

TECHNICAL APPENDIX 9.1 – NOISE SENSITIVE RECEPTORS, NOISE MONITORING LOCATIONS, PROPOSED SCHEME AND CUMULATIVE DEVELOPMENT TURBINES

This sections presents the following figures:

- Figure 9.2: Proposed Scheme turbines, noise sensitive receptors, and noise monitoring locations.
- Figure 9.3: Proposed Scheme, cumulative noise sensitive receptors and cumulative developments

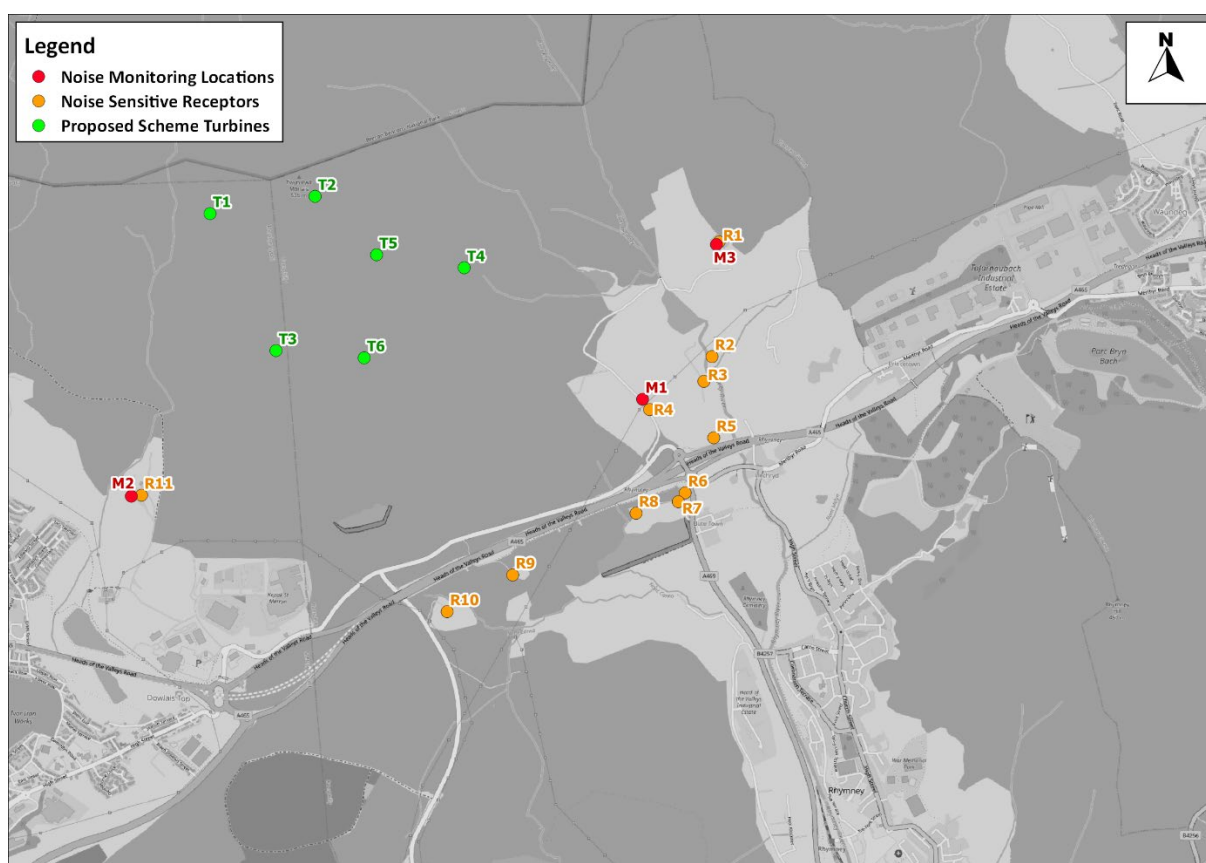


Figure 9.1: Proposed Scheme turbines, noise sensitive receptors and noise monitoring locations

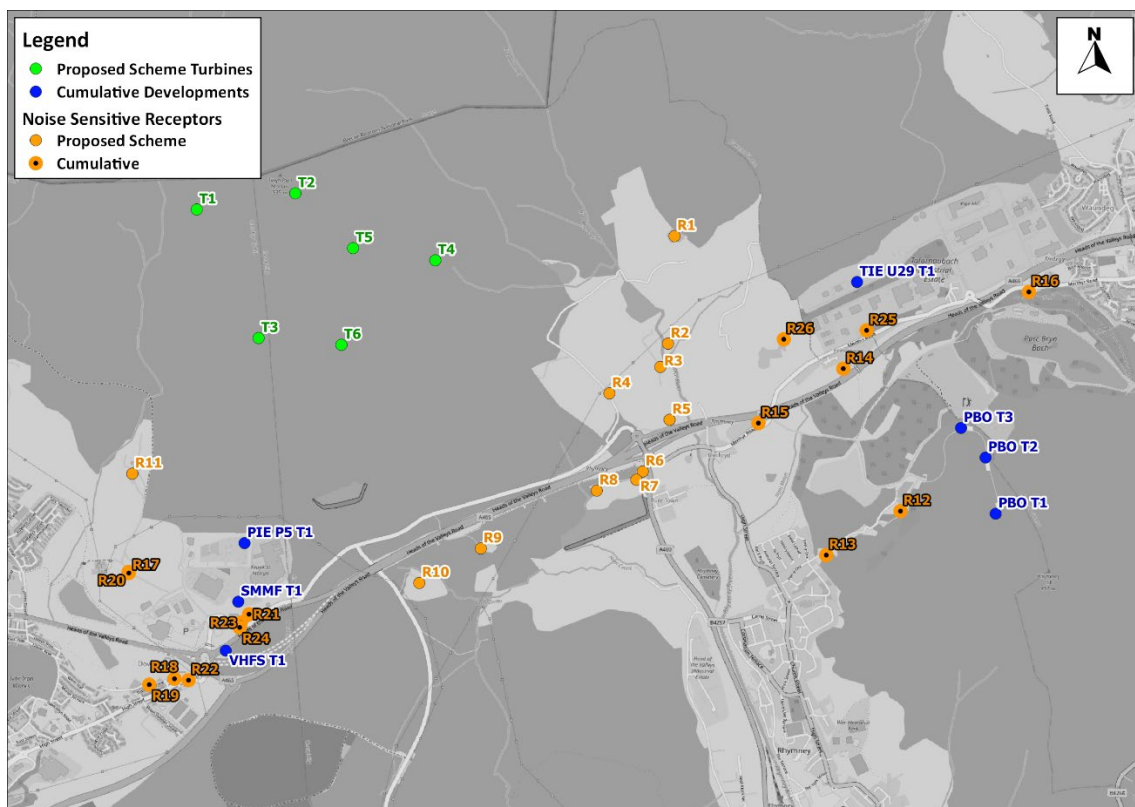


Figure 9.2: Proposed Scheme, cumulative noise sensitive receptors and cumulative developments

Table 9.1: Proposed Scheme: wind turbine coordinates

WT Number	WT Reference	WT Hub Height (m)	Easting	Northing
1	T1	105	307733	210855
2	T2	105	308300	210948
3	T3	105	308089	210116
4	T4	105	309105	210563
5	T5	105	308632	210633
6	T6	105	308565	210077

Table 9.2: Cumulative assessment: wind turbine coordinates

Cumulative Development	WT Ref.	WT Model	WT Hub Height (m)	Easting	Northing
Pen Bryn Oer Wind Farm	PBO T1	Vestas V90 2MW	65	312327	209106
Pen Bryn Oer Wind Farm	PBO T2	Vestas V90 2MW	65	312269	209429
Pen Bryn Oer Wind Farm	PBO T3	Vestas V90 2MW	65	312128	209599
Plot 5 Pengarnddu Industrial Estate	PIE P5 T1	EWT Direct Wind 54 500kW	50	308008	208937
Unit 29 Tafaranaubach Industrial Estate	TIE U29 T1	PowerWind 500kW	46	311530	210438
St. Merryn Meat Factory	SMMF T1	EWT Direct Wind 54	50	307972	208600

Table 9.3: Cumulative assessment: small wind turbine coordinates

Cumulative Development	WT Ref.	WT Model	WT Hub Height (m)	Easting	Northing
Valley Heights Filling Station	VHFS T1	Britwind H15	21	307900	208319

TECHNICAL APPENDIX 9.2 – NOISE MONITORING SUMMARY

Table 9.4: Monitoring Location 1

Measurement Location		Tywn Yr Arian				
Description		Monitoring location to the north-west of the property. Road traffic noise from the Heads of the Valley Road the dominant contributor to the ambient sound environment. Resident confirmed corona discharge from the power lines is just audible, during periods of rain, however representative of the sound environment at the property. An alternative location in the properties front garden was discounted due to the present of extraneous sound sources, and vegetation.				
Equipment		Type	Serial Number		Last Calibrated	
Sound Level Meter		Rion NL-52	00687043		24/02/2020	
Pre-amplifier		Rion NH-25	87198		24/02/2020	
Microphone		Rion UC-59	13561		24/02/2020	
Calibrator		Rion NC-75	34291339		03/08/2020	
Monitoring Period	File Number	Time Start (GMT/BST)	Time End (GMT/BST)	Calibration Start	Calibration End	Significant Drift
1	4302	24/03/21 12:00	09/04/21 10:50	94.0	93.9	None
2	4305	09/04/21 12:20	16/04/21 21:10	94.0	93.9	None
3	4308	05/05/21 13:10	18/05/21 11:30	94.0	94.1	None
4	4311	18/05/21 12:00	01/06/21 11:40	94.0	94.0	None
Data Exclusions (other than those correction for meteorological conditions)						
Time Start (GMT)	Time End (GMT)	Notes				
16/04/21 21:10	05/05/21 13:10	SLM encountered an SD card error and stopped monitoring mid-way through monitoring period.				



Figure 9.3: Monitoring Location 1: Photograph (1)



Figure 9.4: Monitoring Location 1: Photograph (2)



Figure 9.5: Monitoring Location 1: Photograph (3)



Figure 9.6: Monitoring Location 1: Photograph (4)

Table 9.5: Monitoring Location 2

Measurement Location		Blaen Morlais Farm				
Description		Monitoring location to the south-west of the property. Road traffic noise from the Heads of the Valley Road the dominant contributor to the ambient sound environment. Psithurism audible at the monitoring location during wind gusts. Monitoring location selected, as away from the properties ventilation building services, located on the other side of the property.				
Equipment		Type	Serial Number		Last Calibrated	
Sound Level Meter		Rion NL-52	00687044		24/02/2020	
Pre-amplifier		Rion NH-25	87199		24/02/2020	
Microphone		Rion UC-59	13563		24/02/2020	
Calibrator		Rion NC-75	34291339		03/08/2020	
Monitoring Period	File Number	Time Start (GMT/BST)	Time End (GMT/BST)	Calibration Start	Calibration End	Significant Drift
1	4402	24/03/21 14:10	09/04/21 11:40	94.0	94.0	None
2	4405	09/04/21 13:10	04/05/21 20:40	94.0	93.9	None
3	4408	05/05/21 14:00	18/05/21 12:10	94.0	94.0	None
4	4411	18/05/21 12:50	01/06/21 12:00	94.0	93.9	None
Data Exclusions (other than those correction for meteorological conditions)						
Time Start (GMT)	Time End (GMT)	Notes				
09/04/21 13:10	04/05/21 20:40	SLM blew over in high winds during survey. All data discounted during period.				



Figure 9.7: Monitoring Location 2: Photograph (1)



Figure 9.8: Monitoring Location 2: Photograph (2)



Figure 9.9: Monitoring Location 2: Photograph (3)



Figure 9.10: Monitoring Location 2: Photograph (4)

Table 9.6: Monitoring Location 3

Measurement Location		Blaen Rhymney Farm				
Description		Monitoring location to the south-west of the property. Road traffic noise from the Heads of the Valley Road the dominant contributor to the ambient sound environment. Dog barking noise from the property's kennels also a contributor to the sound environment. Aquapur 950 water filtration system, located in the vicinity of the noise equipment, was not in operation during the survey.				
Equipment		Type	Serial Number		Last Calibrated	
Sound Level Meter		Rion NL-52	01176453		03/08/2020	
Pre-amplifier		Rion NH-25	76472		03/08/2020	
Microphone		Rion UC-59	12404		03/08/2020	
Calibrator		Rion NC-75	34291339		03/08/2020	
Monitoring Period	File Number	Time Start (GMT/BST)	Time End (GMT/BST)	Calibration Start	Calibration End	Significant Drift
1	5302	24/03/21 13:10	09/04/21 10:10	94.0	93.7	None
2	5305	09/04/21 11:30	04/05/21 17:10	94.0	94.0	None
3	5308	05/05/21 11:30	18/05/21 10:50	94.0	94.0	None
4	5311	18/05/21 11:10	01/06/21 11:10	94.0	94.2	None
Data Exclusions (other than those correction for meteorological conditions)						
Time Start (GMT)	Time End (GMT)	Notes				
-	-	n/a				



Figure 9.11: Monitoring Location 3: Photograph (1)



Figure 9.12: Monitoring Location 3: Photograph (2)



Figure 9.13: Monitoring Location 3: Photograph (3)



Figure 9.14: Monitoring Location 3: Photograph (4)

TECHNICAL APPENDIX 9.3 – WIND ANALYSIS: MONITORING PERIOD

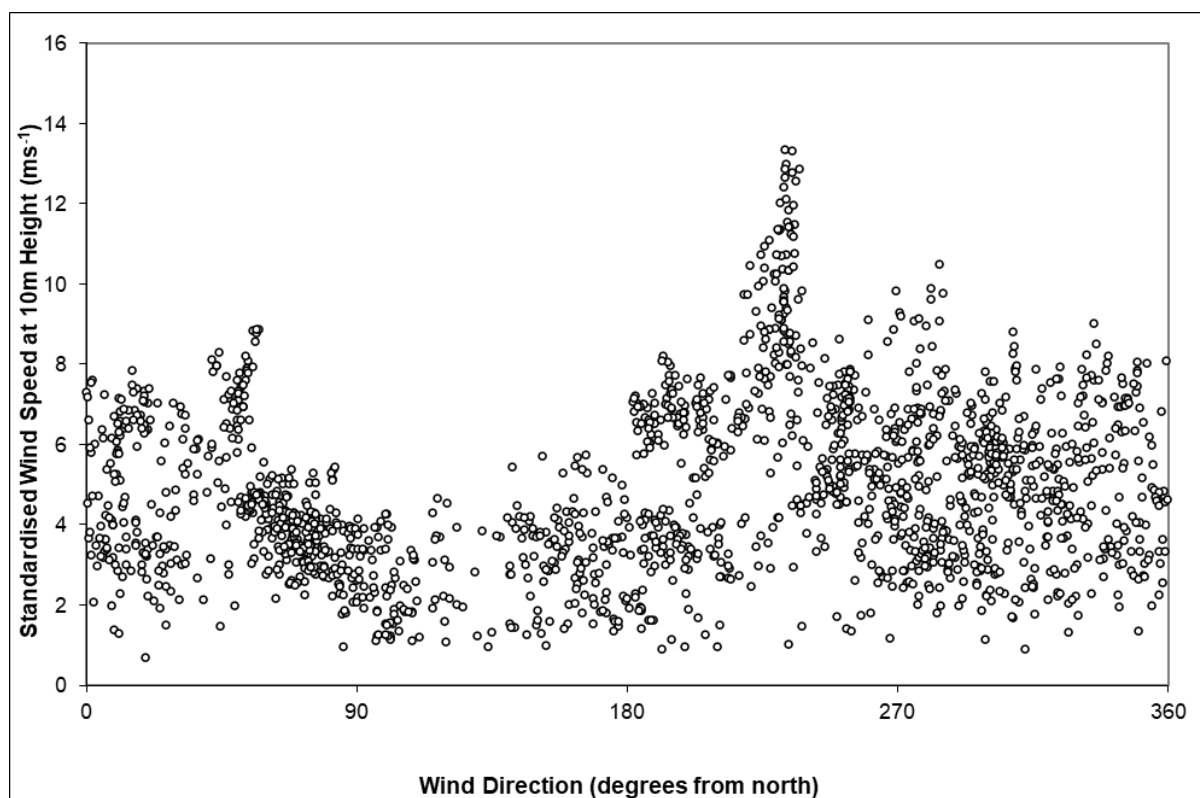


Figure 9.15: M1: Wind Conditions - Quiet Day-time (entire period)

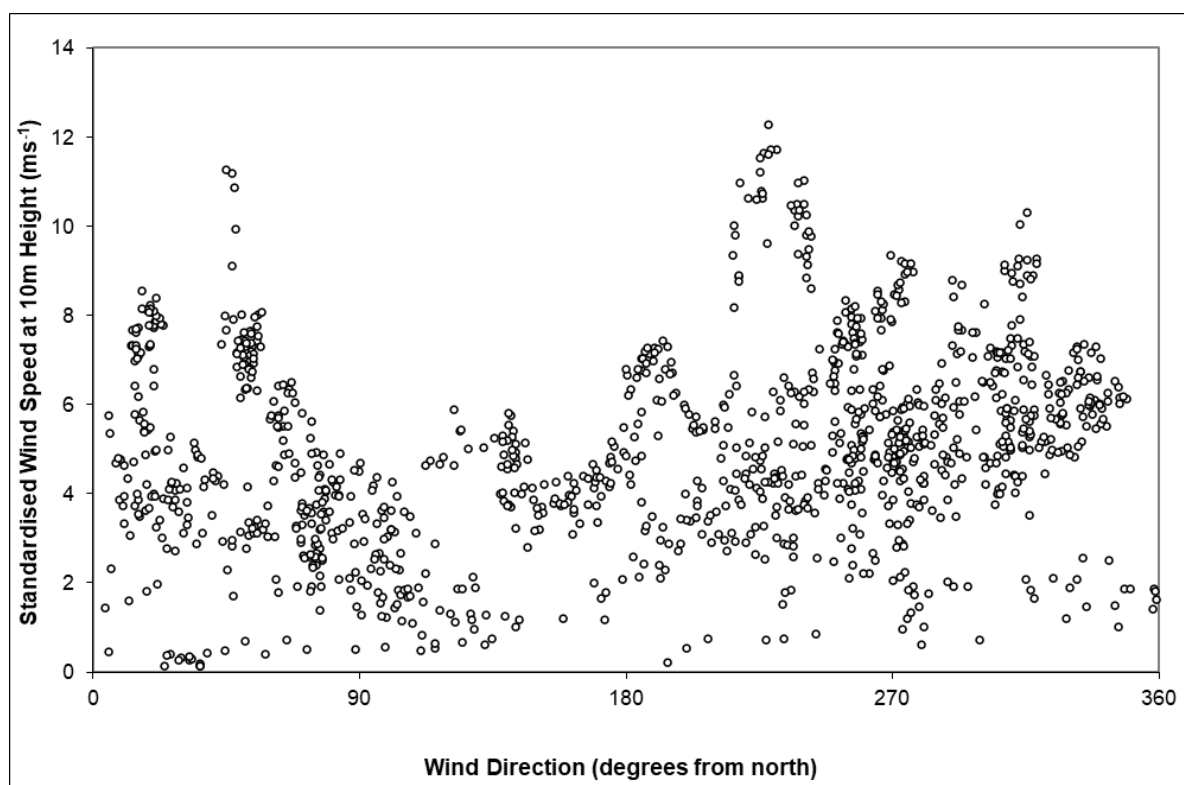


Figure 9.16: M1: Wind Conditions – Night-time (entire period)

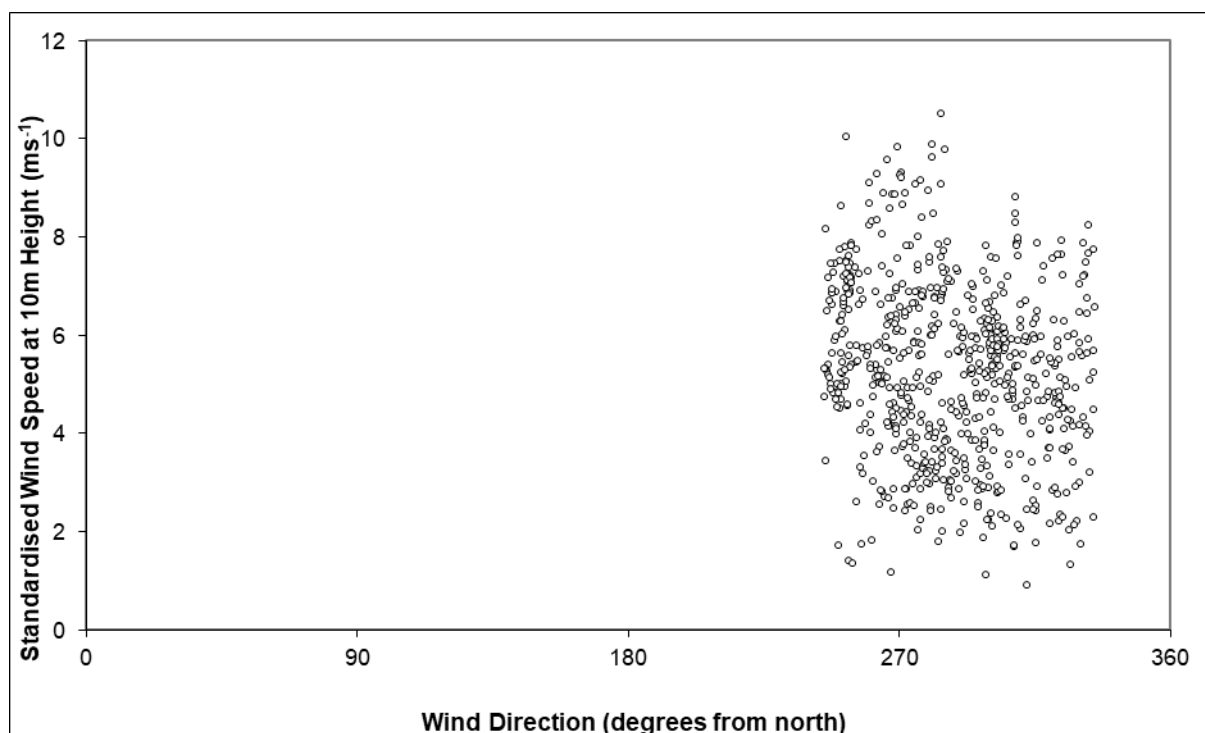


Figure 9.17: M1: Wind Conditions - Quiet Day-time (assessment scenario - downwind of Proposed Scheme)

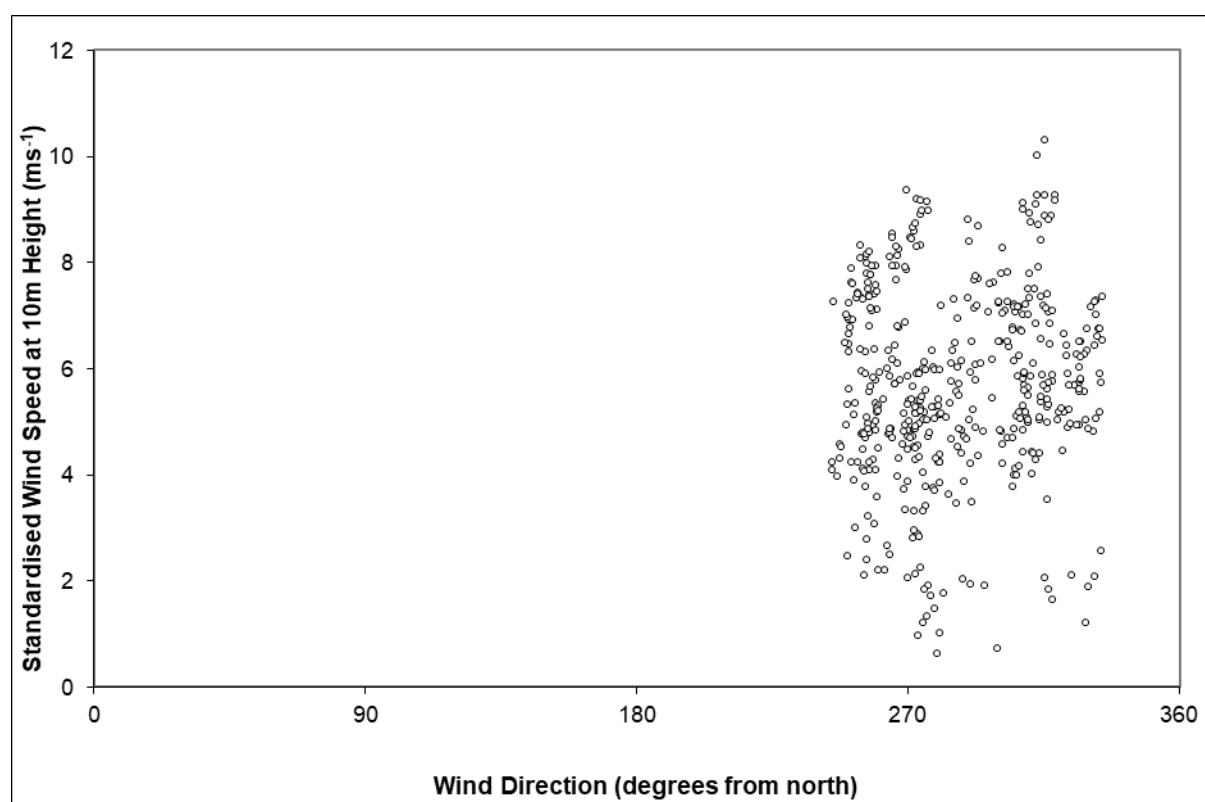


Figure 9.18: M1: Wind Conditions – Night-time (assessment scenario - downwind of Proposed Scheme)

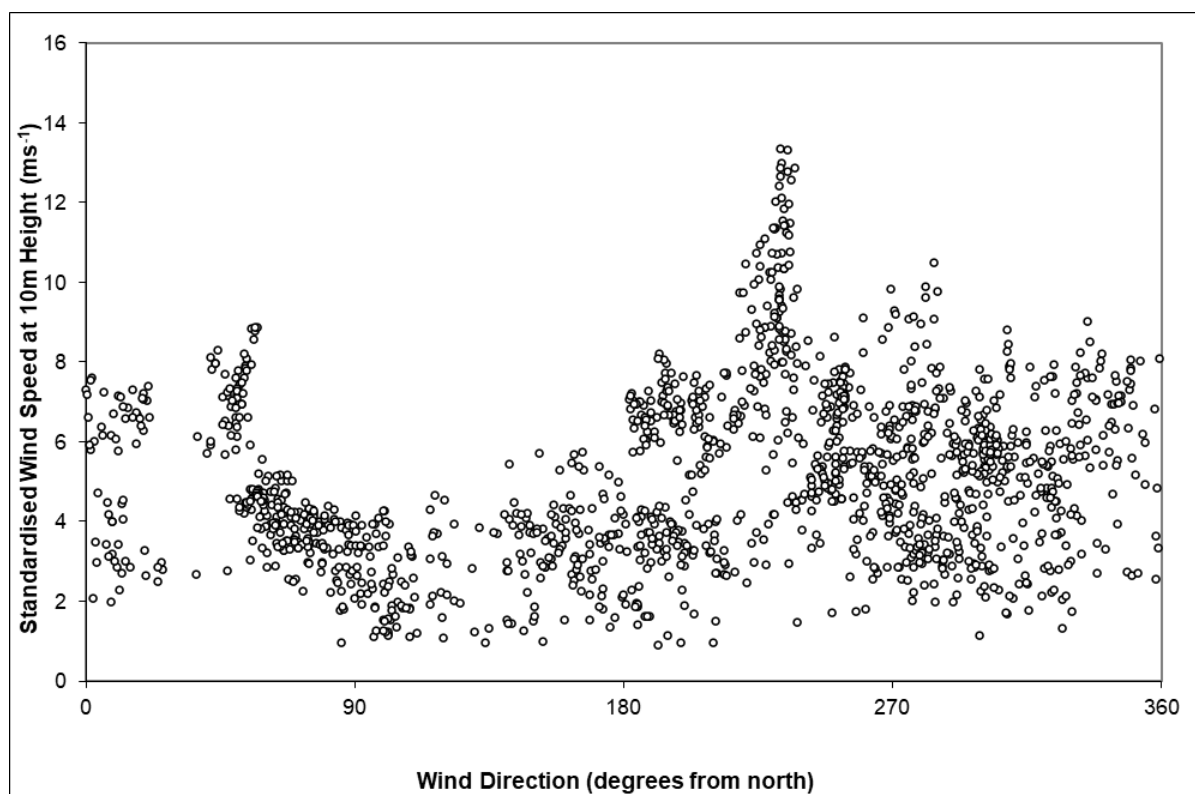


Figure 9.19: M2: Wind Conditions - Quiet Day-time (entire period)

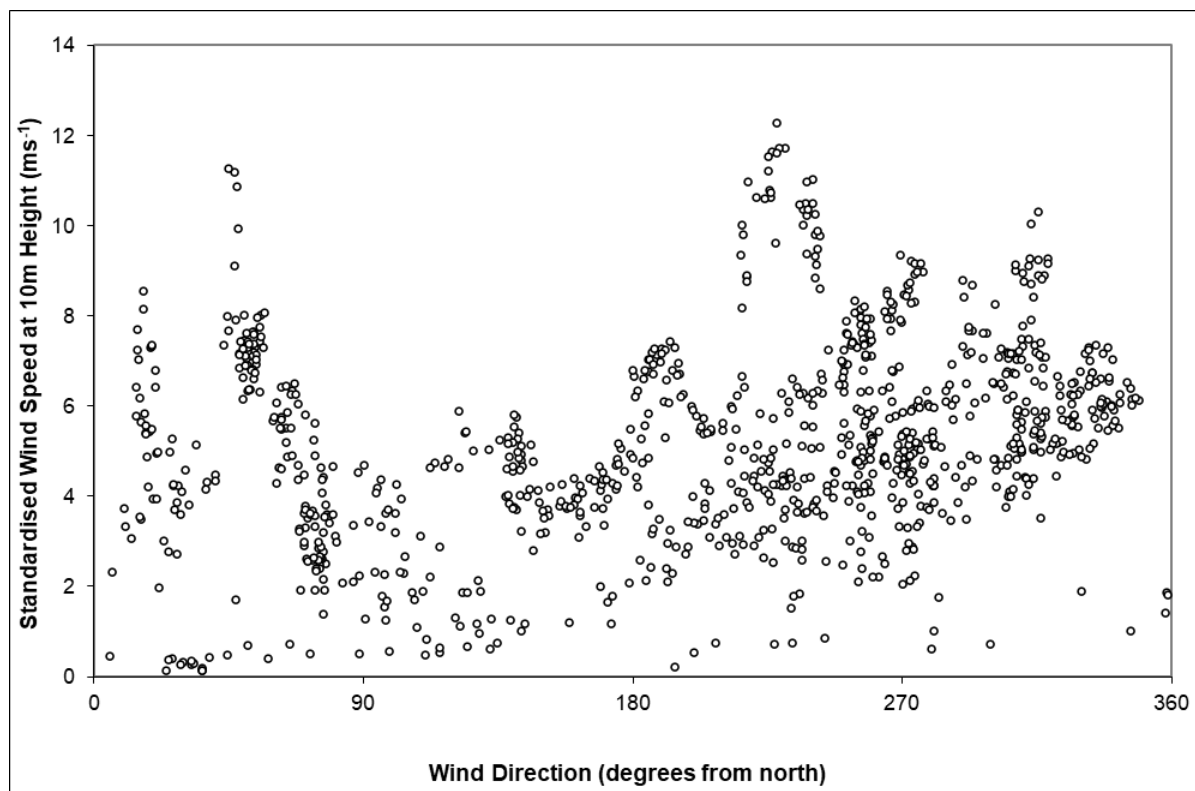


Figure 9.20: M2: Wind Conditions – Night-time (entire period)

