

Norfolk Boreas Offshore Wind Farm

Appendix 24.5

Scenario 1&2 - Cable Pulling and Jointing Calculations and Access Routes

Environmental Statement

Volume 3

Applicant: Norfolk Boreas Limited
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Photo: Ormonde Offshore Wind Farm

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Material and Deliveries Per Joint Location

| Material | Assumption | Dimensions | HGV Deliveries | HGV Movements | Comment |
|--------------------|------------|---------------|----------------|---------------|--|
| Stone (Aggregate) | 240 | m3 | 48 | 96 | 40mx20m + bellmouth @ 0.3m depth. Factor 2 for density. 20T delivery capacity. TEMPORARY- (delivery/removal required) |
| Fencing | 188 | m | 2 | 4 | Perimeter fencing - 54m x 40m. 420m capacity per delivery. TEMPORARY- (delivery/removal required) |
| Concrete | 54 | m3 | 9 | 18 | 2 joint bays of 6m x 15m @ 0.3m concrete floor depth. 8m3 transport capacity + 2 HGV delivery for pre-cast concrete cask |
| Joints | 4 | no. | 4 | 8 | Joints, joint materials, winch, cable rollers. Assumed number of deliveries |
| Welfare Facilities | 1 | no. | 4 | 8 | Assumed 2 No. (delivery/removal required) |
| Fibre optics | 1 | no. | 1 | 2 | Assumed |
| Cable deliveries | 4 | no. | 4 | 8 | Cable drum low loader |
| Excavated material | 180 | m3 | 29 | 58 | 2 joint bays of 6m x 15m @ 1m removal (worst case displacement assuming concrete cask burial). Factor 2 for density, factor 1.6 for bulking. 20T delivery capacity. PERMANENT REMOVAL. |
| CBS | 90 | m3 | 12 | 24 | 2 joint bays of 6m x 15m @ 0.5m CBS depth. 8m3 transport capacity. |
| Plant required | 3 | no. | 6 | 12 | Assumed Plant required (delivery/removal required) |
| | | Totals | 119 | 238 | |

| | | |
|------------------------|-------|--|
| No. of joint locations | 90 | 60 km route length divided by 800m cable lengths + 20% contingency |
| Total deliveries | 10710 | Deliveries per joint location x number of joint locations |
| Total movements | 21420 | Total movements per joint location x number of joint locations |

NB: Vehicle numbers contingency not included.

Material to be delivered and removed (x2 deliveries)

Material to be delivered or removed only (x1 deliveries)

Typical Joint Bay Construction Activity

| Construction Activity | Associated Vehicle Quantities | Total Deliveries | Total Movements |
|--|-------------------------------|------------------|-----------------|
| 1. Site set-up (Hardstand, fencing & welfare) | 27 HGVs | 27 | 54 |
| 2. Plant in (excavator, winch etc) | 2 HGVs + 1 low-loader | 3 | 6 |
| 3. Materials in (concrete, joints, cable, CBS) | 26 HGVs + 4 low-loaders | 30 | 60 |
| 4. Materials out (excavated subsoil) | 29 HGVs | 29 | 58 |
| 5. Plant out (excavator, winch...) | 2 HGVs + 1 low-loader | 3 | 6 |
| 6. Site tear-down (hardstand, fencing & welfare) | 27 HGVs | 27 | 54 |
| | Totals | 119 | 238 |

Typical Joint Bay Construction Programme

| Construction Programme | Activity | Associated Total HGV Deliveries (Construction Activity Id) | | Total Daily Deliveries | Total Daily movements |
|------------------------|-----------------------------------|--|------------|------------------------|-----------------------|
| | | Per Activity | Per week | | |
| Week 1 | Site set-up & excavate joint pits | 27+3+29 (1,2,4) | 59 | 12 | 24 |
| Week 2 | Pour joint bases & pull circuit 1 | 30-4 (3) | 26 | 5 | 10 |
| Week 3 | Joint circuit 1 & pull circuit 2 | 2 (3) | 2 | 2 | 4 |
| Week 4 | Joint circuit 2 & replace topsoil | 2 (3) | 2 | 2 | 4 |
| Week 5 | Site tear-down | 27+3 (5,6) | 30 | 6 | 12 |
| | Totals | 119 | 119 | n/a | n/a |

