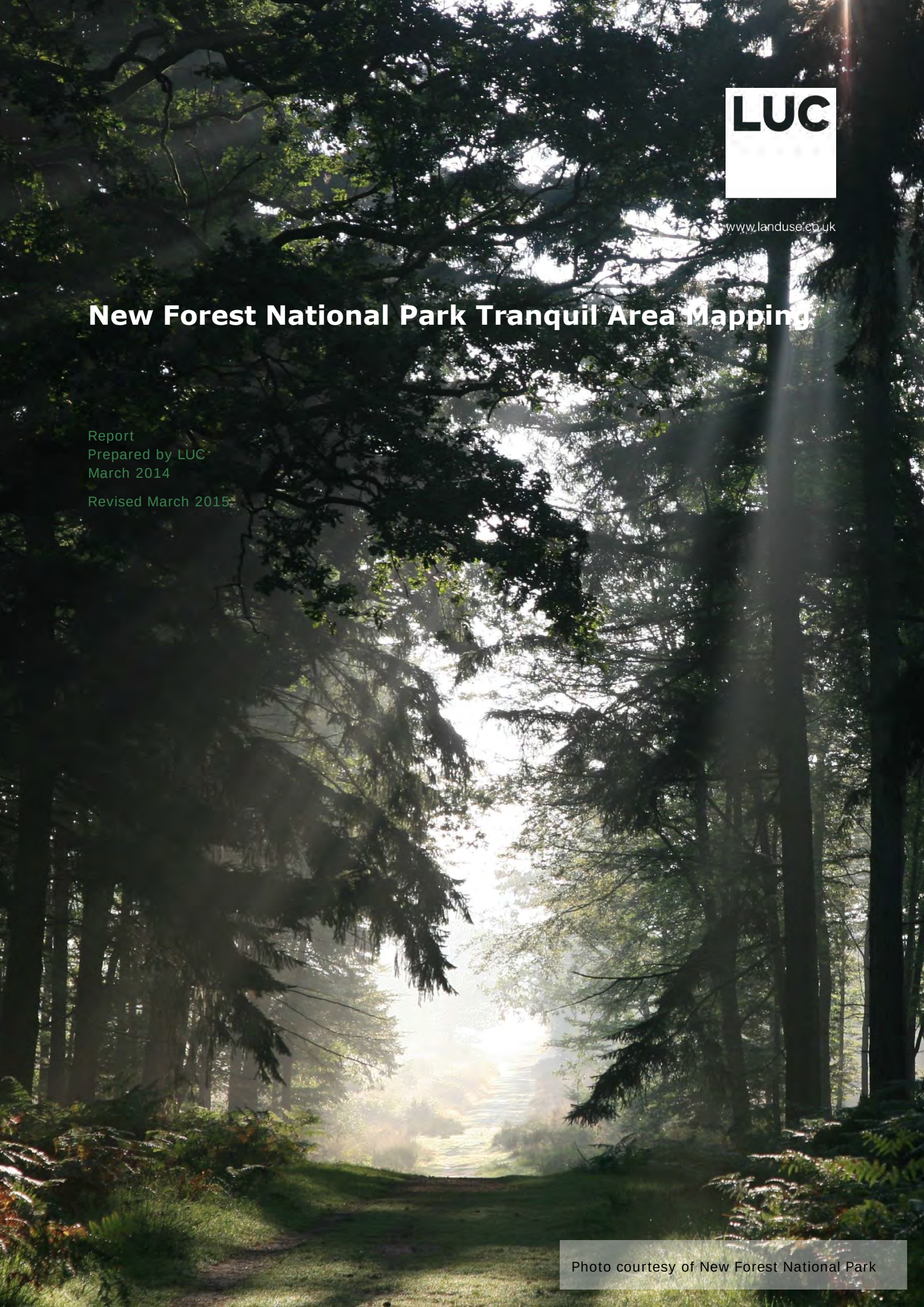

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New Forest National Park Tranquil Area Mapping

Report
Prepared by LUC
March 2014

Revised March 2015

Photo courtesy of New Forest National Park

Project Title: New Forest National Park Tranquil Areas Mapping

Client: New Forest National Park

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Introduction

1 Introduction

Context

1.1 In 1995 the Council for the Protection of Rural England, now the Campaign to Protect Rural England (CPRE) and the then Countryside Commission first published a national set of 'Tranquil Area' maps. These had enormous impact at the time and brought the loss of tranquillity to national attention. These maps, showing features that had a visual and audible impact on the countryside, such as roads, railways, and urban areas, were based on a methodology first developed by Simon Rendel of ASH Consulting in 1991. The impetus for the development of the methodology was a major Department of Transport highways project, and the output was a tranquil areas map for parts of Hertfordshire, Bedfordshire and Essex which would potentially be affected by the development of a new transport corridor. Following this work, which was groundbreaking at the time, the methodology was developed further and a national map of tranquil areas in England was produced in 1995 by ASH Consulting, published as the regional tranquil areas maps in October 1995 by CPRE and the Countryside Agency. These maps provided a snap shot of Tranquil Areas in the early 1990s and, for comparison, in the early 1960s following the same methodology.

1.2 In July 1996 Ash Consulting produced a detailed map of Tranquil Areas for the New Forest Heritage Area. This map was developed at a more detailed scale than the national/regional maps produced the preceding year (at 1:50,000) and took into account more local influences on the tranquillity of the area. A reproduction of this map is shown in **Figure 1.1.**

1.3 The ASH Consulting maps played a vital role in raising political awareness of tranquillity. Nevertheless, over time the approach that lay behind the maps was subject to some criticism. The main thrust of this criticism was that the approach did not take local perceptions into account, and that it only considered detractors from tranquillity, ignoring factors that contribute to tranquillity.

