

# Inch Cape Offshore Wind Farm

New Energy for Scotland

Offshore Environmental Statement:  
**VOLUME 2B**  
**Annex 10A.7: Modelled Assessment  
Plots**





**INCH CAPE OFFSHORE  
LIMITED**

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**ANNEX10A.7 MODELLED  
ASSESSMENT PLOTS**

TECHNICAL REPORT

Report Reference. Annex10A.7\_Rev2

Issued: 24 May 2013

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## FIGURES

10A.7.1 : DIFFERENCE IN MEAN SPRING TIDE HIGH WATER (HW) LEVEL (M) – NEAR-FIELD.....	2
10A.7.2: DIFFERENCE IN MEAN SPRING TIDE LOW WATER (LW) LEVEL (M) – NEAR-FIELD.....	3
10A.7.3: DIFFERENCE IN MEAN NEAP TIDE HIGH WATER (LW) LEVEL (M) – NEAR-FIELD .....	4
10A.7.4: DIFFERENCE IN MEAN NEAP TIDE LOW WATER (LW) LEVEL (M) – NEAR-FIELD.....	5
10A.7.5: DIFFERENCE IN MEAN SPRING TIDE PEAK FLOOD CURRENT SPEED (M/S) – NEAR-FIELD....	6
10A.7.6: DIFFERENCE IN MEAN SPRING TIDE PEAK EBB CURRENT SPEED (M/S) – NEAR-FIELD .....	7
10A.7.7: DIFFERENCE IN MEAN NEAP TIDE PEAK FLOOD CURRENT SPEED (M/S) – NEAR-FIELD .....	8
10A.7.8: DIFFERENCE IN MEAN NEAP TIDE PEAK EBB CURRENT SPEED (M/S) – NEAR-FIELD .....	9
10A.7.9: DIFFERENCE IN THE 50-PERCENTILE CURRENT SPEED (M/S) – NEAR-FIELD.....	10
10A.7.10: DIFFERENCE IN THE 90-PERCENTILE CURRENT SPEED (M/S) – NEAR-FIELD.....	11
10A.7.11: DIFFERENCE IN THE 95-PERCENTILE CURRENT SPEED (M/S) – NEAR-FIELD.....	12
10A.7.12: DIFFERENCE IN THE 99-PERCENTILE CURRENT SPEED (M/S) – NEAR-FIELD.....	13
10A.7.13: DIFFERENCE IN MEAN SPRING TIDE HIGH WATER (HW) LEVEL (M) – FAR-FIELD.....	14
10A.7.14: DIFFERENCE IN MEAN SPRING TIDE LOW WATER (LW) LEVEL (M) – FAR-FIELD.....	15
10A.7.15: DIFFERENCE IN MEAN NEAP TIDE HIGH WATER (HW) LEVEL (M) – FAR-FIELD.....	16
10A.7.16: DIFFERENCE IN MEAN NEAP TIDE LOW WATER (LW) LEVEL (M) – FAR-FIELD .....	17
10A.7.17: DIFFERENCE IN MEAN SPRING TIDE PEAK FLOOD CURRENT SPEED (M/S) – FAR-FIELD ..	18
10A.7.18: DIFFERENCE IN MEAN SPRING TIDE PEAK EBB CURRENT SPEED (M/S) – FAR-FIELD .....	19
10A.7.19: DIFFERENCE IN MEAN NEAP TIDE PEAK FLOOD CURRENT SPEED (M/S) – FAR-FIELD .....	20
10A.7.20: DIFFERENCE IN MEAN NEAP TIDE PEAK EBB CURRENT SPEED (M/S) – FAR-FIELD.....	21
10A.7.21: DIFFERENCE IN 50-PERCENTILE CURRENT SPEED (M/S) – FAR-FIELD.....	22
10A.7.22: DIFFERENCE IN 90-PERCENTILE CURRENT SPEED (M/S) – FAR-FIELD.....	23
10A.7.23: DIFFERENCE IN 95-PERCENTILE CURRENT SPEED (M/S) – FAR-FIELD.....	24
10A.7.24: DIFFERENCE IN 99-PERCENTILE CURRENT SPEED (M/S) – FAR-FIELD.....	25
10A.7.25: DIFFERENCE IN 50-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – NEAR-FIELD.....	26
10A.7.26: DIFFERENCE IN 90-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – NEAR-FIELD.....	27
10A.7.27: DIFFERENCE IN 95-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – NEAR-FIELD.....	28
10A.7.28: DIFFERENCE IN 99-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – NEAR-FIELD.....	29
10A.7.29: DIFFERENCE IN 50-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – FAR-FIELD .....	30
10A.7.30: DIFFERENCE IN 90-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – FAR-FIELD .....	31
10A.7.31: DIFFERENCE IN 95-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – FAR-FIELD .....	32
10A.7.32: DIFFERENCE IN 99-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – FAR-FIELD .....	33

10A.7.33: DIFFERENCE IN THE EXCEEDANCE OF CRITICAL SHEAR STRESS (N/M <sup>2</sup> ) – BASED ON THE COMBINED (CURRENTS PLUS WAVES) MAXIMUM BED SHEAR STRESS – NEAR-FIELD.....	34
10A.7.34: DIFFERENCE IN THE EXCEEDANCE OF CRITICAL SHEAR STRESS (N/M <sup>2</sup> ) – BASED ON THE COMBINED (CURRENTS PLUS WAVES) MEAN BED SHEAR STRESS – NEAR-FIELD .....	35
10A.7.35: DIFFERENCE IN THE EXCEEDANCE OF CRITICAL SHEAR STRESS (N/M <sup>2</sup> ) – BASED ON THE COMBINED (CURRENTS PLUS WAVES) MAXIMUM BED SHEAR STRESS – FAR-FIELD.....	36
10A.7.36: DIFFERENCE IN THE EXCEEDANCE OF CRITICAL SHEAR STRESS (N/M <sup>2</sup> ) – BASED ON THE COMBINED (CURRENTS PLUS WAVES) MEAN BED SHEAR STRESS – FAR-FIELD.....	37
10A.7.37: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 6 HOURS AFTER COMMENCEMENT .....	38
10A.7.38: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 12 HOURS AFTER COMMENCEMENT .....	39
10A.7.39: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 1 DAY AFTER COMMENCEMENT .....	40
10A.7.40: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 2 DAYS AFTER COMMENCEMENT .....	41
10A.7.41: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 3 DAYS AFTER COMMENCEMENT .....	42
10A.7.42: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 4 DAYS AFTER COMMENCEMENT .....	43
10A.7.43: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 5 DAYS AFTER COMMENCEMENT .....	44
10A.7.44: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 6 DAYS AFTER COMMENCEMENT .....	45
10A.7.45: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 7 DAYS AFTER COMMENCEMENT .....	46
10A.7.46: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 8 DAYS AFTER COMMENCEMENT .....	47
10A.7.47: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 9 DAYS AFTER COMMENCEMENT .....	48
10A.7.48: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 10 DAYS AFTER COMMENCEMENT .....	49
10A.7.49: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 11 DAYS AFTER COMMENCEMENT .....	50
10A.7.50: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 12 DAYS AFTER COMMENCEMENT .....	51
10A.7.51: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 13 DAYS AFTER COMMENCEMENT .....	52
10A.7.52: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 14 DAYS AFTER COMMENCEMENT .....	53

10A.7.53: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 15 DAYS AFTER COMMENCEMENT .....	54
10A.7.54: SUSPENDED SEDIMENT CONCENTRATIONS DUE TO DREDGING: 16 DAYS AFTER COMMENCEMENT .....	55
10A.7.55: DEPOSITION THICKNESS DUE TO DREDGING – AFTER ALL MATERIAL HAS SETTLED.....	56
10A.7.56: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – OFFSHORE AREA: 2 HOURS AFTER COMMENCEMENT .....	57
10A.7.57: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – OFFSHORE AREA: 4 HOURS AFTER COMMENCEMENT .....	58
10A.7.58: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – OFFSHORE AREA: 6 HOURS AFTER COMMENCEMENT .....	59
10A.7.59: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – OFFSHORE AREA: 8 HOURS AFTER COMMENCEMENT .....	60
10A.7.60: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – OFFSHORE AREA: 10 HOURS AFTER COMMENCEMENT .....	61
10A.7.61: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – OFFSHORE AREA: 12 HOURS AFTER COMMENCEMENT .....	62
10A.7.62: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – OFFSHORE AREA: 2 HOURS AFTER CESSATION OF TRENCHING.....	63
10A.7.63: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – OFFSHORE AREA: 4 HOURS AFTER CESSATION OF TRENCHING.....	64
10A.7.64: DEPOSITION THICKNESS DUE TO CABLE TRENCHING – OFFSHORE AREA: AFTER ALL DISTURBED MATERIAL HAS SETTLED .....	65
10A.7.65: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – MIDPOINT AREA: 2 HOURS AFTER COMMENCEMENT .....	66
10A.7.66: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – MIDPOINT AREA: 4 HOURS AFTER COMMENCEMENT .....	67
10A.7.67: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – MIDPOINT AREA: 6 HOURS AFTER COMMENCEMENT .....	68
10A.7.68: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – MIDPOINT AREA: 8 HOURS AFTER COMMENCEMENT .....	69
10A.7.69: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – MIDPOINT AREA: 10 HOURS AFTER COMMENCEMENT .....	70
10A.7.70: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – MIDPOINT AREA: 12 HOURS AFTER COMMENCEMENT .....	71
10A.7.71: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – MIDPOINT AREA: 2 HOURS AFTER CESSATION OF TRENCHING .....	72
10A.7.72: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – MIDPOINT AREA: 4 HOURS AFTER CESSATION OF TRENCHING .....	73
10A.7.73: DEPOSITION THICKNESS DUE TO CABLE TRENCHING – MIDPOINT AREA: AFTER ALL DISTURBED MATERIAL HAS SETTLED .....	74

10A.7.74: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – NEARSHORE AREA: 2 HOURS AFTER COMMENCEMENT .....	75
10A.7.75: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – NEARSHORE AREA: 4 HOURS AFTER COMMENCEMENT .....	76
10A.7.76: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – NEARSHORE AREA: 6 HOURS AFTER COMMENCEMENT .....	77
10A.7.77: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – NEARSHORE AREA: 8 HOURS AFTER COMMENCEMENT .....	78
10A.7.78: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – NEARSHORE AREA: 10 HOURS AFTER COMMENCEMENT .....	79
10A.7.79: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – NEARSHORE AREA: 12 HOURS AFTER COMMENCEMENT .....	80
10A.7.80: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – NEARSHORE AREA: 2 HOURS AFTER CESSATION OF TRENCHING .....	81
10A.7.81: SUSPENDED SEDIMENT CONCENTRATION DUE TO CABLE TRENCHING – NEARSHORE AREA: 4 HOURS AFTER CESSATION OF TRENCHING .....	82
10A.7.82: DEPOSITION THICKNESS DUE TO CABLE TRENCHING – NEARSHORE AREA: AFTER ALL DISTURBED MATERIAL HAS SETTLED .....	83
10A.7.83: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 6 HOURS AFTER ‘COMMENCEMENT’ .....	84
10A.7.84: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 12 HOURS AFTER ‘COMMENCEMENT’ .....	85
10A.7.85: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 1 DAY AFTER ‘COMMENCEMENT’ .....	86
10A.7.86: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 2 DAYS AFTER ‘COMMENCEMENT’ .....	87
10A.7.87: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 3 DAYS AFTER ‘COMMENCEMENT’ .....	88
10A.7.88: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 4 DAYS AFTER ‘COMMENCEMENT’ .....	89
10A.7.89: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 5 DAYS AFTER ‘COMMENCEMENT’ .....	90
10A.7.90: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 6 DAYS AFTER ‘COMMENCEMENT’ .....	91
10A.7.91: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 7 DAYS AFTER ‘COMMENCEMENT’ .....	92
10A.7.92: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 8 DAYS AFTER ‘COMMENCEMENT’ .....	93
10A.7.93: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 9 DAYS AFTER ‘COMMENCEMENT’ .....	94



