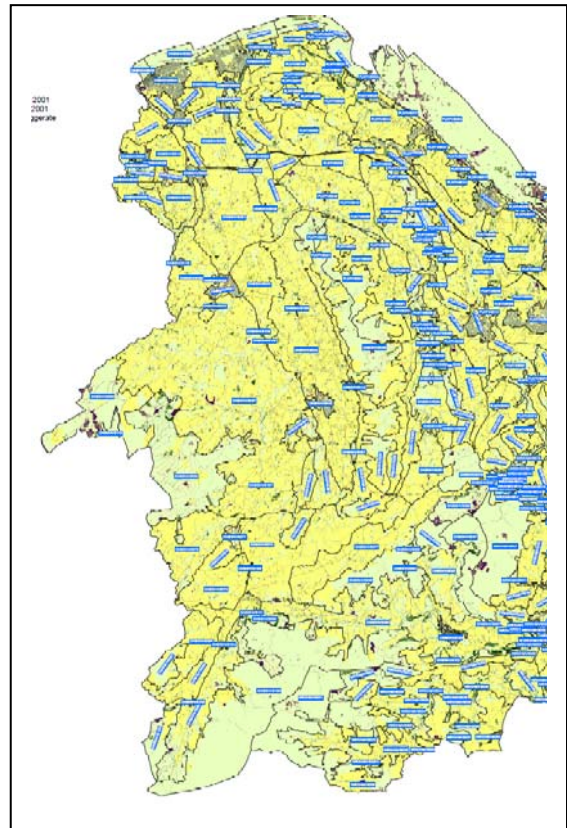


# INTERPRETATION OF LANDMAP VISUAL & SENSORY CHANGE DETECTION PACKS: DENBIGHSHIRE

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**Final Report**

for

**Natural Resources Wales**

February 2014

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### Appendix

LANDMAP visual and sensory data change detection sheets

## 1. Introduction

1.1. Natural Resources Wales commissioned White Consultants in August 2013 to undertake the interpretation of LANDMAP Visual & Sensory aspect change detection packs for Powys and North Wales excluding the Isle of Anglesey. The study is intended to provide the desk study evidence base to understand where changes may have occurred since the original LANDMAP assessments.

1.2. The tasks set out in the brief are as follows:

### Stage 1

- Desk study of the Change Detection Pack data using techniques derived from the pilot study and the technical report guidance provided.
- Identification of areas of significant landscape change.
- Preparation of a tabulated excel table filling in columns 1-4 and 8.
- Map extracts to show potential boundary changes if appropriate for clarity

### Stage 2a

- Review change questionnaire responses from local authorities provided by NRW.
- Preparation of a tabulated excel table filling in column 5 and amending 8 as necessary.

### Stage 2b

- Review changes from other resources provided by NRW.
- Preparation of a tabulated excel table filling in column 6 and amending 8 as necessary.

### Stage 2- report and check for Consistency report changes

- Checking if any changes have already been implemented in Consistency report changes on latest LANDMAP dataset
- Prepare a short summary report of key changes and influences for each authority.

1.3. The Change Detection Pack data provided includes the following:

- OS maps
- Existing Visual and Sensory layer
- Aerial photographs dated 2001 and 2009.
- Phase 1 Habitat Survey 2008/9
- Tranquillity Map of Wales
- Normalised Difference Vegetation Index [NDVI]
- Mastermap road and building change maps
- Segment Density/Complexity Maps [SD]
- Seasonal change derived from Phase 1 mapping
- Mega Change Map - incorporating key changes in a single map (based on simplified NDVI and Mastermap)

