Appendix 7.A
Noise Terminology

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Appendix 7A
Noise Terminology

The ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. Because of the wide range a logarithmic scale is used in noise level measurement. The scale used is the decibel (dB) scale which extends from 0 to 140 dB corresponding to the intensity of the sound pressure level. It is widely accepted that a change of 3 dB(A) is required for a person to perceive the change in a steady noise level and that an increase or decrease of 10 dB(A) is perceived as being twice or half as loud respectively.

The ear has the ability to recognise a particular sound depending on the pitch or frequencies found at the source. Microphones cannot differentiate noise in the same way as the ear and to counter this, the noise measuring instrument applies a correction to correspond more closely to the frequency response of the human ear. The correction factor is called 'A Weighting' and the resulting measurements are written as dB(A). The dB(A) is internationally accepted and has been found to correspond well with people's subjective reaction to noise. Typical dB(A) noise levels for familiar noises are given in **Table 7A.1**.

Table 7A.1 Typical Noise Levels

Approximate Noise Level (dB)	Example
0	Limit of hearing
30	Rural area at night, no wind or adverse weather conditions
40	Library
50	Quiet office without noisy machinery, such as typewriters
60	Normal conversation
70	In car noise without radio
80	Household vacuum cleaner
100	Pneumatic drill
140	Threshold of pain

Source: Generalised Examples Based upon Flakt Woods: Practical Guide to Noise Control, Ninth Impression, 2005, Table 1.3 Average Sound Pressure Levels to be Expected in Some Common Environments

The following indices are used when describing noise:

- L_W is the sound power level. It is a measure of the total noise energy radiated by a source of noise, and is used to calculate noise levels at a distant location. The L_{WA} is the A-weighted sound power level;
- L_{eq} is the equivalent continuous sound level, and is the sound level of a steady sound with the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time. The L_{Aeq} is the A-weighted equivalent continuous sound level;
- L_{90} index represents the noise level exceeded for 90 percent of the measurement period and is used to indicate quieter times during the measurement period. It is often used to measure the background noise level. The L_{A90} is the A-weighted background noise level;
- L_{Amax} is the A-weighted maximum recorded noise level during the measurement period;
- Hard Ground (G=1) – a ground cover which includes paving, water, ice, concrete and all other ground surfaces having a low porosity;

- Soft Ground (Porous) (G=0) – ground cover which includes ground covered by grass, trees or other vegetation, and all other ground surface suitable for the growth of vegetation, such as farming land; and
- Mixed Ground (G=0.5) – the surface consists of both hard and soft (porous) ground.

The ETSU-R-97 Guidance includes a specific definition of tones in relation to wind farm noise. However, for the purposes of this assessment a tone may be considered a sound at a specific pitch or frequency which is audible above noise levels at other frequencies from the turbine at the receptor.

A final non-acoustic descriptor used in this assessment is wind shear. The level of wind shear for a particular site describes how wind speed varies with height, and is assigned a coefficient which can be used to convert the wind speed measured at one height to the wind speed at another height.

Appendix 7.B
Noise Kit Specifications

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

MEASUREMENT SYSTEMS

CERTIFICATE OF CONFORMANCE

Date of Issue	**22 February 2013**
Customer	**AMEC Environment & Infrastructure UK Ltd**
Certificate Number	**CONF021313**

	Manufacturer	Type	Serial Number
Sound Level Meter	Rion	NL-52	01121394
Preamplifier	Rion	NH-25	21438
Microphone	Rion	UC-59	04410

This is to certify that the instrument was tested and calibrated at the Manufacturer's factory according to their specification and that the product satisfied all the relevant requirements of the following Standards:

IEC 61672-1:2002 Class 1.

The instrument also received a functional check by ANV Measurement Systems prior to despatch in the UK, in accordance with our standard procedures.

Signed. Amrat C. Patel Position.Laboratory Manager. Date.22/02/2013.

BEAUFORT COURT, 17 ROEBUCK WAY, MILTON KEYNES, MK5 8HL
☎ 01908 642846 🖷 01908 642814
✉ info@noise-and-vibration.co.uk 💻 www.noise-and-vibration.co.uk

ACOUSTICS NOISE AND VIBRATION LIMITED. REGISTERED IN ENGLAND NO. 3549028. REGISTERED OFFICE AS ABOVE.

MEASUREMENT SYSTEMS

CERTIFICATE OF CONFORMANCE

Date of Issue	**22 February 2013**
Customer	**AMEC Environment & Infrastructure UK Ltd**
Certificate Number	**CONF021314**

	Manufacturer	**Type**	**Serial Number**
Sound Level Meter	Rion	NL-52	01121395
Preamplifier	Rion	NH-25	21439
Microphone	Rion	UC-59	04412

This is to certify that the instrument was tested and calibrated at the Manufacturer's factory according to their specification and that the product satisfied all the relevant requirements of the following Standards:

IEC 61672-1:2002 Class 1.

The instrument also received a functional check by ANV Measurement Systems prior to despatch in the UK, in accordance with our standard procedures.

Signed. Amrat C. Patel Position.Laboratory Manager Date.22/02/2013.

BEAUFORT COURT, 17 ROEBUCK WAY, MILTON KEYNES, MK5 8HL
☎ 01908 642846 🖹 01908 642814
✉ info@noise-and-vibration.co.uk 💻 www.noise-and-vibration.co.uk

ACOUSTICS NOISE AND VIBRATION LIMITED. REGISTERED IN ENGLAND NO. 3549028. REGISTERED OFFICE AS ABOVE.

NL-32 (61)

CERTIFICATE OF CALIBRATION

Date of Issue: 16 October 2013 **Certificate Number: TCRT13/1311**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

M. Breslin [ ] K. Mistry [ ]

Customer	Amec Environment and Infrastructure UK Ltd Northumbria House Regent Centre Gosforth Newcastle upon Tyne NE3 3PX
Order No.	261015
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-32	00513549
Rion	Firmware		1.4
Rion	Pre Amplifier	NH-21	35651
Rion	Microphone	UC-53A	318322
Rion	Calibrator	NC-74	34251554
	Calibrator adaptor type if applicable		NC-74-002

Performance Class	1
Test Procedure	TP 2.SLM 61672-3 TPS-49
	Procedures from IEC 61672-3:2006 were used to perform the periodic test.
Type Approved to IEC 61672-1:2002	No Approval Number
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003
Date Received	08 October 2013 ANV Job No. TRAC13/10179
Date Calibrated	16 October 2013

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	03 August 2012	TCRT12/1143	ANV Measurement Systems

This certificate provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATE OF CALIBRATION

Certificate Number
TCRT13/1311

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	NL-22 NL-32 Instruction Manual		
SLM instruction manual ref / issue	33625 09-06		
SLM instruction manual source	Manufacturer		
Internet download date if applicable	N/A		
Case corrections available	Yes		
Uncertainties of case corrections	No	See comment on page 3	
Source of case data	Manufacturer		
Wind screen corrections available	Yes		
Uncertainties of wind screen corrections	No	See comment on page 3	
Source of wind screen data	Manufacturer		
Mic pressure to free field corrections	Yes		
Uncertainties of Mic to F.F. corrections	No	See comment on page 3	
Source of Mic to F.F. corrections	Manufacturer		
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes		
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Customers Calibrator		
Calibrator adaptor type if applicable	NC-74-002		
Calibrator cal. date	11 October 2013		
Calibrator cert. number	TCRT13/1308		
Calibrator cal cert issued by Lab.	ANV Measurement Systems		
Calibrator SPL @ STP	94.03	dB	Calibration reference sound pressure level
Calibrator frequency	1000.90	Hz	Calibration check frequency
Reference level range	30 - 120	dB	

Accessories used or corrected for during calibration - Wind Shield WS-10
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	21.98	22.68	± 0.20 °C
Humidity	47.6	50.8	± 3.00 %RH
Ambient Pressure	99.96	99.83	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.1	dB		Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±					0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	10.5	dB	UR	17.8	dB	UR	22.7	dB	
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Comments

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the Actual microphone free field response was used.
The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

If any of the "Uncertainties of ....." are set to NO above, then the following applies.
No information on the uncertainty of measurement, required by 11.7 of IEC 61672-3:2006, of the adjustment data given in the instruction manual or obtained from the manufacturer or supplier of the sound level meter, or the manufacturer of the microphone, or the manufacturer of the multi-frequency sound calibrator, or the manufacturer of the electrostatic actuator was published in the instruction manual or made available by the manufacturer or supplier. The uncertainty of the measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the sound level meter may not conform to the requirements of IEC 61672-1:2002.

Calibrated by: A Patel

..... END .....

Additional Comments
None

CERTIFICATE OF CALIBRATION

Date of Issue: 08 October 2013 **Certificate Number: TCRT13/1307**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

M. Breslin [ ] K. Mistry [ ]

Customer	Amec Environment and Infrastructure UK LTD Finance Department Northumbria House Regent Centre Gosforth Newcastle upon Tyne NE3 3PX			
Order No.	261015			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-32	00513581
	Rion	Firmware		1.400AN1003
	Rion	Pre Amplifier	NH-21	35683
	Rion	Microphone	UC-53A	318469
	Brüel & Kjær	Calibrator	4231	3002998
		Calibrator adaptor type if applicable		UC 0210
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic test.*			
Type Approved to IEC 61672-1:2002	No Approval Number *If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*			
Date Received	08 October 2013	ANV Job No.	TRAC13/10179	
Date Calibrated	08 October 2013			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	03 August 2012	TCRT12/1144	ANV Measurement Systems

This certificate provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATE OF CALIBRATION

Certificate Number
TCRT13/1307

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	NL-22 NL-32 Instruction Manual		
SLM instruction manual ref / issue	33625 09-06		
SLM instruction manual source	Manufacturer		
Internet download date if applicable	N/A		
Case corrections available	Yes		
Uncertainties of case corrections	No	See comment on page 3	
Source of case data	Manufacturer		
Wind screen corrections available	Yes		
Uncertainties of wind screen corrections	No	See comment on page 3	
Source of wind screen data	Manufacturer		
Mic pressure to free field corrections	Yes		
Uncertainties of Mic to F.F. corrections	No	See comment on page 3	
Source of Mic to F.F. corrections	Manufacturer		
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes		
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Lab Calibrator		
Calibrator adaptor type if applicable	UC 0210		
Calibrator cal. date	07 October 2013		
Calibrator cert. number	UCRT13/1160		
Calibrator cal cert issued by Lab.	ANV Measurement Systems		
Calibrator SPL @ STP	94.12	dB	Calibration reference sound pressure level
Calibrator frequency	1000.00	Hz	Calibration check frequency
Reference level range	30 - 120	dB	

Accessories used or corrected for during calibration - Wind Shield WS-10
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	22.81	22.69	± 0.20 °C
Humidity	54.9	54.4	± 3.00 %RH
Ambient Pressure	101.42	101.39	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.1	dB	Adjusted indicated level	94.1	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	11.7	dB	UR	18.0	dB	UR	24.0	dB	
Uncertainty of the electrical self generated noise ±							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Comments

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the Actual microphone free field response was used.
The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

If any of the "Uncertainties of ....." are set to NO above, then the following applies.
No information on the uncertainty of measurement, required by 11.7 of IEC 61672-3:2006, of the adjustment data given in the instruction manual or obtained from the manufacturer or supplier of the sound level meter, or the manufacturer of the microphone, or the manufacturer of the multi-frequency sound calibrator, or the manufacturer of the electrostatic actuator was published in the instruction manual or made available by the manufacturer or supplier. The uncertainty of the measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the sound level meter may not conform to the requirements of IEC 61672-1:2002.

Calibrated by: A Albans

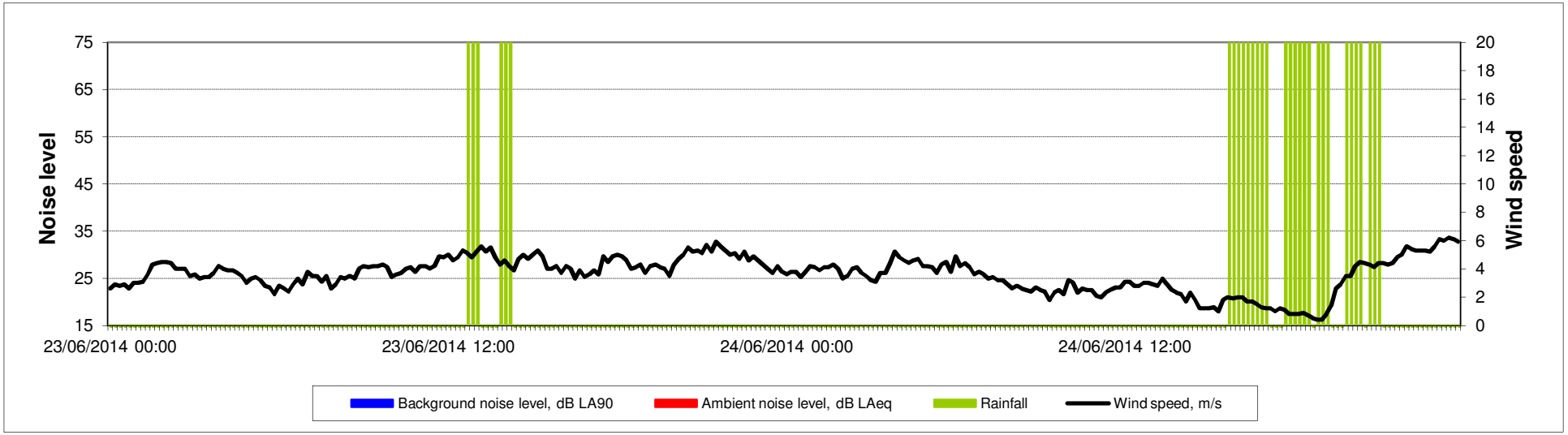
..... END .....

Additional Comments
None

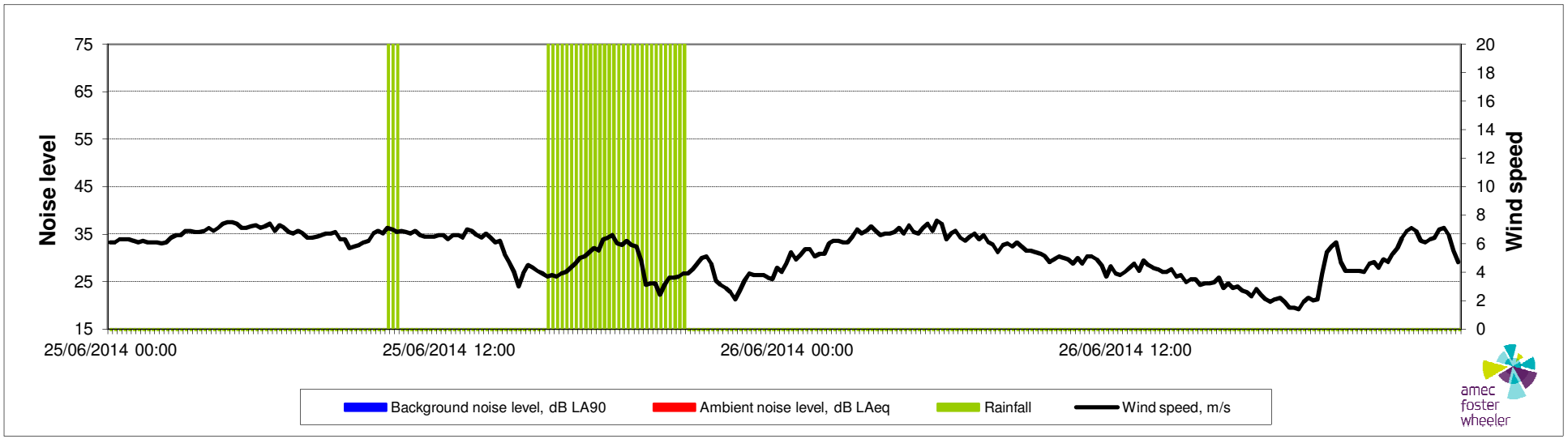
Appendix 7.C
Noise Survey – Time History Graphs

© Amec Foster Wheeler Environment & Infrastructure UK Limited

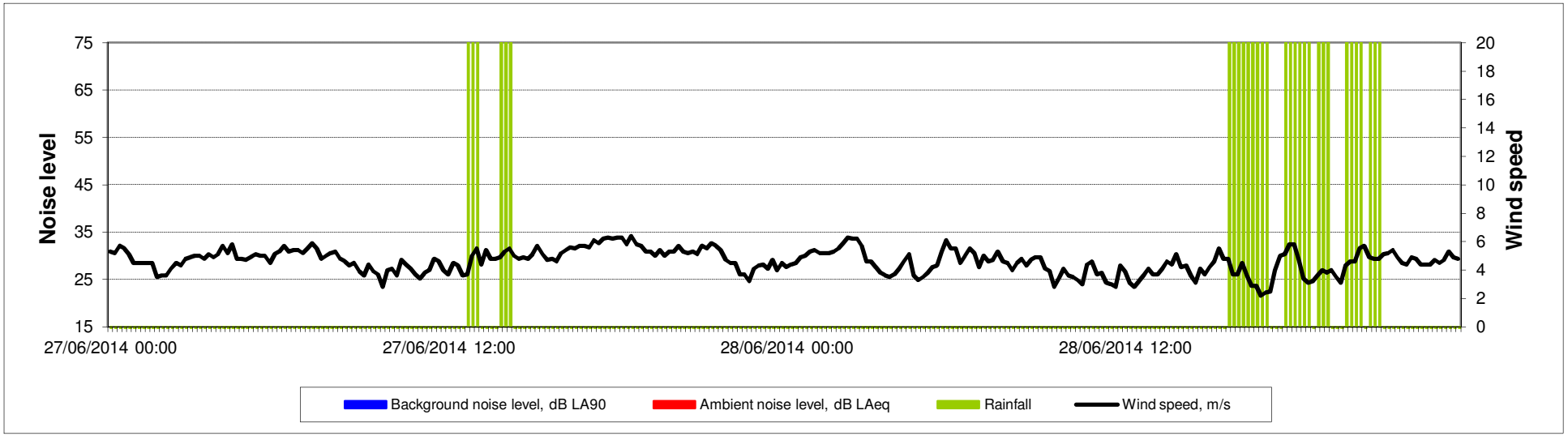
© Amec Foster Wheeler Environment & Infrastructure UK Limited



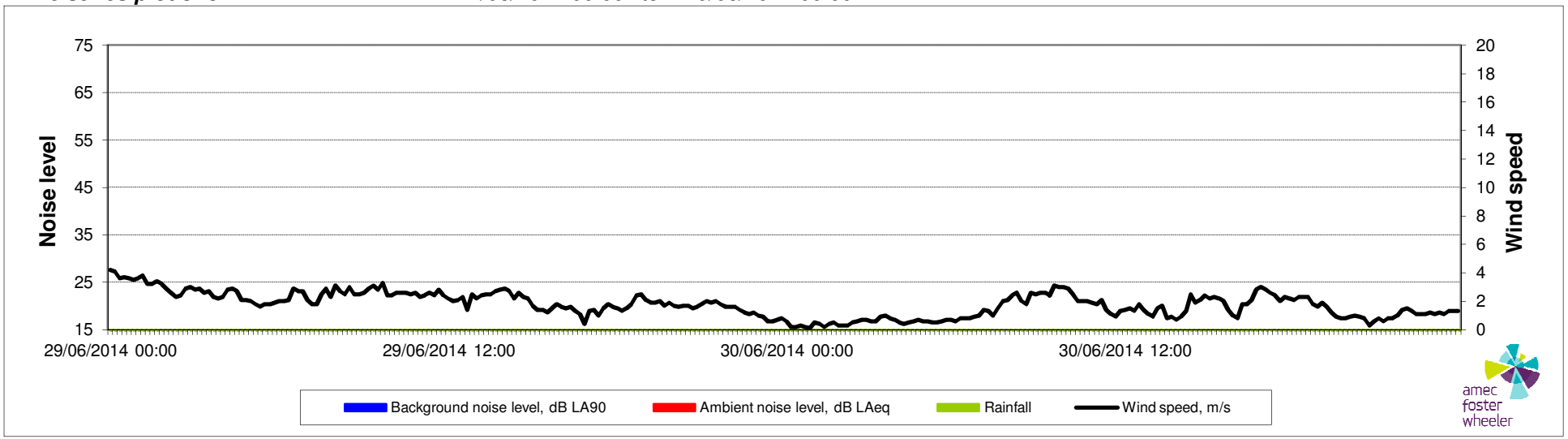
Time series plot 1 for M1 *23/06/2014 00:00 to 25/06/2014 00:00*



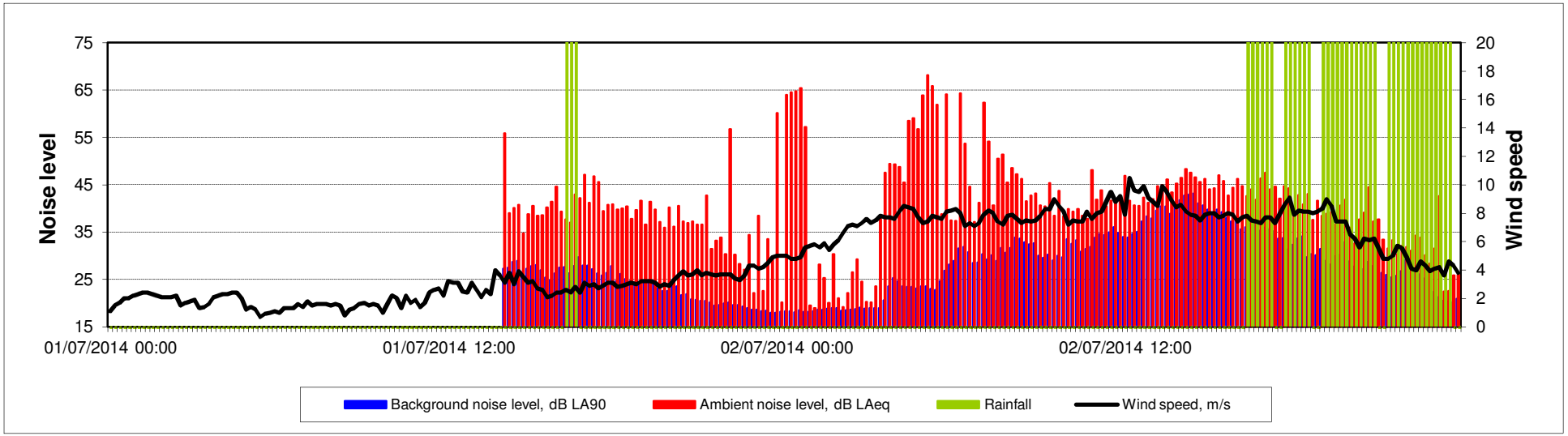
Time series plot 2 for M1 *25/06/2014 00:00 to 27/06/2014 00:00*



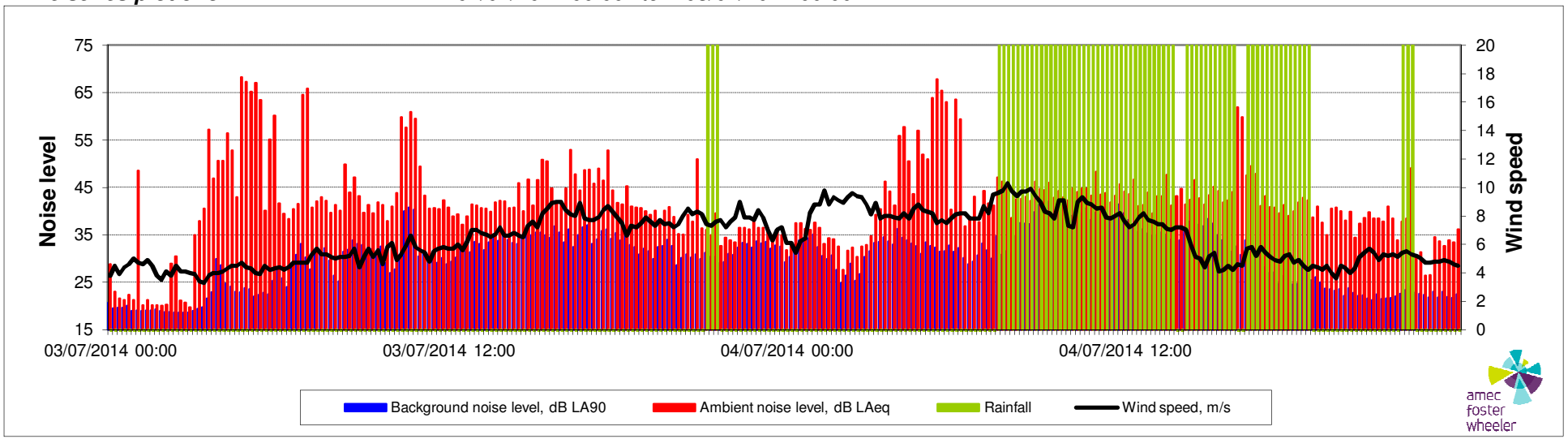
Time series plot 3 for M1 *27/06/2014 00:00 to 29/06/2014 00:00*



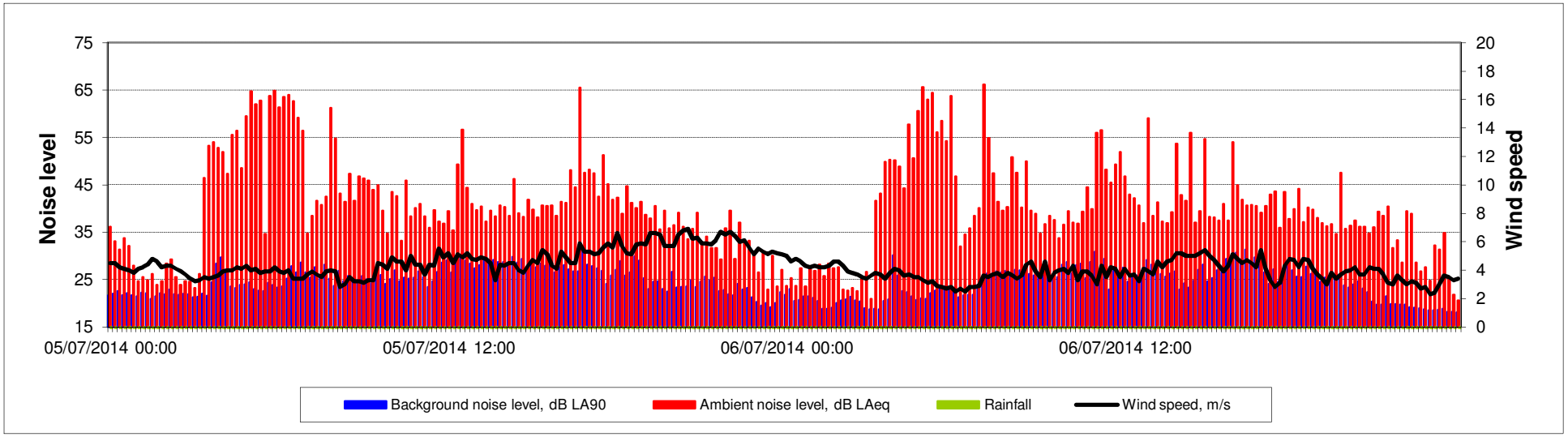
Time series plot 4 for M1 *29/06/2014 00:00 to 01/07/2014 00:00*



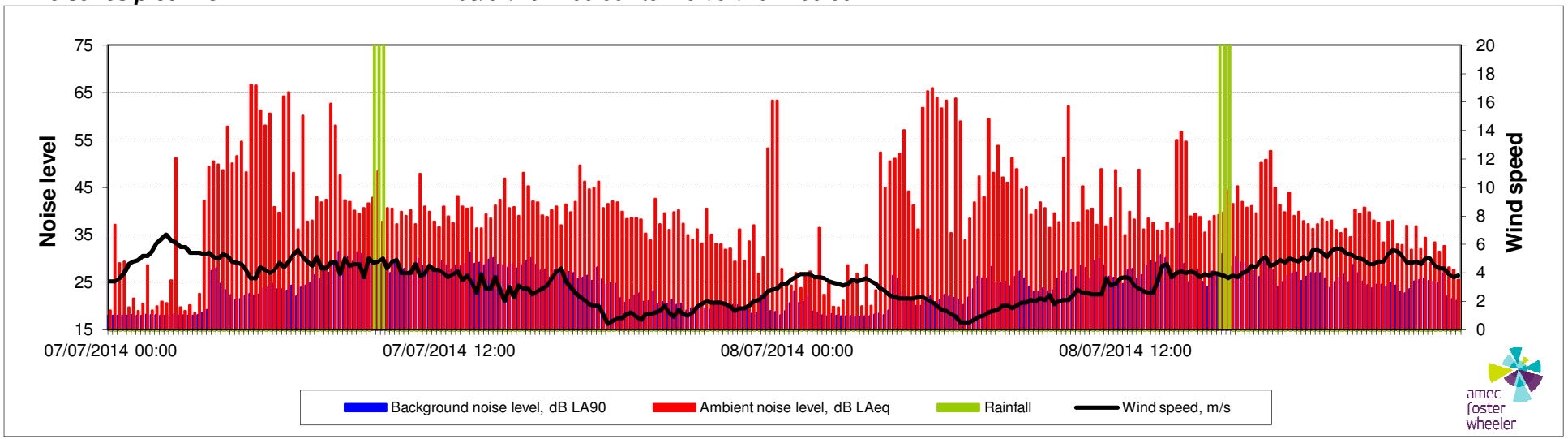
Time series plot 5 for M1 *01/07/2014 00:00 to 03/07/2014 00:00*



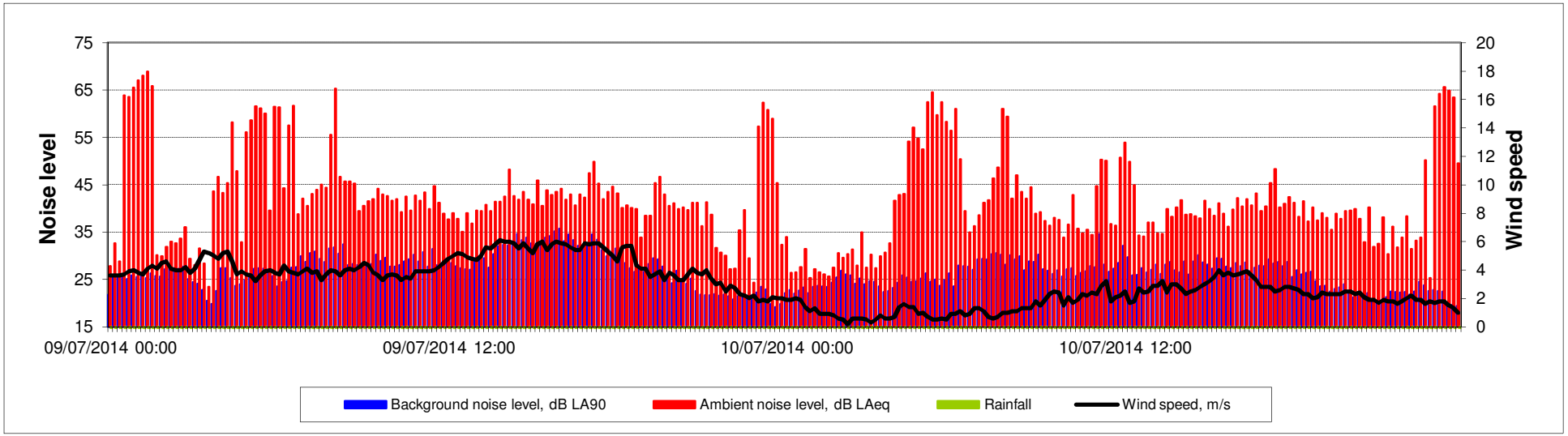
Time series plot 6 for M1 *03/07/2014 00:00 to 05/07/2014 00:00*



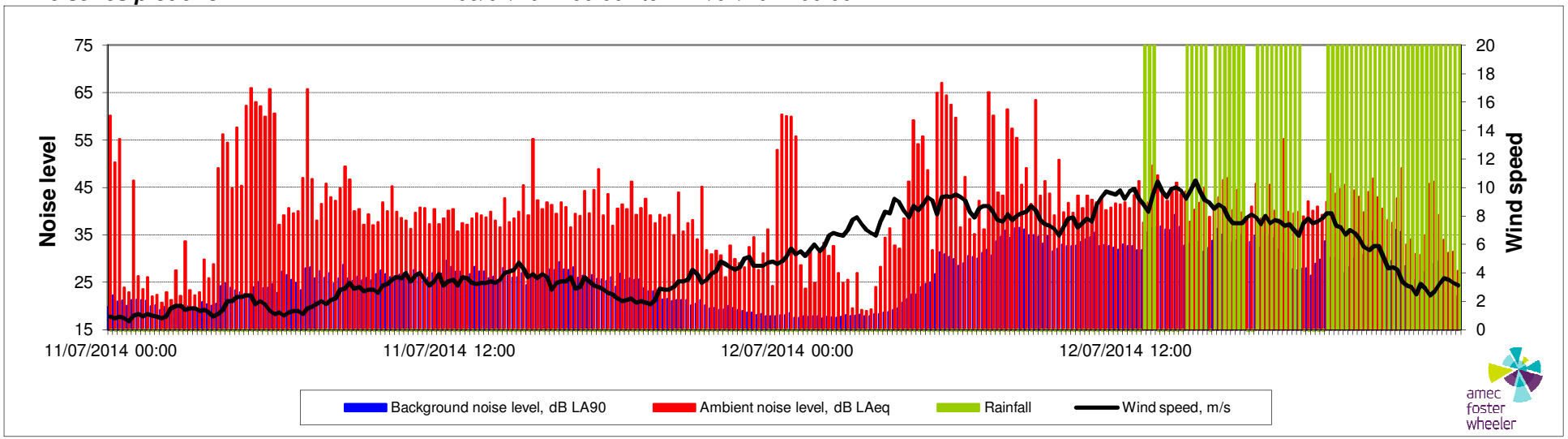
Time series plot 7 for M1 *05/07/2014 00:00 to 07/07/2014 00:00*



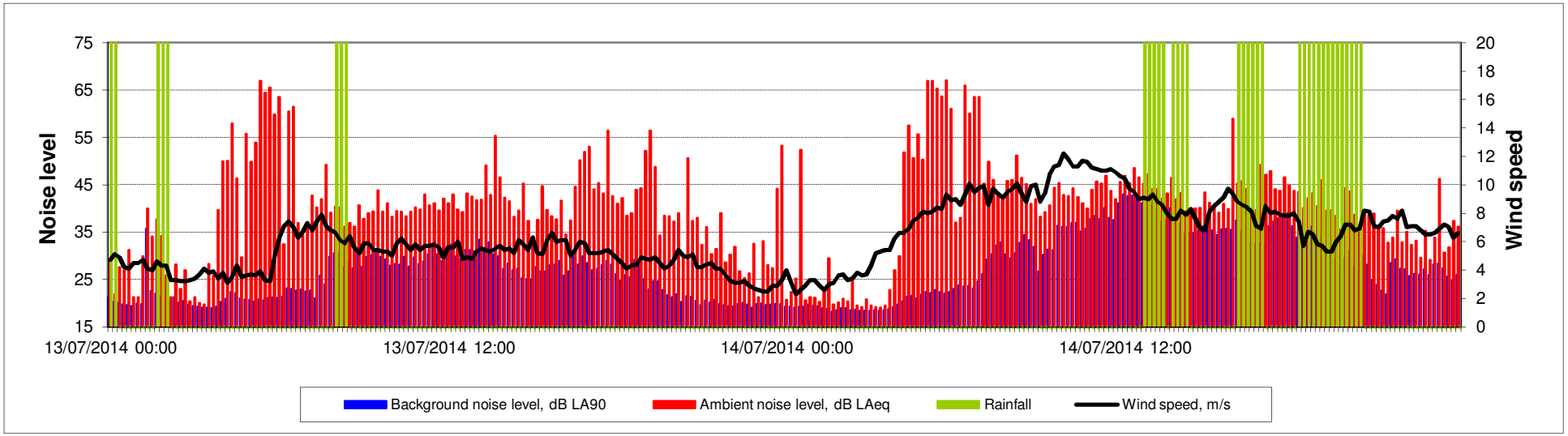
Time series plot 8 for M1 *07/07/2014 00:00 to 09/07/2014 00:00*



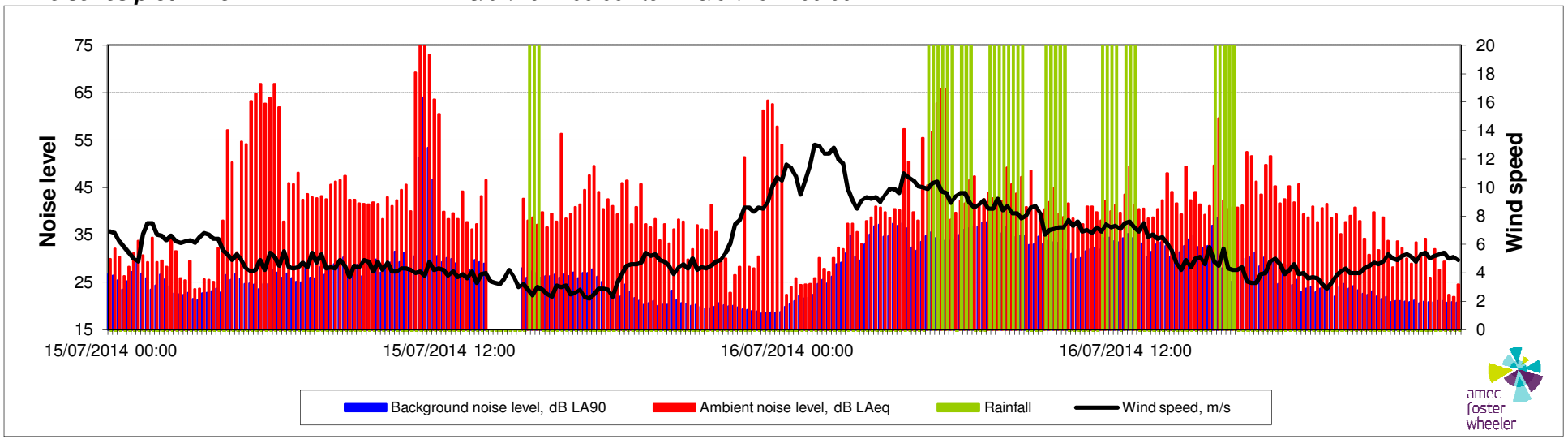
Time series plot 9 for M1 *09/07/2014 00:00 to 11/07/2014 00:00*



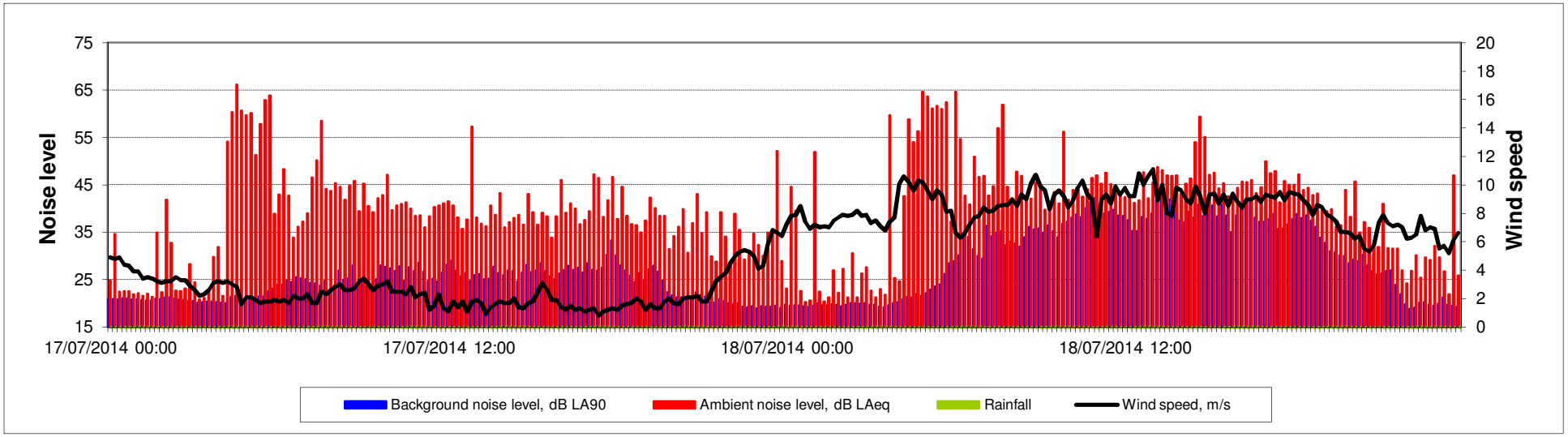
Time series plot 10 for M1 *11/07/2014 00:00 to 13/07/2014 00:00*



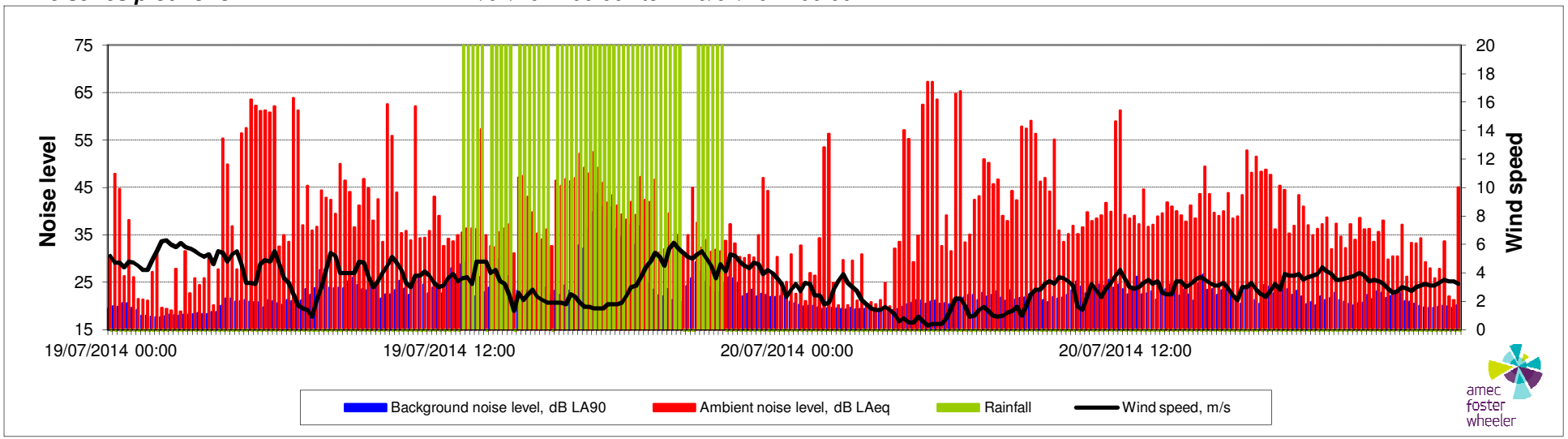
Time series plot 11 for M1 *13/07/2014 00:00 to 15/07/2014 00:00*



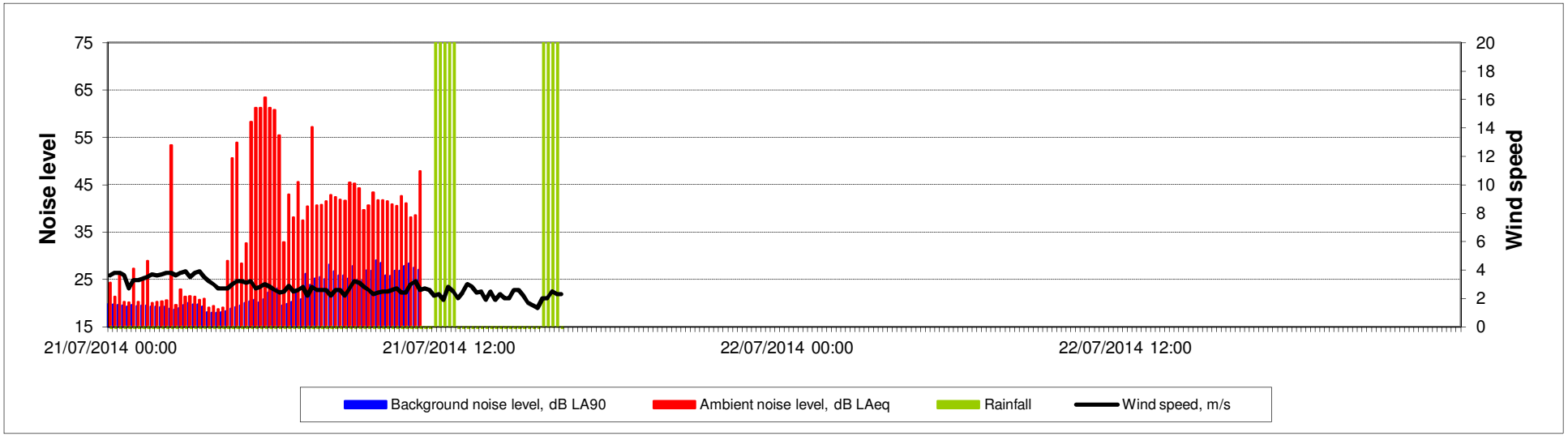
Time series plot 12 for M1 *15/07/2014 00:00 to 17/07/2014 00:00*



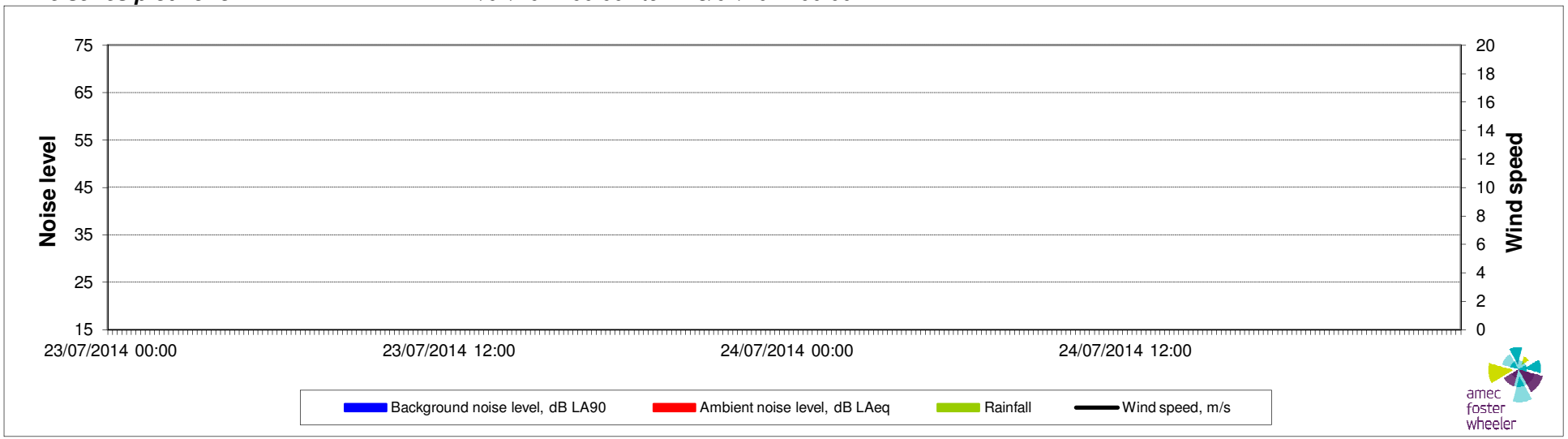
Time series plot 13 for M1 *17/07/2014 00:00 to 19/07/2014 00:00*



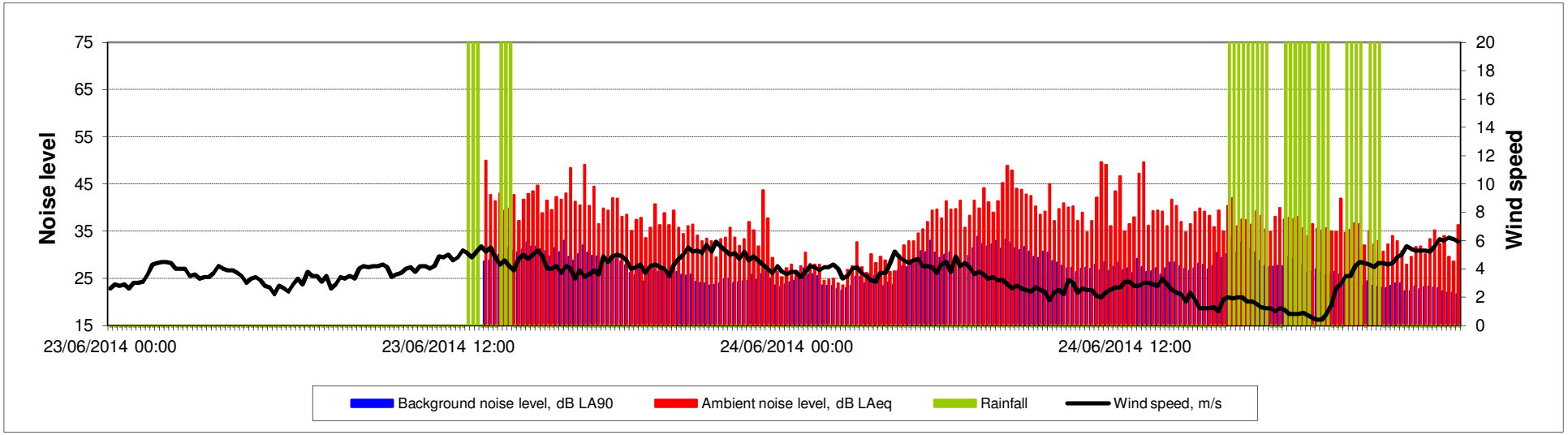
Time series plot 14 for M1 *19/07/2014 00:00 to 21/07/2014 00:00*



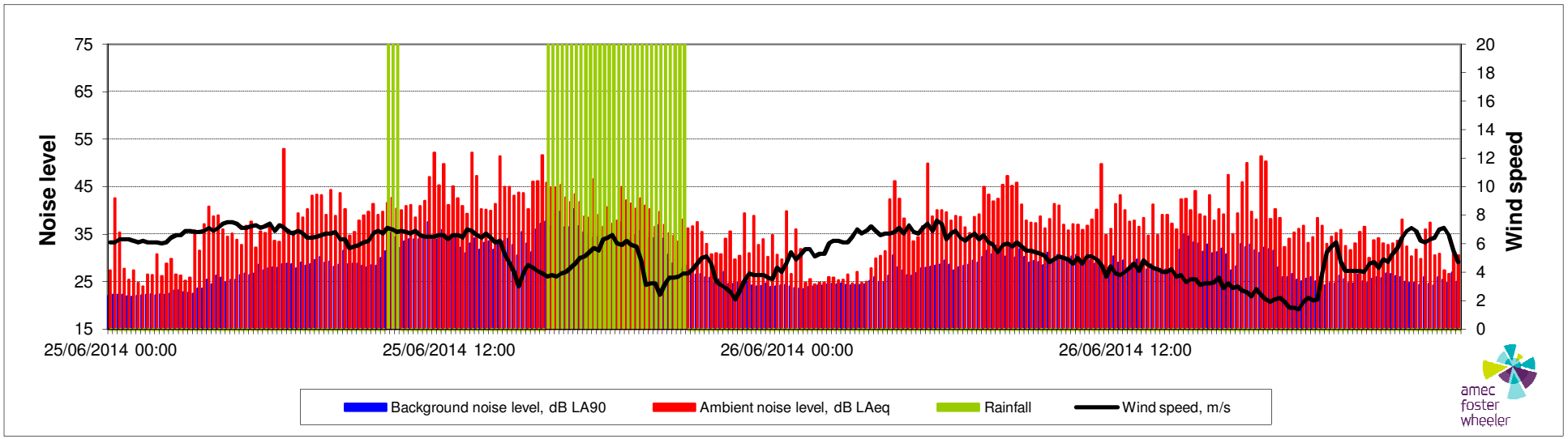
Time series plot 15 for M1 *21/07/2014 00:00 to 23/07/2014 00:00*



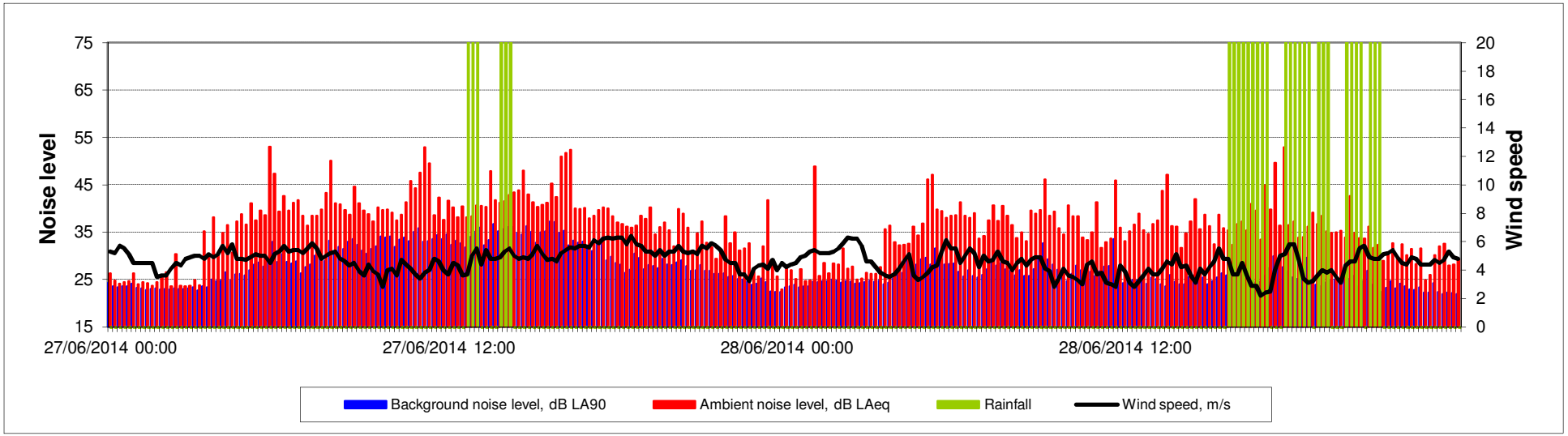
Time series plot 16 for M1 *23/07/2014 00:00 to 25/07/2014 00:00*



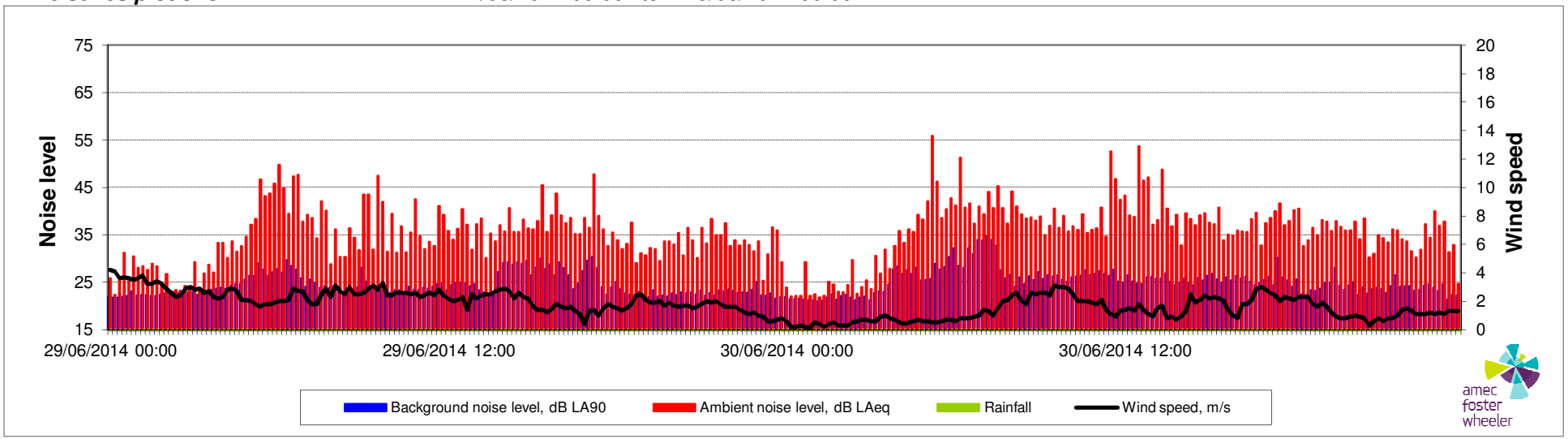
Time series plot 1 for M2 *23/06/2014 00:00 to 25/06/2014 00:00*



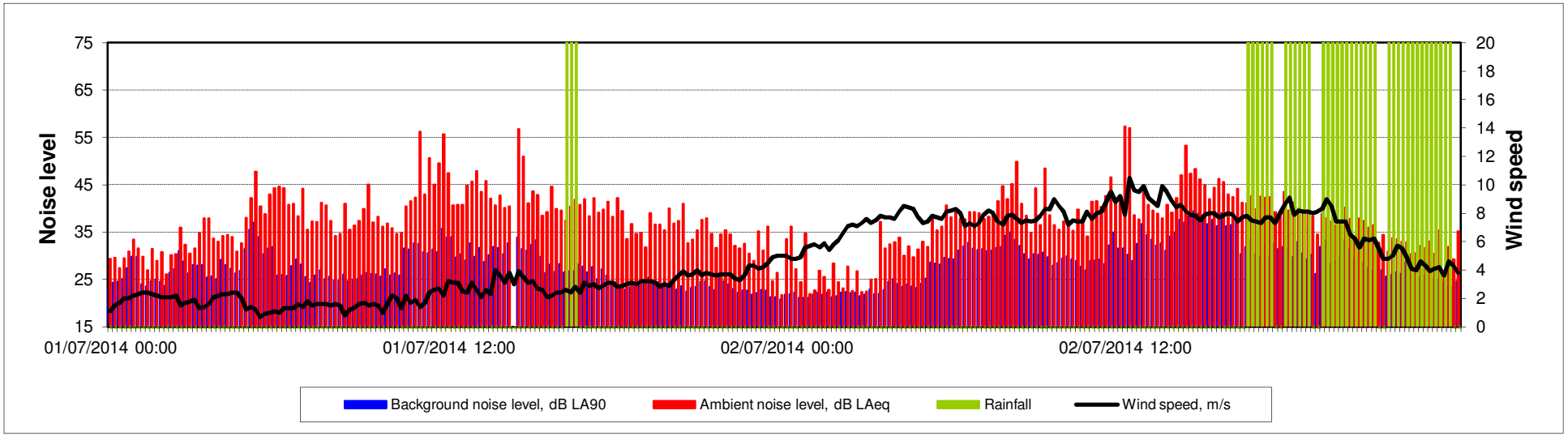
Time series plot 2 for M2 *25/06/2014 00:00 to 27/06/2014 00:00*



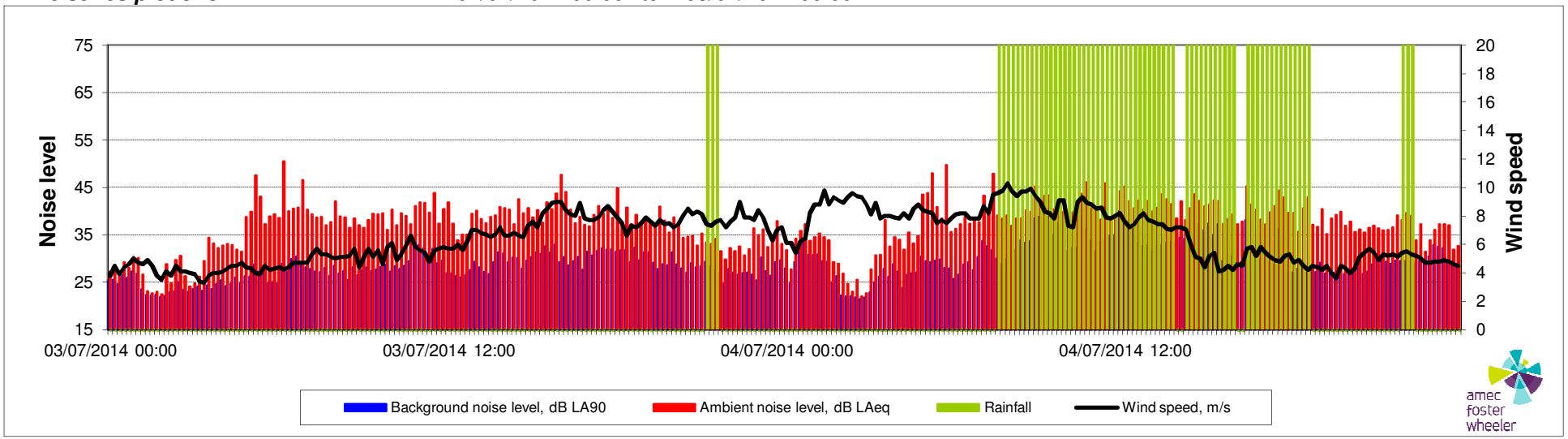
Time series plot 3 for M2 *27/06/2014 00:00 to 29/06/2014 00:00*



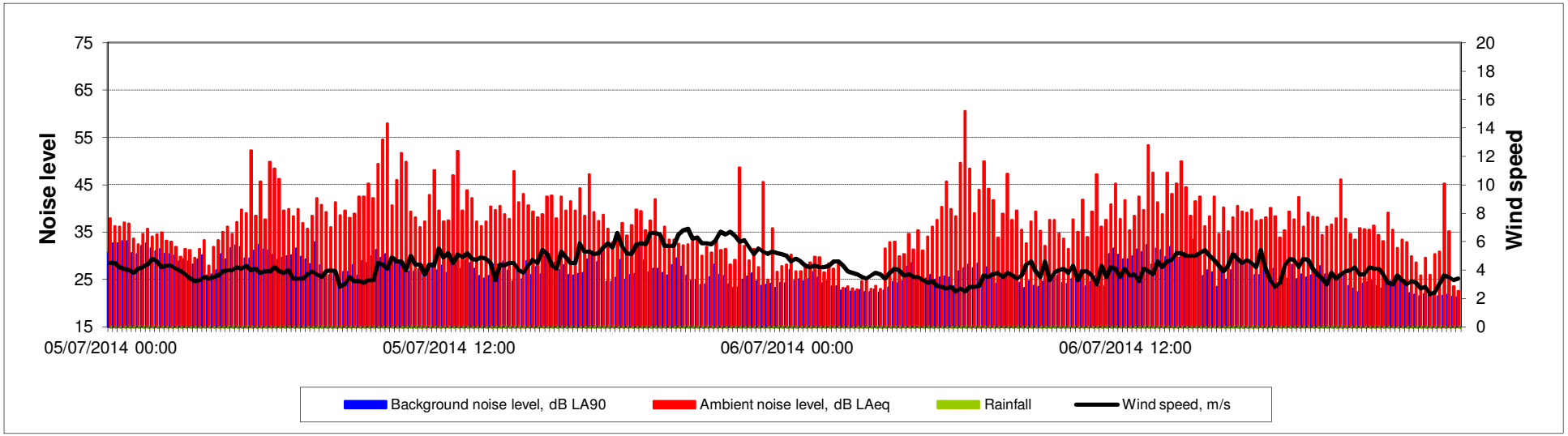
Time series plot 4 for M2 *29/06/2014 00:00 to 01/07/2014 00:00*



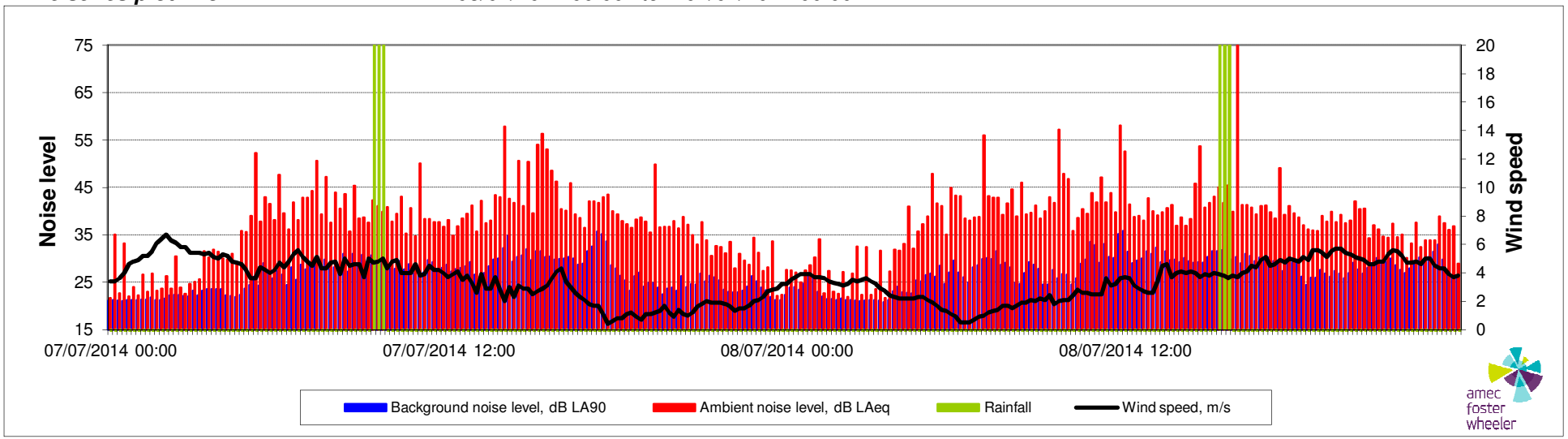
Time series plot 5 for M2 *01/07/2014 00:00 to 03/07/2014 00:00*



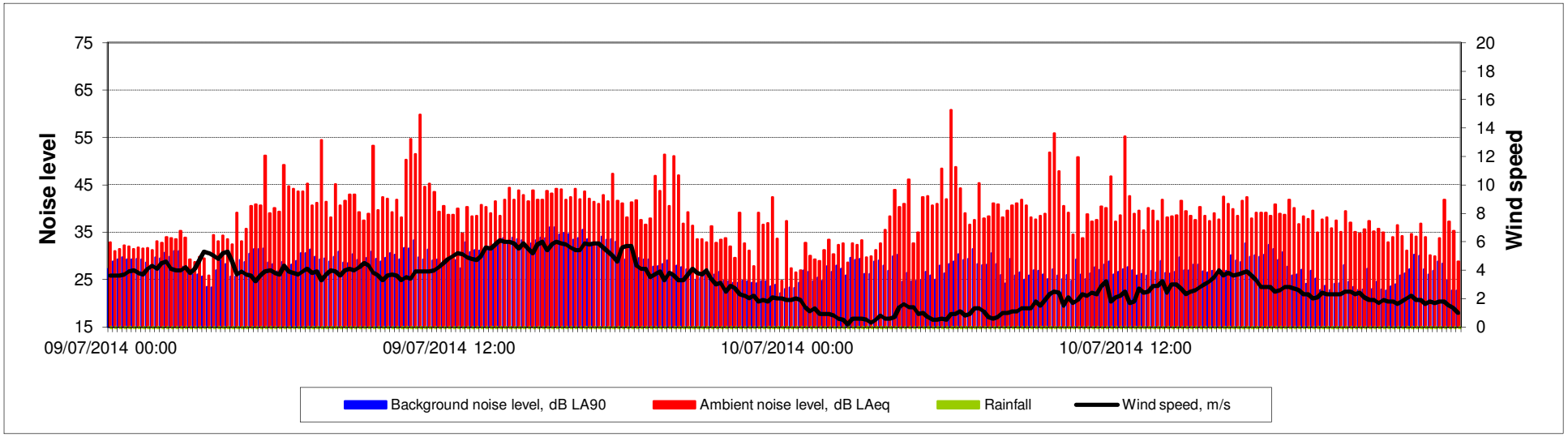
Time series plot 6 for M2 *03/07/2014 00:00 to 05/07/2014 00:00*



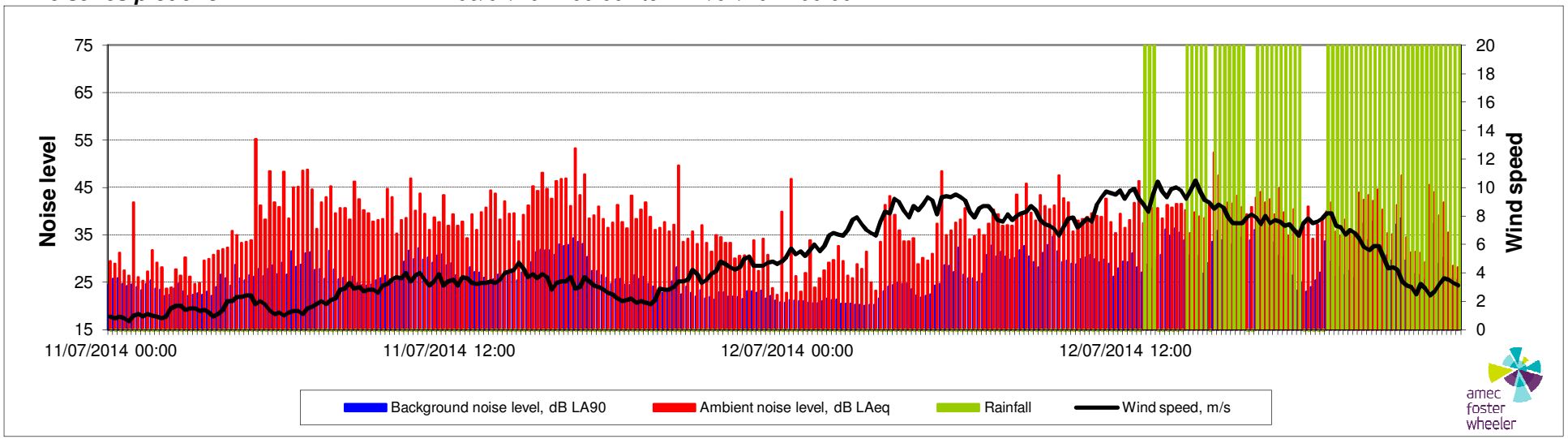
Time series plot 7 for M2 *05/07/2014 00:00 to 07/07/2014 00:00*



