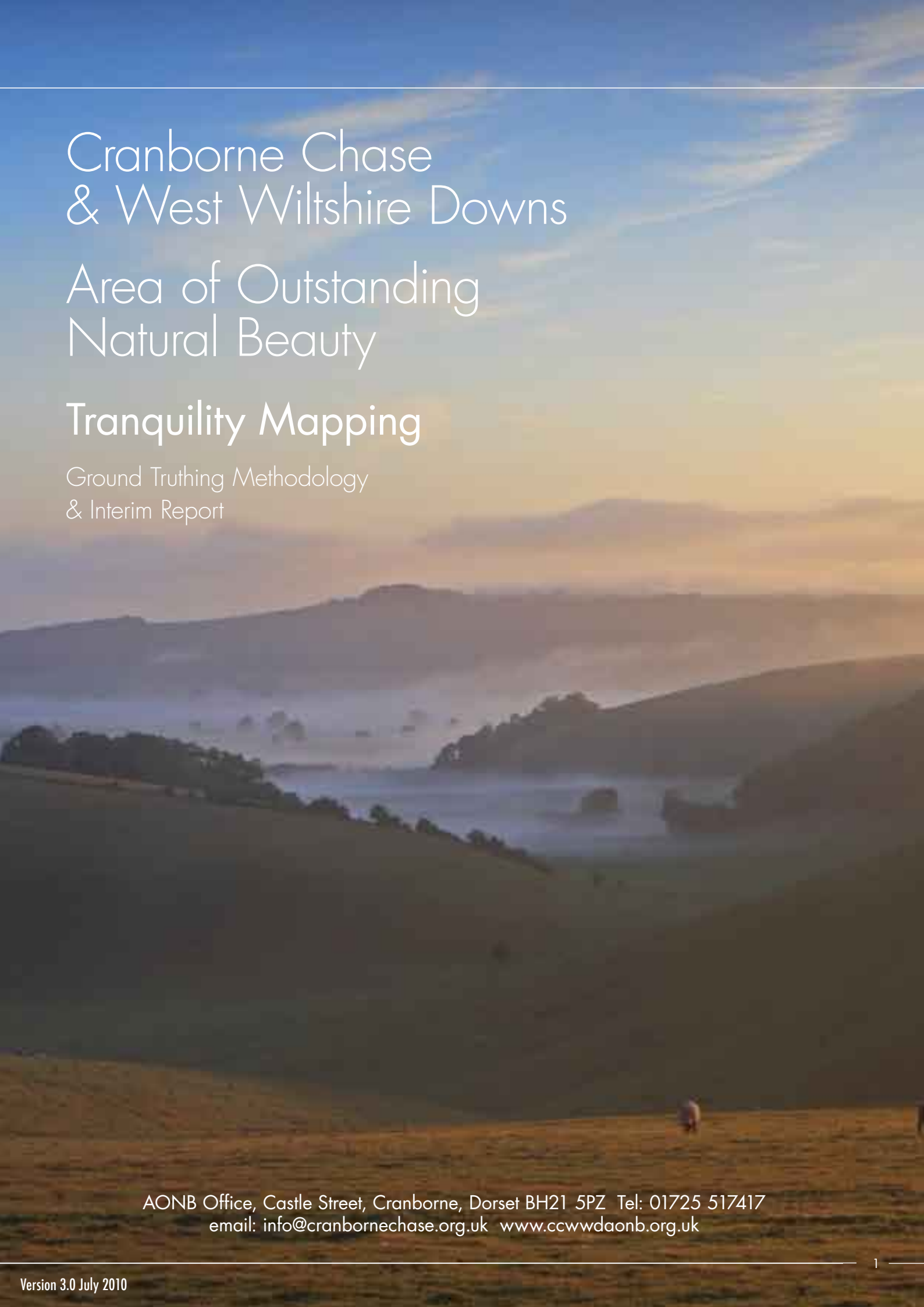
Cranborne Chase & West Wiltshire Downs Area of Outstanding Natural Beauty

Tranquility Mapping

Ground Truthing Methodology
& Interim Report



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1. Preface

The Cranborne Chase and West Wiltshire Downs Area of Outstanding Natural Beauty (AONB) was designated with the purpose of 'Conserving and Enhancing Natural Beauty'. It covers 983 sq km and stretches across parts of four counties. Consultations during the processes of preparing and reviewing the AONB Management Plans (2004–2009; 2009–2014) have indicated that tranquillity is a key attribute of this AONB.

In order to facilitate and encourage actions and activities that sustain and enhance tranquillity, it is first necessary to understand in greater detail which are the most and least tranquil areas, and why. Furthermore, a greater understanding of the characteristics of locations with intermediate tranquillity may be able to inform proposals to enhance the situation.

1.1 Related Research

In February 2008 the Cranborne Chase and West Wiltshire Downs AONB completed a report entitled 'Tranquillity Mapping - Investigative Study' which was an initial investigation into tranquillity data supplied to the AONB by the University of Northumbria, re-calculated from the national data, and cut to the AONB Boundary. The report was used to gain a better understanding of the methodology behind the tranquillity data at the local level.

The report concluded that:

'A key outcome for any future investigative work must focus on which tranquillity factors we can influence. Comparison of the model data with ground truthing would yield further insights into the robustness of the model, and possible future action.'

This report, therefore, covers the work carried out to compare the supplied tranquillity data with tranquillity data observed from field studies. It also examines possible relationships between tranquillity and landscape character.

Available online at: http://www.ccwwdaonb.org.uk/projects/pub_other.htm

2. Introduction

2.1 The New Tranquillity Map

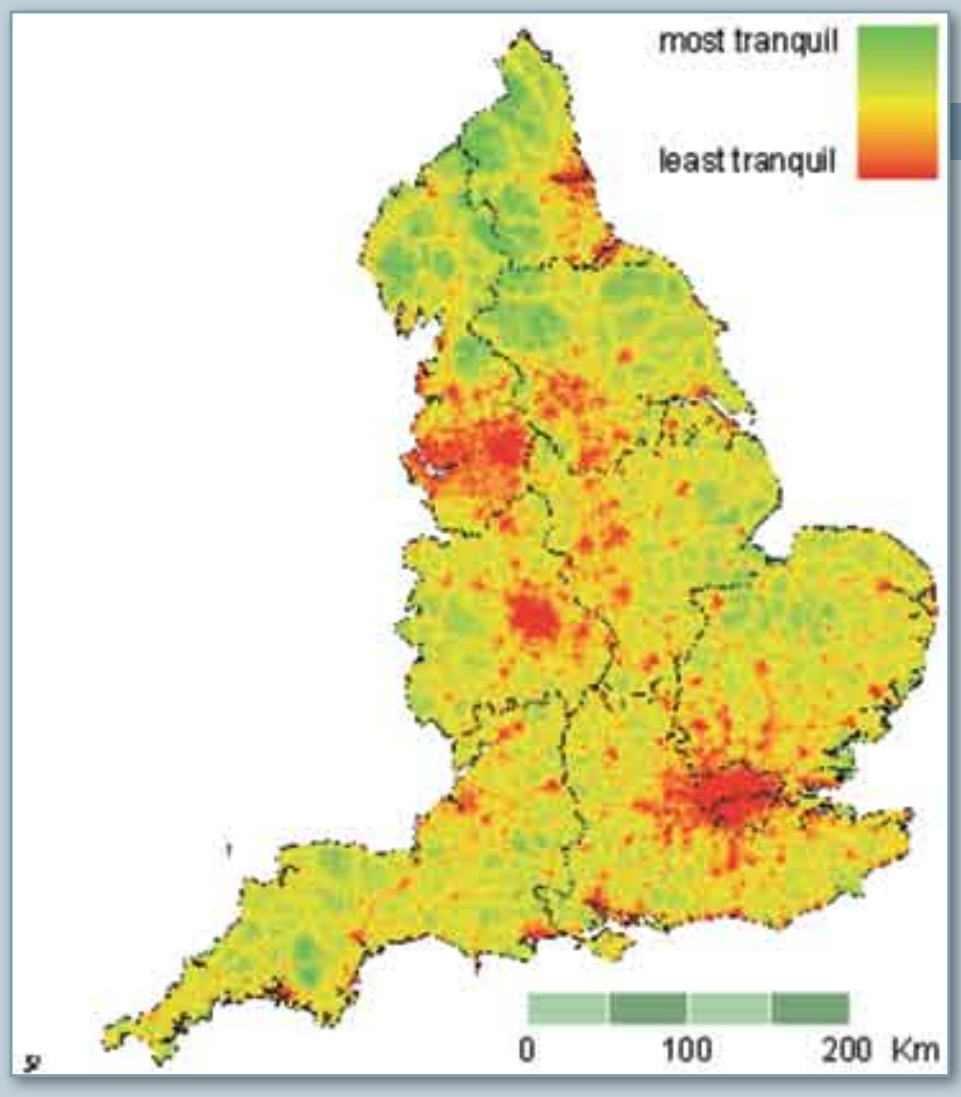


Figure 1 - The New Tranquillity Map

In October 2006 CPRE published its new Tranquillity Map of England. The map is a product of 3 years research by Northumbria and Newcastle Universities. The map derives from extensive research, bringing together surveys of the human experience of tranquillity – and the factors which add to, or detract from it – with desk based analysis of national data on the presence of such factors in the landscape. These measurements have been applied via 500x500m squares covering the land mass of England, and are based upon 'seeing' and 'hearing' factors which contribute to, or detract from, overall tranquillity.

The tranquillity data is broken down into **'what you can see'** and **'what you can hear'.**

Researchers asked more than 1,000 people what they thought tranquillity was, what enhances it and what detracts from it and how important those factors are to them. The 44 factors which emerged from that exercise were used to collate data on the characteristics of each locality – such as its closeness to roads and buildings, how noisy and crowded it is, how near to water and whether it offers views of open countryside.

The 44 factors of **'seeing'** and **'hearing'** factors that contribute positively or negatively to tranquillity are shown in **Figure 2** below, along with the weightings:

ID	Question	Total	% Weighting
a01	Seeing. A natural landscape	533	6.59
a13	Hearing. Birdsong	396	4.90
a17	Hearing. Peace and quiet	271	6.59
a107	Seeing. Natural looking woodland	256	6.59
a12	Seeing. The stars at night	245	6.59
a08	Seeing. Streams	225	6.59
a11	Seeing. The sea	221	6.59
a15	Hearing. Natural sounds	212	6.59
a14	Hearing. Wildlife	183	6.59
a19	Hearing. Running water	180	6.59
a09	Seeing. Rivers	176	6.59
a02	Seeing. Wide open spaces	174	6.59
a03	Seeing. A wild landscape	171	6.59
a05	Seeing. Trees in the landscape	146	6.59
a10	Seeing. Lakes	118	6.59
a04	Seeing. Remote landscapes	113	6.59
a18	Seeing. A natural landscape	109	6.59
a20	Hearing. No human sounds	109	6.59
a21	Hearing. The sea	84	6.59
a06	Seeing. Deciduous trees in the landscape	72	6.59
a16	Hearing. Silence	47	6.59
	Sub Total	**4041**	**50**
a41	Hearing. Constant noise from cars, lorries and/or motorbikes	886	10.96
a22	Seeing. Lots of people	627	7.76
a30	Seeing. Urban development	373	4.62
a24	Seeing. Overhead light pollution (night time)	270	3.34
a37	Hearing. Lots of people	266	3.29
a25	Seeing. Low flying aircraft	228	2.82
a38	Hearing. Low flying aircraft	225	2.78
a28	Seeing. Power lines	221	2.73
a34	Seeing. Towns and cities	202	2.50
a33	Seeing. Roads	139	1.72
a44	Hearing. Non-natural sounds	107	1.32
a31	Seeing. Any signs of human impact	102	1.26
a36	Seeing. Military training (not aircraft)	101	1.25
a29	Seeing. Wind turbines	88	1.09
a42	Hearing. Occasional noise from cars, lorries and/or motorbikes	44	0.54
a43	Hearing. Military training (not aircraft)	32	0.40
a29	Seeing. Railways	30	0.37
a42	Seeing. High altitude aircraft	25	0.31
a43	Seeing. Anyone at all	24	0.30
a32	Seeing. Coniferous woodland	18	0.22
a22	Hearing. High altitude aircraft	11	0.14
a22	Seeing. Villages and scattered houses	5	0.06

Figure 2 - The 44 factors & weightings

The weightings represent the proportion of the total positive or negative aspects of tranquility assigned from the research, to the individual factors.

2.2 The Tranquillity Map explained

Prior to the 2006 'New' tranquillity map being released, the following bodies carried out a detailed pilot study of tranquillity in the North East in 2004, and a follow-up study in the Chilterns a year later:

- Northumbria University's Centre for Environmental and Spatial Analysis and Participatory Evaluation and Appraisal in Newcastle upon Tyne.
- Newcastle University's Landscape Research Group, in collaboration with Bluespace Environments, Durham.

CPRE's national project has developed and extended this work. It has two main parts. Firstly, the researchers used a nationwide survey to test what tranquillity means to people and their perceptions of what factors were most likely to add to, and to detract from, their sense of experiencing tranquillity when they visited the countryside. Secondly, using a Geographical Information Systems (GIS) model, they associated the survey information with a range of national datasets and took account of topography to create a map showing how likely each locality was to make people feel tranquil.

Table 1 - What tranquillity is – the top 10 survey responses:

Seeing	Hearing
a natural landscape	birdsong
natural looking woodland	peace and quiet
the stars at night	natural sounds
streams	wildlife
the sea	running water

Table 2 - What tranquillity is not – the top 10 survey responses:

Seeing	Hearing
lots of people	constant noise from cars, lorries and/or motorbikes
urban development	lots of people
overhead light pollution	low flying aircraft
low flying aircraft	
power lines	
towns and cities	
roads	

The tranquillity map is made up of many layers of information based on what people say adds to and detracts from tranquillity, weighted according to how important those factors are, and taking into account the country's topography. If you could peel away the layers, you would see maps which show the positive or negative impact on tranquillity of:

- a natural landscape, including woodland
- rivers, streams, lakes and the sea
- birds and other wildlife
- wide open spaces
- cars, motorbikes, trains and aircraft, roads and railways
- light pollution
- towns, cities and villages
- large numbers of people
- pylons, power lines, masts and wind turbines.

2.3 Presenting the findings

The overall tranquillity scores resulting from the weighted model data were plotted on an Ordnance Survey grid by using the 1Km grid and dividing each square into 500x500m squares. Each 500x500m square of England has therefore been given a tranquillity score, based on the 44 different factors which add to or detract from people's feelings of tranquillity. These scores have been colour coded – darkest green for those places most likely to make people feel tranquil, brightest red for those least likely. However, it is important to recognise that squares that are the same colour and have the same score may differ markedly in the different 'components' of tranquillity – both positive and negative – which determine their overall score.

3 National Versus Local Tranquillity

3.1 Tranquillity data re-calculated for the AONB

The national tranquillity model identifies, on a relative scale, the tranquillity of each 500x500m square within the national map grid, based on a desk study score. That score is measured from nationally available datasets and compared to other scores within the minimum and maximum range of data values for England. However, local areas of tranquillity, especially in urban fringe areas, may be 'vital sanctuaries' for urban residents and may offer a 'sense of wilderness' relative to their setting. In raw and national terms, they may have a low tranquillity score, but when considered in their local to regional context, they have real significance for a great many people. Such local or regional areas will not, however, be as apparent on a national scale.

In December 2007, the Cranborne Chase and West Wiltshire Downs AONB was sent a spreadsheet with tranquillity scores cut to the AONB boundary. The spreadsheet supplied to the AONB enables the identification of local patterns and trends, which might not be so obvious using data on a national scale.

The methodology used by Northumbria University offers two potential approaches to providing a solution for more localised tranquillity data:

i. a simple cartographic device where only the maximum and minimum data for a region are displayed; this stretches the tranquillity scale and the gradation of tranquillity becomes clearer;
ii. the GIS model can be rerun on a regional basis only; this means raw data for a specific region is used before reclassing on a scale of 0-10.

Generating a tranquillity map on a regionally relative scale is most appropriate for modelling regional tranquillity and, therefore, data option ii was applied to the data cut to the AONB boundary.

3.1.1 How can this new tranquillity data help to protect and enhance the tranquillity of the AONB?

Once it is known what tranquillity means to people, and there is an effective way to measure it, we can create policies and take decisions to protect and enhance tranquillity. We can also confidently monitor how well the policies are working.

Tranquillity is valued, and can be measured, mapped and protected. Sometimes it may even be enhanced. This will not happen through just good will or warm words, but through concerted and effective action. The new methodology is a potentially powerful tool for land use and landscape planning. It has implications for targets, indicators, policies and plans relating to quality of life, countryside quality, landscape strategies, environmental management, spatial development and sustainable development.

The Campaign to Protect Rural England (CPRE) is keen to promote tranquillity data to policy and decision-makers at a national, regional, and at local levels. At the same time as the national data shown in Figure 1 was released, it was also indicated that more specific datasets might be available for certain areas at some point in the future. With support from the South Wiltshire Group of the Wiltshire Branch of CPRE, the AONB sought and obtained the tranquillity dataset for this AONB.

3.1.2 Other useful sources of information

CPRE have produced 'intrusion' maps (September 2007) which show that the area affected by new development stretches far beyond their actual 'footprint'. This shadow of urban growth or new roads or runways means that with 11% of England already urbanised, 50% is seriously disturbed by the sight, noise, and movement of development.

From the 1960s to 1990s the total area of England disturbed by the noise and visual intrusion of roads, urban areas and major infrastructure rose from 26% to 41%. In the past 15 years alone another 9% has been blighted. If this rate of loss continues, much of what remains could all but disappear in the next 80 years.

An opinion poll commissioned by CPRE (YouGov poll, October 2006) shows that 72% of people value the tranquillity of the countryside above other factors.

Appendix 4 CPRE Intrusion map shows the map for England, along with the factors used in its creation. For further information, the Intrusion section on the CPRE website (www.cpre.org.uk) should be consulted.

3.2 What is the Ground Truthing trying to establish?

The Cranborne Chase & West Wiltshire Downs AONB ground truthing project simply aims to enhance the understanding of the tranquillity factors in relation to the specific areas covered by individual squares. Put another way, it seeks to establish how accurately the tranquillity assessments derived remotely from national datasets reflect the actual situations on the ground in this AONB.

The project also seeks to identify ways in which tranquillity in parts of this AONB differs from other parts, and to see if there are any improvements or modifications that can be made to the methodology at a local scale to more accurately reflect tranquillity.

The ground truthing exercise takes into account the fact that the results of the model should not be used without an understanding of the methodology and its caveats. In particular, the figure for each individual 500x500m cell should not be taken and interpreted out of context. This is because two or more cells with the same net value can have different combinations of the 44 potential option choices resulting in the same figure, or raw scores, of tranquillity - i.e. identical scores do not equate to identical environmental factors on the ground.

The Ground Truthing work does not seek to discredit or replace the recorded score supplied to the AONB.

In this report, Recorded data applies to that supplied from Northumbria and Newcastle Universities, and Surveyed data relates to information gathered by AONB Staff and Surveyors.

3.3 Overview of what we did

We:

- Obtained National and AONB 'cut' data.
- Plotted tranquillity scores – converted to colours for both datasets onto GIS maps.
- Undertook visual comparison of topographic maps with tranquillity maps to identify and assess where 'hotspots' of high and low tranquillity occur.
- Devised a simple method for measuring 'On Site' tranquillity.
- Carried out a Pilot Exercise surveying tranquillity and comparing with the recorded AONB data.
- Provided preliminary reports of the Pilot Exercise – 'Ground Truthing' (February 2008).
- Carried out ground truthing fieldwork in all of the Landscape Character Areas of the AONB.
- Carried out analysis and comparison of Ground Truthing data.
- Created this document to report the findings.

4 The Pilot Exercise

Between October 2008 and January 2009, a pilot 'Ground Truthing' exercise was initiated by Harry Bell (GIS Consultant, Jubilee Computing Services Ltd) and Vicki White. The field exercise was carried out by Vicki and a CPRE volunteer. This was extremely useful in providing further insights into the recorded data, and setting up the pro forma for a further, more comprehensive study.

4.1 Survey Locations

The initial pilot work looked at nine different locations (500x500m squares). In order to find out whether the methodology yielded similar results for different people at the same location, four of the sites were surveyed by two different people. This gave a total of thirteen site records.

