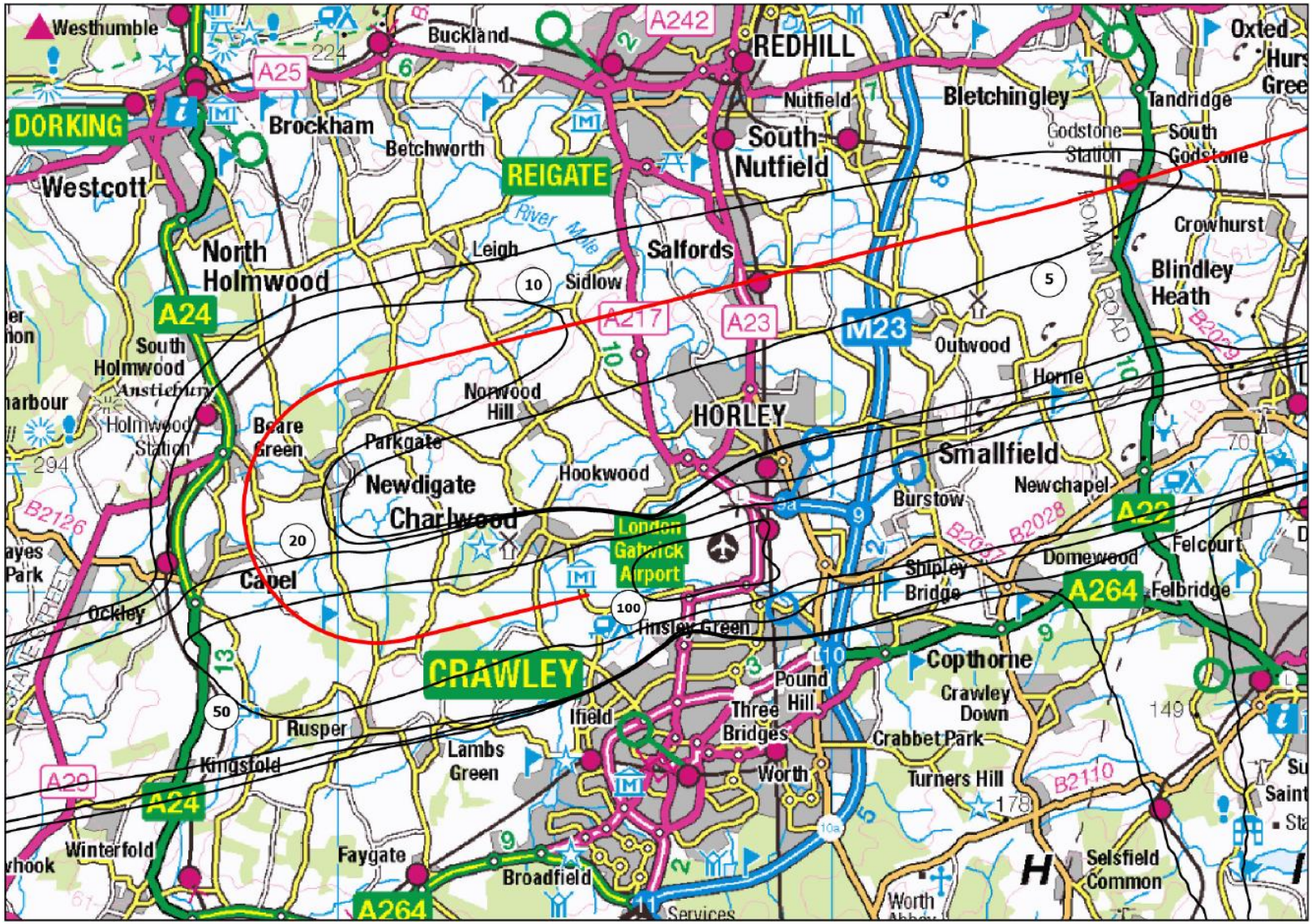


Figure 35 Option D 2036 Summer Night N60 Contours

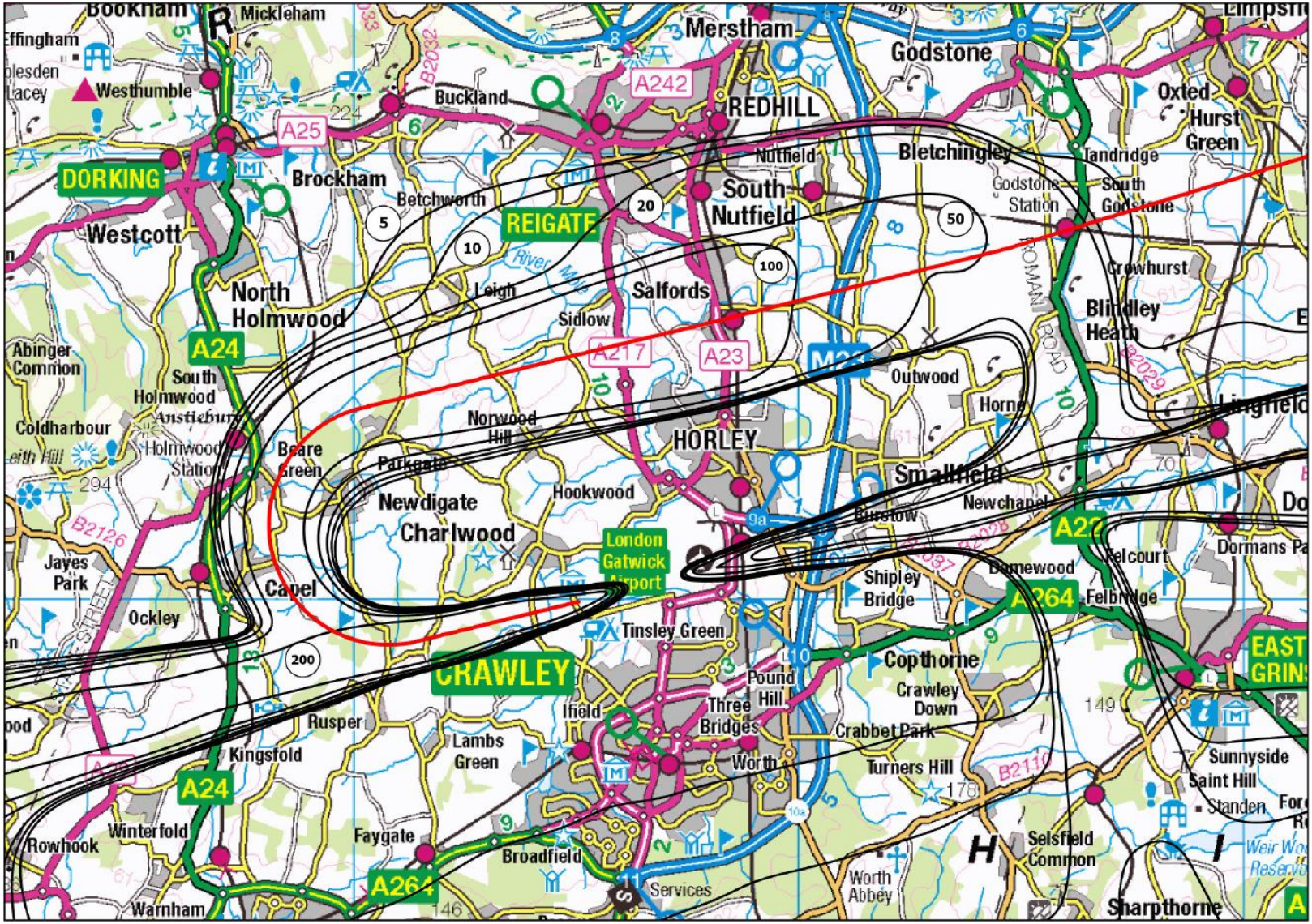


Figure 36 Option D 2036 Summer Day Overflight Contours

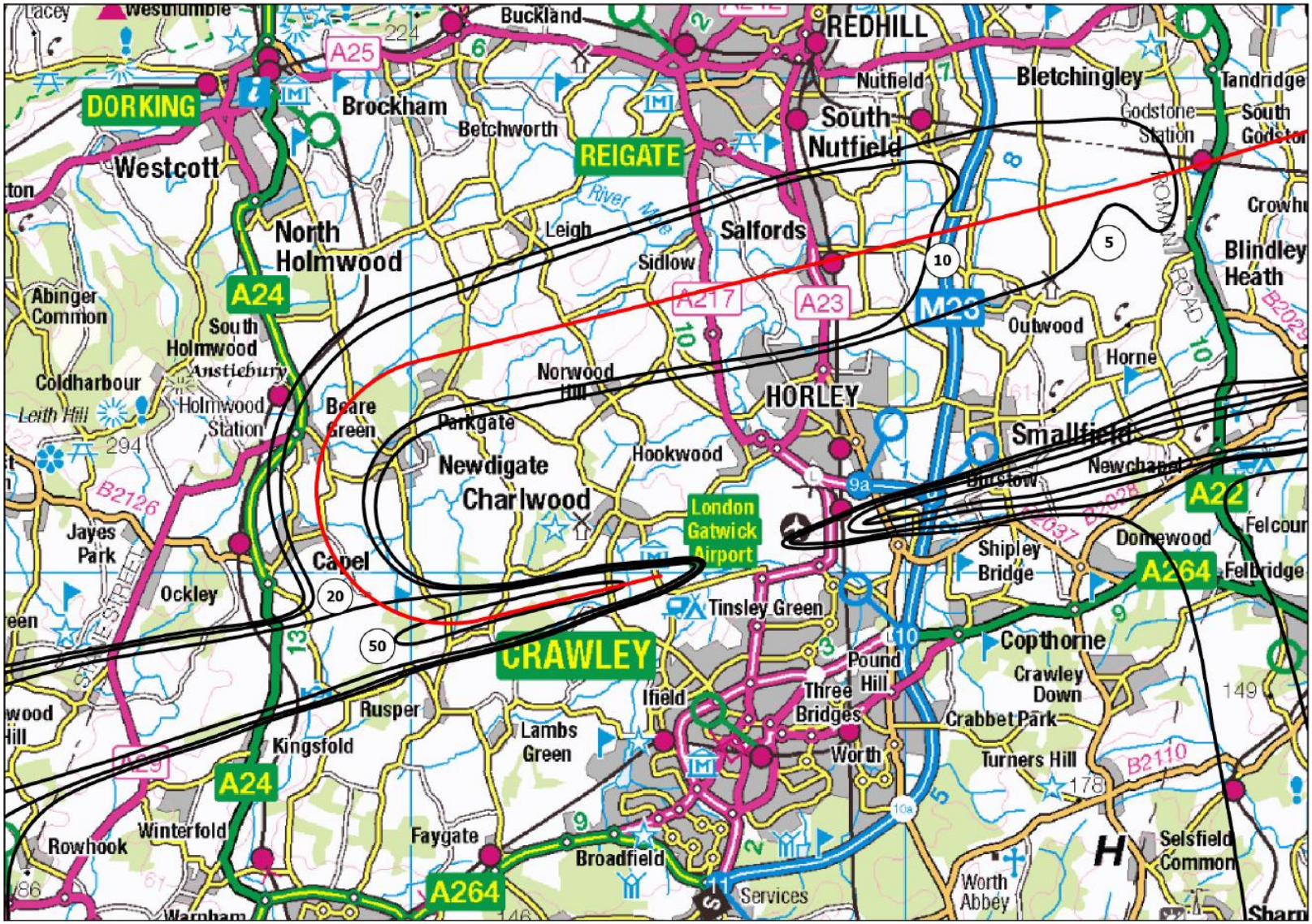


Figure 37 Option D 2036 Summer Night Overflight Contours

9 Comparing Options Compared to Baseline

9.1 Noise: NPV of Impacts

Table 13 presents the TAG noise assessment results in terms of Net Present Value (NPV) in 2010 prices of a range of impacts. The monetised results represent the annual cost over the 10-year appraisal period and the output is the net present value of the change in noise exposure. **A positive £ figure indicates a positive benefit, i.e. a reduction in noise-related adverse health impacts. Within each row, a figure has been highlighted green to indicate the most optimal outcome for that impact. The least optimal outcome has been highlighted red.**

Impact	A	B	C	D
Change in noise	+£3,214	+£109,812	+£24,977	+£301,183
Sleep disturbance	+£23,942	+£74,622	+£19,203	+£126,611
Amenity	–£14,124	+£25,787	+£4,494	+£123,438
AMI[9]	–£162	+£244	+£45	+£533
Stroke	–£2,566	+£3,655	+£494	+£20,169
Dementia	–£3,876	+£5,504	+£741	+£30,432

Table 13 NPV of Noise Impact

Figure 38 below shows a chart of the NPV of the impact of each option: the taller the bars on the chart, the bigger the benefit.

[9] AMI = Acute Myocardial Infarction (Heart Attack)

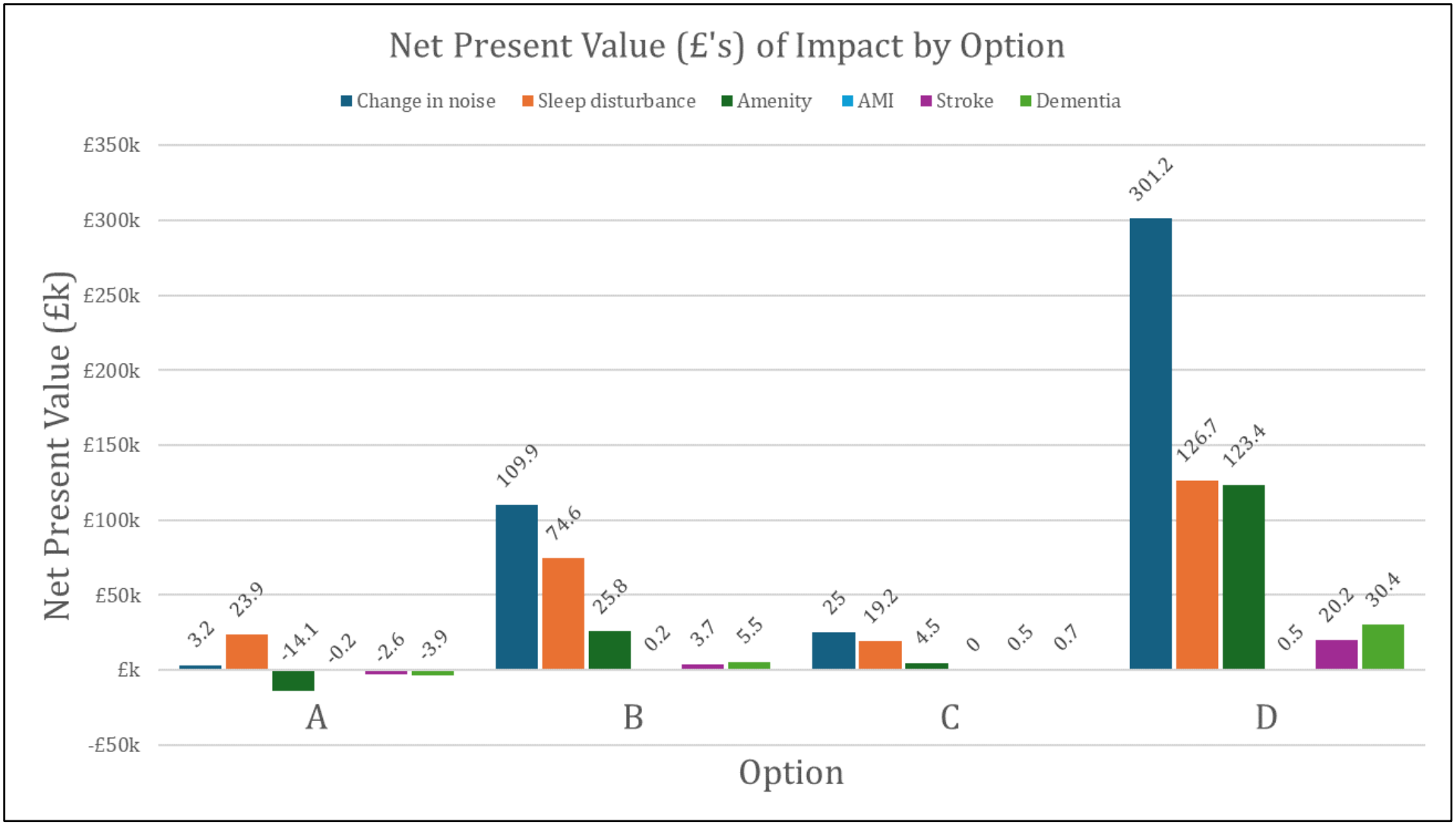


Figure 38 Option D 2036 Summer Night Overflight Contours

9.2 Noise: Quantitative population exposure to change in noise

Table 14 presents the TAG derived quantitative assessment of the number of individuals experiencing either an increase of or a decrease in noise levels for each of the options.

As Table 14 compares data for increased noise with that of reduced noise, a higher value does not necessarily equate to positive outcome. Within the rows indicating the increase and reduction in noise, a value has been emboldened to represent the option with the most optimal outcome whilst the value highlighted grey represents the least optimal.

The overall change row for both day and night represents the combined impact against the baseline. Negative figures are highlighted in red and represent a negative impact against the baseline whilst positive figures in green represent a positive impact.

Quantitative Change	A	B	C	D
Increased day noise	664	752	285	550
Reduced day noise	461	1210	315	1449
Overall day change	-203	458	30	899
Increased night noise	268	320	163	349
Reduced night noise	519	1090	297	717
Overall night change	251	770	134	368

Table 14 Quantitative Assessment of Population Exposure to Change in Noise Levels

Figure 39 below shows a chart of the number of people experiencing changes in average noise levels versus the Baseline, for each of the options. A positive bar indicates an overall decrease in the number of people affected.

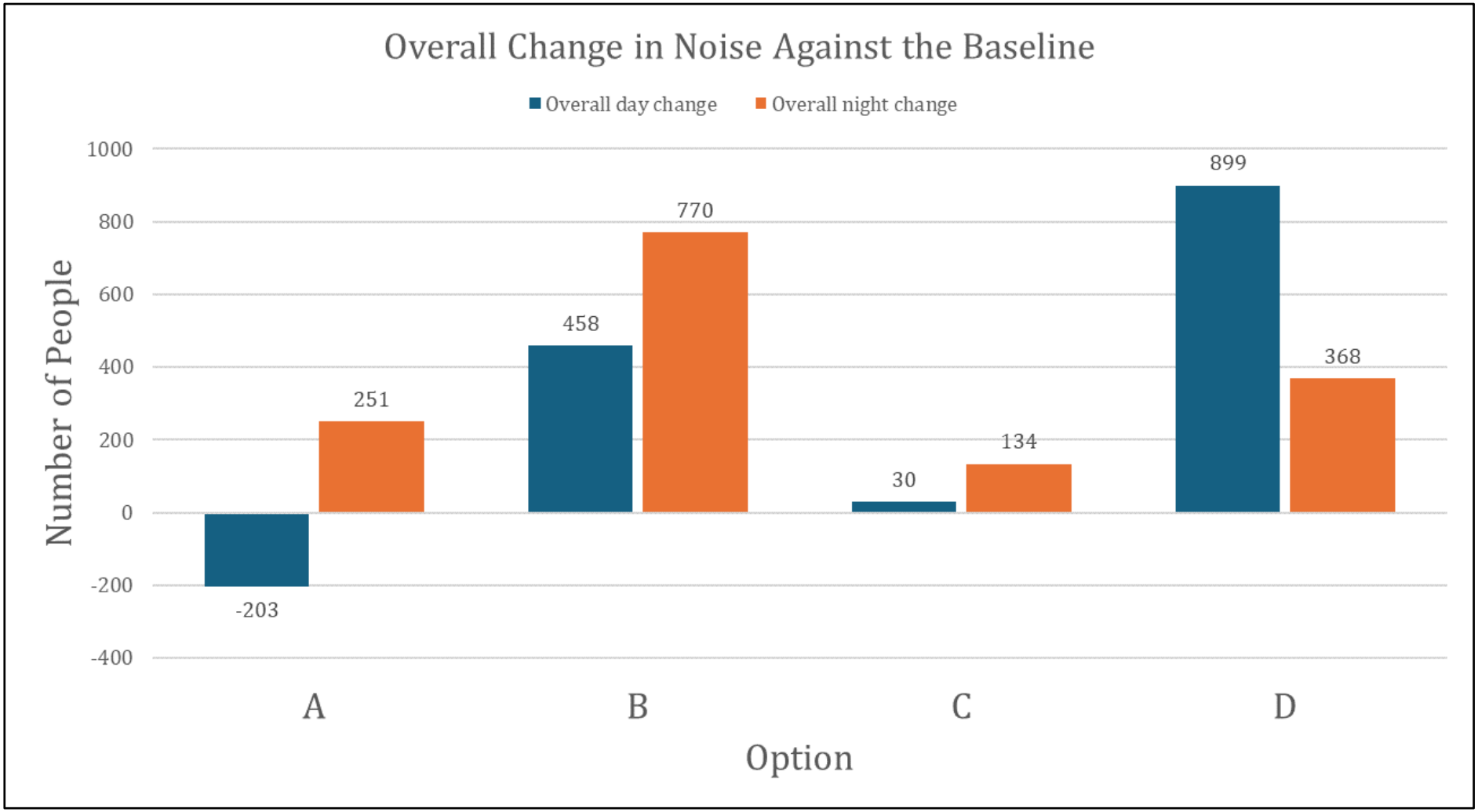


Figure 39 Overall Reduction in Noise Against the Baseline

9.3 Population by dBA LAeq16hr level

The number of people deemed to be exposed to daytime noise in each dBA level from 51dBA in 3dB increments up to 72dBA has been determined during the environmental assessment. These figures can be seen in Appendices A1 to A5 of this report which contains all of the results of the TAG analysis used throughout the full options appraisal process.

9.4 Population by dBA LAeq8hr level

The number of people deemed to be exposed to night-time noise in each dBA level from 45dBA in 3dB increments up to 72dBA has been determined during the environmental assessment. These figures can also be seen in Appendices A1 to A5 of this report which contains all of the results of the TAG analysis used throughout the full options appraisal process.

9.5 Fuel and CO_2

The mass fuel burn results (in tonnes) are summarised in Table 11. The differences calculated for future year scenarios are relative to the corresponding Baseline scenario. Positive numbers mean that more fuel is burned. As such, the option with the most optimal item in both 2027 and 2036 has been highlighted green and the least optimal has been highlighted red.

Scenario		Total Fuel Burn (tonnes)	Difference in Fuel Burn (tonnes)
2023	Current Day	341,148	n/a
2027	Baseline	383,311	2027 Reference Scenario
	Option A	383,327	+16
	Option B	383,291	–20
	Option C	383,339	+28
	Option D	383,207	–104
2036	Baseline	386,891	2036 Reference Scenario
	Option A	386,908	+17
	Option B	386,880	–11
	Option C	386,918	+27
	Option D	386,812	–79

Table 15 Mass Fuel Burn Results

The tonnes CO_2e results are summarised in Table 12.

Scenario		Total CO_2 (tonnes)	Traded CO_2 (tonnes)	Non-Traded CO_2 (tonnes)
2023	Current Day	1,084,294	458,369	625,925
2027	Baseline	1,218,301	429,047	789,254
	Option A	1,218,352	429,105	789,247
	Option B	1,218,237	429,032	789,206
	Option C	1,218,391	429,131	789,260
	Option D	1,217,972	428,865	789,107
2036	Baseline	1,229,681	421,473	808,208
	Option A	1,229,735	421,544	808,191
	Option B	1,229,646	421,494	808,152
	Option C	1,229,767	421,563	808,204
	Option D	1,229,430	421,365	808,064

Table 16 Tonnes CO2e Results

Fuel burn and CO_2e figures have been presented to the nearest tonne to enable meaningful comparisons between options. However, due to the various assumptions made and the inherent uncertainties in the modelling process, the absolute values of fuel burn and CO_2e should only be treated as estimates.

Figure 40 below shows the annual fuel burn and CO_2 emissions associated with each of the options versus the Baseline. The higher the bar on the chart, the less favourable the option regarding fuel consumption and emissions.

Figure 41 shows the difference in annual fuel burn for each option against the Baseline. The lower the bar on the chart, the more favourable the option regarding fuel consumption.

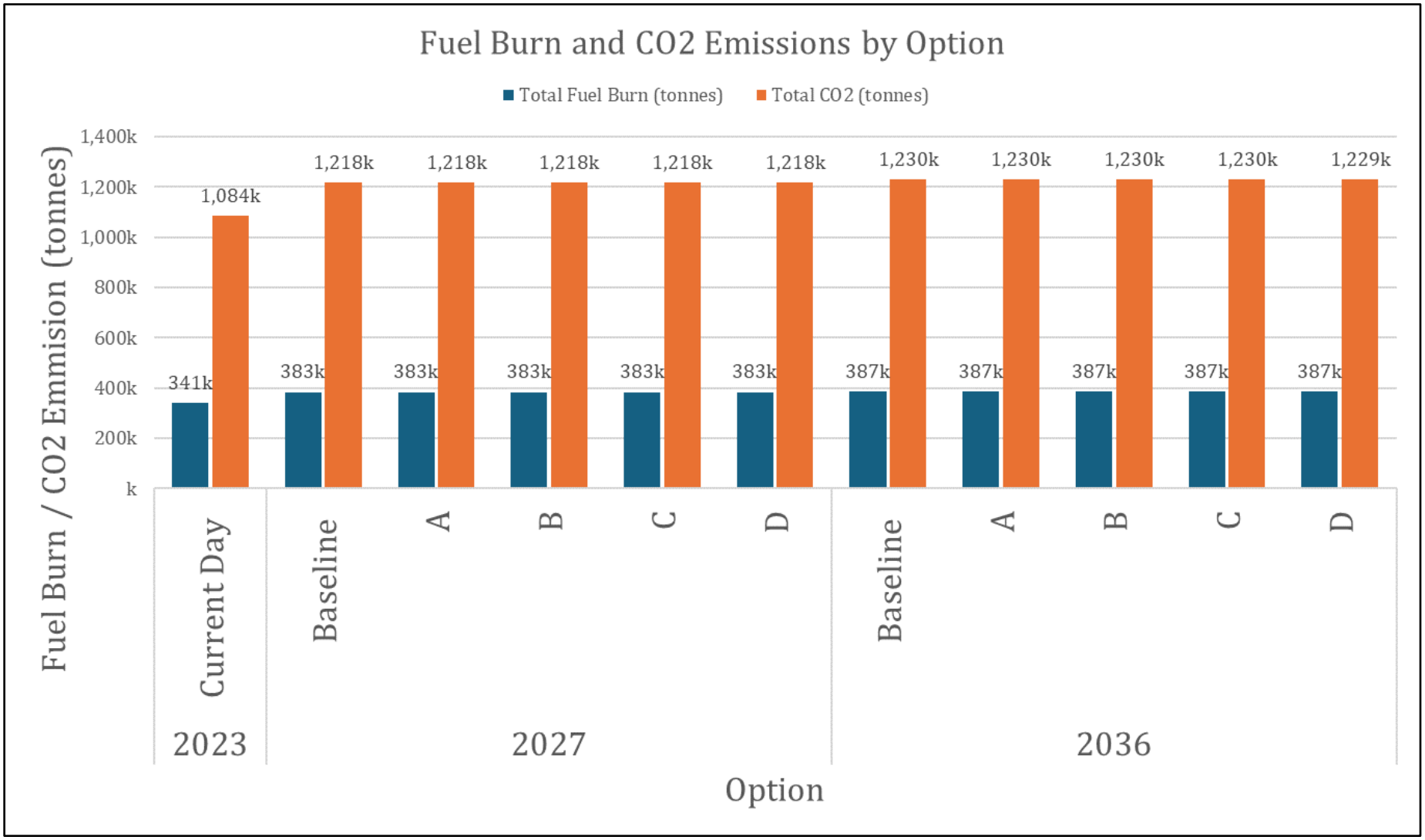


Figure 40 Annual Fuel Burn and the Annual CO_2 Emissions Associated with each of the Options Versus the Baseline

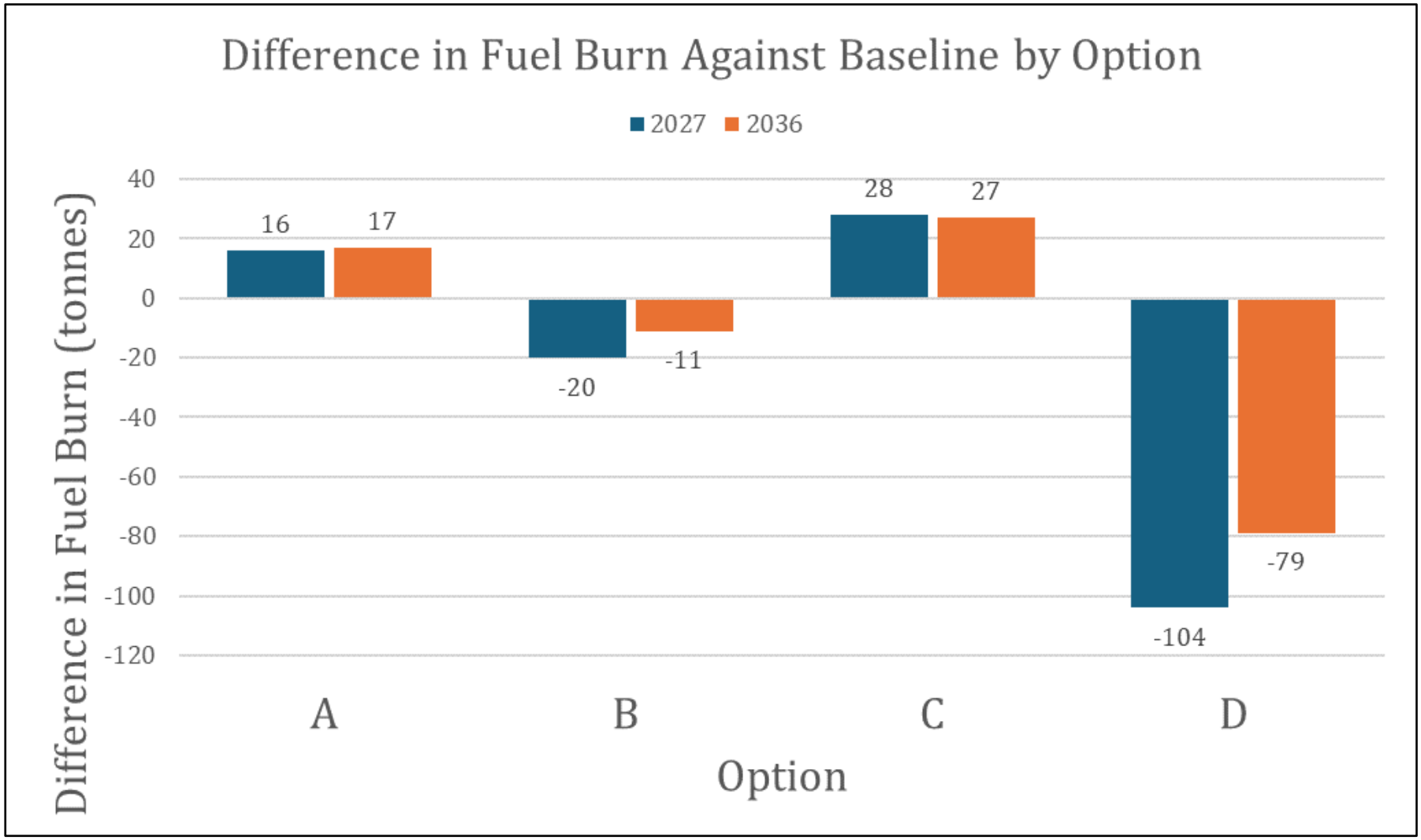


Figure 41 Difference in Fuel Burn (Tonnes) for each Option Against the Baseline

9.6 Financial Impacts (TAG for Greenhouse Gases)

The Overall Assessment Score in each case and the Quantitative Assessment (which shows the result of the NPV[10] of traded sector CO_2 equivalent emissions (tCO_2e) in GBP (£) are the results of this assessment summarised for each option in the figure below.

The monetised results represent the annual cost over the 10-year appraisal period and the output is the net present value of the change in greenhouse gas emissions. A positive figure indicates a benefit to society versus the Baseline.

TAG Assessment	A	B	C	D
NPV CO_2 Equivalent (CO_2e) Emissions (£)	–42,287	+67,465	–79,904	+325,159
Change in CO_2e Emissions over 10-year Appraisal Period (tonnes)	+525	–495	+879	–2,901
– Of Which Traded	645	27	868	–1,449
Change in CO_2e Emissions in Opening Year (tonnes)	+51	–64	+90	–329
NPV of Traded Sector CO_2 Equivalent (CO_2e) Emissions of Proposal (£)	–57,930	–1,533	–78,232	+132,553

Table 17 Financial Impacts of Greenhouse Gases for Proposed Options

Figure 42 below presents a chart of these results.

[10] Net Present Value.

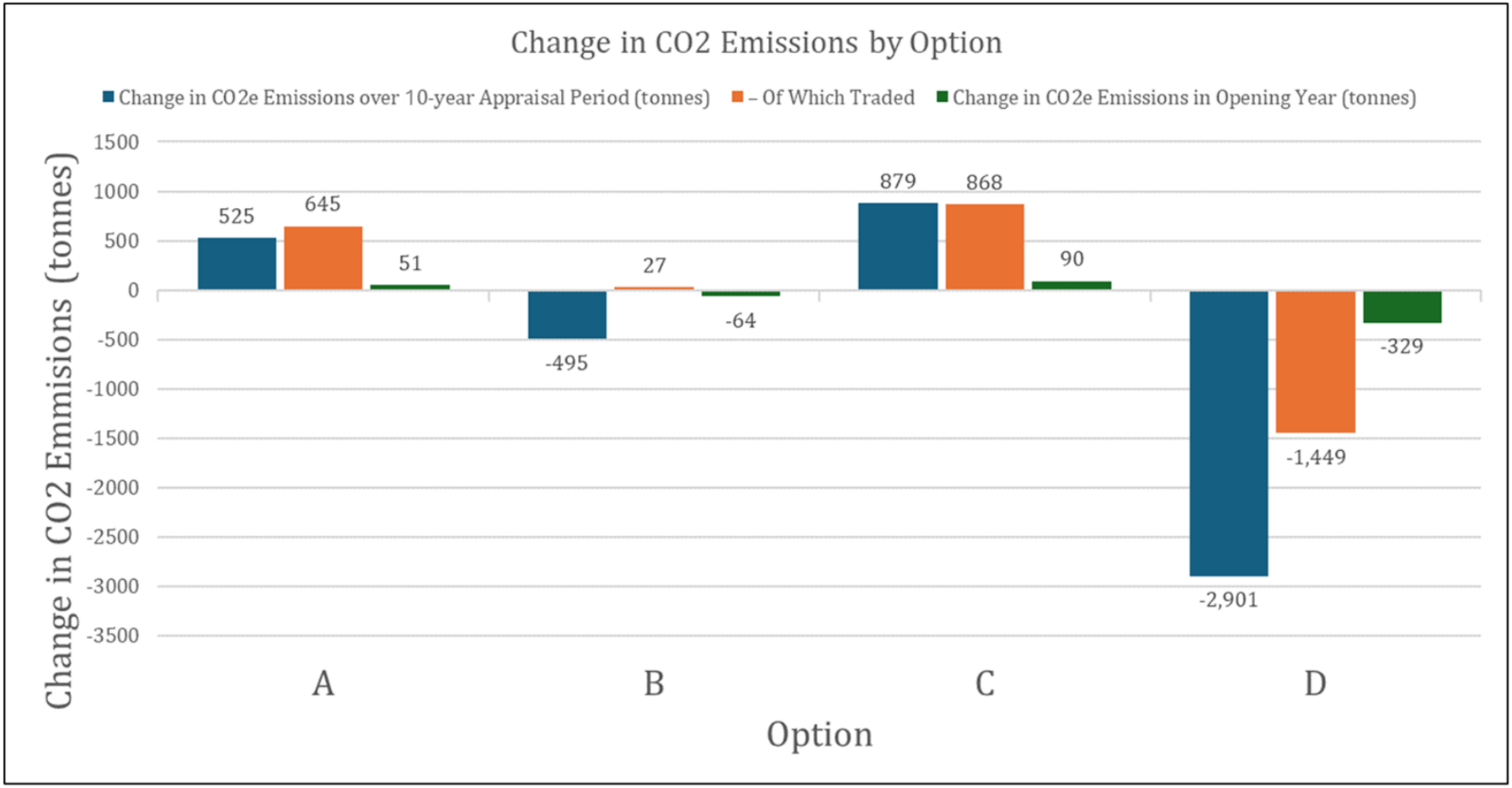


Figure 42 Change in CO_2 Emissions with and without scheme, by Option Against the Baseline

9.7 Overflight Assessment

We have carried out an overflight assessment to determine the number of people perceived to be overflown by aircraft in the different options. This is not a measure of noise but a demonstration of the pattern and dispersal of traffic i.e. a perception of overflight.

The full overflight contour diagrams and tables of results have been included in Appendices A1 to A5 for the Baseline and each option.

Summer Day 2036 – Population					
Overflights	**Baseline**	**A**	**B**	**C**	**D**
>5	444,100	434,300	434,100	434,900	438,700
>10	338,500	332,300	332,100	332,900	336,100
>20	263,400	257,300	256,300	257,000	258,100
>50	74,700	73,500	71,900	72,100	68,300
>100	10,500	14,700	16,700	14,000	14,000
>200	3,200	3,200	3,200	3,200	3,200

Table 18 Summer Day 2036 Overflight Assessment

Summer Night 2036 – Population					
Overflights	**Baseline**	**A**	**B**	**C**	**D**
>5	182,400	174,600	173,100	173,400	169,900
>10	41,600	44,800	44,300	43,800	41,400
>20	5,800	5,800	5,800	5,800	5,800
>50	2,500	2,500	2,400	2,500	2,400

Table 19 Summer Night 2036 Overflight Assessment

9.8 Full Results Summary

The table containing the full analysis carried out at the full options appraisal stage is included in Appendix A9.

10 Monetised Evaluation

10.1 Comparison of Quantitative Data

		Cost/ Benefit			
		Option A	Option B	Option C	Option D
Benefits	Sleep Disturbance	+£23,942	+£74,622	+£19,203	+£126,611
	Amenity	–£14,124	+£25,787	+£4,494	+£123,438
	AMI	–£162	+£244	+£45	+£533
	Stroke	–£2,566	+£3,655	+£494	+£20,169
	Dementia	–£3,876	+£5,504	+£741	+£30,432
	PVB of Change in Noise	**+£3,214**	**+£109,812**	**+£24,977**	**+£301,183**
	PVB of traded sector CO_2 Equivalent emissions	–£57,930	–£1,533	–£78,232	+£132,553
	PVB of non-traded sector CO_2 Equivalent emissions	+£15,643	+£68,998	–£1,672	+£192,606
	PVB of CO_2 Equivalent Emissions	**–£42,287**	**+£67,465**	**–£79,904**	**+£325,159**
	Fuel Burn 2027[11,12]	-£18,240	+£22,800	-£31,920	+£118,560
	Fuel Burn 2036	-£19,380	+£12,540	-£30,780	+£90,060
	Local Air Quality	£0	£0	£0	£0
	Tranquillity	£0	£0	£0	£0
	Biodiversity	£0	£0	£0	£0
	Economic impact from increased effective capacity	£0	£0	£0	£0
Present Value of Benefits (PVB)		**-£76,693**	**£212,617**	**-£117,627**	**£834,962**
Costs	Deployment Costs	+£60,000	+£60,000	+£60,000	+£60,000
Present Value of Costs (PVC)		**+£60,000**	**+£60,000**	**+£60,000**	**+£60,000**
Net Present Value (PVB-PVC)		**–£136,693**	**+£152,617**	**–£177,627**	**+£774,962**

Table 20 - Comparison of Quantified Benefits and Costs

Table 20 above summarises the quantified data for each of the ACP options compared to the Baseline scenario. These results have been determined from the environmental modelling conducted by ERCD, together with the analysis of each

[11] Based on a 2010 price of £1,140 per tonne.
[12] Negative value indicates additional fuel burn compared to the baseline. Positive value indicates a fuel saving.

option contained in Sections 5-8 above. A positive figure indicates a net benefit to society versus the Baseline.

11 Conclusions

11.1 Options Taken Forward to Consultation

Based on the analysis conducted in this Full Options Appraisal, Option D is the preferred option because it is anticipated to have the greatest potential environmental benefits. It provides the greatest Net Present Value of change in noise, CO_2 equivalent emissions and traded sector CO_2 equivalent emissions. It is the only option that potentially provides a positive benefit in traded sector CO_2 equivalent emissions. Option D also provides the greatest reduction in total fuel burn in both 2027 and 2036.

Option B is the second best performing option, with a positive benefit for the NPV of the impact of the change in noise, NPV of CO_2 equivalent emissions and fuel burn.

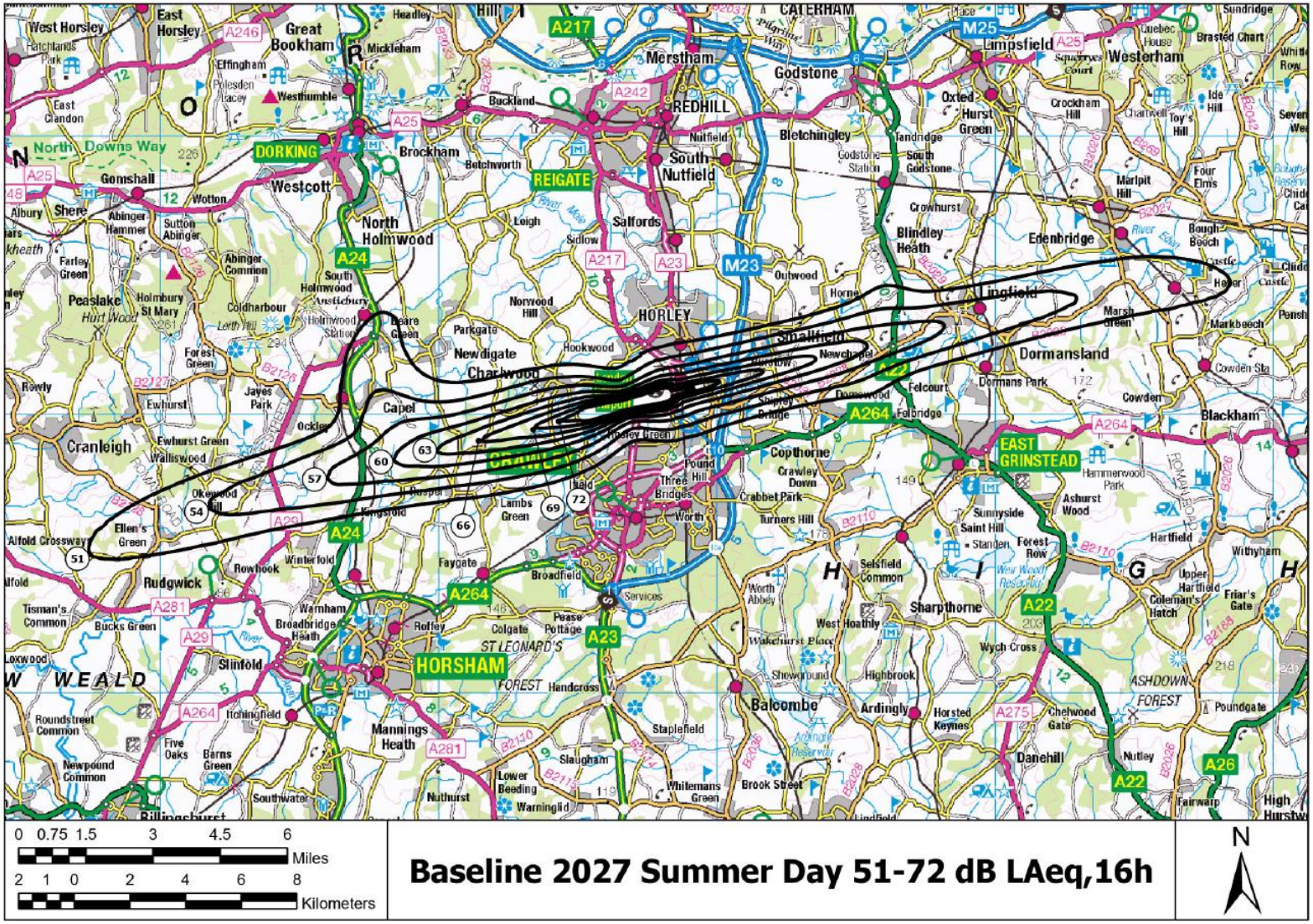
Option A is assessed as being the third best performing option. Although the NPV of the impact of the change in noise is the worst performing, it still provides a positive benefit over the baseline. Although the NPV of CO_2 equivalent emissions and fuel burn is better than Option C, this option performs worse than the Baseline in these impacts.