Cable Pulling and Jointing Sectionalised Breakdown

Provided on a per annum basis for worst case two phase (2 circuits per phase) HVDC install

| Cable Pull Section | Section Length [km] | No. of Joints | Inaccessible Length [km] | % of Section Inaccessible | Joint Bay HGV Deliveries (Total) | Joint Bay HGV Movements (Total) | Running Track HGV Deliveries (without 300m week cap) | Running Track HGV Movements (Total) (without 300m week cap) | Total Cable Route Section HGV Movements | Worst Case Daily Joint Bay HGV Movements (1 joint) | Worst Case Daily Movements at Accesses Serving Inaccessible Areas | Peak hour Total Movements (1 joints) |
|--------------------|---------------------|---------------|--------------------------|---------------------------|----------------------------------|---------------------------------|--|---|---|--|---|--------------------------------------|
| 1 | 3.8 | 6 | 0.95 | 25% | 714 | 1428 | 350 | 1400 | 2828 | 24 | 68 | 6.8 |
| 2 | 3.8 | 6 | 0.96 | 25% | 714 | 1428 | 353 | 1412 | 2840 | 24 | 68 | 6.8 |
| 3 | 3.8 | 6 | 0.96 | 25% | 714 | 1428 | 353 | 1412 | 2840 | 24 | 68 | 6.8 |
| 4 | 3.8 | 6 | 0.07 | 2% | 714 | 1428 | 24 | 96 | 1524 | 24 | 68 | 6.8 |
| 5 | 3.8 | 6 | 0.20 | 5% | 714 | 1428 | 72 | 288 | 1716 | 24 | 68 | 6.8 |
| 6 | 3.8 | 6 | 0.82 | 22% | 714 | 1428 | 302 | 1208 | 2636 | 24 | 68 | 6.8 |
| 7 | 3.8 | 6 | 1.91 | 50% | 714 | 1428 | 703 | 2812 | 4240 | 24 | 68 | 6.8 |
| 8 | 3.8 | 6 | 0.54 | 14% | 714 | 1428 | 198 | 792 | 2220 | 24 | 68 | 6.8 |
| 9 | 3.8 | 6 | 0 | 0% | 714 | 1428 | 0 | 0 | 1428 | 24 | 68 | 6.8 |
| 10 | 3.8 | 6 | 1.32 | 35% | 714 | 1428 | 486 | 1944 | 3372 | 24 | 68 | 6.8 |
| 11 | 3.8 | 6 | 0.83 | 22% | 714 | 1428 | 306 | 1224 | 2652 | 24 | 68 | 6.8 |
| 12 | 3.8 | 6 | 0.45 | 12% | 714 | 1428 | 166 | 664 | 2092 | 24 | 68 | 6.8 |
| 13 | 3.8 | 6 | 1.4 | 37% | 714 | 1428 | 516 | 2064 | 3492 | 24 | 68 | 6.8 |
| 14 | 3.8 | 6 | 0.27 | 7% | 714 | 1428 | 100 | 400 | 1828 | 24 | 68 | 6.8 |
| 15 | 3.8 | 6 | 0.75 | 20% | 714 | 1428 | 276 | 1104 | 2532 | 24 | 68 | 6.8 |
| 16 | 3.8 | 6 | 0.4 | 11% | 714 | 1428 | 148 | 592 | 2020 | 24 | 68 | 6.8 |
| Totals | 60.8 | 96 | 11.81 | 19.42% | 11424 | 22848 | 4353 | 17412 | 40260 | n/a | n/a | n/a |

Assumptions

16 Jointing gangs (one at each cable pull section)

5 week programmer per joint

Week 1 with highest intensity

Typical 300m running track completion per week

Running Track Deliveries per 100m

| | |
|----------------------------------|-------------|
| Running Track Stone (Aggregate) | 36 |
| Fencing | 0.8 |
| Total Deliveries per 100m | 36.8 |

Capped Movements per Week

| Movements per Week | Weekly Deliveries | Weekly Movements | Daily Movements |
|--------------------|-------------------|------------------|-----------------|
| 300m | 110.4 | 220.8 | 44 |