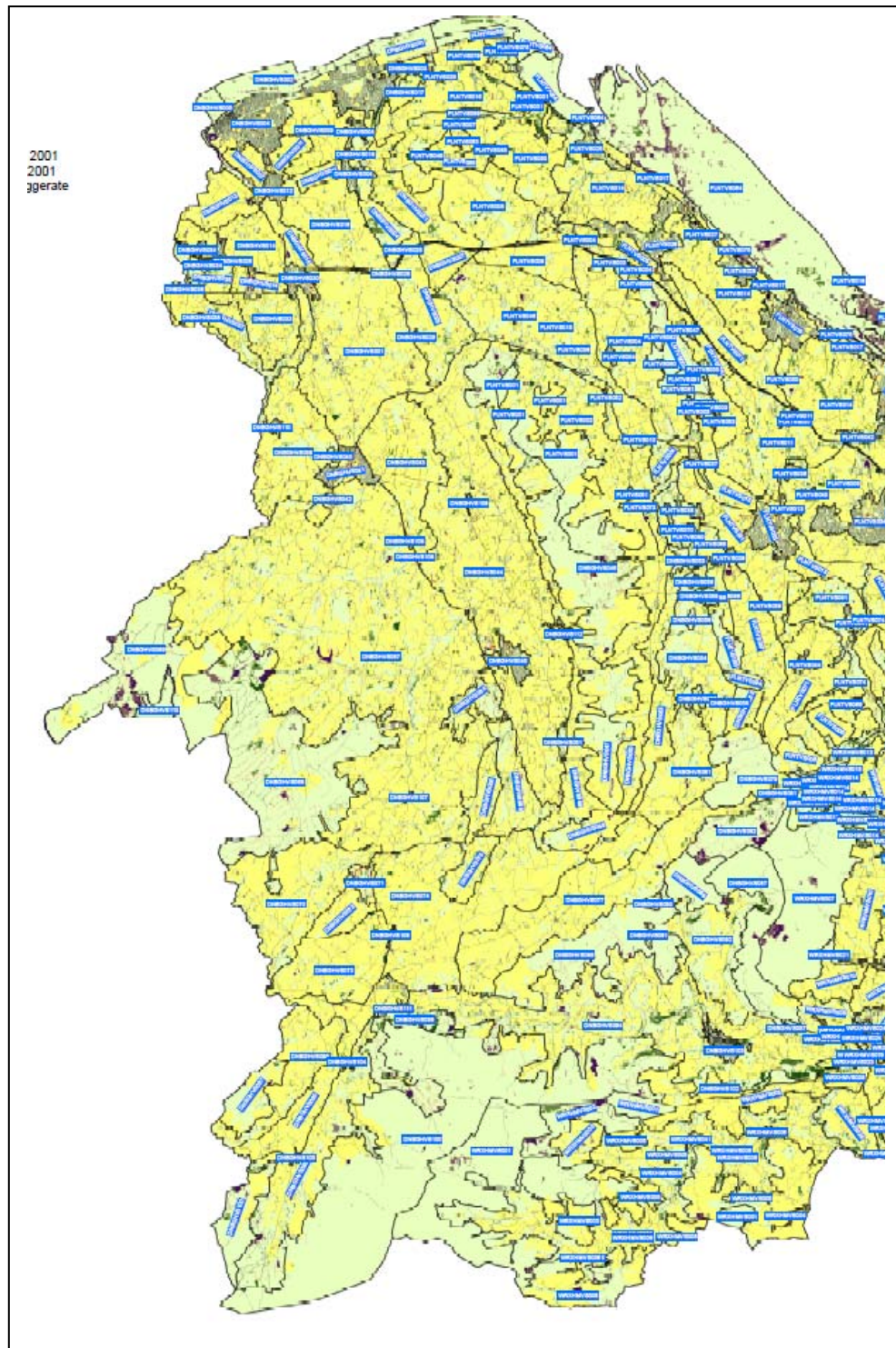
The information is in hard copy form and in GIS.

- 1.4. Other GIS data has been obtained including broadleaf planting from NRW which have proved invaluable in places.
- 1.5. Simon White has liaised with the client and Environment Systems on the data and inputs from various local planning authorities. The method has been derived from the guidance and from previous monitoring experience in South Wales.
- 1.6. The most useful data used in the study have been the Mastermap road and built form change, NDVI, the Mega change map (see Figure) and 2001 and 2009/2010 aerial photographs. This has allowed assessment at a broad and detailed level with small scale changes to be identified in places.
- 1.7. The most detailed data are the aerial photos which have been used to verify indications of change in other data. The 2001 and 2009/10 photos are the most useful to identify and verify significant change but they have a different colour balance and degree of contrast, and were flown at different times of year. This makes identification of change more difficult.
- 1.8. There has been no input of Local Authority staff to date.
- 1.9. The purpose of the study is not to refine/improve the current Collector text or aspect area GIS boundaries. It is only to monitor and note potential change. This can then be verified in the field. There are limitations to this desk based stage. It is possible that some noted changes may not be perceptible, eg young broadleaf planting in conifer plantations, and some may not be regarded as significant at the Level 3 scale of the assessment/aspect area. Other changes may affect a wider area than noted at the desk study eg the effect of wind farms on nearby aspect areas. Some changes may not be perceptible at the desk study level but are apparent on site. An example could be single wind turbines. Therefore, the site survey element of the study is essential, particularly for the visual and sensory aspect, where perception and changes at key points for public access can be very important.
- 1.10. The tabulated list of potential changes drawn from the analysis for each relevant aspect area is set out in the Appendix and is available as a separate excel table.
- 1.11. The issues that have arisen from the study of this specific area are discussed in Section 2.0.