Option C is assessed as being the worst performing option.

Operationally, there is no difference between the options, so Option D has been selected as the preferred option based on the environmental analysis as this option is anticipated to have the greatest potential environmental benefits.

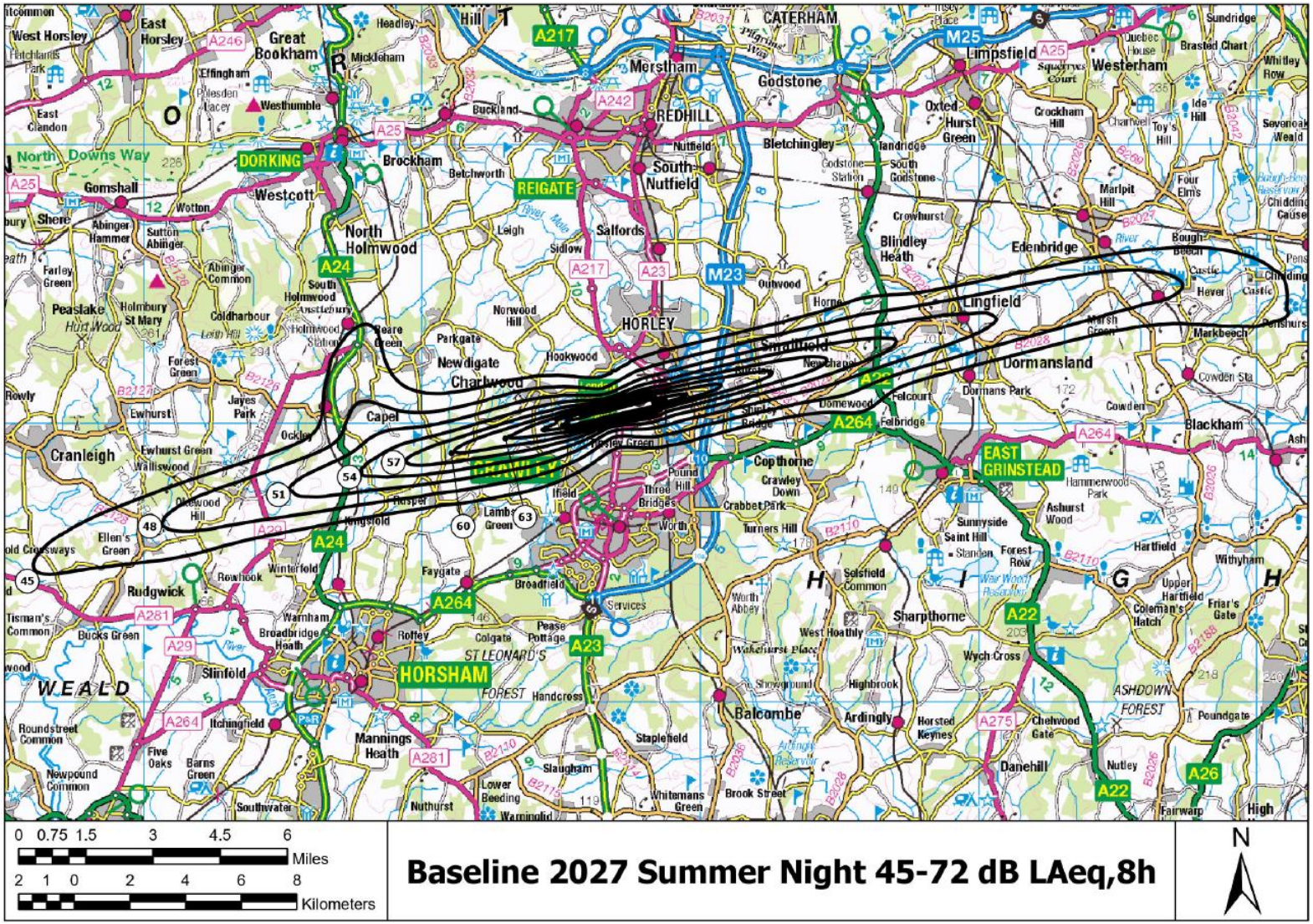
A1 Baseline Environmental Modelling Results

A1.1 Baseline 2027 Summer Day 51-72 dB LAeq,16h



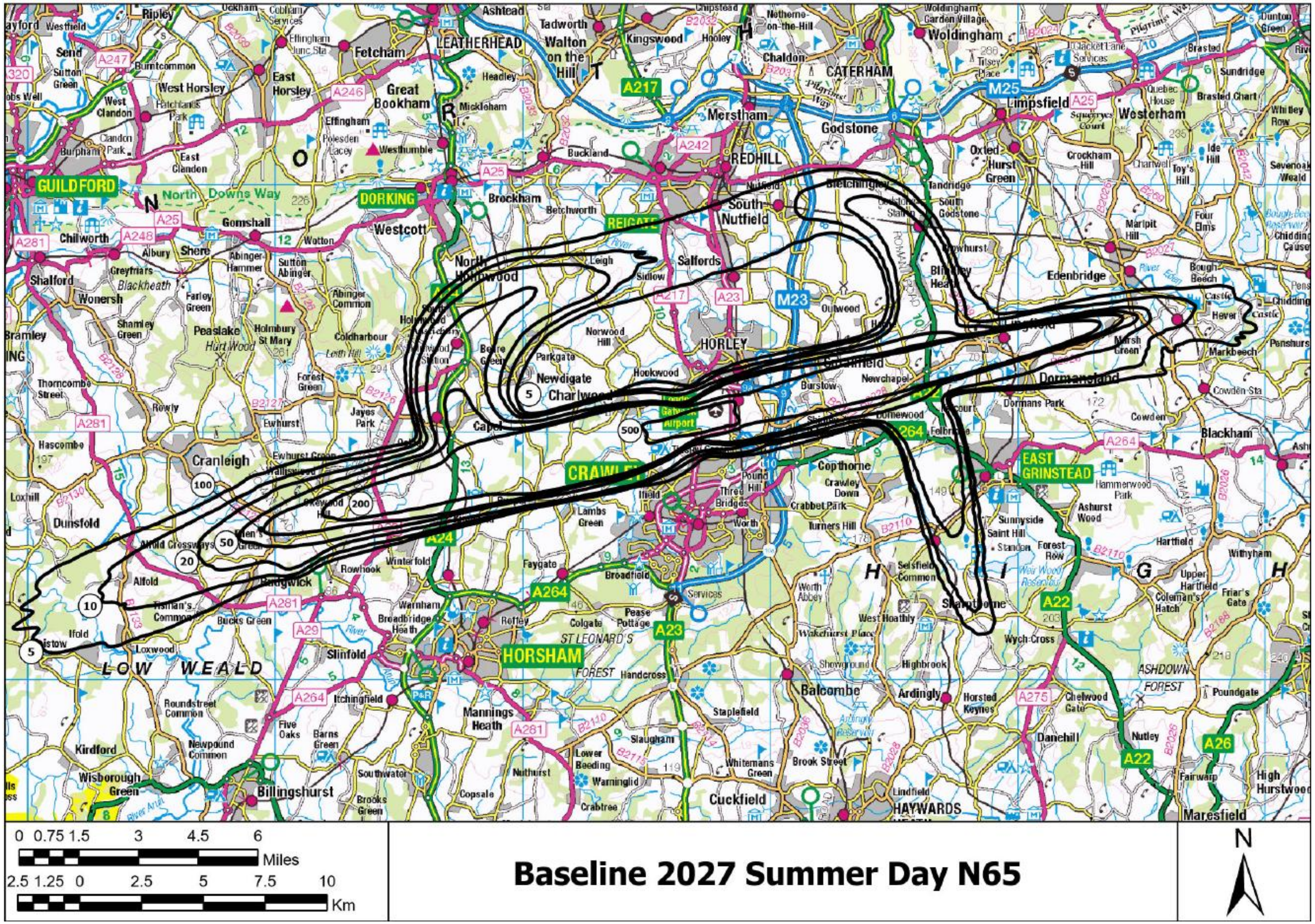
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	128.8	19800	8200	10	1	28	17
>54	70.0	8200	3500	4	0	16	11
>57	37.9	2200	1000	1	0	6	5
>60	21.3	1200	500	1	0	2	3
>63	11.8	400	200	0	0	2	3
>66	6.1	100	100	0	0	0	1
>69	3.0	0	0	0	0	0	0
>72	1.6	0	0	0	0	0	0

A1.2 Baseline 2027 Summer Night 45-72 dB LAeq,8h



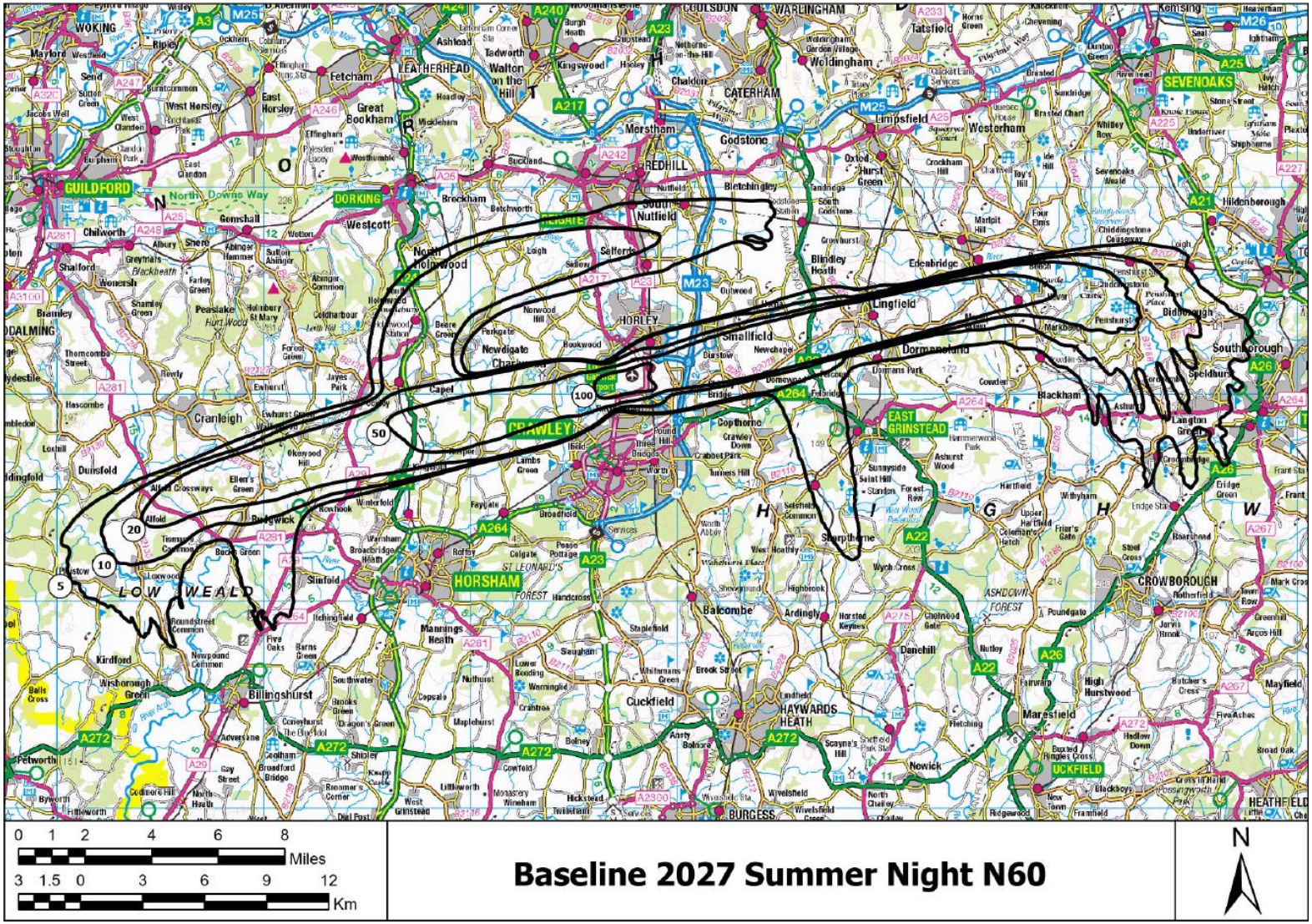
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	146.8	22500	9400	11	1	30	20
>48	83.8	10200	4300	4	1	16	13
>51	43.8	4600	2000	2	0	13	7
>54	24.5	1400	600	1	0	2	3
>57	13.7	600	300	0	0	2	3
>60	7.3	100	100	0	0	0	2
>63	3.6	100	<100	0	0	0	1
>66	2.0	0	0	0	0	0	0
>69	1.3	0	0	0	0	0	0
>72	0.8	0	0	0	0	0	0

A1.3 Baseline 2027 Summer Night N60



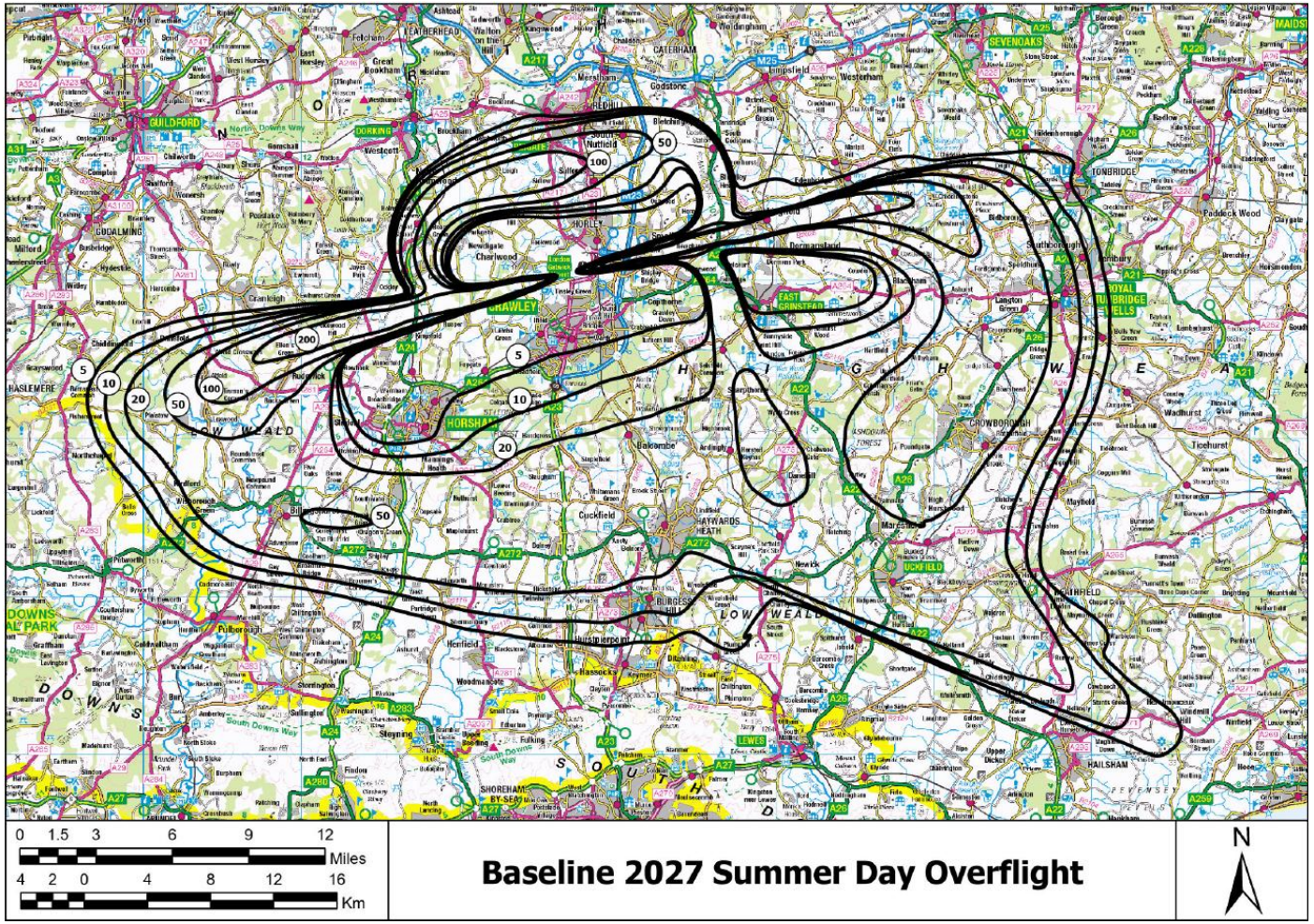
N65	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	289.3	58300	24000	22	2	61	50
>10	212.4	32300	13500	16	0	40	37
>20	156.8	21100	8900	14	0	28	25
>50	97.4	12200	5300	7	0	19	15
>100	72.6	8900	3800	5	0	17	11
>200	52.5	5300	2300	3	0	10	8
>500	3.4	<100	<100	0	0	2	1

A1.4 Baseline 2027 Summer Night N60



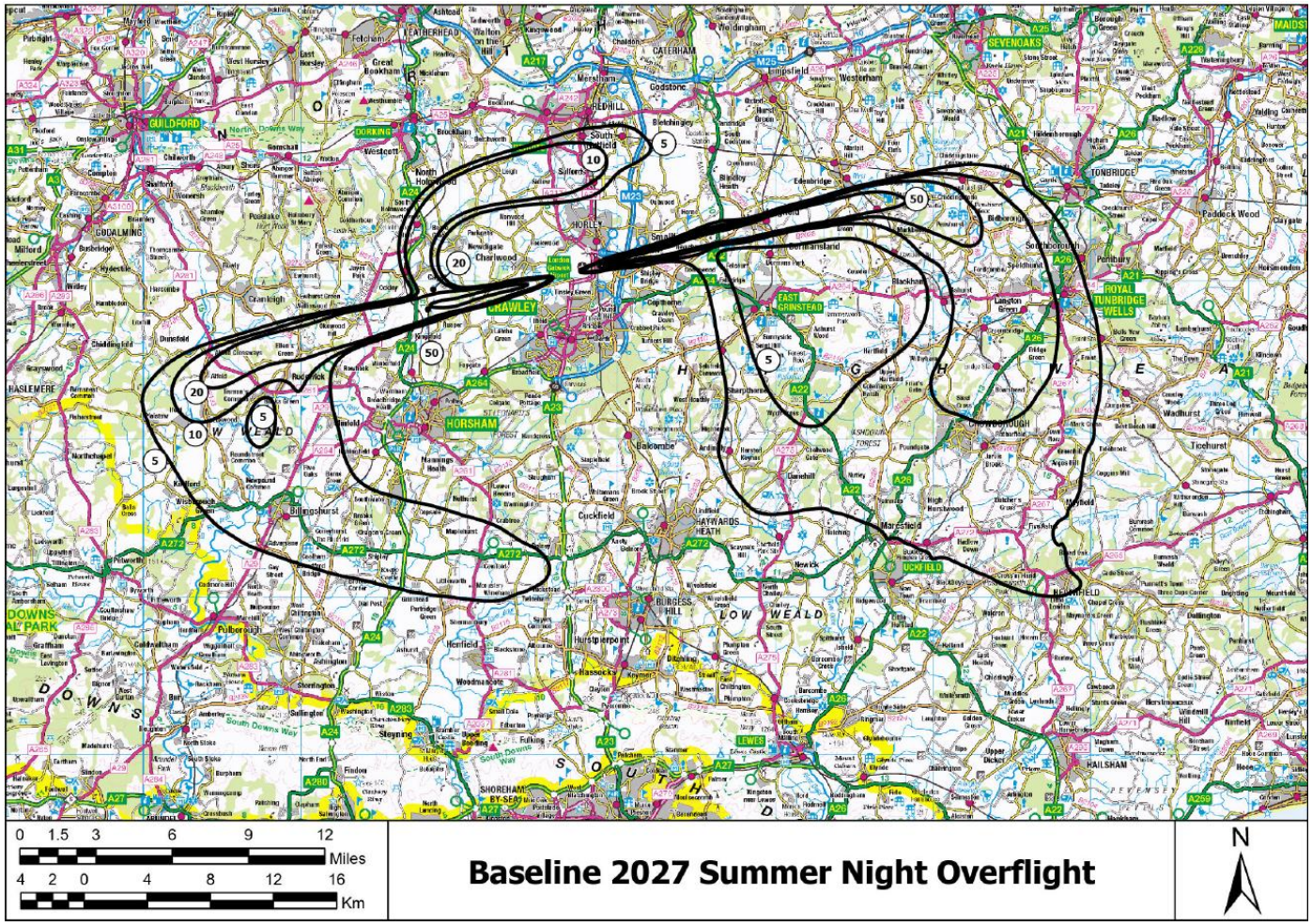
N60	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	387.8	78400	32400	41	3	77	66
>10	239.4	37500	15600	21	1	39	32
>20	138.1	15000	6200	11	1	21	16
>50	66.4	8000	3400	3	1	16	9
>100	3.2	0	0	0	0	2	1

A1.5 Baseline 2027 Summer Day Overflight



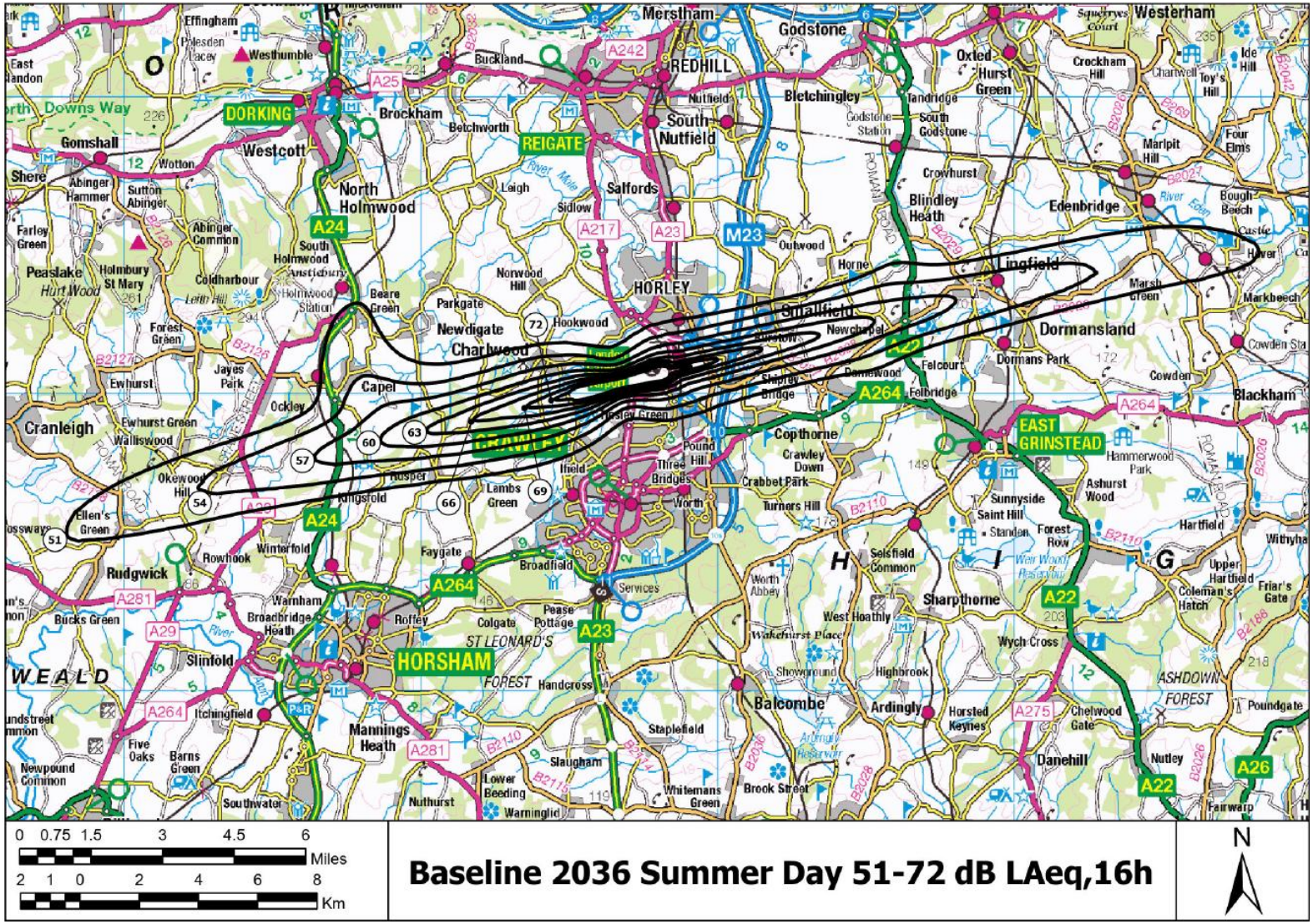
Overflights	>5	>10	>20	>50	>100	>200
Population	442,500	336,800	263,000	77,200	9,900	3,200

A1.6 Baseline 2027 Summer Night Overflight



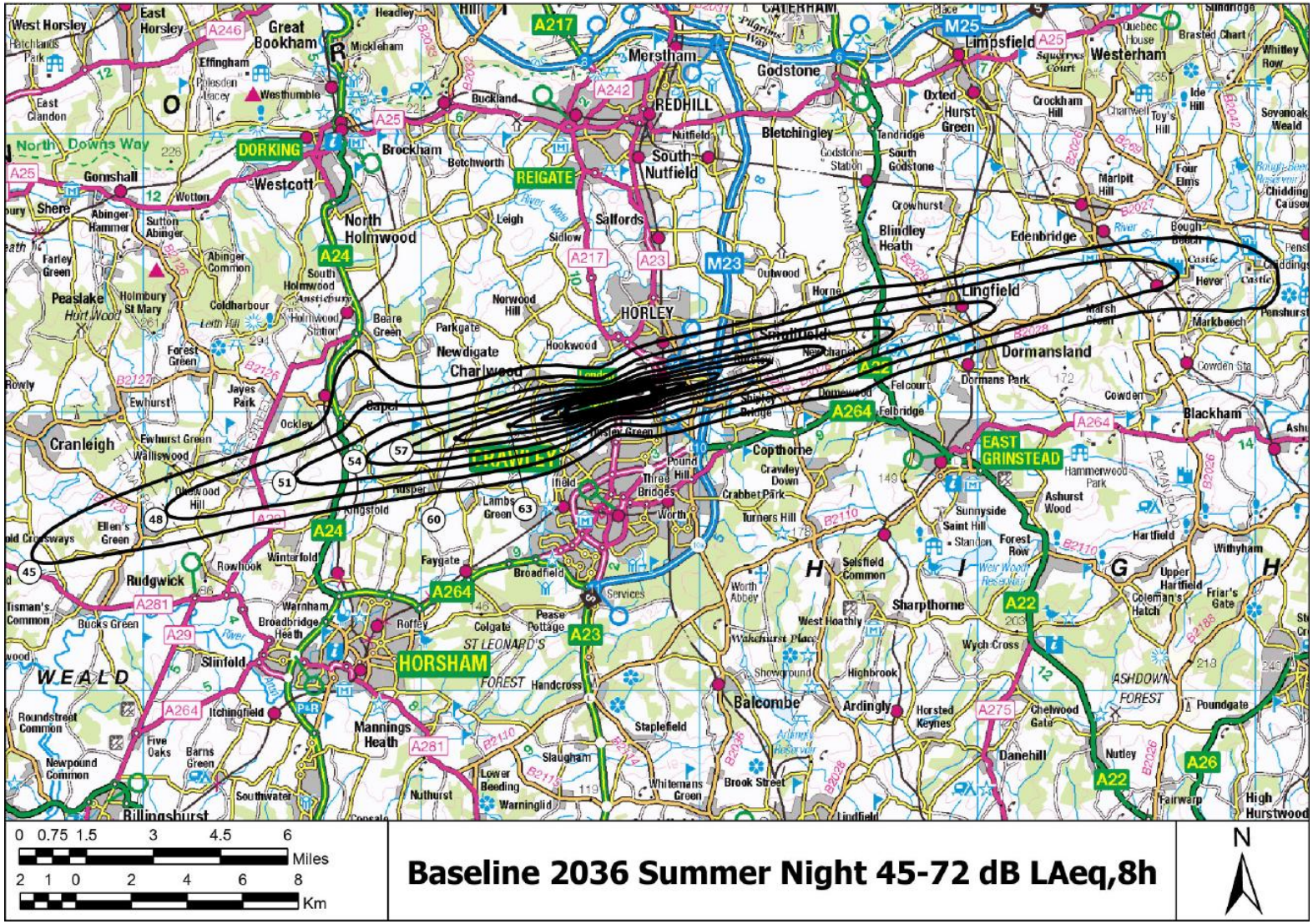
Overflights	>5	>10	>20	>50
Population	185,000	46,400	5,800	2,400

A1.7 Baseline 2036 Summer Day 51-72 dB LAeq,16h



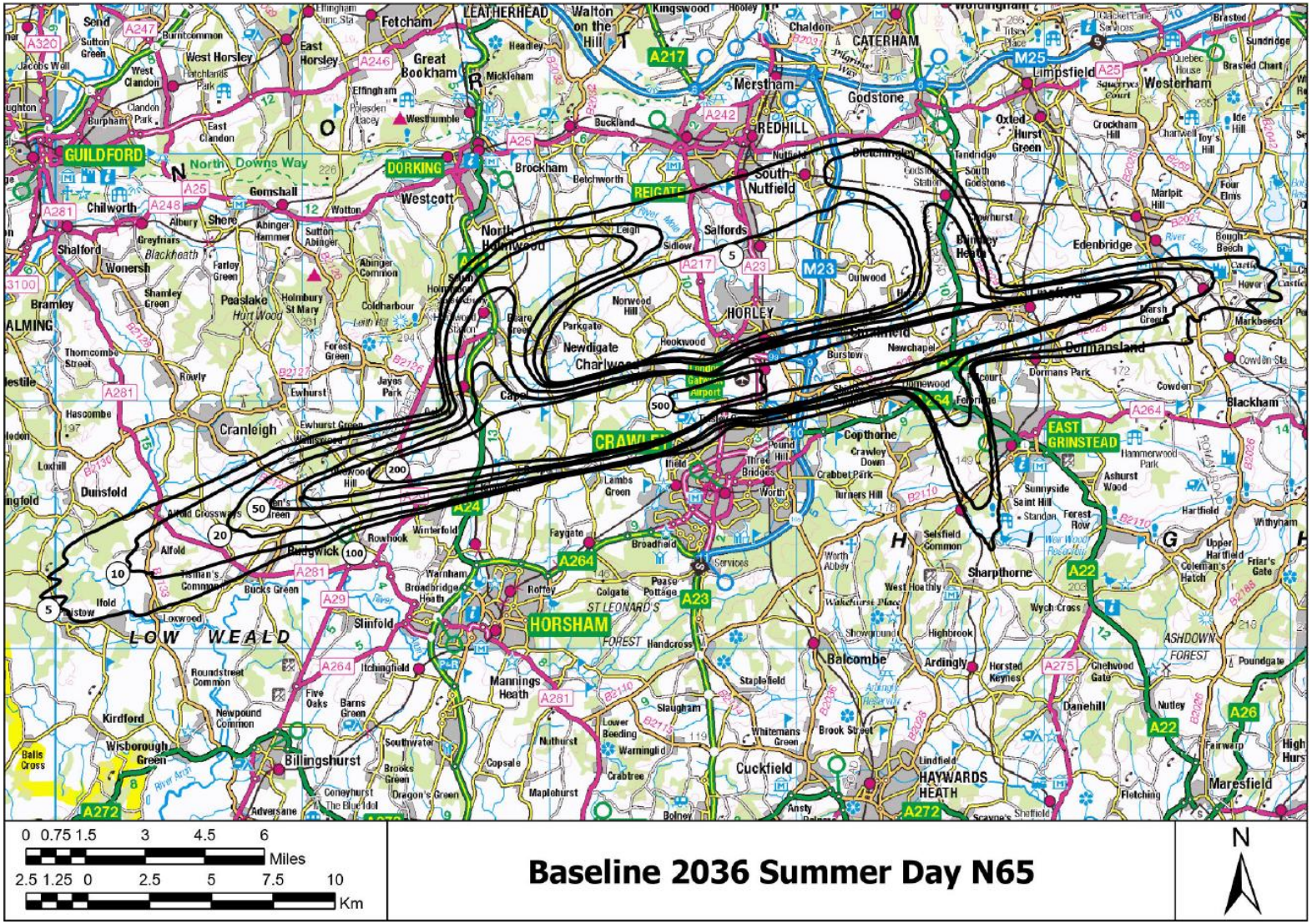
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	118.7	17800	7400	10	1	24	17
>54	64.4	7400	3200	4	0	15	11
>57	34.9	2100	900	1	0	5	3
>60	19.6	1100	500	0	0	2	3
>63	10.9	400	200	0	0	2	3
>66	5.7	100	<100	0	0	0	1
>69	2.8	0	0	0	0	0	0
>72	1.5	0	0	0	0	0	0

A1.8 Baseline 2036 Summer Night 45-72 dB LAeq,8h



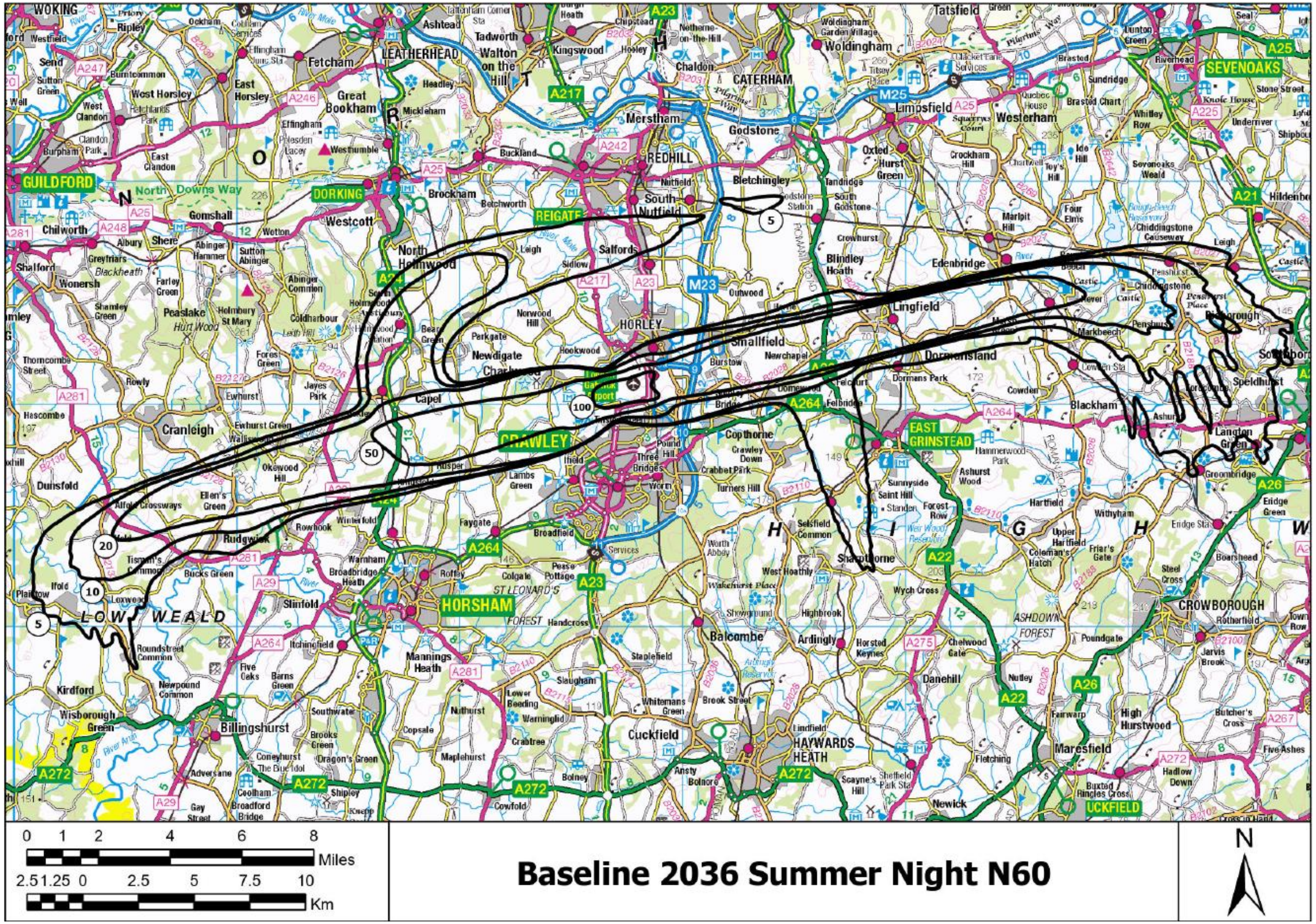
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	135.9	19500	8100	11	1	29	19
>48	79.5	9600	4000	3	1	15	13
>51	41.4	4100	1800	2	0	13	7
>54	23.0	1300	600	1	0	2	3
>57	13.1	600	300	0	0	2	3
>60	7.0	100	100	0	0	0	2
>63	3.5	100	<100	0	0	0	1
>66	1.9	0	0	0	0	0	0
>69	1.2	0	0	0	0	0	0
>72	0.7	0	0	0	0	0	0

A1.9 Baseline 2036 Summer Day N65



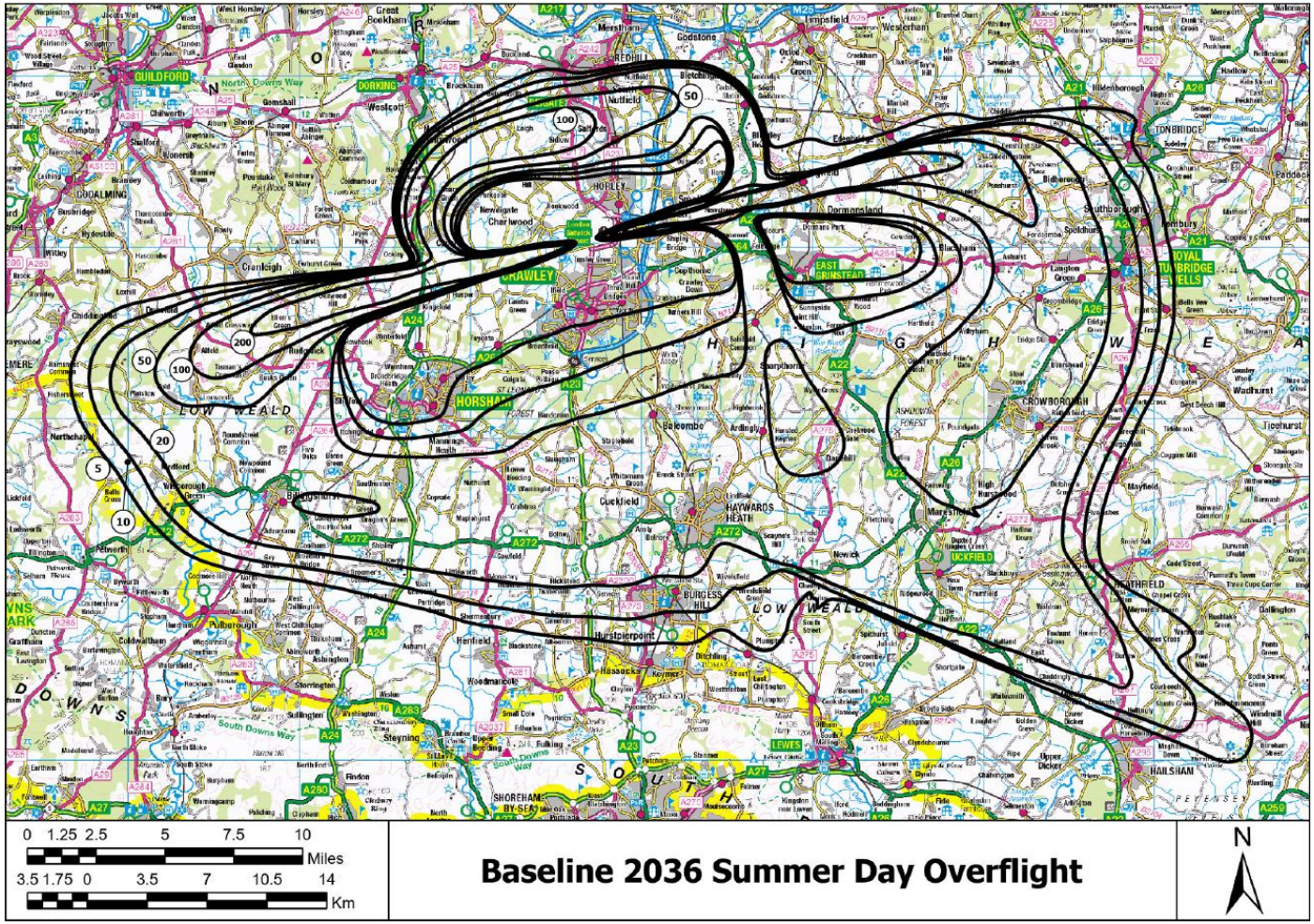
N65	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	275.8	54400	22400	22	2	55	44
>10	197.7	28600	11900	15	0	34	31
>20	139.6	18500	7800	13	0	26	19
>50	88.8	11700	5000	7	0	19	13
>100	67.4	8300	3600	4	0	16	9
>200	48.7	5000	2200	3	0	10	8
>500	3.3	<100	<100	0	0	2	1

