
CHAPTER 8: ONSHORE ENVIRONMENT

8.1 Introduction

This section outlines the onshore components of the Burbo Offshore Wind Farm development. This comprises of the following items:

- Interconnection facility
- Underground cabling
- Electrical substation

Offshore cabling will be brought ashore by directional drilling under the sea defences. They will connect with the onshore cables at an interconnection facility located behind the sea wall. Three cables will leave the facility and travel underground to the substation, located 3km inland in the vicinity of Bidston Moss on brownfield land. The substation will connect by underground cable into the Manweb Distribution Network using existing overhead transmission lines. The underground cable will link with the Grid at one of the existing transmission towers. This ensures no additional overhead cabling is required to connect the wind farm into the transmission network.

The planning and development of the onshore works associated with the wind farm will be outlined in a planning application submitted to Wirral Metropolitan Borough Council (MBC).

What follows is a description of each of these components, their location and installation methodology.

8.1.1 Interconnection Facility

8.1.1.1 Description

The interconnection facility will consist of a concrete underground chamber (4m by 4m) located behind the Leasowe Revetment sea defences on Mockbeggar Wharf. The area selected for development is an existing car parking area consisting of an irregular, flat, tarmaced surface with no markings.

The chamber is the junction point where the offshore cables are connected to the onshore cables. The offshore cabling will be brought into the facility by directional drilling under the sea defences, to prevent disturbance to the concrete sea wall. An example of a typical interconnection facility is shown in Figure 8.1.

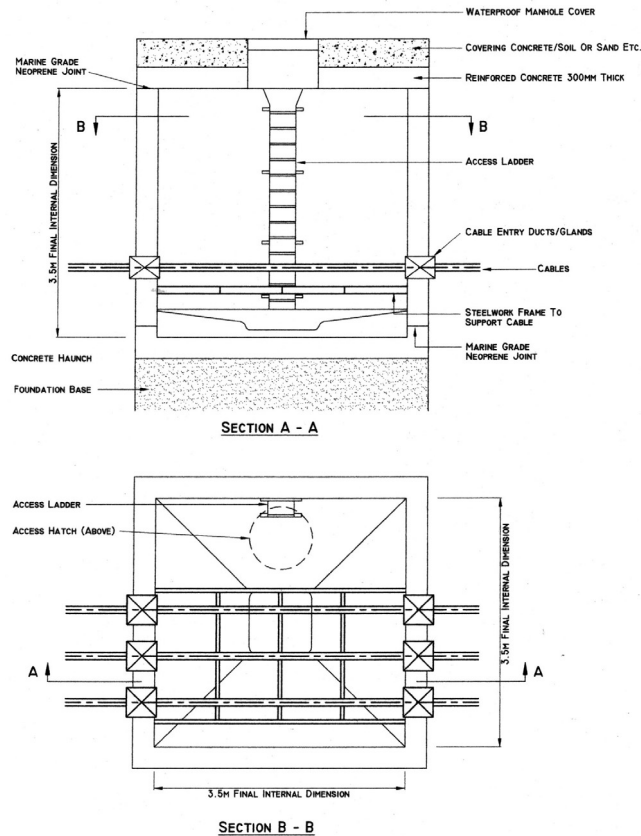


Figure 8.1: A typical interconnection facility schematic (Courtesy of Econnect Ltd)

Access to the chamber will be through a water-tight, lockable manhole cover on the surface, the only visible sign that the facility exists following construction.

8.1.1.2 Construction

Installation of the interconnection facility will require the excavation of a hole to contain the chamber, which is then backfilled and resurfaced. This will require the use of excavation equipment and personnel to carry out the work. Construction is expected to take four weeks.

8.1.1.3 Operation

Once the facility has been constructed, there will be no operational disturbance from the site. The only visible remains of the facility will be the resurfaced tarmac where the excavation took place and the manhole access cover at ground level. The manhole area will be identified with yellow warning markings and, if necessary, a raised kerb or similar obstruction to prevent cars blocking the entrance.

8.1.2 Underground Cabling

8.1.2.1 Description

The offshore cables will be brought into the interconnection facility by directional drilling. Three 100mm 3-core 33kV (kilovolts) cables will leave the facility and go underground to the substation location, travelling approximately 3.5km. The cable route makes use of the following roads, from the facility to the substation:

- Coastal track (near Gun Site Picnic Area)
- Green Lane (West)
- A554 North Wallasey Approach
- A5139 Docks Link Road

The route is outlined in Figure 8.2. By using existing roads and roadside verges, habitat disturbance can be kept to a minimum.

