Specification

Rock Grading:

A standard rock grading of 1-3t is required. The mass distribution of the rock armour in accordance with BS EN 13383-1 is provided in the table below:

Class designation	ELL	NLL	NUL	EUL	M_{emll}	M_{emul}	M_{50}/M_{em}	M_{50min}	M_{50max}
Passing requirements (kg)	<5% (kg)	<10% (kg)	>70% (kg)	>97% (kg)	>50% (kg)	<50% (kg)	Eqn 3.18	>50% (kg)	<50% (kg)
1000-3000 (Armour Rock)	700	1000	3000	4500	1700	2100	1.099	1870	2310

Quantities:

An estimated 16,300 tonnes and rock armour is required. Quantities will be confirmed prior to placing an order.

Minimum Specification of Rock Properties:

The minimum physical rock properties in accordance with BS EN 13383 and CIRA CUR CETMEF (2007) (C683 the rock manual) are as follows:

Rock Property	Criteria	Test Reference
Particle density	The average saturated surface-dry density shall be greater than 2,870 kg/m^3 with 90% of the stones having a density of at least 2,870 kg/m^3	BS EN 13383 Part 1 Clause 5.2
Water Absorption	The maximum water absorption shall not exceed 2% (WA_2)	BS EN 13383 Part 1 Table 12
Impurities	Armour stone shall not contain any foreign matter in a quantity that will cause damage to the structure or the environment in which it is used	BS EN 13383 Part 1 Clause 6.2
Resistance to Breakage	>80MPa (CS_{80})	BS EN 13383 Part 1 Table 9
Resistance to Freeze/Thaw	0.5% (FT_A)	BS EN 13383 Part 1 Table 13
Resistance to Salt Crystallization	<25% (MS_{25})	BS EN 13383 Part 1 Table 14
Sonnenbrand	Maximum of one piece of 20 tested pieces shows signs of Sonnenbrand. (SB_A)	BS EN 13383 Part 1 Table 15. Applicable to rock from volcanic sources only.
Block Integrity Drop Test (I_{d50})	I_{d50} < 3%	Box 3.20 of CIRIA C683 (2007)
Shape Index (LT_A)	< 5% (LT_A)	BS EN 13383 Part 1 Table 6
Proportion of crushed or broken surfaces (RO)	<5% (RO_5)	BS EN 13383 Part 1 Table 7
Resistance to wear (M_{DE})	$M_{DE}20$	BS EN 13383 Part 1 Table 10

Delivery Location

The rocak armour is to be delivered to B5300 at Crosscannoby village. The village is located less than 1 mile from Cumbria's west coast, 0.5 miles off the A596 and north of the river ellen. The delivery location is shown in figure 1.1 below:

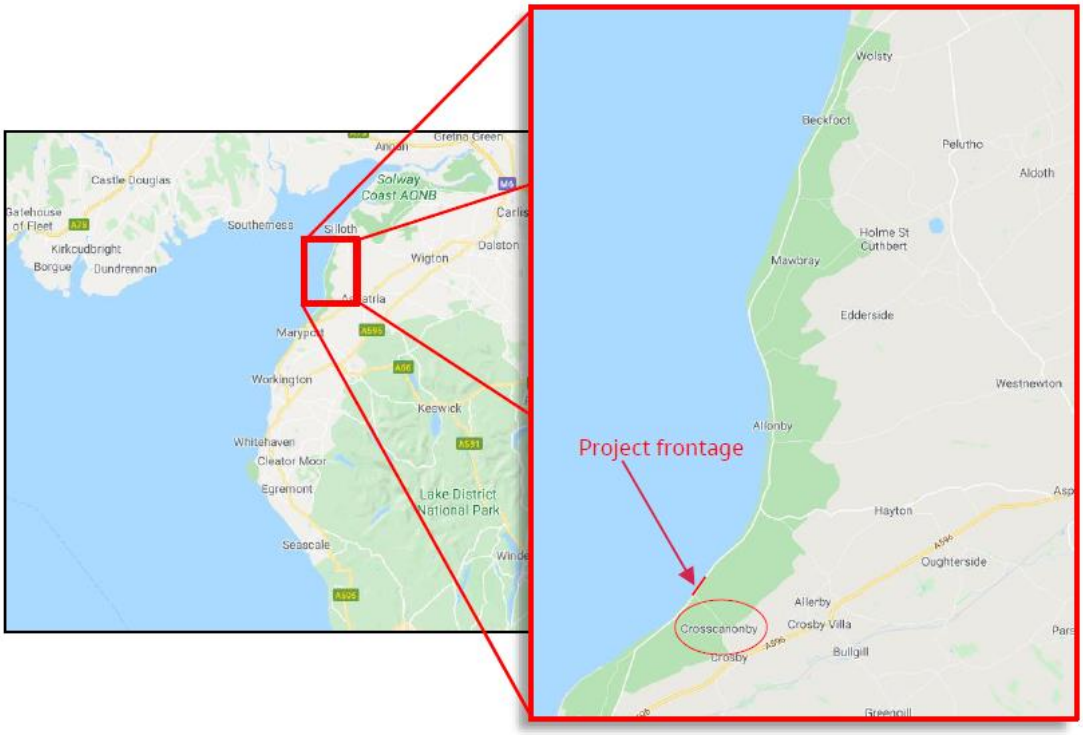

Figure 1.1: Location of Crosscanonby

Delivery timescales and frequency

Delivery timescales and frequency will be notified a week in advance during the works and will be subject to progress on site and forecast weather conditions. However, it is anticipated that circa 2000t per week may be required during the works.