A1.10 Baseline 2036 Summer Night N60



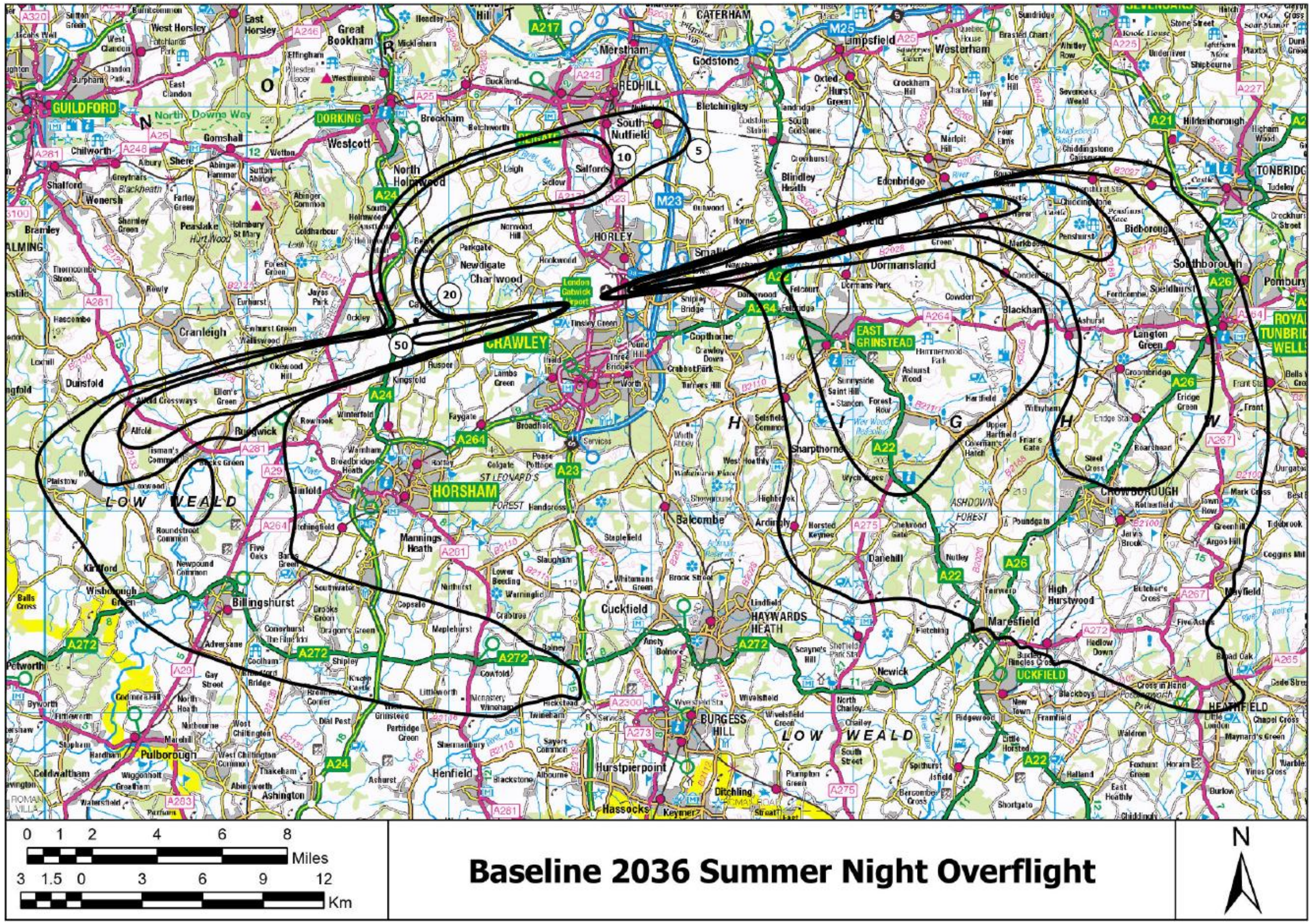
N60	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	326.1	63200	26200	34	3	62	55
>10	204.5	28700	12000	16	1	34	24
>20	130.2	14500	6000	9	1	21	16
>50	63.9	7800	3300	3	1	16	9
>100	3.1	0	0	0	0	2	1

A1.11 Baseline 2036 Summer Day Overflight



Overflights	>5	>10	>20	>50	>100	>200
Population	444,100	338,500	263,400	74,700	10,500	3,200

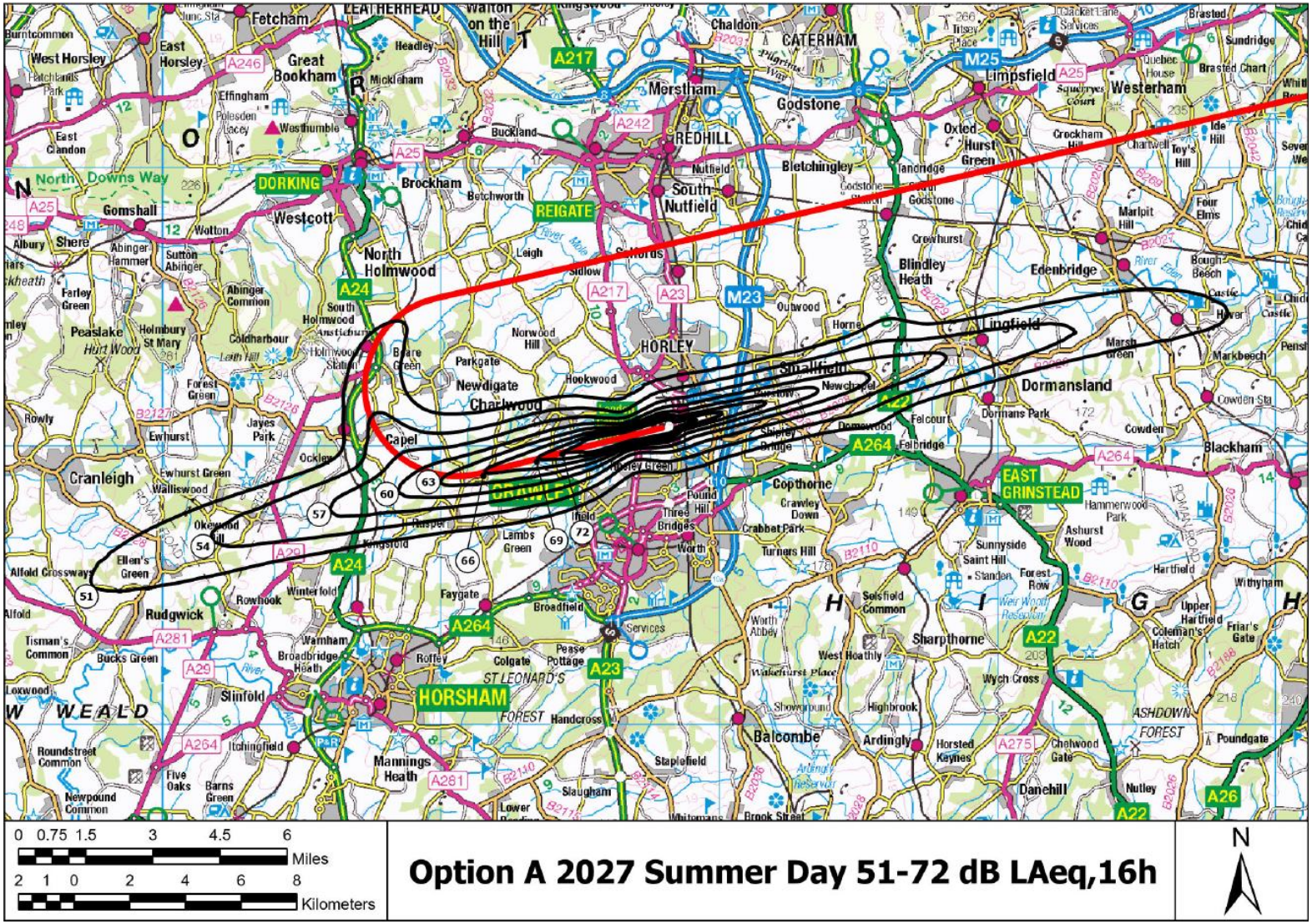
A1.12 Baseline 2036 Summer Night Overflight



Overflights	>5	>10	>20	>50
Population	182,400	41,600	5,800	2,500

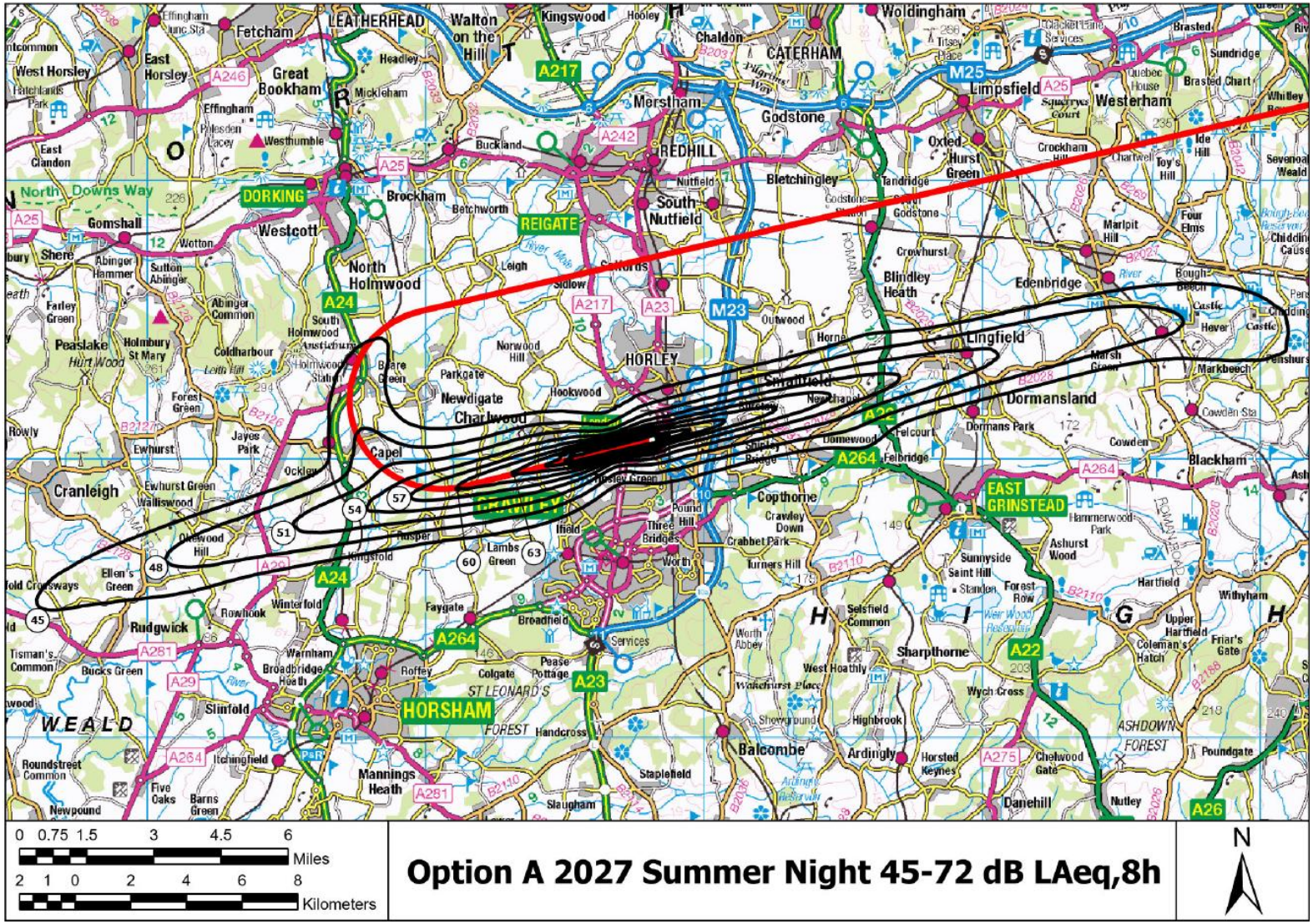
A2 Option A Environmental Modelling Results

A2.1 Option A 2027 Summer Day 51-72 dB LAeq,16h



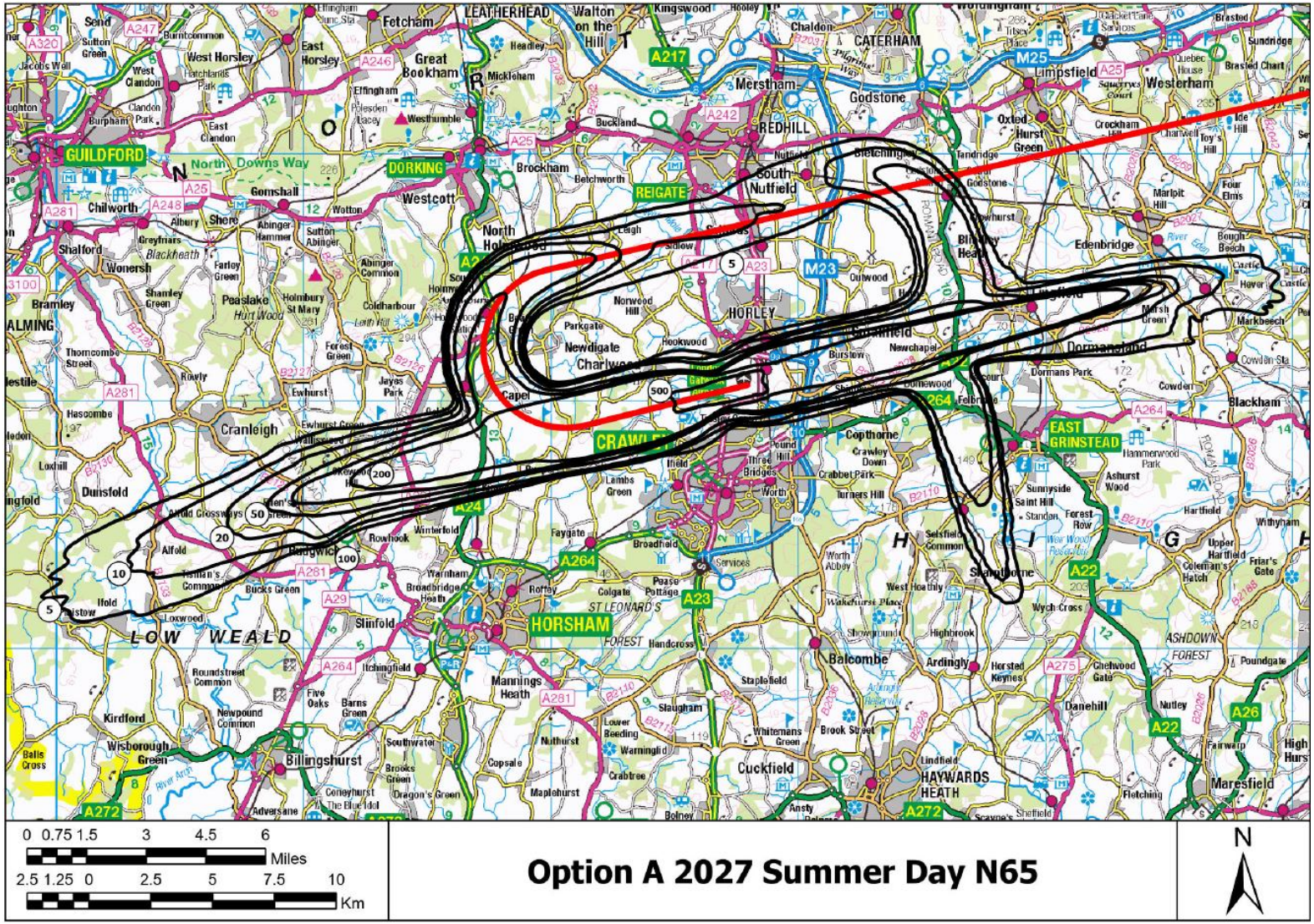
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	128.9	20200	8400	11	1	26	17
>54	69.9	8400	3600	5	0	17	12
>57	37.8	2200	1000	1	0	6	5
>60	21.2	1200	500	1	0	2	3
>63	11.7	400	200	0	0	2	3
>66	6.1	100	100	0	0	0	1
>69	3.0	0	0	0	0	0	0
>72	1.6	0	0	0	0	0	0

A2.2 Option A 2027 Summer Night 45-72 dB LAeq,8h



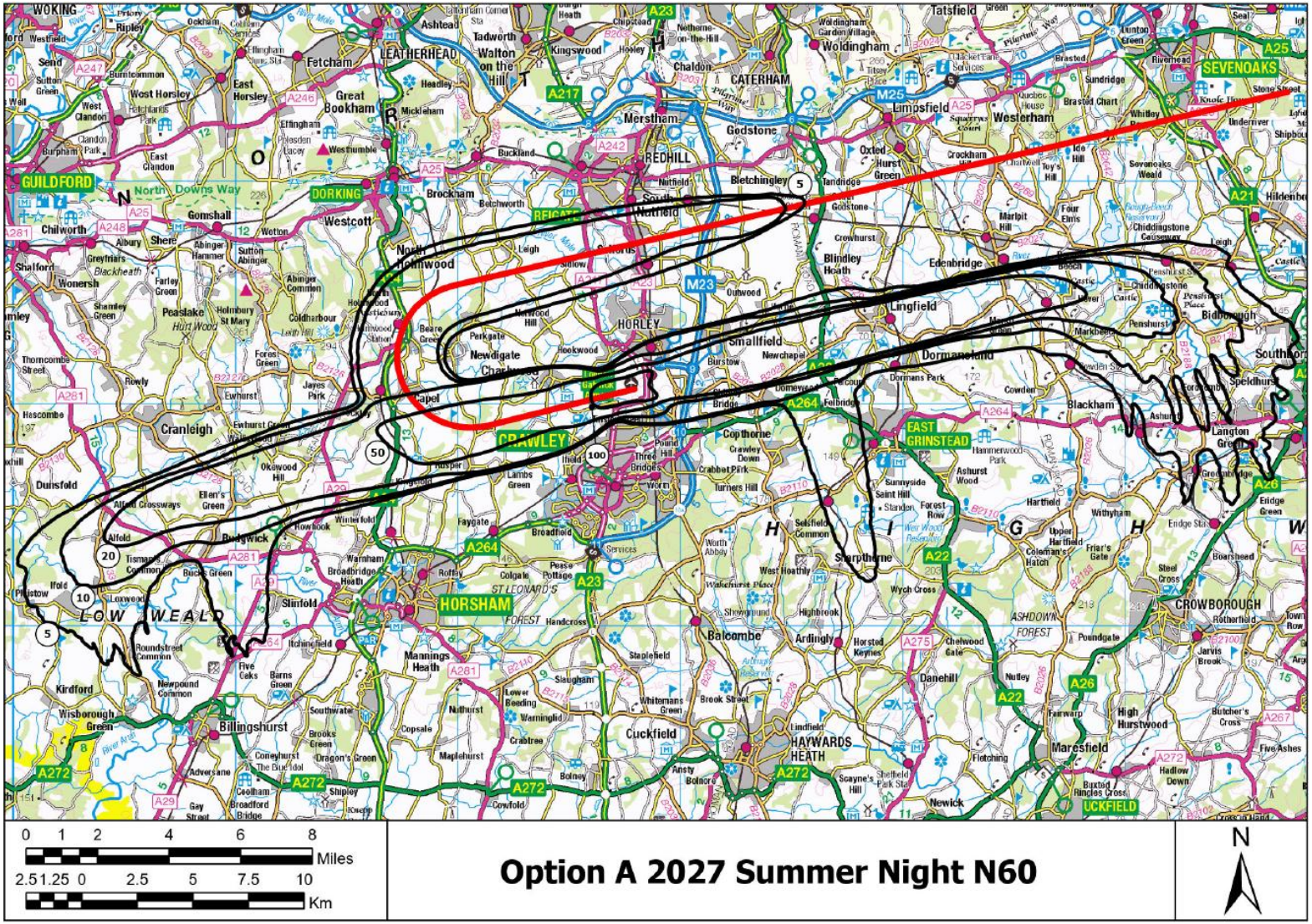
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	146.8	23000	9700	12	1	30	19
>48	83.6	10300	4300	5	1	18	14
>51	43.6	4500	2000	2	0	13	7
>54	24.4	1400	600	1	0	2	3
>57	13.7	600	300	0	0	2	3
>60	7.3	100	100	0	0	0	2
>63	3.6	100	<100	0	0	0	1
>66	2.0	0	0	0	0	0	0
>69	1.3	0	0	0	0	0	0
>72	0.8	0	0	0	0	0	0

A2.3 Option A 2027 Summer Day N65



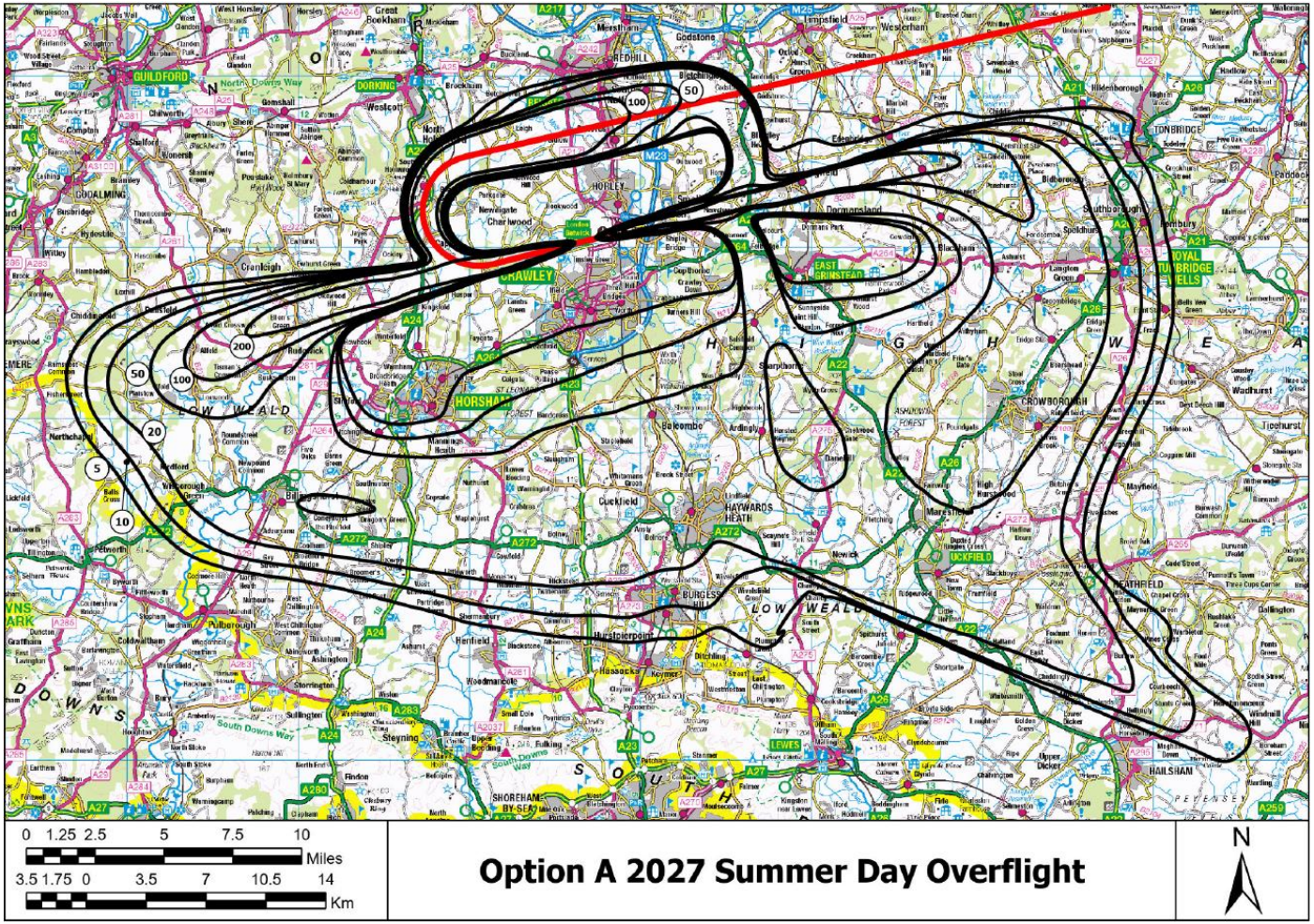
N65	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	280.3	53100	21900	21	2	54	45
>10	210.2	34800	14400	16	0	41	37
>20	152.3	20700	8700	14	0	28	25
>50	100.4	12400	5400	7	0	19	15
>100	76.3	10300	4500	6	0	17	11
>200	52.3	5200	2300	3	0	10	8
>500	3.4	<100	<100	0	0	2	1

A2.4 Option A 2027 Summer Night N60



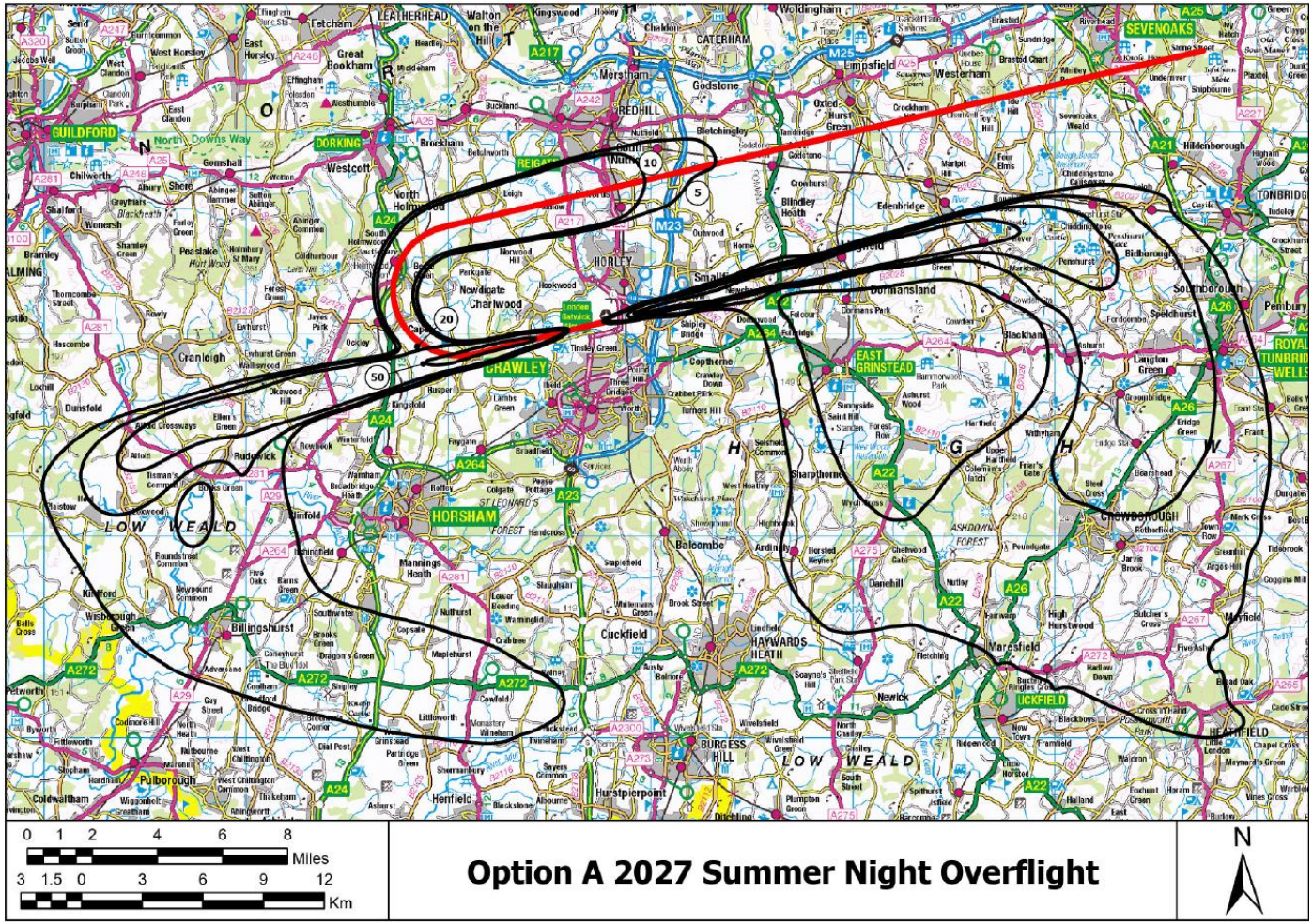
N60	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	386.5	75100	31100	38	3	76	67
>10	256.0	41100	17100	24	2	41	37
>20	137.9	15000	6200	11	1	21	16
>50	65.3	7900	3300	3	1	16	9
>100	3.2	0	0	0	0	2	1

A2.5 Option A 2027 Summer Day Overflight



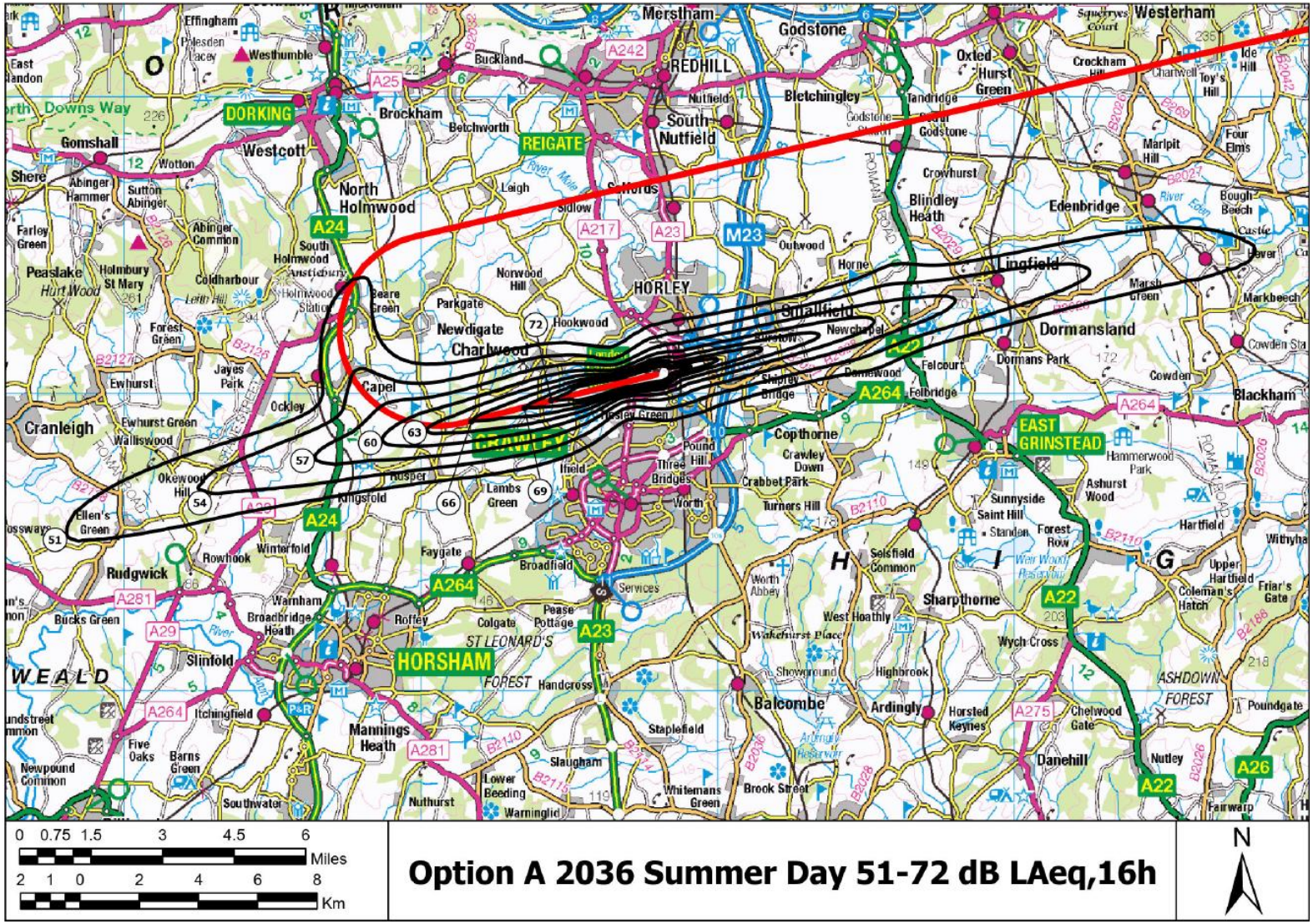
Overflights	>5	>10	>20	>50	>100	>200
Population	449,900	330,100	257,600	73,200	17,400	3,200

A2.6 Option A 2027 Summer Night Overflight



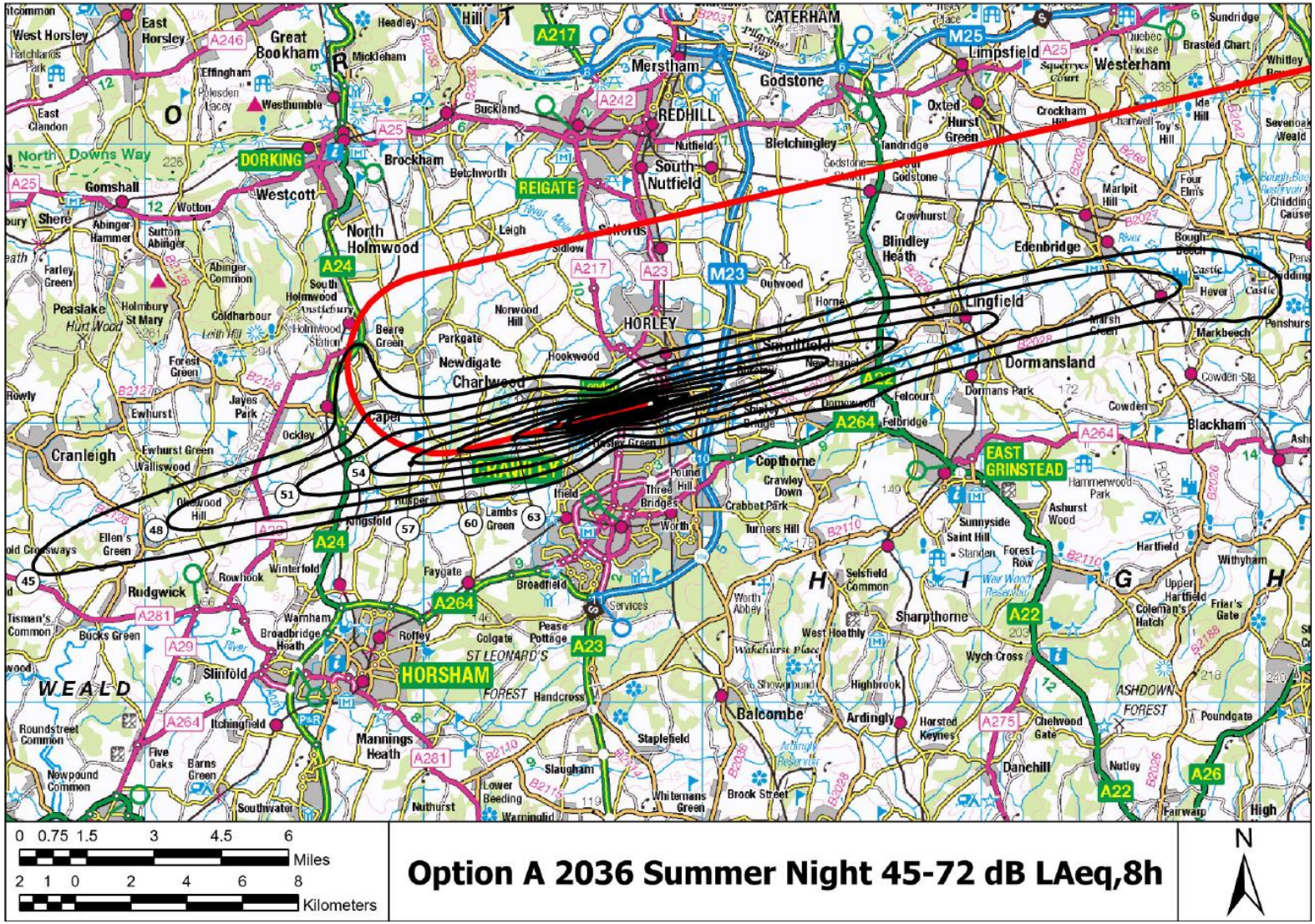
Overflights	>5	>10	>20	>50
Population	175,900	46,400	5,800	2,400

A2.7 Option A 2036 Summer Day 51-72 dB LAeq,16h



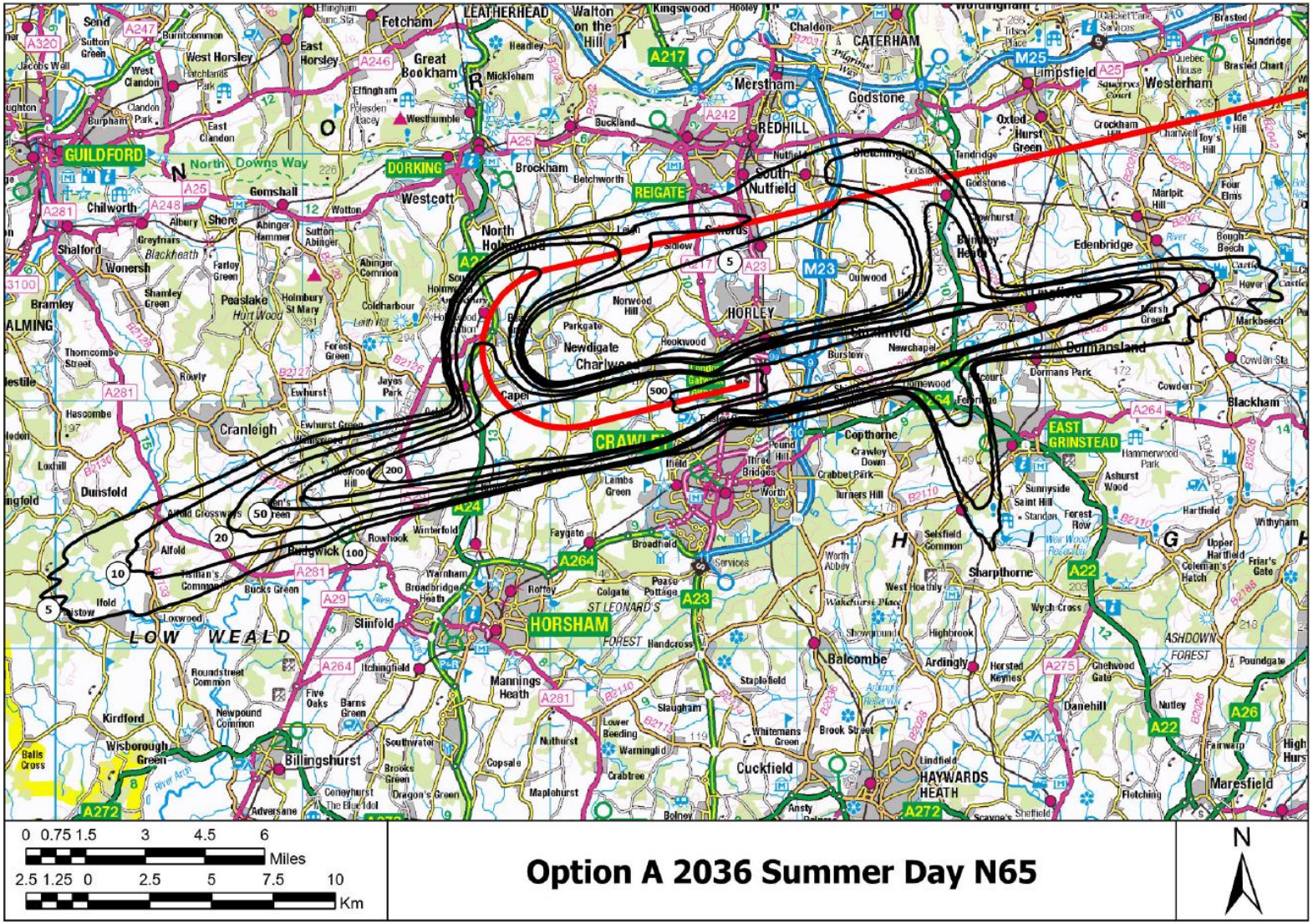
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	118.9	18500	7700	11	1	25	17
>54	64.3	7500	3200	4	0	15	11
>57	34.8	2100	900	1	0	5	3
>60	19.5	1100	500	0	0	2	3
>63	10.9	400	200	0	0	2	3
>66	5.7	100	<100	0	0	0	1
>69	2.8	0	0	0	0	0	0
>72	1.5	0	0	0	0	0	0

