

## Schallimmissionen Standort Swatte Poele

DEWI-GER-AP16-11428604-01.01

### Nachtrag zu Bericht

DEWI-GER-AP15-04513-01.02

**08.09.2016**

Im Bericht DEWI-GER-AP15-04513-01.02 und den folgenden Nachträgen wurde davon ausgegangen, dass drei benachbart geplante WEA im Bereich Handrup aus genehmigungstechnischen Gründen nachrangig zu berücksichtigen sind und daher nicht als Vorbelastung in die Berechnungen einzubeziehen sind.

Im Folgenden soll die Immissionssituation unter Berücksichtigung der drei WEA im Bereich Handrup eingeschätzt werden.

Die beantragten nächtlichen Schallleistungspegel der geplanten WEA des Windparks Handrup können einem Auszug aus dem Bericht 1401-1863 SL Handrup rev 00 der BBB Umwelttechnik GmbH vom 18.04.2016 entnommen werden, der DEWI vom Auftraggeber übermittelt wurde.

Gemäß diesem Auszug werden die beiden WEA Han01 und Han02 vom Typ Enercon E-141 EP4 mit einem nächtlichen Schallleistungspegel von 105.5 dB(A) und einem pauschalen Sicherheitszuschlag von 2 dB berücksichtigt. Für die WEA Han03 vom Typ Enercon E-115 wird in der Berechnung von BBB Umwelttechnik ein Schallleistungspegel von 103.3 dB(A) zuzüglich eines pauschalen Zuschlags von 2 dB verwendet.

Tabelle 1 zeigt die in der vorliegenden Berechnung berücksichtigten Daten in der Übersicht.

| ID     | Koordinaten (UTM ETRS89 Zone 32) |           | Höhe ü.<br>NN<br>[m] | WEA – Typ          | Naben-<br>höhe<br>[m] | SLP Nacht<br>dB(A) | Zuschlag<br>Nacht<br>dB |
|--------|----------------------------------|-----------|----------------------|--------------------|-----------------------|--------------------|-------------------------|
|        | Rechtswert                       | Hochwert  |                      |                    |                       |                    |                         |
| WEA07  | 406'354                          | 5'824'059 | 34                   | SENVION 3.2M122    | 139                   | 105.5              | 2                       |
| WEA08  | 406'234                          | 5'823'650 | 34                   | SENVION 3.2M122    | 139                   | 105.5              | 2                       |
| WEA09  | 406'533                          | 5'823'355 | 37                   | SENVION 3.2M122    | 139                   | 105.5              | 2                       |
| WEA10  | 406'375                          | 5'822'945 | 37                   | SENVION 3.2M122    | 139                   | 105.5              | 2                       |
| WEA11  | 406'225                          | 5'822'552 | 38                   | SENVION 3.2M122    | 139                   | 105.5              | 2                       |
| WEA 01 | 406'590                          | 5'822'645 | 40                   | AN BONUS 2.3 MW/82 | 100                   | 104.5              | 0                       |
| WEA 02 | 406'991                          | 5'822'730 | 41                   | AN BONUS 2.3 MW/82 | 100                   | 104.5              | 0                       |
| WEA 03 | 407'179                          | 5'822'579 | 44                   | AN BONUS 2.3 MW/82 | 100                   | 104.5              | 0                       |
| WEA 04 | 406'898                          | 5'823'326 | 39                   | AN BONUS 2.3 MW/82 | 100                   | 104.5              | 0                       |
| WEA 05 | 407'130                          | 5'823'196 | 40                   | AN BONUS 2.3 MW/82 | 100                   | 104.5              | 0                       |
| WEA 06 | 407'421                          | 5'823'114 | 42                   | AN BONUS 2.3 MW/82 | 100                   | 104.5              | 0                       |
| Han01  | 405'561                          | 5'823'107 | 34                   | ENERCON E-141 EP4  | 129                   | 105.5              | 2                       |
| Han02  | 405'749                          | 5'822'707 | 37                   | ENERCON E-141 EP4  | 129                   | 105.5              | 2                       |
| Han03  | 405'999                          | 5'823'018 | 36                   | ENERCON E-115      | 149                   | 103.3              | 2                       |

Tabelle 1: technische Daten der berücksichtigten WEA

Tabelle 2 zeigt die resultierenden Immissionswerte der Gesamtbelastung. An IO 1 bis IO 7 werden die nächtlichen Immissionsrichtwerte **rechnerisch eingehalten**.

| Gesamtbelastung            |                         |                  |                                                 |                     |
|----------------------------|-------------------------|------------------|-------------------------------------------------|---------------------|
| Bezeichnung                | L <sub>AT</sub> [dB(A)] | OVBG 90% [dB(A)] | Beurteilungs-<br>pegel L <sub>r</sub> * [dB(A)] | IRW Nacht** [dB(A)] |
| IO1 Feldkamp 19            | 42.5                    | 44.3             | 44                                              | 45                  |
| IO2 Feldkamp 14            | 43.5                    | 45.1             | 45                                              | 45                  |
| IO3 Neuengraben 7          | 43.3                    | 45.2             | 45                                              | 45                  |
| IO4 Fasanenweg 1           | 43.5                    | 45.4             | 45                                              | 45                  |
| IO5 Fürstenauer Straße 3   | 39.7                    | 41.5             | 41                                              | 45                  |
| IO6 Im Felde 15            | 41.6                    | 42.5             | 42.5                                            | 42.5                |
| IO7 WA am Kloster          | 34.7                    | 36.5             | 36                                              | 40                  |
| IO8 WE_1                   | 40.9                    | 41.9             | 42                                              | 40                  |
| IO9 WE_2                   | 42.2                    | 42.9             | 43                                              | 40                  |
| IO10 WE_3                  | 42.3                    | 42.8             | 43                                              | 40                  |
| IO11 Ferienhausgebiet_Nord | 39.8                    | 40.5             | 41                                              | 40                  |
| IO12 Ferienhausgebiet_Süd  | 30.7                    | 31.7             | 32                                              | 40                  |

Tabelle 2: Berechnete Schalldruckpegel an den Immissionsorten – Gesamtbelastung, offener Betrieb.

