Visual Representation of wind farms

Training day

Battleby, 23rd October 2014
• Background (Brendan)

• 2 technical sessions (Ian)

• Verification (Brendan)

• Q&A / feedback
Background – how we got to where we are…..

Brendan Turvey
Policy and Advice Manager, SNH
23rd October 2014
Scottish Natural Heritage

Outline

• Why we reviewed the guidance
• How we did it
• The paradigm shift
• The evidence
• Key changes
• The THC Standards
• What next
Why we reviewed the guidance

- 2006 version out of date
- New methods emerging
- Request from Minister for a single, objective, verifiable methodology across Scotland
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How we did it

- **Steering Group** (SNH, LIS, SG Planning and ECDU, THC, HoPS, Scottish Renewables)

- Field testing

- Consultation
• Canon EOS 5D Mk 2 with a Canon EF 28mm (f/2.8) lens

• Canon EOS 5D Mk 2 with a Canon EF 35mm (f/2) lens

• Pentax K-r digital SLR (with an APS-C size sensor) fitted with an SMC Pentax-A 28mm f/2.8 lens

• Nikon FM 35mm film SLR with a Nikkor 50mm f/1.8 lens.

• Canon EOS 5D Mk 2 with a Canon EF 50mm f/1.8 lens
Format A - 50mm single frame images (3 versions, complying with THC standards 2010, then 2013)

Format B - 75mm single frame images (3 versions, complying with THC standards 2010, then 2013)

Format C – cylindrical projection image which conforms with the 2006 SNH guidance

Format E, F, G – planar panoramic images presented at A1 length, with focal lengths of 50, 60 and 75 respectively, enlarged from 50mm photography

Format H – 50mm lens with 57.3 horizontal field of view, enlarged to 75mm equivalent

Format I – 28mm lens cropped to 57.3 horizontal field of view, enlarged to 75mm equivalent

Format J – 50mm lens 53.5 horizontal field of view, enlarged to 75mm equivalent

Format K – 28mm lens cropped to 53.5 horizontal field of view, enlarged to 75mm equivalent

Transparencies at both 50mm and 75mm focal length, printed at A3.
Field testing

- 82 people involved in field tests
- Landscape architects, developers, planning officers, DPEA reporters, ECDU staff, SNH staff
- 4 viewpoints at 5, 4, 11 and 20km from an existing wind farm
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Consultation

- May – July 2013
- 69 responses
- Consultation workshop in June
- Main conclusions
  - Too many images and options
  - Avoid contradictory images
  - Keep it simple
  - Mixed views on transition to new format
  - Support for digital viewer
  - Mixed understanding of methods
  - Consistent approach onshore / offshore
- Final draft in Sept 2013
- Advice to Government 3rd Dec 2013
- Publication in July 2014
- Final package of images supported by:
  - SNH
  - Scottish Renewables
  - Landscape Institute
  - Heads of Planning Scotland
  - Scottish Government
The paradigm shift

- 2006 guidance based on perspective geometry
- 2014 based on perception of scale and distance in the landscape
  - The “viewing distance” is dead!
  - Cylindrical to planar projection
Leonardo’s window…. good for perspective, not for perception, particularly in long distance views which are typical for wind farms....
Viewpoint: Cateran Trail Old Military Road (ES viewpoint 8)

Format A (50mm)
### Viewpoint: Cateran Trail Old Military Road (ES viewpoint 8)

**Format B (50mm)**

- **OS reference:** 314330 E, 750897 N
- **Eye level:** 251 m AOD
- **Direction of view:** 41°
- **Horizontal field of view:** 27° (planar projection)
- **Principal distance:** 750 mm
- **Nearest turbine:** 4.8 km

**Camera:** Canon EOS 5D Mk2
- **Lens:** 50mm (Canon EF 50mm f/1.8)
- **Camera height:** 1.5 m AGL
- **Date and time:** 06/02/2013 13:03

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**Actual photograph**

The photograph shows a landscape scene with snow-covered fields and wind turbines in the background. Trees and scattered houses are visible in the foreground.
The paradigm shift.....