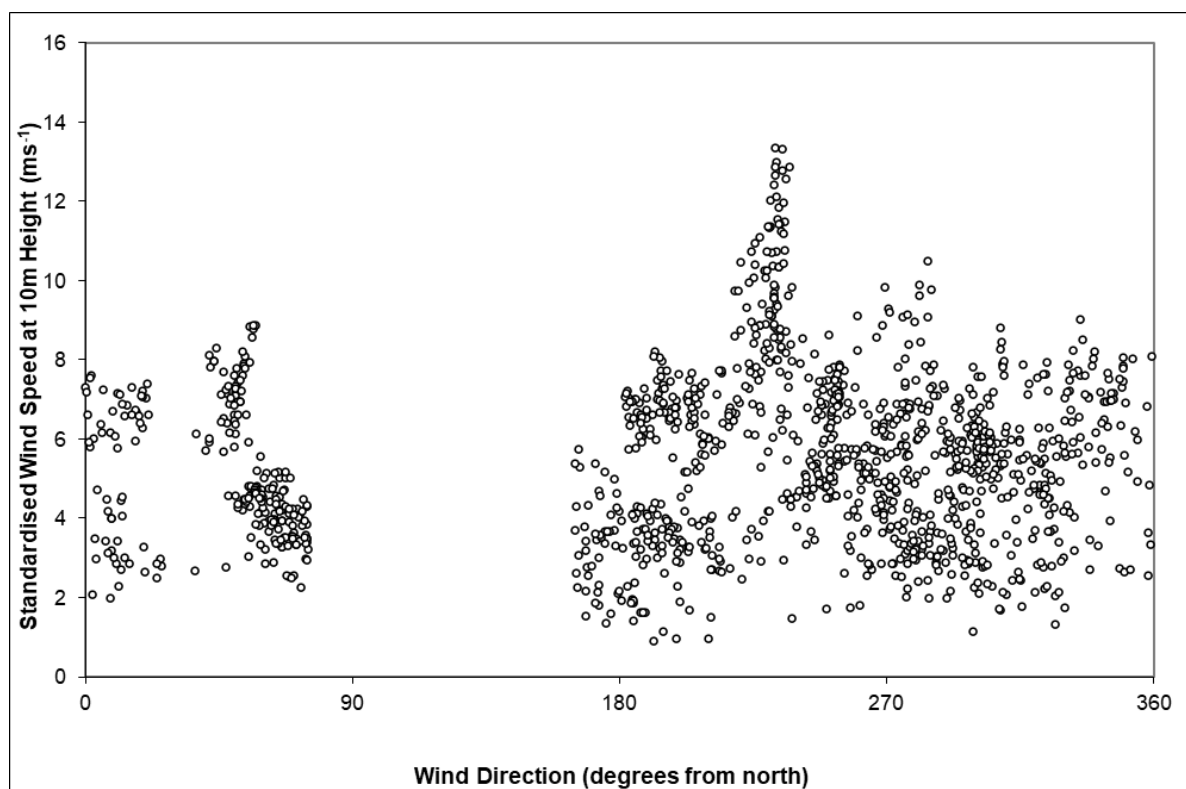


Figure 9.21: M2: Wind Conditions - Quiet Day-time (assessment scenario – downwind of cumulative scheme(s) removed)

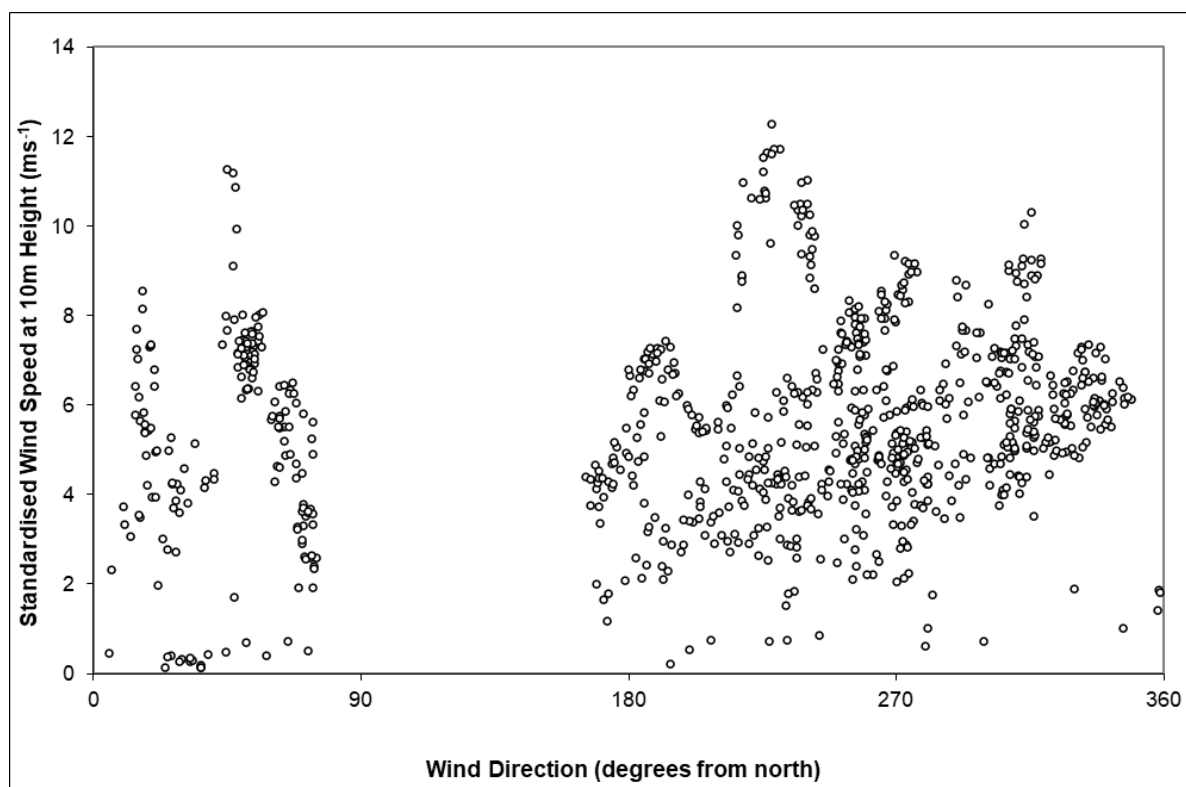


Figure 9.22: M2: Wind Conditions – Night-time (assessment scenario – downwind of cumulative scheme(s) removed)

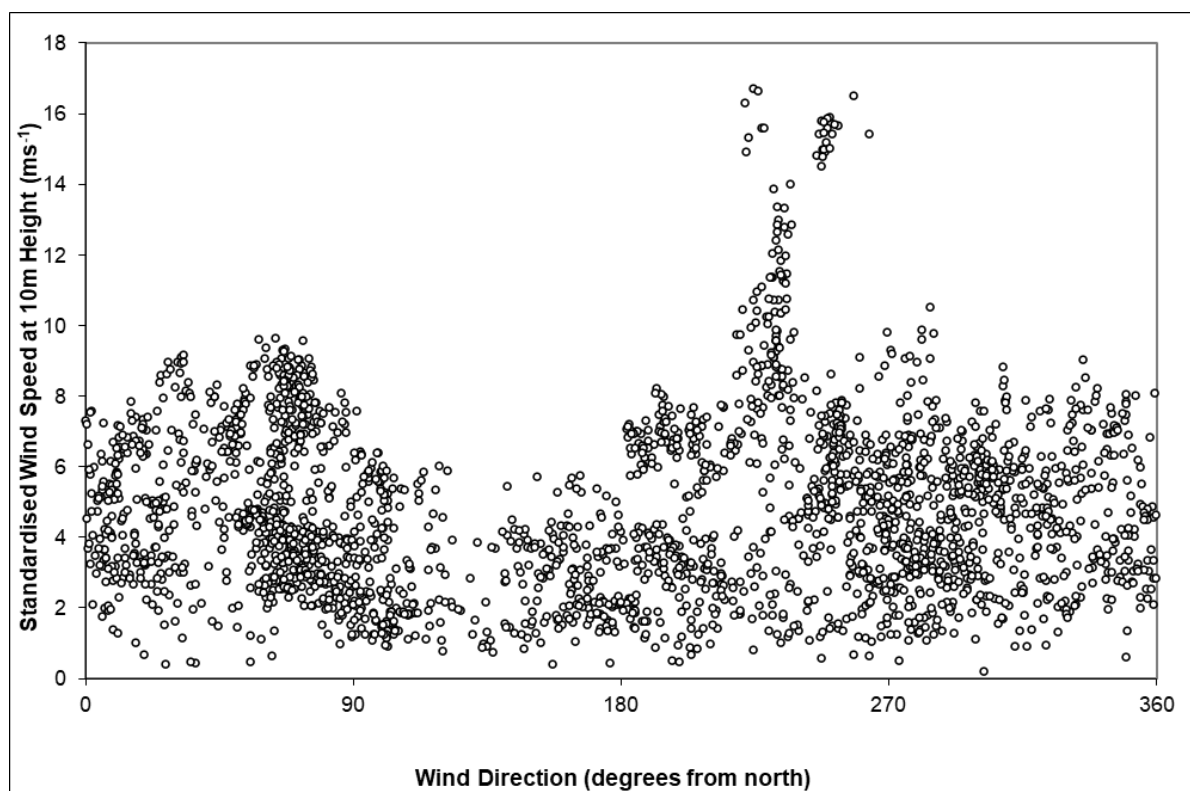


Figure 9.23: M3: Wind Conditions - Quiet Day-time (entire period)

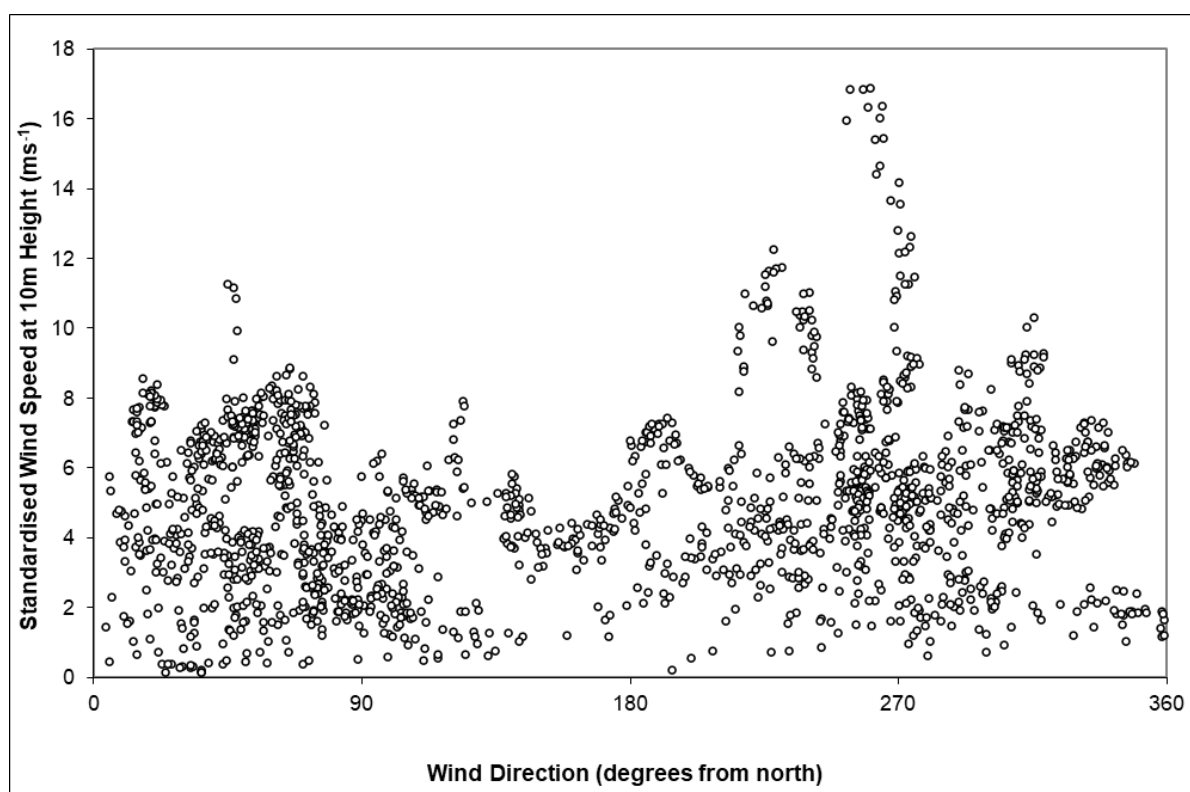


Figure 9.24: M3: Wind Conditions – Night-time (entire period)

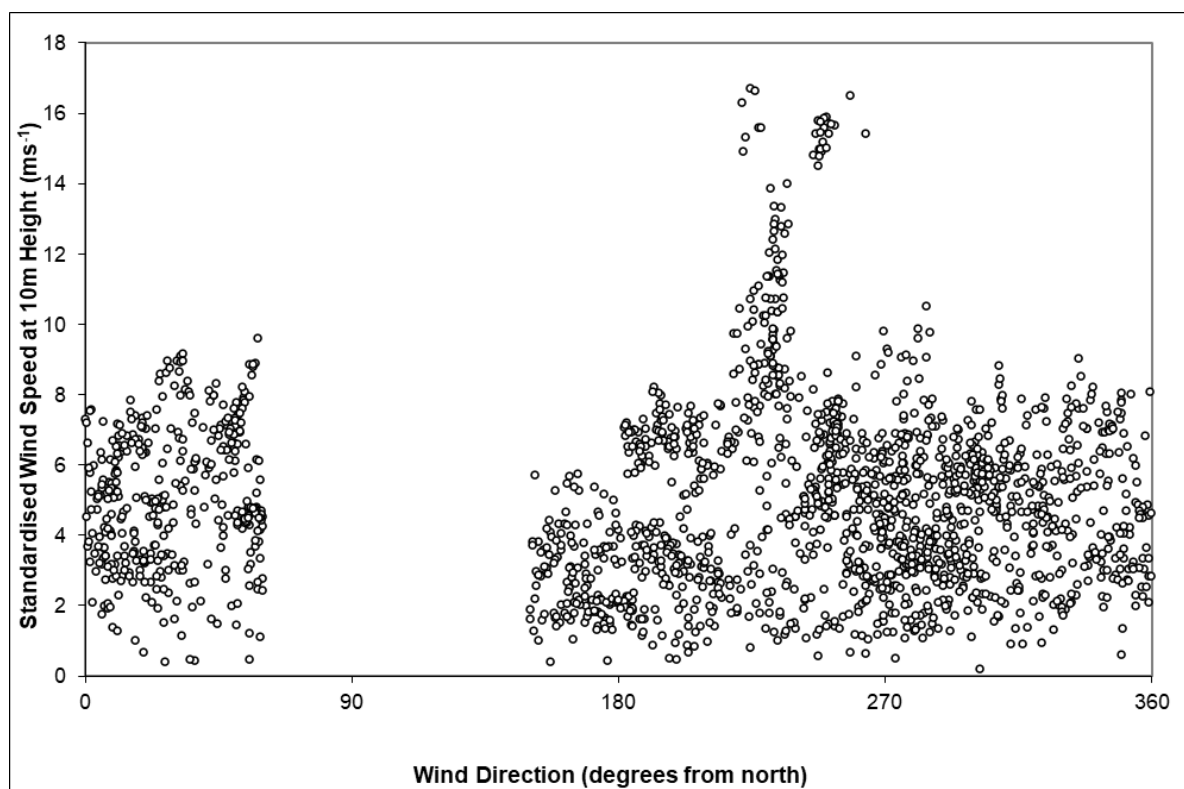


Figure 9.25: M3: Wind Conditions - Quiet Day-time (assessment scenario – downwind of cumulative scheme(s) removed)

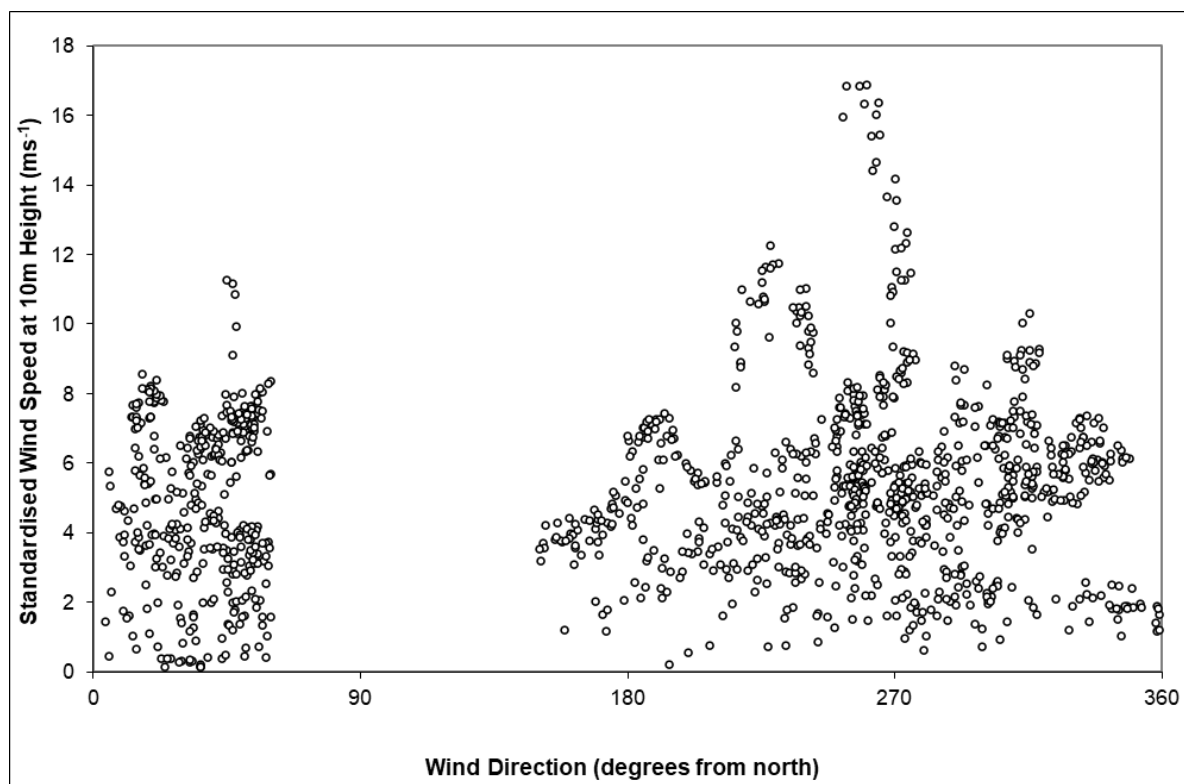


Figure 9.26: M3: Wind Conditions – Night-time (assessment scenario – downwind of cumulative scheme(s) removed)

TECHNICAL APPENDIX 9.4 – DERIVED BACKGROUND NOISE LEVELS

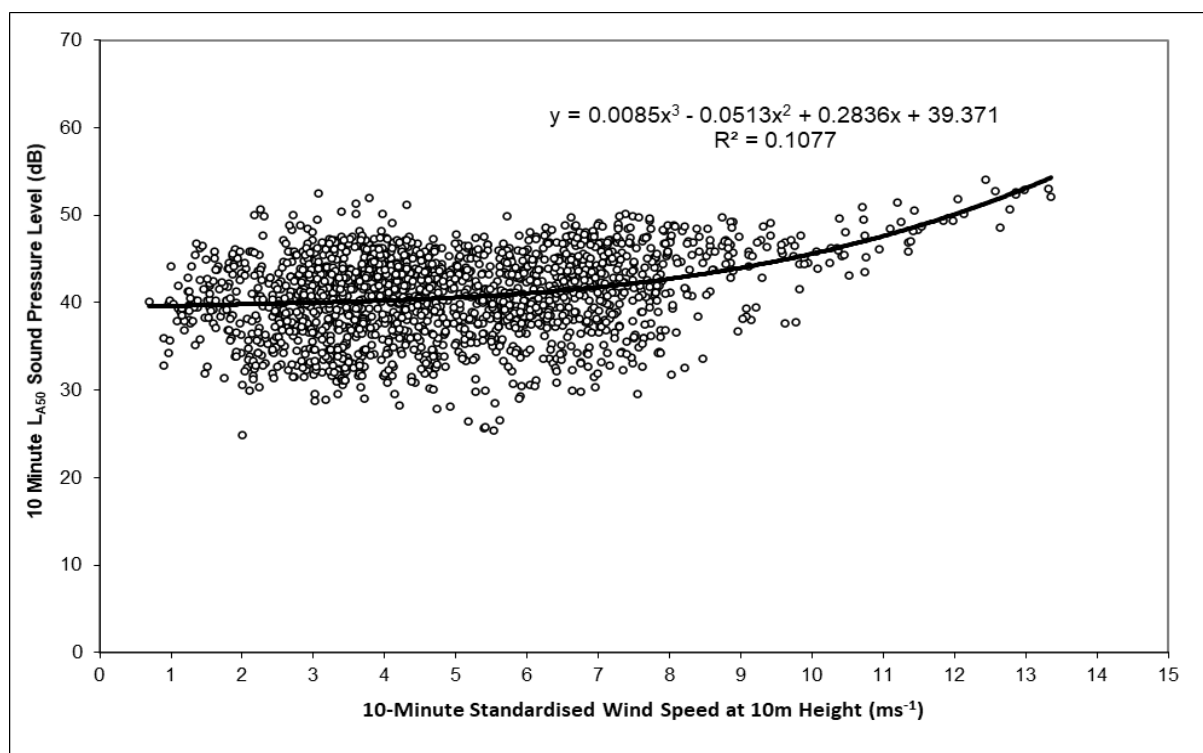


Figure 9.27: M1: Background Noise Levels and Limits: Quiet Day-time

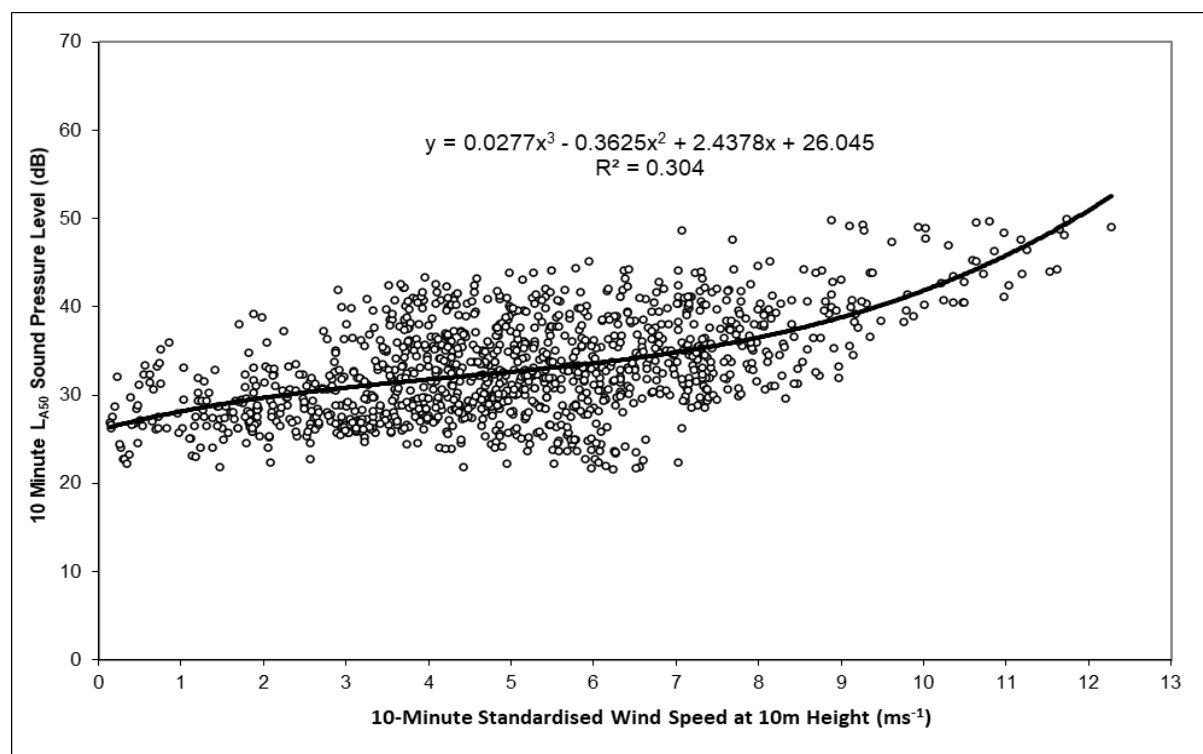


Figure 9.28: M1: Background Noise Levels and Limits: Night-time

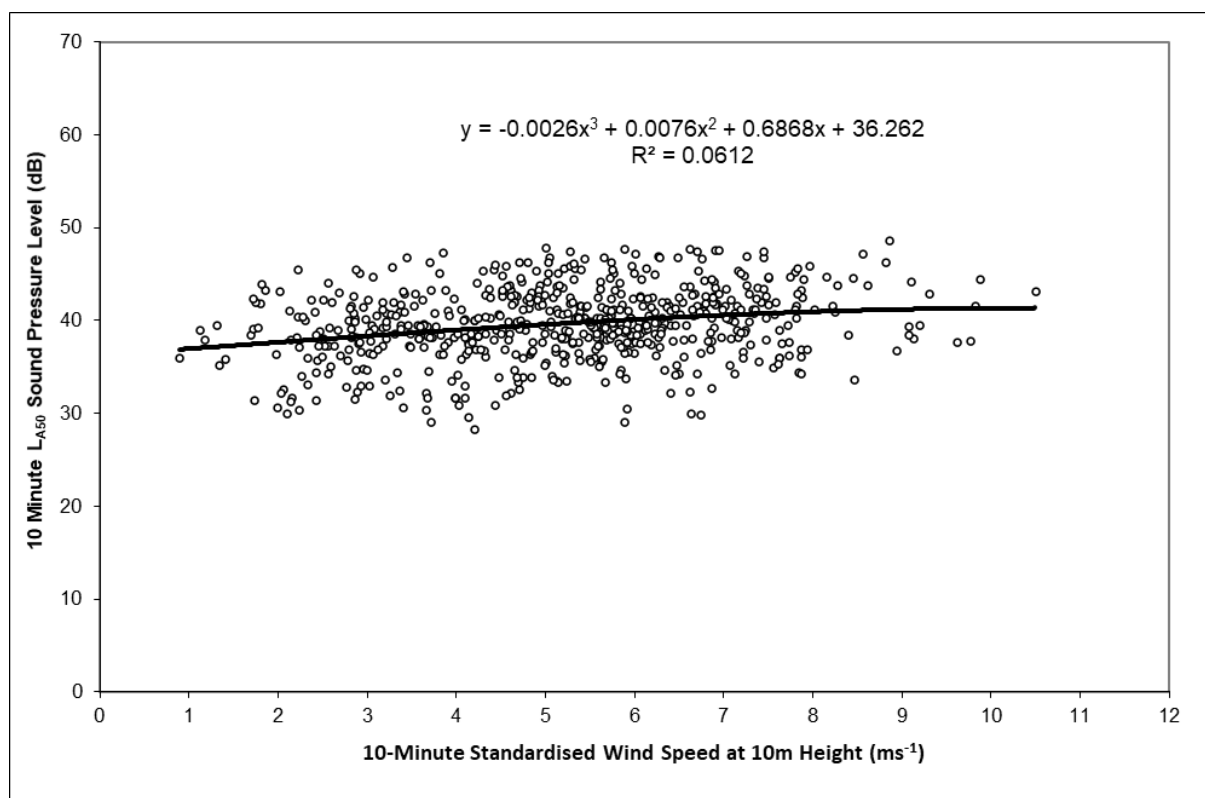


Figure 9.29: M1: Background Noise Levels and Limits: Quiet Day-time (245 – 335°)

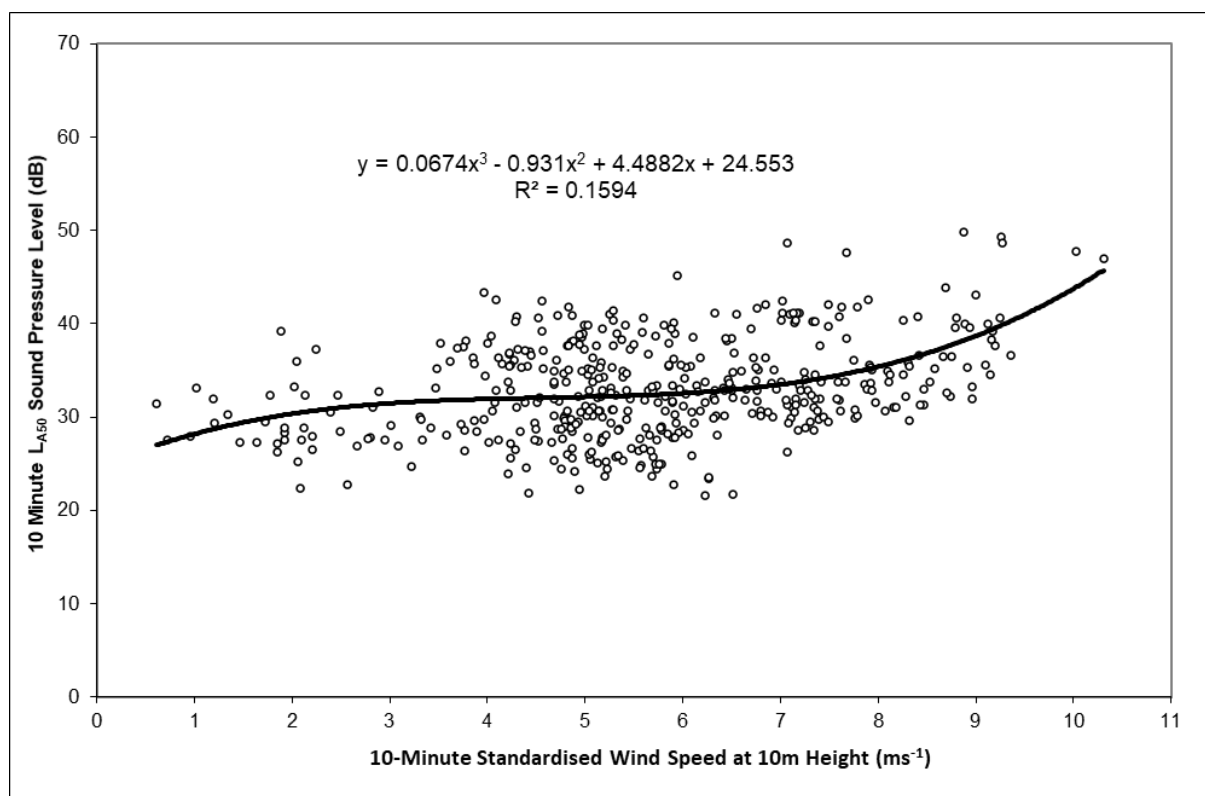


Figure 9.30: M1: Background Noise Levels and Limits: Night-time (245 – 335°)