10A.7.94: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 10 DAYS AFTER ‘COMMENCEMENT’ .....	95
10A.7.95: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 11 DAYS AFTER ‘COMMENCEMENT’ .....	96
10A.7.96: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 12 DAYS AFTER ‘COMMENCEMENT’ .....	97
10A.7.97: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 13 DAYS AFTER ‘COMMENCEMENT’ .....	98
10A.7.98: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 14 DAYS AFTER ‘COMMENCEMENT’ .....	99
10A.7.99: SUSPENDED SEDIMENT CONCENTRATION DUE TO SCOURING AROUND TURBINE BASES – 15 DAYS AFTER ‘COMMENCEMENT’ .....	100
10A.7.100: DEPOSITION THICKNESS DUE TO SCOURING AROUND TURBINE BASES – AFTER ALL SCOURED MATERIAL HAS SETTLED .....	101
10A.7.101: CUMULATIVE DIFFERENCE TO MEAN SPRING TIDE HIGH WATER LEVEL (M) .....	102
10A.7.102: CUMULATIVE DIFFERENCE TO MEAN SPRING TIDE LOW WATER LEVEL (M).....	103
10A.7.103: CUMULATIVE DIFFERENCE TO MEAN NEAP TIDE HIGH WATER LEVEL (M) .....	104
10A.7.104: CUMULATIVE DIFFERENCE TO MEAN NEAP TIDE LOW WATER LEVEL (M).....	105
10A.7.105: CUMULATIVE DIFFERENCE TO MEAN SPRING TIDE PEAK FLOOD CURRENT SPEED (M/S).....	106
10A.7.106: CUMULATIVE DIFFERENCE TO MEAN SPRING TIDE PEAK EBB CURRENT SPEED (M/S) .....	107
10A.7.107: CUMULATIVE DIFFERENCE TO MEAN NEAP TIDE PEAK FLOOD CURRENT SPEED (M/S).....	108
10A.7.108: CUMULATIVE DIFFERENCE TO MEAN NEAP TIDE PEAK EBB CURRENT SPEED (M/S)....	109
10A.7.109: CUMULATIVE DIFFERENCE TO 50-PERCENTILE CURRENT SPEED (M/S).....	110
10A.7.110: CUMULATIVE DIFFERENCE TO 90-PERCENTILE CURRENT SPEED (M/S).....	111
10A.7.111: CUMULATIVE DIFFERENCE TO 95-PERCENTILE CURRENT SPEED (M/S).....	112
10A.7.112: CUMULATIVE DIFFERENCE TO 99-PERCENTILE CURRENT SPEED (M/S).....	113
10A.7.113: CUMULATIVE DIFFERENCE TO 50-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) .....	114
10A.7.114: CUMULATIVE DIFFERENCE TO 90-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) .....	115
10A.7.115: CUMULATIVE DIFFERENCE TO 95-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) .....	116
10A.7.116: CUMULATIVE DIFFERENCE TO 99-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) .....	117
10A.7.117: CUMULATIVE DIFFERENCE TO EXCEEDANCE OF CRITICAL SHEAR STRESS – BASED ON COMBINED (CURRENTS PLUS WAVES) MAXIMUM BED SHEAR STRESS.....	118
10A.7.118: CUMULATIVE DIFFERENCE TO EXCEEDANCE OF CRITICAL SHEAR STRESS – BASED ON COMBINED (CURRENTS PLUS WAVES) MEAN BED SHEAR STRESS .....	119
10A.7.119: FAR-FIELD SUSPENDED SEDIMENT TRANSPORT PATHWAYS – PRE AND POST DEVELOPMENTS.....	120
10A.7.120: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO MEAN SPRING TIDE HIGH WATER LEVEL (M) – FAR-FIELD .....	121

10A.7.121: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO MEAN SPRING TIDE LOW WATER LEVEL (M) – FAR-FIELD .....	122
10A.7.122: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO MEAN NEAP TIDE HIGH WATER LEVEL (M) – FAR-FIELD .....	123
10A.7.123: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO MEAN NEAP TIDE LOW WATER LEVEL (M) – FAR-FIELD .....	124
10A.7.124: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO MEAN SPRING TIDE PEAK FLOOD CURRENT SPEED (M/S) – FAR-FIELD .....	125
10A.7.125: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO MEAN SPRING TIDE PEAK EBB CURRENT SPEED (M/S) – FAR-FIELD .....	126
10A.7.126: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO MEAN NEAP TIDE PEAK FLOOD CURRENT SPEED (M/S) – FAR-FIELD .....	127
10A.7.127: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO MEAN NEAP TIDE PEAK EBB CURRENT SPEED (M/S) – FAR-FIELD .....	128
10A.7.128: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO 50-PERCENTILE CURRENT SPEED (M/S) – FAR-FIELD .....	129
10A.7.129: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO 90-PERCENTILE CURRENT SPEED (M/S) – FAR-FIELD .....	130
10A.7.130: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO 95-PERCENTILE CURRENT SPEED (M/S) – FAR-FIELD .....	131
10A.7.131: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO 99-PERCENTILE CURRENT SPEED (M/S) – FAR-FIELD .....	132
10A.7.132: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO 50-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – FAR-FIELD.....	133
10A.7.133: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO 90-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – FAR-FIELD.....	134
10A.7.134: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO 95-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – FAR-FIELD.....	135
10A.7.135: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE TO 99-PERCENTILE SIGNIFICANT WAVE HEIGHT (M) – FAR-FIELD.....	136
10A.7.136: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE OF CRITICAL SHEAR STRESS – BASED ON COMBINED (CURRENTS PLUS WAVES) MAXIMUM BED SHEAR STRESS – FAR-FIELD.....	137
10A.7.137: DIFFERENCE DUE TO POTENTIAL CLIMATE CHANGE OF CRITICAL SHEAR STRESS – BASED ON COMBINED (CURRENTS PLUS WAVES) MEAN BED SHEAR STRESS – FAR-FIELD.....	138

This annex includes the results of the assessment of the effect of the proposed developments on the metocean and sediment regimes.

The annex is divided into the following sections:

- The effects due to the Inch Cape development only
- The cumulative impacts from Neart na Gaoithe and the Firth of Forth Round 3 developments, in addition to those from the Inch Cape OWF; and
- The effects from the potential climate change

The effects from the developments are shown as differences, or changes, to key metocean and sediment regime parameters, including water level, current speed, wave height and ultimately the exceedance of the critical shear stress. It is the change in the percentage of time that the critical shear stress is exceeded which most clearly demonstrates the impact of the development(s) on the sediment regime. An additional set of plot (Figure 10A.7.119) shows any changes to the far-field suspended sediment transport pathways.

Differences are calculated by subtracting the results from the baseline model runs from the same results obtained from the impact assessment model runs.

Therefore positive values (shown in the orange/brown colour range) indicate an increase (in the parameter) due to the development(s), and negative differences (shown in the pink/purple colour range) indicate a decrease in the presented parameter.

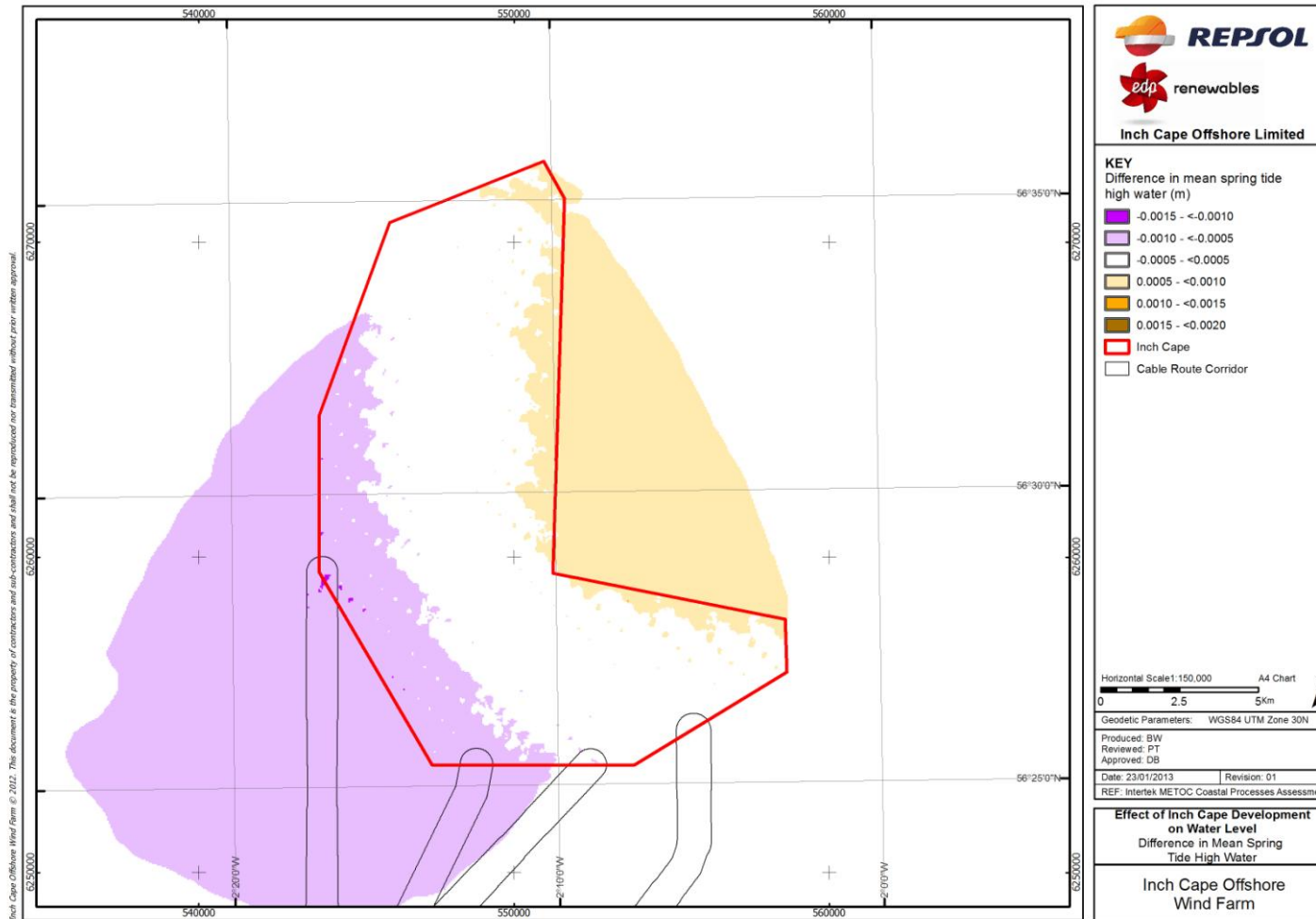
Finally, where possible the same contour banding has been used for the set of plots for each parameter (i.e. for the differences to 50, 90, 95 and 99%ile significant wave height), to allow easy comparison. This means that on some plots only one or two contour colours are presented.