## **2. Potential changes in the study area**





- 2.1. Within the study area the key changes appear to be:
  - The construction of windfarms in the Strategic Search Area A and environs with possibly wide ranging effects for character.
  - Continued limestone extraction in terms of expanding quarries in places with potential increase in effect on the landscape.
  - Expansion of settlements in places such as Prestatyn.
  - Expansion of commercial development areas such as Ruthin with a new access road.
  - Expansion of caravan sites- such as at St Asaph.
  - Forest plantation felling and broadleaf plantings which may change the character.
  - Possible changes to upland vegetation cover through grazing regimes.

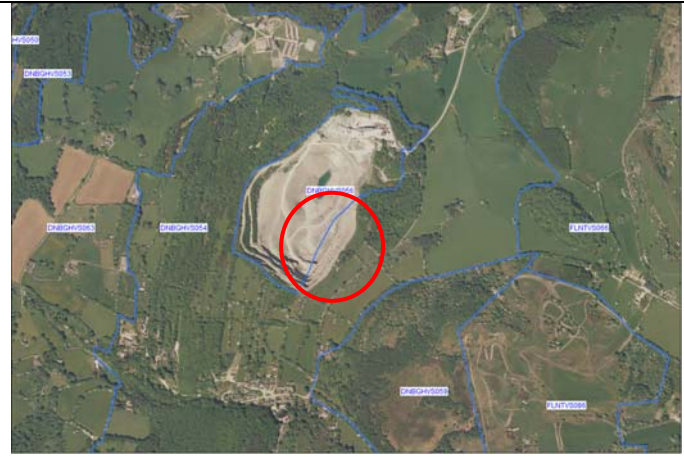


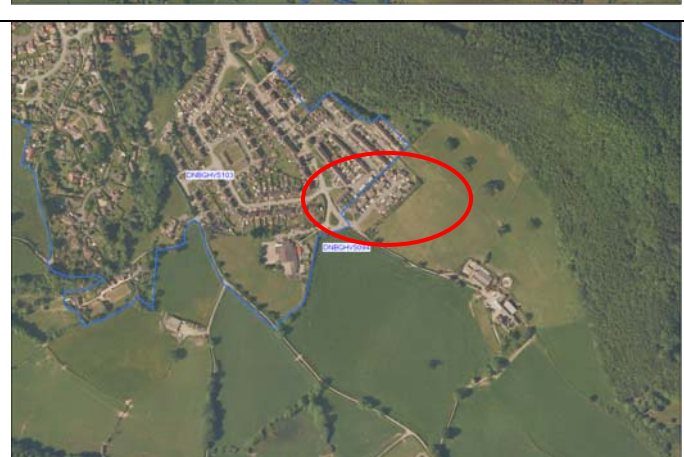
These are illustrated by maps and aerial photos on the following pages.