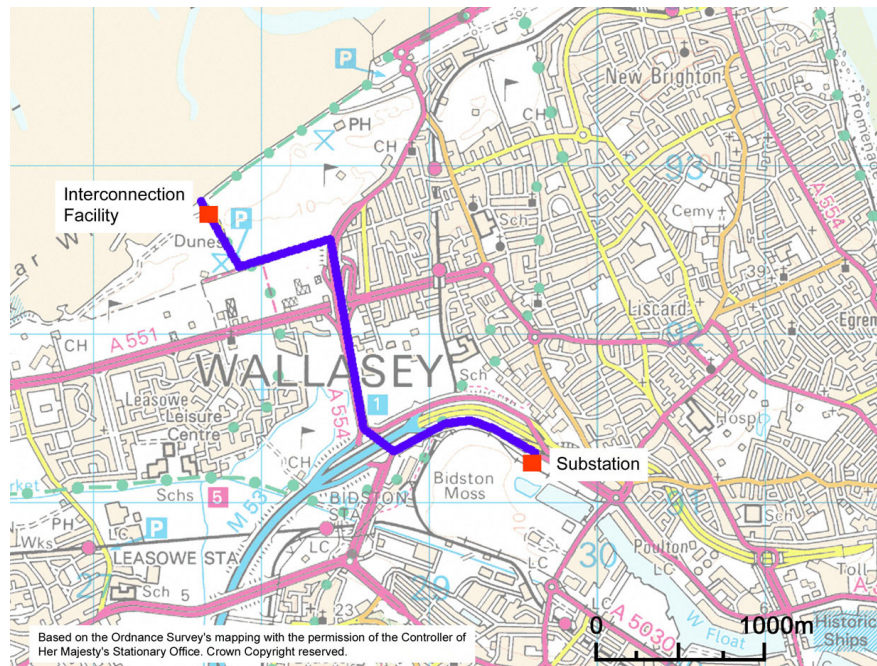


Figure 8.2: Location of onshore components and cable route

8.1.2.2 Construction

Suitable installation equipment will be used to excavate the trench for the laying of the cables. The trench will follow existing pathways and roads to minimise environmental impacts to the surrounding ecology. The cables will be laid in a trench approximately 1.5m wide by 1m deep, each cable spaced 0.5m apart (Figure 8.3 and 8.4). Marker tapes will be laid above the cables during backfilling for safety purposes.

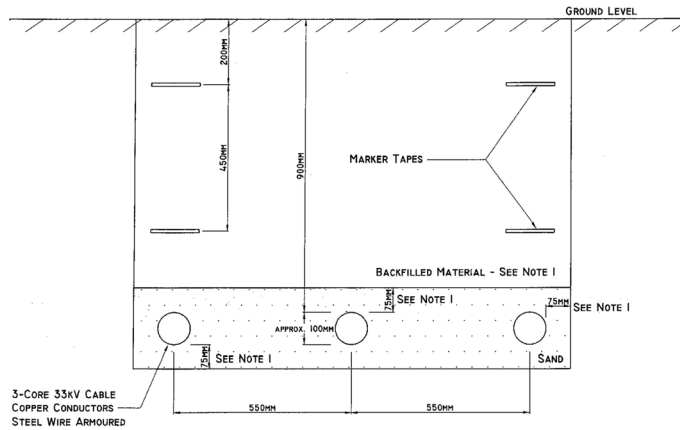


Figure 8.3: A typical cable trench layout schematic (Courtesy of Econnect Ltd)



Figure 8.4: Typical trench construction

An alternative cabling method is to have a deeper trench (approx. 3m) and stack the cables vertically with the same 0.5m spacing. This has the benefit of reducing the width of the trench, should it be deemed necessary. The appropriate cable laying procedure will be determined in consultation with Wirral MBC Highways Department.

8.1.2.3 Operation

Following installation, there will be no visible signs of the cabling other than the resurfaced roads and tracks.

8.1.3.2 Construction

Construction of the substation will require a suitable piece of land on which to install all the components. The land will require preparation by flattening and construction of a bunded, sealed base. This is necessary to prevent any possible leakage of oil from the transformer into the surrounding environment.

The switch gear building will be a single-storey structure with no windows. It will be constructed of materials similar to those of the surrounding buildings, to maintain consistency. An example of an existing substation is shown in Figure 8.6, in this case Wallasey substation (SJ 29875 91175).



Figure 8.6: An existing electrical substation (Wallasey)

All equipment and structures will carry appropriate Health and Safety notices and have security fences and gates to prevent access.

8.1.3.3 Operation

Once constructed, the substation is expected to operate with minimal maintenance to ensure that all equipment is functioning properly. Annual

inspections will be carried out by trained personnel, checking the electrical equipment and ensuring no environmental or safety hazards arise.

The bunded surface will be checked for leaks and drained if necessary.

8.2 Ecology

This section assesses the impacts of the onshore development on the ecology of the area in the vicinity of the construction. The pre-, during and post-construction ecology are examined to determine any significant impacts. Where necessary, mitigation measures are presented to ensure no long-term environmental impact occurs.

The interconnection facility, cabling and substation will all be sited on land which has been historically used by people (roads or brownfield land). The natural habitat, therefore, no longer exists in these locations and re-colonisation by local flora has been little or non-existent.

8.2.1 Interconnection Facility

8.2.1.1 Existing Environment

The site for the interconnection facility is 50m behind the sea defences at Leasowe Revetment. The location is a small tarmaced car park, with enough space to hold a dozen cars. The car park is of moderate quality, unmarked and requiring some maintenance. The site is surrounded by 2-3m high sand dunes colonised by local plant species.

To the west of the car park is a small dune system, a remnant of the old foreshore habitat pre-dating human interference. The dunes consist of low sandy hummocks with local foreshore species. To the west of the car park is Wallasey Golf Course which consists of some relic dune features but mostly managed landscaping.

8.2.1.2 Impacts and Mitigation

The interconnection facility will consist of a concrete underground chamber with manhole access. The location for this structure is under land which has already been developed into a car park for public access to the foreshore. The installation of the facility will require the excavation of the car park, construction of the interconnection chamber followed by back-filling and resurfacing. The only visible evidence of the facility will be a manhole access cover at surface level, which will be clearly marked.

The construction of the chamber will have no significant impact on the surrounding dune system or its ecology. There will be low level disturbance during construction which will be removed once the facility has been built and the surface re-laid.