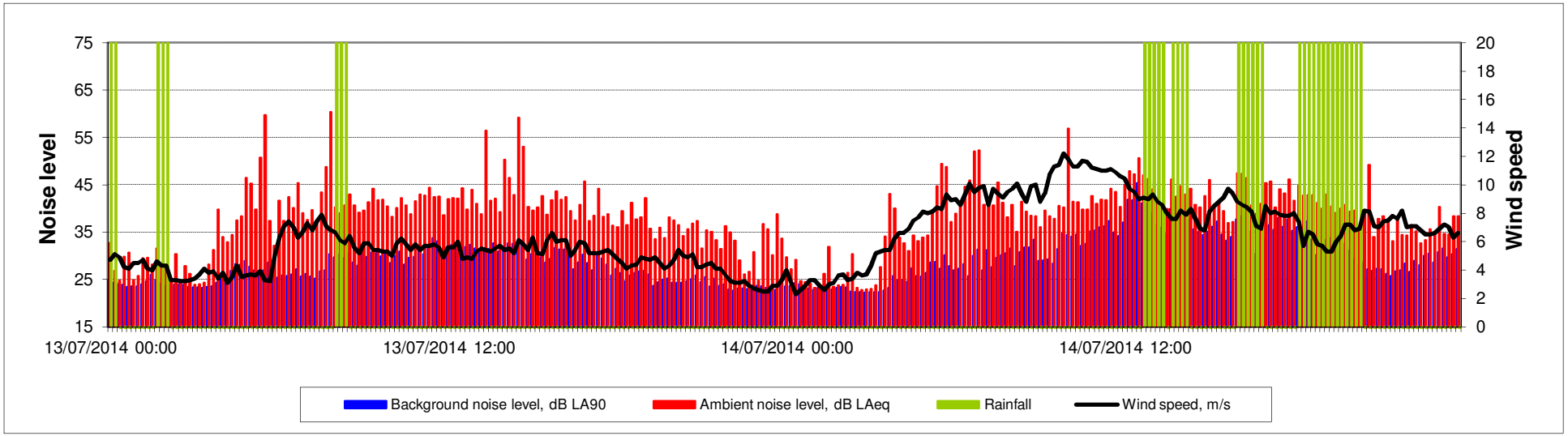
Time series plot 8 for M2 *07/07/2014 00:00 to 09/07/2014 00:00*



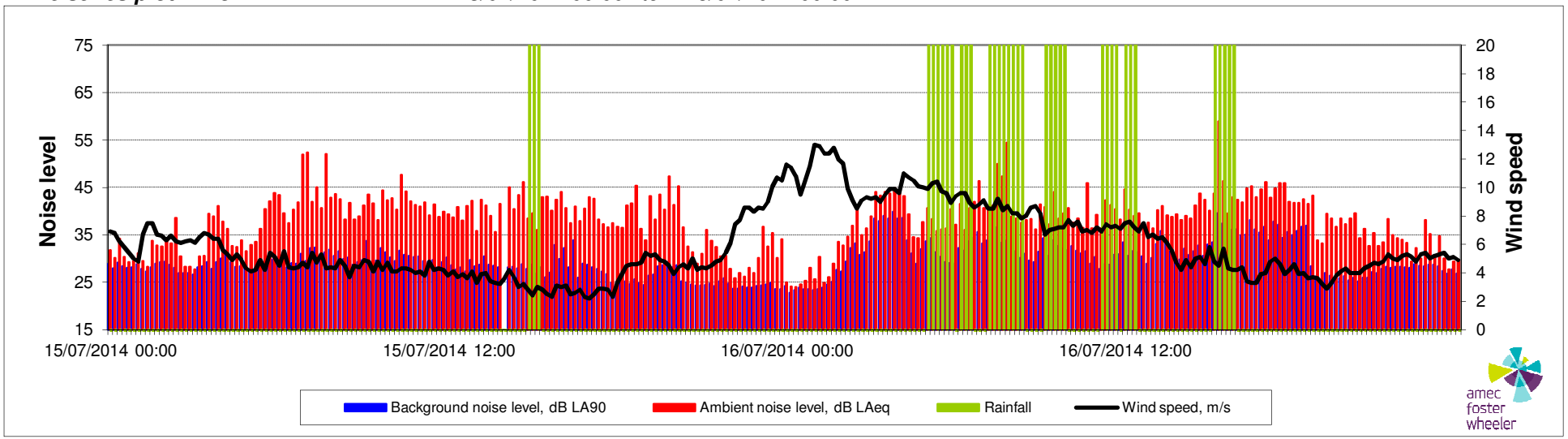
Time series plot 9 for M2 *09/07/2014 00:00 to 11/07/2014 00:00*



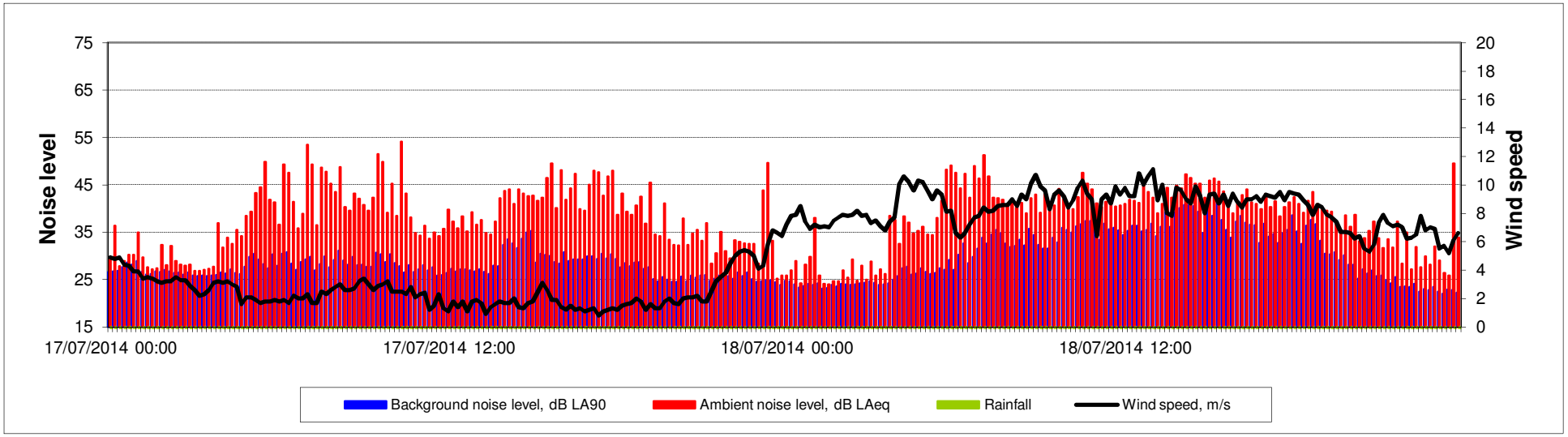
Time series plot 10 for M2 *11/07/2014 00:00 to 13/07/2014 00:00*



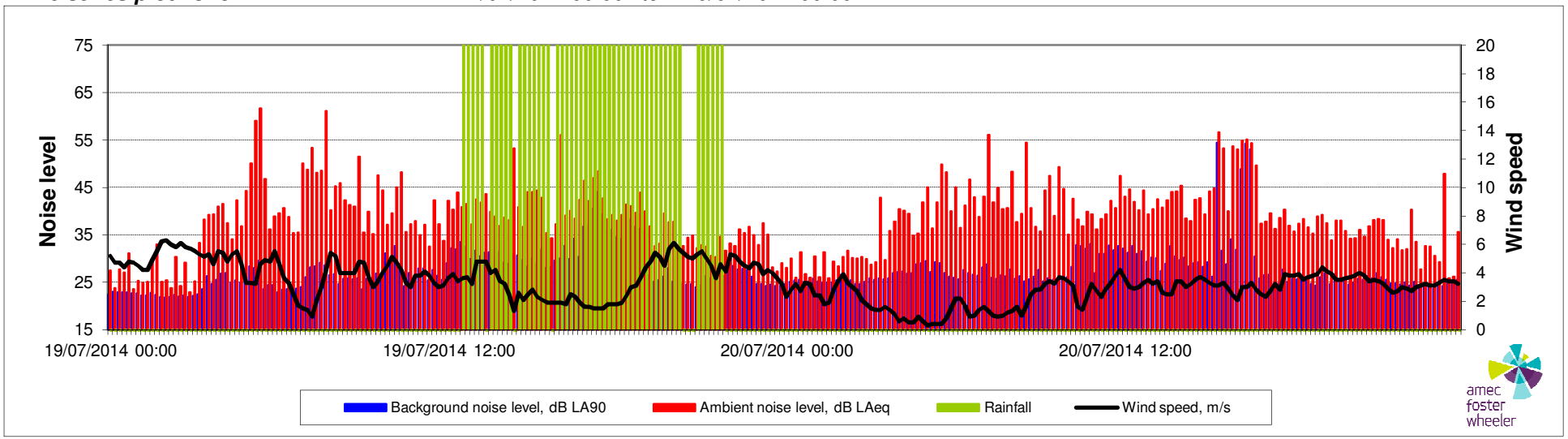
Time series plot 11 for M2 *13/07/2014 00:00 to 15/07/2014 00:00*



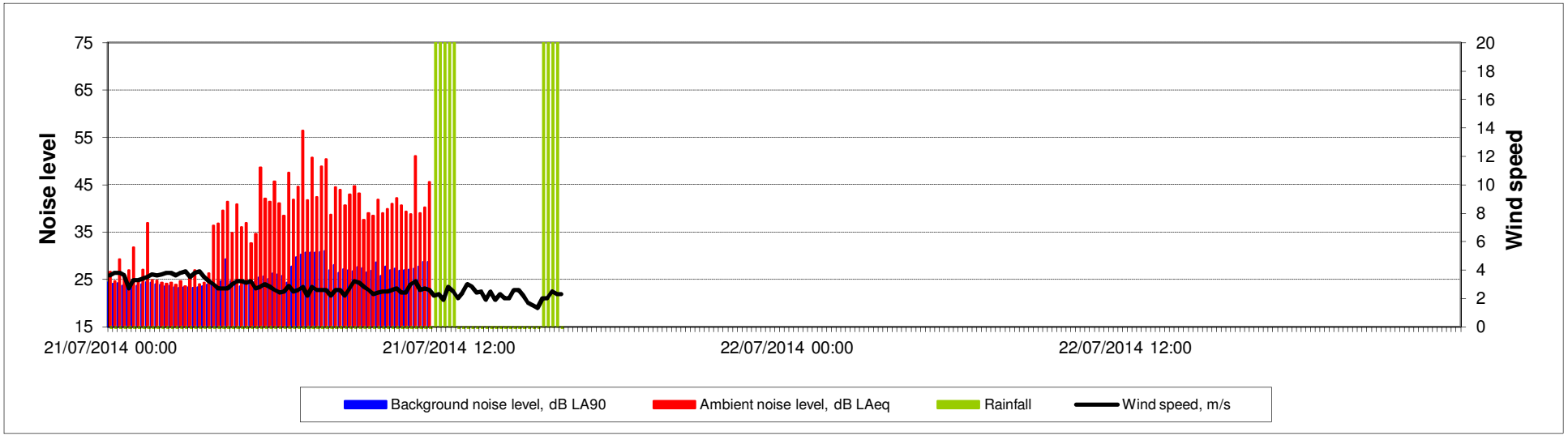
Time series plot 12 for M2 *15/07/2014 00:00 to 17/07/2014 00:00*



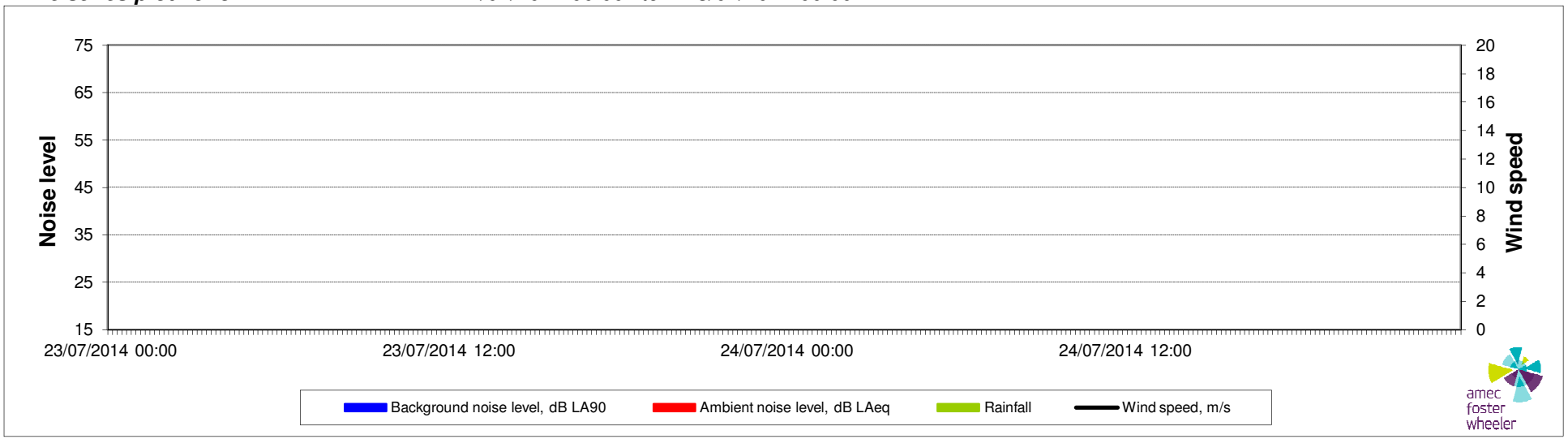
Time series plot 13 for M2 *17/07/2014 00:00 to 19/07/2014 00:00*



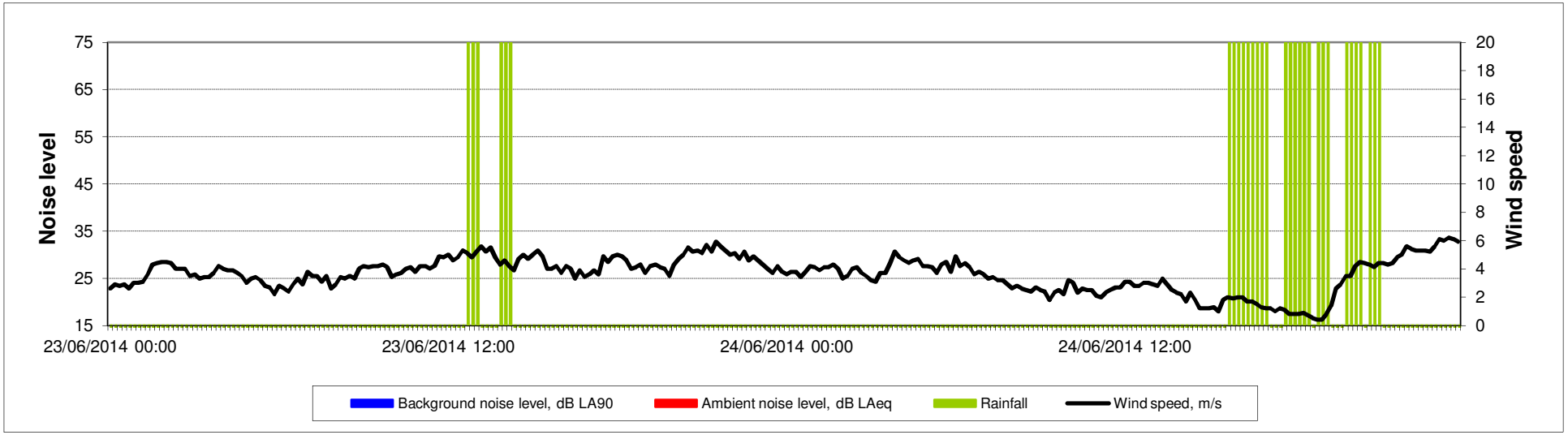
Time series plot 14 for M2 *19/07/2014 00:00 to 21/07/2014 00:00*



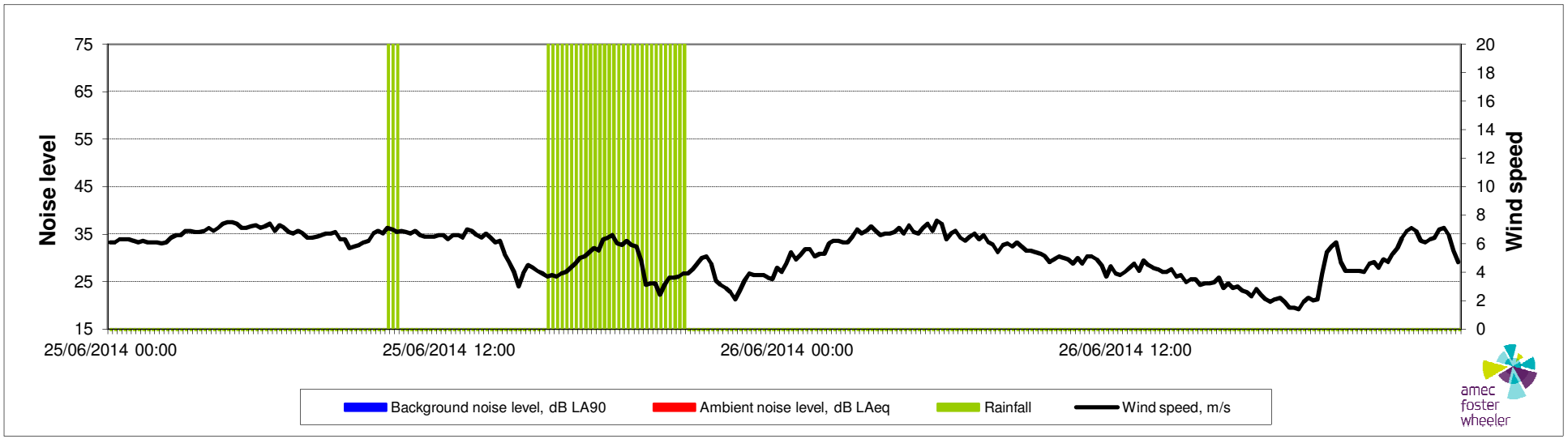
Time series plot 15 for M2 *21/07/2014 00:00 to 23/07/2014 00:00*



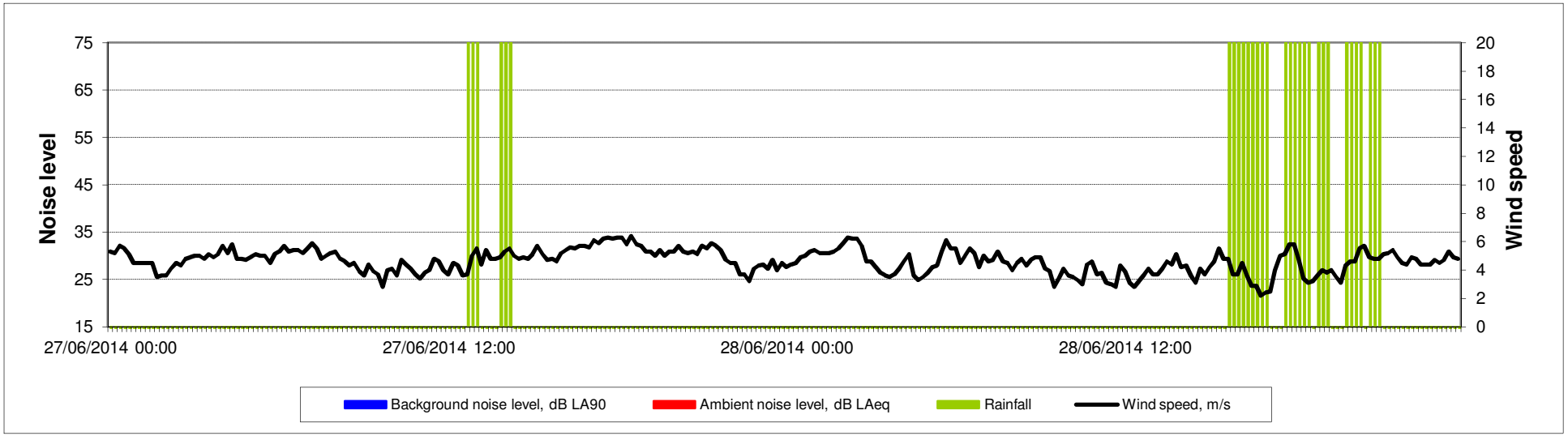
Time series plot 16 for M2 *23/07/2014 00:00 to 25/07/2014 00:00*



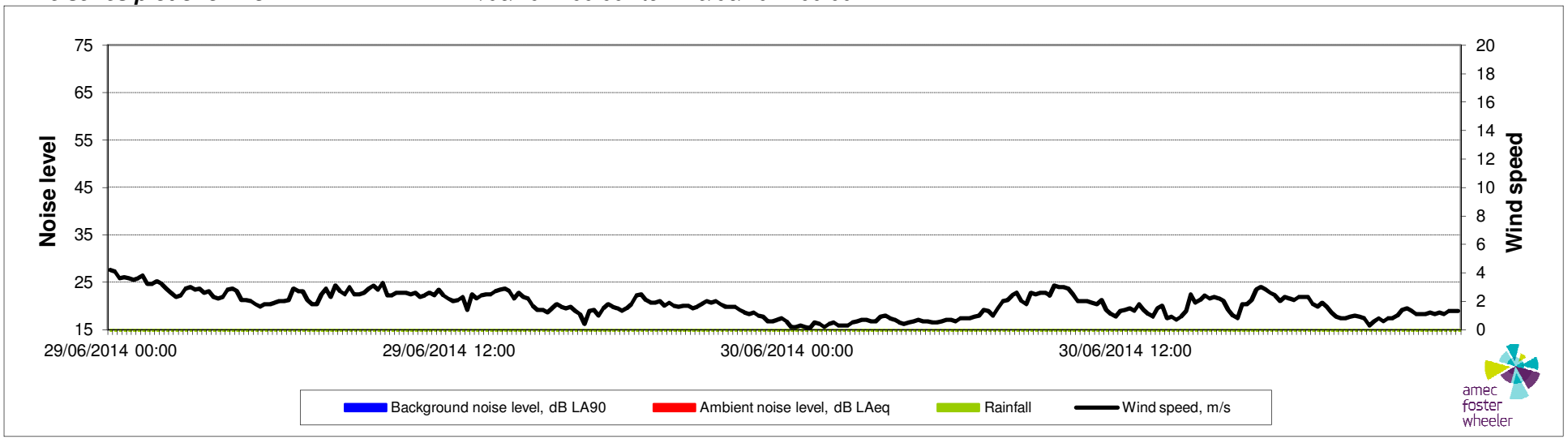
Time series plot 1 for M3 *23/06/2014 00:00 to 25/06/2014 00:00*



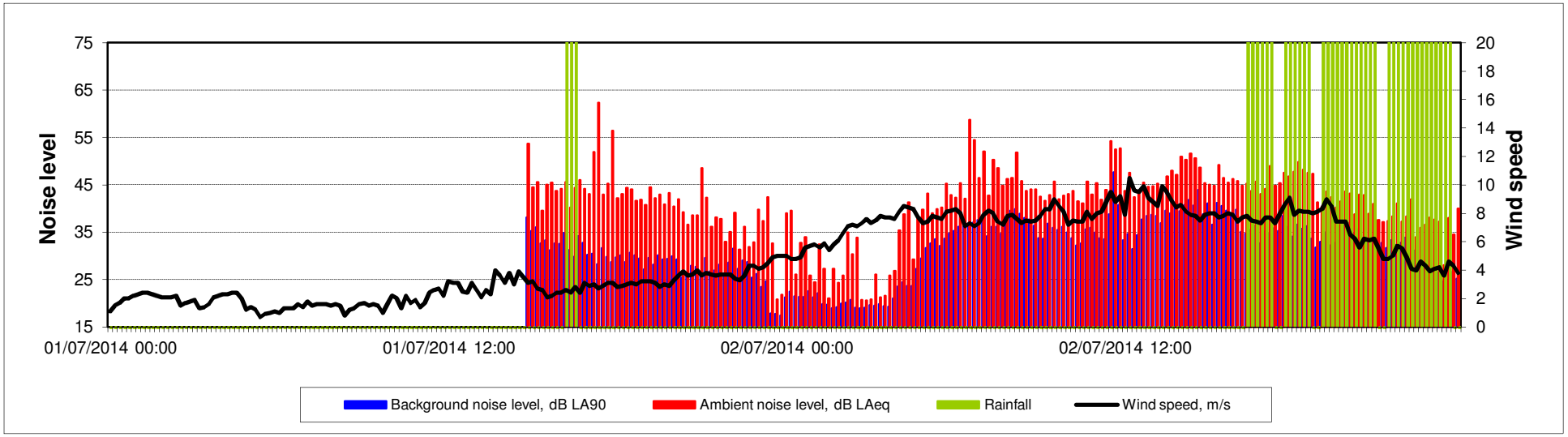
Time series plot 2 for M3 *25/06/2014 00:00 to 27/06/2014 00:00*



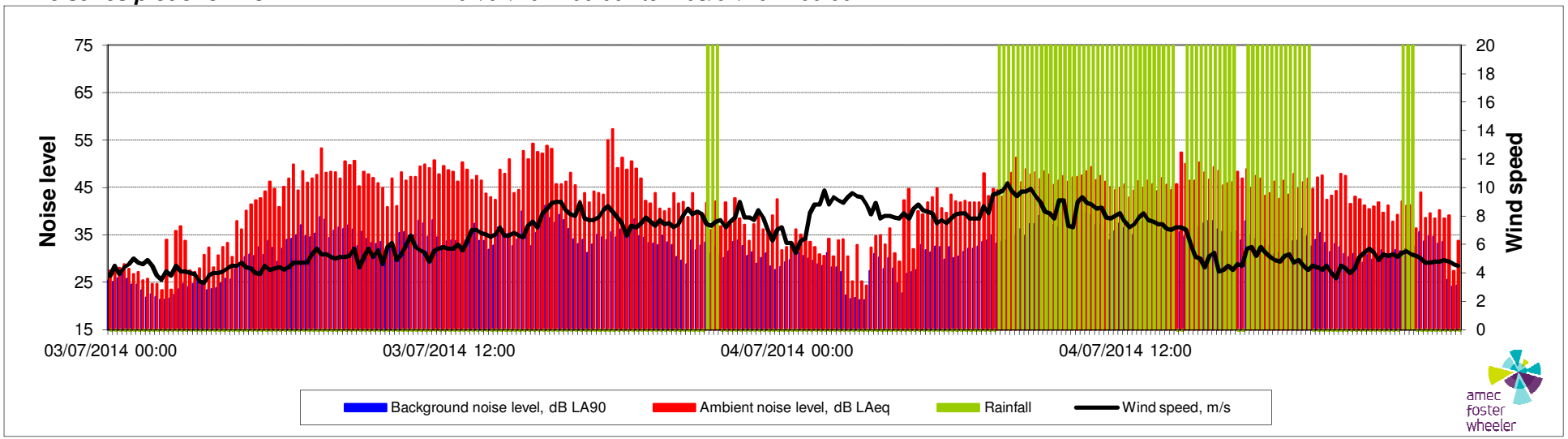
Time series plot 3 for M3 *27/06/2014 00:00 to 29/06/2014 00:00*



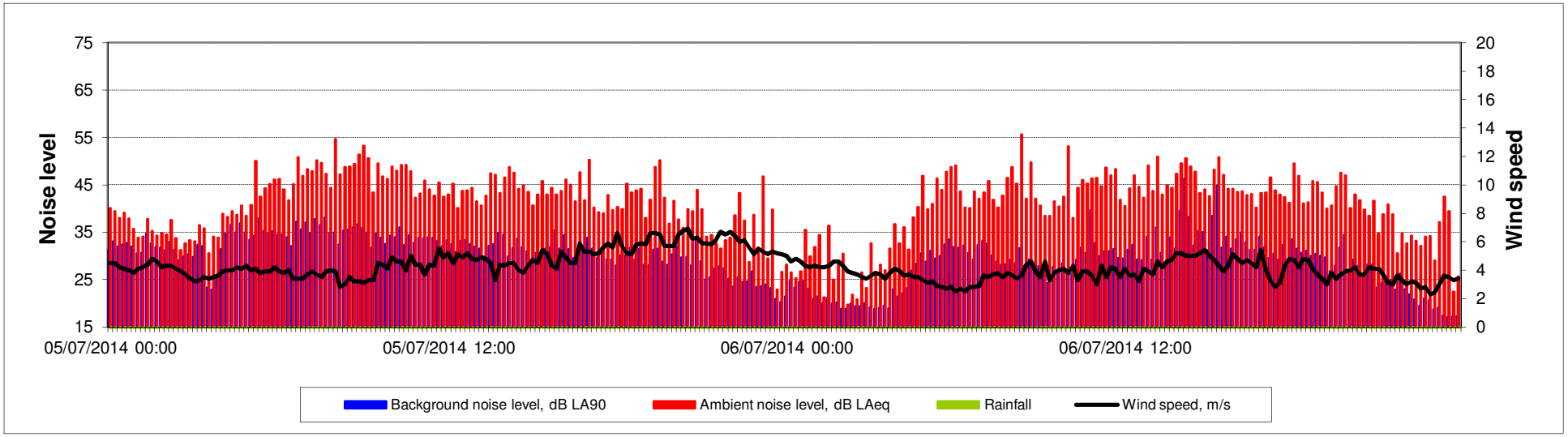
Time series plot 4 for M3 *29/06/2014 00:00 to 01/07/2014 00:00*



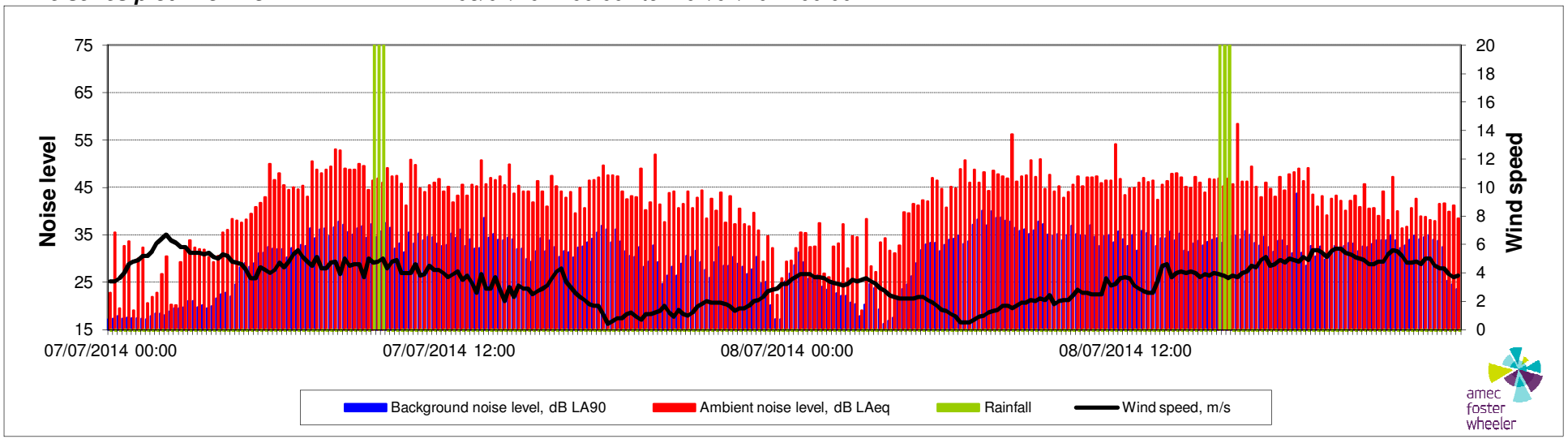
Time series plot 5 for M3 *01/07/2014 00:00 to 03/07/2014 00:00*



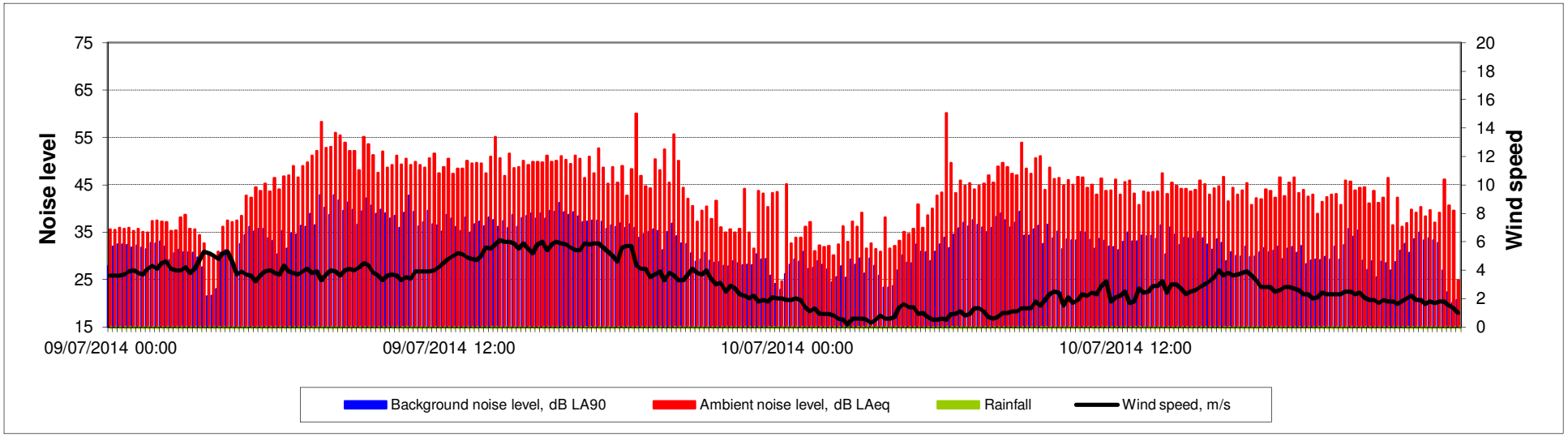
Time series plot 6 for M3 *03/07/2014 00:00 to 05/07/2014 00:00*



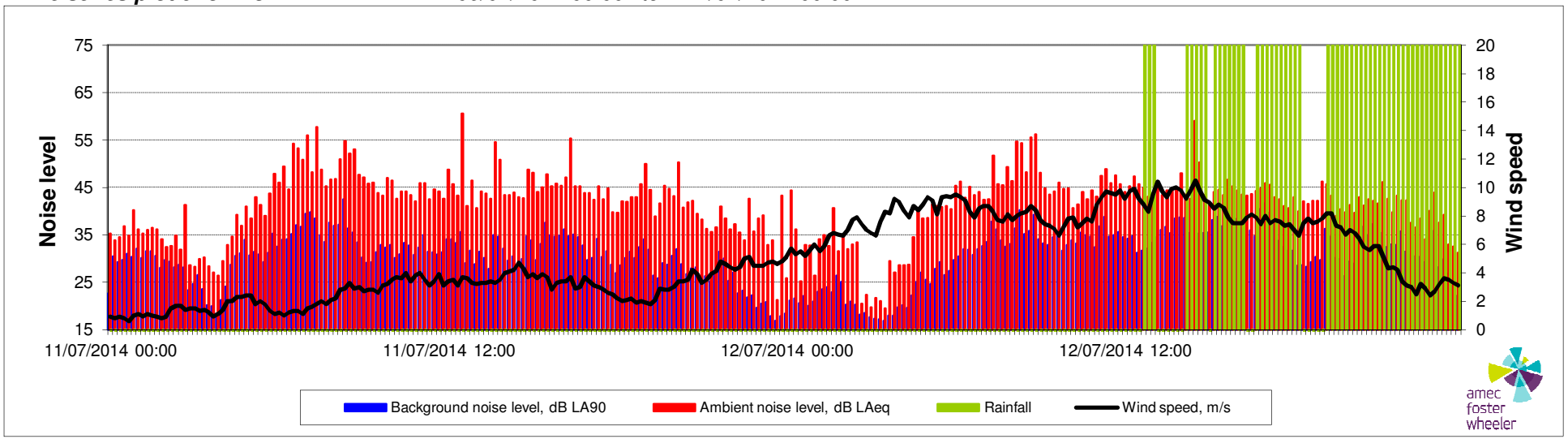
Time series plot 7 for M3 *05/07/2014 00:00 to 07/07/2014 00:00*



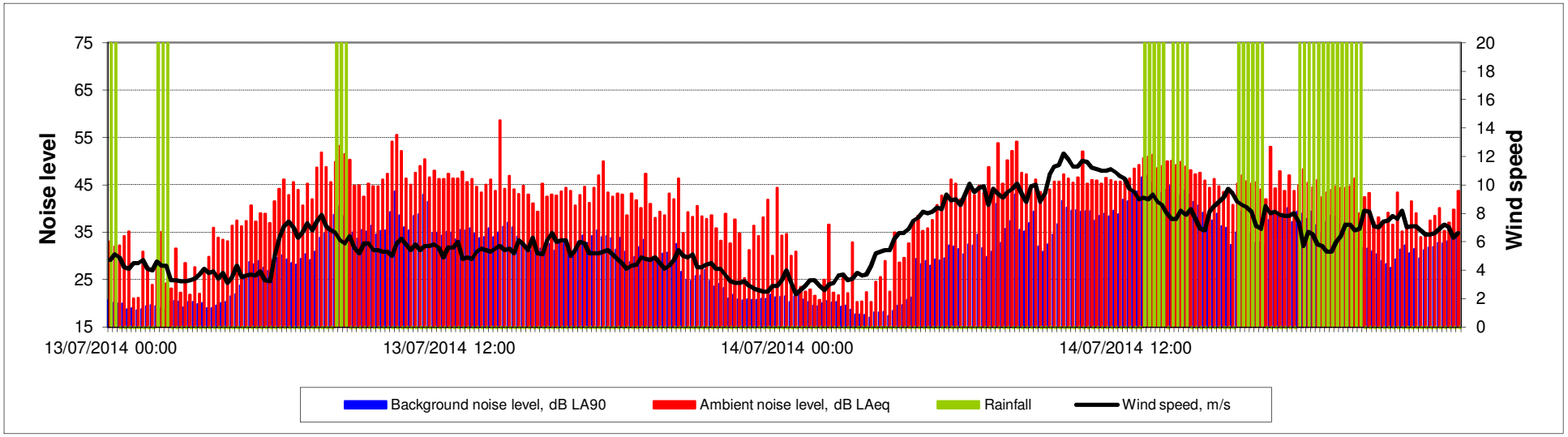
Time series plot 8 for M3 *07/07/2014 00:00 to 09/07/2014 00:00*



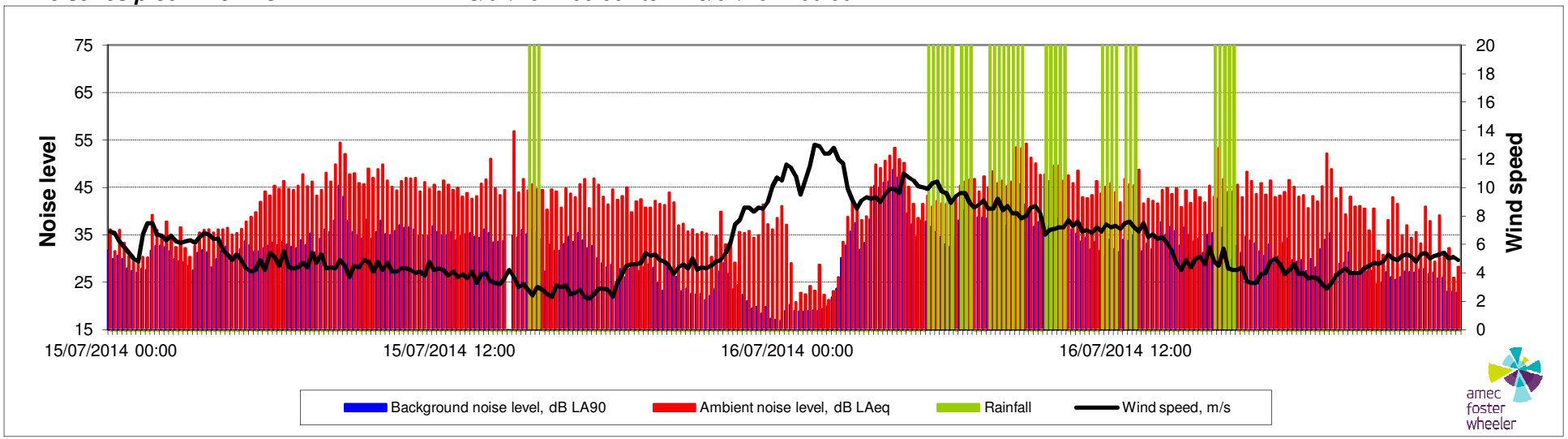
Time series plot 9 for M3 *09/07/2014 00:00 to 11/07/2014 00:00*



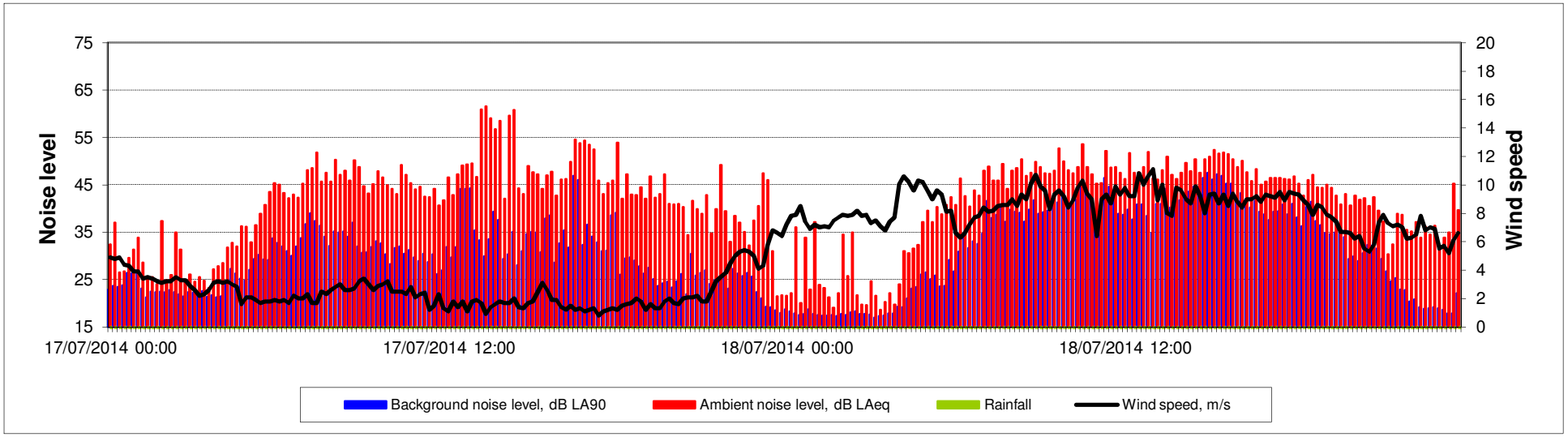
Time series plot 10 for M3 *11/07/2014 00:00 to 13/07/2014 00:00*



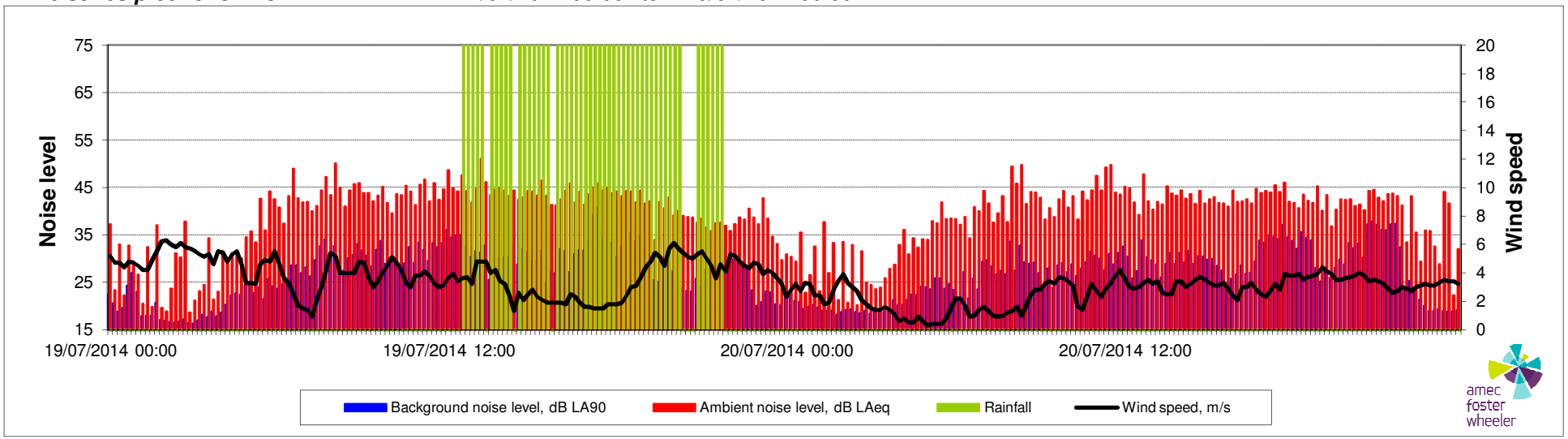
Time series plot 11 for M3 *13/07/2014 00:00 to 15/07/2014 00:00*



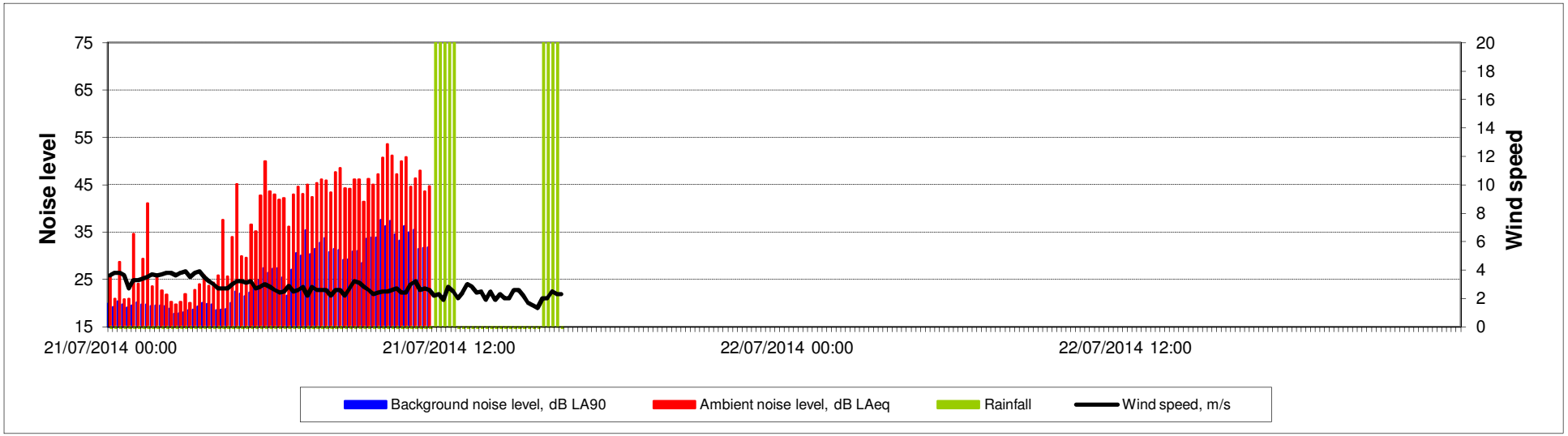
Time series plot 12 for M3 *15/07/2014 00:00 to 17/07/2014 00:00*



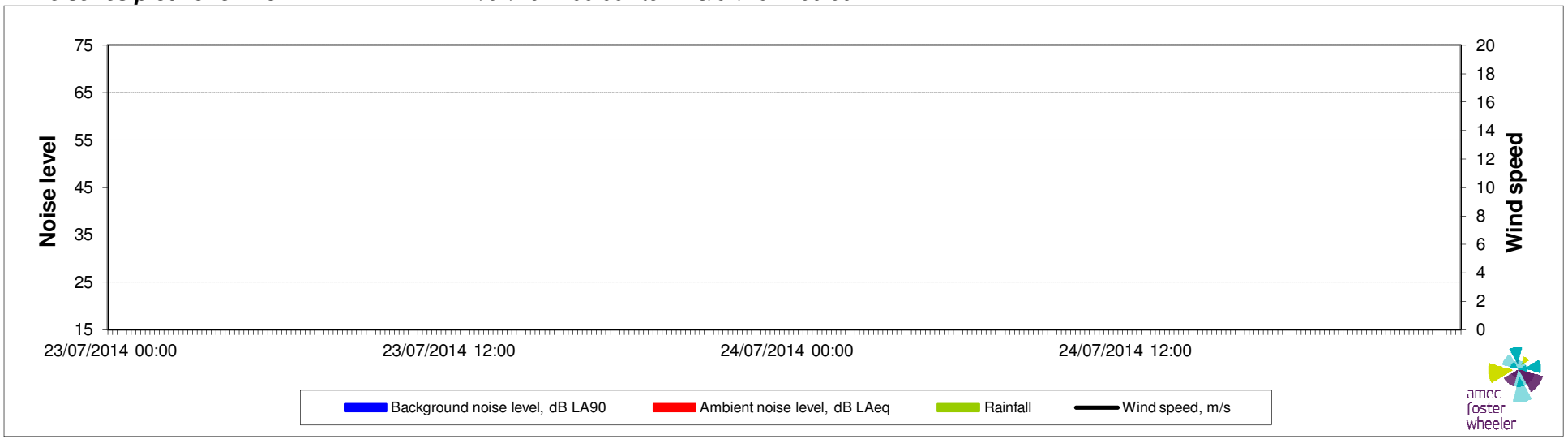
Time series plot 13 for M3 *17/07/2014 00:00 to 19/07/2014 00:00*



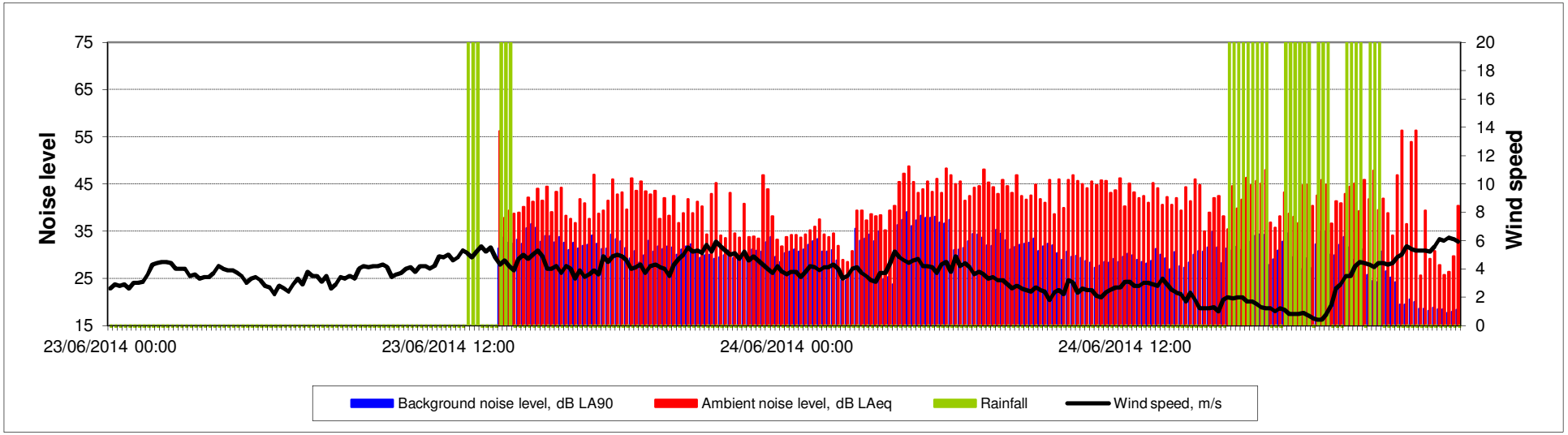
Time series plot 14 for M3 *19/07/2014 00:00 to 21/07/2014 00:00*



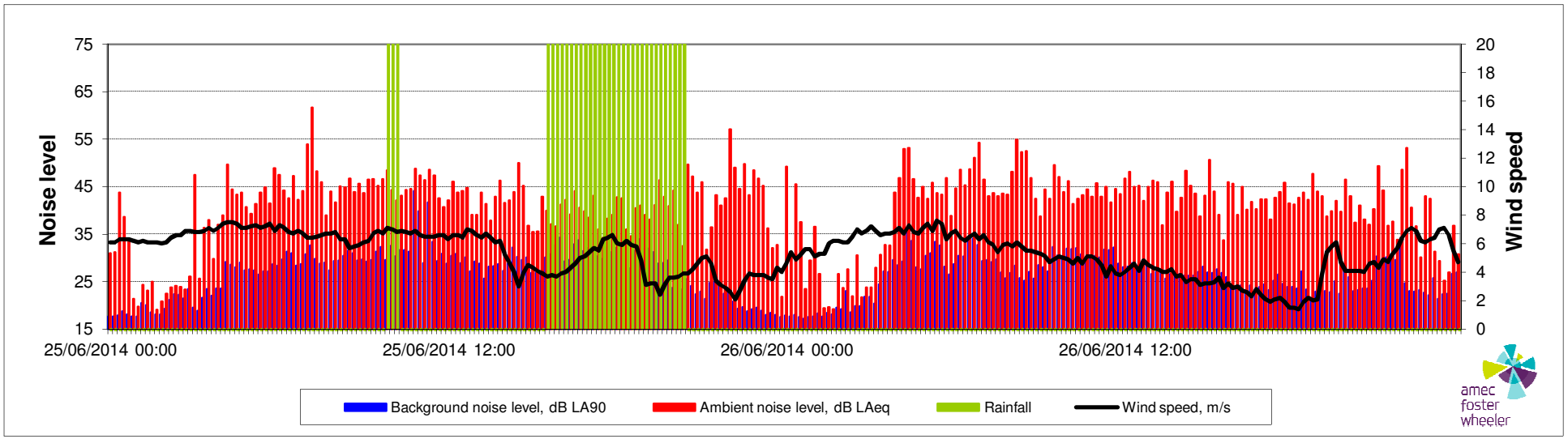
Time series plot 15 for M3 *21/07/2014 00:00 to 23/07/2014 00:00*



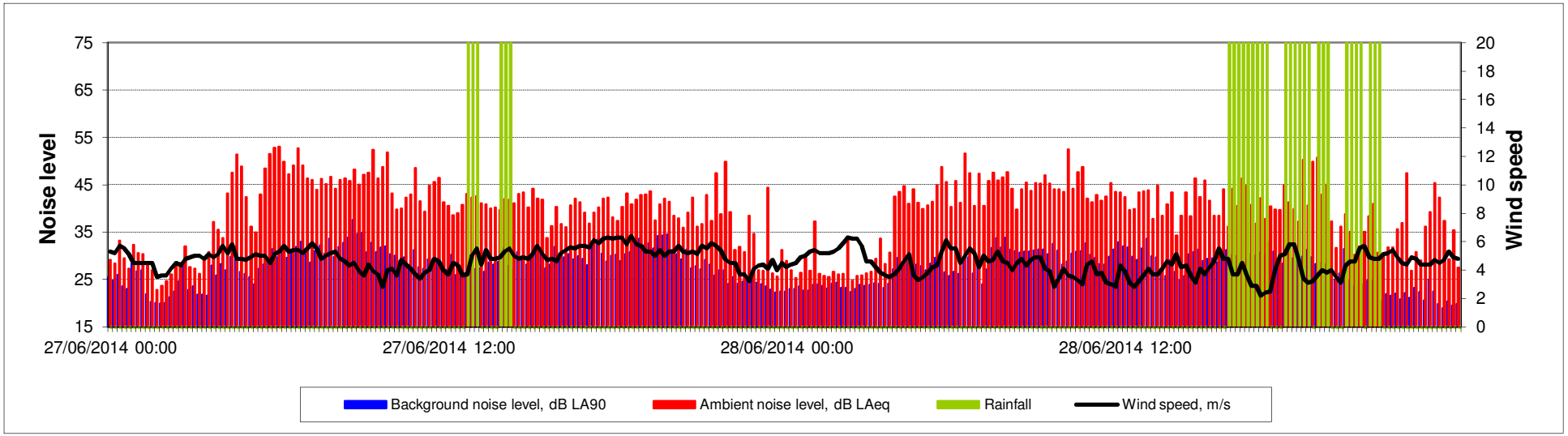
Time series plot 16 for M3 *23/07/2014 00:00 to 25/07/2014 00:00*



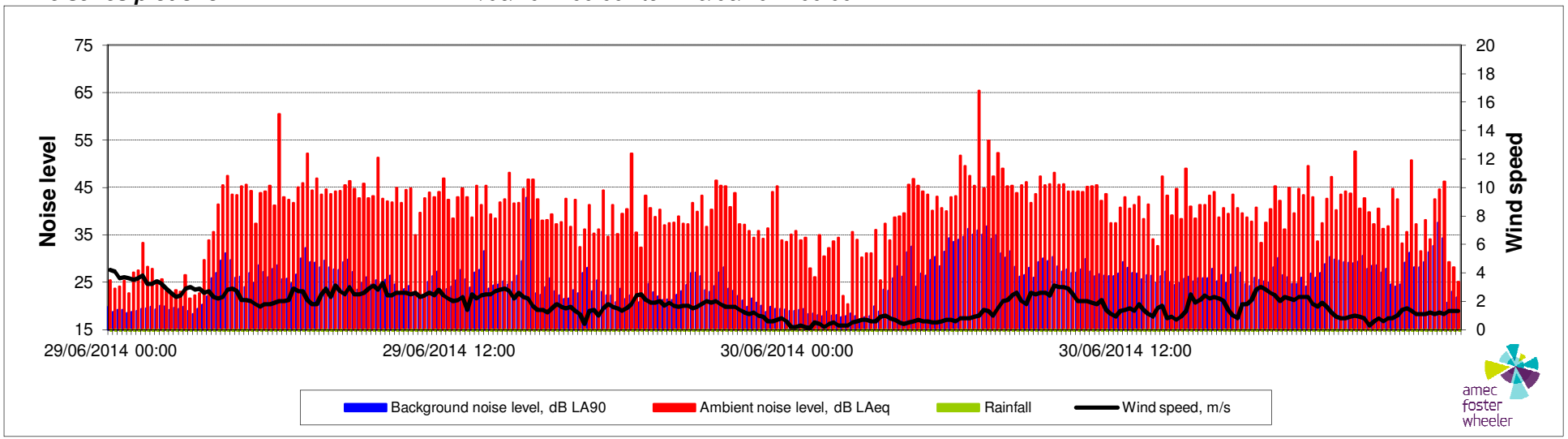
Time series plot 1 for M4 *23/06/2014 00:00 to 25/06/2014 00:00*



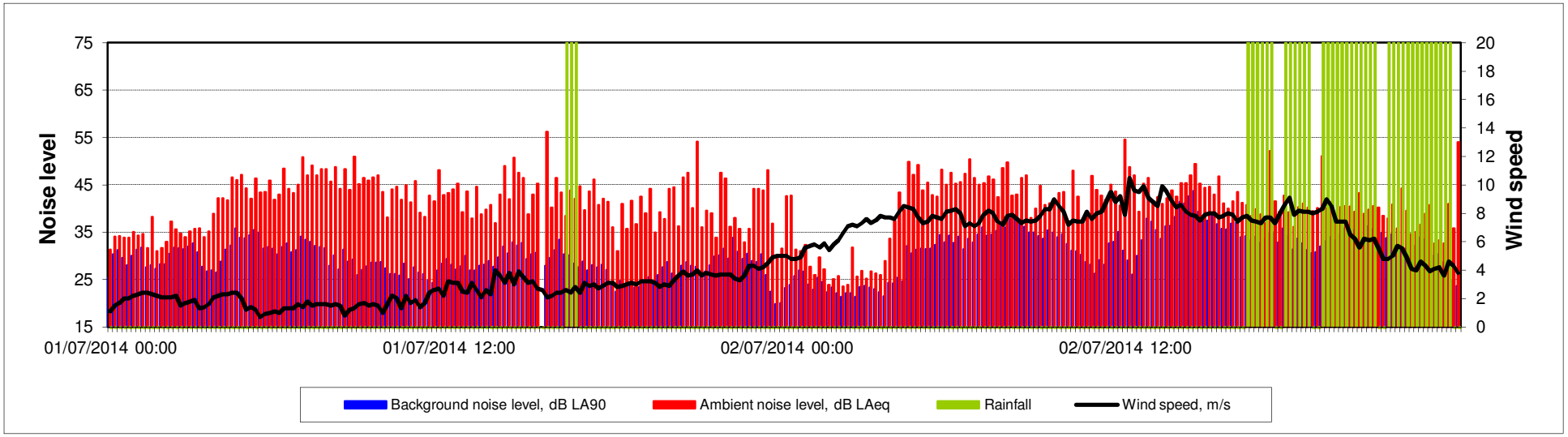
Time series plot 2 for M4 *25/06/2014 00:00 to 27/06/2014 00:00*



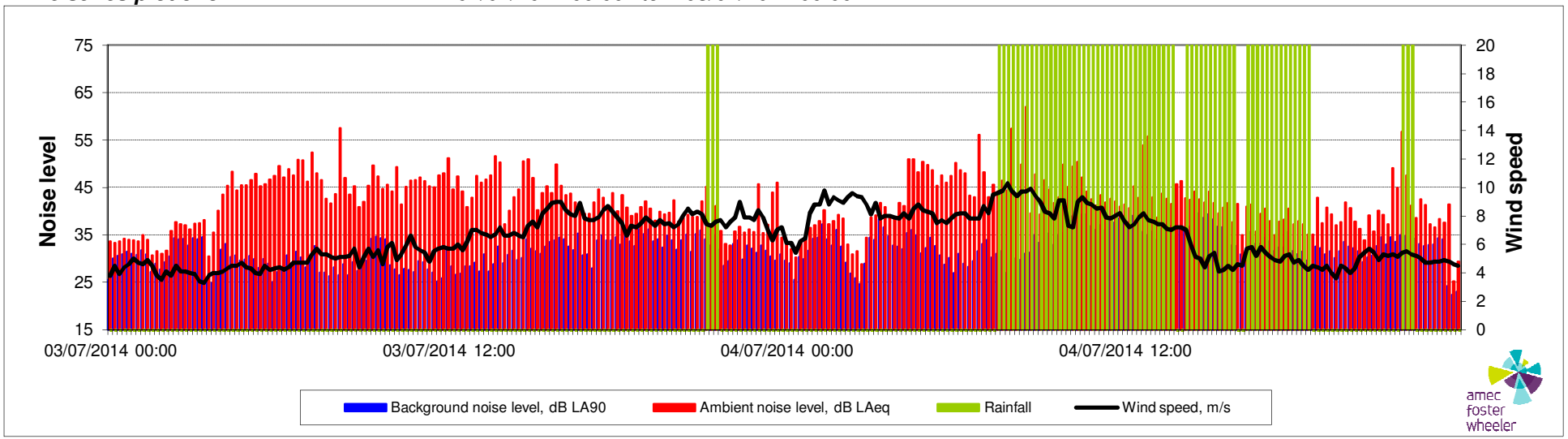
Time series plot 3 for M4 *27/06/2014 00:00 to 29/06/2014 00:00*



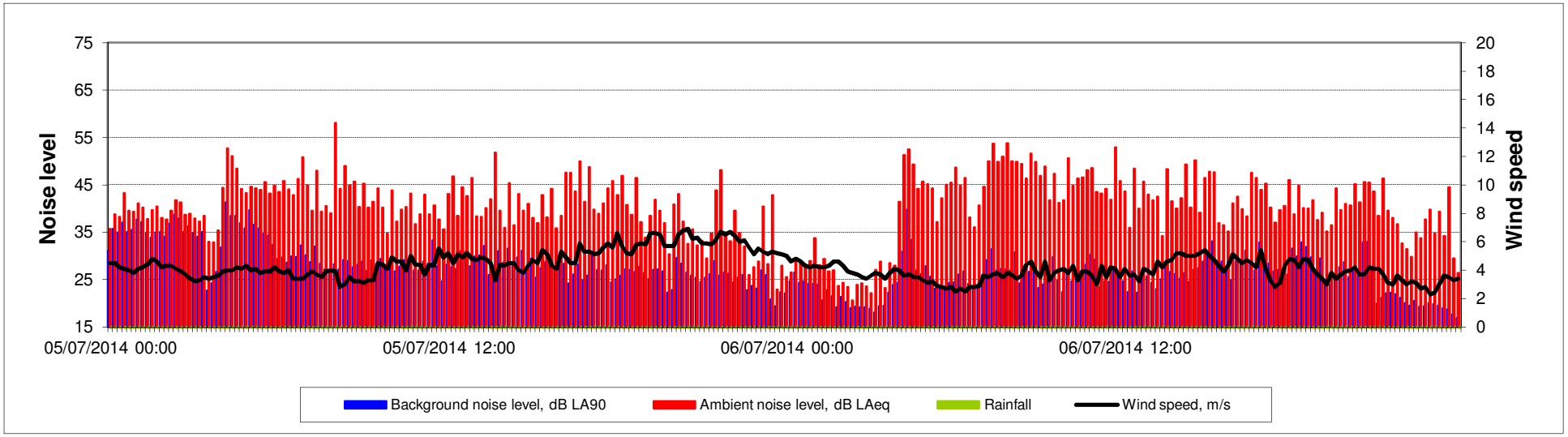
Time series plot 4 for M4 *29/06/2014 00:00 to 01/07/2014 00:00*



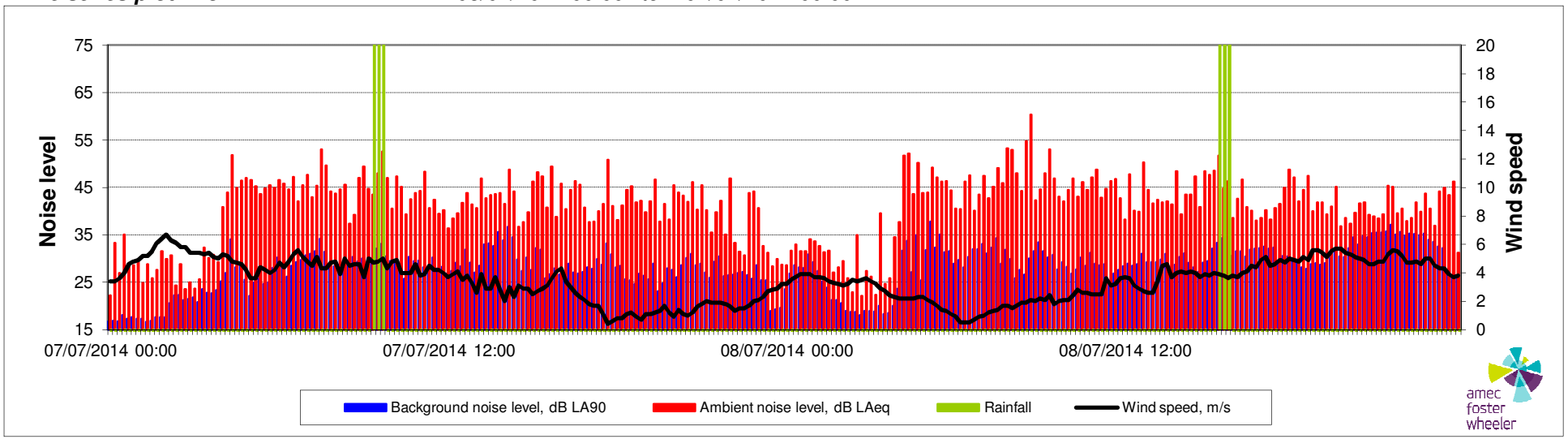
Time series plot 5 for M4 *01/07/2014 00:00 to 03/07/2014 00:00*