*Mega change map*



Aerial view of change	Potential/actual change
	<p>DNBGHVS009</p> <p>Expansion of Prestatyn to the west</p>
	<p>DNBGHVS030</p> <p>Expansion of St Asaph to the north</p>
	<p>DNBGHVS034</p> <p>Expansion of Bodelwyddan to the north</p>
	<p>DNBGHVS045</p> <p>Expansion of Ruthin to the north</p>

	<p>DNBGHVS056</p> <p>Expansion of quarry</p>
	<p>DNBGHVS068 and DNBGHVS069</p> <p>Tir Mostyn and Foel Goch Windfarms- access roads and pads visible on aerial (red lines). The effect on character of the windfarms will extend further than the aspect areas in which they are located. Broadleaf planting in conifer plantation (green lines).</p>
	<p>DNBGHVS094</p> <p>Removal of conifer plantation on locally prominent hill- Vale of Llangollen</p>
	<p>DNBGHVS103</p> <p>Expansion of Llangollen to the south east</p>

**APPENDIX**  
**LANDMAP VISUAL AND SENSORY DATA CHANGE DETECTION SHEETS:**  
**DENBIGHSHIRE**



Aspect area		Change- indicated by:					Stage 2c	
UID	Name	OS data, aerial photos and roads and buildings	Complexity maps (segment density) and NVDI	Phase 1 and seasonal change	LPA workshop/ questionnaire	Other resources	Field-work	Recommended LANDMAP amendment- GIS or survey or both
DNBGHVS004	Prestatyn/ Rhyl	Aerial and Built form indicate settlement expansion						GIS-Amend boundary to west
DNBGHVS009	Coastal fields west of Prestatyn	Aerial and roads indicate settlement expansion						GIS-Amend boundary to east
DNBGHVS012	Rhuddlan	Aerial-commercial development extension to west						Survey- amend boundary
DNBGHVS013	Coastal fields - near Towyn	Aerial-commercial development extension of Rhuddlan to west						Survey- amend boundary
DNBGHVS014	Area north and east of Bodelwyddan	Aerial-settlement extension of Bodelwyddan to north						Survey- amend boundary
DNBGHVS030	St Asaph	Aerial-settlement extension to north						GIS-Amend boundary to incorporate fixed caravan park to north
DNBGHVS033	Cefn Estate		Segment density- indicates significantly					Survey- management guidelines might note any management necessary for pipeline route running along northern edge

			more complex					
Aspect area		Change- indicated by:					Stage 2c	
UID	Name	OS data, aerial photos and roads and buildings	Complexity maps (segment density) and NVDI	Phase 1 and seasonal change	LPA workshop/ questionnaire	Other resources	Field-work	Recommended LANDMAP amendment- GIS or survey or both
DNBGHVS034	Bodelwyddan and industrial fringe	Aerial- settlement extension to north						Survey- amend boundary
DNBGHVS044	Vale of Clwyd Denbigh- Ruthin	Aerial and roads indicate settlement expansion						GIS-Amend boundary to south
DNBGHVS045	Ruthin	Aerial and roads indicate settlement expansion with a new link road						GIS-Amend boundary to north, or consider separate aspect area to cover industrial area in development
DNBGHVS049	Clwydian slopes main ridge	Aerial- felling evident	NDVI indicates reduction in productivity-plantation felling			NRW- broadleaf planting plans indicate planting in forest plantation to the east		Survey- Consider change to description to include felling and some replanting with deciduous species leading to a mixed plantation
DNBGHVS056	Quarry	Aerial- expansion of quarry						GIS-Amend boundary for quarry
DNBGHVS067	Denbigh and Derwen Hills	Aerial and built form indicate windfarms of Tir Mostyn and Foel Goch on						Survey- Possibly change description to include adjacent windfarms as backcloth to area to west and effects including tranquillity

		western backcloth to area						
<b>Aspect area</b>		<b>Change- indicated by:</b>					<b>Stage 2c</b>	
<b>UID</b>	<b>Name</b>	<b>OS data, aerial photos and roads and buildings</b>	<b>Complexity maps (segment density) and NVDI</b>	<b>Phase 1 and seasonal change</b>	<b>LPA workshop/questionnaire</b>	<b>Other resources</b>	<b>Field-work</b>	<b>Recommended LANDMAP amendment- GIS or survey or both</b>
DNBGHVS068	Clocaenog Forest	Aerial- felling evident and built form also indicates windfarms of Tir Mostyn and Foel Goch on eastern edge	NDVI indicates reduction in productivity-plantation felling			NRW- broadleaf planting plans indicate planting throughout, especially to the north		Survey- Consider change to description to include felling and also adjacent constructed windfarm at Tir Mostyn and consented windfarm at Derwydd Bach and effect on character including tranquillity. Also consider change to guidelines in light of the above.
DNBGHVS069	Llyn Brenig moorland/forest	Aerial- felling evident and windfarm evident adjacent - Foel Goch and Tir Mostyn	NDVI indicates reduction in productivity-plantation felling			Renewable Energy planning database indicates Llyn Brenig East windfarm in area and Foel Goch and Tir Mostyn in adjacent area and Wern Ddu wind farm is located on adjacent ridge		Survey- Change description to include possibly constructed Llyn Brenig windfarm and adjacent windfarms and their effects including tranquillity
DNBGHVS070	Maerdy Hills					Renewable Energy		Survey- Change description to include adjacent windfarm at Wern Ddu and