Cable Pulling and Jointing Access Routes

| Access ID* | Access Road ID | Access route to Access Road |
|------------|--|--|
| AC3 | Whimpwell Street | B1159, Vicarage Road, The Common, Coronation Road, Whimpwell Street |
| AC5 | Grub Street | B1159, N Walsham Road, Grub Street |
| AC10 | Walcott Green | B1159, N Walsham Road, Walcott Green |
| AC12 | North Walsham Road | B1159, North Walsham Road |
| AC13 | North Walsham Road | B1159, North Walsham Road |
| AC16 | North Walsham Road | B1159, Happisburgh Road, N Walsham Road |
| AC18 | Hole House Road | B1159, Happisburgh Road, N Walsham Road, Hole House Road |
| AC20 | Edingthorpe | B1159, N Walsham Road, Bacton Road, Edingthorpe |
| AC21 | Bacton Road | B1159, Happisburgh Road, N Walsham Road, Bacton Road |
| AC22 | Edingthorpe Road | B1159, Happisburgh Road, N Walsham Road, Bacton Road, Edingthorpe Road |
| AC24 | Edingthorpe | B1159, Bloodslat Lane, N Walsham Road, Plantation Road |
| AC25 | Plantation Road | B1159, Bloodslat Lane, N Walsham Road, Plantation Road |
| AC28 | North Walsham Road | B1159, Bloodslat Lane, N Walsham Road |
| AC32 | Paston Road | B1159, Bloodslat Lane, N Walsham Road, Paston Road |
| AC34 | Hall Lane | B1145, Bacton Road, Hall Lane |
| AC35 | Hall Lane | B1159, Bloodslat Lane, N Walsham Road, Hall Lane |
| AC37 | Little London Road | B1145, Little London Road |
| AC38 | B1145 | B1145 |
| AC47 | A149 | A149 |
| AC49 | Felmingham Road | B1145, Felmingham Road |
| AC50 | Felmingham Road | B1145, Felmingham Road |
| AC51 | Brick Kiln Lane | B1145, Felmingham Road, Brick Kiln Lane |
| AC55 | Suffield Road | B1145, Suffield Road |
| AC57 | Church Road, into farm access | A140, High Noon Road, Church Road |
| AC58 | Church Road | A140, High Noon Road, Church Road |
| AC62 | Banningham Road | A140, Banningham Road |
| AC66 | A140 | A140 |
| AC75 | Unnamed Road | B1149,B1354 (Brickling Road), Unnamed Road |
| AC77 | Blickling Road | B1149,B1354 (Brickling Road) |
| AC78 | Blickling Road | B1149,B1354 (Brickling Road) |
| AC84 | Heydon Road | B1149, The Street, Heydon Road |
| AC85 | Heydon Road | B1149, The Street, Heydon Road |
| AC88 | The Street | B1149, The Street |
| AC89 | B1149 | B1149 |
| AC91 | Southgate (Road to Southgate from B1149) | B1149, Southgate |
| AC92 | Southgate (Road to Southgate from B1149) | B1149, Southgate |
| AC96 | Heydon Road | B1149,B1145, Heydon Road |
| AC101 | B1145 (Cawston) | B1149,B1145 |
| AC103 | B1145 (Cawston) | B1149,B1145 |
| AC104 | B1145 (Reepham) | B1145 |
| AC106 | Wood Dalling Road | B1145, Wood Dalling Road |
| AC108 | Worlds End Lane | B1149,B1145, Wood Dalling Road, Worlds End Lane |
| AC109 | B1145 (Bawdeswell) | A1067 |
| AC110 | B1145 (Bawdeswell) | A1067 |
| AC111 | B1145 (Bawdeswell) | A1067 |
| AC120 | Private Access Track (Adjacent to Well Lane) | A1067, B1145, Private Access Track (Adjacent to Well Lane) |
| AC121 | Lime Kiln Road | A1067, Lime Kiln Road |
| AC125 | Mill Street | A1067, Elsing Lane, Mill Street |
| AC126 | Unnamed Road to Bylaugh Hall | A1067, Elsing Lane, Unnamed Road to Bylaugh Hall |
| AC127 | Elsing Road | A1067, B1147, Elsing Road |
| AC130 | Elsing Road | A1067, B1147, Elsing Road |
| AC131 | Elsing Road, Private Access Track | A1067, B1147, Elsing Road, Private Access Track |
| AC134 | Mowles Road, Farm Access Track | A47, B1147 (Norwich Road), Mowles Road, Farm Access Track |
| AC135 | Norwich Road | A47, B1147 (Norwich Road), Mowles Road, Norwich Road |
| AC136 | Luddenham Road | A47, B1147 (Norwich Road), Mowles Road, Luddenham Road |
| AC138 | Swanton Road | A47, B1147 (Norwich Road), Mowles Road, Luddenham Road, Swanton Road |
| AC141 | Hoe Road South | A47, B1147 (Norwich Road), Mowles Road, Luddenham Road, Swanton Road, Hoe Road South |
| AC142 | Hoe Road South | A47, B1147 (Norwich Road), Mowles Road, Luddenham Road, Swanton Road, Hoe Road South |
| AC143 | Hoe Road South | A47, B1147 (Norwich Road), Mowles Road, Luddenham Road, Swanton Road, Hoe Road South |
| AC144 | Back Lane | A1067, B1145, B1110 |
| AC146 | B1146 (Holt Road) | A1067, B1145, B1110 |
| AC147 | B1146 (Holt Road) | A1067, B1145, B1110 |
| AC150 | Mill Lane | A1067, B1146, Gressenhall Road to Dillington |
| AC151 | Church Lane | A1067, B1146, Gressenhall Road to Dillington, Church Lane |
| AC152 | Church Lane | B1146, Rushmeadow Rd, Longham Rd |
| AC159 | Unnamed Road | A47, Unnamed Road |
| AC160 | Dale Road | A47, Dale Road |
| AC162 | Dereham Road | A47, Greenbanks Road, Dereham Road |
| AC163 | Dale Road | A47, Greenbanks Road, Dereham Road, Dale Road |
| AC164 | Dereham Road | A47, Greenbanks Road |
| AC165 | Bradenham Lane | A47, Bradenham Lane |
| AC166 | Bradenham Lane | A47, Bradenham Lane |
| AC180 | A47 | A47 |