The location of the facility under a car park ensures that there will be no loss of local habitat. Disturbance to birds and mammals will only exist during the construction period, for up to four weeks. Construction will be scheduled to take place to ensure any disturbance is kept to a minimum.

8.2.1.3 Operation and Monitoring

The interconnection facility will be inspected at least twice a year for servicing and to carry out any maintenance work. This will involve one or two people accessing the facility via the manhole. No other activity will be necessary and, therefore, no monitoring required.

8.2.2 Cabling

8.2.2.1 Existing Environment

The cable route will follow the path as shown in Figure 8.2. The route from the interconnection facility follows a single track tarmac road before reaching the main A554 (North Wallasey Approach). The road consists of a single track with intermittent passing places. Speed control humps are spaced evenly along both sections of the road and along Green Lane (West) before joining the A554.

The main A554 connects with Junction 1 of the M53 motorway, close to Bidston Moss. The road is dual carriageway with grass verges, creating a fly-over at the A554/A5139 roundabout adjacent to the B&Q superstore.

The route along the A5139 Docks Link is similar to that of the A554, consisting of dual carriageway with grass verges. There is currently no slipway access to the proposed substation location to the south of the A5139 to MDHC land.

8.2.2.2 Impacts and Mitigation

Installation of the cable from the interconnection facility to the substation will require the excavation of a trench along the planned route. As the route makes use of the existing road network, ecological disturbance will be kept to a minimum. Care will be taken to ensure that none of the surrounding verges or hedgerows are disturbed during construction along the coastal track and Green Lane.

Trenching of the cable along the A554 and A5139 will follow a similar format to that stated above. Where possible, the cabling will be entrenched under the road or verge. Disturbance to existing ecology will be kept to a minimum, as these locations have already been significantly affected during road building.

In all cases, the disturbed ground will be returned to its previous condition. Disturbed verges will be re-planted with native species, to ensure quick colonisation and regrowth.

8.2.2.3 Operation and Monitoring

Once the cables have been installed, the roads and verges will be reinstated. No ongoing disturbance is expected. In the future, access to the cables for maintenance may require re-excavating a section of the route, but this will create minimal disturbance and is not anticipated.

No follow-on monitoring is planned due to the unobtrusive nature of the cabling underground.

8.2.3 Substation

8.2.3.1 Existing Environment

The substation will be located on brownfield land, close to the existing Wallasey substation on the south side of the A5139. The land is currently being cleared following several decades of industrial use by Mersey Docks and Harbour Corporation (MDHC).

The site consists of a flat, overgrown expanse of land close to Bidston Moss. The land previously contained railway tracks and industrial units. The abandonment of the site in the past has led to the re-colonisation of the area by native plant species to a limited extent. The land is designated Industrial in the Wirral MBC Unitary Development Plan (UDP).

8.2.3.2 Impacts and Mitigation

Construction of the substation will require the development of a section of land 80m by 40m to accommodate the substation, ancillary equipment and slip road access. It will require the levelling and preparation of this space and the construction of an on/off slip road from the A5139 western carriageway.

The clearance of the land will result in the removal of all ecology in the area. As this land was previously used for industrial purposes and is classed as a brownfield site, habitat loss will not be significant.

8.2.3.3 Operation and Monitoring

The operation of the substation is not expected to create any additional habitat losses. Should there be any leakage of oil from the transformer, it will be held within the bunded site and will not pollute the surrounding environment. The site will be inspected twice yearly to ensure the bunding has not leaked and to drain any oil which may have collected there.

8.3 Archaeology

This section examines the impact the onshore works could have on archaeological remains in the area. On shore sites are covered by the

Ancient Monuments and Archaeological Areas Act (1979) and the National Heritage Act (2002) and by Planning Policy Guidance Note 16. Full details of the archaeological investigation of the onshore works are presented in Technical Appendix F.

The North Wirral foreshore has been extensively used in the past (see Chapter 6 of this volume), but the onshore works will use land which has been significantly disturbed by present-day construction. The depth to which the interconnection facility and the cabling will be buried may uncover some archaeological remains. The location of the substation is on a brownfield site, which has been industrialised until recently.

8.3.1 *Interconnection Facility*

8.3.1.1 Existing Environment

The site for the interconnection facility is under an existing car parking area. The ground has already been disturbed in the upper layer, probably to a depth of 1m below ground level. Any remains in this horizon are likely to have been destroyed.

The construction of the facility is not likely to impact on any wider area. Directional drilling to the site under the sea defences is unlikely to reveal any finds due to the closed nature of the drilling process.

8.3.1.2 Impacts and Mitigation

The facility will require excavation of a hole 5m deep by 7m wide. As this will extend below the upper 1m disturbed layer, there is the possibility of uncovering archaeological remains and there may be evidence of pre-10th century occupation on the site.

Survey work has suggested there are not likely to be any significant archaeological remains at this location. Excavation of the chamber will be carried out under a watching brief in association with the archaeological department of the National Museums and Galleries on Merseyside (NMGM). Work will continue under the guidance of the archaeological representative and any finds will be recorded and removed for further study. Where requested, sediment samples will be provided for pollen and diatom analysis.

8.3.1.3 Operation and Monitoring

Once the chamber has been constructed, there will be no additional assessment required and no further disturbance to the site.

8.3.2 Cabling

8.3.2.1 Existing Environment

The proposed cable route makes use of the existing road network to link the interconnection facility to the substation. Consequently, the ground through which the cabling will pass has already been disturbed. The depth of disturbance will be significant for the main A554 and A5139 routes, less so for Green Lane and the shore approach road.