1.4 Subsequent work was carried out by CPRE and Natural England, in conjunction with Northumbria and Newcastle Universities and others, to refine the approach to tranquillity mapping, leading to the publication of a new national map of tranquillity in 2006. This newer methodology built strongly on consultation methods to determine what people consider to be 'tranquil' and 'non-tranquil' rather than the objective 'expert judgement' used in the original 1995 Tranquil Areas maps.

1.5 However, these new maps of tranquillity failed to capture some local significant effects on Tranquillity, and in the New Forest the positive effects of the natural land cover 'dilute' the negative effects from significant roads (particularly the A31 which cuts through the National Park) making the resulting map less meaningful on a local scale.

1.6 This project aims to recreate the Tranquil Area Map that was created of the New Forest Heritage Area in 1996.

1.7 In 2014/2015 a revised New Forest Tranquil Areas Map was created, following the 1996 methodology as closely as possible. Over the summer of 2014 ground truthing work was carried out to check the tranquillity levels predicted by the map. Thirty ground truthing volunteers were asked to survey 7 to 8 locations each, in pairs. There were a total of 100 locations and some of these were visited by more than one pair of volunteers to provide a comparison of results. This was carried out over a two week period in July 2014. Following this, several small changes were made to the threshold distances used to develop the map, particularly to lessen the threshold distances for the roads and settlements. This 2015 report details the final thresholds, data sets and processes used, to allow the map to be created again in the future, to allow for comparison over time.

New Forest National Park Tranquil Areas Mapping 2015

Figure 1.1

1996 Tranquil Areas Map

Tranquil Areas (ASH Consulting, 1996)

- Zone A (least tranquil)
- Zone B
- Zone C
- Zone D
- Zone E (most tranquil)

- Study area boundary (5km from NFNP)
- Heritage Area boundary
- National Park boundary

Map Scale @ A3:1:170,000

New Forest National Park

LUC LDN 106_5990-01_018_Fig1_1_1996_Map_Rev1 15/03/2015

Source: New Forest National Park, ASH Consulting

2 Methodology

2.1 The work undertaken to prepare the 2015 Tranquil Areas Map has been based on three main sources:

- Tranquil Areas: The New Forest Heritage Area. A report to The Countryside Commission by the ASH Consulting Group, 1996.
- the national and regional maps of tranquil areas developed by ASH Consulting and published by CPRE and the Countryside Commission in October 1995 (hereafter referred to as the 1995 Tranquil Area maps).
- Developing an Intrusion Map of England, Prepared for CPRE by LUC, 2007

2.2 Each of these sources was examined with reference to the New Forest, in order to establish the threshold distances by which each visual and noise disturbance factor was mapped.

Creating the 2015 Tranquil Areas Map

2.3 Each data set contributing to the 2015 map is detailed below, together with a detailed methodology of how the data was processed.

2.4 In establishing the methodology, our aim was to keep as close as possible to the methodology used in the production of the 1996 map. However data sources have inevitably changed over time, it has not always been possible to measure the distances over which disturbances were recorded on the 1996 map and the 2015 mapping takes into account the results of the ground-truthing work. We have endeavoured to remain as close as possible to the original study, within these parameters, but the 1996 and 2015 maps are not directly comparable. We have set out the methodology used in detail below, to enable this 2015 study to be repeated in the future.

2.5 A couple of notes specific to this study:

- The area of study was extended to 5km beyond the National Park boundary, to ensure that disturbances beyond the park boundary were taken into account.
- An additional level of very high disturbance has been mapped, to reflect the very intrusive nature of the A31 through the National Park.

2.6 In general, the approach has been to:

- identify each type of feature (e.g. roads, railways), used in the original map;
- establish the categories used within the mapping (usually derived from the 1996 report)
- use the 1996 map to identify the distance buffers taken from each category. In practice, these distances were extremely difficult to measure, as a great deal of inconsistency appeared on the map, potentially resulting from two causes:
    - the maps may not have been generated using GIS, and were therefore subject to more variation.
    - factors (such as woodland) which aren't clear on the basemap were also taken into account as having an impact, this may have resulted in what appears as inconsistencies appearing on the map, as buffer zones have been modified manually.
- identify data sources which can be used to produce the 2015 map (both in terms of geographic features and categorising those features)
- map the disturbance buffers to create the 2015 map.

Roads

1996 methodology notes

2.7 The 1996 methodology notes the following with reference to roads:

2.8 *"The traffic map of the area shows four non-urban roads with traffic flows greater than 10,000 vehicles a day averaged over the year(…) In the regional methodology they are allotted a 1km disturbance distance beyond which the countryside can be perceived to be Tranquil even though they can be heard much further away than this on a still day. However, there are zones of the Forest within ½ km of these roads, which, though disturbed by noise, are conducive to peaceful walking. These have been referred to as semi-Tranquil in the Regional maps."* ASH Consulting Group (1996), pp4-5

2.9 The following categories of roads are set out in the 1996 report, although it is not completely clear what distance thresholds have been used from each category, to impact upon the local Tranquil Area zones:

Table 2.1: Roads (AAWT) (taken from ASH Consulting 1996 report, Table 1)

Category	Description
>75,000	
25,000-75,000	Very high
10,000-25,000	High
5,000-10,000	Med
2,000-5,000	Low
800-2,000	Very low
200-800	

2.10 The following comments on roads are provided in Table 2 of the 1996 methodology, which describes each of the local Tranquil Area Zones:

Table 2.2: Local Tranquil Area Zones and road specific comments (taken from ASH Consulting 1996 report, Table 2)

Local Nomenclature	Traffic related points in description
Zone E (most tranquil)	No access roads Traffic hum not usually audible
Zone D	Distant traffic often audible
Zone C	Distant traffic noise noticeable in average conditions
Zone B	(No specific traffic related comments) 'As regional'
Zone A (least tranquil)	Substantial traffic disturbance throughout zone.