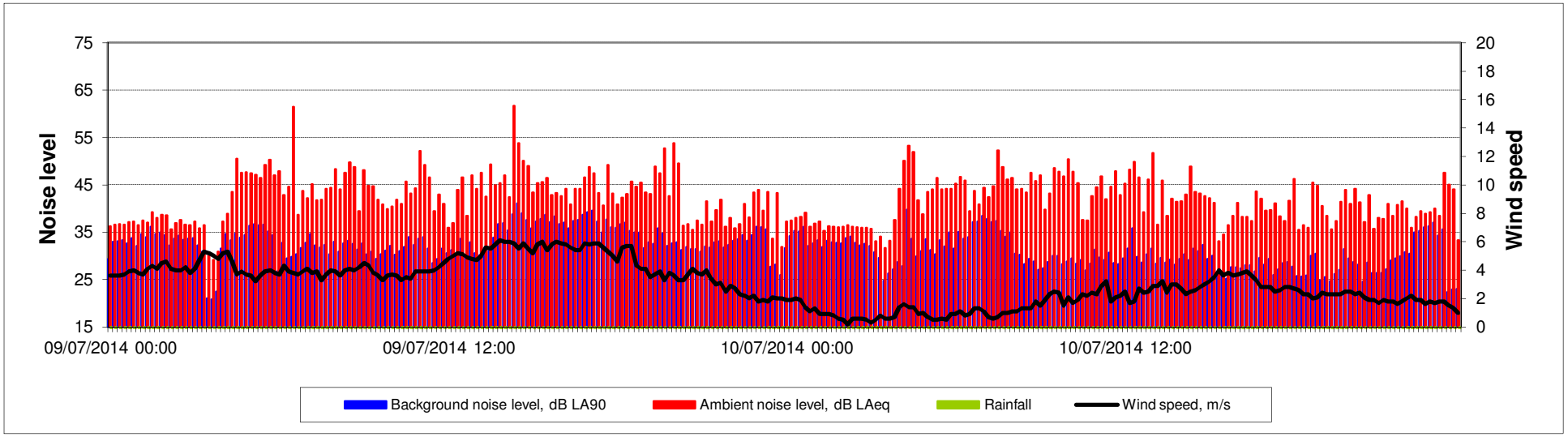
Time series plot 6 for M4 *03/07/2014 00:00 to 05/07/2014 00:00*



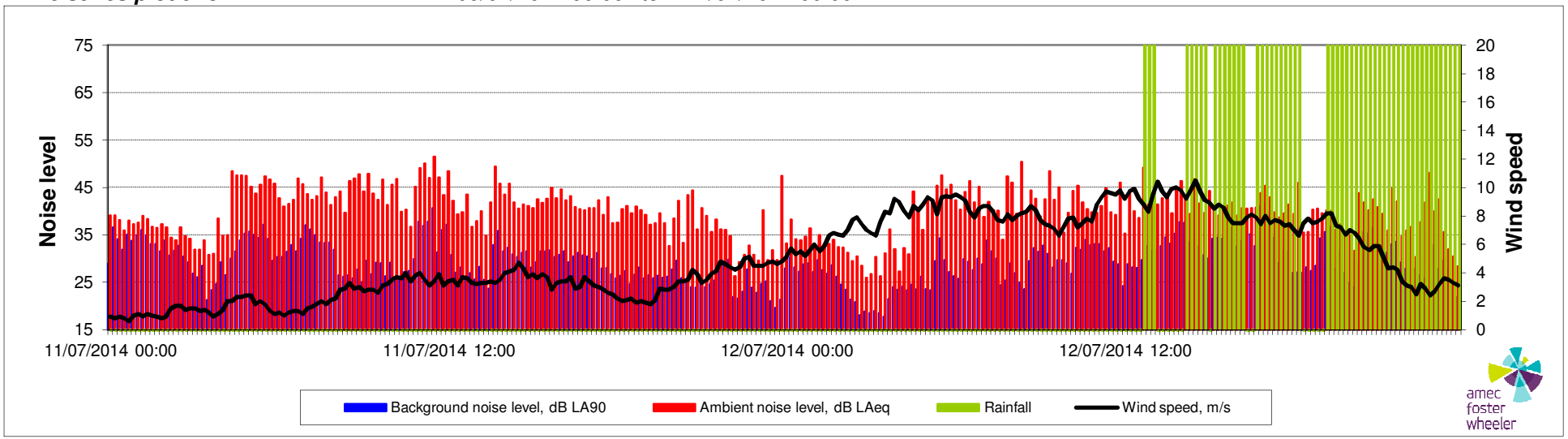
Time series plot 7 for M4 *05/07/2014 00:00 to 07/07/2014 00:00*



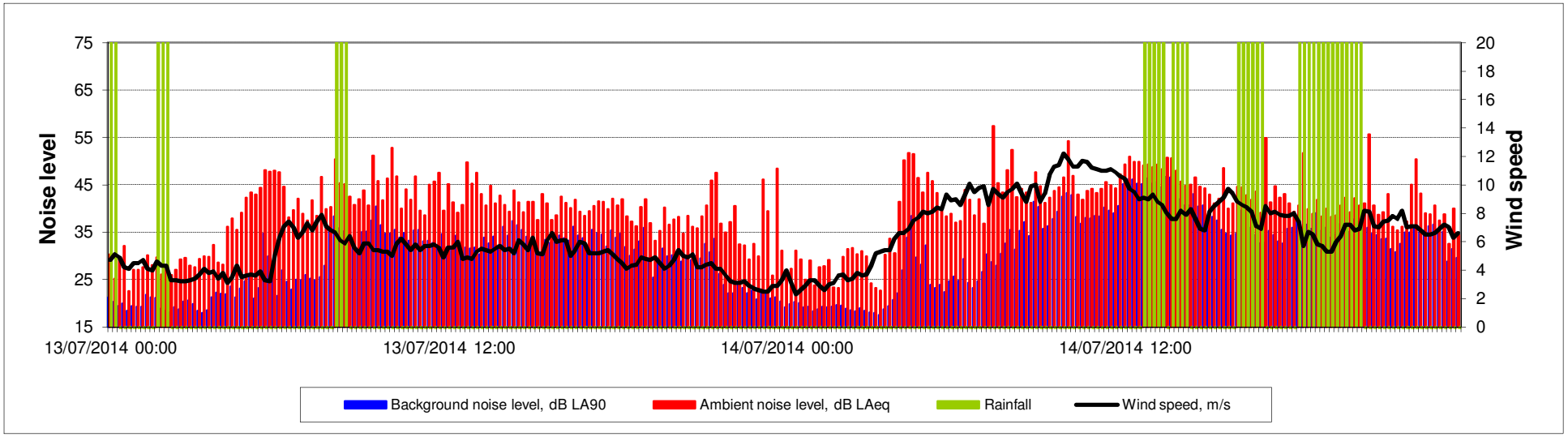
Time series plot 8 for M4 *07/07/2014 00:00 to 09/07/2014 00:00*



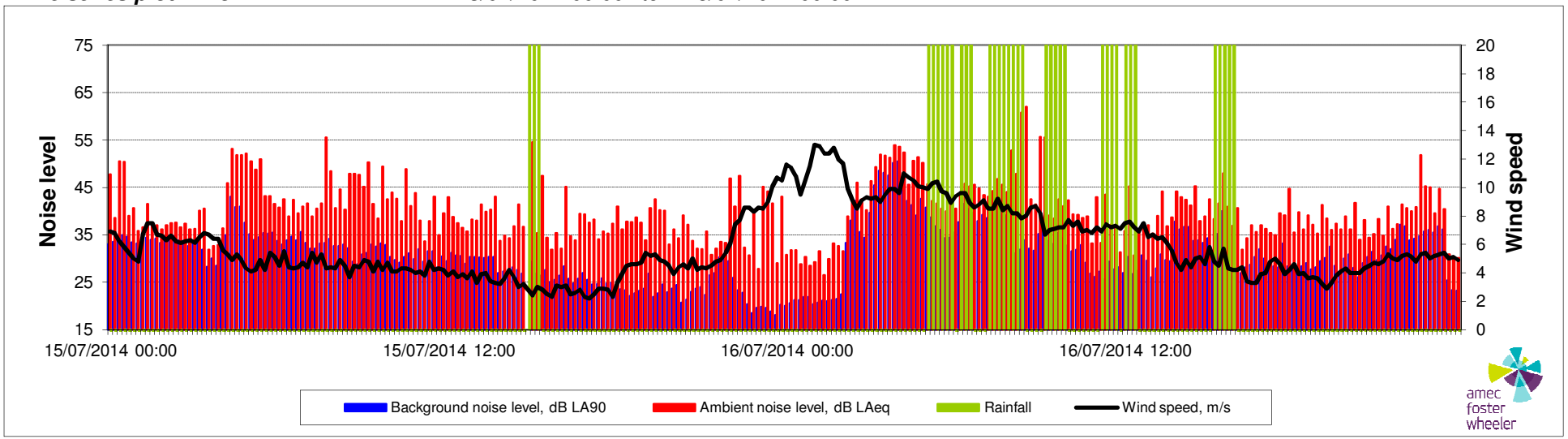
Time series plot 9 for M4 *09/07/2014 00:00 to 11/07/2014 00:00*



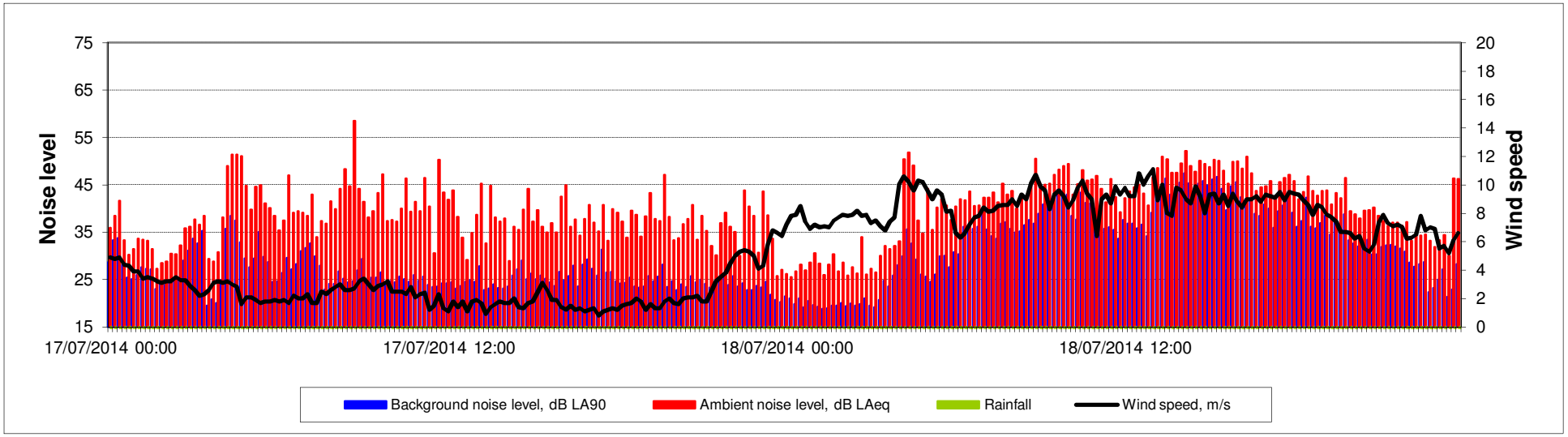
Time series plot 10 for M4 *11/07/2014 00:00 to 13/07/2014 00:00*



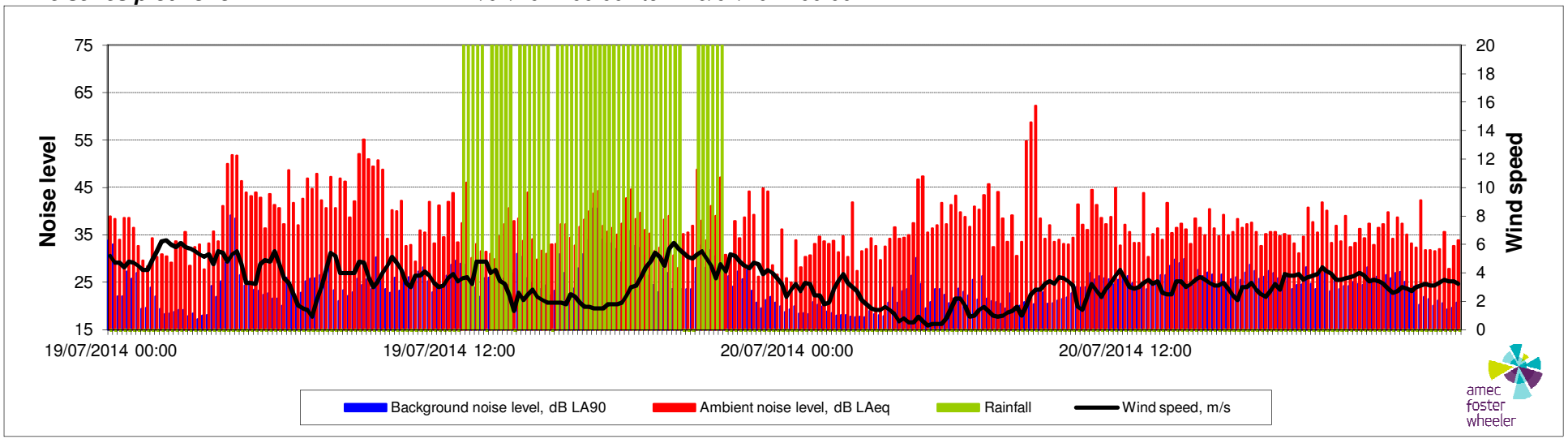
Time series plot 11 for M4 *13/07/2014 00:00 to 15/07/2014 00:00*



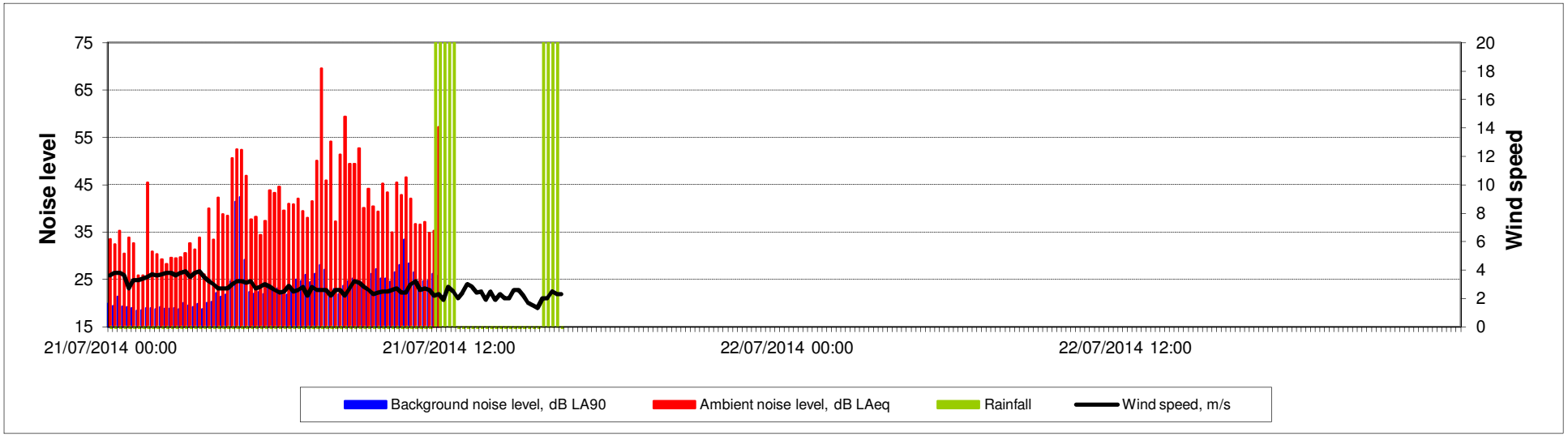
Time series plot 12 for M4 *15/07/2014 00:00 to 17/07/2014 00:00*



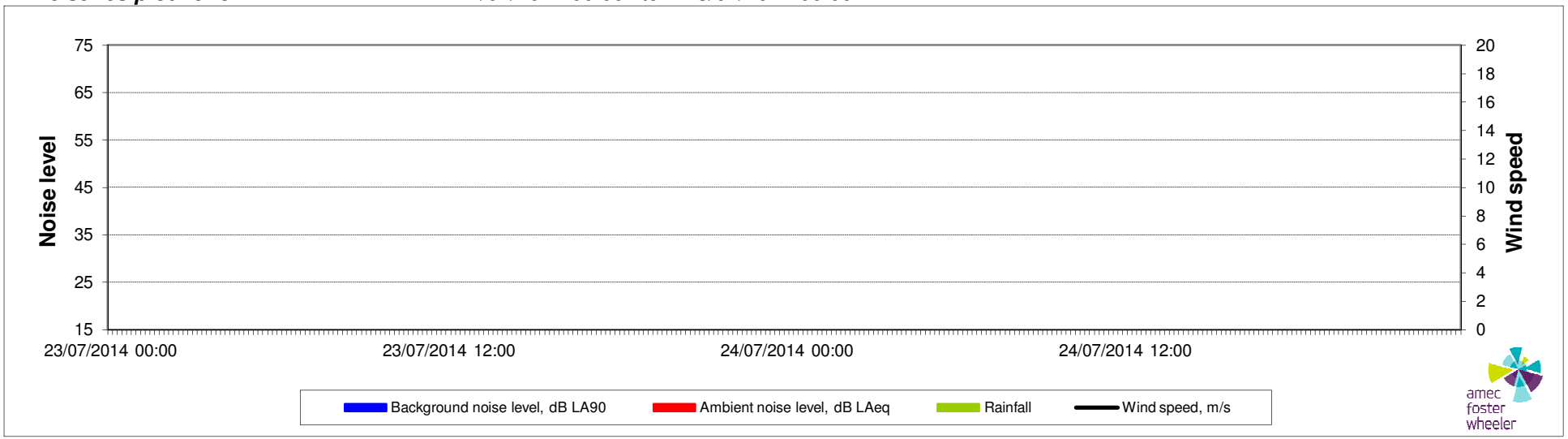
Time series plot 13 for M4 *17/07/2014 00:00 to 19/07/2014 00:00*



Time series plot 14 for M4 *19/07/2014 00:00 to 21/07/2014 00:00*



Time series plot 15 for M4 *21/07/2014 00:00 to 23/07/2014 00:00*



Time series plot 16 for M4 *23/07/2014 00:00 to 25/07/2014 00:00*

Appendix 7.D
Noise Survey - Photographs

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Figure 7D.1 – M1 Meikle Hill (1)

Figure 7D.2 – M1 Meikle Hill (2)

Figure 7D.3 – M2 Knockburnie (1)

Figure 7D.4 – M2 Knockburnie (2)

Figure 7D.5 – M3 Dalleagles (1)

Figure 7D.6 – M3 Dalleagles (2)

Figure 7D.7 – M4 Brockloch (1)

Figure 7D.8 – M4 Brockloch (2)

Appendix 7.E
Candidate Turbines – Manufacturer Data

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

SWT-3.2-101, Rev. 0, Hub Height 79.5 m
Standard Acoustic Emission

Typical Sound Power Levels
The sound power levels are presented with reference to the code IEC 61400-11 ed. 2.1 (2006-12) based on a hub height of 79.5 m and a roughness length of 0.05 m as described in the IEC code. The sound power levels (L_{WA}) presented are valid for the corresponding wind speeds referenced to a height of 10.0 m above ground level.

Wind speed [m/s]	3	4	5	6	7	8	9	10	11	12	Up to cut-out
Standard setting	91.0	95.2	99.8	104.5	106.5	107.0	107.0	107.0	107.0	107.0	107.0
"-1dB"	91.0	95.2	99.8	104.5	106.0	106.0	106.0	106.0	106.0	106.0	106.0
"-2dB"	91.0	95.2	99.8	104.2	105.0	105.0	105.0	105.0	105.0	105.0	105.0
"-3dB"	91.0	95.2	99.8	103.8	104.0	104.0	104.0	104.0	104.0	104.0	104.0
"-4dB"	91.0	95.2	99.8	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0
"-5dB"	91.0	95.2	99.8	102.0	102.0	102.0	102.0	102.0	102.0	102.0	102.0
"-6dB"	91.0	95.2	99.8	101.0	101.0	101.0	101.0	101.0	101.0	101.0	101.0

Table 1: Acoustic emission, L_{WA} [dB(A) re 1 pW]

Typical Sound Power Frequency Distribution
Typical spectra for L_{WA} in dB(A) re 1 pW for the corresponding centre frequencies are tabulated below for 6 and 8 m/s referenced to a height of 10.0 m above ground level.

1/1 oct. band, center freq.	63	125	250	500	1000	2000	4000	8000
Standard setting	86.0	90.2	94.9	97.2	100.2	97.7	92.2	78.2
"-1dB"	86.0	90.2	94.9	97.2	100.2	97.7	92.2	78.2
"-2dB"	86.1	90.1	94.6	96.9	99.9	97.4	91.9	77.9
"-3dB"	86.0	90.0	94.2	96.5	99.5	97.0	91.5	77.5
"-4dB"	85.3	90.1	93.5	95.6	98.6	96.3	90.6	76.8
"-5dB"	85.1	89.7	92.4	94.5	97.5	95.2	89.5	75.7
"-6dB"	85.0	89.4	91.4	93.5	96.5	94.2	88.5	74.7

Table 2: Typical 1/1 octave band spectrum for 63 Hz to 8 kHz at 6 m/s

1/1 oct. band, center freq.	63	125	250	500	1000	2000	4000	8000
Standard setting	87.4	93.8	97.7	99.5	102.5	100.6	94.5	80.9
"-1dB"	87.2	93.5	96.7	98.5	101.5	99.6	93.5	79.9
"-2dB"	86.9	93.1	95.6	97.4	100.4	98.5	92.4	78.8
"-3dB"	86.7	92.7	94.6	96.4	99.4	97.5	91.4	77.8
"-4dB"	86.5	92.4	93.5	95.3	98.3	96.4	90.3	76.7
"-5dB"	86.3	92.0	92.4	94.2	97.2	95.3	89.2	75.6
"-6dB"	86.1	91.6	91.3	93.1	96.1	94.2	88.1	74.5

Table 3: Typical 1/1 octave band spectrum for 63 Hz to 8 kHz at 8 m/s

Noise Restricted Operation
The lower sound power levels presented for the settings listed above are achieved by controlling the SWT-3.2-101 wind turbine in a noise restricted mode of operation. This noise restricted mode of operation will, depending on the mode, have an impact on the power output of the wind turbine. Please contact Siemens for further information on this option.

Siemens Wind Power and its affiliates reserve the right to change the above specification without prior notice.

© All Rights Reserved 2014

GE Power & Water

– Original Instructions –

Technical Documentation
Wind Turbine Generator Systems
3.2-103 - 50 Hz and 60 Hz

Product Acoustic Specifications

Normal Operation according to IEC
Incl. Octave Band Spectra
Incl. 1/3rd Octave Band Spectra

imagination at work

© 2014 General Electric Company. All rights reserved.

GE Power & Water

www.ge-energy.com

Visit us at
www.ge-renewable-energy.com/en/home

Copyright and patent rights

This document is to be treated confidentially. It may only be made accessible to authorized persons. It may only be made available to third parties with the expressed written consent of General Electric Company.

All documents are copyrighted within the meaning of the Copyright Act. The transmission and reproduction of the documents, also in extracts, as well as the exploitation and communication of the contents are not allowed without express written consent. Contraventions are liable to prosecution and compensation for damage. We reserve all rights for the exercise of commercial patent rights.

© 2014 General Electric Company. All rights reserved.

GE and are trademarks and service marks of General Electric Company.

Other company or product names mentioned in this document may be trademarks or registered trademarks of their respective companies.

imagination at work

Table of Contents

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2014 General Electric Company. All rights reserved

1 Introduction

This document summarizes the acoustic emission characteristics of 3.2-103 wind turbine for normal operation, including calculated apparent sound power levels $L_{WA,k}$, as well as uncertainty levels associated with the apparent sound power levels, tonal audibility, and calculated 1/3rd octave band apparent sound power level.

All provided sound power levels are A-weighted.

GE continuously verifies specifications with measurements, including those performed by independent institutes. If a wind turbine noise performance test is carried out it needs to be done accoriding to the following minimum requirements:

- Regulations of the international standard IEC 61400-11, ed. 2.1: 2006
- GE Machine Noise Performance Test (MNPT)

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2014 General Electric Company. All rights reserved

2 Normal Operation Calculated Apparent Sound Power Level

The apparent sound power levels $L_{WA,k}$ are initially calculated as a function of the hub height wind speed v_{HH}. The corresponding wind speeds v_{10m} at 10 m height above ground level have been evaluated assuming a logarithmic wind profile. In this case a surface roughness of z_{0ref} = 0.05 m has been used, which is representative of average terrain conditions.

$$v_{10m} = v_{HH} \frac{\ln\left(10m / z_{0ref}\right)}{\ln\left(hub\ height / z_{0ref}\right)} \quad [1]$$

The calculated apparent sound power levels $L_{WA,k}$ and the associated octave-band spectra are given in Table 1-4 for four different hub heights. The values are provided as mean levels as a function of v_{10m} for Normal Operation (NO) over cut-in to cut-out wind speed range. The uncertainties for octave sound power levels are generally higher than for total sound power levels. Guidance is given in IEC 61400-11, Annex D.

70 m hub height - Normal Operation Octave Band Spectra									
Standardized wind speed at 10 m (m/s)		**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-Cutout**
Hub height wind speed at 70 m (m/s)		**4.1**	**5.5**	**6.8**	**8.2**	**9.6**	**10.9**	**12.3**	**13.7-cut out**
Frequency (Hz)	**32**	69.7	69.6	72.5	76.3	78.9	79.4	79.4	79.3
	63	79.9	79.7	82.8	86.4	89.0	89.6	89.5	89.3
	125	84.3	84.5	88.0	91.4	93.7	94.4	94.3	94.1
	250	86.0	86.8	90.6	93.9	95.8	95.9	95.6	95.2
	500	87.7	87.9	91.3	95.0	97.3	97.5	97.2	96.7
	1000	89.9	90.0	92.9	96.0	98.3	99.2	99.3	99.7
	2000	88.7	90.6	94.0	96.7	98.3	99.0	99.3	99.6
	4000	79.9	82.8	87.5	91.0	92.8	93.2	93.0	91.9
	8000	61.3	62.0	66.6	71.7	74.1	74.1	73.4	72.2
	16000	13.3	19.2	23.9	27.5	29.9	30.4	30.1	30.1
Total Sound Power Level (dB)		**95.0**	**95.8**	**99.2**	**102.4**	**104.4**	**105.0**	**105.0**	**105.0**

Table 1: Normal Operation Calculated Apparent Sound Power Level, 3.2-103 with 70 m hub height as a function of 10 m wind speed (z_{0ref} = 0.05 m)

[1] Simplified from IEC 61400-11, ed. 2.1: 2006 equation 7

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2014 General Electric Company. All rights reserved

75 m hub height - Normal Operation Octave Band Spectra									
Standardized wind speed at 10 m (m/s)		**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-Cutout**
Hub height wind speed at 75 m (m/s)		**4.1**	**5.5**	**6.9**	**8.3**	**9.7**	**11.0**	**12.4**	**13.8-Cutout**
Frequency (Hz)	**32**	69.7	69.6	72.7	76.4	79.0	79.4	79.4	79.3
	63	79.9	79.7	83.0	86.6	89.1	89.6	89.5	89.3
	125	84.3	84.6	88.2	91.6	93.8	94.4	94.3	94.1
	250	86.0	86.9	90.8	94.1	95.8	95.9	95.6	95.1
	500	87.7	87.9	91.5	95.2	97.3	97.5	97.2	96.7
	1000	89.9	90.0	93.0	96.2	98.4	99.2	99.3	99.8
	2000	88.7	90.6	94.2	96.9	98.4	99.1	99.3	99.6
	4000	79.9	83.0	87.7	91.1	92.9	93.2	93.0	91.8
	8000	61.3	62.1	66.9	71.9	74.2	74.1	73.4	72.1
	16000	13.5	19.5	24.2	27.7	30.1	30.4	30.1	29.8
Total Sound Power Level (dB)		**95.0**	**95.9**	**99.4**	**102.6**	**104.5**	**105.0**	**105.0**	**105.0**

Table 2: Normal Operation Calculated Apparent Sound Power Level, 3.2-103 with 75 m hub height as a function of 10 m wind speed (z_{0ref} = 0.05 m)

85 m hub height - Normal Operation Octave Band Spectra									
Standardized wind speed at 10 m (m/s)		**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-Cutout**
Hub height wind speed at 85 m (m/s)		**4.2**	**5.6**	**7.0**	**8.4**	**9.8**	**11.2**	**12.6**	**14-Cutout**
Frequency (Hz)	**32**	69.7	69.6	73.1	76.8	79.2	79.4	79.4	79.2
	63	79.8	79.8	83.4	86.9	89.4	89.6	89.5	89.3
	125	84.3	84.7	88.5	91.9	94.1	94.3	94.3	94.0
	250	86.1	87.2	91.2	94.5	95.9	95.8	95.6	95.1
	500	87.8	88.0	91.9	95.6	97.5	97.5	97.1	96.5
	1000	89.9	90.1	93.3	96.5	98.7	99.2	99.4	99.9
	2000	88.8	90.9	94.5	97.1	98.7	99.1	99.3	99.6
	4000	79.8	83.3	88.1	91.4	93.0	93.2	93.0	91.6
	8000	61.4	62.3	67.5	72.4	74.3	74.0	73.2	72.0
	16000	13.8	19.8	24.5	28.1	30.3	30.3	30.1	29.4
Total Sound Power Level (dB)		**95.1**	**96.0**	**99.7**	**102.9**	**104.7**	**105.0**	**105.0**	**105.0**

Table 3: Normal Operation Calculated Apparent Sound Power Level, 3.2-103 with 85 m hub height as a function of 10 m wind speed (z_{0ref} = 0.05 m)

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2014 General Electric Company. All rights reserved

98.3 m hub height - Normal Operation Octave Band Spectra									
Standardized wind speed at 10 m (m/s)		**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-Cutout**
Hub height wind speed at 98.3 m (m/s)		**4.3**	**5.7**	**7.2**	**8.6**	**10.0**	**11.4**	**12.9**	**14.3-Cutout**
Frequency (Hz)	**32**	69.7	69.7	73.5	77.2	79.4	79.4	79.3	79.2
	63	79.8	79.9	83.7	87.2	89.7	89.6	89.5	89.3
	125	84.3	84.9	88.9	92.2	94.3	94.3	94.3	94.0
	250	86.1	87.4	91.5	94.7	96.0	95.8	95.5	94.9
	500	87.7	88.2	92.2	95.9	97.7	97.4	97.1	96.3
	1000	89.9	90.2	93.7	96.8	99.0	99.2	99.4	100.0
	2000	88.9	91.1	94.8	97.3	98.9	99.2	99.4	99.7
	4000	79.7	83.6	88.4	91.7	93.2	93.2	92.8	91.4
	8000	61.5	62.5	68.0	72.8	74.5	73.8	73.0	72.0
	16000	14.1	20.2	24.9	28.4	30.6	30.2	30.2	29.2
Total Sound Power Level (dB)		**95.1**	**96.2**	**100.1**	**103.2**	**105.0**	**105.0**	**105.0**	**105.0**

Table 4: Normal Operation Calculated Apparent Sound Power Level, 3.2-103 with 98.3 m hub height as a function of 10 m wind speed (z_{0ref} = 0.05 m)

At wind speeds lower than those included in the table above the sound power levels decreases, and may get so low that the wind turbine noise becomes indistinguishable from the background noise. For a conservative calculation the data for the lowest wind speed may be used.

For wind speeds higher than those included in the tables above, the wind turbine has reached rated power and the blade pitch regulation acts in a way that tends to decrease the noise levels. For a conservative calculation the data for the highest wind speed may be used.

The highest normal operation calculated apparent sound power level for the 3.2-103 is $L_{WA,k}$ = 105.0 dB.

3 Uncertainty Levels

The apparent sound power levels given above are calculated mean levels. If a wind turbine noise performance test is carried out, it needs to be done in accordance with the regulations of the international standard IEC 61400-11, ed. 2.1: 2006. Uncertainty levels associated with measurements are described in IEC/TS 61400-14.

Per IEC/TS 61400-14, L_{WAd} is the maximum apparent sound power level for 95 % confidence level resulting from n measurements performed according to IEC 61400-11 standard: $L_{Wad} = L_{WA} + K$, where L_{WA} is the mean apparent sound power level from IEC 61400-11 testing reports and $K = 1.645\ \sigma_T$.

The testing standard deviation values σ_T, σ_R and σ_P for measured apparent sound power level are described by IEC/TS 61400-14, where σ_T is the total standard deviation, σ_P is the standard deviation for product variation and σ_R is the standard deviation for test reproducibility.

Assuming $\sigma_R < 0.8$ dB and $\sigma_P < 0.8$ dB as typical values leads to a calculated K < 2 dB for 95 % confidence level.

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2014 General Electric Company. All rights reserved

4 Tonal Audibility

The tonal audibility ($\Delta L_{a,k}$), when measured in accordance with the IEC 61400-11 standard, for the 3.2-103 is less than or equal to 4 dB.

5 IEC 61400-11 and IEC/TS 61400-14 Terminology

- $L_{WA,K}$ is wind turbine apparent sound power level (referenced to 10^{-12}W) measured with A-weighting as function of reference wind speed v_{10m}. Derived from multiple measurement reports per IEC 61400-11, it is considered as a mean value
- σ_P is the product variation i.e. the 3.2-103 unit-to-unit product variation; typically < 0.8 dB
- σ_R is the overall measurement testing reproducibility as defined per IEC 61400-11; typically < 0.8 dB with adequate measurement conditions and sufficient amount of data samples
- σ_T is the total standard deviation combining both σ_P and σ_R
- $K = 1.645\ \sigma_T$ is defined per IEC/TS 61400-14 for 95 % confidence level
- R_0 is the ground measuring distance from the wind turbine tower axis per IEC 61400-11, which shall equal the hub height plus half the rotor diameter
- $\Delta L_{a,k}$ is the audibility according to IEC 61400-11, described as potentially audible narrow band sound

6 1/3rd Octave Band Spectra

The tables in Annex I are showing the 1/3rd octave band values for different wind speeds at different hub heights.

7 Reference Documents

- IEC 61400-1, Wind turbines – part 1: Design requirements, ed. 3, 2005-08
- IEC 61400-11, wind turbine generator systems part 11: Acoustic noise measurement techniques, ed. 2.1, 2006-11
- IEC/TS 61400-14, Wind turbines – part 14: Declaration of apparent sound power level and tonality values, ed. 1, 2005-03
- MNPT – Machine Noise Performance Test, Technical documentation

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2014 General Electric Company. All rights reserved

Appendix - Calculated 1/3rd Octave Band Apparent Sound Power Level $L_{WA,k}$

70 m hub height - Normal Operation 1/3rd Octave Band Spectra (dB)									
Standardized wind speed at 10 m (m/s)		3	4	5	6	7	8	9	10-Cutout
Hub height wind speed at 70 m (m/s)		4.1	5.5	6.8	8.2	9.6	10.9	12.3	13.7-cut out
Frequency (Hz)	25	58.9	58.8	61.9	65.8	68.4	68.9	68.8	68.7
	32	63.7	63.5	66.6	70.4	73.0	73.4	73.4	73.3
	40	68.0	67.8	70.9	74.6	77.2	77.6	77.6	77.5
	50	71.5	71.3	74.5	78.1	80.6	81.0	81.0	80.9
	63	74.6	74.5	77.7	81.3	83.8	84.3	84.2	84.1
	80	77.3	77.2	80.5	84.1	86.6	87.2	87.0	86.8
	100	78.9	79.0	82.4	85.8	88.3	88.9	88.8	88.7
	125	79.6	79.9	83.5	86.9	89.1	89.7	89.6	89.4
	160	79.9	80.4	84.2	87.5	89.6	90.1	90.0	89.7
	200	80.3	81.1	85.0	88.3	90.2	90.5	90.3	90.0
	250	81.1	82.1	86.1	89.3	90.9	91.0	90.8	90.3
	315	82.1	83.0	86.8	90.2	91.8	91.7	91.3	90.7
	400	82.3	83.0	86.7	90.2	92.0	91.9	91.5	90.9
	500	83.0	83.2	86.8	90.5	92.6	92.7	92.4	91.8
	630	83.5	83.3	86.8	90.6	93.0	93.5	93.3	92.8
	800	84.0	83.7	87.0	90.6	93.2	93.9	93.8	93.7
	1000	84.9	84.8	87.9	91.1	93.4	94.2	94.4	94.8
	1250	86.1	86.6	89.5	92.3	94.3	95.0	95.3	96.2
	1600	85.5	86.6	89.8	92.4	94.0	94.7	95.1	95.8
	2000	84.1	86.2	89.8	92.4	93.9	94.6	94.8	95.1
	2500	81.4	84.5	88.5	91.4	93.0	93.5	93.6	93.3
	3150	78.0	81.8	86.1	89.3	91.0	91.4	91.3	90.3
	4000	74.0	76.1	81.7	85.3	87.1	87.4	87.1	85.5
	5000	69.3	69.5	75.7	80.2	82.0	82.0	81.6	79.8
	6300	61.1	61.7	66.6	71.7	73.9	73.8	73.1	71.8
	8000	48.5	51.3	54.5	59.0	61.5	61.4	61.0	60.5
	10000	32.9	37.6	41.2	44.5	46.9	47.1	47.0	46.8
	12500	13.5	19.5	24.2	27.7	30.1	30.4	30.1	29.8
	16000	-13.4	-7.7	-1.0	3.4	5.9	6.2	6.1	4.9
	20000	-42.4	-37.2	-29.5	-23.7	-20.6	-20.5	-20.7	-22.7
Total Sound Power Level (dB)		95.0	95.8	99.2	102.4	104.4	105.0	105.0	105.0

Table 5: Calculated Apparent 1/3rd Octave Band Sound Power Level (A-weighted) 3.2-103 with 70 m hub height as Function of Wind Speed v_{10m}

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2014 General Electric Company. All rights reserved

75 m hub height - Normal Operation 1/3rd Octave Band Spectra (dB)									
Standardized wind speed at 10 m (m/s)		3	4	5	6	7	8	9	10-Cutout
Hub height wind speed at 75 m (m/s)		4.1	5.5	6.9	8.3	9.7	11.0	12.4	13.8-Cutout
Frequency (Hz)	25	58.9	58.8	61.9	65.8	68.4	68.9	68.8	68.7
	32	63.7	63.5	66.6	70.4	73.0	73.4	73.4	73.3
	40	68.0	67.8	70.9	74.6	77.2	77.6	77.6	77.5
	50	71.5	71.3	74.5	78.1	80.6	81.0	81.0	80.9
	63	74.6	74.5	77.7	81.3	83.8	84.3	84.2	84.1
	80	77.3	77.2	80.5	84.1	86.6	87.2	87.0	86.8
	100	78.9	79.0	82.4	85.8	88.3	88.9	88.8	88.7
	125	79.6	79.9	83.5	86.9	89.1	89.7	89.6	89.4
	160	79.9	80.4	84.2	87.5	89.6	90.1	90.0	89.7
	200	80.3	81.1	85.0	88.3	90.2	90.5	90.3	90.0
	250	81.1	82.1	86.1	89.3	90.9	91.0	90.8	90.3
	315	82.1	83.0	86.8	90.2	91.8	91.7	91.3	90.7
	400	82.3	83.0	86.7	90.2	92.0	91.9	91.5	90.9
	500	83.0	83.2	86.8	90.5	92.6	92.7	92.4	91.8
	630	83.5	83.3	86.8	90.6	93.0	93.5	93.3	92.8
	800	84.0	83.7	87.0	90.6	93.2	93.9	93.8	93.7
	1000	84.9	84.8	87.9	91.1	93.4	94.2	94.4	94.8
	1250	86.1	86.6	89.5	92.3	94.3	95.0	95.3	96.2
	1600	85.5	86.6	89.8	92.4	94.0	94.7	95.1	95.8
	2000	84.1	86.2	89.8	92.4	93.9	94.6	94.8	95.1
	2500	81.4	84.5	88.5	91.4	93.0	93.5	93.6	93.3
	3150	78.0	81.8	86.1	89.3	91.0	91.4	91.3	90.3
	4000	74.0	76.1	81.7	85.3	87.1	87.4	87.1	85.5
	5000	69.3	69.5	75.7	80.2	82.0	82.0	81.6	79.8
	6300	61.1	61.7	66.6	71.7	73.9	73.8	73.1	71.8
	8000	48.5	51.3	54.5	59.0	61.5	61.4	61.0	60.5
	10000	32.9	37.6	41.2	44.5	46.9	47.1	47.0	46.8
	12500	13.5	19.5	24.2	27.7	30.1	30.4	30.1	29.8
	16000	-13.4	-7.7	-1.0	3.4	5.9	6.2	6.1	4.9
	20000	-42.4	-37.2	-29.5	-23.7	-20.6	-20.5	-20.7	-22.7
Total Sound Power Level (dB)		95.0	95.9	99.4	102.6	104.5	105.0	105.0	105.0

Table 6: Calculated Apparent 1/3rd Octave Band Sound Power Level (A-weighted) 3.2-103 with 75 m hub height as Function of Wind Speed v_{10m}

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2014 General Electric Company. All rights reserved

85 m hub height - Normal Operation 1/3rd Octave Band Spectra (dB)									
Standardized wind speed at 10 m (m/s)		3	4	5	6	7	8	9	10-Cutout
Hub height wind speed at 85 m (m/s)		4.2	5.6	7.0	8.4	9.8	11.2	12.6	14-Cutout
Frequency (Hz)	25	58.9	58.8	62.3	66.1	68.6	68.9	68.8	68.6
	32	63.7	63.6	67.0	70.7	73.2	73.4	73.4	73.2
	40	68.0	67.9	71.3	75.0	77.4	77.6	77.6	77.4
	50	71.5	71.4	74.8	78.5	80.8	81.0	81.0	80.8
	63	74.6	74.6	78.1	81.6	84.1	84.3	84.2	84.0
	80	77.2	77.3	80.9	84.4	86.9	87.2	87.0	86.8
	100	78.9	79.1	82.7	86.2	88.6	88.9	88.8	88.6
	125	79.6	80.1	83.8	87.2	89.4	89.6	89.6	89.4
	160	79.9	80.6	84.5	87.8	89.8	90.0	90.0	89.7
	200	80.4	81.4	85.4	88.7	90.3	90.4	90.3	89.9
	250	81.2	82.4	86.4	89.6	91.1	91.0	90.7	90.2
	315	82.2	83.2	87.2	90.6	91.9	91.6	91.3	90.7
	400	82.4	83.1	87.0	90.6	92.1	91.8	91.4	90.8
	500	83.0	83.3	87.2	90.9	92.8	92.7	92.3	91.6
	630	83.5	83.4	87.2	91.0	93.2	93.4	93.2	92.7
	800	84.0	83.8	87.3	91.0	93.4	93.9	93.8	93.7
	1000	84.9	84.9	88.2	91.4	93.7	94.2	94.4	94.9
	1250	86.2	86.8	89.8	92.6	94.6	95.1	95.4	96.3
	1600	85.5	86.8	90.1	92.6	94.3	94.8	95.1	95.9
	2000	84.2	86.4	90.1	92.6	94.1	94.6	94.8	95.1
	2500	81.5	84.8	88.9	91.7	93.2	93.5	93.6	93.2
	3150	78.0	82.0	86.4	89.6	91.2	91.4	91.3	90.1
	4000	73.9	76.5	82.1	85.6	87.3	87.3	87.0	85.2
	5000	69.3	70.0	76.1	80.4	82.1	82.0	81.4	79.6
	6300	61.2	61.9	67.2	72.2	74.0	73.7	72.9	71.7
	8000	48.8	51.4	54.9	59.6	61.7	61.3	60.9	60.4
	10000	33.2	37.8	41.5	44.9	47.1	47.2	46.9	46.6
	12500	13.8	19.8	24.5	28.1	30.3	30.3	30.1	29.4
	16000	-13.2	-7.2	-0.5	3.7	6.2	6.1	6.0	4.4
	20000	-42.2	-36.7	-28.9	-23.1	-20.3	-20.6	-20.8	-23.2
Total Sound Power Level (dB)		95.1	96.0	99.7	102.9	104.7	105.0	105.0	105.0

Table 7: Calculated Apparent 1/3rd Octave Band Sound Power Level (A-weighted) 3.2-103 with 85 m hub height as Function of Wind Speed v_{10m}

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2014 General Electric Company. All rights reserved

98.3 m hub height - Normal Operation 1/3rd Octave Band Spectra (dB)									
Standardized wind speed at 10 m (m/s)		3	4	5	6	7	8	9	10-Cutout
Hub height wind speed at 98.3 m (m/s)		4.3	5.7	7.2	8.6	10.0	11.4	12.9	14.3-Cutout
Frequency (Hz)	25	58.9	58.9	62.7	66.5	68.9	68.9	68.8	68.6
	32	63.7	63.6	67.4	71.1	73.4	73.4	73.3	73.2
	40	68.0	67.9	71.7	75.4	77.6	77.6	77.5	77.4
	50	71.4	71.5	75.2	78.8	81.1	81.0	80.9	80.8
	63	74.5	74.7	78.4	82.0	84.4	84.3	84.2	84.0
	80	77.2	77.4	81.2	84.7	87.2	87.1	87.0	86.8
	100	78.9	79.2	83.1	86.5	88.9	88.9	88.8	88.6
	125	79.6	80.2	84.2	87.5	89.6	89.6	89.6	89.4
	160	79.9	80.8	84.9	88.1	90.1	90.0	90.0	89.7
	200	80.4	81.6	85.7	88.9	90.5	90.4	90.3	89.9
	250	81.3	82.6	86.7	89.9	91.2	90.9	90.6	90.1
	315	82.2	83.5	87.5	90.9	92.0	91.6	91.2	90.5
	400	82.4	83.3	87.4	90.9	92.2	91.7	91.3	90.5
	500	83.0	83.4	87.5	91.3	93.0	92.6	92.3	91.4
	630	83.4	83.5	87.5	91.3	93.5	93.4	93.2	92.5
	800	84.0	83.9	87.7	91.3	93.7	93.9	93.8	93.8
	1000	84.9	85.1	88.5	91.7	94.0	94.2	94.4	95.1
	1250	86.2	86.9	90.1	92.8	94.8	95.1	95.5	96.5
	1600	85.6	87.1	90.4	92.8	94.5	94.9	95.2	96.0
	2000	84.3	86.7	90.4	92.8	94.3	94.7	94.9	95.1
	2500	81.6	85.0	89.2	91.9	93.4	93.5	93.5	93.1
	3150	77.9	82.2	86.8	89.9	91.4	91.4	91.1	89.9
	4000	73.8	77.0	82.4	85.9	87.5	87.3	86.7	85.1
	5000	69.2	70.5	76.7	80.7	82.3	81.9	81.1	79.6
	6300	61.2	62.1	67.7	72.6	74.2	73.5	72.7	71.7
	8000	49.1	51.5	55.3	60.0	61.8	61.3	60.7	60.2
	10000	33.5	38.1	41.7	45.3	47.4	47.3	46.8	46.3
	12500	14.1	20.2	24.9	28.4	30.6	30.2	30.2	29.2
	16000	-12.9	-6.7	0.0	4.1	6.5	6.1	5.9	4.2
	20000	-41.9	-36.2	-28.2	-22.6	-20.1	-20.7	-21.0	-23.3
Total Sound Power Level (dB)		95.1	96.2	100.1	103.2	105.0	105.0	105.0	105.0

Table 8: Calculated Apparent 1/3rd Octave Band Sound Power Level (A-weighted) 3.2-103 with 98.3 m hub height as Function of Wind Speed v_{10m}

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2014 General Electric Company. All rights reserved

GE Power & Water

– Original Instructions –

Technical Documentation
Wind Turbine Generator Systems
2.x-103 - 50 Hz and 60 Hz

Product Acoustic Specifications

Normal Operation according to IEC
Incl. Octave Band Spectra and
1/3rd Octave Band Spectra

imagination at work

© 2013 General Electric Company. All rights reserved.

GE Power & Water

www.ge-energy.com

Visit us at
www.ge-renewable-energy.com/en/home

Copyright and patent rights

This document is to be treated confidentially. It may only be made accessible to authorized persons. It may only be made available to third parties with the expressed written consent of General Electric Company.

All documents are copyrighted within the meaning of the Copyright Act. The transmission and reproduction of the documents, also in extracts, as well as the exploitation and communication of the contents are not allowed without express written consent. Contraventions are liable to prosecution and compensation for damage. We reserve all rights for the exercise of commercial patent rights.

© 2013 General Electric Company. All rights reserved.

GE and are trademarks and service marks of General Electric Company.

Other company or product names mentioned in this document may be trademarks or registered trademarks of their respective companies.

imagination at work

Table of Contents

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2013 General Electric Company. All rights reserved

1 Introduction

This document summarizes acoustic emission characteristics of the 2.5-103, 2.75-103 and 2.85-103 wind turbines for normal operation, including calculated apparent sound power levels $L_{WA,k}$, as well as uncertainty levels associated with apparent sound power levels, tonal audibility, and calculated 1/3rd octave band apparent sound power level.

All provided sound power levels are A-weighted.

Seller verifies specifications with measurements, including those performed by independent institutes. If a wind turbine noise performance test is carried out, it needs to be done in accordance with regulations of the international standard IEC 61400-11, ed. 2.1: 2006 and Machine Noise Performance Test document.

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2013 General Electric Company. All rights reserved

2 Normal Operation Calculated Apparent Sound Power Level and Octave Band Spectra

Apparent sound power levels $L_{WA,k}$ are initially calculated as a function of hub height wind speed v_{HH}. Corresponding wind speeds v_{10m} at 10 m height above ground level have been evaluated assuming a logarithmic wind profile. In this case a surface roughness of z_{0ref} = 0.05 m has been used.

$$v_{10m} = v_{HH} \frac{\ln\left(10m / z_{0ref}\right)}{\ln\left(hub\ height / z_{0ref}\right)} \quad *$$

Calculated apparent sound power levels $L_{WA,k}$ and associated octave-band spectra are given in Table 1-3. Values are provided as mean levels as a function of v_{10m} for Normal Operation (NO) over cut-in to cut-out wind speed range. Uncertainties for octave sound power levels are generally higher than for total sound power levels. Guidance is given in IEC 61400-11, Annex D.

75 m hub height - Normal Operation Octave Band Spectra									
Standard wind speed at 10 m [m/s]		**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-Cutout**
Hub height wind speed at 75 m [m/s]		**4.1**	**5.5**	**6.9**	**8.3**	**9.7**	**11.0**	**12.4**	**14-Cutout**
Frequency [Hz]	31.5	69.3	69.2	72.5	77.0	80.3	80.4	80.4	80.7
	63	78.6	78.4	81.9	86.6	90.2	90.2	90.1	90.3
	125	82.2	82.5	86.5	91.3	94.6	94.7	94.6	94.5
	250	83.3	84.2	88.6	93.7	96.3	96.0	95.8	94.6
	500	84.9	84.5	88.5	94.3	97.7	97.4	97.2	95.8
	1000	87.1	86.6	90.0	95.1	98.9	99.0	99.2	100.3
	2000	85.9	87.3	91.2	95.8	98.9	99.1	99.3	99.6
	4000	76.9	79.7	84.9	90.0	93.0	92.8	92.4	90.7
	8000	58.6	58.8	63.9	70.8	73.9	73.3	72.6	71.9
	16000	10.5	16.4	21.2	26.4	30.3	30.0	30.0	28.3
Total apparent sound power level L_{WA} [dB]		**92.4**	**92.8**	**96.7**	**101.8**	**105.0**	**105.0**	**105.0**	**105.0**

Table 1: Normal Operation Calculated Apparent Sound Power Level, 2.5-103/2.75-103/2.85-103 with 75 m hub height as a function of 10 m wind speed (z_{0ref} = 0.05 m)

* Simplified from IEC 61400-11, ed. 2.1: 2006 equation 7

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2013 General Electric Company. All rights reserved

85 m hub height - Normal Operation Octave Band Spectra									
Standard wind speed at 10 m [m/s]		**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-Cutout**
Hub height wind speed at 85 m [m/s]		**4.2**	**5.6**	**7.0**	**8.4**	**9.8**	**11.2**	**12.6**	**14-Cutout**
Frequency [Hz]	31.5	69.3	69.3	72.8	77.4	80.3	80.4	80.4	80.7
	63	78.5	78.6	82.3	87.0	90.2	90.2	90.1	90.3
	125	82.2	82.7	86.9	91.7	94.7	94.7	94.6	94.5
	250	83.3	84.4	89.0	94.1	96.3	96.0	95.7	94.6
	500	84.9	84.7	88.9	94.7	97.7	97.4	97.1	95.8
	1000	87.1	86.7	90.4	95.5	98.9	99.0	99.2	100.3
	2000	86.0	87.5	91.6	96.1	98.9	99.1	99.4	99.6
	4000	76.8	80.0	85.3	90.4	93.0	92.8	92.3	90.7
	8000	58.7	59.0	64.5	71.3	73.9	73.1	72.4	71.9
	16000	10.7	16.7	21.7	26.9	30.4	30.0	30.0	28.3
Total apparent sound power level L_{WA} [dB]		**92.4**	**92.9**	**97.1**	**102.1**	**105.0**	**105.0**	**105.0**	**105.0**

Table 2: Normal Operation Calculated Apparent Sound Power Level, 2.5-103/2.75-103/2.85-103 with 85 m hub height as a function of 10 m wind speed (z_{0ref} = 0.05 m)

98.3 m hub height - Normal Operation Octave Band Spectra									
Standard wind speed at 10 m [m/s]		**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-Cutout**
Hub height wind speed at 98.3 m [m/s]		**4.3**	**5.7**	**7.2**	**8.6**	**10.0**	**11.4**	**12.9**	**14-Cutout**
Frequency [Hz]	31.5	69.3	69.5	73.2	77.8	80.4	80.4	80.5	80.7
	63	78.5	78.8	82.7	87.4	90.2	90.2	90.2	90.3
	125	82.2	82.9	87.3	92.1	94.7	94.7	94.6	94.5
	250	83.4	84.6	89.5	94.6	96.3	96.0	95.6	94.6
	500	84.9	84.8	89.4	95.3	97.7	97.4	96.9	95.8
	1000	87.1	86.9	90.9	95.9	98.9	99.0	99.4	100.3
	2000	86.0	87.8	92.0	96.4	98.8	99.1	99.4	99.6
	4000	76.8	80.4	85.8	90.8	93.0	92.8	92.1	90.7
	8000	58.7	59.3	65.1	72.0	73.9	73.1	72.3	71.9
	16000	11.0	17.1	22.2	27.5	30.4	30.0	29.8	28.3
Total apparent sound power level L_{WA} [dB]		**92.4**	**93.2**	**97.6**	**102.6**	**105.0**	**105.0**	**105.0**	**105.0**

Table 3: Normal Operation Calculated Apparent Sound Power Level, 2.5-103/2.75-103/2.85-103 with 98.3 m hub height as a function of 10 m wind speed (z_{0ref} = 0.05 m)

For 10 m wind speeds above 10 m/s, the wind turbine has reached rated power and blade pitch regulation acts in a way that tends to decrease noise levels. For a conservative calculation data at 10 m/s may be used.

The highest normal operation calculated apparent sound power level for the 2.5-103, 2.75-103 and 2.85-103 is $L_{WA,k}$ = 105.0 dB.

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2013 General Electric Company. All rights reserved

3 Uncertainty Levels

Apparent sound power levels in Table 1, Table 2 and Table 3 are calculated mean levels. Uncertainty levels associated with measurements are described in IEC/TS 61400-14.

Per IEC/TS 61400-14, L_{WAd} is the maximum apparent sound power level for 95 % confidence level resulting from n measurements performed according to IEC 61400-11 standard: $L_{Wad} = L_{WA} + K$, where L_{WA} is the mean apparent sound power level from IEC 61400-11 testing reports and $K = 1.645\ \sigma_T$.

Testing standard deviation values σ_T, σ_R and σ_P for measured apparent sound power level are described by IEC/TS 61400-14, where σ_T is the total standard deviation, σ_P is the standard deviation for product variation and σ_R is the standard deviation for test reproducibility.

Assuming $\sigma_R < 0.8$ dB and $\sigma_P < 0.8$ dB as typical values leads to a calculated $K < 2$ dB for 95 % confidence level.

4 Tonal Audibility

At the reference measuring point R_0 the 2.5-103, 2.75-103 and 2.85-103 wind turbines have a value for tonality of $\mathbf{\Delta L_{a,k} \leq 4\ dB}$.

5 IEC 61400-11 and IEC/TS 61400-14 Terminology

- $\mathbf{L_{WA,k}}$ is wind turbine apparent sound power level (referenced to 10^{-12}W) measured with A-weighting as function of reference wind speed $\mathbf{v_{10m}}$. Derived from multiple measurement reports per IEC 61400-11, it is considered as a mean value
- $\mathbf{\sigma_P}$ is the product variation i.e. 2.5-103, 2.75-103 and 2.85-103 unit-to-unit product variation; typically < 0.8 dB
- $\mathbf{\sigma_R}$ is the overall measurement testing reproducibility as defined per IEC 61400-11; typically < 0.8 dB with adequate measurement conditions and sufficient amount of data samples
- $\mathbf{\sigma_T}$ is the total standard deviation combining both $\mathbf{\sigma_P}$ and $\mathbf{\sigma_R}$
- $\mathbf{K = 1.645\ \sigma_T}$ is defined per IEC/TS 61400-14 for 95 % confidence level
- $\mathbf{R_0}$ is the ground measuring distance from the wind turbine tower axis per IEC 61400-11, which shall equal the hub height plus half the rotor diameter
- $\mathbf{\Delta L_{a,k}}$ is the tonal audibility according to IEC 61400-11, described as potentially audible narrow band sound

6 1/3rd Octave Band Spectra

The tables in Annex I are showing the 1/3rd octave band values for different wind speeds at different hub heights.

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2013 General Electric Company. All rights reserved

Reference:

- IEC 61400-1, Wind turbines – part 1: Design requirements, ed. 2, 2005-08
- IEC 61400-11, wind turbine generator systems part 11: Acoustic noise measurement techniques, ed. 2.1, 2006-11
- IEC/TS 61400-14, Wind turbines – part 14: Declaration of apparent sound power level and tonality values, ed. 1, 2005-03
- MNPT – Machine Noise Performance Test, Technical documentation

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2013 General Electric Company. All rights reserved

Appendix I - Calculated 1/3rd Octave Band Apparent Sound Power Level $L_{WA,k}$

75 m hub height - Normal Operation 1/3rd Octave Band Spectra									
Standard wind speed at 10 m [m/s]		3	4	5	6	7	8	9	10-Cutout
Hub Height wind speed at 75 m [m/s]		4.1	5.5	6.9	8.3	9.7	11.0	12.4	14-Cutout
Frequency [Hz]	25	58.9	59.0	62.2	66.7	70.0	70.0	70.1	70.4
	32	63.4	63.3	66.6	71.1	74.4	74.5	74.5	74.8
	40	67.4	67.3	70.6	75.2	78.5	78.5	78.5	78.9
	50	70.6	70.5	73.8	78.5	81.8	81.8	81.8	82.1
	63	73.5	73.3	76.7	81.4	85.0	84.9	84.9	85.1
	80	75.8	75.7	79.3	84.0	87.7	87.7	87.6	87.7
	100	77.2	77.2	80.9	85.6	89.2	89.3	89.3	89.3
	125	77.6	77.9	81.8	86.6	89.9	90.0	89.9	89.9
	160	77.6	78.1	82.4	87.2	90.3	90.3	90.2	90.0
	200	77.7	78.7	83.1	88.0	90.7	90.7	90.5	89.9
	250	78.3	79.3	83.8	88.9	91.4	91.2	90.9	89.8
	315	79.3	80.1	84.4	89.8	92.2	91.9	91.6	89.9
	400	79.6	79.7	83.8	89.6	92.4	92.0	91.7	89.7
	500	80.2	79.7	83.6	89.5	93.0	92.7	92.5	90.7
	630	80.7	79.8	83.6	89.4	93.3	93.2	93.0	92.2
	800	81.2	80.3	83.9	89.5	93.6	93.5	93.4	93.8
	1000	82.1	81.5	84.8	90.1	93.9	94.0	94.1	95.4
	1250	83.4	83.3	86.6	91.3	94.8	95.1	95.4	96.8
	1600	82.7	83.3	86.8	91.4	94.5	94.8	95.2	96.1
	2000	81.4	82.9	86.8	91.4	94.4	94.6	94.8	95.0
	2500	78.4	81.2	85.5	90.4	93.3	93.4	93.4	92.5
	3150	75.0	78.5	83.1	88.2	91.2	91.1	90.8	89.1
	4000	71.1	72.7	79.1	84.2	87.2	86.9	86.3	84.5
	5000	66.6	66.1	72.9	79.0	82.0	81.4	80.5	79.5
	6300	58.4	58.4	63.6	70.5	73.7	73.0	72.3	71.7
	8000	45.6	48.3	51.7	57.7	61.2	60.9	60.4	59.9
	10000	29.8	34.5	38.3	43.2	46.9	46.8	46.6	45.7
	12500	10.5	16.3	21.2	26.4	30.3	30.0	30.0	28.3
	16000	-16.4	-10.8	-4.0	2.1	6.2	5.8	5.5	3.3
	20000	-45.3	-40.3	-32.4	-24.8	-20.6	-21.1	-21.5	-23.7
Total apparent sound power level L_{WA} [dB]		92.4	92.8	96.7	101.8	105.0	105.0	105.0	105.0

Table 4: Calculated Apparent 1/3rd Octave Band Sound Power Level (A-weighted) 2.5-103/2.75-103/2.85-103 with 75 m hub height as Function of Wind Speed v_{10m}

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2013 General Electric Company. All rights reserved

85 m hub height - Normal Operation 1/3rd Octave Band Spectra									
Standard wind speed at 10 m [m/s]		**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-Cutout**
Hub Height wind speed at 85 m [m/s]		**4.2**	**5.6**	**7.0**	**8.4**	**9.8**	**11.2**	**12.6**	**14-Cutout**
Frequency [Hz]	25	58.9	59.1	62.5	67.0	70.0	70.1	70.1	70.4
	32	63.4	63.5	66.9	71.5	74.4	74.5	74.5	74.8
	40	67.4	67.4	71.0	75.5	78.5	78.5	78.6	78.9
	50	70.6	70.6	74.2	78.8	81.8	81.8	81.8	82.1
	63	73.4	73.4	77.1	81.8	85.0	84.9	84.9	85.1
	80	75.8	75.9	79.7	84.4	87.7	87.7	87.6	87.7
	100	77.2	77.3	81.2	86.0	89.3	89.3	89.3	89.3
	125	77.6	78.0	82.2	86.9	90.0	90.0	89.9	89.9
	160	77.6	78.3	82.8	87.6	90.3	90.3	90.2	90.0
	200	77.8	78.9	83.5	88.4	90.8	90.6	90.4	89.9
	250	78.3	79.5	84.3	89.3	91.4	91.1	90.8	89.8
	315	79.3	80.2	84.8	90.2	92.2	91.8	91.4	89.9
	400	79.6	79.9	84.3	90.0	92.4	91.9	91.6	89.7
	500	80.1	79.9	84.1	90.0	93.0	92.7	92.4	90.7
	630	80.6	79.9	84.0	89.9	93.3	93.2	92.9	92.2
	800	81.2	80.4	84.4	89.9	93.6	93.5	93.4	93.8
	1000	82.1	81.6	85.2	90.4	93.9	94.0	94.2	95.4
	1250	83.4	83.4	86.9	91.7	94.8	95.1	95.5	96.8
	1600	82.7	83.5	87.2	91.7	94.5	94.9	95.3	96.1
	2000	81.4	83.1	87.1	91.7	94.3	94.6	94.9	95.0
	2500	78.5	81.4	85.9	90.7	93.3	93.4	93.3	92.5
	3150	74.9	78.8	83.6	88.6	91.2	91.1	90.7	89.1
	4000	70.9	73.1	79.6	84.6	87.2	86.8	86.1	84.5
	5000	66.5	66.4	73.5	79.4	81.9	81.3	80.3	79.5
	6300	58.4	58.6	64.2	71.1	73.7	72.8	72.1	71.7
	8000	45.7	48.4	52.1	58.4	61.3	60.8	60.3	59.9
	10000	30.1	34.7	38.7	43.8	46.9	46.9	46.5	45.7
	12500	10.7	16.7	21.7	26.9	30.4	30.0	29.9	28.3
	16000	-16.2	-10.3	-3.4	2.7	6.2	5.8	5.4	3.3
	20000	-45.2	-39.8	-31.7	-24.2	-20.6	-21.2	-21.8	-23.7
Total apparent sound power level L_{WA} [dB]		**92.4**	**92.9**	**97.1**	**102.1**	**105.00**	**105.00**	**105.00**	**105.00**

Table 5: Calculated Apparent 1/3rd Octave Band Sound Power Level (A-weighted) 2.5-103/2.75-103/2.85-103 with 85 m hub height as Function of Wind Speed v_{10m}

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2013 General Electric Company. All rights reserved

98.3 m hub height - Normal Operation 1/3rd Octave Band Spectra									
Standard wind speed at 10 m [m/s]		**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-Cutout**
Hub Height wind speed at 98.3 m [m/s]		**4.3**	**5.7**	**7.2**	**8.6**	**10.0**	**11.4**	**12.9**	**14-Cutout**
Frequency [Hz]	25	58.9	59.3	63.0	67.4	70.0	70.1	70.2	70.4
	32	63.4	63.6	67.4	71.9	74.4	74.5	74.6	74.8
	40	67.4	67.6	71.4	75.9	78.5	78.5	78.6	78.9
	50	70.6	70.8	74.6	79.2	81.8	81.8	81.9	82.1
	63	73.4	73.6	77.6	82.2	85.0	84.9	85.0	85.1
	80	75.8	76.1	80.1	84.8	87.7	87.7	87.6	87.7
	100	77.1	77.5	81.7	86.4	89.3	89.3	89.3	89.3
	125	77.6	78.3	82.6	87.4	90.0	90.0	89.9	89.9
	160	77.6	78.6	83.2	88.0	90.4	90.3	90.2	90.0
	200	77.9	79.1	84.0	88.8	90.8	90.6	90.4	89.9
	250	78.4	79.8	84.7	89.7	91.4	91.1	90.7	89.8
	315	79.4	80.5	85.3	90.7	92.3	91.8	91.3	89.9
	400	79.6	80.1	84.8	90.5	92.3	91.9	91.4	89.7
	500	80.1	80.1	84.6	90.6	93.0	92.6	92.1	90.7
	630	80.6	80.1	84.6	90.4	93.3	93.2	92.8	92.2
	800	81.1	80.6	84.9	90.4	93.5	93.5	93.5	93.8
	1000	82.1	81.7	85.7	90.9	93.9	94.0	94.3	95.4
	1250	83.4	83.6	87.4	92.1	94.8	95.2	95.7	96.8
	1600	82.8	83.7	87.6	92.0	94.5	94.9	95.5	96.1
	2000	81.5	83.3	87.6	92.0	94.3	94.6	94.9	95.0
	2500	78.6	81.7	86.4	91.0	93.2	93.4	93.3	92.5
	3150	74.9	79.2	84.0	89.0	91.2	91.1	90.5	89.1
	4000	70.8	73.6	80.0	85.1	87.1	86.8	85.8	84.5
	5000	66.4	66.9	74.2	79.9	81.9	81.3	80.1	79.5
	6300	58.5	58.9	64.9	71.7	73.7	72.8	72.0	71.7
	8000	46.0	48.6	52.7	59.2	61.3	60.8	60.2	59.9
	10000	30.4	35.0	39.1	44.5	46.9	46.9	46.5	45.7
	12500	11.0	17.1	22.2	27.5	30.4	29.9	29.8	28.3
	16000	-16.0	-9.8	-2.7	3.3	6.3	5.8	5.0	3.3
	20000	-44.9	-39.2	-30.9	-23.5	-20.7	-21.2	-22.2	-23.7
Total apparent sound power level L_{WA} [dB]		**92.4**	**93.2**	**97.6**	**102.6**	**105.00**	**105.00**	**105.00**	**105.00**

Table 6: Calculated Apparent 1/3rd Octave Band Sound Power Level (A-weighted), 2.5-103/2.75-103/2.85-103 with 98.3 m hub height as Function of Wind Speed v_{10m}

CONFIDENTIAL - Proprietary Information. DO NOT COPY without written consent from General Electric Company.
UNCONTROLLED when printed or transmitted electronically.
© 2013 General Electric Company. All rights reserved

Appendix 9.A
LVIA Methodology, Glossary & Abbreviations

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Appendix 9.A: Methodology and Glossary

9.1 Introduction

9.1.1 The Landscape and Visual Impact Assessment (LVIA) and cumulative landscape and visual impact assessment (CLVIA) identifies, predicts, and evaluates potential landscape and visual effects likely to result from the proposed Enoch Hill Wind Farm (The Proposed Development).