### **Effects due to the Inch Cape Development**

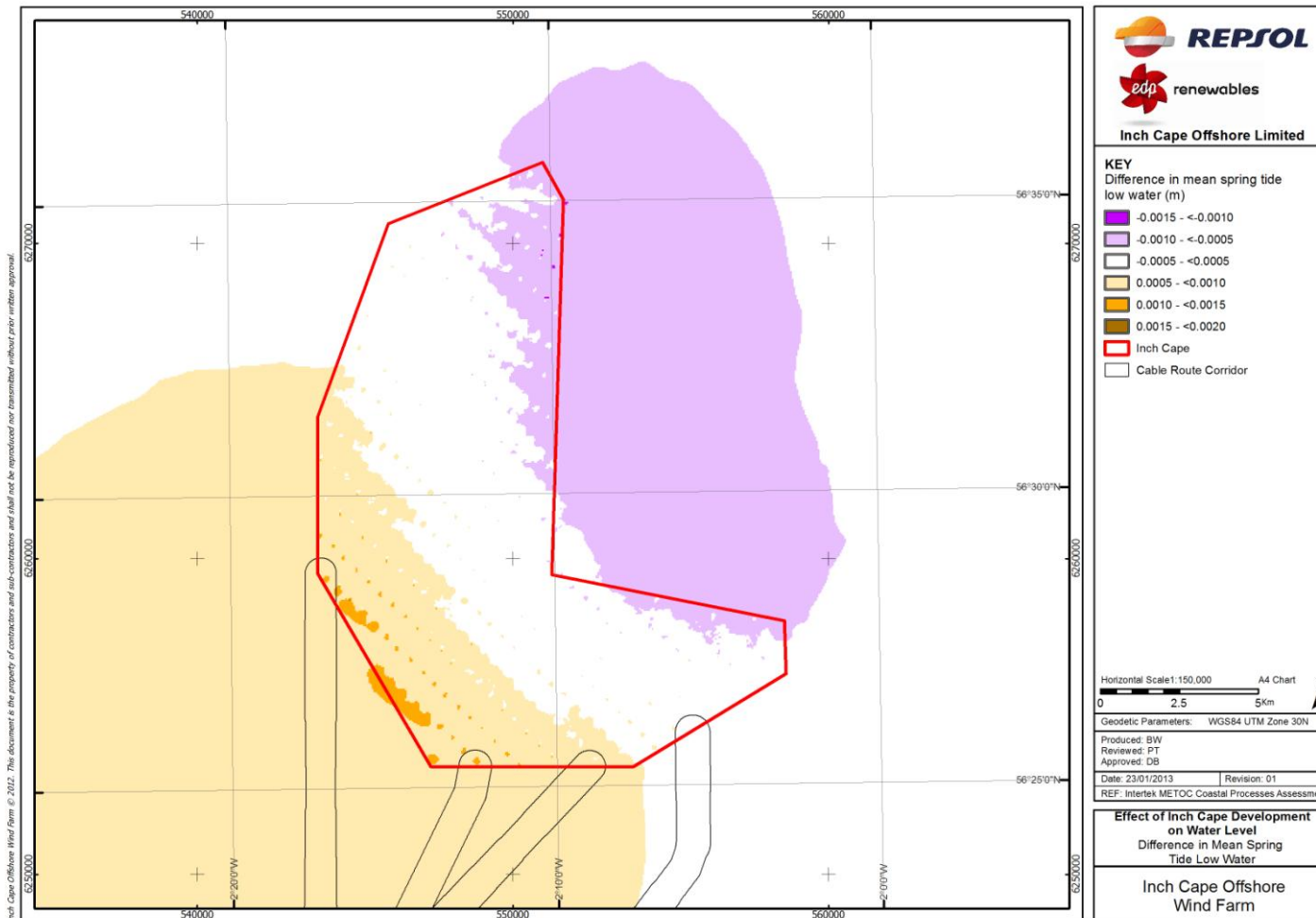
Effects are shown for the hydrodynamic regime, then the wave climate, and then the sediment regime. Near-field changes are shown first for each regime, followed by the regional, or far-field impacts.

### Hydrodynamic regime

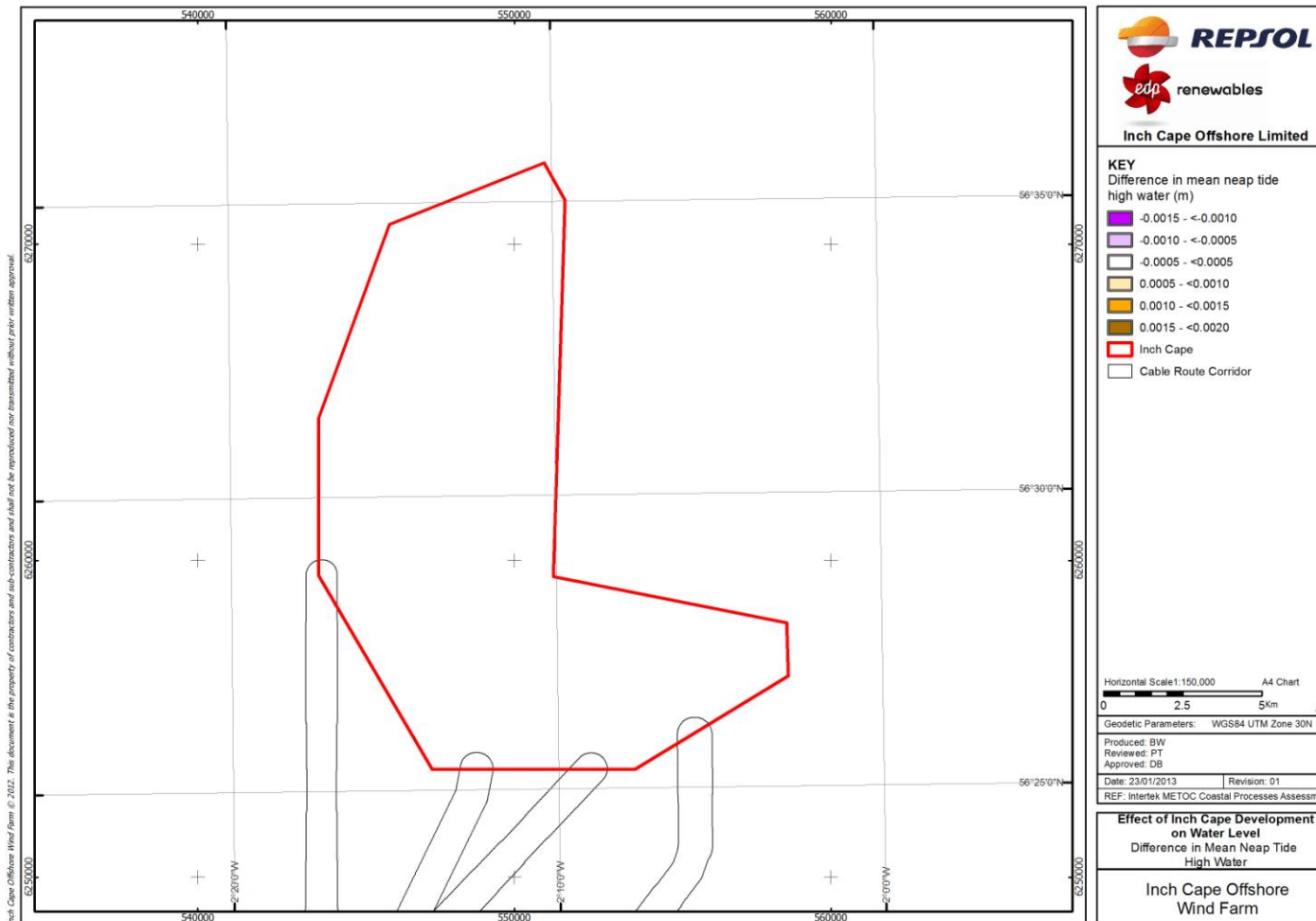
#### 10A.7.1 : Difference in mean spring tide high water (HW) level (m) – near-field



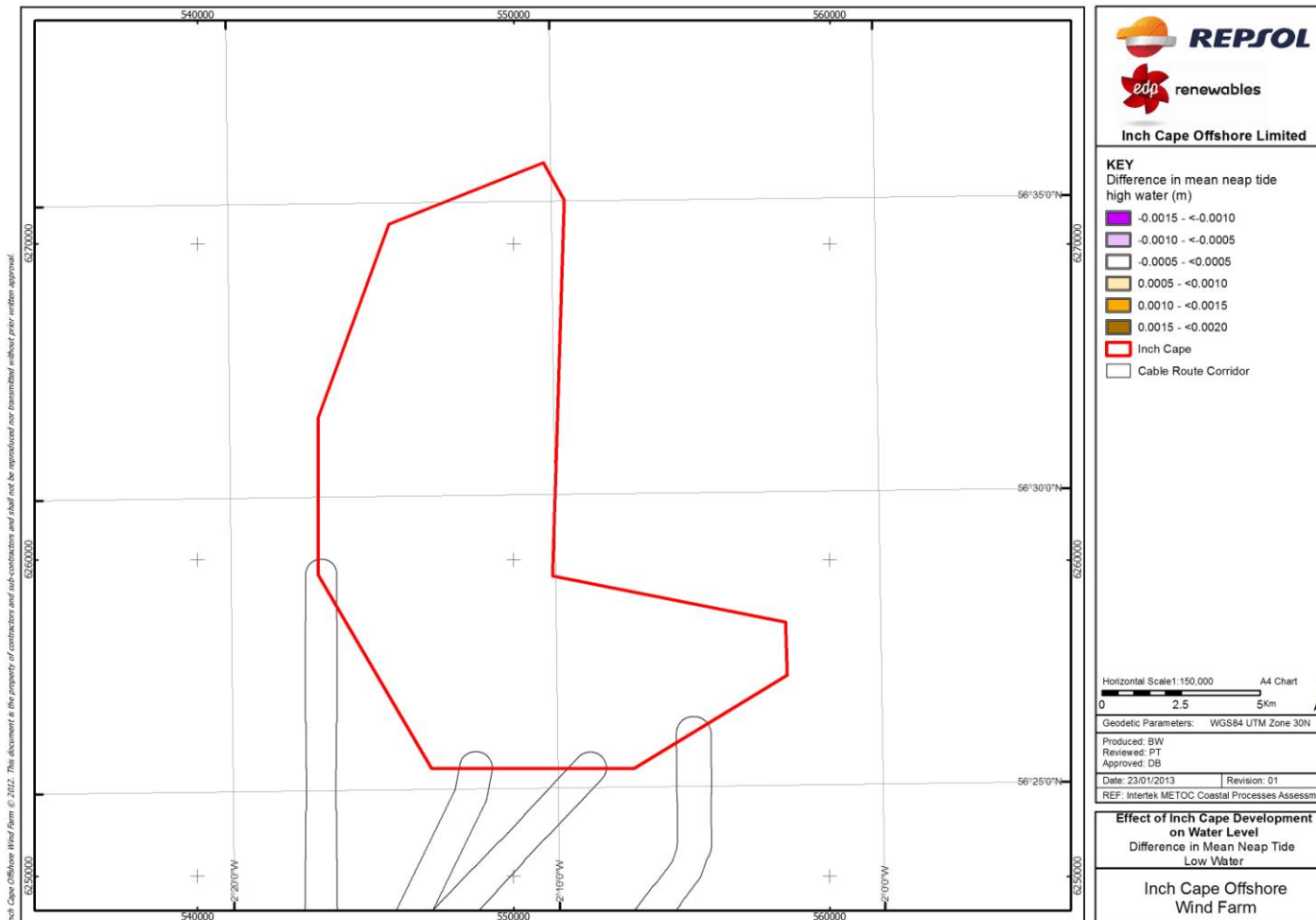
10A.7.2: Difference in mean spring tide low water (LW) level (m) – near-field



