AQUIND Limited

AQUIND INTERCONNECTOR

Environmental Statement – Volume 3 – Appendix 27.2 Waste and Material Resources Assumptions and Limitations

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

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APPENDIX 27.2 WASTE AND MATERIAL RESOURCES ASSUMPTIONS AND LIMITATIONS

1.1. INTRODUCTION

1.1.1.1. The following table provides the assumptions and limitations for the type and quantity of material resources, arisings and waste to landfill data provided by the design team for the Proposed Development. This appendix supplements the Assumptions and Limitations section (Section 27.4.5) of Chapter 27 (Waste and Material Resources) of the Environmental Statement ('ES') Volume 1 (document reference 6.1.27).

Table 1 - Converter Station

Component	Assumption
Aggregate - 6F5/Type 1	Assumed 500 mm thick pile mat over entire footprint of the Converter Station
Aggregate - Chippings	20 mm single sized aggregate
Aggregate - Road (Type 1)	Assumed average of 750 mm thick base coarse and coarse over 1.2 km of road (7 m wide road and 10 m hard shoulder)
Aggregate - Type 1	Assumed 400 mm thick to create appropriate platform for various construction activities during construction
Asphalt	Assumes top wearing course to site access road is fully removed and replaced at the end of the project.
Concrete including blinding concrete	Take off has been done based on structural design of other HVDC interconnector.
Elevation and wall Cladding	Type and build up under design development, therefore cannot be quantified at this stage
Plastic (Geogrid)	Excludes Laps of geogrid.
Precast floor	First Floor assume to be made of 100mm thick solid precast with 130 mm in-situ concrete structural topping
Precast kerb (road)	Kerb sizes assume to be 914x255x125x4000 m (64 kg/0.914 m)

Precast Kerb construction anc.	Bedding is about 300x150 dp C20 concrete, Haunch is about 175x255 C20 concrete, Dowels are 12 dia mild steel, 300 mm long @300 centres
Precast piles	2000 Piles assume to be 400x400 precast up to 15 m long
Precast Troughs	on average precast troughs assumed to be 1000 mm wide and 600 mm deep with 200 mm thick walls (Clear internal dimensions).
Steel	Take off has been done based on structural design of other HVDC interconnector and therefore quantities will be within +/- 20%
Steel dowels in Precast Kerb construction anc.	Bedding is about 300x150dp C20 concrete, Haunch is about 175x255 C20 concrete, Dowels are 12 dia mild steel, 300 mm long @300 centres
Steel reinforcement	Assumed B16@150ctrs both directions and faces. Structure has not been designed. Therefore, quantities will be within +/- 20%
Earthwork cut & fill (Re-use on site)	The density of excavated material will be 1700 – 2000 kg/m^3, so an assumed average density of 1850 kg/m^3 has been used.

Table 2 - Onshore Cable Route

Component	Assumption
Blockwork	Conversion factor (m^2 to tonnes) based on 212 kg/m^2 for each block
Brickwork	Conversion factor (m^2 to tonnes) based on 50 bricks /m^2 and each brick weighing 3.5 kg
Fibre Optic Cable ('FOC') earthworks	Strip topsoil of 300 mm deep over footprint plus 1.5 m surround. Conversion factor (m3 to tonnes) based on 1.17 tonnes/m^3 Additional excavation and trim to form solid base over same area as topsoil strip. Conversion factor (m^3 to tonnes) based on 1.40 tonnes/m^3
FOC imported subbase material	Conversion factor (m^3 to tonnes) based on 2.2 tonne/m^3
Onshore Cable Route	Quantity assumptions: Circuit lengths 18600 m and 18700 m 2400 m of Horizontal Directional Drilling ('HDD') (4-off crossings) 100 m of micro-tunnel 5800/5900 m in open country, parkland, common and verges, 10300 m in roads
Onshore Cable Route	Density assumptions: Density of Cement bound sand ('CBS') 2100 kg/m^3 Density of concrete 2300 kg/m^3