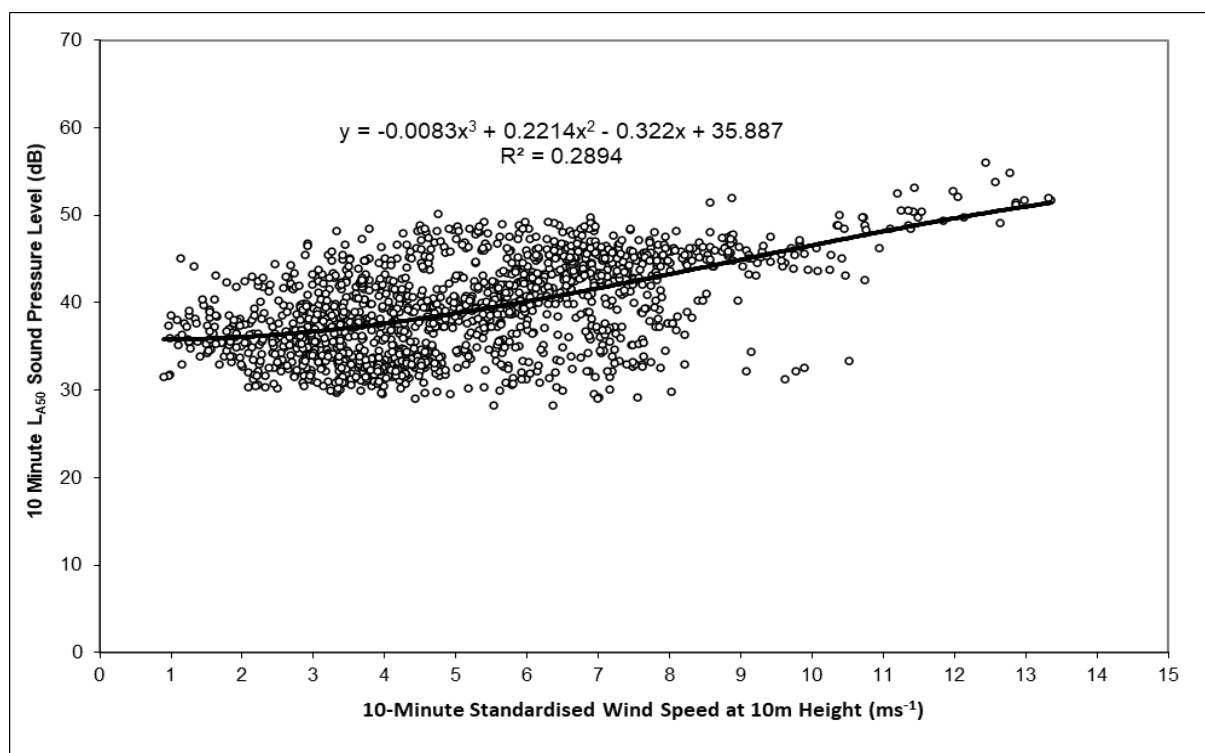


Figure 9.31: M2: Background Noise Levels and Limits: Quiet Day-time

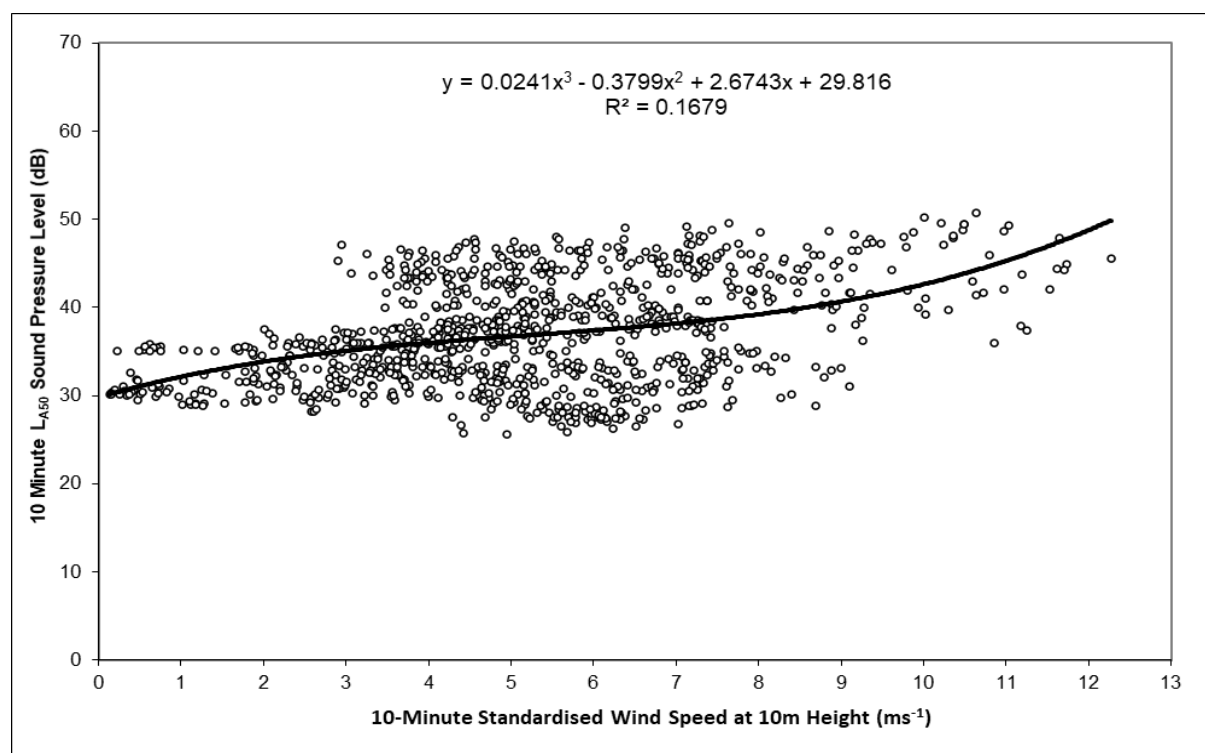


Figure 9.32: M2: Background Noise Levels and Limits: Night-time

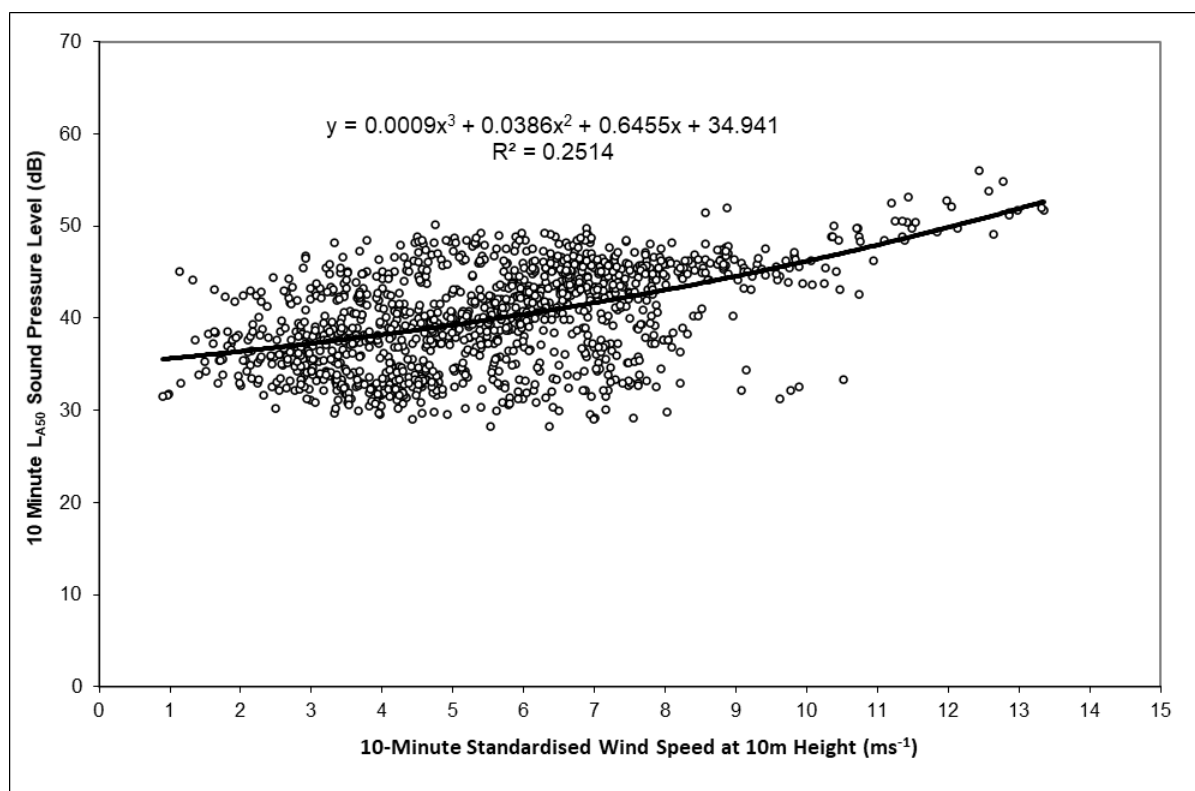


Figure 9.33: M2: Background Noise Levels and Limits: Quiet Day-time (165 – 75°)

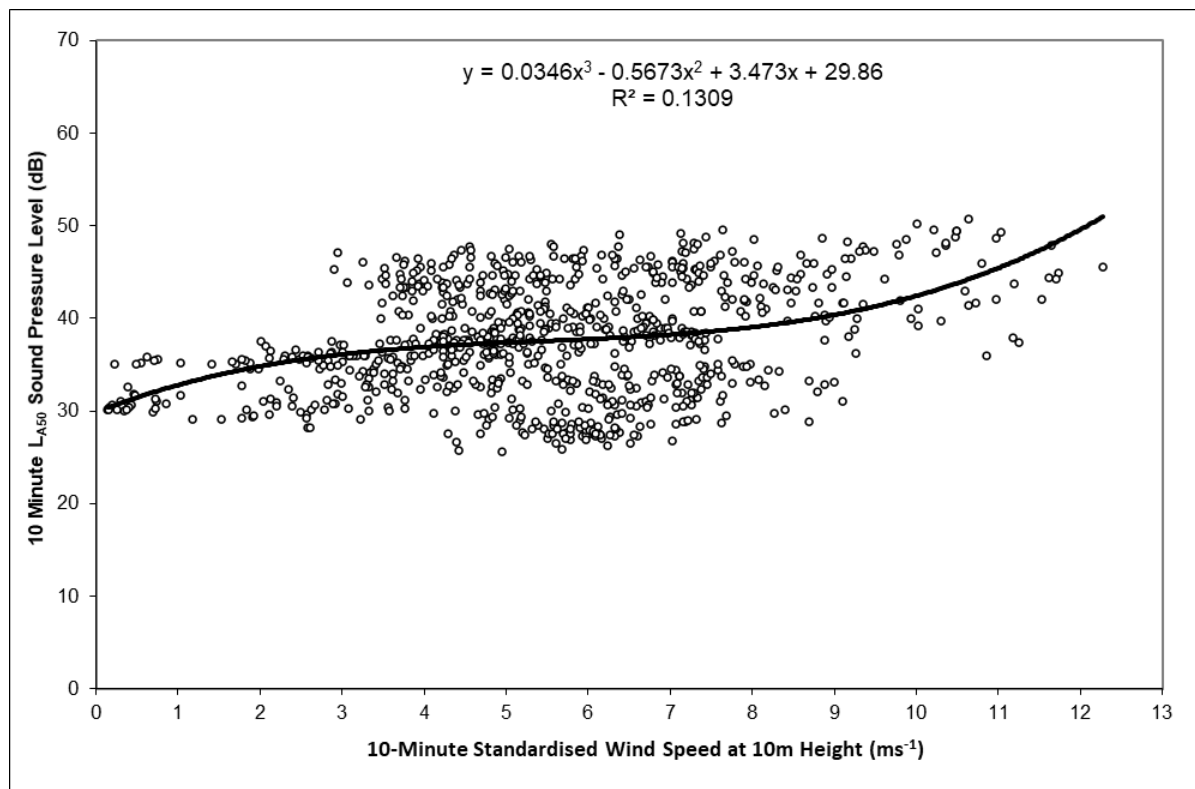


Figure 9.34: M2: Background Noise Levels and Limits: Night-time (165 – 75°)

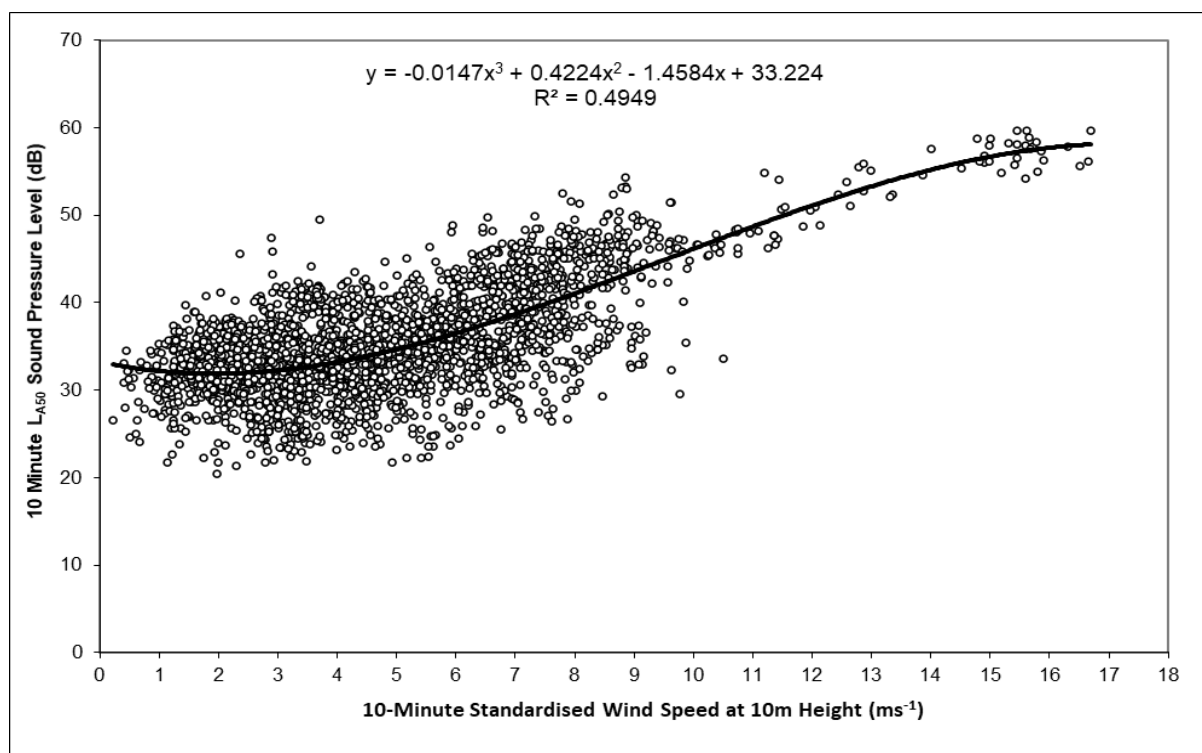


Figure 9.35: M3: Background Noise Levels and Limits: Quiet Day-time

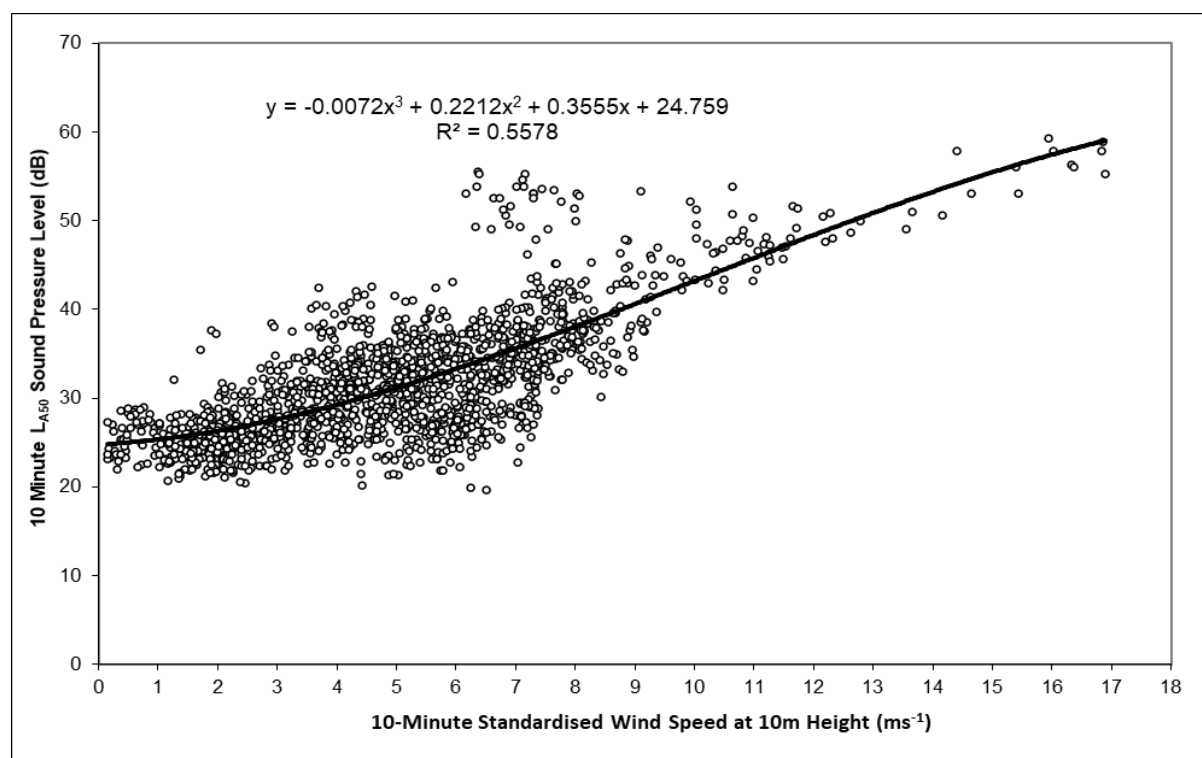


Figure 9.36: M3: Background Noise Levels and Limits: Night-time

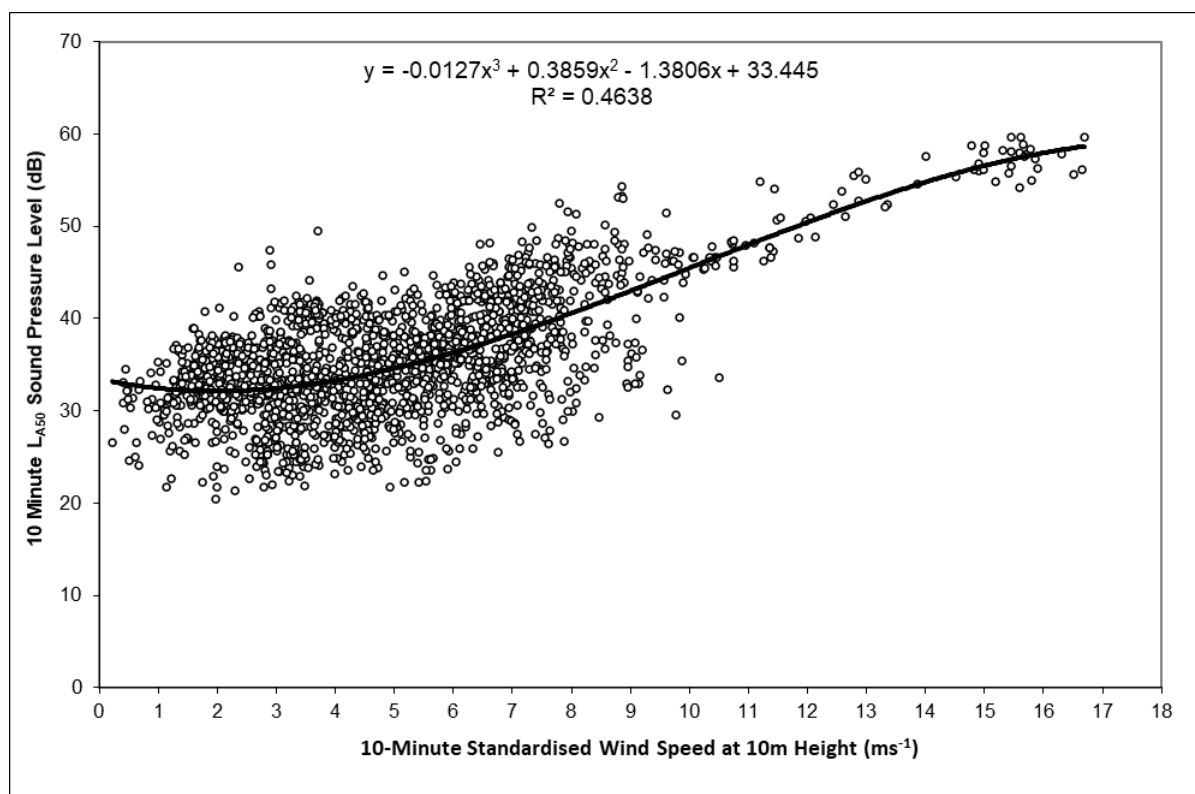


Figure 9.37: M3: Background Noise Levels and Limits: Quiet Day-time (150 – 60°)

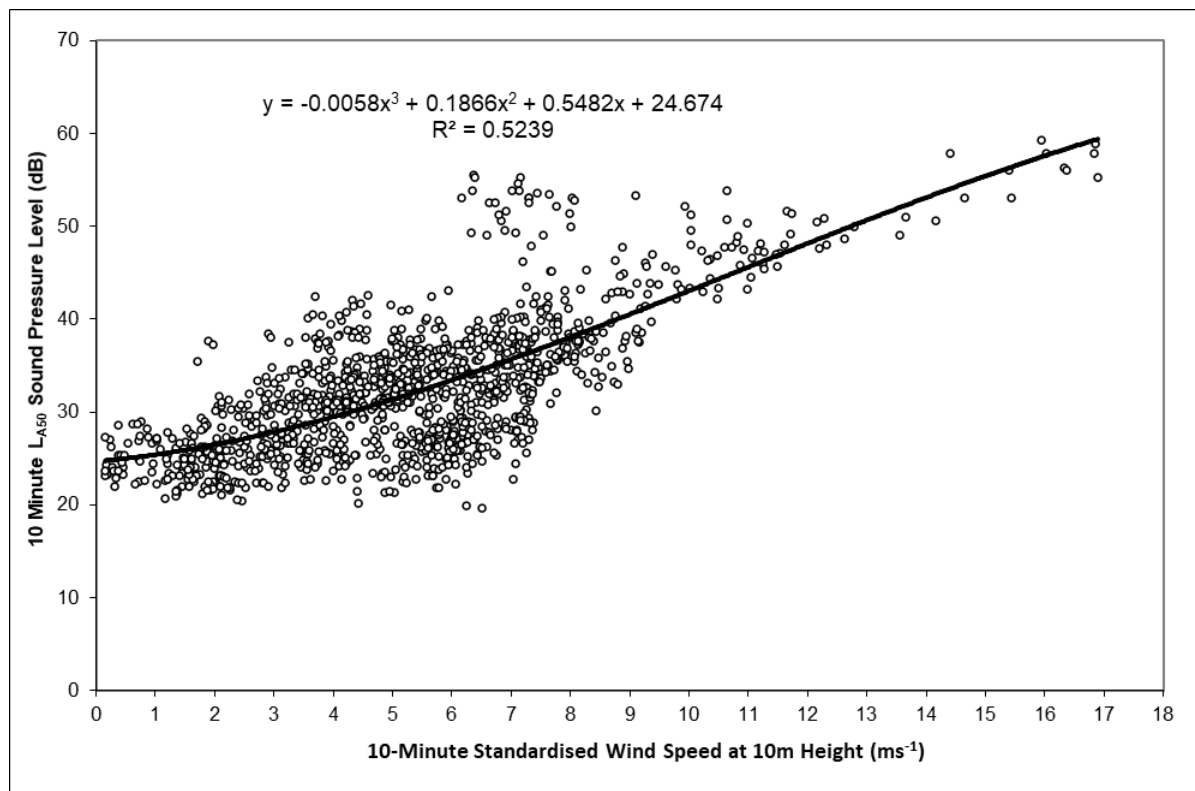


Figure 9.38: M3: Background Noise Levels and Limits: Night-time (150 – 60°)

TECHNICAL APPENDIX 9.5 – PROPOSED SCHEME AND CUMULATIVE DEVELOPMENT TURBINES SOUND POWER LEVELS

Proposed Scheme

Details of the sound power levels at each wind speed, as specified by the candidate turbine manufacturer are given in **Table 9.36**.

Table 9.7: Candidate Turbines – Sound Power Level

Standardised Wind Speed, ms- 1	Sound Power Level, dB (A)
	Nordex N149 ¹ (without serrated edge) + 2 dB
4	99.2
5	103.8
6	108.2
7	109.6
8	109.6
9	109.6
10	109.6
11	109.6
12	109.6

The sound emitted by wind turbines consists of a number of different frequencies, some of which are more dominant than others. These frequencies are grouped together into what are known as octave band centre frequencies or spectra. Within each spectrum the highest frequency is twice the lowest frequency and the octave bands are defined by the octave band centre frequency. The addition of these spectra will give an overall sound power level for the turbine. The amount of absorption over a given distance depends on the frequency of the noise - high frequencies are absorbed more readily by the ground and atmosphere than for low frequencies.

The octave band spectral information for the candidate turbine is summarised in **Table 9.37**.

¹ Nordex 'Third octave sound power levels – Nordex N149/5.X' (Rev 1. August 2019).

Table 9.8: Candidate Turbines – Octave Band Centre Frequency

Octave Band Centre Frequency (OBCF) (Hz)	Warranted Sound Power Level, dB (A)
	Nordex N149
63	89.9
125	96.1
250	100.3
500	103.6
1000	105.0
2000	102.6
4000	93.8
8000	85.0

Cumulative Developments

Details of the sound power levels at each wind speed for the cumulative development turbines, and the source of the data, are summarised in **Table 9.38**.

The octave band spectral information for the cumulative development turbines is summarised in **Table 9.39** and **Table 9.40**.

Table 9.9: Cumulative Turbines – Sound Power Level

Standardised Wind Speed, ms ⁻¹	Sound Power Level, dB (A)				
	P/15/0001 V90 2MW ² + 3dB	P/12/0078 EWT 0.5MW ³	C/2012/0327 PW 500 0.5MW ⁴ + 2dB	P/16/0384 Britwind H15 0.15MW ⁵ [Small Wind Turbine]	P/16/0128 EWT 54 0.9MW ⁶
4	97.4	97.0	91.0	85.7	98.2
5	102.4	99.5	96.0	86.7	98.2
6	105.5	98.0	100.0	88.1	100.0
7	106.6	99.0	102.0	89.5	101.4
8	107.0	100.0	104.0	90.9	102.0
9	107.0	100.5	104.0	92.0	102.0
10	107.0	100.5	104.0	92.8	102.0
11	107.0	100.5	104.0	93.5	102.0
12	107.0	100.5	104.0	93.5	102.0

² Vestas Wind Systems A/S. 2008. "General Specification V90 – 1.8/2.0 MW". Item no. 950019 V07, 2008-05-05 + 2 dB"

³ EWT Specification Sound power warranty levels DW52/54 500kW (S1005020, 07.12.11) & EWT Specification Sound power level DW54 – 500 kW (S-1005030, 09.05.12)

⁴ KR Associates Report 'Wind Farm Assessment – Tafarnaubach, KR02475 (26.09.2021)

⁵ 24 Acoustics 'Proposed Wind Turbine at Millenium Service Station, Methyr Tydfil, Noise Impact Assessment' (07.11.2016). No octave band centre frequency data so spectra for DW54 used (EWT Specification Sound power level DW54 – 500 kW (S-1005030, 09.05.12)

⁶ EWT Specification Sound power warranty levels DW52/54 (S1005010, 22.07.11) & EWT Specification Sound power level DW54 (S1005000, 10.12.10)

Table 9.10: Cumulative Turbines – Octave Band Centre Frequency

OBCF (Hz)	Sound Power Level, dB (A)				
	P/15/0001 V90 2MW	P/12/0078 EWT 0.5MW	C/2012/0327 PowerWind 500 0.5MW	P/16/0384 Britwind H15 0.15MW [Small Wind Turbine]	P/16/0128 EWT 54 0.9MW
63	86.1	80.7	80.0	80.7	81.0
125	90.6	86.9	93.2	86.9	89.0
250	94.6	92.6	94.1	92.6	94.0
500	97.5	94.1	92.0	94.1	96.0
1000	98.2	92.0	94.3	92.0	93.0
2000	97.1	89.2	94.1	89.2	91.0
4000	94.8	83	93.7	83.0	89.0
8000	83.7	72.8	91.1	72.8	83.0

Table 9.11: Cumulative Turbines – Octave Band Centre Frequency (scaled to 8ms⁻¹)

OBCF (Hz)	Sound Power Level, dB (A)				
	P/15/0001 V90 2MW	P/12/0078 EWT 0.5MW	C/2012/0327 PowerWind 500 0.5MW	P/16/0384 Britwind H15 0.15MW [Small Wind Turbine]	P/16/0128 EWT 54 0.9MW
63	89.1	81.9	82.2	72.8	82.3
125	93.6	88.1	95.4	79.0	90.3
250	97.6	93.8	96.3	84.7	95.3
500	100.5	95.3	94.2	86.2	97.3
1000	102.2	93.2	96.5	84.1	94.3
2000	100.1	90.4	96.3	81.3	92.3
4000	97.8	84.2	95.9	75.1	90.3
8000	86.7	74.0	93.3	64.9	84.3

Small wind development

There is a consented wind turbine at Valley Heights Filling Station⁷. The wind turbine is 15 kW, and therefore below the minimum wind turbine power rating of 50 kW upon which the application of the ETSU Guidance and IOA GPG, is intended.

However, for informative purposes, the noise immissions from the Valley Heights Wind Turbine has been determined at receptors close to the turbine (R21 and R23), and presented with the noise immission from the cumulative developments and Proposed Scheme.

Details of the sound power levels at each wind speed for the Valley Heights Wind Turbine (Britwind H15 0.15MW), and the source of the data, are summarised in **Table 9.38**. The octave band spectral information is summarised in **Table 9.39** and **Table 9.40**. The noise immissions from the wind developments are presented in **Table 9.41**.

As shown in **Table 9.41**, whilst outside the scope of the ETSU Guidance and IOA GPG, the noise immission from the Valley Heights Wind Turbine are 16.1 dB and 8.5 dB or more below the noise immissions from the other wind developments at R21 and R23, respectively.