						planning database indicates Derwydd Bach wind farm is consented and Wern Ddu wind farm is located on adjacent ridge		consented windfarm at Derwydd Bach and effects including tranquillity
Aspect area		Change- indicated by:					Stage 2c	
UID	Name	OS data, aerial photos and roads and buildings	Complexity maps (segment density) and NVDI	Phase 1 and seasonal change	LPA workshop/questionnaire	Other resources	Field-work	Recommended LANDMAP amendment- GIS or survey or both
DNBGHVS071	Gwddelwern Quarry					Renewable Energy planning database indicates Wern Ddu wind farm is located on adjacent ridge and consented nant Bach windfarm is to the west		Survey- Change description to include adjacent windfarm/s and effects including tranquillity
DNBGHVS072	Mynydd Rhyd Ddu	turbine access tracks-roads				Renewable Energy planning database indicates Wern Ddu wind farm		Survey- Change description to include windfarm and its effects including tranquillity

						is located in the area		
<b>Aspect area</b>		<b>Change- indicated by:</b>					<b>Stage 2c</b>	
<b>UID</b>	<b>Name</b>	<b>OS data, aerial photos and roads and buildings</b>	<b>Complexity maps (segment density) and NVDI</b>	<b>Phase 1 and seasonal change</b>	<b>LPA workshop/ questionnaire</b>	<b>Other resources</b>	<b>Field-work</b>	<b>Recommended LANDMAP amendment- GIS or survey or both</b>
DNBGHVS073	Gwyddelwern Hills							Survey- Change description to include adjacent windfarm and effect on character including tranquillity
DNBGHVS082	Cyrn-y-Brain Forest	Aerial and roads- indicate clearance of some plantation in pockets						Survey- Consider amending description to include pocket clearance
DNBGHVS094	Vale of Llangollen	Aerial- felling evident in some forest plantations including on prominent hill in valley	NDVI indicates reduction in productivity-plantation felling					Survey- Consider change to description to include felling in prominent locations and also in guidelines for replanting. GIS- Amend boundary south of Llangollen to accommodate expansion.
DNBGHVS098	Afforested slopes- Llandrillo/ Corwen	Aerial- felling evident to the south west	NDVI indicates reduction in productivity-plantation felling					Survey- Consider amending description to include some clearance of forest plantation
DNBGHVS099	Cynwyd Forest, Corwen	Aerial- felling evident	NDVI indicates reduction in productivity-plantation felling			NRW- broadleaf planting plans indicate planting in forest plantation		Survey- Consider change to description to include felling and some replanting with deciduous species leading to a mixed plantation although conifer dominates
DNBGHVS100	Berwyn Mountains		Segment density- indicates less					Survey- assess area for changes in vegetation cover possibly due to grazing regimes and alter Description and

			complex					Management recommendations if required.
<b>Aspect area</b>		<b>Change- indicated by:</b>					<b>Stage 2c</b>	
<b>UID</b>	<b>Name</b>	<b>OS data, aerial photos and roads and buildings</b>	<b>Complexity maps (segment density) and NVDI</b>	<b>Phase 1 and seasonal change</b>	<b>LPA workshop/ questionnaire</b>	<b>Other resources</b>	<b>Field-work</b>	<b>Recommended LANDMAP amendment- GIS or survey or both</b>
DNBGHVS103	Llangollen	Aerial- settlement extension to south east						GIS- Amend boundary to south east
DNBGHVS113	Llyn Brenig	Aerial- windfarm to east- Tir Mostyn and Foel Goch						Survey- Change description to include effect on character of nearby Tir Mostyn and Foel Goch windfarm including tranquillity