\*unter der Voraussetzung, dass keine Immissionsrelevante Ton- oder Impulshaltigkeit vorliegt

\*\*gemäß Angaben des Auftraggebers

Verantwortlicher Bearbeiter



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|----------|---------|---------------------------------------|--------------------|
| Auftrag  | Kd.-Nr. | Ansprechpartner                       | Datum              |
| 11428604 | 1530978 | Kathrin Beier<br>+49 (0)441 77937 117 | 20. September 2016 |

Ergänzung zum Nachtrag DEWI-GER-AP16-11428604-01.01 für den Standort Swatte Poele

Sehr geehrter Herr Beuchler,

wie besprochen, erhalten Sie nachstehend die detaillierten Berechnungsergebnisse zum Nachtrag der Schallimmissionsermittlung am Standort Swatte Poele.

Die nachfolgenden Berechnungsergebnisse sind nur im Zusammenhang mit dem Nachtrag DEWI-GER-AP16-11428604-01.01, datiert vom 08.09.2016, gültig.

Bei Rückfragen stehen wir Ihnen gerne zur Verfügung.

Freundliche Grüße

**UL International GmbH – Zweigstelle Oldenburg**

Susanne Horodyvskyy  
Teamleiterin Micrositing Deutschland



Die Akkreditierung gilt nur für die in den Urkunden aufgeführten DEWI-Standorte. Prüf- und Kalibrierverfahren. Die Urkunden sind auf Anfrage erhältlich.



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## Detaillierte Berechnungsergebnisse:

| IO1 Feldkamp 19 / Höhe über NN 34 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|--------------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                                 | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                        | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                                  | 139.0 | 34  | 105.5   | 582     | 597       | 72            | 40.3      | 3.0  | 66.5 | 1.1  | 0.6  | 68.3 | 0.0  |
| WEA08                                                  | 139.0 | 34  | 105.5   | 997     | 1006      | 72            | 33.2      | 3.0  | 71.1 | 1.9  | 2.3  | 75.3 | 0.0  |
| WEA09                                                  | 139.0 | 37  | 105.5   | 1196    | 1204      | 72            | 30.9      | 3.0  | 72.6 | 2.3  | 2.7  | 77.6 | 0.0  |
| WEA10                                                  | 139.0 | 37  | 105.5   | 1626    | 1631      | 72            | 26.9      | 3.0  | 75.3 | 3.1  | 3.3  | 81.6 | 0.0  |
| WEA11                                                  | 139.0 | 38  | 105.5   | 2041    | 2046      | 72            | 23.8      | 3.0  | 77.2 | 3.9  | 3.6  | 84.7 | 0.0  |
| WEA01                                                  | 100.0 | 40  | 104.5   | 1899    | 1902      | 53            | 23.5      | 3.0  | 76.6 | 3.6  | 3.9  | 84.1 | 0.0  |
| WEA02                                                  | 100.0 | 41  | 104.5   | 1839    | 1842      | 53            | 23.9      | 3.0  | 76.3 | 3.5  | 3.8  | 83.6 | 0.0  |
| WEA03                                                  | 100.0 | 44  | 104.5   | 2026    | 2028      | 54            | 22.6      | 3.0  | 77.1 | 3.9  | 3.9  | 84.9 | 0.0  |
| WEA04                                                  | 100.0 | 39  | 104.5   | 1236    | 1240      | 54            | 29.0      | 3.0  | 72.9 | 2.4  | 3.3  | 78.5 | 0.0  |
| WEA05                                                  | 100.0 | 40  | 104.5   | 1420    | 1423      | 54            | 27.2      | 3.0  | 74.1 | 2.7  | 3.5  | 80.3 | 0.0  |
| WEA06                                                  | 100.0 | 42  | 104.5   | 1609    | 1613      | 54            | 25.7      | 3.0  | 75.2 | 3.1  | 3.7  | 81.9 | 0.0  |
| Han1                                                   | 129.0 | 34  | 105.5   | 1819    | 1823      | 67            | 25.3      | 3.0  | 76.2 | 3.5  | 3.5  | 83.2 | 0.0  |
| Han2                                                   | 129.0 | 37  | 105.5   | 2057    | 2061      | 67            | 23.6      | 3.0  | 77.3 | 3.9  | 3.7  | 84.9 | 0.0  |
| Han3                                                   | 149.0 | 36  | 103.3   | 1669    | 1675      | 77            | 24.4      | 3.0  | 75.5 | 3.2  | 3.2  | 81.9 | 0.0  |