2015 methodology

Data sources

2.11 The data sources used for roads for the 2015 methodology are:

- OS VectorMap District (for Roads GIS shapefile)
- Annual Average Daily Traffic Flows, GB National Road Traffic Survey, DfT (2012) (source: http://www.dft.gov.uk/traffic-counts/).
- Hampshire County Council Transport Department (static and temporary road traffic counters)

Approach

2.12 Each road has been attributed with a category of road traffic, to fit with the categories set out in **Table 2.1** above, and derived from the Annual Average Daily Traffic Flows. **Figure 2.1** shows the roads set out by category, and the traffic count points used. For roads where no classification data was available, local knowledge was used (from NFNP officers) to classify roads based on similar roads for which data was available.

2.13 These roads have then been measured against the 1996 map, where some road traffic levels were known, to derive the distance buffers affecting each local Tranquil Area Level, as shown in Table 2.3. It is noted that the distance buffers are not drawn with consistent widths on the 1996 map, and so the distances set out in Table 2.3 are our best estimate of a standard distance to use in the 2015 map.

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.1

Roads (Categorized by volume of traffic)

- > 75000
- 25000 - 75000
- 10000 - 25000
- 5000 - 10000
- 2000 - 5000
- 800 - 2000
- 200 - 800
- < 200
- Unknown
- HCC TCP
- DFT TCP (Major roads)
- DFT TCP (Minor roads)
- Study area boundary (5km from NFNP)
- National Park boundary

Map Scale @ A3:1:170,000

LUC

New Forest National Park

LUC LDN 106_5990-01_015_Fig2_1_Roads_by_category_RevB 15/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local, Hampshire County Council, Department for Transport

Table 2.3: Roads – distance buffers (2015)

Category	**Example of where measurement on map is derived**	Distance threshold (regional mapping)	**Level A**	**Level B**	**Level C**	**Level D**	**Level E**
Over 75,000	N/A No roads within study have this level of traffic	3km	3km (beyond NFNP boundary)				
25,000 – 75,000 (very high)*	**A31** in 1996 had AADF > 25,000. It is generally mapped (with exceptions) as Zone A – 1km buffer, Zone B, 1km buffer. *A31 in 2000 had c. 51k AADT, therefore likely to be in 'very high' category)*	2km	1000m	1750m	2500m	3500m	
10,000 – 25,000 (high)	A36 in 1996 had AADF of 10-25k	1km	500m	1000m	1500m	3000m	
5,000 – 10,000 (med)	Section of B3055 in 1996 had AADF of 5-10k	500m	250m	500m	1500m	2000m	
2,000- 5,000 (low)	B3058 in 1996 had AADF of 2-5k	no disturbance	100m	200m	500m	1500m	
800-2,000 (very low – suitable for cycling)	In many areas of the map this category does not appear to have an impact - measurement taken from the area around St Leonards Rd near East End.	(new category)	0m	100m	200m	300m	
200-800 (walkable – uncomfortable)	In many areas of the map this category does not appear to have an impact - measurement taken from the area around St Leonards Rd near East End.		0m	0m	100m	200m	

Category	**Example of where measurement on map is derived**	Distance threshold (regional mapping)	**Level A**	**Level B**	**Level C**	**Level D**	**Level E**
Less than 200 (walkable – comfortable)			0m	0m	0m	100m	

2.14 In addition to the zones set out in the table, in areas of forest, each Level has been upgraded to the next level of tranquillity (i.e. Level A becomes Level B). This is carried out on the final Tranquil Areas map.

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.2

Roads and disturbance buffers

Roads and traffic volume (AADT)

- > 75000
- 25000 - 75000
- 10000 - 25000
- 5000 - 10000
- 2000 - 5000
- 800 - 2000
- 200 - 800
- < 200
- Unknown

Road traffic derived tranquil levels

- Level A (most disturbed)
- Level B
- Level C
- Level D (least disturbed)
- Study area boundary (5km from NFNP)
- National Park boundary

Map Scale @ A3:1:170,000

LUC

New Forest National Park

LUC LDN 106_5990-01_016_Fig2_2_Roads_and_disturbance_buffers 15/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local, Hampshire County Council, Department for Transport

Railways

1996 methodology notes

2.17 No specific notes are made about railways in the 1996 methodology other than that they are listed within the disturbance category tables at the end of the document. **Table 2.4** sets out the categories defined for railways in Table 1 of the ASH Consulting report.

Table 2.4: Railways (taken from ASH Consulting 1996 report, Table 1)

Category	Description
8 trains per hour	High frequency
6 trains per hour	Medium frequency
3 trains per hour	Low frequency

2.18 No reference is made to railways in Table 2 of the 1996 methodology, which describes each of the local Tranquil Area Zones.

2015 methodology

Data sources

2.19 The data sources used for railways for the 2015 methodology are:

- OS VectorMap District (for Roads GIS shapefile)
- South West Trains Timetable

Approach

2.20 Based on these data sources, we have attributed the railway lines through the study area with the categories in Table 2.4.

2.21 The railways were measured against the 1996 map. The Southampton – Bournemouth line is evident on the map with broadly two 100m buffers into Zone A and Zone B (although these buffers have variable widths throughout the map). The Brockenhurst to Lymington Pier train line isn't evident on the 1996 tranquil areas map at all, although it is adjacent to the A337 road corridor in places, which is evident on the map. In the regional methodology, only mainline train routes were buffered.

2.22 The distance buffers set out in Table 2.5 are therefore our best estimation of the distances used on the 1996 map, and have been used for the 2015 map.