The land based sections of the cables pass through an area of coastal sand dunes likely to have accumulated since the 10th century AD. Little recent work has been done on these, though they could seal peat or similar organic deposits, which may contain evidence relating to the earlier occupation of the area. Historic 19th and 20th century construction is likely to have destroyed any archaeological deposits along the rest of the cable route.

8.3.2.2 Impacts and Mitigation

The cables will be entrenched to a depth of approximately 3m below ground level. There is the possibility of discovering some archaeological remains around Green Lane, as the road preparation will not have reached this depth. SeaScape Energy will undertake a watching brief under the guidance of the NMGM archaeologist.

The first 400m of the cable passes through an area of sand dunes which have produced occasional finds of early metal work and stone tools. Although the cable is unlikely to disturb archaeological deposits, 'stray finds' may occur and this section should be monitored as a watching brief during construction. The remainder of the cable route passes through an area which has seen extensive 19th and 20th century development and is unlikely to retain any archaeological deposits.

8.3.2.3 Operation and Monitoring

Once the cables have been entrenched, no further disturbance or monitoring is expected.

8.3.3 Substation

8.3.3.1 Existing Environment

The location of the substation is currently land owned by MDHC. The land is classed as an industrial brownfield site, which once had railway sidings and buildings within it. Presently the land has been cleared for redevelopment.

The substation site is located on the northern fringe of Bidston Moss, close to one of the last remaining undeveloped parcels of land in that area. Map

evidence shows that the site was agricultural land until well into the 20th century and fieldnames from the 19th century suggest that it was waterlogged. Areas on the fringes of wetlands were often attractive locations for settlement in the Prehistoric period and it is possible that palaeo-environmental deposits survive on the site. However, large scale industrial development in the late 19th and 20th century may have destroyed any deposits which may once have been present.

8.3.3.2 Impacts and Mitigation

As a consequence of the industrial use of the site and the construction of the A5139 main road, land disturbance has been considerable. Any archaeological remains are likely to have been destroyed during the development of the area.

Any borehole or geo-technical surveys prior to construction should make provision for suitable archaeological analysis of any deposits present and a watching brief may be required during construction.

8.3.3.3 Operation and Monitoring

Following construction of the substation there will be no need for further monitoring or assessment and no further archaeological impact. In fact the potential for recovery of samples of peat from otherwise inaccessible deposits of peat suggests a net potential benefit to archaeology from the development.

8.4 Noise

Disturbance by noise will be related to the construction work necessary to place the onshore works and post-construction operations. The level of disturbance will be minimal following construction.

All construction work will comply with HSE regulations, planning permission granted by Wirral MBC and PPG24: *Planning and Noise*. All work will also be carried out following the guidance in BS.5228: 1997 *Noise and vibration control on construction and open sites*.

A visit was made to an existing substation of similar type in order to make noise measurements and the results were used to assess the likely effects of a new substation on local residential properties. Guidance on this aspect of the project was taken from BS.4142:1997 Method for rating industrial noise affecting mixed residential and industrial areas.

BS.4142:1997 applies in the particular case of an electrical substation, since it would be a permanent industrial site. The noise from the substation should therefore be rated according to the standard as part of the environmental assessment process.

8.4.1 *Interconnection Facility*

8.4.1.1 Existing Environment

Located 50m behind the sea defences at Leasowe Revetment, the current environment has typical background noise associated with a frequently used coastal path and car park. Noise levels are increased by the wind blowing through the surrounding dune system. People using the coastal path increase the noise level, as do cars which pass through or use the car park. Low level noise can be heard from the golf course at busy periods, such as weekends and holidays. Overall noise levels increase at busy periods, such as after work, weekends and holidays.

8.4.1.2 Impacts and Mitigation

The main noise disturbance will be during the construction period. There will be a need for excavation equipment, pneumatic drills and compressors to install the facility. All noise-generating equipment will operate following standard construction regulations. There will be a short period of increased traffic through the area and associated noise increases

Appropriate measures will be taken to ensure the noise levels are kept to a minimum. Consultation with local planners and affected members of the public will ensure noise levels are acceptable for this period of construction. Once the facility has been constructed, there will be no further noise associated with the site.

8.4.1.3 Operation and Monitoring

Operation of the interconnection facility will not introduce additional noise into the local environment. As a consequence, no post-construction monitoring is required.

8.4.2 *Cabling*

8.4.2.1 Existing Environment

The cable route makes use of existing roads to connect the interconnection facility to the substation.

Noise along the shore track connecting Green Lane to the car park is associated with visitors, their cars and dogs. Green Lane similarly has noise levels associated with cars passing to and from the Gun Site car park and shoreward car park (proposed interconnection facility location). Both routes have traffic noise which varies depending on the time of day, week and season.

Both the A554 and A5139 main roads are extremely busy from early morning to late evening. These roads are major arterial links to the M53

and the Kingsway tunnel under the Mersey to the City of Liverpool. Noise levels are high, as would be expected from such locations.

8.4.2.2 Impacts and Mitigation

As with the interconnection facility, the entrenchment of the cabling creates the largest increase in noise level. Construction work will be carried out in a similar manner to that for the interconnection facility.

Noise disturbance will move along the cable route, as the cabling is laid underground and the surface restored. The most significant disturbance will be along the shore track and Green Lane, where present noise levels are moderate.

8.4.2.3 Operation and Monitoring

Following the entrenchment of the cables, there will be no further noise disturbance and, therefore, no monitoring.