| IO2 Feldkamp 14 / Höhe über NN 34 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|--------------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                                 | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                        | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                                  | 139.0 | 34  | 105.5   | 589     | 605       | 71            | 40.1      | 3.0  | 66.6 | 1.2  | 0.7  | 68.5 | 0.0  |
| WEA08                                                  | 139.0 | 34  | 105.5   | 901     | 911       | 71            | 34.5      | 3.0  | 70.2 | 1.7  | 2.1  | 74.0 | 0.0  |
| WEA09                                                  | 139.0 | 37  | 105.5   | 964     | 974       | 72            | 33.7      | 3.0  | 70.8 | 1.9  | 2.2  | 74.9 | 0.0  |
| WEA10                                                  | 139.0 | 37  | 105.5   | 1403    | 1410      | 71            | 28.8      | 3.0  | 74.0 | 2.7  | 3.1  | 79.7 | 0.0  |
| WEA11                                                  | 139.0 | 38  | 105.5   | 1824    | 1829      | 71            | 25.3      | 3.0  | 76.2 | 3.5  | 3.5  | 83.2 | 0.0  |
| WEA01                                                  | 100.0 | 40  | 104.5   | 1628    | 1631      | 52            | 25.5      | 3.0  | 75.3 | 3.1  | 3.7  | 82.1 | 0.0  |
| WEA02                                                  | 100.0 | 41  | 104.5   | 1512    | 1515      | 52            | 26.4      | 3.0  | 74.6 | 2.9  | 3.6  | 81.1 | 0.0  |
| WEA03                                                  | 100.0 | 44  | 104.5   | 1682    | 1685      | 53            | 25.1      | 3.0  | 75.5 | 3.2  | 3.7  | 82.5 | 0.0  |
| WEA04                                                  | 100.0 | 39  | 104.5   | 914     | 920       | 53            | 32.7      | 3.0  | 70.3 | 1.8  | 2.8  | 74.8 | 0.0  |
| WEA05                                                  | 100.0 | 40  | 104.5   | 1066    | 1071      | 53            | 30.8      | 3.0  | 71.6 | 2.0  | 3.1  | 76.7 | 0.0  |
| WEA06                                                  | 100.0 | 42  | 104.5   | 1234    | 1239      | 53            | 29.0      | 3.0  | 72.9 | 2.4  | 3.3  | 78.5 | 0.0  |
| Han1                                                   | 129.0 | 34  | 105.5   | 1766    | 1770      | 67            | 25.7      | 3.0  | 76.0 | 3.4  | 3.5  | 82.8 | 0.0  |
| Han2                                                   | 129.0 | 37  | 105.5   | 1926    | 1930      | 66            | 24.5      | 3.0  | 76.7 | 3.7  | 3.6  | 84.0 | 0.0  |
| Han3                                                   | 149.0 | 36  | 103.3   | 1527    | 1534      | 77            | 25.6      | 3.0  | 74.7 | 2.9  | 3.1  | 80.7 | 0.0  |

| IO3 Neuengraben 7 / Höhe über NN 30 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|----------------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                                   | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                          | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                                    | 139.0 | 34  | 105.5   | 728     | 741       | 72            | 37.3      | 3.0  | 68.4 | 1.4  | 1.4  | 71.2 | 0.0  |
| WEA08                                                    | 139.0 | 34  | 105.5   | 693     | 707       | 72            | 37.9      | 3.0  | 68.0 | 1.3  | 1.2  | 70.6 | 0.0  |
| WEA09                                                    | 139.0 | 37  | 105.5   | 1104    | 1113      | 72            | 31.9      | 3.0  | 71.9 | 2.1  | 2.6  | 76.6 | 0.0  |
| WEA10                                                    | 139.0 | 37  | 105.5   | 1282    | 1290      | 72            | 30.0      | 3.0  | 73.2 | 2.5  | 2.9  | 78.6 | 0.0  |
| WEA11                                                    | 139.0 | 38  | 105.5   | 1555    | 1561      | 71            | 27.4      | 3.0  | 74.9 | 3.0  | 3.2  | 81.1 | 0.0  |
| WEA01                                                    | 100.0 | 40  | 104.5   | 1651    | 1655      | 52            | 25.3      | 3.0  | 75.4 | 3.1  | 3.7  | 82.2 | 0.0  |
| WEA02                                                    | 100.0 | 41  | 104.5   | 1854    | 1857      | 52            | 23.8      | 3.0  | 76.4 | 3.5  | 3.8  | 83.7 | 0.0  |
| WEA03                                                    | 100.0 | 44  | 104.5   | 2095    | 2098      | 53            | 22.2      | 3.0  | 77.4 | 4.0  | 3.9  | 85.4 | 0.0  |
| WEA04                                                    | 100.0 | 39  | 104.5   | 1431    | 1435      | 53            | 27.1      | 3.0  | 74.1 | 2.7  | 3.5  | 80.4 | 0.0  |
| WEA05                                                    | 100.0 | 40  | 104.5   | 1697    | 1700      | 53            | 24.9      | 3.0  | 75.6 | 3.2  | 3.7  | 82.6 | 0.0  |
| WEA06                                                    | 100.0 | 42  | 104.5   | 1994    | 1997      | 53            | 22.8      | 3.0  | 77.0 | 3.8  | 3.9  | 84.7 | 0.0  |
| Han1                                                     | 129.0 | 34  | 105.5   | 884     | 893       | 66            | 34.6      | 3.0  | 70.0 | 1.7  | 2.2  | 73.9 | 0.0  |
| Han2                                                     | 129.0 | 37  | 105.5   | 1287    | 1293      | 67            | 29.8      | 3.0  | 73.2 | 2.5  | 3.0  | 78.7 | 0.0  |
| Han3                                                     | 149.0 | 36  | 103.3   | 1038    | 1049      | 77            | 30.6      | 3.0  | 71.4 | 2.0  | 2.3  | 75.7 | 0.0  |