Table 2.5: Railways – distance buffers

Category	**Example of where measurement on map is derived**	Distance threshold (regional mapping)	**Level A**	**Level B**	**Level C**	**Level D**	**Level E**
8 or more trains per hour (high frequency)	Southampton – Bournemouth line	0.5km / 1km	200m	350m	1000m	1500m	n/a
6-7 trains per hour (Medium frequency)	n/a		n/a	n/a	n/a	n/a	n/a
3-5 trains per hour	Brockenhurst to Lymington Pier (train line isn't evident on tranquil areas map, adjacent to road corridor which is evident on the map). Buffer derived following		n/a	350m	625m	825m	n/a

Category	**Example of where measurement on map is derived**	Distance threshold (regional mapping)	**Level A**	**Level B**	**Level C**	**Level D**	**Level E**
	consultation with stakeholder group.						

2.23 **Figure 2.3** shows the application of the disturbance buffers to railway lines.

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.3

Railways (Categorized by Frequency) and Disturbance Buffers

- 3 - 5 trains per hour (low frequency)
- 8 or more trains per hour (high frequency)
- Freight line (irregular frequency)

Railway derived tranquil levels

- Level A
- Level B
- Level C
- Level D
- Study area boundary (5km from NFNP)
- National Park boundary

Map Scale @ A3:1:170,000

New Forest National Park

LUC LDN 106_5990-01_007_Fig2_3_Railways_and_disturbance_buffers 15/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local

Airports

1996 methodology notes

2.24 The 1996 methodology sets out the following in relation to airports:

2.25 "Noise from aircraft is a regular feature of conditions in the New Forest as it is in most of southern England and beyond. Much of this noise cannot be simply ascribed to particular runways or routes and has therefore been ignored.

2.26 Noise contours from Bournemouth and Southampton airports have been obtained from local authorities.

2.27 Bournemouth / Hurn: the 57dB(A) Leq contour is available and just infringes the Heritage area boundary near Ripley. It has been taken as the boundary between the A and B zones. Beyond this it has been observed that aircraft normally turn to the north or south. Notional boundaries to higher zones have been drawn by judgement to reflect this.

2.28 Southampton / Eastleigh: the 57dB(A) Leq contour lies outside the Heritage Area and beyond this much traffic turns north or south. Although the regular flights to the Channel Islands are presumed to pass over the south-east corner of the Forest no obvious effect from this has been recorded."

2.29 Table 2.4 sets out the category defined for Airports in the table of the ASH Consulting report.

Table 2.6: Airports (taken from ASH Consulting 1996 report, Table 1)

Category	Description
Use dBA Leq contour	57dB(A) Leq contour

2.30 The following comments on airports are provided in Table 2 of the 1996 methodology, which describes each of the local Tranquil Area Zones:

Table 2.7: Local Tranquil Area Zones and air traffic specific comments (taken from ASH Consulting 1996 report, Table 2)

Local Nomenclature	Traffic related points in description
Zone E (most tranquil)	High overflying aircraft occur
Zone D	Significant intermittent aircraft noise can occur
Zone C	Aircraft noise at medium altitude occurs often
Zone B	
Zone A (least tranquil)	

2015 methodology

Data sources

2.31 The Strategic Noise Mapping Report (2012) for Bournemouth airport has been provided by the airport. This report was written in 2012 and based on data from 2011.

2.32 For Southampton Airport the Noise Action Plan 2010-2015 was downloaded (from http://www.southamptonairport.com/about-us/aircraft-noise/). This report was adopted by the Secretary of State for Environment, Food and Rural Affairs in December 2011.

Approach

2.33 Although the 57dBA (L_{eq}) contour isn't plotted as standard within the noise reports, the 55dBA(L_{den}) has been taken as the most relevant and broadly equivalent area within which significant noise disturbance from aircraft can be heard.

Table 2.8: Airports – distance buffers

Category	**Example of where measurement on map is derived**	Distance threshold (regional mapping)	**Level A**	**Level B**	**Level C**	**Level D**	**Level E**
Distance from 55dBA L_{den} contour		1km	Contour itself (i.e. no buffer)	500m	1000m		

2.34 Figure 2.4 shows the two airports and their impacts on the Tranquil Area Levels, together with an area vulnerable to noise from light aircraft and military helicopters. This 'vulnerable' area has an evident effect on Tranquillity, but it was not included within the Tranquil Area buffers, partly in order to remain consistent with the 1996 study, but also because further work is need to accurately map the frequency and degree of impact from this intermittent source of noise disturbance.

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.4

Airports and Disturbance Buffers

55dB Lden contour

Approx. area vulnerable to noise by light aircraft & military helicopters

Aviation derived tranquil levels

Level A

Level B

Level C

Study area boundary (5km from NFNP)

National Park boundary

Map Scale @ A3:1:170,000

LUC

New Forest National Park

LUC LDN 106_5990-01_008_Fig2_4_Airports_and_disturbance_buffers 15/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local, Bickerdyke Allen Partners

Settlements

1996 methodology notes

2.35 Settlements are placed into categories based on their population size. The methodology also notes that:

2.36 *"A rough indication of population against settlement size is given and settlements which conform to this are referred to as 'tight'. Some settlements do not conform because they are infilled with paddocks and are referred to as 'loose'.*

2.37 *"Local mapping thresholds for 'tight' settlements not used in the regional mapping are: 0.1, ¼, ½km^2 . These are taken off the O.S. map by measurement. In practice the influence of settlements at the lower end is often overridden by local traffic effects.*

2.38 *"The following should also be noted with respect to small settlements:*

(a) some small settlements are graded down a zone for disturbance because of continuous street lighting. This is a very slight effect.

(b) some 'loose' settlements are graded up a zone e.g. Burley

(c) although some Conservation Areas can be considered less disturbing on account of their 'fit' with the landscape, in the New Forest such settlements (e.g. Minstead, Fritham) attract extra visitors and have therefore not been allocated a positive bias.