A2.8 Option A 2036 Summer Night 45-72 dB LAeq,8h



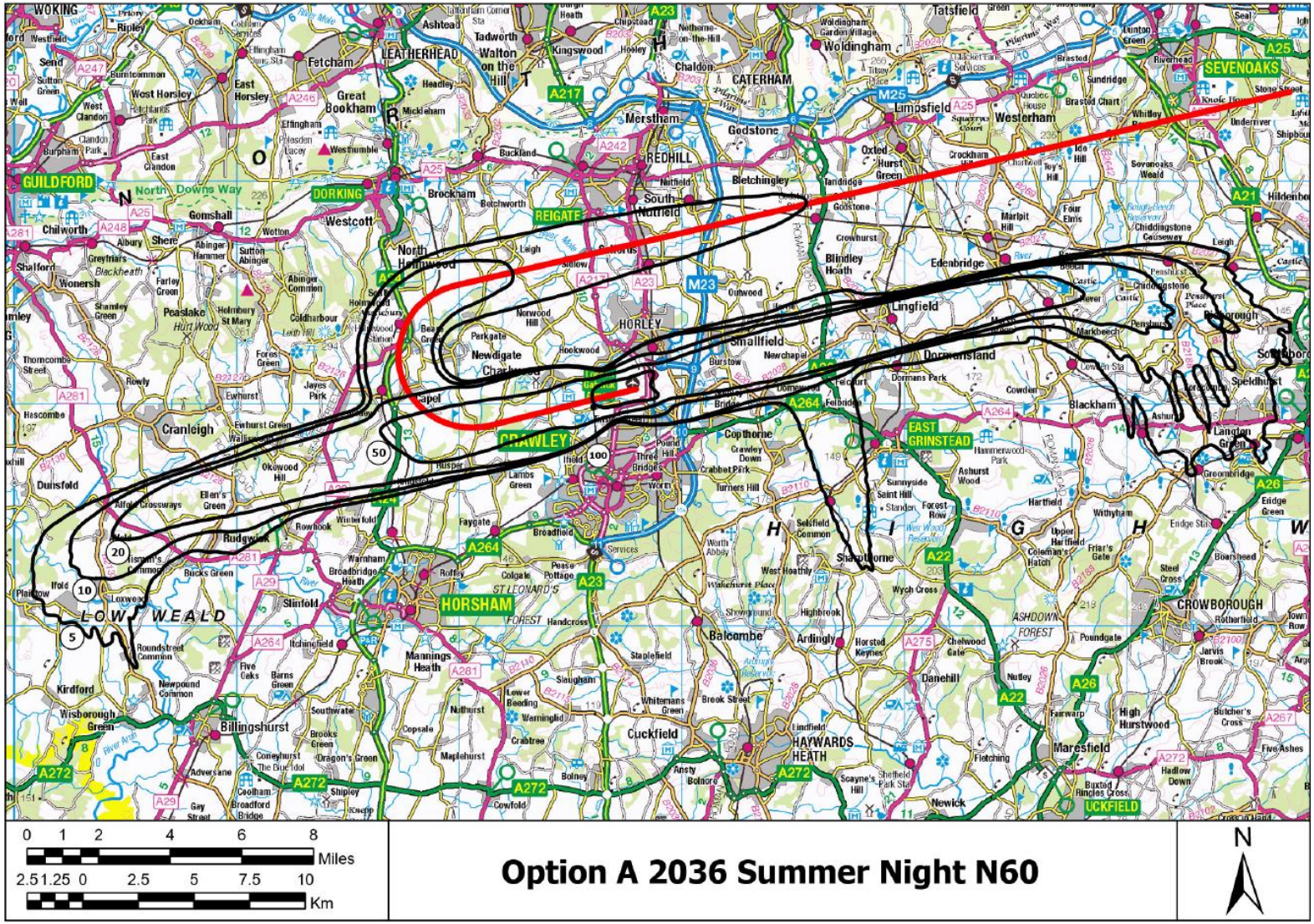
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	135.7	19800	8300	11	1	29	19
>48	79.2	9600	4000	3	1	15	13
>51	41.3	4100	1800	2	0	13	7
>54	22.9	1300	600	1	0	2	3
>57	13.0	500	200	0	0	2	3
>60	7.0	100	100	0	0	0	2
>63	3.5	100	<100	0	0	0	1
>66	1.9	0	0	0	0	0	0
>69	1.2	0	0	0	0	0	0
>72	0.7	0	0	0	0	0	0

A2.9 Option A 2036 Summer Day N65



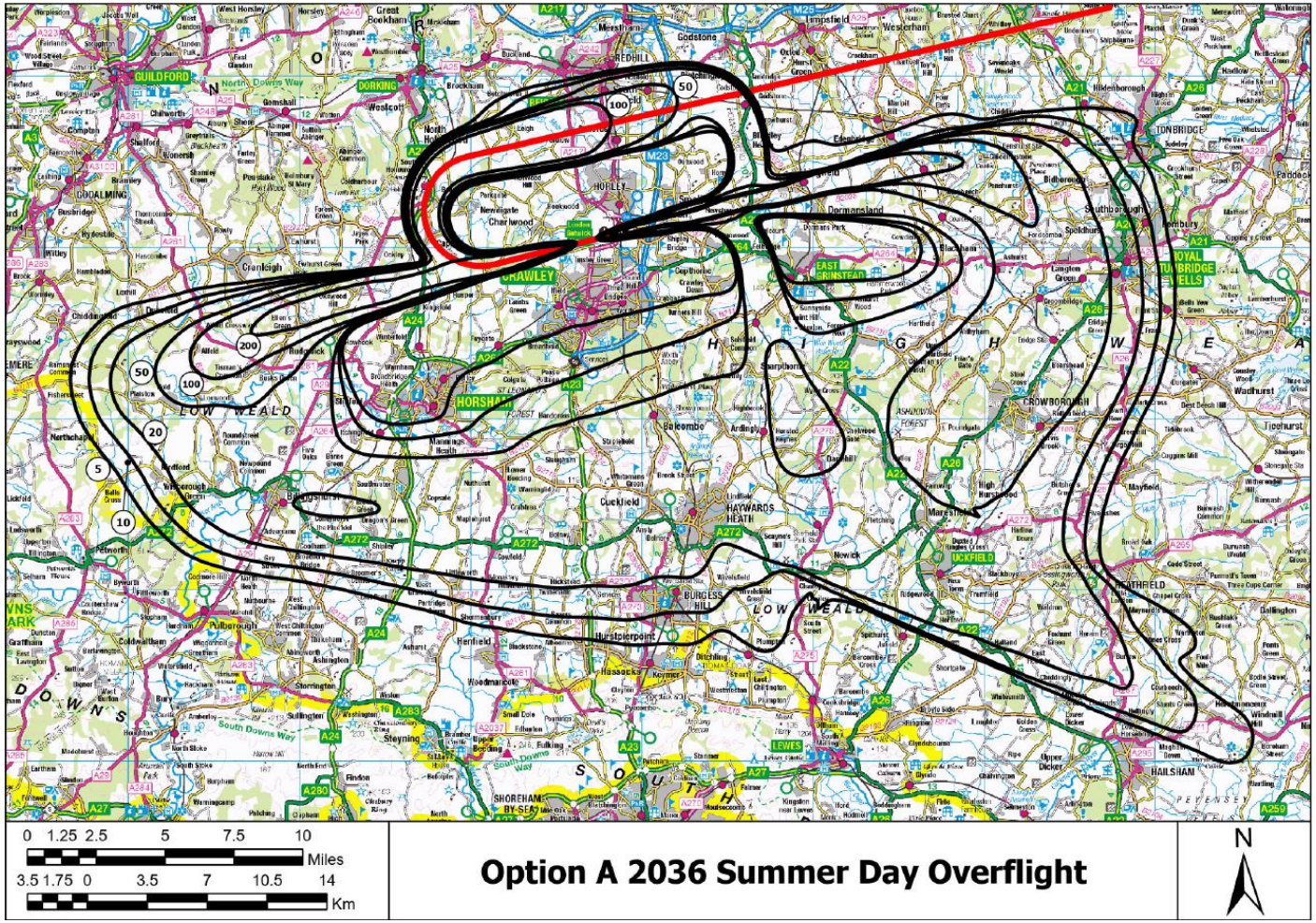
N65	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	268.0	50500	20800	21	2	50	43
>10	193.6	28000	11700	14	0	33	31
>20	136.0	18400	7700	13	0	26	20
>50	91.4	11900	5100	7	0	19	13
>100	68.9	8400	3600	4	0	16	9
>200	48.6	5000	2200	3	0	10	8
>500	3.3	<100	<100	0	0	2	1

A2.10 Option A 2036 Summer Night N60



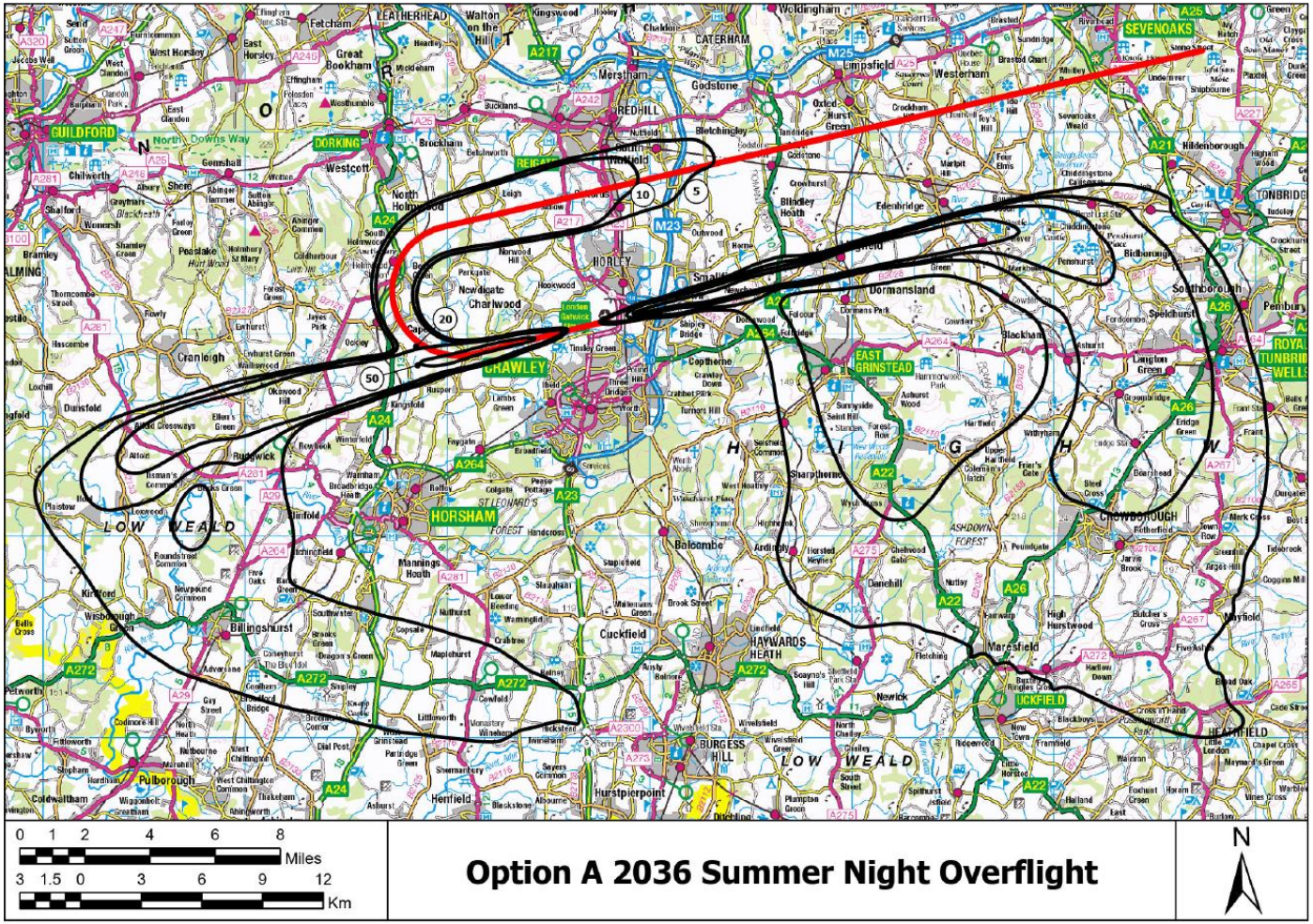
N60	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	339.5	65000	27000	36	3	62	60
>10	206.1	29300	12200	17	1	34	25
>20	130.2	14400	6000	9	1	21	16
>50	62.9	7700	3300	3	1	16	9
>100	3.1	0	0	0	0	2	1

A2.11 Option A 2036 Summer Day Overflight



Overflights	>5	>10	>20	>50	>100	>200
Population	434,300	332,300	257,300	73,500	14,700	3,200

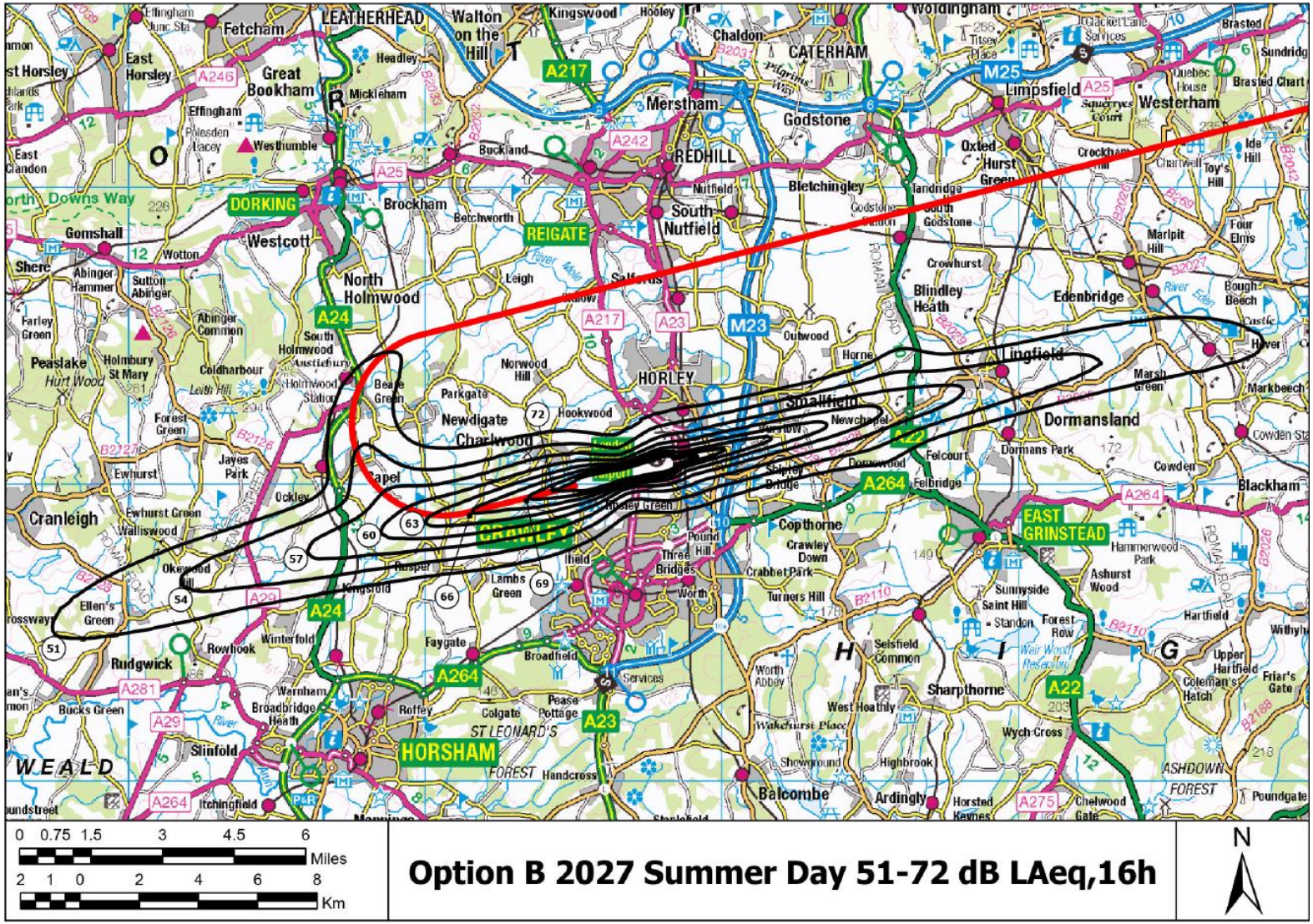
A2.12 Option A 2036 Summer Night Overflight



Overflights	>5	>10	>20	>50
Population	174,600	46,800	5,800	2,500

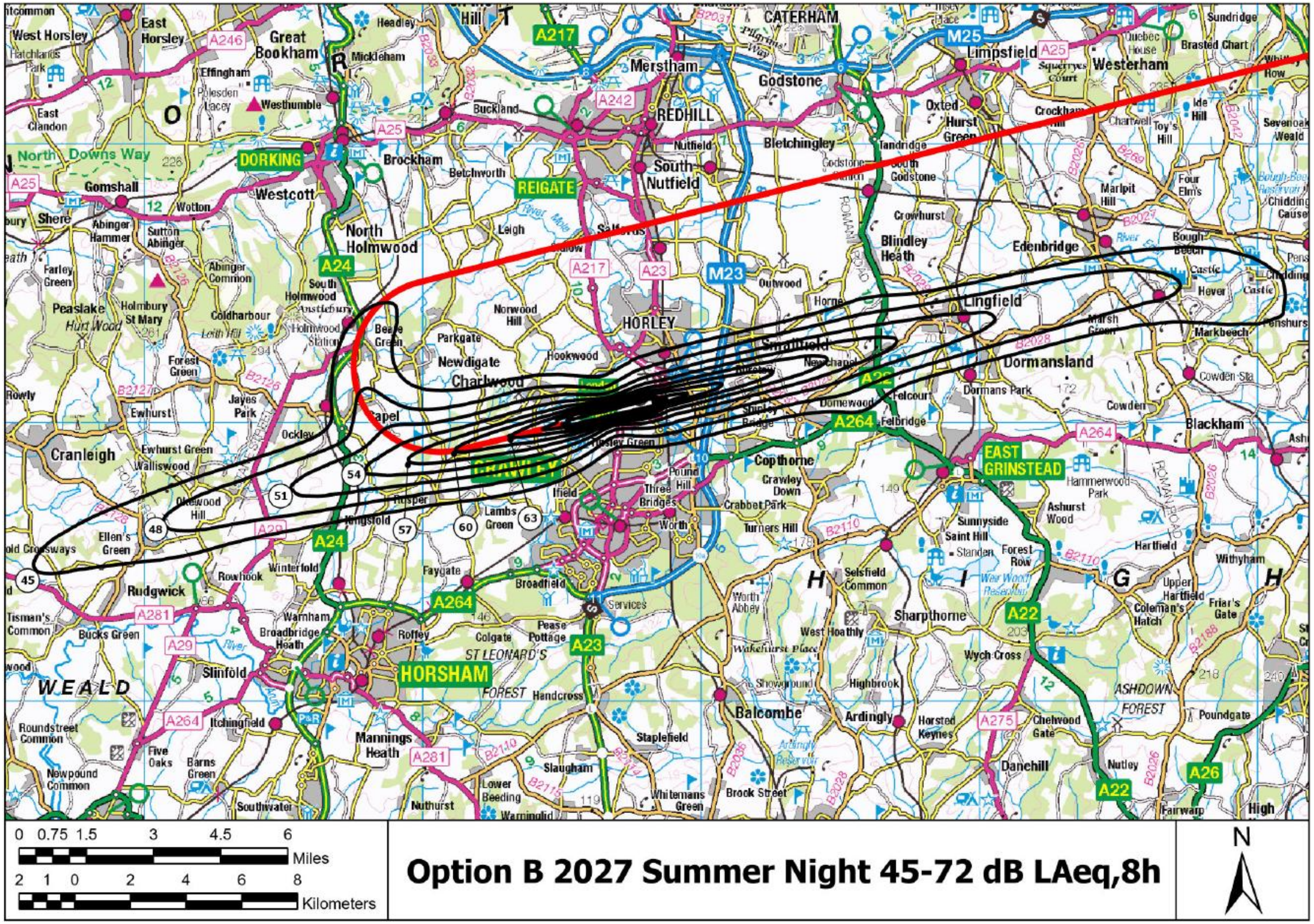
A3 Option B Environmental Modelling Results

A3.1 Option B 2027 Summer Day 51-72 dB LAeq,16h



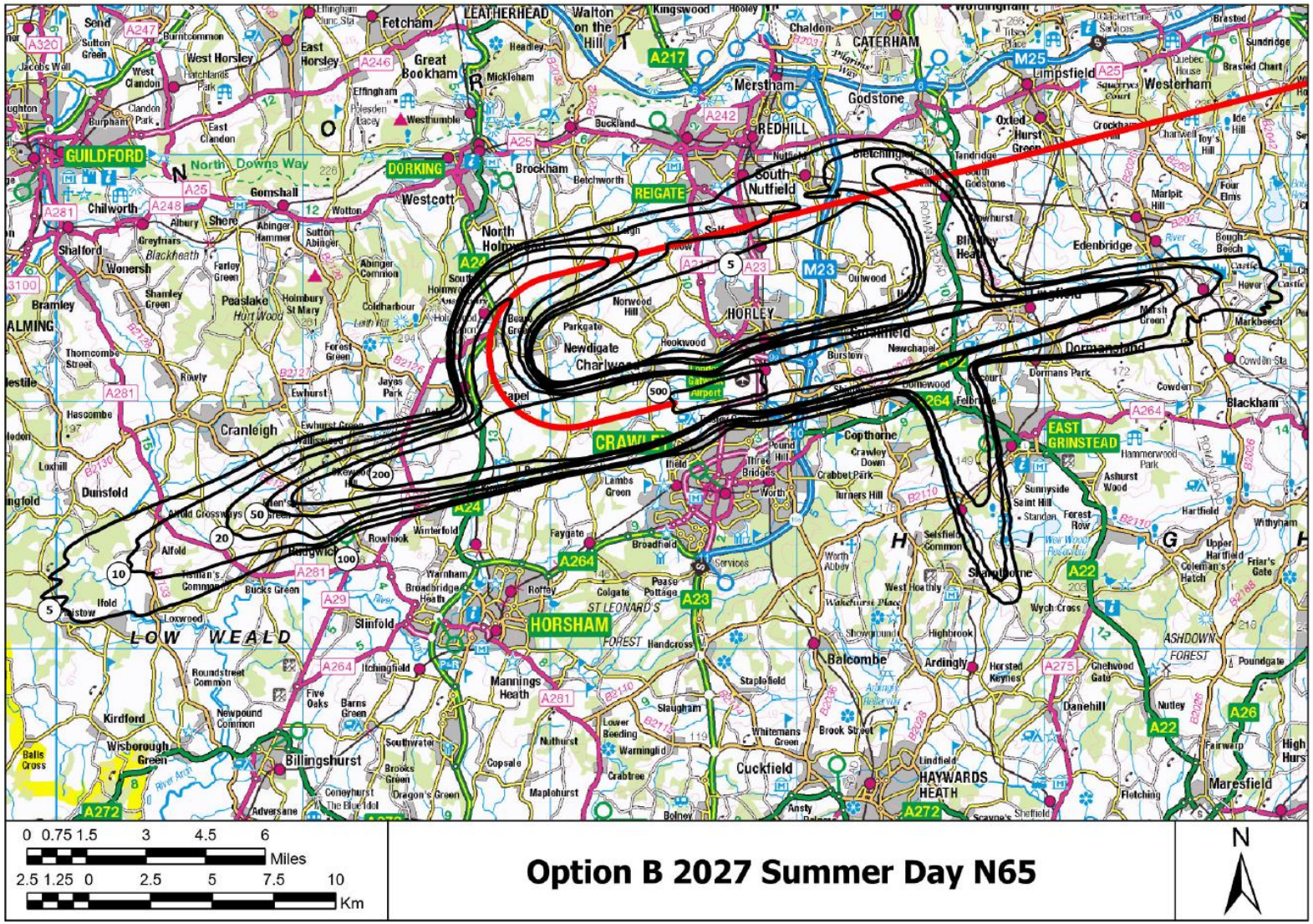
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	128.9	20000	8300	11	1	26	17
>54	69.9	8200	3500	5	0	17	12
>57	37.8	2200	1000	1	0	6	5
>60	21.1	1200	500	1	0	2	3
>63	11.7	400	200	0	0	2	3
>66	6.1	100	100	0	0	0	1
>69	3.0	0	0	0	0	0	0
>72	1.6	0	0	0	0	0	0

A3.2 Option B 2027 Summer Night 45-72 dB LAeq,8h



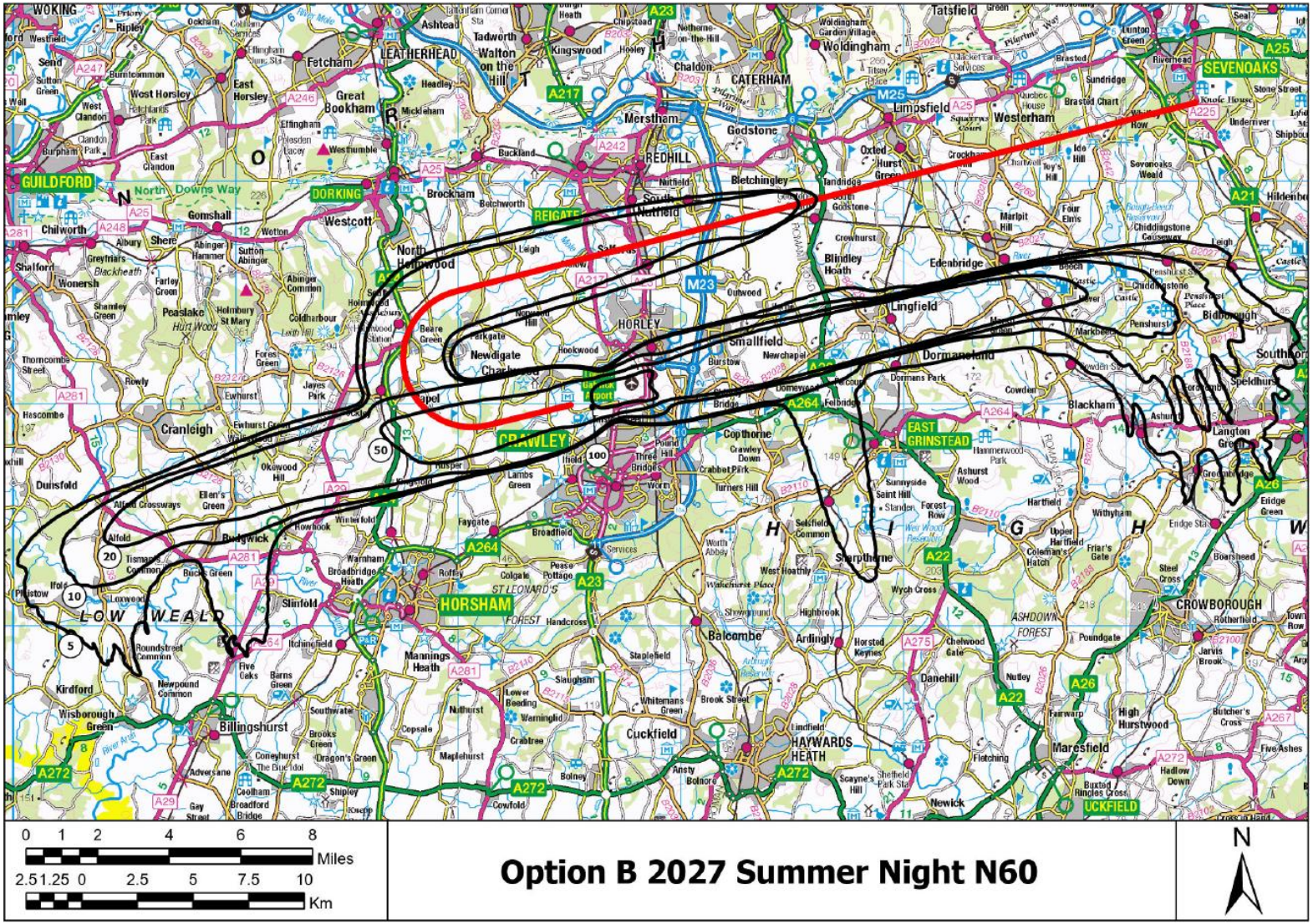
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	146.7	22500	9500	11	1	30	19
>48	83.5	10100	4300	4	1	18	13
>51	43.5	4500	2000	2	0	13	7
>54	24.3	1400	600	1	0	2	3
>57	13.7	600	300	0	0	2	3
>60	7.3	100	100	0	0	0	2
>63	3.6	100	<100	0	0	0	1
>66	2.0	0	0	0	0	0	0
>69	1.3	0	0	0	0	0	0
>72	0.8	0	0	0	0	0	0

A3.3 Option B 2027 Summer Day N65



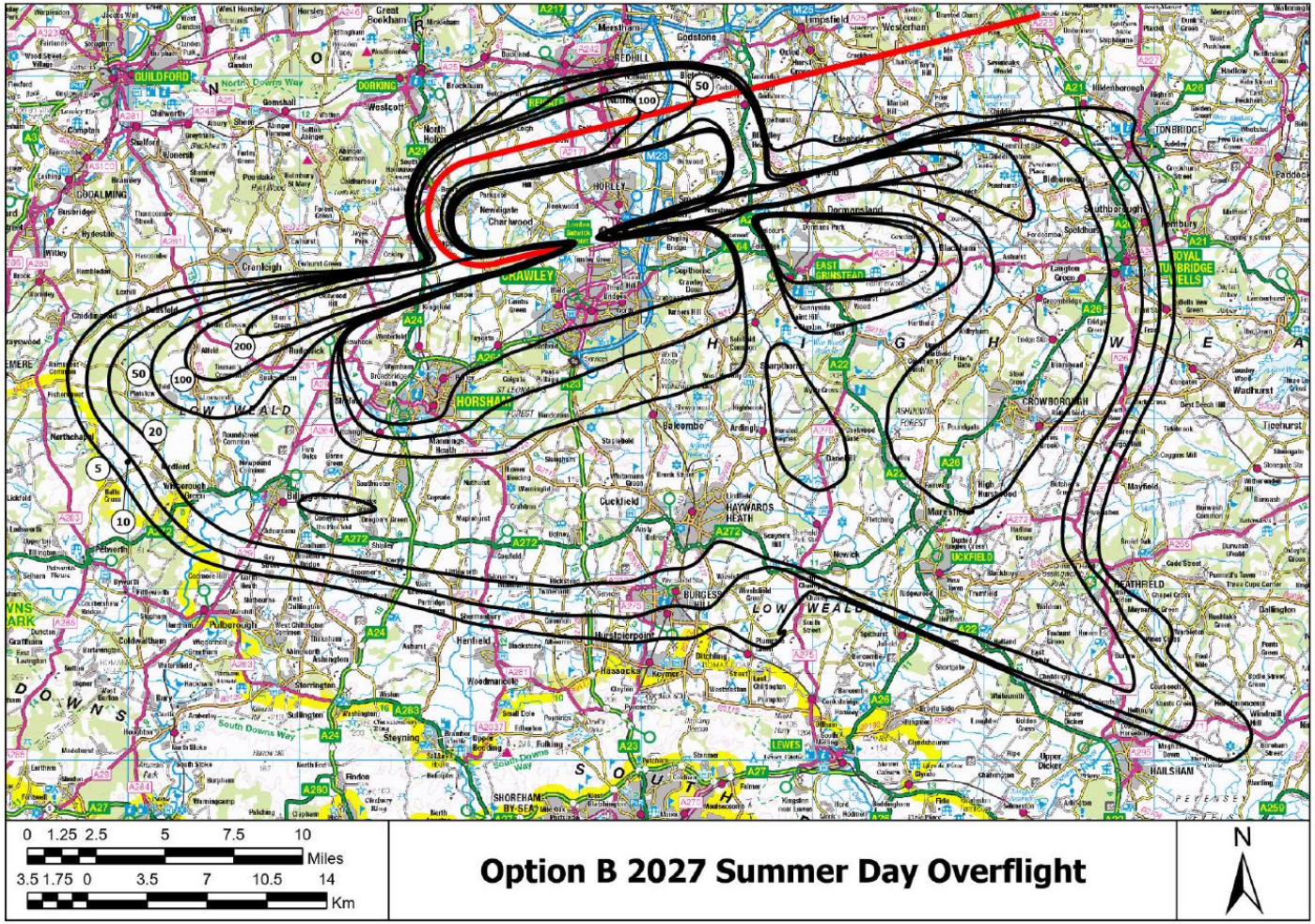
N65	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	281.0	53000	21800	21	2	53	45
>10	211.6	35100	14500	15	0	42	36
>20	153.2	20500	8600	13	0	28	24
>50	100.2	12200	5300	7	0	19	15
>100	75.9	9800	4200	5	0	18	11
>200	52.2	5200	2300	3	0	10	8
>500	3.4	<100	<100	0	0	2	1

A3.4 Option B 2027 Summer Night N60



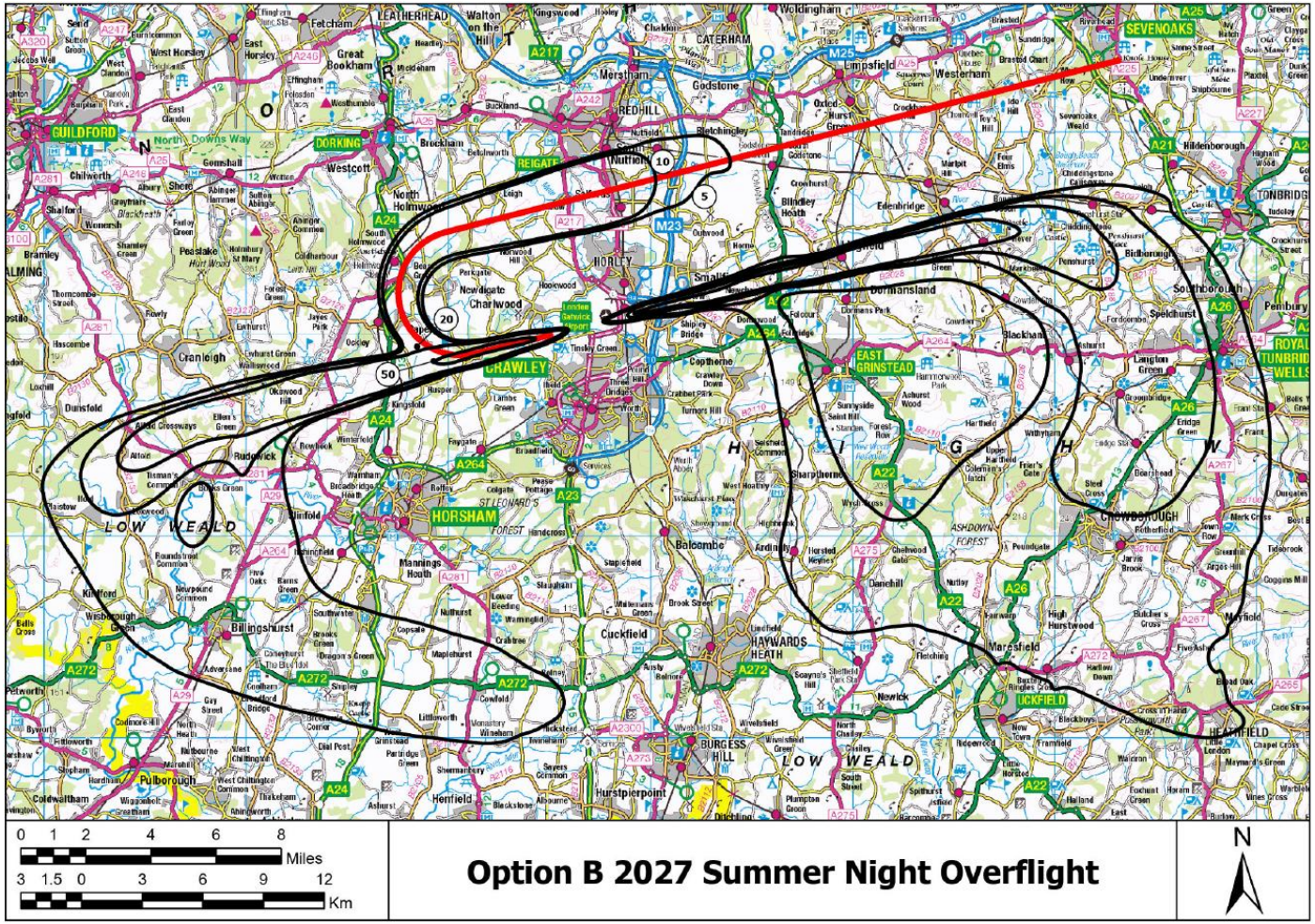
N60	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	387.4	74400	30800	39	3	76	66
>10	256.7	41100	17000	24	2	40	37
>20	137.7	14900	6200	11	1	21	16
>50	64.9	7900	3300	3	1	16	9
>100	3.2	0	0	0	0	2	1

A3.5 Option B 2027 Summer Day Overflight



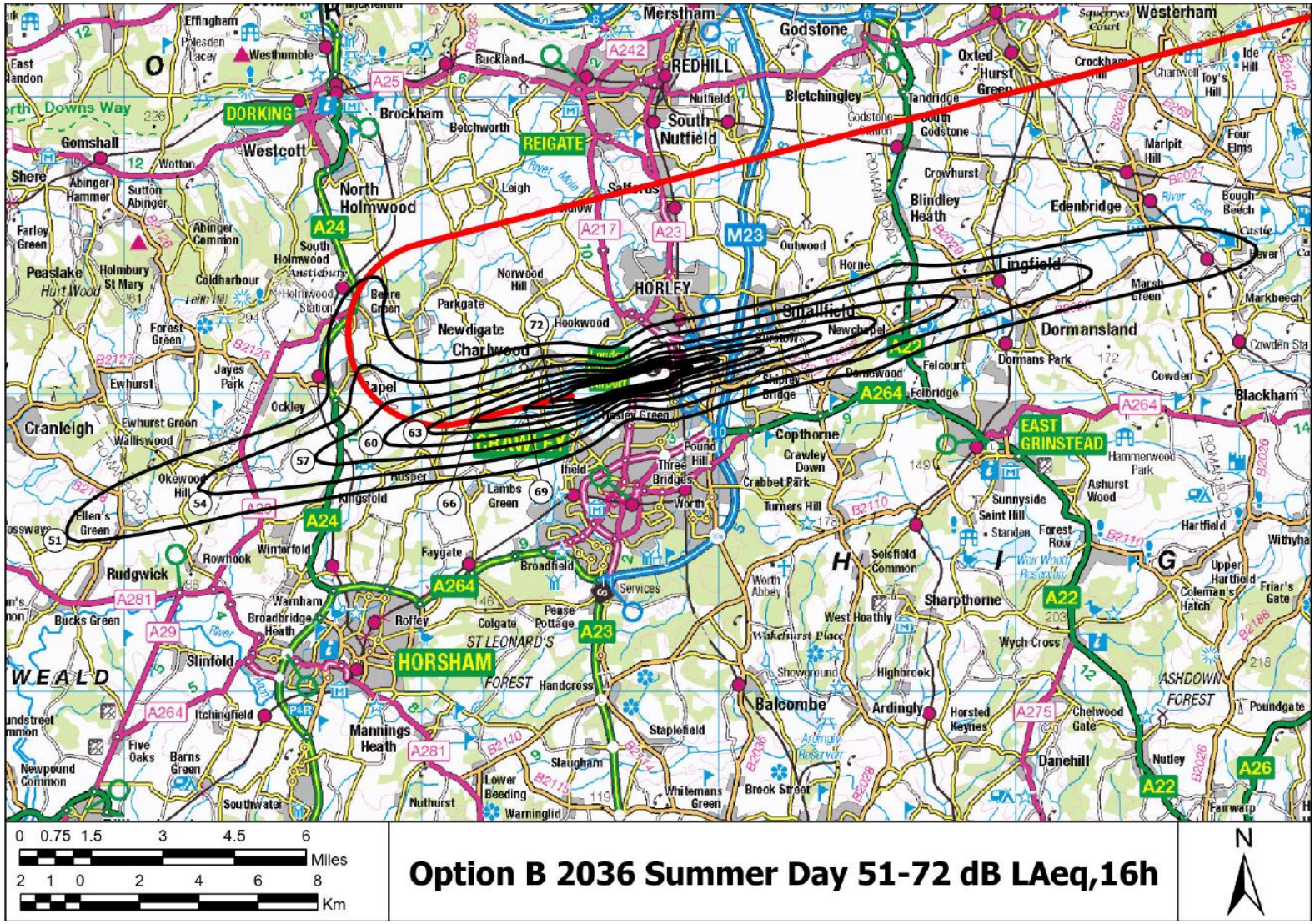
Overflights	>5	>10	>20	>50	>100	>200
Population	449,700	330,000	257,100	71,500	17,300	3,200

A3.6 Option B 2027 Summer Night Overflight



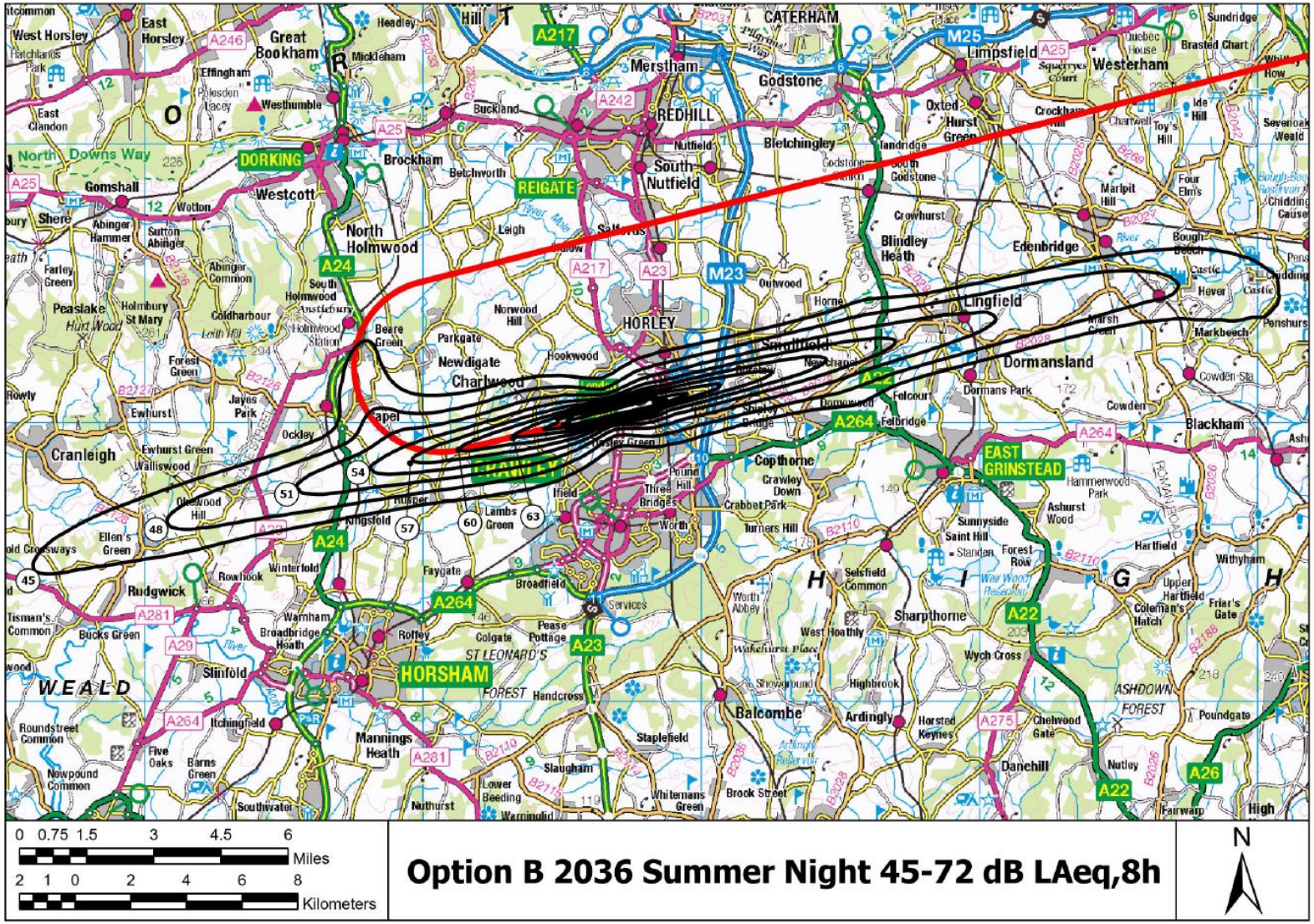
Overflights	>5	>10	>20	>50
Population	174,100	44,900	5,800	2,400