9.1.2 Essentially, the level of landscape and visual effect (and whether this is significant) is determined through consideration of the '*sensitivity*' and '*susceptibility*' of the landscape or visual receptor to the Proposed Development and the '*magnitude of change*' that would be brought about by the Proposed Development, were it to be constructed. The time period for the assessment covers the construction of the Proposed Development and associated infrastructure, its operation for a period of 25 years and decommissioning. The assessment process has involved a process of iterative design and re-assessment of any remaining, residual effects that could not otherwise be mitigated or 'designed out'. The type of effect is also considered and may be direct or indirect; temporary or permanent (reversible); cumulative; and positive, neutral or negative. The landscape and visual assessment unavoidably involves a combination of both quantitative and qualitative assessment and wherever possible a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

9.1.3 Technical Appendix 9.A has been structured as follows:

- General Methodology:
  - Variations: and
  - Defining the Study Area.
- Landscape Assessment:
  - Evaluating Landscape Sensitivity to Change; and
  - Evaluating the Magnitude of Landscape Change.
- Visual Assessment:
  - Zone of Theoretical Visibility (ZTV);
  - Viewpoint Analysis;
  - Evaluating Visual Sensitivity to Change; and
  - Evaluating the Magnitude of Change to the View.
- Evaluating Landscape and Visual Effects:
  - Types of Landscape and Visual Effect;
  - Valency;
  - Probability of Effect; and
  - Determining the Significance of Effects.
- Cumulative Landscape and Visual Assessment (CLVIA):
  - Predicting Cumulative Landscape Effects;
  - Predicting Cumulative Visual Effects; and
  - Evaluation of Cumulative Landscape and Visual Effects.

- Visual Assessment of Views from Residential Properties;
- Methodology for Production of ZTV's and Visualisations:
  - Methodology for Production of ZTV's;
  - Photomontage and Wireline Production;
  - Methodology for Production of Visualisations; and
  - Printing of Visualisations.
- Abbreviations and Glossary.

General Methodology

9.1.4 The methodology for the LVIA and CLVIA has been undertaken in accordance with best practice guidance and in reference to a number of publications including, but not limited to, the following:

- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, Landscape Institute and IEMA (May 2013);
- Siting and Designing Windfarms in the Landscape, Version 2, SNH (2014);
- Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments, SNH (2012);
- Visual Representation of Windfarms, Version 2.1, SNH (December 2014); and
- Visual Assessment of Windfarms: Best Practice Commissioned Report F01AA303A produced for SNH by the University of Newcastle (2002).

Variations

9.1.5 The LVIA and cumulative assessment has assessed the Proposed Development on the basis of the final layout comprising 19 wind turbines with a maximum height of up to 130m to blade tip. Pre-construction and during procurement the selected turbine model would be agreed with the local planning authority and the exact hub height and rotor dimensions may vary slightly within the overall maximum blade tip height of 130m.

9.1.6 The location of the Proposed Development has been assessed on the basis of the final wind turbine layout, which would be subject to micrositing of +/-50m.

9.1.7 Slight variations to the turbine dimensions (within the maximum height of 130m to blade tip) and micro-siting of up to +/-50m would not generally affect the overall conclusions of the LVIA and cumulative assessments, although variations may be subject to further assessment and agreement with the local planning authority as required.

Defining the Study Area

9.1.8 The SNH guidance[1] advises that the LVIA Study Area for wind turbines of this height should be based on an area 35km distance from each of the proposed turbine locations. The Landscape and Visual Study Area is illustrated in **Figure 9.1** and in order to achieve the SNH guidelines, covers a circular area of 36,694m radius from the application site centre.

9.1.9 It is important to note that the boundary of the Study Area is not the limit of potential visibility in clear weather conditions. Rather it is an area defined by SNH, on the basis of research to

1 Siting and Design Wind Farms in the Landscape, Version 2, Scottish Natural Heritage (2014).

determine a suitable Study Area for the assessment of wind farms, which would contain all potential significant landscape and visual effects.

9.2 Landscape Assessment

9.2.1 Landscape Effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows:

9.2.2 *"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner."*

9.2.3 The potential landscape effects, occurring during the construction, operation and decommissioning period may therefore include, but are not restricted to the following:

- Changes to landscape elements: the addition of new elements (wind turbines) or the removal of existing elements such as trees, vegetation and buildings and other characteristic elements of the landscape character type;
- Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of landscape character types or contribute to the landscape value;
- Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the cumulative addition of new features, the magnitude of which is sufficient to alter the overall landscape character type of a particular area; and
- Cumulative landscape effects: where more than one wind farm may lead to a potential landscape effect.

9.2.4 Development may have a direct (physical) effect on the landscape as well as an indirect effect which would be perceived from the wider landscape, outside the immediate site area and associated landscape character area.

Evaluating Landscape Sensitivity to Change

9.2.5 The sensitivity of the landscape to a particular development considers the susceptibility of the landscape and its value. The overall sensitivity is described as high, medium, low, or negligible. This is assessed by taking into account the existing landscape quality, landscape value and landscape capacity or susceptibility to change, which often vary in response to both the type of development proposed and the particular site location, such that landscape sensitivity needs to be considered on a case by case basis. This should not be confused with 'inherent sensitivity' where areas of the landscape may be referred to as inherently of 'high' or 'low' sensitivity. For example, a National Scenic Area may be described as inherently of high sensitivity on account of its designation, although it may prove to be less sensitive to particular development and/or the design of that development. Alternatively an area or undesignated landscape may be of high sensitivity to a particular development and/or the design of that development regardless of the lack of local or national designation.

9.2.6 The main factors considered are discussed as follows:

Landscape Susceptibility

9.2.7 Landscape susceptibility according to GLVIA3 means "*the ability of the landscape to accommodate the proposed development without undue consequences for maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies*". In the case of wind farm development there may be local or regional spatial strategies and/or landscape capacity studies

that can assist in broad scale judgements about the overall landscape capacity / sensitivity and susceptibility to wind farm development, although attention must be paid to the purpose, scope and methodology of these documents, as whilst providing assistance for strategic planning, they usually do not assess individual or specific wind farm proposals and should not be directly applied to individual applications. Rather they provide background information that should be considered as part of the more detailed landscape assessment.

9.2.8 Judgements on landscape susceptibility include references to both the physical and aesthetic characteristics, and the potential scope for mitigation that would be in character with the landscape. Landscape susceptibility varies according to different areas of landscape character and whilst accepting that wind farm development is likely to lead to high levels of landscape change in most circumstances, factors that commonly indicate lower landscape susceptibility or capacity to accommodate wind farm development include landscape characteristics of larger scale, uniformity, simple landform and skylines with limited landscape features. Generally speaking, lower landscape susceptibility together with lower landscape quality and value tends to indicate lower landscape sensitivity to development. Conversely, higher landscape susceptibility, quality and value tend to indicate higher landscape sensitivity to development.

Landscape Value

9.2.9 This includes the consideration of a range of features which may include the presence or absence of landscape designation, landscape and scenic qualities, rarity / representativeness, conservation interests, recreational value, perceptual qualities such as tranquillity and historical or cultural associations. The importance attached to a landscape, often as a basis for designation or recognition, which expresses national or local consensus, because of its quality including cultural associations, scenic or aesthetic qualities. Landscape value may be indicated by the presence or absence of a landscape planning designation such as a National Scenic Area or Special Landscape Area indicating a landscape of national or local value accordingly.

9.2.10 The absence of a landscape planning designation should not assume an area of 'low' landscape value and undesignated areas of the landscape are often of some local value and indications of this are likely to be present in the form of documented, locally valued, cultural / natural heritage and scenic or aesthetic qualities such as 'wildness' or the presence of viewing platforms or benches. It should be noted that a landscape of high value may not always equate to areas of high landscape quality and that areas of low landscape value may contain areas of higher landscape quality. The state of repair or condition of the elements of a particular landscape, its integrity and intactness and the extent to which its distinctive character is apparent are also relevant. The quality of a landscape element or characteristic may also be influenced by the degree to which it may contribute to the overall landscape character, its rarity, fragility, and potential for replacement or mitigation. Landscapes of lower quality tend to include those under intensive agriculture, forestry or urban fringe situations where the landscape elements and patterns have been eroded, often creating a new landscape character.

Evaluating the Magnitude of Landscape Change

9.2.11 The 'magnitude' or 'degree of change' resulting from a particular development is described as high, medium, low, or negligible. This is assessed by considering the scale and extent of proposed development, which may include the loss or addition of particular features, changes to landscape quality and changes to landscape character. As such this needs to be considered on a case by case basis. It may be possible for some mitigation measures to reduce the magnitude of change and consequently the residual landscape effects and for these reasons landscape design of the wind farm should form part of the assessment process. The main factors to be considered are discussed as follows.

- Loss, Alteration, or Addition to Landscape Elements: Development may result in the loss, alteration, or addition of landscape elements such as trees, hedgerows, or development components such as wind turbines and new access tracks. These can be quantified objectively;

- Loss, Alteration, or Addition to Landscape Characteristics / Quality: Development may result in the loss, alteration, or addition of physical landscape characteristics, such as wooded areas, landscape patterns, or development components such as wind turbines, which can be quantified objectively. Perceptual characteristics and effects on scenic quality or wildness also need to be considered, albeit subjectively, with reference made to objective and documented opinion; and
- Change to Landscape Character: All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for conservation, enhancement, or alteration to create new landscapes for the accommodation of forestry or to provide areas or development resulting in townscape or peri-urban development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape character areas and their overall integrity.

9.2.12 Examples and further guidance on the evaluation of landscape sensitivity and magnitude are provided in **Table 9.A.1**.

Table 9.A.1 Landscape Sensitivity and Magnitude

Examples of Landscape Sensitivity	
High	Landscape character, characteristics, and elements where, through consideration of the landscape resource and characteristics, there would generally be a lower landscape capacity or scope for landscape change and higher landscape value and quality. Often includes landscapes which are nationally or internationally designated.
Medium	Landscape character, characteristics, and elements where, through consideration of the landscape resource and characteristics, there would be a medium landscape capacity or some scope for landscape change. Often includes landscapes of medium landscape value and quality which may be locally designated.
Low	Landscape character, characteristics and elements where, through consideration of the landscape resource and characteristics, there would be higher landscape capacity or scope for landscape change to accommodate the proposed type of development as part of spatial strategy for example. Usually applies to landscapes with a lower landscape susceptibility or higher landscape capacity for the proposed development. May also apply to degraded landscapes that may have been subject to very intensive agriculture, blanket forestry, un-mitigated / partly naturalised mining operations or similar.
Negligible	Landscape character, characteristics and elements where there is a high landscape capacity or a planned desire for landscape change of the type proposed as part of spatial strategy for example. Usually applies to landscapes with a lower landscape susceptibility or higher landscape capacity for the proposed development. May also apply to derelict landscapes, spoil heaps, and de-graded urban fringe areas that require restoration or re-development / re-planting.
Examples of Landscape Magnitude	
High	A total or large scale change and / or extent that may include the loss of key landscape characteristics or the addition of new uncharacteristic features or elements, that would become the dominant characteristics of the landscape, and change the overall landscape quality, and character over a large area.
Medium	A prominent or noticeable change of more limited scale and extent including the loss of some key landscape characteristics or elements, or the addition of some new uncharacteristic features or elements that would potentially change landscape quality and indicate the potential for change in landscape character of a localised area or part of a landscape character area.
Low	A change affecting small areas of landscape character and quality, including the loss of lower value landscape elements or the addition of new features or elements of limited characterising influence.
Negligible	A change affecting smaller areas of landscape character and quality, including the loss of some landscape elements or the addition of features or elements, which are either of low value or hardly noticeable.
None	There would be no change to the receptor.

9.2.13 The level of landscape effect is evaluated through the combination of landscape sensitivity and magnitude of change, a process assisted by the use of **Table 9.A.3**, which is used to guide the assessment. The assessment then makes a judgement as to whether the level of effect is

'significant' to accord with the relevant Environmental Impact Assessment (EIA) Regulations, which requires the assessments undertaken as part of the EIA process to identify the likely significant effects of the development where these may occur. Further information is provided about the nature of the effects (whether these would be direct / indirect, temporary / permanent / reversible, isolated / cumulative or positive, neutral or negative).

9.2.14 In those instances where there would be no change to the landscape, the magnitude has been recorded as 'zero' and the level of effect as 'no change'.

9.3 Visual Assessment

9.3.1 Visual Effects are concerned wholly with the effect of the development on views, and the general visual amenity and are defined by the Landscape Institute in GLVIA 3, paragraphs 6.1 as follows:

9.3.2 "*An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views*."

9.3.3 Visual effects are identified for different receptors (people) who will experience the view at their places of residence, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view.
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

Zone of Theoretical Visibility (ZTV)

9.3.4 In order to assist with viewpoint selection and to appreciate the potential influence of the development in the wider landscape, preliminary ZTV plans are used. ZTV plans illustrate the area from where it may be theoretically possible to view all or part of the Proposed Development. The ZTV does not however, take account of the screening effects of buildings, localised landform and vegetation, unless specifically mentioned (see individual figures). As a result, there may be roads, tracks and footpaths in the vicinity of the site and in the wider setting which, although shown as falling within the ZTV, are screened or filtered by banks, walls and vegetation which would otherwise preclude viewing opportunities.

9.3.5 The ZTVs provide a starting point in the assessment process and accordingly tend towards giving a 'worst case' or greatest calculation of the theoretical visibility.

Viewpoint Analysis

9.3.6 Viewpoint analysis is used to assist the LVIA and is conducted from selected viewpoints within the Study Area. The purpose of this is to assess both the level of visual impact for particular receptors and to help guide the design process and focus the assessment. A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer limit beyond which there would be no further significant effects. The assessment involves visiting the viewpoint location and viewing wireframes and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather and good visibility and has also considered seasonally reduced leaf cover. The assessors have also viewed the electronic photomontages in animated form as part of the office based software used for their production so the effects of blade rotation can be assessed. The turbines are always viewed as though facing

towards the viewer to provide maximum potential visibility, although during operation, the turbines would face into the prevailing wind.

Evaluating Visual Sensitivity to Change

9.3.7 Visual effects are also assessed by considering the sensitivity of the visual receptor and the proposed magnitude of change. The sensitivity takes account of the susceptibility of the receptor and the value of the view.

9.3.8 The main factors to consider are the activity of the receptor (people) at the viewpoint location and the importance or popularity of the view and / or typical numbers of viewers. Other factors include the location and context of the viewpoint (in terms of the landscape value, quality, and capacity of the area within the view).

9.3.9 The factors to be considered are discussed as follows:

- Visual Receptor:

  Whilst it is accepted that people will undertake a range of different activities, their visual experience of a development will change according to where they are, and what they are doing. The primary activity of the receptor at the viewpoint is a key determinate of visual sensitivity. Residents and people engaged in out-door recreation, where the focus of the activity is on enjoyment of the landscape and there is a high frequency of use, are considered to be of high sensitivity. People on local footpaths that are less frequently walked or utilitarian in character, people engaged in sport, or travelling are considered as less sensitive (medium); and people at work as the least (low) sensitive.

- Frequency:

  The popularity and/or number of viewers are also an important factor to consider. Landmarks / tourist attractions and national trails visited and used by large numbers of people are likely to be more sensitive than those which are less visited. Occasionally there may be exceptions such as motorways where, although there are higher numbers of receptors these are generally considered to be of lower visual sensitivity. Conversely some less well visited footpaths within wild areas may be of higher visual sensitivity precisely because of the lower visitor numbers.

- Location and Context:

  The visual experience from a tourist destination, for example, could involve either the key views to or from the main attraction, or those from the car-park / service area, and this context will affect the sensitivity of the views. Whilst these views (from car-parks / service areas) may still be experienced by receptors of inherently higher sensitivity, these types of views should not be considered of higher value or sensitivity.

Evaluating the Magnitude of Change to the View

9.3.10 The magnitude of change is described as high, medium, low or negligible, and is assessed by taking into account possible changes caused by the wind farm, which may affect the view. In those instances where the Proposed Development would not be visible and there would be no change to the view, the magnitude has been recorded as ‘zero’ and the level of effect as ‘no view’ of the Proposed Development.

9.3.11 The magnitude of visual change is described by reference to the following:

- Scale of Change:

  The scale of change in the view (including horizontal and vertical Angle of View (AOV) affected), is determined by the loss or addition of features in the view and changes in the composition and extent of view affected. This can in part be described objectively by reference to numbers of new objects visible and the horizontal / vertical angle.

- Contrast:

  The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of mass, scale, colour, form and texture. Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and have a higher magnitude of change.

- Distance:

  The proximity and distance from the development can be provided objectively and often provides a strong indicator of magnitude, subject to any intervening screening of the development by landform, vegetation, or buildings.

- Speed:

  The speed at which the development may be viewed will affect how long the view is experienced and the likelihood of the development being particularly noticed by people travelling in cars compared to those who may be walking and able to stop and 'take in' a view.

- Field of View:

  The field of view from the main direction of view may be considered in terms of whether the development is experienced directly or more obliquely. Road users are generally more aware of the views in the direction of travel, whilst train passengers are more aware of views perpendicular to their direction of travel. Elevated views are likely to reveal more of the development, whereas low level views are more likely to be screened by intervening built form and vegetation.

- Screening:

  Development may be wholly or partly screened by landform, vegetation (seasonal) and or buildings. Conversely open views, particularly from landscapes where this is a characteristic, are likely to experience more of the development.

- Skyline / Background:

  Whether a development would be viewed against the skyline or a background landscape may affect the level of contrast and magnitude, for example, skyline developments may appear more noticeable, particularly where they affect open and uninterrupted horizons.

- Duration:

  The duration of the change, whether temporary or long term, intermittent or continuous, seasonal due to periodic management or leaf fall, is a further factor for consideration.

9.3.12 Further guidance on the evaluation of visual sensitivity and magnitude is provided in **Table 9.A.2**. The level of an effect is determined by the combination of sensitivity and magnitude of change, a process assisted by the use of **Table 9.A.3**, which is used to guide the assessment.

Table 9.A.2 Visual Receptor Sensitivity and Magnitude

Examples of Visual Receptor Sensitivity	
High	Generally, people in residential properties or settlements and on long distance, strategic footpaths or popular footpaths and tourist destinations, viewing important landscape features, beauty spots and picnic areas, where the activities are focused on the landscape. Receptors include walkers, cyclists, and horse riders travelling through the landscape. The location, numbers, frequency of use and visual context of the viewpoint, would be higher.
Medium	Generally, people within recreational space, local and less well used footpaths or tracks. Receptors include walkers, cyclists, horse riders, skiers, minor road users, and rail passengers travelling through the landscape. The location, numbers, frequency of use and visual context of the viewpoint would be medium.

Examples of Visual Receptor Sensitivity	
Low	Generally, people within non-designated landscapes of lower value or quality with low footpath or recreational use. Receptors are likely to include people at their place of work, or taking part in activities not involving an appreciation of the landscape, and drivers on motorways and other busy trunk roads. The location, numbers, frequency of use and visual context of the viewpoint, would be low.
Negligible	Generally not used, but would apply to waste disposal sites and derelict land.
Examples of Magnitude	
High	A major change or obstruction of a view that may be directly visible, appearing as the dominant and contrasting feature appearing in the foreground.
Medium	A moderate change or partial view of a new element within the view that may be readily noticeable, directly or obliquely visible including glimpsed, partly screened or intermittent views, appearing as a noticeable feature in the middle ground.
Low	A small level of change, affecting a small part of the view that may be obliquely viewed or partly screened and/or appearing in the background landscape. May include moving views at speed.
Negligible	A small or intermittent change to the view that may be obliquely viewed and mostly screened and/or appearing in the distant background or viewed at high speed over short periods and capable of being missed by the casual observer.
None	There would be no change to the view.

9.4 Cumulative Landscape and Visual Assessment

9.4.1 The assessment of cumulative effects is essentially the same as for the assessment of the stand-alone landscape and visual effects, in that the level of landscape and visual effect is determined by assessing the combination of sensitivity of the landscape or visual receptor (ranging from high to negligible) and the magnitude of change (ranging from high to zero).

9.4.2 Types of cumulative effect are defined as follows:

- Cumulative Landscape Effects: Where more than one wind development may have an effect on a landscape designation or particular area of landscape character.
- Cumulative Visual Effects: the cumulative or incremental visibility of similar types of development that may combine to have a cumulative visual effect. These can be further defined as follows:
  - Simultaneous or combined: where two or more developments may be viewed from a single fixed viewpoint simultaneously, within the viewer's field of view and without requiring them to turn their head[2].
  - Successive or repetitive: where two or more developments may be viewed from a single viewpoint successively as the viewer turns their head or swivels through 360°;
  - Sequential: where a number of developments may be viewed sequentially or repeatedly at increased frequency, from a range of locations when travelling along a route within the Study Area.

9.4.3 The SNH document 'Siting and Designing Wind farms in the Landscape' (Version 2) explains that the development of multiple wind farms within a particular area may create different types of cumulative effect, such as where:

[2] Note: A person's field of view is variable but is approximately 90° when facing in one direction.

"The wind farms are seen as separate isolated features within the landscape character type, too infrequent and of insufficient significance to be perceived as a characteristic of the area;

The wind farms are seen as a key characteristic of the landscape, but not of sufficient dominance to be a defining characteristic of the area; and

The wind farms appear as a dominant characteristic of the area, seeming to define the character type as a 'wind farm landscape character type."

9.4.4 A cumulative landscape or visual effect simply means that more than one type of development is present or visible within the landscape. Other forms of existing development and landuse such as woodland and forestry, patterns of agriculture, built form, and settlements already have a cumulative effect on the existing landscape that is already accepted or taken for granted. These features often contribute strongly to the existing character, forming a positive component of the local landscape. Landscapes however, will have a finite capacity for new development, beyond which further change or alteration to the existing landscape character may be unacceptable in landscape terms.

9.4.5 Whilst the CLVIA considers other wind farm development, it should not be considered as a substitute for individual LVIA assessment in respect of each of the other developments concerned.

Cumulative Study Area

9.4.6 The cumulative Study Area is the same as the Study Area for the main part of the LVIA, but also takes account of other existing, under-construction and consented wind energy development as well as known planning application sites within the 35km Study Area. Those developments at pre-planning or scoping stage are excluded in accordance with SNH guidance unless there is a justified / exceptional circumstance for inclusion in the assessment. In some circumstances more distant wind farms and single turbines or wind cluster schemes may be excluded from the assessment. These excluded schemes and the reasons for their exclusion would be clearly stated in the CLVIA.

Predicting Cumulative Landscape Effects

9.4.7 The assessment considers the extent to which the Proposed Development, in combination with others, may change landscape character through either incremental effect on characteristic elements, landscape patterns and quality, or by the cumulative addition of new features. Identified cumulative landscape effects are described in relation to each individual Landscape Character Type and for any designated landscape areas that exist within the Study Area.

Predicting Cumulative Visual Effects

9.4.8 The assessment of cumulative visual effects involves reference to the cumulative visibility ZTV maps and the cumulative viewpoint analysis. The cumulative visibility of existing wind energy developments is established in the first instance using the computer programme to identify areas where wind energy developments are theoretically visible. The potential visibility of other consented and proposed developments is then incorporated to establish a level of visibility within which the additional contribution of the Proposed Development can be assessed. Cumulative visibility maps are analysed to identify the visual receptor locations and routes where cumulative visual effects on people may occur as a result of the Proposed Development.

9.4.9 With potential receptor locations identified, cumulative effects on individual receptor groups are then explored through viewpoint analysis, which involves site visits informed by wireline illustrations that include other wind energy developments. The computer programme itself can also be used to 'drive' particular travel routes to assess the visibility of different wind energy developments and inform the assessment of sequential cumulative effects that may occur along a route or journey and compared to actual route on site.

Evaluation of Cumulative Landscape and Visual Effects

9.4.10 The evaluation of cumulative effects is assisted by the use of a matrix table to guide the assessment. The matrix is illustrated in **Table 9.A.3**.

9.4.11 The cumulative assessment has been prepared to ensure that, as well as the additional or stand-alone effect of the Proposed Development (LVIA) the combined cumulative effect (CLVIA) is also reported. The cumulative assessment identifies the magnitude of change contributed by other wind farm development. The combined cumulative effects of the baseline of existing and consented wind farms with the Proposed Development and the maximum analysis of cumulative effects taking into account the baseline of existing, consented and wind farm applications with the Proposed Development are reported wherever relevant. These levels of assessment and cumulative assessment are reported in this chapter under the headings as follows:

- Enoch Hill Wind Farm (the Proposed Development);
- Existing + Consented + the Proposed Development; and
- Existing + Consented + Applications + the Proposed Development.

9.4.12 The level and significance of cumulative landscape or visual effects is determined in the same manner as for the LVIA, i.e. through a combination of sensitivity and magnitude of change. Due to the numbers of other developments involved, the overall cumulative effects may be greater than for the stand-alone or additional effect for the Proposed Development assessed in the main LVIA. The resulting level of cumulative effect may remain at the same level of effect or increase to a higher level of effect. The point at which these effects become significant or not significant in landscape and visual terms is still a matter for professional judgement, although four scenarios or combinations of cumulative effect, taking account of other wind energy development can occur as follows:

- A significant effect from the Proposed Development is predicted in addition or in combination with another significant effect attributed to other development(s). The effect is still termed significant and cumulative, but is a greater level of effect than for either development individually;
- A significant effect from the Proposed Development is predicted in addition or combination with another non-significant effect attributed to other development(s). The effect is still termed significant and cumulative, but is attributed to the Proposed Development and is a greater level of effect than for either development individually;
- A non-significant effect from the Proposed Development is predicted in addition or combination with another significant effect attributed to other development(s). The effect is still termed significant and cumulative, but is attributed to the other wind energy development(s) and is a greater level of effect than for either development individually; and
- A non-significant effect from the Proposed Development is predicted in addition or combination with another non-significant effect attributed to other development(s). The effect is still termed cumulative and is a greater level of effect than for either development individually; the combined effect however, may or may not be significant.

9.4.13 The nature of a cumulative effect may also be described as direct / indirect, temporary / permanent, or positive/ negative. The probability of a cumulative effect occurring may also be described (certain, likely or uncertain / unknown).

9.5 Evaluating Landscape and Visual Effects

9.5.1 The level of effect relating to landscape and visual effects and or cumulative landscape and visual effects is determined by the combination of sensitivity (ranging from high to negligible) and magnitude of change (ranging from high to zero), which is assisted by the use of a matrix table to guide the assessment. The matrix is illustrated in **Table 9.A.3**.

Types of Landscape and Visual Effect

9.5.2 The relevant EIA Regulations also require that the level of effect is also described in terms of its 'type' or 'nature' of effect (whether the effect is permanent / temporary, direct / indirect, positive / neutral / negative and or cumulative) as well as the scale over which the effect would occur. For example, an effect may be locally significant, or significant with respect to a small number of receptors, but not significant when judged in a wider context. These terms are defined below:

- Temporary or Short Term / Long term / Permanent:

  The time period over which an effect may occur is referred to as temporary / short term, long term, or permanent. Unlike many other forms of development, wind farms are largely reversible and this has a bearing on the type and nature of a particular effect. In the case of this development the application is for a 25 year period, therefore the landscape and visual effects of the development are referred to as long term and reversible.

- Direct / Indirect effects:

  Direct effects relate to the host landscape and concern both physical and perceptual effects on the receptor. Indirect effects relate to those landscapes which are remote from the development and therefore are only affected in terms of visual or perceptual effects. The Landscape Institute also defines indirect effects as those which are not a direct result of the development, but are often produced away from it or as a result of a complex pathway.

- Positive / Neutral / Negative:

  The landscape and visual effects may be positive, neutral, or negative. The assessment tends to assume that the nature of the effects would be 'negative' unless otherwise stated and in the case of wind farm development, the most noticeable effects and changes are likely to be visual. However the landscape and visual assessment guidelines caution against the automatic assumption that all change would result in a negative effect.

  - In Landscape Terms: a positive effect would require development to add to the landscape quality and character of an area. Neutral landscape effects would include changes that neither add nor detract from the quality and character of an area including development that may be reasonably accommodated within the scale and capacity of the landscape in the context of landscape management and change, and negligible magnitudes of change. A negative effect may include the loss of landscape elements such as mature trees and hedgerows as part of construction or development that exceeds landscape capacity, leading to a reduction in landscape quality and character of an area.

  - In Visual Terms: positive or negative effects are less easy to define or quantify and require subjective consideration of a number of aesthetic factors affecting the view, which may be positive, neutral, or negative. Not all change, including high levels of change, is necessarily a negative experience. Public opinions as to the visual effects of wind farms vary widely, however this assessment is not an assessment of public opinion. Rather this assessment considers architectural and aesthetic factors such as the visual composition of the landscape in the view together with the wind farm design, which may or may not be reasonably accommodated within the scale and character of the landscape as perceived from the receptor location. Neutral visual effects would include changes that are not dominating, overbearing, or oppressive. They include development that appears reasonably well accommodated within the scale and landscape setting or context and also includes negligible magnitudes of change. A negative effect may include poor visual design quality such as overlapping turbines, inappropriate scale of development relative to the underlying landscape, or other visual factors that may reduce scenic quality, such that the wind farm would appear dominating, overbearing, or oppressive for example.

- Cumulative Effects:

  Landscape and visual effects may also be cumulative with other existing, consented, or proposed wind farm development, for which there is a submitted planning application.

Probability of Effect

9.5.3 The probability of cumulative effects is variable. Those effects related to existing wind energy development and those under construction are considered as certain; effects related to development with planning consent are considered as likely. Wind energy development sites for which there is a submitted planning application are considered as uncertain with an even greater level of uncertainty attached to pre-planning application sites.

Table 9.A.3 Evaluation of Landscape and Visual Effects

Magnitude of Change	**Landscapes and Visual Sensitivity**			
	High	Medium	Low	Negligible
High	Substantial	Substantial / Moderate	Moderate	Slight
Medium	Substantial / Moderate	Moderate	Slight	Slight / Negligible
Low	Moderate	Slight	Slight / Negligible	Negligible
Negligible	Slight	Slight / Negligible	Negligible	Negligible
Zero	None / No View	None / No View	None / No View	None / No View

Determining the Significance of Effects

9.5.4 In accordance with the relevant EIA Regulations it is important to determine whether the predicted effects, resulting from the Proposed Development, are likely to be significant. Significant landscape and visual effects are highlighted in **bold** in the text and in most cases relate to all those effects that result in a '**Substantial**' or a '**Substantial** / **Moderate**' effect as indicated in **Table 9.A3**. In some circumstances, Moderate levels of effect also have the potential, subject to the assessor's opinion, to be considered as significant and these exceptions are also highlighted in bold and explained as part of the assessment, where they occur.

9.5.5 Wind turbines and wind farm development are by their nature tall, visible structures, indeed, the Scottish Government's web-based Planning Advice Note (PAN) on Onshore Wind Turbines notes the height of wind turbines as "*140/150m high*"[3]. The existence of what would inevitably be a significant effect does not mean that a wind farm proposal should be considered unacceptable and consent refused. Rather, the decision makers will then consider the project overall, in terms of the relevant development plan and Government guidance such as National Planning Framework (NPF) 3 and Scottish Planning Policy (SPP) 2014.

9.5.6 Wind farms do give rise to a considerable range of opinions, from strongly negative to strongly positive, with a wide range of opinion lying between these two positions. However, this assessment is not an assessment of public opinion and although a precautionary approach has been taken, particularly in respect of nationally designated landscapes, the assessment overall tends to assume that the nature of the effects would be negative unless otherwise stated. The nature of a negative or positive effect is not absolute, but occurs in varying degrees and may relate to the particular circumstances of the receptor and the magnitude of change posed by the development.

[3] Scottish Government's web-based Planning Advice Note (PAN) on Onshore Wind Turbines, Scottish Planning Policy and Development Plan Policy, 28 May 2014 paragraph 1.

9.5.7 The landscape and visual effects of wind turbines can be directly experienced through the observation of existing wind farms within this area and it is worth noting that the nature of these effects are in a different category to other more permanent and solid development such as housing developments or mineral extraction projects. Perhaps most noticeably, wind farm development can co-exist with other features of the landscape, rather than replacing or removing them, as in the case of more conventional built development. Wind farm development is also visually permeable and although views may be interrupted, they are not blocked or prevented. Generally speaking, wind farms have a 'small' development footprint that preserves much of the physical elements of the landscape, but entails the addition of tall structures, which are unavoidably visible over longer distances, leading to greater visual effects. These visual effects however, are mitigated to some extent by the nature of wind turbines as discussed above and the undulating landform and the screening effects of successive layers of trees and woodland within the surrounding landscape.

9.5.8 A further, important difference from other forms of development is the reversibility of the landscape and visual effects at the decommissioning stage. Decommissioning would involve the removal of all of the above ground features, which in this case would include the removal of the turbines, crane hardstandings, control building, and anemometry mast(s). This action would effectively reverse almost all of the landscape and visual effects, with only the access tracks remaining visible and continuing to be used for agricultural operations.

9.6 Visual Assessment of Residential Properties

9.6.1 Planning law contains a widely understood principle that individuals (i.e. visual receptors at a single residential property) have no 'right to a view' and that the outlook or view from a private property is a private interest and not therefore protected by the UK planning system. However, the planning system also recognises situations where the effects on residential visual amenity are considered as a matter of public interest. This matter has been examined at a number of public inquiries where the key determining issue was not the identification of significant effects on views, but whether the proposed turbines would have an overbearing effect and/or result in unsatisfactory living conditions, leading to a property being regarded, objectively, as an unattractive (as opposed to a less attractive) place in which to live.

9.6.2 As a consequence the visual assessment methodology provides for a much more detailed assessment of the closest residential properties. This allows the assessor and consequently the determining authority to make a judgement as to whether the residents at these properties would be likely to sustain unsatisfactory living conditions which it would not be in the public interest to create. Reviews of decisions demonstrate that significant changes to the views available from a residential property and its curtilage are not the decisive consideration.

9.6.3 By way of further clarification, the methodology for assessing the visual effects on views from residential properties allows for two stages of assessment as follows:

- The first stage is to identify those properties where a significant visual effect on a view from the property is likely to occur; and
- The second stage is to consider the residential amenity and whether, in terms of the wider public interest, the visual effects would result in unsatisfactory living conditions, leading to a property being regarded, objectively, as an unattractive (as opposed to a less attractive) place in which to live.

9.6.4 A residential property, for the purposes of EIA, should be one that was designed and built/converted for that purpose and currently (at the time of the assessment) remains in a habitable condition, of a safe construction, wind and water tight with appropriate vehicle access, and services (drinking water, sanitation, and power supply). Related buildings such as barns/outbuildings, garage, huts/bothys and derelict properties should generally be excluded from the assessment, unless they form part of the curtilage of an existing residence.

9.6.5 The sensitivity of individual residential receptors is assessed as high in each case.

9.6.6 The assessment of residential properties or groups of residential properties in this case has been limited to those properties within 3km of the Proposed Development, which appear on the Ordnance Survey 1:25,000 scale map. Whilst most of the properties can be viewed at close range from public roads and footpaths, some of these properties are accessed via private or gated roads and due to these access limitations they have been assessed from the nearest public road or footpath which may be at greater distance from the property. The properties at Brockloch Farm, Nith Lodge, Knockenlee and Laglaff Farm have been visited with the landowner's permission. The assessment should therefore be regarded as a 'best estimate' of the likely visual effects.

9.6.7 The assessment has been further supported by aerial and ground level photography as well as map based data, the production of ZTV plots and visualisations such as wireframes. The assessment takes account of the likely views from the ground floors of properties and main garden areas, but excludes upper floors and other land that may be connected with the property. Relevant information considered as part of the assessment may include, but is not limited to the following:

- Scale of Wind Farm:
  - Number and height of turbines;
  - The horizontal extent or AOV of the visible turbine array; and
  - Separation distance (closest and furthest turbines).
- Description of Property, as far as this can be ascertained:
  - Orientation and size of property and whether views from the property towards the wind farm would be direct or oblique;
  - Location of principal rooms and main living areas such as living/dining rooms, kitchens and conservatories, as opposed to working areas such as farm buildings and utility areas;
  - Location of principal garden areas which may include patios and seating areas as opposed to less well used areas such as paddocks or garages; and
  - The effects of any screening by landform, vegetation or nearby built development.
- Location and Context:
  - The aspect of the property in terms of the overall use and relationship to the garden areas and surrounding landscape;
  - The principal direction of main views and visual amenity; and
  - The context and nature of any intervening structures e.g. other existing wind farm development, farm buildings or forestry.

9.6.8 Other factors affecting residential amenity such as noise and shadow flicker are not considered as part of this assessment and can be found in **Chapter 7: Noise** and **Chapter 8: Shadow Flicker** respectively.

9.7 Wild Land Assessment

9.7.1 SNH have published a map of Wild Land Areas (WLA) alongside the new SPP and NPF3 (June 2014). Merrick WLA is located to the west of the Proposed Development at a distance of approximately 18.6km.

9.7.2 SNH is developing new guidance on how to assess these areas during 2014-15, and they advise that until adopted, their document entitled *Assessing the Impacts on Wild Land Interim Guidance Note*, SNH (February 2007) will continue to be applied. A Wild Land Assessment has been scoped out as agreed with SNH and will not be included in this assessment.

9.8 Production of ZTV's and Visualisations

9.8.1 Zones of Theoretical Visibility (ZTVs) and visualisations (wireframes / wireframes and photomontages) are graphical images produced to assist and illustrate the landscape and visual assessment as well as the cumulative assessment. The methodology for the production of these graphics conforms to the new SNH guidance *Visual Representation of Windfarms, Version 2.1,* SNH (December 2014) and is further described in this section.

Methodology for Production of ZTV's

9.8.2 The ZTVs are calculated using Resoft Wind Farm© software to generate the zone of theoretical visibility of the Proposed Development. This software creates a 3D computer model of the existing landscape and the development using digital terrain data as follows:

- Ordnance Survey (OS) Landform Panorama: Used to produce a basic ZTV plot these tiles provide a digital record of the existing landform of Great Britain at 10m elevation intervals based on 50m grid squares and models representing the specified geometry and position of the proposed turbines. The computer model includes the entire Study Area and takes account of the effects caused by atmospheric refraction and the Earth's curvature;
- OS Terrain 5: Used to produce a more detailed ZTV plot these tiles provide a digital record of the existing landform of Great Britain based on 5m grid squares and models representing the specified geometry and position of the proposed turbines. The computer model includes the central Study Area and takes account of atmospheric refraction and the Earth's curvature.

9.8.3 The resulting ZTV plots are overlaid on OS mapping at an appropriate scale and presented as figures using desktop publishing/graphic design software.

9.8.4 Resoft Wind Farm© software is also used to calculate cumulative ZTV plots based on the intervisibility of the Proposed Development with other existing, consented and application wind farms. In addition to the methods as described above, the layouts and geometries of the surrounding existing, consented and application wind farms are loaded into the Resoft Wind Farm© programme. To cover these surrounding developments the 3D computer model of the existing landscape is extended out to the required radius (usually 60km from the centre of the proposed wind farm).

Methodology for Baseline Photography

9.8.5 Once a view has been selected, the location is visited, confirmed, and assessed with the aid of a wireframe or similar visualisation in the field. A photographic record is taken to record the view and the details of the viewpoint location and associated data are recorded in order to assist in the production of visualisations and to validate their accuracy.

9.8.6 The following photographic information is recorded:

- Date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference accurate to ~5-10 m;
- GPS recorded Above Ordnance Datum (AOD) height data;
- Use of a fixed 50mm focal length lens is confirmed;
- Horizontal field of view (in degrees); and
- Bearing to Target Site (Proposed Development).

9.8.7 All photographs included in this assessment were recorded with a digital SLR camera set to produce photographs equivalent to that of a manual 35mm SLR camera with a fixed 50mm focal length lens.

9.8.8 All of the resulting visualisations have been prepared to show other cumulative wind energy development in order that they may assist the cumulative assessment as well as the LVIA. Additional cumulative 360° photographs have been aligned with 360° wireframes from some elevated or hill top locations to provide an indication of the 'all round' cumulative effects.

9.8.9 Whilst no two dimensional image can fully represent the real viewing experience the visualisation aims to provide a realistic representation of the Proposed Development, based on current information and photomontage methodology.

Methodology for Production of Visualisations

9.8.10 Each view has been illustrated with a photograph, a wireline and in some cases a photomontage indicating the Proposed Development. In accordance with SNH guidance, photomontages are most useful when illustrating views of the development over distances of up to 15km, beyond this the visibility of the turbines in printed photomontages is difficult to see and so wireframes are produced instead.

9.8.11 The wireframes and photomontages are produced using Resoft Wind Farm© software to generate a perspective view of the wind farm. This software creates a 3D computer model of the existing landscape and the development using digital terrain data and models representing the specified geometry and position of the proposed turbines. The computer model includes the entire Study Area and all visualisations take account of the effects caused by atmospheric refraction and the Earth's curvature. The computer model does not take account of the screening effects of any intervening objects and forestry, unless specified (see individual figures).

9.8.12 A wireline or outline of the Proposed Development and the existing landform is generated for each viewpoint within the Study Area. These wireframes are used to assist the assessment on location at each viewpoint, the position of which, if required, is adjusted on site to achieve the most visible vantage-point of the Proposed Development (e.g. to avoid buildings, forestry, other features, potentially interfering with the view). Photographs are then taken using a digital SLR camera in combination with a panoramic head equipped tripod. Detailed information is then recorded on site to enable the accurate alignment of the photographs with the wireline model (data such as: GPS grid co-ordinates; ground level information; compass bearings; and any other known references and viewpoint information as required by the SNH guidance).

9.8.13 The photographs from the viewpoint are then joined to form a planar or cylindrical projection image or panorama as required by the SNH guidance, using computer software to remove 'barrel distortion' caused by the camera lens. This panorama, combined in Resoft Wind Farm© with the data recorded on site, enables the wireline to be superimposed and aligned. To produce the photomontage, the wireline turbines are rendered to appear 'life-like' taking into account the time of the photography and weather conditions occurring on the day.

9.8.14 The completed panoramas, wireframes, photomontages and accompanying data are then presented as figures using desktop publishing/graphic design software.

Printing of Maps and Visualisations

9.8.15 All electronic visualisations and maps should be printed out and viewed at the correct scale as noted on the document.

9.9 Abbreviations and Glossary

Please Note:
Those descriptions marked with an asterisk are identical to the terminology provided in the GLVIA3 glossary.

AOD	Above Ordnance Datum
BT	Blade Tip
CLVIA	Cumulative Landscape and Visual Impact Assessment
Cumulative effects	'Additional changes caused by a proposed development in conjunction with other similar developments or as a combined effect of a set of developments, taken together' (SNH, 2012)
Cumulative landscape effects:	Effects that 'can impact on either the physical fabric or character of the landscape, or any special values attached to it' (SNH, 2012)
Cumulative visual effects: **In combination** **In succession** **Sequentially**	Effects that can be caused by combined visibility, which 'occurs where the observer is able to see two or more developments from one viewpoint' and/or sequential effects which 'occur when the observer has to move to another viewpoint to see different developments' (SNH 2012) Occurs where the observer is able to see two or more developments from one viewpoint: In combination Where two or more developments are or would be within the observer's arc of vision at the same time without moving his/her head (GLVIA3, 2013 Table 7.1). In succession Where the observer has to turn his/her head to see the various developments – actual and visualised (GLVIA3, 2013 Table 7.1). Sequential cumulative effect Occurs where the observer has to move to another viewpoint to see the same or different developments. Sequential effects may be assessed for travel along regularly used routes such as major roads or popular paths. Frequently sequential Where the features appear regularly and with short time lapses between instances depending on the speed of travel and distance between viewpoints (GLVIA3, 2013 Table 7.1). Occasionally sequential Where longer time lapses between appearances would occur because the observer is moving slowly and/or there are larger distances between the viewpoints (GLVIA3, 2013 Table 7.1).
Development*	Any proposal that results in change to the landscape and/or visual environment.
Degree of change	A combination of the scale, extent and duration of an effect also defined as 'magnitude'.
Designated Landscape*	Areas of landscape identified as being of importance at international, national or local levels, either defined by statue or identified in development plans or other documents.
EIA	Environmental Impact Assessment
Elements*	Individual parts which make up the landscape, such as, for example, trees, hedges and buildings.
Enhancement*	Proposals that seek to improve the landscape resource of the site and its wider setting beyond its baseline condition.
Environmental fit	The relationship of a development to identified environmental opportunities and constraints in its setting.
Feature*	Particularly prominent or eye-catching elements in the landscape such as tree clumps, church towers or wooded skylines OR a particular aspect of the project proposal.
FoV	Field of View – the horizontal angle of the view illustrated in a visualisation.
Geographical Information System (GIS)	A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.
GLVIA	Guidelines for Landscape and Visual Impact Assessment, Third Edition, published jointly by the Landscape Institute and Institute of Environmental Management and Assessment, 2013.

Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions.
HH	Hub Height
Historic Landscape Characterisation (HLC) and Historic Land-use Assessment (HLA)	Historic characterisation is the identification and interpretation of the historic dimension of the present-day landscape or townscape within a given area. HLC is the term used in England and Wales, HLA is the term used in Scotland.
Indirect effects*	Effects that result indirectly from the proposed project as a consequence of the direct effects, often occurring away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects. Also used to describe indirect landscape effects concerning perceptual characteristics and qualities of the landscape and indirect visual effects in relation to issues such as 'setting'.
Iterative design process	The process by which project design is amended and improved by successive stages of refinement which respond to growing understanding of environmental issues.
Key characteristics	Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
Land cover	The surface cover of the land, usually expressed in terms of vegetation cover or lack of it. Related to but not the same as land use.
Landscape and Visual Impact Assessment (LVIA)	A tool used to identify and assess the likely significance of the effects of change resulting from development both on the landscape as an environmental resource in its own right and on people's views and visual amenity.
Landscape Character Area (LCA)*	These are single unique areas which are the discrete geographical areas of a particular landscape type.
Landscape Character Assessment (LCA)	The process of identifying and describing variation in the character of the landscape, and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscapes distinctive. The process results in the production of a Landscape Character Assessment.
Landscape Character Types (LCTs)*	These are distinct types of landscapes that are usually homogenous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes. (Topic Paper 6, Countryside Agency and SNH 2004)
Landscape capacity	The degree to which a particular landscape character type or area is able to accommodate change without altering the overall character of the area or its integrity. Capacity is likely to vary according the type and nature of change being proposed and the management or landuse of the site area.
Landscape character*	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape character unit	A small area of distinctive or recognisable character within a wider LCA.
Landscape classification	A process of sorting the landscape into different types using selected criteria but without attaching relative values to different sorts of landscape.
Landscape constraints	Components of the landscape resource such as views or mature trees recognised as constraints to development. Often associated with landscape opportunities.
Landscape effects*	Effects on the landscape as a resource in its own right. An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern here is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. (GLVIA3 2013, Para 5.1).
Landscape fit	The relationship of a development to identified landscape opportunities and constraints in its setting.

Landscape patterns	Spatial distributions of landscape elements combining to form patterns, which may be distinctive, recognisable and describable e.g. hedgerows and stream patterns.
Landscape quality (condition)*	A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.
Landscape qualities	A term used to describe the aesthetic or perceptual and intangible characteristics of the landscape such as scenic quality, tranquillity, sense of wildness or remoteness. Cultural and artistic references may also be described here.
Landscape receptors *	Defined aspects of the landscape resource that have the potential to be affected by a proposal.
Landscape resource	The combination of elements that contribute to landscape context, character, and value.
Landscape sensitivity	The sensitivity of a landscape is defined by consideration of factors such as value, quality / condition importance, resilience, susceptibility and capacity of the landscape relative to a particular type of proposed development.
Landscape strategy	The overall vision and objectives for what the landscape should be like in the future, and what is thought to be desirable for a particular landscape type or area as a whole, usually expressed in formally adopted plans and programmes or related documents.
Landscape value*	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.
Level of effect	Determined through the combination of sensitivity of the receptor and the proposed magnitude of change brought about by the development.
Magnitude (of effect)*	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short term or long term in duration'.
Mitigation	Measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and if possible remedy identified effects. (GLVIA3, 2013 Para 3.37).
NSA	National Scenic Area
Perception	Combines the sensory (that we receive through our senses) with the cognitive (our knowledge and understanding gained from many sources and experiences).
Perceptual Aspects	A landscape may be valued for its perceptual qualities, notably wildness and/or tranquillity. (GLVIA3, 2013 Box 5.1)
Photomontage*	A visualisation which superimposes an image of the proposed Development upon a photograph or series of photographs.
Positive or Negative Types of Landscape Effect	The landscape effects may be positive, neutral, or negative. In landscape terms – a positive effect would require development to add to the landscape quality and character of an area. Neutral landscape effects would include low or negligible changes that may be considered as part of the 'normal' landscape processes such as maintenance or harvesting activities. A negative effect may include the loss of landscape elements such as mature trees and hedgerows as part of construction leading to a reduction in the landscape quality and character of an area.
Positive or Negative Types of Visual Effect	The visual effects may be positive, neutral, or negative. In visual terms – positive or negative effects are less easy to define or quantify and require a subjective consideration of a number of factors affecting the view, which may be positive, neutral, or negative. Opinions as to the visual effects of wind energy developments vary widely, however it is not the assumption of this assessment that all change, including substantial levels of change is a negative experience. Rather this assessment has considered factors such as the visual composition of the landscape in the view together with the design and composition, which may or may not be reasonably, accommodated within the scale and character of the landscape as perceived from the receptor location.

Probability of Effect	The probability of a landscape and visual effect occurring as a result of this Proposed Development should be regarded as certain, subject to the stated project design and the continuance of the existing, baseline landscape resource, including known changes such as other permitted wind farm development. The probability of cumulative effects however is variable. Whereas those effects related to existing wind energy development and those under construction are considered as certain, effects related to development with planning consent is only considered as likely. Wind energy development sites for which there is a submitted planning application are considered as uncertain and other wind energy development for which no planning application has been made are considered as uncertain / unknown, as the level of uncertainty would be greater.
Rarity	The presence of rare elements or features in the landscape or the presence of a rare Landscape Character Type. (GLVIA3 2013, Box 5.1)
RD	Rotor Diameter
Receptor	Physical landscape resource, special interest, or viewer group that will experience an effect.
Recreation Value	Evidence that the landscape is valued for recreational activity where experience of the landscape is important. (GLVIA3 2013, Box 5.1)
Representativeness*	Whether the landscape contains a particular character and/or features or elements which are considered particularly important examples.
Residual effects	Potential environmental effects, remaining after mitigation.
Scale Indicators	Landscape elements and features of a known or recognisable scale such as houses, trees, and vehicles that may be compared to other objects, where the scale of height is less familiar, to indicate their true scale.
Scenic quality	Depends upon perception and reflects the particular combination and pattern of elements in the landscape, its aesthetic qualities, its more intangible sense of place or 'genius loci' and other more intangible qualities. (GLVIA3 2013, Box 5.1)
Seascape	Landscapes with views of the coast or seas, and coasts and adjacent marine environments with cultural, historical and archaeological links with each other.
Sense of Place (genius loci)	The essential character and spirit of an area: 'genius loci' literally means 'spirit of the place'.
Sensitivity*	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value associated to that receptor.
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
Significant Effects	It is a requirement of the EIA Regulations to determine the likely significant effects of the development on the environment which should relate to the level of an effect and the type of effect. Where possible significant effects should be mitigated. The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and the sensitivity of the receptor) that should be attached to the impact described. Whether or not an effect should be considered significant is not absolute and requires the application of professional judgement. Significant – 'noteworthy, of considerable amount or effect or importance, not insignificant or negligible'. The Concise Oxford Dictionary. Those levels and types of landscape and visual effect likely to have a major or important / noteworthy or special effect of which a decision maker should take particular note.
SNH	Scottish Natural Heritage
Susceptibility*	The ability of a defined landscape or visual receptor to accommodate the specific proposed Development without undue negative consequences.
Sustainability*	The principle that the environment should be protected in such a condition and to such a degree that ensures new development meets the needs of the present without compromising the ability of future generations to meet their own needs.

Temporary or permanent effects	Effects may be considered as temporary or permanent. In the case of wind energy development the application is for a 25 year period after which the assessment assumes that decommissioning will occur and that the site will be restored. For these reasons the development is referred to as long term and reversible.
Time depth	Historical layering – the idea of landscape as a 'palimpsest', a much written-over asset of landscape.
Townscape	The character and composition of the built environment including the buildings and the relationships between them, the different types of urban open space, including green spaces, and the relationship between buildings and open spaces.
Type or Nature of effect	Whether an effect is direct or indirect, temporary or permanent, positive (beneficial), neutral or negative (adverse) or cumulative.
Viewpoints	Selected for illustration of the visual effects fall broadly into three groups: Representative Viewpoints: selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ – for example certain points may be chosen to represent the view of users of particular public footpaths and bridleways; Specific Viewpoints: chosen because they are key and sometimes promoted viewpoints within the landscape, including for example specific local visitor attractions, such as landscapes with statutory landscape designations or viewpoints with particular cultural landscape associations. Illustrative Viewpoints: chosen specifically to demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations. (GLVIA3 2013, Para 6.19).
Visual amenity*	The overall pleasantness of the views people enjoy of their surroundings, which provide an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.
Visual dominance	A visual effect often referred to in respect of residential properties that in relation to development would be subject to blocking of views, or reduction of light / shadowing, and high levels of visual intrusion.
Visual effect*	Effects on specific views and on the general visual amenity experienced by people.
Visual Receptors*	Individuals and/or defined groups of people who have the potential to be affected by a proposal.
Visual sensitivity	The sensitivity of visual receptors such as residents, relative to their location and context, to visual change proposed by development.
Visualisation	Computer visualisation, photomontage, or other technique to illustrate the appearance of the development from a known location.
Wireline or Wireframe	A computer generated line drawing of the DTM (digital terrain model) and the Proposed Development from a known location.
Zone of Theoretical Visibility (ZTV)*	A map, usually digitally produced, showing areas of land within which a development is theoretical visible.

Appendix 9.B
Viewpoint Analysis

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Appendix 9.B: Viewpoint Assessment

9.1 Introduction

9.1.1 The viewpoint analysis is used to assist the design and further define the scope of the assessment process. In particular, the outer distance from the Proposed Development, where significant effects may be likely has been identified. This has been used to focus the baseline information and detailed reporting of the assessment in Environmental Statement (ES) Chapter 9 – Landscape and Visual Impact Assessment (LVIA).

9.2 Viewpoint and Cumulative Viewpoint Analysis

9.2.1 The viewpoint analysis has been conducted from 22 locations as illustrated in **ES Figure 9.7** and the views from these locations are illustrated at a 90° and a 53.5° angle or field of view (FoV) in **ES Figures 9.27a/b/c/d** to **9.52a/b/c/d/e** with wireframes and photomontages for those viewpoints within 15km of the Proposed Development.

9.2.2 Cumulative wind farm development that would be visible within 35km of each viewpoint has been illustrated in the wireframes. In addition, the Cumulative LVIA (CLVIA) has included a check for any micro-generation turbines that maybe located close to (10km) and potentially visible in the foreground of the illustrated assessment viewpoints, either appearing in the viewpoint photograph or illustrated on the wireframe.

9.3 Geographical Extent of Potentially Significant Visual Effects

9.3.1 The viewpoint analysis indicates that the additional significant visual effects would extend out in a north and northeast direction, primarily affecting views from the River Nith Upland Basin including open views from the A76 and the south western edge of New Cumnock within approximately 7km from the nearest turbine locations, as indicated by Viewpoints 1 to 7. Due to the landform and the wind farm design, residential properties closest to the Proposed Development within 2km would not be significantly affected. The views in other directions to the east, south and west would not be significantly affected due to the intervening landform and forestry.

9.3.2 The Proposed Development has also been considered in terms of the combined or cumulative visual effects with other existing, consented and application wind farms. The analysis indicates that there would be further potentially significant visual effects at 4 viewpoints (Viewpoint 8: Cairnsmore of Carsphairn, Viewpoint 9: Bogton Loch, Viewpoint 11: Auchenroy Hill and Viewpoint 12: Corsencon Hill) as a result of closer proximity to other proposed wind farms, notably the consented Windy Standard Extension, Afton and Dersalloch wind farms and the applications at South Kyle, Keirs Hill, Lethans and Glenmount. These viewpoints would not be significantly affected by the Proposed Development when assessed on a standalone basis.

9.3.3 The predicted levels of effect are indicative of a visual effect on a particular viewpoint location and they should not be assumed to translate into visual effects on the overall visual experience within 7km, as each of the viewpoints have been specifically located where the sensitivity of the receptor and / or the views of the Proposed Development would be greatest. In this sense they are not typical or representative.

9.3.4 The information set out in, **Table 9.B.1** provides a summary of the viewpoint analysis and lists the names of the viewpoints and includes information as follows:

- LVIA Assessment:
  - Distance: Distance of the viewpoint location from the nearest turbine within the Proposed Development;

- Sensitivity: The sensitivity of the viewer at the viewpoint location is recorded (ranging from high, medium, low, and negligible) in accordance with the methodology in **Appendix 9.A**;
- Magnitude: The magnitude of change, taking account of the Proposed Development only is recorded (ranging from high, medium, low, negligible, and zero) in accordance with the methodology;
- Level of Effect: The level of visual effect for the Proposed Development only is recorded and takes account of the sensitivity and magnitude in accordance with the methodology.

- Assessment: CLVIA:
  - Magnitude (Existing and Consented wind farms): The magnitude of change, taking account of other existing and consented / under construction wind farms that may be visible on the wireframe is recorded (ranging from high, medium, low, negligible, and zero) in accordance with the methodology;
  - Cumulative Level of Effect 1: The level of visual effect, taking account of the other existing, consented / under construction wind farms and the Proposed Development, is recorded (taking account of the sensitivity and magnitude in accordance with the methodology). Those levels of effect shown in bold relate to significant effects in accordance with the relevant EIA Regulations and the wind farm contributing most to the cumulative effects is recorded in brackets;
  - Magnitude (Other Application Wind farms): The magnitude of change, taking account of other wind applications that may be visible on the wireframe is recorded (ranging from high, medium, low, negligible, and zero) in accordance with the methodology;
  - Cumulative Level of Effect 2: The level of visual effect, taking account of the other existing, consented / under construction, application wind farms and the Proposed Development, is recorded (taking account of the sensitivity and magnitude in accordance with the methodology). Those levels of effect shown in bold relate to significant effects in accordance with the relevant EIA Regulations and the wind farm contributing most to the cumulative effects is recorded in brackets.

9.4 Sunlight and Weather Conditions

Changing weather patterns and local climatic conditions will influence the visibility of the Proposed Development which will vary from periods of low visibility (fog, low cloud, and bright sunny conditions that are accompanied by haze generated by temperature inversions) as well as periods of high visibility in clear weather. In some instances the Proposed Development may appear 'back-lit' (e.g. appearing darker in colour during sunset/sunrise and periods of pale or white blanket cloud) and in other circumstances may appear to be 'up-lit' (e.g. during stormy periods that combine dark clouds and bright sunshine).

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Table 9.B.1 Summary of Viewpoint Analysis

Viewpoint Number and Name	Distance to nearest turbine (m)	Sensitivity	Assessment: LVIA (Enoch Hill only)		Assessment: CLVIA (Enoch Hill and other wind farms)			
			Magnitude	Level of Effect	Magnitude (Existing / Consented only)	Cumulative Level of Effect 1: (Existing and Consented and Enoch Hill)	Magnitude (Applications only)	Cumulative Level of Effect 2: (All wind farms and Enoch Hill)
1. B741 North East of Dalmellington	1,893	High to Medium	Medium	**Substantial** / **Moderate** to Moderate	None	No cumulative effect	Negligible	**Substantial** / **Moderate** to Moderate
2. B741 South West of New Cumnock	3,167	High to Medium	High to Medium	**Substantial to Substantial** / **Moderate**	Low to Negligible	**Substantial to Substantial** / **Moderate**	Low	**Substantial to Substantial** / **Moderate**
3. Core Path 667 Water of Deugh	4,463	High	Negligible	Slight	Low	Moderate (due to Windy Standard Extension)	High	**Substantial** (due to South Kyle)
4. New Cumnock Cemetery	5,639	High	Medium	**Substantial** / **Moderate**	Low	**Substantial** / **Moderate**	Medium	**Substantial** / **Moderate** (due to multiple development)
5. Highpoint north of site (near Auchinross)	6,398	Medium	High to Medium	**Substantial** / **Moderate to Moderate**	Low	**Substantial** / **Moderate to Moderate**	Medium	**Substantial** / **Moderate to Moderate** (due to multiple development)
6. Blackcraig Hill S of New Cumnock	6,771	High	Medium	**Substantial** / **Moderate**	Medium	**Substantial** / **Moderate** *(due to multiple wind farms)*	High	**Substantial** (due to South Kyle)
7. Lochside Hotel	7,080	High	Medium	**Substantial** / **Moderate**	Low	**Substantial** / **Moderate** *(due to multiple wind farms)*	Medium	**Substantial** / **Moderate** (due to multiple development)
8. Cairnsmore of Carsphairn	8,728	High	Low	Moderate	Medium	**Substantial** / **Moderate** (due to Benbrack and Windy Standard Extension)	Medium	**Substantial** / **Moderate** (due to multiple development)
9. Bogton Loch	9,213	High	Negligible	Slight	Zero	No cumulative effect	Medium	**Substantial** / **Moderate** (due to Keirs Hill)
10. Scottish Dark Sky Observatory	9,592	High	Negligible	Slight	Low	Moderate	Low	Moderate
11. Auchenroy Hill	10,631	High	Low	Moderate	High	**Substantial** (due to Dersalloch)	High	**Substantial** (due to multiple development)
12. Corsencon Hill	11,266	High	Low	Moderate	Low	Moderate	High	**Substantial** (due to Lethans)

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Viewpoint Number and Name	Distance to nearest turbine (m)	Sensitivity	Assessment: LVIA (Enoch Hill only)		Assessment: CLVIA (Enoch Hill and other wind farms)			
			Magnitude	**Level of Effect**	**Magnitude** (Existing / Consented only)	**Cumulative Level of Effect 1:** (Existing and Consented and Enoch Hill)	**Magnitude** (Applications only)	**Cumulative Level of Effect 2:** (All wind farms and Enoch Hill)
13. Loch Doon Shore	12,287	High	Negligible	Slight	None	No cumulative effect	Medium	**Substantial** / **Moderate** to Moderate (due to South Kyle and Benbrack)
14. A70 Between Cumnock and Prestwick	14,223	Medium	Low	Slight	Negligible	Slight	Medium to Low	Moderate to Slight
15. A76 N of Auchinleck	15,586	Medium	Low to Negligible	Slight to Slight / Negligible	Negligible	Slight to Slight / Negligible	Low	Slight
16. A70 NE of Cumnock	17,466	Medium	Zero	No View	N/A	No cumulative effect	N/A	No cumulative effect
17. A76 Mauchline	19,383	Medium	Negligible	Slight / Negligible	Negligible	Slight / Negligible	Negligible	Slight / Negligible
18. Shalloch on Minnoch	22,117	High	Negligible	Slight	Low to Negligible	Moderate to Slight	Low to Negligible	Moderate to Slight
19. Meikle Milyea	23,760	High	Negligible	Slight	Low to Negligible	Moderate to Slight	Low to negligible	Moderate to Slight
20. Kirriereoch Hill	23,952	High	Negligible	Slight	Low to Negligible	Moderate to Slight	Low to Negligible	Moderate to Slight
21. Merrick	24,748	High	Negligible	Slight	Negligible	Slight	Negligible	Slight
22. East Mount Lowther	29,760	High	Negligible	Slight	Low to Negligible	Moderate to Slight	Low to Negligible	Moderate to Slight

Table 9.B.1 Viewpoint Analysis

Figure 9.27a/b/c/d	**Viewpoint 1: B741 NE of Dalmellington** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the B741 NE of Dalmellington and is the closest minor road to the Proposed Development. The nearest turbine is Turbine 16 at a distance of 1,893m. The view is orientated southeast and looks out across rolling, open moorland of mostly of rough grassland with some commercially managed forest.	
Sensitivity	This viewpoint would be experienced by road users, mostly drivers (Medium sensitivity) with walkers using the intermittent footpaths and cyclists of higher sensitivity. The sensitivity has therefore been assessed as *High to Medium*.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear beyond the horizon with 13 turbines theoretically visible (8 hubs and 5 blades) affecting 35° of the horizontal FoV at 1,893m distance. The most prominent turbines 4, 3 and 1 are currently screened by forestry, although it is acknowledge that felling operations are on-going. The wind farm composition would appear as a simple and cohesive design with minimal stacking and in those terms could be regarded as partly neutral. The magnitude of change would be *Medium*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Medium*.	
Assessment	Sensitivity	**High to Medium**
	Magnitude	**Medium**
	Level of Effect	***Substantial / Moderate to Moderate and Significant***
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	No existing or consented wind farms would be visible.	
Cumulative Level of Effect 1	***No cumulative effect.***	
Type of Effect	N/A	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	South Kyle would be simultaneously visible at approximately 2.5km distance to the south (Medium magnitude). Theoretically, the Polquhairn application would be successively visible at approximately 8km distance to the northwest (Negligible magnitude). The combined magnitude of these wind farms is assessed as *Medium to Negligible.*	
Cumulative Level of Effect 2	***Substantial / Moderate to Moderate and Significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.28a/b/c/d	**Viewpoint 2: B741 South West of New Cumnock** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the B741 southwest of New Cumnock and is the closest minor road to the Proposed Development. The nearest turbine is Turbine 18 at a distance of 3,167m. The view is orientated southwest and looks out across a rolling, open moorland. The road is present in the view. Land cover consists mostly of rough grassland and moorland as well as some broad-leafed forestry.	
Sensitivity	This viewpoint would be experienced by road users, mostly drivers (Medium sensitivity) with walkers using the intermittent footpaths and cyclists of higher sensitivity. The sensitivity has therefore been assessed as *High to Medium*.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear behind the horizon with 17 turbines theoretically visible (12 hubs and 5 blades) affecting 45° of the horizontal FoV at 3,167m distance. The turbines would appear as a simple and cohesive design with minimal stacking and in those terms could be regarded as partly neutral. The magnitude of change would be *High to Medium*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to High to Medium*.	
Assessment	Sensitivity	**High to Medium**
	Magnitude	**High to Medium**
	Level of Effect	***Substantial to Substantial / Moderate and Significant***
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	Theoretically, the existing High Park Farm Wind Farm (Negligible magnitude) at approximately 4.5km to the east and the Hare Hill Wind Farm (Low magnitude) at approximately 6km distance to the east would be successively visible. Theoretically, the consented Hare Hill Extension Wind Farm would also be successively visible at approximately 7.5km to the east (Negligible magnitude). The combined magnitude of these wind farms is assessed as *Low to Negligible*.	
Cumulative Level of Effect 1	***Substantial to Substantial / Moderate and Significant*** *(due to the Proposed Development)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The South Kyle application would be simultaneously visible at approximately 5km distance to the south (Negligible magnitude). High Cumnock, Garleffan and Lethans applications would be successively visible at between approximately 6km and 9.5km distance (Low magnitude). The combined magnitude of these wind farms is assessed as *Low.*	
Cumulative Level of Effect 2	***Substantial to Substantial / Moderate and Significant*** *(due to the Proposed Development)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.29a/b/c/d	**Viewpoint 3: Core Path 667 Water of Deugh** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	The viewpoint is located on Core Path 667: Water of Deugh, in the Carsphairn Forest on a forest track. The view is orientated to the northeast viewing across predominantly rolling hills planted with commercial forestry of varying maturity with some clear-felled and newly planted or re-stocked areas . The nearest turbine is Turbine 19 located at a distance of 4,463m from the viewpoint.	
Sensitivity	The viewpoint would be experienced by walkers and others on the core path and the sensitivity has been assessed as *High*.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear beyond the horizon with 5 turbines theoretically visible (1 hub and 4 blades) affecting 1.5° of the horizontal FoV at 4,463m distance. The turbines would appear as a simple and cohesive design with minimal stacking and in those terms could be regarded as partly neutral. The magnitude of change would be *Negligible*, increasing slightly subject to forestry felling and re-stocking. **Whilst Under Construction and Decommissioning:** A crane may be visible during the construction and decommissioning periods and the magnitude of change would range from Zero to Negligible.	
Assessment	Sensitivity	**High**
	Magnitude	**Negligible**
	Level of Effect	***Slight and not Significant***
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The existing Windy Standard Wind Farm (Low to Negligible magnitude) at a distance of approximately 5.5km to the east would be theoretically visible successively. The consented Windy Standard Extension Wind Farm would be theoretically and successively visible at approximately 3km to the east (Low magnitude) and the consented Afton Wind Farm would be successively visible at approximately 7km to the northeast (Negligible magnitude) The combined magnitude of these wind farms is assessed as *Low.*	
Cumulative Level of Effect 1	***Moderate and not Significant*** *(due to Windy Standard Extension)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The South Kyle Application would be theoretically and successively visible to the east and west around the viewpoint (High magnitude) and the Pencloe Application would be theoretically and successively visible to the northeast at a distance of approximately 5km (Low magnitude). The combined magnitude of these wind farms is assessed as *High*.	
Cumulative Level of Effect 2	***Substantial and Significant*** *(due to South Kyle)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.30a/b/c/d	**Viewpoint 4: New Cumnock Cemetery** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is at the entrance to New Cumnock Cemetery on a Core Path / Scottish Hill Track and Heritage Trail leading into the Glen Afton Valley. The viewpoint is orientated towards the southwest viewing out across open pasture fields and moorland with occasional woodland and groups of farm buildings scattered across the foothills and lowland areas. The Southern Uplands and foothills with forestry are visible in the beyond forming the horizon. The nearest turbine is Turbine 18 located at a distance of 5,639m.	
Sensitivity	The viewpoint would be experienced by road users and people visiting the cemetery as well as walkers on the Core Path / Scottish Hill Track and Heritage Trail leading into the Glen Afton Valley and the sensitivity is assessed as *High*.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear on the distant hills (Enoch Hill) with 19 turbines theoretically visible on the horizon (18 hubs and 1 blade tip) affecting approximately 23° of the horizontal FoV at 5,639m distance. The turbines would appear as a simple and cohesive group although from this view there are some slight gaps and overlapping turbines in the overall composition. Whilst the scale of some of these turbines is noticeable this is partly mitigated by the intervening distance between the wind farm and the viewer. The magnitude of change would be *Medium*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Medium*.	
Assessment	Sensitivity	**High**
	Magnitude	**Medium**
	Level of Effect	**Substantial** / **Moderate and Significant**
	Type of Effect	Long term (reversible) direct and negative.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The consented Windy Standard Extension Wind Farm (Negligible magnitude) and the consented Afton Wind Farm (Low magnitude) would be theoretically and simultaneously visible at a distance of between approximately 8km and 6.5km respectively to the southwest. The existing Hare Hill Wind Farm (Low magnitude) and the existing High Park Farm Wind Farm (Low magnitude) would be theoretically and successively visible at distances of between approximately 5km to 2km to the southeast respectively. The combined magnitude of these wind farms is assessed as *Low*.	
Cumulative Level of Effect 1	***Substantial*** / ***Moderate and Significant*** *(due to the Proposed Development)*	
Type of Effect	Long term (reversible) direct, cumulative and negative.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The Pencloe (Medium magnitude) and the South Kyle (Low magnitude) applications would be simultaneously visible at a distance of between approximately 5km and 6.5km to the southwest. The High Cumnock (Medium magnitude), Garleffan (Medium magnitude) and Lethans (Low magnitude) applications would be theoretically and successively visible at distances of between approximately 4km to 6km to the north and east. The combined magnitude of these wind farms is assessed as *Medium*.	
Cumulative Level of Effect 2	***Substantial*** / ***Moderate and Significant*** *(due to High Cumnock, Garleffan and Pencloe)*	
Type of Effect	Long term (reversible) direct, cumulative and negative.	