The locations chosen for the pilot exercise were based on their total tranquillity scores. Tranquillity is measured on a scale where -60 is the maximum negative tranquillity, and +50 is the maximum positive tranquillity score. In Figure 1 (Page 6) showing the 'New Tranquillity Map', the scores closer to -60 are shown as darker red, and the scores closer to + 50 are shown as a deeper shade of green.

Six of the nine sites had tranquillity scores which tended towards the maximum or minimum tranquillity scores, and three of the sites had scores closer to zero. This was done for the pilot exercise as an initial check to make it easier to establish whether the ground truthing surveyed scores were similar to the recorded scores from Northumbria University.

4.2 Results of the pilot exercise

The results of the pilot exercise were useful, with a clear correlation being shown between recorded score and ground truthing (See Appendix 1). It was clear, however, that the ground truthing worked best for those tranquillity scores closer to the extremes of +50 or -60. For these sites it was easier to establish a score because if the site was next to a busy road, this would clearly result in a negative score, and if it was in a remote/quieter area, this would clearly result in a more positive score.

The pilot exercise raised two key questions:

- Whether the weightings applied to individual factors could be improved;
- Could the weightings of the surveyed scores be adjusted to reflect better the trend of the recorded scores for overall tranquillity?

The pilot exercise also highlighted pointers for any further ground-truthing work:

- Further work would require a more detailed and clear description of what each factor means;
- Basic training would enable survey staff to record their findings more effectively.

4.3 Particular issues; weightings applied to individual factors

When the tranquillity scores are calculated, each factor is attributed a weighting score. This weighting is based on the results of the initial Participatory Appraisal (PA) sessions carried out in 2004. The PA findings developed broad, qualitative and more inclusive understanding of what tranquillity is, what it is not, and why it is important. For more information relating to how the weightings were calculated, please see the Tranquillity section on the CPRE website.

Positive Tranquillity: Within the data, two factors came to light as having slightly odd weightings – these were 'Seeing – the stars at night' and 'Hearing - water'. The surveyors reported that it was very difficult in daytime to score whether or not stars would be visible from a certain location. Similarly, they found that unless the water source was particularly large, or you were right next to it, it was difficult to hear.

In the recorded data, seeing the stars at night is given a percentage weighting of 3.03 (fifth highest) and being able to hear water given a percentage weighting of 2.23. These two topics, one not easy to record, and the other only effective over a short distance, can be frequent causes of differences between recorded and surveyed tranquillity scores.

Negative Tranquillity: Again, some factors were listed as being difficult to score – these were 'Seeing – overhead light pollution (night-time)', 3.34 (with the fourth highest weighting factor). Also, it was questioned by the surveyors as to whether seeing coniferous woodland should actually be a negative factor (0.21% weighting).

Further in-depth analysis of the recorded data shows that there are many squares within the AONB to which these particular weightings are applied and may, therefore, contribute to differences between recorded and surveyed scores.

5 Ground Truthing Methodology

5.1 How were the locations chosen?

The pilot exercise indicated that it is easiest to obtain a direct comparison between the tranquillity model and the real world in those areas where tranquillity scores were either very high or very low.

It is more difficult to match up model data with ground truthing scores where the tranquillity scores are closer to zero, on the cusp between positive and negative. However, these scores are in the squares where there is most risk from positive scores dropping into negative scores, and already slightly negative scores dropping further – therefore, these are the most 'at risk' areas.

The ground truthing survey therefore concentrated on these 'at risk' areas.

The chart in Figure 3 shows all of the total tranquillity scores for the AONB. The data was sorted by total tranquillity score, and the curve shows the distribution of the data. It is clear that the AONB has more positive tranquillity squares than negative tranquillity squares, indicated by the greater number of values above the '0' line. Those squares falling within the 'at risk' (+10 to -10 total tranquillity score) area were extracted for use in the study.

Figure 3 - Tranquillity scores – illustrating data range

These squares were then mapped on the GIS. The map in Figure 4 shows all of the squares in the +10 to -10 'total tranquillity score' category, with those squares earmarked for surveying marked in red: *(see over)*

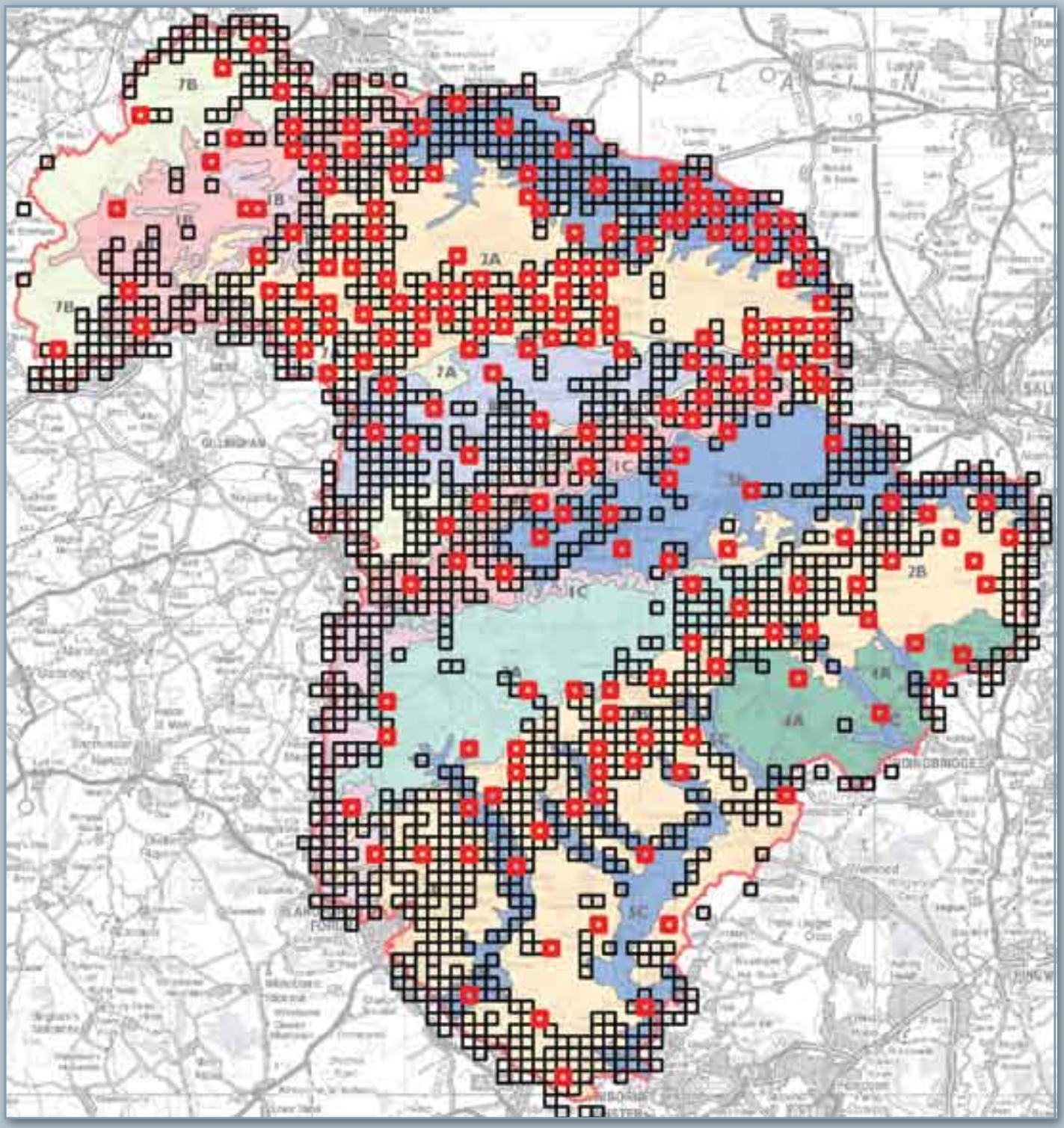


Figure 4 – Survey Squares and Landscape Character Areas

Figure 4 shows the locations of the +10 to -10 total tranquillity squares (black squares) overlaid on top of Landscape Character Areas. The survey locations are shown in red.

5.1.1 Landscape Character Areas

Landscape character is a key attribute of the AONB, so as far as possible, target squares for investigation were selected within each Landscape Character Area. This would help identify whether there is any correlation between tranquillity and particular

Landscape Character Areas. However, as some Landscape Character Areas are associated with high net tranquillity scores, very few 'at risk' squares fall within them. Nevertheless, an attempt was made to spread the ground truthing work as equally as possible across all of the Character Areas.

5.1.2 What was analysed?

In order to enable comparisons with the CPRE Recorded data to be as accurate as possible, the ground truthing survey work investigates the same factors as the original data. These are split into two distinct categories of Positive and Negative factors, as shown in Table 3:

POSITIVE FACTORS	NEGATIVE FACTORS
Seeing	
a Wild Landscape	Urban Development
Remote Landscapes	Towns and Cities
Wide Open Spaces	Villages and Scattered Houses
a Natural Landscape	Roads
Trees in the Landscape	Railways
Deciduous Trees	Power Lines
Natural Looking Woodland	Any Signs of Human Impact
Water	Anyone at All
the Stars at Night	Wind Turbines
	Low Flying Aircraft
	Overhead Pollution
	Coniferous Trees
Hearing	
Water	Occasional Noises from Cars and Lorries
Low Noise Area	Constant Noise from Cars and Lorries
	Railways and Trains
	Low Flying Aircraft
	Non-natural Sounds
	Seeing and Hearing:
	Lots of People
	High Altitude Aircraft

Table 3
– Positive and Negative factors

5.2 Ground Truthing Surveyors

There were five ground truthing surveyors available to carry out the research. This work was carried out between March and April 2009.

5.2.1 Carrying out the research

The surveyors were each asked to assess the tranquillity for a set of squares. Based on a standard 7.5 hour day, it was calculated that it would be possible to visit 12 sites (15-20 mins per site) in a day. This allows for travel time between sites, and input of the data in a spreadsheet on return home.

(See Figure 6 - page 20 for a sample spreadsheet used by the surveyors)

The surveyors were briefed as to the exact requirements for the work, and were also given a pack of instructions and guidance notes. It was stressed how important it was to get as close to the centre of each square as safely as possible (without trespassing on private land), and to try to assess the tranquillity for the square as a whole, and not just the immediate locality. For example, if a surveyor were to park on a road with hedges each side, there might not be any evidence of a 'Natural Landscape'. However, if one was to peer through the hedge, there may be wide ranging natural views.

The allocation of squares also allowed for more than one person to visit some of the squares at different times of the day. This was an experiment to see if there was any significant personal bias between the surveyors, and also if there were any distinct patterns relating to a particular time of day.

The main points to consider were:

- To try and assess the tranquillity of the square from a safe and public place.
- To try and position themselves as to give a good chance for landscape to be viewed - i.e. not behind a hedge.
- To record the start time on the questionnaire.
- To spend 15 minutes at each square in order to get a good feel for the square, recording perceptions of seeing and hearing onto the questionnaire.
- To use the 'guide to tranquillity terminology' helpsheet to assist fully understanding what each factor means.
- To add any additional feeling and/or observations on the sheet.
- To record the leaving time.

A considerable amount of training was given to all of the ground truthing staff before they carried out the surveying. This was highlighted as necessary during the pilot exercise. Although all survey work is, by its nature, subjective, rigorous training means that the data gathered is more reliable as higher levels of standardisation would be employed, thereby minimising score differences based on differences in opinion.

5.3 Ground Truthing – how are locations scored?

The tranquillity scores provided to the AONB office by Northumbria and Newcastle Universities are complex and multi-dimensional, based upon nationally available locational data, modified with weightings derived from extensive public perception studies. These weightings have been used to influence the final survey tranquillity scores.

The Ground Truthing work carried out by the AONB uses a simple 'minimum', 'medium' or 'strong' scoring method, and employs a weighting factor which was developed and refined during the pilot study exercise. The scores were converted to the relevant factor shown in Table 4.

Table 4 - AONB Weighting Factors

Positive Tranquillity:	Negative Tranquillity:
Min = Multiplied by 1.0	Min = Multiplied by 1.5
Med = Multiplied by 1.5	Med = Multiplied by 2.5
Strong = Multiplied by 2.0	Strong = Multiplied by 3.5

We then applied the same weightings to each factor as developed by the initial methodology of Northumbria and Newcastle Universities, and multiplied the 'score' and 'weight' to give a 'final' value.

Example – Tranquillity Square Ref 2078

1. A surveyed result of 'Med' for this square for the factor 'Seeing – wide open spaces' gives a basic score of 1.5.
2. 'Seeing Wide Open Spaces' has a weighting of 2.15 (same weighting as applied to the recorded data).
3. The surveyed score is multiplied by the spreadsheet weighting of 2.15 to give a final weighted score of 3.225.

Figure 5 – Example of Ground Truthing weighting and final score

TRANQUILLITY SQUARE REF:	2078						
POSITIVE FACTORS					*Admin Only*		
	No	Min	Med	Strong	Score	Weight	Final
Seeing a Wild Landscape	1				FALSE	2.12	0
Seeing Remote Landscapes		1			1	1.4	1.4
Seeing Wide Open Spaces			1		1.5	2.15	3.225
Seeing a Natural Landscape			1		1.5	6.59	9.885
Seeing Trees in the Landscape			1		1.5	1.81	2.715

This method of data recording made it quicker for the surveyors to enter their findings, as they only needed to enter a '1' for each factor. This also made the data entry less prone to errors.

Although this is a relatively crude way of determining tranquillity, it allows insights to be gained into the methodological concepts and assumptions made in the recorded data.

The surveyor training, and design of the data entry sheets, encouraged individual surveyor comments, which allowed us to garner further insights into aspects of tranquillity at a local scale.

The final positive and negative tranquillity scores were generated in the 'Final' column. A final tranquillity figure for the surveyed score is calculated by subtracting negative from positive totals. A sample worksheet is shown on page 20.

TRANQUILLITY SQUARE REF:	2078						
POSITIVE FACTORS					*Admin Only*		
	No	**Min**	**Med**	**Strong**	Score	Weight	**Final**
Seeing a Wild Landscape	1				FALSE	2.12	0
Seeing Remote Landscapes		1			1	1.4	1.4
Seeing Wide Open Spaces			1		1.5	2.15	3.225
Seeing a Natural Landscape			1		1.5	6.59	9.885
Seeing Trees in the Landscape			1		1.5	1.81	2.715
Seeing Deciduous Trees				1	2	0.89	1.78
Seeing Natural Looking Woodland	1				FALSE	3.17	0
Seeing Water	1				FALSE	6.42	0
Seeing the Stars at Night	0				FALSE	3.03	0
Hearing Water	1				FALSE	3.58	0
Hearing Low Noise Area				1	2	15.06	30.12
							49.125
							24.563
Seeing Trees in the Landscape	10.479						
Seeing Trees in the Landscape	9.28						

NEGATIVE FACTORS					*Admin Only*		
	No	**Min**	**Med**	**Strong**	Score	Weight	**Final**
Seeing Urban Development			1		2.5	4.62	11.55
Seeing Towns and Cities	1				FALSE	2.5	0
Seeing Villages and Scattered Houses			1		2.5	1.25	3.125
Seeing Roads			1		2.5	1.72	4.3
Seeing Railways	1				FALSE	0.37	0
Seeing Power Lines					1.5	2.73	4.095
Seeing Any Signs of Human Impact			1		2.5	1.26	3.15
Seeing Anyone at All					1.5	0.22	0.33
Seeing Wind Turbines	1				FALSE	1.09	0
Seeing Low Flying Aircraft	1				FALSE	2.82	0
Seeing Overhead Pollution	1				FALSE	3.34	0
Seeing Coniferous Trees					1.5	0.21	0.315
Hearing Occassional Noise from Cars and Lorries			1		2.5	0.54	1.35
Hearing Constant Noise from Cars and Lorries	1				FALSE	10.96	0
Hearing Railways and Trains	1				FALSE	0.3	0
Hearing Low Flying Aircraft	1				FALSE	2.78	0
Hearing Non-natural Sounds	1				FALSE	1.32	0
Seeing and Hearing Lots of People	1				FALSE	11.05	0
Seeing and Hearing High Altitude Aircraft			1		2.5	0.45	1.125
							29.34
							14.083

Figure 6 – Sample whole sheet for Square Ref 2078

In the bottom left hand corner, the Total Ground Truth score (**Surveyed**) is displayed alongside the Total CPRE (**Recorded**) score. This is then automatically fed into the master worksheet, the differences calculated, and a graph to show the scores for each square displayed (see Figure 7).

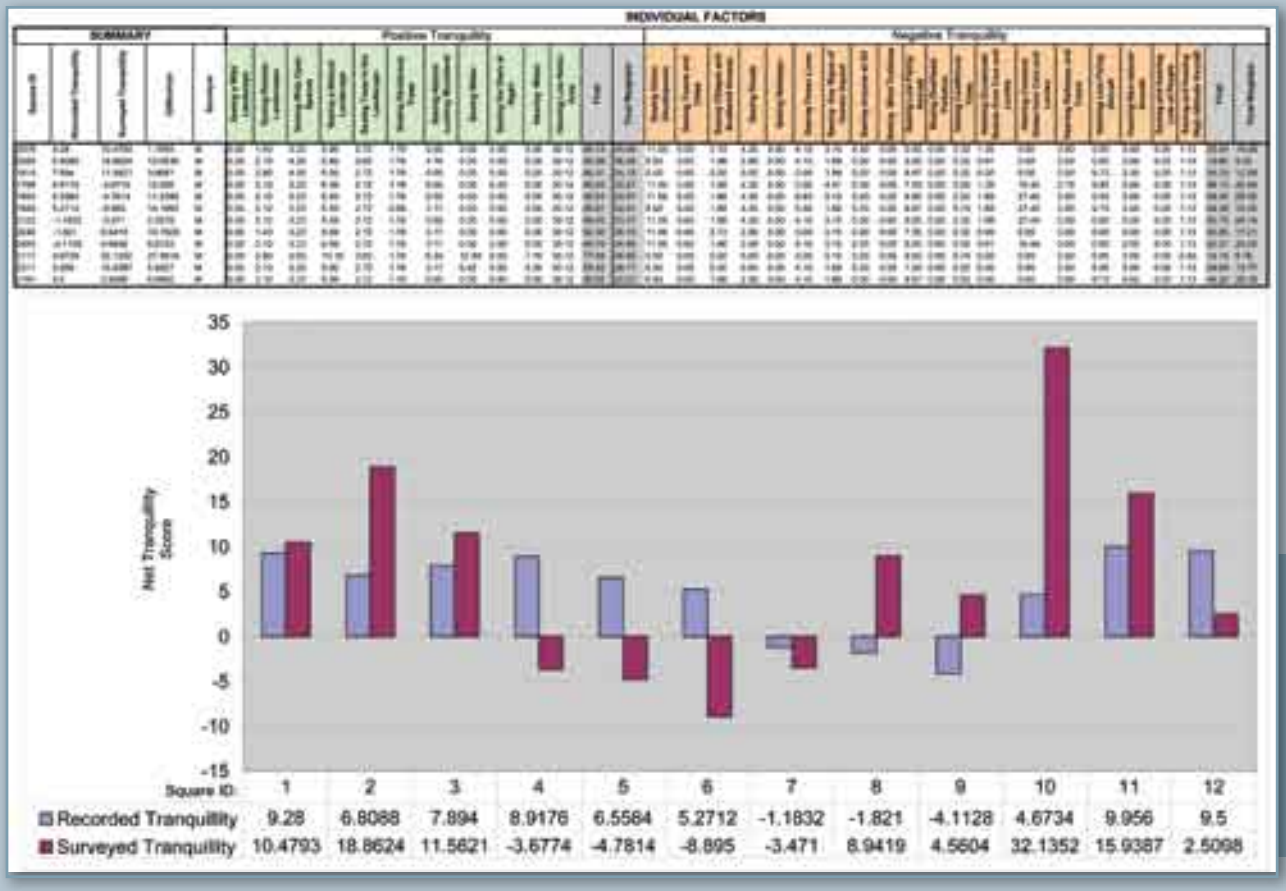


Figure 7 – Master spreadsheet example showing a single day's survey results.

The master spreadsheet showing all twelve sites surveyed by a researcher in one day clearly show the differences between the surveyed (purple) and the recorded (blue) total tranquillity data for each square visited. The square 2078 is the first one in the list – the first column on the left hand side of the chart. It clearly shows the similarities between the surveyed and recorded data.