A3.7 Option B 2036 Summer Day 51-72 dB LAeq,16h



$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	118.7	17900	7400	10	1	25	17
>54	64.3	7400	3200	4	0	15	11
>57	34.7	2100	900	1	0	5	3
>60	19.5	1000	500	0	0	2	3
>63	10.9	400	200	0	0	2	3
>66	5.7	100	<100	0	0	0	1
>69	2.8	0	0	0	0	0	0
>72	1.5	0	0	0	0	0	0

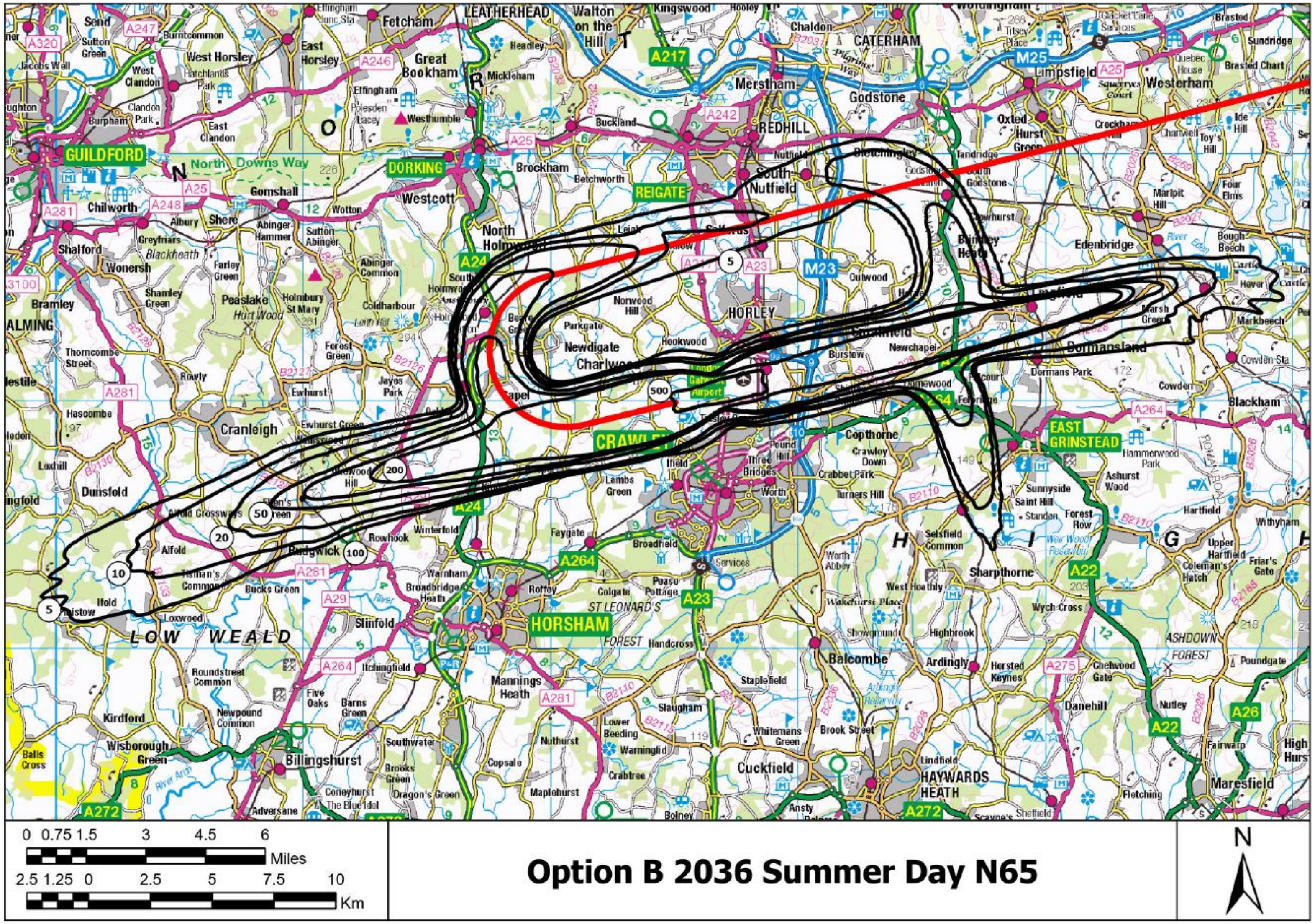
A3.8 Option B 2036 Summer Night 45-72 dB LAeq,8h



$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	135.8	19900	8300	11	1	29	19
>48	79.2	9600	4000	3	1	15	13
>51	41.2	4100	1800	2	0	13	7
>54	22.9	1300	600	1	0	2	3
>57	13.0	500	200	0	0	2	3
>60	7.0	100	100	0	0	0	2
>63	3.5	100	<100	0	0	0	1
>66	1.9	0	0	0	0	0	0
>69	1.2	0	0	0	0	0	0
>72	0.7	0	0	0	0	0	0

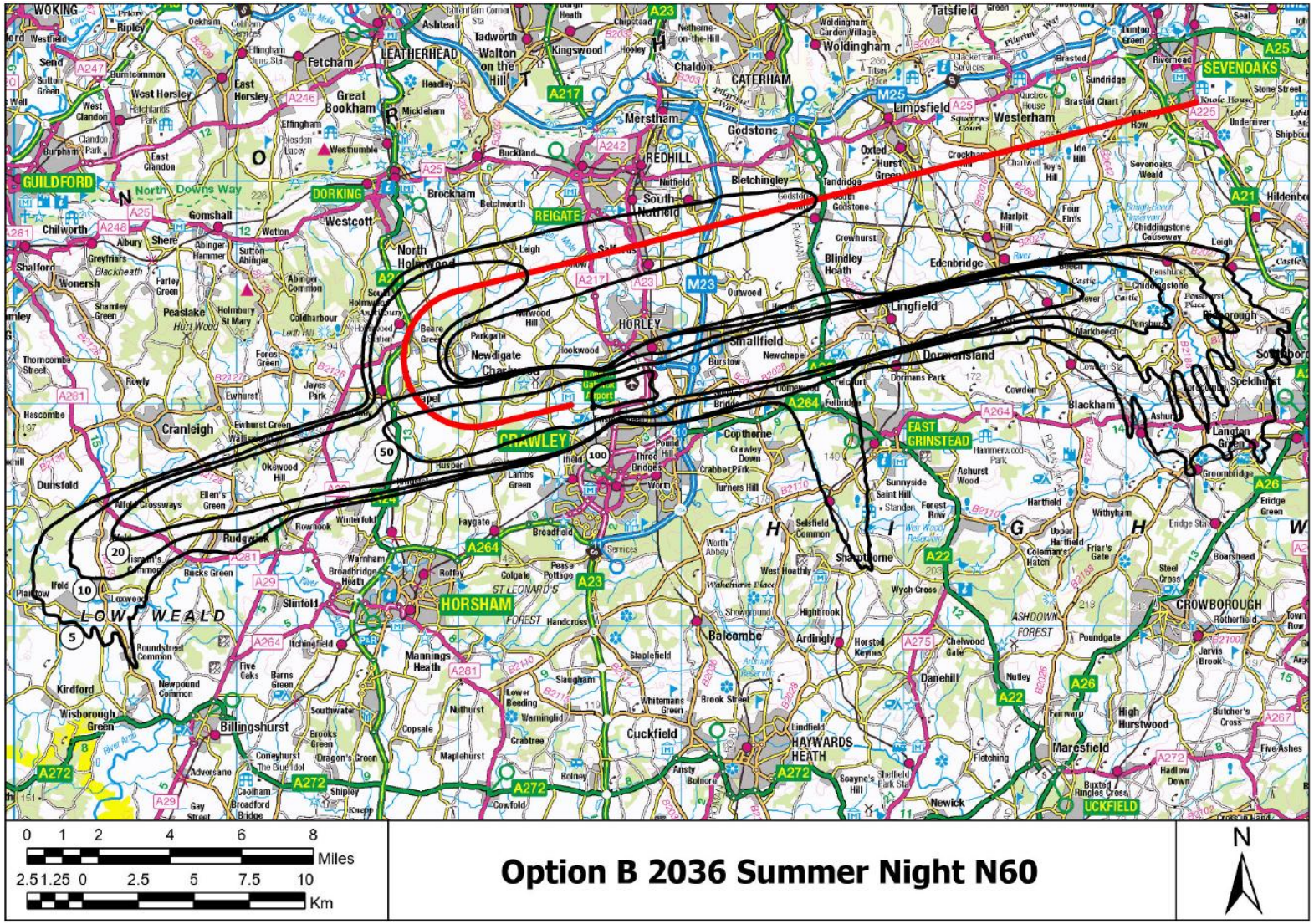
LONDON GATWICK

A3.9 Option B 2036 Summer Day N65



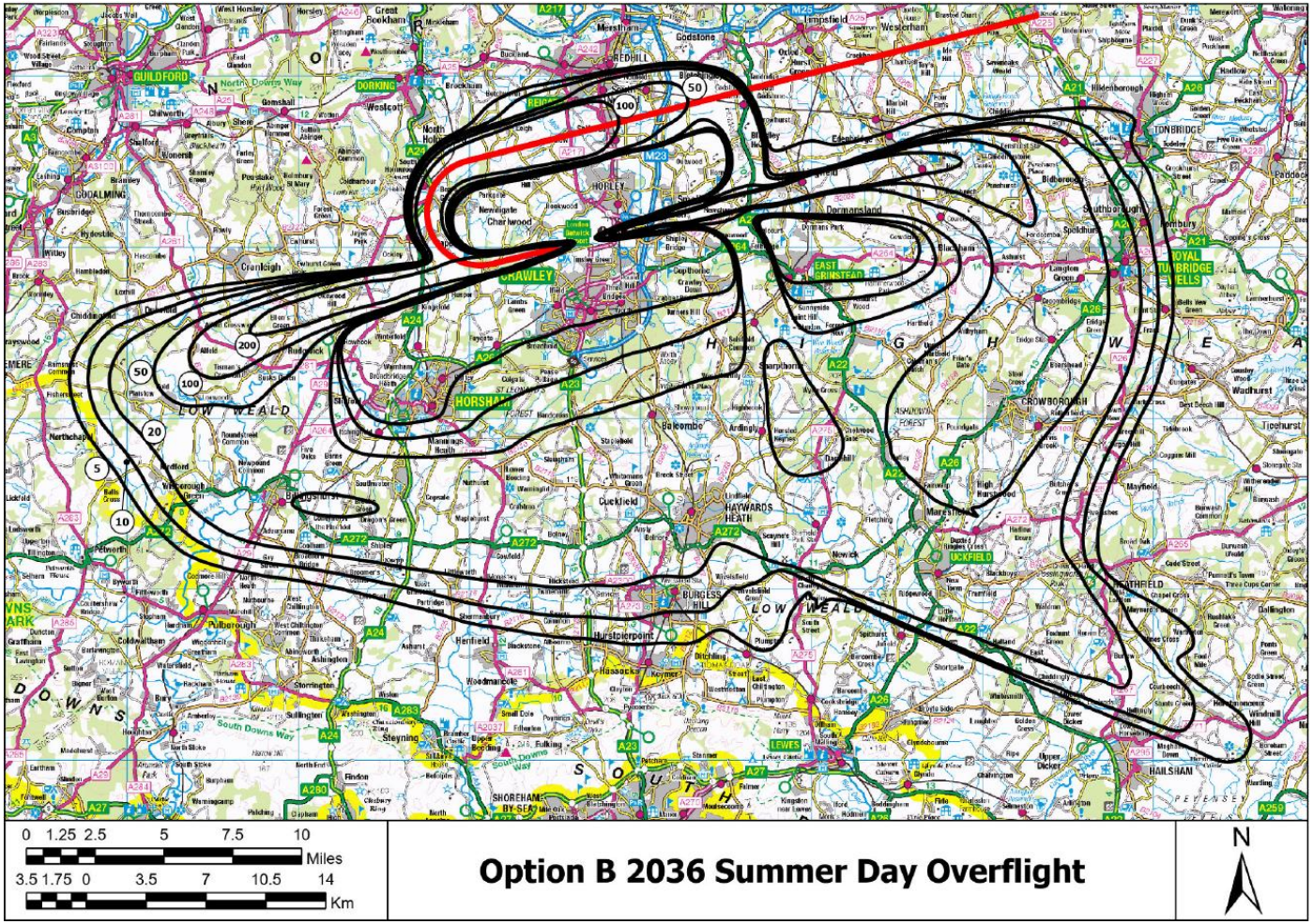
N65	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	268.4	50400	20800	21	2	49	43
>10	194.8	28600	11900	14	0	34	30
>20	136.6	18200	7600	13	0	25	19
>50	91.3	11700	5100	7	0	19	13
>100	69.0	8500	3700	4	0	16	9
>200	48.6	5000	2200	3	0	10	8
>500	3.3	<100	<100	0	0	2	1

A3.10 Option B 2036 Summer Night N60



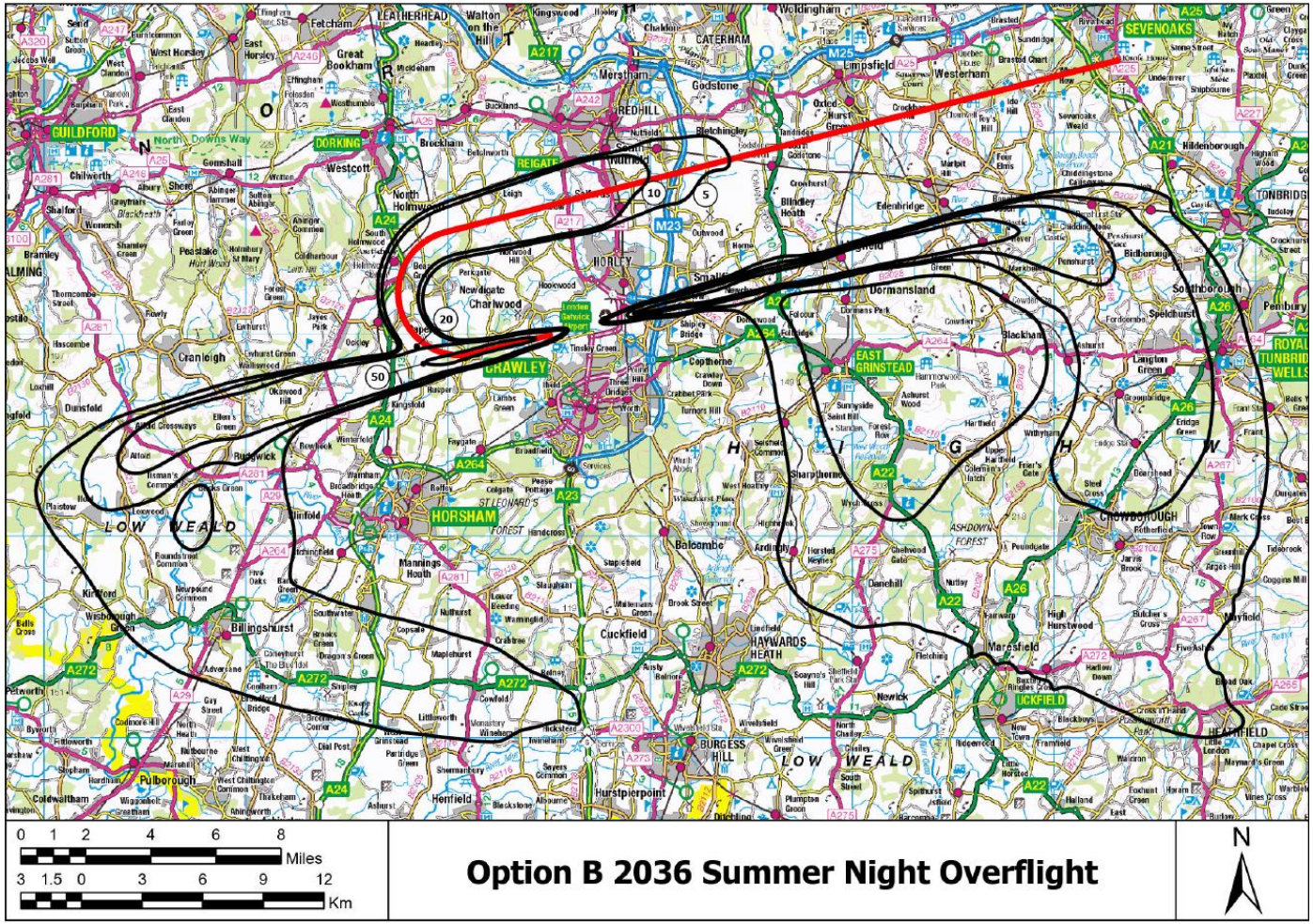
N60	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	340.7	64600	26800	36	3	60	59
>10	206.7	29000	12100	16	1	34	24
>20	130.0	14400	6000	9	1	21	16
>50	62.6	7700	3300	3	1	16	9
>100	3.1	0	0	0	0	2	1

A3.11 Option B 2036 Summer Day Overflight



Overflights	>5	>10	>20	>50	>100	>200
Population	434,100	332,100	256,300	71,900	16,700	3,200

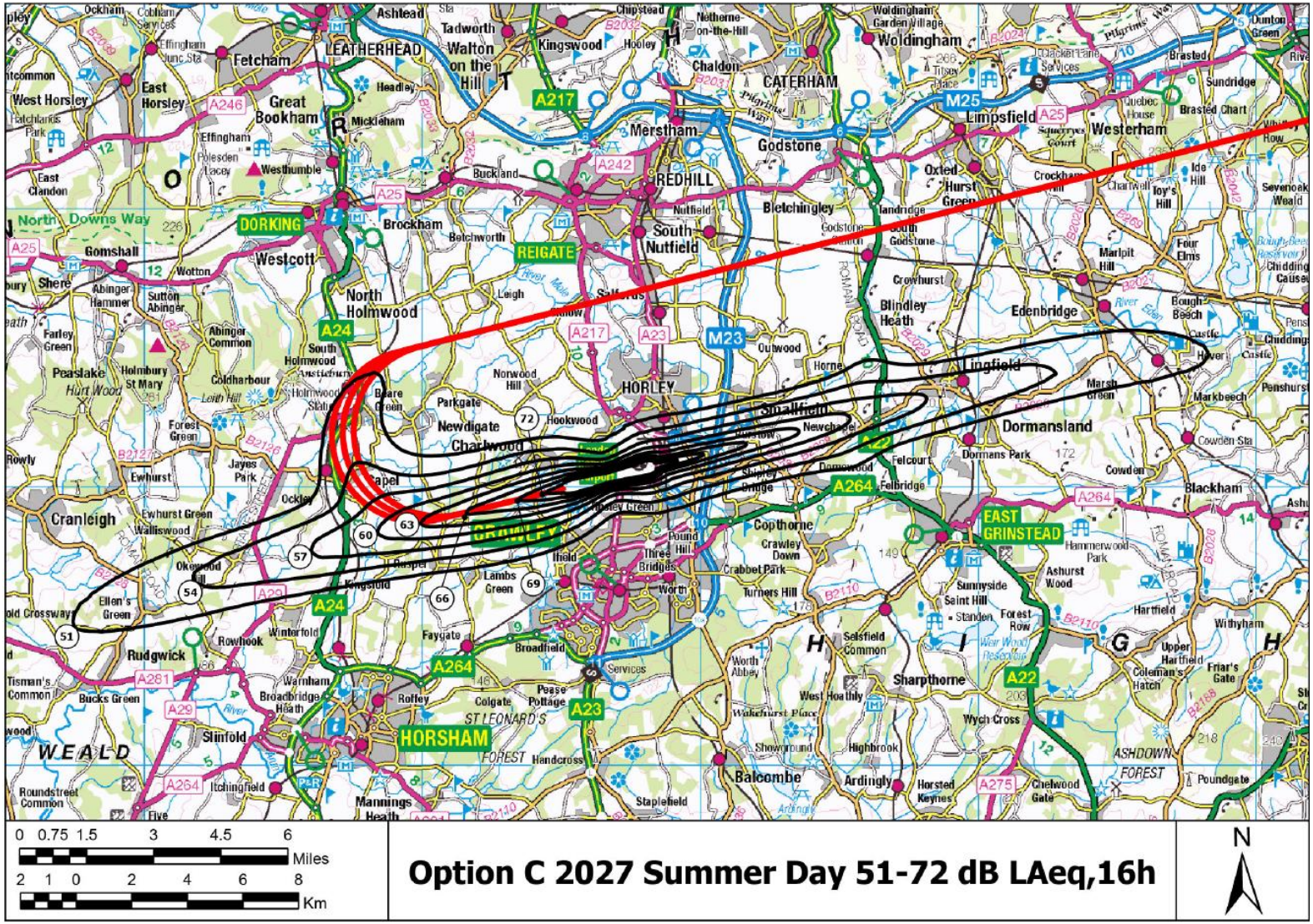
A3.12 Option B 2036 Summer Night Overflight



Overflights	>5	>10	>20	>50
Population	173,100	44,300	5,800	2,400

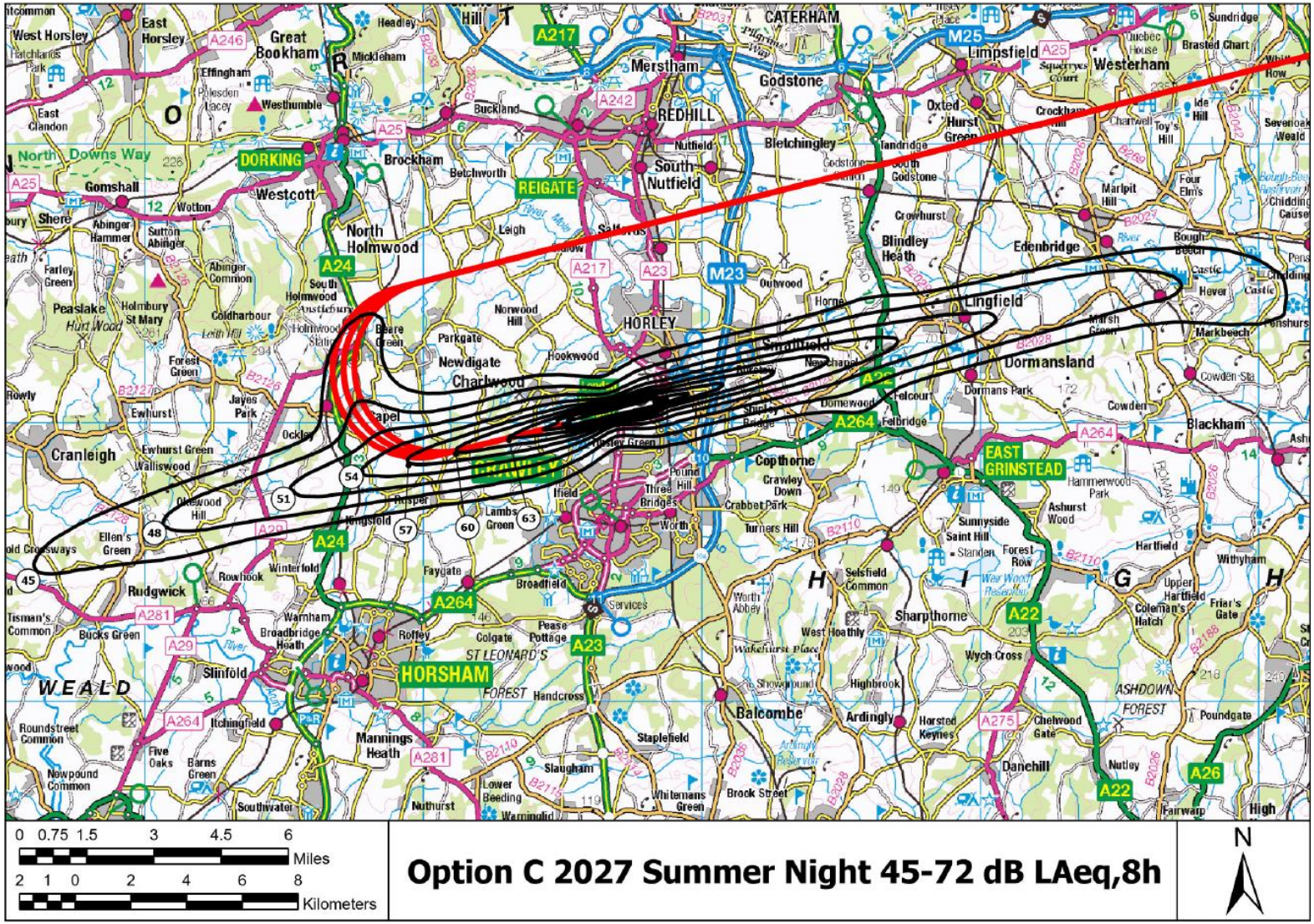
A4 Option C Environmental Modelling Results

A4.1 Option C 2027 Summer Day 51-72 dB LAeq,16h



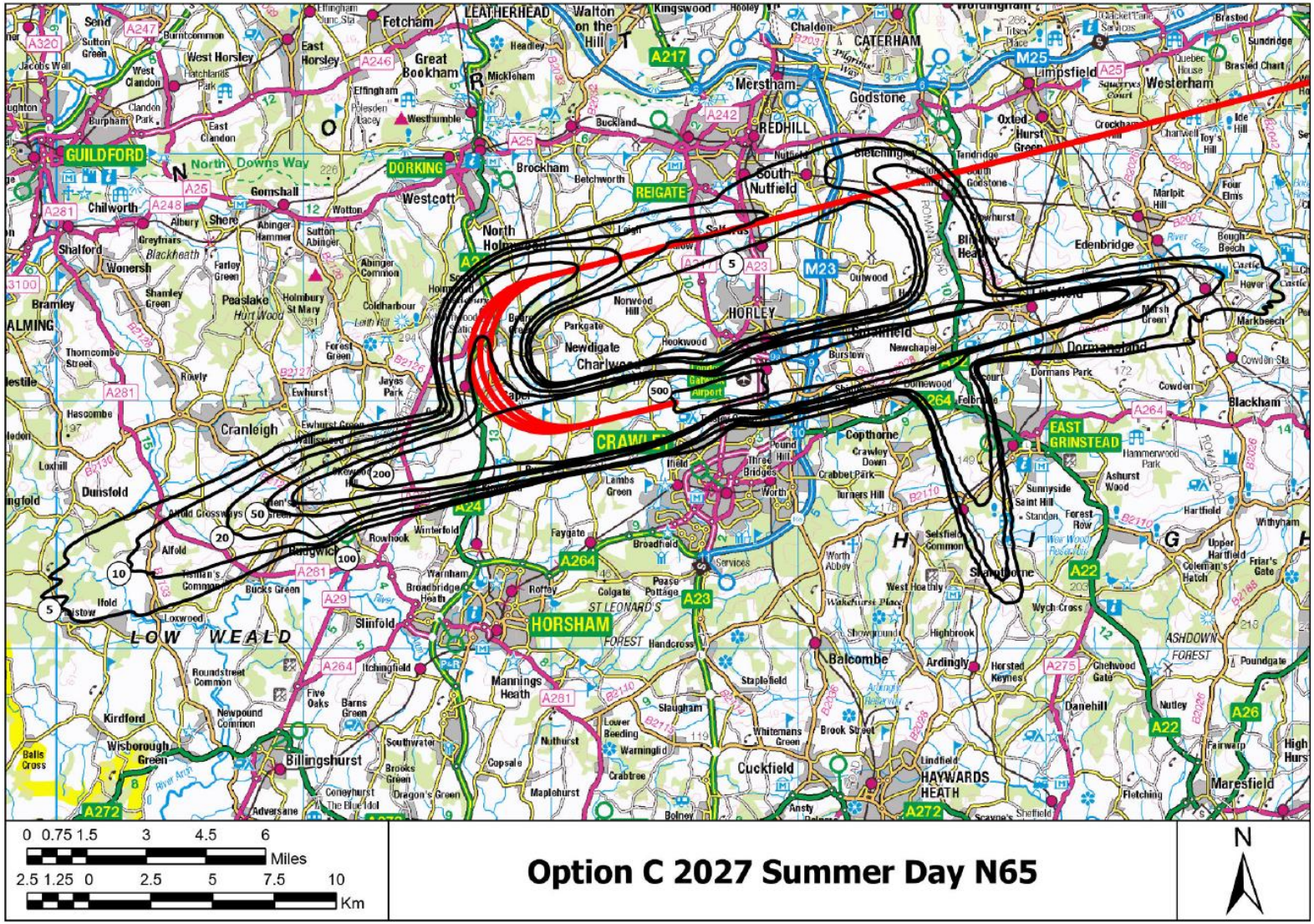
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	128.6	20300	8500	11	1	26	17
>54	69.7	8300	3600	4	0	17	12
>57	37.9	2200	1000	1	0	6	5
>60	21.3	1200	500	1	0	2	3
>63	11.7	400	200	0	0	2	3
>66	6.1	100	100	0	0	0	1
>69	3.0	0	0	0	0	0	0
>72	1.6	0	0	0	0	0	0

A4.2 Option C 2027 Summer Night 45-72 dB LAeq,8h



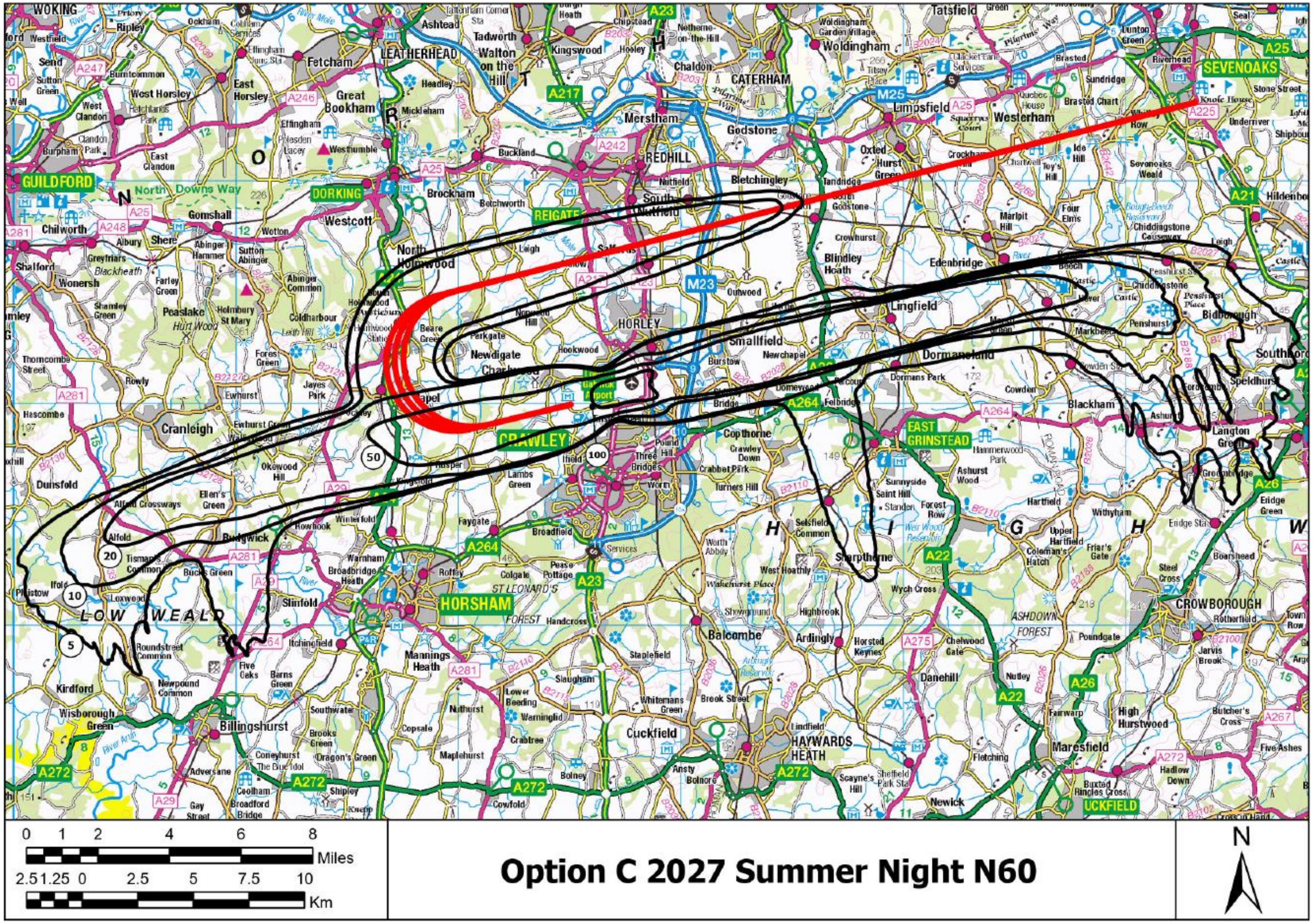
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	146.3	22800	9600	12	1	30	19
>48	83.4	10300	4300	4	1	18	13
>51	43.7	4500	2000	2	0	13	7
>54	24.5	1400	600	1	0	2	3
>57	13.7	600	300	0	0	2	3
>60	7.3	100	100	0	0	0	2
>63	3.6	100	<100	0	0	0	1
>66	2.0	0	0	0	0	0	0
>69	1.3	0	0	0	0	0	0
>72	0.8	0	0	0	0	0	0

A4.3 Option C 2027 Summer Day N65



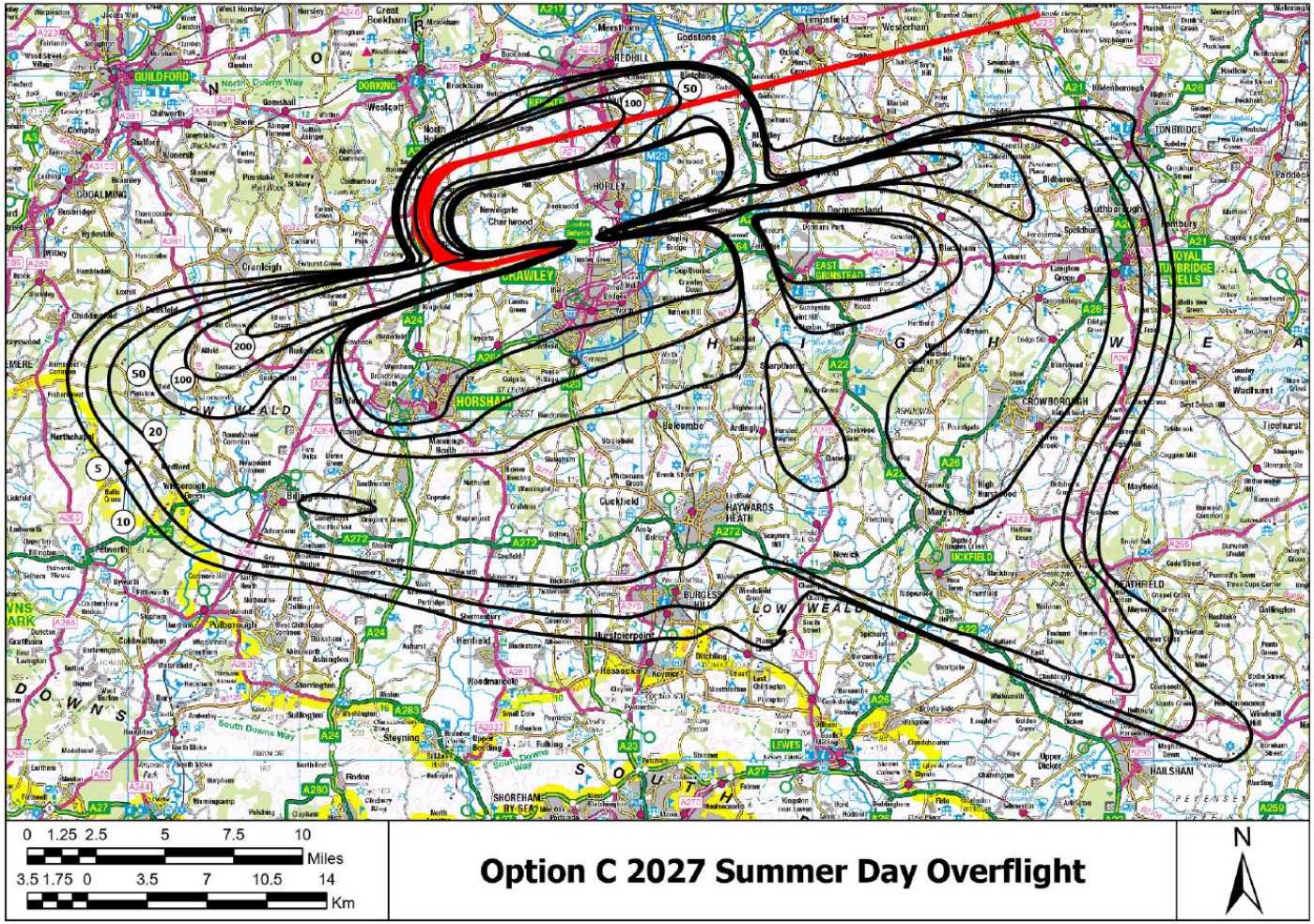
N65	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	282.8	53000	21800	21	2	53	46
>10	211.5	32800	13600	16	0	40	37
>20	153.9	20800	8800	14	0	28	25
>50	99.1	12300	5300	7	0	19	15
>100	73.4	8900	3800	5	0	17	11
>200	52.5	5300	2300	3	0	10	8
>500	3.4	<100	<100	0	0	2	1

A4.4 Option C 2027 Summer Night N60



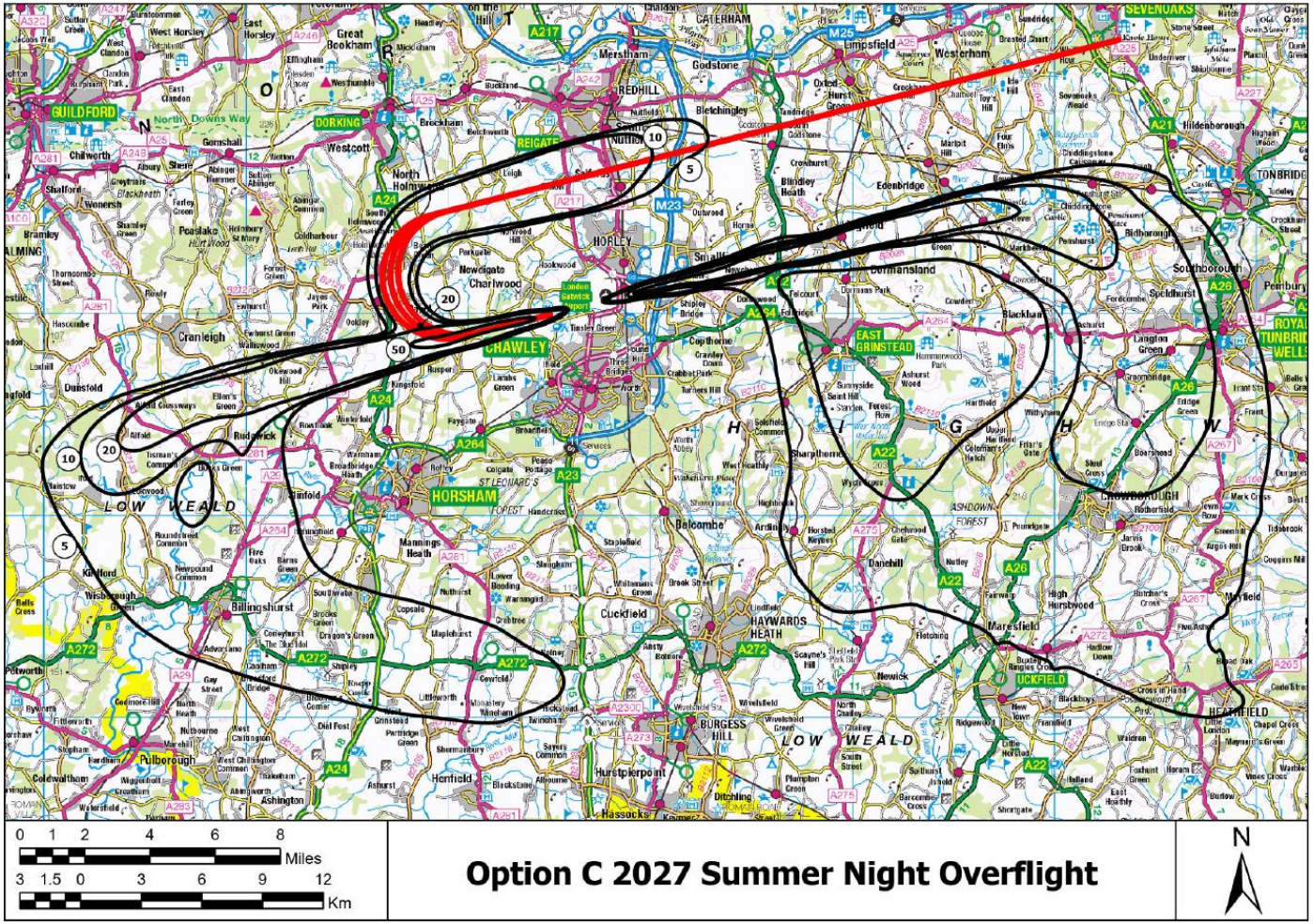
N60	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	386.6	73600	30400	38	3	76	66
>10	253.5	40300	16700	23	2	39	37
>20	138.2	15000	6200	11	1	21	16
>50	66.4	8000	3400	3	1	16	9
>100	3.2	0	0	0	0	2	1