Figure 9.31a/b/c/d	**Viewpoint 5: Highpoint north of site (near Auchinross)** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is at a highpoint north of site (near Auchinross) to the northwest of the settlement of New Cumnock. It looks out across old opencast workings and a minor road with open moorland, fields and scattered farms in the distance and is orientated south. Land cover is predominantly rough grassland and moorland with commercial forestry in the distance. Man-made elements include the road, current open-cast workings, fencing and farm buildings. The nearest turbine is Turbine 14 at a distance of 6,398m.	
Sensitivity	The viewpoint would be experienced predominantly by road users (cars and occasional cyclists) and is considered to be of *Medium* sensitivity. It should be noted that there is no footpath for walkers.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear across the horizon with 19 blade tips and 19 hubs visible, affecting 29° of the horizontal FoV at 6,398m distance. The turbines would appear as a simple group and although from this view the scale of some of these turbines is noticeable, this is partly mitigated by the intervening distance between the wind farm and the viewer. Turbine No.16 appears as a slight outlier that would be mitigated by the South Kyle application. The magnitude of change would be *High to Medium*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to High*.	
Assessment	Sensitivity	**Medium**
	Magnitude	**High to Medium**
	Level of Effect	**Substantial** / **Moderate to Moderate and Significant**
	Type of Effect	Long term (reversible) direct and negative.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The existing Windy Standard and the consented Windy Standard Extension Wind Farm (Negligible magnitude) and the consented Afton Wind Farm (Low magnitude) would be simultaneously visible at a distance of between approximately 3km and 8km respectively to the south. The existing Hare Hill Wind Farm (Low magnitude) and the existing High Park Farm Wind Farm (Negligible magnitude) would be theoretically and successively visible at approximately 8km and 6km respectively to the southeast. The combined magnitude of these wind farms is assessed as *Low*.	
Cumulative Level of Effect 1	***Substantial*** / ***Moderate to Moderate and Significant*** *(due to the Proposed Development)*	
Type of Effect	Long term (reversible) direct, cumulative and negative.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	Pencloe (Medium to Low magnitude) and the South Kyle (Low magnitude) applications would be simultaneously visible at a distance of between approximately 7km and 8km to the southeast and southwest respectively. The High Cumnock (High magnitude) Garleffan (High to Medium magnitude), Lethans (Low magnitude), Spango (Negligible magnitude), Kennoxhead (Negligible magnitude), Penbreck (Negligible magnitude) applications would be theoretically and successively visible at a distance of between approximately 3km and 15.5km to the north and east. The combined magnitude of these wind farms is assessed as *High to Medium*.	
Cumulative Level of Effect 2	***Substantial*** / ***Moderate to Moderate and Significant*** *(due to multiple wind farms)*	
Type of Effect	Long term (reversible) direct, cumulative and negative.	

Figure 9.32a/b/c/d	**Viewpoint 6: Blackcraig Hill South of New Cumnock** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the summit of Blackcraig Hill (700m AOD) to the northeast of the Proposed Development. The nearest turbine is Turbine 18 at a distance of 6,771m and the view is orientated west viewing across a large-scale open landscape of the Scaur Hills, the Carsphairn Forest and the Southern Uplands with Forestry. Land cover consists mostly of commercially managed forest and moorland vegetation.	
Sensitivity	The viewpoint would be experienced by walkers and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear within the middle distance, at 6,771m distance close to the Carsphairn Forest and within the Southern Uplands with Forestry. The Proposed Development would affected an 18° horizontal with all 19 turbines (hubs and blades) visible. Whether viewed alone or with other windfarms (notably South Kyle) the proposed turbines would appear as a simple and cohesive composition with minimal overlapping and in those terms could be regarded as partly neutral. The magnitude of change would be *Medium*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Medium*.	
Assessment	Sensitivity	**High**
	Magnitude	**Medium**
	Level of Effect	**Substantial** / **Moderate and Significant**
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be successive views with the existing Hare Hill Wind Farm to the northeast (Medium to Low magnitude) at a distance of approximately 4km, with the existing Windy Standard Wind Farm to the southwest (Low magnitude) at a distance of approximately 6.5km and with the existing Wether Hill Wind Farm to the southeast (Negligible magnitude) at a distance of approximately 14.5km. There would also be successive views theoretically, of the existing Bankend Rig Wind Farm to the north (Negligible magnitude) at a distance of approximately 27.5km. There would be simultaneous views with the consented wind farms of Windy Standard Extension to the southwest (Medium magnitude) Afton to the southwest (High to Medium magnitude) at approximately 3km distance and Dersalloch to the west (Negligible magnitude) at approximately 5km distance. The combined magnitude of these wind farms is assessed as *Medium*.	
Cumulative Level of Effect 1	***Substantial*** / ***Moderate and Significant*** *(due to multiple wind farms)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with the South Kyle application (High magnitude), Pencloe (Medium magnitude) Keirs Hills (Low magnitude) Benbrack (Medium magnitude) Glenmount (Negligible magnitude) and the Quantans Hill (High to Medium magnitude) application sites to the southwest at a distance of between approximately 3km and 22.5km. There would be theoretical and successive views of High Glenmuir to the northwest (Negligible magnitude) High Cumnock to the northwest (Low magnitude) Garleffan to the northwest (Medium to Low magnitude) and Loch Urr, Margree and Longburn applications to the south (Negligible magnitude) at a distance of between approximately 5km and 34km. The combined magnitude of these wind farms is assessed as *High*.	
Cumulative Level of Effect 2	***Substantial and Significant*** *(due to South Kyle)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.33a/b/c/d	**Viewpoint 7: Lochside Hotel** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the northern shore of the Loch of the Lowes, within the grounds of the Lochside Hotel to the northwest of New Cumnock. The nearest turbine is Turbine18 at a distance of 7,080m. The view is orientated broadly southwest viewing across the hotel grounds and the loch towards Hare Hill, Blackcraig Hill and the Scaur Hills. The loch and hotel grounds are visible in the foreground with mixed woodland and moorland vegetation beyond. The existing Hare Hill and Windy Standard wind farms are visible in the distance, on the hills to the south off this photograph.	
Sensitivity	The view would be experienced by tourists and visitors to the hotel and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would be visible on the horizon, beyond the hills to the southwest of the loch, with 19 turbines visible (18 hubs and 1 blade) affecting 23° of the horizontal FoV at 7,080m distance. The wind farm has been designed to appear on or beyond the background hills and horizon, with no turbines appearing on the 'front' slopes of the hills. The turbine composition would appear as a simple and cohesive design with minimal overlapping and in those terms could be regarded as partly neutral. The magnitude of change would be *Medium*. **Whilst Under Construction and Decommissioning:** A crane may be visible during the construction and decommissioning periods and the magnitude of change would range from Zero to Medium.	
Assessment	Sensitivity	**High**
	Magnitude	**Medium**
	Level of Effect	**Substantial** / **Moderate and Significant**
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be successive views of the existing Hare Hill Wind Farm (Low magnitude). There would be simultaneous views of the existing Windy Standard and the consented Windy Standard Extension wind farms and the consented Afton Wind Farm (Low magnitude) at a distance of between approximately 12km and 8km respectively. The combined magnitude of these wind farms is assessed as *Low*.	
Cumulative Level of Effect 1	***Substantial*** / ***Moderate and Significant*** *(due to multiple wind farms)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with the applications at Pencloe (Medium magnitude) and South Kyle (Medium to Low magnitude) to the southwest at a distance of between approximately 8km and 12km respectively. There would be in theory, successive views with the applications at High Cumnock (High magnitude), Garleffan (Medium magnitude) and Lethans (Low magnitude) to the southeast at a distances of approximately 2.5km to 10km. The combined magnitude of these wind farms is assessed as *Medium*.	
Cumulative Level of Effect 2	***Substantial*** / ***Moderate and Significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.34a/b/c/d	**Viewpoint 8: Cairnsmore of Carsphairn** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the summit of Cairnsmore of Carsphairn to the southeast of Dalmellington, and the Proposed Development. The nearest turbine is Turbine 19 at a distance of 8,728m. The view is orientated northwest and views out across the broad summit of this Southern Upland hill which partly obscures the wider view. The Carsphairn Forest, Windy Standard and Hare Hill wind farms are visible in the middle distance with the Ayrshire lowlands in the distance. The Firth of Clyde and the Isle of Arran are also visible in the far distance (beyond the study area) from this summit in conditions of clear visibility. Although not shown on the photograph, Loch Doon is visible to the southwest.	
Sensitivity	The viewpoint would be experienced by hill walkers and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear against the background landscape, below the summit and partly obscured by the landform with 19 turbines visible (18 hubs and 1 blade) affecting 17° of the horizontal FoV at 8,728m distance. The Proposed Development would also appear at further distance than the existing Windy Standard Wind Farm and beyond or partly overlapped by the consented Windy Standard Extension, occupying the same shoulder of land and area of the Southern Uplands with Forest with limited (Low) additional effect. The turbine composition would appear as a simple and cohesive design with minimal overlapping and in those terms could be regarded as partly neutral. The magnitude of change would be *Low*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Low*.	
Assessment	Sensitivity	**High**
	Magnitude	**Low**
	Level of Effect	***Moderate and not Significant***
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be theoretical simultaneous views of the existing Windy Standard at approximately 4km (Low magnitude), Hare Hill at approximately 13km (Negligible magnitude) and High Park Farm at approximately 14km (Negligible magnitude) and the consented Windy Standard Extension at approximately 3km (Medium) and Afton Wind Farm at approximately 5km distance (Low magnitude) to the north. There would be theoretical successive views of the existing Wether Hill at approximately 11km to the southeast (Negligible magnitude) and the consented wind farms to the northeast at Penbreck at approximately 28km (Negligible magnitude), Sanquhar at approximately 14.5km (Negligible magnitude), Whiteside Hill at approximately 14.5km (Negligible magnitude), Twentyshilling Hill at approximately 20km (Negligible magnitude) and Knockman Hill and Blackcraig Hill to the southeast at approximately 16 and 19km respectively (both Negligible magnitude), Torrs Hill to the southwest at approximately 11km (Negligible magnitude) and Dersalloch to the west at approximately 18.5km (Negligible magnitude). The combined magnitude of these wind farms is assessed as *Medium*.	
Cumulative Level of Effect 1	***Substantial*** / ***Moderate and Significant*** *(due to Windy Standard Extension)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views of South Kyle (Medium magnitude) at approximately 4km, Polquhairn (Negligible magnitude) at approximately 20km and Taglim (Negligible magnitude) at approximately 18km, High Cumnock (Negligible magnitude) at approximately 19km, Pencloe (Low magnitude) at approximately 7km, High Glenmuir (Negligible magnitude) at approximately 23km, Garleffan (Negligible magnitude) at approximately 19km, Linburn Farm (Negligible magnitude) at approximately 33km, Lethans (Negligible magnitude) at approximately 19km, Benbrack (Medium to Low magnitude) at approximately 6km and Keirs Hill (Negligible magnitude) at approximately 18km distance. There would be theoretical and successive views of Kennoxhead (Negligible magnitude) at approximately 33km, Spango (Negligible magnitude) at approximately 24.5km and Ulzieside (Negligible magnitude) at approximately 16.5km to the northeast, Longburn (Low magnitude), Margree (Negligible magnitude) and Loch Urr (Negligible magnitude) at approximately 7.5, 14.5 and 20km respectively to the southeast and Quantans Hill (Low magnitude) at approximately 3km to the south and Glenmount (Negligible magnitude) at approximately 13.5km distance to the west .	

Figure 9.34a/b/c/d	**Viewpoint 8: Cairnsmore of Carsphairn** (The assessment takes account of a 90° FoV from this location as illustrated).
	The combined magnitude of these wind farms is assessed as *Medium*.
Cumulative Level of Effect 2	***Substantial*** / ***Moderate and Significant*** *(due to multiple development)*
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.

Figure 9.35a/b/c/d	**Viewpoint 9: Bogton Loch** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located to the west of the Proposed Development on a small pedestrian bridge which forms part of a boardwalk across Bogton Loch. The nearest turbine is Turbine 16 at a distance of 9,213m. The view is orientated east, viewing over the River Doon and Bogton Loch towards the Carsphairn Forest and the Forested Southern Upland hills. The settlements of Dalmellington and Bellsbank can be seen in the middle distance beyond riverside vegetation and trees at Bogton Loch.	
Sensitivity	The viewpoint would be experienced by walkers and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development is shown on the wireline, appearing beyond the hills with 13 turbines theoretically visible (4 hubs and 11 blades) affecting 10° of the horizontal FoV at 9,213m distance. The turbines would however be screened by broad-leaved trees around the Loch reducing the visibility to Negligible magnitude and in those terms could be regarded as partly neutral. The magnitude of change would be *Negligible*. **Whilst Under Construction and Decommissioning:** A crane may be visible during the construction and decommissioning periods and the magnitude of change would range from *Zero to Negligible*.	
Assessment	Sensitivity	**High**
	Magnitude	**Negligible**
	Level of Effect	**Slight and not Significant**
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	No existing or consented wind farms would be visible.	
Cumulative Level of Effect 1	***No cumulative effect.***	
Type of Effect	N/A.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the proposed development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be theoretical and simultaneous views of the South Kyle application (Low magnitude) at approximately 7km distance and the Benbrack application (Low magnitude) at approximately 8km distance. Theoretically, there would be successive views of the Keirs Hill application (Medium magnitude) at a distance of approximately 4km. The combined magnitude of these wind farms is assessed as *Medium*.	
Cumulative Level of Effect 2	***Substantial /Moderate and Significant*** *(due to Keirs Hill)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.36a/b/c/d	**Viewpoint 10: Scottish Dark Sky Observatory** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located to the south of Craigengillan Estate, adjacent to the Scottish Dark Sky Observatory, where a dip in the landscape allows the maximum view of the Proposed Development although even then only one proposed turbine (Turbine 16) would be visible at a distance of 9,592m. The view is orientated west, viewing across Ness Glen towards Bryan's Heights (328m AOD). Mixed woodland is visible across the foreground of the view with Bellsbank Plantation visible on the hill sides beyond.	
Sensitivity	The viewpoint would be experienced by visitors to the Scottish Dark Sky Observatory and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would be largely screened from this viewpoint by landform with the hub and upper part of 1 turbine visible at 9,592m distance. The magnitude of change would be Negligible and in those terms could be regarded as partly neutral. **Whilst Under Construction and Decommissioning:** A crane may be visible during the construction and decommissioning periods and the magnitude of change would range from *Zero to Negligible*.	
Assessment	Sensitivity	**High**
	Magnitude	**Negligible**
	Level of Effect	**Slight and not Significant**
	Type of Effect	Long term (reversible) direct and negative and neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the proposed development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	No other existing wind farms would be visible in the simultaneous view. There would be successive theoretical views of the consented Dersalloch Wind Farm (Low magnitude) to the northwest at approximately 5km distance.	
Cumulative Level of Effect 1	***Moderate and not Significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views of blades and blade tips from South Kyle (Negligible magnitude) and Benbrack (Low magnitude) application sites both at approximately 6km distance. There would theoretically be successive views of Kiers Hill (Negligible magnitude) and Glenmount (Low magnitude) both at approximately 9.5 and 3.5km distance respectively. The combined magnitude of these wind farms is assessed as *Low*.	
Cumulative Level of Effect 2	***Moderate and not Significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.37a/b/c/d	**Viewpoint 11: Auchenroy Hill** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located to the west of Dalmellington and the Proposed Development on the summit of Auchenroy Hill (361m AOD). Turbine 16 is the nearest at 10,631m distance and the view is orientated east towards the River Doon and Bogton Loch. Bogton Loch and the settlements of Dalmellington and Bellsbank can be seen centrally in the middle distance, set within a lowland pastoral landscape, sheltered by surrounding hills and coniferous forestry.	
Sensitivity	The viewpoint would be experienced by walkers and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear across the forested horizon with 19 turbines visible (16 hubs and 3 blades) affecting approximately 13° of the horizontal FoV at 10,631m distance. The turbine composition would appear as a simple and cohesive design with minimal overlapping and in those terms could be regarded as partly neutral. The magnitude of change would be *Low*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Low*.	
Assessment	Sensitivity	**High**
	Magnitude	**Low**
	Level of Effect	**Moderate and not Significant**
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The existing Hare Hill and Windy Standard (both Negligible), the consented Windy Standard Extension and Afton (both Negligible magnitude) and Penbreck (Negligible magnitude) wind farms would be simultaneously visible at a distance of between approximately 13km and 33km. There would theoretically be successive views of the consented Knockman Hill and Blackcraig to the southeast at approximately 31 and 34km distance (both Negligible magnitude) and Dersalloch (High magnitude) at a distance of approximately 1.5km to the west. The combined magnitude of these wind farms is assessed as *High*.	
Cumulative Level of Effect 1	***Substantial and Significant*** *(due to Dersalloch)*	
Type of Effect	Long term (reversible) direct, cumulative and negative.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views of the South Kyle (Low magnitude), Garleffan (Negligible magnitude), Penbreck (Negligible magnitude), Spango (Negligible magnitude), Lethans (Negligible magnitude), Pencloe (Negligible magnitude) and Benbrack (Low magnitude) applications at a distance of between approximately 8km and 32km. There would be successive views of the Quantans Hill and Margree applications to the southeast at a distance of approximately 17.5 and 23.5km respectively, the Glenmount application (Medium magnitude) to the south at approximately 4.5km and the Keirs Hill application (High to Medium magnitude) at approximately 2.5km distance to the northwest. The combined magnitude of these wind farms is assessed as *High to Medium*.	
Cumulative Level of Effect 2	***Substantial and Significant*** *(due to multiple development)*	
Type of Effect	Long term (reversible) direct, cumulative and negative.	

Figure 9.38a/b/c/d	**Viewpoint 12: Corsencon Hill** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located to the northwest of New Cumnock on the summit of Corsencon Hill viewing across open moorland towards the Nith Valley with the settlement of New Cumnock in the middle distance on the right of the photograph. The Southern Uplands and the Hare Hill Wind Farm are visible on the left of the photograph. The nearest turbine is Turbine 18 at a distance of 11,266m.	
Sensitivity	The viewpoint would be experienced by hill walkers and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear within the hills to the south beyond the Nith Valley and basin area and New Cumnock. In total 19 turbines would be visible affecting approximately 12° of the horizontal FoV at 11,266m distance. The turbine composition would appear as a simple and cohesive design with minimal overlapping and in those terms could be regarded as partly neutral. The magnitude of change would be *Low*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Low*.	
Assessment	Sensitivity	**High**
	Magnitude	**Low**
	Level of Effect	**Moderate and not Significant**
	Type of Effect	Long term (reversible) direct and negative.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The existing Hare Hill (Low magnitude) and High Park Farm (Low magnitude) wind farms would be simultaneously visible at approximately 4km and 5km distance respectfully. The consented Afton (Negligible magnitude), Windy Standard Extension (Negligible magnitude), Dersalloch (Negligible magnitude) and Mansfield Mains (Negligible magnitude) wind farms would be simultaneously visible at between approximately 3km and 26km distances. The existing Bankend Rig (Negligible magnitude) and the consented Penbreck (Low magnitude), Sunnyside (Negligible magnitude), Twentyshilling Hill (Negligible magnitude), Whiteside Hill (Low magnitude), Sanquhar (Low magnitude) and Hare Hill Extension (Low magnitude) wind farms would be theoretically and successively visible at between approximately 5km and 18.5km distance. The combined magnitude of these wind farms is assessed as *Low*.	
Cumulative Level of Effect 1	***Moderate and not Significant*** *(due to multiple development)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views of South Kyle (Low magnitude), Pencloe (Low magnitude), Benbrack (Negligible magnitude), Keirs Hill (Negligible magnitude), Knockshinnoch (Negligible magnitude), Polquhairn (Negligible magnitude) and Taiglim Farm (Negligible magnitude) applications at between approximately 9km and 25km distances. There would theoretically be successive views of Lethans (High magnitude), Penbreck (Low magnitude), Kennoxhead (Negligible magnitude), Spango (Low magnitude), Ulzieside (Low magnitude), High Cumnock (Low magnitude), Garleffan (Medium magnitude), High Glenmuir (Negligible magnitude) and Fowler Farm (Negligible magnitude) application sites at between approximately 1km and 22km distance. The combined magnitude of these wind farms is assessed as *High*.	
Cumulative Level of Effect 2	***Substantial and Significant*** *(due to Lethans)*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

 © Amec Foster Wheeler Environment & Infrastructure UK Limited

Figure 9.39a/b/c/d	**Viewpoint 13: Loch Doon Shore** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the Carrick Forest scenic drive / cycle route on the shores of Loch Doon near to the bridge over the Garpel Burn to the southwest of the Proposed Development. The nearest turbine is Turbine 19 at a distance of 12,287m. The view is orientated to the northeast and views across Loch Doon towards the hills within Carsphairn Forest. The western shores of Loch Doon appear in the foreground with some trees and loch side vegetation, whilst the landscape beyond Loch Doon is predominantly a mixture of rough grassland and forestry.	
Sensitivity	The viewpoint would be experienced by visitors and tourists in cars, on bikes or walking and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would be on the horizon with 4 turbines visible (2 hubs and 2 blade tips) affecting approximately 3° of the horizontal FoV at 12,287m distance. In these terms the visual effects could be regarded as partly neutral due to the negligible magnitude of effect. The magnitude of change would be *Negligible*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Negligible*.	
Assessment	Sensitivity	**High**
	Magnitude	**Negligible**
	Level of Effect	**Slight and not Significant**
	Type of Effect	Long term (reversible) direct and negative.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	No existing or consented wind farms would be visible.	
Cumulative Level of Effect 1	***No cumulative effect.***	
Type of Effect	N/A.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views of South Kyle (Medium to Low magnitude) and Benbrack (Medium to Low magnitude) applications to the west at a distance of between approximately 8km and 6km respectively. The combined magnitude of these wind farms is assessed as *Medium to Low*.	
Cumulative Level of Effect 2	***Substantial*** / ***Moderate to Moderate and significant*** *(due to South Kyle and Benbrack).*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.40a/b/c/d	**Viewpoint 14: A70 Between Cumnock and Prestwick** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the A70 between Cumnock and Prestwick where there would be open views of the Proposed Development. The nearest turbine is Turbine 16 at 14,223m distance to the northwest. The viewpoint is orientated southeast and views out across pasture fields with some intervening hedgerows and broad-leaved trees / woodland. In the distance commercial forestry can be seen across the horizon line which would screen the bases of turbines.	
Sensitivity	This viewpoint would be experienced by road users and is considered to be of *Medium* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would be on the horizon with 19 turbines visible (18 hubs and 1 blade) affecting approximately 10° of the horizontal FoV at 14,223m distance. The turbine composition would appear as a simple and distant group, experienced at speed and in those terms could be regarded as partly neutral. The magnitude of change would be *Low*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Low*.	
Assessment	Sensitivity	**Medium**
	Magnitude	**Low**
	Level of Effect	**Slight and not significant**
	Type of Effect	Long term (reversible) direct and negative.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The existing Windy Standard and Hare Hill wind farms would be theoretically visible, simultaneously behind the Proposed Development at approximately 20km and 22km distance respectively (Negligible magnitude). The consented Afton and Hare Hill Extension wind farms would be theoretically visible, simultaneously at approximately 20km and 21km to the southeast respectively (both Negligible magnitude). The consented Penbreck turbines (Negligible magnitude) would be theoretically visible in a successive view at approximately 26km to the east. The combined magnitude of these wind farms is assessed as *Negligible*.	
Cumulative Level of Effect 1	***Slight and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views of the South Kyle and Pencloe applications sites (both Negligible magnitude) at approximately 15km and 18km distance respectively, collectively appearing as a group of wind farm development with the Proposed Development, the consented Afton and the existing Windy Standard schemes. The Proposed Development would be seen as filling in a gap within that group. The Polquhairn application site (Medium to Low magnitude) would also be visible simultaneously to the west of the Proposed Development at approximately 5km to the south. The High Cumnock, Garleffan, Lethans and Spango applications would also be visible in a simultaneous view (all Negligible magnitude) at between approximately 13km and 29km to the east and southeast. The Keirs Hill (Negligible magnitude) and Knockshinnoch (Low magnitude) applications would be theoretically visible in a successive view at approximately 13km and 8km to the southwest. The Penbreck, High Glenmuir and Kennoxhead applications (all Negligible magnitude) would also be theoretically visible in a successive view at between approximately the 15km and 27km to the east. The combined magnitude of these wind farms is assessed as *Medium to Low*.	
Cumulative Level of Effect 2	***Moderate to Slight and not significant*** *(due to Polquhairn).*	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.41a/b/c	**Viewpoint 15: A76 North of Auchinleck** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the A76 north of Auchinleck where there would be an open view of the Proposed Development. The nearest turbine is Turbine 16 at a distance of 15,586m to the north. The view is orientated south viewing along the A76 and across a pastoral landscape of pasture fields, trees and woodland with the Southern Uplands and distant, forest clad hills visible on the horizon. A small area of industrial development is present in the middle distance.	
Sensitivity	This viewpoint would be experienced by road users and is considered to be of *Medium* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear on the horizon with 19 turbines visible (16 hubs and 3 blades) affecting approximately 11° of the horizontal FoV at 15,586m distance. The magnitude of change would be Low to Negligible. **Whilst Under Construction and Decommissioning:** Construction activity including a crane may be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Low*.	
Assessment	Sensitivity	**Medium**
	Magnitude	**Low to Negligible**
	Level of Effect	**Slight to Slight / Negligible and not significant**
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The existing Windy Standard Wind Farm would be visible simultaneously behind the Proposed Development at approximately 22km to the southeast. The existing High Park Farm turbine and Hare Hill Wind Farm would also be visible in the simultaneous view at approximately 16km and 18km to the southeast respectively (both Negligible magnitude). The consented Afton Wind Farm and the Windy Standard Extension Wind Farm would be visible in a simultaneous view at approximately 20km to the southeast (both Negligible magnitude). The consented Hare Hill Extension and Sanquhar wind farms would also be visible in a simultaneous view at approximately 19.5km and 23km to the southeast respectively (both Negligible magnitude). The existing Hadyard Hill Wind Farm would be visible in a successive view at approximately 34.1km to the southwest (Negligible magnitude). The combined magnitude of these wind farms is assessed as *Negligible*.	
Cumulative Level of Effect 1	***Slight to Slight / Negligible and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views of the South Kyle and Pencloe applications sites (both Negligible magnitude) at a distance of approximately 16km and 19km respectively, collectively appearing as a group of wind farm development with the Proposed Development, the consented Afton and the existing and consented Windy Standard schemes. The Proposed Development would be seen as filling in a gap within that group. The Polquhairn application site (Negligible magnitude) would also be visible simultaneously at approximately 10km distance to the southwest. The Taiglim application site (Negligible magnitude) as well as the High Cumnock and Garleffan application sites (both Low magnitude) would be visible in a simultaneous view at between approximately 9km and 13km to the southeast. The Linburn Farm, Kennoxhead, Penbreck, High Glenmuir, Spango and Lethans (all Negligible magnitude) applications sites would be visible in a successive view at between approximately 10 and 26km to the east. The Knockshinnoch and Keirs Hill applications sites (both Negligible magnitude) would be visible in a successive view at a distance of between approximately 14km and 19km to the southwest. The combined magnitude of these wind farms is assessed as *Low*.	
Cumulative Level of Effect 2	***Slight and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.42a/b/c	**Viewpoint 16: A70 NE of Cumnock** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the A70 northeast of Cumnock where there would be theoretical views of the Proposed Development. The nearest turbine is Turbine 18 at a distance of 17,466m to the north. The view is orientated south viewing out across pasture fields to the edge of an area of open cast mining. The A70 is visible on the right of the photograph and some white sheds / industry are visible beyond this in the middle distance.	
Sensitivity	This viewpoint would be experienced by road users and is considered to be of *Medium* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would be completely screened by the over burden mounds associated with the open cast or surface mining on the horizon. The magnitude of change would be Zero. **Whilst Under Construction and Decommissioning:** Construction activity including a crane is likely to be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero*.	
Assessment	Sensitivity	**Medium**
	Magnitude	**Zero**
	Level of Effect	***No View***
	Type of Effect	N/A
Cumulative Level of Effect 1: Existing + Consented wind farms and the proposed development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	N/A.	
Cumulative Level of Effect 1	***No cumulative effect.***	
Type of Effect	N/A.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	N/A.	
Cumulative Level of Effect 2	***No cumulative effect.***	
Type of Effect	N/A.	

Figure 9.43a/b/c	**Viewpoint 17: A76 Mauchline** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the A76 within Mauchline where there would be an open view of the Proposed Development. The nearest turbine is Turbine 16 at a distance of 19,383m located to the southeast of the viewpoint. The view is orientated southeast across the road itself, with amenity landscape areas, and roadside vegetation visible in the foreground. Rolling moorland and commercial forestry is visible at higher elevations in the distance. Man-made elements within the view include road signage, fences, roadside lighting, residential properties and telegraph poles.	
Sensitivity	This viewpoint would be experienced by road users and is considered to be of *Medium* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear on the horizon in the far distance with 19 turbines visible (18 hubs and 1 blade) affecting approximately 9° of the horizontal FoV at 19,383m distance. The magnitude of change would be *Negligible* **Whilst Under Construction and Decommissioning:** Construction activity including a crane may be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Negligible*.	
Assessment	Sensitivity	**Medium**
	Magnitude	**Negligible**
	Level of Effect	***Slight / Negligible and not significant***
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The existing Hare Hill, Windy Standard, High Park Farm and the consented Whiteside Hill, Sanquhar, Hare Hill Extension, Afton, Windy Standard Extension and Dersalloch wind farms (all Negligible magnitude) would be visible in simultaneous views at a distance of between approximately 20km and 30km. The combined magnitude of these wind farms is assessed as *Negligible*.	
Cumulative Level of Effect 1	***Slight / Negligible and not significant***	
Type of Effect	Long term (reversible), direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	The Spango, High Glenmuir, Lethans, Garleffan, South Kyle, Pencloe, Polquhairn, Ulzieside, Taiglim, Benbrack and Keirs Hill application sites (all Negligible magnitude) would be visible in simultaneous views at a distance of between approximately 12km and 31km. The combined magnitude of these wind farms is assessed as *Negligible*.	
Cumulative Level of Effect 2	***Slight / Negligible and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.44a/b/c	**Viewpoint 18: Shalloch on Minnoch** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the summit of Shalloch on Minnoch (775m AOD) within the Merrick Wild Land Area to the southwest of the Proposed Development. The nearest turbine is Turbine 19 at a distance of 22,117m. The view is orientated northeast and views out across a large scale, open landscape of the Galloway Hills and the Rhinns of Kells towards the Southern Uplands. Land cover consists mostly of rough grassland, moorland and forestry. The existing Windy Standard and Hare Hill wind farms are visible in the far distance.	
Sensitivity	The viewpoint would be experienced by hill walkers and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear in the far distance with 19 turbines visible (17 hubs and 2 blades affecting approximately 7° of the horizontal FoV at 22,117m distance. The magnitude of change would be *Negligible*. **Whilst Under Construction and Decommissioning:** Construction activity including a crane may be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Negligible*.	
Assessment	Sensitivity	**High**
	Magnitude	**Negligible**
	Level of Effect	**Slight and not significant**
	Type of Effect	Long term (reversible) direct and negative.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with existing High Park Farm, Windy Standard, Hare Hill and Wether Hill wind farms to the east (all Negligible magnitude) at a distance of between approximately 23km and 31km. There would be simultaneous views with the consented Hare Hill Extension, Windy Standard Extension (both Negligible magnitude), Dersalloch (Low to Negligible magnitude), Whiteside Hill (Negligible magnitude), Afton (Negligible magnitude) and Sanquhar (Negligible magnitude) wind farms to the east at a distance of between approximately 13km and 33km. There would be successive views with the existing Hadyard Hill Wind Farm (Low to Negligible magnitude) and the consented Chapelton Farm scheme (Negligible magnitude) to the northwest at a distance of between approximately 13km and 22 km. There would also be successive views with the existing Artfield Fell, Arecleoch and Mark Hill schemes to the southwest (all Negligible magnitude) at a distance of between approximately 17km and 30km. There would be successive views with the consented Airies, Carscreugh and Glenchamber wind farms (all Negligible magnitude) and Kilgallioch Wind Farm (Low to Negligible) to the southwest, the Assel Valley scheme to the west (Negligible magnitude) and the Downhill scheme to the northwest (Negligible magnitude) at a distance of between approximately 18km and 34 km. The combined magnitude of these wind farms is assessed as *Low to Negligible*.	
Cumulative Level of Effect 1	***Moderate to Slight and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with the Benbrack (Low to Negligible), Keirs Hill (Negligible magnitude), Knockshinnoch (Negligible magnitude), Glenmount (Low magnitude), High Cumnock (Negligible magnitude), Garleffan (Negligible magnitude), Polquhairn (Negligible magnitude), South Kyle (Low to Negligible magnitude), Pencloe (Negligible magnitude), Quantans Hill (Negligible magnitude), Longburn (Negligible magnitude) and Benbrack (Low magnitude) application sites at a distance of between approximately 10km and 34km. The combined magnitude of these wind farms is assessed as *Low to Negligible*.	
Cumulative Level of Effect 2	***Moderate to Slight and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.45a/b/c	**Viewpoint 19: Meikle Millyea** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	The viewpoint is located on the summit of Meikle Millyea (746m AOD) which is the southernmost summit on the Rhinns of Kells ridge, to the southwest of the Proposed Development. The nearest turbine is Turbine 19 at a distance of 23,760m. The view is orientated broadly north, northeast and views out over Galloway Forest Park and the Glenkens valley, Cairnsmore of Carsphairn and the Scaur Hills. The Rhinns of Kells, including the summits of Corserine and Cairnsgarroch, are visible to the left of the view behind the summit cairn of Meikle Millyea., The landscape has an open and large-scale nature and is predominantly moorland vegetation and commercially managed forest. Commercially managed forest also covers the lower slopes of Corserine and Cairnsgarroch and numerous lower hills to the north, visible in the background. The existing Windy Standard and Wether Hill wind farms are visible in the far distance.	
Sensitivity	The viewpoint would be experienced by hill walkers and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear on the horizon with 19 turbines visible (18 hubs and 1 blade) affecting approximately 7° of the horizontal FoV at 23,760m distance. The magnitude of change would be Negligible. **Whilst Under Construction and Decommissioning:** Construction activity including a crane may be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Negligible*.	
Assessment	Sensitivity	**High**
	Magnitude	**Negligible**
	Level of Effect	**Slight and not significant**
	Type of Effect	Long term (reversible) direct and negative.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with the existing Windy Standard scheme to the northeast (Negligible magnitude) at a distance of approximately 21km. There would be simultaneous views with the consented Torrs Hill (Low magnitude), Sanquhar (Negligible magnitude), Whiteside Hill (Negligible magnitude), Afton (Negligible magnitude), Windy Standard Extension (Negligible magnitude) and Twentyshilling Hill (Negligible magnitude) wind farms at a distance of between approximately 6km and 33km. There would be successive views with the existing Wether Hill Wind Farm (Negligible magnitude) to the northeast and the consented Knockmann Hill (Negligible magnitude) and Blackcraig (Negligible magnitude) wind farms to the east at a distance of between approximately 15 and 20km. There would also be successive views with the existing Artfield Fell I and II and Arecleoch wind farms (all Negligible magnitude) to the southwest at a distance of approximately 34km. The combined magnitude of these wind farms is assessed as *Low to Negligible*.	
Cumulative Level of Effect 1	***Moderate to Slight and not significant.***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views of the South Kyle (Low to Negligible magnitude), Polquhairn (Negligible magnitude), Benbrack (Negligible magnitude), Pencloe (Negligible magnitude), Longburn (Low to Negligible magnitude), Ulzieside (Negligible magnitude), Twentyshilling Hill (Negligible magnitude) and Quantans Hill (Low to Negligible magnitude) application sites at a distance of between approximately 13km and 33km. There would be successive views of the Margree (Low to Negligible magnitude) and Loch Urr (Negligible magnitude) application sites at a distance of between approximately 16.5km and 25.5km. The combined magnitude of these wind farms is assessed as *Low to Negligible*.	
Cumulative Level of Effect 2	***Moderate to Slight and not significant.***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.46a/b/c	**Viewpoint 20: Kirriereoch Hill** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located in the Galloway Hills on the summit of Kirriereoch Hill (786m AOD) to the southwest of the Proposed Development. The nearest turbine is Turbine 19 at a distance of 23,952m. The view is orientated northeast and views out across Loch Doon, towards the settlement of Dalmellington and towards Cairnsmore of Carsphairn. Loch Macaterick can be seen to the left of the view. The slopes of Mullwharchar and Hoodens Hill are visible in the foreground to the right of the image, with the Rhinns of Kells behind them, and the Scaur Hills in the far distance. Blocks of commercially managed forest are visible across areas of lower ground with rough grassland and moorland vegetation on hill slopes. Man-made elements present within the view include the existing Hare Hill and Windy Standard wind farms visible across the horizon and scattered settlements in the distance.	
Sensitivity	The viewpoint would be experienced by hill walkers and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would be in the far distance with 19 turbines visible, affecting approximately 6° of the horizontal FoV at 23,952m distance. The magnitude of change would be Negligible. **Whilst Under Construction and Decommissioning:** Construction activity including a crane may be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Negligible*.	
Assessment	Sensitivity	**High**
	Magnitude	**Negligible**
	Level of Effect	**Slight and not significant**
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the Proposed Development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with the existing Windy Standard (Negligible magnitude) and Hare Hill (Negligible magnitude) wind farms to the northeast at a distance of approximately 23km and 31km. There would be simultaneous views with the consented Dersalloch Wind Farm to the north (Negligible magnitude) and the Windy Standard Extension, Afton and Sanquhar wind farms to the northeast (both Negligible magnitude) at a distance of approximately 16km and 35km. There would be successive views with the consented Blackcraig Wind Farm to the east at 28km distance and the existing Hadyard Hill Wind Farm (Negligible magnitude) and the consented Chapelton Farm scheme (Negligible magnitude) There would be successive views with the existing Artfield Fell I and II and Arecleoch wind farms to the southwest (both Negligible magnitude) and Mark Hill Wind Farm to the west (Negligible magnitude) at a distance of between approximately 18km and 29 km. There would be successive views with the consented Blackcraig Hill scheme to the east (Negligible magnitude), Aries, Carscreugh and Glenchamber Kilgallioch schemes to the southwest (all Negligible magnitude) and Machlarieston and Assel Valley schemes to the west (both Negligible magnitude) at a distance of between approximately 21km and 35 km. The combined magnitude of these wind farms is assessed as *Low to Negligible*.	
Cumulative Level of Effect 1	***Moderate to Slight and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the proposed development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with the Keirs Hill (Negligible magnitude), Polquhairn (Negligible magnitude), Garleffan (Negligible magnitude), Benbrack (Negligible magnitude), South Kyle (Low magnitude), Pencloe (Negligible magnitude), Quantans Hill (Negligible magnitude) and Glenmount (Low to Negligible magnitude) application sites at a distance of between approximately 12km and 35km. The combined magnitude of these wind farms is assessed as *Low to Negligible*.	
Cumulative Level of Effect 2	***Moderate to Slight and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.47a/b/c	**Viewpoint 21: Merrick** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the summit of Merrick (843m AOD) within the Merrick Wild Land Area, to the southwest of the Proposed Development. The nearest turbine is Turbine 19 at a distance of 24,748m. The view is orientated northeast and views out across the large-scale open landscape of the Galloway Hills and the Rhinns of Kells towards the Southern Uplands. Land cover consists mostly of rough grassland and moorland vegetation as well as commercially managed forest. The existing Windy Standard, Hare Hill and Wether Hill wind farms are visible in the far distance.	
Sensitivity	The viewpoint would be experienced by hill walkers and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear in the far distance with 19 turbines visible approximately 5° of the horizontal FoV at 24,748m distance. The magnitude of change would be Negligible. **Whilst Under Construction and Decommissioning:** Construction activity including a crane may be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Negligible.*	
Assessment	Sensitivity	**High**
	Magnitude	**Negligible**
	Level of Effect	**Slight and not significant**
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the proposed development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with the existing Windy Standard, Hare Hill, High Park Farm and Wether Hill schemes to the northeast (all Negligible magnitude) at a distance of between approximately 23km and 32km. There would be simultaneous views with the consented Dersalloch, Windy Standard Extension, Hare Hill Extension, Sanquhar, Whiteside Hill, Twentyshilling Hill and Afton wind farms (all Negligible magnitude) at a distance of between approximately 17km and 31km. There would be successive views with the existing Artfield Fell and Arecleoch schemes to the southwest (both Negligible magnitude), the Mark Hill scheme to the west (Negligible magnitude) and the Hadyard Hill scheme to the northwest (Negligible magnitude) at a distance of between approximately 16km and 29 km. There would be successive views with the consented Knockman Hill and Blackcraig Hill schemes to the east (Negligible magnitude) and Chapelton Farm scheme to the northwest (Negligible magnitude) at a distance of between approximately 24km and 29km. The combined magnitude of these wind farms is assessed as *Negligible*.	
Cumulative Level of Effect 1	***Slight and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the proposed development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with the Keirs Hill, Garleffan, Benbrack, Pencloe, South Kyle and Glenmount application sites (all Negligible magnitude) at a distance of between approximately 18km and 25km. There would be successive views with the Margree and Loch Urr application schemes to the east (all negligible magnitude) at a distance of between approximately 25km and 34km. The combined magnitude of these wind farms is assessed as *Negligible*.	
Cumulative Level of Effect 2	***Slight and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Figure 9.48a/b/c	**Viewpoint 22: East Mount Lowther** (The assessment takes account of a 90° FoV from this location as illustrated).	
Description	This viewpoint is located on the summit of East Mount Lowther at a cairn noted in guide to the Southern Upland Way. The nearest turbine is Turbine 18 at a distance of 29,760m to the east. The view is orientated west and views out across rolling moorland and valley landscape with pockets of forestry and woodland present in the view	
Sensitivity	The viewpoint would be experienced by hill walkers and is considered to be of *High* sensitivity.	
Magnitude of Change (proposed development only)	**Whilst in Operation:** The Proposed Development would appear in the far distance with 19 turbines visible (13 hubs and 6 blades) affecting approximately 4° of the horizontal FoV at 29,760m distance. The magnitude of change would be Negligible. **Whilst Under Construction and Decommissioning:** Construction activity including a crane may be visible from this location during the construction and decommissioning periods. The magnitude of change would range from *Zero to Negligible*.	
Assessment	Sensitivity	**High**
	Magnitude	**Negligible**
	Level of Effect	**Slight and not significant**
	Type of Effect	Long term (reversible) direct and negative to neutral.
Cumulative Level of Effect 1: Existing + Consented wind farms and the proposed development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with the existing Windy Standard, Hare Hill and Wether Hill schemes to the northeast (Negligible magnitude) at a distance of between approximately 20km and 28km. There would be simultaneous views with the consented Twentyshilling Hill Wind Farm (Low to Negligible magnitude), Whiteside Hill, Windy Standard Extension, Hare Hill Extension, Sunnyside, Mansfield Mains and Afton wind farms (all Negligible magnitude) at a distance of between approximately 10km and 28km. There would be successive views with the consented Knockman Hill, Penbreck and Blackcraig schemes (negligible magnitude) at a distance of between approximately 18km and 34km. The combined magnitude of these wind farms is assessed as *Low to Negligible*.	
Cumulative Level of Effect 1	***Moderate to Slight and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	
Cumulative Level of Effect 2: Existing + Consented + Application wind farms and the proposed development (The assessment takes account of a 360° FoV from this location).		
Magnitude of Change	There would be simultaneous views with the Longburn, Garleffan, Ulzieside, Pencloe, South Kyle, High Cumnock, Lethans, Penbreck and Glenmount application sites (all Negligible magnitude) at a distance of between approximately 14km and 30 km and with the Spango application site to the northwest (Low to Negligible magnitude) at a distance of 11km. There would be successive views with the Kennoxhead, Loch Urr and Margree application schemes (all Negligible magnitude). The combined magnitude of these wind farms is assessed as *Low to Negligible*.	
Cumulative Level of Effect 2	***Moderate to Slight and not significant***	
Type of Effect	Long term (reversible) direct, cumulative and negative to neutral.	

Appendix 9.C
Residential Visual Amenity Assessment

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Appendix 9.C: Residential Visual Amenity Assessment

9.1 Introduction

9.1.1 The residential visual amenity assessment for the Enoch Hill Wind Farm (the Proposed Development) is set out in this appendix and should be read in conjunction with the Environmental Statement (ES) Chapter 9 Landscape and Visual Impact.

9.2 Methodology

9.2.1 The methodology for the assessment of views from residential properties and residential visual amenity is set out in **Appendix 9.A** and a summary of the main aspects of this methodology is set out here.

9.2.2 Planning law contains a widely understood principle that the outlook or view from a private property is a private interest and not therefore protected by the UK planning system. However, the planning system also recognises that situations can arise where the effects on residential visual amenity are of such severity as to become a matter of public interest. This matter has been examined at a number of public inquiries where the key determining issue was not the identification of significant effects on views, but whether the proposed turbines would have an overbearing effect and/or result in unsatisfactory living conditions, leading to a property being regarded, objectively, as an unattractive (as opposed to a less attractive) place in which to live.

9.2.3 Based on a number of previous wind farm planning applications and decisions in Scotland and the UK, a study area of 2km distance from the proposed turbines has been selected for assessment and agreed with East Ayrshire Council. In addition we have included a number of properties just beyond the study area, where there may be views of the Proposed Development as a precaution.

9.2.4 Properties included in the assessment are limited to those which can be identified on the Ordnance Survey 1:25,000 scale map as shown in **Figure 9.23a-r**. The assessment has been has been informed by site visits, observing the properties from public locations and through the examination of publicly available aerial and ground level photography as well as map based data, the production of ZTV plots and visualisations such as wirelines. The properties at Brockloch Farm, Nith Lodge, Knockenlee and Laglaff Farm have been visited with the landowner's permission. The assessment takes account of the likely views from the ground floors of properties and the main garden areas, but excludes upper floors and other land that may be connected with the property.

9.2.5 The sensitivity of individual residential receptors is assessed as high in each case.

9.2.6 The assessment also considered the effects of cumulative wind farm development, taking account of the Proposed Development as well as other existing, consented and application wind farms within 20km.

9.2.7 Other factors affecting residential amenity such as noise and shadow flicker are not considered as part of this assessment and can be found in Chapters 7 and Chapter 8 of the ES respectively.

9.3 Residential Visual Amenity Assessment

9.3.1 There are no properties within 1km of any proposed turbine location. There are 4 individual residential properties beyond 1km and within (although close to the edge of) the 2km study area. Of these, only two (Knockenless and Nith Lodge) are overlapped by the ZTV and may theoretically view part of the Proposed Development (illustrated in **Figure 9.23a**). There would be no visibility of any proposed turbines from the other two residential properties.

9.3.2 There are 20 individual residential properties which lie just beyond 2km of the Proposed Development which we have been assessed adopting a precautionary approach. Two of these

have No View with a further eighteen (including the group of 8 properties in Dalleagles Terrace) that are overlapped by the ZTV and may theoretically view the Proposed Development (illustrated in **Figure 9.23a**). A summary of the assessment is provided in **Table 9.C.1** and a detailed assessment record for each of these properties is provided in **Table 9.C.2**.

9.3.3 None of the 24 individual residential properties included in the assessment (including the group of 8 properties in Dalleagles Terrace) would experience a significant visual effect (i.e. a Substantial or Substantial/Moderate level of effect) as a result of the Proposed Development. This assessment may be further summarised as follows:

- There are no residential properties within 1km of the proposed turbines;
- There are 4 residential properties within 1-2km of the proposed turbines – two would have no view of the Proposed Development and the views from the remaining two would not be significantly affected by the proposed turbines;
- There are 20 residential properties beyond the 2km study area which have been included in the assessment as a precaution. Of these 11[1] would be at least moderately, but not significantly affected by the proposed turbines, whilst 6 would experience a slight effect and 2 would have no view of the Proposed Development;
- Within the wider vicinity there is 1 further residential property just beyond 3km, but this would not be significantly affected.

9.3.4 The experience of a prominent view of the Proposed Development, or a significant change to a view, is not the same as an unacceptable effect in the public interest as described previously. None of the properties would be affected in terms of their living standards or in a manner that would render any of these properties as an unattractive place to live (as opposed to less attractive) when judged objectively and in the public interest as a result of the addition of the Proposed Development. This is because of the intervening distances (all in excess of 1.6km) and combinations of the property setting, partial screening, orientation and the visual composition and manner in which the Proposed Development would be experienced, such that the turbines would not overshadow the properties or appear oppressive or surrounding on all sides. Examination of previous appeal decisions considering residential visual amenity and large wind farm development shows that unacceptable effects usually occur within and up to approximately 800m – 1km distance from the nearest turbine and very rarely beyond approximately 1.5km. The nature of these effects would be indirect, long term (reversible), cumulative and negative.

Table 9.C.1 Summary of Residential Visual Amenity Assessment

Residential Property No. and Name	Distance from the nearest turbine (km)	Level of Effect
Residential properties within 1km		
None	N/A	N/A
Residential properties within 1-2km		
1. **Maneight Farm**	1.741	Slight and not significant
2. **Meiklehill**	1.819	Moderate to Slight and not significant
3. **Knockenlee**	1.824	No View

[1] Two of these properties are involved with the application.

Residential Property No. and Name	Distance from the nearest turbine (km)	Level of Effect
4. **Nith Lodge**	1.956	No View
Residential properties beyond 2km		
5. **Craighouse**	2,278	No View
6. **Knockburnie***	2.427	Moderate and not significant
7. **Dalleagles Terrace (group of 8 semi-detached properties)**	2.464	Moderate and not significant
8. **Straid Farm**	2.496	Slight and not significant
9. **Dalleagles Farm**	2.496	Moderate and not significant
10. **Enoch Bank**	2.499	Slight and not significant
11/12. Dalleagles School House / Dalleagles House	2.504	Slight and not significant
13. Marshallmark	2.547	No View
14. Littlemark	2.585	Moderate and not significant
15. Lanehead	2.783	Slight and not significant
16. Brockloch Farm*	2.838	Slight and not significant (Moderate and not significant from parts of main garden)
Residential properties beyond 3km		
17. Laglaff Farm	3.151	Slight and not significant

***Involved property.**

Table 9.C.2 Residential Visual Amenity Assessment: Assessment Records

1. **Maneight Farm**	
Description	Maneight Farm is a two storey farmhouse with associated farm buildings located along the B741 to the northeast of Dalmellington and to the northwest of the Proposed Development. The main property is orientated to the northwest away from the Proposed Development. A small garden surrounds the house. Commercial forestry plantation present to the southeast of the house is likely to screen the view towards the upper parts of the turbines within the Proposed Development. However, it is noted that large areas of this forest is currently being felled. The wireline indicates that 7 blade tips (no hubs), out of the 19 proposed turbines would be theoretically visible from the property. Assuming the forestry is felled the magnitude of change would still be Negligible due to the landform screening.
Nearest turbine	Turbine 16 at 1,741m to the northwest.
Level of Visual Effect: (Enoch Wind Farm)	*Slight and not significant*. The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	
Existing:	Bankend Rig would be visible in a successive view at approximately 26km distance to the northeast (Negligible magnitude).There would be no views of other existing wind farms.

Consented:	Dersalloch would be visible in a successive view at approximately 12km distance to the southwest (Negligible magnitude).
Applications:	Polquhairn would be visible in a successive view at approximately 8km distance to the northwest (Negligible magnitude). High Cumnock, Garleffan and Linburn Farm would be visible in a successive view to the northeast at approximately 9km, 11km and 25km distance respectively (all Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.
2. **Meiklehill**	
Description	Meiklehill is a two storey property with associated farm buildings located to the south of the B741 and to the northwest of the Proposed Development. The main property is orientated broadly to the west with the driveway onto the B741 to the north and the main views to the east and west away the Proposed Development. A small garden surrounds the house. Commercial forestry plantation present to the southeast of the house is likely to screen the views of the visible turbines, although it is noted that clear-fell operations are ongoing. The wireline indicates that 7 blades including 1 hub out of the 19 proposed turbines would theoretically be partially visible from the property across the horizon. However, the screening provided by intervening commercial forestry surrounding the property from all directions means that it is unlikely that views of the Proposed Development would be available from within the property except as partial views. The magnitude of change would be Low to Negligible.
Nearest turbine	Turbine 16 at 1,819m to the northwest.
Level of Visual Effect: (Enoch Wind Farm)	*Moderate to Slight and not significant*. The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	
Existing:	Bankend Rig would be visible in a successive view at approximately 27km distance to the northeast (Negligible magnitude).There would be no views of other existing wind farms.
Consented:	There would be no views of any consented wind farms.
Applications:	South Kyle would be visible in a simultaneous view in front of the Proposed Development at approximately 2km distance to the southeast (Medium magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.
3. **Knockenlee**	
Description	This property is outwith the ZTV and would have No View of the Proposed Development.
4. **Nith Lodge**	
Description	This property is outwith the ZTV and would have No View of the Proposed Development.
5. **Craighouse**	
Description	This property is outwith the ZTV and would have No View of the Proposed Development.
6. **Knockburnie**	

Description	This group of properties is located to the south of the B741 and to the north of the Proposed Development. Both the bungalow and the two-story semi-detached house are orientated to the north with the gardens to the north, east and south and the main views to the north and east away from the Proposed Development. There are broadleaved trees and farm buildings to the south of the properties and would screen the views of the Proposed Development available on higher ground across the horizon. The wireline indicates that 8 blades including 4 hubs out of 19 proposed turbines would theoretically be partially visible from the property through the trees. The magnitude of change would be Low.
Nearest turbine	Turbine 8 at 2,427m to the north.
Level of Visual Effect: (Enoch Wind Farm)	*Moderate and not significant.* The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	
Existing:	High Park Farm and Hare Hill would be visible in a successive view at approximately 6.5km and 8km distance respectively to the east (both Negligible magnitude).
Consented:	Mansfield Mains and Penbreck would be visible in a successive view at approximately 8.5km and 20km distance respectively to the northeast (Negligible magnitude).
Applications:	High Cumnock and Garleffan would be visible in a successive view to the northeast at approximately 7.5km and 9km distance respectively (both Low to Negligible magnitude). Penbreck would be visible at approximately 19.5km distance to the northeast (Negligible magnitude). Lethans would also be visible in a successive view to the northeast at approximately 12 km distance (Low to Negligible magnitude). Spango would be visible in a successive view to the east at approximately 19.5km distance (Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.
7. **Dalleagles group of properties (group of 8 semi-detached properties)**	
Description	This group of properties comprises eight semi-detached two-storey houses located to the south of the B741, north of the Proposed Development. The properties are orientated to the north with the main views away from the Proposed Development. The back gardens are located to the south. The wireline indicates that 10 blades including 4 hubs out of the 19 proposed turbines would be theoretically visible. Only the uppermost parts of the Proposed Development would be visible due to the intervening landform. The magnitude of change would be Low.
Nearest turbine	Turbine 14 at 2,464m to the north.
Level of Visual Effect: (Enoch Wind Farm)	*Moderate and not significant.* The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	
Existing:	High Park Farm and Hare Hill would be visible in a successive view at approximately 5km and 7km distance respectively to the east (both Low to Negligible magnitude). Bankend Rig would also be visible in a successive view at approximately 24km distance to the northeast (Negligible magnitude).
Consented:	Mansfield Mains and Penbreck would be visible in a successive view at approximately 7km and 19km distance respectively to the northeast (Negligible magnitude).

Applications:	High Cumnock and Garleffan would be visible in a successive view to the northeast at approximately 6.5km and 8km distance respectively (both Low magnitude). Lethans would also be visible in a successive view to the northeast at approximately 12km distance (Low to Negligible magnitude). Spango would be visible in a successive view to the east at approximately 20km distance (Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.
8. **Straid Farm**	
Description	Straid Farm is a two storey farmhouse with associated farm buildings located to the south of the B741 road and to the north of the Proposed Development. The main property is orientated broadly to the north with the main views to the north and views from the back garden to the south, towards the Proposed Development. The wireline indicates that 11 blades, including 1 hub, out of 19 proposed turbines would theoretically be visible from the property. Most views of the Proposed Development would be screened by the intervening landform with a tracery of branches masking the upper parts of the turbines even in the winter months. The magnitude of change would be Negligible.
Nearest turbine	Turbine 14 at 2,496m to the north.
Level of Visual Effect: (Enoch Wind Farm)	*Slight and not significant*. The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	
Existing:	High Park Farm would be visible in a successive view at approximately 5km distance to the east (Negligible magnitude).
Consented:	Mansfield Mains and Penbreck would be visible in a successive view at approximately 7km and 19km distance respectively to the northeast (Negligible magnitude).
Applications:	South Kyle may be partially visible in a simultaneous view at approximately 4.5km distance to the south (Negligible magnitude). High Cumnock and Garleffan would be visible in a successive view to the northeast at approximately 6.5km and 8km distance respectively (both Low magnitude). Lethans would also be visible in a successive view to the northeast at approximately 10km distance (Low to Negligible magnitude). Spango would be visible in a successive view to the east at approximately 18km distance (Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property or render it an unattractive place to live when judged objectively and in the public interest.
9. **Dalleagles Farm**	
Description	Dalleagles Farm is a two-storey farmhouse and associated farm building located along the B741 orientated to the north with views across the minor road. The garden is largely to the north with a small area to the south bordered by dense broadleaved woodland along Dalleagles Burn. The wireline indicates that that 9 blades, including 5 hubs, out of 19 proposed turbines would theoretically be visible from the property The Proposed Development is located to the south and would be mostly screened by intervening landform and vegetation even during the winter months. The magnitude of change would be Low.
Nearest turbine	Turbine 14 at 2,496m to the north.
Level of Visual Effect: (Enoch Wind Farm)	*Moderate* and not significant. The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	

Existing:	Hare Hill and High Park Farm would be visible in a successive view to the east at approximately 7km and 6km distance respectively (Negligible magnitude). Bankend Rig would also be visible in a successive view at approximately 24km distance to the northeast (Negligible magnitude).
Consented:	Mansfield Mains and Penbreck would be visible in a successive view at approximately 7.5km and 19.5km distance respectively to the northeast (Negligible magnitude).
Applications:	South Kyle may be partially visible in a simultaneous view at approximately 3.5km distance to the south (Negligible magnitude). High Cumnock and Garleffan would be visible in a successive view to the northeast at approximately 7km and 8.5km distance respectively (both Low magnitude). Lethans would also be visible in a successive view to the northeast at approximately 11km distance (Low to Negligible magnitude). Spango would be visible in a successive view to the east at approximately 19km distance (Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.
10. **Enoch Bank**	
Description	Enoch Bank is a single storey bungalow located to the south of the B741 road, to the north of the Proposed Development. There is a single storey shed located directly south of the property. The main property is orientated broadly to the north with the main views to the north over the minor road and views from the back garden to the south, towards the Proposed Development. The wireline indicates that 4 blades, including 1 hub, out of 19 proposed turbines would theoretically be visible from the property. Most views of the Proposed Development would be screened by the intervening landform and vegetation. The magnitude of change would be Negligible.
Nearest turbine	Turbine 14 at 2,499m to the north.
Level of Visual Effect: (Enoch Wind Farm)	Slight and not significant The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	
Existing:	Hare Hill and High Park Farm would be visible in a successive view to the east at approximately 7km and 5.5km distance respectively (Negligible magnitude). Bankend Rig would also be visible in a successive view at approximately 24km distance to the northeast (Negligible magnitude).
Consented:	Hare Hill Extension would be visible in a successive view at 8.5km distance to the east. Mansfield Mains and Penbreck would be visible in a successive view at approximately 8km and 19.5km distance respectively to the northeast (Negligible magnitude).
Applications:	High Cumnock and Garleffan would be visible in a successive view to the northeast at approximately 7km and 8.5km distance respectively (both Low magnitude). Lethans would also be visible in a successive view to the northeast at approximately 11km distance (Low to Negligible magnitude). Spango would be visible in a successive view to the east at approximately 19km distance (Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.
11/12. Dalleagles School House / Dalleagles House	

Description	Dalleagles School House and Dalleagles House are 2 semi-detached two storey, red brick properties, located to the south of the B741 road, to the north of the Proposed Development. The main properties are orientated broadly to the north with the main views to the north over the minor road and views from the back garden to the south, towards the Proposed Development. The main gardens are to the south and the wireline indicates that 2 blades and no hubs, out of 19 proposed turbines would theoretically be visible from the properties. Most views of the Proposed Development would be screened by the intervening landform. The magnitude of change would be Negligible.
Nearest turbine	Turbine 14 at 2,504m to the north.
Level of Visual Effect: (Enoch Wind Farm)	Slight and not significant The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	
Existing:	Hare Hill would be visible in a simultaneous view to the east at approximately 7km distance (Negligible magnitude). High Park Farm would be visible in a successive view to the east at approximately 5.5km distance (Negligible magnitude). Bankend Rig would also be visible in a successive view at approximately 24km distance to the northeast (Negligible magnitude).
Consented:	Hare Hill Extension would be visible in a simultaneous view at 8.5km distance to the east. Mansfield Mains and Penbreck would be visible in a successive view at approximately 7.5km and 19.5km distance respectively to the northeast (Negligible magnitude).
Applications:	High Cumnock and Garleffan would be visible in a successive view to the northeast at approximately 6.5km and 8.5km distance respectively (both Low magnitude). Lethans would also be visible in a successive view to the northeast at approximately 11km distance (Low to Negligible magnitude). Spango would be visible in a successive view to the east at approximately 19km distance (Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.
12. **Marshallmark**	
Description	This property is outwith the ZTV and would have No View of the Proposed Development.
13. **Littlemark**	
Description	Littlemark is a two storey farmhouse with associated farm infrastructure and kennels located to the north of the B741, to the north of the Proposed Development. The main property is orientated broadly to the east with the main views to the east and the gable end of the house facing north. The garden is located to the south and west of the main property and includes mature pine trees which would partially screen towards the Proposed Development. The wireline indicates that 16 blades, including 9 hubs, out of 19 proposed turbines would theoretically be visible from the property. However, the orientation of the property and the screening provided by the intervening pine trees mean that it is unlikely that views of the Proposed Development would be available from within the property or the garden except as partial, oblique glimpses. The magnitude of change would be Low.
Nearest turbine	Turbine 14 at 2,585m to the north.
Level of Visual Effect: (Enoch Wind Farm)	*Moderate* and not significant. The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	

Existing:	Hare Hill and High Park Farm would be visible in a successive view to the east at approximately 7km and 5.5km distance respectively (Negligible magnitude). Bankend Rig would also be visible in a successive view at approximately 24km distance to the northeast (Negligible magnitude).
Consented:	Hare Hill Extension would be visible in a successive view at 8.5km distance to the east. Mansfield Mains and Penbreck would be visible in a successive view at approximately 7.5km and 19.5km distance respectively to the northeast (Negligible magnitude).
Applications:	South Kyle may be partially visible in a simultaneous view at approximately 4km distance to the south (Medium magnitude). High Cumnock and Garleffan would be visible in a successive view to the northeast at approximately 7km and 8.5km distance respectively (both Low magnitude). Lethans would also be visible in a successive view to the northeast at approximately 10.5km distance (Low to Negligible magnitude). Spango would be visible in a successive view to the east at approximately 19km distance (Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.
14. **Lanehead**	
Description	Lanehead is a two storey farmhouse with associated farm buildings located to the north of the B741, to the north of the Proposed Development. The main property is orientated to the southeast with the driveway onto the B741 to the southeast and the main views to the southeast largely away from the Proposed Development. Mature garden vegetation and farm buildings located to the southeast of the property area are likely to screen the majority of views. The property is located in an area of lower ground by the Bow Burn which means intervening landform would further screen the view of the Proposed Development. The wireline indicates that 8 blades, including 7 hubs, out of 19 proposed turbines would theoretically be visible from the property. However, the screening provided by intervening garden vegetation and farm buildings means that it is unlikely that views of Proposed Development would be available from within the property except from the main garden areas. The magnitude of change would be *Negligible*.
Nearest turbine	Turbine 16 at 2,783m to the north.
Level of Visual Effect: (Enoch Wind Farm)	Slight and not significant The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	
Existing:	Hare Hill and High Park Farm would be visible in a successive view to the east at approximately 9km and 7km distance respectively (Negligible magnitude).
Consented:	Hare Hill Extension would be visible in a successive view at 10km distance to the east. Mansfield Mains and Penbreck would be visible in a successive view at approximately 9km and 20km distance respectively to the northeast (Negligible magnitude).
Applications:	Pencloe may be partially visible in a simultaneous view at approximately 6km distance to the southeast (Medium magnitude). High Cumnock and Garleffan would be visible in a successive view to the northeast at approximately 7.5km and 9.5km distance respectively (both Negligible magnitude). Penbreck would be visible at approximately 20km distance to the northeast (Negligible magnitude). Lethans would also be visible in a successive view to the northeast at approximately 12km distance (Negligible magnitude). Spango would be visible in a successive view to the east at approximately 20km distance (Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone, In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.

15. **Brockloch Farm**	
Description	Brockloch is a two storey farmhouse with associated farm buildings and sheepfolds located to the south of the B741, to the northeast of the Proposed Development. The main property is orientated broadly to the west with the access track onto the B741 with main views to the east towards the Proposed Development. A small block of evergreen woodland located immediately to the west of the property is likely to screen views of the Proposed Development from the property itself, although as illustrated in Figure 9.23q there would be clear views of from the edge of the main garden. There is a currently uninhabited, bungalow to the north of the main property which would be similarly screened by the block of evergreen woodland The wireline indicates that 11 blades, including 8 hubs, out of 19 proposed turbines would theoretically be visible from the property. However, the screening provided by the intervening block of woodland means that it is unlikely that any views of Proposed Development would be available from within the properties themselves. The magnitude of change would be *Negligible* (*Low* from parts of main garden)
Nearest turbine	Turbine 18 at 2,838m to the northeast.
Level of Visual Effect: (Enoch Wind Farm)	Slight and not significant (Moderate and not significant from parts of main garden) The nature of these effects would be long-term (reversible) indirect and negative.
Cumulative Assessment:	
Existing:	Hare Hill and High Park Farm would be visible in a successive view to the east at approximately 5km and 3.5km distance respectively (both Low magnitude).
Consented:	Afton would be visible in a successive view at approximately 5km distance to the southeast (Low to Negligible magnitude). Hare Hill Extension would be visible in a successive view at approximately 6.5km distance to the east (Negligible magnitude). Mansfield Mains and Penbreck would be visible in a successive view at approximately 6km and 18km distance respectively to the northeast (Negligible magnitude).
Applications:	South Kyle may be partially visible in a simultaneous view at approximately 4.5km distance to the south (Negligible magnitude). Pencloe may be visible in a successive view to the southeast (Medium to Low magnitude) at 3.5km distance. High Cumnock and Garleffan would be visible in a successive view to the northeast at approximately 6km and 7.5km distance respectively (both Low magnitude). Penbreck would be visible at approximately 17km distance to the northeast (Negligible magnitude). Lethans (Low to Negligible magnitude) and Kennoxhead (Negligible magnitude) would also be visible in a successive view to the northeast at approximately 9km and 21km distance. Taiglim would be visible in a successive view to the north at approximately 6km distance (Negligible magnitude). Polquhairn would be visible in a successive view to the northwest at approximately 12km distance (Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.
16. **Laglaff Farm**	
Description	The two storey farmhouse with associated farm buildings is located at the end of an access track from the Afton Road to the northwest of the Proposed Development. The main property is orientated broadly west with the main views to the west, partly towards the Proposed Development. The garden is located to the west of the main property. A long block of broadleaved woodland is located to the west and southwest of the property and is likely to screen the majority of the view towards the Proposed Development. The wireline indicates that 10 blades, including 7 hubs, out of 19 proposed turbines would theoretically be visible from the property. However, the turbines would be partially screened by landform and intervening garden vegetation. The magnitude of change would be *Negligible*.
Nearest turbine	Turbine 18 at 3,151m to the northeast.
Level of Visual Effect: (Enoch Wind Farm)	Slight and not significant The nature of these effects would be long-term (reversible) indirect and negative.