8.4.3 *Proposed Substation Location*

8.4.3.1 Existing Environment

The site for the substation is located adjacent to the A5139 main road and within a disused dock environment. Noise levels associated with the A5139 are high, as explained previously. Construction work is also underway to improve the dock area, adding to baseline noise levels, although this may have finished by the time SeaScape wishes to build the substation. Within 500m of the site is a substantial industrial unit associated with the docks.

The following sections outline a more detailed assessment of the noise which would be associated with an electrical substation. This was deemed necessary as, following construction, the substation will be the only above-ground facility onshore.

8.4.3.2 Weather

Survey work was carried out on the afternoon of 12 August 2002, which was fine with an air temperature of 18°C and an light westerly breeze of 2 to 3 ms⁻¹ at ground level. There was cloud cover of approximately 3/8 and there was no rain during the course of the measurements. Road surfaces were dry.

The small hours of 13 August 2002 were fine with an air temperature of 11°C and no significant wind. There was cloud cover of approximately 4/8 and there was no rain during the course of the measurements.

8.4.3.3 Instrumentation

A Bruel and Kjaer type 2260 Investigator (precision integrating sound level meter) was used for all measurements. It was fitted with a type 4183 condenser microphone and a foam windshield.

Calibration was checked before and after the survey using a type 4231 electronic calibrator, and no drift was observed. The entire measurement chain is subject to regular laboratory calibration, the most recent having been in October 2001.

The sound level meter was mounted on a tripod with its microphone 1.2m above ground level. It was pre-set to take a series of 5-minute samples during which the usual statistical noise indices were recorded.

8.4.3.4 Measurement Location

The sample measurements were made at a location representative of the nearest residential properties to the proposed location of the new substation. This was on the south side of Mosslands Drive, Wallasey, at grid reference 329595E, 391575N where the public footpath adjacent to number 198 emerges. The location was chosen as it was subject to similar background noise as most of the area of housing closest to the proposed substation site, mainly from the A5139 and the approach road to the Wallasey Tunnel. Measurements were undertaken during the evening peak period of 12 August, and in the small hours of Tuesday 13 August 2002, in order to obtain samples of the expected maximum and minimum ambient noise levels in the locality.

8.4.3.5 Results

Tables 8.1 and 8.2 present the statistical noise data for daytime and night-time.

As can be seen from the Tables, the typical daytime background noise level on Mosslands Drive was in the range 46 to 48 dB LA90. It was dominated by noise from the nearby major road network, but there were only three individual vehicle movements on Mosslands Road itself during the measurement period.

Table 8.1: Daytime ambient noise levels (evening peak period) dB

start	end	LA90	LA50	LA10	LA01	LAeq
12 August 2002						
16:52	16:57	47.5	49.9	53.7	64.0	53.4
16:57	17:02	47.4	53.4	54.8	63.7	54.9
17:02	17:07	46.2	50.2	53.4	62.7	53.6
17:07	17:12	46.0	48.1	55.8	64.9	54.3
17:12	17:17	46.6	49.1	53.9	60.6	52.0
17:17	17:22	47.0	50.1	55.0	64.7	54.3

Table 8.2: Night-time ambient noise levels dB

start	end	LA90	LA50	LA10	LA01	LAeq
13 August 2002						
01:12	01:17	33.2	36.8	38.6	47.7	39.2
01:17	01:22	35.3	39.2	42.3	49.9	41.7
01:22	01:27	36.1	38.7	41.1	48.9	41.2
01:27	01:32	33.8	36.2	39.1	42.9	37.0
01:32	01:37	34.1	36.0	37.7	41.4	36.7
01:37	01:42	34.4	37.6	40.2	44.1	38.6
01:42	01:47	31.5	35.2	38.6	42.9	36.4

The night-time background noise level in terms of LA90 was a minimum of 32dB. This can reasonably be assumed to be the typical minimum during a fine night.

8.4.4 Characteristics of Noise from Electrical Substations

The sound emitted by a typical electrical substation consists of an underlying broad-band noise with a strong tonal element in the 100Hz third-octave band. Generally, the only noise that can readily be heard at any distance is this characteristic “hum”. In order to quantify this, a visit was made to an existing substation in Wallasey and noise measurements made during the normal daytime operation of the equipment.

8.4.4.1 Location

The substation visited is situated just off the Docks Link road, near the Poulton Bridge roundabout in Wallasey. It is similar to that envisaged for the Burbo Bank project, although it has been in place for some time. Recent advances in electrical transformer technology mean that the noise emissions from the new installation are likely to be somewhat lower, although the 100Hz tone will still be present.

8.4.4.2 Instrumentation

The same Bruel and Kjaer type 2260 Investigator (precision integrating sound level meter) used for background noise surveys was employed for all equipment measurements. It was fitted with a type 4183 condenser microphone and a foam windshield. Calibration was checked before and after the survey using a type 4231 electronic calibrator and no drift was observed.

The sound level meter was hand-held so that its microphone was 1.2m above ground level and 3m from the nearest surface of the transformer unit under measurement. The third-octave band spectral levels and the overall A-weighted equivalent continuous sound level were then averaged over a period of several seconds and the results stored in the meter’s internal memory. The process was repeated for each measurement location. Measurements were made at all accessible locations 3m from the

transformer, so that the results could be averaged and the overall sound power emissions derived.