Square ID 10 is a good example of a greater difference between the surveyed and recorded scores (although they are both positively tranquil).

6 Results and Analysis

Bearing in mind the purpose of the study is to investigate how realistically the nationally derived tranquillity scores reflect the 'on the ground' situations, it was decided to examine three key areas:

1. Individual Factors - Is there a particular individual tranquillity factor which causes the greatest discrepancy between recorded and surveyed?
2. Surveyor Bias - Are there significant differences between surveyor scores?
3. Character Areas - Do the results relate to particular character areas?

In the examination of the major differences between the two scores, it is possible to refer back to the original worksheet to see what contributes to the scores being so different, and whether there are any particular factors which seem to be causing the discrepancies.

6.1 Individual Factors

Square 2152 has been chosen to illustrate differences in surveyed and recorded data as it shows a large difference of 52.8 between the recorded and the surveyed scores.

Table 5 – Square 2152 total tranquillity

FID	Recorded Tranquillity	Surveyed Tranquillity	Difference	Surveyor
2152	7.98	-44.8338	52.8138	K

Tranquillity Factor	Recorded	Surveyed	
Seeing a Wild Landscape	0.00	0	POSITIVE
Seeing Remote Landscapes	9.80	0	
Seeing Wide Open Spaces	2.15	3.225	
Seeing a Natural Landscape	32.95	0	
Seeing Trees in the Landscape	1.81	1.81	
Seeing Deciduous Trees	0.89	0.89	
Seeing Natural Looking Woodland	3.17	0	
Seeing Water	4.96	0	
Seeing the Stars at Night	30.30	4.545	
Hearing Water	0.00	0	
Hearing Low Noise Area	0.00	0	
Total	86.03	10.47	
Total Weighted	43.02	5.235	
Seeing Urban Development	4.62	0	NEGATIVE
Seeing Towns and Cities	2.5	3.75	
Seeing Villages and Scattered Houses	0	3.125	
Seeing Roads	1.72	4.3	
Seeing Railways	0	0	
Seeing Power Lines	0	4.095	
Seeing Any Signs of Human Impact	1.26	4.41	
Seeing Anyone at All	0	0.77	
Seeing Wind Turbines	0	0	
Seeing Low Flying Aircraft	0	0	
Seeing Overhead Pollution	0	0	
Seeing Coniferous Trees	0.21	0.315	
Hearing Occasional Noises from Cars and Lorries	2.16	1.89	
Hearing Constant Noise from Cars and Lorries	54.8	38.36	
Hearing Railways and Trains	0.3	0	
Hearing Low Flying Aircraft	2.78	0	
Hearing Non-natural Sounds	2.64	4.62	
Seeing and Hearing Lots of People	0	38.675	
Seeing and Hearing High Altitude Aircraft	0	0	
TOTAL	72.99	104.31	
TOTAL WEIGHTED	35.0352	50.0688	
TOTAL TRANQUILLITY	7.98	-44.8338	
TOTAL DIFFERENCE		52.81	

Table 6 - Square No.2152 – Detailed breakdown of recorded and surveyed data

6.1.1 The recorded data

This square has a positive total tranquillity score of 7.98. For the 'Hearing, constant noise from cars, lorries and/or motorbikes' factor, it received a high score (54.80). However, this high total negative tranquillity score is counterbalanced by very strong positive scores for 'Seeing the stars at night' (30.30) and 'Seeing a natural landscape' (32.95).

6.1.2 The surveyed data

Table 6 shows that square number 2152 exhibits a very high Ground Truthing (surveyed) negative score of minus 44.8. Examination of the detailed surveyed data shows that this is derived mainly from the factors 'Hearing, constant noise from cars, lorries and/or motorbikes' (38.36) and 'Seeing and hearing lots of people (38.675).

6.1.3 What are the possible reasons for these differences?

Investigations into the National Tranquillity model revealed that the 'seeing the stars at night' figure is based on skyglow. This is defined as the brightness of the night sky as a function of distance from varying sizes of urban areas. An inverse of the dataset was used for 'seeing, the stars at night'.

The 'Seeing a Natural Landscape' figure (Perceived Naturalness) uses the LCS2000 categorisation of land cover. Percentage of each type of vegetation is weighted by multiplying by STA score – a mean of the surrounding scores is also included to take into account context. The data is reliant on classification of vegetation of remotely sensed data at a resolution of 25m by 25m.

(**Source:** *Tranquillity Mapping Short Methodological Report Prepared by the Campaign to Protect Rural England - October 2007)*

If it were not for the high 'Seeing Stars at Night' and 'Seeing a Natural Landscape' scores in the recorded data, the total tranquillity of the square might actually be negative.

On many occasions, the surveyors thought it unlikely that the night stars would be particularly clear, due to street lighting, or lighting from nearby dwellings. They were also only asked to score the likelihood of being able to see stars in the sky (because the survey work was carried out in the daytime).

Further analysis of square 2152, and its location within the AONB, indicates that the 'Seeing a natural landscape' figure might also be too high in the recorded data. The presence of an A Road, and proximity to the village of Coombe Bissett seem to have influenced the surveyed score, making it far lower than the recorded score, despite the presence of permanent grassland on steep slopes, scrub, and narrow tree belts.

6.1.4 Geographical Analysis

Figure 8 shows the map detail, and is the Ordnance Survey Mastermap map data for square 2152.

The square shows several buildings, a small road and track. The Ordnance Survey land classifications also show mainly nonconiferous trees and scrub.

Figure 8
OS Mastermap Square 2152 - Detail

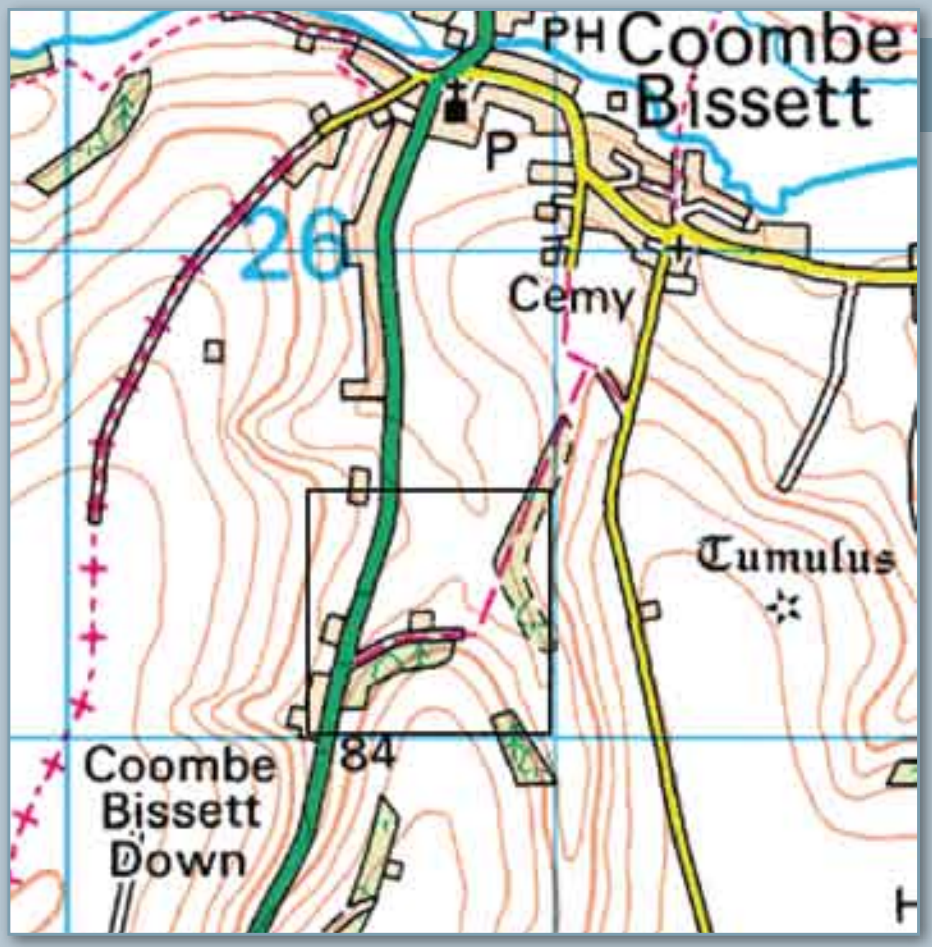


Figure 9 – OS 1:50,000 Square 2152 - Context

The 1:50,000 OS map left shows the square in relation to the nearby village of Coombe Bissett:

The 1:50,000 map clearly shows the impact of the A354 (green road line) and also the proximity of the smaller B road. These features clearly have an influence on the 'Seeing a natural landscape' score registered by surveyors.

6.2 Is there any particular surveyor bias affecting the results?

The survey results were examined to see if there is significant surveyor bias towards either unduly positive or unduly negative survey scores. The differences in surveyed and recorded scores, therefore, were examined to see if any surveyor was scoring either particularly high, or low.

Table 7 shows the surveyor initials in the left hand column. The total tranquillity 'points' figure for the recorded and surveyed scores was used, with the count showing the number of occurrences. Two categories were chosen for comparison purposes - a difference of 10 or more points, and a difference of 15 or more points.

The count figures were derived from the number of times the differences between the recorded and surveyed scores were greater than 10 points, and the number of times the differences were greater than 15 points.

The last two columns show the percentage of sites visited for each surveyor in each category.

Table 7 - Summary of differences between surveyed and recorded total tranquillity scores

Surveyor	Total Sites Surveyed	Count where difference greater than 10	Count where difference greater than 15	% Gtr or less than 10	% Gtr or less than 15
A	46	24	12	52%	26%
M	96	39	23	41%	24%
K	11	8	5	73%	45%
S	24	10	7	42%	29%

6.2.1 Interpretation of results

The chart shows that, on average, surveyors varied by more than 10 tranquillity points on 50% of their squares, and where the differences were 15 or greater, approximately 25% of the squares.

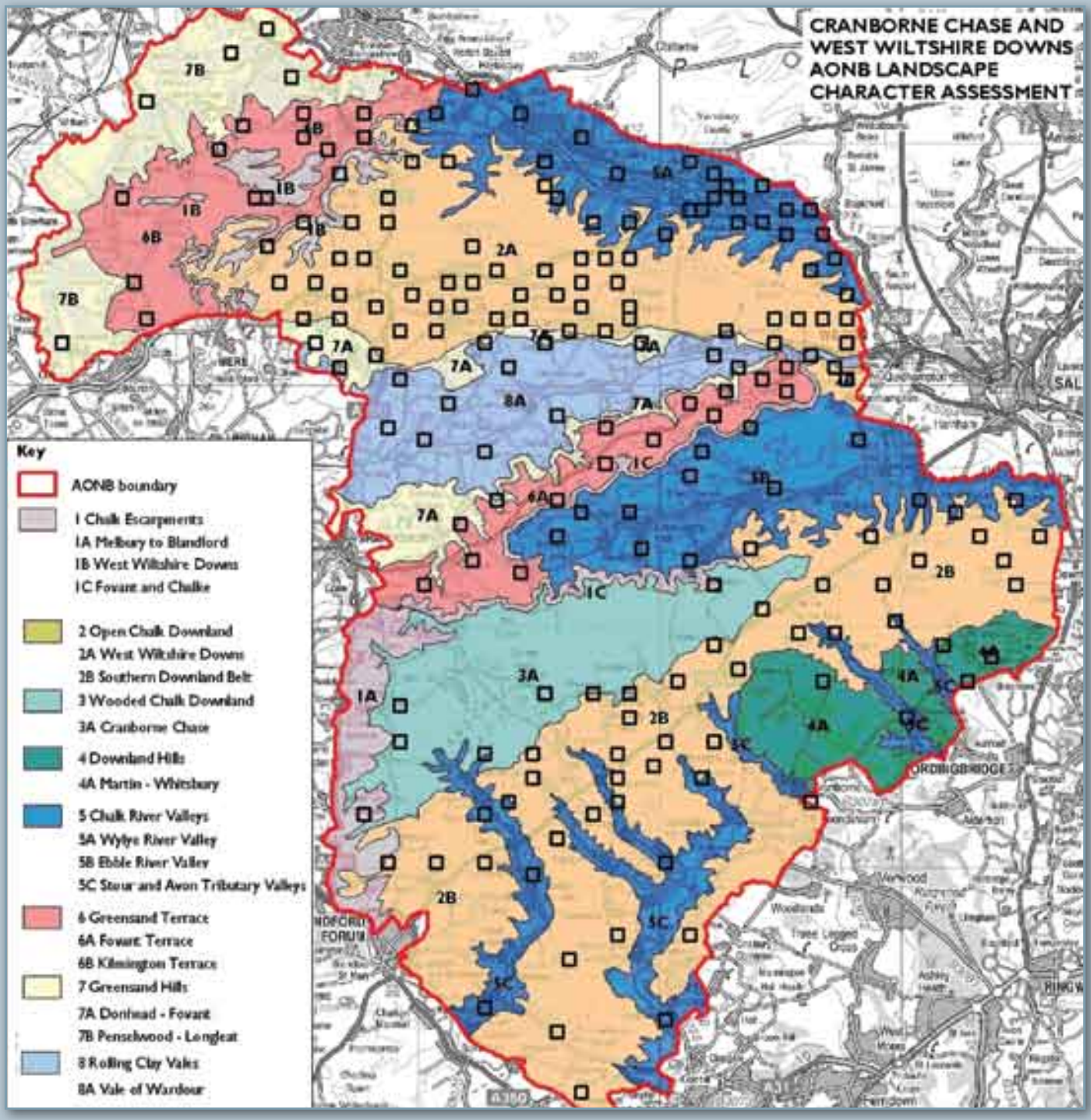
The variations are significantly similar for each surveyor. Surveyor 'K' (fewest number of sites surveyed) shows the largest difference between the surveyed and recorded data with 73% of squares surveyed having a difference of 10 or more, and 45% of squares having a difference of 15 or more.

6.3 Do the results relate to particular Landscape Character Areas?

In 1995 and 2003 the Countryside Agency commissioned landscape assessments of the AONB. These were undertaken by Land Use Consultants.

The Landscape Character Areas are shown on Page 27, along with the survey squares (squares falling in the +10 to -10 category). By grouping the survey results by Character Area, it should be possible to see if there are significant differences between character areas. This can then be compared against the original data received from CPRE.

Figure 10 – Landscape Character Map with survey squares shown



6.3.1 TYPE 1: CHALK ESCARPMENTS – 5% of AONB

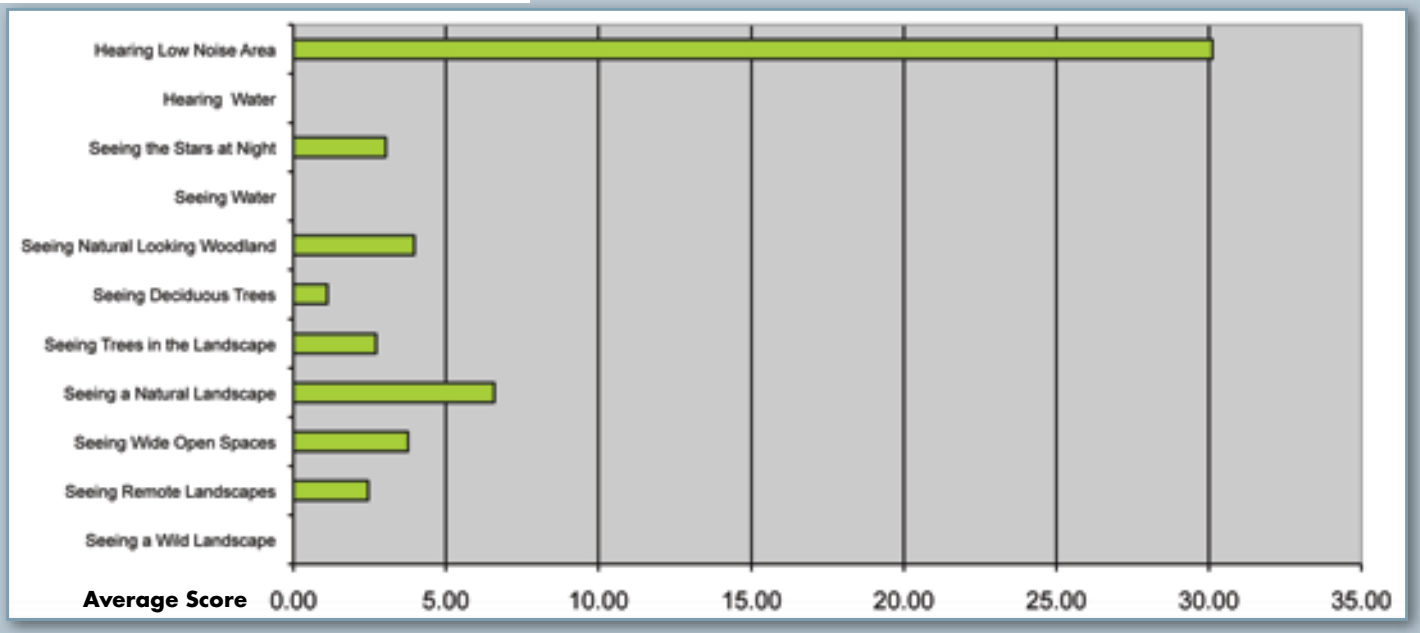
Brief Description

The escarpments are amongst the most dramatic elements of the chalk landscape. These are large scale landscapes with repeating patterns of rounded spurs and deep combes. The scarps frequently support internationally important nature conservation sites and ancient field systems - dramatic features of the landscape still visible today. Recreational opportunities are mainly limited to public footpaths, although the scarps contain large areas of 'Open Country'.

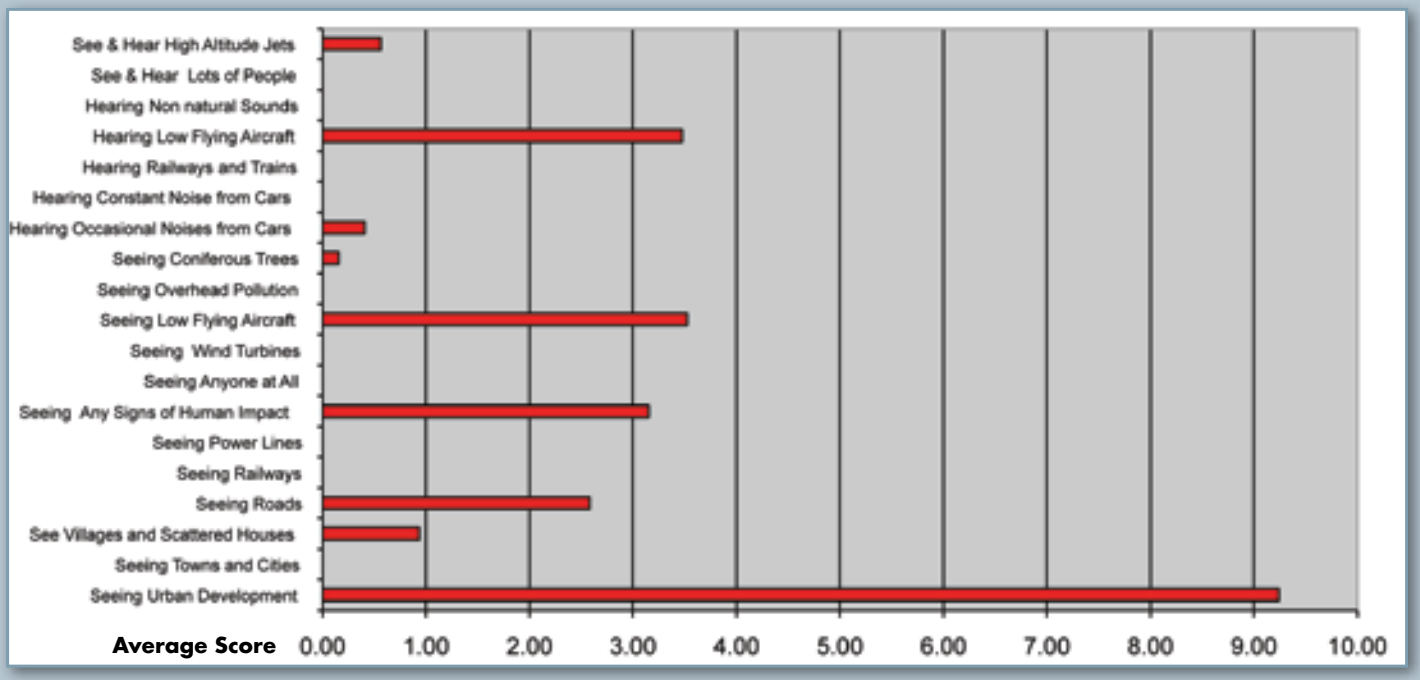
Key Characteristics

- Dramatic chalk escarpments eroded into rounded spurs and deep combes.
- Underlying geology of Lower, Middle and Upper Chalk giving rise to the predominantly calcareous soils.
- Areas of unimproved chalk grassland of international importance on steeper slopes.
- Field systems on the lower slopes, strip lynchets close to Medieval villages sited along the springline.
- Improved pasture and arable fields occupy the shallower, more accessible, slopes where straight-sided fields represent late 18th/early 19th century Parliamentary inclosure.
- Hanging woodland and sunken lanes are features of the steep, enclosing chalk combes.
- Panoramic views over adjacent landscapes.