10A.7.3: Difference in mean neap tide high water (LW) level (m) – near-field



10A.7.4: Difference in mean neap tide low water (LW) level (m) – near-field

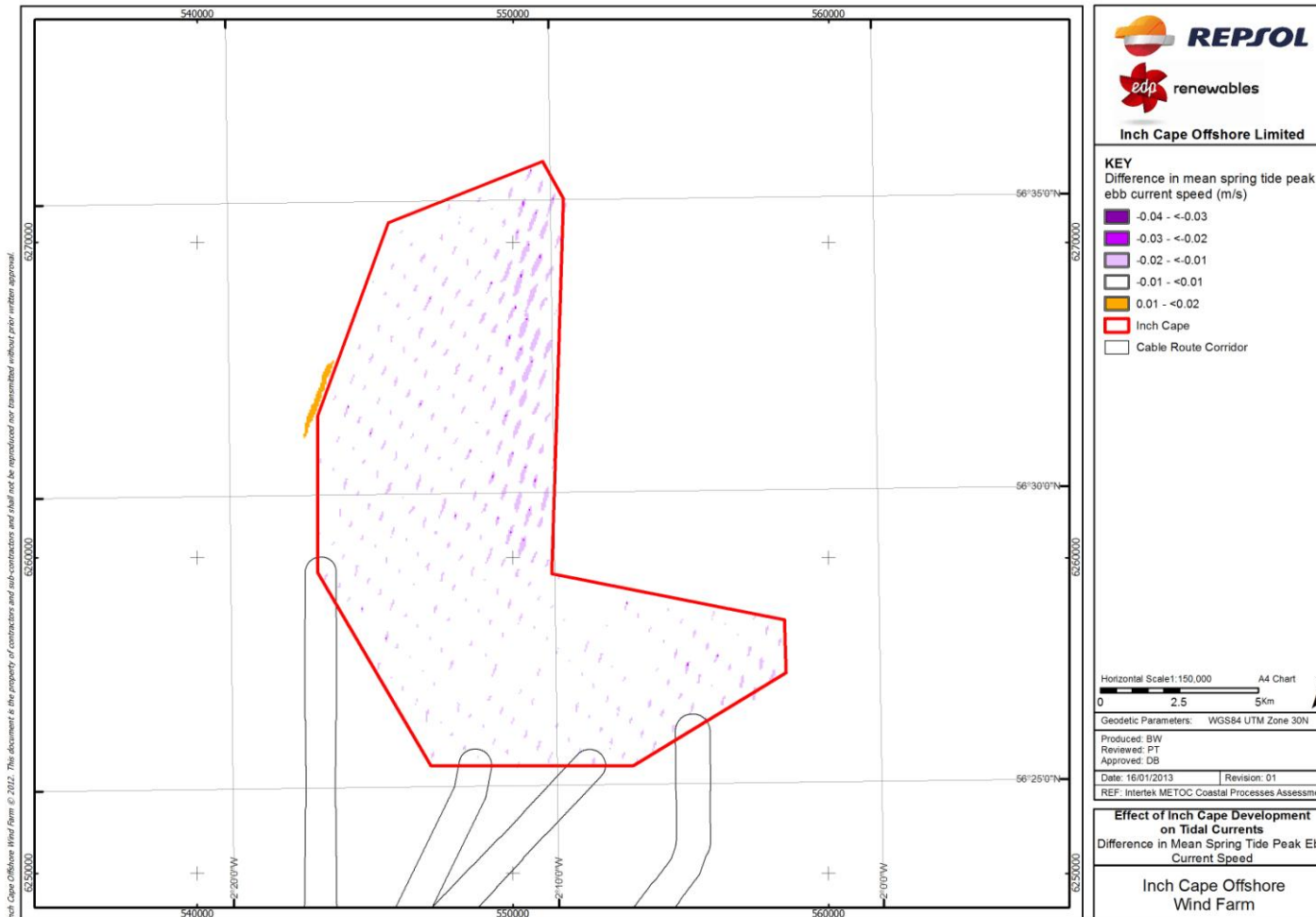


10A.7.5: Difference in mean spring tide peak flood current speed (m/s) – near-field

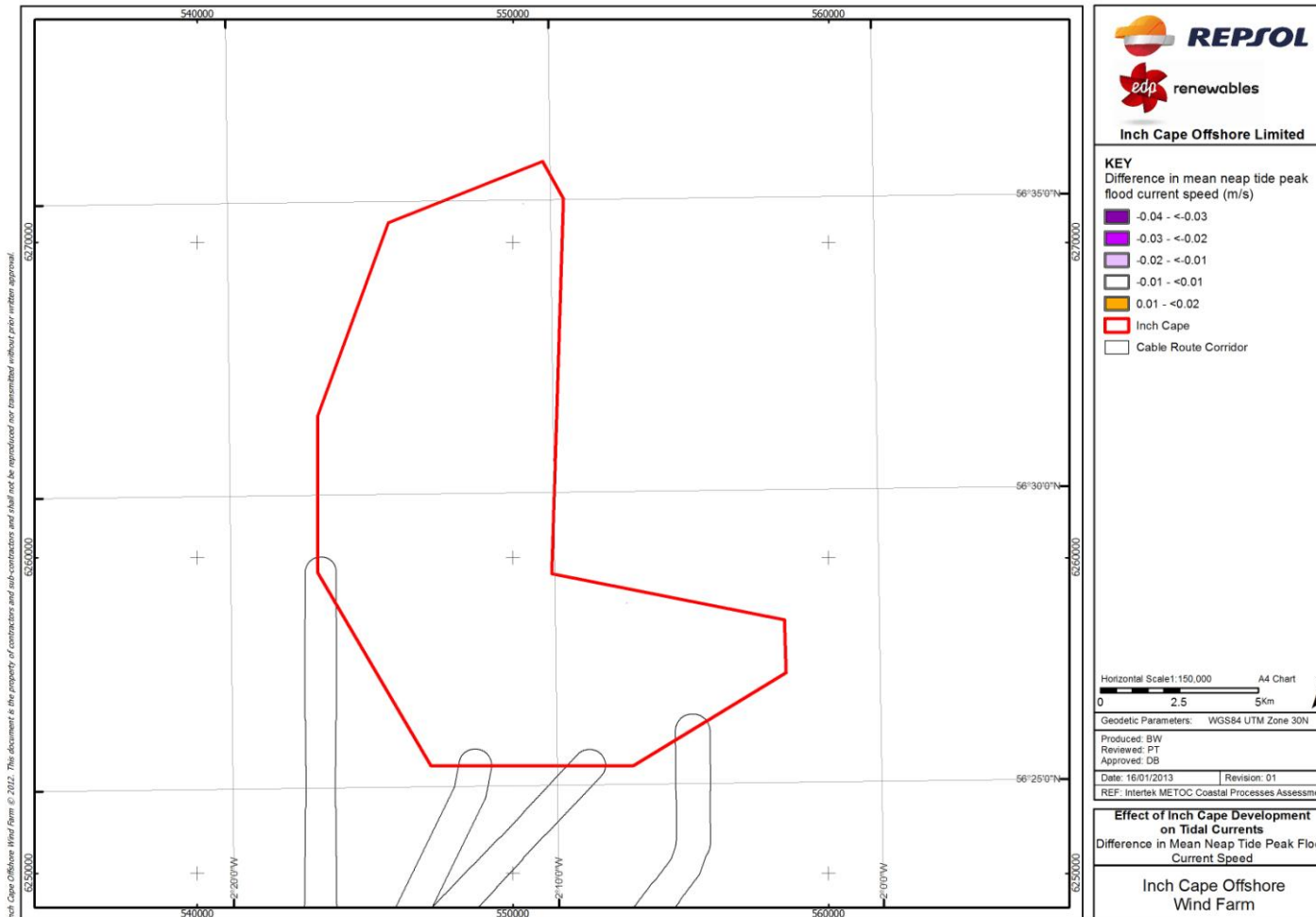




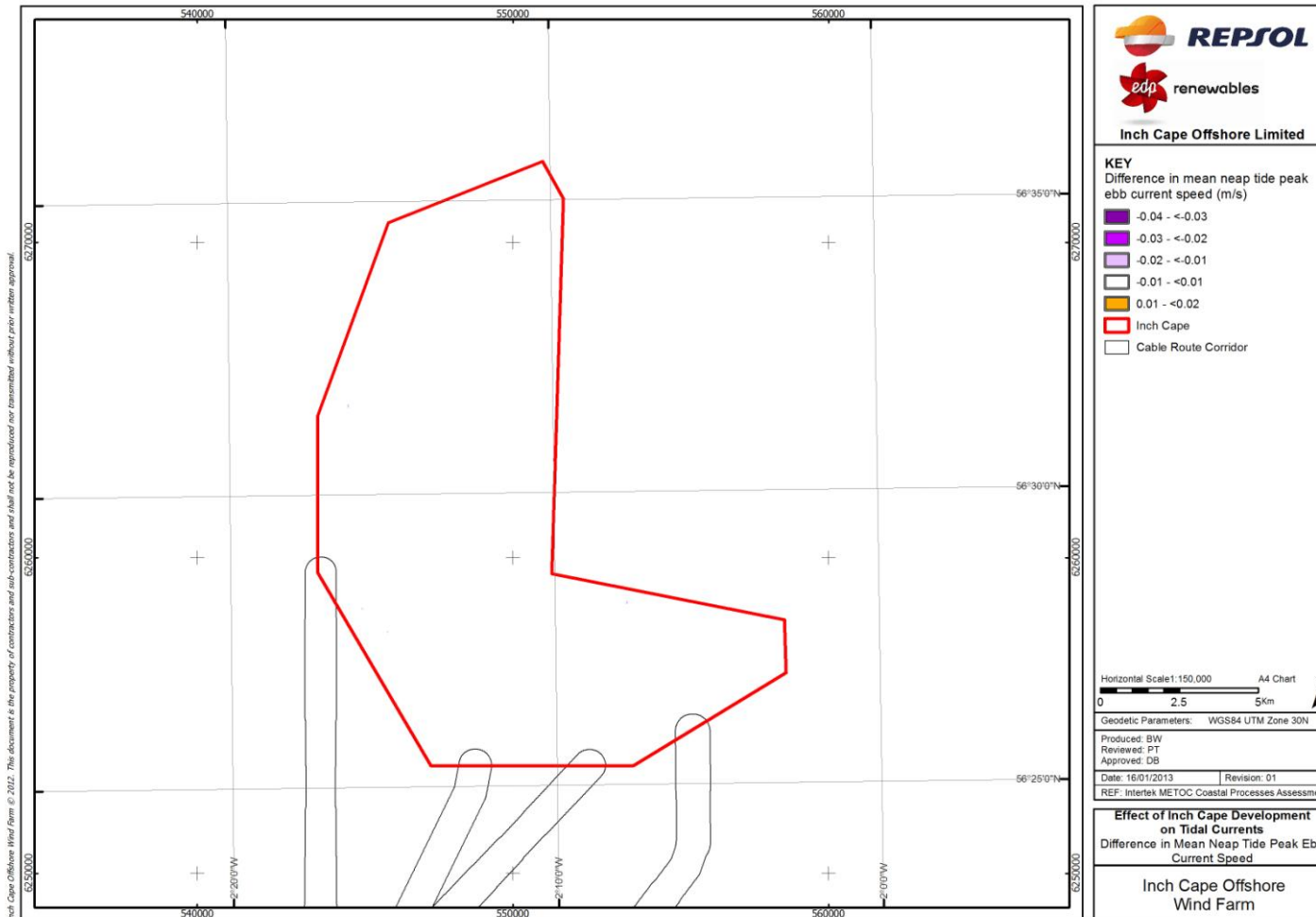
10A.7.6: Difference in mean spring tide peak ebb current speed (m/s) – near-field



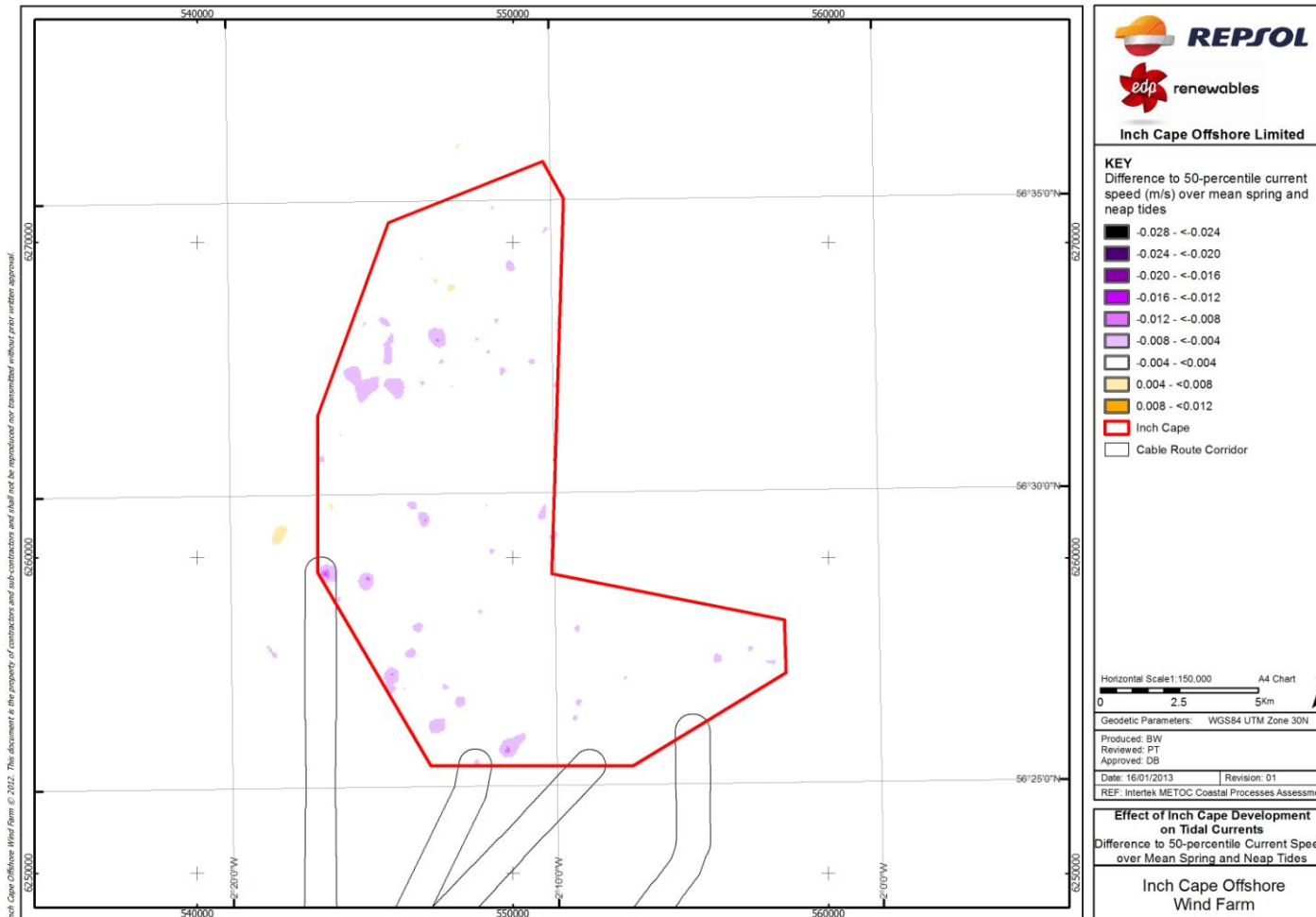
10A.7.7: Difference in mean neap tide peak flood current speed (m/s) – near-field