Cumulative Assessment:	
Existing:	Hare Hill and High Park Farm would be visible in a successive view to the east at approximately 4km and 3km distance respectively (both Low magnitude). Bankend Rig would also be visible in a successive view at approximately 24.5km distance to the northeast (Negligible magnitude).
Consented:	Afton would be visible in a successive view at approximately 4.5km distance to the southeast (Negligible magnitude). Hare Hill Extension would be visible in a successive view at approximately 5.5km distance to the east (Negligible magnitude). Mansfield Mains and Penbreck would be visible in a successive view at approximately 5.5km and 17.5km distance respectively to the northeast (Negligible magnitude).
Applications:	South Kyle would be partially visible in a simultaneous view at approximately 5km distance to the south (Low magnitude). Pencloe would be visible in a successive view to the southeast (Medium magnitude) at 3.5km distance. High Cumnock and Garleffan would be visible in a successive view to the northeast at approximately 6km and 7km distance respectively (both Low magnitude). Penbreck would be visible at approximately 16.5km distance to the northeast (Negligible magnitude). Lethans (Low to Negligible magnitude) and Kennoxhead (Negligible magnitude) would also be visible in a successive view to the northeast at approximately 8.5km and 20km distance. Spango would be visible in a successive view to the northeast at approximately 16km distance (Negligible magnitude).
Residential Visual Amenity:	The visual effect would not be significant in respect of the Enoch Hill Wind Farm alone. In terms of the residential visual amenity, taking account of other cumulative development, the change to the views would not affect the living standards of the property overall or render it an unattractive place to live when judged objectively and in the public interest.

Appendix 9.D
Descriptions of Landscape Character Units within 10km

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Appendix 9.D: Descriptions of Landscape Character Units within 10km and Landscape Survey Sheets

Dumfries and Galloway Landscape Wind Farm Capacity Study, Carol Anderson in association with Alison Grant, Landscape Architects 2011; and

East Ayrshire Landscape Wind Capacity Study, Carol Anderson, 2013

4 CHARACTER TYPE 7C: EAST AYRSHIRE LOWLANDS

4.1 Introduction

This landscape character type occurs extensively across Ayrshire where it covers much of the Ayrshire Basin. This assessment considers the part of the Ayrshire Lowlands which occur within East Ayrshire only. Separate assessments have been carried out for the areas of Ayrshire Lowlands identified in the Ayrshire Landscape Character Assessment (1998) lying in South and North Ayrshire.

This assessment considers both smaller and larger development typologies in detail.

4.1.1 *Existing/consented wind farms*

An operational single large turbine, 48 m high is located to the south of Crosshouse, on the western edge of Kilmarnock, within this character type. Some smaller turbines <30m high are also operational across this character type. A number of consented single and smaller turbines lie within this character area and include turbines >30m high.

The operational Whitelee wind farm (140 turbines, 110m high) lies approximately 14km to the east of this character type within neighbouring East Renfrewshire and South Lanarkshire. Extensions to this wind farm (75 turbines, 140m high) and the Sneddons Law wind farm (15 turbines, 130m high) lie within East Ayrshire and have been consented and form the baseline for this study.

The operational Hare Hill wind farm (20 turbines, 63.5m high) lies approximately 9km to the south-east of this character type but is only visible from limited areas.

The operational Kelburn, Ardrossan, Dalry and Millour Hill wind farms are located in the southern uplands of the Clyde Muirshiel Park within neighbouring North Ayrshire and approximately 14km to the west of the Ayrshire Lowlands which lie within East Ayrshire. Together, these wind farms comprise 41 turbines between 100 and 125m high.

4.2 Summary of sensitivity

The Ayrshire Lowlands have a variable landform which although generally undulating, can be more complex and rolling in some areas and also comprises small areas of flatter remnant moss on more elevated areas close to the North Ayrshire border. It is a diverse landscape with small pastures, enclosed by intact hedgerows, small woodlands and field trees and a regular pattern of small farms enriching the overall composition. Broader hill slopes with a less densely settled character occur at the transition with the larger scale upland landscape of the Foothills with Forestry and Opencast Mining (17a) to the south and the Rugged Upland Farmland within neighbouring East Renfrewshire in the north-east of this character type.

The generally small to medium scale of this landscape, which is influenced by the relatively dense pattern of evenly distributed small farms, trees and woodlands, increases sensitivity to larger development typologies. The presence of existing and consented large wind farm developments within adjacent upland areas also increases sensitivity in relation to cumulative effects. There would be a ***High*** sensitivity to the large typology (turbines 70m+) and a ***High-medium*** sensitivity to the medium typology (turbines 50-70m). Sensitivity to the small-medium typology (turbines 30m-50m) would be ***Medium*** and ***Medium-low*** for the small typology (turbines 15-30m) reflecting increased opportunities for these smaller typologies to fit better with the scale of this well-settled landscape and to minimise cumulative effects.

4.2.1 *Potential cumulative issues*

Potential cumulative issues may include the following:

- Close inter-visibility between the operational and consented wind farm developments of Whitelee (+ extensions) and Sneddons Law sited in the adjacent Plateau Moorland with Forestry and Wind Farms (18a) and multiple larger turbines sited in this character type seen from roads and settlement, particularly in the east but also from open elevated roads and settlements across this landscape.
- Turbines (and particularly larger turbines) sited close to the consented Whitelee extension and Sneddons Law wind farms in the eastern part of this character type, which could increase visual clutter and contrasts of scale/design potentially affecting the landscape setting and design integrity of these developments.
- Close inter-visibility between any turbines sited on the southern and eastern fringes of this character type at the transition with the more extensive upland landscapes of the Plateau Moorlands (18a) and the Foothills with Forestry and Opencast Mining (17a) which could in future accommodate larger wind farm developments.
- Larger typologies sited in this settled small scale landscape would be contrary to the established association of turbines >100m high with more simple and expansive upland landscapes.
- Multiple turbines >30m associated with the majority of land holdings would have significant cumulative landscape and visual effects due to the relatively dense spacing of small farms characteristic of this landscape, quickly becoming a dominant feature. A greater number of turbines <30m could be accommodated in this landscape due to their ability to fit more comfortably with the size of buildings, woodlands and trees and be partially contained by landform and vegetation.
- Variations in the type and size of single and small groups of small turbines proposed within the landscape type

4.2.2 *Constraints*

- The predominantly small to medium scale of this landscape where the rolling landform and woodlands provide containment and the density of closely spaced small farms and settlements provide ready scale references and increase potential for cumulative effects associated with multiple turbines and particularly turbines >30m high.
- Occasional more complex areas of rolling landform, more defined prominent small hills, diverse areas of policy woodlands, field and road-side trees and hedgerows and the distinctive heath, raised bog and birch woodland of remnant moss areas.
- Potential intrusion of larger turbines on the setting to Blackside Hill located within the adjacent Plateau Moorland (18a) character type which forms a landmark feature widely visible across Ayrshire.
- The often intimately scaled Lowland River Valleys (9) character type which cut into the Ayrshire Lowlands and often feature diverse policy woodlands and mansion houses/castles which would be sensitive to intrusion by larger turbines seen on the skyline of containing ridges above the valley.
- The potential for significant cumulative effects to arise with large wind farm developments sited in the adjacent Plateau Moorland with Forestry and Wind Farms (18b) character type which lie in close proximity to the eastern part of this character type and are also highly visible from roads and settlement across much of this landscape.

4.2.3 *Opportunities*

- The less densely settled, more elevated hill slopes which lie at the transition with the Rugged Upland Farmland character type (within neighbouring East Renfrewshire) in the north-eastern part of this character type and the Foothills with Forestry and Opencast Mining (17a) lying to the south where the medium typology (turbines 50-70m) could potentially be accommodated.
- More open and less densely settled flatter pastures fringing remnant moss in the western part of this character type where the small-medium typology (turbines 30-50m) could potentially be accommodated.
- The more fragmented urban fringes around Kilmarnock where the landform is often less rolling, the field enclosure and woodland pattern weaker and where the small-medium typology (turbines 30-50m) would fit better with the scale of industrial and other larger buildings provided they were sited close-by to minimise the spread of clutter.
- The regular pattern of farms which are often located on low hills and ridges where the small typology (turbines <30m) could be sited so visually associated with buildings thus emphasising this existing pattern and relationship to landform and minimising clutter.
- The rolling landform and often dense pattern of hedgerows, woodlands and roadside trees which could provide intermittent screening of smaller turbines.

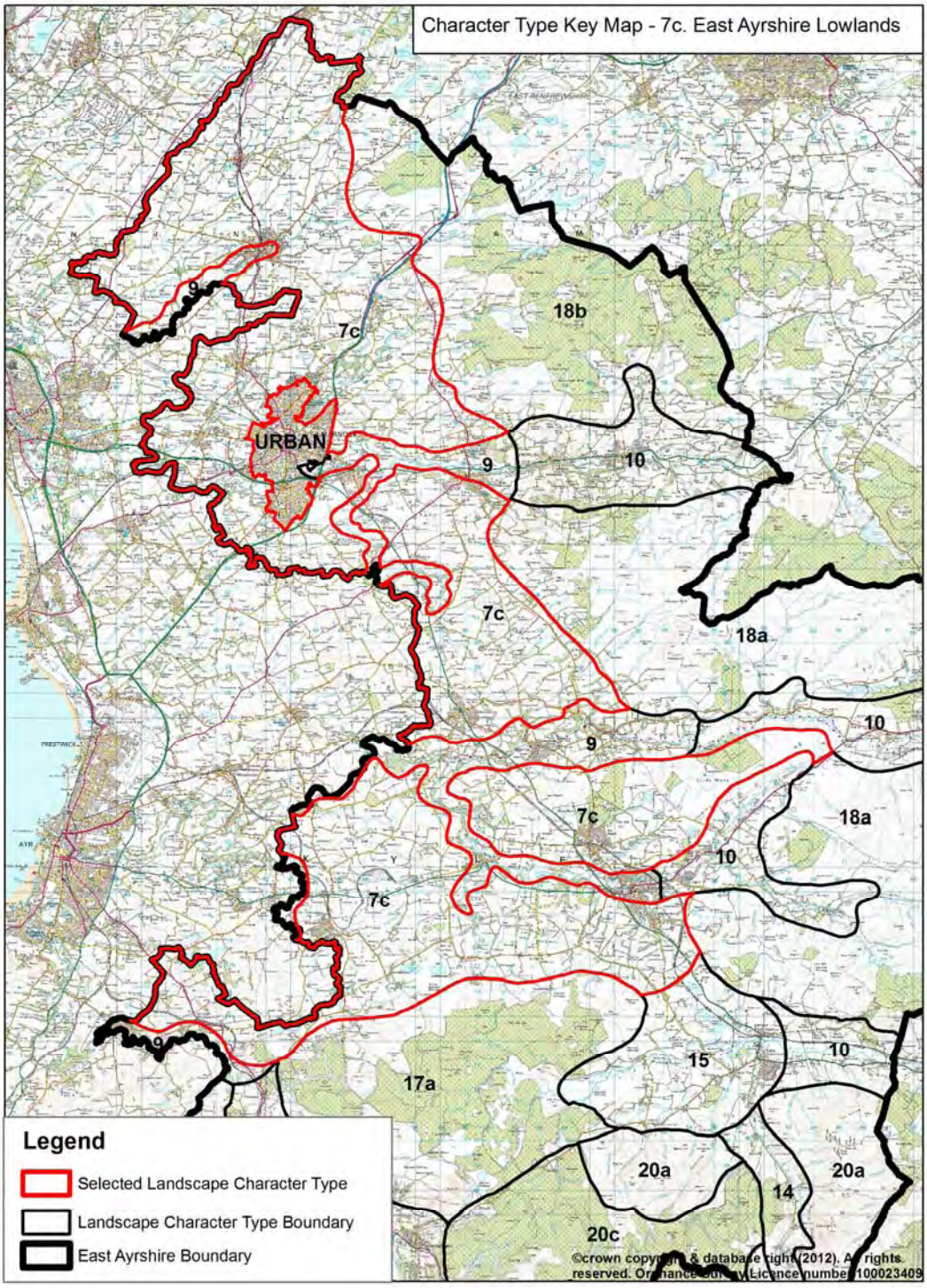
4.3 Guidance for development

There is no scope for the large typology (turbines >70m) to be accommodated in this landscape.

There are some ***very limited*** opportunities for the medium typology (turbines 50-70m) to be accommodated but only in the southern fringes of this character type at the transition with the Foothills with Forestry and Opencast Mining (17a) and in the north-east at the transition with the Rugged Upland Farmland character type in neighbouring East Renfrewshire where the landscape is less densely settled and scale increases. Potential cumulative effects could occur with any future larger scale wind farm developments that may be proposed in these upland areas.

There are some ***limited*** opportunities for the small-medium typology (30-50m) to be located in this landscape. Turbines of this size should be set back from the East Ayrshire Plateau Moorland with Forestry and Wind Farms (18b) to minimise potential cumulative effects with operational and consented wind farm developments. They should avoid areas with a more complex rolling landform and more strongly enclosed field pattern and diverse pattern of woodlands/field trees. The less densely settled, flatter and more open areas of pasture fringing the remnant mosses in the western part of this character type and the broader and less settled hill slopes at the transition with the Rugged Upland Farmland (in neighbouring East Renfrewshire) to the north-east and the Foothills with Forestry and Opencast Mining (17a) to the south offer opportunities to accommodate this size of turbine whilst minimising landscape and visual impact. This size of turbine could also be associated with larger industrial and municipal buildings on the fringes of Kilmarnock although the number and range of turbines would need to be limited to avoid significant cumulative effects.

There are increased opportunities to locate multiple turbines of the small typology (15-30m) to minimise cumulative effects as turbines of this size would have a less dominant effect on buildings, field enclosure pattern, woodland and the often rolling landform which all influence the scale of this landscape. Turbines could be sited to be partially back-dropped by low hills and would be additionally screened in places by woodland and trees. Turbines <15m should be visually associated with existing farms and other buildings to minimise clutter in this fairly densely settled landscape. Detailed siting and design should accord with the guidance set out in section 16 of this report.


Character Type Key Map - 7c. East Ayrshire Lowlands
9
7c
18b
URBAN
9
10
7c
18a
10
9
7c
18a
10
7c
9
15
10
17a
20a
20a
14
20c
Legend
Selected Landscape Character Type
Landscape Character Type Boundary
East Ayrshire Boundary
©crown copyright & database right (2012). All rights reserved. Ordnance Survey Licence number 100023409

6 CHARACTER TYPE 10: UPLAND RIVER VALLEYS

6.1 Introduction

This landscape character type occurs only within East Ayrshire where it covers the upper valleys of the Rivers Doon, Irvine, Ayr and Nith. These valleys are strongly contained by adjacent upland character types within East Ayrshire.

The detailed assessment considers both larger and smaller development typologies.

6.1.1 *Existing/consented wind farms*

No existing wind farms or larger wind turbines are sited within this character type.

The Hare Hill operational wind farm (20 turbines, 63.5m high) is located approximately 2km south of the upper Nith valley. The operational Whitelee wind farm (140 turbines, 110m high) lies around 3km to the north of the upper Irvine valley. Extensions to this wind farm (75 turbines, 140m high) and the Sneddon Law wind farm (15 turbines, 130m high) also lie within East Ayrshire and have been consented[2]. The operational Hagshaw Hill wind farm (I and II) and the consented Galawhistle wind farm (22 turbines, 122m high) are located within neighbouring South Lanarkshire and close to the Ayr valley.

6.2 Summary of sensitivity

The Upland River Valleys (10) of the upper Doon, Nith, Ayr and Irvine form relatively broad valleys which are strongly contained by adjacent uplands. The Rivers Nith and Doon have open flat floodplains which are patterned with wetlands and water bodies – these being particularly diverse and extensive within the Doon valley. Valley sides are often steep but also comprise more gentle lower slopes and occasional broader terraces. More complex knolls and deeply incised side valleys are especially associated with the Irvine valley and the prominent craggy Loudoun Hill, and the hills of Cairn Table, Auchenroy and Corsencon, form 'landmark' features on the edge of these valleys. Mixed policy woodlands create a strong pattern on the southern slopes of the Irvine valley and are also associated with the Craigengillan designed landscape in the Doon valley. Small woodlands and small to medium-sized fields, enclosed by stone dykes, hedges and shelterbelts, occur throughout these valleys while semi-improved pastures and more open grass moorland and coniferous woodlands are also present on upper valley sides. These valleys are well settled and contain a number of settlements including Newmilns, Darvel, Dalmellington, Patna and Muirkirk and with small farms and dwellings commonly positioned on lower hill slopes above the floodplain. Each of these valleys accommodates major 'A' roads.

[2] The Phase II Whitelee wind farm extension had been largely constructed during our field survey work undertaken in late summer 2012.

The confined scale of these well-settled Upland River Valleys, together with the potential for significant cumulative effects to occur with operational and consented wind farm developments sited within adjacent uplands, comprise key constraints to larger typologies. There would be a ***High*** sensitivity to the large typology (turbines >70m) and the medium typology (turbines 50-70m). Sensitivity would be ***High-medium*** for the small-medium typology (turbines 30-50m) and ***Medium-low*** for the small typology (turbines <30m), reflecting increased opportunities for these smaller typologies to fit better with the scale of this well-settled landscape and to be sited to avoid significant cumulative effects with existing wind farm development in adjacent upland landscape character types.

6.2.1 *Potential cumulative issues*

The following issues may arise in connection with any possible developments situated in this and adjacent landscapes:

- Inter-visibility between larger turbines which are more likely to be located in the surrounding upland areas and smaller turbines sited in these valleys.
- Cumulative effects on the setting of Dalmellington and the Doon Valley if larger turbines were located in the Foothills with Forestry and Opencast Mining (17a), Foothills with Forest west of Doon Valley (17b) and Southern Uplands with Forestry (20c) and visible on containing skylines.
- Potential location of larger turbines within the Plateau Moorland (18a) which could result in significant cumulative effects on the Irvine valley (in combination with the operational/consented Whitelee I and II and Sneddon Law wind farms) and which may also affect the Ayr valley in combination with the consented wind farm development of Galawhistle.

6.2.2 *Constraints*

- The strongly enclosed and confined nature of these valleys and the small farms and houses, areas of enclosed farmland and woodlands which provide ready scale references.
- More complex landform including steep hill slopes, small knolls, deeply incised side valleys and the ‘landmark’ Loudoun Hill in the Irvine Valley.
- The ‘landmark’ hills of Corsencon and Cairn Table which lie on the edge of the adjacent Plateau Moorlands (18a) and are highly visible from the Ayr and Nith valleys.
- The steep rugged slopes of the ‘landmark’ hill of Auchenroy and other complex small hills which form the western backdrop to the scenic upper Doon valley and Craigengillan designed landscape.
- The strong pattern of mixed policy woodlands on the southern slopes of the Irvine valley and extensive wetlands, scrub and water bodies within the floodplain of the Doon, and to a lesser extent within the Nith valley.
- Potential effects on the setting of settlements, designed landscapes and the industrial heritage site of Waterside located within some of these Upland River Valleys.

- The often open and elevated views from settlement sited on valley sides and from the A76, A70 and A71 roads which are aligned through these landscapes.
- Disturbed ground and spoil associated with current open cast mining operations within the Ayr and Doon valleys where turbines sited nearby could exacerbate visual clutter and fragmentation of the landscape.
- Cumulative effects with the operational Hare Hill and Whitelee I and II wind farms and the consented Galawhistle and Sneddon Law wind farms which comprise large turbines sited within 3km of the Nith, Irvine and Ayr valleys.

6.2.3 *Opportunities*

- Lower, gently graded hill slopes at the transition with the Foothills with Forest and Opencast Mining (17a), Foothills with Forest west of Doon Valley (17b) and the Plateau Moorlands (18a) (landscapes which are currently less affected by nearby extensive wind farm developments) where smaller typologies (turbines <50m) could be accommodated provided key views to 'landmark' hills were conserved.

6.3 Guidance for development

This study has found there to be no scope for the large or medium typology (turbines >50m high) to be accommodated in this landscape.

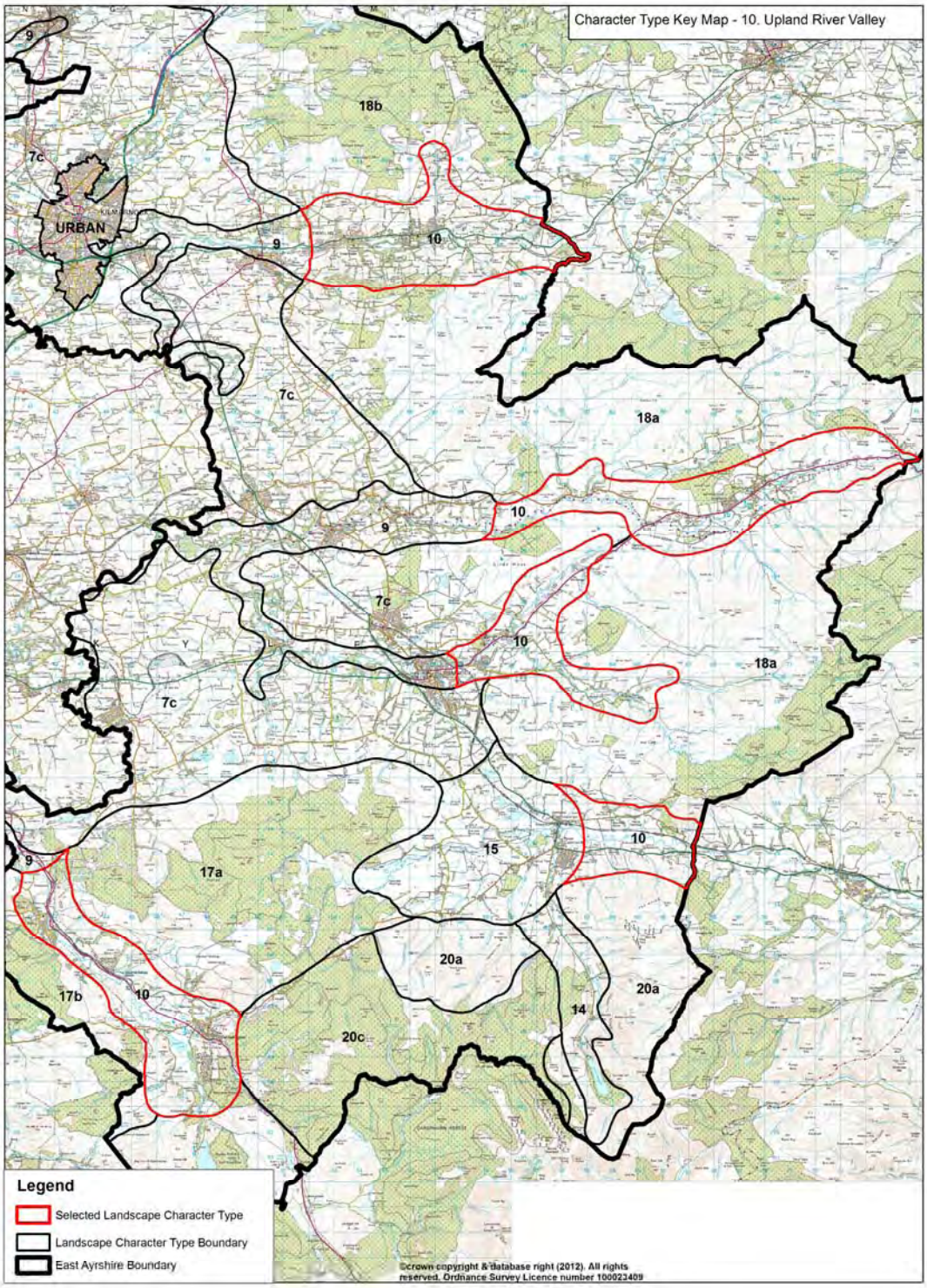
There is some ***limited*** scope for the small-medium typology (turbines 30-50m) to be accommodated in this landscape. Turbines of this size should be located on more sparsely settled lower hill slopes of the Doon, Ayr and Nith valleys at the transition with the adjacent upland landscapes of the East Ayrshire Plateau Moorlands (18a) and the Foothills with Opencast Mining (17a) and Foothills with Forest West of Doon Valley (17b) but should avoid impacting on the 'landmark' hills of Auchenroy, Corsencon and Cairn Table seen in key views from these valleys. Turbines should not be sited close to areas currently affected by opencast mining operations or obviously disturbed areas in order to avoid exacerbating visual clutter and the fragmentation evident in parts of the Doon and Ayr valleys. Turbines should be sited to avoid significant intrusion on the setting of designed landscapes, settlements and the industrial heritage site of Waterside. Opportunities for accommodating turbines in these areas may increase in future following successful restoration of these disturbed landscapes.

Potential cumulative effects with larger turbines sited in adjacent upland landscapes are a key constraint, especially within the Irvine valley given the extent of operational and consented wind farm development already visible on containing skylines. Turbines should be set well away from operational/consented wind farm developments and should avoid more prominent knolls and higher hill slopes, utilising a backdrop of rising ground in order to minimise inter-visibility and cumulative impacts.

On-going review will be essential to fully consider potential cumulative effects on this landscape should wind farm developments be proposed in the adjacent Plateau Moorlands (18a), Foothills with Forest and Opencast Mining (17a) and the Foothills with Forest west of Doon Valley (17b) where they may be prominent on containing skylines.

There are increased opportunities for the small typology (turbines 15-30m) to be sited in this landscape to minimise cumulative effects as turbines of this size could be sited to be partially back-dropped by low hills and would be additionally screened in places by local topography and small woodlands. All turbines should however be sited to avoid impacting on the open floodplains of these valleys which often provide a focal point in views from settlement and roads. Turbines <15m high should be visually associated with existing farms and other buildings.

All turbines should additionally be sited to avoid impact on designed landscapes and areas with a more diverse pattern including wetlands, water bodies and policy woodlands. Detailed siting and design should accord with the guidance set out in section 16 of this report.


Character Type Key Map - 10. Upland River Valley
9
18b
7c
URBAN
9
10
7c
18a
10
9
7c
10
18a
7c
9
17a
15
10
20a
20a
17b
10
14
20c
Legend
Selected Landscape Character Type
Landscape Character Type Boundary
East Ayrshire Boundary
©crown copyright & database right (2012). All rights reserved. Ordnance Survey Licence number 100023409

7 CHARACTER TYPE 14: UPLAND GLEN

7.1 Introduction

There are three Upland Glens within Ayrshire, Glen Afton in East Ayrshire and Glen App and Glen Tig in South Ayrshire. All these Upland Glens are considered in this sensitivity assessment.

The detailed assessment considers both larger (turbines >50m) and smaller (turbines <50m) development typologies.

7.1.1 *Existing/consented wind farms*

There are no existing or consented wind farms or turbines located in these Upland Glens.

The Hare Hill operational wind farm (20 turbines, 63.5m high) is located within the adjacent East Ayrshire Southern Upland (20a) character type, approximately 1.5km to the east of Glen Afton and is visible in close proximity on the skyline of the middle section of this glen. The Windy Standard I operational wind farm (36 turbines, 53.5m high) and its consented extension (30 turbines, up to 120m high) is also located within the same Southern Uplands character type but within neighbouring Dumfries and Galloway. Although this wind farm lies within 1.5km to the west of Glen Afton views to it are restricted from the floor of this glen by steep side slopes and forestry.

The operational Arecleoch wind farm (60 turbines, 135m high) and the Mark Hill wind farm (28 turbines, 110m high) are located in the South Ayrshire Plateau Moorland with Forest and Wind Farms (18c). There are close views of the Arecleoch wind farm from Glen Tig. There are no views of the Arecleoch wind farm from roads and settlement within Glen App.

7.2 Summary of sensitivity

The Upland Glens of Glen App, Glen Tig and Glen Afton are narrow and strongly enclosed, predominantly contained by steep sides which rise to form often irregular and highly prominent ridgelines. A number of well-defined hills on the edge of these glens form landmark features and are especially dramatic where these glens are contained by the high ground of the Southern Uplands (20a, 20b) character type. Land-cover is diverse with riparian woodlands and small walled pastures covering the valley floor and lower slopes and more extensive mixed policy woodlands and coniferous plantings, interspersed with semi-improved pastures and heather-flecked grass moorland, on steep upper slopes. The narrowness and enclosure of these glens create a small scale landscape, accentuated by the presence of small buildings, woodlands and fields. Encircling ridgelines are particularly sensitive to any form of built development seen on the skyline. There would be a ***High*** sensitivity to the Large, Medium and Small-medium typologies (turbines >30m) and a ***Medium*** sensitivity to the small typology (turbines 15-30m).

7.2.1 *Potential cumulative issues*

The following issues may arise in connection with any possible developments situated in this and adjacent landscapes:

- Inter-visibility of turbines sited in these glens and the larger turbines of operational and any future extensions/new developments within the adjacent Southern Uplands (20a and 20b) and South Ayrshire Plateau Moorland with Forest and Wind Farm (18c) character types which may be visible on sensitive skylines formed by the encircling hills containing these glens.
- Variations in the size and design of smaller turbines which would be appreciated in close view from settlement and roads due to the confined extent of these glens.

7.2.2 *Constraints*

- The small scale and narrow extent of these glens which would be quickly dominated by turbines (and especially multiple turbines) over 30m high and also by smaller but poorly sited turbines.
- The dramatic forms of steep-sided hill flanks and ridges and the high rugged peaks of 'landmark' hills including Beneraird, Milljoan Hill and Carlock Hill in Glen App and Blackcraig and Craigbraneoch Hills in Glen Afton where turbines and access tracks would significantly detract.
- The upper edge of the glens where the irregularly shaped enclosing ridgeline is visually prominent against the sky when viewed from within the glen.
- The heads of the glens which are often the focal point in views from roads.
- The predominantly open glen floor which contrasts with more wooded and coarse textured hill sides, where turbines (and particularly multiple turbines) sited in these areas would be detractive and interrupt linear views from roads which are channelled along the glen.

7.2.3 *Opportunities*

- Lower side slopes where small terraces and other landform features, the pattern of settlement and small side valleys/tributary watercourses offer opportunities for turbines < 20m to be sited where they can be associated with these features in the landscape, building up a consistent pattern of development able to optimise successful accommodation of multiple turbines.
- More gently graded lower hill slopes on the west side of Glen Afton and at the junction between Glen Tig and the Intimate Pastoral Valley (13) of the Stinchar Valley where turbines >20m would be less likely to detract from dramatic steep slopes present in the more deeply incised sections of the Upland Glens.

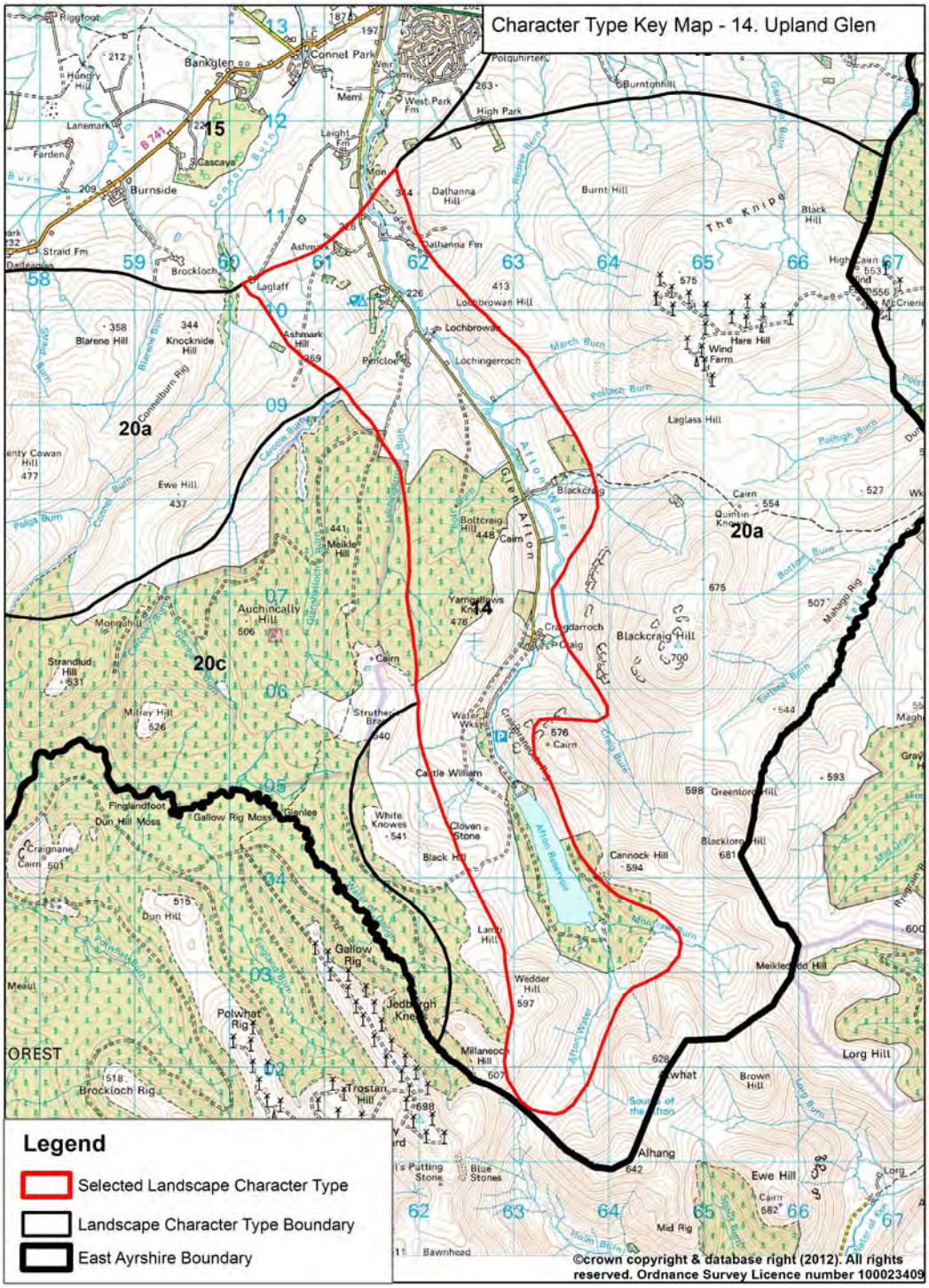
7.3 Guidance for development

There is no scope for turbines >30m to be sited within the Upland Glens.

Small turbines (15-30m) should be located where they can reinforce the pattern of existing development, being associated with farms located at the edge of the glen floor, lower side slopes above existing built development, within side valleys or along the head dyke. Turbines above 20m should be located on more gently graded side slopes where the scale of the glen is perceived as being broader.

Turbines should avoid intrusion on key views to the often dramatic heads of the glens and should not interrupt the irregular ridges which contain these glens and form prominent skylines. The flat and predominantly open glen floor should be avoided. They should also not be sited close-by operational wind farm developments sited in adjacent upland landscapes in order to minimise cumulative effects. Detailed siting and design should accord with the guidance set out in section 16 of this report

The Upland Glens are highly sensitive to intrusion from large wind turbines sited in the adjacent Southern Uplands (20a and 20b) and South Ayrshire Plateau Moorland with Forest and Wind Farm (18c) character types. The wind farms of Hare Hill and Arecleoch are visible from some of these Upland Glens and care should be taken to avoid any exacerbation of existing intrusion when considering extensions to existing developments, or any new proposals, in adjacent upland areas.


Character Type Key Map - 14. Upland Glen
Legend
Selected Landscape Character Type
Landscape Character Type Boundary
East Ayrshire Boundary
20a
20c
14
©crown copyright & database right (2012). All rights reserved. Ordnance Survey Licence number 100023409

8 CHARACTER TYPE 15: UPLAND BASIN

8.1 Introduction

This landscape character type only lies within East Ayrshire where it forms a low-lying basin at the headwaters of the River Nith sitting at the foot of the upland character types of the East Ayrshire Southern Uplands (20a), the East Ayrshire Plateau Moorlands (18a) and Foothills with Forest and Opencast Mining (17a).

The detailed assessment considers both larger and smaller development typologies.

8.1.1 *Existing/consented wind farms*

No existing wind farms are sited within this character type.

The Hare Hill operational wind farm (20 turbines, 63.5m high) is located approximately 3km to the south-east of this character type within the Southern Uplands (20a) character type in East Ayrshire. The Windy Standard wind farm (36 turbines, 53.5m high) and the consented Windy Standard II extension (30 turbines, up to 120m high) also lie within the Southern Uplands character type but within neighbouring Dumfries and Galloway approximately 11km to the south of this character type.

8.2 Summary of sensitivity

The Upland Basin (15) forms a low-lying landscape which is strongly contained by surrounding upland character types. The steep-sided Southern Uplands (20a), cut by the deep cleft of Afton Glen, form a particularly dramatic juxtaposition with this relatively simple basin. Although generally low-lying, close-up the landform is surprisingly varied and includes areas of flat wetland and water bodies to the east together with occasional more pronounced ridges, small knolls and the often deeply incised valley of the Nith. The landscape is fragmented by extensive current opencast mining operations to the west and small, partially vegetated spoil heaps and disturbed ground from former mining works are also evident amidst farmland. Small woodlands and shelterbelts are associated with farms and with the Knockshinnoch Lagoons nature reserve. The settlement of New Cumnock is sited at the foot of Hare Hill on the south-eastern edge of this character type and small farms and settlements are dispersed throughout, commonly located on the small knolls and lower hill slopes set above the floodplain of the Nith.

The presence of settlement and existing wind farm development sited on adjacent upland areas are key constraints to larger typologies. There would be a ***High*** sensitivity to the large typology (turbines >70m) and the medium typology (turbines 50-70m). Sensitivity would be ***High-medium*** for the small-medium typology (turbines 30-50m) and ***Medium-low*** for the small typology (turbines <30m), reflecting increased opportunities for these smaller typologies to fit better with the

scale of this well-settled landscape and to be sited to avoid significant cumulative effects with existing wind farm development in adjacent landscape character types.

8.2.1 *Potential cumulative issues*

The following issues may arise in connection with any possible developments situated in this and adjacent landscapes:

- Inter-visibility between larger turbines which are more likely to be located in the surrounding upland areas and smaller turbines sited in this area.
- Potential location of larger turbines within the surrounding upland areas of the Southern Uplands (20a), East Ayrshire Plateau Moorland (18a) and Foothills with Forest and Opencast Mining (17a) (seen together with the existing Hare Hill wind farm) where they may 'encircle' this basin and dominate containing skylines.

8.2.2 *Constraints*

- Small farms and houses, areas of enclosed farmland and woodlands which provide ready scale references.
- The deeply incised valley of the Nith and more diverse patterning of wetlands, woodland and lochs in the east which are well-used for recreation.
- Views from the A76 and other roads and settlement including open views across this landscape from New Cumnock.
- Disturbed ground and spoil associated with current open cast mining operations in the western part of this character type where turbines sited nearby could exacerbate visual clutter and fragmentation of the landscape.
- Cumulative effects with the existing Hare Hill and Windy Standard I wind farm and the consented extension to the Windy Standard wind farm, which features significantly larger turbines, sited between 3 and 9km from this character type.

8.2.3 *Opportunities*

- Lower, gently graded hill slopes at the transition with the Southern Uplands (20a) and the Plateau Moorlands (18a) and less disturbed hill slopes at the transition with the Foothills with Forest and Opencast Mining (17a) where smaller typologies (turbines <50m) could be accommodated.

8.3 Guidance for development

This study has found there to be no scope for the large or medium typology (turbines >50m high) to be accommodated in this landscape.

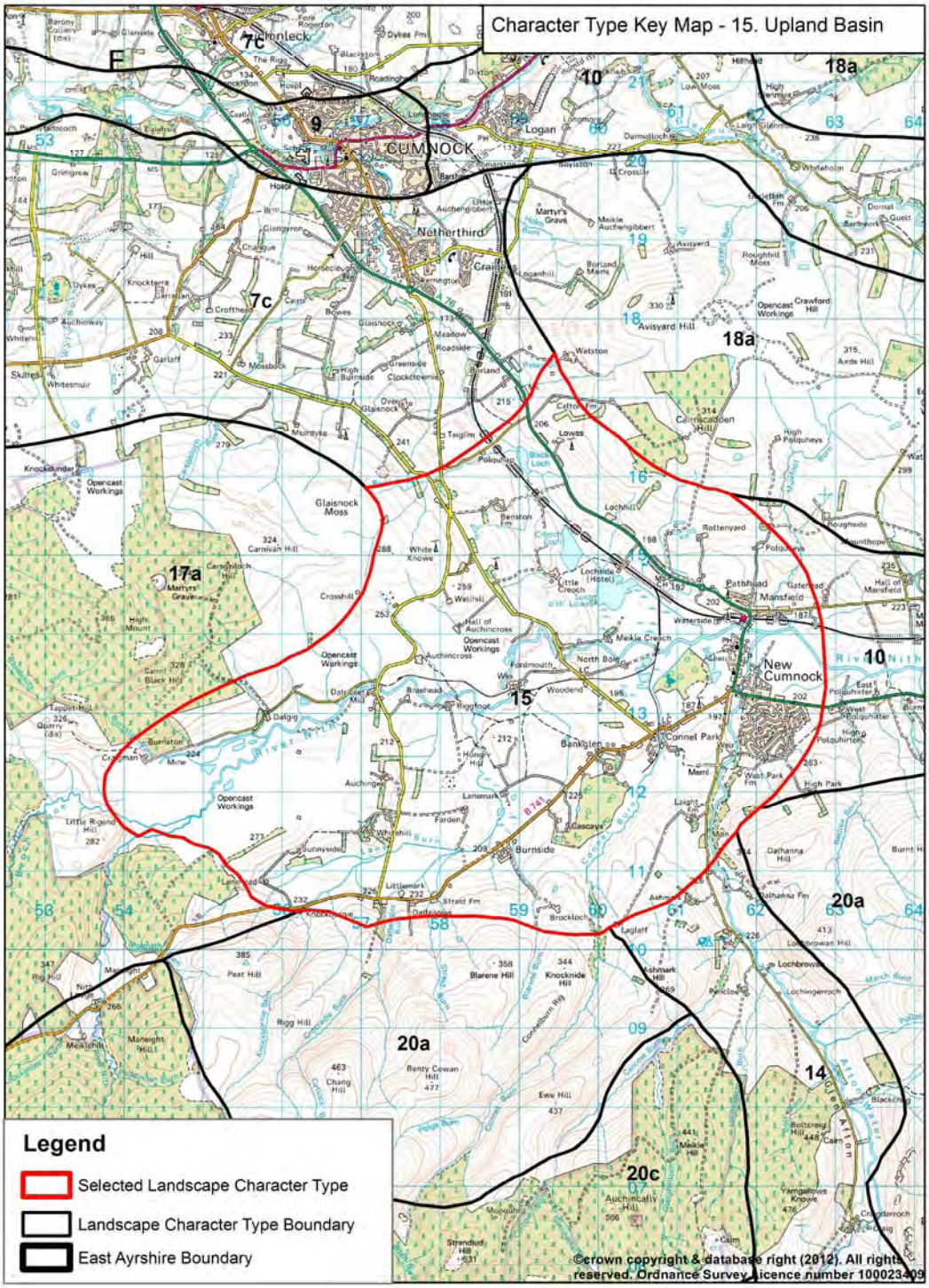
There is some ***limited*** scope for the small-medium typology (turbines 30-50m) to be accommodated in this landscape. Turbines of this size should be located on more sparsely settled lower hill slopes at the transition with the adjacent upland landscapes of the East Ayrshire Plateau Moorlands (18a) and the Southern Uplands (20a). Turbines could also be accommodated on gently graded slopes at

the transition with the Foothills with Forest and Opencast Mining (17a) although they should not be sited close to areas currently affected by opencast mining operations or obviously disturbed areas in order to avoid exacerbating visual clutter and the fragmentation evident in the western parts of the Upland Basin (15). Opportunities for accommodating turbines in these areas may increase in future following successful restoration of these disturbed landscapes.

Potential cumulative effects with the existing/consented Hare Hill and Windy Standard II wind farms are a key constraint and small-medium turbines should be set well away from the lower slopes of Hare Hill and should avoid more prominent knolls and higher hill slopes, utilising a backdrop of rising ground in order to minimise visual intrusion and cumulative impacts.

There are ***some*** opportunities for the small typology (turbines 15-30m) to be sited in this landscape to minimise cumulative effects as turbines of this size could be sited to be partially back-dropped by low hills and would be additionally screened in places by local topography and small woodlands. Turbines <15m should be visually associated with existing farms and other buildings. Detailed siting and design should accord with the guidance set out in section 16 of this report.

It will be essential to monitor the cumulative situation in relation any future developments sited in the surrounding upland landscapes of the Plateau Moorlands (18a), Foothills with Forest and Opencast Mining (17a) and East Ayrshire Southern Uplands (20a) and to ensure that these avoid a dominant 'encircling' effect on the skylines which contain this landscape.


Character Type Key Map - 15. Upland Basin
CUMNOCK
Netherthird
New Cumnock
Glaisnock Moss
Legend
Selected Landscape Character Type
Landscape Character Type Boundary
East Ayrshire Boundary
©crown copyright & database right (2012). All rights reserved. Ordnance Survey Licence number 100023409

9 CHARACTER TYPE 17A: FOOTHILLS WITH FORESTRY AND OPENCAST MINING

9.1 Introduction

The 'Foothills' and 'Foothills with Forest' landscape character types occur in 7 different areas within South and East Ayrshire. Due to the differences in character and context within these landscapes, the following areas are considered separately in the sensitivity assessments undertaken for this study:

- The 'Foothills with Forest and Opencast Mining' (17a) that lie east of Dalmellington within East Ayrshire.
- The 'Foothills with Forest West of the Doon Valley'(17b)
- The 'Foothills with Forest and Wind Farm' (17c) which lie between the Girvan Water and Stinchar valleys in South Ayrshire and include the operational wind farm of Hadyard Hill.
- The 'Maybole Foothills' (17d) which form a 'stand-alone' outcrop of settled and farmed hills to the north-west of the Girvan Water valley in South Ayrshire.
- The 'Coastal Foothills' (17e) which lie close to the coast between the settlements of Girvan and Ballantrae in South Ayrshire.

This sensitivity assessment considers the Foothills with Forest and Opencast Mining (17a) centred on Martyrs Moss to the north-east of Dalmellington and lying wholly in East Ayrshire.

This landscape is very sparsely settled and the detailed assessment therefore focuses on larger development typologies (turbines >50m) with key constraints and opportunities for smaller turbines briefly outlined in the summary and guidance section only.

9.1.1 *Existing/consented wind farms*

No existing or consented wind farms are sited within this area of the Foothills with Forestry character type.

The operational Hadyard Hill wind farm is located within the Foothills with Forestry within South Ayrshire. This development comprises 52 turbines, a maximum of 111m high, and lies over 20km distance from the area of the Foothills and Forestry which forms the subject of this assessment.

The Hare Hill and Windy Standard operational wind farms are located approximately 11km to the south-east of this landscape. These developments lie within the East Ayrshire Southern Uplands (20a) and similar uplands lying in neighbouring Dumfries and Galloway.

9.2 Summary of sensitivity

This landscape forms an expansive upland plateau with a generally simple landform of gently rounded hills and shallow mossy basins. Although this landscape forms a long, low and fairly even upland skyline to the north where it adjoins the East Ayrshire Lowlands (7c), occasional more pronounced hills lie on the south-western edge and include Benquhat Hill which is prominent in views from the upper Doon Valley. Land cover is simple, dominated by extensive coniferous forestry and with some grass moorland and moss although excavations, large spoil heaps and lagoons from former and current mine workings are clearly evident on the outer fringes of this plateau and these give this landscape a fragmented and degraded character. These uplands are very sparsely settled and their interior is not readily visible from public roads and settlement in the surrounding area.

Although the large scale and simple landform and land cover of these uplands could relate in principle to larger turbine typologies, this landscape is not without constraints, the key ones being the need to reduce intrusion on adjacent well-settled lowland landscapes and to minimise the exacerbation of the already fragmented nature of this landscape which is characterised by extensive open cast mining. There would be a ***Medium*** sensitivity to the large typology (turbines >70m) and a ***Medium-low*** sensitivity to the medium typology (50-70m).

9.2.1 *Potential cumulative issues*

The following issues may arise in connection with any possible development situated in this and adjacent landscapes:

- Inter-visibility between larger turbines which are more likely to be located in this upland landscape character type and smaller turbines sited in the adjacent more settled Upland River Valleys (10), Upland Basin (15) and East Ayrshire Lowlands (7c).
- Exacerbation of the fragmentation of this landscape which may occur if multiple developments and/or a range of different heights and types of turbine were located in this character type and seen in conjunction with past and current opencast mining operations.
- Potential ‘encirclement’ of the Upland Basin (15) character type should further wind farm development be sited within this character type and the East Ayrshire Southern Uplands (20a), the Southern Uplands with Forest (20c) and the Plateau Moorlands (18a) and visible on containing skylines.
- Cumulative effects on the upper Doon Valley (including effects on the setting of settlements such as Dalmellington) if wind farm developments were sited within this character type and the Southern Uplands with Forest (20c) and the Foothills west of the Doon Valley (17b) and visible on containing skylines.

9.2.2 *Constraints*

- The more prominent outer slopes and hills of this landscape which form the containing edges to settled and smaller scale Upland River Valley (10) of the

Doon valley to the south-west, the Upland Basin (15) to the east and the more densely settled East Ayrshire Lowlands (7c) and Lowland River Valley (9) of the Lugar Water to the north-east.

- Areas of spoil and excavations from current and former mining operations where wind turbine development could exacerbate clutter and fragmentation of this landscape and where it may be difficult to achieve an integrated development of multiple turbines in more complex disturbed areas.
- The less modified pockets of remnant moss and associated mixed woodlands.

9.2.3 *Opportunities*

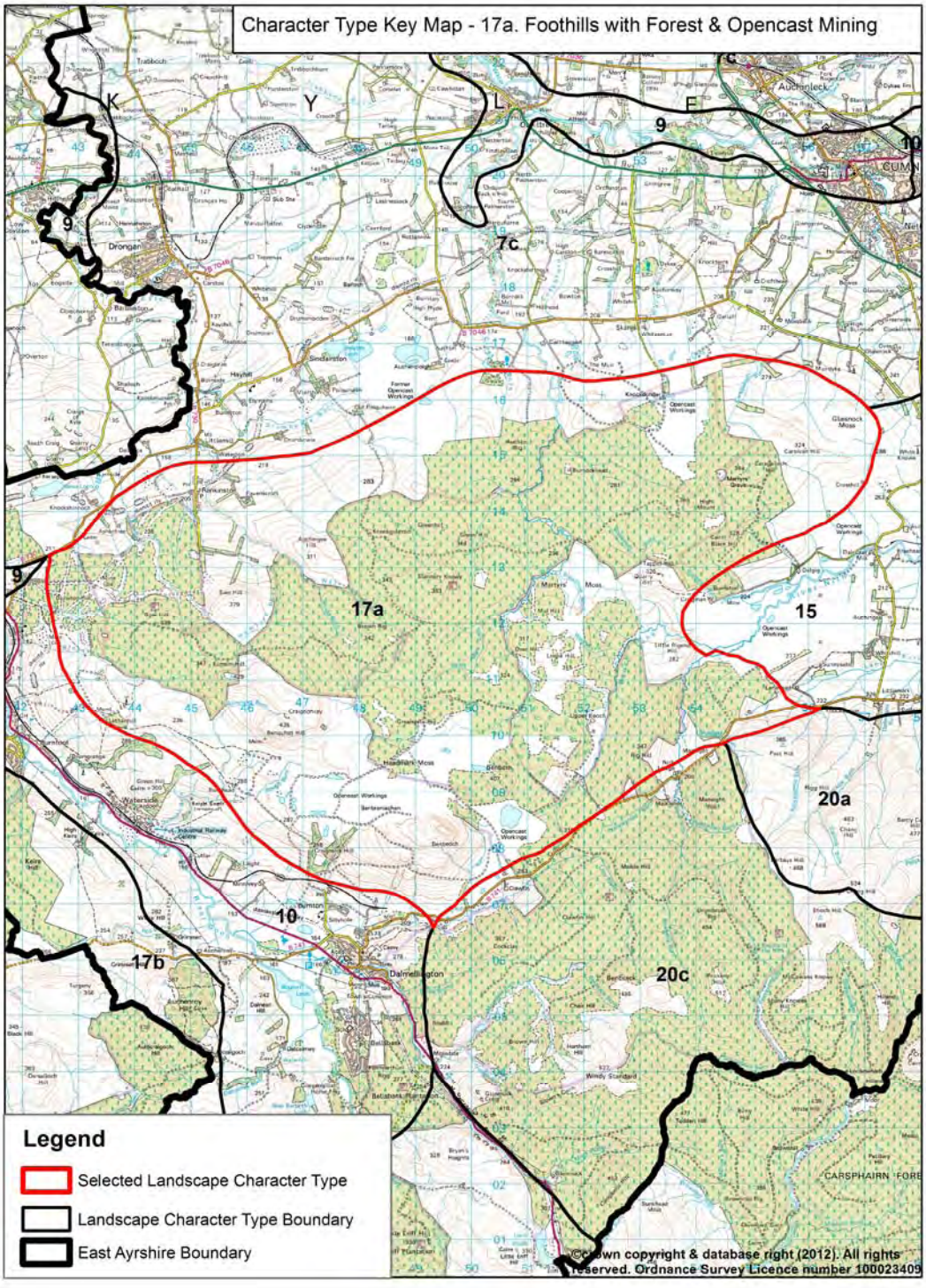
- Less visually prominent lower hills and shallow basins within the core of these uplands which could provide a degree of visual containment for wind turbine development and minimise intrusion on adjoining more settled smaller scale landscapes.

9.3 Guidance for development

There is ***some limited*** scope for the large typology (turbines >70m) to be accommodated within this landscape. Turbines should be set well back from the more sensitive north-eastern, eastern and south-western edges of these foothills to avoid significant impact on smaller scale settled landscapes and to also minimise potential cumulative effects with operational wind farms seen from the Upland Basin (15) character types. Turbines <100m high are more likely to have a reduced effect on adjacent more sensitive landscapes and on views.

There is increased scope for the medium typology (50-70m) to be located in this landscape. Turbines of this size may be more able to be contained by landform minimising intrusion on adjoining well-settled landscapes and inter-visibility with disturbed ground. This size of turbine (and particularly turbines towards the lower height band of this typology) could also be better accommodated on less sensitive lower hill slopes to the north-west where they could be back-clothed by rising ground reducing visual prominence, although potential cumulative effects with any larger turbines sited within the core of this landscape would need to be considered.

All turbine development should be sited well away from current opencast operations or should be planned to be constructed post restoration in order to reduce clutter and cumulative effects between these two types of development. Where former mining operations have left a legacy of disturbed ground, remedial earth works and landscape restoration should form an integral part of any larger wind farm proposals. The more naturalistic areas of remnant moss and mixed woodlands should be avoided.


Character Type Key Map - 17a. Foothills with Forest & Opencast Mining
17a
7c
15
20a
20c
17b
10
9
Legend
Selected Landscape Character Type
Landscape Character Type Boundary
East Ayrshire Boundary
©Crown copyright & database right (2012). All rights reserved. Ordnance Survey Licence number 100023409

11 CHARACTER TYPE 18A: PLATEAU MOORLANDS

11.1 Introduction

This upland landscape character type lies within East Ayrshire. Other areas of the same character type lie in South Ayrshire although these are different in character and context and are considered separately in the study.

The East Ayrshire Plateau Moorlands occur either side of the Upper Ayr valley. The following changes have been made to the boundaries of this character type within East Ayrshire for the purposes of this assessment:

- The lower-lying Airds Moss to the east of Auchinleck has been reclassified as the 'East Ayrshire Lowlands' (7c) character type because of its close relationship to the more settled lowlands and river valleys.
- A narrow strip of the Plateau Moorland with Forestry character type defined in the 1998 Ayrshire Landscape Assessment lying on the south-eastern edge of the East Ayrshire Plateau Moorlands, close to the boundary between East Ayrshire and Dumfries and Galloway, has been incorporated into the East Ayrshire Plateau (18a) character type. This is because the landform, scale and context of this landscape are similar to the adjacent East Ayrshire Plateau Moorlands and these characteristics form key criteria for the assessment of sensitivity to wind energy developments rather than simply one aspect of land cover (forestry in this case).

The detailed assessment considers larger development typologies (turbines >50m) with key constraints and opportunities for smaller turbines briefly outlined in the summary and guidance section only.

11.1.1 *Existing/consented wind farms*

No existing wind farms are sited within the East Ayrshire Plateau Moorlands (18a). The consented Galawhistle wind farm (22 turbines, 122m high) is located on the eastern edge of this character area, with the majority of this development extending into neighbouring South Lanarkshire. The operational Hagshaw wind farm in South Lanarkshire lies close-by this development.

The Hare Hill operational wind farm (20 turbines, 63.5m high) is located approximately 5km to the south of this character type within the East Ayrshire Southern Uplands (20a) character type in East Ayrshire. The Windy Standard wind farm (36 turbines, 53.5m high) also lies within the East Ayrshire Southern Uplands (20a) character type but within neighbouring Dumfries and Galloway approximately 13km distance from the southern edge of the East Ayrshire Plateau Moorlands (18a).

The existing Whitelee wind farm (and the consented Sneddon Law wind farm) is highly visible from the northern part of this landscape from Blackside Hill and more open parts of the settled hill slopes to the south-east of Galston.

11.2 Summary of sensitivity

The East Ayrshire Plateau Moorlands (18a) form an extensive undulating upland plateau of subtly rounded hills, shallow basins and some very gently graded lower slopes but also feature the higher hills of Blackside, Wardlaw, Cairn Table and Corsencon Hills which have steep slopes and defined ridges and summits. These 'landmark' hills are prominent in views from the settled lowlands of Ayrshire and a number of them are popular for recreation and offer fine views across Ayrshire and the Firth of Clyde. Land cover is simple, dominated by grass moorland with some coniferous forestry, although small enclosed pastures and mixed woodlands occur on the settled lower hill slopes to the south-east of Galston and within the valley of the Greenock Burn. Spoil and disturbed ground from former and current opencast workings are evident on the outer edges of the southern area of these Plateau Moorlands although the core of these uplands is little modified.

Although the large scale, simple landform and land cover of these uplands reduces sensitivity to larger turbine typologies, the presence of the 'landmark' hills is a key constraint. There would be ***High-medium*** sensitivity to the large typology (turbines >70m) and a ***Medium*** sensitivity to the medium typology (50-70m).

11.2.1 *Potential cumulative issues*

The following issues may arise in connection with any possible developments situated in this and adjacent landscapes:

- Inter-visibility between any larger turbines located in this landscape character type and smaller turbines sited in the adjacent Upland River Valleys (10) and the East Ayrshire Lowlands (7c).
- Effects on the backdrop and skyline of uplands seen from more elevated views across the densely settled lowlands of Ayrshire. The Whitelee wind farm is already highly visible in these views forming an extended even band of very tall turbines on the Plateau Moorlands with Forestry and Wind Farms (18b) along the north-eastern boundary of East Ayrshire. Larger turbines sited in this landscape and also in the Foothills with Forest and Opencast Mining (17a) (which form a less sensitive low even skyline and have fewer constraints than this landscape) would appear as a continuous band of development visible on the broad arc of uplands which contain the settled lowlands of Ayrshire which lie to the west.

11.2.2 *Constraints*

- The higher hills of Wardlaw, Corsencon, Cairn Table and Blackside which have steeper slopes and defined summits and form 'Landmark Hills' prominent in views across the densely settled lowlands of Ayrshire.

- Outer hill slopes which form immediate skylines to the more sensitive smaller scale landscapes of the Upland River Valleys (10) of the upper Ayr, Nith and Irvine and the East Ayrshire Lowlands (7c).
- The narrow and lower Avisyard Hill area which is more visually prominent due to its close proximity to settled lowlands and valleys and where tall turbines would appear out of scale with the low relief of this ridge.
- Dramatic views from the popularly accessed Cairn Table and Blackside Hills west across Ayrshire, the Firth of Clyde and to Arran.
- Disturbed ground and spoil associated of former and current open cast mining operations which create a fragmented and degraded landscape on lower hill slopes on the periphery of the southern part of this character type.
- The smaller scale of settled lower hill slopes south-east of Galston and within the Greenock Burn valley where enclosed pastures, dispersed farms and houses and mixed woodlands provide ready scale references.
- Potential for significant cumulative effects to arise with the operational/consented wind farms of Whitelee/Sneddon Law on the adjacent well-settled Irvine valley and the nearby East Ayrshire Lowlands (7c) should wind farm/turbine development be sited on the northern and north-eastern edges of this landscape and visible on prominent containing skylines.

11.2.3 *Opportunities*

- Less visually prominent lower hills and shallow basins close to the boundaries with South Lanarkshire and Dumfries and Galloway where the large typology could be accommodated to minimise intrusion on the setting and views to and from the 'landmark' hills.
- Broad, very gently graded lower hill slopes and plateaux on the outer fringes of these uplands where smaller turbines (<50m) could be accommodated to minimise effects on the 'landmark' hills and cumulative effects with very large wind farm developments sited in the East Ayrshire Plateau Moorlands with Forest and Wind Farms' (18b) and fit with the scale of smaller developments sited within the East Ayrshire Southern Uplands (20a).

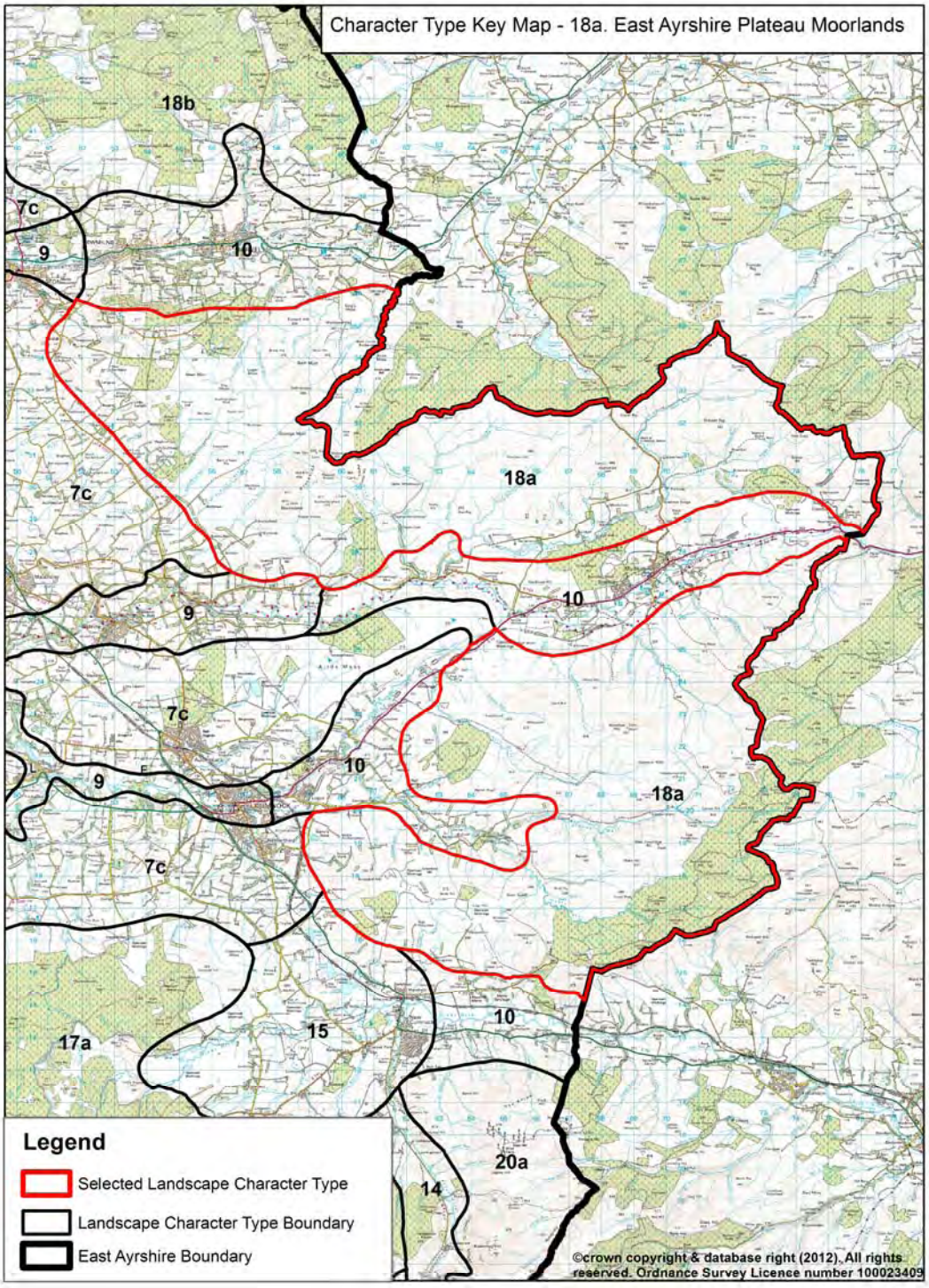
11.3 Guidance for development

There is ***very limited*** scope for the large typology (turbines >70m) to be accommodated within this landscape. Turbines should be set well back from the more sensitive outer edges of this landscape to avoid significant impact on smaller scale settled lower slopes and valleys within this character type and the adjacent landscapes of the East Ayrshire Lowlands (7c), Upland Basin (15) and Upland River Valleys (10). They should not be sited close-by, or significantly intruding on key views to and from the landmark hills of Blackside, Corsencon, Cairn Table and Wardlaw Hill. The lower, gently undulating hills in the eastern part of this landscape, which extend into neighbouring authorities, offer opportunities to accommodate this typology while minimising impacts on the 'landmark' hills and views from Ayrshire.

There would be increased scope for the medium typology (50-70m) to be located on lower, gently graded outer hill slopes provided they were set back from the

landmark hills and also from settlement on lower hill slopes and valleys in this and adjacent character types. Single and small groups of turbines of this size sited in these areas would establish a hierarchy of smaller developments appropriate to this more sensitive upland landscape and provide a clear scale contrast with the very large Whitelee/Sneddon Law wind farms located in the nearby East Ayrshire Plateau Moorland with Forest and Wind Farms (18b).

The detailed assessment considers larger typologies only. Smaller turbines <50m could be accommodated on the sparsely settled lower hill slopes and valleys of this landscape where they could be sited so back-dropped by gently rising ground thus minimising visual prominence. Small turbines >30m may appear out of scale with the more open and expansive core of these uplands and should be clearly associated with more settled lower hill slopes and broader valleys. Detailed siting and design for smaller turbines <50m high should accord with the guidance set out in section 16 of this report.


Character Type Key Map - 18a. East Ayrshire Plateau Moorlands
18b
7c
9
10
18a
7c
10
9
7c
9
10
18a
7c
17a
15
10
20a
14
Legend
Selected Landscape Character Type
Landscape Character Type Boundary
East Ayrshire Boundary
©crown copyright & database right (2012). All rights reserved. Ordnance Survey Licence number 100023409

13 CHARACTER TYPE 20A: EAST AYRSHIRE SOUTHERN UPLANDS

13.1 Introduction

This sensitivity assessment is for the East Ayrshire Southern Uplands character type. There are four areas of the Southern Uplands character type identified across Ayrshire in the 1998 Ayrshire Landscape Assessment. This sensitivity assessment covers the two areas of this character type which lie close to New Cumnock within East Ayrshire only. An area of the Southern Uplands lying in the Galloway Forest Park within South Ayrshire has been amalgamated with a number of other landscape character types to form a new character type the 'Rugged Uplands with Lochs and Forest' (21) which is assessed separately in this study. A separate assessment has also been undertaken of the area of the South Ayrshire Southern Uplands (20b) lying close to Glen App.

This landscape is unsettled and the detailed assessment therefore considers larger development typologies (turbines >50m) with key constraints and opportunities for smaller turbines briefly outlined in the summary and guidance section only.