"As in the regional maps, a settlements size of ½ - 1km^2 (i.e. approx. 2000-4000 population) is taken to be equivalent in disturbance to a traffic band of 5,000-10,000 vehicles a day."

2.39 The following categories of settlement are set out in the report:

Table 2.9: Settlements (taken from ASH Consulting 1996 report, Table 1)

Category	Description
>500,000	Metropolitan
75,000-500,000	Large towns
25,000-75,000 (<18km^2)	Medium towns
10,000-25,000 (<6 km^2)	
4,000-10,000	Small towns
2,000-4,000 (<1km^2)	Large villages
1,000-2,000 (<½ km^2)	
<1,000 (<1/4 km^2)	
10-50 dwellings	

2.40 The following comments on settlements are provided in Table 2 of the 1996 methodology, which describes each of the local Tranquil Area Zones:

Table 2.10: Local Tranquil Area Zones and settlement specific comments (taken from ASH Consulting 1996 report, Table 2)

Local Nomenclature	Settlement related points in description
Zone E (most tranquil)	No dwellings

Local Nomenclature	Settlement related points in description
Zone D	No dwelling groups
Zone C	No settlements greater than 10 dwellings
Zone B	No settlements greater than 50 dwellings
Zone A (least tranquil)	(no settlement related points)

2015 methodology

Data sources

2.41 The data sources used for the settlements data were:

- Ordnance Survey MasterMap
- Ordnance Survey Meridian2 (Developed Land Use Area)
- AddressBase Premium

Approach

2.42 Ordnance Survey MasterMap was used in order to establish a well-defined settlement edge. Buildings and gardens were extracted from the MasterMap data set, and grouped into settlements using the Developed Land Use Area from Ordnance Survey Meridian (which provides the settlement names). Two areas were manually manipulated as it was felt that the geography provided by the DLUA data set wasn't representative of the settlements on the ground. Netley Marsh was separated from Totton, and Burley was aggregated into one settlement (from Burley, Burley Street and Bistern Close).

2.43 AddressBase Plus was used to identify the number of residential dwellings within each settlement, and the dwelling number was multiplied by a factor of 2.3 to estimate population.

2.44 This approach was felt to be more precise than using data from the 2011 census, as Output Area level data (from the Office of National Statistics) is too coarse to categorise the settlements without including the dispersed dwellings within the surrounding countryside.

2.45 Figure 2.5 shows the settlements by band.

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.5

Settlements by Category

Settlements

- dispersed settlements
- 10-50 dwellings
- <1,000
- 1,000-2,000
- 2,000-4,000
- 4,000-10,000
- 10,000-25,000
- 25,000-75,000
- 75,000-500,000

- Study area boundary (5km from NFNP)
- National Park boundary

Map Scale @ A3:1:170,000

New Forest National Park

LUC LDN 106_5990-01_009_Fig2_5_Settlements_by_category 15/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local, OS Address Base, OS Meridian

2.46 Table 2.11 sets out the distance buffers for each category of settlement:

Table 2.11: Settlements – distance buffers

Category	Example	Level A	Level B	Level C	Level D	Level E
>500,000	n/a					
75,000-500,000	Bournemouth, Southampton Effects not particularly clear on the map. Potentially map as 2km into Level A, as per national methodology.	1000m	1500m	2000m		
25,000-75,000 (<18km^2)	New Milton Effects from Christchurch and New Milton not very clear from map, but approximately 500m into Level A.	250m	750m	1250m		
10,000-25,000 (<6 km^2)	Ringwood, Lymington Approx 200m into Level A around Fawley. Around 600m around Ringwood. Variable widths around Totton. 400m seems reasonable average.	200m	600m	1000m		
4,000-10,000	Pooksgreen Very variable widths shown on map – chosen distance between adjacent category bands	150m	450m	750m		
2,000-4,000 (<1km^2)	West Wellow, Lyndhurst Brockenhurst "As in the regional maps, a settlement size of ½ - 1km^2 (i.e. approx. 2000-4000 population) is taken to be equivalent in disturbance to a traffic band of 5,000-10,000 vehicles a day". P6	100m	300m	500m	700m	
1,000-2,000 (<½ km^2)	Landford Very variable widths shown on map – chosen distance between adjacent	100m	200m	400m	500m	

Category	Example	Level A	Level B	Level C	Level D	Level E
	category bands					
<1,000 (<1/4 km^2)	East Boldre	0m	100m	200m	300m	
10-50 dwellings	(not measured from map, but no settlements greater than 10 dwellings in Level C, and no dwelling groups in Level D)	0m	0m	100m	200m	

2.47 Figure 2.6 shows the settlements and the disturbance buffers.

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.6

Settlements and disturbance buffers

- Settlements

Settlement derived tranquil levels

- Level A
- Level B
- Level C
- Level D
- Study area boundary (5km from NFNP)
- National Park boundary

Map Scale @ A3:1:170,000

New Forest National Park

LUC LDN 106_5990-01_010_Fig2_6_Settlements_and_disturbance_buffers 15/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local, OS Address Base, OS Meridian

Electrical Infrastructure

1996 methodology notes

2.48 The 1996 methodology sets out that:

2.49 "there are three significant categories of overhead line which occur: national grid (400/275kV), 132kV and double pole 33kV. Single pole lines would affect zone E if not following an access road and /or are obtrusively grouped. No such lines have been found but the survey has not been exhaustive.

2.50 "As for regional mapping, the influence of national grid is taken to be equivalent to a road traffic flow of 5,000 – 10,000 vehicles a day"

2.51 The methodology also states that:

2.52 "Fawley Power Station and Refinery: Loss of remoteness occurs in the south east of the area due to skyline effects from the refinery and power station. The zone of visibility where there is a significant disturbing effect has been estimated from fieldwork. The District Council holds visual surveys which have been consulted and compared with field observations".