A4.5 Option C 2027 Summer Day Overflight



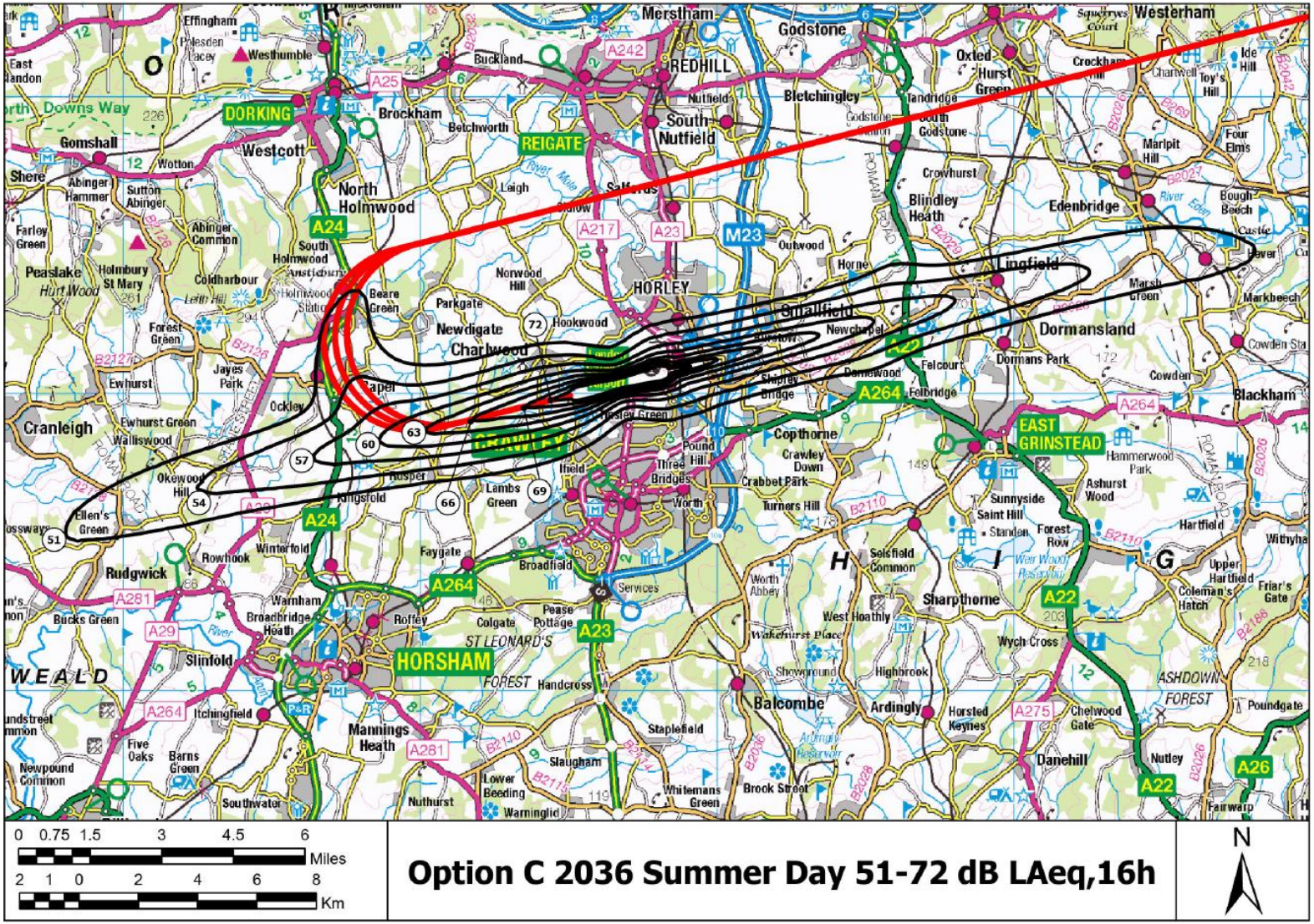
Overflights	>5	>10	>20	>50	>100	>200
Population	430,500	330,700	257,700	71,700	15,600	3,200

A4.6 Option C 2027 Summer Night Overflight



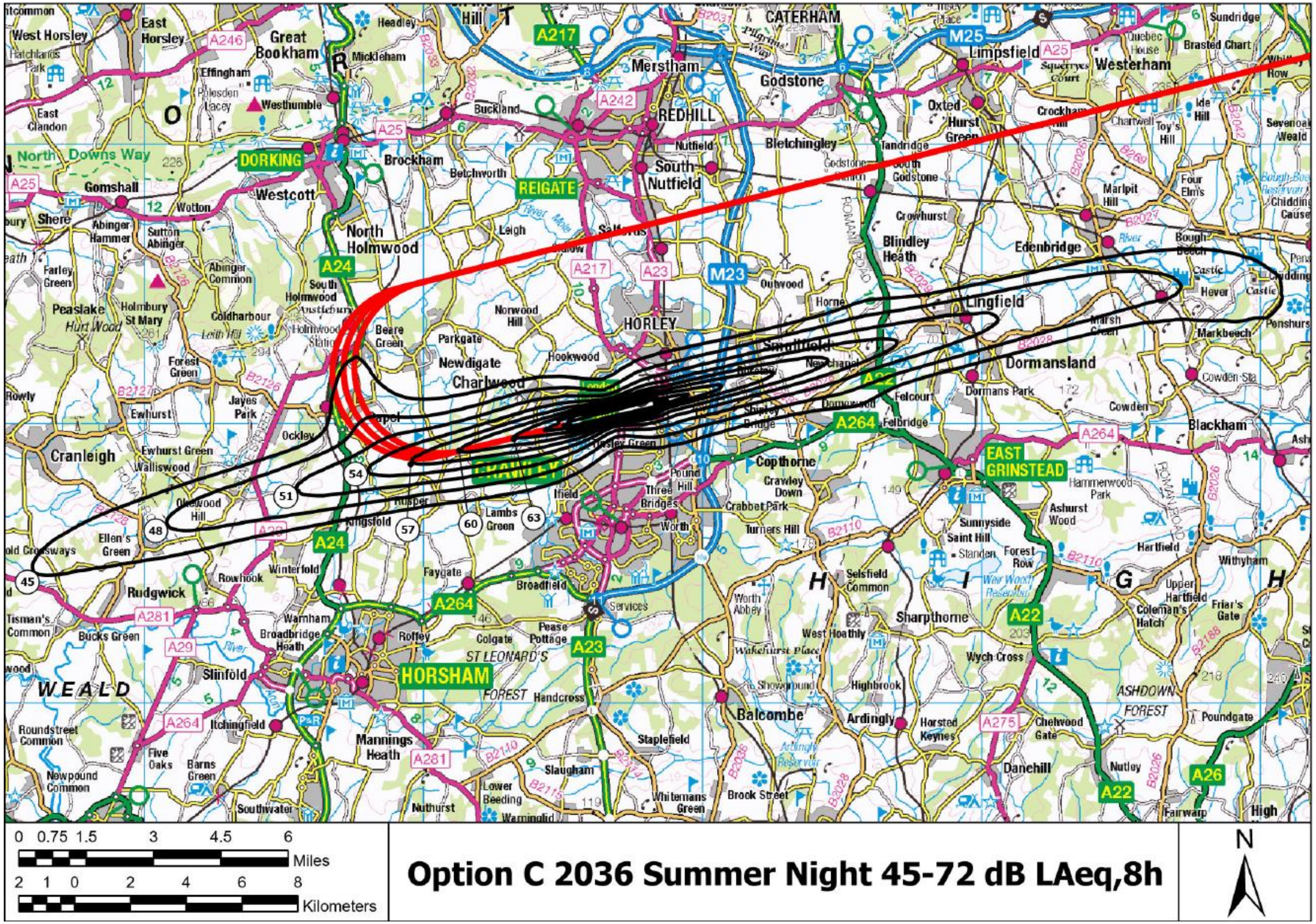
Overflights	>5	>10	>20	>50
Population	174,700	45,400	5,800	2,400

A4.7 Option C 2036 Summer Day 51-72 dB LAeq,16h



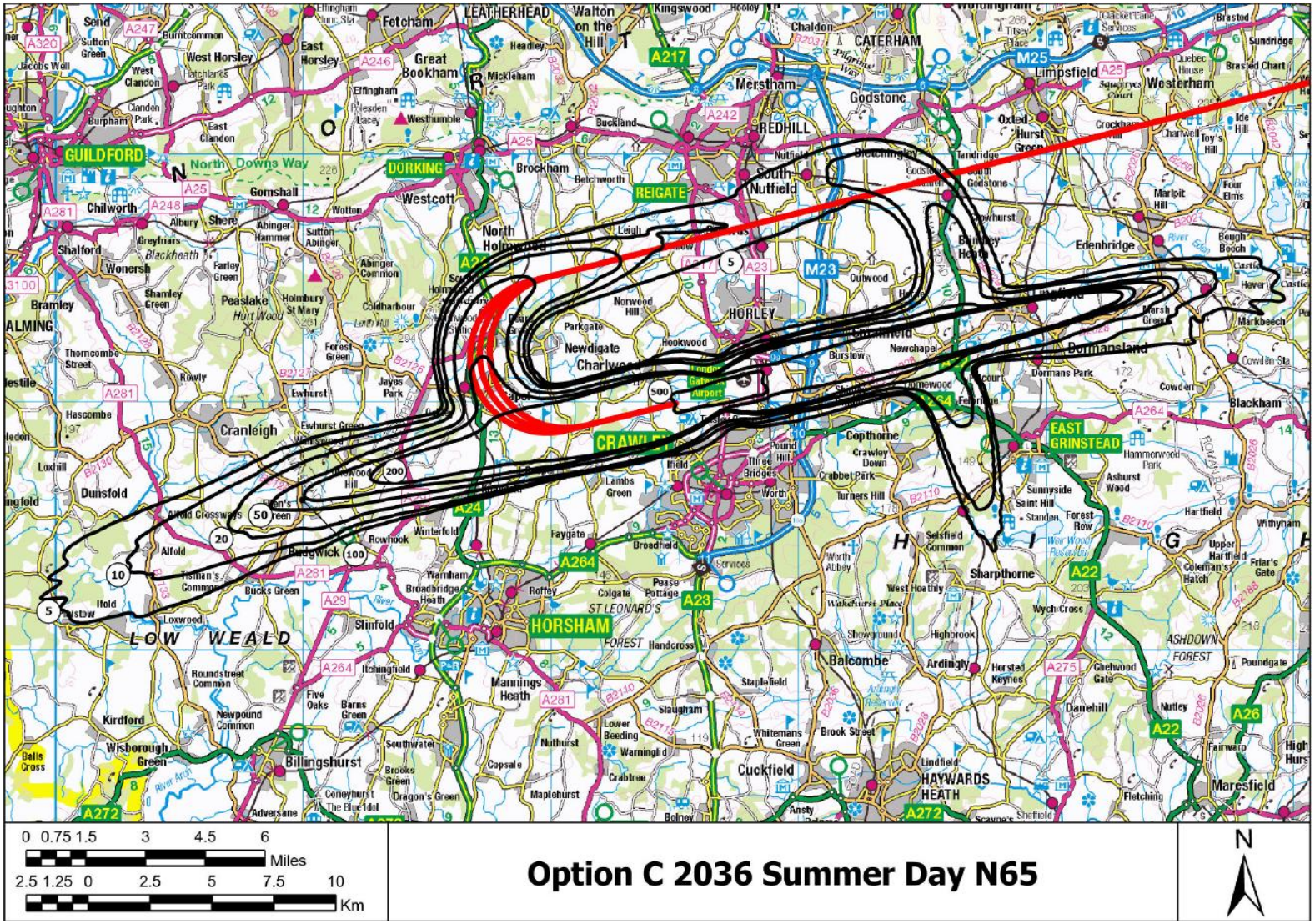
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	118.5	17900	7400	10	1	25	17
>54	64.2	7300	3200	4	0	15	11
>57	34.9	2100	900	1	0	5	3
>60	19.6	1100	500	0	0	2	3
>63	10.9	400	200	0	0	2	3
>66	5.7	100	<100	0	0	0	1
>69	2.8	0	0	0	0	0	0
>72	1.5	0	0	0	0	0	0

A4.8 Option C 2036 Summer Night 45-72 dB LAeq,8h



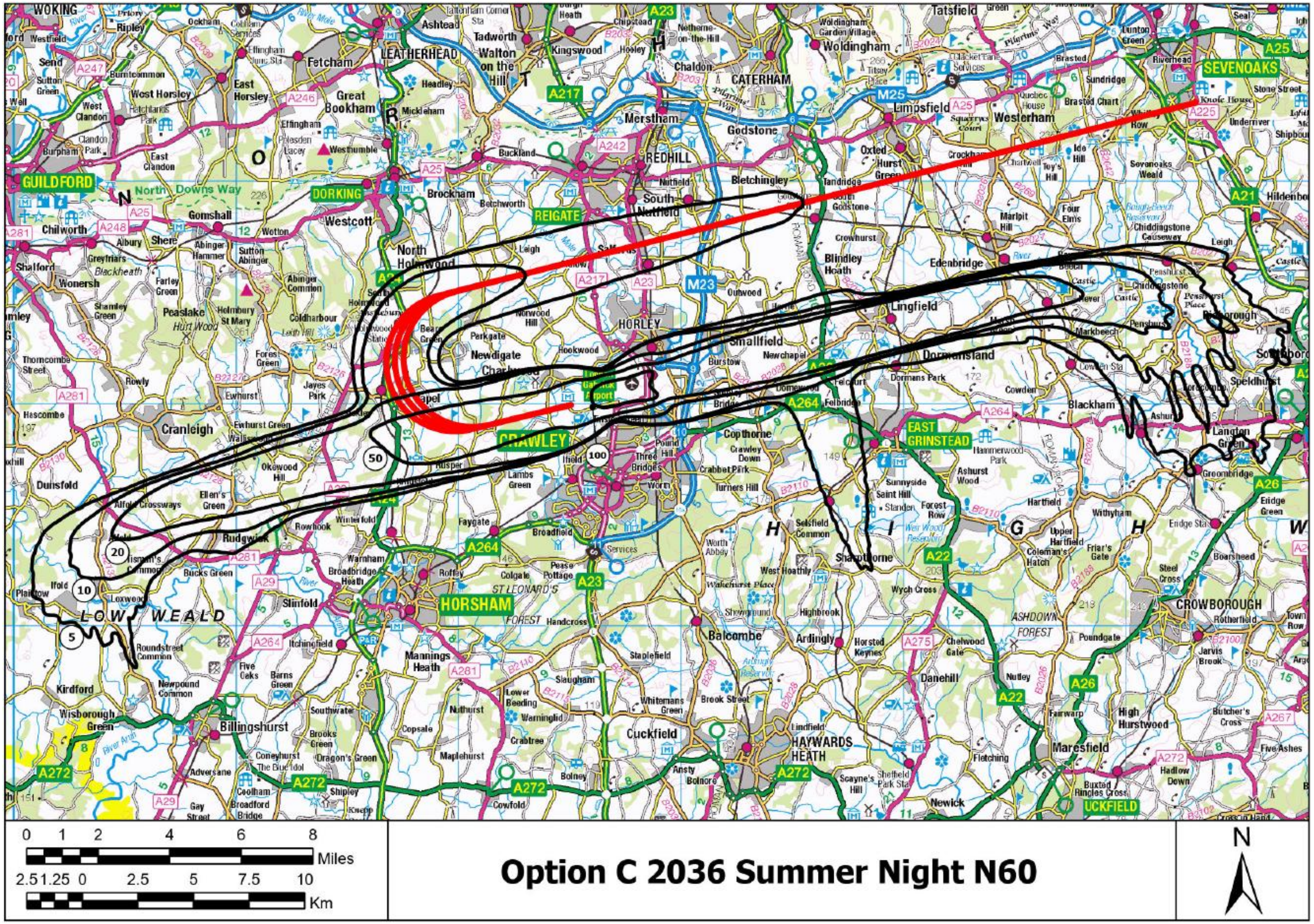
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	135.3	19400	8100	11	1	29	19
>48	79.2	9600	4000	3	1	15	13
>51	41.3	4100	1800	2	0	13	7
>54	23.0	1300	600	1	0	2	3
>57	13.0	500	200	0	0	2	3
>60	7.0	100	100	0	0	0	2
>63	3.5	100	<100	0	0	0	1
>66	1.9	0	0	0	0	0	0
>69	1.2	0	0	0	0	0	0
>72	0.7	0	0	0	0	0	0

A4.9 Option C 2036 Summer Day N65



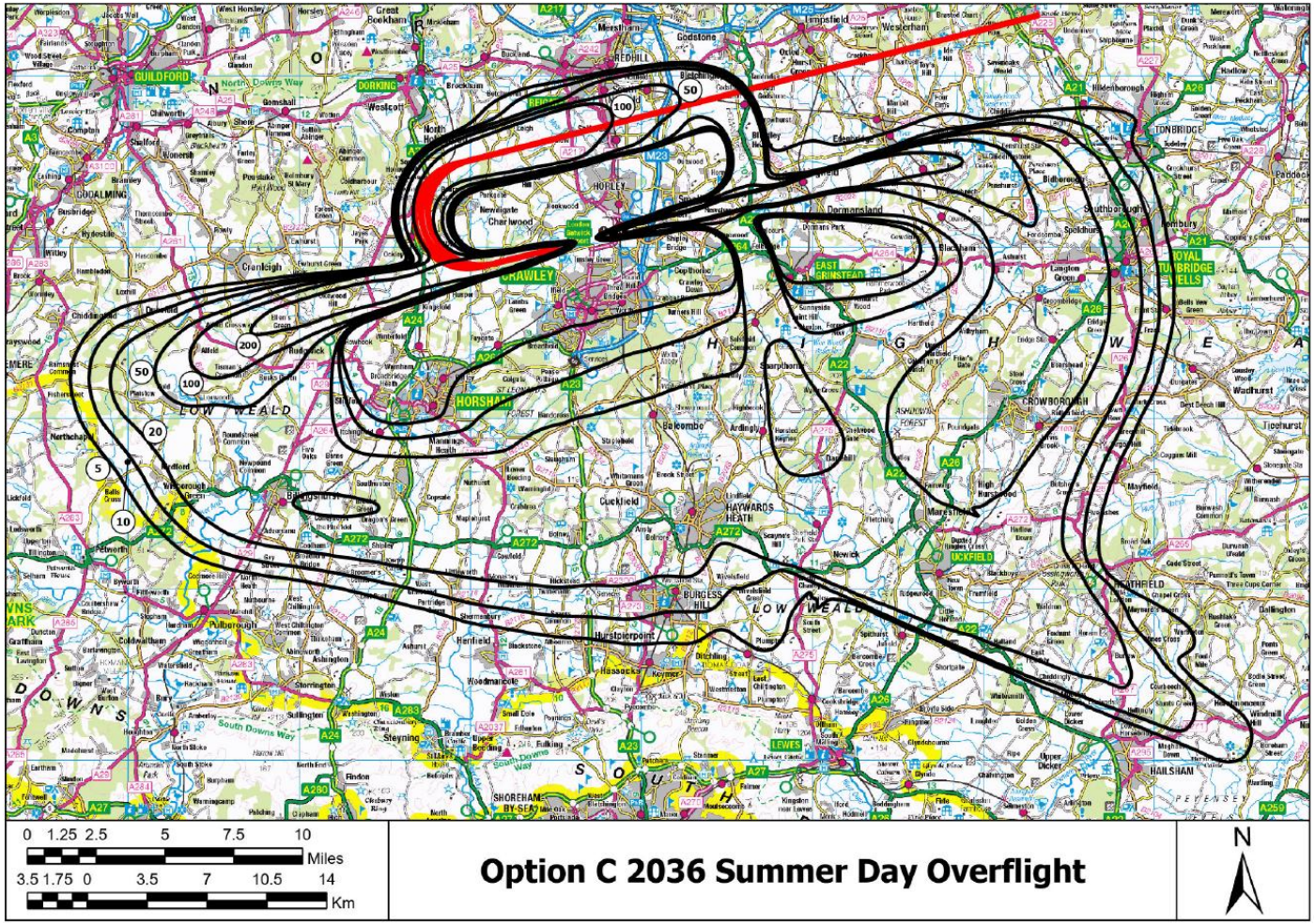
N65	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	270.1	50600	20800	20	2	49	44
>10	194.3	28100	11800	14	0	33	32
>20	136.9	18400	7700	13	0	26	19
>50	90.6	11800	5100	7	0	19	14
>100	67.9	8300	3600	4	0	16	9
>200	48.8	5000	2200	3	0	10	8
>500	3.3	<100	<100	0	0	2	1

A4.10 Option C 2036 Summer Night N60



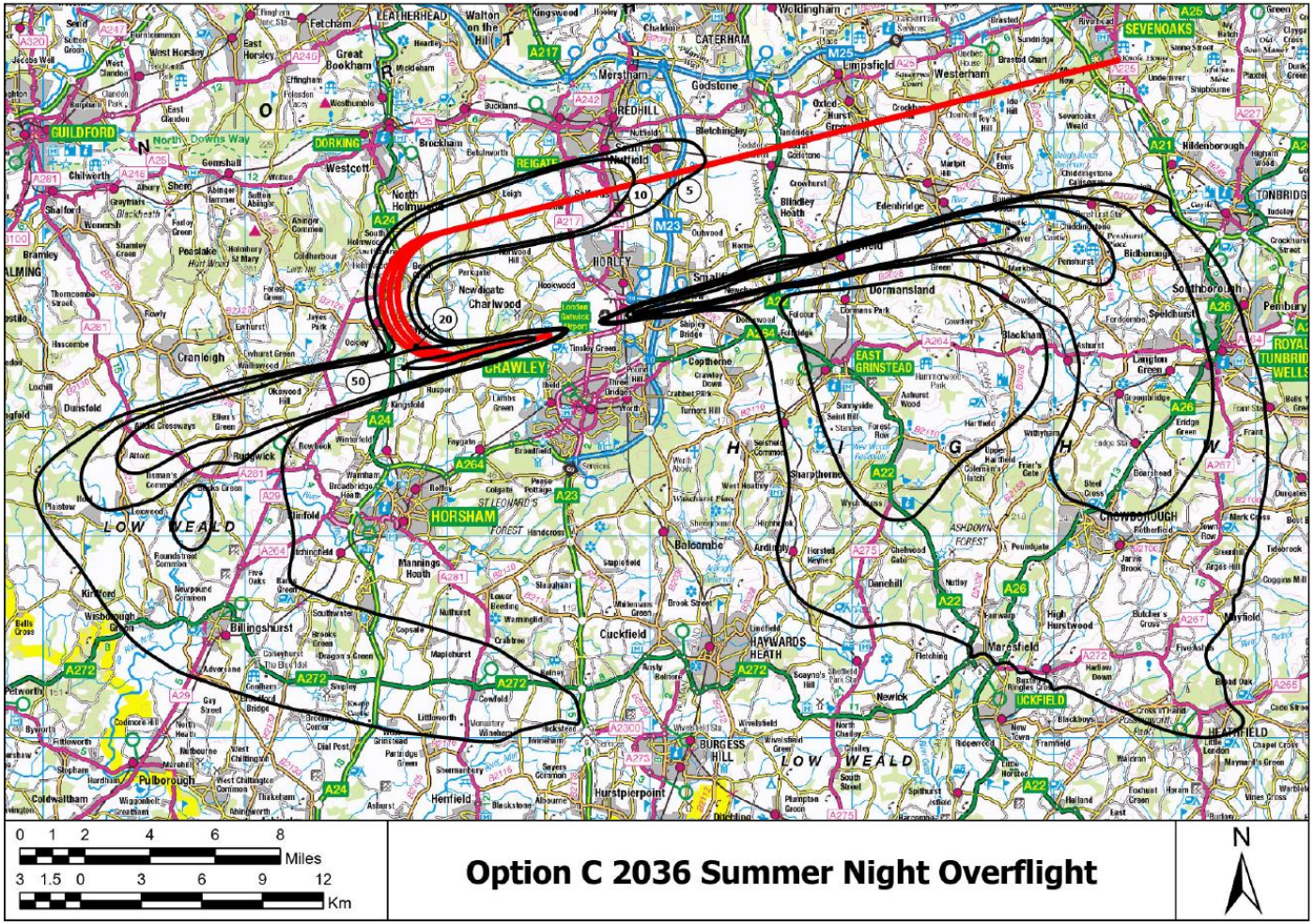
N60	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	339.3	63800	26500	36	3	60	60
>10	206.1	29000	12100	17	1	34	25
>20	130.2	14500	6000	9	1	21	16
>50	63.9	7800	3300	3	1	16	9
>100	3.1	0	0	0	0	2	1

A4.11 Option C 2036 Summer Day Overflight



Overflights	>5	>10	>20	>50	>100	>200
Population	434,900	332,900	257,000	72,100	14,000	3,200

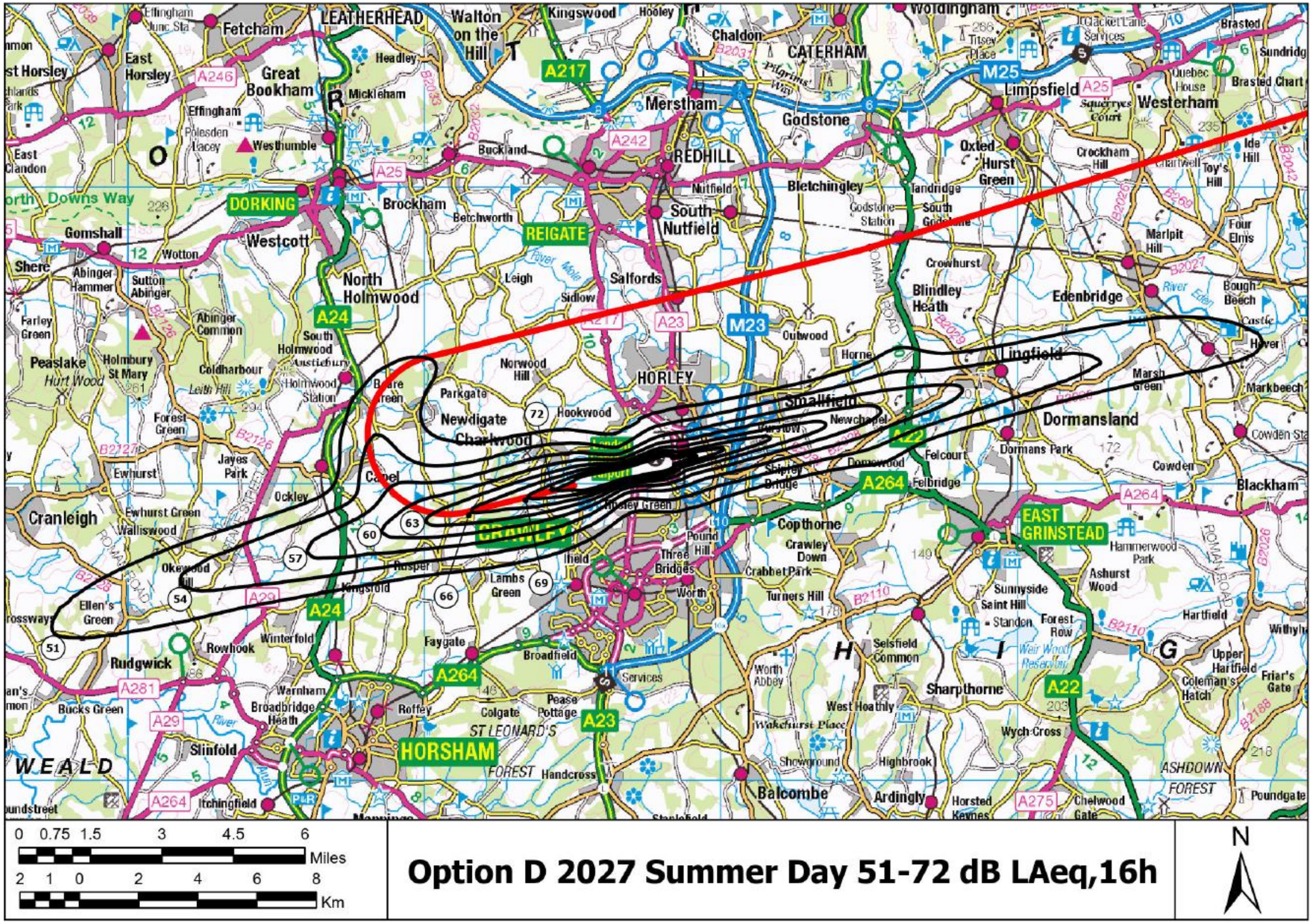
A4.12 Option C 2036 Summer Night Overflight



Overflights	>5	>10	>20	>50
Population	173,400	43,800	5,800	2,500

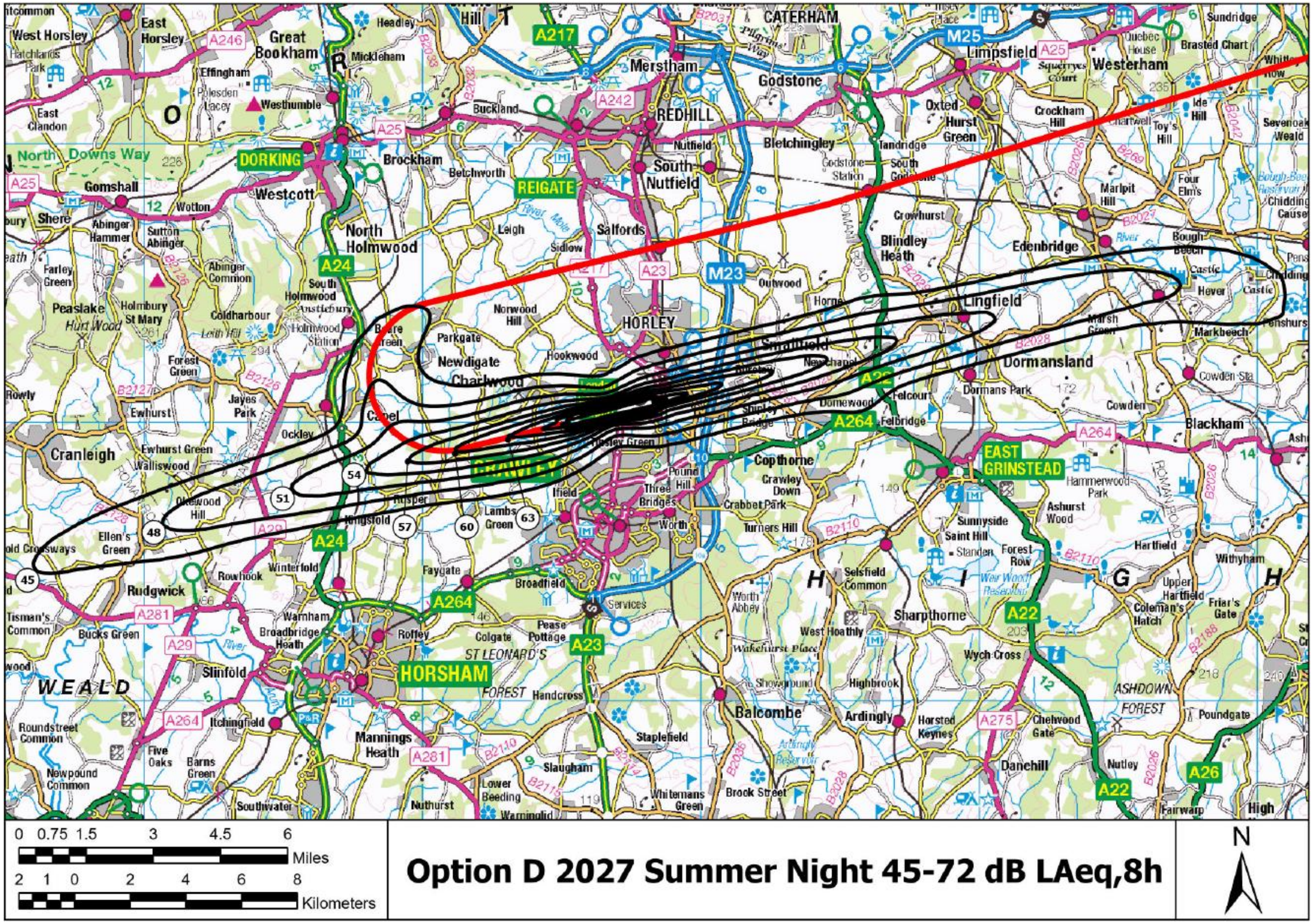
A5 Option D Environmental Modelling Results

A5.1 Option D 2027 Summer Day 51-72 dB LAeq,16h



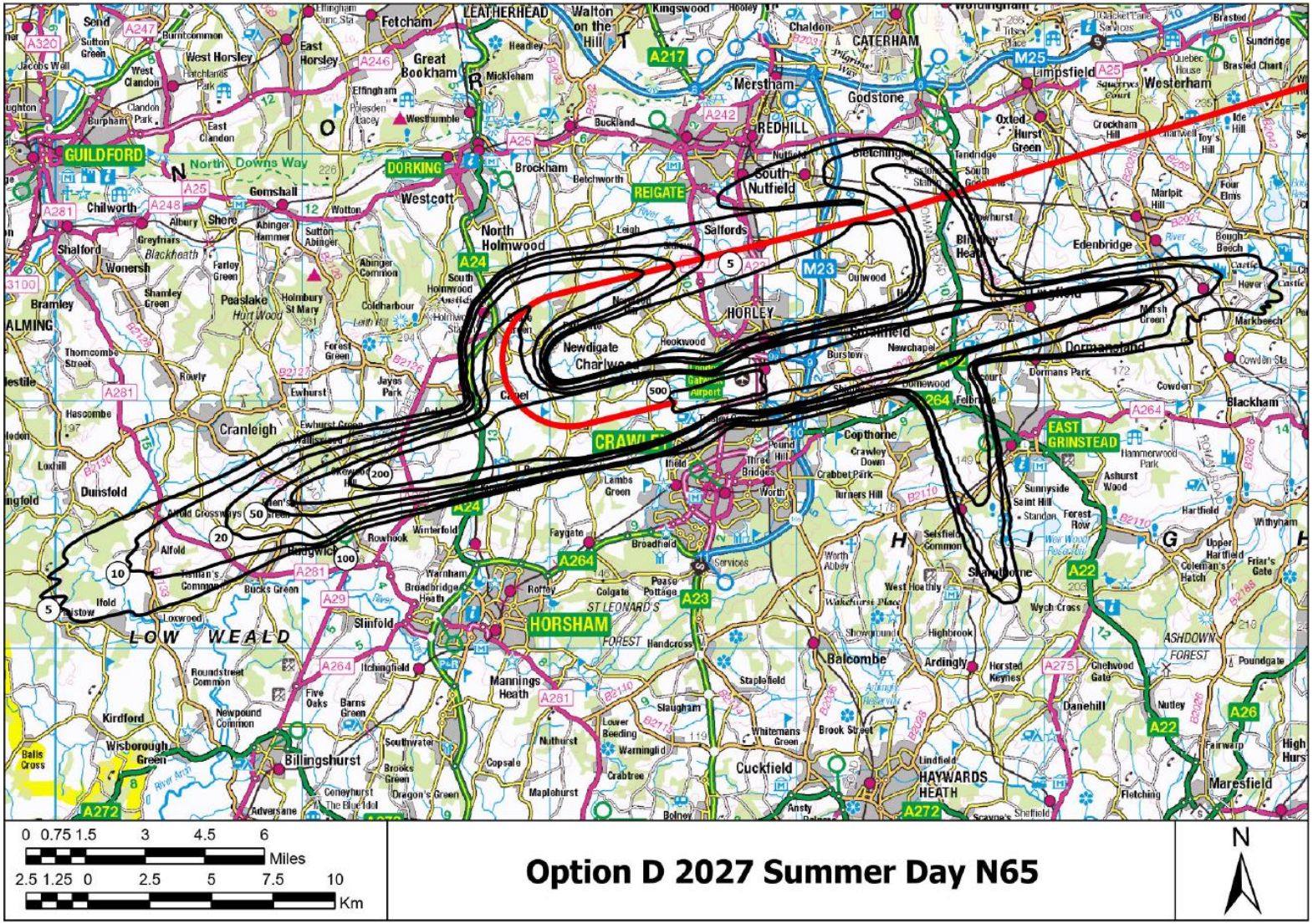
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	129.8	19900	8200	11	1	30	18
>54	70.1	8000	3400	4	0	15	11
>57	37.7	2300	1000	1	0	6	5
>60	21.1	1200	500	1	0	2	3
>63	11.7	400	200	0	0	2	3
>66	6.1	100	100	0	0	0	1
>69	3.0	0	0	0	0	0	0
>72	1.6	0	0	0	0	0	0

A5.2 Option D 2027 Summer Night 45-72 dB LAeq,8h



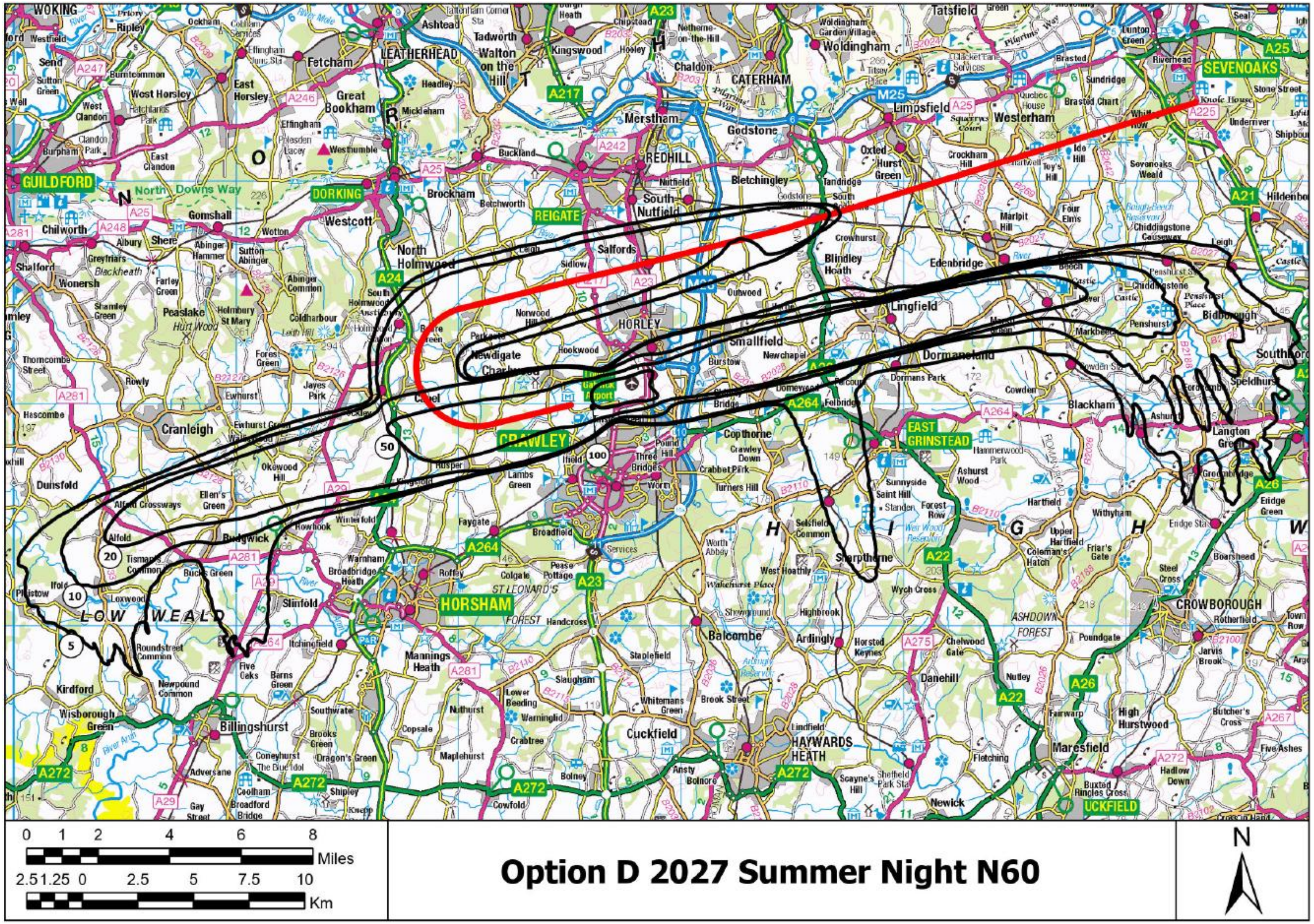
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	147.5	22600	9500	12	1	32	20
>48	83.7	10000	4200	4	1	16	13
>51	43.5	4500	2000	2	0	13	7
>54	24.2	1300	600	1	0	2	3
>57	13.6	600	300	0	0	2	3
>60	7.3	100	100	0	0	0	2
>63	3.6	100	<100	0	0	0	1
>66	2.0	0	0	0	0	0	0
>69	1.3	0	0	0	0	0	0
>72	0.8	0	0	0	0	0	0

A5.3 Option D 2027 Summer Day N65



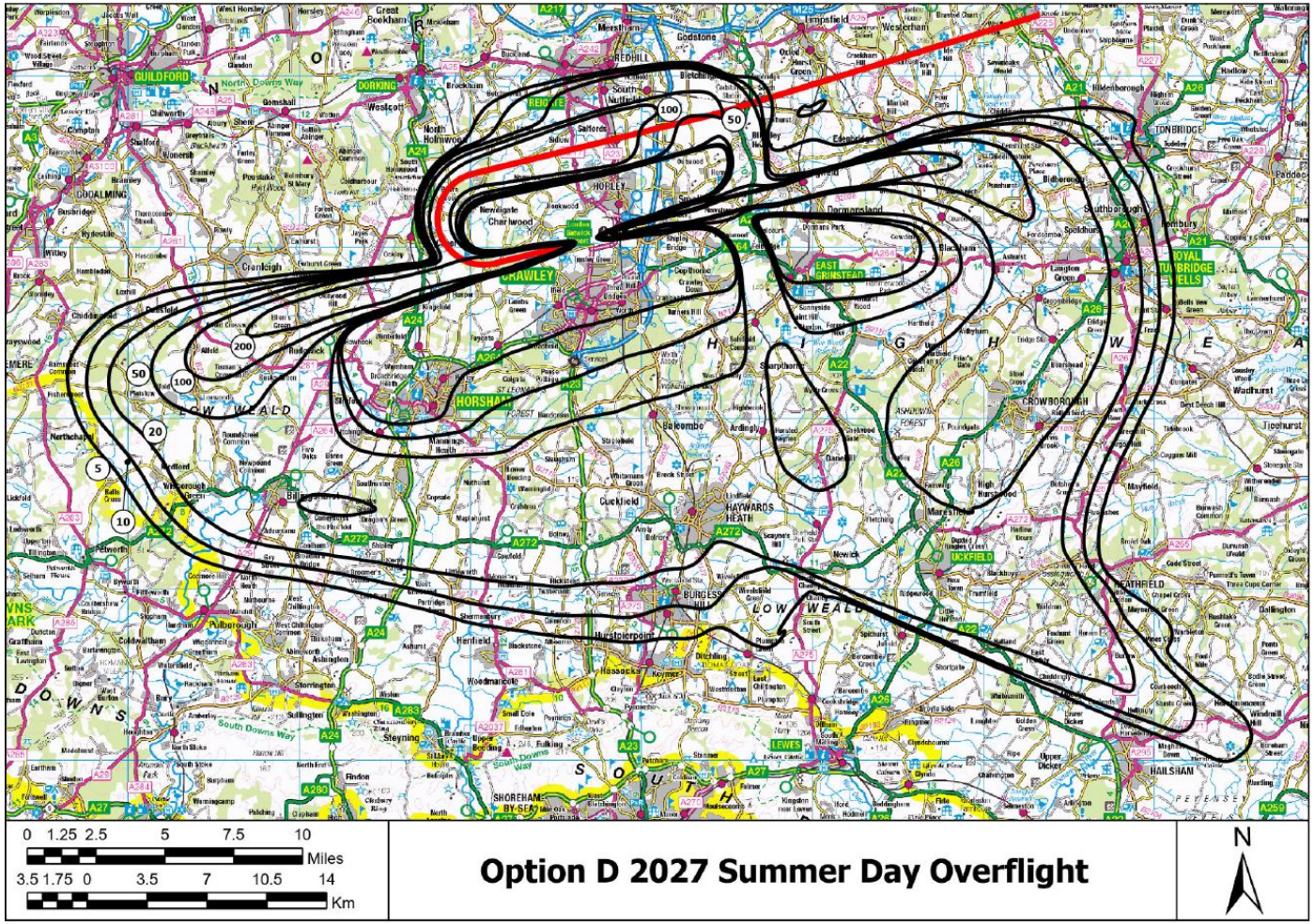
N65	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	283.8	52400	21600	20	2	52	44
>10	207.3	31600	13200	15	0	40	35
>20	154.2	20900	8800	14	0	28	24
>50	100.5	12100	5200	7	0	19	15
>100	75.5	8900	3800	5	0	17	11
>200	52.0	5200	2300	3	0	10	8
>500	3.4	<100	<100	0	0	2	1