Table 9.12: Cumulative Development: Noise Assessment Analysis – R21 and R23

Noise Parameters, $L_{A90\ 10min}$, dB	10m Wind Speed quoted by Manufacturer (m/s)								
	4	5	6	7	8	9	10	11	12
R21									
Proposed Scheme Wind Farm Noise	24.0	28.6	33.0	34.4	34.4	34.4	34.4	34.4	34.4
Cumulative Wind Farm Noise (all turbines)	45.7	45.9	47.6	49.0	49.6	49.6	49.6	49.6	49.6
Pen Bryn Oer Wind Farm	12.5	17.5	20.6	21.7	22.1	22.1	22.1	22.1	22.1
Pengarnddu Wind Turbine	31.7	34.2	32.7	33.7	34.7	35.2	35.2	35.2	35.2
Tafaranaubach IE Wind Turbine	3.4	8.4	12.4	14.4	16.4	16.4	16.4	16.4	16.4
Valley Heights Wind Turbine	25.3	26.3	27.7	29.1	30.5	31.6	32.4	33.1	33.1
St Merryn Wind Turbine	45.4	45.4	47.2	48.6	49.2	49.2	49.2	49.2	49.2
Maximum Cumulative Development Noise	45.4	45.4	47.2	48.6	49.2	49.2	49.2	49.2	49.2
R23									
Proposed Scheme Wind Farm Noise	23.6	28.2	32.6	34.0	34.0	34.0	34.0	34.0	34.0

⁷ Erection of a single micro wind turbine with a hub height of 15 metres and blade tip height 20.2 metres (Planning Ref. P/16/0384)

Noise Parameters, L _{A90} 10min, dB	10m Wind Speed quoted by Manufacturer (m/s)								
	4	5	6	7	8	9	10	11	12
Cumulative Wind Farm Noise (all turbines)	44.1	44.4	46.1	47.4	48.1	48.2	48.3	48.3	48.3
Pen Bryn Oer Wind Farm	12.3	17.3	20.4	21.5	21.9	21.9	21.9	21.9	21.9
Pengarnddu Wind Turbine	30.6	33.1	31.6	32.6	33.6	34.1	34.1	34.1	34.1
Tafaranaubach IE Wind Turbine	3.3	8.3	12.3	14.3	16.3	16.3	16.3	16.3	16.3
Valley Heights Wind Turbine	31.1	32.1	33.5	34.9	36.3	37.4	38.2	38.9	38.9
St Merryn Wind Turbine	43.6	43.6	45.4	46.8	47.4	47.4	47.4	47.4	47.4
Maximum Cumulative Development Noise	43.6	43.6	45.4	46.8	47.4	47.4	47.4	47.4	47.4