Survey Results - Positive Tranquillity (1 Chalk Escarpments)



Survey Results - Negative Tranquillity (1 Chalk Escarpments)



6.3.2 TYPE 2: OPEN CHALK DOWNLAND – 36% of AONB

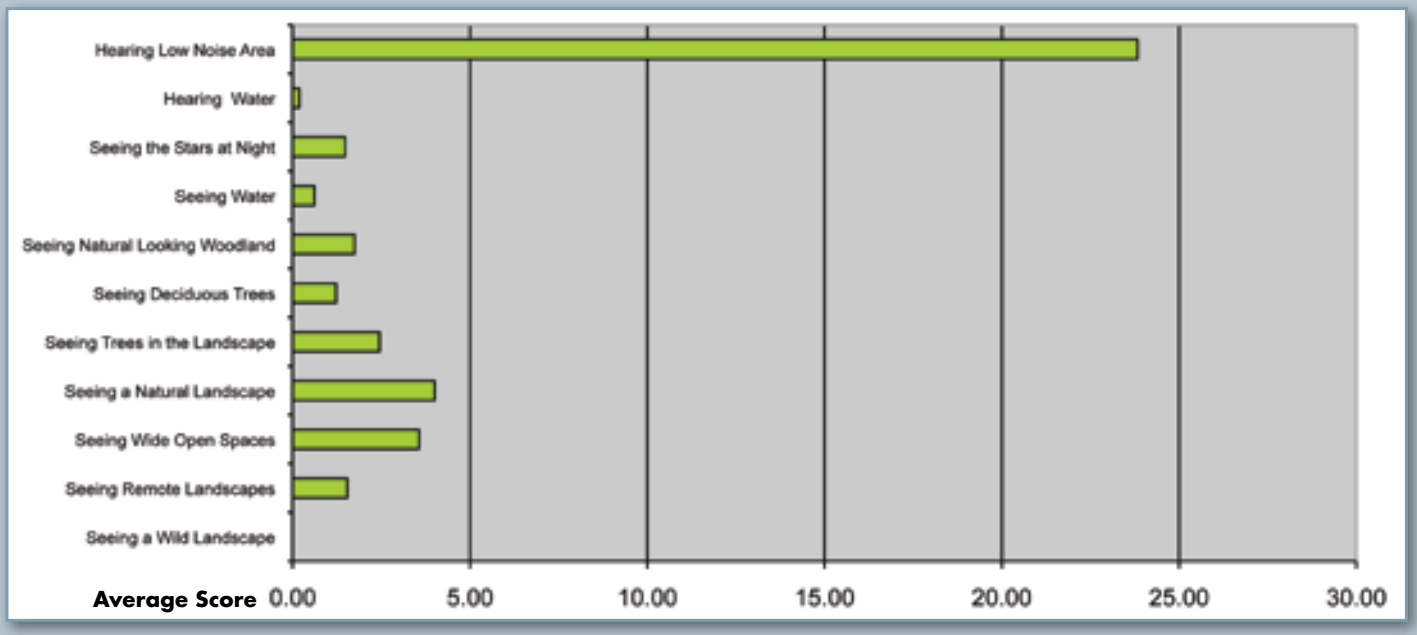
Description

Two large tracts of open chalk downland, divided by the Vale of Wardour, account for a large proportion of the AONB area. The chalk downs have a much more subdued landform of gently rolling spurs and dry valleys. Only where these valleys come close to an escarpment do they deepen to create convoluted, dividing valley systems. These uninterrupted rolling hills and gentle slopes give a real sense of openness. The land is now predominantly under arable fields but with areas of chalk grassland surviving. Open Chalk Downland occurs in two extensive areas making it the most significant landscape type in terms of area covered.

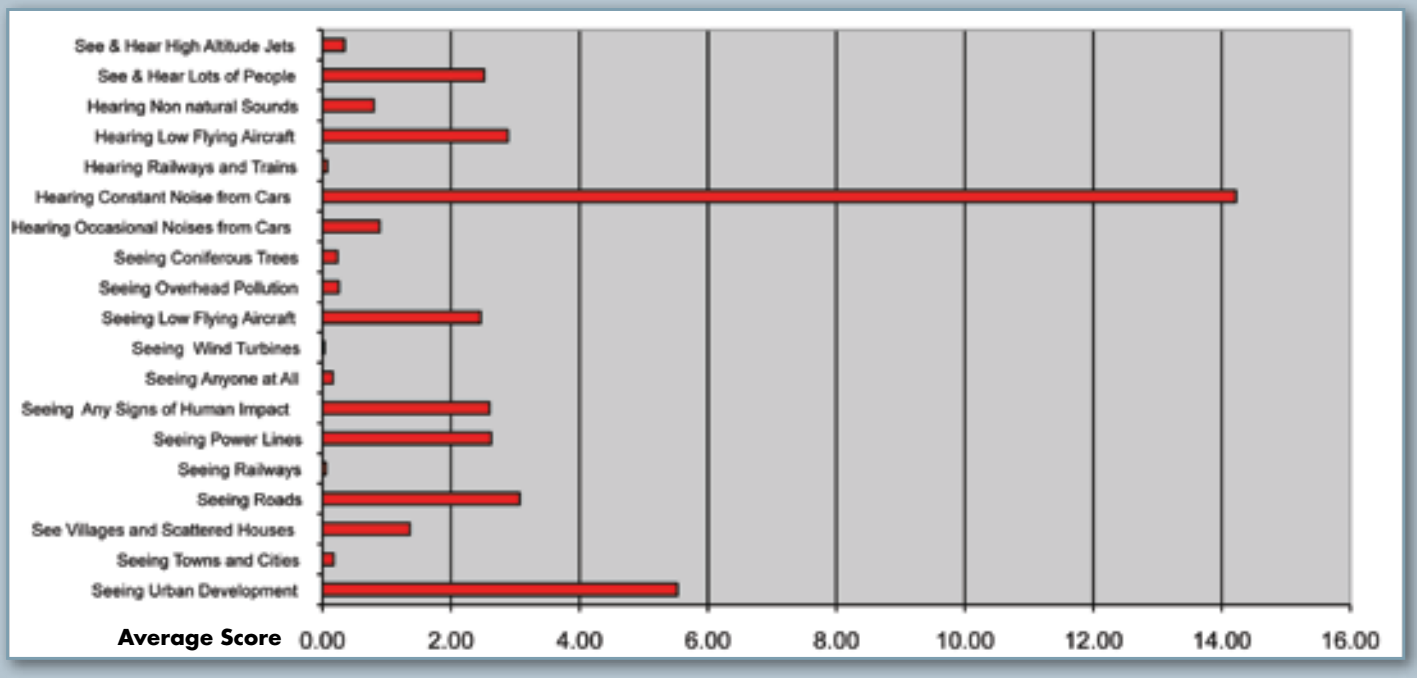
Key Characteristics

- Large-scale landform of broad rolling hills intercepted by a dry river valley.
- Dominated by an Upper Chalk surface geology with drift clay with flints capping on higher ground.
- A predominantly arable landscape divided into large, regular field units with straight-sided fields representing late 18th/early 19th century Parliamentary inclosure.
- Remnant chalk grassland, ancient broadleaved woodland and Yew woodland are important habitats.
- Main roads cut across the undulating landscape linking major settlements on either side of the AONB.
- Large open skies and distant panoramic views.
- Low density scattered settlement of farmsteads and the occasional downland village.
- Numerous Neolithic burial and ritual monuments and Bronze Age barrows.
- Later prehistoric and Romano-British ditches and defensive earthworks.

Survey Results - Positive Tranquillity (2 Open Chalk Downland)



Survey Results - Negative Tranquillity (2 Open Chalk Downland)



6.3.3 TYPE 3: WOODED CHALK DOWNLAND – 8% of AONB

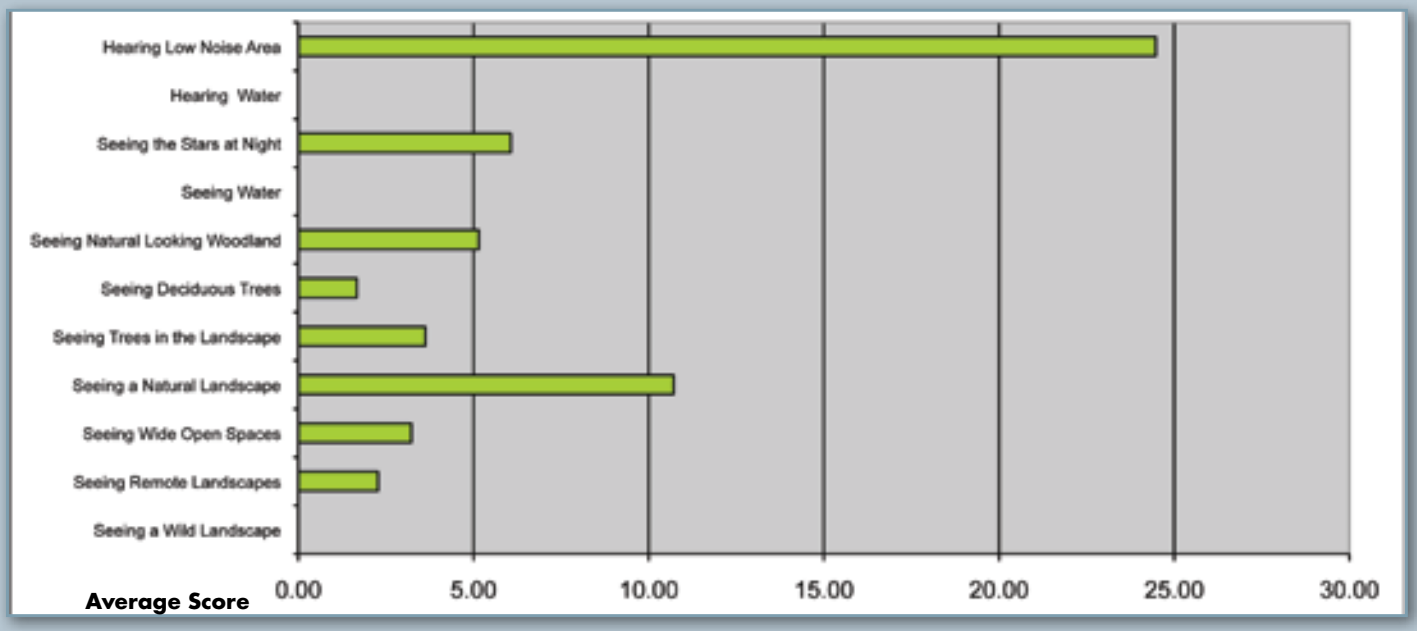
Description

The wooded chalk downland landscape type is similar to the open chalk downland landscape type in terms of its underlying geology, elevation, hydrology and early history. The most distinguishing feature is its woodland cover which is present in the form of large woods, shelter belts, copses, and clumps creating a series of enclosed spaces or 'rooms' surrounded by trees. This creates a downland mosaic of woodland, grassland and arable land that wraps around the steeply undulating landscape of upstanding chalk ridges and deeply incised combes.

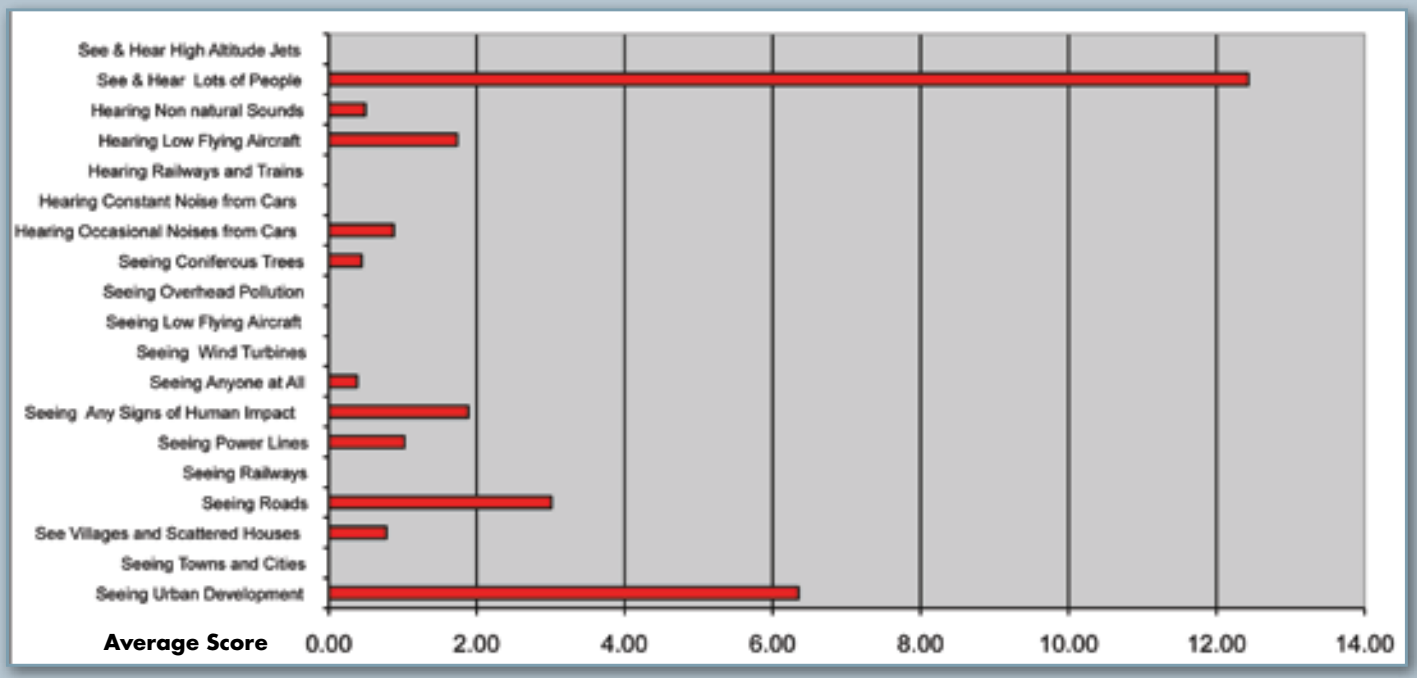
Key Characteristics

- An elevated downland landscape with dramatic intersecting combe valleys and rounded upstanding ridges.
- Dominated by an Upper Chalk surface geology with drift clay with flints capping higher ground.
- A well wooded landscape with large woods, shelter belts, copses, and clumps creating a series of enclosed spaces or 'rooms' surrounded by trees.
- Mosaic of unenclosed downland, improved grassland and arable fields, dating from 19th century inclosure, between the woodland.
- Chalk grassland and ancient woodland provide important nature conservation habitats.
- Typically low density, scattered settlement of individual farmsteads with the occasional downland village or Medieval hunting lodge.
- Visible archaeological features including Neolithic long barrows, Bronze Age round barrows, prehistoric to Romano-British earthworks and field systems.
- Panoramic views from upstanding chalk ridges to adjacent ridges and into valleys/combes.

Survey Results - Positive Tranquillity 3 Wooded Chalk Downland



Survey Results - Negative Tranquillity 3 Wooded Chalk Downland



6.3.4 TYPE 4: DOWNLAND HILLS – 4.5% of AONB

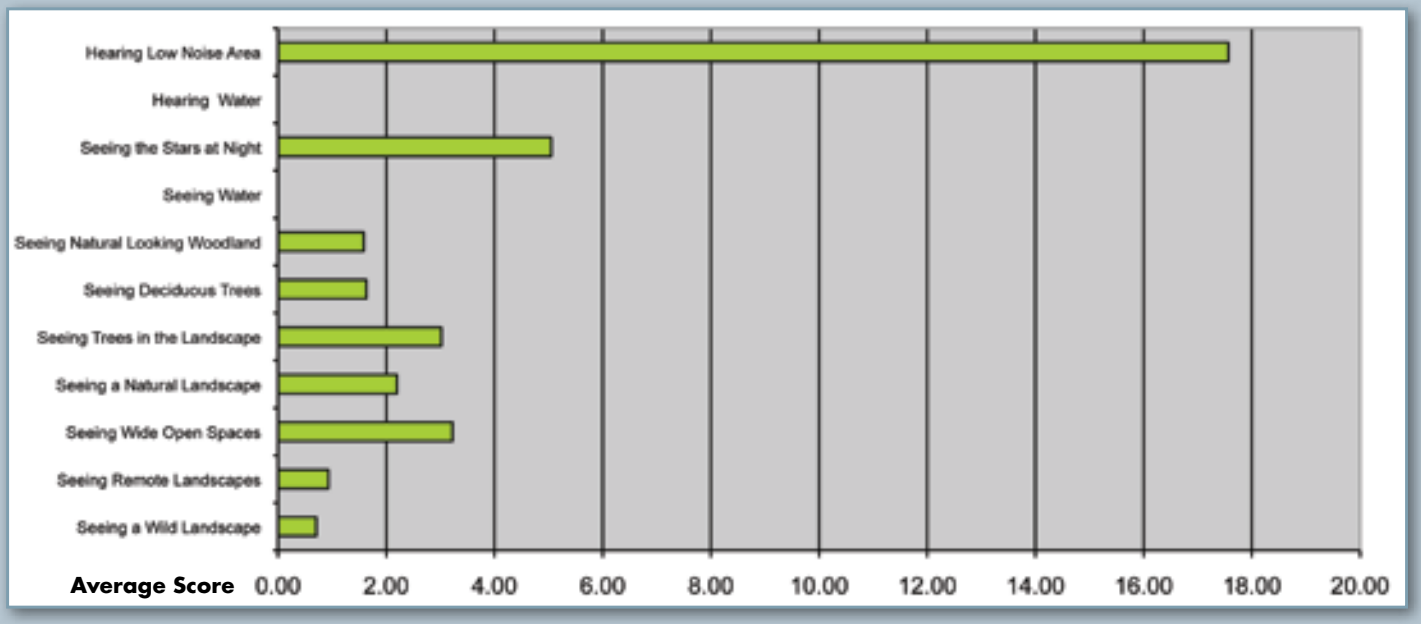
Description

The Downland Hills are formed from the dissected remnants of an older chalk escarpment. The rivers which once drained the chalk dipslope of the AONB have cut through eroding the remnants of the escarpment into a series of rounded bluffs. These appear as a series of low ridges that stand out from the surrounding downland. The ploughed slopes and enlarged fields create a vast patchwork of arable land with isolated remnants of chalk grassland and ancient semi-natural woodland.