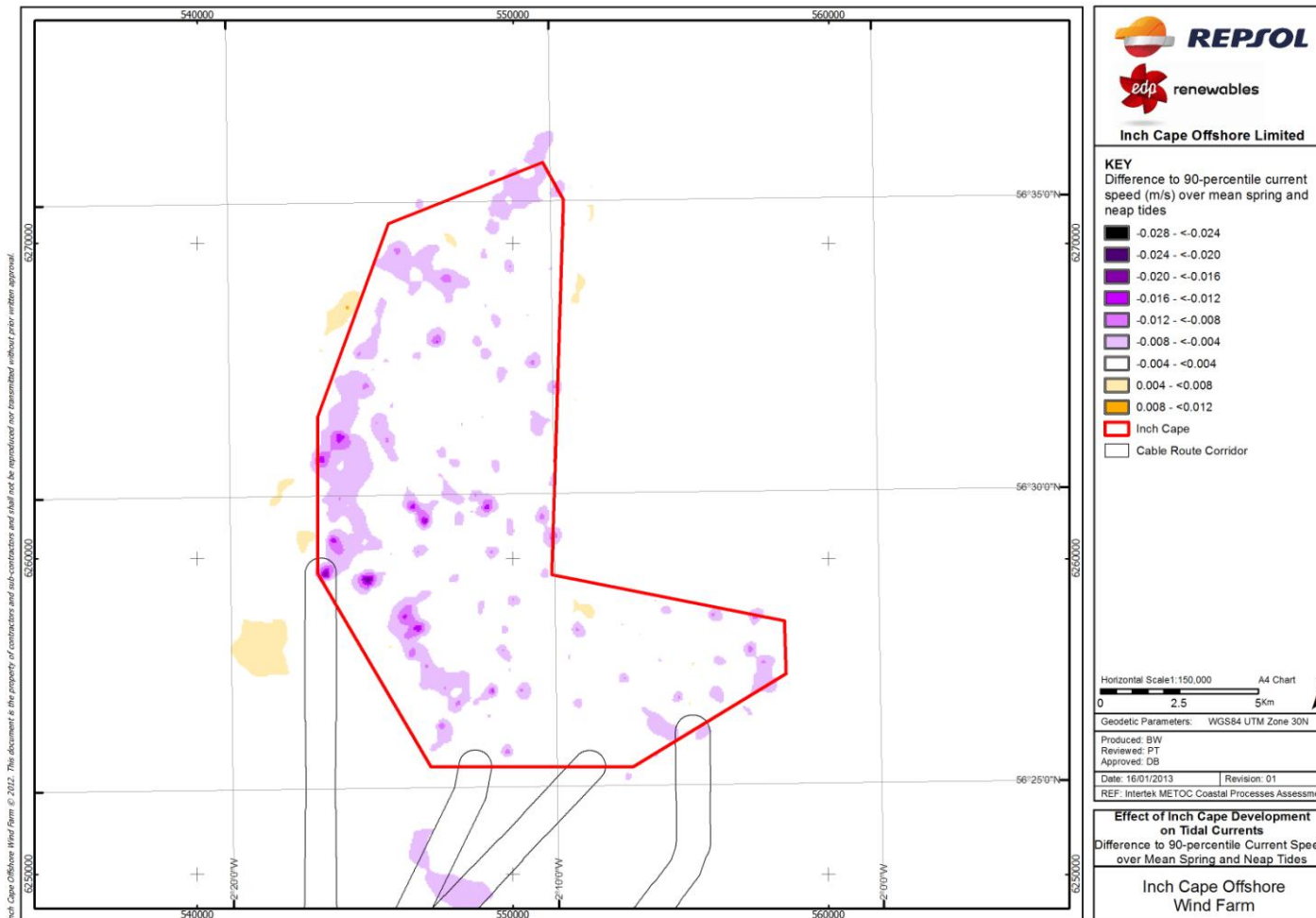
10A.7.8: Difference in mean neap tide peak ebb current speed (m/s) – near-field



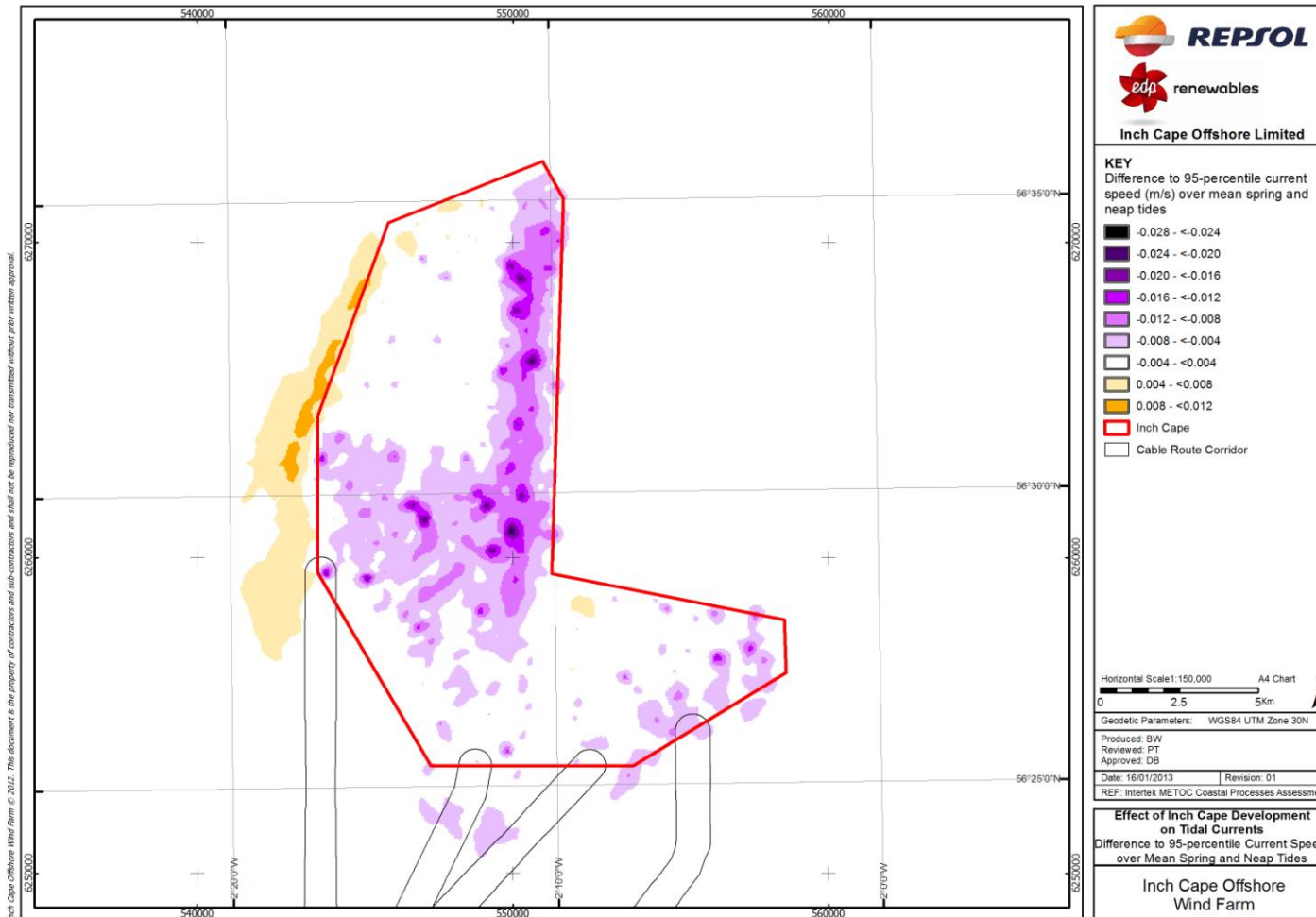
10A.7.9: Difference in the 50-percentile current speed (m/s) – near-field



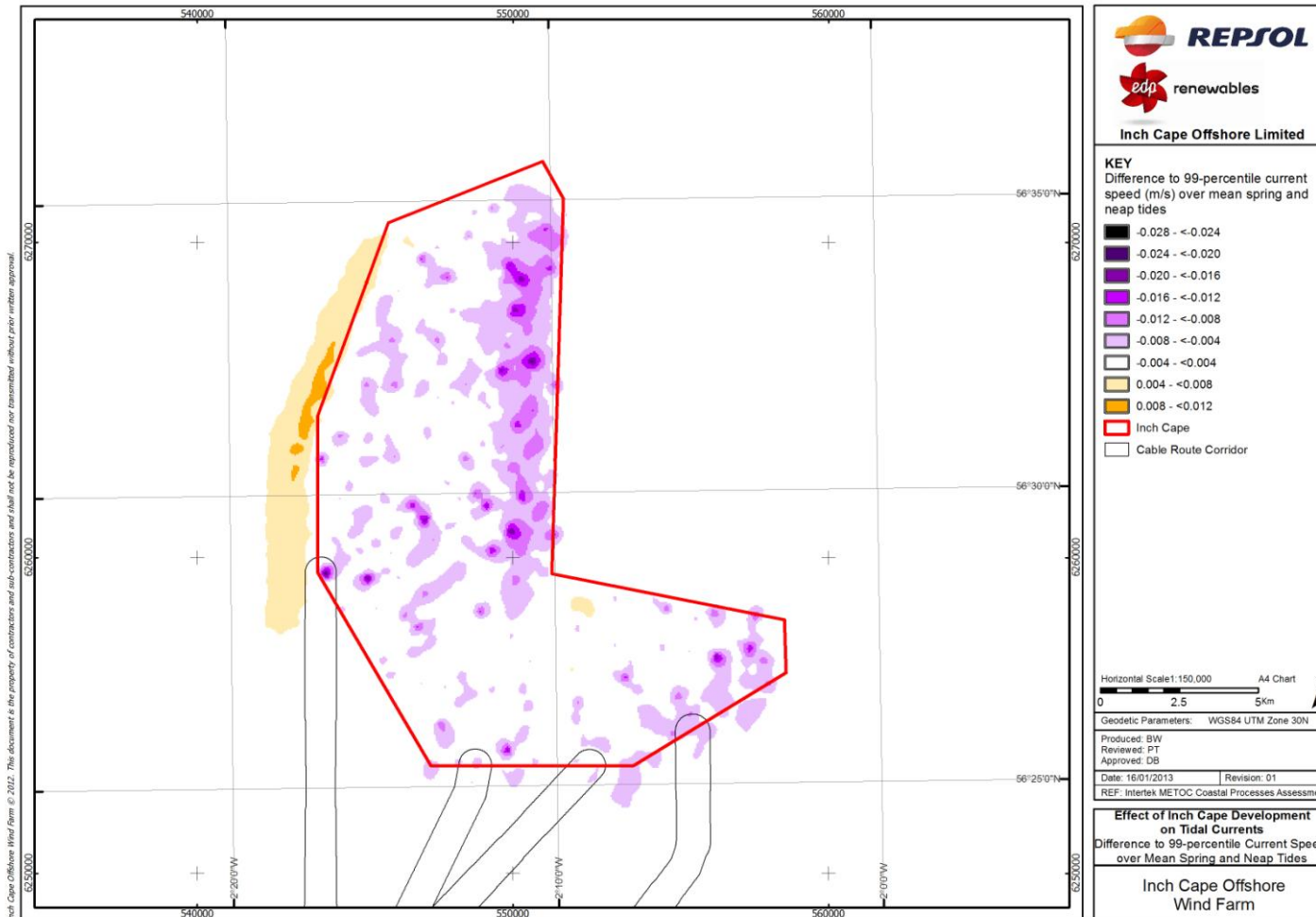
10A.7.10: Difference in the 90-percentile current speed (m/s) – near-field