2.53 Table 2.12 sets out the categories defined for electrical infrastructure in the table of the ASH Consulting report.

Table 2.12: Electrical infrastructure (taken from ASH Consulting 1996 report, Table 1)

Category	Description
Power stations	Largest with min 6 cooling towers Medium Nuclear
Grid stations	
Overhead lines	275 and 400kV 132kV 33kV/11kV if double pole

2.54 The following comments on electrical infrastructure are provided in Table 2 of the 1996 methodology, which describes each of the local Tranquil Area Zones:

Table 2.13: Local Tranquil Area Zones and electrical infrastructure specific comments (taken from ASH Consulting 1996 report, Table 2)

Local Nomenclature	Settlement related points in description
Zone E (most tranquil)	
Zone D	33kV overhead lines can occur
Zone C	
Zone B	No 132kV overhead cables
Zone A (least tranquil)	

2015 methodology

Data sources

2.55 Data sets showing the electrical infrastructure were sourced from the National Grid, and Scottish and Southern Electricity (SSE). National Grid data showed 400kV overhead power lines and electrical sub stations. SSE data provided 11kV to 132kV overhead power lines.

2.56 Fawley Power Station and oil refinery were digitised manually from the Ordnance Survey Vector Map Local data set. Although the power station has now been decommissioned, its impact as a visual disturbance remains, and it was therefore mapped consistently with the 1996 study.

2.57 Photovoltaic Arrays: information was provided from the stakeholder group showing the location of PV arrays within the National Park.

Approach

2.58 **Figure 2.7** sets out the electrical infrastructure features mapped.

2.59 The table below sets out the distance buffers from electrical infrastructure.

Table 2.14: Electrical infrastructure – distance buffers

Category	Example of where measurement on map is derived	Distance threshold (regional mapping)	Level A	Level B	Level C	Level D	Level E
Fawley Power Station and Refinery		3km (Level A) 1.5km (Level B)	1000m	3000m	4000m	5000m	
Overhead power lines (400kV)	Hale	0.5km as Level B	250m	500m	750m	1000m	
Lower voltage power line						150m	
Electricity sub station				1km	2000m	3000m	
Photovoltaic Arrays	n/a for previous study			100m	200m	300m	

2.60 **Figure 2.8** sets out the electrical infrastructure and disturbance buffers.

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.7

Electrical Infrastructure by Category

- 400kV overhead powerline
- 11kV - 132kV overhead powerline
- Electricity sub station
- Solar Array

Power related industrial site

- Fawley Oil Refinery
- Fawley Power Station (disused)
- Oil Storage Depot

- Study area boundary (5km from NFNP)
- National Park boundary

Map Scale @ A3:1:170,000

LUC

New Forest National Park

LUC LDN 106_5990-01_011_Fig2_7_Electrical_infra_by_category 15/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local, Bickerdyke Allen Partners

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.8

Electrical Infrastructure with Disturbance Buffers

- 400kV overhead powerline
- 11kV - 132kV overhead powerline
- Electricity sub station
- Solar Array

Power related industrial site

- Fawley Oil Refinery
- Fawley Power Station (disused)
- Oil Storage Depot

Electrical infrastructure derived tranquil levels

- Level A
- Level B
- Level C
- Zone D

- Study area boundary (5km from NFNP)
- National Park boundary

Map Scale @ A3:1:170,000

LUC

New Forest National Park

LUC LDN 106_5990-01_012_Fig2_8_Electrical_infra_and_disturbance_buffers 15/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local, Bickerdyke Allen Partners

Other noise disturbances and recreational effects

1996 methodology notes

2.61 The 1996 methodology sets out the following in relation to recreational effects:

2.62 "It is assumed that recreation will have no effect on zones A and B because they are already sufficiently disturbed. Two levels of intrusion by recreation are defined: intensive and moderate.

2.63 "Intensive is defined as a large site with year-round activity ie a 'honeypot'; moderate is defined as where other visitors are always nearby in daylight hours.

2.64 "The main areas of activity are identified from car park patterns and points of interest. Adding these effects to the highest zones of Tranquillity downgrades the area.

2.65 "In practice it has been found that most car parks in the New Forest are sited in the more disturbed zones adjacent to through roads. Only a few of the largest such sites are deemed to extend their influence beyond that of the road itself.

2.66 "Some routes across heathland show up on the aerial surveys as being highly eroded. However, it is not possible without further research to attribute this erosion to any particular activity and some of it may be due to routes taken by Forest ponies. We recommend that such research is considered as a follow up to this report. Riding (including hunting) is reported to be intrusive at certain times and to cause damage to flora. However because the riding stables are all located in areas influence by road noise no quantifiable effect is severe enough to affect the map.

2.67 "Cycling is mainly carried out on designated forest tracks which are also used for forestry operations from time to time. It has been judged that the combined effect of cycles, occasional forestry operations and the visual impact of the tracks themselves is sufficient to downgrade zone E to zone D. This happens particularly in the area west of Fritham.

2.68 "Model aircraft are flown at Beaulieu Heath and have been taken into account along with other recreational intrusion at that site. The Model power boat site at St Andrew's Mare has no effect on the map because it is so close to the A31."