TECHNICAL APPENDIX 9.6 – RECEPTOR ASSESSMENT CHARTS: BACKGROUND NOISE, NOISE LIMITS AND PROPOSED SCHEME NOISE IMMISSION

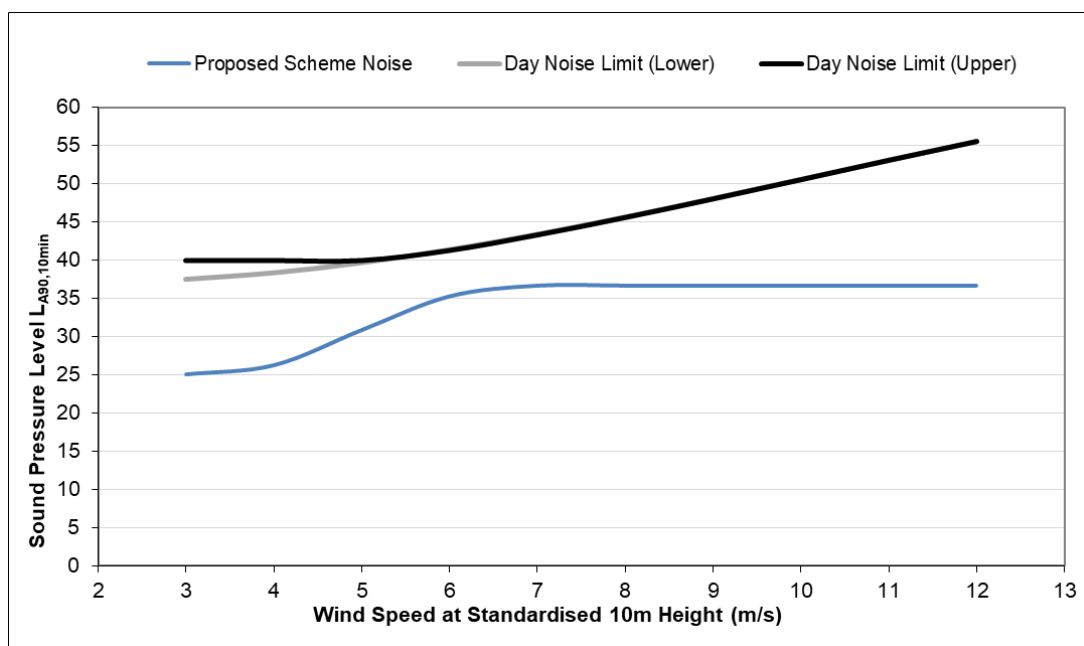


Figure 9.39: Proposed Scheme: day-time noise assessment – R1

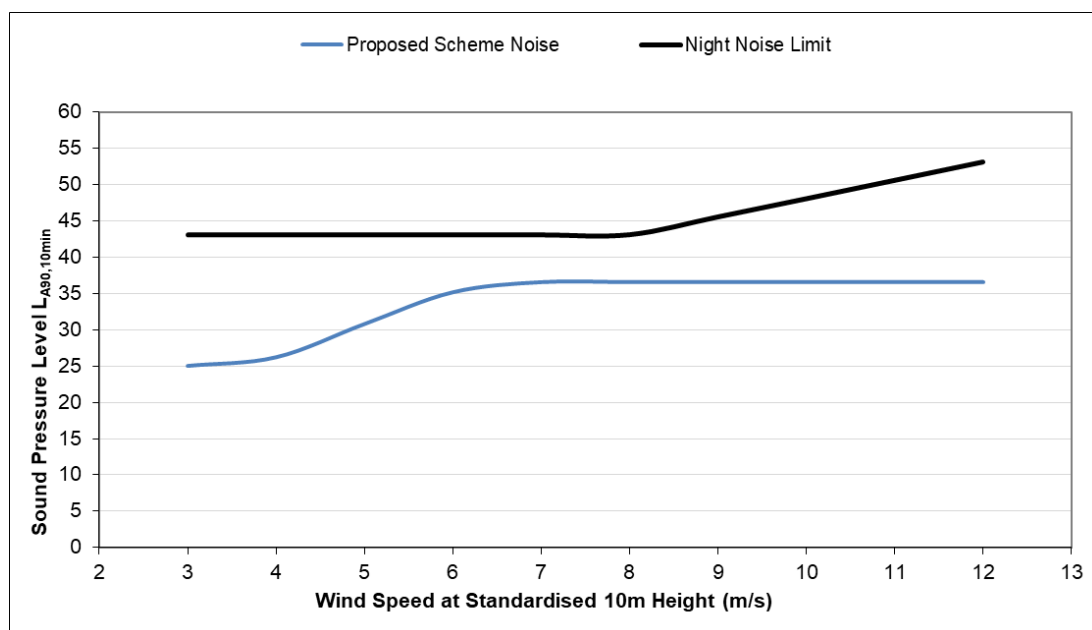


Figure 9.40: Proposed Scheme: night-time noise assessment – R1

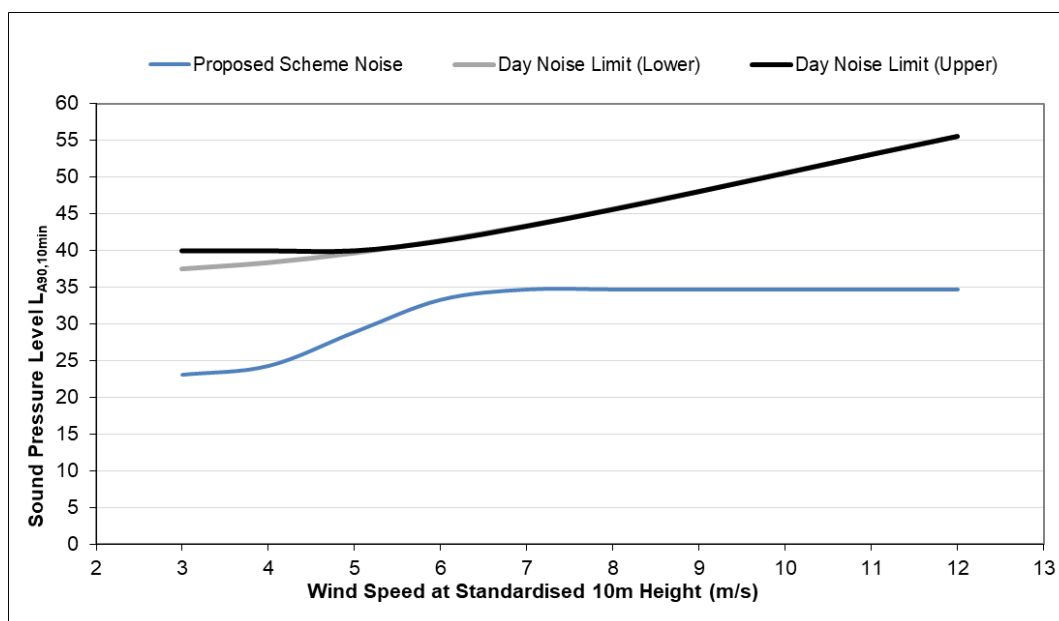


Figure 9.41: Proposed Scheme: day-time noise assessment – R2

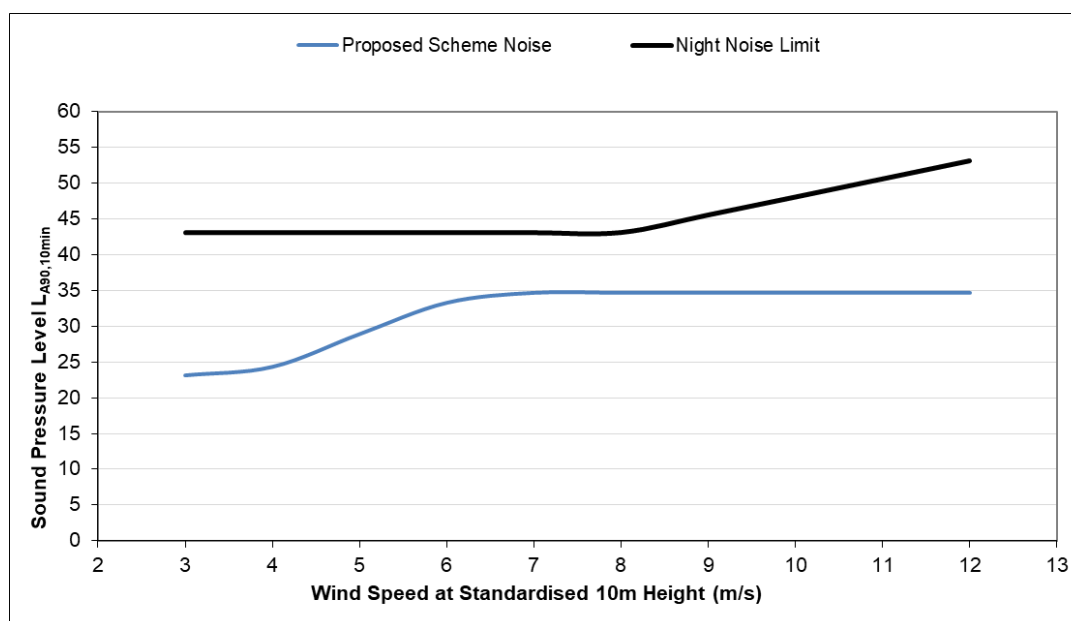


Figure 9.42: Proposed Scheme: night-time noise assessment – R2

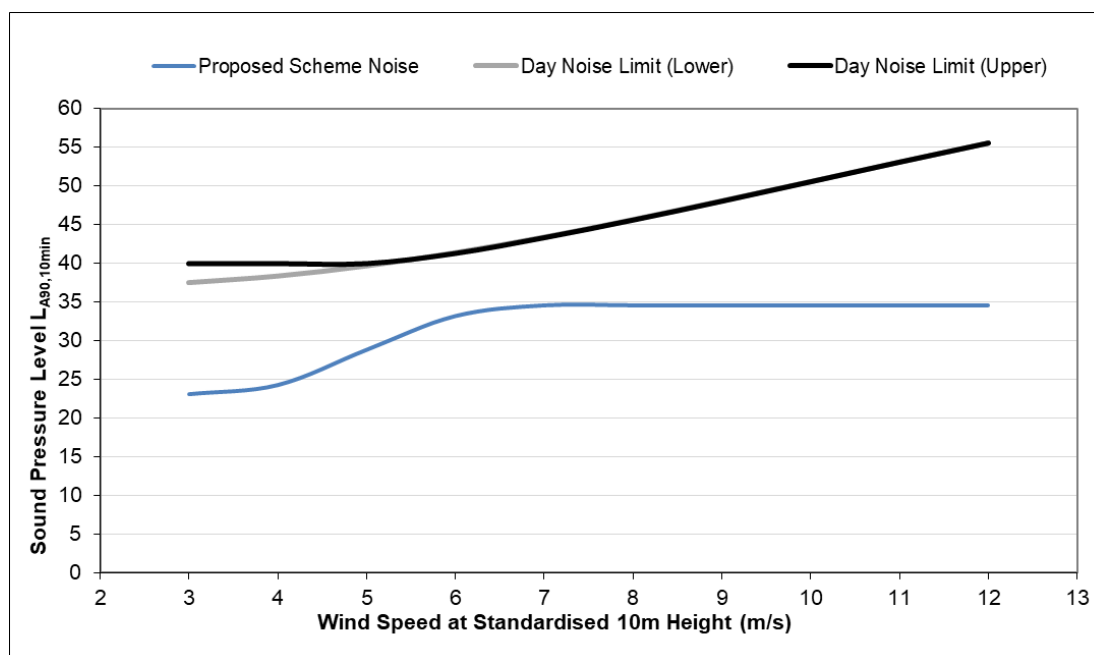


Figure 9.43: Proposed Scheme: day-time noise assessment – R3

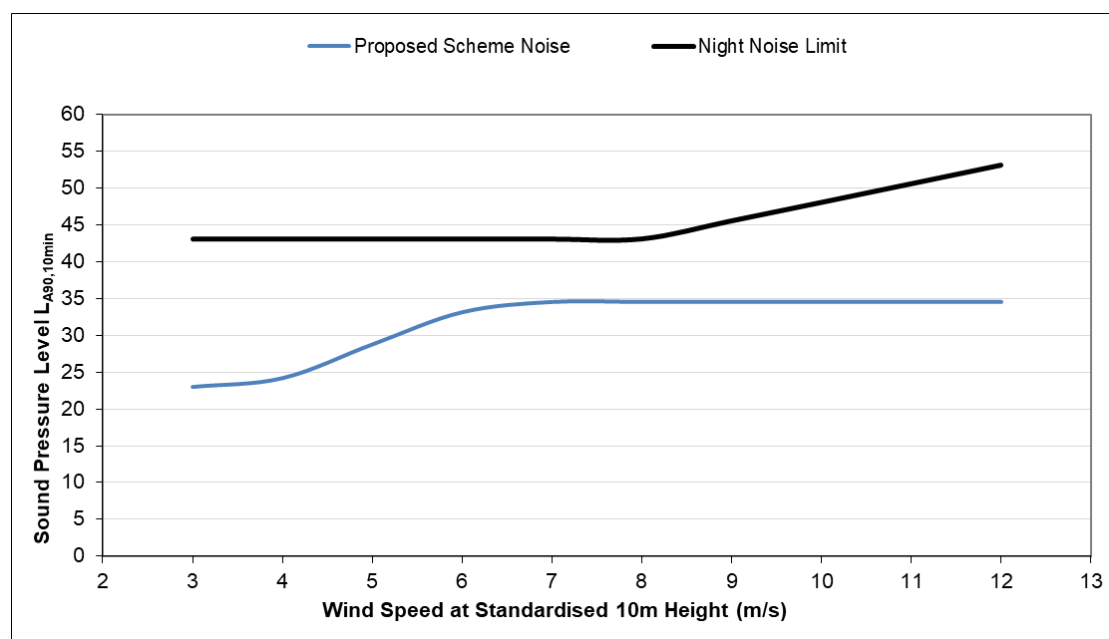


Figure 9.44: Proposed Scheme: night-time noise assessment – R3

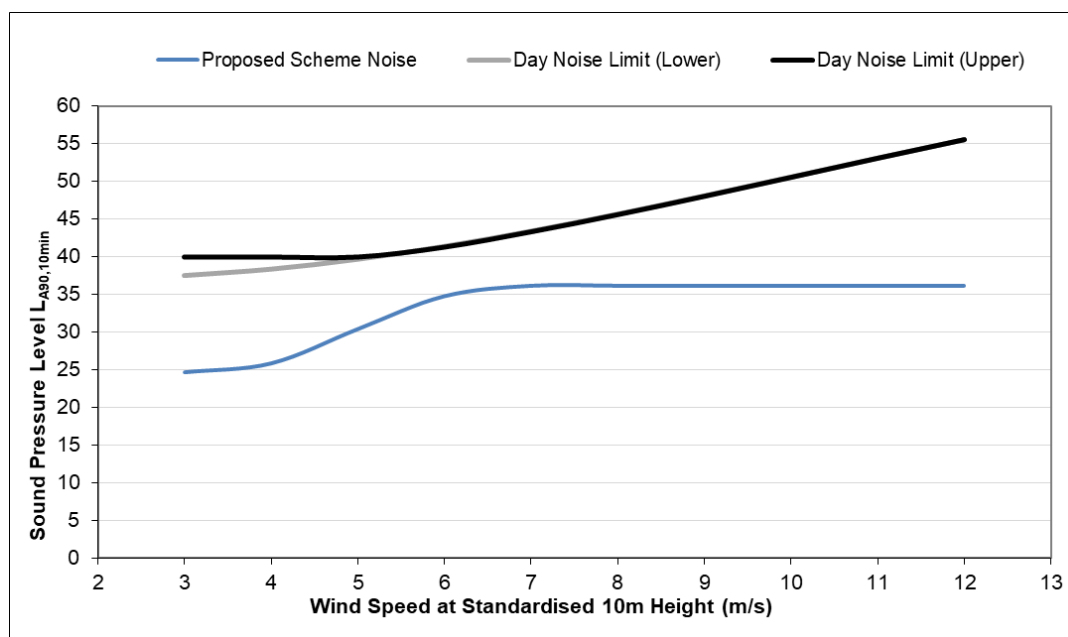


Figure 9.45: Proposed Scheme: day-time noise assessment – R4

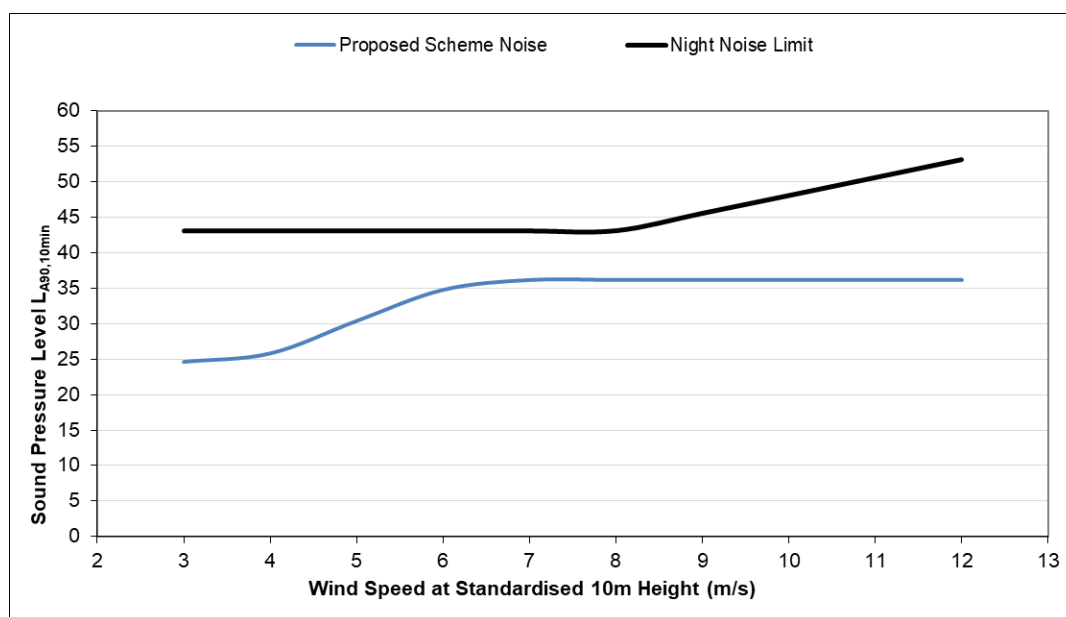


Figure 9.46: Proposed Scheme: night-time noise assessment – R4

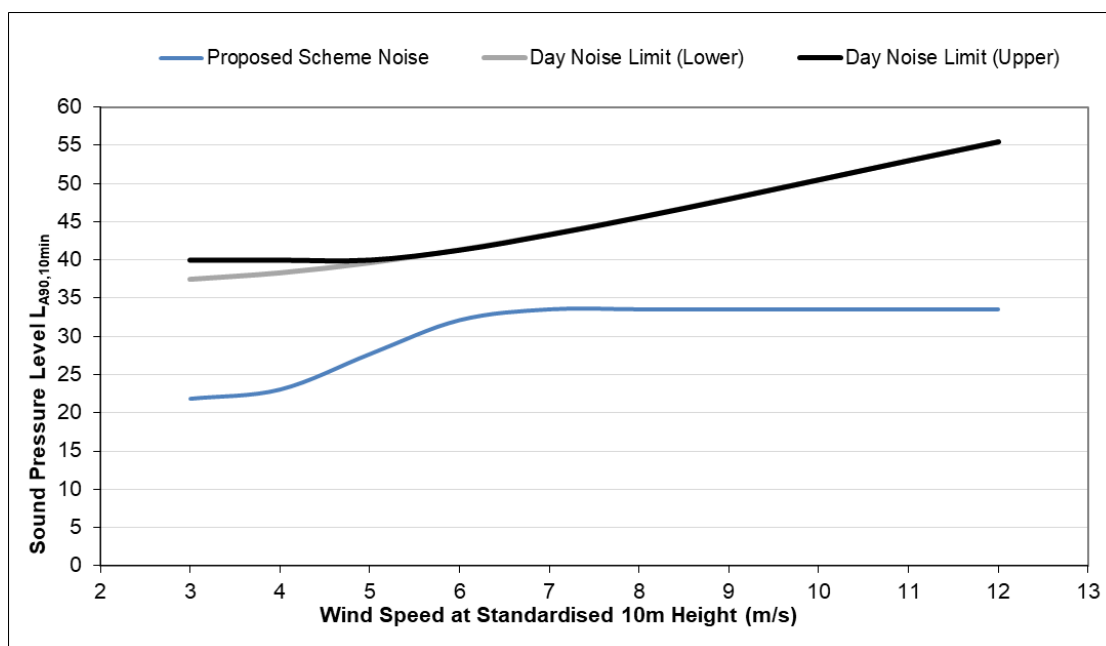


Figure 9.47: Proposed Scheme: day-time noise assessment – R5

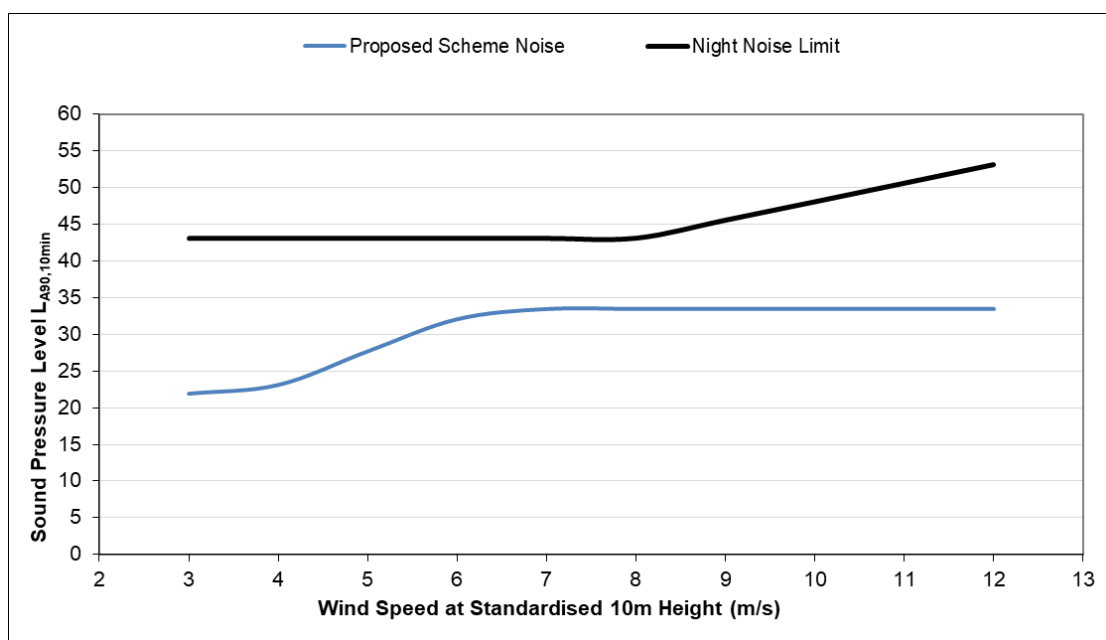


Figure 9.48: Proposed Scheme: night-time noise assessment – R5

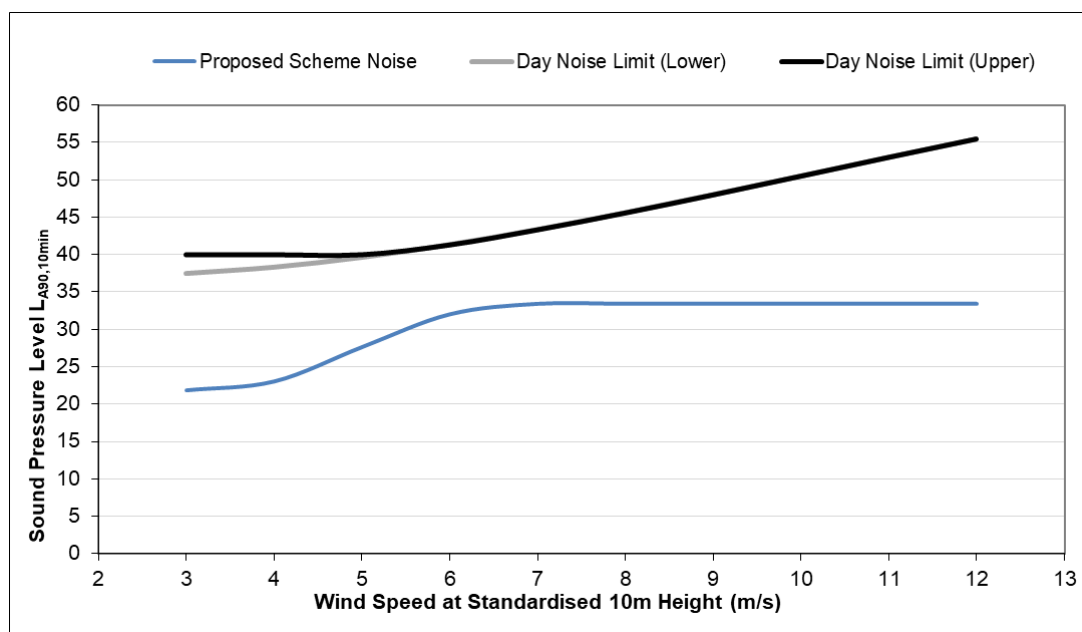


Figure 9.49: Proposed Scheme: day-time noise assessment – R6

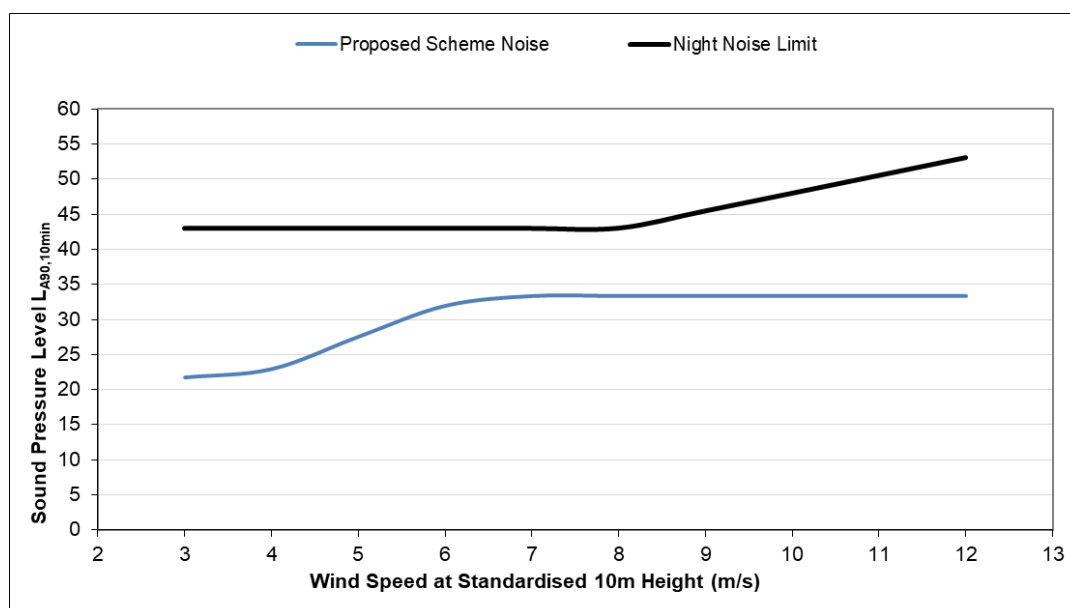


Figure 9.50: Proposed Scheme: night-time noise assessment – R6

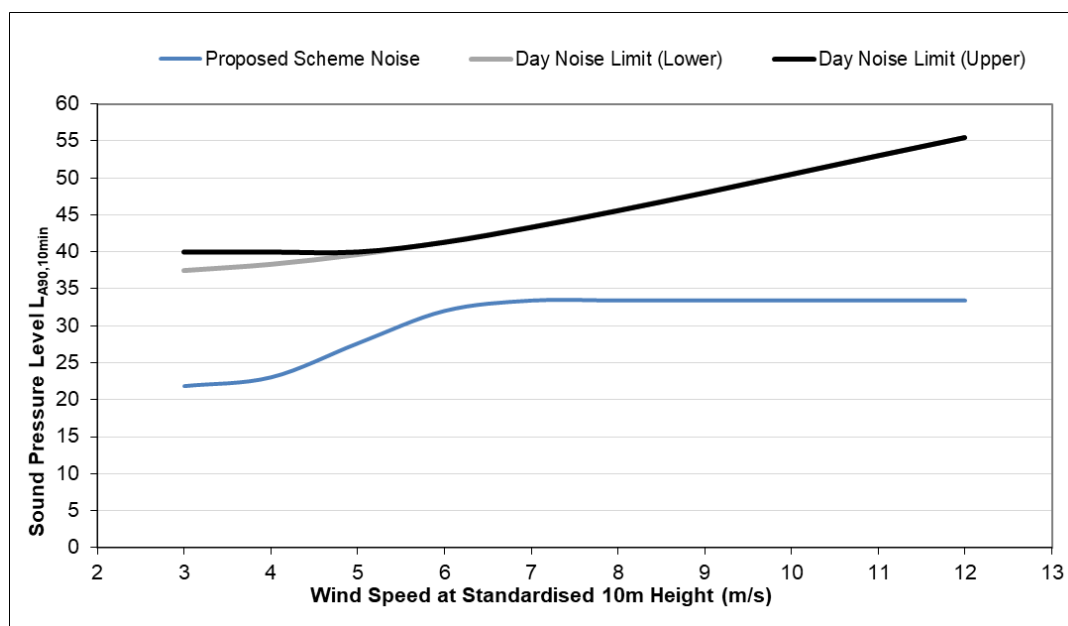


Figure 9.51: Proposed Scheme: day-time noise assessment – R7

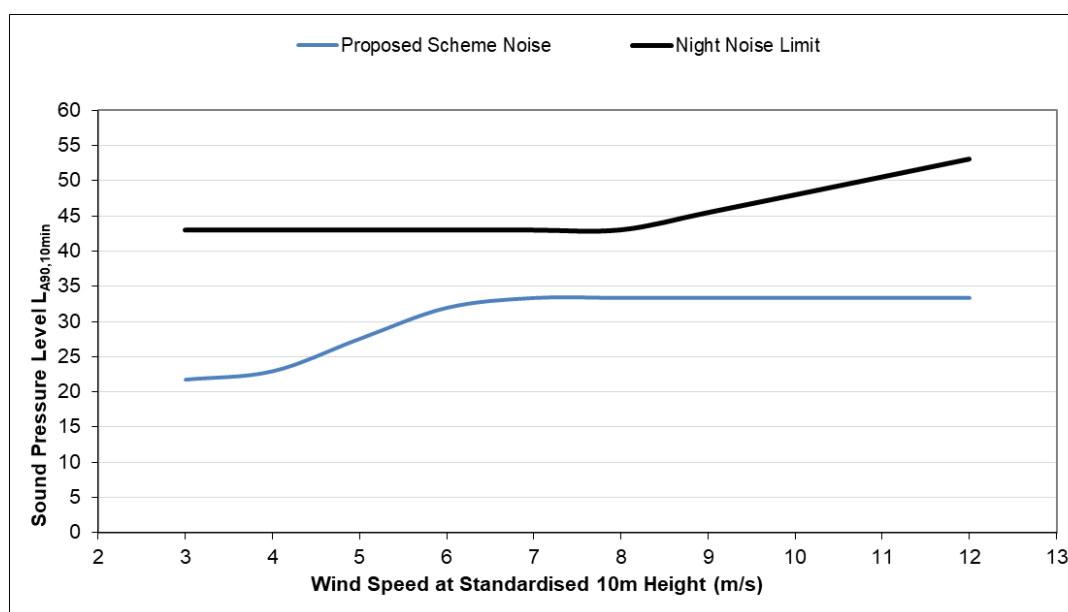


Figure 9.52: Proposed Scheme: night-time noise assessment – R7

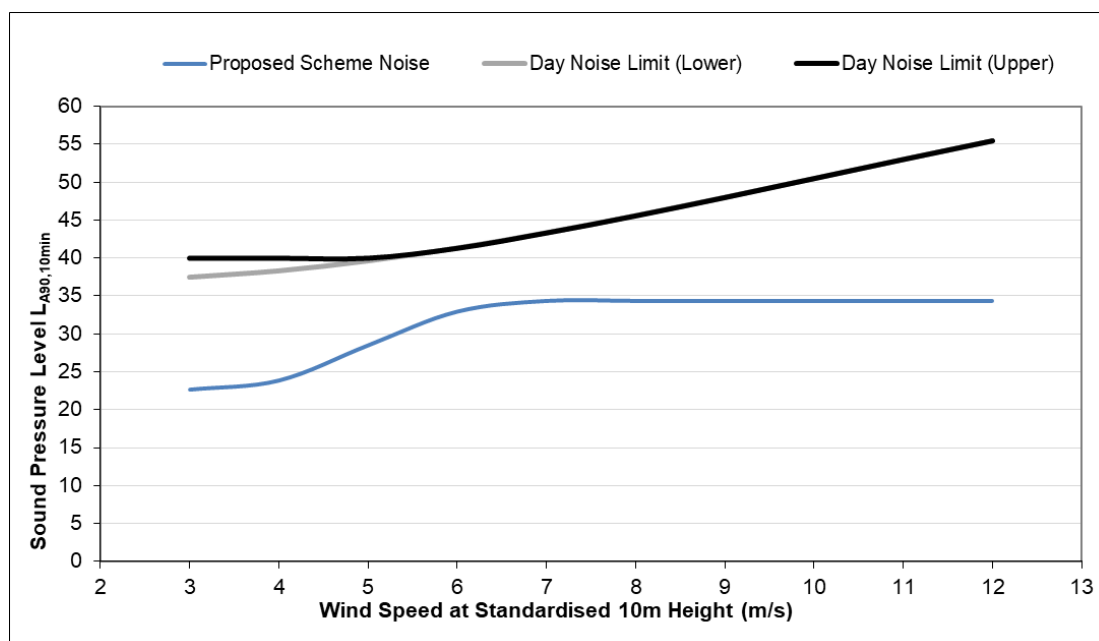


Figure 9.53: Proposed Scheme: day-time noise assessment – R8

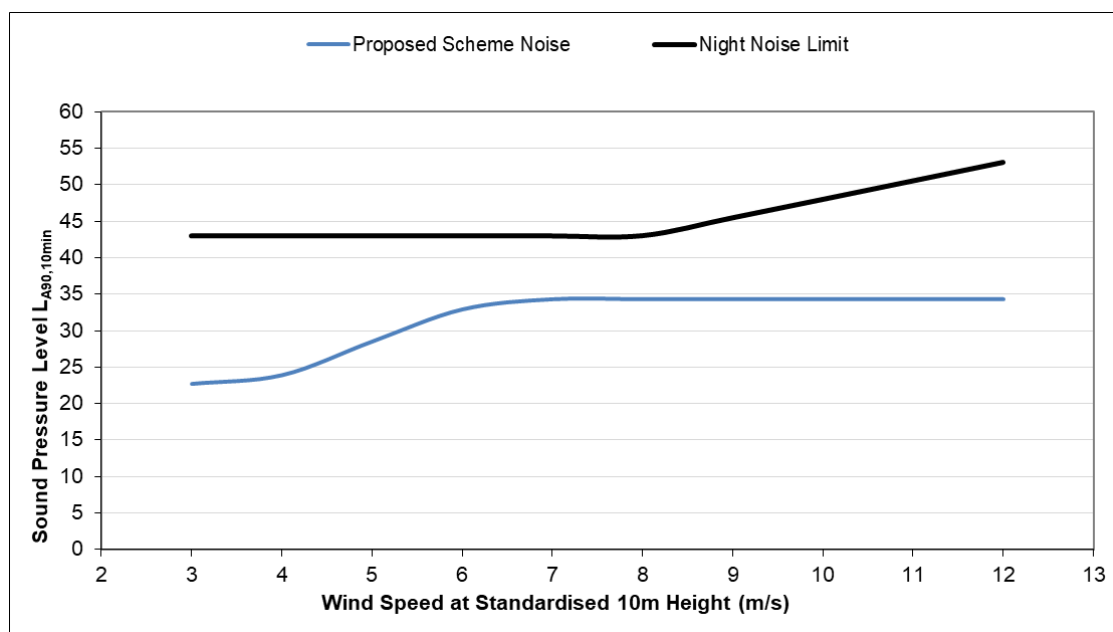


Figure 9.54: Proposed Scheme: night-time noise assessment – R8

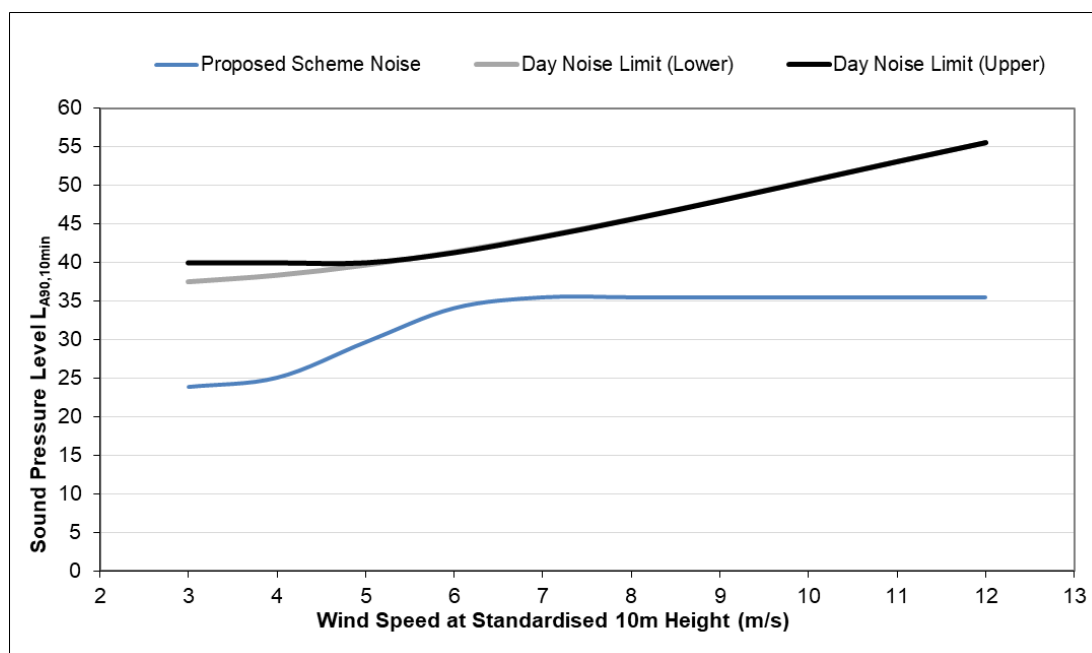


Figure 9.55: Proposed Scheme: day-time noise assessment – R9

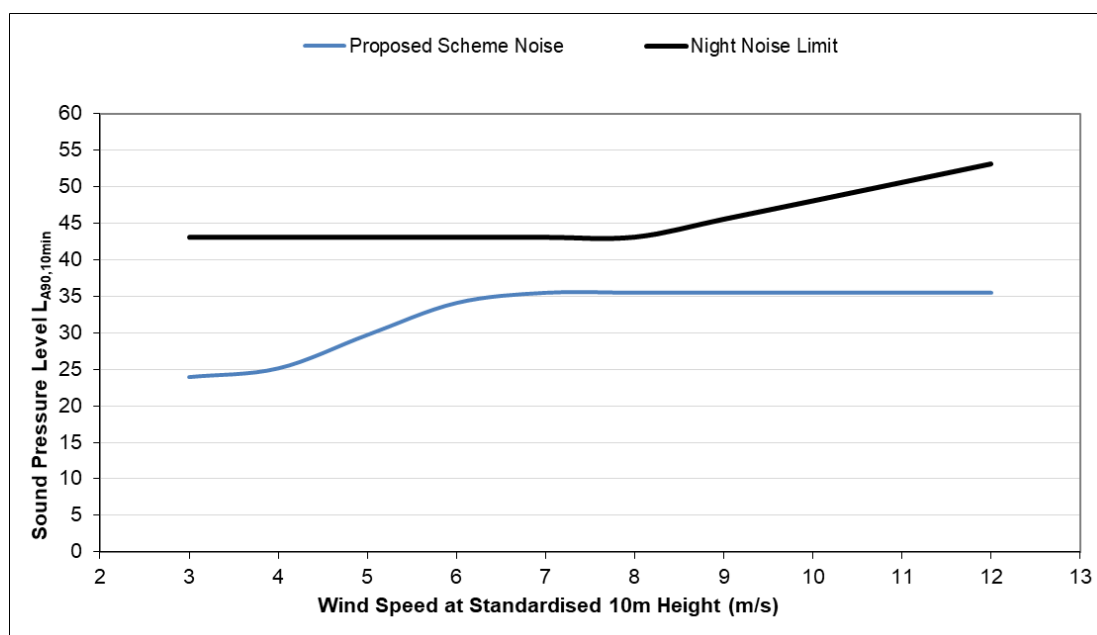


Figure 9.56: Proposed Scheme: night-time noise assessment – R9

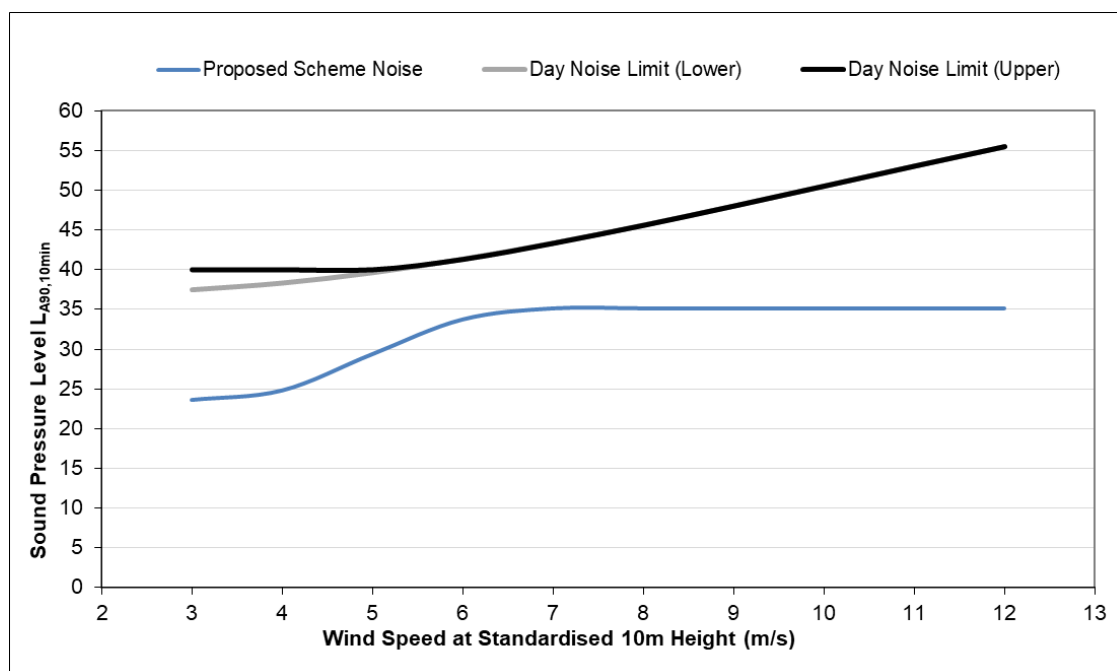


Figure 9.57: Proposed Scheme: day-time noise assessment – R10

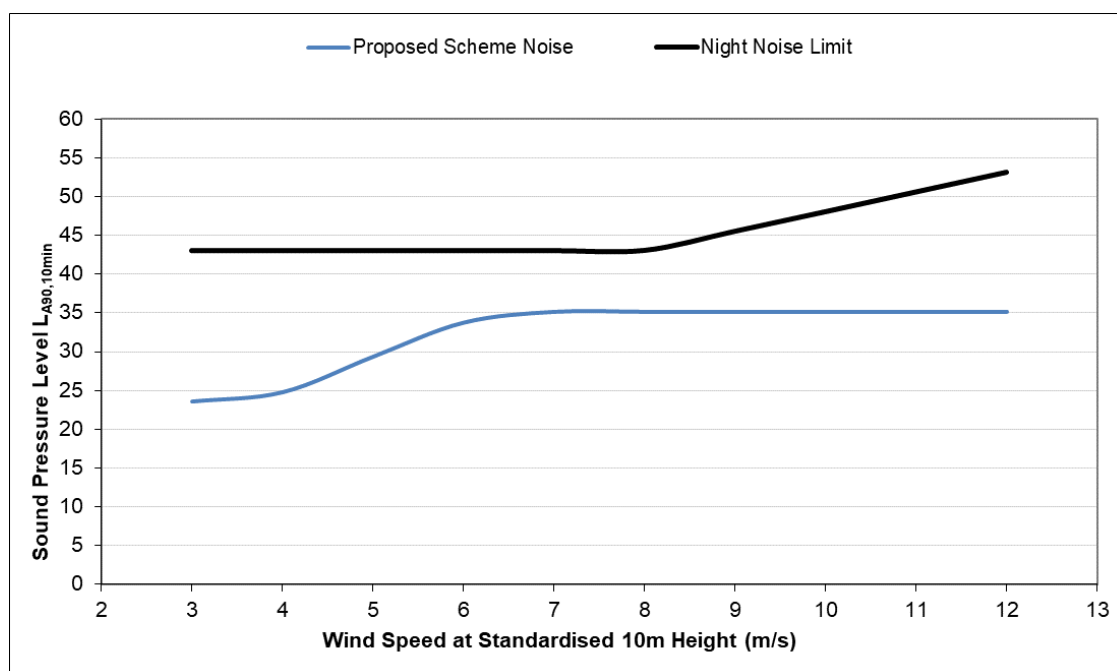


Figure 9.58: Proposed Scheme: night-time noise assessment – R10

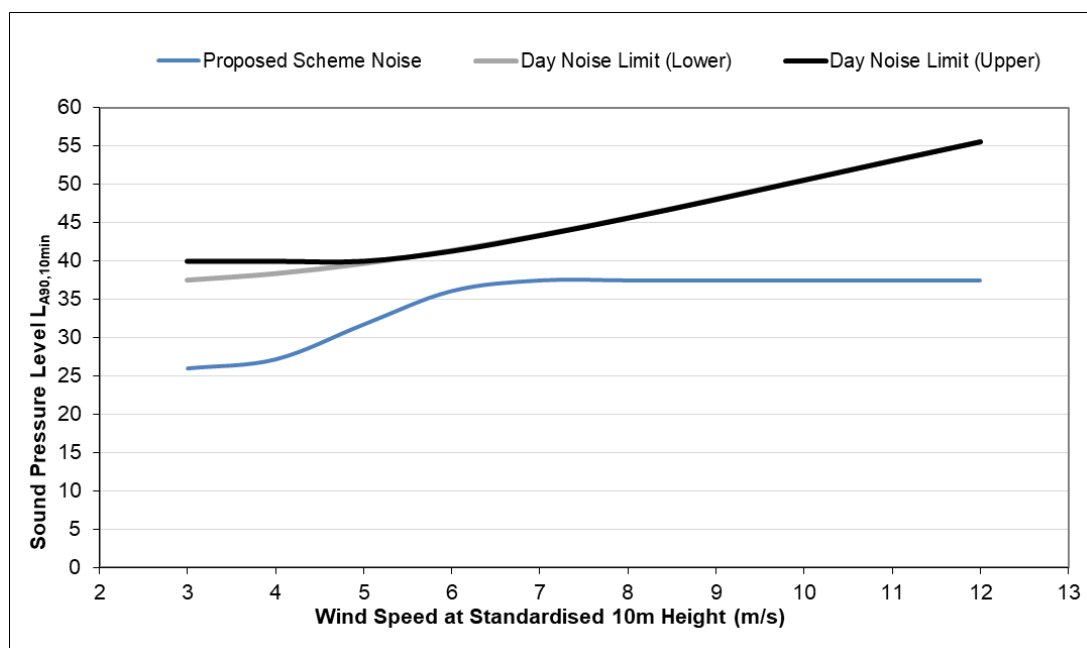


Figure 9.59: Proposed Scheme: day-time noise assessment – R11

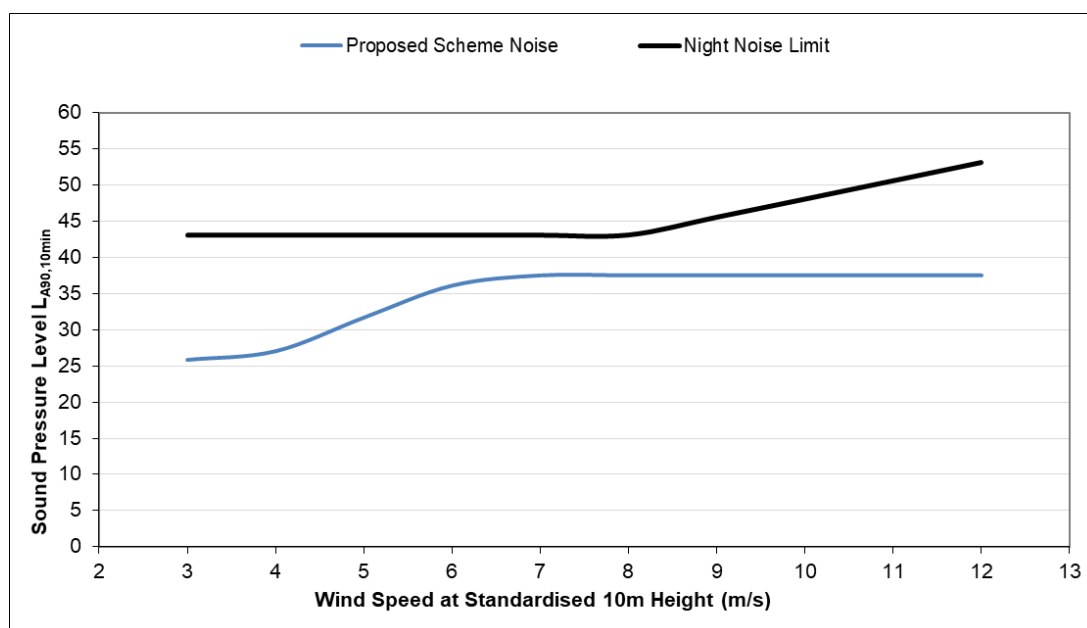


Figure 9.60: Proposed Scheme: night-time noise assessment – R11

TECHNICAL APPENDIX 9.7 – RECEPTOR ASSESSMENT CHARTS: BACKGROUND NOISE, NOISE LIMITS AND CUMULATIVE DEVELOPMENT NOISE IMMISSION