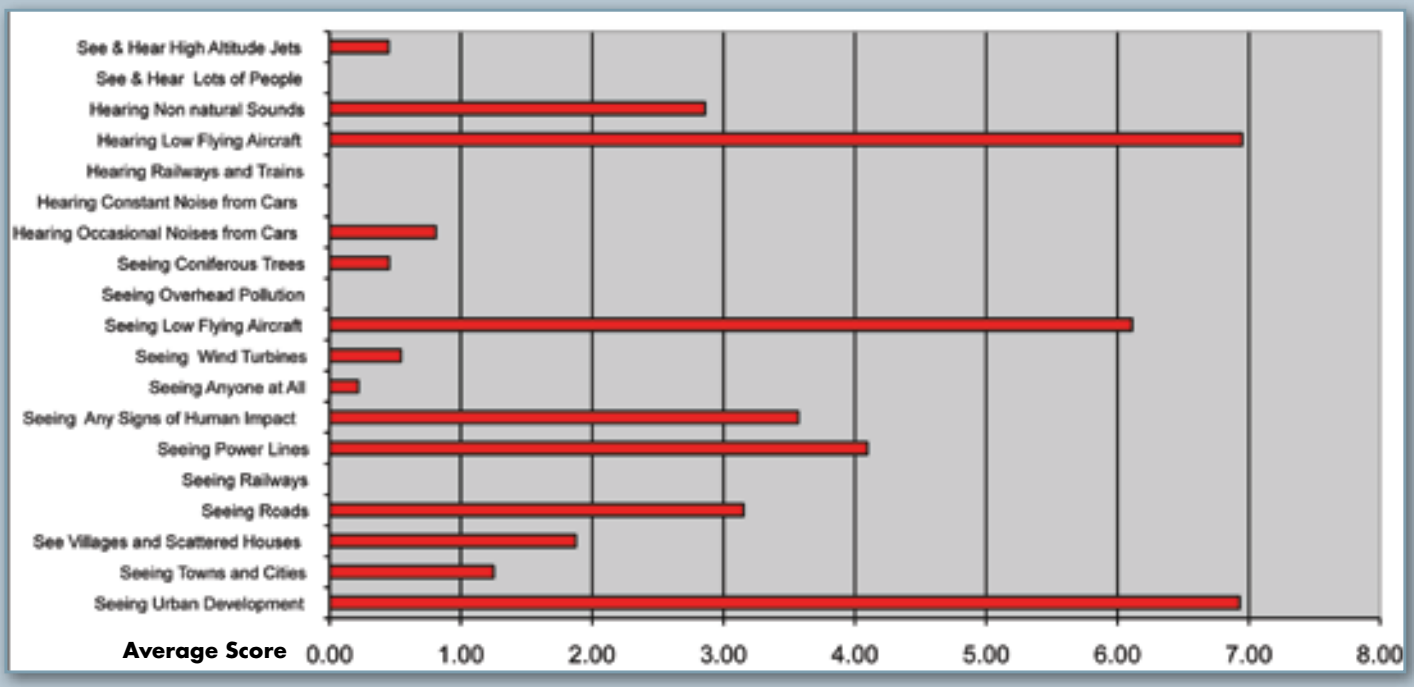
Key Characteristics

- A series of prominent knolls and hills.
- Dominated by an Upper Chalk surface geology giving rise to argyllic brown earths.
- Land cover is predominantly arable, with improved pasture on lower ground towards the River Valleys.
- Dominated by a pattern of medium to large Parliamentary type fields.
- Deciduous and coniferous woodland silhouette against the skyline, clothing the crests of the slopes.
- Low density, dispersed settlement pattern of scattered farmsteads.
- The absence of major roads contributes to the feeling of remoteness.
- A number of ancient woodlands including Burwood, Ashwood Copse and Boulsbury Wood (SSSI).
- Neolithic and Bronze Age burial monuments, prehistoric and Romano-British enclosures, settlements, field systems and linear boundaries and hillforts contribute to the plethora of visible historic features of the landscape.
- Panoramic views from hill tops.

Survey Results - Positive Tranquillity Downland Hills



Survey Results - Negative Tranquillity Downland Hills



6.3.5 TYPE 5: CHALK RIVER VALLEYS – 20% of AONB

Description

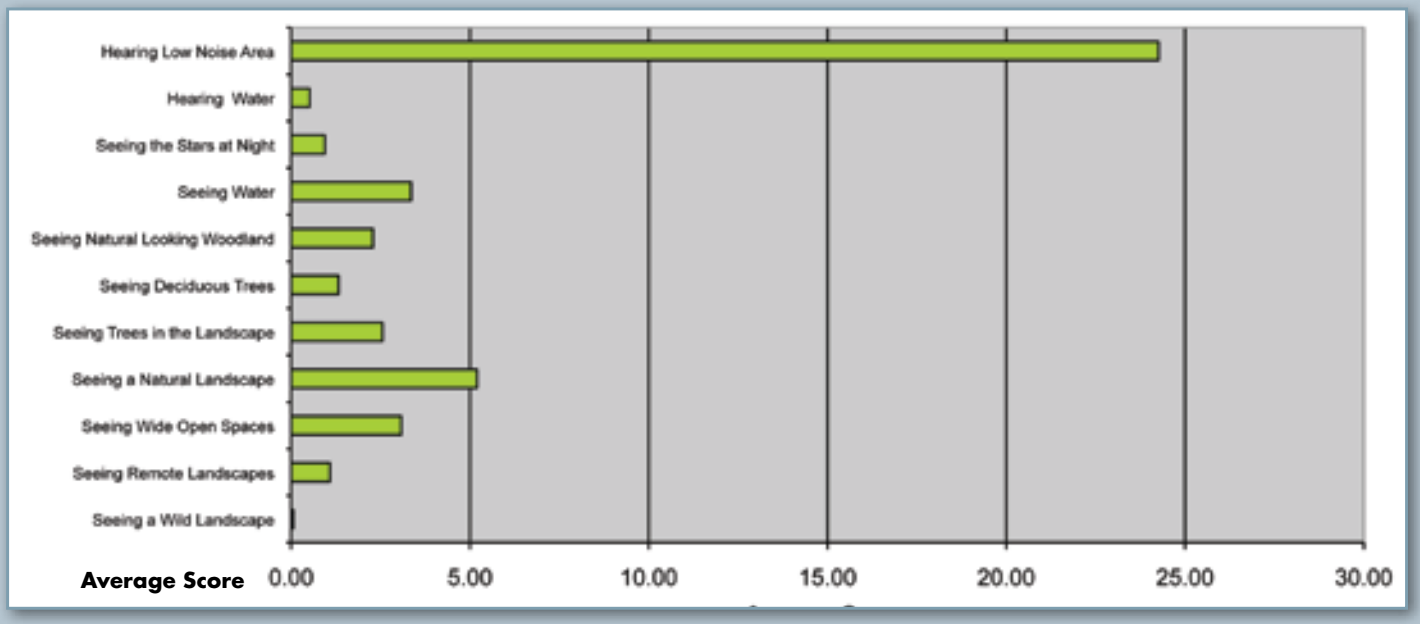
The river valleys are a key element of the landscape. Villages tend to be concentrated in these valleys, sited at the springline, just above the water meadows and floodplain.

In physical terms, these valleys can be divided into the river valleys - such valleys tend to flow 'across' the chalk landform, from west to east, and those which drain the dipslope of the chalk, tending to flow 'down' the landform, from north to south.

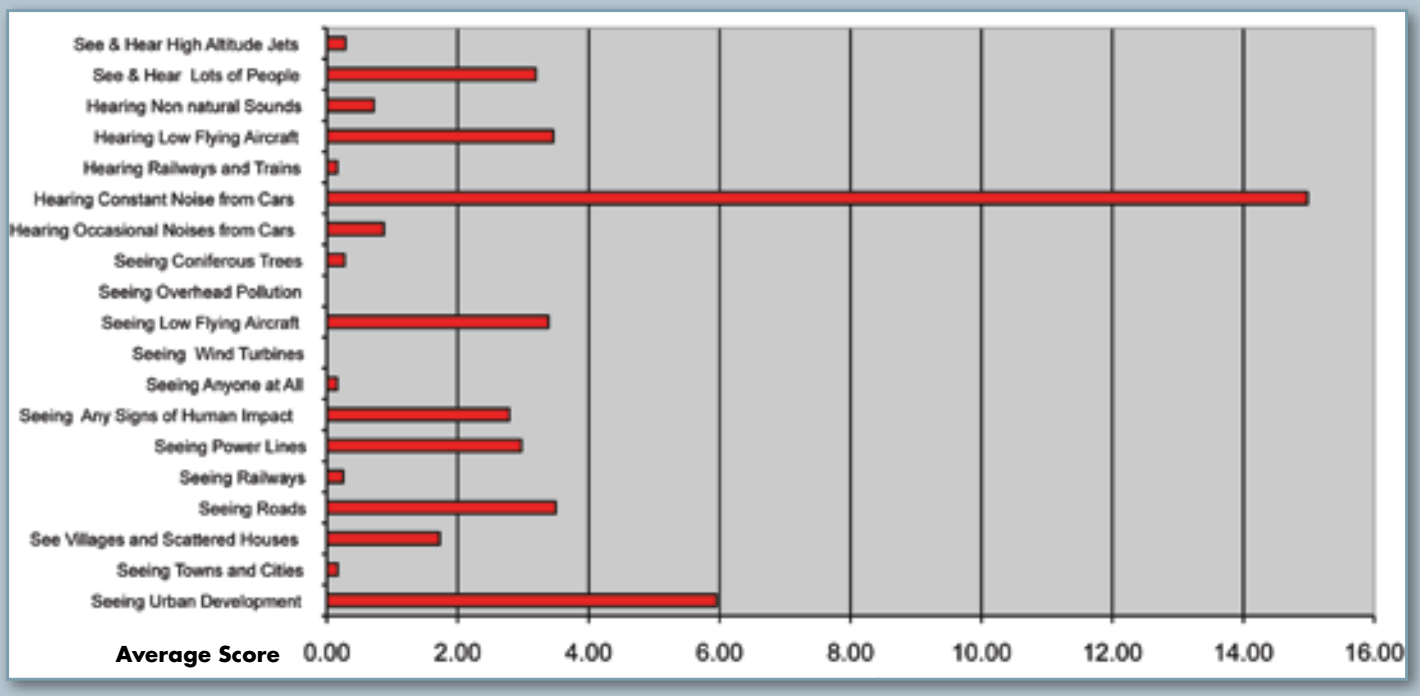
Key Characteristics

- Strongly enclosing valley sides, frequently eroded to form dry tributary valleys.
- The steepest valley slopes have retained their semi-natural chalk grassland or are clothed in 'hanging' woodland while the shallow valley sides have been exploited for arable cultivation.
- The clear fast flowing chalk rivers and streams are a key habitat.
- The floodplains support watermeadows, cress beds and damp pastures.
- The valleys typically provide convenient transport corridors, containing major roads and railways.
- Straight-sided fields represent late 18th/early 19th century Parliamentary inclosure, with large scale fields resulting from 20th century boundary loss.
- Field boundaries and footpaths often reflect the tracks, droves and hollow ways that took the livestock to and from the downs in the Medieval period.
- A series of linear springline villages typically lie at the foot of the valley slopes.
- The rural landscapes are sometimes interrupted by the large volumes of traffic that use the valleys as transport corridors.

Survey Results - Positive Tranquillity Chalk River Valleys



Survey Results - Negative Tranquillity Chalk River Valleys



6.3.6 TYPE 6: GREENSAND TERRACE – 9% of AONB

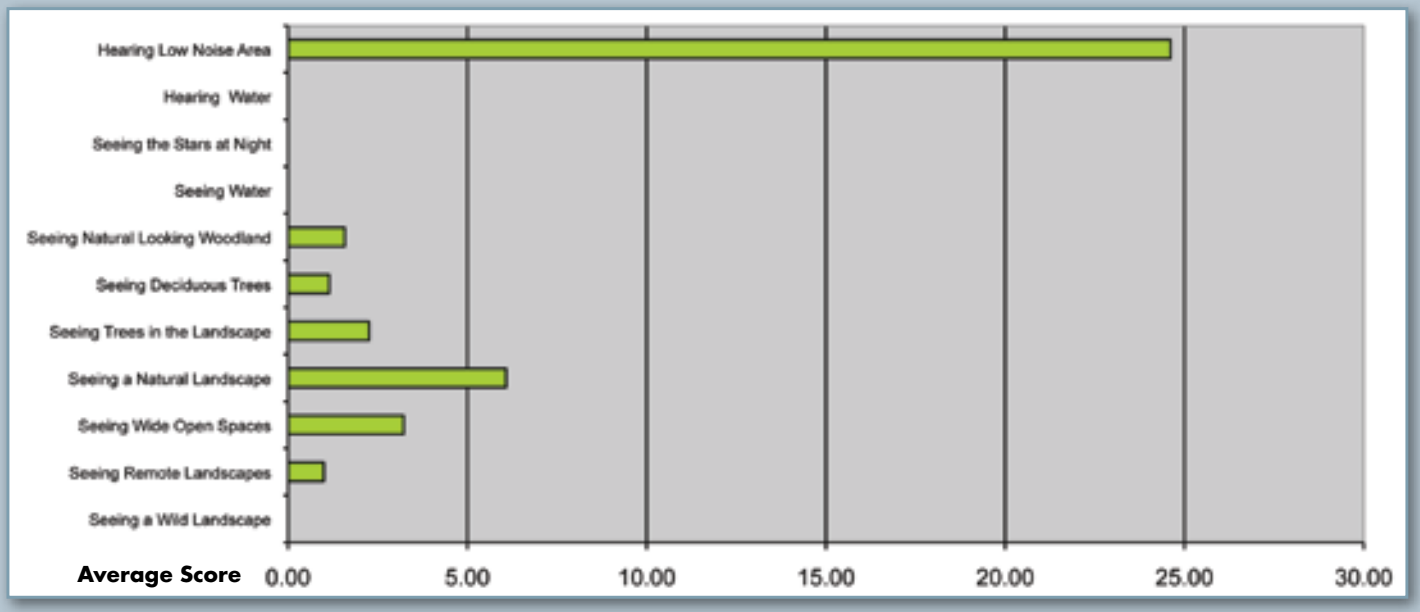
Description

The large rectangular arable fields which dominate the terrace landscapes are characteristic of Parliamentary enclosure of a probable late 18th/early 19th century date. Mixed woodland typically marks the transition and edge of the terrace. Coniferous blocks, planted as game coverts, are typical features of the terrace landscape and low density, scattered farmsteads characterise settlement and built character.

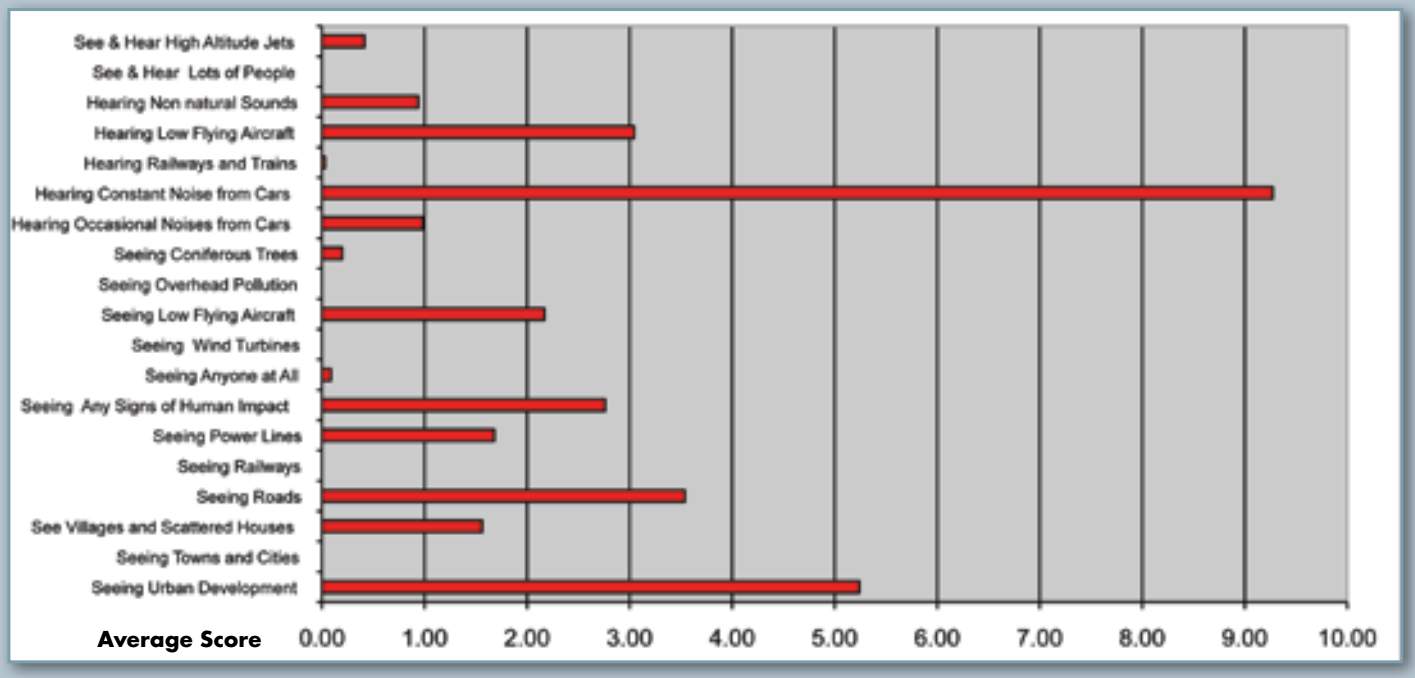
Key Characteristics

- Flat aprons of land from which the dramatic chalk escarpments and hills rise.
- Dominated by arable fields of Parliamentary enclosure.
- Large geometric fields and open skies contrast with the smaller scale, enclosed landscape of the adjacent Greensand Hills.
- Upper Greensand geology giving rise to rich brown earth soils that have a high agricultural value.
- Land use is predominantly agricultural, including cereal cropping, grass rotations, dairy farming and stock rearing.
- Mixed woodland runs in discontinuous belts along the base of the chalk escarpment.
- Coniferous belts shelter dispersed farmsteads.
- General absence of prehistoric earthworks.

Survey Results - Positive Tranquillity Greensand Terrace



Survey Results - Negative Tranquillity Greensand Terrace



6.3.7 TYPE 7: GREENSAND HILLS – 10% of AONB

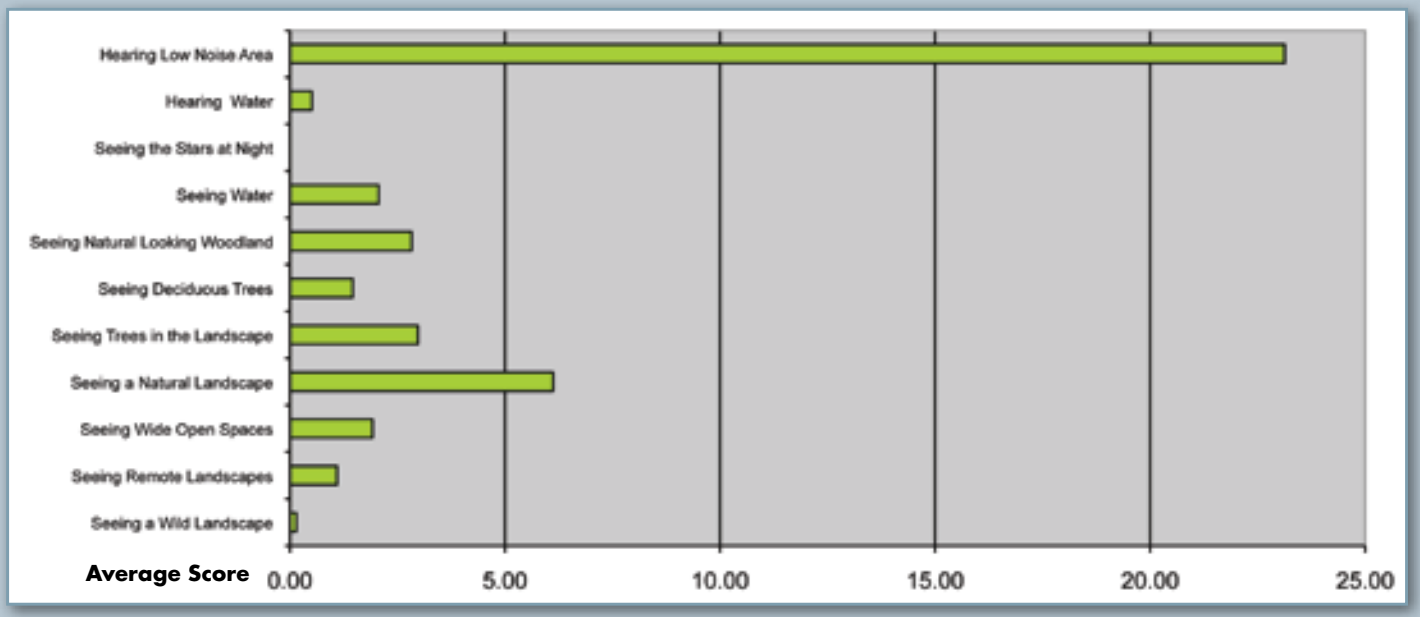
Description

These hills are characterised by tight valleys, sunken lanes and are typically covered in woodland. The patterns of settlement are also distinctive. Villages are hidden among these hills, focused on the springline at the junction of the Chalk and Greensand, tucked into the valleys. The hills have historically provided desirable locations for siting large houses and parklands as well as providing strategic sites for fortified settlements and buildings where they have commanding views over the adjacent lowlands. Views vary between enclosed and framed to open and panoramic.