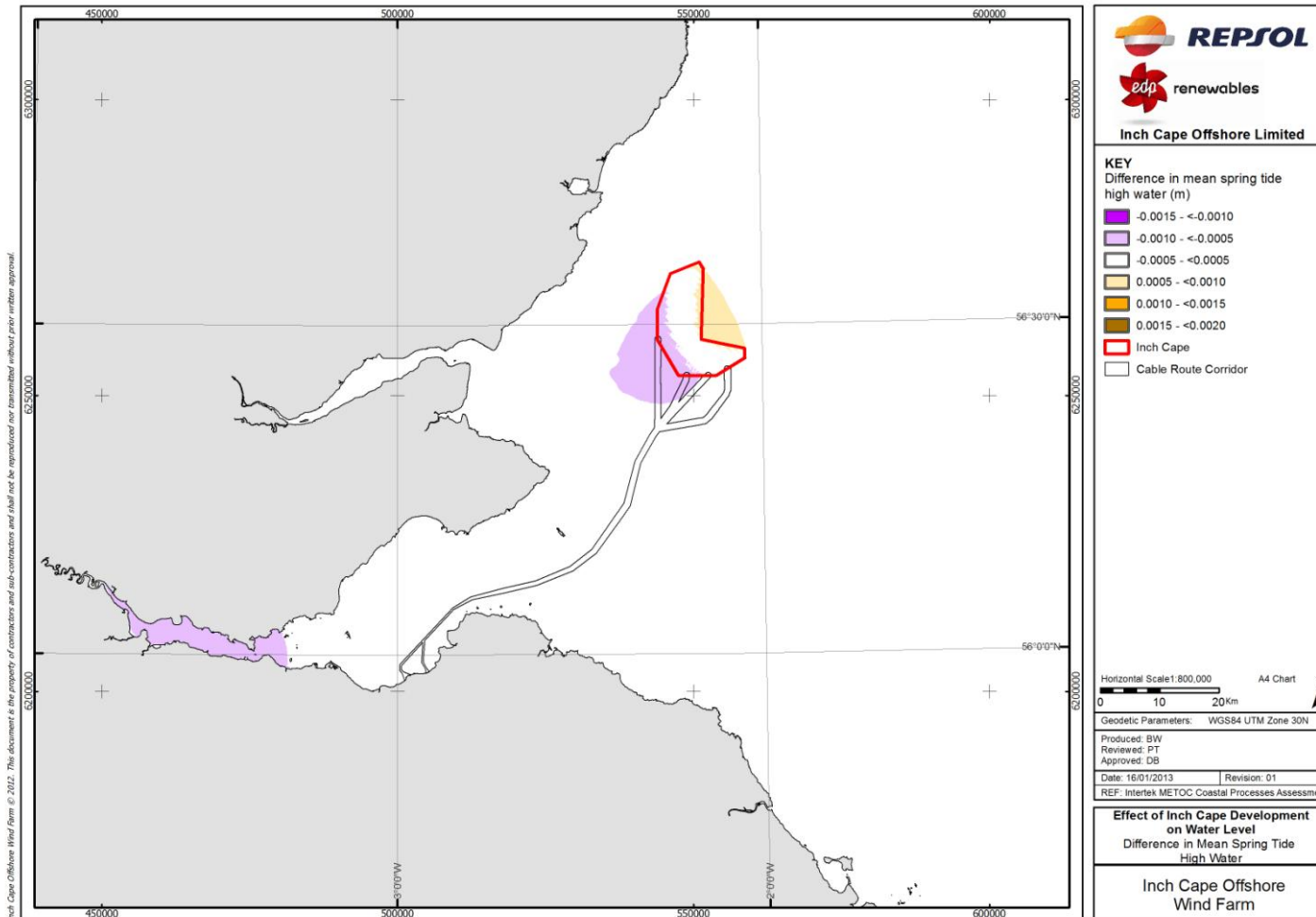
10A.7.11: Difference in the 95-percentile current speed (m/s) – near-field