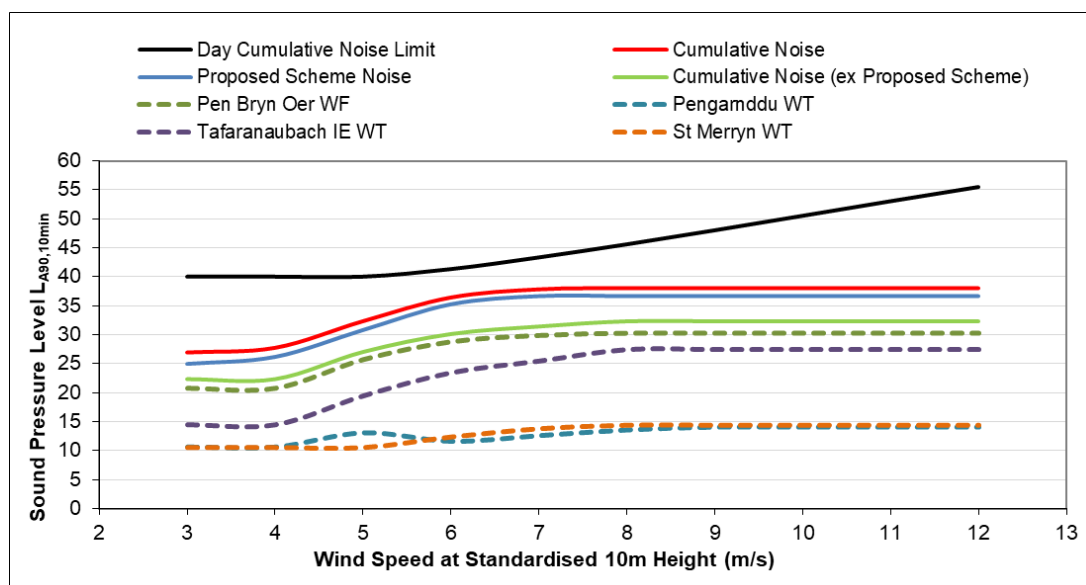


Figure 9.61: Cumulative Developments: day-time noise assessment – R1

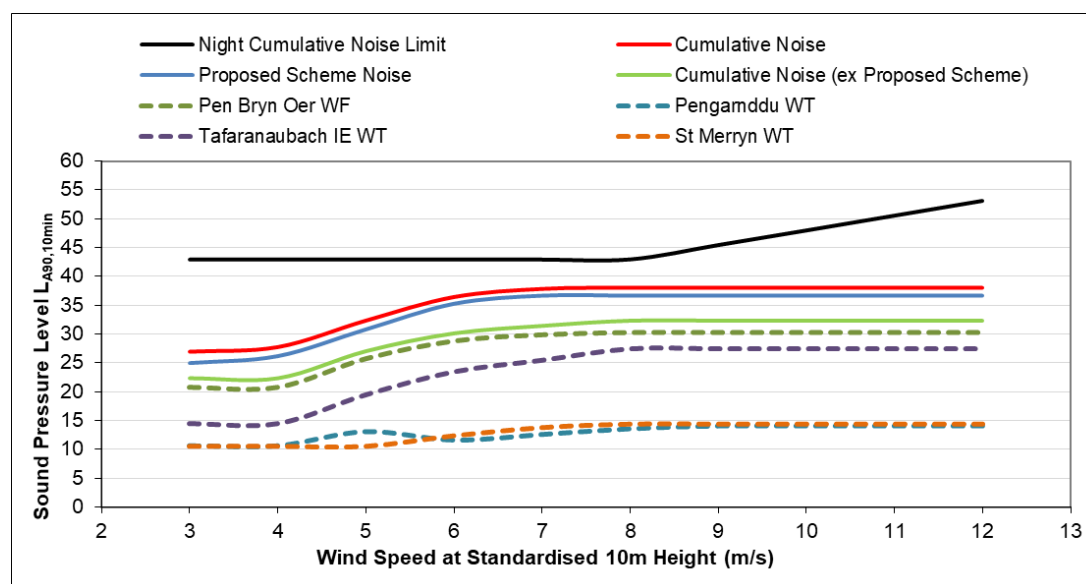


Figure 9.62: Cumulative Developments: night-time noise assessment – R1

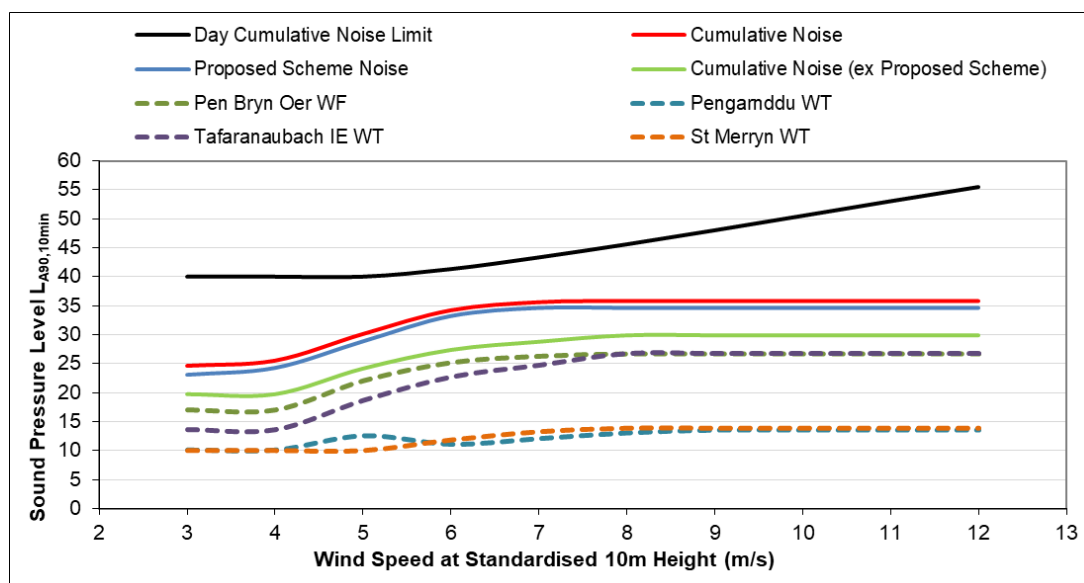


Figure 9.63: Cumulative Developments: day-time noise assessment – R2

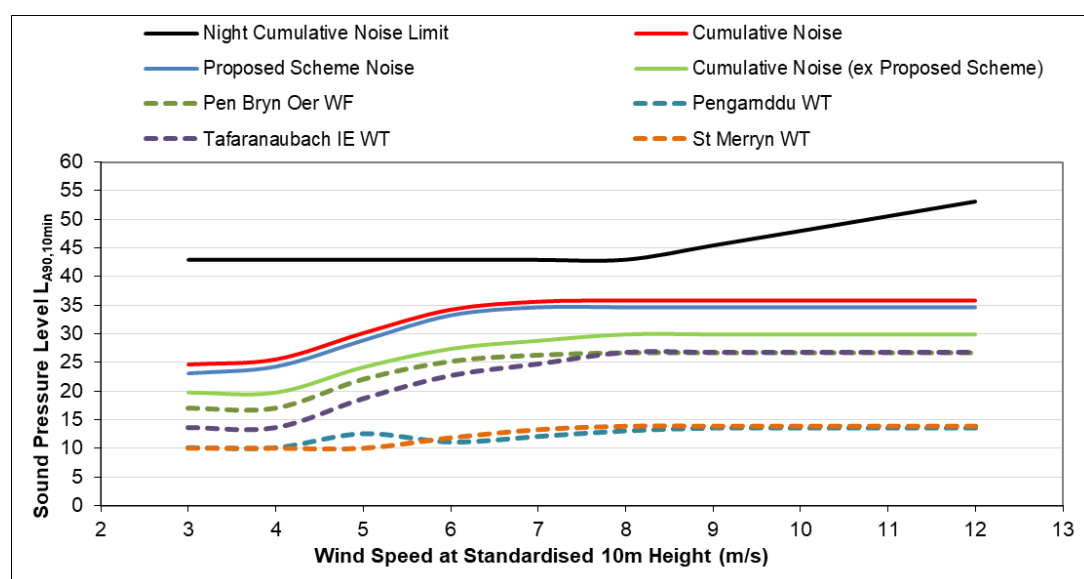


Figure 9.64: Cumulative Developments: night-time noise assessment – R2

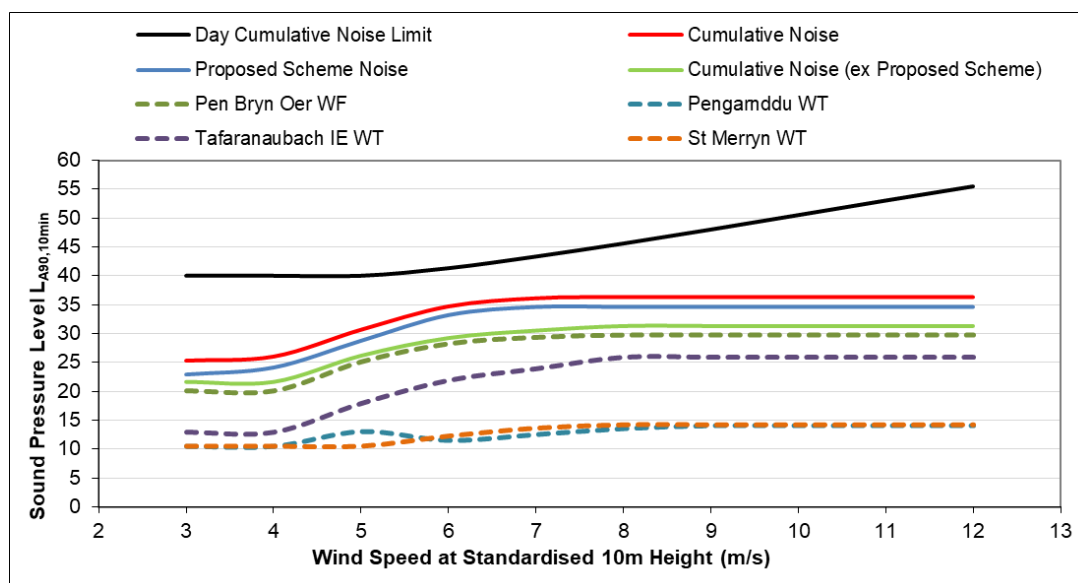


Figure 9.65: Cumulative Developments: day-time noise assessment – R3

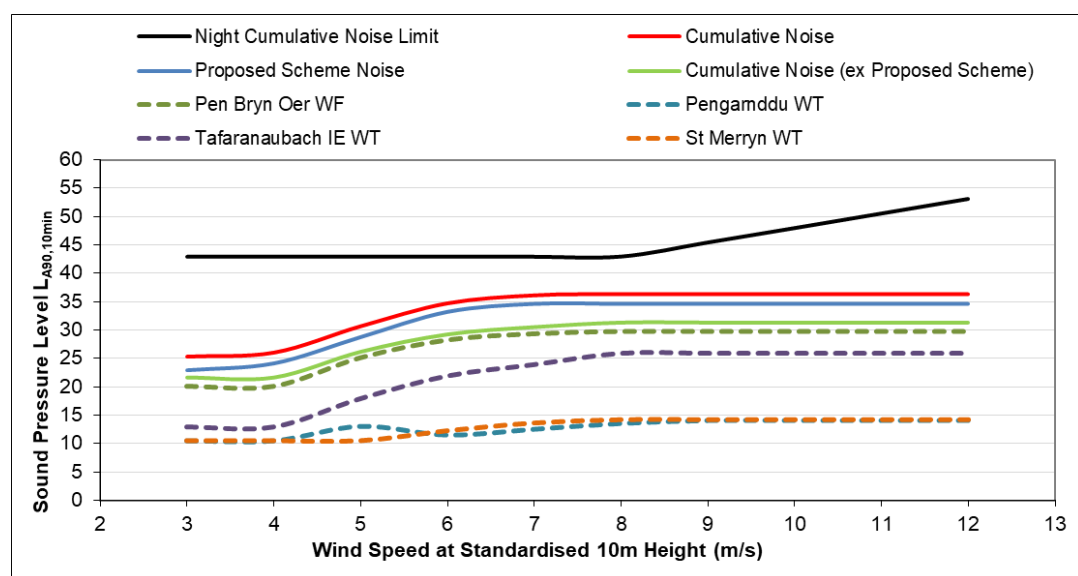


Figure 9.66: Cumulative Developments: night-time noise assessment – R3

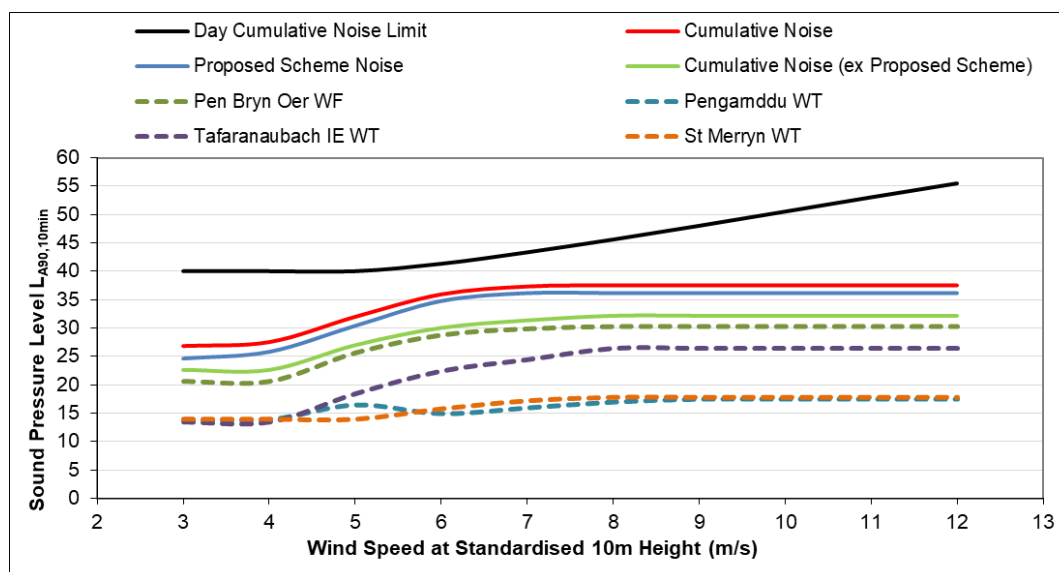


Figure 9.67: Cumulative Developments: day-time noise assessment – R4

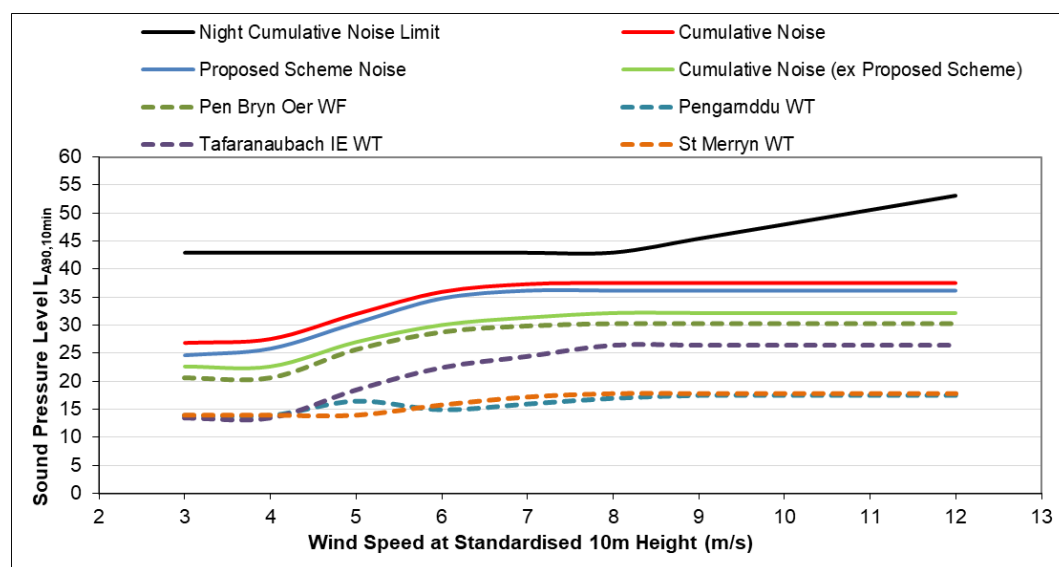


Figure 9.68: Cumulative Developments: night-time noise assessment – R4

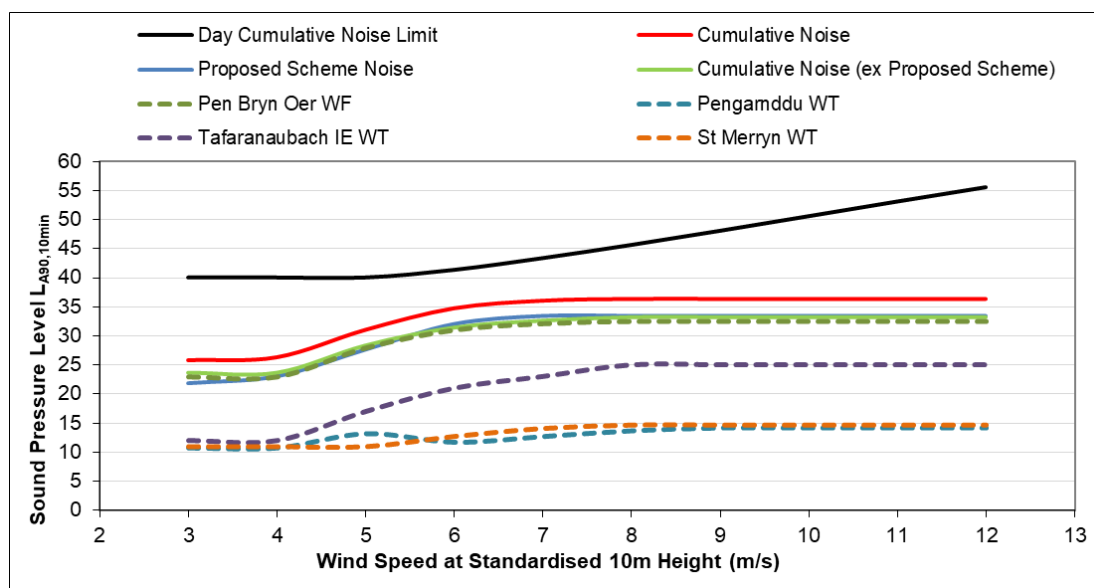


Figure 9.69: Cumulative Developments: day-time noise assessment – R5

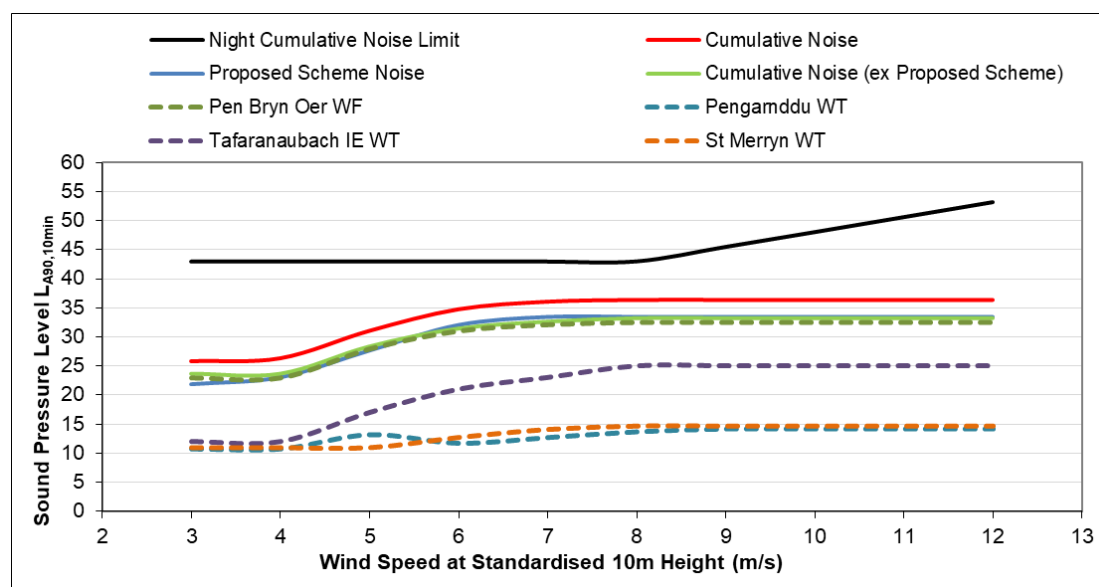


Figure 9.70: Cumulative Developments: night-time noise assessment – R5

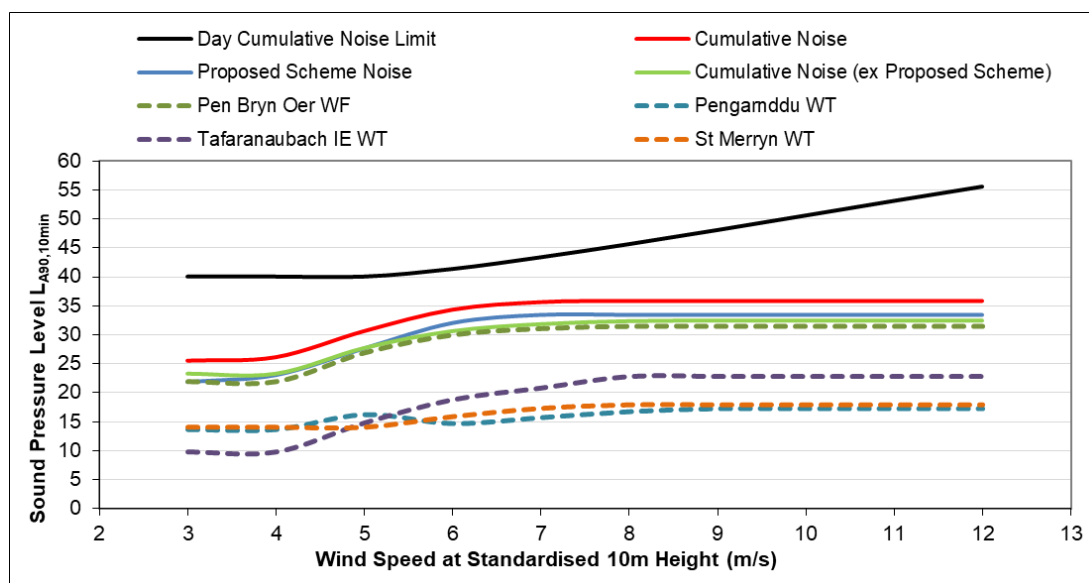


Figure 9.71: Cumulative Developments: day-time noise assessment – R6

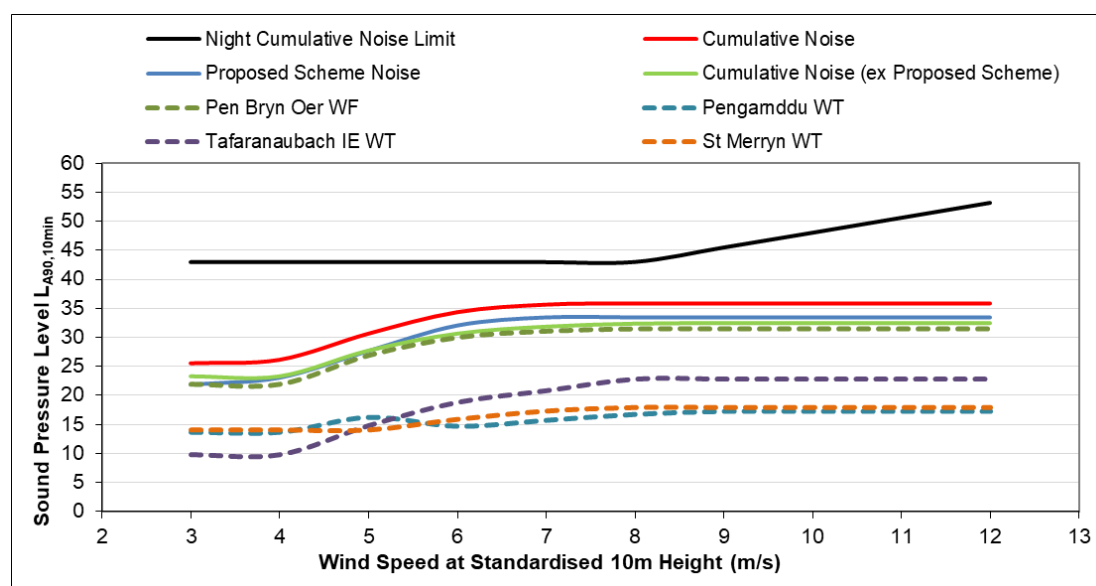


Figure 9.72: Cumulative Developments: night-time noise assessment – R6

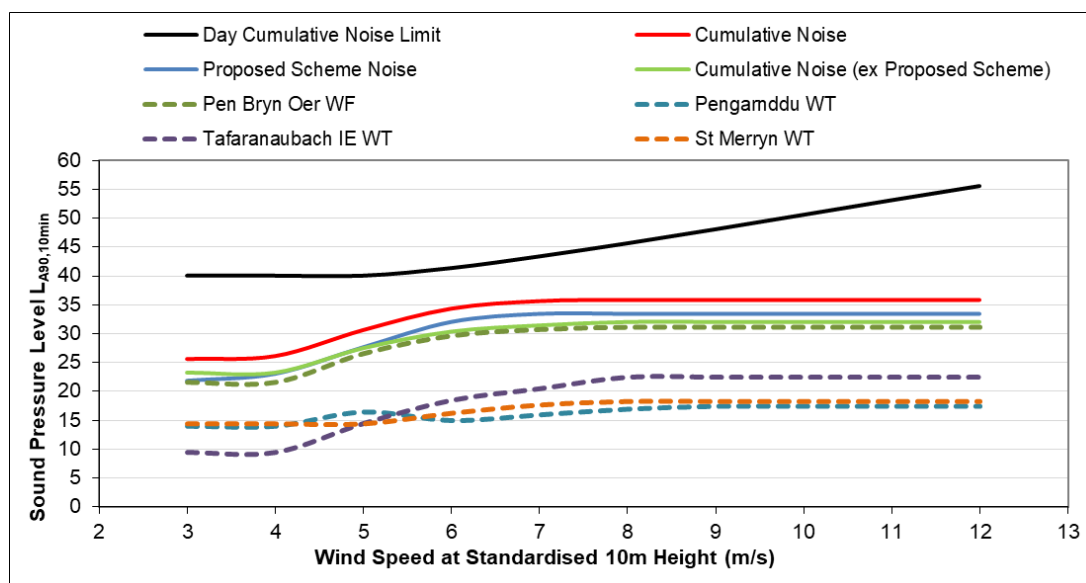


Figure 9.73: Cumulative Developments: day-time noise assessment – R7

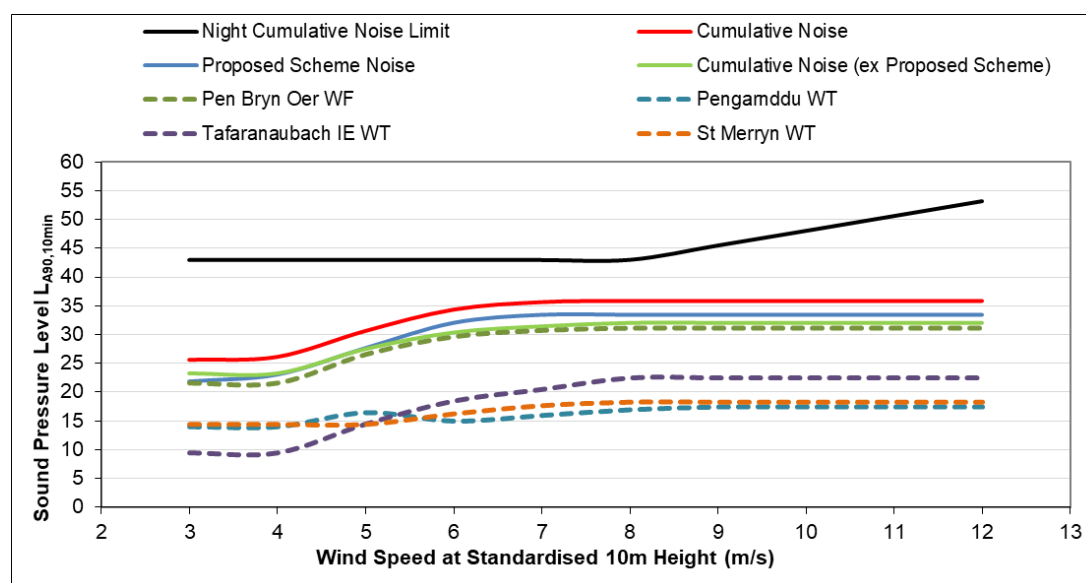


Figure 9.74: Cumulative Developments: night-time noise assessment – R7

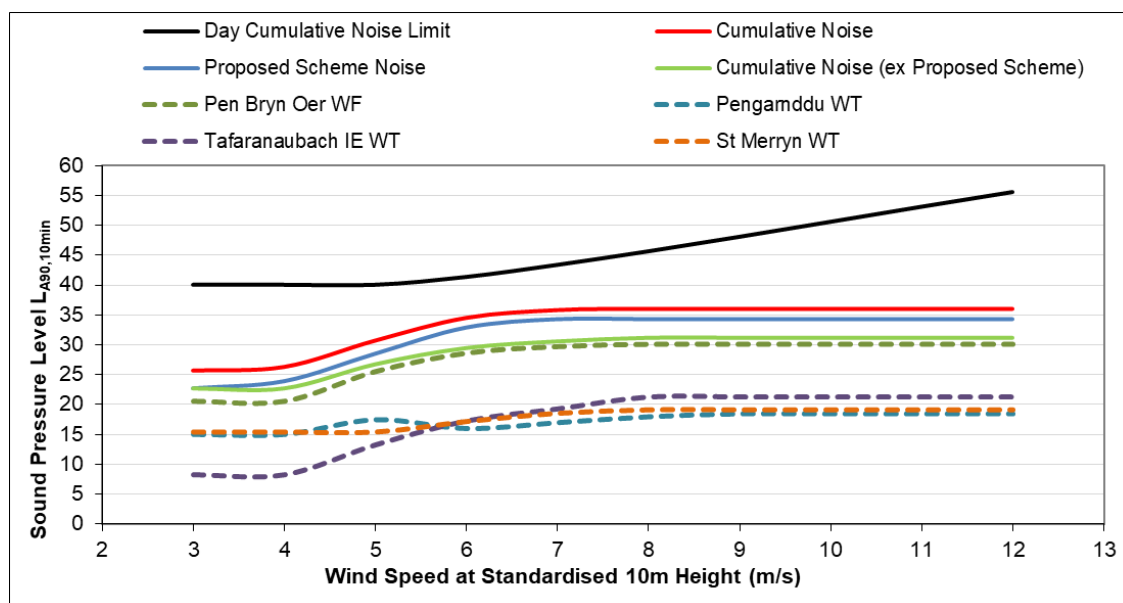


Figure 9.75: Cumulative Developments: day-time noise assessment – R8

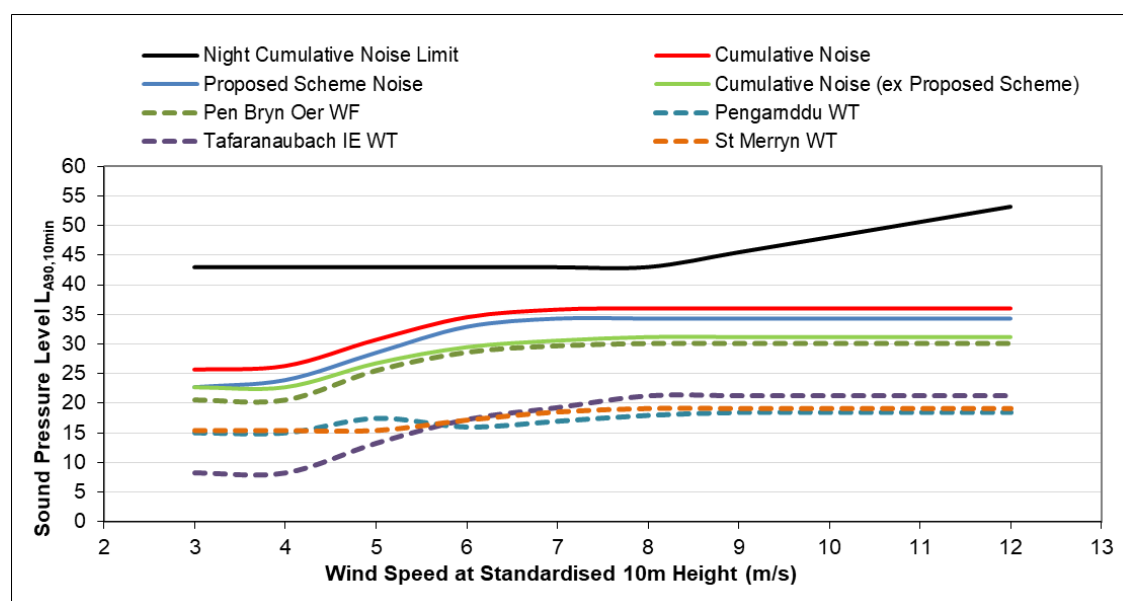


Figure 9.76: Cumulative Developments: night-time noise assessment – R8

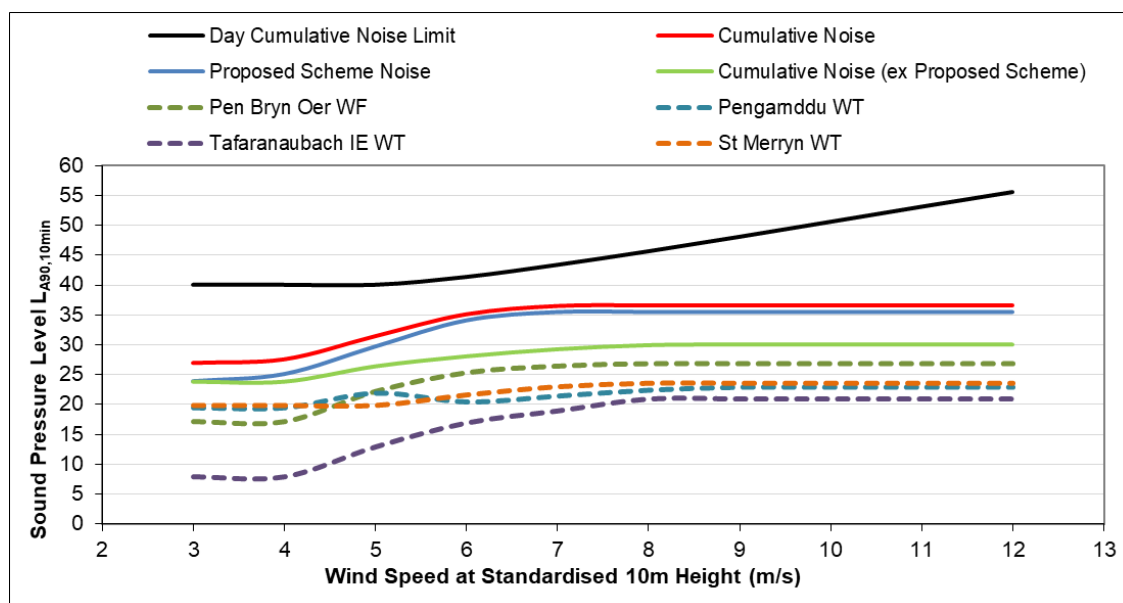


Figure 9.77: Cumulative Developments: day-time noise assessment – R9

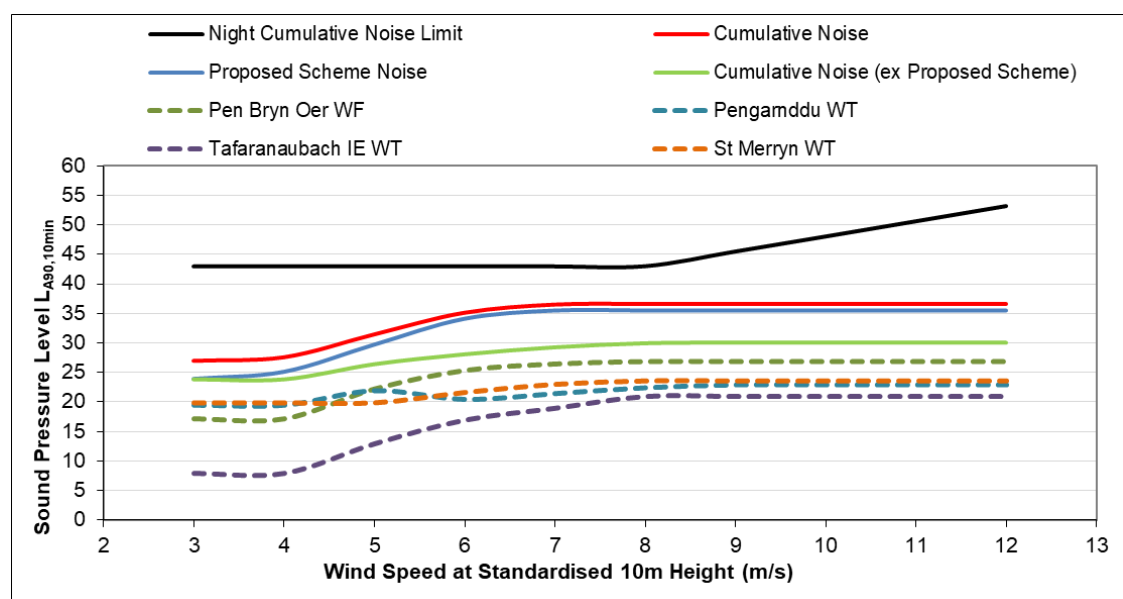