Table 2.15: Other noise disturbances (taken from ASH Consulting 1996 report, Table 1)

Category	Description
e.g. power boating, low-flying aircraft	

2.69 The following comments on other noise disturbances and recreational effects are provided in Table 2 of the 1996 methodology, which describes each of the local Tranquil Area Zones:

Table 2.16: Local Tranquil Area Zones and other noise/recreational effects specific comments (taken from ASH Consulting 1996 report, Table 2)

Local Nomenclature	Traffic related points in description
Zone E (most tranquil)	No well-used cycle tracks No moderate passive recreation
Zone D	No camp sites No intensive passive recreation
Zone C	No all year campsites greater than 150 pitches
Zone B	
Zone A (least tranquil)	

2015 methodology

Data sources

2.70 The following data sources have been used to map these other noise disturbances and recreational effects.

- Car parks: identified from paper map of Forestry Commission Car Parks (provided by NFNP), and Ordnance Survey MasterMap, checked against Ordnance Survey 1:50,000 scale base map. Some car parks were identified as 'high use' based on information provided by the NFNP. These sites are differentiated in **Figure 2.9**.
- Campsites and caravan sites: information provided by NFNP (providing postcodes of major caravan and camping sites within the National Park), supplemented by a review of Ordnance Survey base map (1:50,000).
- Cycle routes: information provided in 'The New Forest Cycle Trails' leaflet, digitised from the Ordnance Survey base map (1:25,000).
- Visitor attractions: information provided by NFNP, digitised from Ordnance Survey base map (1:50,000).
- Model aircraft locations: one site identified, at Beaulieu Heath, digitised from Ordnance Survey base map (1:50,000).

2.71 **Figure 2.9** shows the location of these features within the study area.

Approach

2.72 Table 2.17 sets out the disturbance buffer distances from which the other noise and recreational disturbances have been mapped.

Table 2.17: Other noise and recreational disturbances – distance buffers

Category	Level A	Level B	Level C	Level D	Level E
Car parks (very high usage)			200m	300m	
Car parks (other level usage)			100m	200m	
Campsite and caravan sites			100m	200m	
Cycle routes				100m	
Visitor attractions			100m	200m	
Model aircraft		150m	300m	400m	

2.73 **Figure 2.10** shows the application of these disturbance buffers to the other noise and recreational disturbance features.

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.9

Other noise and recreation by category

- Visitor attraction
- Camping and caravan sites
- Beaulieu model aircraft flying area
- All cycle routes, bridleways & byways

Car parks

- High or very high usage
- Lower usage

- Study area boundary (5km from NFNP)
- National Park boundary

Map Scale @ A3:1:170,000

New Forest National Park

LUC LDN 106_5990-01_013_Fig2_9_Other_noise_and_recreation_Rev2 15/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.10

Other noise and recreation with disturbance buffers

- Visitor attraction
- Camping and caravan sites
- Beaulieu model aircraft flying area
- All cycle routes, bridleways and byways

Car parks

- High or very high usage
- Lower usage

- Level B
- Level C
- Level D

- Study area boundary (5km from NFNP)
- National Park boundary

Map Scale @ A3:1:170,000

LUC

New Forest National Park

LUC LDN 106_5990-01_013_Fig2_10_Other_noise_and_recreation_with_disturb_buffers 15/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local

Adjusting the zones

2.74 There are a number of features which affect the zones beyond the descriptions set out in the section above. These relate to:

- *"the positive influence of woodland on perception of Tranquillity*
- *The positive influence of topography on distant noise transmission*
- *The positive and negative influences of traffic management measures"* (1996 methodology, p8)

Woodland

1996 methodology notes

2.75 According to the 1996 methodology, woodland adjusts the zones according to the following criteria:

2.76 "Woodland categories can be picked up from the O.S. using the Landscape Types map in 'A Strategy for the New Forest'."

2.77 "The perceived edge of the woodland is drawn 100m in from the actual edge."

2.78 "Continuous woodland has the effect of converting zone A into zone B and so on until zone D where a contour is taken between C and D. Woodland less than 200m thick is ignored. Glades less than 100m in diameter or gaps less than 100m think count as woodland."

2015 methodology

2.79 We reviewed a number of options for Woodland coverage, but it was considered that the OS 1:50,000 scale base map provided the most realistic data set.

2.80 To derive woodland coverage we therefore digitised the woodland as shown on the 1:50,000 scale base map. We then reduced the woodland blocks using a buffer of 250m. Although this deviated from the previous methodology, it was felt that this was a distance which ensured that the woodland effect was not overly exaggerated.

2.81 **Figure 2.11** shows the extent of the woodland coverage throughout the study area, and the woodland reduced by 250m buffer. Table 2.18 sets out how it has been used to adjust the zones.

Table 2.18: Impact of other features on tranquil area zones

Feature	Data source	Impacts
Woodland	Ordnance Survey 1:50000 scale base map (digitised), reduced by 250 metres inwards.	Upgrade each zone for Levels A and B (i.e. where woodland is present Level A becomes Level B, and Level B becomes Level C).

Additional adjustments

2.82 One final editing process was undertaken on this data, to produce the final map. Following the woodland processing, some areas on the map had adjacent areas with tranquillity levels that differed by more than one level (i.e. a Level A area adjacent to a Level C area). This was largely a result of the process of 'upgrading' the tranquil levels where woodland was present. In order to better reflect reality, in any location where two non-consecutive levels were adjacent, the lower level was downgraded by one band, putting a buffer of 100m between the two areas.