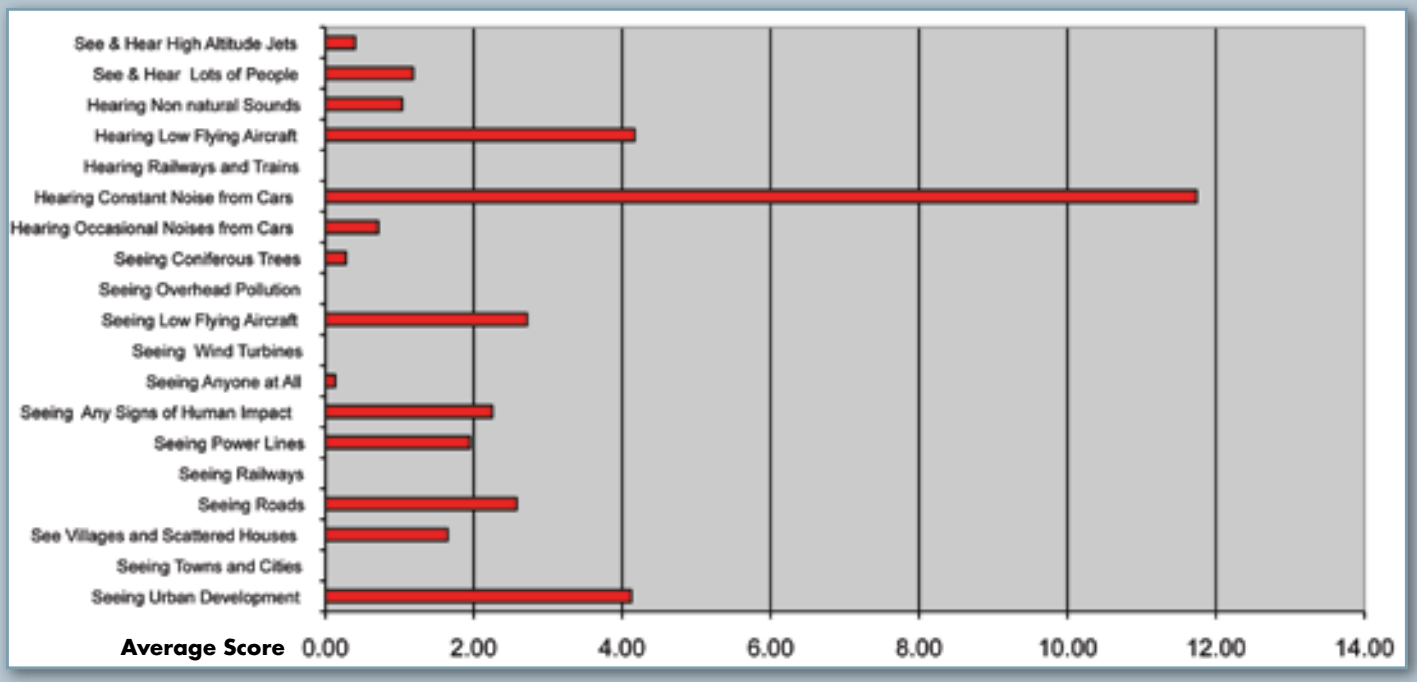
Key Characteristics

- Upper Greensand is exposed as a band between the older clays and younger chalk.
- The Greensand typically forms upstanding hills that have been eroded by tributaries of the major rivers into a series of rounded knolls and deep valleys.
- Hills support a large proportion of woodland, both deciduous and coniferous.
- Country houses and estates, set within landscaped parkland, contribute to the scenic beauty of the area.
- Distinctive patterns of settlement include villages hidden in the shelter of the deep valleys.
- Fortifications are strategically located on the hill tops.
- Ancient sunken lanes wind their way through the hills.
- Small and irregular fields characterise areas of agricultural land use.
- Meadows and wet woodland are typical of the valley floors.

Survey Results - Positive Tranquillity Greensand Hills



Survey Results - Negative Tranquillity Greensand Hills



6.3.8 TYPE 8: ROLLING CLAY VALES – 6.5% of AONB

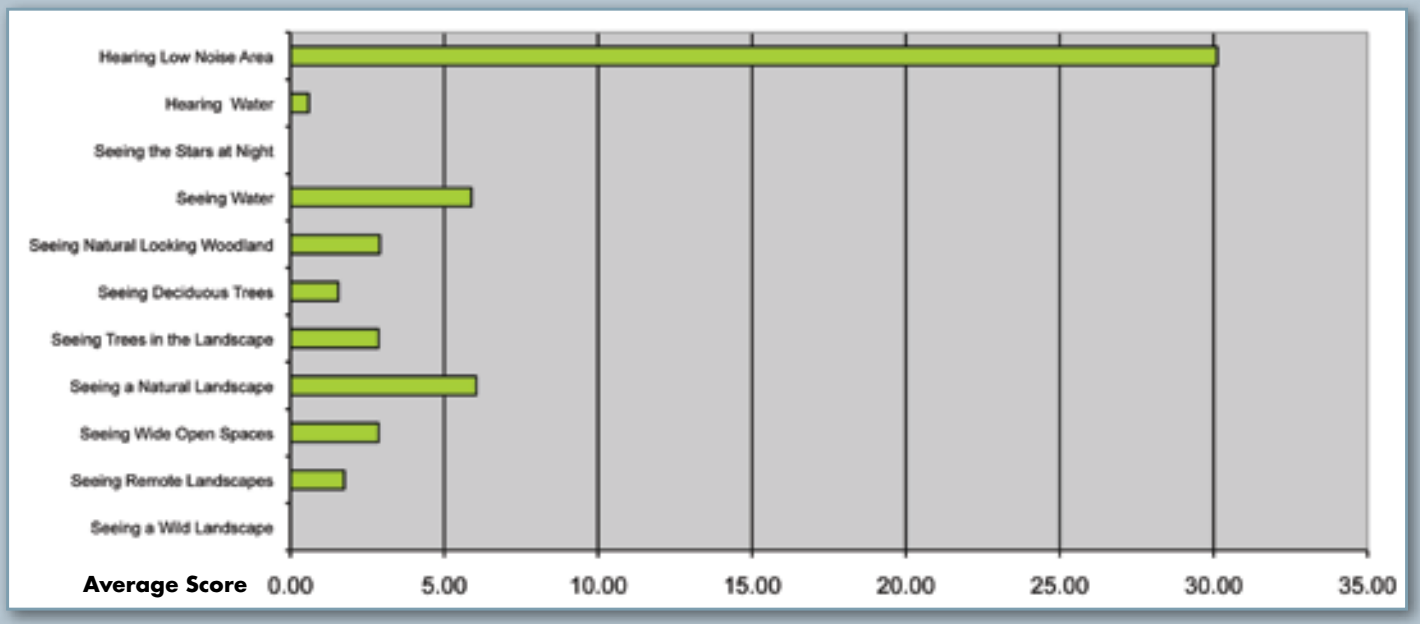
Description

The result of geological process gave rise to wide open vales exhibiting a number of different geological exposures. These vales provide a contrast to the adjacent upland chalk downland and are characterised by a pastoral valley of small scale fields divided by lush hedgerows and scattered with woods and copses - both mixed and deciduous. The layout of fields, farms and villages illustrate the pattern of Medieval settlement, clearance and farming, and the post-Medieval process of agricultural improvement and estate development. Within the AONB there is only one Rolling Clay Vale, known as the Vale of Wardour.

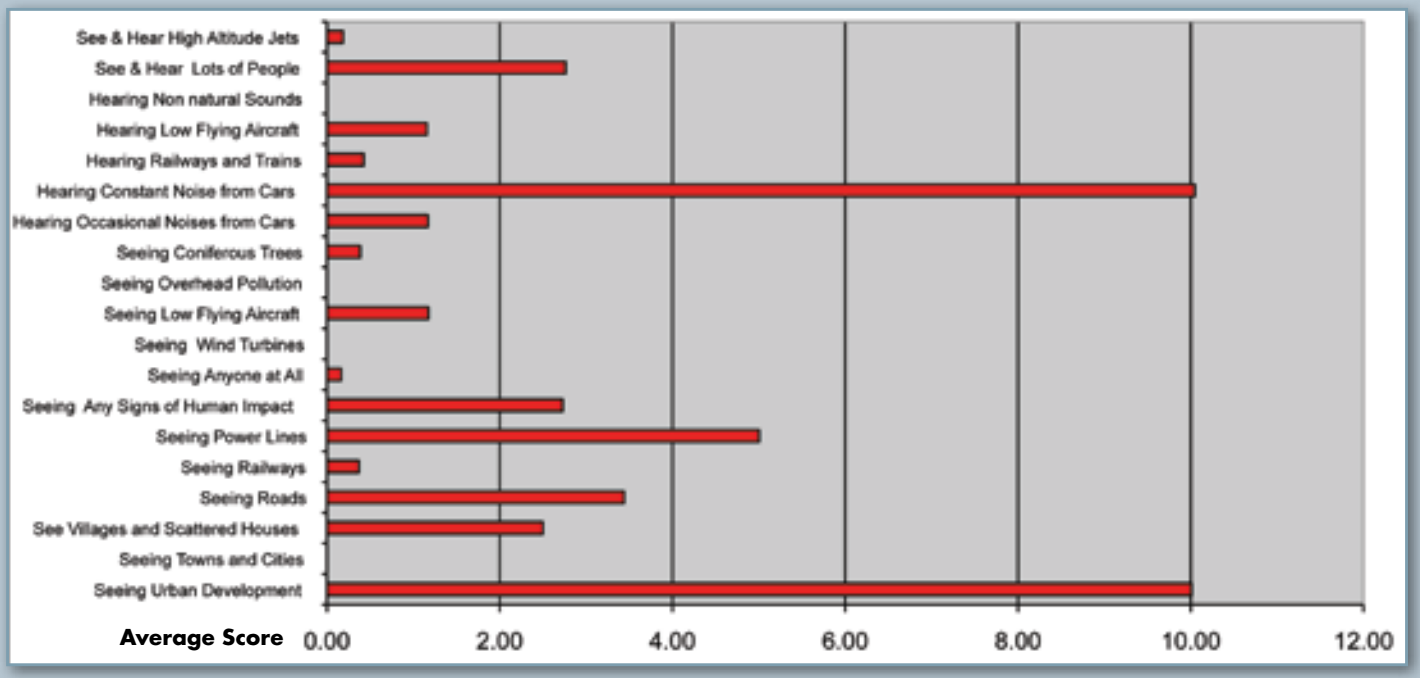
Key Characteristics

- Vale occupying a geological anti-clinal between the chalk.
- Varied underlying geology with many different geological exposures.
- Pastoral landscape of small scale fields divided by lush hedgerows and scattered with woods and copses.
- Layout of fields, farms and villages illustrate the pattern of Medieval settlement, clearance and farming.
- Rivers and their tributaries meander through the vale.
- A sense of enclosure is provided by the surrounding upland landscapes.
- A mixed agricultural landscape of lush improved pastures and arable production with water meadows on the valley floor.
- Wooded character with broad leaf and mixed woodland (some of ancient origin) scattered across the vale.
- Villages dispersed over the floor of the vale.

Survey Results - Positive Tranquillity Rolling Clay Vales



Survey Results - Negative Tranquillity Rolling Clay Vales



6.4 Conclusions - Character Area Tranquillity

It is clear from looking at the data, split into character areas, that there are some notable differences between certain character areas, but there are also some similarities.

Of particular interest is the relationship between landscape character area, and the road network. This is due to the fact that the roads within the character areas follow either ridge lines, or valley floors – particularly the A354 through area 2B (Southern Downland Belt) and the A30 through 6A (Fovant Terrace). For these areas, tranquillity is substantially reduced by the factors 'Seeing Roads', 'Hearing Occasional Noise from Cars and Lorries', 'Hearing Constant Noise from Cars and Lorries' and 'Hearing Non-natural Sounds'. These factors have a significant impact on the tranquillity of these character areas.

In character areas where the presence of major road networks is not so prevalent, there is substantially higher tranquillity, brought about by lower figures for those factors previously mentioned, coupled with substantially higher scores for 'Hearing – Low Noise Area'. In addition, many of these surveyed squares exhibit a generally higher score for 'Seeing a Natural Landscape', 'Seeing Remote Landscapes', and 'Seeing Wide Open Spaces'.

Character area 2B (Southern Downland Belt) is a classic example of an area with varying degrees of tranquillity, and this can almost completely be attributed to the presence of the A354 which passes through the northern part of the character area. The southern squares surveyed in this particular area display notably higher tranquillity for both surveyed and the recorded scores.

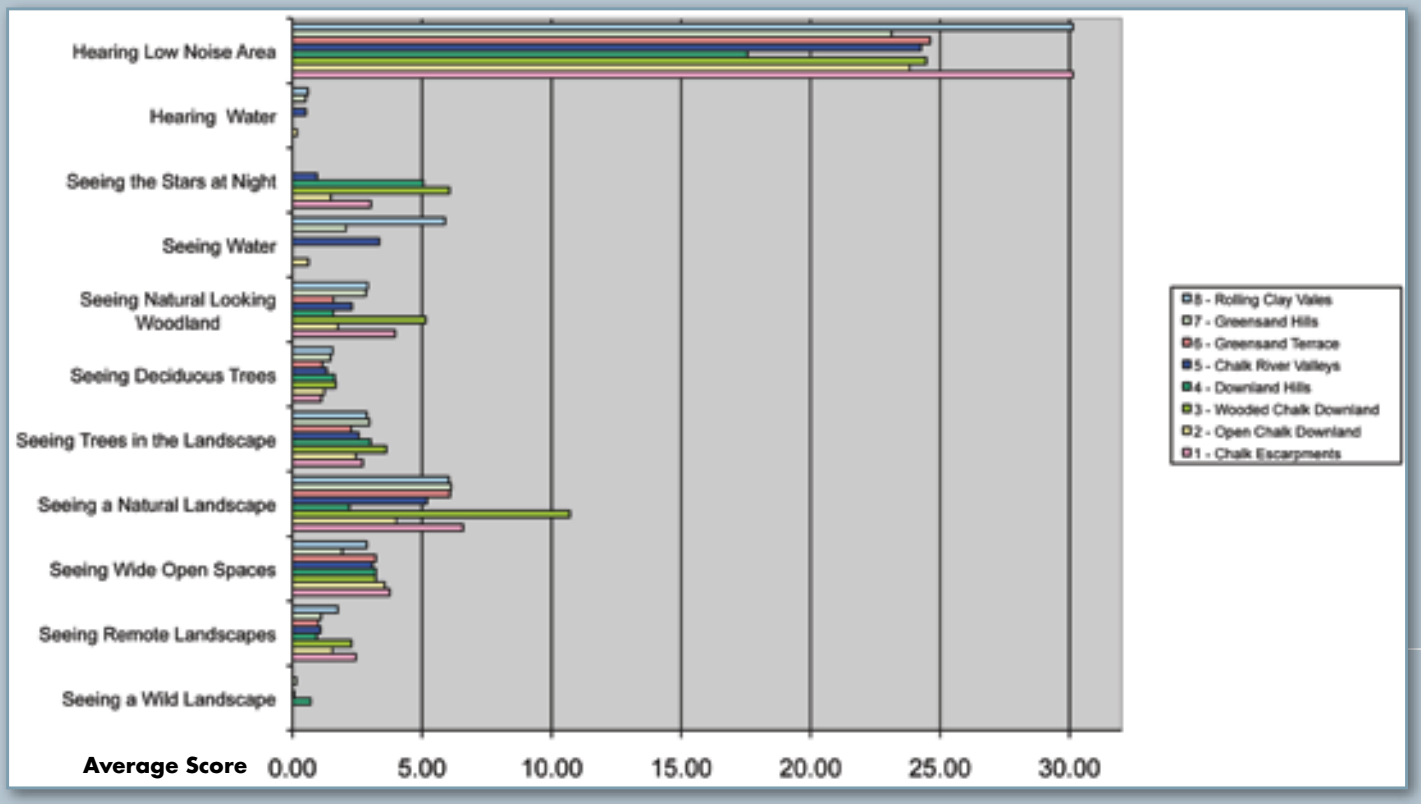
The biggest factor by far for all of the character areas is 'Hearing Low Noise Area', followed by 'Seeing a Natural Landscape'.

Negative tranquillity scores are more variable. However, the 'Hearing constant noise from Cars/Lorries' and 'Seeing Urban Development' are recurring topics.

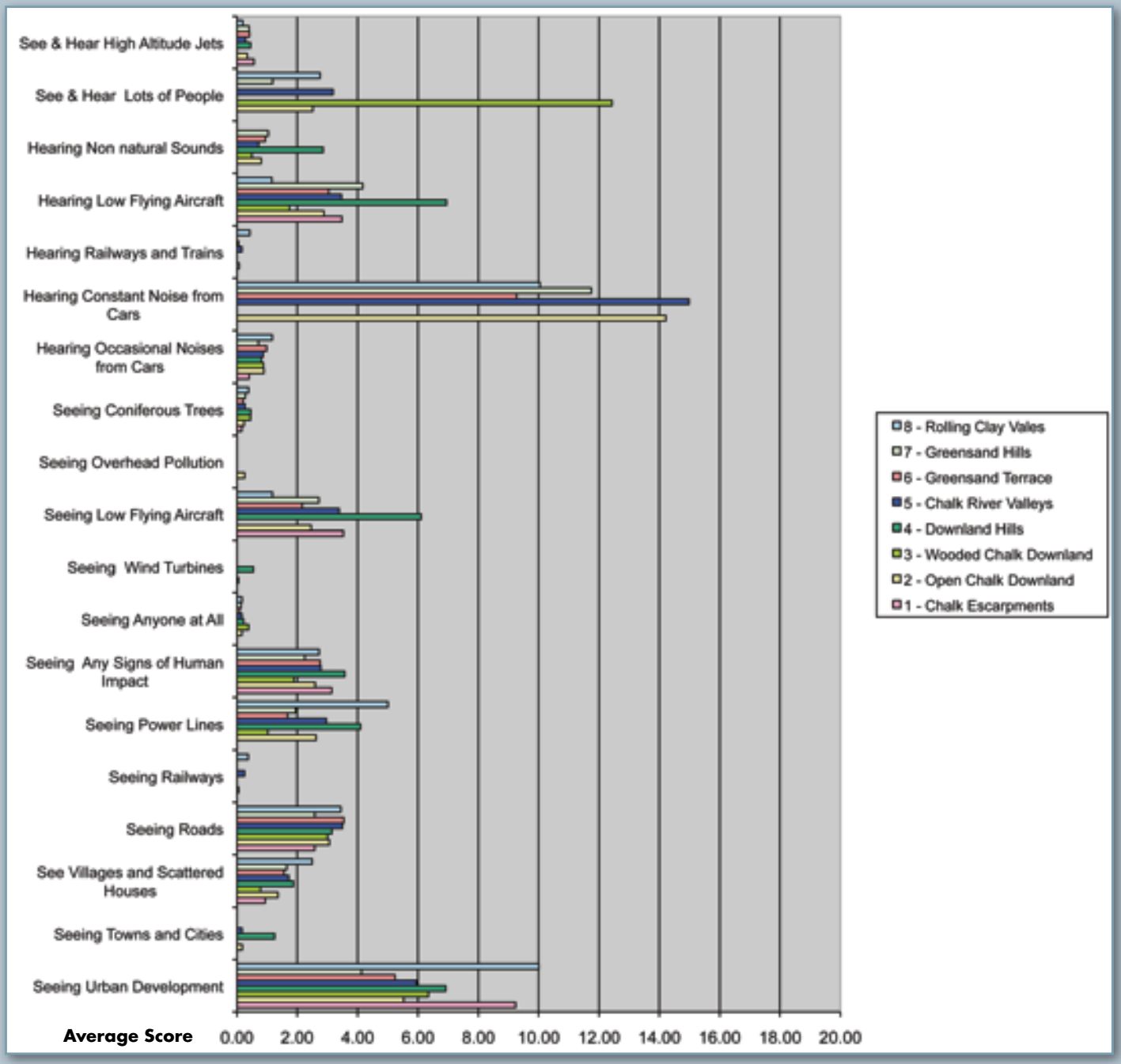
It is notable that a comparison with the recorded data for the factor 'Seeing a Natural Landscape' shows the recorded data giving consistently higher scores (27 and higher) for this topic, whereas the survey data is more variable and considerably lower; around 5, with the highest score being 11.