8.4.4.3 Results

The substation emits a sound pressure level of 66dBA at a distance of 3m. This equates to an overall sound power level of 91dBA. However, the most prominent feature of the noise is the pronounced hum at twice mains frequency – 100Hz – where the third-octave band level reaches 85dB (an un-weighted sound power level of 109dB). A typical spectrum is shown in Figure 8.7.

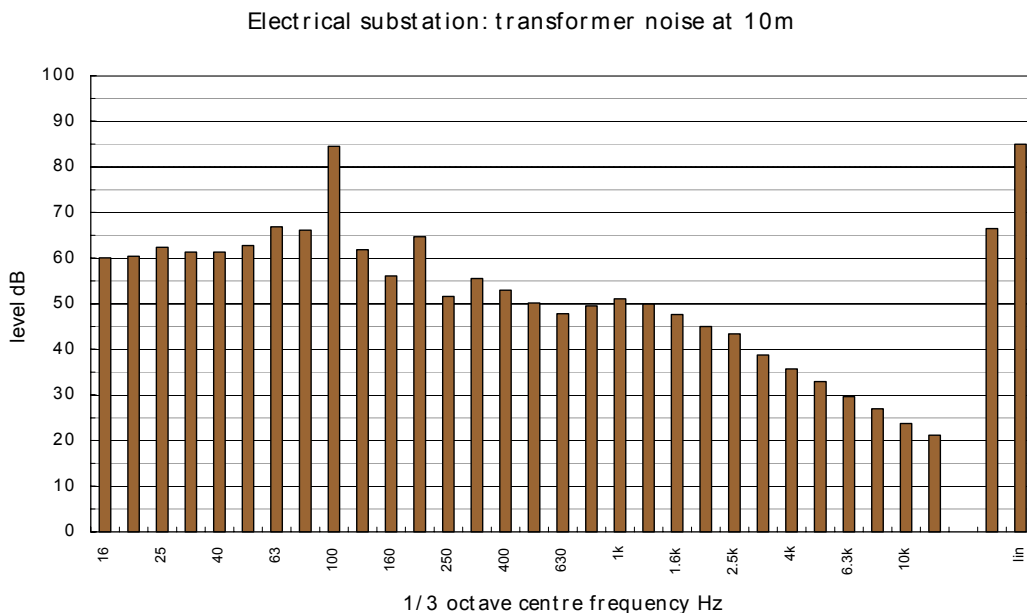


Figure 8.7: Noise emitted by substation

It should be noted that the calculated sound power represents the level emitted in any direction, provided that there is a direct transmission path between the transformer and the receiver. In fact, there is significant screening of transformer noise by intervening buildings both on the substation site and nearby, so that in some directions the transformer noise could not be heard above the normal background levels from road traffic and general urban activity.

8.4.5 Impacts

The new substation will be installed at grid reference 329625E, 391025N which is close to Bidston Moss. The background noise levels at the nearest residential properties did not fall below 30dB LA90 even at night, because of the suburban location and the presence of major roads nearby. It is therefore reasonable to assume that provided the substation noise does not exceed that value, there will be no noise nuisance to residents. In

other words, the very slight increase in overall noise level would just be acceptable.

However, using the guidance provided in BS.4142:1997 the substation noise would attract a so-called “tonal penalty”, which means that the noise level from the substation is regarded as 5dB noisier than is actually the case. This arbitrary figure of 5dB is designed to make allowance for the greater attention-drawing capability, and arguably greater potential to annoy, of the prominent tone emitted by the equipment. In order to be sure that a BS.4142 assessment would regard the new noise as being “of marginal significance” at worst, the noise level resulting from the operation of the substation alone should be at least 5dB below the minimum background level.

The nearest noise-sensitive property will benefit from the screening of substation noise provided by the A5139 embankment (the distance from the proposed substation to the background noise measurement location is 550m). The A5139 is a high-speed road leading to and from Junction 1 of the M53. There will be no direct line of sight from the nearest housing to the new substation, so there will be at least 5dB of additional attenuation.

The noise level outside the nearest houses will be approximately 21dBA allowing for the attenuation of sound over soft ground, the absorption provided by atmospheric air and screening effects. No increase will therefore be measurable at noise-sensitive locations. Even if the 5dB penalty for tonal content is applied, the rating level of substation noise is such that complaints would not be expected. This is confirmed by experience with the existing Wallasey substation, which is considerably closer to its nearest neighbouring houses than the proposed new installation.

8.4.6 Conclusions

Noise emissions from the proposed new electrical substation will be acceptable at local residential property. Calculations indicate that additional noise control equipment will not be required as the noise from the substation will be well below the existing background noise levels, even allowing for the tonal content.

8.5 Traffic and Access

This section deals with the issue of accessibility to the onshore works and traffic volume. Each of the onshore components has an impact on the levels of accessibility, either for short- or long-term periods. Likewise traffic volume can also vary by time of day and season. Traffic impacts will be caused by burial of the onshore cabling and construction of the interconnection facility and substation.

Where there is direct impact on the public highway, Wirral MBC Highways Department and the police will be notified of all such works. This will include details of the work to be carried out, operation time and duration.

8.5.1 *Interconnection Facility*

8.5.1.1 Existing Environment

The site for the interconnection facility is presently a small car park, capable of holding a dozen cars at the most. Access is via Green Lane from the A554 main road. The access road is single lane tarmac and passes through the site and onto the coastal defences.

Traffic density is light to moderate, depending on the time of day, season and weather. At weekends and holidays the traffic levels increase as more people travel to the area.