| IO4 Fasanenweg 1 / Höhe über NN 30 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|---------------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                                  | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                         | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                                   | 139.0 | 34  | 105.5   | 592     | 608       | 72            | 40.0      | 3.0  | 66.7 | 1.2  | 0.7  | 68.5 | 0.0  |
| WEA08                                                   | 139.0 | 34  | 105.5   | 719     | 732       | 72            | 37.5      | 3.0  | 68.3 | 1.4  | 1.4  | 71.0 | 0.0  |
| WEA09                                                   | 139.0 | 37  | 105.5   | 1137    | 1146      | 73            | 31.5      | 3.0  | 72.2 | 2.2  | 2.6  | 77.0 | 0.0  |
| WEA10                                                   | 139.0 | 37  | 105.5   | 1396    | 1403      | 72            | 28.9      | 3.0  | 73.9 | 2.7  | 3.0  | 79.7 | 0.0  |
| WEA11                                                   | 139.0 | 38  | 105.5   | 1714    | 1720      | 71            | 26.2      | 3.0  | 75.7 | 3.3  | 3.4  | 82.4 | 0.0  |
| WEA01                                                   | 100.0 | 40  | 104.5   | 1760    | 1763      | 52            | 24.5      | 3.0  | 75.9 | 3.4  | 3.8  | 83.1 | 0.0  |
| WEA02                                                   | 100.0 | 41  | 104.5   | 1910    | 1913      | 52            | 23.4      | 3.0  | 76.6 | 3.6  | 3.9  | 84.1 | 0.0  |
| WEA03                                                   | 100.0 | 44  | 104.5   | 2147    | 2149      | 53            | 21.8      | 3.0  | 77.7 | 4.1  | 4.0  | 85.7 | 0.0  |
| WEA04                                                   | 100.0 | 39  | 104.5   | 1423    | 1427      | 53            | 27.2      | 3.0  | 74.1 | 2.7  | 3.5  | 80.3 | 0.0  |
| WEA05                                                   | 100.0 | 40  | 104.5   | 1686    | 1690      | 53            | 25.0      | 3.0  | 75.6 | 3.2  | 3.7  | 82.5 | 0.0  |
| WEA06                                                   | 100.0 | 42  | 104.5   | 1971    | 1974      | 53            | 23.0      | 3.0  | 76.9 | 3.8  | 3.9  | 84.5 | 0.0  |
| Han1                                                    | 129.0 | 34  | 105.5   | 1123    | 1130      | 67            | 31.5      | 3.0  | 72.1 | 2.2  | 2.8  | 77.0 | 0.0  |
| Han2                                                    | 129.0 | 37  | 105.5   | 1501    | 1507      | 67            | 27.8      | 3.0  | 74.6 | 2.9  | 3.3  | 80.7 | 0.0  |
| Han3                                                    | 149.0 | 36  | 103.3   | 1210    | 1219      | 77            | 28.7      | 3.0  | 72.7 | 2.3  | 2.6  | 77.7 | 0.0  |

| IO5 Fürstenauer Straße 3 / Höhe über NN 33 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|-----------------------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                                          | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                                 | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                                           | 139.0 | 34  | 105.5   | 784     | 795       | 73            | 36.4      | 3.0  | 69.0 | 1.5  | 1.6  | 72.1 | 0.0  |
| WEA08                                                           | 139.0 | 34  | 105.5   | 1087    | 1095      | 73            | 32.1      | 3.0  | 71.8 | 2.1  | 2.5  | 76.4 | 0.0  |
| WEA09                                                           | 139.0 | 37  | 105.5   | 1477    | 1483      | 73            | 28.2      | 3.0  | 74.4 | 2.8  | 3.1  | 80.3 | 0.0  |
| WEA10                                                           | 139.0 | 37  | 105.5   | 1801    | 1806      | 73            | 25.5      | 3.0  | 76.1 | 3.4  | 3.4  | 83.0 | 0.0  |
| WEA11                                                           | 139.0 | 38  | 105.5   | 2151    | 2155      | 73            | 23.1      | 3.0  | 77.7 | 4.1  | 3.6  | 85.4 | 0.0  |
| WEA01                                                           | 100.0 | 40  | 104.5   | 2153    | 2155      | 54            | 21.8      | 3.0  | 77.7 | 4.1  | 3.9  | 85.7 | 0.0  |
| WEA02                                                           | 100.0 | 41  | 104.5   | 2245    | 2247      | 54            | 21.2      | 3.0  | 78.0 | 4.3  | 4.0  | 86.3 | 0.0  |
| WEA03                                                           | 100.0 | 44  | 104.5   | 2471    | 2473      | 54            | 19.9      | 3.0  | 78.9 | 4.7  | 4.1  | 87.6 | 0.0  |
| WEA04                                                           | 100.0 | 39  | 104.5   | 1696    | 1699      | 54            | 25.0      | 3.0  | 75.6 | 3.2  | 3.7  | 82.5 | 0.0  |
| WEA05                                                           | 100.0 | 40  | 104.5   | 1943    | 1946      | 54            | 23.2      | 3.0  | 76.8 | 3.7  | 3.9  | 84.3 | 0.0  |
| WEA06                                                           | 100.0 | 42  | 104.5   | 2201    | 2204      | 54            | 21.5      | 3.0  | 77.9 | 4.2  | 4.0  | 86.0 | 0.0  |
| Han1                                                            | 129.0 | 34  | 105.5   | 1596    | 1601      | 69            | 27.1      | 3.0  | 75.1 | 3.0  | 3.3  | 81.5 | 0.0  |
| Han2                                                            | 129.0 | 37  | 105.5   | 1970    | 1974      | 69            | 24.3      | 3.0  | 76.9 | 3.8  | 3.6  | 84.3 | 0.0  |
| Han3                                                            | 149.0 | 36  | 103.3   | 1660    | 1667      | 79            | 24.5      | 3.0  | 75.4 | 3.2  | 3.2  | 81.8 | 0.0  |