13.1.1 *Existing/consented wind farms*

The operational Hare Hill wind farm (20 turbines, 63.5m high) is located in this character type.

The Windy Standard operational wind farm (36 turbines,53.5m high) and its consented extension (30 turbines, up to 120m high) are located within the same character type but within neighbouring Dumfries and Galloway and lying close to the East Ayrshire boundary. The consented Whiteside Hill wind farm (11 turbines, 121m high) is located within the Nithsdale landscape unit of the Southern Uplands character type within Dumfries and Galloway.

13.2 Summary of sensitivity

This landscape comprises a small part of the Southern Uplands character type which extends into neighbouring Dumfries and Galloway. Within East Ayrshire, the Southern Uplands form steep-sided, rugged open hills strongly containing the Upland Glen (14) of Glen Afton and providing a dramatic backdrop to the low-lying Upland Basin (15). Higher and particularly steep-sided and well-defined hills on the eastern edge of Glen Afton form landmark features and include the distinctly rugged Blackcraig Hill and Craigbraneoch Rig. Lower and relatively narrow ridges occur west of Glen Afton. Land cover is simple, dominated by grass moorland. This landscape is not settled although it is highly visible from settlement and roads within the Upland Basin (15) to the north. The peripheral hills of this character type also form prominent skylines seen from Glen Afton. The operational Hare Hill wind farm occupies a prominent hill summit seen in views to the north-west. The operational wind farm of Windy Hill and its consented extension are also located within the

same character type but within neighbouring Dumfries and Galloway and close to the East Ayrshire boundary.

Although this landscape is large scale and extensive where it merges with adjacent similarly scaled upland character types both in East Ayrshire and Dumfries and Galloway, the presence of existing and consented wind farms limit scope for new developments. Key constraints include the need to reduce intrusion on the adjacent settled Upland Basin (15) and the Upland Glen (14) of Glen Afton. There would be a ***High-medium*** sensitivity to the large typology (turbines >70m) and a ***Medium*** sensitivity to the medium typology (50-70m).

13.2.1 *Potential cumulative issues*

The following issues may arise in connection with any possible development situated in this and adjacent landscapes:

- Inter-visibility between larger turbines which are more likely to be located in this upland landscape character type and smaller turbines sited in the adjacent more settled Upland Glens (14), Upland River Valleys (10) and Upland Basin (15).
- Cumulative effects between existing/consented wind farms sited in this character type together with any new wind farm developments sited in the Foothills with Forest and Opencast Mining (17a) and the Plateau Moorlands (18a) which could affect views from the Upland Basin (15) where turbines may extend over the skylines of these upland character types which encircle this settled landscape.

13.2.2 *Constraints*

- The steep-sided hills which contain the dramatic narrow cleft of Glen Afton and the higher well-defined hills of Hare Hill and the distinctly rugged Blackcraig Hill and Craigbraneoch Rig on the eastern edge of Glen Afton which form landmark features seen from roads and settlement within the glen and from the well-settled Upland Basin (15).
- Complex interlocking ridges and deeply cut narrow valleys of the lower western hills of this character type where it may be difficult to achieve an integrated layout of turbines and to minimise cut and fill of access road construction.
- Potential exacerbation of the existing intrusion of the Hare Hill turbines on the small scale and scenic settled Upland Glen (14) of Glen Afton and on views from the Upland Basin (15).
- Cumulative effects with the existing Hare Hill wind farm development which features relatively small turbines of 63m high to blade tip and where differences in turbine size will be apparent in close views from Glen Afton.
- Cumulative effects with the existing Hare Hill and Windy Standard I and II wind farms seen from the Upland Basin (15) which may limit scope for additional new wind farm developments to be successfully accommodated in

this character type because of differences in turbine size and also layout given variations in landform either side of Glen Afton.

13.2.3 *Opportunities*

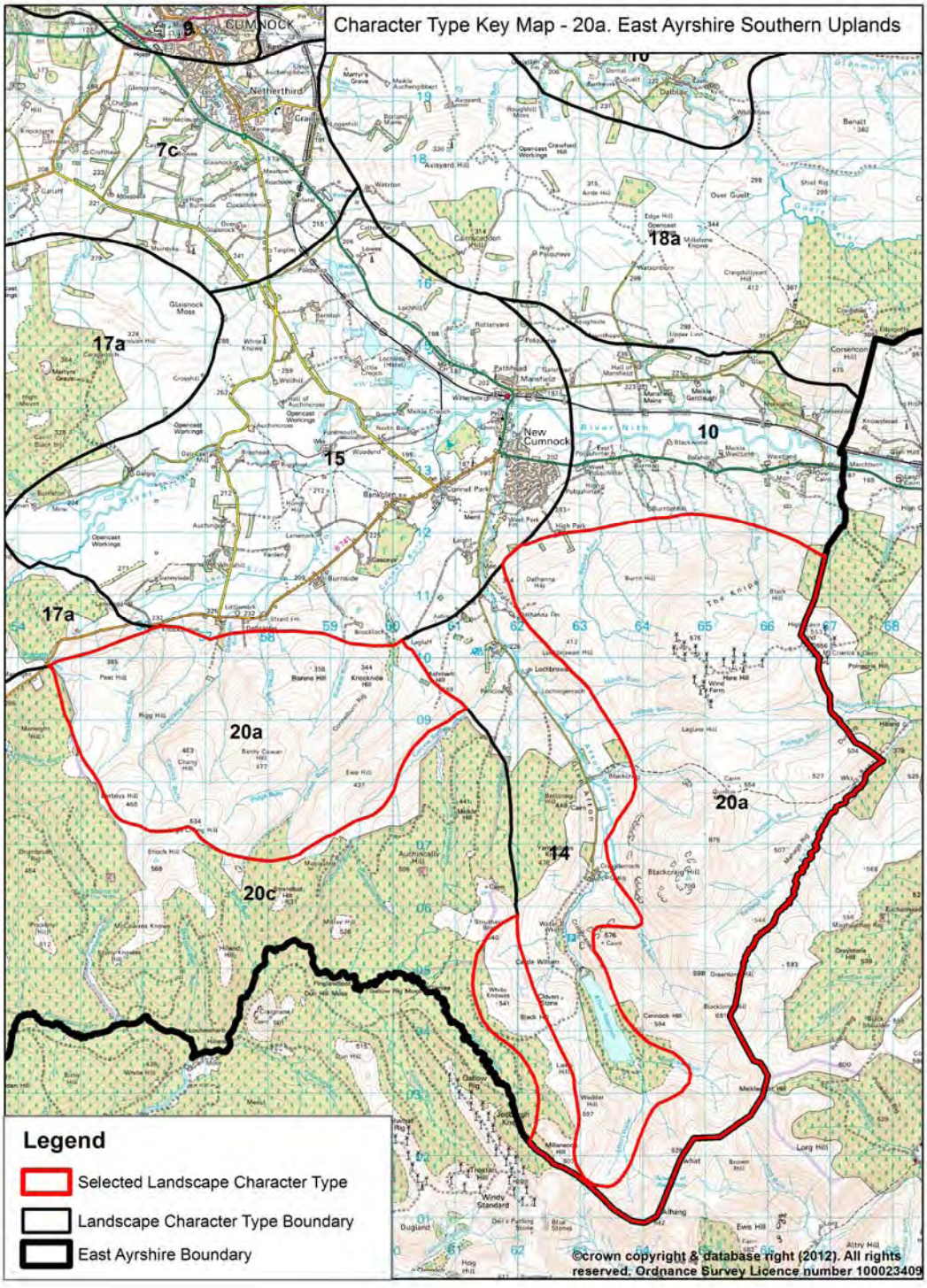
- Less visually prominent gentler hill slopes in the eastern part of this character type where a limited extension to the existing Hare Hill wind farm could potentially be sited to minimise intrusion on the adjacent Glen Afton and on views from the Upland Basin (15).

13.3 Guidance for development

It is recommended that there is ***no scope*** for the large typology (turbines >70m) to be accommodated within this landscape.

There is ***some limited*** scope for the medium typology (50-70m) to be located in this landscape as an extension to the existing Hare Hill wind farm. Any extension should be sited on gentler east-facing slopes, avoiding more defined summits and steep slopes, and should not exacerbate the existing intrusion of turbines seen on the skyline from Glen Afton. The uncluttered setting of the landmark hill of Blackcraig should be maintained in views from Glen Afton.

The detailed assessment considers larger typologies only. Smaller typologies would have significant cumulative effects with existing wind farm developments if sited close-by. There may be some limited scope to site turbines at the transition with the Upland River Valleys (10), the Upland Basin (15) and on gently graded upper slopes on the western side of Glen Afton provided they were restricted to <30m and clearly associated with more settled lower hill slopes. Detailed siting and design should accord with the guidance set out in section 16 of this report.


Character Type Key Map - 20a. East Ayrshire Southern Uplands
CUMNOCK
Netherthird
New Cumnock
7c
17a
15
18a
10
20a
20c
14
Legend
Selected Landscape Character Type
Landscape Character Type Boundary
East Ayrshire Boundary
©crown copyright & database right (2012). All rights reserved. Ordnance Survey Licence number 100023409

14 CHARACTER TYPE 20C: SOUTHERN UPLANDS WITH FORESTRY

14.1 Introduction

This sensitivity assessment is for the Southern Uplands with Forestry (20c) character type which lies to the east of Dalmellington and extends over the East Ayrshire boundary into Dumfries and Galloway. Two other areas of the Southern Uplands with Forestry character type are defined within South Ayrshire in the 1998 Ayrshire Landscape Assessment. One of these areas lies within the Galloway Forest Park and this has been amalgamated with a number of other landscape character types to form a new character type the Rugged Uplands with Lochs and Forest (21) which is assessed separately in this study. Another small area of the Southern Uplands with Forestry lying to the south-west of Barrhill has been incorporated into the adjacent South Ayrshire Plateau Moorland with Forestry and Wind Farms (18c) and is also considered in a separate sensitivity assessment.

The detailed assessment considers larger development typologies (turbines >50m) with key constraints and opportunities for smaller turbines briefly outlined in the summary and guidance section only.

14.1.1 *Existing/consented wind farms*

The operational Windy Standard wind farm (36 turbines, 53.5m high) and its consented extension (30 turbines, up to 120m high) are located within the Southern Uplands with Forestry character type in neighbouring Dumfries and Galloway but lying close to the East Ayrshire boundary. The consented Whiteside Hill wind farm (11 turbines, 121m high) is located within the Nithsdale landscape unit of the Southern Uplands character type within Dumfries and Galloway.

The operational Hare Hill wind farm (20 turbines, 63.5m high) is located in the East Ayrshire Southern Uplands (20a) and lies approximately 10km from the eastern boundary of this character type.

14.2 Summary of sensitivity

This landscape forms a small part of the Southern Uplands with Forestry character type which extends into neighbouring Dumfries and Galloway and overall forms an expansive tract of uplands. The predominantly rounded hills of this character type are largely covered with commercial coniferous forestry which masks their landform although steep-sided narrow ridges and deep valleys are present. A few of the highest hill tops are open and these are seen in views from the lower Loch Doon area and also backdrop the settlement of Dalmellington in the Doon Valley. This landscape is very sparsely settled with occasional farms sited on lower outward-facing slopes. The B741 and A713 are aligned on the periphery of this landscape although views from these roads are restricted by landform and forestry. The operational and consented Windy Standard I and II wind farms are located in this same character type but within Dumfries and Galloway.

While the large scale and relatively simple land cover of this character type reduces sensitivity to larger wind turbine typologies, likely effects on views from the Doon Valley and on the setting and views from the Loch Doon area and the settlement of Dalmellington are key constraints. Cumulative effects would also be likely to occur in conjunction with the operational/consented Windy Standard I and II wind farm, particularly where multiple developments were seen on the backdrop of hills which contain Loch Doon. Landscape sensitivity would be ***High-medium*** for the large typology (turbines >70m) and ***Medium*** for the medium typology (turbines 50-70m), reflecting increased opportunities for minimising intrusion and cumulative effects with smaller turbines.

14.2.1 *Potential cumulative issues*

The following issues may arise in connection with any possible development situated in this and adjacent landscapes:

- Inter-visibility between larger turbines which are more likely to be located in this upland landscape character type and smaller turbines sited in the adjacent more settled Upland River Valley (10) of the Doon Valley.
- Cumulative effects on the setting of Dalmellington and the Doon Valley if larger turbines were located in this landscape character type and the Foothills with Forestry and Opencast Mining (17a) and Foothills with Forest west of Doon Valley (17b) and visible on containing skylines.
- Potential 'encirclement' of the settled Upland Basin (15) where the operational Hare Hill wind farm and any other larger turbines sited in this character type and also in the Foothills with Forestry and Opencast Mining (17a) and East Ayrshire Plateau Moorland (18a) would be seen in close proximity on containing skylines.
- Dominant effects on the small scale, settled Glen Afton incurred by any turbines sited on the eastern edge of this landscape seen in combination with the operational Hare Hill wind farm which already significantly intrudes on this scenic glen.

14.2.2 *Constraints*

- The prominent western slopes and hills of this landscape which form the containing edges to the settled Upland River Valley (10) of the Doon Water.
- The backdrop provided by the steep-sided rounded western hills of this character type to Dalmellington, particularly apparent in views from the A713 on the approach to the settlement from the north-west.
- A complex landform of steep-sided narrow interlocking ridges found in some areas where operational and consented wind turbines (Windy Standard I and II) adopt a linear arrangement, increasing the extent of wind farm development seen in the Loch Doon area and contrasting with the more clustered layout of the Hare Hill wind farm on the nearby more rounded hills of the East Ayrshire Southern Uplands (20a).

- Impacts on views from the public road and shores of west Loch Doon including potential cumulative effects with the operational Windy Standard I and much larger and closer turbines of the consented extension to this wind farm in these views. The setting of the scenic Loch Doon area would be compromised by larger turbines sited on prominent containing skylines.
- Potential cumulative effects with the existing Hare Hill and Windy Standard I and II wind farms experienced from the Upland Basin (15) character type.

14.2.3 *Opportunities*

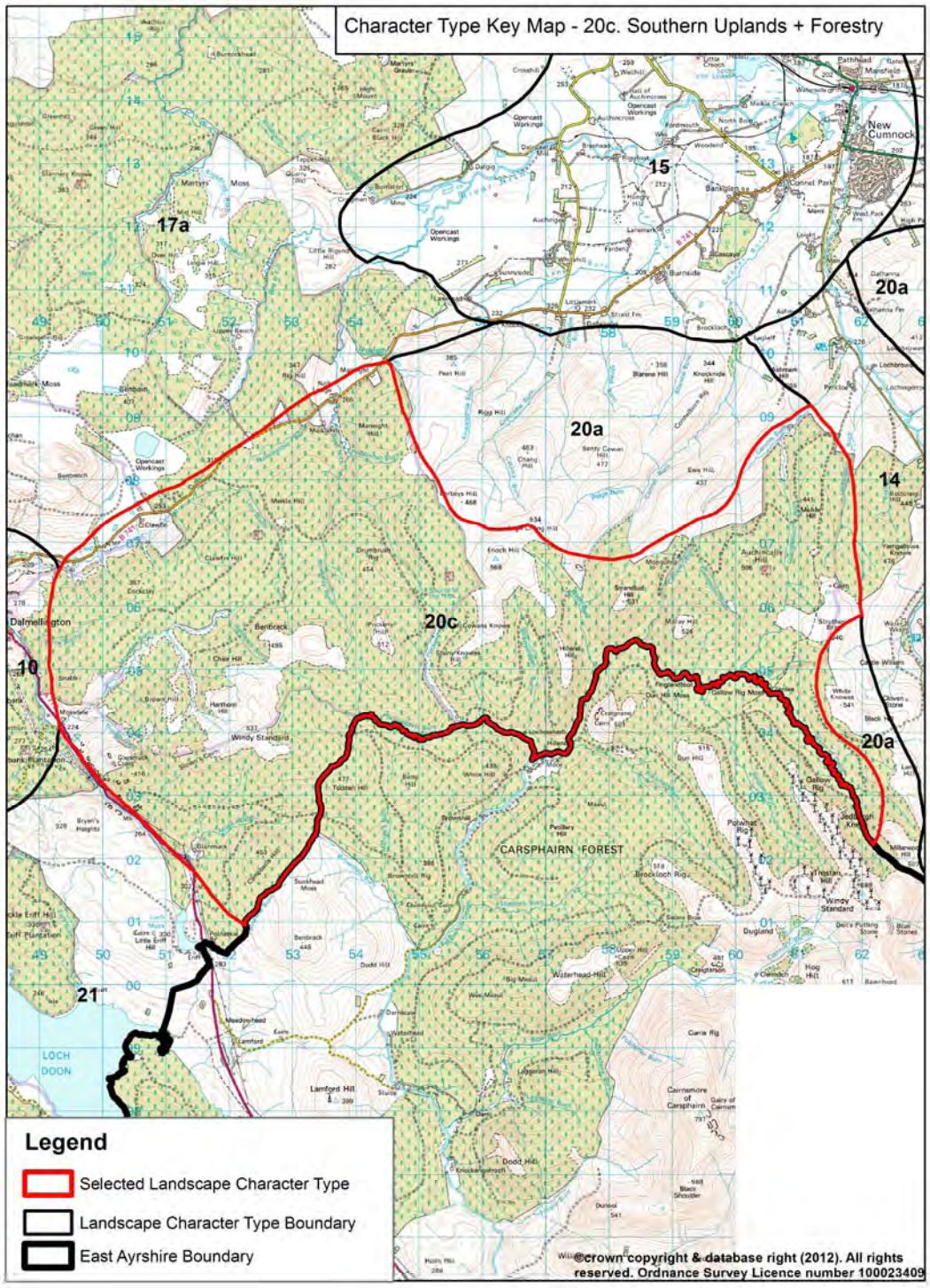
- The expansiveness of this character type (which extends into Dumfries and Galloway), its relatively simple land cover and broader more gently sloping hills set well back into the interior and eastern part of this landscape where larger typologies could be sited to avoid significant effects on Loch Doon and more settled valleys and glens.

14.3 Guidance for development

There may be some ***very limited*** scope for the large typology (turbines >70m) to be accommodated within this landscape. Turbines should be set well back from the more sensitive western edges of these uplands and should avoid significant impact on the setting of Loch Doon and the upper Doon valley including the settlement of Dalmellington. Potential cumulative effects with the operational Hare Hill, operational and consented Windy Standard I and II wind farms should be considered carefully, especially in views from the Upland Basin (15) and Afton Glen (14) character types. A key cumulative issue to consider will also be any contrasts in design layout that may be obvious in key views between the more clustered form of the nearby operational Hare Hill wind farm located in the adjacent East Ayrshire Southern Uplands (20a) and more linear layouts likely to be adopted in the eastern part of this character type.

There may also be increased opportunities to accommodate the medium typology (turbines 50-70m) within the less sensitive interior and eastern hills of this character type. While this smaller typology would fit with the size of turbines within the operational Hare Hill and Windy Standard I wind farms seen in views from the north, the consented Windy Standard II extension comprises significantly larger turbines. ***It is therefore recommended that regular review of the changing cumulative situation is undertaken when considering proposals for all turbine developments in this, and adjacent, character types.***

The detailed assessment considers larger typologies only. Smaller turbines <50m would not fit with the expansive scale of these uplands. They could also have significant cumulative effects with existing wind farm developments, although there may be some very limited scope to site them on the periphery of these uplands and associated with farms and other buildings on lower hill slopes and valleys. Detailed guidance for smaller typologies is set out in section 16 of this report.


Character Type Key Map - 20c. Southern Uplands + Forestry
17a
15
20a
20a
14
20c
10
20a
CARSPHAIRN FOREST
21
LOCH DOON
Legend
Selected Landscape Character Type
Landscape Character Type Boundary
East Ayrshire Boundary
©crown copyright & database right (2012). All rights reserved. Ordnance Survey Licence number 100023409

15 CHARACTER TYPE 21: RUGGED UPLANDS WITH LOCHS AND FOREST

15.1 Introduction

This sensitivity assessment is for the Rugged Uplands with Lochs and Forests character type which lies in the Carrick Forest and Loch Doon area within East and South Ayrshire. This character type comprises an amalgamation of the 'Rugged Granite Uplands', 'Rugged Granite Uplands with Forest', the 'Southern Uplands', 'Southern Uplands with Forestry' and the 'Foothills' character types, defined in the 1998 Ayrshire Landscape Character Assessment. The craggy granite hills which lie at the core of this new character type form the northern extent of the 'Rugged Granite Uplands' which extend southwards into Dumfries and Galloway and culminate in the dramatic high hills of Merrick and the Rhinns of Kells.

This landscape is very sparsely settled and the detailed assessment therefore focuses on larger development typologies (turbines >50m) with key constraints and opportunities for smaller turbines briefly outlined in the summary and guidance section only.

15.1.1 *Existing/consented wind farms*

There are no operational or consented wind turbines within this character type.

The operational Windy Standard wind farm (36 turbines, 53.5m high) and its consented extension (30 turbines, up to 120m high) are located within the Southern Uplands with Forestry character type in neighbouring Dumfries and Galloway but lying close to the East Ayrshire boundary. Both these developments are/will be visible from the western side of Loch Doon.

The operational Mark Hill wind farm (28 turbines, 110m high) and the Arecleoch wind farm (60 turbines, 120m high) are located in the 'South Ayrshire Plateau Moorland with Forest and Wind Farms' (18c) character type, lying approximately 6km and 14km respectively to the south-west. The operational Hadyard Hill wind farm (52 turbines, 111m high) lies within 4km distance in the 'Foothills with Forest and Wind Farm' (17c) character type. These wind farms, and other wind farm developments sited within neighbouring Dumfries and Galloway, are visible from the higher hills within this character type.

15.2 Summary of sensitivity

This character type extends south into Dumfries and Galloway encompassing an extensive upland tract which includes the high hills of Merrick and the Rhinns of Kells. The dramatic craggy mountainous scenery, which is a feature of the granite hills lying at the core of this landscape, is enhanced by a band of smoother, more rounded but steep-sided hills lying to the west and the diverse Loch Doon and other smaller lochs which lie within a rough basin of moorland, wetland and forest to the east. The complex landform and land cover, including the varied pattern of lochs

and mature woodland and heather moor, is more reminiscent of a typically 'Highland' landscape and this character type is highly scenic and a popular destination for recreation. This landscape is also very sparsely settled and, although it features some commercial forestry and impounded lochs, a strong sense of seclusion and naturalness can be experienced, particularly within the rugged hills lying at its core.

These scenic and rugged hills, lochs and forests are important within East Ayrshire in providing a little modified landscape which is highly valued for recreation. There would be an overall ***High*** sensitivity to both the large and medium wind turbine typologies (turbines >50m).

15.2.1 *Potential cumulative issues*

The following issues may arise in connection with any potential developments sited in adjacent landscapes:

- Incremental effects of multiple wind farm developments located in surrounding upland landscapes on key views from this character type, including those from the higher, popularly accessed hills such as the Corbett Shalloch on Minnoch and from Loch Doon, and on the perception of wildness.

15.2.2 *Constraints*

- The strong enclosure provided by the complex craggy landform and the often small scale of landform features including narrow valleys, lochans, knolls and confined hill summits.
- The dramatic rugged hills of this landscape which form a scenic western backdrop to Loch Doon, the upper Doon Valley (including Craigengillan House and its designed landscape) and are also visible from the more open parts of the Foothill (17b and 17c) landscapes within South Ayrshire.
- The complexity of the topography which features craggy and steep-sided hills and an intricate pattern of lochs and diverse vegetation cover.
- Pronounced wildland qualities associated with the more difficult to access core hills and accentuated by the sparse settlement and naturalness of open rough ground and unmodified lochs (these qualities also contribute to the 'Dark Skies' designation).
- The popularity of this landscape for recreational pursuits including walking and cycling and its role in providing respite from nearby more developed landscapes within East Ayrshire.

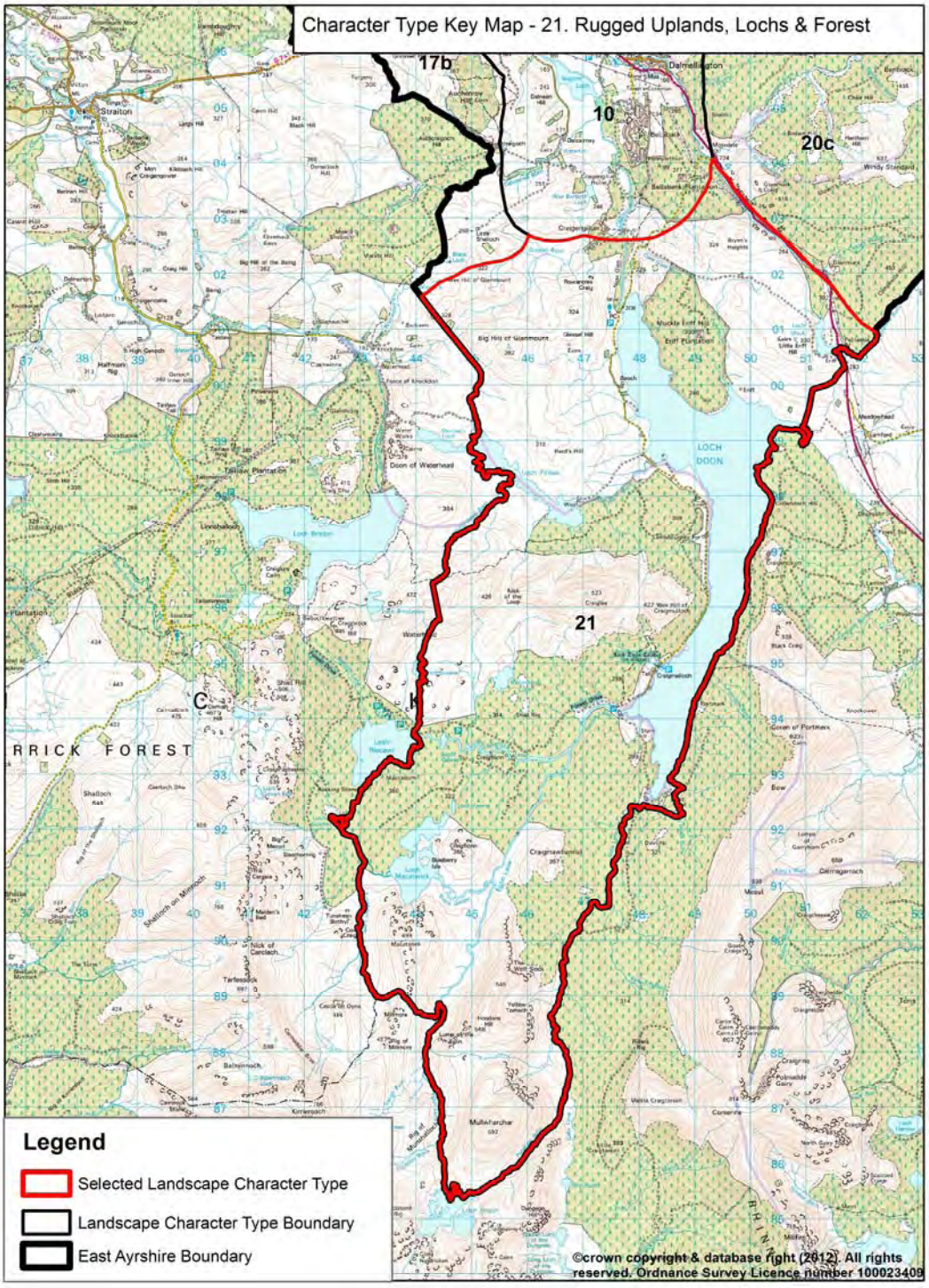
15.2.3 *Opportunities*

- Smoother lower hill slopes on the outer fringes of this character type and within forest clearings where the small typology (turbines 15-30m) could be sited in association with existing buildings providing turbines did not intrude on key views.

15.3 Guidance for development

The study found there to be ***no scope*** for larger development typologies to be sited in this landscape.

The detailed sensitivity assessment considers larger typologies only. Smaller turbines <50m would not fit with the expansive scale of the higher hills of this landscape. They would also have a similarly detractive effect on the often complex landform of this landscape and would impact on wildland qualities, particularly experienced within the more rugged core hills. There would however be some very limited scope to site small turbines <20m so associated with more settled lower hill slopes. Turbines should avoid being sited between the public road and the shore of Loch Doon in order to minimise visual intrusion. Detailed siting and design should accord with the guidance set out in section 16 of this report.


Character Type Key Map - 21. Rugged Uplands, Lochs & Forest
17b
10
20c
21
LOCH DOON
RRICK FOREST
Legend
Selected Landscape Character Type
Landscape Character Type Boundary
East Ayrshire Boundary
©crown copyright & database right (2012). All rights reserved. Ordnance Survey Licence number 100023409

Character Type 9: Upper dales

Introduction

The Upper Dales are located in the upper valleys of two main river valleys in Dumfriesshire. They are generally narrower, and more enclosed, than the lower and middle dales. These two landscape units are identified in the Dumfries and Galloway landscape assessment as:

- Upper Glenkens
- Upper Nithsdale

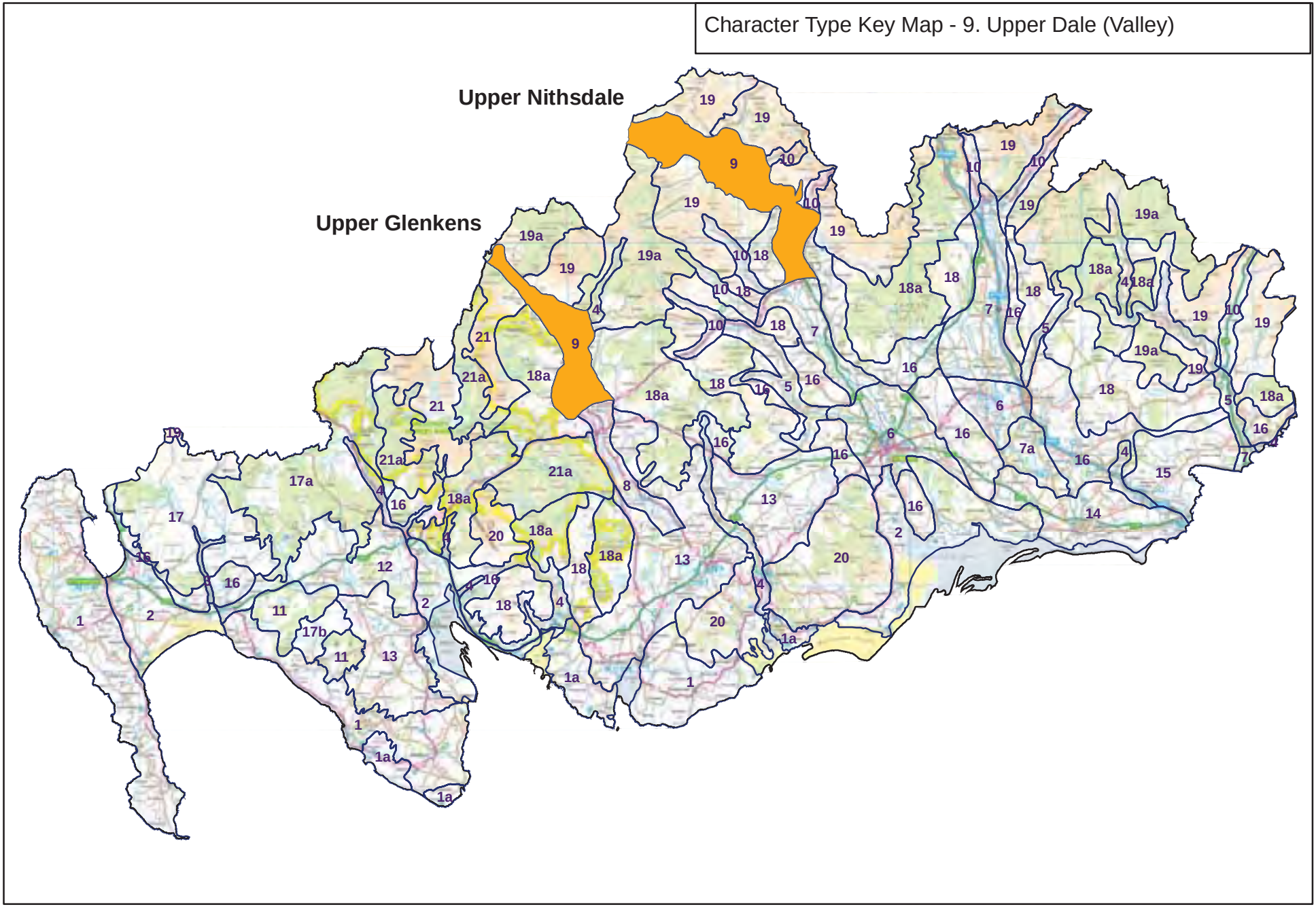
Cultural heritage overview

This landscape character type has not yet been assessed for its historic land-use evidence, but the site-specific record indicates that this will prove to be one with significant historic environment constraints. At a site-specific level, there are numerous archaeological sites of outstanding significance and distinctiveness, some of which are promoted for public benefit. In addition, there is the largest designed landscape in the region, as well as three Archaeologically Sensitive Areas.

Existing/consented wind farm development

There are no existing larger scale wind farm developments within the Upper Dales and no small turbines were noted during our field work. The existing Hare Hill wind farm is located within the adjacent Southern Uplands Type (19) within neighbouring South Ayrshire and is clearly visible from Upper Nithsdale. This wind farm comprises 20 turbines, 63.5m in height. The existing Dalswinton wind farm is located in the 'Ae' Foothills with Forest (18a) and is also visible from parts of Upper Nithsdale. The consented (but not yet constructed) Torrs Hill wind farm is sited within the 'Rhinns of Kells' unit of the Foothills with Forest (18a), adjacent to the Upper Glenkens. This development comprises 2 turbines, 100m high.

Character Type Key Map - 9. Upper Dale (Valley)



Type 9 Upper Dales

Summary of sensitivity

The Upper Dales of Nithsdale and the Glenkens are predominantly broad valleys, contained by much higher hills, including the Southern Uplands and other upland character types. The gently undulating to flat valley floors give way to either uneven, but gently graded side slopes, or to more steep-sided and enclosing slopes. Outcrop hills form key pinch-points within the valleys. The valleys can be relatively wide and open, with enclosed pastures extending up to higher, more open rough grazing and bracken slopes although some sections of the dales are much more confined. Woodlands are a key feature and these include semi-natural woodlands and the policies of designed landscapes. While the floors of the dales are well settled and linked by major roads, the upper slopes and side valleys are more sparsely settled.

The landscape of these dales has an overall ***High*** sensitivity to the large typology and a ***High-medium*** sensitivity to the medium typology. The openness and more expansive scale of the broader parts of these upper dales, however, offer some opportunities for smaller typologies and there would be a ***Medium*** sensitivity to the small-medium typology and a ***Low*** sensitivity to small wind turbines.

The Upper Dales are highly visible from settlement and major roads. Visual sensitivity was concluded to be ***High*** for large, medium typologies and small/medium typologies and ***Low*** for small wind turbines, as there could be opportunities to site the latter where they are less visible due to tree cover and landform.

RSA designations cover much of the Upper Dales and there are a number of Archaeologically Sensitive Areas. There would be a ***High-medium*** sensitivity in terms of landscape values for the large, medium and small-medium typology and a ***Medium*** sensitivity for small turbines. Landscape values would be ***Low*** within undesignated parts of north-west Nithsdale.

Cumulative impacts

Existing and consented wind farm development located within the adjacent Southern Uplands (19) and Foothills with Forest (18a) character types is/will be highly visible from north-west ‘Upper Nithsdale’ and from parts of the ‘Upper Glenkens’ landscape units. These wind farms include the Hare Hill, Whiteside Hill, Torrs Hill and Wether Hill developments. The proposed wind farm developments of Knockman Hill and Magree within the ‘Stroan’ Foothills with Forest (18a) would also be likely to be visible in relative proximity from the ‘Upper Glenkens’.

Any additional development of the larger typologies sited within the Upper Dales would be inter-visible with turbines located on adjacent, surrounding hills in more upland character areas and potential cumulative effects are one of the key sensitivities inhibiting this scale of development in the Upper Dales. The small-medium typology, while more able to fit with other key characteristics of these landscapes, could also result in significant cumulative impacts with wind farm development in adjacent upland landscapes if poorly sited. Inter-visibility between the

small-medium typology and existing/consented development is likely to be more intermittent, but should be monitored closely, especially as turbines located at the less sensitive upper edges of the dales are likely to be seen in close proximity with these existing, consented and proposed wind farms.

Additional cumulative impacts may arise if more than one, or small groups, of the small-medium typology appear within these dales, and the relationship between proposals for this typology will need to be monitored closely as they might easily become a dominant feature. Cumulative effects are most likely to be increased visual clutter, which may be compounded by different turbine models and existing masts and other vertical structures, and the sense of turbines visually detracting from the rural or more secluded character of the landscape where they become visually dominant.

Constraints

- The narrower sections of these upper dales, especially where enclosure is emphasised by steeper slopes and woodland.
- The outcrop hills, for example north of Crairiepark Farm in Nithsdale and Dundeugh Hill in Glenkens and more complex knolly landform often found within the floors and lower slopes of these Upper Dales.
- Key landscape features, including water bodies and often extensive designed landscapes such as Drumlanrig Castle and Garroch.
- The Archaeologically Sensitive Areas in Glenkens.
- The high visibility of these dales, which are well settled along the valley floors as well as being highly visible from roads and more elevated farms
- The potential inter-visibility of development within the Upper Dales with large wind farms on the nearby Southern Uplands (19) and Foothills with Forest (18a) character types which inhibits scope for larger typologies.
- Key views to Cairnsmore of Carsphairn and the Rhinns of Kells from the ‘Upper Glenkens’.
- The RSA designations which cover much of these landscapes.

Opportunities

- The more open and expansive areas of the upper dales, especially where there are larger fields, where the vegetation pattern becomes more extensive and where there is backdrop of larger hills and broad sweeping upland slopes
- Areas where settlement is sparser, usually on upper side slopes at the transition with the Foothills (18a) and Southern Uplands (19) (although some of these areas may be constrained by the presence of existing/consented wind farm development in these adjoining character types).

Guidance on development

There is no scope to locate larger typologies within the Upper Dales without incurring significant impacts across a wide spectrum of sensitivities, including cumulative landscape and visual effects with existing and consented wind farm development in adjacent landscapes with a more upland character.

There may be some limited opportunities for the small-medium typology to be sited within broader stretches of the dales and relating to concave folds in the land form, natural terraces, more open and simple areas of vegetation, gently graded side slopes and areas of more expansive scale. However, the location of developments would need to be carefully considered because of the potential for cumulative effects to arise with existing, consented and proposed wind farm developments within the adjacent 'Nithsdale' unit of the Southern Uplands (19) and the Foothills with Forest (18a). There is likely to be scope for multiple developments of this small-medium typology within these broader sections of the Upper Dales, although cumulative effects will be a key limitation given the proposals for wind farm developments in adjacent areas. It may be preferable to use turbines towards the lower height band of the small-medium typology in order to create a clear differential between wind turbine developments within landscapes with a more extensive upland character and the more settled and patterned Upper Dales which are more 'lowland' in character.

Small turbines should be located where they can reinforce the pattern of existing development, associated with farms and other small groups and single buildings which provide a framework of built development-related spot features within the dales.

Turbines should be sited to avoid impacts on the setting of settlements, on designed landscapes, archaeology and other features of importance, as well as key landmark features such as the water bodies within the Glenkens. Areas of more complex landform and key outcrop hills should be kept free of development. Micro-siting should follow the guidance set out in Section 7 of this report.

Character Type 19: Southern Uplands Type

Introduction

The Southern Uplands Type predominantly occurs on the northern and eastern fringes of Dumfriesshire and extends into neighbouring Scottish Borders and South Lanarkshire. There are 11 landscape units identified within the character type within the Dumfries and Galloway landscape assessment. The 'Lamford' unit has been reclassified as the Southern Uplands Type with Forests (19a) and amalgamated with the 'Carsphairn' unit of that type. The Tynron area of the 'Nithsdale' unit has been reclassified as character type 18 (Foothills) and the 'Merrick' unit is reclassified as character type 21 (Rugged Granite Uplands).

There is a strong consistency across the following landscape units which are considered together in a single sensitivity assessment:

- North Moffat
- East Moffat
- North Langholm
- West Langholm
- Tarras
- Lowther
- Carsphairn
- Beneraird

The 'Nithsdale' landscape unit has similarities with the north-western part of the 'Lowthers' unit in terms of the generally lower elevation of hills, geographic location and visual relationship with Upper Nithsdale. The north-western part of the 'Lowthers' unit has therefore been reclassified as the 'North-west Lowthers' and is considered together with 'Nithsdale' in a separate sensitivity assessment to the units listed above.

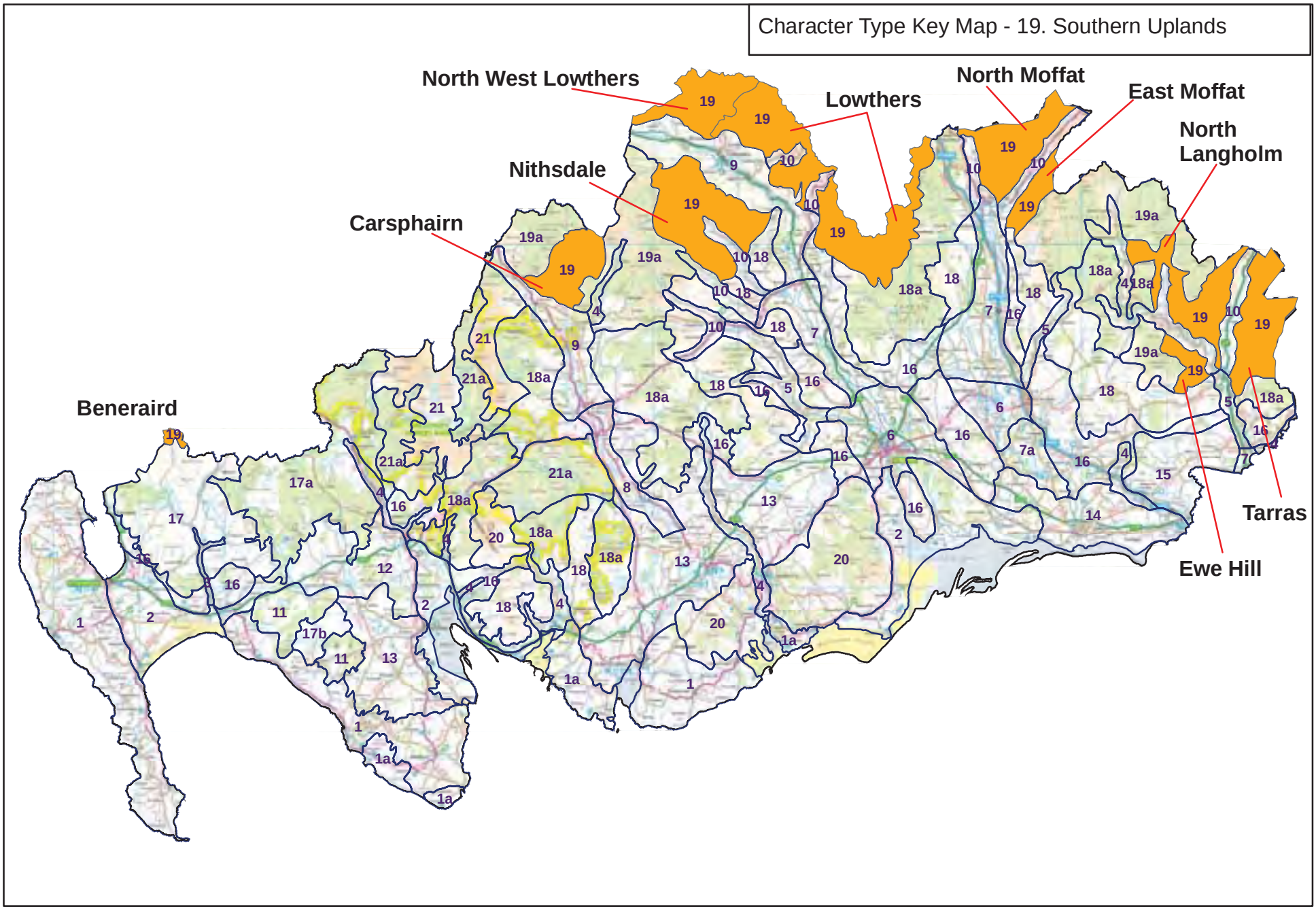
Due to the very sparsely populated nature of this upland landscape, demand for smaller scale typologies is likely to be limited and smaller scale typologies are only considered within the summary and guidance section of the assessment.

Cultural heritage overview

This landscape type is characterised as moorland/rough grazing with some forestry in the east, along with relict land-uses, (although parts have not yet been assessed by the HLA process). There are areas of pre-improvement (pre-19thc) land-use with their remains of buildings and distinct field shapes, as well as industrial landscapes. There are a number of archaeological sites of outstanding significance and distinctiveness, a few of which are promoted for public benefit.

Existing wind farm development

The existing wind farm development of Hare Hill is located within this character type but within neighbouring South Ayrshire. The existing Carlesgill/Craig and Windy Standard wind farms are also partially located in this character type. The consented Whiteside Hill wind farm is located within the Nithsdale landscape unit of this type and the consented/under construction Clyde wind farm is located in the Southern Uplands Type within neighbouring South Lanarkshire.


Character Type Key Map - 19. Southern Uplands
North West Lowthers
Lowthers
North Moffat
East Moffat
North Langholm
Nithsdale
Carsphairn
Beneraird
Tarras
Ewe Hill

Type 19: Southern Uplands

Tarras, North/East Moffat, North/West Langholm, Lowther and Carsphairn and Beneraird units

Summary of sensitivity

These landscape units of the Southern Uplands Type have a generally consistent and homogenous character within Dumfries and Galloway, forming high hills with an often dramatic sculptural landform. This same character type extends into neighbouring South Lanarkshire where it has a less distinctive landform and is generally less sensitive in terms of its landscape context than the Southern Uplands occurring within Dumfries and Galloway.

While the scale of this character type could relate to larger typologies, the distinctive landform of these uplands, where hills are pronounced and often form steep, rugged edges to adjacent dales and upland glens, is a key constraint to development. The sparsely settled nature and simple land cover pattern reduces sensitivity although, conversely, these uplands are particularly valuable because of their openness and absence of built development and large-scale forestry. These units of the Southern Uplands Type have an overall ***High*** sensitivity to the large and medium typologies of wind farm development.

These uplands are fairly narrow in extent within Dumfries and Galloway and they border well-settled dales and upland glens thus increasing visibility. A ***High*** visual sensitivity would be associated with both the large and medium typologies.

Regional Scenic Areas cover much of this character type with a ***High to medium*** sensitivity accorded in terms of landscape values.

Smaller typologies

There is unlikely to be a significant demand for smaller typologies within this very sparsely settled upland area. Small-medium typologies would be likely to have similar adverse effects as larger typologies on dramatic landform, openness, landscape context and wildland qualities. Small typologies would appear trivial in relation to the predominantly large scale of these uplands, especially if sited on ridges and summits. They could also have similar adverse effects on more complex landform, for example, the sheer slopes bordering Upland Glens (10) and on areas with a more pronounced wildland character away from settlement. Opportunities may exist on the fringes of this character type, on smoother less complex lower hill slopes at the transition with more settled glens and valleys where the small typology could relate to the scale of existing buildings, providing they did not intrude on key views to the hills or interrupt skylines.

Potential cumulative impacts

The existing Windy Standard wind farm is sited close to the ‘Carsphairn’ unit and adversely affects the wider setting of Cairnsmore of Carsphairn. The proposed Afton wind farm is sited within neighbouring South Ayrshire, approximately 2km to the north-east of Windy Standard and, as such, it would be unlikely to significantly exacerbate the effect on this distinctive hill.

The consented Harestanes wind farm is located within the 'Ae' unit of the Foothills with Forest (18a). This large development is likely to impact on the setting and landmark of Queensberry Hill within the 'Lowthers' unit of the Southern Uplands Type (19), particularly in views from Annandale to the east. Any further wind farm development on the steep hill slopes of Queensberry Hill and/or on the surrounding higher open hills of the Southern Uplands Type (19) in this area (these forming a markedly rugged edge on the north-eastern boundary with the 'Ae' Foothills with Forest (18a)) would be likely to significantly exacerbate the effects on the setting of this landmark hill and the 'Lowther' unit of the Southern Uplands Type in this area.

The existing Craig/Carlesgill wind farm is located within the 'West Langholm' unit of the Southern Uplands Type (19). This small development of 4 turbines occupies a prominent position above the Esk valley. Any further extension to this development would be likely to accentuate adverse effects on the dramatic landform of steep scarp slopes above the Esk and on the small scale character and views from this settled 'Narrow Wooded Valley' (4).

Constraints

- A landform where high and shapely peaks, steep scarp slopes, crags and deeply incised valleys are interspersed with smoother rolling upland plateaux.
- The backdrop provided by these uplands to adjoining settled areas such as the upland glens of Moffat and Langholm and the broad dales of Nithsdale, the Glenkens and Annandale which increases visibility.
- Areas of extensive heather moorland that notably occur within the Lowther, Langholm and Moffat Hills.
- Extensive forestry within adjacent upland areas in Dumfries and Galloway which increases the value of these open, less modified hills and increases the sense of naturalness experienced.
- The important contribution that these dramatic sculptural and open uplands make to wider scenic quality as recognised in the RSA designations that cover the majority of these uplands.
- Recreational use of these uplands which include a number of 'Corbett' hills and other celebrated features such as the Devil's Beef Tub in upper Annandale and the setting for the Grey Mare's Tail waterfall, and which increase visual sensitivity.

Opportunities

- Lower, less complex hill slopes where the small typology could be associated with existing settlement on the fringes of the uplands.

Guidance on development

There is no scope for the large development typology to be sited within this character type without incurring significant impacts on a number of key characteristics. Although there may be some limited opportunities for the medium and small-medium typology to be sited to minimise views from surrounding settled glens and dales, this typology would also significantly impact on a number of key characteristics of these uplands including the sense of naturalness which is important in a context where extensive forestry influences the character of surrounding upland areas.

There may be some limited opportunities for the small typology to be sited on lower, less complex hill slopes in association with existing settlement providing that key views to distinctive hills or landform features are avoided and the setting of archaeological sites are not affected. Micro-siting should accord with the guidance set out in Section 7 of this report.

Proposed extensions to existing wind farms, or new wind farm development in Dumfries and Galloway or neighbouring South Lanarkshire, should avoid impacting on the skyline of these hills seen from Annandale, Nithsdale and the upland glens (10). Wind farm development should also be sited to avoid detracting from distinctive ‘landmark’ hills within this character type. This guidance will relate to any potential future proposals for extensions to the existing/consented developments of Clyde, Harestanes or Dalswinton but also to any new developments in the adjacent ‘Foothills’ (18) or ‘Foothills with Forestry’ (18a) character types.

Type 19: Southern Uplands

NW Lowther and Nithsdale units

Summary of sensitivity

While the large scale, generally subtle landform and simple land cover of these landscape units of the Southern Uplands could relate to larger typologies, there are some characteristics which increase sensitivity, including more pronounced landform, particularly occurring on the southern edge of the 'Nithsdale' unit, which make an important contribution to the scenic diversity of adjacent glens and valleys. These units of the Southern Uplands Type have an overall ***Medium*** sensitivity to the large and a ***Medium-low*** sensitivity to the medium typologies of wind farm development.

These uplands border well-settled dales and upland glens thus increasing visibility. A ***High-medium*** visual sensitivity would be associated with both the large and medium typologies.

Regional Scenic Areas cover the southern part of the 'Nithsdale' unit although the remainder of these uplands are not designated. Sensitivity in terms of landscape values would therefore range from ***High-medium*** to ***Low.***

Smaller typologies

There is unlikely to be a significant demand for smaller typologies within this very sparsely settled upland area. Small-medium typologies would have similar adverse effects to the larger typologies on more complex and distinctive landform and if sited so they intruded on adjacent sensitive small scale valleys and glens. They could however relate better to lower hill slopes adjacent to Upper Nithsdale. Small typologies would appear out of scale in relation to the predominantly large scale of these uplands, especially if sited on ridges and summits although could relate to the scale of existing settlement sited within valleys and on lower hill slopes.

Potential cumulative impacts

The existing Hare Hill wind farm is located in the Southern Uplands Type but within neighbouring South Ayrshire. The Southern Uplands Type character types within Dumfries and Galloway and South Ayrshire are very similar in character and merge in views from Upper Nithsdale (9) between Sanquhar and New Cumnock to form a largely homogenous upland backdrop to this dale. The Hare Hill wind farm forms a prominent, but not dominant, feature seen across north-west Nithsdale largely because of the broad scale of the dale and the extensiveness of views possible but also the relatively small size of turbines at 63.5m height. An extension is proposed to this wind farm and this is sited on a similarly broad-topped hill to the south below the more distinctive higher and rugged Blackcraig Hill. This extension would comprise an additional 39 turbines of between 44-91m height. It would consolidate wind farm development seen to the west from the part of north-west Upper Nithsdale within Dumfries and Galloway but would be back-dropped/partially contained by the higher Blackcraig Hill (depending on precise viewpoint) in views from the north and east thus helping it 'sit' more satisfactorily within the landscape.

The consented Whiteside wind farm is located within the 'Nithsdale' unit of this character type. It comprises 11 turbines of 121m high. It will lie approximately 6km to the south-east from the existing Hare Hill wind farm. This development will be located on a broad ridge between the upper glens of the Euchan and Scar Water and close to the adjacent 'Ken' unit of the Southern Uplands with Forest (19a). It will be set well back from Upper Nithsdale within a plateau-like area in the 'interior' of these uplands although turbines will be almost twice as large as the existing Hare Hill turbines, which is likely to increase visual prominence. This wind farm is likely to be visible from the sensitive small scale and diverse Euchan and Scar Water valleys[14].

Constraints

- More complex landform associated with the deeply incised valleys of the Kello and Euan Water, irregular landform between the Euan Water and Scar glens which creates a knolly, notched skyline seen from the elevated northern slopes of Nithsdale and more deefined, rugged hills bordering the Upland Glens (10) of the Scar and Shinnel Water.
- The distinctive landmark hills of Blackcraig, Cairn Kinney and Cairnkinna; the latter particularly important in providing a backdrop to Drumlanrig Castle and its designed landscape seen from the Thornhill area.
- The high visibility of these uplands from north-west Upper Nithsdale, where long hill slopes and generally fairly smooth skyline ridges provide a backdrop and focus in views from settlement and roads.
- Commercial forestry within adjacent upland areas in Dumfries and Galloway and neighbouring South Ayrshire which increases the value of the less modified parts of these hills and increases the sense of naturalness experienced.
- The important contribution that the dramatic sculptural open hills of the southern part of the 'Nithsdale' unit make to wider scenic quality as recognised in the RSA designations that cover part of these uplands.
- Recreational use of these hills by walkers using tracks, minor roads and the SUW which increase visual sensitivity.
- Likely cumulative landscape and visual effects with the existing Hare Hill and consented Whiteside Hill

Opportunities

- The generally simple landform of long smooth lower hill slopes containing Upper Nithsdale and gently undulating upland plateaux within the 'interior' of these uplands.
- The sparsely populated nature of these uplands.
- The broadness of north-west Upper Nithsdale which could potentially reduce the visual impact of development set within these uplands.
- An absence of landscape designations in the northern part of the 'Nithsdale' unit and the 'NW Lowthers' unit.

Guidance on development

The existing Hare Hill wind farm, together with its proposed extension and the consented Whiteside wind farm limits scope for additional larger typologies of wind farm development to

[14] Whiteside Hill Windfarm, Environmental Statement Supplementary LVIA Figures, October 2006

be sited within the ‘Nithsdale’ landscape unit of the Southern Uplands Type (19), given both the cumulative landscape and visual effects that are likely to arise and the key landscape constraints outlined above which inhibit development. ***The ‘Nithsdale’ unit of the Southern Uplands Type is a landscape where capacity is considered to be nearly reached for additional development.***

There is some scope for larger typologies to be located in the ‘NW Lowthers’ unit but set well back from the ‘edge’ hills which provide a backdrop to Upper Nithsdale and from the sensitive small scale Crawick valley. Turbines should be reduced in height if necessary to avoid significant intrusion on views from settlement and roads within Nithsdale and to minimise the extent of development visible on the skyline of the uplands. A ‘corridor’ effect where multiple wind farms were visible in the uplands either side of north-west Upper Nithsdale would be likely to dominate views, detract from the simple and largely uncluttered skyline of the uplands and could diminish the characteristic expansiveness of this dale.

There may be some limited opportunities for turbines towards the lower height band of the medium typology and the small-medium typology to be sited on broad, even, lower hill slopes bordering Upper Nithsdale (9). However, the numbers and scale of such development would need to be restricted because of the influence of existing/consented wind farm developments within the Southern Uplands Type (19) and potential for cumulative effects to arise. Establishing a clear differential between development typologies and landscape character (ie. smaller turbines on lower hill slopes, larger turbines on ridges and upland plateaux) could minimise cumulative effects although the existing Hare Hill turbines are only 63.5m high and still appear prominent within the open landscape of Upper Nithsdale. The medium typology turbines would be similar in scale (50-80m) but would be sited closer to key views and landscape features such as enclosed fields, woodlands and settlement, thus increasing the perception of scale and visual prominence. The small-medium typology would be likely to provide a better differential in these areas.

There are opportunities for the small typology to be sited on lower, less complex hill slopes in association with existing settlement providing that key views to distinctive landform features were avoided. Micro-siting should accord with the guidance set out in Section 7 of this report.

Character Type 19a: Southern Uplands Type with Forests

Introduction

The Southern Uplands Type with Forest predominantly occurs on the northern and eastern fringes of Dumfriesshire and extends into neighbouring Scottish Borders and South Ayrshire. There are four landscape units identified within the character type in the Dumfries and Galloway landscape assessment. The upper part of the 'Rhinns of Kells' landscape unit is reclassified as the Rugged Granite Uplands with Forests character type (21a) due to its inherent landform and association with the Galloway Hills. The remainder of this unit is amalgamated with the 'Cairnsmore' unit of 18a. The 'Lamford' unit of the Southern Uplands Type (19) is reclassified as Southern Uplands with Forests (19a) due to its proximity to densely forested landscapes and amalgamated with the 'Casphairn' landscape unit of 19a. The majority of the 'West Langholm' unit of the Southern Uplands Type (19) is reclassified as 19a because of its predominant forest cover.

There is a strong consistency across the following remaining three landscape units which are considered together with the new unit of 'West Langholm' in the sensitivity assessment:

- Casphairn
- Ken
- Eskdalemuir

Due to the very sparsely populated nature of this upland landscape, demand for smaller scale typologies is likely to be limited and smaller scale typologies are therefore only considered within the summary and guidance section of the assessment.

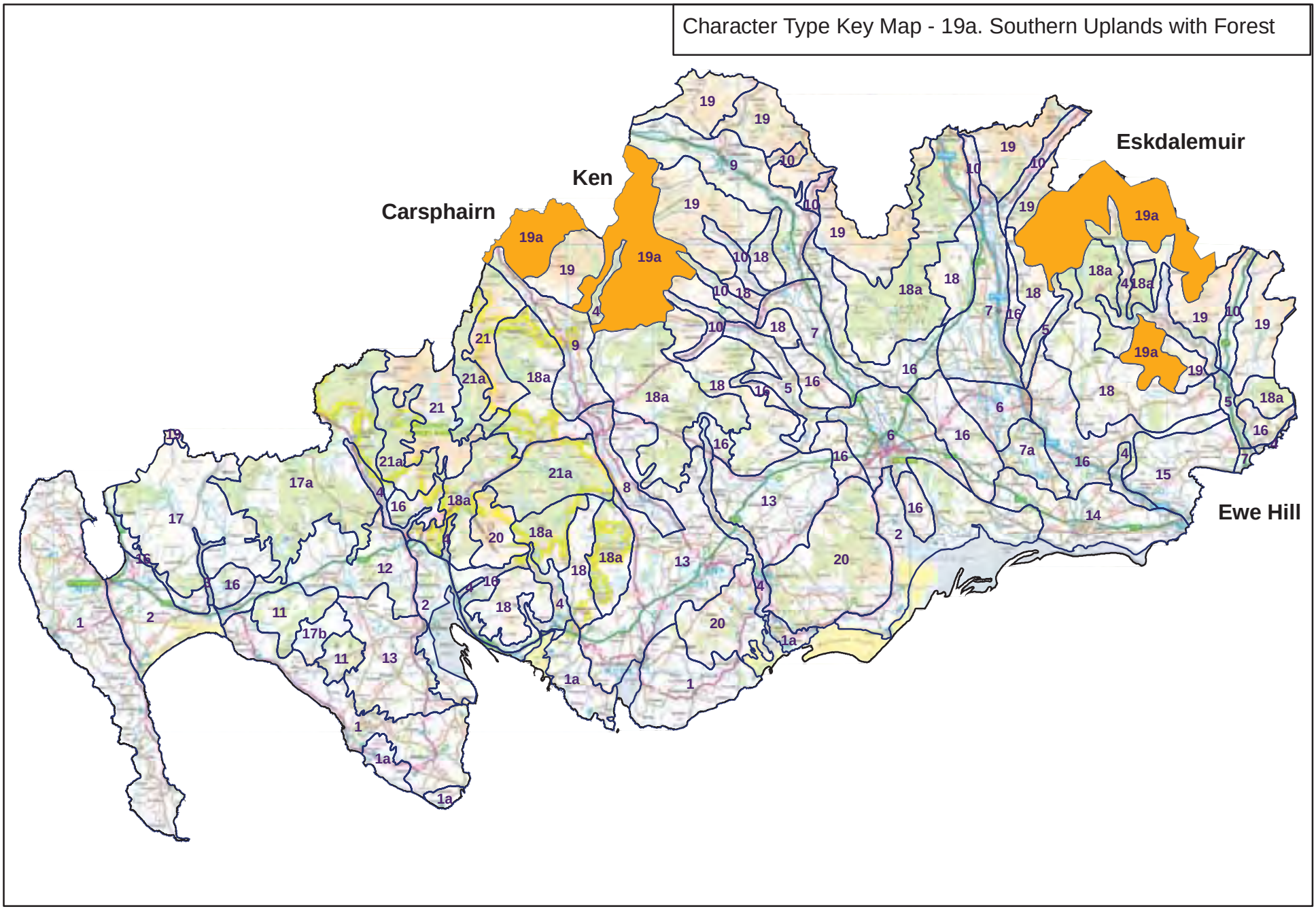
Cultural heritage overview

A landscape type characterised as forestry with very little evidence of relict land-uses although there are a few archaeological sites of outstanding significance and distinctiveness.

Existing wind farm development

The existing wind farm development of Wether Hill is located in the 'Ken' unit of this character type. The existing Carlesgill/Craig and Windy Standard wind farms are partially located in this character type. The existing wind farm of Hare Hill is located in the related Southern Uplands character type but within neighbouring South Ayrshire.

The consented Whiteside wind farm is located within the 'Nithsdale' unit of the Southern Uplands Type (19) which lies adjacent to the 'Ken' unit of (19a). The consented Ewe Hill wind farm lies within the 'Annandale' Foothills (16) with 16 further turbines forming part of this development lying within the 'West Langholm' unit of the Southern Uplands Type with Forests (19a).


Character Type Key Map - 19a. Southern Uplands with Forest
Carsphairn
Ken
Eskdalemuir
Ewe Hill

Type 19a: Southern Uplands with Forests

Eskdalemuir, Ken, Carsphairn and West Langholm units

Summary of sensitivity

The key characteristics of the Southern Uplands Type with Forest of a predominantly expansive, gently undulating landform and simple extensive commercially managed forest cover reduces sensitivity wind farm development. Landscape sensitivity would be ***low*** for both the large and medium typologies.

This landscape is very sparsely populated and not readily visible from the wider landscape being sited away from settled areas and public roads. Visual sensitivity would be ***Medium*** in relation to the large typology and ***Medium-low*** in relation to the medium typology.

The majority of this landscape is not covered by landscape designations and this, together with an absence of recreational use or other non-designated interests, would result in ***Low*** sensitivity in respect of landscape values.

Smaller typologies

There is unlikely to be a demand for smaller typologies within this very sparsely populated upland area. Although smaller typologies would appear trivial in relation to the predominantly large scale of these uplands, visibility would be limited thus reducing sensitivity. Opportunities may exist on the fringes of this character type and at the transition with more settled valleys and upland glens where smaller turbines could relate to existing buildings.

Potential cumulative effects

Cumulative effects would be more likely to arise within the 'Ken' and 'Carsphairn' units and associated with the existing wind farms of Wether Hill, Windy Standard and Hare Hill and the consented wind farm of Whiteside. A number of wind farms are also proposed in the adjacent 'Stroan' unit of the Foothills with Forest character type (18a) and cumulatively, development in the 'Ken' unit of the Southern Uplands Type with Forest could 'bridge the gap' between developments in the Foothills and Southern Uplands, potentially forming a concentrated band of wind farm development. The sparsely populated nature of the Southern Uplands, Southern Uplands with Forest and Foothills with Forest (18a) in a broad area between Upper Nithsdale and Stroan Hill would result in cumulative visual impacts being primarily experienced by walkers accessing hills such as Cairnsmore of Carsphairn. There would be likely to be more distant views from elevated parts of the Glenkens and Rhinns of Kells.

Constraints

- The arc of hills which includes Benbrack, Cairn and Blackcraig which form a key focus at the head of the upper Dalwhat Water. The presence of the SUW and the landmark sculptures of Striding Arches add to the sensitivities of this area.
- The rim of open-topped rugged higher hills extending from Loch Fell (688m) north-west of the 'Eskdalemuir' unit, visible from the Corbetts of White Coombe and Hart Fell in the Moffat Hills.

- The proximity of the dramatic sculptural hill of Cairnsmore of Carsphairn to parts of this character type.
- Occasional areas of more complex landform and deeply incised valleys largely masked by extensive forest.
- Potential for cumulative effects with existing and consented wind farm development within the ‘Ken’ and ‘Carsphairn’ landscape units.

Opportunities

- The expansive scale of this character type and its predominantly simple, gently rolling landform.
- The sparsely settled nature of this character type and its distance from more populated lowland areas.
- Extensive commercially managed forestry which covers the majority of the character type and which inhibits the perception of wildness.

Guidance on development

Multiple large and medium typologies could be accommodated within this character type although development should avoid the more pronounced open-topped hills which provide an important backdrop and containing ‘edge’ to smaller scale valleys and upland glens and areas of more complex landform. They should also be sited to avoid impacting on the site and setting of significant and distinctive archaeological sites. The ‘Eskdalemuir’ unit is particularly extensive and very distant from settlement and has potential to accommodate developments of 50-100 turbines. The rim formed by a ridge of higher hills on the north-west boundary of this landscape unit could potentially provide screening of wind farm development located on lower forested hills to the south-east. The number of turbines and scope for multiple developments will be more limited in the ‘Ken’ and ‘Carsphairn’ units, constrained by their smaller area and other landscape sensitivities outlined under the list of constraints above including potential cumulative landscape and visual effects.

Smaller typologies could appear ‘trivial’ within these large scale landscapes and should be located in association with existing settlement on lower hills at the transition with the Narrow Wooded Valleys (4) and Upland Glens (10). Micro-siting of smaller typologies should accord with the guidance set out in Section 7 of this report.