10A.7.12: Difference in the 99-percentile current speed (m/s) – near-field

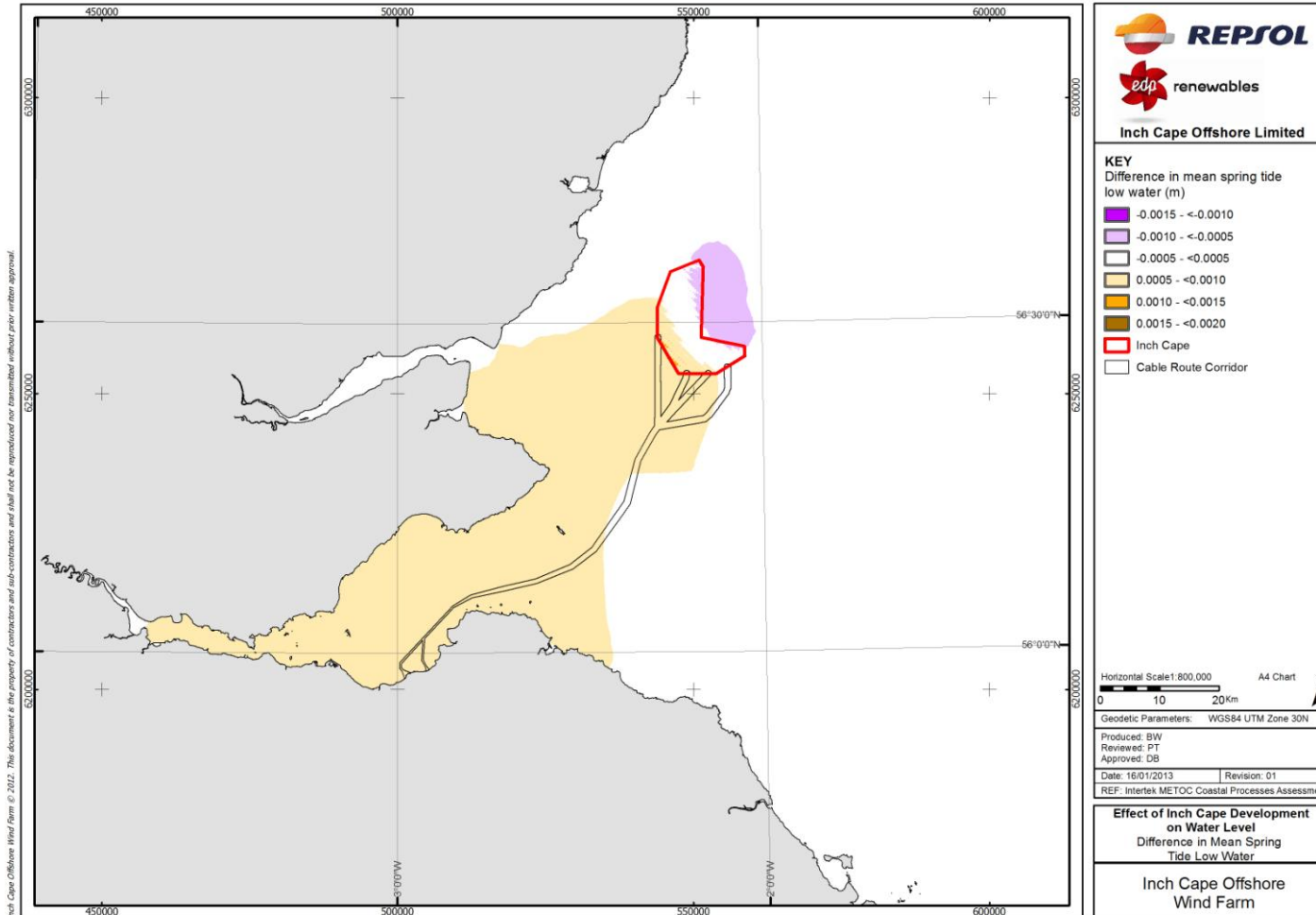


10A.7.13: Difference in mean spring tide high water (HW) level (m) – far-field

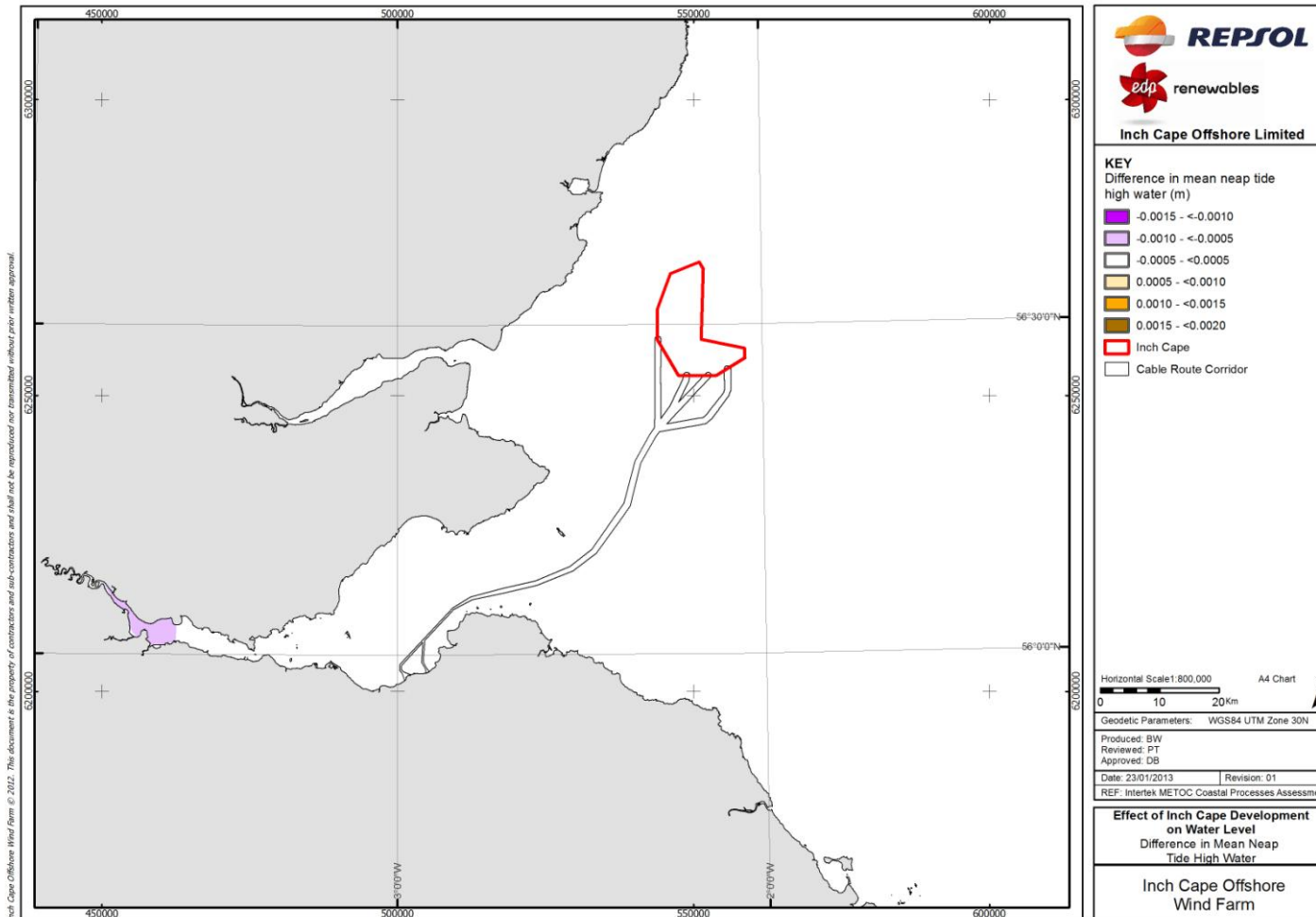




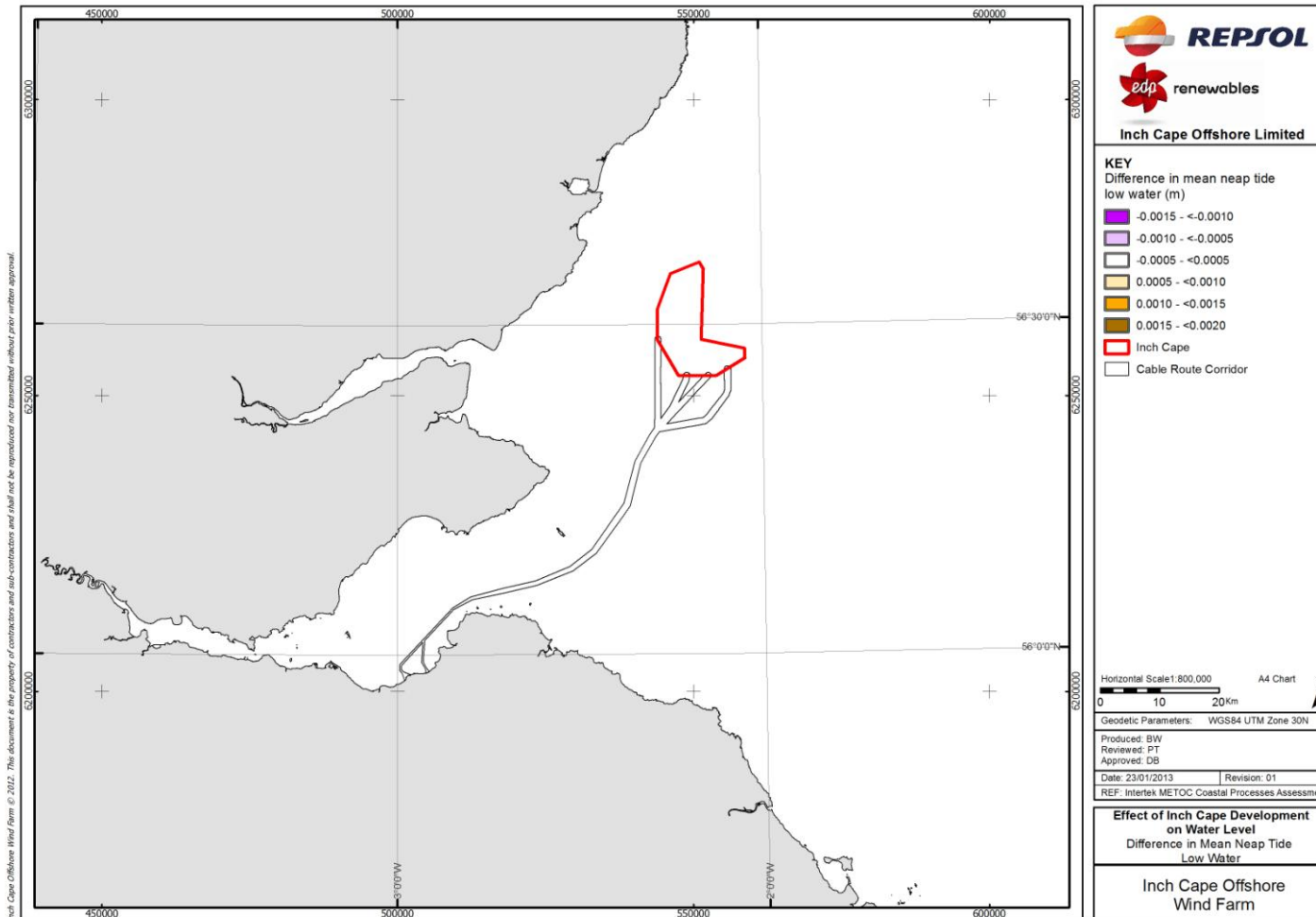
10A.7.14: Difference in mean spring tide low water (LW) level (m) – far-field



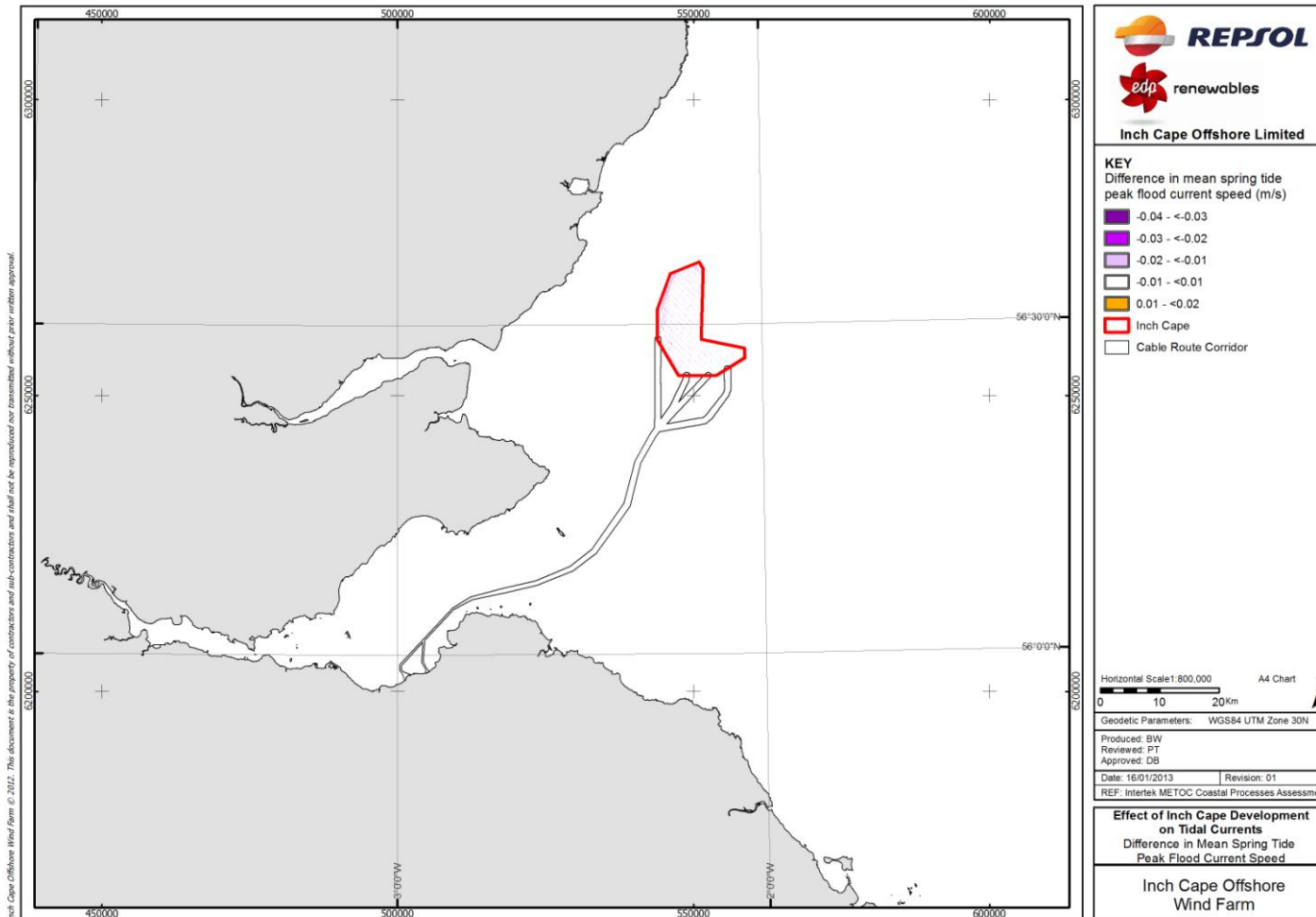
10A.7.15: Difference in mean neap tide high water (HW) level (m) – far-field



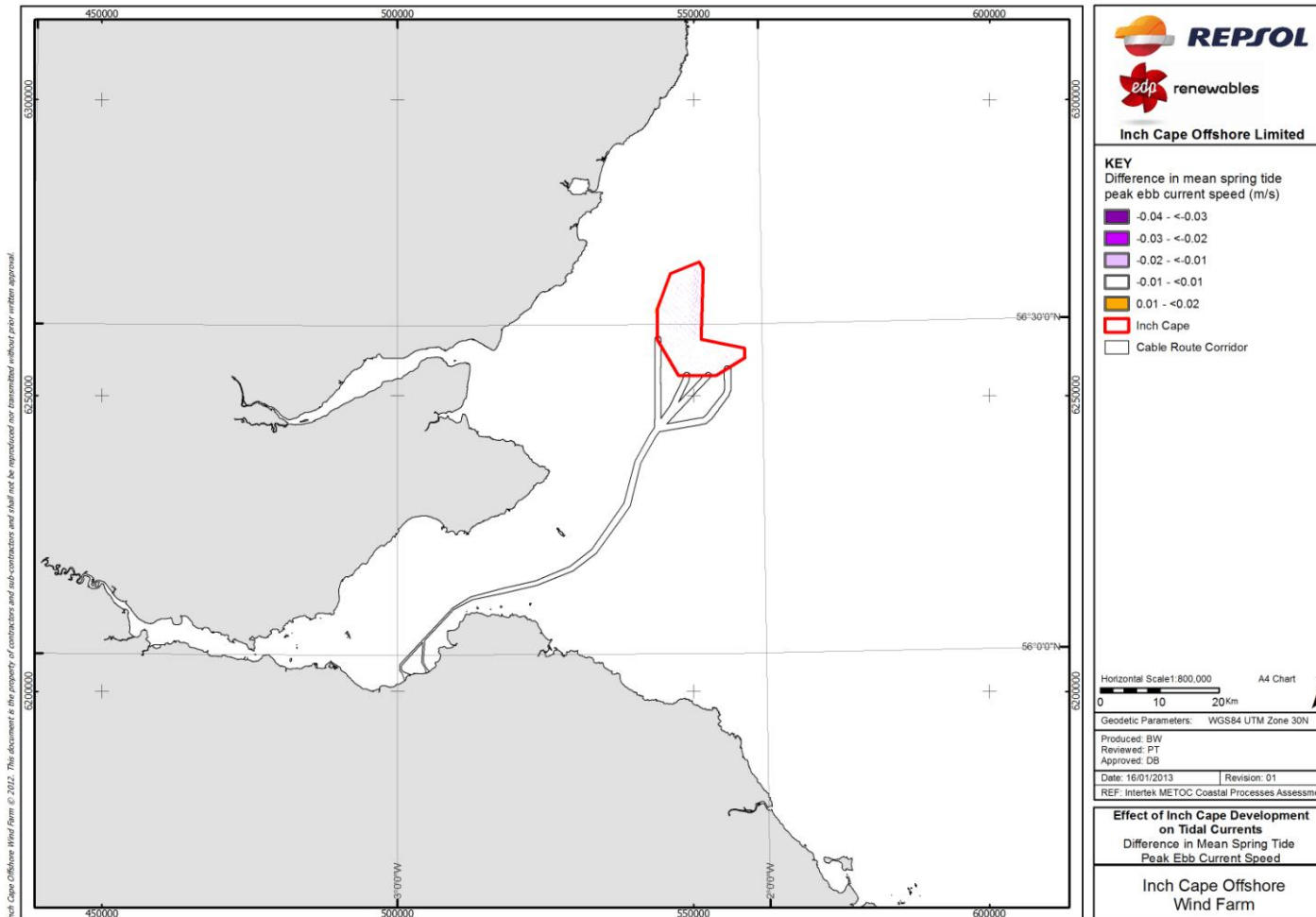
10A.7.16: Difference in mean neap tide low water (LW) level (m) – far-field