Figure 9.78: Cumulative Developments: night-time noise assessment – R9

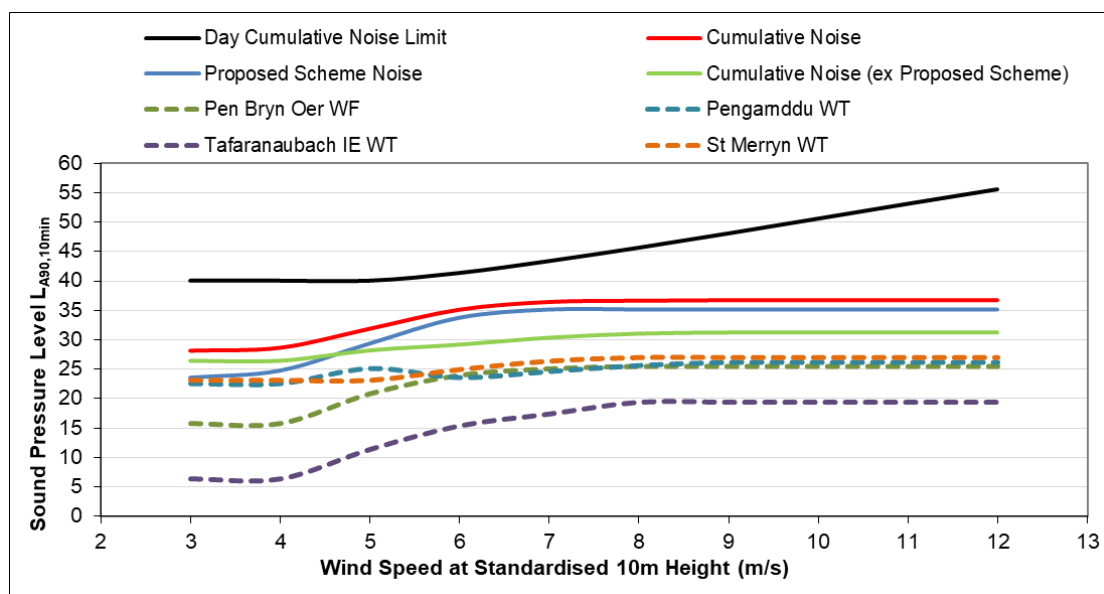


Figure 9.79: Cumulative Developments: day-time noise assessment – R10

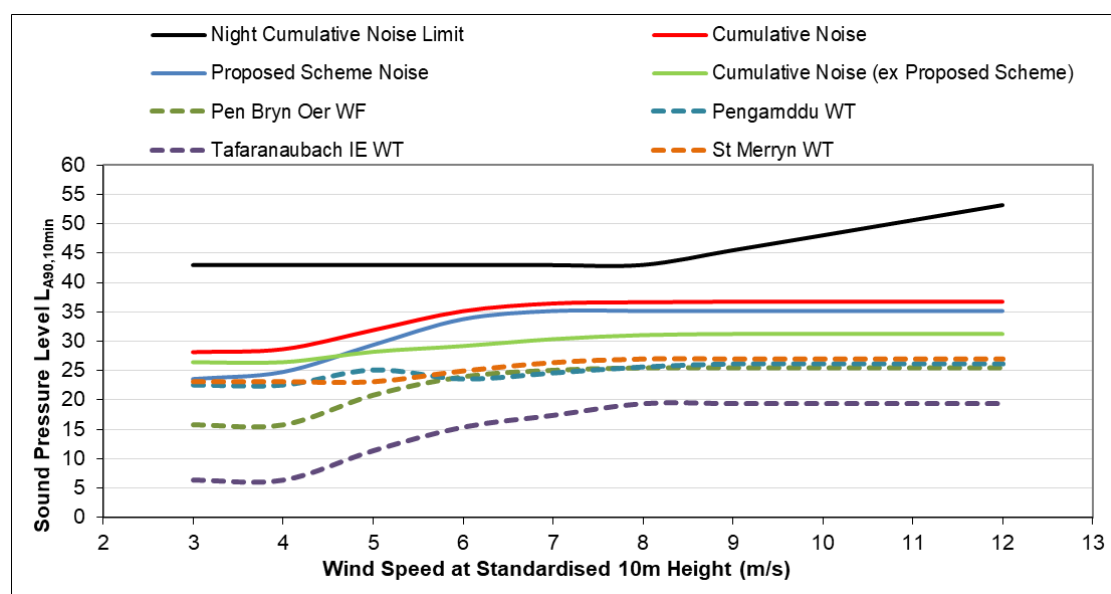


Figure 9.80: Cumulative Developments: night-time noise assessment – R10

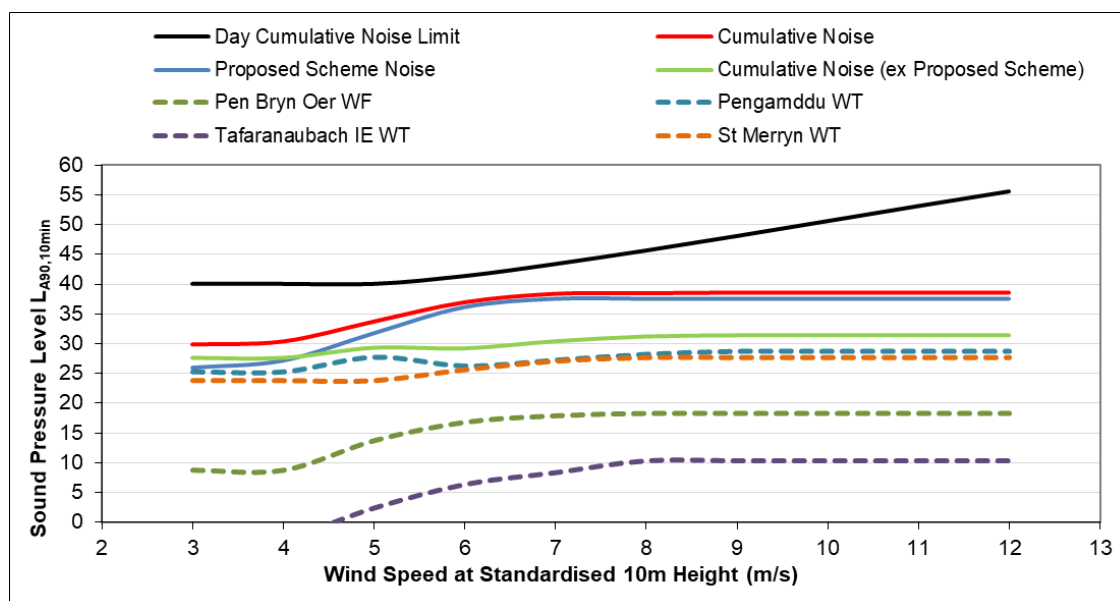


Figure 9.81: Cumulative Developments: day-time noise assessment – R11

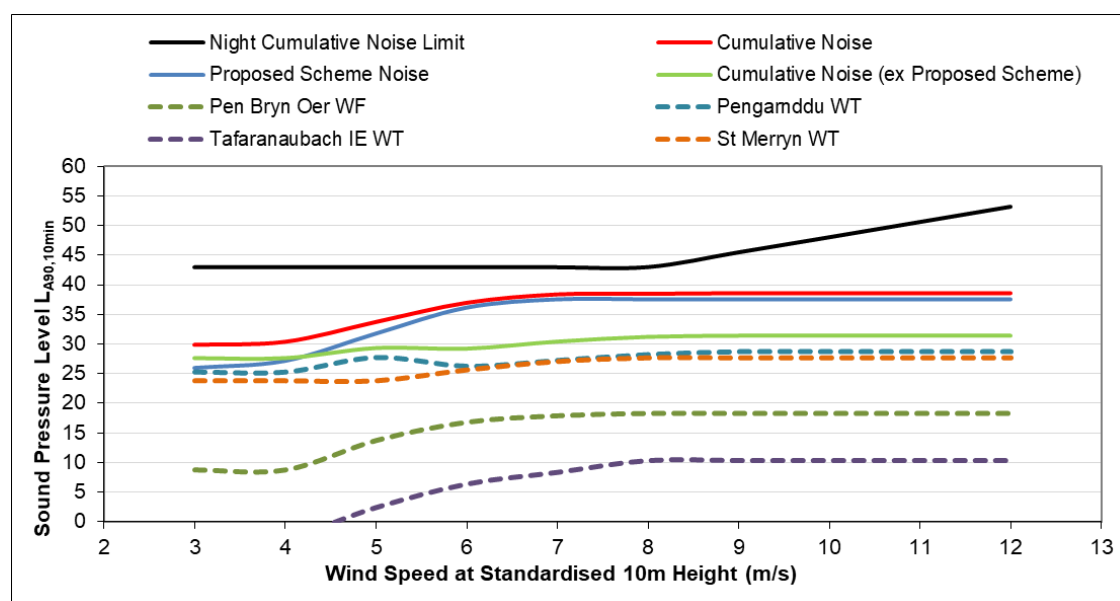


Figure 9.82: Cumulative Developments: night-time noise assessment – R11

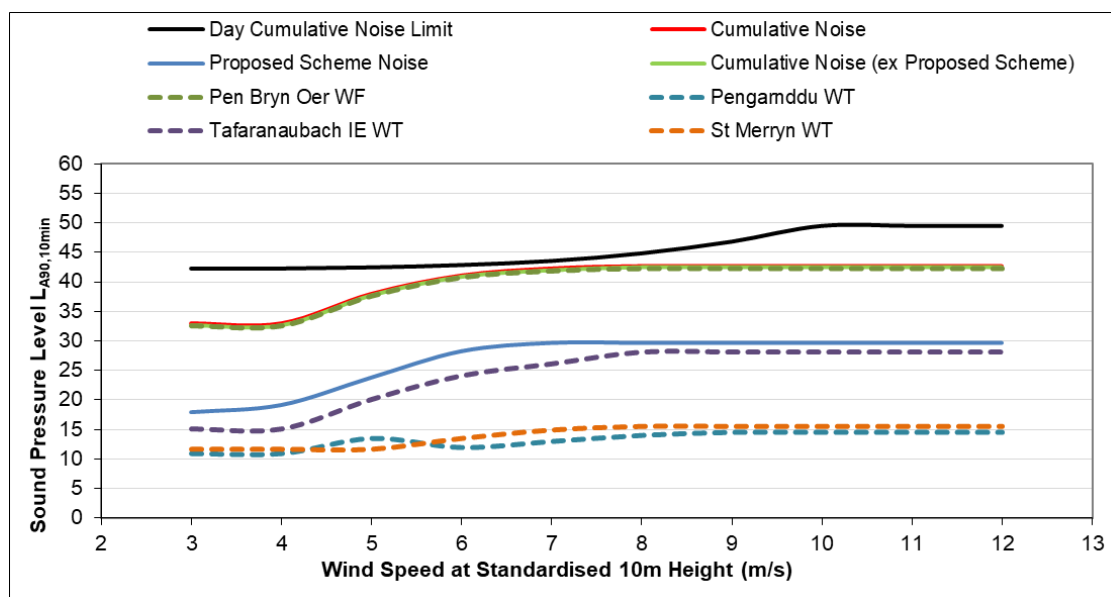


Figure 9.83: Cumulative Developments: day-time noise assessment – R12

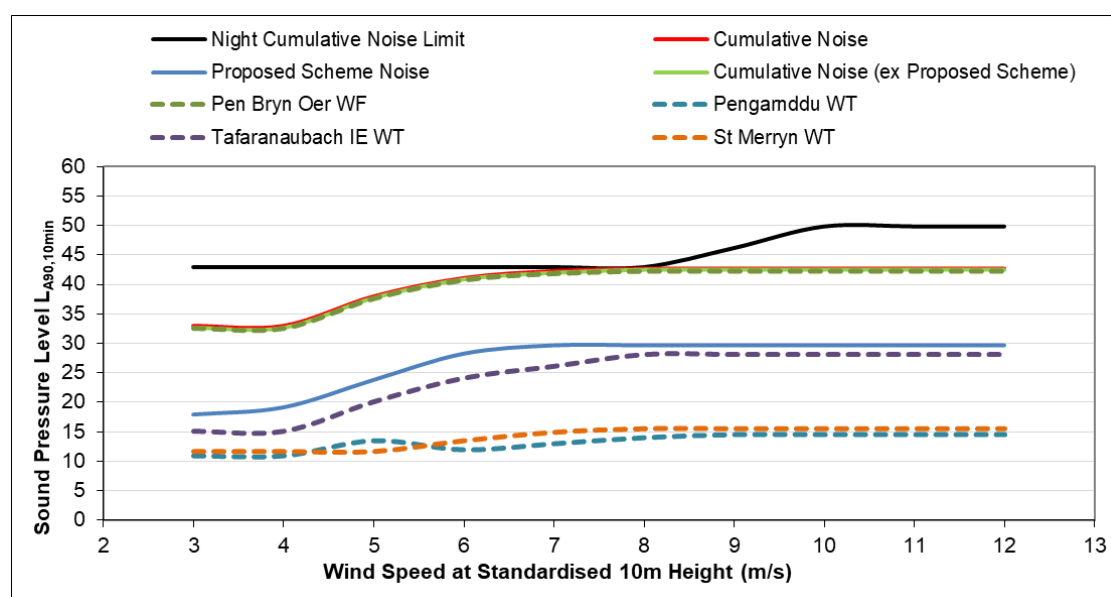


Figure 9.84: Cumulative Developments: night-time noise assessment – R12

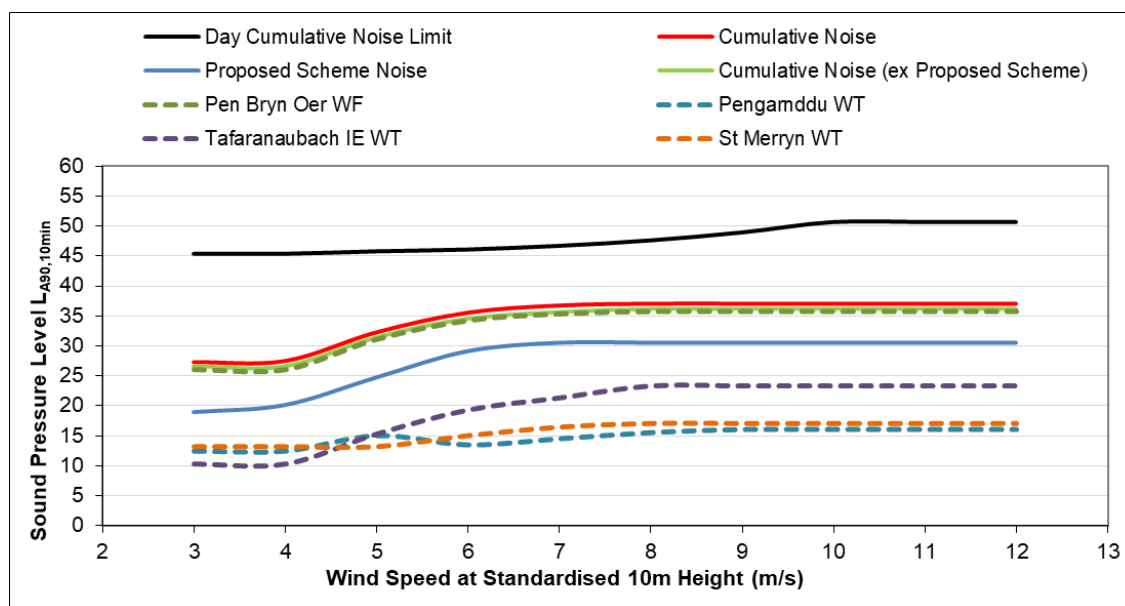


Figure 9.85: Cumulative Developments: day-time noise assessment – R13

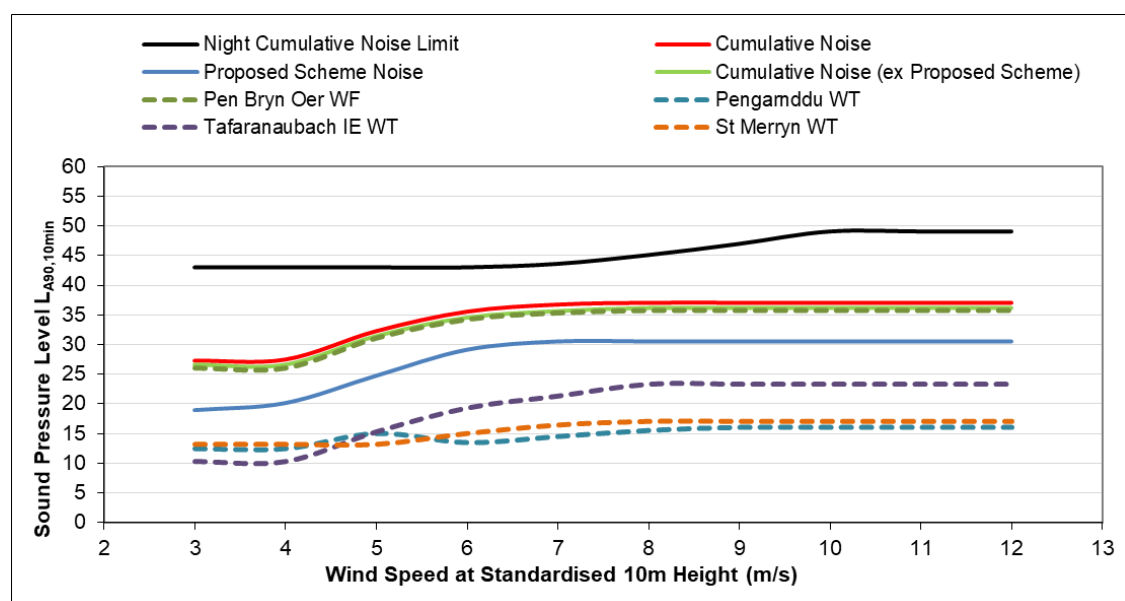


Figure 9.86: Cumulative Developments: night-time noise assessment – R13

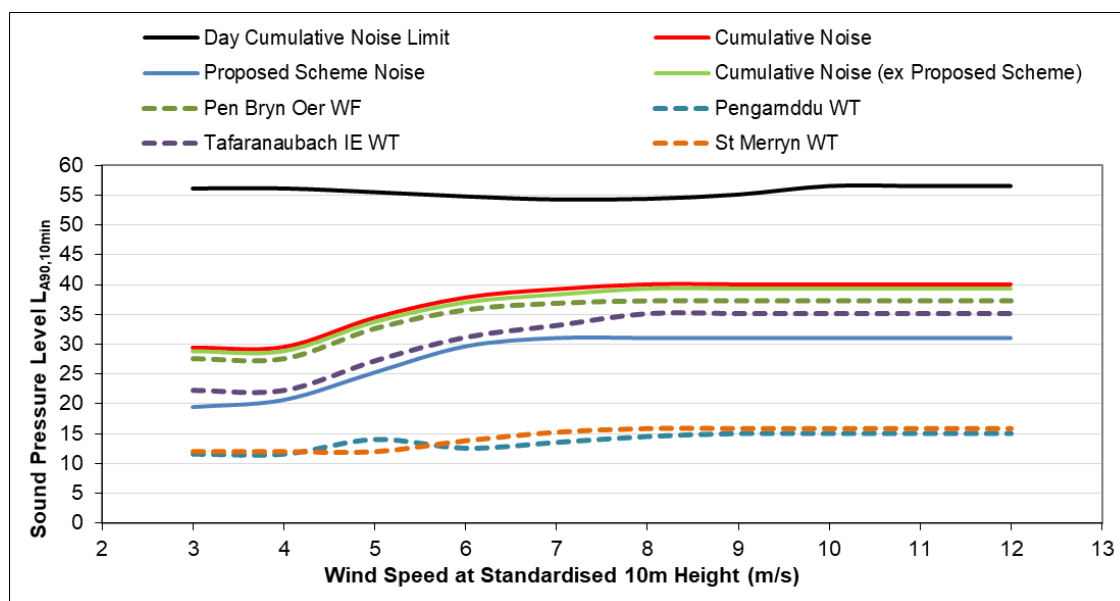


Figure 9.87: Cumulative Developments: day-time noise assessment – R14

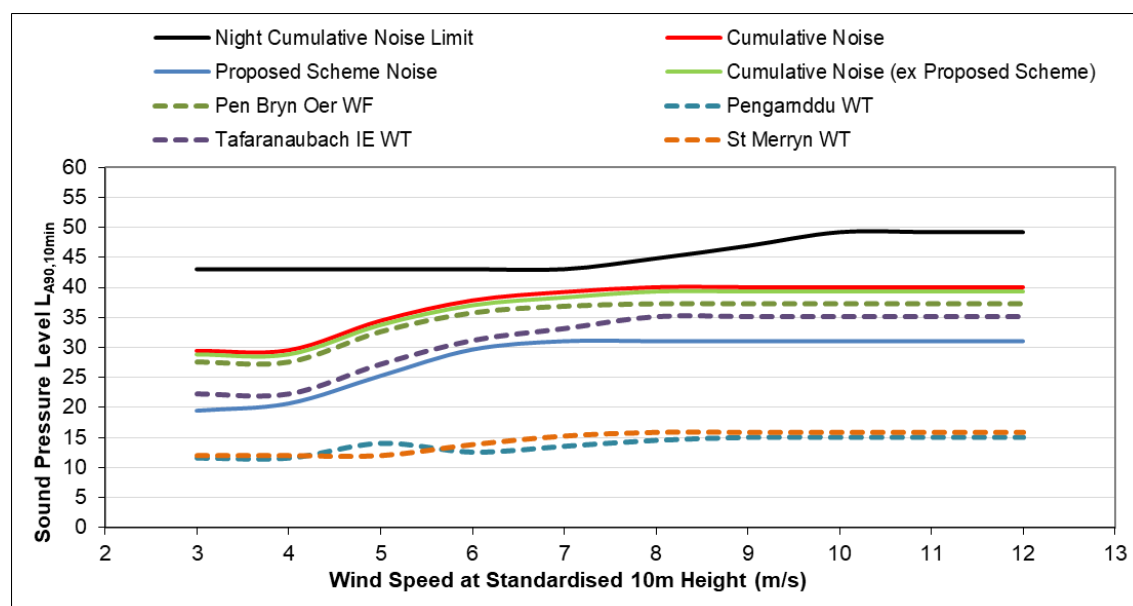


Figure 9.88: Cumulative Developments: night-time noise assessment – R14

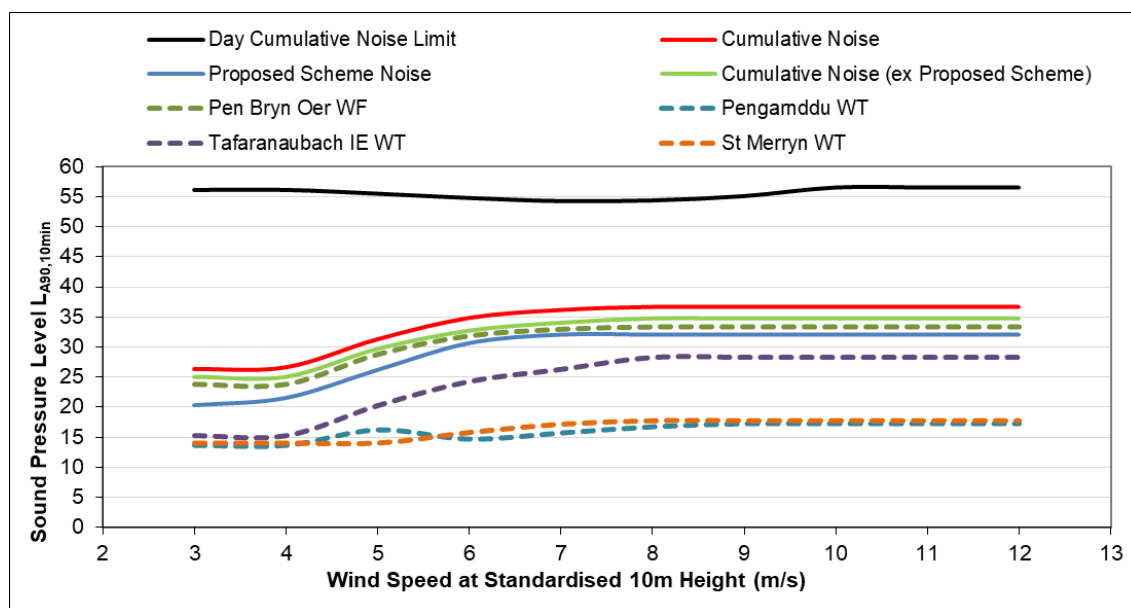


Figure 9.89: Cumulative Developments: day-time noise assessment – R15

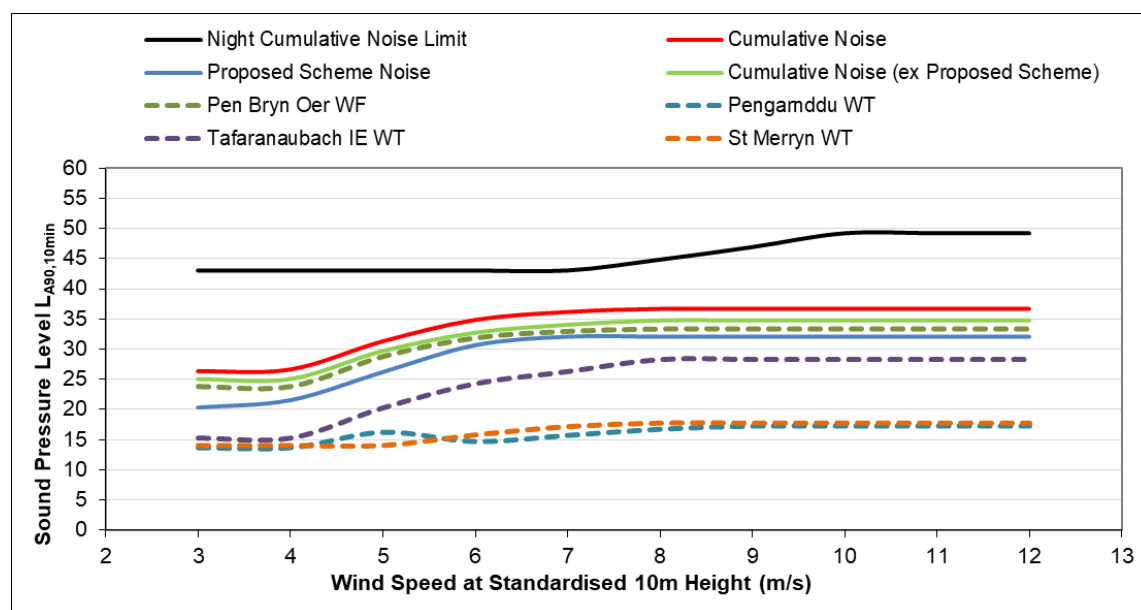


Figure 9.90: Cumulative Developments: night-time noise assessment – R15

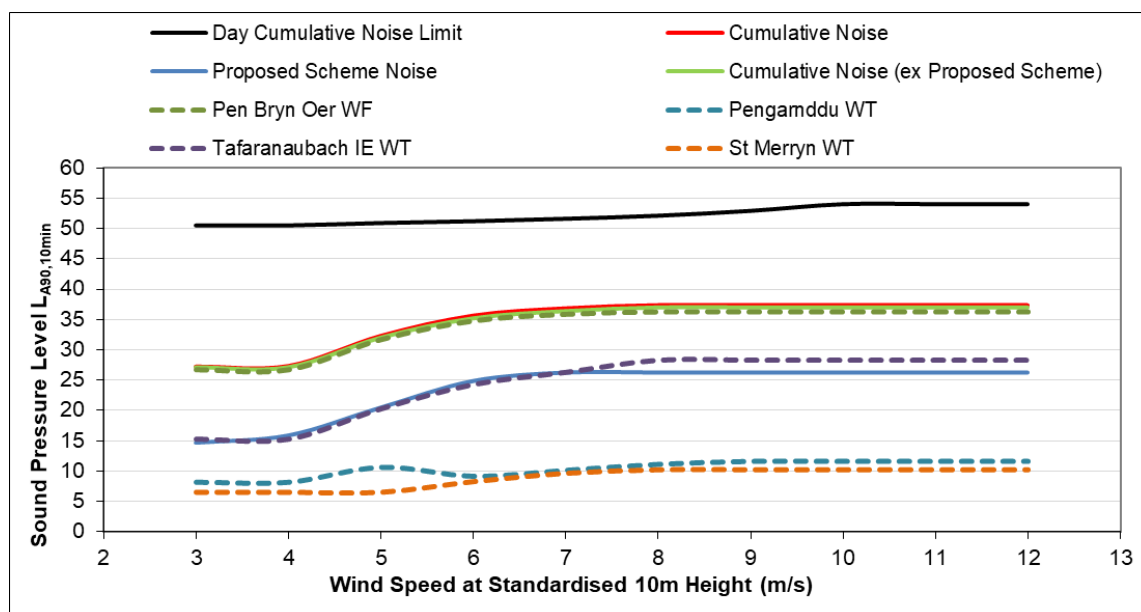


Figure 9.91: Cumulative Developments: day-time noise assessment – R16

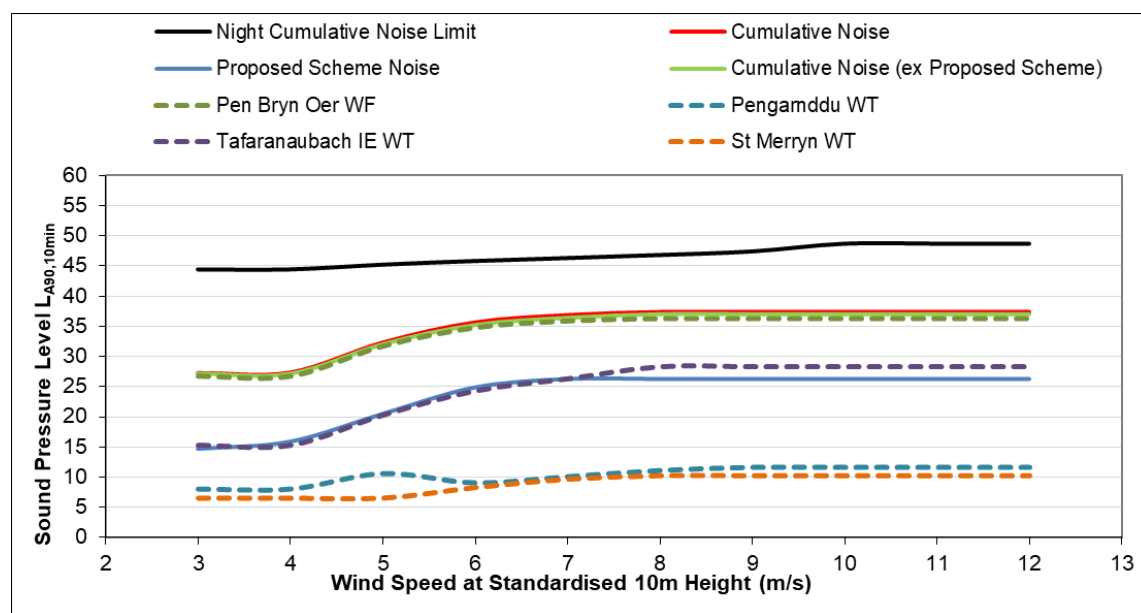


Figure 9.92: Cumulative Developments: night-time noise assessment – R16

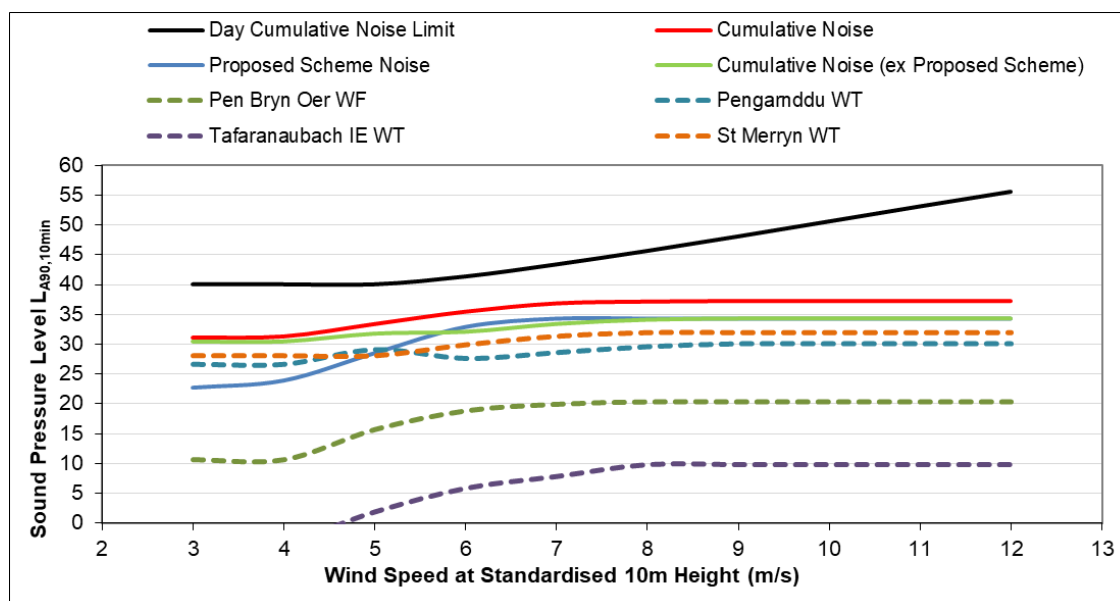


Figure 9.93: Cumulative Developments: day-time noise assessment – R17

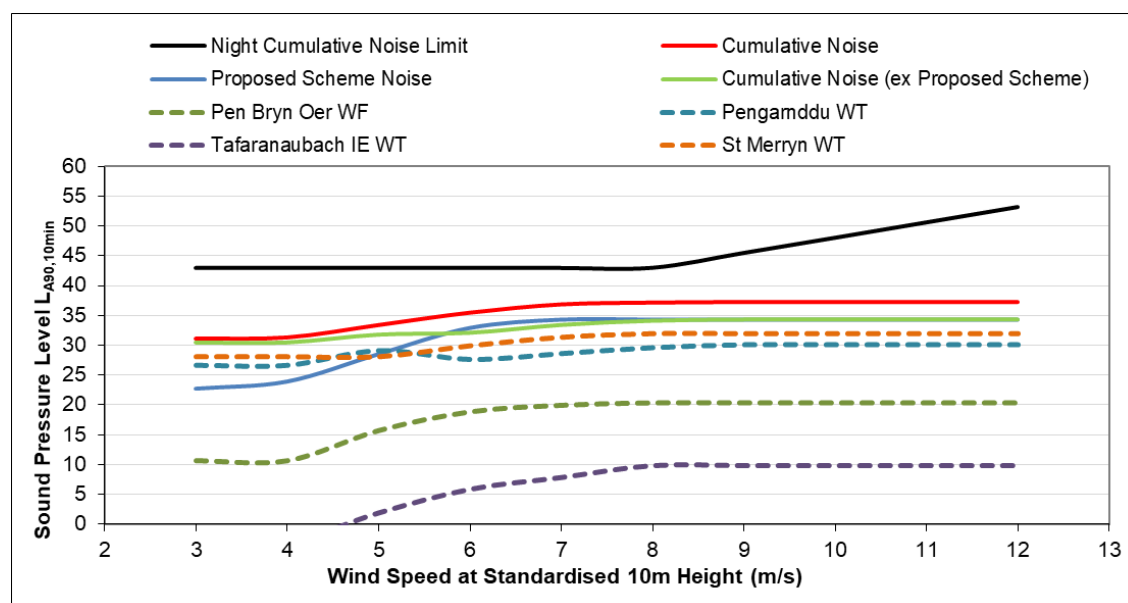


Figure 9.94: Cumulative Developments: night-time noise assessment – R17

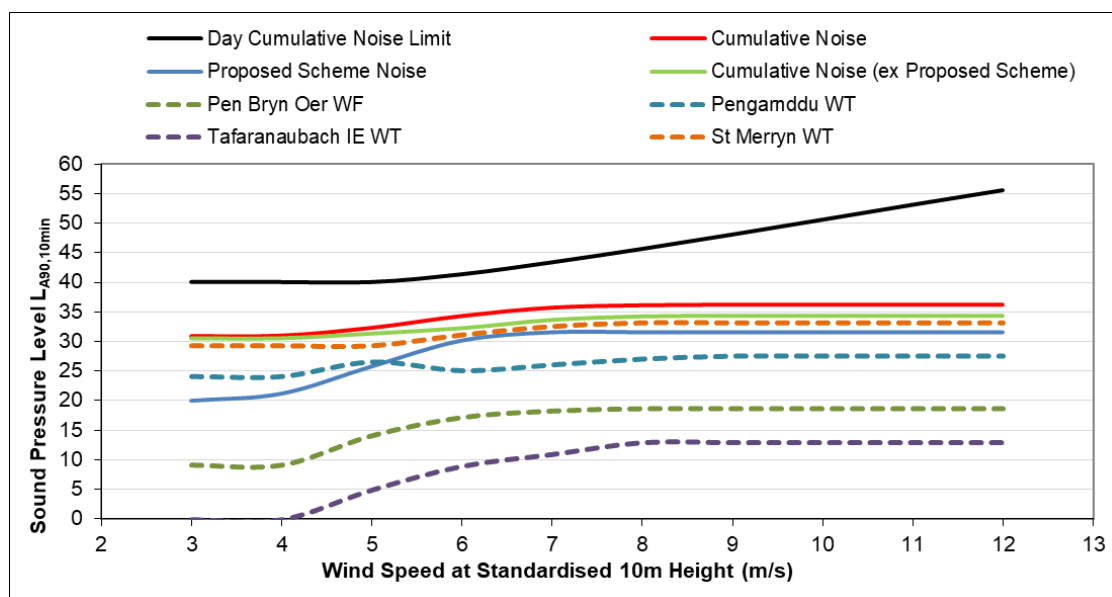


Figure 9.95: Cumulative Developments: day-time noise assessment – R18