New Forest National Park Tranquil Areas Mapping 2015

Figure 2.11

Woodland

- Woodland (as digitised from 1:50k base map)
- Woodland (reduced by 250m buffer)
- Study area boundary (5km from NFNP)
- National Park boundary

Map Scale @ A3:1:170,000

LUC

New Forest National Park

Source: New Forest National Park,Forestry Commission

All thresholds

2.83 Table 2.19 below sets out all of the thresholds used in the map.

Table 2.19: All threshold values

Feature	Category	Level A	Level B	Level C	Level D	Level E
ROADS	Over 75,000	3km				
	25,000 – 75,000 (very high)*	1000m	1750m	2500m	3500m	
	10,000 – 25,000 (high)	500m	1000m	1500m	3000m	
	5,000 – 10,000 (med)	250m	500m	1500m	2000m	
	2,000- 5,000 (low)	100m	200m	500m	1500m	
	800-2,000 (very low – suitable for cycling)	0m	100m	200m	300m	
	200-800 (walkable – uncomfortable)	0m	0m	100m	200m	
	Less than 200 (walkable – comfortable)	0m	0m	0m	100m	
RAILWAYS	8 or more trains per hour (high frequency)	200m	350m	1000m	1500m	n/a
	6-7 trains per hour (Medium frequency)	n/a	n/a	n/a	n/a	n/a
	3-5 trains per hour	n/a	350m	625m	825m	n/a
	Category	Level A	Level B	Level C	Level D	Level E
AIRPORTS	Distance from 55dBA L_{den} contour	Contour itself (i.e. no buffer)	500m	1000m		
SETTLEMENTS	>500,000					
	75,000-500,000	1000m	1500m	2000m		
	25,000-75,000 (<18km^2)	250m	750m	1250m		
	10,000-25,000 (<6 km^2)	200m	600m	1000m		
	4,000-10,000	150m	450m	750m		
	2,000-4,000 (<1km^2)	100m	300m	500m	700m	
	1,000-2,000 (<½ km^2)	100m	200m	400m	500m	

Feature	Category	Level A	Level B	Level C	Level D	Level E
	<1,000 (<1/4 km^2)	0m	100m	200m	300m	
	10-50 dwellings	0m	0m	100m	200m	
ELECTRICAL INFRASTRUCTURE	Fawley Power Station and Refinery	1000m	3000m	4000m	5000m	
	Overhead power lines (400kV)	250m	500m	750m	1000m	
	Lower voltage power line				150m	
	Electricity sub station		1km	2000m	3000m	
	Photovoltaic Arrays		100m	200m	300m	
OTHER NOICE DISTURBANCES AND RECREATIONAL EFFECTS	Car parks (very high usage)			200m	300m	
	Car parks (other level usage)			100m	200m	
	Campsite and caravan sites			100m	200m	
	Cycle routes				100m	
	Visitor attractions			100m	200m	
	Model aircraft		150m	300m	400m	

Feature	Data source	Impacts
WOODLAND	Ordnance Survey 1:50000 scale base map (digitised), reduced by 250 metres inwards.	Upgrade each zone for Levels A and B (i.e. where woodland is present Level A becomes Level B, and Level B becomes Level C).

3 Results

3.1 **Figure 3.1** shows the final Tranquil Areas within the New Forest National Park.

3.2 Although every effort was made to adhere to the methodology used in the 1996 map, as set out in this report, it was not always possible to do so (either due to different data sets being available, or because some aspects of the original methodology were not always clear). These aspects of the methodology were therefore updated, allowing the 2015 map to now be treated as the new baseline for future studies. It is therefore not possible to compare the 1996 map in detail with the 2015 map, although broad comparisons can be made.

3.3 The main sources of disturbance to tranquillity have remained the same, (with the A31, the large settlements and the industrial areas around Fawley Power Station being marked as the most highly disturbed areas). Although we were unable to access the original road traffic data used in the 1996 study, we reviewed data from 2000 to 2012 for the A31, which showed that traffic volumes actually decreased slightly over the time period. Fawley Power Station has now been closed, although currently remains a visual disturbance to the landscape. The areas of greatest disturbance to tranquillity have been specifically marked on the 2015 map, these are:

- Settlements with populations over 25,000 people (namely the Christchurch – New Milton conurbation, and Totton)
- Roads with traffic volumes over 25,000 AADT (namely the M27 and the A31)
- Fawley Power Station, Fawley Oil Refinery and the Oil Storage Depot.

3.4 On the 2015 map, there are six main locations which contain the most tranquil levels, these are:

- Much of the coastal area between Lymington River and Beaulieu River
- The coastal spit around Hurst Castle
- Around Bisterne Common
- Frame Wood / Stubbs Wood, west of Beaulieu
- The area around Denny Lodge, east of the A337 between Lyndhurst and Brockenhurst.
- The areas around Amberwood Inclosure and Hasley Inclosure, between Frogham and Fritham. For this last area, it is noteworthy that it is also entirely within an area likely to be affected by noise from light aircraft and military helicopters.

3.5 Table 3.1 shows the area of land within each Tranquillity Level in hectares and in terms of percentage. It is clear from the table that the most tranquil levels (Levels D and E) together comprise 27% of the land area within the National Park. The two least tranquil levels (A and B) together comprise just under half of the area of the National Park (47%).

Table 3.1: Total area of land within National Park at each Tranquillity Level

Tranquillity Level	Area (hectares)	Area (percentage)
Level A (least tranquil)	14544	27%
Level B	10696	20%
Level C	14451	27%
Level D	11127	21%
Level E (most tranquil)	3426	6%

New Forest National Park Tranquil Areas Mapping 2015

Figure 3.1

Tranquil Areas Map 2015

- Most highly disturbed area
- Level A (least tranquil)
- Level B
- Level C
- Level D
- Level E (most tranquil)
- Approximate area vulnerable to noise by light aircraft & military helicopters
- National Park boundary

Please note that this 2015 tranquil areas mapping follows the criteria used in the original 1996 mapping as far as possible. However some aspects of the original methodology are unclear and have been updated. Therefore this should be treated as new baseline mapping, and should not be directly compared to the 1996 study.

Map Scale @ A3:1:150,000

LUC

New Forest National Park

LUC LDN 106_5990-01_025_Fig3_1_Final_Tranquil_Levels_250k_A3 18/03/2015

Source: New Forest National Park, OS Mastermap, OS Vector Map Local, OS Address Base, OS Meridian, Forestry Commission