A5.4 Option D 2027 Summer Night N60



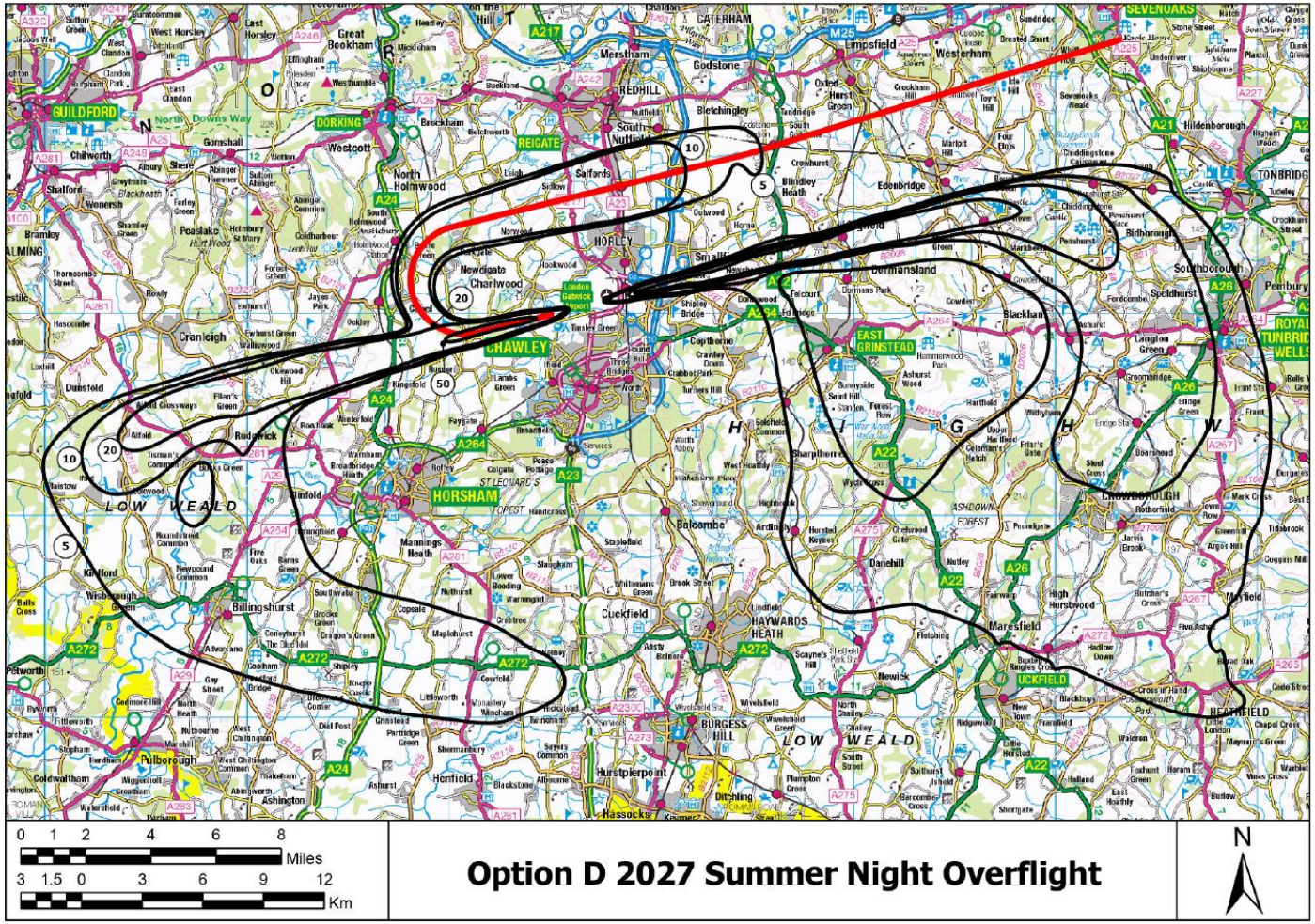
N60	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	389.1	74000	30600	37	2	73	64
>10	256.6	39300	16300	22	1	38	33
>20	137.4	14700	6100	11	1	21	16
>50	64.3	7900	3300	3	1	16	9
>100	3.2	0	0	0	0	2	1

A5.5 Option D 2027 Summer Day Overflight



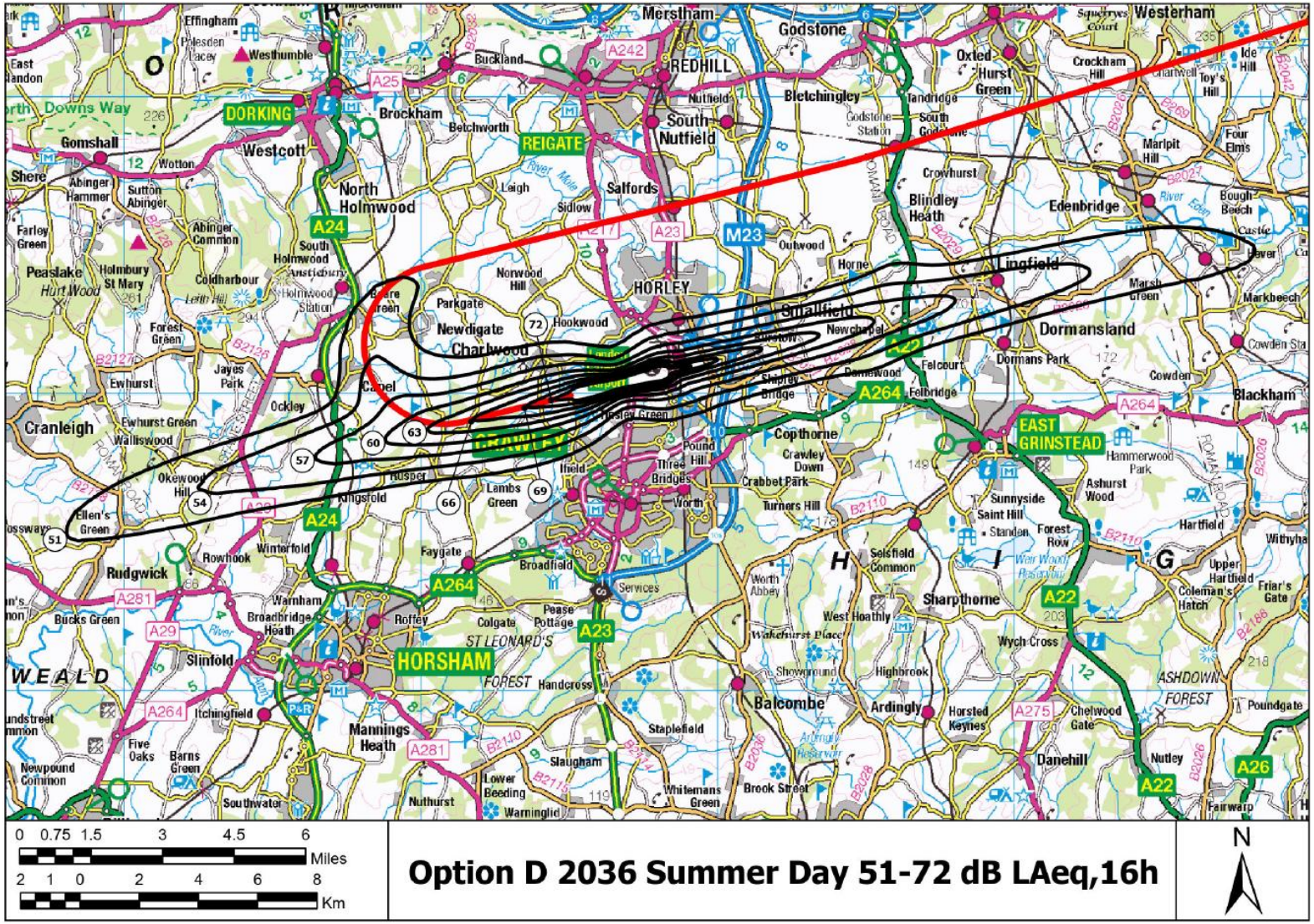
Overflights	>5	>10	>20	>50	>100	>200
Population	434,000	334,100	259,900	67,800	13,800	3,200

A5.6 Option D 2027 Summer Night Overflight



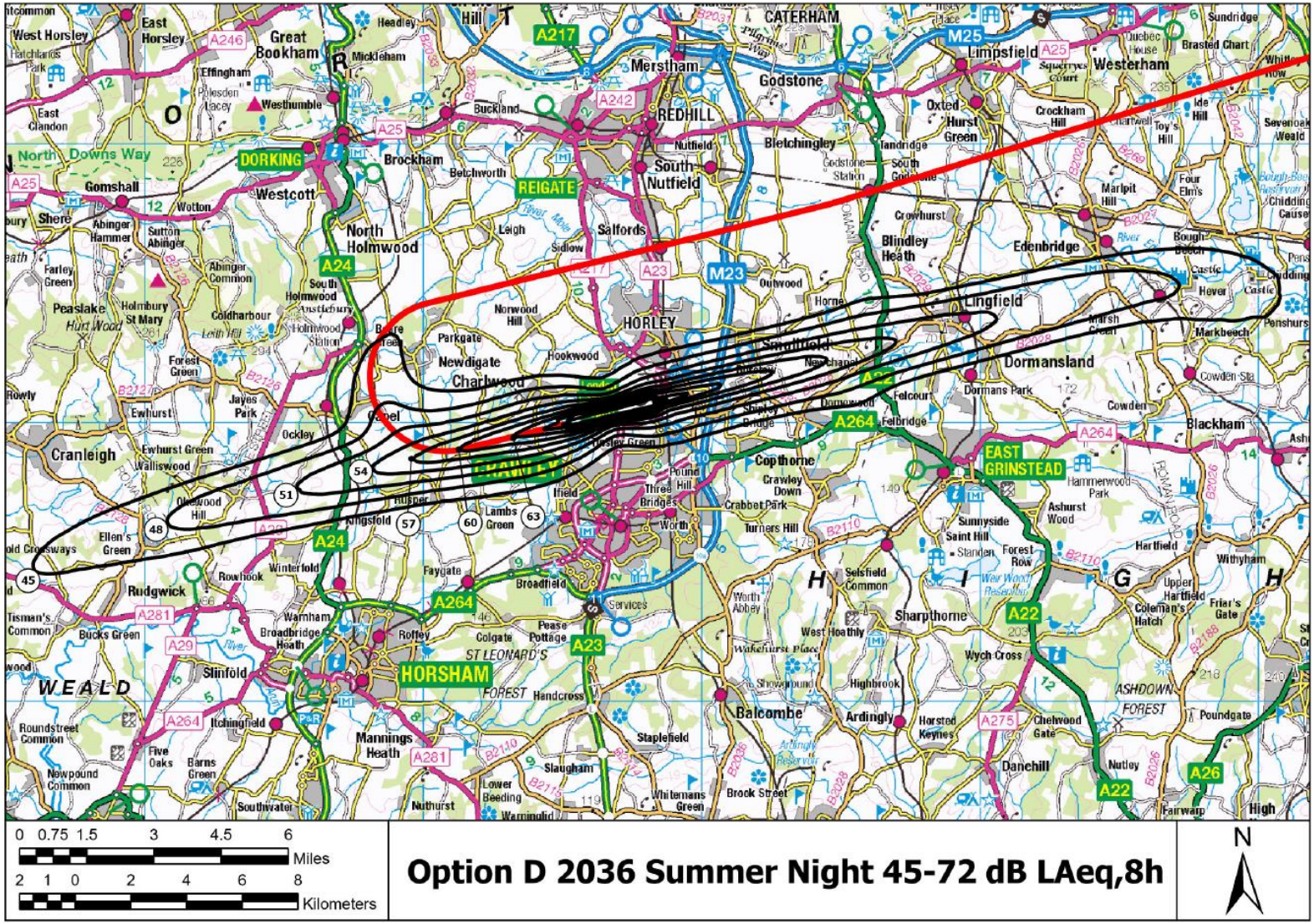
Overflights	>5	>10	>20	>50
Population	170,700	41,500	5,800	2,400

A5.7 Option D 2036 Summer Day 51-72 dB LAeq,16h



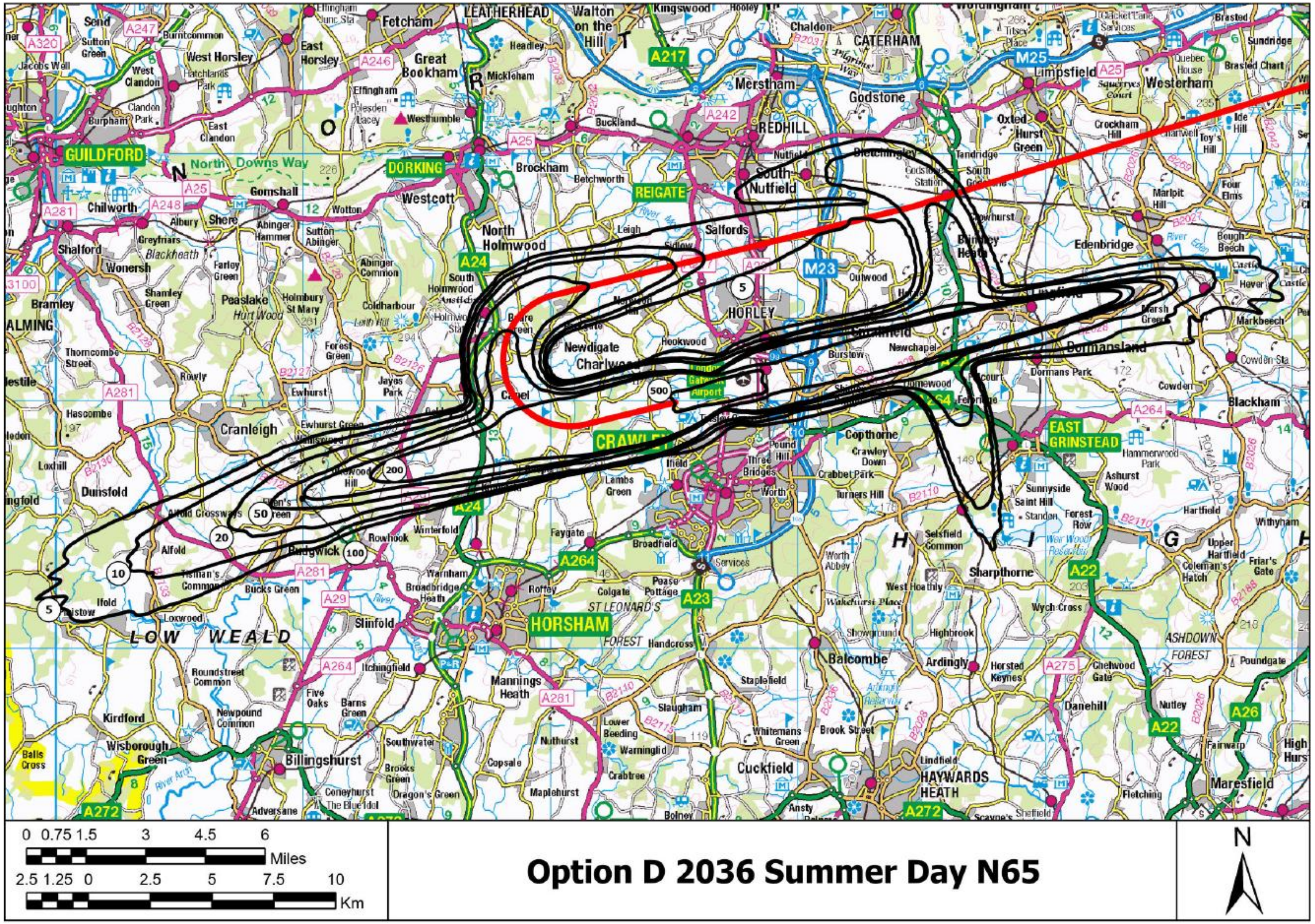
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>51	119.6	17600	7300	11	1	24	17
>54	64.4	7400	3200	4	0	15	11
>57	34.7	2100	900	1	0	5	3
>60	19.4	1000	500	0	0	2	3
>63	10.9	400	200	0	0	2	3
>66	5.7	100	<100	0	0	0	1
>69	2.8	0	0	0	0	0	0
>72	1.5	0	0	0	0	0	0

A5.8 Option D 2036 Summer Night 45-72 dB LAeq,8h



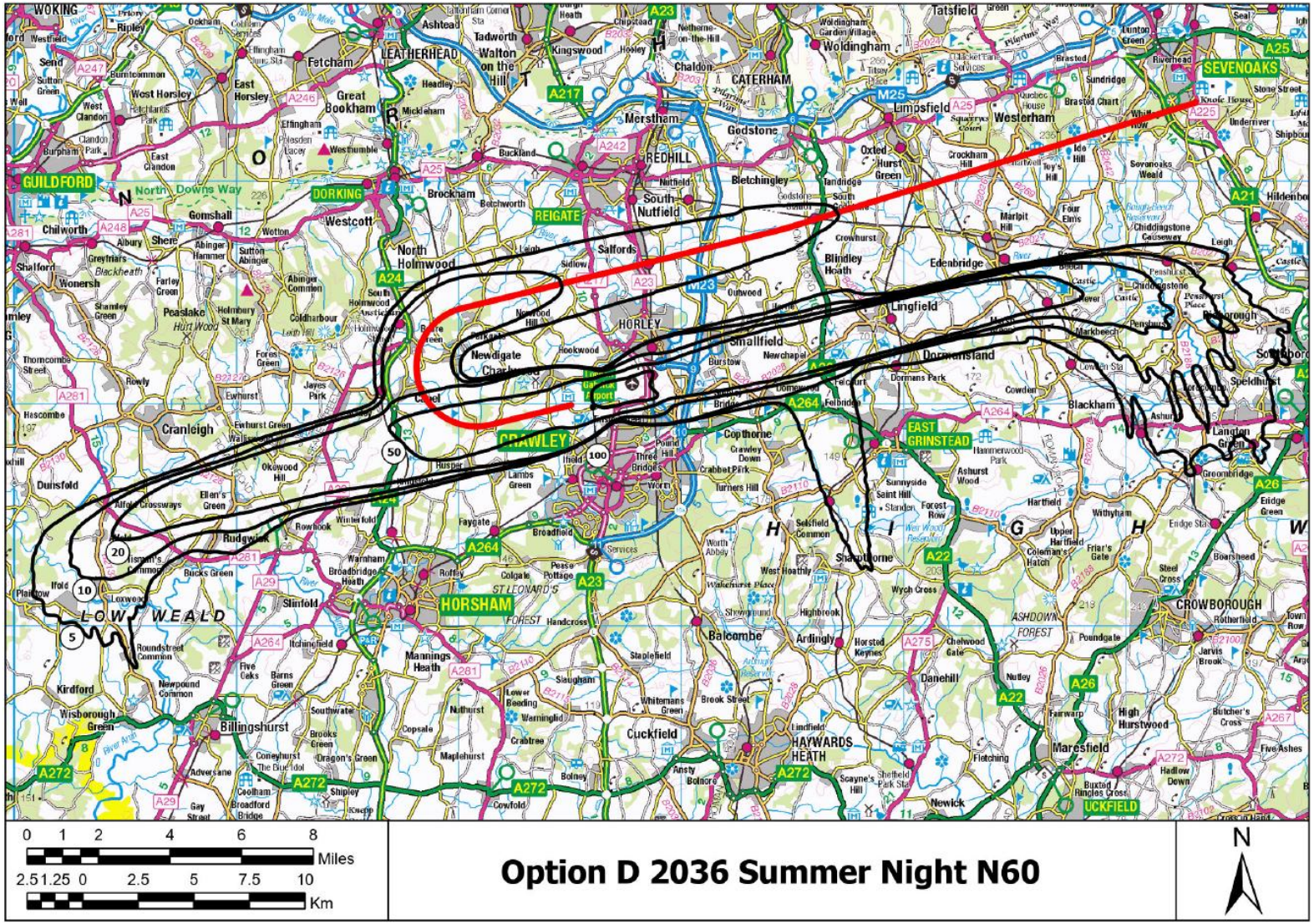
$L_{Aeq,16h}$ dB	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>45	136.4	19100	7900	11	1	29	19
>48	79.3	9600	4000	3	1	15	13
>51	41.2	4100	1800	2	0	13	7
>54	22.9	1300	600	1	0	2	3
>57	13.0	600	300	0	0	2	3
>60	7.0	100	100	0	0	0	2
>63	3.5	100	<100	0	0	0	1
>66	1.9	0	0	0	0	0	0
>69	1.2	0	0	0	0	0	0
>72	0.7	0	0	0	0	0	0

A5.9 Option D 2036 Summer Day N65



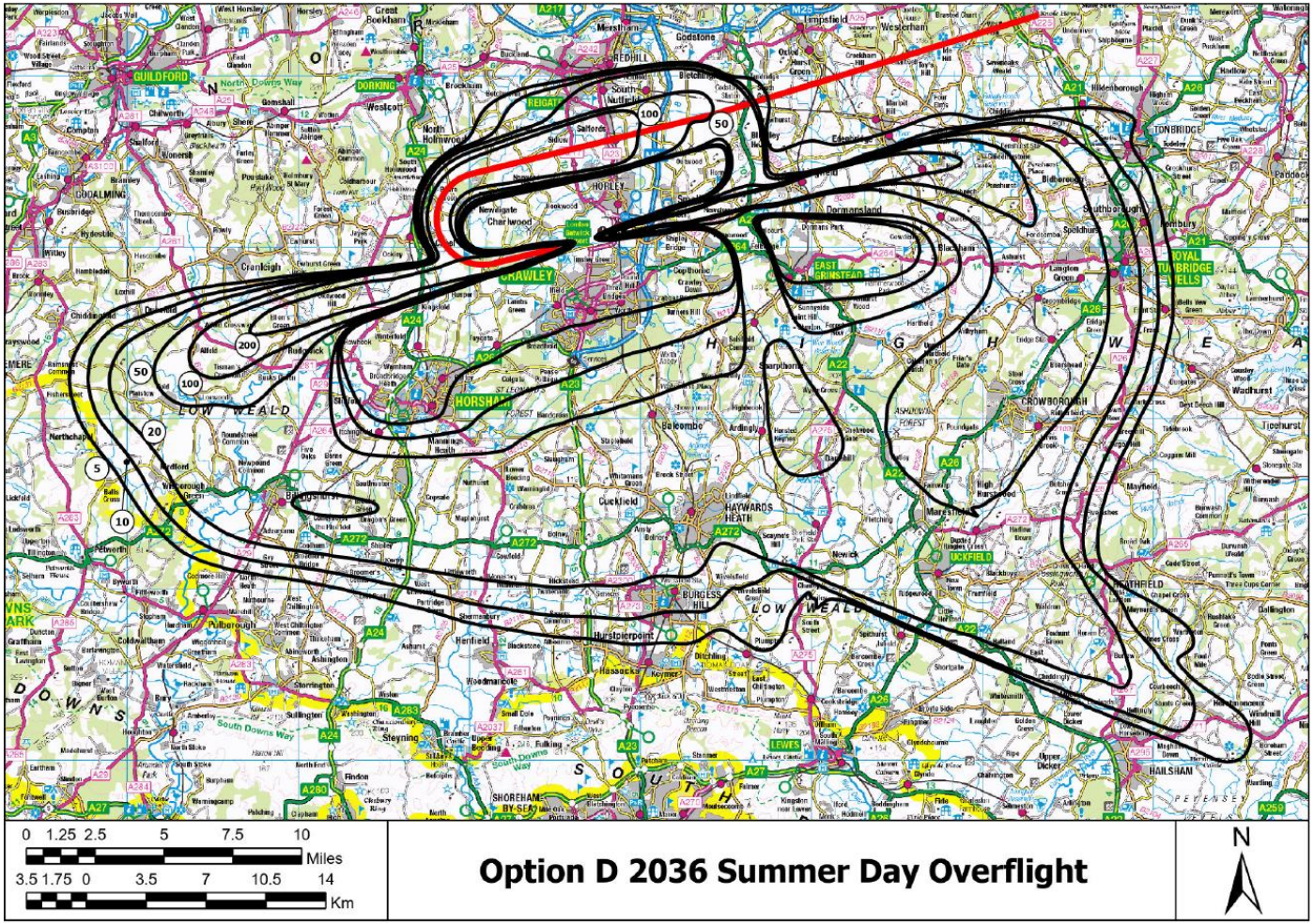
N65	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	269.6	48100	19800	20	2	48	41
>10	193.2	28000	11700	14	0	34	30
>20	137.5	18700	7800	14	0	25	19
>50	91.5	11000	4700	6	0	19	13
>100	69.1	8100	3500	4	0	16	9
>200	48.5	5000	2200	3	0	10	8
>500	3.3	<100	<100	0	0	2	1

A5.10 Option D 2036 Summer Night N60



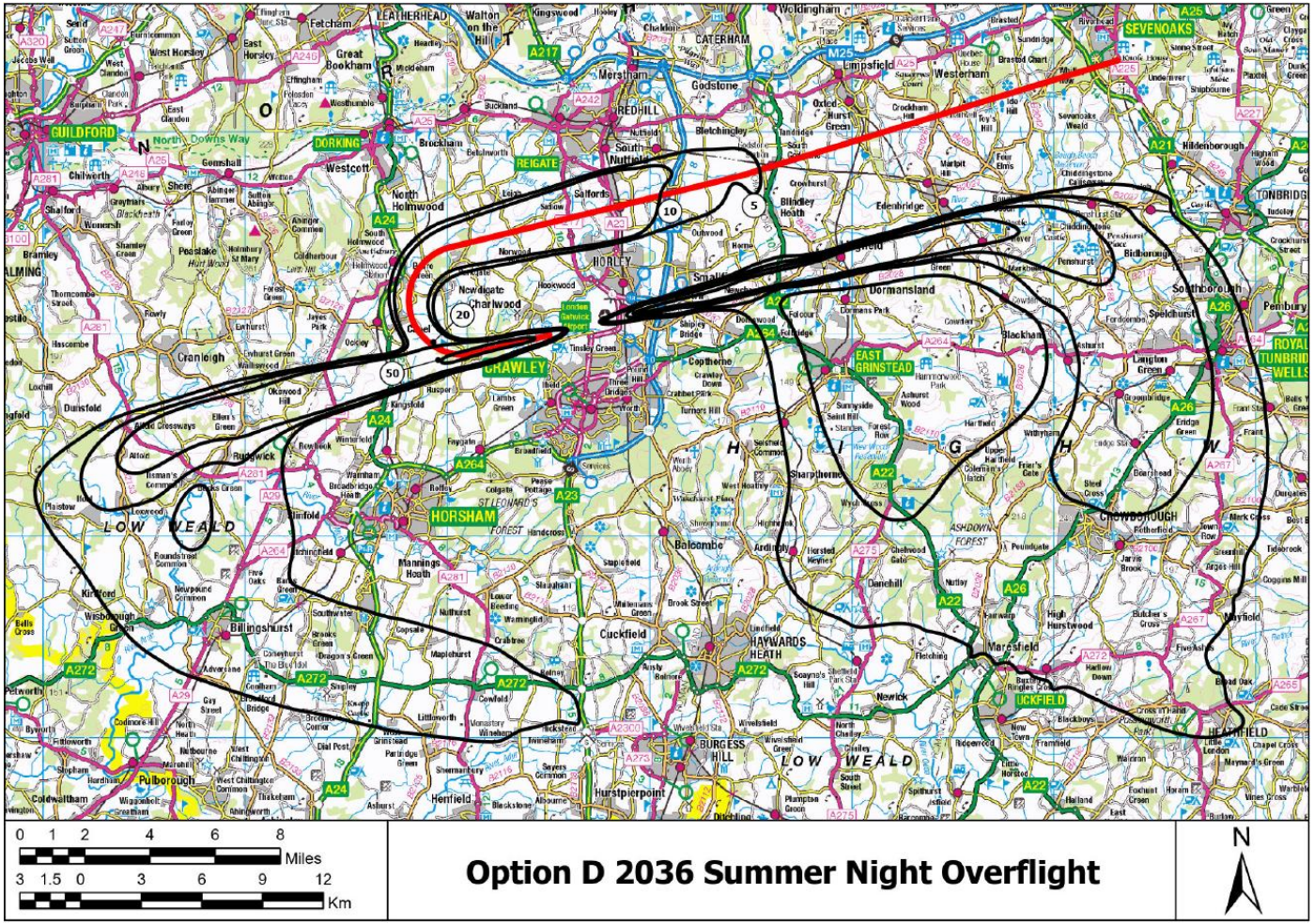
N60	Area (km²)	Population	Households	Community Buildings	Hospitals	Schools	Places of Worship
>5	342.0	63300	26300	34	2	59	57
>10	207.1	29400	12300	17	1	33	24
>20	129.8	14200	5900	9	1	21	16
>50	61.9	7700	3300	3	1	16	9
>100	3.1	0	0	0	0	2	1

A5.11 Option D 2036 Summer Day Overflight



Overflights	>5	>10	>20	>50	>100	>200
Population	438,700	336,100	258,100	68,300	14,000	3,200

A5.12 Option D 2036 Summer Night Overflight



Overflights	>5	>10	>20	>50
Population	169,900	41,400	5,800	2,400

A6 Local Air Quality

A6.1 Overview

The new updated CAP 1616 v5, and specifically CAP 1616i Chapter 7, requires a change sponsor to ensure that an airspace change proposal minimises local air quality emissions and ensures that the UK complies with its international obligations on air quality by, for example:

- minimising the impact on the overall air quality pollution levels in the local area.
- complying with national air quality objectives and air quality standards, including limit and target values in the UK Air Quality Strategy.

A6.2 Air Quality Management Areas

CAP 1616 requires change sponsors to consider the impact of proposed changes on Air Quality Management Areas (AQMAs). AQMAs are areas within which local authorities are required to measure, review, and assess the impact of air quality on people's health and the environment; most are associated with road traffic emissions.

With reference to Gatwick Airport, the most applicable AQMAs are:

- Crawley Borough Council AQMA.
- Reigate & Banstead Borough Council AQMA No. 3.
- Reigate & Banstead Borough Council AQMA No. 1 (M25).
- Reigate & Banstead Borough Council AQMA No. 9.
- Reigate & Banstead Borough Council AQMA No. 11.
- Reigate & Banstead Borough Council AQMA No. 12.
- Hooley AQMA.
- Croydon AQMA.
- Sevenoaks District Council AQMA No. 10.
- Sevenoaks District Council AQMA No. 13 (A25).

All of the listed areas require local authorities to measure the levels of Nitrogen Dioxide (NO_2) caused by road traffic. The locations of these AQMAs in relation to Gatwick Airport is illustrated in Figure 43 below.

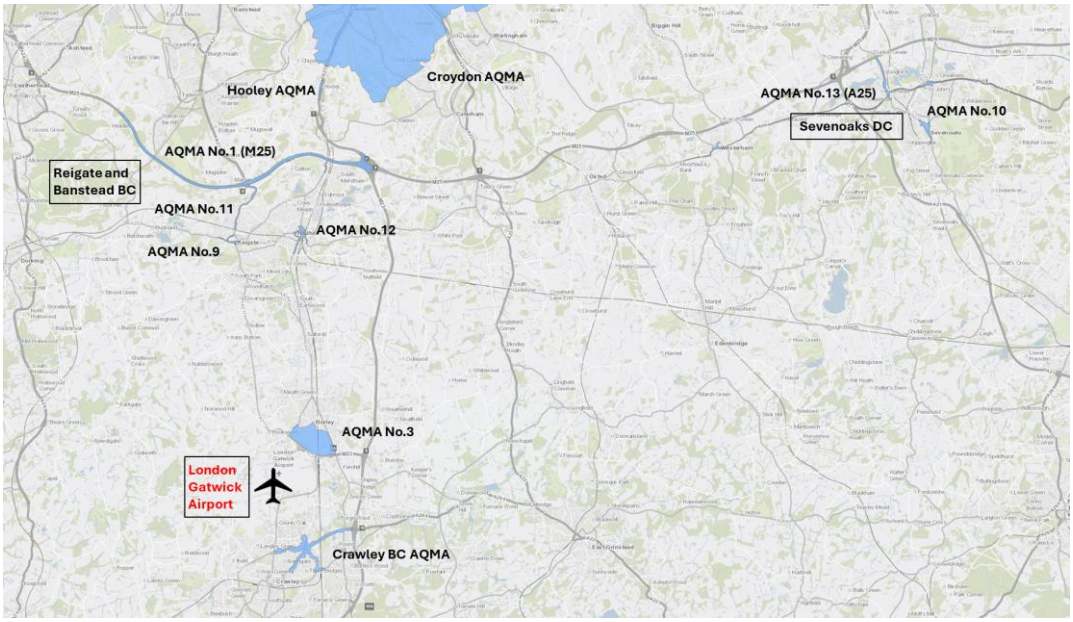


Figure 43 AQMA Locations

Source: DEFRA

A6.3 Assessment Requirements

CAP 1616i – Environmental Assessment Requirements and Guidance for Airspace Change Proposals Chapter 7 states that change sponsors must show explicit consideration of whether local air quality could be impacted when developing an airspace change proposal.

Change sponsors must produce information on local air quality impacts only where there is the possibility of pollutants breaching legal limits and target values following the implementation of an airspace change proposal (or worsening an existing breach of legal limits and target values). The CAA deems that this is only likely to become a possibility where:

- there is likely to be a change in aviation emissions (by volume or location) below 1,000 feet (ft) aal, and
- the location of the emissions is within or adjacent to a designated Air Quality Management Area (AQMA).

If both of these conditions are met, an assessment of local air quality is required, and modelling of impacts must be undertaken. This modelling must include concentrations from all sources whether related to aviation and the airport or not.

Due to the effects of mixing and dispersion, emissions from aircraft above 1,000 ft aal are unlikely to have a significant impact on local air quality. Therefore, the impact of airspace design on local air quality is generally negligible compared with other factors such as changes in the volume of air traffic, and local transport infrastructures feeding the airport.

A6.4 Assessment of Route 4 Options

Figure 44 below shows the mean centreline (in red) of the Baseline tracks and the tracks of the Route 4 options (in black) in relation to the local AQMA's. For each option, aircraft will depart in a westerly direction to achieve an altitude of not below 1,500 ft above mean sea level (1,300 ft aal) before commencing the right-hand turn.

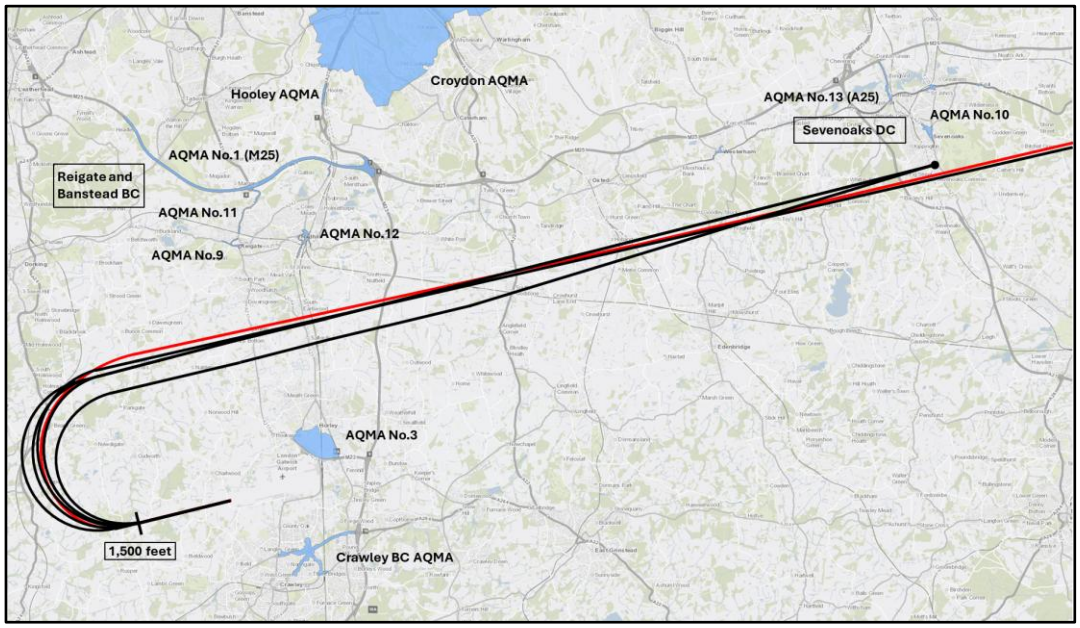


Figure 44 AQMA Locations in Relation to Route 4 Options

Source: DEFRA

This is the same as the current day situation, and hence there will be no change in the location of aircraft below 1,000 ft aal with the new options. In addition, the implementation of this ACP will not have an impact on volumes of air traffic or local transport infrastructure feeding the airport. Therefore, there will be no change in aviation emissions below 1,000 ft aal with any of the options being considered.

None of the options fly within, or adjacent to, any designated AQMA's, as indicated in Figure 44 above. Therefore, neither of the conditions detailed in paragraph A6.3 above will be met with any of these options and an assessment of local air quality is not required.

A7 Tranquillity

A7.1 Overview

CAP 1616i - Environmental Assessment Requirements and Guidance for Airspace Change Proposals, Chapter 8 states that the consideration of impacts upon tranquillity for airspace change proposals is with specific reference to National Parks, Areas of Outstanding Natural Beauty (AONB)[13], plus any local 'tranquil' areas that are identified through community engagement.

These are designated areas with specific statutory purposes to ensure their continued protection in relation to landscape and scenic beauty. Change sponsors must have regard to these statutory purposes when developing airspace change proposals and are encouraged, where it is practical, to avoid overflight of tranquillity receptors below 7,000 feet. This does not preclude either a designated Quiet Area (or any other local area that has similar characteristics) from being identified via community engagement during the early development of design options. It is important that local circumstances, including community feedback on specific areas that should be avoided, are taken into account where possible.

Change sponsors must show how they have considered and taken account of these impacts by using operational diagrams or overflight contours to identify any tranquillity receptors overflown below 7,000 feet. An assessment is also required for the opening year and across the forecast period (normally 10 years).

A7.2 Areas of Tranquillity

A7.2.1 National Parks

The nearest National Park to Gatwick Airport is the South Downs National Park, to the south and west of the airport. The boundary of the National Park is approximately 15 NM from the airport at its closest point (to the south), as shown in Figure 45 below. None of the proposed design options are in a southerly direction towards the South Downs National Park. Consequently, it is deemed that aircraft currently departing on Route 4, or any of the routes proposed as part of this ACP shall have no effect on the South Downs National Park either at implementation or across the subsequent 10-year period.

[13] Now known as National Landscapes

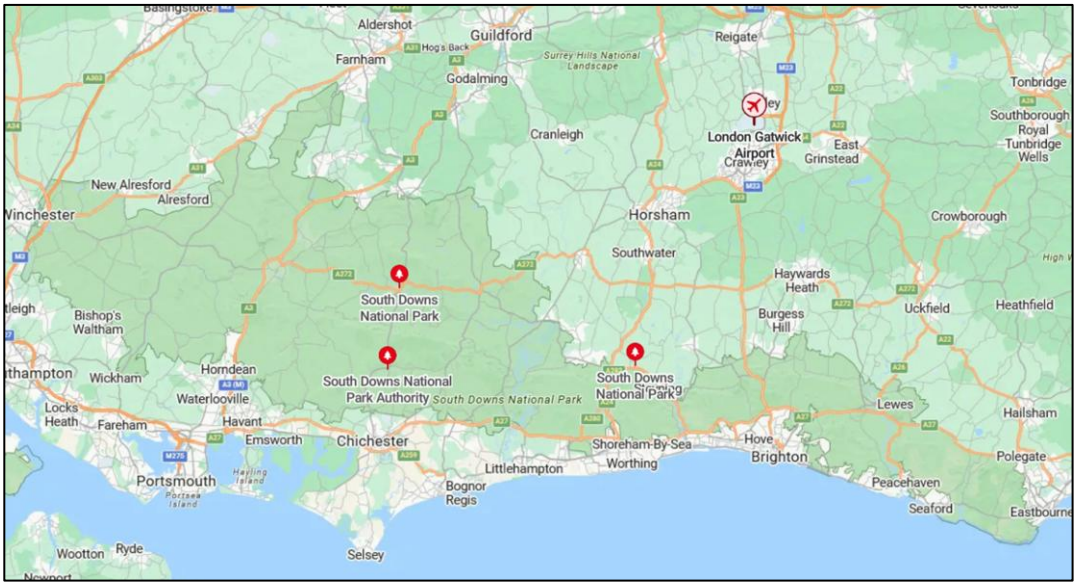


Figure 45 National Parks

Source: Google Maps

A7.2.2 National Landscapes

Gatwick Airport is located in close proximity to the Surrey Hills (located to the north and west), Kent Downs (located to the north-east) and High Weald (located to the south) National Landscape's, as shown in Figure 46 below. There is no difference between the Do Nothing (Baseline [Current]) option and the Do Minimum (Baseline [Future]) option. Although Gatwick Airport itself is outside the boundary of any National Landscape, aircraft departing the airport currently overfly the most easterly section of the Surrey Hills National Landscape and the most westerly section of the Kent Downs National Landscape. Aircraft will be between 1,500 ft and 3,200 ft whilst overflying the eastern portion of the Surrey Hills National Landscape during the initial turn and will be between 4,000 ft and 5,000 ft whilst overflying the western portion of the Kent Downs National Landscape.

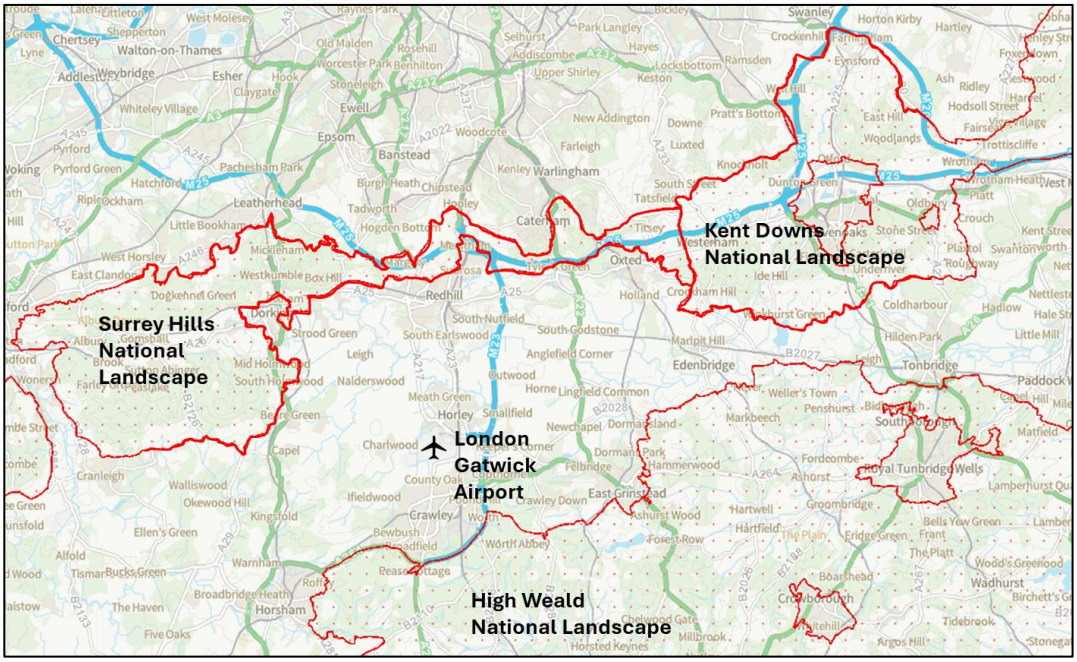


Figure 46 National Landscapes

Source: DEFRA

Natural England is currently considering whether to extend the boundary of the Surrey Hills National Landscape and has undertaken a second consultation on their proposal to include additional landscape as part of the National Landscape[14]. If approved, some of these new areas will be overflown by aircraft departing Gatwick Airport on the current Route 4. Aircraft will be above 2,000 ft when overflight occurs.