| IO6 Im Felde 15 / Höhe über NN 37 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|--------------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                                 | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                        | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                                  | 139.0 | 34  | 105.5   | 1083    | 1091      | 72            | 32.2      | 3.0  | 71.8 | 2.1  | 2.5  | 76.3 | 0.0  |
| WEA08                                                  | 139.0 | 34  | 105.5   | 1244    | 1251      | 72            | 30.4      | 3.0  | 73.0 | 2.4  | 2.8  | 78.1 | 0.0  |
| WEA09                                                  | 139.0 | 37  | 105.5   | 1096    | 1104      | 73            | 32.0      | 3.0  | 71.9 | 2.1  | 2.5  | 76.5 | 0.0  |
| WEA10                                                  | 139.0 | 37  | 105.5   | 1480    | 1486      | 72            | 28.1      | 3.0  | 74.4 | 2.8  | 3.1  | 80.4 | 0.0  |
| WEA11                                                  | 139.0 | 38  | 105.5   | 1870    | 1875      | 71            | 25.0      | 3.0  | 76.5 | 3.6  | 3.5  | 83.5 | 0.0  |
| WEA01                                                  | 100.0 | 40  | 104.5   | 1579    | 1582      | 52            | 25.9      | 3.0  | 75.0 | 3.0  | 3.7  | 81.7 | 0.0  |
| WEA02                                                  | 100.0 | 41  | 104.5   | 1325    | 1329      | 53            | 28.1      | 3.0  | 73.5 | 2.5  | 3.4  | 79.4 | 0.0  |
| WEA03                                                  | 100.0 | 44  | 104.5   | 1423    | 1427      | 53            | 27.2      | 3.0  | 74.1 | 2.7  | 3.5  | 80.3 | 0.0  |
| WEA04                                                  | 100.0 | 39  | 104.5   | 845     | 850       | 53            | 33.7      | 3.0  | 69.6 | 1.6  | 2.6  | 73.8 | 0.0  |
| WEA05                                                  | 100.0 | 40  | 104.5   | 840     | 846       | 53            | 33.7      | 3.0  | 69.5 | 1.6  | 2.6  | 73.8 | 0.0  |
| WEA06                                                  | 100.0 | 42  | 104.5   | 865     | 871       | 53            | 33.4      | 3.0  | 69.8 | 1.7  | 2.7  | 74.1 | 0.0  |
| Han1                                                   | 129.0 | 34  | 105.5   | 2066    | 2070      | 67            | 23.6      | 3.0  | 77.3 | 3.9  | 3.7  | 84.9 | 0.0  |
| Han2                                                   | 129.0 | 37  | 105.5   | 2111    | 2115      | 67            | 23.3      | 3.0  | 77.5 | 4.0  | 3.7  | 85.2 | 0.0  |
| Han3                                                   | 149.0 | 36  | 103.3   | 1727    | 1733      | 77            | 24.0      | 3.0  | 75.8 | 3.3  | 3.3  | 82.3 | 0.0  |

| IO7 WA am Kloster / Höhe über NN 29 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|----------------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                                   | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                          | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                                    | 139.0 | 34  | 105.5   | 1455    | 1461      | 73            | 28.4      | 3.0  | 74.3 | 2.8  | 3.1  | 80.2 | 0.0  |
| WEA08                                                    | 139.0 | 34  | 105.5   | 1606    | 1612      | 73            | 27.1      | 3.0  | 75.2 | 3.1  | 3.2  | 81.5 | 0.0  |
| WEA09                                                    | 139.0 | 37  | 105.5   | 2026    | 2031      | 74            | 23.9      | 3.0  | 77.2 | 3.9  | 3.6  | 84.6 | 0.0  |
| WEA10                                                    | 139.0 | 37  | 105.5   | 2237    | 2242      | 73            | 22.6      | 3.0  | 78.0 | 4.3  | 3.7  | 86.0 | 0.0  |
| WEA11                                                    | 139.0 | 38  | 105.5   | 2496    | 2500      | 73            | 21.0      | 3.0  | 79.0 | 4.8  | 3.8  | 87.5 | 0.0  |
| WEA01                                                    | 100.0 | 40  | 104.5   | 2606    | 2608      | 54            | 19.1      | 3.0  | 79.3 | 5.0  | 4.1  | 88.4 | 0.0  |
| WEA02                                                    | 100.0 | 41  | 104.5   | 2793    | 2795      | 54            | 18.1      | 3.0  | 79.9 | 5.3  | 4.1  | 89.4 | 0.0  |
| WEA03                                                    | 100.0 | 44  | 104.5   | 3032    | 3034      | 55            | 16.9      | 3.0  | 80.6 | 5.8  | 4.2  | 90.6 | 0.0  |
| WEA04                                                    | 100.0 | 39  | 104.5   | 2319    | 2321      | 54            | 20.8      | 3.0  | 78.3 | 4.4  | 4.0  | 86.7 | 0.0  |
| WEA05                                                    | 100.0 | 40  | 104.5   | 2581    | 2584      | 54            | 19.3      | 3.0  | 79.2 | 4.9  | 4.1  | 88.2 | 0.0  |
| WEA06                                                    | 100.0 | 42  | 104.5   | 2864    | 2866      | 54            | 17.8      | 3.0  | 80.2 | 5.5  | 4.2  | 89.7 | 0.0  |
| Han1                                                     | 129.0 | 34  | 105.5   | 1733    | 1738      | 68            | 26.0      | 3.0  | 75.8 | 3.3  | 3.5  | 82.6 | 0.0  |
| Han2                                                     | 129.0 | 37  | 105.5   | 2170    | 2174      | 68            | 22.9      | 3.0  | 77.8 | 4.1  | 3.7  | 85.6 | 0.0  |
| Han3                                                     | 149.0 | 36  | 103.3   | 1979    | 1984      | 79            | 22.1      | 3.0  | 77.0 | 3.8  | 3.4  | 84.2 | 0.0  |