6.4.1 Summary – Surveyed Landscape Character Area data

Positive Tranquillity



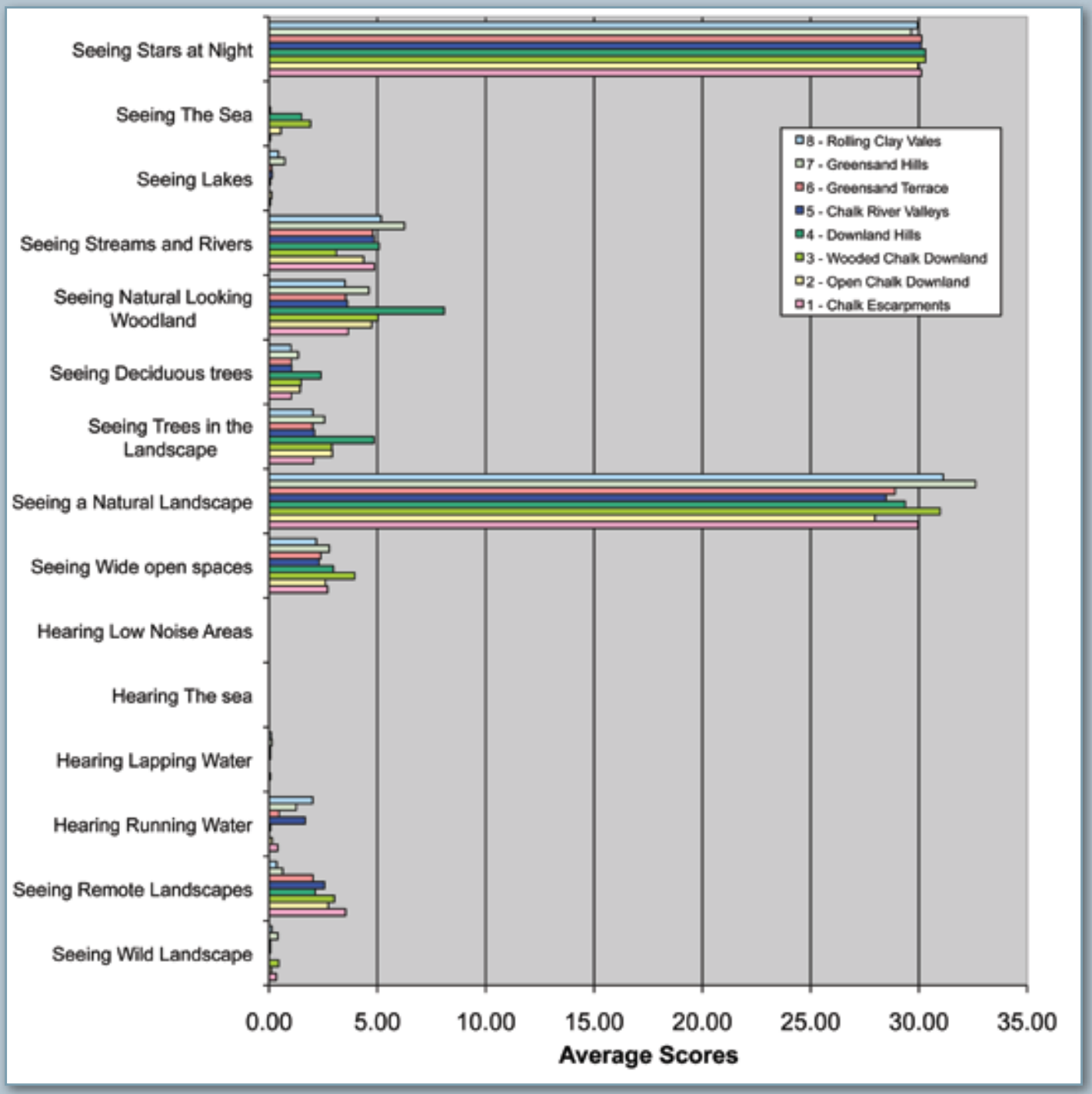
Negative Tranquillity



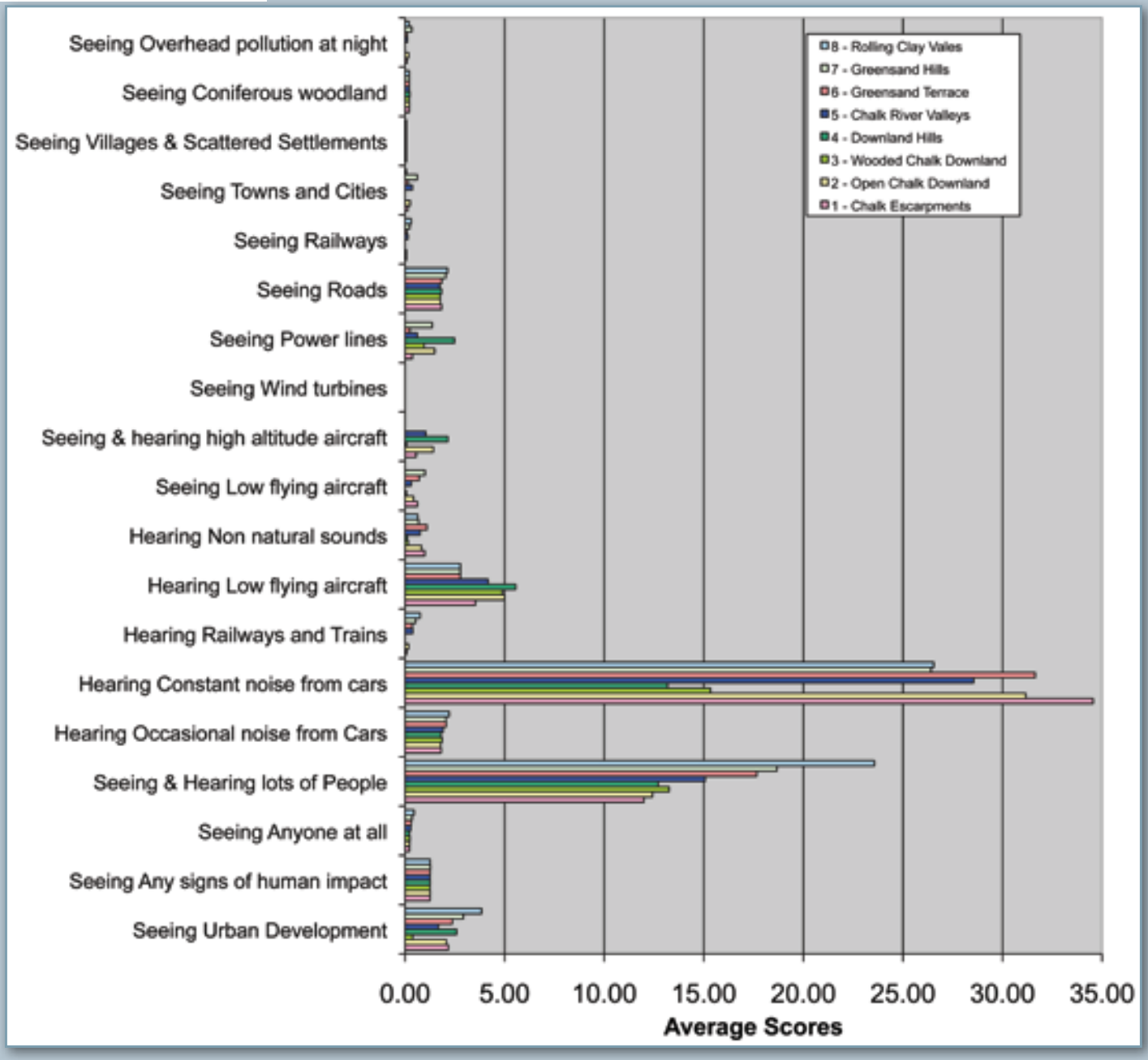
6.4.2 Recorded Tranquillity data for each Character Area

The recorded average tranquillity data for each Landscape Character Area provide further insights into the tranquillity data:

Positive Tranquillity



Negative Tranquillity



6.5 Analysis of differences between Surveyed and Recorded data for Character Areas

The average score charts on the previous pages show clear differences between the surveyed and recorded tranquillity data for both positive and negative tranquillity. Factors which have the greatest influence on net tranquillity scores can clearly be distinguished.

6.5.1 Positive Tranquillity

The most notable factors which can be identified as scoring highly in every one of the sample squares for the Recorded data are 'Seeing a natural landscape' and 'Seeing - the stars at night'.

Seeing - the stars at night

The recorded data shows almost identical high scores for this factor for each character area. For the surveyed data the surveyors reported that it was very difficult to score the 'Seeing the stars at night' factor – mainly because the survey work was being carried out in the daytime. The surveyor training emphasised that surveyors were being asked to estimate whether (assuming clear skies) the stars would be visible at night.

Seeing - a natural landscape

The surveyors found that the 'Seeing - a natural landscape' figure was often offset by the presence of power lines, communication masts, nearby villages, roads and tracks or farm buildings. The fact that it would be difficult to include the presence of these smaller landscape features in a national dataset might go some way to explaining why this factor in the recorded data scored consistently higher than in the surveyed data.

Seeing - woodland and water

Also of note are the 'Seeing natural looking woodland' and 'Seeing streams and rivers' factors in the recorded data. These appear consistently throughout the data – although with low scores. Surveyors reported that it was difficult in many cases to actually see water sources from the centre of the survey squares, even if a stream or river were relatively close by.

Hearing - low noise areas

'Low noise areas, where there is an opportunity to hear non-human sounds that would otherwise be drowned out, represents one of the variables that people most valued in identifying tranquil areas.'

*(**Source:** Tranquillity Mapping: Developing a Robust Methodology for Planning Support - Technical Report on Research in England, January 2008 - revised)*

This is the factor for which there is by far the greatest differences. For the surveyed data, this factor has the greatest influence on positive tranquillity, whereas for the recorded data it rather strangely scores zero for every square. The definition for this factor is ***'Hearing natural sounds - i.e. Hearing birdsong, wildlife, no artificial or human sounds. Distant agricultural noises. Includes hearing silence.'*** It is therefore reasonable to expect this factor to have a strong influence in an Area of Outstanding Natural Beauty.

6.5.2 Negative Tranquillity

In the recorded data, relatively high scores are attributed to the factors 'Seeing and hearing lots of people' and 'Hearing constant noise from cars and lorries'.

The high scoring for the factor 'Hearing constant noise from cars and lorries' is a pattern which is repeated in the surveyed data where the theme also scores highly. This factor is heavily influenced by the presence of major road networks, reflected clearly in the local total tranquillity mapping as well as the national mapping.

Further analysis of the theme 'Seeing and hearing lots of people' indicates that perhaps the recorded figure should not be as high as it is. For example, for square 3358 it is the highest negative factor (33.15), yet scores zero for the surveyed data. OS mapping for the square indicates it is relatively remote (see Appendix 2). Based on the map, it is difficult to see why this square should have such a high negative recorded score.

It seems that the opposite starts to occur for point 2152, where the recorded score for 'Seeing and hearing lots of people' is zero, and the surveyed score (surveyor rated as 'strong') is particularly high at 38.67 (Appendix 3). The recorded score for 'Any signs of human impact' is also low at 1.26. From the OS map, it is apparent that in this square there are several dwellings and a farm present in the square itself. In addition, the village of Coombe Bissett is roughly 500m from the centre of the square. Despite the questionable surveyed rating of 'strong' for this factor, it would seem as if the surveyed figure is perhaps a more accurate assessment when the whole AONB setting is taken into consideration.

Note: It is stated in the Tranquillity Methodology that:

'Obtaining figures for noise associated with the presence of people, number, age for all sites where people are likely to be, honey pot sites, are outside the capacity of this project. Instead data generated for the option choice 'seeing, lots of people' will be used as a relative indicator of presence and absence.'

*(**Source:** Tranquillity Mapping Short Methodological Report, Prepared by the Campaign to Protect Rural England, October 2007)*

Seeing - urban development

The recorded scores for this factor are consistently lower than for the surveyed scores. There is the possibility that within the AONB any development has a far greater impact on perceived tranquillity, and it is therefore given a higher negative score by the surveyors than attributed by the model.

Hearing - low flying aircraft

It is worth noting the occurrence of 'Hearing – low flying aircraft' and 'Hearing – non-natural sounds' for the recorded negative factors. These have a low weighting value and therefore do not score highly overall, but do appear consistently. The non-natural sounds values apply to sounds such as distant artillery, and the low flying aircraft include military helicopters and jets; reflecting the proximity to Salisbury Plain.

Surveyors also noted other non-natural sounds which were prevalent, described by surveyors as being made by automatic detonations of crow-scarers, tractors and farm machinery and lawnmowers in distant villages.

6.5.3 Positive correlation between recorded and surveyed data

In terms of the overall robustness of the model data, it is worth highlighting that there is a positive correlation between many of the recorded and surveyed figures, particularly for 'Hearing constant noise from cars and lorries'. The factors which display these similar characteristics are listed below:

Table 8 - Consistency and similarities between recorded and surveyed scores

Seeing a Wild Landscape	**POSITIVE TRANQUILLITY**
Seeing a Remote Landscape	
Seeing Wide Open Spaces	
Seeing Trees in the Landscape	
Seeing Deciduous trees	
Seeing Towns and Cities	**NEGATIVE TRANQUILLITY**
Seeing Villages and Scattered Houses	
Seeing Railways	
Seeing Any Signs of Human Impact	
Seeing Wind Turbines	
Seeing Overhead Pollution	
Hearing Occasional Noises from Cars and Lorries	
Hearing Railways and Trains	
Seeing and Hearing High Altitude Aircraft	

6.6 Manipulation of the weighting factor to achieve a closer 'fit'

It may be possible to gain a better picture of tranquillity in the Cranborne Chase and West Wiltshire Downs Area of Outstanding Natural Beauty by careful manipulation of the data provided by CPRE.

The data used to build the tranquillity model was the outcome of Participatory Appraisal (PA) consultation as well as using nationally available datasets such as land cover (vegetation), terrain, urban areas and other human infrastructure to represent the different dimensions of tranquillity. The PA results identified the relative significance of these issues, allowing the datasets to be differentially weighted.

Through careful manipulation of the weightings applied to the model, it may be that the model could be altered to better fit the type of environment represented by this Area of Outstanding Natural Beauty.

6.6.1 Which factors to alter?

In the initial work to generate the model, researchers were careful not to impose their own opinions on what is tranquil, rejecting expert-led decisions in favour of using the Participatory Appraisal (PA) consultation. However, it may be that something which is thought of as 'tranquil' in one part of the country might not be thought of the same way in an AONB.

Whilst it is outside the scope of this report to carry out PA research, the surveyors' findings and notes both in the pilot exercise, and Ground Truthing work, along with the surveyed tranquillity scores, do give some useful insights into how these weightings might be altered.

For the factors 'Seeing the stars at night' and 'Hearing running water' it was consistently reported by the surveyors that they felt that it would be difficult to see the stars at night, despite the relatively remote nature of some of the locations. Some of the surveyors also felt that cloudy skies, and the proximity to the market towns would mean that it would be difficult to see stars unless well away from settlements and roads, and only when the sky was completely clear. They did not therefore feel that the factor should be scored particularly highly. With 'hearing running water' and 'Seeing streams and rivers', again, the surveyors reported that it was difficult to hear running water unless you were right next to it, and seeing rivers was difficult unless the banks were completely clear and again, you were standing in close proximity to the water source.

The options available for refinement include removing those factors deemed unsuitable or unreliable, or adjusting the weightings for each factor. The tables below show the factors which could have their weighting increased or decreased, and their current percentage weightings:

Table 9 - Increasing or decreasing weightings - Positive Tranquillity

Factor	Increase or Decrease weighting	Current Percentage Weighting
Seeing the Stars at Night	**Decrease**	**3.03**
Seeing a Natural Landscape	**Decrease**	**6.59**
Hearing Running Water	**Decrease**	**2.23**
Seeing Streams and Rivers	**Decrease**	**2.78**
Hearing Low Noise Areas	**Increase**	**0.58**

Table 10 - Increasing or decreasing weightings - Negative Tranquillity

Factor	Increase or Decrease weighting	Current % Weighting
Seeing Urban Development	**Increase**	**4.62**
Seeing and Hearing Lots of People	**Decrease**	**Seeing: 7.76** **Hearing: 3.29**
Seeing Overhead Pollution	**Increase**	**3.34**

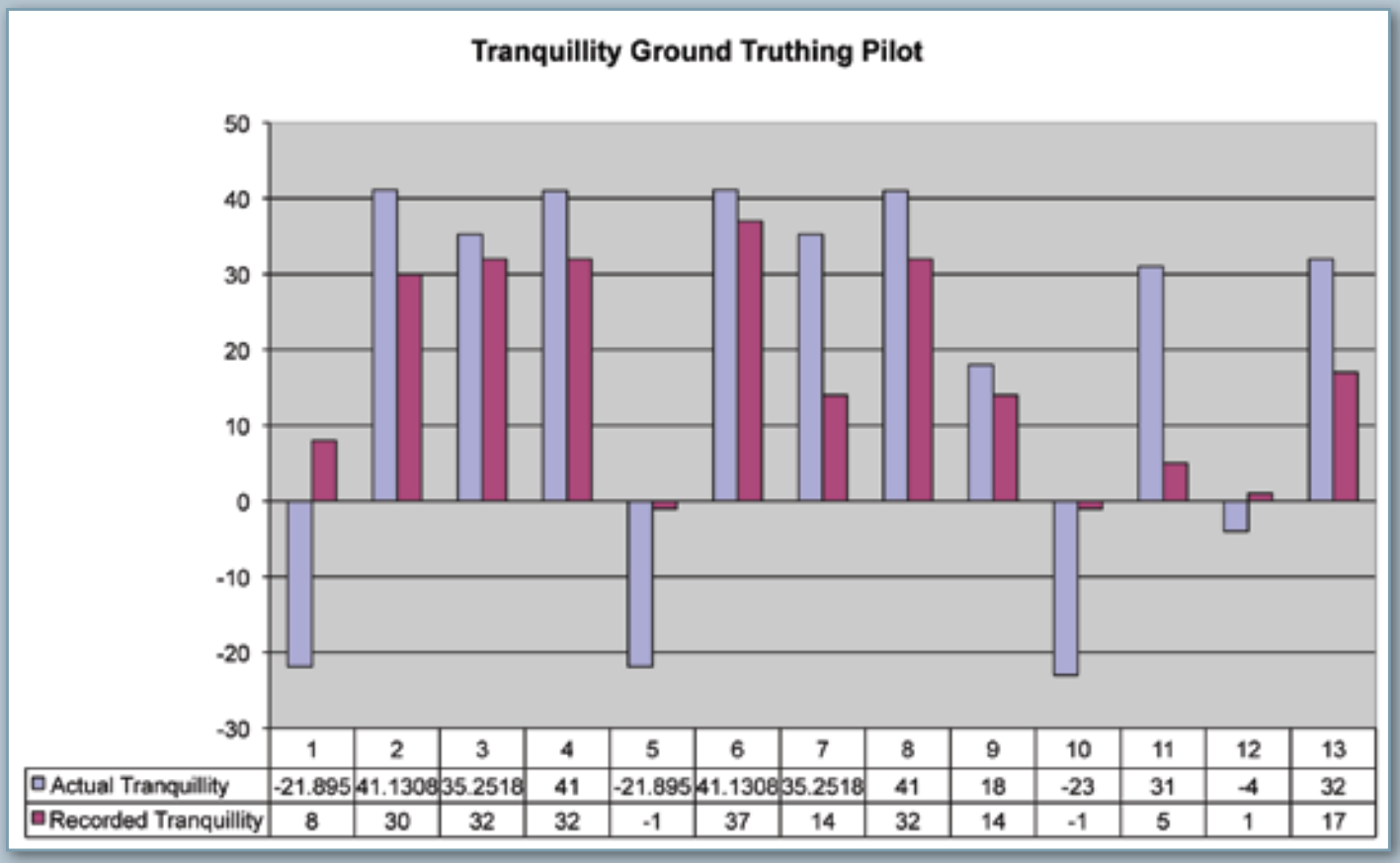
6.7 Overall Conclusion

There is quite a good fit for a number of the factors between recorded and surveyed data. However, a small number of factors, both negative and positive, appear to unduly influence the net tranquillity score in a number of situations.