A7.2.3 Local Areas of Tranquillity

No additional areas identified through community engagement.

A7.3 Impact on National Landscapes

A7.3.1 Option A

Figure 47 below shows the nominal track for Option A overlaid on the current day arrival and departure tracks. The nominal track for Option A overflies the most easterly section of the Surrey Hills National Landscape and the most westerly section of the Kent Downs National Landscape. Aircraft will be between 1,500 ft and 3,200 ft whilst overflying the eastern portion of the Surrey Hills National Landscape during the initial turn and will be between 4,000 ft and 5,000 ft whilst overflying the western portion of the Kent Downs National Landscape.

This represents no difference between Option A and the Do Minimum (Baseline [Future]) and therefore there is unlikely to be any difference in the impact.

[14] DEFRA Website states there is currently no agreed timeframe for this change, which is dependent upon consultation outcomes. Surrey Hills National Landscape (AONB) Variation Project Second Consultation - Defra - Citizen Space

If Natural England's plan to extend the boundary of the Surrey Hills National Landscape is approved, some of the new areas will also be overflown by Option A. However, this also represents no difference between Option A and the Do Minimum (Baseline [Future]) and therefore there is unlikely to be any difference in the impact.

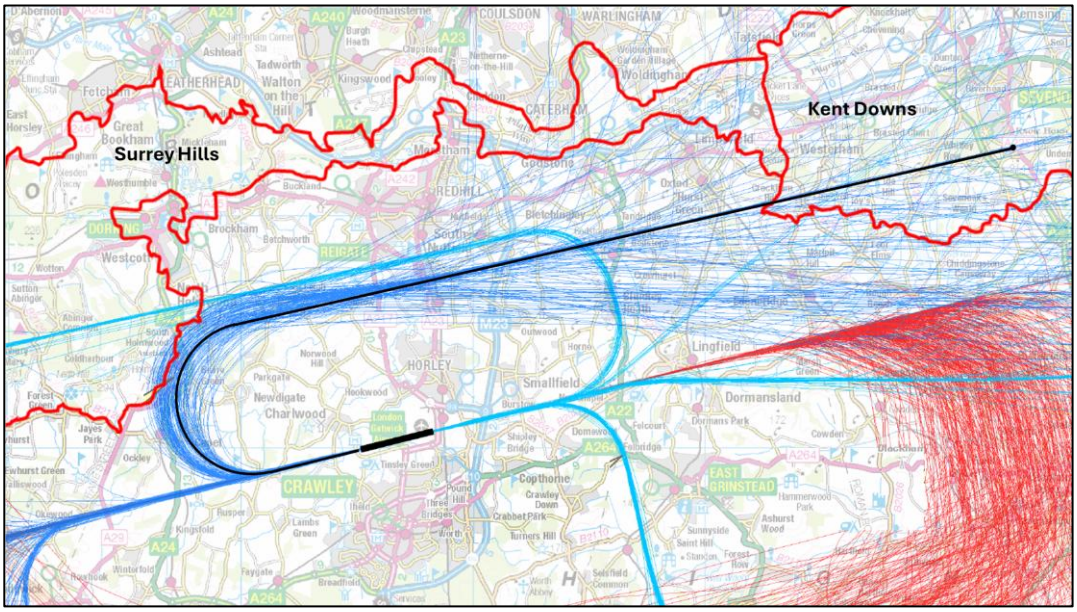


Figure 47 Option A Tranquillity Assessment

A7.3.2 Option B

Figure 48 below shows the nominal track for Option B overlaid on the current day arrival and departure tracks. The nominal track for Option B is slightly further east than Option A, but still overflies the most easterly section of the Surrey Hills National Landscape and the most westerly section of the Kent Downs National Landscape. Aircraft will be between 1,500 ft and 3,200 ft whilst overflying the eastern portion of the Surrey Hills National Landscape during the initial turn and will be between 4,000 ft and 5,000 ft whilst overflying the western portion of the Kent Downs National Landscape.

This represents no difference between Option B and the Do Minimum (Baseline [Future]) and therefore there is unlikely to be any difference in the impact.

If Natural England's plan to extend the boundary of the Surrey Hills National Landscape is approved, some of the new areas will also be overflown by Option B. However, this also represents no difference between Option B and the Do Minimum (Baseline [Future]) and therefore there is unlikely to be any difference in the impact.

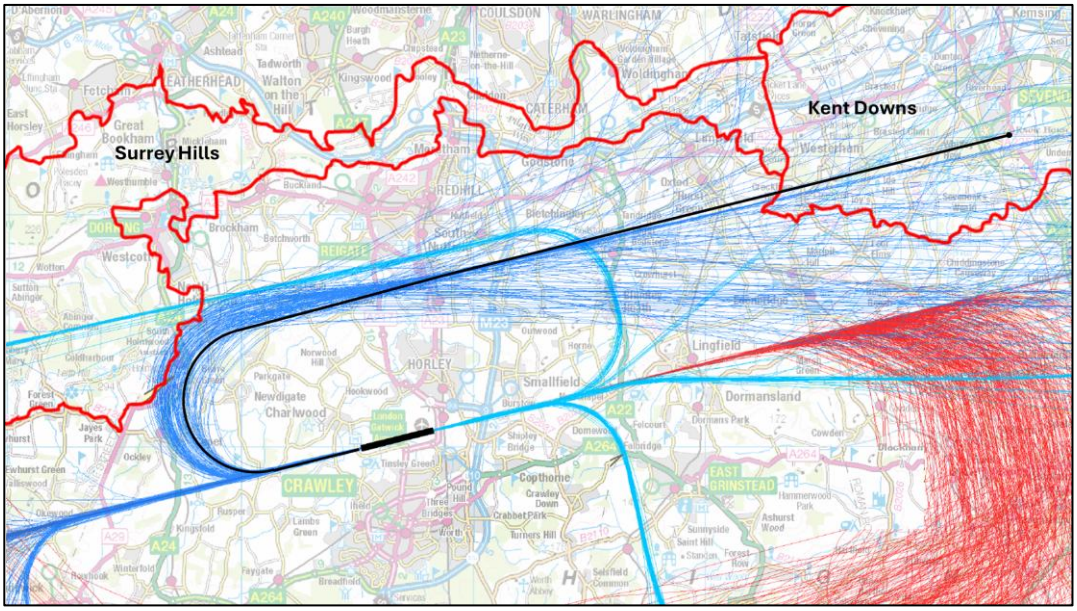


Figure 48 Option B Tranquillity Assessment

A7.3.3 Option C

Figure 49 below shows the nominal track for Option C overlaid on the current day arrival and departure tracks. The nominal track for Option C extends further west than both Option A and Option B and overflies the most easterly section of the Surrey Hills National Landscape and the most westerly section of the Kent Downs National Landscape. Aircraft will be between 1,500 ft and 3,200 ft whilst overflying the eastern portion of the Surrey Hills National Landscape during the initial turn and will be between 4,000 ft and 5,000 ft whilst overflying the western portion of the Kent Downs National Landscape B.

This represents no difference between Option C and the Do Minimum (Baseline [Future]) and therefore there is unlikely to be any difference in the impact.

If Natural England's plan to extend the boundary of the Surrey Hills National Landscape is approved, some of the new areas will also be overflown by Option C. However, this also represents no difference between Option C and the Do Minimum (Baseline [Future]) and therefore there is unlikely to be any difference in the impact.

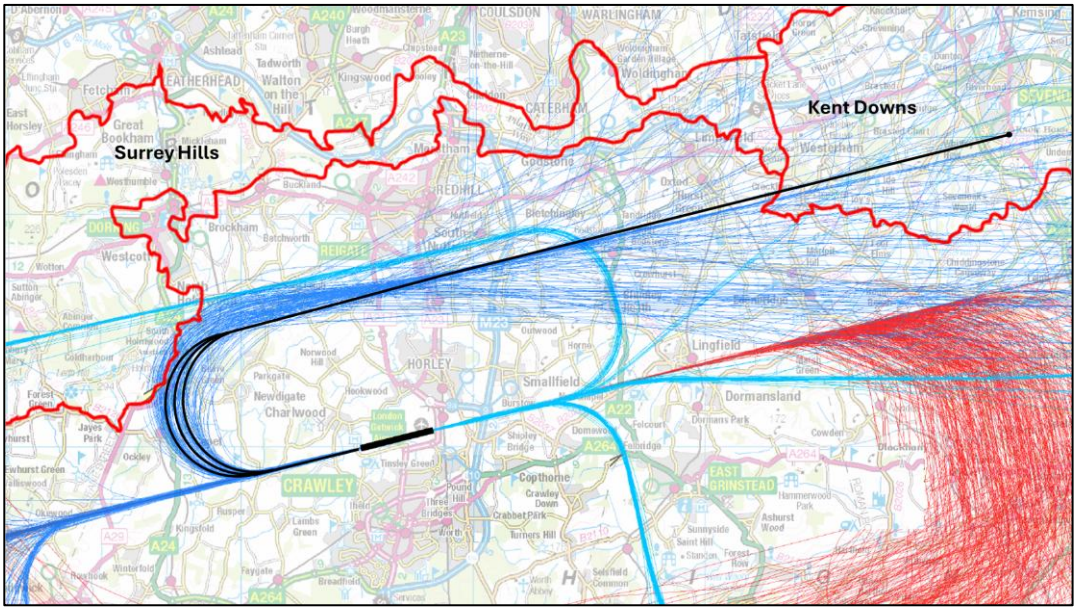


Figure 49 Option C Tranquillity Assessment

A7.3.4 Option D

Figure 50 below shows the nominal track for Option D overlaid on the current day arrival and departure tracks. Although the nominal track for Option D remains outside of the boundary of the Surrey Hills National Landscape, it is likely due to dispersion in the turn, that aircraft will overfly the most easterly section of the Surrey Hills National Landscape between 1,500 ft and 3,200 ft during the initial turn. Aircraft will also the most westerly section of the Kent Downs National Landscape between 4,000 ft and 5,000 ft.

This represents no difference between Option D and the Do Minimum (Baseline [Future]) and therefore there is unlikely to be any difference in the impact.

If Natural England's plan to extend the boundary of the Surrey Hills National Landscape is approved, some of the new areas will also be overflown by Option D. However, this also represents no difference between Option D and the Do Minimum (Baseline [Future]) and therefore there is unlikely to be any difference in the impact.

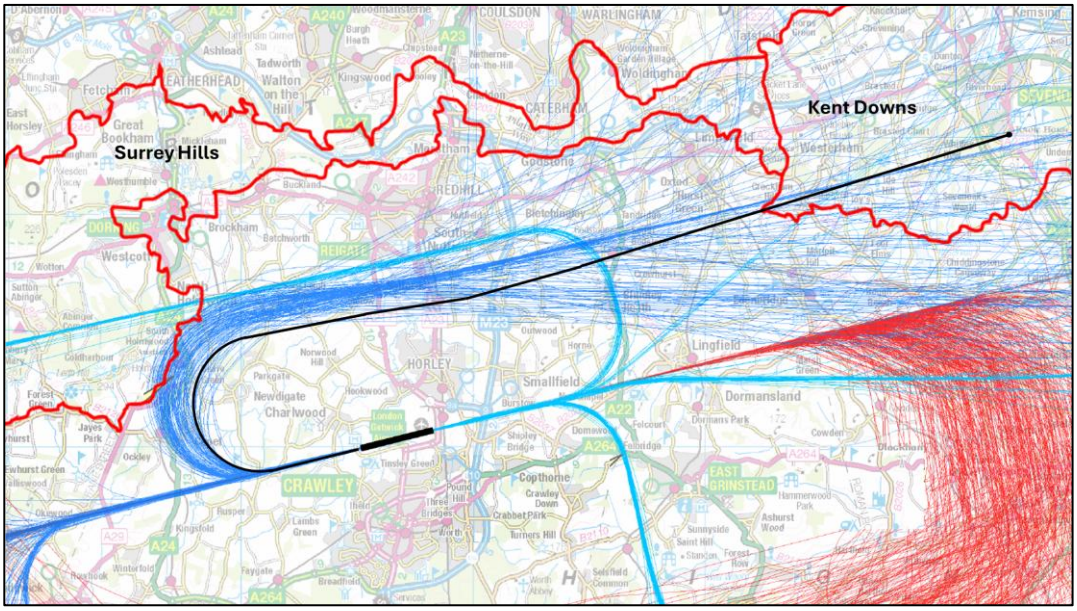


Figure 50 Option D Tranquillity Assessment

A8 Biodiversity

A8.1 Overview

Within CAP 1616 (Fifth Edition), and specifically CAP 1616i Chapter 9, the change sponsor is required to complete the habitats regulations assessment early screening criteria. The screening focuses on how the proposed changes will alter the proximity and volume of air traffic on important biodiversity sites of European significance. Depending upon the outcome of this screening, it may be then necessary to conduct a full habitats regulation assessment.

A8.2 Habitats Regulation Assessment – Early Screening Criteria

Cap 1616i[15] – Environmental Assessment Requirements and Guidance for Airspace Change Proposals (ACP) (Pg 33) details the questions that must be answered as part of the Early Screening Criteria. In particular, the screening requires sponsors to consider the impacts on the following types of areas:

- Sites of Special Scientific Interest (SSSI): These are the most important sites for wildlife conservation in England, Wales, and Northern Ireland. They are designated for their flora, fauna, geological or geomorphological features.
- Special Areas of Conservation (SACs): These sites are designated under the EU Habitats Directive to protect habitats and species of European importance.
- Special Protection Areas (SPAs): These sites are designated under the EU Birds Directive to protect important bird species.
- Ramsar Sites: Wetlands of international importance, designated under the Ramsar Convention.
- National Nature Reserves (NNRs): These are nationally important sites managed by Natural England (in England) or equivalent bodies in other UK nations.
- Local Wildlife Sites (LWSs): These are locally important sites identified and protected by local authorities.
- Marine Conservation Zones (MCZs): These are areas of the sea protected for their marine life and habitats.

Within CAP 1616i (Chapter 9) the first question that sponsors must consider is:

> *"Are there any changes to air traffic patterns or number of movements expected below 3,000ft due to the airspace change proposal?"*

The response to this initial question is considered in the next two sections covering Air Traffic Patterns and Aircraft Movements.

[15] CAP 1616i Link

A8.3 Air Traffic Patterns – Initial Screening Question

The background to the Gatwick Airport Limited (GAL) Route 4 ACP is detailed earlier in this document at paragraph 1.2.1, and in previous ACP documentation already published on the CAA Portal. Since the implementation of the CAP 1912 guidance, airlines continue to fly conventional Route 4 SIDs. The exact track flown over the ground is guided by a satellite-based coded overlay of the conventional SID. These coded overlays are created outside of the regulated process to support the 'temporary' status of Route 4. Aircraft use of this conventional track will continue whilst ACP-2018-86 is progressed to provide a more permanent RNAV 1 solution for Route 4.

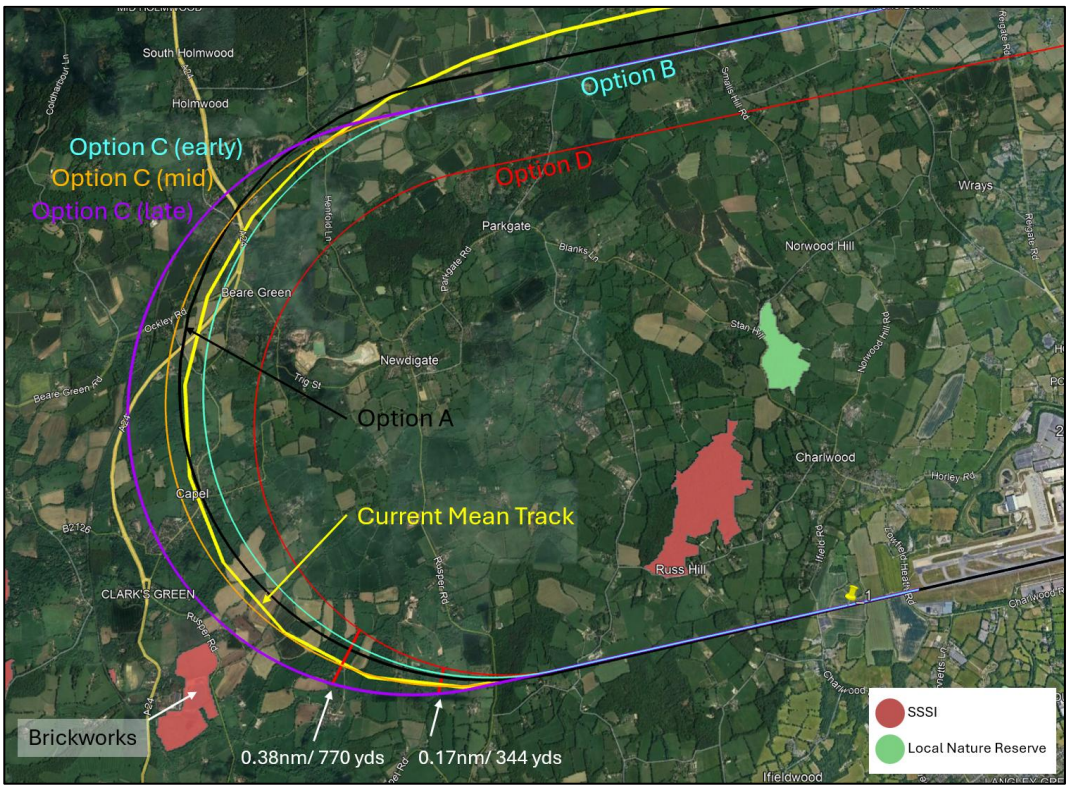


Figure 51 Current and Planned Aircraft Mean Tracks

Source: Google Earth

Figure 51 above shows the current and planned mean tracks of the Route 4 departure SIDs in relation to the SSSI and local nature reserves as published on the Natural England website[16]. These are the only relevant sites that sit close to Gatwick airport in areas where traffic is likely to have an impact below 3,000ft. The yellow track represents the current mean conventional track flown since the implementation of CAP 1912. It should be noted, that as an average reflecting the current operation, it takes account of aircraft vectored from the published track where this is judged necessary by ATC.

When reviewing Flight Radar 24 data for Route 4, it can be seen that most A320 class aircraft reach 3,000 ft between the red markers labelled above as 0.38nm and

[16] Natural England Open Data Geoportal

0.17nm. This cross-track distance shows the total track width defined by the new planned tracks; the red Option D line depicts the anticipated mean track of the most easterly route and the purple Option C is the anticipated mean track of the most westerly route. For a variety of reasons, some aircraft will not climb to 3,000ft until further around turn. However, most aircraft are well above 3,000ft by the time they are three-quarters of the way around this turn.

As can be seen from the above description, introduction of any of the 4 proposed routes will not result in a direct track overflying any new locations of a sensitive nature related to biodiversity. The Clock House Brickworks are currently already overflown by a small number or aircraft that may be forced to turn late for weather or for ATC considerations; it is not anticipated that this will be any different following introduction of a new route. In fact, selection of either Option A, B or D, or Option C (early turn) will move the mean track further east. The introduction of an RNAV procedure will also likely reduce dispersion for those aircraft not taken off the published route for operational ATC or weather considerations.

A8.4 Number of Aircraft Movements

The timing between successive departures using Route 4 has been temporarily increased to ensure safe separation between departing aircraft utilising the 'temporary' conventional Route 4 SID. This increase is a provisional measure and separation will be reduced back to the norm once a CAP 1616 approved Route 4 RNAV SID has been published. Furthermore, due to the nature of operations at Gatwick and the various SIDs available for multiple destinations, there is no intention to significantly increase the numbers of aircraft utilising the Route 4 departure between today and implementation, or during the period covered by the environmental assessments.

A8.5 Habitats Regulation Assessment Conclusion

The change sponsor believes that they can confidently answer 'no' to the question posed in the Habitats Regulation Assessment – Early Screening Criteria with regards to air traffic patterns and procedures being affected by the implementation of Route 4 at Gatwick Airport.

The change sponsor does not expect any changes to air traffic patterns or movements below 3,000 ft due to the airspace change proposal. In line with the direction contained within CAP 1616i, as the answer to this question is 'no', then any further consideration of the Habitats Regulations Assessment is not necessary.

A9 Full Options Appraisal (Full Table Analysis)

A9.1 Full Options Appraisal Table

The table below contains the full results summary of the full options appraisal for each option being considered.

				Operational Assessment:				
Present Value base year	2010			Third Overall Benefit	Second Overall Benefit	Least Overall Benefit	Greatest Overall Benefit	
Current year	2023							
Proposal Opening Year	2027							
Forecast Year	2036							
	Aviation		**Forecast Year 2036**	**A**	**B**	**C**	**D**	
Affected Group	**Impact**	**Level**	**WebTAG assessment (noise)**	**Alternative**	**Preferred Alternative**	**Least Benefit**	**Preferred**	**Baseline Totals**
Communities	Noise impact on health and quality of life	££ and Quantify	NPV of change in noise (£):	+£3,214	+£109,812	+£24,977	+£301,183	-
			NPV of impact on sleep disturbance (£):	+£23,942	+£74,622	+£19,203	+£126,611	-
			NPV of impact on amenity (£):	-£14,124	+£25,787	+£4,494	+£123,438	-
			NPV of impact on AMI (£):	-£162	+£244	+£45	+£533	-
			NPV of impact on stroke (£):	-£2,566	+£3,655	+£494	+£20,169	-
			NPV of impact on dementia (£):	-£3,876	+£5,504	+£741	+£30,432	-
			Quantitative noise results					
			Individuals experiencing increased daytime noise in forecast year:	664	752	285	550	-
			Individuals experiencing reduced daytime noise in forecast year:	461	1210	315	1449	-
			Individuals experiencing increased night time noise in forecast year:	268	320	163	349	-
			Individuals experiencing reduced night time noise in forecast year:	519	1090	297	717	-
	Impact	**Level**	**WebTAG assessment**	**A**	**B**	**C**	**D**	**Baseline Totals**
Communities	Air Quality	Qual/ ££ and Quantify	Cost of change below 1000ft	Nil	Nil	Nil	Nil	-
Wider Society	Greenhouse Gas impact	Qual/ ££ and Quantify	Total CO_2 in year of implementation (tonnes)	1,218,352	1,218,237	1,218,391	1,217,972	1,218,301
			Total CO_2 in forecast year (metric tonnes)	1,229,735	1,229,646	1,229,767	1,229,430	1,229,681
			NPV CO_2 Equivalent (CO_2e) Emissions (£)	-£42,287	+£67,465	-£79,904	+£325,159	-
			Change in CO_2e Emissions over 60-year Appraisal Period (tonnes)	+525	-495	+879	-2,901	-
			- of which Traded	+645	+27	+868	-1,449	-
			Change in CO_2e Emissions in Opening Year (tonnes)	+51	-64	+90	-329	-
			NPV of Traded Sector CO_2 Equivalent (CO_2e) Emissions of Proposal (£)	-£57,930	-£1,533	-£78,232	+£132,553	-
Wider Society	Capacity and resilience	Qualitative	Impact on capacity and resilience (aligns with AMS)	No Change	No Change	No Change	No Change	-
General Aviation (GA)	Access	Qualitative	Change to access arrangements for GA	No Change	No Change	No Change	No Change	-
GA / commercial airlines	Economic impact from increased effective capacity	Quantify	Impact on delays versus baseline	Nil	Niil	Nil	Nil	-
GA / commercial airlines	Fuel burn	££ and Quantify	Total fuel burn in year of implementation (tonnes)	383,327	383,291	383,339	383,207	383,311
			Change in annual fuel burn in year of implementation (tonnes)	+16	-20	+28	-104	
			Total fuel burn in forecast year (tonnes)	386,908	386,880	386,918	386,812	386,891
			Change in annual fuel burn in forecast year (tonnes)	+17	-11	+27	-79	
Commercial airlines	Training costs	££ and Quantify		Nil	Nil	Nil	Nil	-
Commercial airlines	Other costs	££ and Quantify		Nil	Nil	Nil	Nil	-
Airport / ANSP	Infrastructure costs	££ and Quantify		Nil	Nil	Nil	Nil	-
Airport / ANSP	Operational costs	££ and Quantify		Nil	Nil	Nil	Nil	-
Airport / ANSP	Deployment costs	££ and Quantify		-£60,000	-£60,000	-£60,000	-£60,000	-

Primary Metrics	Population per dB level, nearest 100	Level	WebTAG assessment	A	B	C	D	Baseline
		Quantitative	Population exposed to daytime noise 51dB	18500	17900	17900	17600	17800
		Quantitative	Population exposed to daytime noise 54dB	7500	7400	7300	7400	7400
		Quantitative	Population exposed to daytime noise 57dB	2100	2100	2100	2100	2100
		Quantitative	Population exposed to daytime noise 60dB	1100	1000	1100	1000	1100
		Quantitative	Population exposed to daytime noise 63dB	400	400	400	400	400
		Quantitative	Population exposed to daytime noise 66dB	100	100	100	100	100
		Quantitative	Population exposed to daytime noise 69dB	0	0	0	0	0
		Quantitative	Population exposed to daytime noise 72dB	0	0	0	0	0
		Quantitative	Population exposed to nightime noise 45dB	19800	19900	19400	19100	19500
		Quantitative	Population exposed to nightime noise 48dB	9600	9600	9600	9600	9600
		Quantitative	Population exposed to nightime noise 51dB	4100	4100	4100	4100	4100
		Quantitative	Population exposed to nightime noise 54dB	1300	1300	1300	1300	1300
		Quantitative	Population exposed to nightime noise 57dB	500	500	500	600	600
		Quantitative	Population exposed to nightime noise 60dB	100	100	100	100	100
		Quantitative	Population exposed to nightime noise 63dB	100	100	100	100	100
		Quantitative	Population exposed to nightime noise 66dB	0	0	0	0	0
		Quantitative	Population exposed to nightime noise 69dB	0	0	0	0	0
		Quantitative	Population exposed to nightime noise 72dB	0	0	0	0	0
Primary Metrics	**Number of Households per dB level, nearest 100**	**Level**	**WebTAG assessment**	**A**	**B**	**C**	**D**	**Baseline**
		Quantitative	Number of houses exposed to daytime noise 51dB	7700	7400	7400	7300	7400
		Quantitative	Number of houses exposed to daytime noise 54dB	3200	3200	3200	3200	3200
		Quantitative	Number of houses exposed to daytime noise 57dB	900	900	900	900	900
		Quantitative	Number of houses exposed to daytime noise 60dB	500	500	500	500	500
		Quantitative	Number of houses exposed to daytime noise 63dB	200	200	200	200	200
		Quantitative	Number of houses exposed to daytime noise 66dB	<100	<100	<100	<100	<100
		Quantitative	Number of houses exposed to daytime noise 69dB	0	0	0	0	0
		Quantitative	Number of houses exposed to daytime noise 72dB	0	0	0	0	0
		Quantitative	Number of houses exposed to nightime noise 45dB	8300	8300	8100	7900	8100
		Quantitative	Number of houses exposed to nightime noise 48dB	4000	4000	4000	4000	4000
		Quantitative	Number of houses exposed to nightime noise 51dB	1800	1800	1800	1800	1800
		Quantitative	Number of houses exposed to nightime noise 54dB	600	600	600	600	600
		Quantitative	Number of houses exposed to nightime noise 57dB	200	200	200	300	300
		Quantitative	Number of houses exposed to nightime noise 60dB	100	100	100	100	100
		Quantitative	Number of houses exposed to nightime noise 63dB	<100	<100	<100	<100	<100
		Quantitative	Number of houses exposed to nightime noise 66dB	0	0	0	0	0
		Quantitative	Number of houses exposed to nightime noise 69dB	0	0	0	0	0
		Quantitative	Number of houses exposed to nightime noise 72dB	0	0	0	0	0

Primary Metrics	Number of Community Buildings per dB level	Level	WebTAG assessment	A	B	C	D	Baseline
		Quantitative	Number of Community Buildings exposed to daytime noise 51dB	11	10	10	11	10
		Quantitative	Number of Community Buildings exposed to daytime noise 54dB	4	4	4	4	4
		Quantitative	Number of Community Buildings exposed to daytime noise 57dB	1	1	1	1	1
		Quantitative	Number of Community Buildings exposed to daytime noise 60dB	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to daytime noise 63dB	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to daytime noise 66dB	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to daytime noise 69dB	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to daytime noise 72dB	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to nightime noise 45dB	11	11	11	11	11
		Quantitative	Number of Community Buildings exposed to nightime noise 48dB	3	3	3	3	3
		Quantitative	Number of Community Buildings exposed to nightime noise 51dB	2	2	2	2	2
		Quantitative	Number of Community Buildings exposed to nightime noise 54dB	1	1	1	1	1
		Quantitative	Number of Community Buildings exposed to nightime noise 57dB	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to nightime noise 60dB	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to nightime noise 63dB	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to nightime noise 66dB	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to nightime noise 69dB	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to nightime noise 72dB	0	0	0	0	0
Primary Metrics	**Number of Hospitals per dB level**	**Level**	**WebTAG assessment**	**A**	**B**	**C**	**D**	**Baseline**
		Quantitative	Number of Hospitals exposed to daytime noise 51dB	1	1	1	1	1
		Quantitative	Number of Hospitals exposed to daytime noise 54dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime noise 57dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime noise 60dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime noise 63dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime noise 66dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime noise 69dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime noise 72dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to nightime noise 45dB	1	1	1	1	1
		Quantitative	Number of Hospitals exposed to nightime noise 48dB	1	1	1	1	1
		Quantitative	Number of Hospitals exposed to nightime noise 51dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to nightime noise 54dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to nightime noise 57dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to nightime noise 60dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to nightime noise 63dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to nightime noise 66dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to nightime noise 69dB	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to nightime noise 72dB	0	0	0	0	0

Primary Metrics	Number of Schools per dB level	Level	WebTAG assessment	A	B	C	D	Baseline
		Quantitative	Number of Schools exposed to daytime noise 51dB	25	25	25	**24**	24
		Quantitative	Number of Schools exposed to daytime noise 54dB	15	15	15	15	15
		Quantitative	Number of Schools exposed to daytime noise 57dB	5	5	5	5	5
		Quantitative	Number of Schools exposed to daytime noise 60dB	2	2	2	2	2
		Quantitative	Number of Schools exposed to daytime noise 63dB	2	2	2	2	2
		Quantitative	Number of Schools exposed to daytime noise 66dB	0	0	0	0	0
		Quantitative	Number of Schools exposed to daytime noise 69dB	0	0	0	0	0
		Quantitative	Number of Schools exposed to daytime noise 72dB	0	0	0	0	0
		Quantitative	Number of Schools exposed to nightime noise 45dB	29	29	29	29	29
		Quantitative	Number of Schools exposed to nightime noise 48dB	15	15	15	15	15
		Quantitative	Number of Schools exposed to nightime noise 51dB	13	13	13	13	13
		Quantitative	Number of Schools exposed to nightime noise 54dB	2	2	2	2	2
		Quantitative	Number of Schools exposed to nightime noise 57dB	2	2	2	2	2
		Quantitative	Number of Schools exposed to nightime noise 60dB	0	0	0	0	0
		Quantitative	Number of Schools exposed to nightime noise 63dB	0	0	0	0	0
		Quantitative	Number of Schools exposed to nightime noise 66dB	0	0	0	0	0
		Quantitative	Number of Schools exposed to nightime noise 69dB	0	0	0	0	0
		Quantitative	Number of Schools exposed to nightime noise 72dB	0	0	0	0	0
Primary Metrics	**Number of Places of Worship per dB level**	**Level**	**WebTAG assessment**	**A**	**B**	**C**	**D**	**Baseline**
		Quantitative	Number of Places of Worship exposed to daytime noise 51dB	17	17	17	17	17
		Quantitative	Number of Places of Worship exposed to daytime noise 54dB	11	11	11	11	11
		Quantitative	Number of Places of Worship exposed to daytime noise 57dB	3	3	3	3	3
		Quantitative	Number of Places of Worship exposed to daytime noise 60dB	3	3	3	3	3
		Quantitative	Number of Places of Worship exposed to daytime noise 63dB	3	3	3	3	3
		Quantitative	Number of Places of Worship exposed to daytime noise 66dB	1	1	1	1	1
		Quantitative	Number of Places of Worship exposed to daytime noise 69dB	0	0	0	0	0
		Quantitative	Number of Places of Worship exposed to daytime noise 72dB	0	0	0	0	0
		Quantitative	Number of Places of Worship exposed to nightime noise 45dB	19	19	19	19	19
		Quantitative	Number of Places of Worship exposed to nightime noise 48dB	13	13	13	13	13
		Quantitative	Number of Places of Worship exposed to nightime noise 51dB	7	7	7	7	7
		Quantitative	Number of Places of Worship exposed to nightime noise 54dB	3	3	3	3	3
		Quantitative	Number of Places of Worship exposed to nightime noise 57dB	3	3	3	3	3
		Quantitative	Number of Places of Worship exposed to nightime noise 60dB	2	2	2	2	2
		Quantitative	Number of Places of Worship exposed to nightime noise 63dB	1	1	1	1	1
		Quantitative	Number of Places of Worship exposed to nightime noise 66dB	0	0	0	0	0
		Quantitative	Number of Places of Worship exposed to nightime noise 69dB	0	0	0	0	0
		Quantitative	Number of Places of Worship exposed to nightime noise 72dB	0	0	0	0	0

Secondary Metrics	Population exposed to noise events, nearest 100	Level	WebTAG assessment	A	B	C	D	Baseline
		Quantitative	Population exposed to daytime N65 events >5	50500	50400	50600	48100	54400
		Quantitative	Population exposed to daytime N65 events >10	28000	28600	28100	28000	28600
		Quantitative	Population exposed to daytime N65 events >20	18400	18200	18400	18700	18500
		Quantitative	Population exposed to daytime N65 events >50	11900	11700	11800	11000	11700
		Quantitative	Population exposed to daytime N65 events >100	8400	8500	8300	8100	8300
		Quantitative	Population exposed to daytime N65 events >200	5000	5000	5000	5000	5000
		Quantitative	Population exposed to daytime N65 events >500	<100	<100	<100	<100	<100
		Quantitative	Population exposed to nighttime N60 events >5	65000	64600	63800	63300	63200
		Quantitative	Population exposed to nighttime N60 events >10	29300	29000	29000	29400	28700
		Quantitative	Population exposed to nighttime N60 events >20	14400	14400	14500	14200	14500
		Quantitative	Population exposed to nighttime N60 events >50	7700	7700	7800	7700	7800
		Quantitative	Population exposed to nighttime N60 events >100	0	0	0	0	0
Secondary Metrics	**Number of Households exposed to noise events, nearest 100**	**Level**	**WebTAG assessment**	**A**	**B**	**C**	**D**	**Baseline**
		Quantitative	Number of houses exposed to daytime N65 events >5	20800	20800	20800	19800	22400
		Quantitative	Number of houses exposed to daytime N65 events >10	11700	11900	11800	11700	11900
		Quantitative	Number of houses exposed to daytime N65 events >20	7700	7600	7700	7800	7800
		Quantitative	Number of houses exposed to daytime N65 events >50	5100	5100	5100	4700	5000
		Quantitative	Number of houses exposed to daytime N65 events >100	3600	3700	3600	3500	3600
		Quantitative	Number of houses exposed to daytime N65 events >200	2200	2200	2200	2200	2200
		Quantitative	Number of houses exposed to daytime N65 events >500	<100	<100	<100	<100	<100
		Quantitative	Number of houses exposed to nighttime N60 events >5	27000	26800	26500	26300	26200
		Quantitative	Number of houses exposed to nighttime N60 events >10	12200	12100	12100	12300	12000
		Quantitative	Number of houses exposed to nighttime N60 events >20	6000	6000	6000	5900	6000
		Quantitative	Number of houses exposed to nighttime N60 events >50	3300	3300	3300	3300	3300
		Quantitative	Number of houses exposed to nighttime N60 events >100	0	0	0	0	0
Secondary Metrics	**Number of Community Buildings exposed to noise events**	**Level**	**WebTAG assessment**	**A**	**B**	**C**	**D**	**Baseline**
		Quantitative	Number of Community Buildings exposed to daytime N65 events >5	21	21	20	20	22
		Quantitative	Number of Community Buildings exposed to daytime N65 events >10	14	14	14	14	15
		Quantitative	Number of Community Buildings exposed to daytime N65 events >20	13	13	13	14	13
		Quantitative	Number of Community Buildings exposed to daytime N65 events >50	7	7	7	6	7
		Quantitative	Number of Community Buildings exposed to daytime N65 events >100	4	4	4	4	4
		Quantitative	Number of Community Buildings exposed to daytime N65 events >200	3	3	3	3	3
		Quantitative	Number of Community Buildings exposed to daytime N65 events >500	0	0	0	0	0
		Quantitative	Number of Community Buildings exposed to nightime N60 events >5	36	36	36	34	34
		Quantitative	Number of Community Buildings exposed to nightime N60 events >10	17	16	17	17	16
		Quantitative	Number of Community Buildings exposed to nightime N60 events >20	9	9	9	9	9
		Quantitative	Number of Community Buildings exposed to nightime N60 events >50	3	3	3	3	3
		Quantitative	Number of Community Buildings exposed to nightime N60 events >100	0	0	0	0	0

Secondary Metrics	Number of Hospitals exposed to noise events	Level	WebTAG assessment	A	B	C	D	Baseline
		Quantitative	Number of Hospitals exposed to daytime N65 events >5	2	2	2	2	2
		Quantitative	Number of Hospitals exposed to daytime N65 events >10	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime N65 events >20	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime N65 events >50	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime N65 events >100	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime N65 events >200	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to daytime N65 events >500	0	0	0	0	0
		Quantitative	Number of Hospitals exposed to nightime N60 events >5	3	3	3	2	3
		Quantitative	Number of Hospitals exposed to nightime N60 events >10	1	1	1	1	1
		Quantitative	Number of Hospitals exposed to nightime N60 events >20	1	1	1	1	1
		Quantitative	Number of Hospitals exposed to nightime N60 events >50	1	1	1	1	1
		Quantitative	Number of Hospitals exposed to nightime N60 events >100	0	0	0	0	0
Secondary Metrics	**Number of Schools exposed to noise events**	**Level**	**WebTAG assessment**	**A**	**B**	**C**	**D**	**Baseline**
		Quantitative	Number of Schools exposed to daytime N65 events >5	50	49	49	48	55
		Quantitative	Number of Schools exposed to daytime N65 events >10	33	34	33	34	34
		Quantitative	Number of Schools exposed to daytime N65 events >20	26	25	26	25	26
		Quantitative	Number of Schools exposed to daytime N65 events >50	19	19	19	19	19
		Quantitative	Number of Schools exposed to daytime N65 events >100	16	16	16	16	16
		Quantitative	Number of Schools exposed to daytime N65 events >200	10	10	10	10	10
		Quantitative	Number of Schools exposed to daytime N65 events >500	2	2	2	2	2
		Quantitative	Number of Schools exposed to nightime N60 events >5	62	60	60	59	62
		Quantitative	Number of Schools exposed to nightime N60 events >10	34	34	34	33	34
		Quantitative	Number of Schools exposed to nightime N60 events >20	21	21	21	21	21
		Quantitative	Number of Schools exposed to nightime N60 events >50	16	16	16	16	16
		Quantitative	Number of Schools exposed to nightime N60 events >100	2	2	2	2	2
Secondary Metrics	**Number of Places of Worship exposed to noise events**	**Level**	**WebTAG assessment**	**A**	**B**	**C**	**D**	**Baseline**
		Quantitative	Number of Places of Worship exposed to daytime N65 events >5	43	43	44	41	44
		Quantitative	Number of Places of Worship exposed to daytime N65 events >10	31	30	32	30	31
		Quantitative	Number of Places of Worship exposed to daytime N65 events >20	20	19	19	19	19
		Quantitative	Number of Places of Worship exposed to daytime N65 events >50	13	13	14	13	13
		Quantitative	Number of Places of Worship exposed to daytime N65 events >100	9	9	9	9	9
		Quantitative	Number of Places of Worship exposed to daytime N65 events >200	8	8	8	8	8
		Quantitative	Number of Places of Worship exposed to daytime N65 events >500	1	1	1	1	1
		Quantitative	Number of Places of Worship exposed to nightime N60 events >5	60	59	60	57	55
		Quantitative	Number of Places of Worship exposed to nightime N60 events >10	25	24	25	24	24
		Quantitative	Number of Places of Worship exposed to nightime N60 events >20	16	16	16	16	16
		Quantitative	Number of Places of Worship exposed to nightime N60 events >50	9	9	9	9	9
		Quantitative	Number of Places of Worship exposed to nightime N60 events >100	1	1	1	1	1

Secondary Metrics	Population experiencing overflight events, nearest 100	Level	WebTAG assessment	A	B	C	D	Baseline
		Quantitative	Population exposed to daytime overflight events >5	434300	434100	434900	438700	444100
		Quantitative	Population exposed to daytime overflight events >10	332300	332100	332900	336100	338500
		Quantitative	Population exposed to daytime overflight events >20	257300	256300	257000	258100	263400
		Quantitative	Population exposed to daytime overflight events >50	73500	71900	72100	68300	74700
		Quantitative	Population exposed to daytime overflight events >100	14700	16700	14000	14000	10500
		Quantitative	Population exposed to daytime overflight events >200	3200	3200	3200	3200	3200
		Quantitative	Population exposed to nighttime overflight events >5	174600	173100	173400	169900	182400
		Quantitative	Population exposed to nighttime overflight events >10	44800	44300	43800	41400	41600
		Quantitative	Population exposed to nighttime overflight events >20	5800	5800	5800	5800	5800
		Quantitative	Population exposed to nighttime overflight events >50	2500	2400	2500	2400	2500

Table 21 Full Options Appraisal Results for Each Option