8.5.1.2 Impacts and Mitigation

Construction of the interconnection facility will require the closure of the car park and restriction of access to the sea defences to foot only. Parking will still be possible at Gun Site car park at the end of Green Lane.

This maintains safety on-site and minimises the time taken to carry out the works. Accessibility and traffic assessment will be carried out with the guidance of Wirral MBC Highways Department. This will determine whether or not it is appropriate to close the access road temporarily whilst construction takes place.

8.5.1.3 Operation and Monitoring

Following construction of the facility, access to the site will only be necessary to service the facility twice per year. Access will be made by car with no special provisions required.

8.5.2 *Cabling*

8.5.2.1 Existing Environment

Cabling from the interconnection facility to the substation will traverse existing roads and tracks. The shore track to the start of Green Lane is a single tarmaced road with passing places. Green Lane to the A554 is a tarmaced road with enough space for two cars to pass safely. Traffic calming measures are spaced regularly along the Lane and allow only one car to pass at a time. The main A554 road is a dual carriageway access to the M53 and Kingsway Tunnel at Junction 1. The A5139 road is also a dual carriageway, providing access to the M53 at Junction 1 and Poulton.

Traffic along the shore track and Green Lane is light, with slightly increased traffic density at weekends and holidays. Traffic along the A554

and A5139 is standard for a main dual carriageway, increasing substantially during rush hour and at weekends.

8.5.2.2 Impacts and Mitigation

Accessibility through Green Lane and the shore track will be reduced whilst the cable is installed. It may be necessary to close access to these roads for the duration of installation, although such action will be considered only after consultation with Wirral MBC.

Installation of cabling along the A554 and A5139 will utilise the grass verge where possible to minimise traffic disruption. Where it is necessary to cross or follow the road, then appropriate measures will be taken to minimise the impact on traffic.

Mitigation measures will be implemented to prevent undue disruption to essential roads and access ways, in consultation with the local Highways Department.

8.5.2.3 Operation and Monitoring

Following the installation of the cables there will be no further disruption to the affected roads. All road surfaces will be returned to their pre-construction state and all access re-opened.

8.5.3 Substation

8.5.3.1 Existing Environment

At present there is no access from the A5139 to the proposed substation location. The substation will involve the development of a section of MDHC land which had historic industrial land use.

8.5.3.2 Impacts and Mitigation

In order to construct the substation, it will be necessary to access the site through the MDHC dockside main entrance. Once the main substation base has been prepared, construction of the slip road on and off the A5139 westbound carriageway can be completed.

Construction of the slip road will require the closure of one lane of the A5139 for a period to be determined in consultation with the Highways Department. Work will be carried out to minimise disruption to traffic along the A5139. Once the slip road has been completed, traffic will be able to flow freely along the A5139 again.

The installation of the equipment at the substation will require the use of cranes, low loaders and other ancillary equipment. Access to the substation location can be either from the A5139 or through MDHC. Access from the A5139 may cause slight delays due to the slowness of

the vehicles. To minimise the impacts, equipment will be transported to site during off-peak traffic times.

8.5.3.3 Operation and Monitoring

Once construction of the substation has been completed, it will only require minimal servicing and maintenance. Traffic impact will be non-existent for maintenance checks. Should substantial work be required on the substation then slight delays on the A5139 might occur due to slow-moving vehicles.

8.6 Visual Assessment of Onshore Components

This section should be read with reference to Volume 3 of the Environmental Statement.

8.6.1 Landscape Characterisation

Volume 3, Figure 7, the Seascape Character Map for North Wirral, sets this local area in the wider context of the regional area of North Wirral. Figure 11 is the Landscape Character Map for the local landscape unit through which the connection infrastructure is proposed. Various designations exist on the foreshore for nature conservation, but appraisal of the Wirral UDP shows that neither the onshore cable route nor the area through which it is proposed are subject to any landscape designations or relevant Local Plan Policies.

The proposed cable landing point would occur on a heavily engineered and elevated promenade section of coastline between two splayed slipways. The onshore cables would be routed adjacent or under the tracks labelled 1, 2 and 3 on the plan, varying between 3.5 and 5m, and then alongside the verge of the A554. The cable route would be directed under Junction 1 of the M53, and finally adjacent the west-bound approach to Junction 1, terminating in a small cutting between the road and the recently restored wooded slopes of the Bidston Moss landfill site.

8.6.2 Appraisal of Landscape and Visual Effects

Landscape and visual effects are usually appraised separately in any such assessment. Due to the minimal effect of the junction chamber and cabling, these will be considered together. However, the landscape and visual assessment of the substation will be considered separately.

8.6.2.1 Onshore Interconnection Facility

Although quite a large structure at 4 x 4 x 4 metres, this will be below ground and located within the small car park back from the coastline. The only evidence of the structure would be a secure, locked manhole cover, with the excavated area being neatly restored to match the existing

surface 'like-for-like'. There would be no disturbance to the seaward concrete revetment between the slipways since the cables will be brought ashore by directional-drilling under the concrete.

8.6.2.2 Onshore Cabling

The proposed route of the onshore cabling is shown on Figure 11. Three 100mm diameter cables would be laid in a trench measuring 1.5 metres wide by 1.2 metres deep. For the tracks and unclassified road marked 1, 2 and 3 on the plan, the cables will be entrenched along road verges wherever possible, otherwise below the road itself, and adjacent the A554 and the motorway access road the trench will be within the road verge, ensuring maximum safety and minimum disruption.

Cable routes will be fully and appropriately restored after backfilling, and there should be no landscape or visual effects from this operation.