| IO8 WE_1 / Höhe über NN 49 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|-------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                          | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                 | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                           | 139.0 | 34  | 105.5   | 2344    | 2347      | 74            | 21.9      | 3.0  | 78.4 | 4.5  | 3.7  | 86.6 | 0.0  |
| WEA08                                           | 139.0 | 34  | 105.5   | 1980    | 1983      | 73            | 24.3      | 3.0  | 77.0 | 3.8  | 3.5  | 84.3 | 0.0  |
| WEA09                                           | 139.0 | 37  | 105.5   | 1618    | 1623      | 73            | 27.0      | 3.0  | 75.2 | 3.1  | 3.3  | 81.5 | 0.0  |
| WEA10                                           | 139.0 | 37  | 105.5   | 1268    | 1274      | 73            | 30.2      | 3.0  | 73.1 | 2.4  | 2.8  | 78.4 | 0.0  |
| WEA11                                           | 139.0 | 38  | 105.5   | 1000    | 1008      | 72            | 33.2      | 3.0  | 71.1 | 1.9  | 2.3  | 75.3 | 0.0  |
| WEA01                                           | 100.0 | 40  | 104.5   | 914     | 918       | 53            | 32.7      | 3.0  | 70.3 | 1.7  | 2.8  | 74.8 | 0.0  |
| WEA02                                           | 100.0 | 41  | 104.5   | 974     | 978       | 53            | 31.9      | 3.0  | 70.8 | 1.9  | 2.9  | 75.6 | 0.0  |
| WEA03                                           | 100.0 | 44  | 104.5   | 878     | 883       | 52            | 33.2      | 3.0  | 69.9 | 1.7  | 2.7  | 74.3 | 0.0  |
| WEA04                                           | 100.0 | 39  | 104.5   | 1560    | 1562      | 54            | 26.1      | 3.0  | 74.9 | 3.0  | 3.6  | 81.5 | 0.0  |
| WEA05                                           | 100.0 | 40  | 104.5   | 1457    | 1460      | 53            | 26.9      | 3.0  | 74.3 | 2.8  | 3.5  | 80.6 | 0.0  |
| WEA06                                           | 100.0 | 42  | 104.5   | 1465    | 1468      | 53            | 26.8      | 3.0  | 74.3 | 2.8  | 3.6  | 80.7 | 0.0  |
| Han1                                            | 129.0 | 34  | 105.5   | 1856    | 1859      | 68            | 25.1      | 3.0  | 76.4 | 3.5  | 3.5  | 83.5 | 0.0  |
| Han2                                            | 129.0 | 37  | 105.5   | 1444    | 1448      | 67            | 28.3      | 3.0  | 74.2 | 2.8  | 3.2  | 80.2 | 0.0  |
| Han3                                            | 149.0 | 36  | 103.3   | 1510    | 1516      | 79            | 25.8      | 3.0  | 74.6 | 2.9  | 3.0  | 80.5 | 0.0  |