50mm transparency  50mm photograph  75mm photograph

.....you view a **cropped and enlarged image**, at a **comfortable arm’s length** to compensate for linear perspective and the lack of depth in the printed image.....
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• THC field testing and analysis


• “Wind farm visualisations. Perspective or perception?” by Alan Macdonald (Whittles 2012).
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Key changes

- More prescriptive (but with some options and flexibility)
  - portrait images in some circumstances
  - create images in cylindrical projection if necessary

- Standardised image size
- Verification method
- Move to the equivalent of 75mm images (cropped and enlarged from 50mm photograph)
- Larger images, held flat at a comfortable arm’s length
• Limited changes
• Less, not more…
The new methodology

- Full frame sensor camera
- 50mm fixed focal length lens
- Standard camera height (1.5m)
- Enlarged to equivalent of 75mm
- Specification for image size (VFOV and HFOV)

See Annex F
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Images in the ES

90° to 360° baseline photo and cumulative wireline (on separate sheets)

‘75mm’ wireline

‘75mm’ photomontage
Additional images

Jpeg for digital viewer

Viewpoint pack – single frame for use on site only
• Aiming to have ready for Jan 2015

• Applicant to provide jpeg

• PA to load in to viewer through e-planning
  – Ease of access online
  – Useful to illustrate cumulative effects
  – Users can print if required
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Single frame for viewpoint pack

Figure:
Viewpoint 8: Cateran Trail Old Military Road

Photomontage
View flat at a comfortable arm’s length

OG reference: 314310 E 756380 N
Eye level: 281 m AOD
Direction of view: 41°
Nearest turbine: 4.8 km

Horizontal field of view: 37° (planar projection)
Principal distance: 812.5 mm
Paper size: 430 x 257 mm (A3)
Correct printed image size: 350 x 250 mm

Camera: Canon EOS 5D Mark II
50mm (Canon EF 50mm f/1.4)

Date and time: 13/05/2010 12:00
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Information to include on visuals

See Para 132...

View flat at a comfortable arm's length

OS reference: 314339 E 750880 N
Eye level: 251 m AOD
Direction of view: 41°
Nearest turbine: 4.8 km

Horizontal field of view: 27° (planar projection)
Principal distance: 812.5 mm
Paper size: 420 x 297 mm (A3)
Correct printed image size: 390 x 260 mm

Camera: Canon EOS 5D Mk2
Lens: 50mm (Canon EF 50mm f/1.8)
Camera height: 1.5 m AGL
Date and time: 13/08/2013 12:00
Limitations

• Set out in **Annex A**

• Provide in ES **and** at public exhibition

• Use same images at public exhibitions
• Set out in **Annex B**

• It is for decision makers to ‘police’ this, not SNH

<table>
<thead>
<tr>
<th><strong>Photography</strong></th>
<th><strong>Camera</strong></th>
<th>Full Frame Sensor Size</th>
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</thead>
<tbody>
<tr>
<td><strong>Lens</strong></td>
<td>50mm fixed focal length</td>
<td></td>
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<tr>
<td><strong>Camera height</strong></td>
<td>1.5m (unless alternative height can be justified, in agreement with planning authority)</td>
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<tr>
<td><strong>Location</strong></td>
<td>Grid reference, relevant location map, and photograph of tripod location provided</td>
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<table>
<thead>
<tr>
<th><strong>Photomontage</strong></th>
<th><strong>Image</strong></th>
<th>Clear of foreground objects</th>
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</thead>
<tbody>
<tr>
<td><strong>Conditions</strong></td>
<td>Visibility sufficiently good</td>
<td></td>
</tr>
<tr>
<td><strong>Baseline panorama and wireline</strong></td>
<td>Cylindrical projection 90, 180, 270 or 360 degrees printed on A1 length sheet(s). Image size for both the baseline panorama and wireline should be 820mm by 130mm</td>
<td></td>
</tr>
<tr>
<td><strong>Wireline</strong></td>
<td>Planar projection, image size 250 by 820mm on A1 sheet. HFOV 53.5° and VFOV 18°</td>
<td></td>
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<tr>
<td><strong>Panorama</strong></td>
<td>Planar projection, image size 260 by 820mm on A1 sheet. HFOV 53.5° and VFOV 18°</td>
<td></td>
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<tr>
<td><strong>Viewpoint pack</strong></td>
<td>A3 single frames from viewpoints agreed with determining authority, image size 260 by 390mm. HFOV 27° and VFOV 18°</td>
<td></td>
</tr>
<tr>
<td><strong>JPEG</strong></td>
<td>Cylindrical projection jpeg for uploading to digital viewer. VFOV 18° and HFOV as required</td>
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</tr>
<tr>
<td><strong>Principal Distance</strong></td>
<td>Printed on visualisations</td>
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| **Maps** | **Viewpoint map** | To include overall viewpoint location map (combined with ZTV). Thumbnail location map provided on each panorama |