	Density of grout (filling pipe at railway crossing) 2200 kg/m³ Made ground density 1400 kg/m³ Topsoil and subsoil density 1600 kg/m³ Asphalt density 2300 kg/m³ MOT type 1 aggregate density 2000 kg/m³ Cable covers assumed density 900 kg/m³
Onshore Cable Route	Construction assumptions: 75% of the trench route using the 'standard' cross-section 15% of the trench route (assumed to all be in the roads, that is where the service congestion is worse) using 50% more CBS, in a 30% wider trench, at a depth of 1250 mm to the duct surround 10% of the trench route using a concrete duct block, including A393 reinforcing mesh top and bottom Road construction maximum of 150 mm of base and surface (asphalt) courses, the rest MOT type 1 aggregate Cable ducts in trenches Emtelle ENE TS 12-25 class 1 188 mm/200 mm push-fit u-PVC ducts Cable ducts at land HDDs HDPE 280 mm outside diameter, SDR11 Cable ducts at landfall HDD (1450 m long) HDPE 711 mm outside diameter, SDR11 Cable covers Centriforce Stokbord, full width of trench, 14 mm (for EHV cables) 300mm average of topsoil stripped for haul road Fibre optic cable. Combination of glass and polymers. Tonnage is an estimate based on mass of 196 fibre cable as 240 kg/km, so approximately 9600 kg in total.

	Indicative estimated mass of HVDC is 25. 2 kg/m. The cables are usually protected by plastic sheets, estimate 25 kg per drum. Often, the cable drums are scrapped, the cable companies consider the cost of returning them to the factories and refurbishing them being greater than the cost of the drums. A drum for 1 km of cable will have a mass of approximately 2000 kg, and there may be as many as 21 cable sections, so 84-off drums.

Table 3 - Marine

Component	Assumption
HVDC Marine Cable (Transition Joint Bay ('TJB') to Exclusive Economic Zone ('EEZ')	Assume 50 kg/m individual cable
Fibre Optic Cable (TJB to EEZ)	Assume 4.8 kg/m individual cable
Cable Joints (not including TJB)	This is dependent upon the contractors design (cable weight) and installation method (cable lay vessel capacity) and operational reasons (planned and unplanned). As a worst case, there are likely to be between 8 – 12 individual in-line joints per cable pair (16 – 24 joints in total at 4 – 6 locations) required within the UK marine cable corridor during cable installation. This does not include the joints that will be required between the onshore and marine cable at the Transition Joint Bays ('TJB') at Landfall which will be located above the MHWS mark. Therefore assume 24 joints as WCS
Trench backfill for pre-cut/freelay installation	Converted from m^3 to tonnes by factor of 1.7
Remedial non-burial protection	Construction phase: 11 km Rock assumed - bund profile 3m crest width, 1.5 m height, 1:4 side slopes, 13.5 m^2 csa, 1.35 bulking factor, 1.8 conversion from m^3 to tonnes, for each bundled pair, construction phase only.

HDD Exit Pit temporary and permanent fill	Assumed rock, at factor of 1.8 (m^3 to tonnes), no bulking multiplier since volume constrained by size of pit
Cable Crossing – prelay bund	One bund, 100 m long, 30 m wide, 1.5 m high, 1.35 bulking, 1.8 tonne conversion
Cable crossing – postlay bund	Two bunds, 600 m long, 30 m wide, 1.5 m high, 1.35 bulking, 1.8 tonne conversion
Lifetime remedial protection	Operational lifetime: further 11 km Rock assumed - bund profile 3 m crest width, 1.5 m height, 1:4 side slopes, 13.5 m^2 csa, 1.35 bulking factor, 1.8 conversion from m^3 to tonne, for each bundled pair, operational phase only.
Clump weights for Out of Service ('OOS') cables	Assumed 500 kg per weight
Cleared sandwave material (includes 2700 m3 HDD exit pit excavation)	Conversion of 1.7 m^3 to tonne assumed
Boulders	Conversion of 1.8 m^3 to tonne assumed. Tonnage estimate very subjective depending on quantity and type of boulder.
OOS cables	Based on a worst case assumption, from ICPC data, assume 4.8 kg/m for double armoured telecom cable 10 OOS cables x 200 m recovered = 2000m x 4.6 kg/m = c10te"