| IO9 WE_2 / Höhe über NN 50 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|-------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                          | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                 | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                           | 139.0 | 34  | 105.5   | 2260    | 2263      | 74            | 22.4      | 3.0  | 78.1 | 4.3  | 3.7  | 86.1 | 0.0  |
| WEA08                                           | 139.0 | 34  | 105.5   | 1935    | 1939      | 73            | 24.6      | 3.0  | 76.8 | 3.7  | 3.5  | 83.9 | 0.0  |
| WEA09                                           | 139.0 | 37  | 105.5   | 1540    | 1545      | 73            | 27.6      | 3.0  | 74.8 | 2.9  | 3.2  | 80.9 | 0.0  |
| WEA10                                           | 139.0 | 37  | 105.5   | 1263    | 1268      | 73            | 30.2      | 3.0  | 73.1 | 2.4  | 2.8  | 78.3 | 0.0  |
| WEA11                                           | 139.0 | 38  | 105.5   | 1100    | 1106      | 73            | 32.0      | 3.0  | 71.9 | 2.1  | 2.5  | 76.5 | 0.0  |
| WEA01                                           | 100.0 | 40  | 104.5   | 894     | 898       | 53            | 33.0      | 3.0  | 70.1 | 1.7  | 2.8  | 74.5 | 0.0  |
| WEA02                                           | 100.0 | 41  | 104.5   | 805     | 809       | 53            | 34.3      | 3.0  | 69.2 | 1.5  | 2.5  | 73.2 | 0.0  |
| WEA03                                           | 100.0 | 44  | 104.5   | 641     | 647       | 53            | 37.1      | 3.0  | 67.2 | 1.2  | 1.9  | 70.4 | 0.0  |
| WEA04                                           | 100.0 | 39  | 104.5   | 1408    | 1410      | 54            | 27.4      | 3.0  | 74.0 | 2.7  | 3.5  | 80.2 | 0.0  |
| WEA05                                           | 100.0 | 40  | 104.5   | 1257    | 1260      | 54            | 28.8      | 3.0  | 73.0 | 2.4  | 3.3  | 78.7 | 0.0  |
| WEA06                                           | 100.0 | 42  | 104.5   | 1209    | 1212      | 54            | 29.3      | 3.0  | 72.7 | 2.3  | 3.3  | 78.2 | 0.0  |
| Han1                                            | 129.0 | 34  | 105.5   | 1962    | 1965      | 69            | 24.3      | 3.0  | 76.9 | 3.7  | 3.6  | 84.2 | 0.0  |
| Han2                                            | 129.0 | 37  | 105.5   | 1587    | 1591      | 68            | 27.1      | 3.0  | 75.0 | 3.0  | 3.3  | 81.4 | 0.0  |
| Han3                                            | 149.0 | 36  | 103.3   | 1569    | 1574      | 79            | 25.3      | 3.0  | 74.9 | 3.0  | 3.1  | 81.0 | 0.0  |

| IO10 WE_3 / Höhe über NN 53 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|--------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                           | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                  | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                            | 139.0 | 34  | 105.5   | 2279    | 2282      | 75            | 22.3      | 3.0  | 78.2 | 4.3  | 3.7  | 86.2 | 0.0  |
| WEA08                                            | 139.0 | 34  | 105.5   | 1989    | 1993      | 74            | 24.2      | 3.0  | 77.0 | 3.8  | 3.5  | 84.3 | 0.0  |
| WEA09                                            | 139.0 | 37  | 105.5   | 1578    | 1582      | 74            | 27.3      | 3.0  | 75.0 | 3.0  | 3.2  | 81.2 | 0.0  |
| WEA10                                            | 139.0 | 37  | 105.5   | 1363    | 1368      | 74            | 29.3      | 3.0  | 73.7 | 2.6  | 2.9  | 79.3 | 0.0  |
| WEA11                                            | 139.0 | 38  | 105.5   | 1270    | 1275      | 74            | 30.2      | 3.0  | 73.1 | 2.4  | 2.8  | 78.4 | 0.0  |
| WEA01                                            | 100.0 | 40  | 104.5   | 1005    | 1008      | 54            | 31.6      | 3.0  | 71.1 | 1.9  | 3.0  | 75.9 | 0.0  |
| WEA02                                            | 100.0 | 41  | 104.5   | 806     | 810       | 54            | 34.3      | 3.0  | 69.2 | 1.5  | 2.5  | 73.2 | 0.0  |
| WEA03                                            | 100.0 | 44  | 104.5   | 590     | 596       | 54            | 38.2      | 3.0  | 66.5 | 1.1  | 1.7  | 69.3 | 0.0  |
| WEA04                                            | 100.0 | 39  | 104.5   | 1388    | 1391      | 55            | 27.6      | 3.0  | 73.9 | 2.6  | 3.4  | 80.0 | 0.0  |
| WEA05                                            | 100.0 | 40  | 104.5   | 1198    | 1201      | 55            | 29.4      | 3.0  | 72.6 | 2.3  | 3.2  | 78.1 | 0.0  |
| WEA06                                            | 100.0 | 42  | 104.5   | 1091    | 1094      | 55            | 30.6      | 3.0  | 71.8 | 2.1  | 3.1  | 76.9 | 0.0  |
| Han1                                             | 129.0 | 34  | 105.5   | 2117    | 2120      | 70            | 23.3      | 3.0  | 77.5 | 4.0  | 3.7  | 85.2 | 0.0  |
| Han2                                             | 129.0 | 37  | 105.5   | 1768    | 1771      | 70            | 25.7      | 3.0  | 76.0 | 3.4  | 3.5  | 82.8 | 0.0  |
| Han3                                             | 149.0 | 36  | 103.3   | 1702    | 1706      | 80            | 24.2      | 3.0  | 75.6 | 3.2  | 3.2  | 82.1 | 0.0  |