| **Methodology** | Statement of methodologies used to produce visualisations including ZTVs and software used |
• Remain in force
• Common photographic standard
• Use same baseline photography
• 4 additional images (and potentially optional extras)
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SNH requirements

THC requirements

65 degree A3 baseline

65 degree A3 panorama

50mm A3 single frame

75mm A3 single frame
Some recent clarifications:

- OS terrain 5 and 50 fine

- 1.5m **tripod height** to align with THC

- we don’t recommend the use of **acetates**

- **pragmatic approach** required if old photography is used

- we’re not going to prescribe a **workflow** to produce the visualisations, the parameters are set
Some recent clarifications:

- 127 and 163 on turbine direction, use judgement

- non SLR camera fine as long as it meets sensor size

- fine to stitch in cylindrical and convert to planar (166)

- If very close to wind farm and can’t fit in enough context switch to portrait (118)
• Same format for onshore

• Specific considerations for viewpoint selection

• Lighting
• Version 3 in Nov / December
• Grace period ends Jan 2015
• Research on the use of visualisations (Phase 1 and 2)
• Report: Nov 2015
• Reconvene Steering Group: Dec 2015
• Review in Spring 2016
• Research on small scale 2015/16
Brendan Turvey on 01738 458622

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http://www.snh.gov.uk/planning-and-development/renewable-energy/visual-representation/
Visual Representation of wind farms

Training day

Battleby, 23rd October 2014
Verification

Brendan Turvey
Policy and Advice Manager, SNH
23rd October 2014
• Important to maintain public trust

• People know their landscapes well and will ‘question’ the visuals submitted

• A robust verification process should be available to test images if required
**Annex E**

**Checking photography**

1. Source original single frame and metadata
2. Check that camera used has a full frame sensor
3. Check that 50mm fixed focal length lens was used
4. Check single frame provided corresponds with marked extent on baseline panorama
   - or -
5. Check that marked extent is approx 360mm on baseline panorama (some camera configurations may result in a slightly smaller dimension)

**Checking turbine heights and/or locations**

1. Check description of rendering in the ES has followed process described in para 162 - 171
2. If further verification is required overlay the wireframe with the panorama and check fit
3. Alternatively, mark reference points on panorama and measure angles, comparing these to plan view and/or turbine height specified using simple trigonometry
4. Copy single frame on to transparency and check match with centre of the panorama (the two should be identical)
5. Check that the extent of the 53.3 planar panorama corresponds to the markings on baseline panorama (487mm)
What the practitioner needs to do

- Provide markings on baseline panorama
- Make original 50mm images available on request
- Keep full record of photography and production process
- Document any ‘variations’ from the guidance
What the user has to do

• Test the visuals in the field; or

• Obtain the original 50mm photograph and follow the process in Annex E
  
  • either verify single frame (using template) and overlay on panorama, or

  • verify panorama (using a ruler)
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Using the baseline panorama

Extent of central 50mm frame used to construct panorama

360mm

487mm
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Verification process

- SNH will only test in field
- Planning Authority should verify images if necessary
- Process provided to check turbine height and locations
Visual Representation of wind farms

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