Landscape Team Field Survey Form

Viewpoint No. 1 **Location:** 254918, 608604 **Date:** 04/06/2015 **Photo:**

Landscape Character Type: East Ayrshire Southern Uplands

Landscape Character Area: Benty Cowan

Geology: Ordovician rocks, predominantly greywacks; glacial erosion

Topography: Smooth slopes with rounded summits

flat	plain	dry valley
undulating	rolling lowland	deep gorge
rolling	plateau	broad valley
steep	scarp/cliffs	narrow valley / glen
vertical	hills	

Dominant landcover and landscape elements:

BUILDINGS:	HERITAGE:	FARMING:	LANDCOVER:	WOODLAND/TREES:	HYDROLOGY:	COMMUNICATIONS:
farm buildings	vernacular buildings	walls	designed parkland	deciduous woodland	river	road B741 in view
masts/poles	country house	fences	scrub	coniferous plantation	stream just visible	track
pylons	field systems	hedges	marsh	mixed woodland	reservoir	footpath
industry	prehistoric ritual	fields	peat bog	shelterbelt	dry valley	lane
settlement	hill top enclosure/ fort	arable	moor / heath	hedge trees	winterbourne	railway
urban	ecclesiastic	improved pasture	rough grassland	orchard	pond	military
follies	monuments of war	rough grazing	water meadows	clumps	lake / loch	pylons
military	coppice	hedge banks	grassland	isolated trees	drainage ditch	communication masts
		orchard	species rich grassland			

Brief description (including main elements, features, attractors and detractors):
Commercial forestry behind and to the side, smooth sloping hills with rounded summits. Glimpses of the B741 at foot of hills. Views across to recent open cast mining roads and spoil heaps

Key Characteristics / Distinctive Features and why they are important:
Smooth sloping hills with open tops contained by commercial forestry, large-scale expansive open landscape with views across to upland basin and foothills with forest and open cast mining

Rarity:
Rare in council boundary but not in wider geographical area

Condition:
Good condition generally - rough grassland with commercial forestry intact fences / felling coupes

Visual Assessment Criteria

PATTERN (2 Dimensional):	dominant	strong	broken	weak
SCALE:	intimate	small	medium	large
TEXTURE:	smooth	textured	rough	very rough
COLOUR:	monochrome	muted	colourful	garish
COMPLEXITY:	uniform	simple	diverse	complex
REMOTENESS:	wild	remote	vacant	active
UNITY:	unified	interrupted	fragmented	chaotic
FORM (3 Dimensional):	straight	angular	curved	sinuous
ENCLOSURE:	expansive	open	enclosed	constrained
VISUAL DYNAMIC:	sweeping	spreading	dispersed	channelled

Perception

SECURITY:	intimate	comfortable	safe	unsettling	threatening
STIMULUS:	monotonous	bland	interesting	challenging	inspiring
TRANQUILLITY:	inaccessible	remote	vacant	peaceful	busy
PLEASURE:	unpleasant	pleasant	attractive	beautiful	

Architecture - (Note condition / quality)

Local Materials – (stone type, colour / texture etc, brick, colour / size / render)

Combinations – (stone and brick patterns etc)

Vernacular Style - (window style / roof pitch)

Settlement Form - (village greens, clustered, military, scattered) Scattered houses along the b741 can be glimpsed in the distance

Additional Comments – (Note evidence of pollution, erosion, bare or disturbed ground, condition of historic features, new planting, restoration work) Felling coupes visible in the vicinity

Landscape Team Field Survey Form

Viewpoint No. 2 **Location:** 259203 610304 **Date:** 04/06/2015 **Photo:**

Landscape Character Type: East Ayrshire Southern Uplands

Landscape Character Area: Benty Cowan

Geology: Ordovician rocks, predominantly greywacks; glacial erosion

Topography: Smooth slopes with rounded summits

flat	plain	dry valley
undulating	rolling lowland	deep gorge
rolling	plateau	broad valley
steep	scarp/cliffs	narrow valley / glen
vertical	hills	

Dominant landcover and landscape elements:

BUILDINGS:	HERITAGE:	FARMING:	LANDCOVER:	WOODLAND/TREES:	HYDROLOGY:	COMMUNICATIONS:
farm buildings	vernacular buildings	walls	designed parkland	deciduous woodland	river	road
masts/poles	country house	fences	scrub	coniferous plantation	stream	track
pylons	field systems	hedges	marsh	mixed woodland	reservoir	footpath
industry	prehistoric ritual	fields	peat bog	shelterbelt	dry valley	lane
settlement	hill top enclosure/ fort	arable	moor / heath	hedge trees	winterbourne	railway
urban	ecclesiastic	improved pasture	rough grassland	orchard	pond	military
follies	monuments of war	rough grazing	water meadows	clumps	lake / loch	pylons
military	coppice	hedge banks	grassland	isolated trees	drainage ditch	communication masts
		orchard	species rich grassland			

Brief description (including main elements, features, attractors and detractors):
Main elements: rounded sweeping hills with rough grassland and a block of commercial and deciduous forestry. Detractors: derelict farm buildings, views of recent open cast mining

Key Characteristics / Distinctive Features and why they are important:
Sweeping, large-scale, open and expansive rounded hills. Predominantly rough grassland bounded by areas of commercial forestry with blocks of deciduous mixed woodland

Rarity:
Rare in council boundary but not geographical region

Condition:
Vegetation / fences / walls generally in good condition -> some derelict farm buildings reduced to foundations

Visual Assessment Criteria

PATTERN (2 Dimensional):	dominant	strong	broken	weak	little pattern
SCALE:	intimate	small	medium	large	
TEXTURE:	smooth	textured	rough	very rough	
COLOUR:	monochrome	muted	colourful	garish	
COMPLEXITY:	uniform	simple	diverse	complex	
REMOTENESS:	wild	remote	vacant	active	
UNITY:	unified	interrupted	fragmented	chaotic	
FORM (3 Dimensional):	straight	angular	curved	sinuous	
ENCLOSURE:	expansive	open	enclosed	constrained	
VISUAL DYNAMIC:	sweeping	spreading	dispersed	channelled	

Perception

SECURITY:	intimate	comfortable	safe	unsettling	threatening
STIMULUS:	monotonous	bland	interesting	challenging	inspiring
TRANQUILLITY:	inaccessible	remote	vacant	peaceful	busy
PLEASURE:	unpleasant	pleasant	attractive	beautiful	

Architecture - (Note condition / quality) Farm building in use in good condition, evidence of derelict farm building with foundations still in place

Local Materials – (stone type, colour / texture etc, brick, colour / size / render) White rendered brick and metal sheds

Combinations – (stone and brick patterns etc)

Vernacular Style - (window style / roof pitch)

Settlement Form - (village greens, clustered, military, scattered) Scattered houses along the B741 can be glimpsed in the distance

Additional Comments – (Note evidence of pollution, erosion, bare or disturbed ground, condition of historic features, new planting, restoration work) Felling coupes visible spoil heaps / roads for recent open cast mining in the distance

Landscape Team Field Survey Form

Viewpoint No. 3 **Location:** 260874 609605 **Date:** 04/06/2015 **Photo:**

Landscape Character Type: East Ayrshire Southern Uplands

Landscape Character Area: Benty Cowan

Geology: Ordovician rocks, predominantly greywacks; glacial erosion

Topography: Smooth, sloping slopes with rounded tops beyond incised valley of Connel Burn

flat	plain	dry valley
undulating	rolling lowland	deep gorge
rolling	plateau	broad valley
steep	scarp/cliffs	narrow valley / glen
vertical	hills	

Dominant landcover and landscape elements:

BUILDINGS:	HERITAGE:	FARMING:	LANDCOVER:	WOODLAND/TREES:	HYDROLOGY:	COMMUNICATIONS:
farm buildings	vernacular buildings	walls	designed parkland	deciduous woodland	river	road
masts/poles	country house	fences	scrub	coniferous plantation	stream	track
pylons	field systems	hedges	marsh	mixed woodland	reservoir	footpath
industry	prehistoric ritual	fields	peat bog	shelterbelt	dry valley	lane
settlement	hill top enclosure/ fort	arable	moor / heath	hedge trees	winterbourne	railway
urban	ecclesiastic	improved pasture	rough grassland	orchard	pond	military
follies	monuments of war	rough grazing	water meadows	clumps	lake / loch	pylons
military	coppice	hedge banks	grassland	isolated trees	drainage ditch	communication masts
		orchard	species rich grassland			

Brief description (including main elements, features, attractors and detractors):

Views across incised valley containing Connel Burn, smooth round hills and commercial forestry beyond. Some scattered farm buildings and wood poles, some stone walls and fences. Glimpses of the B741.

Key Characteristics / Distinctive Features and why they are important:

Smooth sloping hills with open tops contained by commercial forestry, large-scale expansive open landscape with views across to upland basin and foothills with forest and open cast mining

Rarity:

Rare in council boundary but not in wider geographical area

Condition:

Good condition - rough grassland with felling coupes in view, intact walls / fences, some arable fields

Visual Assessment Criteria

PATTERN (2 Dimensional):	dominant	strong	broken	weak	little pattern
SCALE:	intimate	small	medium	large	
TEXTURE:	smooth	textured	rough	very rough	
COLOUR:	monochrome	muted	colourful	garish	
COMPLEXITY:	uniform	simple	diverse	complex	
REMOTENESS:	wild	remote	vacant	active	
UNITY:	unified	interrupted	fragmented	chaotic	
FORM (3 Dimensional):	straight	angular	curved	sinuous	
ENCLOSURE:	expansive	open	enclosed	constrained	
VISUAL DYNAMIC:	sweeping	spreading	dispersed	channelled	

Perception

SECURITY:	intimate	comfortable	safe	unsettling	threatening
STIMULUS:	monotonous	bland	interesting	challenging	inspiring
TRANQUILLITY:	inaccessible	remote	vacant	peaceful	busy
PLEASURE:	unpleasant	pleasant	attractive	beautiful	

Architecture - (Note condition / quality) Vernacular farm building and metal sheds. Reasonable condition / quality

Local Materials – (stone type, colour / texture etc, brick, colour / size / render) Rendered white brick

Combinations – (stone and brick patterns etc)

Vernacular Style - (window style / roof pitch)

Settlement Form - (village greens, clustered, military, scattered) Scattered farm buildings

Additional Comments – (Note evidence of pollution, erosion, bare or disturbed ground, condition of historic features, new planting, restoration work)

Appendix 9.E
Wild Land Assessment

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Appendix 9.E: Wild Land Assessment

9.1 Introduction

9.1.1 Wild Land Areas (WLA) have recently been identified by SNH as part of the National Planning Framework 3 and the new Scottish Planning Policy 2014. The WLAs supersede the previously identified Core Areas of Wild Land 2013 and replace the former Search Areas for Wild Land (SAWL) which was also identified by the SNH in their Wildness in Scotland's Countryside Policy Statement in 2002.

9.1.2 The Proposed Development is not located within or close to a WLA. The closest WLA is some 18.6km distant at its nearest point.

9.1.3 However, since the Merrick WLA is within the 35km LVIA study area, an assessment of the effects on this WLA is required in accordance with the SNH guidance entitled *Assessing the Impacts on Wild Land Interim Guidance Note*, SNH (February 2007). The process broadly comprises two key stages as follows:

- The establishment of a baseline through the desk-based mapping of wild land, desk-based screening and field survey; and
- The assessment of the effects of the Proposed Development on wild land and its significance through the evaluation of sensitivity and magnitude of change.

9.1.4 The wild land assessment is supported by Environmental Statement (**ES) Figure 9.53 to Figure 9.61, Volume 3** which provides the following information:

- **ES Figure 9.53**: Identifies the WLAs within the 35km radius LVIA study area and the Zone of Theoretical Visibility (ZTV) for the Proposed Development calculated to blade tip;
- **ES Figure 9.54**: Illustrates a more detailed map of the Merrick WLA and its overlap with the ZTV, landscape designations and tourist and recreational receptors within the LVIA study area;
- **ES Figure 9.55**: Illustrates the Merrick WLA and landscape character;
- **ES Figure 9.61**: Provides a wireline from the slopes of Craigfionn (366m AOD), the closest point within the Merrick WLA where there would be some theoretical visibility of the Proposed Development.

9.1.5 The remaining figures illustrate the overlap of the Merrick WLA with SNH's wild land data mapping from June 2014 as follows:

- **ES Figure 9.56**: Wild Land Assessment: Relative Wildness;
- **ES Figure 9.57**: Wild Land Assessment: Ruggedness or Challenging Terrain;
- **ES Figure 9.58**: Wild Land Assessment: Absence of Modern Artefacts;
- **ES Figure 9.59**: Wild Land Assessment: Remoteness from Roads and Ferries; and
- **ES Figure 9.60**: Wild Land Assessment: Perceived Naturalness.

9.2 Screening and Baseline

9.2.1 In order to ascertain the extent of any Wild Land Area which might be affected by the Proposed Development, the baseline data was used to inform a screening process which enabled detailed study areas to be identified and taken forward for more detailed assessment. The Proposed Development is not located within or close to any WLA. The Merrick WLA is however, within the LVIA study area.

9.2.2 Only those areas within the Merrick WLA that are overlapped by the ZTV for the Proposed Development are included in the assessment and these amount to fragmented areas of ZTV coverage, between approximately 18.6 and 26km distance from the proposed turbines, along the northeast facing slopes and summits of some of the Galloway Hills, including Caerloch Dhu (659m AOD), Shalloch on Minnoch (768m AOD), Tarfessock (697m AOD), Macaterick (499m AOD), Rig of Millmore (457m AOD), Kirriereoch Hill (786m AOD), Mullwharchar (692m AOD), Merrick (843m AOD) and Craignaw (645m AOD).

9.3 Study Area - Merrick WLA

9.3.1 The Merrick WLA is located at a distance of approximately 18.6km from the Proposed Development at its closest point. It covers an area of land stretching across parts of the Galloway Hills Regional Scenic Area, the South Ayrshire Regional Scenic Area and the East Ayrshire Sensitive Landscape Character Area *'Doon Valley'*, to the southwest of the A713. It is also within the Galloway Forest Park. Within the Merrick WLA, the Study Area for this assessment is focused on the ZTV coverage which indicates those areas within the Merrick WLA where there would be theoretical visibility.

9.3.2 The Merrick WLA is classified within three landscape character studies as follows:

- Dumfries and Galloway Landscape Wind Farm Capacity Study. Final Main Report, Carol Anderson in association with Alison Grant, Landscape Architects 2011;
- East Ayrshire Landscape Wind Capacity Study, Carol Anderson, 2013; and
- South Ayrshire Landscape Wind Capacity Study, Carol Anderson, 2013.

9.3.3 The Merrick WLA is classified as *Rugged Granite Uplands* within the Dumfries and Galloway Landscape Wind Farm Capacity Study (2011); as the *Rugged Uplands, Lochs and Forests* within the East Ayrshire Landscape Wind Capacity Study (2013); and as *Rugged Uplands, Lochs and Forests* within the South Ayrshire Landscape Wind Capacity Study (2013). Although each of these are named differently there are essentially the same area of landscape character and have a high degree of common landscape characteristics across these 3 reports.

Viewpoint Analysis

9.3.4 The boundary of the Merrick WLA is illustrated in **ES Figure 9.53** which shows how this area would be overlapped by the ZTV. All areas overlapped by the ZTV occur at distances of beyond 18.6km, such that where visible, the Proposed Development would be seen consistently in the far distance to the northeast. The ZTV coverage is also relatively limited and fragmented with most of the WLA outwith the ZTV such that there would be no visibility of the Proposed Development from large areas of the Merrick WLA. The ZTV mainly affects fragmented areas of hill summits, ridgelines and some lower northeast facing slopes along the north eastern edge of the WLA as listed previously.

9.3.5 Four assessment viewpoints, selected through consultation with SNH and East Ayrshire Council (EAC) as part of the LVIA assessment viewpoints are located within the Merrick WLA. These include Viewpoint 18: Shalloch on Minnoch, Viewpoint 20: Kirriereoch Hill and Viewpoint 21: Merrick. In addition a forth assessment viewpoint 'Wild Land Viewpoint 1: Craigfionn' has been assessed representing the closest position on the Merrick WLA boundary to the proposed wind farm. The views from these hill summits are accessed by hill walkers and described as follows:

- Viewpoint 18: Shalloch on Minnoch (**ES Figure 9.44 a-c**).
  - This viewpoint is located on the summit of Shalloch on Minnoch (768m) to the southwest of the Proposed Development. The nearest turbine is Turbine 19 at a distance of 22,117m. The view is orientated northeast and looks out across the large scale open landscape of the Galloway Hills and Rhinns of Kells towards the Southern Uplands. Land cover consists mostly of grassland and moorland as well as commercial forestry. Man-made elements include the local roads, commercial forestry and the existing Windy Standard and Hare Hill

wind farms. The settlements of Dalmellington and Bellsbank are simultaneously visible within the view, in the distance;

- The large coastal settlement of Ayr and the Isle of Arran are also visible in distant views to the north and northwest;
- Views to the southeast towards the summits of Macaterick and Rig of Millmore and south towards the summits of Kirriereoch Hill and Merrick, viewing into the greater part of the WLA, are extensive with stronger perceptions of wildness due to the lack of human development. Commercially managed forestry, forestry roads and fencing are however, visible. Considering the SNH Wild Land mapping data, whilst there are high levels of perceived naturalness, the area has a medium to lower score in terms of remoteness from human influences;
- The visual effect on this viewpoint is assessed as ***Slight*** and not significant as a result of the Proposed Development alone (Negligible magnitude) and cumulatively (Negligible magnitude) (see ES **Appendix 9.A**). The existing Windy Standard, Hare Hill and Wether Hill wind farms would be simultaneously visible at a distance of between approximately 23km and 30km with further consented and applications wind farms also potentially visible. The nature of the effect would be long term (reversible) indirect and negative.

- Viewpoint 20: Kirriereoch Hill (**ES Figure 9.46 a-c**).
  - This viewpoint is located fairly centrally within the Merrick WLA. It is located on the summit of Kirriereoch Hill (786m) to the southwest of Loch Doon and the Proposed Development. The nearest turbine is Turbine 19 at a distance of 23,952m. The view is orientated northeast with the settlements of Dalmellington and Bellsbank present in the distance. Cairnsmore of Carsphairn and Loch Macaterick can also be seen. The slopes of Mullwharchar and Hoodens Hill are visible in the foreground, with the Rhinns of Kells behind them and the Scaur Hills in the far background. Blocks of commercial coniferous plantation forest are visible in the areas of lower ground in the mid and background of the view along with rough grassland and moorland on the hill slopes. Man-made elements include the existing Hare Hill and Windy Standard wind farms visible across the horizon to the right of the view and scattered settlements in the distance;
  - Ailsa Craig, the existing Hadyard Hill Wind Farm, the Isle of Arran and the large coastal settlement of Ayr are visible in views to the north and northwest;
  - Views to the southwest towards the sea, to the south towards the summit of Merrick and to southeast towards and beyond Loch Enoch are extensive with stronger perceptions of wildness due to the lack of human development although commercially managed forest is present. Considering the SNH Wild Land mapping data, the area is well within the WLA with high levels of perceived naturalness as well as higher scores in terms of remoteness from human influences;
  - The visual effect on this viewpoint is assessed as ***Slight*** and not significant as a result of the Proposed Development alone (Negligible magnitude) and cumulatively (Negligible magnitude) (see **ES Appendix 9.A**). The nature of the effect would be long term (reversible) indirect and negative.
- Viewpoint 21: Merrick (**ES Figure 9.47 a-c**).
  - This viewpoint is also located fairly centrally within the Merrick WLA. It is located on the summit of Merrick to the southwest of Loch Doon and the Development Site. The nearest turbine is Turbine 19 at a distance of 24,748m. The view is orientated northeast and looks out across the large-scale open landscape of the Galloway Hills and Rhinns of Kells towards the Southern Uplands. Land cover consists mostly of grassland and moorland as well as commercial forestry. Man-made elements include the local roads, commercial forestry and the existing Windy Standard, Hare Hill and Whether Hill wind farms;

- The existing Hadyard Hill Wind Farm, the Isle of Arran and the large coastal settlement of Ayr are visible in views to the north and northwest;
- Views to the southeast towards and beyond Loch Ken, south and southwest towards and beyond the summit of Benyellary are extensive with stronger perceptions of wildness due to the lack of human development, although commercially managed forest and roads are present in parts of the view. Considering the SNH Wild Land mapping data, the area is well within the WLA with high levels of perceived naturalness as well as higher scores in terms of remoteness from human influences;
- The visual effect on this viewpoint is assessed as ***Slight*** and not significant as a result of the Proposed Development alone (Negligible magnitude) and cumulatively (Negligible magnitude) (see **ES Appendix 9.A**). The nature of the effect would be long term (reversible) indirect and negative.

- Wild Land Viewpoint 1: Craigfionn (**ES Figure 9.61**).
  - This viewpoint is located on the summit of Craigfionn (366m) to the southwest of the Proposed Development. The nearest turbine is Turbine 19 at a distance of 18,610m. The view is orientated northeast and looks out across the large scale open landscape of the Galloway Hills and Rhinns of Kells towards the Southern Uplands;
  - The visual effect on this viewpoint is assessed as ***Slight*** and not significant as a result of the Proposed Development alone (Negligible magnitude) and cumulatively (Negligible magnitude) (see **ES Appendix 9.A**). The existing Windy Standard and Hare Hill wind farms and the consented Windy Standard Extension, Hare Hill Extension and Afton wind farms would be simultaneously visible at a distance of between approximately 17km and 29km. The South Kyle, Benbrack and Pencloe application wind farms would also be visible in front of the Proposed Development to the northeast at a distance of between approximately 12 and 23km. The Glenmount application Wind Farm would also be simultaneously visible to the north at a distance of approximately 8km. The nature of the effect would be long term (reversible) indirect and negative.

9.4 Wild Land Sensitivity

9.4.1 The sensitivity of WLA has been assessed using criteria identified in the SNH '*Advice Note – Assessing the Impacts on Wild Land'* which provides criteria "*to determine the condition of wildness expressed for each of the physical attributes"* defined as ranging from high, medium, or low, and the "*presence or absence of perceptual responses*". Further desk and field based assessment (attended by two landscape architects) of these areas and the associated wild land attributes is summarised in **Table 9.E.1**.

9.4.2 In summary, all areas where theoretical visibility is present within the Merrick WLA are assessed as of 'High' wild land sensitivity, generally exhibiting high levels of perceived naturalness with all of the indicators of perceptual responses described as 'present'. These areas are indicative of 'physical challenge' or 'risk' and represent locations where a 'sense of awe' and 'prospect' is experienced in the available long-distance views. The presence of large areas of commercial forestry, forest tracks and roads in views when travelling through the WLA reduces scores for perceived and relative naturalness (Medium).

9.5 Identification of Magnitude and Level of Effect

9.5.1 The magnitude of change identified in relation to each of the wild land attributes as described in the SNH *'Advice Note - Assessing the Impacts on Wild Land'* is described as follows:

- "High: total loss or alteration to attribute;
- Medium: partial loss or alteration to attribute;

- Low: minor loss or alteration to attribute resulting in a change to the baseline; and,
- Negligible: very minor or no loss to the baseline assessment".

9.5.2 The magnitude of change to perceptual criteria is not defined in the same way, but rather each perceptual criteria is again assessed to be 'present' or 'absent', taking into consideration the presence of the Proposed Development. It is accepted that the perceptual responses to both the landscape and wind farm development are subjective and for some people the appearance of turbines may increase a sense of awe and inspiration whilst in others it may reduce it. Generally, those characteristics of the landscape which are judged to inspire awe and inspiration result from long-distance views which would not be impeded by the introduction of the Proposed Development. Otherwise, it is engendered in short-range views involving challenging topography for example, due to the constraints of intervening landform where the Proposed Development would not be visible.

9.5.3 The significance of the effect on the physical attributes and perceptual criteria is then assessed. The guidance describes the significance of the effect as being determined by considering the results for all attributes in each location. SNH *'Policy statement - Wildness in Scotland's Countryside Policy Statement 02/03'* states "*that if any one of the perceptual responses is no longer present then an area cannot be defined as wild and therefore the impacts must be significant".*

9.5.4 The assessment of the Wild Land Areas is set out in **Tables 9.E.2** and **9.E.3** and utilizes the tabular format recommended in the SNH *'Advice Note - Assessing the Impacts on Wild Land'* with the addition of more extensive written commentary. **Table 9.E.2** assesses the significance of effects of the Proposed Development on wild land, in addition to, and in combination with, other existing and consented wind farm development within the 35km LVIA study area. **Table 9.E.3** assesses the significance of effects of the Proposed Development on wild land, in addition to, and in combination with, other existing, consented and application wind farm development within the 35km LVIA study area.

9.5.5 The key to the left hand column for **Tables 9.E.2** and **9.E.3** is as follows:

- 'A' - Strength of attribute at baseline - including Existing Wind Farms; and
- 'B' - Magnitude of Change.

Table 9.E.1 Identification of Sensitivity of Wild Land Study Areas

Physical Attributes	**Merrick WLA**
Perceived Naturalness	High: Areas of ZTV coverage are generally perceived as natural.
Lack of Construction or Other Artefacts	Medium: Due to the presence of forestry, access tracks, field boundaries, commercially managed forestry, views of settlements and visibility of wind farms.
Little Evidence of Contemporary Land Uses	High to Medium: Main land use is rough moorland and managed moorland.
Rugged or Otherwise Challenging Terrain	High to Low: High on craggy summits, ridges and scree slopes. Medium to low where topography is smoother, although presence of rivers, ravines and bogs at lower levels increases the level of challenge.
Remoteness and Inaccessibility	High to Medium: There are limited roads and limited tracks extending up the glens from peripheral areas where the levels are lower.

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Perceptual Responses	Merrick WLA
A Sense of Sanctuary / **Solitude** / **Refuge**	Present
Risk / **Anxiety** / **Hazard**	Present
Arresting, Inspiring Qualities, Sense of Awe / **Prospect**	Present
Physically Challenging	Present

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Table 9.E.2 Merrick WLA: Proposed Development with other Existing and Consented Wind Farms

	PHYSICAL ATTRIBUTES					**PERCEPTUAL RESPONSES**				**RESULT**
	Perceived Naturalness	Lack of construction or other artefacts	Little evidence of contemporary land use	Rugged or otherwise challenging terrain	Remoteness and in-accessibility	A sense of sanctuary, solitude or refuge	Risk or anxiety-hazard	Arresting / inspiring qualities, sense of awe / prospect	Physically challenging	Significance of effect
A	High	Medium	High to Medium	High to Low	High to Medium	Present	Present	Present	Present	N/A baseline assessment
B	Negligible (very minor of no loss).	Negligible (very minor of no loss).	Negligible (very minor of no loss).	Negligible (very minor of no loss).	Negligible (very minor of no loss).	Unchanged	Unchanged	Unchanged	Unchanged	N/A baseline assessment
Summary	There are already simultaneous views of existing wind farms (Windy Standard, Hare Hill, and Wether Hill wind farms and High Park Farm wind turbine) to the northeast. There would also be simultaneous views with the consented Hare Hill Extension, Windy Standard Extension, Dersalloch, Sanquhar, Afton and Whiteside Hill wind farms. There would be successive views with the existing Carscreugh, Artfield Fell and Artfield Fell Extension, Arecleoch, Mark Hill wind farms and Maclachrieston Farm wind turbine to the southwest and west and the existing Hadyard Hill Wind Farm to the northwest. There would also be successive views with the consented Airies, Glenchamber and Kilgallioch wind farms to the southwest, the consented Assel Valley Wind Farm to the west and the Downhill Wind Farm to the northwest and the consented Blackcraig Hill and Knockman Hill wind farms to the east, the latter just beyond 10km distance. The Proposed Development would appear as visually compatible with the existing Windy Standard, Hare Hill, and Wether Hill wind farms and the consented Windy Standard Extension, Hare Hill Extension, Afton and Dersalloch wind farms. With the Proposed Development viewed within the same Field of View (FoV) and forming an additional small cluster of similar proportions and smaller scale than the consented Windy Standard Extension Wind Farm. The introduction of the Proposed Development would not cause the focus of the view to shift from close range landscape features or more distant hill summits and existing and consented wind farms and the composition of the views would remain largely the same. There would be no direct effects on the physical attributes and the introduction of access tracks and the switchgear building within the site boundary would not be discernible as a change to the landscape due to the intervening distance. The perceptual responses would remain unchanged since they are currently engendered by short-range views of the landscape immediately within and surrounding the Wild Land Study Area rather than long-distance views in the direction of existing wind farms.									**Not Significant**

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Table 9.E.3 Merrick WLA: Proposed Development with other Existing, Consented and Application Wind Farms

	PHYSICAL ATTRIBUTES					PERCEPTUAL RESPONSES				RESULT
	Perceived Naturalness	Lack of construction or other artefacts	Little evidence of contemporary land use	Rugged or otherwise challenging terrain	Remoteness and in-accessibility	A sense of sanctuary, solitude or refuge	Risk or anxiety-hazard	Arresting / inspiring qualities, sense of awe / prospect	Physically challenging	Significance of effect
A	High	Medium	High to Medium	High to Low	High to Medium	Present	Present	Present	Present	N/A baseline assessment
B	Negligible (very minor of no loss).	Negligible (very minor of no loss).	Negligible (very minor of no loss).	Negligible (very minor of no loss).	Negligible (very minor of no loss).	Unchanged	Unchanged	Unchanged	Unchanged	N/A baseline assessment
Summary	Other application wind farms would lead to a negligible magnitude of change, with the exception that further wind farm development would add to the visual presence of 'other artefacts' albeit in the far distance, for example, considering clusters of development at Glenmount and Keirs Hill wind farms which would have a Negligible magnitude of change on the views from the north eastern edge of the WLA. The Benbrack and South Kyle application wind farms would appear in front of the Proposed Development. The Proposed Development would be at a further distance from the edge of the WLA and would appear as of similar scale and proportion to Benbrack application Wind Farm and of considerably smaller scale than the South Kyle application Wind Farm. There would be no direct effects on the physical attributes and the perceptual responses would remain unchanged due mainly to the large intervening distances between the wind farm development and the WLA with the development mainly focused to the south.									**Not Significant**

9.6 Summary and Conclusions

9.6.1 The Proposed Development would not be located within or close to the Merrick WLA, being located at a distance of approximately 18.6km from the nearest point on the WLA boundary. The assessment concludes that the introduction of the Proposed Development into the baseline landscape, in which other wind farm development already exists or is consented, would not lead to a significant effect on the Merrick WLA or the wild land characteristics and special qualities. This would be due mainly to the large intervening distances, affecting a similar distance and field of view. The Proposed Development would also appear in visual compatibility with the consented Windy Standard Extension Wind Farm, Dersalloch Wind Farm and other existing and consented wind farm development within the views to the northeast over a similar distance and quadrant of the view.

9.6.2 The Proposed Development would not introduce wind turbines into an area where they do not currently exist.

9.6.3 The Proposed Development would be appear mostly below the horizon, and because of the intervening distances, the Proposed Development would tend to appear ‘recessive’ in the landscape.

9.6.4 Cumulatively, the Proposed Development would not lead to a significant ‘additional’ or ‘in combination’ effect on the Merrick WLA or its key characteristics and special qualities.

Appendix 9.F
Cumulative Wind Farm Development Excluded from the CLVIA

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Appendix 9.F: Wind Energy Development Excluded from the Assessment

9.1 Introduction

9.1.1 The EIA Regulations require identification of likely significant effects and whilst the SNH guidance requires a search of all wind farms within a 60km radius, it is not a requirement to assess all of these in terms of their cumulative effect in relation to the Proposed Development, particularly in instances where significant cumulative effects would be unlikely to occur.

9.1.2 Drawing from the Search Area, and consultation with SNH and the local planning authority, it has been agreed that the following operational, consented and planning application projects be included as part of the cumulative assessment:

- All projects between 25-50m to tip height within 10km of the Proposed Development; and
- All multiple turbine projects above 50m to tip height within 70km.

9.1.3 For the avoidance of doubt, projects at pre-planning application / scoping stage and any micro-generation schemes smaller than 25m will not be included.

9.1.4 Many of the wind energy developments within the Search Area are physically and visually more remote, often beyond the intervening hills and straths within different landscape regions and as a consequence, less relevant to the CLVIA.

9.1.5 Wind energy developments within the cumulative search area that have been excluded from the CLVIA are listed in Table 9.F.1 below. A number of these wind energy developments are extremely remote (physically and visually) such that significant cumulative effects will not occur. Specific reasons for excluding wind energy developments from the CLVIA are provided below as follows:

- Existing Developments:
  - Existing developments to the north and northeast, including Whitelee Wind Farm, which are located beyond the A70 or beyond Blackside Hill, Wardlaw Hill and the Cairn Table Group hills and as such would be physically and visually remote from the Proposed Development, screened by the intervening landform and where visible, viewed in the context of the Glasgow conurbation. As such, these developments would have at most a Negligible contribution to cumulative effects;
  - Existing developments to the northeast, including Clyde Wind Farm, which are located beyond the Lowther Hills, where the intervening landform prevents cumulative visibility with the Proposed Development;
  - Existing developments to the southeast, including Dalswinton Wind Farm, which are located beyond the Southern Uplands and the A76 and in the Forest of Ae, and as such are physically and visually remote from the Proposed Development;
  - Existing developments to the west and southwest, including Mark Hill Wind Farm, which are located beyond the Galloway Hills, the Galloway Forest and the Carrick Forest and where the intervening landform and vegetation would prevent cumulative visibility with the Proposed Development;
  - Existing developments to the northwest, including Ardrossan Wind Farm, which are located beyond the A77 and Kilmarnock and Irvine and would be both physically and visually remote from the Proposed Development. As such, these developments would have at most a Negligible contribution to cumulative effects.
- Consented Developments:

- Consented developments to the north and northeast, including Middleton Wind Farm, which are located beyond the A70 or beyond Blackside Hill and Cairn Table Group hills and as such would be both physically and visually remote from the Proposed Development and where visible, viewed in the context of the Glasgow conurbation. As such, these developments would have at most a Negligible contribution to cumulative effects;
- Consented developments to the northeast, including Clyde Extension Wind Farm, which are located beyond the A76 and the Lowther Hills, and as such would be both physically and visually remote as well as being screened by the intervening landform, which would prevent cumulative visibility with the Proposed Development;
- Consented developments to the west and southwest, including Assel Valley Wind Farm, located beyond the Galloway Hills, Galloway Forest and Carrick Forest, including Airies Fell Wind Farm, are considered to be visually remote and would be screened by the intervening landform, which would prevent cumulative visibility with the Proposed Development.

- Application Developments:
  - Application developments to the north and northeast, including Greengairs East Wind Farm, which are located beyond the A70 or beyond Blackside Hill and the Cairn Table Group hills. These applications would be both physically and visually remote, screened by the intervening landform and where visible, viewed in the context of Glasgow conurbation. As such, these developments would have at most a Negligible contribution to cumulative effects;
  - Application developments to the northeast, including Clyde Extension Wind Farm, which are located beyond the Lowther Hills, where the intervening landform prevents cumulative visibility with the Proposed Development;
  - Application developments to the southeast, including Blackwood Wind Farm, which are located beyond the A76 and in the Forest of Ae. These applications would be both physically and visually remote so as to prevent significant cumulative visibility with the Proposed Development;
  - Application developments to the west and south, located beyond the Galloway Hills, Galloway Forest and Carrick Forest, including Glen App Wind Farm, are considered to be visually remote and screened by the intervening landform, which would prevent significant cumulative visibility with the Proposed Development;
  - Application developments to the northwest, including Blackshaw, which are located beyond the A77 and Kilmarnock and Irvine or are viewed in the context of Ayr or Kilmarnock. These applications would be both physically and visually remote with the intervening built form or its backdrop likely to prevent significant cumulative visibility with the Proposed Development.

9.1.6 Other pre-application wind energy developments at the screening or scoping stage have been identified where known, but are not included in the CLVIA in accordance with SNH guidance.

Table 9.F.1 Wind Energy Development Excluded from the CLVIA within 70km

SITE NAME	NR	BT	DISTANCE	REASON FOR EXCLUSION
EXISTING WIND ENERGY DEVELOPMENTS				
Shewalton Moss / Glaxo	4	110	34.8	Located to the northwest, beyond the A77 and viewed within the context of the built form of Kilmarnock and Irvine and as such both physically and visually remote
Whitelee Extension (Phase I + II)	75	140	35.2	Located to the north, beyond the intervening landform of Blackside Hill and beyond the A71 and as such both physically and visually remote

© Amec Foster Wheeler Environment & Infrastructure UK Limited

SITE NAME	NR	BT	DISTANCE	REASON FOR EXCLUSION
West Browncastle	12	126.5	35.3	Located to the north, beyond the intervening landform of Blackside Hill and the Cairn Table Group hills and beyond the A71 and as such both physically and visually remote
Whitelee	140	110	37.6	Located to the north, beyond the intervening landform of Blackside Hill and beyond the A71 and as such both physically and visually remote
Maclachrieston Farm	1	54	38.1	Located to the west, beyond the intervening landform of the Carrick Forest and the Galloway Hills and as such visually remote
Mark Hill	28	110	38.2	Located to the southwest, beyond the intervening Galloway Forest and the Galloway Hills and as such both physically and visually remote
Myres Hill	2	76	38.5	Located to the north, beyond the intervening landform of Blackside Hill and beyond the A71 and as such both physically and visually remote
Clonherb	1	61	39.2	Located to the north, beyond the M77 and as such both physically and visually remote
Auchren Farm	1	66	39.2	Located to the northeast, beyond the M74 and as such both physically and visually remote
Dykehead Farm (Loch Wood)	1	79	39.8	Located to the northeast, near the M74 and as such both physically and visually remote
Ardoch And Over Enoch	5	110	41.0	Located to the north, beyond the intervening landform of Blackside Hill and beyond the A71 and as such both physically and visually remote
Tanhill Farm	1	76	41.2	Located to the northeast, near the M74 and as such both physically and visually remote
Clyde	152	125	41.3	Located to the northeast, beyond the M74 and the intervening landform of the Lowther Hills and as such both physically and visually remote
Southfield Farm	1	67	42.1	A single turbine at 67m to blade tip beyond 35km will have limited influence on the cumulative context
Dalswinton	15	125	42.3	Located to the southeast, beyond the intervening landform of the Southern Uplands, the Keir Hills, the A76 and in the Forest of Ae and as such both physically and visually remote
Wellgreen Farm	1	66	42.5	A single turbine at 66m to blade tip beyond 40km will have limited influence on the cumulative context
Auchnotroch Farm	1	53.7m	43.2	A single turbine at 53.7m to blade tip beyond 40km will have limited influence on the cumulative context

SITE NAME	NR	BT	DISTANCE	REASON FOR EXCLUSION
Lochhead Farm	3	91	44.0	Located to the northeast, beyond the M74 and the intervening landform of the Lowther Hills and as such both physically and visually remote
Harestanes	68	125	45.0	Located to the southeast, beyond the A76 and the intervening landform of the Southern Uplands and as such both physically and visually remote
Strutherhill Industrial Estate	1	110	45.8	A single turbine at 110m to blade tip beyond 45km will have limited influence on the cumulative context
Blantyre Muir Extension	3	115	45.9	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Blantyre Muir	3	115	45.9	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Arecleoch	60	118.4	46.7	Located to the southwest, beyond the intervening landform of the Galloway Forest, the Galloway Hills, the A714 and as such both physically and visually remote
Neilston	4	120.5	46.8	Located to the north, beyond the A71 and Kilmarnock, viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Middleton	6	100	48.0	Located to the north, beyond the M77 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Ardrossan	15	100	50.1	Located to the northwest, beyond the A77 and Kilmarnock and the intervening built form of Irvine and as such both physically and visually remote
Castlemilk	1	125	50.2	A single turbine located to the north, beyond the A71 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Marshill Farm	1	119	51.0	A single turbine located to the north, beyond the A71 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Artfield Fell	15	74	51.3	Located to the southwest, beyond the intervening landform of the Galloway Forest, the Galloway Hills, the A714 and as such both physically and visually remote
Artfield Fell Extn	7	80	51.7	Located to the southwest, beyond the Galloway Forest, the Galloway Hills and the A714 and as such both physically and visually remote
Plascow	3	76.45	52.2	Located to the southeast, beyond the A75, and the intervening forestry and as such both physically and visually remote

SITE NAME	NR	BT	DISTANCE	REASON FOR EXCLUSION
Dalry Community Windfarm (Wardlaw Wood & Extn)	6	125	53.4	Located to the northwest, beyond the A77 and the intervening built form of Kilmarnock and Irvine and as such both physically and visually remote
Glenkerie	11	105	54.7	Located to the northeast, beyond the M74 and the intervening Lowther Hills and as such both physically and visually remote
Kelburn Estate	14	100	55.6	Located to the northwest, beyond the A77 and the intervening built form of Kilmarnock and Irvine and as such both physically and visually remote
Black Law	54	110	56.0	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Carscreugh	18	70	57.4	Located to the southwest, beyond the intervening landform of the Galloway Forest and the Galloway Hills and as such both physically and visually remote
Hunterston Test Facility	3	177	57.4	Located to the northwest, beyond the A77 and the intervening built form of Kilmarnock and Irvine and as such both physically and visually remote
Black Law Extension Phase 1	23	126.5	58.4	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Climpy	1	99	59.5	A single turbine located to the north, beyond the A70 and as such both physically and visually remote
Damhead	1	99.7	59.5	A single turbine located to the northeast, beyond the A721 and as such both physically and visually remote
Barlockhart Moor	4	112	60.1	Located to the southwest, beyond the intervening landform of the Galloway Forest and the Galloway Hills and as such both physically and visually remote
Braidenhill	1	74	60.6	A single turbine at 74m to blade tip beyond 60km will have limited influence on the cumulative context
Muirhall	6	125	61.9	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Wester Hassockrigg	1	78	62.3	A single turbine at 78m to blade tip beyond 60km will have limited influence on the cumulative context
Easterton Farm	3	n/a	64.5	Located to the northeast, beyond the M8 and as such both physically and visually remote
Bellstane	1	86.5	64.8	A single turbine at 86.5m to blade tip beyond 60km will have limited influence on the cumulative context
Pates Hill	7	107	65.4	Located to the northeast, beyond the A721 and as such both physically and visually remote

SITE NAME	NR	BT	DISTANCE	REASON FOR EXCLUSION
Greendykeside	2	99.5	66.1	Located to the northeast, beyond the M8 and as such both physically and visually remote
Netherton Farm (Torrance Ext)	2	125	66.5	Located to the northeast, beyond the M8 and as such both physically and visually remote
Torrance Farm	3	125	66.5	Located to the northeast, beyond the M8 and as such both physically and visually remote
Easter Glentore	1	99	67.2	A single turbine at 99m to blade tip beyond 65km will have limited influence on the cumulative context
Stoneridge (Burnhead)	13	127	67.6	Located to the northeast, beyond the M8 and as such both physically and visually remote
Minsca	16	120	69.0	Located to the southeast, beyond the intervening landform of the Southern Uplands and the A74(M) and as such both physically and visually remote
CONSENTED WIND ENERGY DEVELOPMENTS				
Holmhead Farm	1	79	35.5	A single turbine at 79m to blade tip beyond 35km will have limited influence on the cumulative context
Assel Valley	10	110	36.6	Located to the west, beyond the intervening landform of the Carrick Forest and the Galloway Hills and as such both physically and visually remote
Letham Farm	1	51	37.2	A single turbine at 51m to blade tip beyond 35km will have limited influence on the cumulative context
Birkhill	2	99.5	38.1	Located to the northeast, next to the M74 and as such both physically and visually remote
Ladehead Farm	3	74	39.3	Located to the northeast, next to the M74 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Dykehead	1	79	39.4	A single turbine at 79m to blade tip beyond 35km will have limited influence on the cumulative context
Broken Cross	2	55.7	39.7	Located to the northeast, beyond the intervening landform of Blackside Hill and the Cairn Table Group hills and as such both physically and visually remote
South Of Marshill Farm	1	67	42.0	A single turbine at 67m to blade tip beyond 65km will have limited influence on the cumulative context
Whitehill Farm	1	77	42.4	A single turbine at 77m to blade tip beyond 40km will have limited influence on the cumulative context
Lochhead East	3	121	43.5	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote

SITE NAME	NR	BT	DISTANCE	REASON FOR EXCLUSION
Langlands	1	65	43.8	A single turbine at 65m to blade tip beyond 40km will have limited influence on the cumulative context
Lochhead Farm Extension I	2	100	44.0	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Haspielaw Farm	1	78	45.0	A single turbine at 78m to blade tip beyond 40km will have limited influence on the cumulative context
Clyde Extension	57	142	45.4	Located to the northeast, beyond the M74 and the Lowther Hills and as such both physically and visually remote
Middleton	6	105	45.7	Located to the north, beyond the M77 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Minnygap	10	125	46.3	Located to the southeast, beyond the A76 and the intervening landform of the Lowther Hills and as such both physically and visually remote
Logoch Farm	1	67	47.1	A single turbine at 67m to blade tip beyond 45km will have limited influence on the cumulative context
Kilgallioch	96	146.5	47.8	Located to the southwest, beyond the intervening landform of the Galloway Forest and the Galloway Hills and as such both physically and visually remote
Airies	14	126.5	49.9	Located to the southwest, beyond the intervening landform of the Galloway Forest and the Galloway Hills and as such both physically and visually remote
Lampits Farm	2	64	53.8	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Glenchamber	11	126.5	53.9	Located to the southwest, beyond the intervening landform of the Galloway Forest and the Galloway Hills and as such both physically and visually remote
Black Law Extension Phase 2	11	126.5	57.1	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Greenwall Farm	1	102	59.7	A single turbine at 102m to blade tip beyond 55km will have limited influence on the cumulative context
Muirhall Extension	2	145	60.8	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Upper Haywood	1	66	61.1	A single turbine at 66m to blade tip beyond 60km will have limited influence on the cumulative context

SITE NAME	NR	BT	DISTANCE	REASON FOR EXCLUSION
Shotts Golf Club	1	76	61.1	A single turbine at 76m to blade tip beyond 60km will have limited influence on the cumulative context
Tormywheel	15	102	62.2	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
West Benhar	8	132	62.4	Located to the northeast, beyond the A71 and as such both physically and visually remote
Stirling Road / A. Bartlett & Sons	1	126	62.8	A single turbine at 126m to blade tip beyond 60km will have limited influence on the cumulative context
Moss Hall Farm	1	80	63.3	A single turbine at 80m to blade tip beyond 60km will have limited influence on the cumulative context
Nether Bracco Farm	1	99.7	64.2	A single turbine at 99.7m to blade tip beyond 60km will have limited influence on the cumulative context
Greengairs	9	125	64.9	Located to the northeast, beyond the M8 and as such both physically and visually remote
Stoneburn Farm	1	61	65.5	A single turbine at 66m to blade tip beyond 60km will have limited influence on the cumulative context
Ag Barr	1	125	66.3	A single turbine at 125m to blade tip beyond 65km will have limited influence on the cumulative context
Pearie Law	6	125	67.0	
High Mathernock Farm	1	67	67.8	A single turbine at 67m to blade tip beyond 60km will have limited influence on the cumulative context
Harburnhead	1	126	68.1	A single turbine at 126m to blade tip beyond 60km will have limited influence on the cumulative context
Cowdenhead	2	84	68.5	Located to the northeast, beyond the M8 and as such both physically and visually remote
Easter Drumclair	1	99.5	69.3	A single turbine at 99.5m to blade tip beyond 60km will have limited influence on the cumulative context
APPLICATION WIND ENERGY DEVELOPMENTS				
Crookedstane	4	126.5	38.5	Located to the northeast, beyond the intervening landform of the Lowther Hills and as such both physically and visually remote
Broken Cross surface mine	7	126.5	38.8	Located to the northeast, beyond the intervening landform of Blackside Hill and the Cairn Table Group hills and as such both physically and visually remote
Auchencairn	16	121	38.8	Located to the southeast, beyond the A76 and in the Forest of Ae and as such both physically and visually remote

© Amec Foster Wheeler Environment & Infrastructure UK Limited

SITE NAME	NR	BT	DISTANCE	REASON FOR EXCLUSION
Blair Farm	8	100	39.0	Located to the north, beyond the A77 and as such both physically and visually remote
Blackwood	5	140-120	39.4	Located to the southeast, beyond the A76 and in the Forest of Ae and as such both physically and visually remote
Whitelee Extension Phase 3	5	111	39.9	Located to the north, beyond the intervening landform of Blackside Hill and beyond the A71 and as such both physically and visually remote
Millenderdale	7	125	41.8	Located to the west, beyond the intervening landform of the Carrick Forest and the Galloway Hills and as such both physically and visually remote
East Whitelee Farm	1	74	42.3	Located to the north, beyond the intervening landform of Blackside Hill and beyond the A71 and as such both physically and visually remote
Harestanes Extension	7	126.5	42.6	Located to the southeast, beyond the A76 and the intervening landform of the Lowther Hills and as such both physically and visually remote
Boghead Farm (Hamilton)	1	77	43.8	A single turbine at 77m to blade tip beyond 60km will have limited influence on the cumulative context
Straid Farm	14	99.5	44.1	Located to the west, beyond the intervening landform of the Carrick Forest and the Galloway Hills and as such both physically and visually remote
Dareduff Hill	1	68	45.7	A single turbine at 68m to blade tip beyond 60km will have limited influence on the cumulative context
Shennanton	12	100	47.5	Located to the southwest, beyond the A714 and as such both physically and visually remote
Knockendurrick	7	132	49.2	Located to the south, beyond the intervening landform of the Galloway Hills and close to A75 and as such both physically and visually remote
Earlshaugh	22	125	49.8	Located to the northeast, beyond the M74 and the intervening landform of the Lowther Hills and as such both physically and visually remote
Auchleand	7	130	50.3	Located to the southwest, beyond the intervening landform of the Galloway Forest and the Galloway Hills and as such both physically and visually remote
Whitelaw Brae (Glenbreck House)	14	133.5	50.5	Located to the west, beyond the Lowther Hills and the A74(M) and as such both physically and visually remote
Gass	9	126.50	50.6	Located to the southwest, beyond the A714 and as such both physically and visually remote

SITE NAME	NR	BT	DISTANCE	REASON FOR EXCLUSION
California	7	110	51.3	Located to the south, beyond the intervening landform of the Galloway Forest and the Galloway Hills and as such both physically and visually remote
Blackshaw	6	125	51.6	Located to the northwest, beyond the intervening settlements at Irvine and Stevenson and as such both physically and visually remote
Stranoch	24	135	52.5	Located to the southwest, beyond the intervening landform of the Galloway Forest, the Galloway Hills, the A714 and as such both physically and visually remote
Glenkerie Extension	6	100	53.6	Located to the northeast, beyond the M74 and the intervening landform of the Lowther Hills and as such both physically and visually remote
East of Auchterhead Farm	1	99.5	55.3	A single turbine at 99.5m to blade tip beyond 60km will have limited influence on the cumulative context
Annabaglish	14	110	55.7	Located to the southwest, beyond the A75, the intervening landform of the Galloway Forest and the Galloway Hills and as such both physically and visually remote
Barcloy Hill	5	115	56.0	Located to the southeast, beyond the A75, the intervening landform of the Galloway Forest and the Galloway Hills and as such both physically and visually remote
Hartwood Hill	7	126.5	56.3	Located to the southeast, beyond the A701, the intervening landform of the Southern Uplands and as such both physically and visually remote
Black Law Phase 3	13	126.5	57.1	Located to the northeast, beyond the A70 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Hartwood	7	126.5	58.1	Located to the northeast, beyond the M74 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Glen App	14	126.5	58.7	Located to the southwest, beyond the intervening landform of the Galloway Forest and the Galloway Hills and as such both physically and visually remote
Greenwall	1	55	59.3	A single turbine at 55m to blade tip beyond 60km will have limited influence on the cumulative context
Stanebent Farm (Torbothie Road)	1	76.5	60.4	A single turbine at 76.5m to blade tip beyond 60km will have limited influence on the cumulative context
Upper Haywood Farm II	1	66	61.1	A single turbine at 66m to blade tip beyond 60km will have limited influence on the cumulative context

SITE NAME	NR	BT	DISTANCE	REASON FOR EXCLUSION
Moffat Distillery	1	78	61.1	A single turbine at 78m to blade tip beyond 60km will have limited influence on the cumulative context
Easter Auchinrivoch (Palace Farm)	1	67	61.9	A single turbine at 67m to blade tip beyond 60km will have limited influence on the cumulative context
Shotts	6	131	62.3	Located to the northeast, beyond the M74 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Greenburn Golf Club	1	59.5	62.5	A single turbine at 59.5m to blade tip beyond 60km will have limited influence on the cumulative context
Greengairs East	8	125	64.9	Located to the northeast, beyond the M8 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote
Southrigg	1	125	66.6	A single turbine at 125m to blade tip beyond 60km will have limited influence on the cumulative context
Torbrex	1	58	66.8	A single turbine at 58m to blade tip beyond 60km will have limited influence on the cumulative context
Drumelzie	1	126.5	68.3	A single turbine at 126.5m to blade tip beyond 60km will have limited influence on the cumulative context
Drumduff, Blackridge	3	118	68.5	Located to the northeast, beyond the M8 and viewed against the backdrop of Glasgow conurbation and as such both physically and visually remote

PROPOSED WIND ENERGY DEVELOPMENTS (At screening or scoping stage)	
Monquhill	Chirmorie
Land At Burnfoot	Barskeoch
High Park Farm II	Craig Airie Fell
Windy Standard Phase III	Cloburn Quarry
Euchanhead	Kissock & Breconside
Windy Rig	Hill Rig
Greenfield Farm	Gelston
Lorg	Watsonhead
Sanquhar 'Six'	Mindork
Knockower Community	Cnoc an Fheidh
Glenmuckloch	The Mosses
Shepherds Rig	Brow Farm
Sandy Knowe	Chapman's Howe

© Amec Foster Wheeler Environment & Infrastructure UK Limited

PROPOSED WIND ENERGY DEVELOPMENTS (At screening or scoping stage)	
Wether Hill Extension	Hartfield Farm
Linfairn Farm	East Henshilwood Farm
Auchenlongford	Birnie Hill
Stroanshalloch (Moniaive)	Airriequillhart
Knockskae	Budshaw Farm
Hawkcleuchside (II)	Damhead Farm
Hawkcleuchside (I)	Barlockhart Moor Extension
Bankend Rig Extension	Crofthill
Loanfoot Farm	Blackridge Farm
Knoweside	Dunsyston Farm
Kirk Hill	Muldron Farm
East Head Steadings	Millriggs Farm
High Bowhill Farm	Mountcow Farm
Cumberhead Wind Farm	Waterside Farm (Mountcow Farm)
Alton Muirhouse Farm	Balgrayhill Farm
Coldwakening	Site east of Benhar Road, Shotts
Barlay Hill	Reiffer Park
Marnhoul	Braehead Farm
Collieston Hill	Auchengree Farm
Balunton	Dewshill
Douglas West & Dalquhandy DP	Annieshill Farm
Bloomsfield Farm	Brackenhirst Farm
Lambdoughty	Bedlay
Auchrobert 2	Sewage Works South Of Easterton Cottage
Mark Hill Extension	Land at Holehouseburn, Stoneyburn
Benshinnie	Forrestburn Farm, Harthill
Drumhumphry	Blackhill Farm
Glenvernoch	Old Woodmuir Collinery
Glenouther	Bedlormie Mains Farm
Altercannoch	Baad's Mill
Arnsheen	Bedlormie Mains Farm
Duncow	Easter Glentore II
Pibble Farm	Meadowfield Farm
East Craigs Water Treatment Works	Hunters Well
Moss Hall/Mid Seat Farms	

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Appendix 10.A
Heritage Assets

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Appendix 10.A - Heritage Assets

Scheduled Monuments

SM No.	Asset	Location	
		X	Y
1034	Lamford Burn, Cairn 800m NE of Lamford Bridge	252812	599128
1046	The King's Cairn, Chambered Cairn and Cairn to W of Water Of Deugh	255347	601063
3009	Dalmellington, Motte	248192	605815
3311	Kyle Castle,200m E of Dalblair	264736	619206
4345	Waterside, Dalmellington Ironworks	244319	608399
4390	Dalnean Hill, Farmstead and Field System	246217	605440
5393	Auchencloigh Castle	249452	616664
7690	Laight Castle	245006	608860
7863	Waterside, Miners' Villages & Mineral Railways	244846	609768

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Listed Buildings

Historic Building No.	Asset	Category	Location	
			X	Y
96	Dumfries House, The Temple	A	253908	621384
122	Buchan's Bridge	C	247237	606236
965	Logan Bridge	B	258590	620696
968	Glenmuir Bridge	B	261290	620299
969	Dalblair Bridge	C	264414	619257
1084	Sillyhole Bridge	C	247510	606432
1085	8-11 (Consecutive Nos) Cathcartson Dalmellington	C	247975	605786
1086	Lodge at Entrance to Craigengillan	B	247433	605936
1087	Bridge, Adjacent to Lodge	B	247415	605929
1088	Linn River Bridge	B	247626	603908
1089	Stone Bridge, Craigengillan Estate	C	247872	603373
1091	Laight Castle	C	245001	608862
1105	Kirk of the Covenant	B	248052	606088
1106	Old Kirkyard	B	248200	606153
1107	Cathcart Hall	B	248062	605963
1109	No’s 30, 32 High Street	C	248095	605838
1109	No’s 30, 32 High Street	C	248088	605839
1110	Church Hill No 17 Dalmellington	C	248105	605956
1111	Doon Tavern	B	248024	605841
1112	Nos. 4 and 5 Main Street	C	247984	605876
1113	Doon Bridge on Straiton Road	B	246192	605987
4900	Dalmellington Inn	C	248037	605861
14246	Martyrs Parish Church	B	261731	613510
14247	Ruins of Old Church and Graveyard	B	261742	613761
14248	Nith Bridge	B	261864	614069
14249	Mossmark of Oldmill	C	261679	613310
14250	East Polquhirter	C	263534	613207
14413	Dumfries House	A	254141	620398
14414	Dumfries House, Lugar Water, Avenue Bridge	A	253798	620643
14415	Dumfries House, Sundial	B	254130	620457
14416	Dumfries House, Dovecot	A	253951	620350
14417	Lady's Bridge, Dumfries House Policies	C	254483	620373
14418	Dumfries House, West Drive, Back Burn, Waterloo Bridge	C	253716	620608
14419	Dumfries House, Ice House	B	254231	620457
14420	Dumfries House, Coach Houses	B	253931	620481

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Historic Building No.	Asset	Category	Location	
			X	Y
14421	Westgates, Dumfries House Policies	B	253623	620049
14422	Stockiehill, Dumfries House Policies	B	254819	620203
14423	Terringzean Castle, Dumfries House Policies	B	255564	620506
14424	Garallan	C	254855	618267
18793	Craigengillan	A	247350	602817
18794	Stables, Craigengillan	A	247365	602755
24092	Old Cumnock Old Church	B	256795	620156
24093	Mercat Cross, The Square	A	256783	620132
24094	No's 1, 2 The Square	C	256823	620129
24095	No's 3, 4 5 The Square Gospel Hall.	B	256811	620123
24096	No 6 The Square	B	256804	620122
24097	No 7, 8 The Square	B	256795	620120
24098	No's 9, 10, 11 The Square	C	256789	620110
24099	No's 18, 19, 20 The Square	C	256765	620125
24100	No 21 The Square	C	256765	620135
24101	No 22 The Square	B	256767	620142
24102	The Sun Inn, The Square	B	256769	620152
24103	The Snug Bar The Square	C	256770	620165
24104	The Clydesdale Bank The Square	B	256784	620191
24105	No 38 The Square	C	256803	620196
24106	The Mercat Hotel, Formerly The Black Bull Hotel, The Square	B	256823	620191
24107	The Royal Hotel 44, 45, 46 The Square	C	256832	620168
24107	The Royal Hotel 44, 45, 46 The Square	C	256837	620155
24107	The Royal Hotel 44, 45, 46 The Square	C	256834	620162
24108	The Craighead Inn	C	256855	620145
24109	Cumnock, 55 And 57 Glaisnock Street	C	256913	620071
24110	Cumnock, 61 And 63 Glaisnock Street	B	256926	620061
24111	Cumnock, 65 And 67 Glaisnock Street, Royal Bank of Scotland	B	256917	620050
24112	Cumnock, Glaisnock Street, Dumfries Arms Hotel	B	256930	619978
24113	No 15 Glaisnock Street	C	256881	620160
24114	No 17 Glaisnock Street	C	256865	620140
24115	No's 12-16 Glaisnock Street	C	256851	620103
24116	No 18 Glaisnock Street	C	256856	620091
24117	No 20 24 Glaisnock Street	C	256861	620081
24118	No's 1-3 Ayr Road	C	256894	620039
24119	Town Hall, Glaisnock Street.	C	256926	619927

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Historic Building No.	Asset	Category	Location	
			X	Y
24120	St John's R.C. Church Glaisnock Street	B	257071	619609
24121	Cumnock, 21 Ayr Road, Including Gatepiers And Boundary Wall	B	256803	619919
24122	No's 38-42 Ayr Road	B	256831	620013
24123	Crichton Church of Scotland Ayr Road	B	256804	620019
24125	Strathcylde Regional Supplies Department (Former United Session Church), Tanyard.	C	256706	620006
24126	Strathclyde Regional Council Area Office, off Lugar Street.	C	256801	620311
24128	Riverside, Lugar Street	C	256716	620250
24129	Lugar (or Stepends) Bridge Over Lugar Water	B	256680	620246
24130	Congregational Church And Manse Auchinleck Road	C	256633	620312
24130	Congregational Church And Manse Auchinleck Road	C	256648	620311
24131	Broomfield, Auchinleck Road	B	256321	620239
24132	Graveyard Barrhill Road	C	257031	620301
24133	Bank (or Templand) Railway Viaduct Over Lugar Water in Woodroad Park	A	257395	620624
24134	Former Railway Viaduct now Footbridge, Murray Park.	B	257372	619520
24135	Auchinleck Road Lochnorris	B	256383	620252
44604	Glaisnock House with Terrace Walls and Steps	B	257496	617929
48145	16 Ayr Road (Former Schoolhouse to Dalmellington Primary School)	C	247648	605956
49506	Dalcairnie Bridge, Craigengillan Estate	C	246580	604185
50128	15 and 17 Castle, Town Hall and Police Station	C	261738	613536
50889	3 Lugar Street, The Baird Institute	C	256745	620166
51711	Galloway Hydro Electric Power Scheme, Loch Doon Dam	C	247730	601430

Category Key	**A:** Buildings of national or international importance, either architectural or historic, or fine little-altered examples of some particular period, style or building type.
	B: Buildings of regional or more than local importance, or major examples of some particular period, style or building type which may have been altered.
	C: Buildings of local importance, lesser examples of any period, style, or building type, as originally constructed or moderately altered; and simple traditional buildings which group well with other listed buildings.

Gardens and Designed Landscapes

Name	Location	
	X	Y
Craigengillan	246391	604198
Dumfries House	254413	620411

Conservation Areas

Name	Location	
	X	Y
Cumnock	256816	620078
Dalmellington	248049	605863
Lugar	259123	621290

© Amec Foster Wheeler Environment & Infrastructure UK Limited

NSR Assets

WoSAS Pin	Asset	Category	Location	
			X	Y
7111	Laight Castle	V	245010	608855
7113	Doon Bridge	V	246350	605750
7115	Elizabeth Isle	V	246985	605530
7118	Benquhat Hill	C	246360	609850
7132	Dalmellington, Dame Helen's Castle	V	248525	605610
7162	Wee Cairn Hill, Dalcairnie	C	246265	604325
7173	Bubbly Cairn, Bellsbank Plantation	C	249085	603505
7175	Pennyarthur Rig	V	248555	603845
7989	Beoch	V	252225	608495
7994	Cairnennock	C	250800	600780
8018	Fardenreoch	C	256075	614640
8024	Little Rigend	V	254165	611415
13051	Craigdullyeart Hill	V	266300	615250
Category Key	**C:** Almost certainly of national importance **V:** Probably of national importance			

© Amec Foster Wheeler Environment & Infrastructure UK Limited

HER Assets Within 500m of the Study Area

WoSAS Pin	Asset	Location	
		X	Y
7988	Peat Hill	255350	609810
7988	Peat Hill	255500	610000
7988	Peat Hill	255220	609620
8017	Marshallmark	257000	610660
8019	Knocknarran Hill	257050	610150
8022	Peat Hill	255500	610000
8022	Peat Hill	255750	610270
8022	Peat Hill	255970	610400
8022	Peat Hill	256200	610560
8022	Peat Hill	255540	610130
22044	Afton No.1 Colliery	258350	610950
22045	Bank No.1 Colliery	260000	611600
22046	Bank No.6 Colliery	259550	611450
46751	Bank No.2 Colliery	259610	611760
47342	Knockburnie	255610	610520
47354	Burnside	258980	611000
47363	Crocradie Burn	256300	608780
48217	Bank Brick and Tile Works	259583	611534

DBA Sites

DBA ID	Name	Description	Location	
			X	Y
DBA1	Macnaught	Building and sheepfold, the building appears to still stand.	254255	609643
DBA2	Polmathburn Bridge	Bridge crossing Polmath Burn	254478	609915
DBA3	Craighouse Sheepfold	Sheepfold to the SW of Craighouse, appears to still be present.	254786	610195
DBA4	Craighouse Whinstone Quarry	Whinstone quarry to the SW of Craighouse	254868	610272
DBA5	Craighouse	Building shown on early mapping, appears to still be present.	254941	610432
DBA6	Craighouse Old Quarry	Limestone Quarry already shown as disused by the 1st edition mapping.	254866	610409
DBA7	Peat Hill Milestone	Milestone depicted on 2nd edition mapping.	255228	610385
DBA8	Stonyknowes	Building shown on early mapping.	255574	610505
DBA9	Lonehead	Building shown on early mapping.	255750	610877
DBA10	Knockburne Cottage	Building shown on early mapping.	255763	610534
DBA11	Peat Hill Lead Mines	Lead mines shown on early mapping.	255874	609909
DBA12	Littlechang Sheepfold	Sheepfold shown on early mapping.	256057	608538
DBA13	Knockburnie	Building shown on early mapping, appears to still be present.	256224	610497
DBA14	Marshallmark	Building shown on early mapping, appears to still be present.	257009	610662
DBA15	Dalleagles	Building shown on early mapping, appears to still be present.	257311	610607
DBA16	Hillhouse	Building and associated well shown on early mapping.	256971	609745
DBA17	Dalleagles Lead Mine	Lead mines shown on early mapping.	257315	609911
DBA18	Dalleagles Air Shafts	Series of circular depressions visible on aerial photography and annotation of one air shaft within this area.	257634	609446
DBA19	Trough Burn Sheepfold	Sheepfold shown on early mapping.	257433	609163
DBA20	Newhouse	Building shown on early mapping.	257633	610094
DBA21	Straid Farm	Building shown on early mapping.	257917	610644
DBA22	Straid Farm Coal Pits	Coal Pits shown on early mapping	258108	610657
DBA23	The Old School House	Building shown on early mapping, appears to still be present.	258120	610817
DBA24	Burnfoot Row	Terraced housing and associated football ground.	258516	611143
DBA25	Burnfoot	Building shown on early mapping, appears to still be present.	258941	611387
DBA26	Burnside Cottage	Building shown on early mapping.	258948	610992
DBA27	Brockloch	Building shown on early mapping.	259506	610508

DBA ID	Name	Description	Location	
			X	Y
DBA28	Brockloch Well	Well shown on early mapping.	259761	610517
DBA29	Connel Burn Limestone Quarry	Limestone Quarry shown on early mapping.	259833	610868
DBA30	Coalcreoch	Building shown on early mapping.	260262	611276
DBA31	Laglaff	Building shown on early mapping.	260255	610311
DBA32	Blarene Burn Sheepfold	Sheepfold shown on early mapping.	259024	609631
DBA33	Ewe Hill Sheepfold	Sheepfold shown on early mapping.	259366	608422
DBA34	Connel Polga Sheepfold	Sheepfold shown on early mapping.	258567	607812
DBA35	Colliery Railway	Colliery Railway shown on early mapping.	259161	611291
DBA36	Crocradie Burn Sheepfold and wall	Round sheepfold to the SE of the burn and wall remnants following the NW edge of the burn.	256749	609154
DBA37	Chang Hill Enclosure	Circular enclosure seen on aerial photography	256916	609053
DBA38	High Chang Hill Modern Cairn	Cairn built upon natural outcrop	256580	607148
DBA39	Banty Cowan Hill possible enclosure	Drainage ditches forming circular enclosure	258150	608445

Appendix 10.B
Details of the Initial Assessment of the Potentially Nationally Important Assets

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

© Amec Foster Wheeler Environment & Infrastructure UK Limited

Appendix 10.B
Details of the Initial Assessment of the Potentially Nationally Important Assets

4	Name	Assessed Further	Rationale
NSR 7111	Laight Castle	No	Asset is outwith the ZTV.
NSR 7113	Doon Bridge	No	ZTV indicates restricted visibility to turbines and longer, heavily filtered views make restricted contributions to the importance of the asset.
NSR 7115	Elizabeth Isle	No	ZTV indicates restricted visibility to turbines and longer, heavily filtered views make restricted contributions to the importance of the asset.
NSR 7118	Benquhat Hill	No	Importance of asset derives from more immediate agricultural surroundings and heavily filtered longer views make restricted contributions to the importance of the asset.
NSR 7132	Dalmellington, Dame Helen's Castle	No	Asset is outwith the ZTV.
NSR 7162	Wee Cairn Hill, Dalcairnie	No	ZTV indicates restricted visibility to turbines and longer, heavily filtered views make restricted contributions to the importance of the asset.
NSR 7173	Bubbly Cairn, Bellsbank Plantation	No	ZTV indicates restricted visibility to turbines and longer, heavily filtered views make restricted contributions to the importance of the asset.
NSR 7175	Pennyarthur Rig	No	ZTV indicates restricted visibility to turbines and longer, heavily filtered views make restricted contributions to the importance of the asset.
NSR 7989	Beoch	Yes	Turbines may intrude on longer views which contribute to the understanding of the asset.
NSR 7994	Cairnennock	No	ZTV indicates restricted visibility to turbines and longer, heavily filtered views make restricted contributions to the importance of the asset.
NSR 8018	Fardenreoch	No	The setting of this asset towards the south is largely dominated by continued opencast workings. With the closest turbine being over 6km away from this site, the visibility of distant turbines would not affect the contribution of the setting to the asset.
NSR 8024	Little Rigend	No	The setting of this asset is largely dominated by continued opencast workings and forrestry planting with only a very localised prominence surviving. Although some visibility of distant turbines may be present, these would not affect the contribution of the setting to the asset.
NSR 13051	Craigdullyeart Hill	No	The setting of this asset is defined by its relationship to the watercourse and surrounding settlements.