| IO11 Ferienhausgebiet_Nord / Höhe über NN 60 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|-------------------------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                                            | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                                   | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                                             | 139.0 | 34  | 105.5   | 2484    | 2487      | 78            | 21.1      | 3.0  | 78.9 | 4.7  | 3.7  | 87.4 | 0.0  |
| WEA08                                                             | 139.0 | 34  | 105.5   | 2170    | 2173      | 77            | 23.1      | 3.0  | 77.7 | 4.1  | 3.6  | 85.5 | 0.0  |
| WEA09                                                             | 139.0 | 37  | 105.5   | 1769    | 1773      | 77            | 25.9      | 3.0  | 76.0 | 3.4  | 3.3  | 82.7 | 0.0  |
| WEA10                                                             | 139.0 | 37  | 105.5   | 1507    | 1511      | 77            | 28.0      | 3.0  | 74.6 | 2.9  | 3.1  | 80.5 | 0.0  |
| WEA11                                                             | 139.0 | 38  | 105.5   | 1344    | 1348      | 75            | 29.5      | 3.0  | 73.6 | 2.6  | 2.9  | 79.0 | 0.0  |
| WEA01                                                             | 100.0 | 40  | 104.5   | 1138    | 1141      | 56            | 30.1      | 3.0  | 72.1 | 2.2  | 3.1  | 77.4 | 0.0  |
| WEA02                                                             | 100.0 | 41  | 104.5   | 1015    | 1018      | 56            | 31.5      | 3.0  | 71.2 | 1.9  | 2.9  | 76.0 | 0.0  |
| WEA03                                                             | 100.0 | 44  | 104.5   | 822     | 825       | 56            | 34.1      | 3.0  | 69.3 | 1.6  | 2.5  | 73.4 | 0.0  |
| WEA04                                                             | 100.0 | 39  | 104.5   | 1612    | 1614      | 57            | 25.7      | 3.0  | 75.2 | 3.1  | 3.6  | 81.8 | 0.0  |
| WEA05                                                             | 100.0 | 40  | 104.5   | 1439    | 1441      | 57            | 27.2      | 3.0  | 74.2 | 2.7  | 3.4  | 80.4 | 0.0  |
| WEA06                                                             | 100.0 | 42  | 104.5   | 1349    | 1351      | 57            | 28.0      | 3.0  | 73.6 | 2.6  | 3.4  | 79.5 | 0.0  |
| Han1                                                              | 129.0 | 34  | 105.5   | 2208    | 2210      | 72            | 22.7      | 3.0  | 77.9 | 4.2  | 3.7  | 85.8 | 0.0  |
| Han2                                                              | 129.0 | 37  | 105.5   | 1827    | 1830      | 71            | 25.3      | 3.0  | 76.3 | 3.5  | 3.5  | 83.2 | 0.0  |
| Han3                                                              | 149.0 | 36  | 103.3   | 1816    | 1820      | 82            | 23.4      | 3.0  | 76.2 | 3.5  | 3.3  | 82.9 | 0.0  |

| IO12 Ferienhausgebiet_Süd / Höhe über NN 53 m / Aufpunkthöhe 5 m |       |     |         |         |           |               |           |      |      |      |      |      |      |
|------------------------------------------------------------------|-------|-----|---------|---------|-----------|---------------|-----------|------|------|------|------|------|------|
| WEA ID                                                           | NH    | z   | LWA     | Abstand | Schallweg | Mittlere Höhe | Berechnet | Dc   | Adiv | Aatm | Agr  | A    | Cmet |
|                                                                  | [m]   | [m] | [dB(A)] | [m]     | [m]       | [m]           | [dB(A)]   | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| WEA07                                                            | 139.0 | 34  | 105.5   | 3687    | 3689      | 68            | 15.0      | 3.0  | 82.3 | 7.0  | 4.2  | 93.5 | 0.0  |
| WEA08                                                            | 139.0 | 34  | 105.5   | 3390    | 3392      | 67            | 16.3      | 3.0  | 81.6 | 6.4  | 4.1  | 92.2 | 0.0  |
| WEA09                                                            | 139.0 | 37  | 105.5   | 2983    | 2985      | 67            | 18.3      | 3.0  | 80.5 | 5.7  | 4.0  | 90.2 | 0.0  |
| WEA10                                                            | 139.0 | 37  | 105.5   | 2729    | 2732      | 66            | 19.6      | 3.0  | 79.7 | 5.2  | 4.0  | 88.9 | 0.0  |
| WEA11                                                            | 139.0 | 38  | 105.5   | 2533    | 2536      | 65            | 20.7      | 3.0  | 79.1 | 4.8  | 3.9  | 87.8 | 0.0  |
| WEA01                                                            | 100.0 | 40  | 104.5   | 2360    | 2362      | 46            | 20.4      | 3.0  | 78.5 | 4.5  | 4.1  | 87.1 | 0.0  |
| WEA02                                                            | 100.0 | 41  | 104.5   | 2214    | 2215      | 45            | 21.3      | 3.0  | 77.9 | 4.2  | 4.1  | 86.2 | 0.0  |
| WEA03                                                            | 100.0 | 44  | 104.5   | 1995    | 1996      | 45            | 22.7      | 3.0  | 77.0 | 3.8  | 4.0  | 84.8 | 0.0  |
| WEA04                                                            | 100.0 | 39  | 104.5   | 2791    | 2792      | 47            | 18.1      | 3.0  | 79.9 | 5.3  | 4.2  | 89.5 | 0.0  |
| WEA05                                                            | 100.0 | 40  | 104.5   | 2583    | 2584      | 46            | 19.2      | 3.0  | 79.3 | 4.9  | 4.2  | 88.3 | 0.0  |
| WEA06                                                            | 100.0 | 42  | 104.5   | 2417    | 2418      | 45            | 20.1      | 3.0  | 78.7 | 4.6  | 4.2  | 87.4 | 0.0  |
| Han1                                                             | 129.0 | 34  | 105.5   | 3396    | 3398      | 63            | 16.3      | 3.0  | 81.6 | 6.5  | 4.2  | 92.3 | 0.0  |
| Han2                                                             | 129.0 | 37  | 105.5   | 2989    | 2991      | 62            | 18.2      | 3.0  | 80.5 | 5.7  | 4.1  | 90.3 | 0.0  |
| Han3                                                             | 149.0 | 36  | 103.3   | 3026    | 3029      | 72            | 15.9      | 3.0  | 80.6 | 5.8  | 4.0  | 90.4 | 0.0  |