Adjusting the weightings for these factors would be a significant additional piece of work. Whilst omitting the factors that unduly influence the net scores could be a way forward, this might be perceived as undermining the basic concepts of the original study, and so should not be undertaken lightly.

7 Appendices

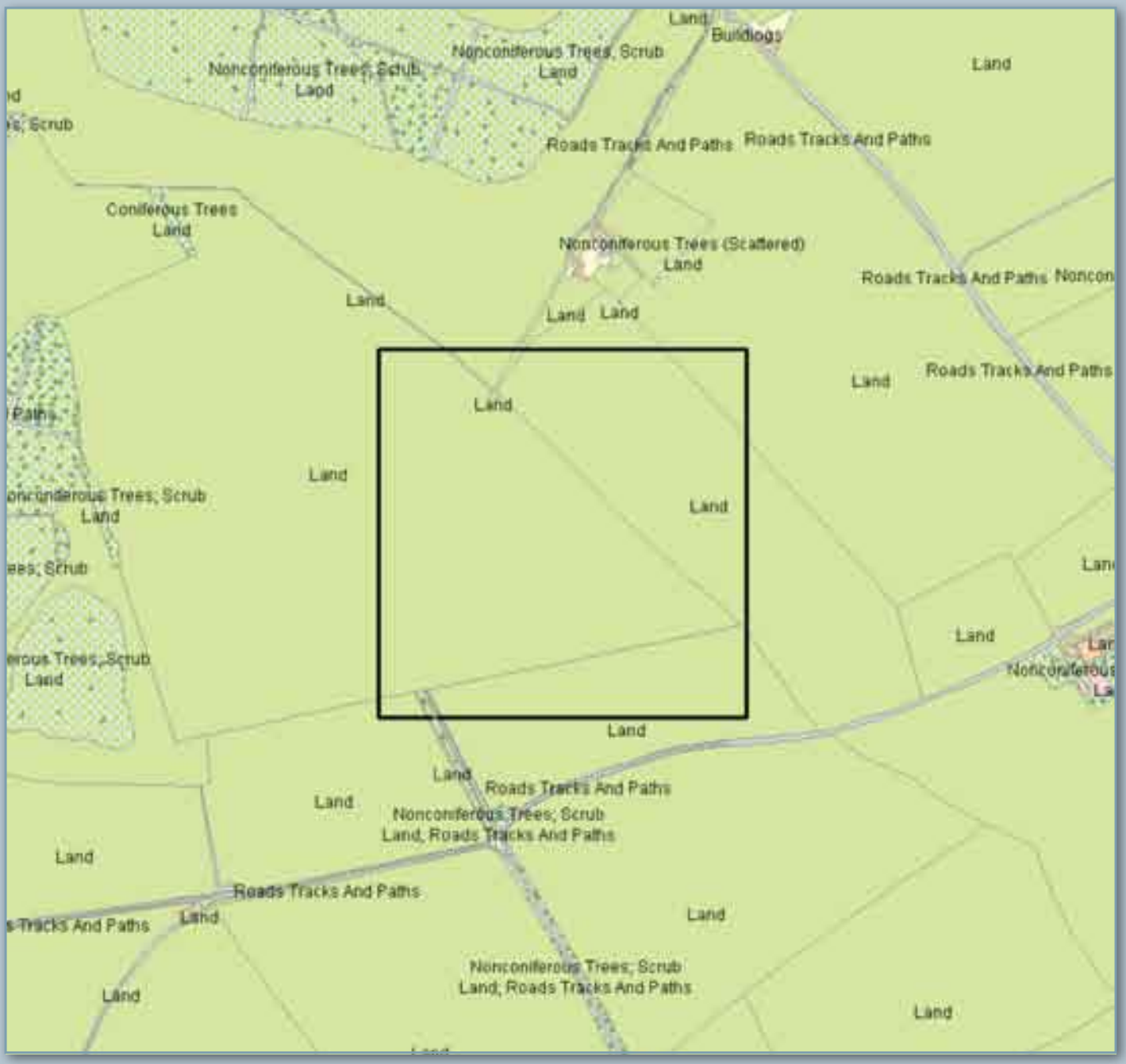
7.1 Appendix 1 - Results of the Pilot Exercise



	1	2	3	4	5	6	7	8	9	10	11	12	13
Actual Tranquillity	-21.895	41.1308	35.2518	41	-21.895	41.1308	35.2518	41	18	-23	31	-4	32
Recorded Tranquillity	8	30	32	32	-1	37	14	32	14	-1	5	1	17

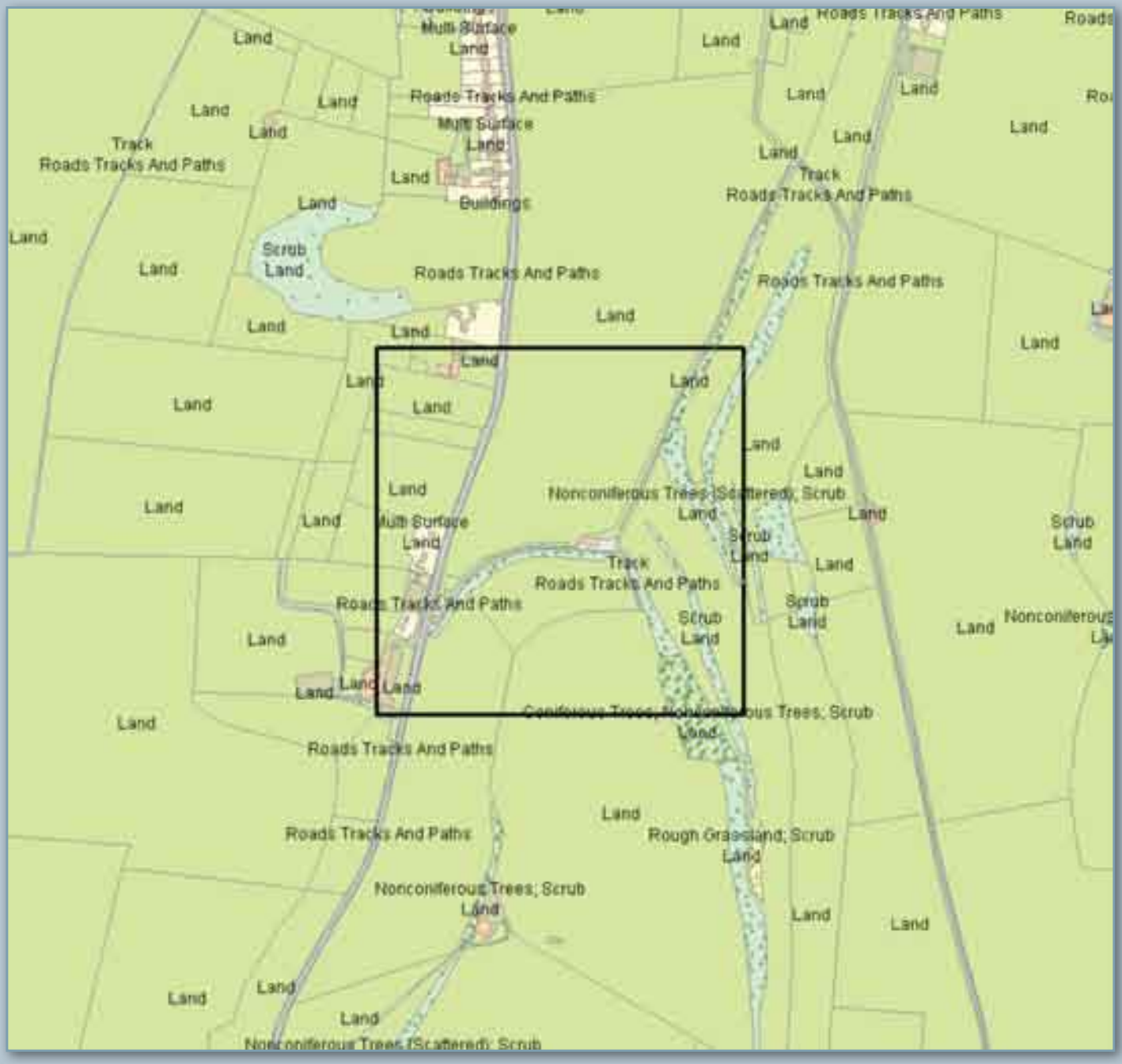
7.2 Appendix 2 – 'Seeing and hearing lots of people' negative tranquillity

Square 3358 – the recorded score is 33.15, and the surveyed score is zero:

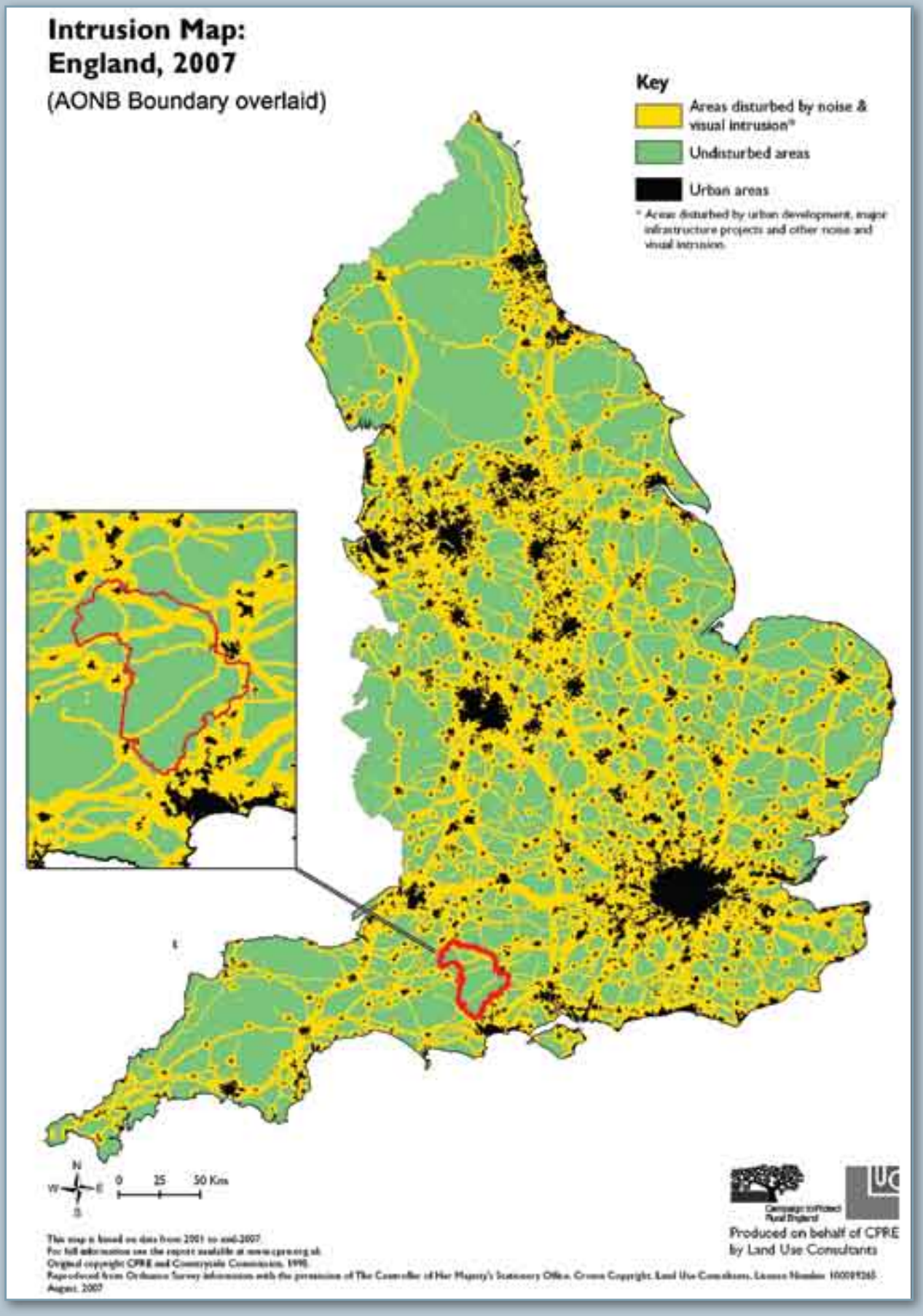


7.3 Appendix 3 – 'Seeing and hearing lots of people' negative tranquillity

Square 2152 – recorded score for 'Seeing and hearing lots of people' is zero, surveyed score (surveyor rated as 'strong') is 38.67:



7.4 Appendix 4 – CPRE Intrusion map



Tranquil areas are defined as those that lie:

- 4km from the largest power stations
- 3km from the most highly trafficked roads such as the M1/M6; from large towns (e.g. towns the size of Leicester and larger); and from major industrial areas
- 2km from most other motorways and major trunk roads such as the M4 and A1 and from the edge of smaller towns
- 1km from medium disturbance roads i.e. roads that are difficult to cross at peak times (taken to be roughly equivalent to greater than 10,000 vehicles per day) and some main line railways
- beyond military and civil airfield/airport noise lozenges as defined by published noise data (where available) and beyond very extensive open cast mining.

(regional tranquil areas were drawn with a minimum radius of 1km to eliminate local effects)

Within the Tranquil Areas a further set of factors were identified as creating lower levels of disturbance affecting areas 1km wide. These were:

- low disturbance roads
- 400KV and 275KV power lines
- some well-trafficked railways.

Additionally, this lower disturbance category included:

- large mining or processing operations
- groups of pylons or masts
- settlements greater than 2,500 in population
- some half-abandoned airfields
- most windpower developments

Important Issues

For a number of criteria there is insufficient information to identify exactly how some thresholds were defined. For example,

- what defines the 'largest power stations'?
- what differentiates 'some main line railways' from 'some well-trafficked railways'?
- how were 'large mining or processing operations' defined?

Source: *CPRE – Developing an Intrusion Map of England : August 2007 – Prepared for CPRE by Land Use Consultants*

Interpretation of the Intrusion Map

It is very noticable that the edge of AONB towns can be identified from this map - Frome, Blandford, Shaftesbury, Gillingham, Warminster, Salisbury, Fordingbridge, Verwood and Wimborne all being visible along with the major roads; the A354, A30, A36, A303 and A350. It is also interesting to note how the A350 shows dominantly from Poole to Blandford, but far less so from Blandford to Shaftesbury.

7.5 Appendix 5 – Surveyors guidance notes

POSITIVE TRANQUILLITY FACTORS	
SEEING	
Wild Landscapes	A natural unmanaged landscape. Absence of development, no human activity or people and no hedgerows or roads etc.
Remote Landscapes	Very few roads or tracks are visible, very little sign of development; possibly the odd farmhouse. Little human activity is visible.
Wide Open Spaces	Open Vistas, long and wide views of surrounding landscape. Sweeping fields. The higher the visibility the more 'open' an area is perceived to be. Ignore man made structures.
Natural Landscapes	Natural looking vegetation cover, beautiful scenery. May contain fields, glades and moorland but appearance is discreetly and sensitively managed. Sensitive and not intensive farming practices, natural crops and livestock ie, corn, wheat, sheep, cows.
Trees in the Landscape	Any types of trees within the landscape.
Deciduous Trees	Trees such as Oak, Beech, Birch, Elm, Ash.
Natural Looking Woodland	Mainly deciduous trees, leaf litter and dead wood evident. Little sign of woodland management.
Water Features	Any streams, rivers or lakes in the landscape.
Stars at Night	Assuming clear skies, will it be possible to see stars at night? Please estimate.
HEARING	
Water Features	Hearing lapping water, running water, waterfalls, rivers and streams.
Low Noise Areas	Hearing natural sounds - i.e. Hearing birdsong, wildlife, no artificial or human sounds. Distant agricultural noises. Includes hearing silence.

NEGATIVE FACTORS OF TRANQUILLITY	
SEEING	
Urban Development	Any building structures within the landscape. Including isolated houses, farm buildings, hamlets, power cables, pylons, roads etc.
Towns and Cities	Settlements with over 10,000 inhabitants. Signs of extensive development and human activity, large expanses of buildings. Lots of evidence of pylons and power cables etc.
Villages and Scattered Houses	Settlements with less than 10,000 inhabitants. Evidence of some development and human activity. Open spaces. May be some evidence of power cables and pylons.
Roads	Roads of any size or class, including farm roads, B Roads, Minor roads.
Railways	Railways are visible within the landscape.
Power Lines	Any sign of pylons, power cables or power plants.
Any Signs of Human Impact	Any building structures within the landscape – including anything related to human activity, foot paths, signs, litter, intensive and unnatural farming practices i.e. Maize, Oilseed rape.
Anyone at All	Any visible sign of people in the landscape, or any sign anyone has been in the landscape recently.
Wind Turbines	Wind turbines are visible in the landscape.
Low Flying Aircraft	Low altitude aircraft are visible.
Overhead Pollution	Consider your proximity to developed areas – would there be any possibility of night-time 'skyglow' or might there be light pollution as from street lighting.
Coniferous Trees	Trees such as Pine, Spruce, Cedar, Larch etc.
HEARING	
Occasional Noises from Cars and Lorries	Frequent breaks in traffic sounds, infrequent and not regular traffic flow noises, can be high volume.
Constant Noise from Cars and Lorries	Little or no breaks in traffic sounds, frequent and regular traffic flow noises, repetitive and on-going sounds of motor vehicles.
Railways and Trains	Hearing the rumble and motion of any train or railway activities at all.
Low Flying Aircraft	Low flying aircraft can be heard at all.
Non-natural Sounds	Sounds that drown out natural sounds such as bird song. Sounds associated with human activity and development.
SEEING and HEARING	
Lots of People	See and hear more than 1 or 2, or crowds of people. This can include those in cars, on bikes, walkers etc.
High Altitude Aircraft	See and hear high altitude aircraft at all.

Tranquillity What is Tranquillity?

Tranquility is considered to be a state of calm, quietude and is associated with peace; a state of mind that promotes mental well-being.

In order to keep the research as simple as we can, we have produced a standard tranquillity questionnaire to fill out at each survey location.

Positive and Negative Aspects of Tranquillity

The questionnaire is divided into two distinct parts;

- **Positive Tranquillity Factors** - aspects that add to the tranquillity of the area;
- **Negative Tranquillity Factors** – aspects that detract from tranquillity.

Hearing and Seeing Tranquillity

The questionnaire is further divided by **seeing** and **hearing** tranquillity factors.

It is essential that you spend time at each location thinking about the landscape and the feeling of tranquillity, and then carefully assess the tranquillity in terms of its visual and aural aspects.

Carrying out the research

You will be asked to assess the tranquillity in several different areas. You will have maps of each area – the size of the square being 500 metres by 500 metres.

Whilst it is important that for the research you try to get as close to the centre of each square as safely and best you can, you will have to try to assess the tranquillity for the square as a whole, not just your immediate locality.

For example, if you stop on a road with hedges each side, you might not be able to see any evidence of a 'Natural Landscape'. However, if one was to peer through the hedge, there may be wide ranging natural views. Try to take this into account in your assessment.

We plan to have more than one person visit each square and at different times, so as to reduce any personal bias and effects linked to a particular time of day.

Main points to consider

- Please try and assess the tranquillity of the square from a safe and public place.
- Try to position yourself as to give a good chance for landscape to be viewed - i.e. not behind a hedge.
- Record the start time on the questionnaire.
- Spend 15 minutes at each square in order to get a good feel for the square, recording your perceptions onto the questionnaire.
- Use the **'guide to tranquillity terminology'** sheet to help you fully understand what each factor means.
- Please add any additional feeling and/or observations on the sheet in any space available.
  These comments will be extremely useful to us as we collate the data.
- Record the time you leave the centre point of the square and keep the questionnaire safe!

To ensure your safety while taking part in this research, it is essential that you let someone know when and where you are going and when you are expected to be back. It is also highly advisable that you carry a charged and working mobile phone.

It is important to remember throughout the research process, there is no right or wrong answer. The data collected is based on your own perceptions and opinion of tranquillity. Your view of tranquillity can be very different to other people's views.

Notes