8.6.2.3 Onshore Substation - Landscape Effects

The proposed substation building would measure 25 by 12.5m by 6.5m high, set within a compound measuring some 60 by 25m, and accessed from a new road spur off the west-bound spur from Poulton roundabout to Junction 1. Outside the building, the compound area would house the transformers, surge arresters and disconnectors, the highest components of which would reach about 8.5m.

Until fairly recently, this area accommodated a number of railway tracks leading from the nearby docks, which are some 8m below the adjacent road at its nearest point. Together with the restoration and planting up of the adjacent Bidston Moss landfill site further south, this area is now clear and disused. From a distance the site appears fairly natural. Considering the sunken nature of its receiving landform and its relatively small footprint compared to the surrounding road and landform, the landscape effects are considered to be very minimal.

The precise location of the compound has yet to be finally determined but it would be sited within the area of the disused tracks and therefore with the top of roof at approximately the same level as the road.

8.6.2.4 Onshore Substation - Visual Effects

The result of this level difference is that the substation building and associated compound would be well accommodated within the landform. Furthermore, due to a 'crossover' road situation requiring total driver concentration at this point, attention is focused ahead and to mirrors rather than sideways to the proposed substation. The only exception to this is where forward visibility is directed down and straight towards the compound as the westbound dual carriageway from the Poulton roundabout descends in the vicinity of pylon 1 before rising again to cross the railway. This offers the chance for potential mitigation.

The other receptor groups likely to experience the visual effects of the substation are cyclists and walkers using the track around the northern edge of the restored landfill site, especially once the new ramped railway access is completed. However, considering the scale of other built forms in the area, for instance the motorway, railway and B&Q, the scale of the adjacent landform and the lack of any sensitive receptors in the vicinity, the visual effects of this relatively small substation and compound are considered to be minimal and not out of character with the area.

8.6.2.5 Overhead Power Lines

No new overhead power lines would be required with this proposal, rather a connection would be fed from the new substation underground to the adjacent electricity pylon, and then discreetly up the inside of the structure to link directly with the existing 132kV overhead lines. There would therefore be no landscape or visual effects from this operation.

8.6.3 Mitigation Measures

The relative landscape and visual effects resulting from development have been shown to be minimal, but five possible mitigation measures could be implemented, namely for the design of the substation building, treatment of Japanese Knotweed, onsite planting, offsite planting and road improvements. If approved, these measures would be implemented following consultation with landscape architects and Wirral Borough Council.

8.7 Economics and Tourism

Construction of the onshore components of the wind farm will have minimal impact on the economics and tourism of the area. The following sections outline the potential impacts for the onshore components as a whole, due to the minimal disruption caused.

8.7.1 Tourism

There will be some disruption to tourists wishing to access the sea defences via Green Lane during construction. As this route is not designated a tourist route and is primarily used by local residents, the impact is expected to be minimal.

Traffic disruption will not affect tourism during cable laying or substation installation. The disruption caused will be no greater than any other form of roadworks or cable laying. Minor disruption will be caused to traffic on the A554, a route through to New Brighton and the shore. The substation location off the A5139 is in an industrial area and is unlikely to be visited by tourists.

Following construction of the onshore elements, no impact on tourism is expected. The interconnection facility and cabling, although close to the coastal path, will be underground and therefore not visible. The substation will be located in an industrial area, unfrequented by tourists.

8.7.2 Economics

Disturbance from the onshore works will not cause significant disruption to the local infrastructure, therefore no negative effects on the local economy are expected. There will be no complete obstruction of traffic, so goods vehicles and other essential services can continue to use the roads.

The construction work will have a positive effect on the local economy. Personnel will be required to work on-site to install all onshore works, utilising the local labour force. Where it is necessary to bring in outside contractors, personnel will provide income to the local area for the duration of the construction work.

As a consequence of the positive effect the onshore works will have on the local economy, no mitigation is required.

8.8 Decommissioning

The lifespan of the Burbo Offshore wind farm is 25 years. It is a requirement of the Agreement for Lease with the Crown Estate that all offshore works are removed before the lease expires. The onshore components become redundant if the offshore wind farm is removed. The following section explains the decommissioning process for the following:

- Interconnection facility
- Underground cabling
- Electrical substation

With all the onshore components, consultation with the Wirral MBC will determine the exact nature of the decommissioning. To minimise disturbance, it is considered appropriate to leave certain components in situ as explained below.

8.8.1 Interconnection Facility

The creation of the interconnection facility requires the excavation of a 64m³ hole under the existing car park. Decommissioning will involve the in-filling of the facility in situ to minimise disturbance to the local environment.

All recyclable material will be removed and the chamber back-filled and compacted with local material appropriate to the task. The manhole will be removed and the surface re-laid to remove any evidence that the facility

existed. This process creates the least amount of disturbance and does not require the use of excavation equipment.

8.8.2 Cabling

The installation of the cabling requires significant excavation of along the proposed route (see Figure 8.2 in 8.1.2.1 earlier). The decommissioning methodology is to leave the cables in place. This removes the need to re-excavate the route to recover the cabling and prevents any further local disturbance.

8.8.3 Substation

Decommissioning of the substation will involve the removal of all ancillary equipment from the site and as much of the site as possible will be recycled for future use. Due to oil contained within the transformer, and other possible contaminants, all due care will be taken to ensure no leakage into the surrounding environment occurs.

The switch-gear building will be demolished unless another suitable use can be found for the structure. Similarly, the slipway will be removed unless required to provide further access to the site.

NOTES