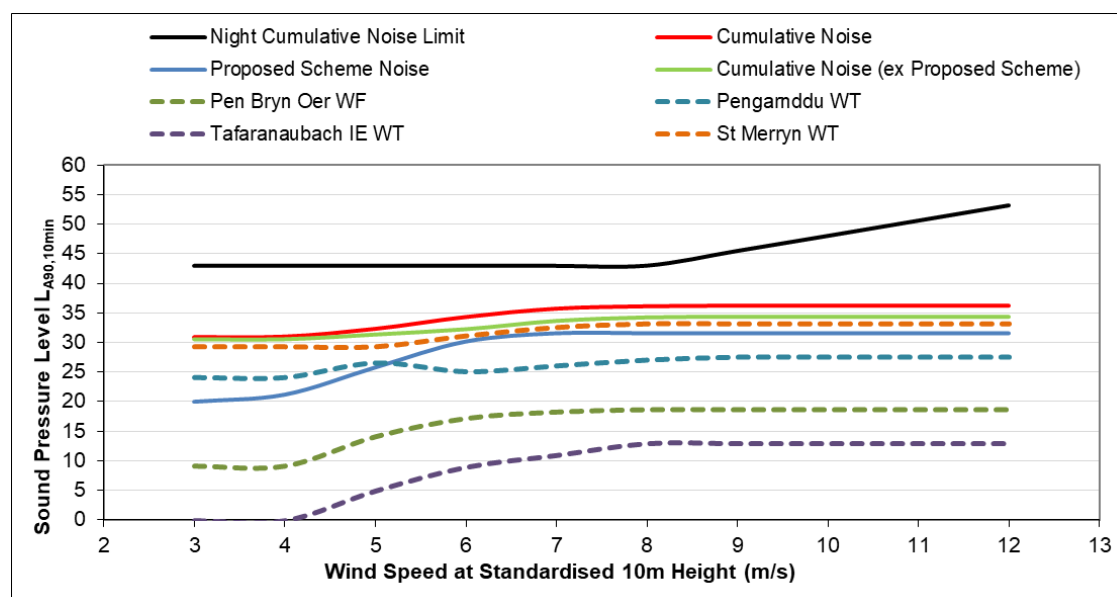


Figure 9.96: Cumulative Developments: night-time noise assessment – R18

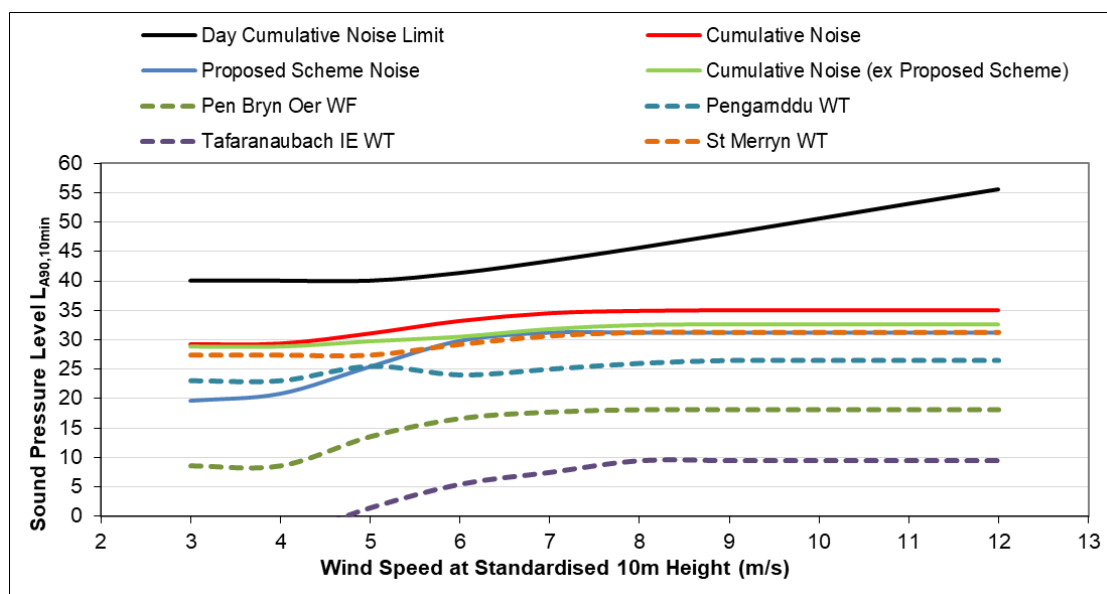


Figure 9.97: Cumulative Developments: day-time noise assessment – R19

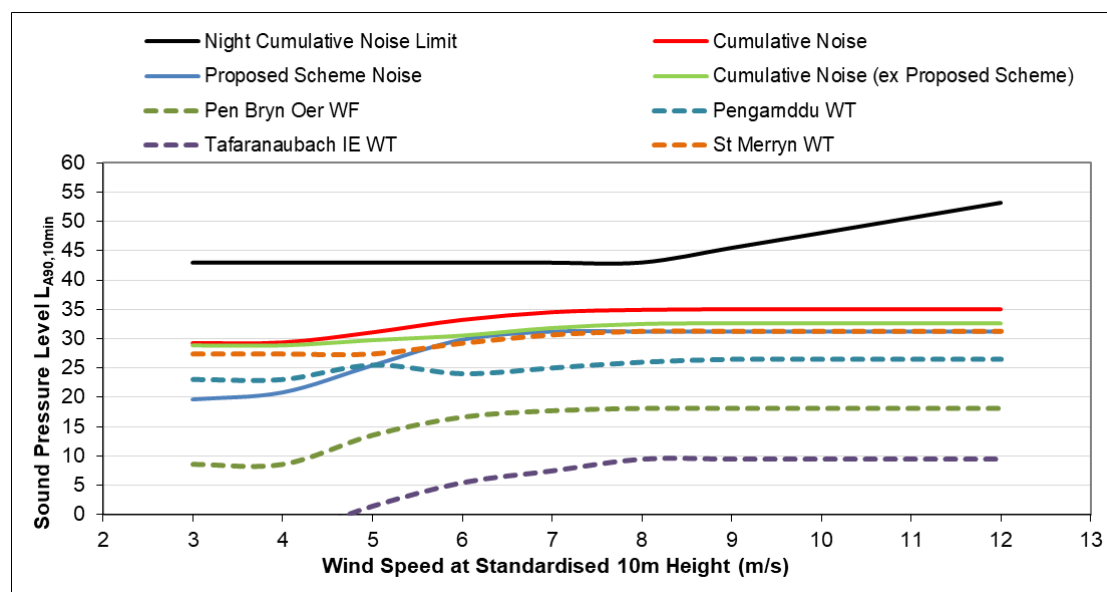


Figure 9.98: Cumulative Developments: night-time noise assessment – R19

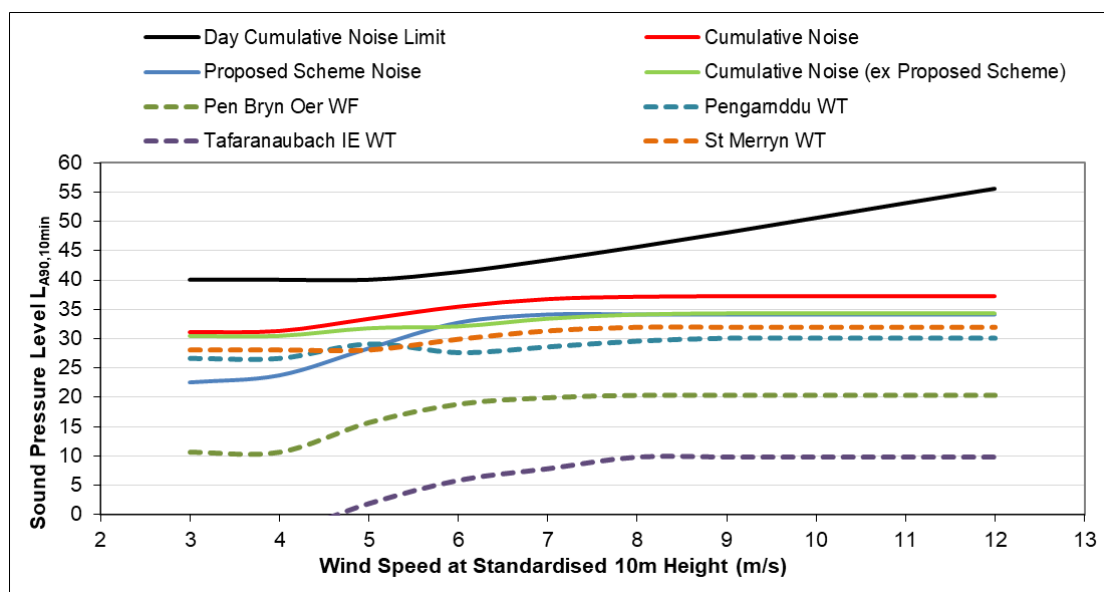


Figure 9.99: Cumulative Developments: day-time noise assessment – R20

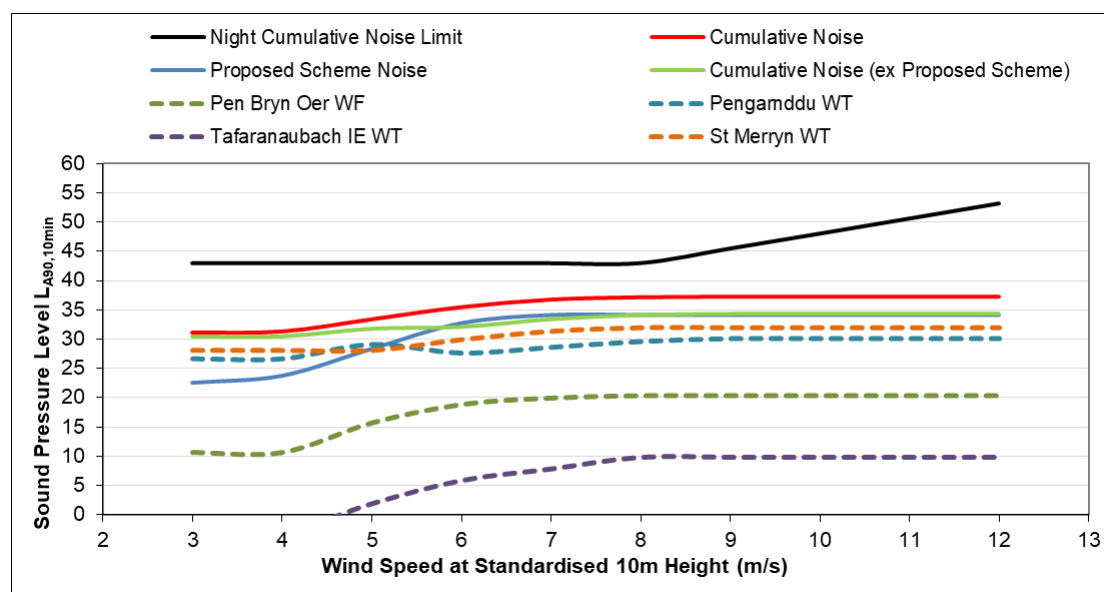


Figure 9.100: Cumulative Developments: night-time noise assessment – R20

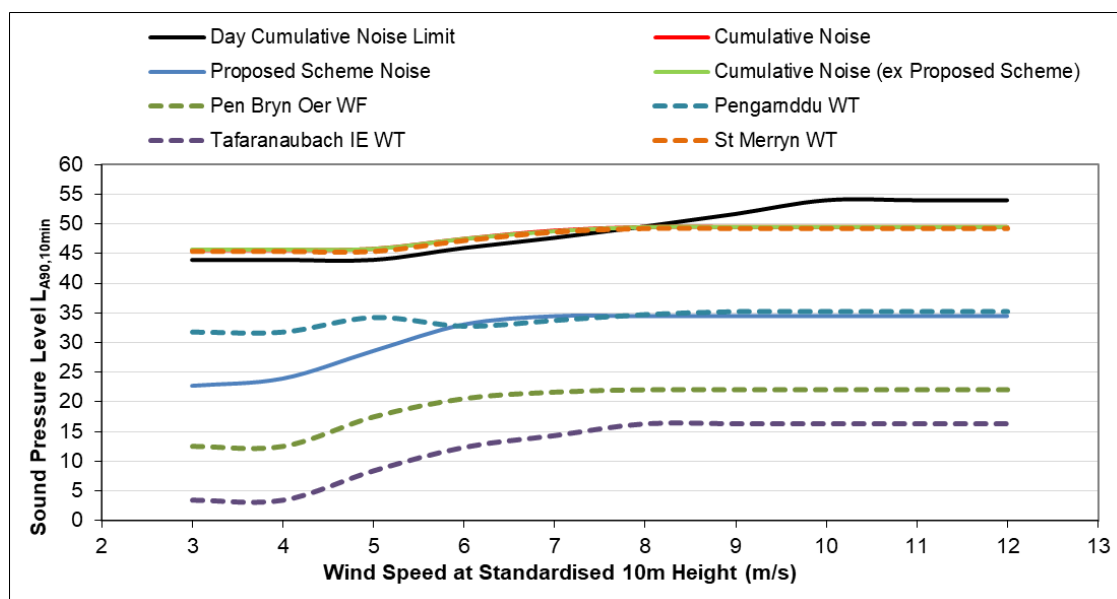


Figure 9.101: Cumulative Developments: day-time noise assessment – R21

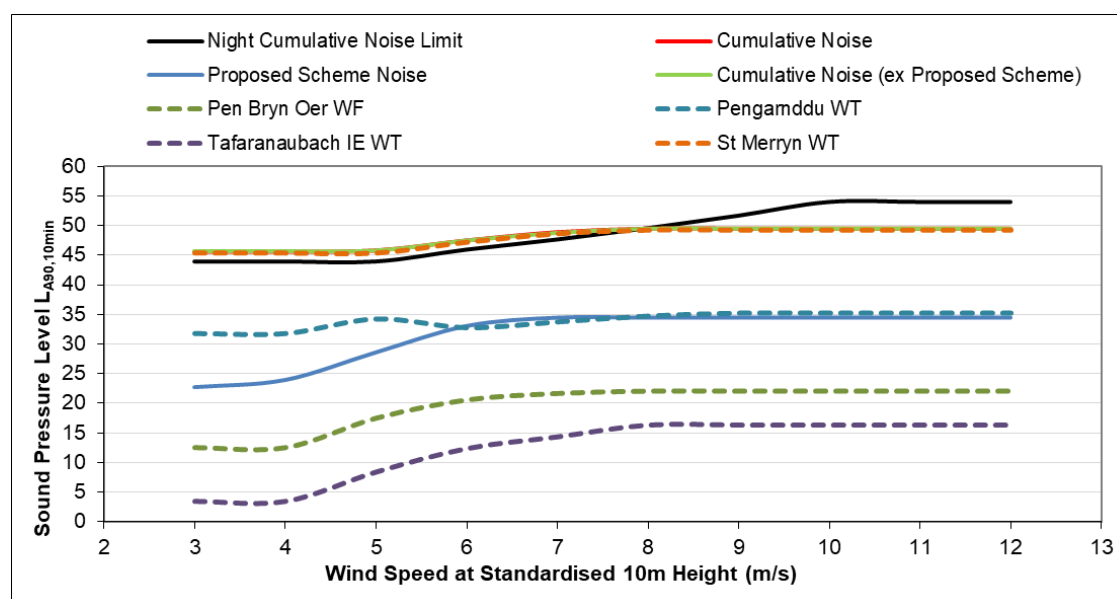


Figure 9.102: Cumulative Developments: night-time noise assessment – R21

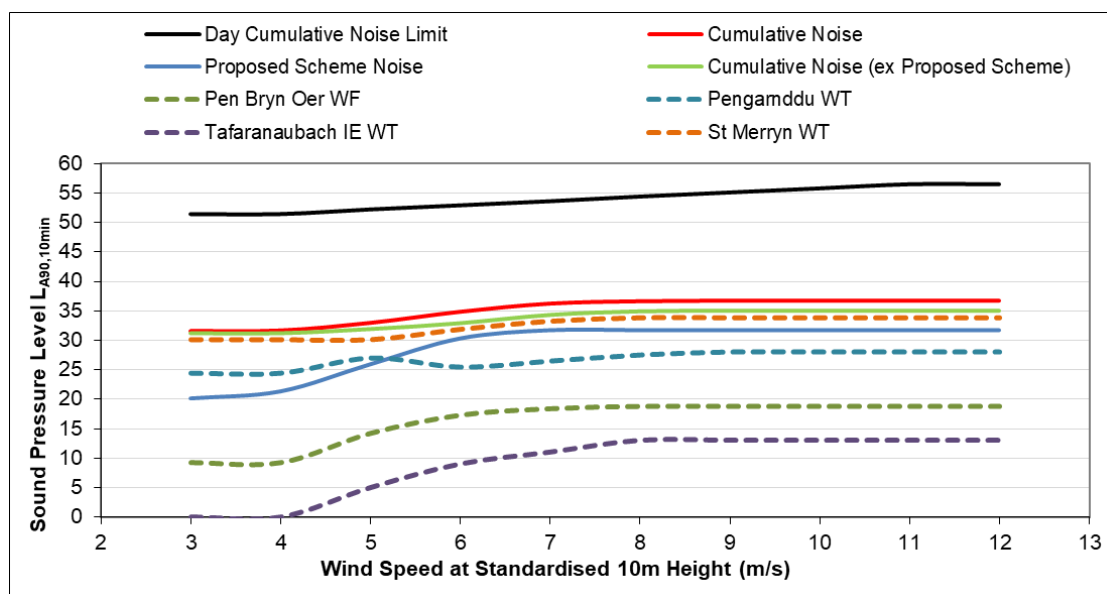


Figure 9.103: Cumulative Developments: day-time noise assessment – R22

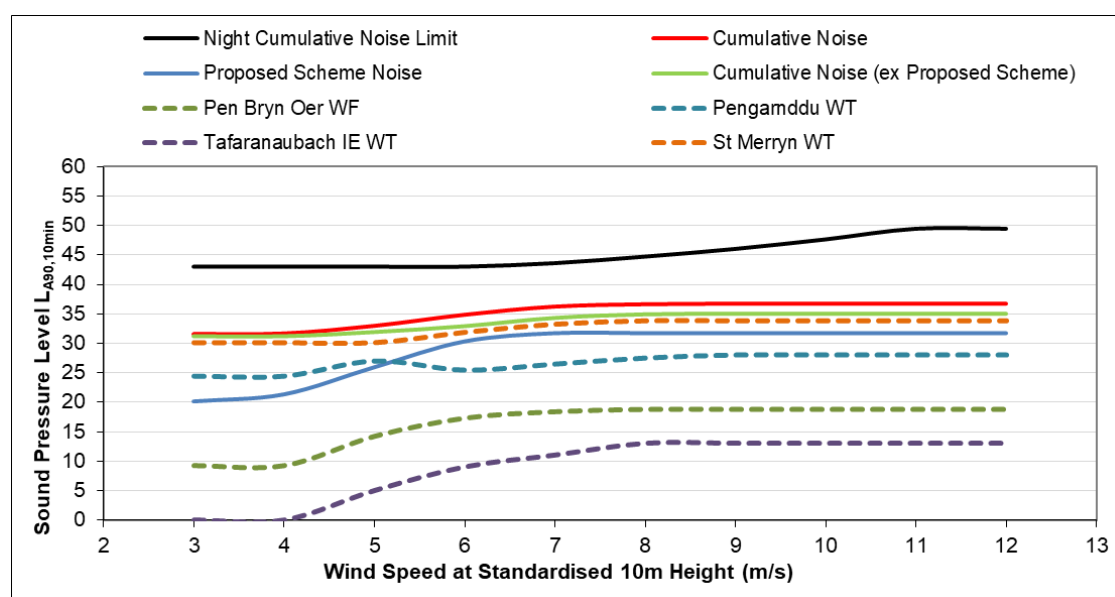


Figure 9.104: Cumulative Developments: night-time noise assessment – R22

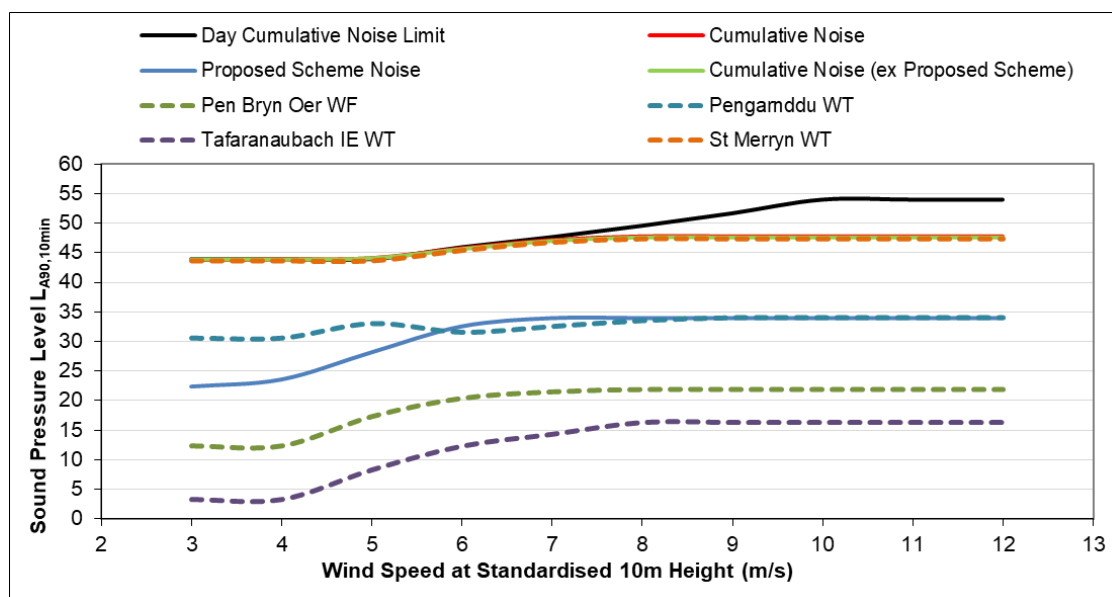


Figure 9.105: Cumulative Developments: day-time noise assessment – R23

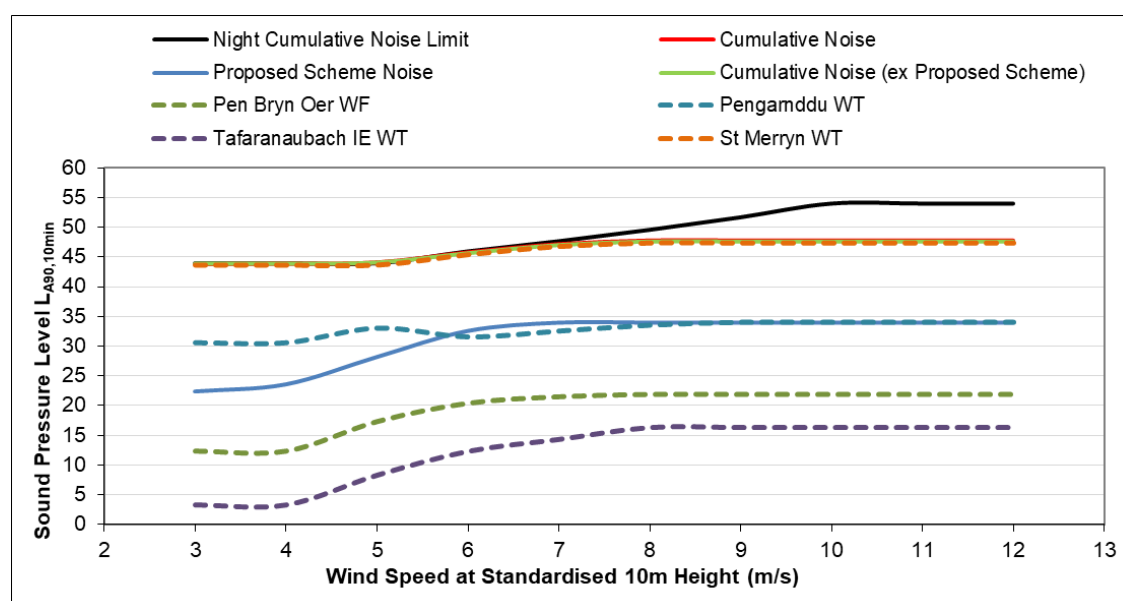


Figure 9.106: Cumulative Developments: night-time noise assessment – R23

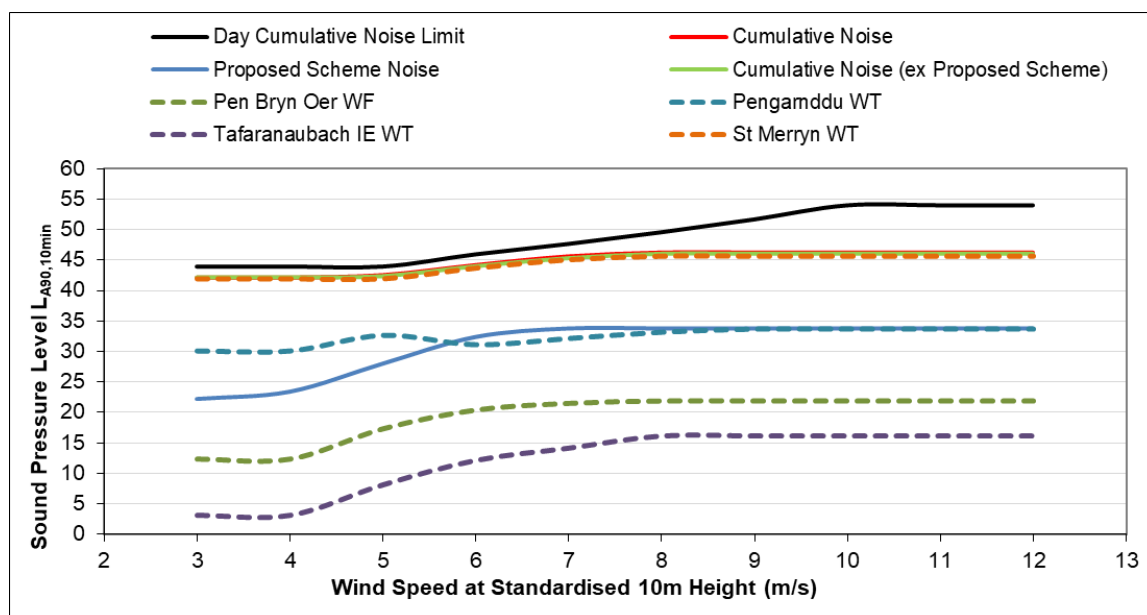


Figure 9.107: Cumulative Developments: day-time noise assessment – R24

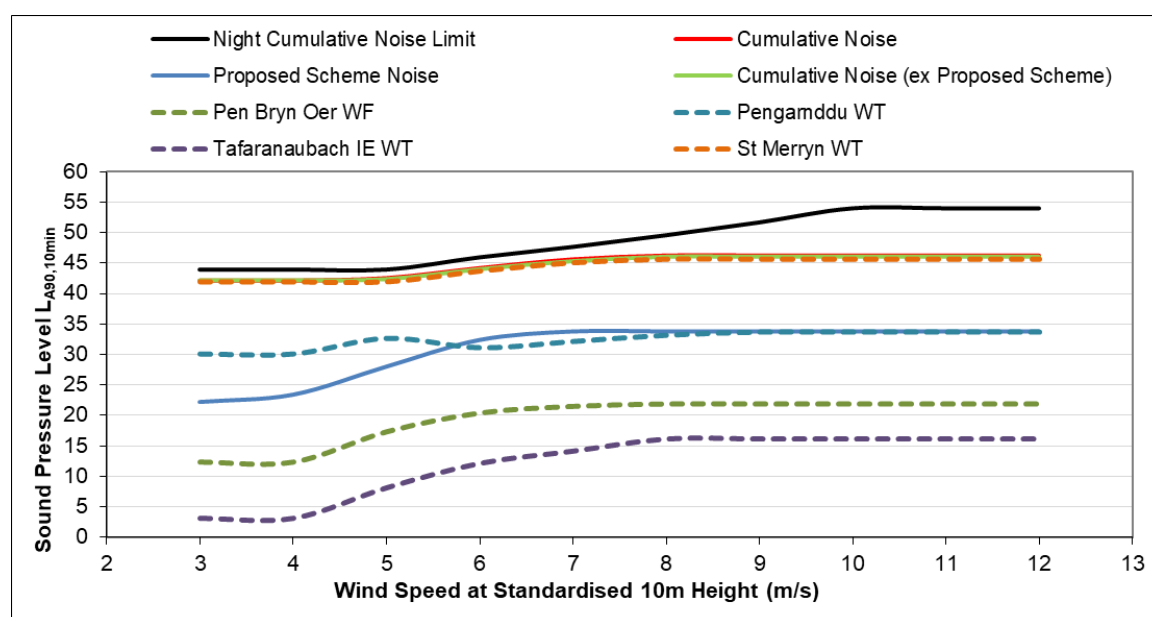


Figure 9.108: Cumulative Developments: night-time noise assessment – R24

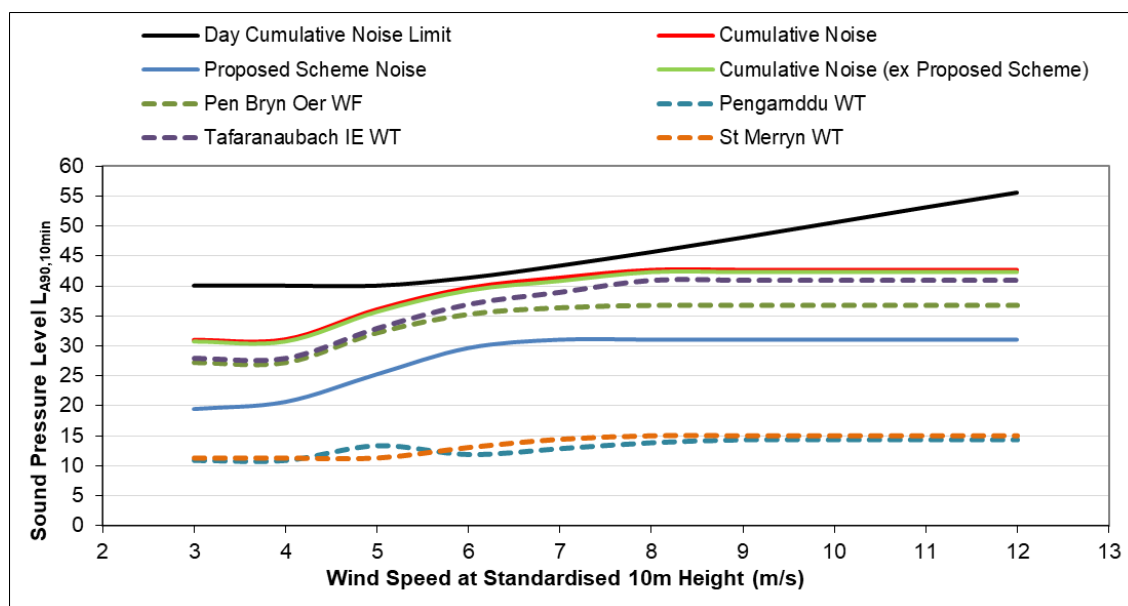


Figure 9.109: Cumulative Developments: day-time noise assessment – R25

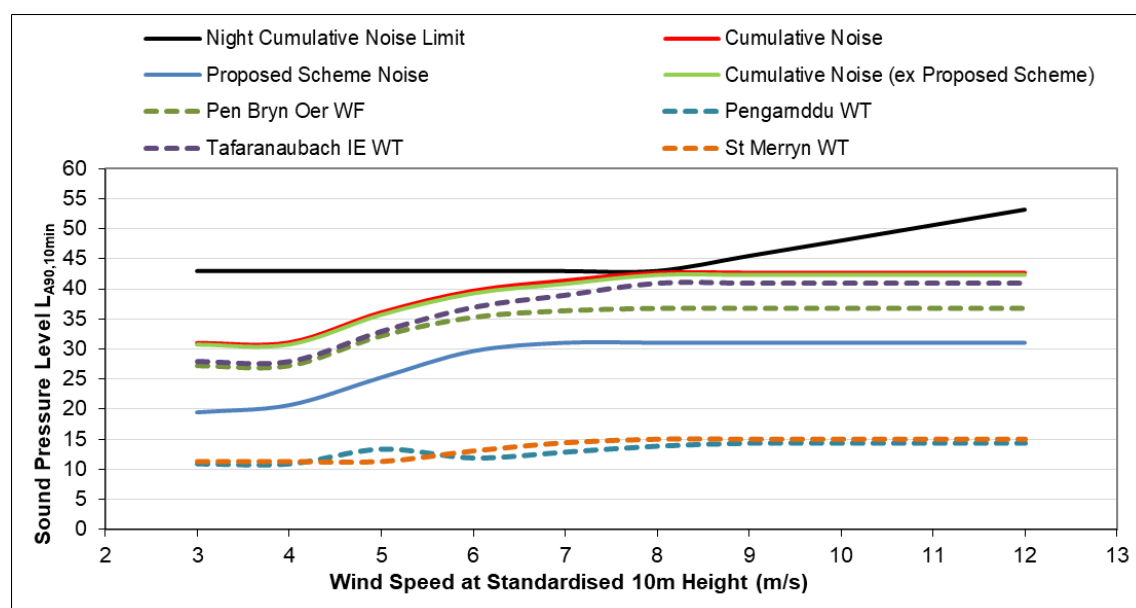


Figure 9.110: Cumulative Developments: night-time noise assessment – R25

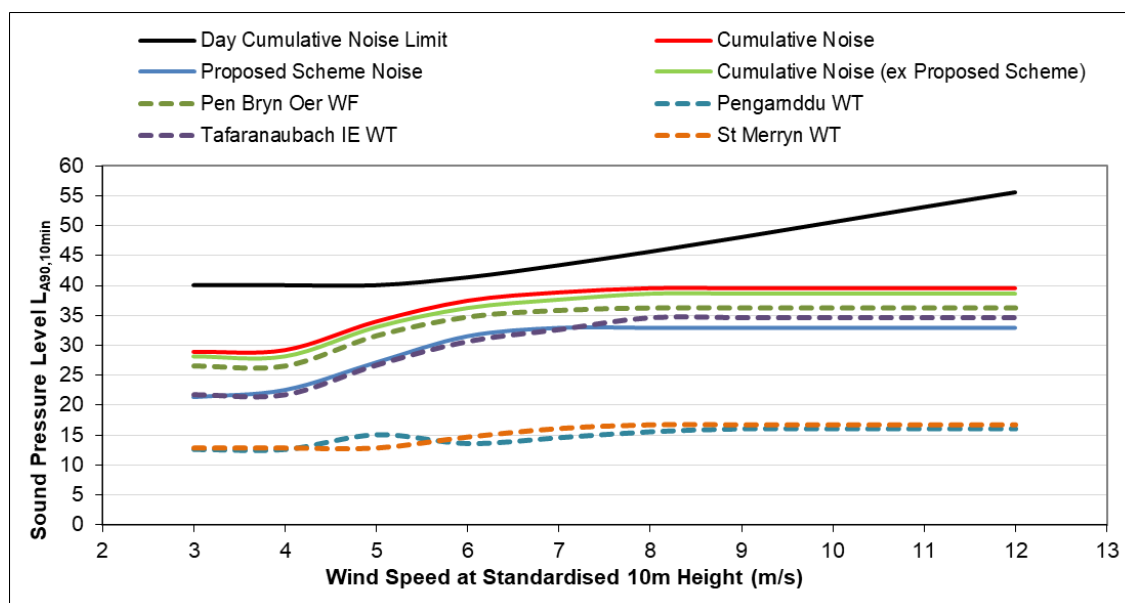


Figure 9.111: Cumulative Developments: day-time noise assessment – R26

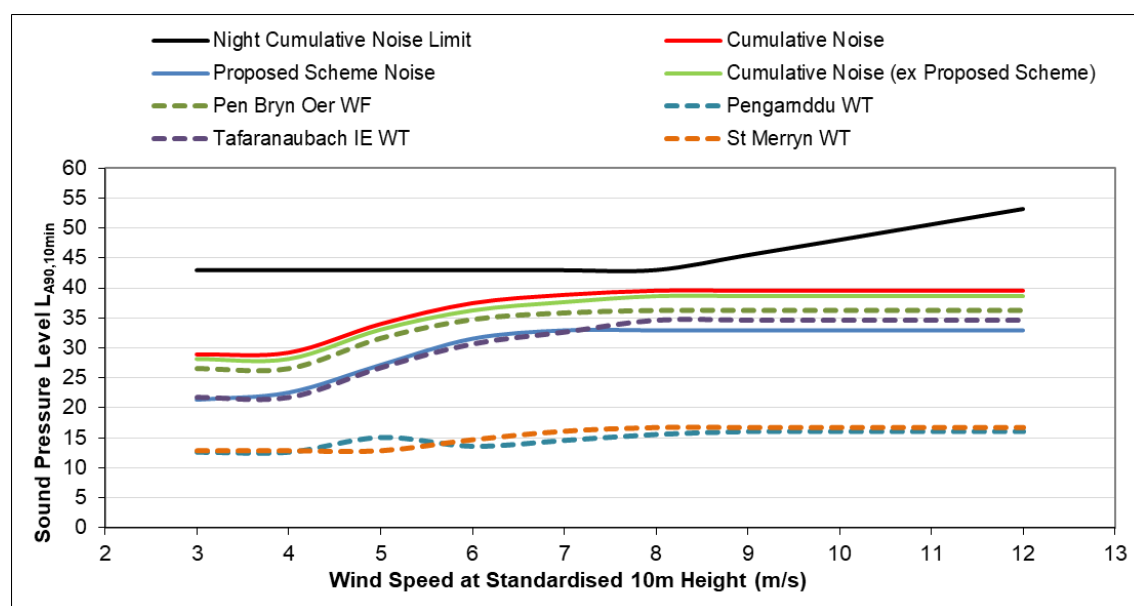


Figure 9.112: Cumulative Developments: night-time noise assessment – R26