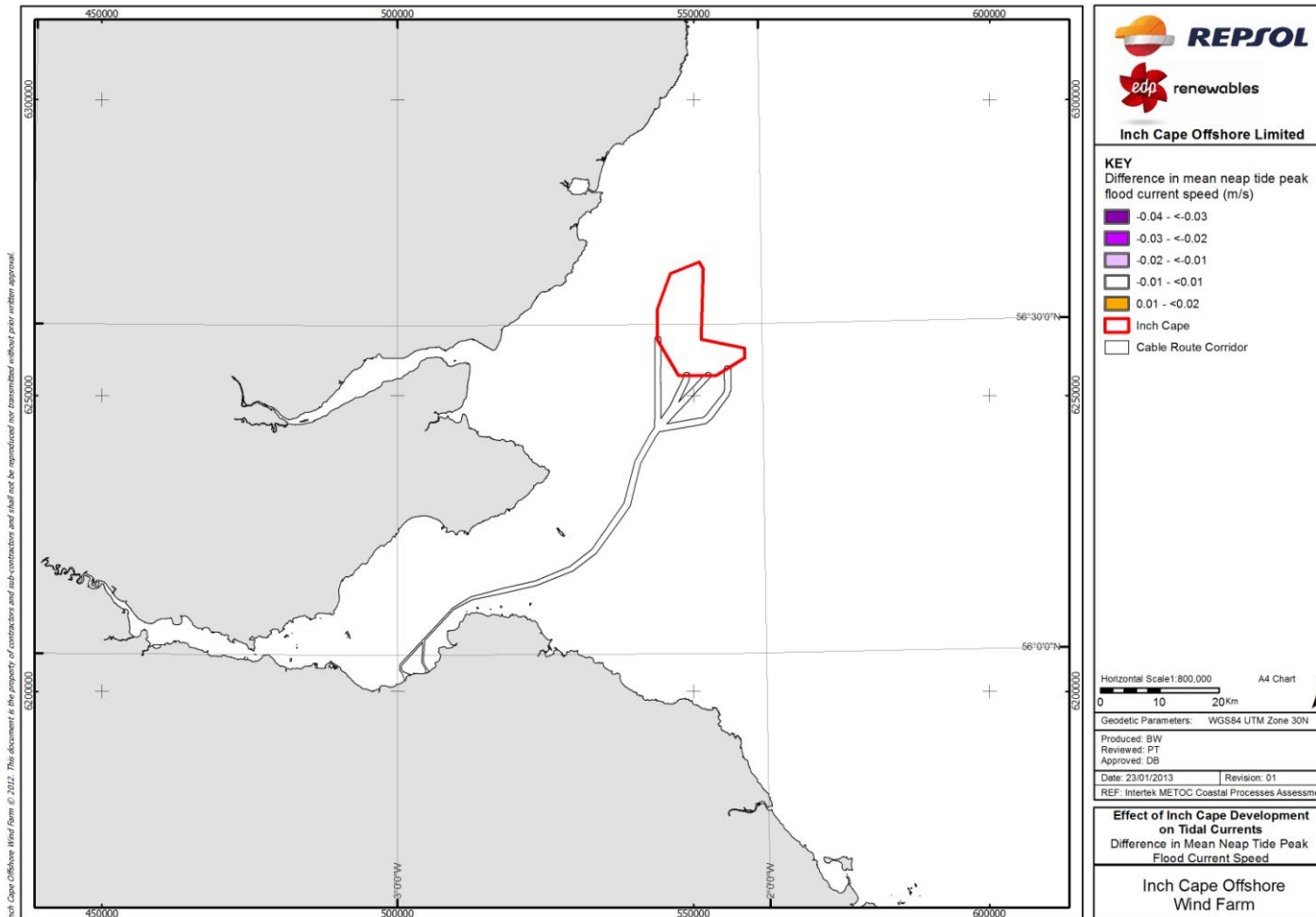
10A.7.17: Difference in mean spring tide peak flood current speed (m/s) – far-field



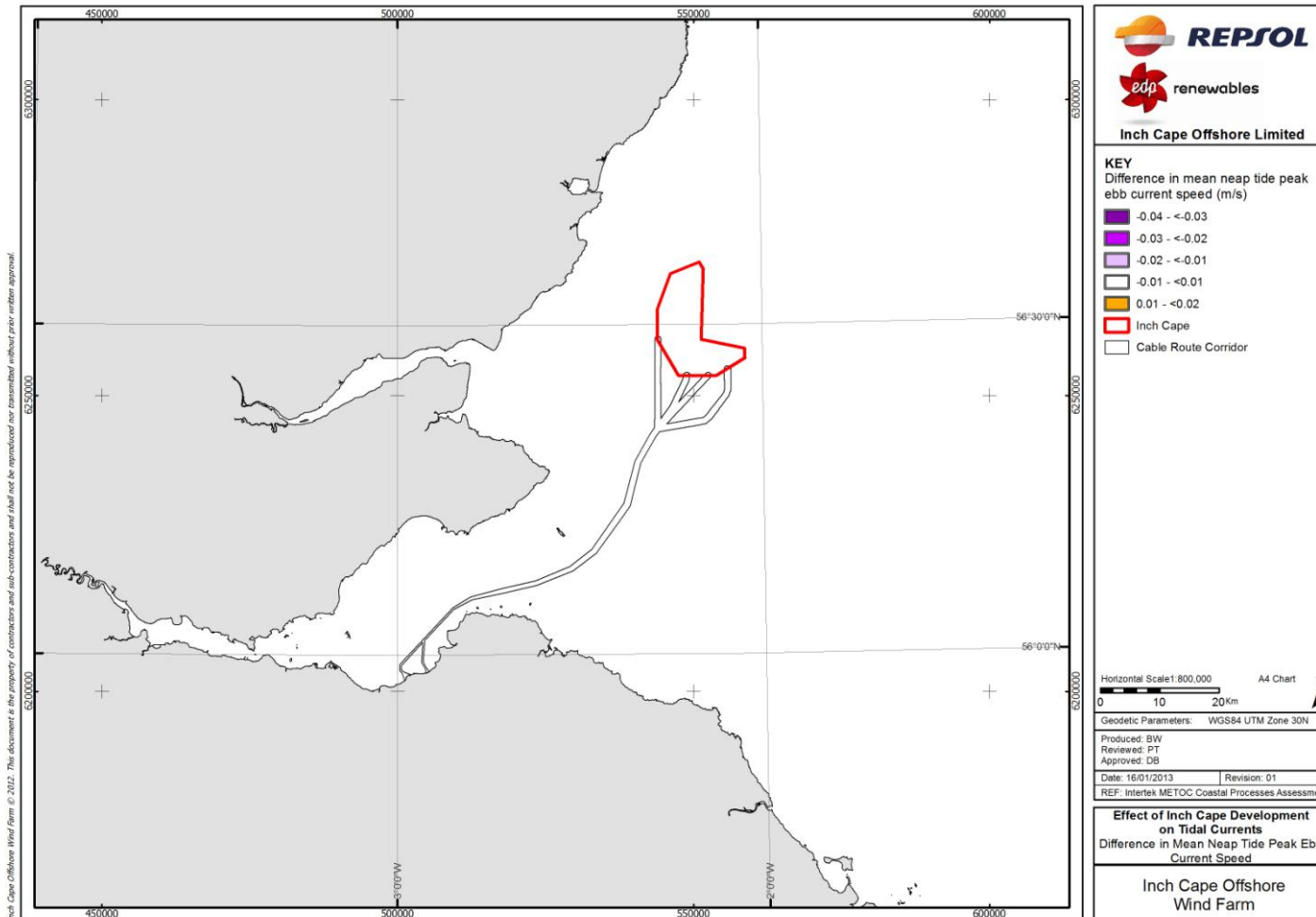
10A.7.18: Difference in mean spring tide peak ebb current speed (m/s) – far-field



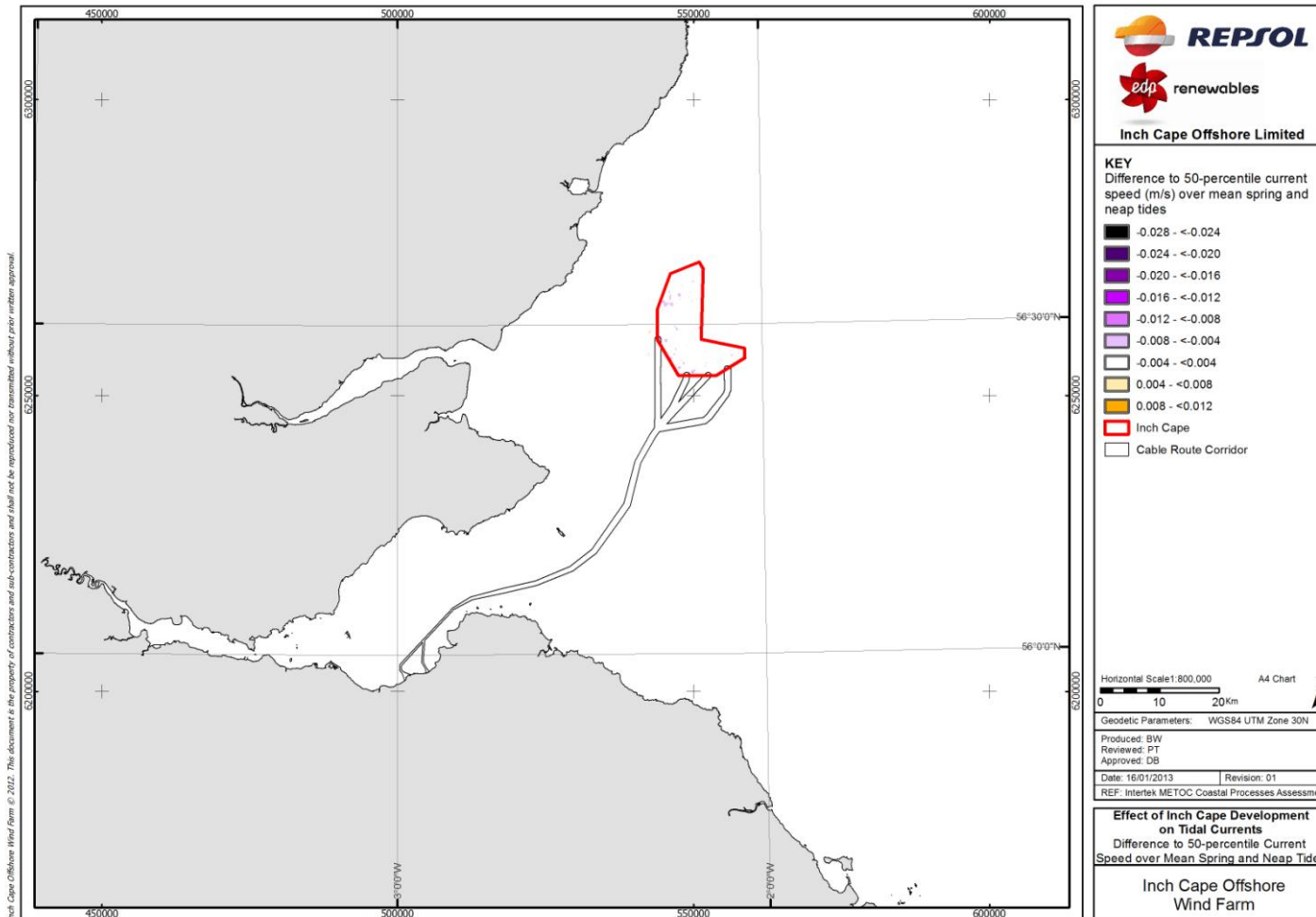
10A.7.19: Difference in mean neap tide peak flood current speed (m/s) – far-field



10A.7.20: Difference in mean neap tide peak ebb current speed (m/s) – far-field

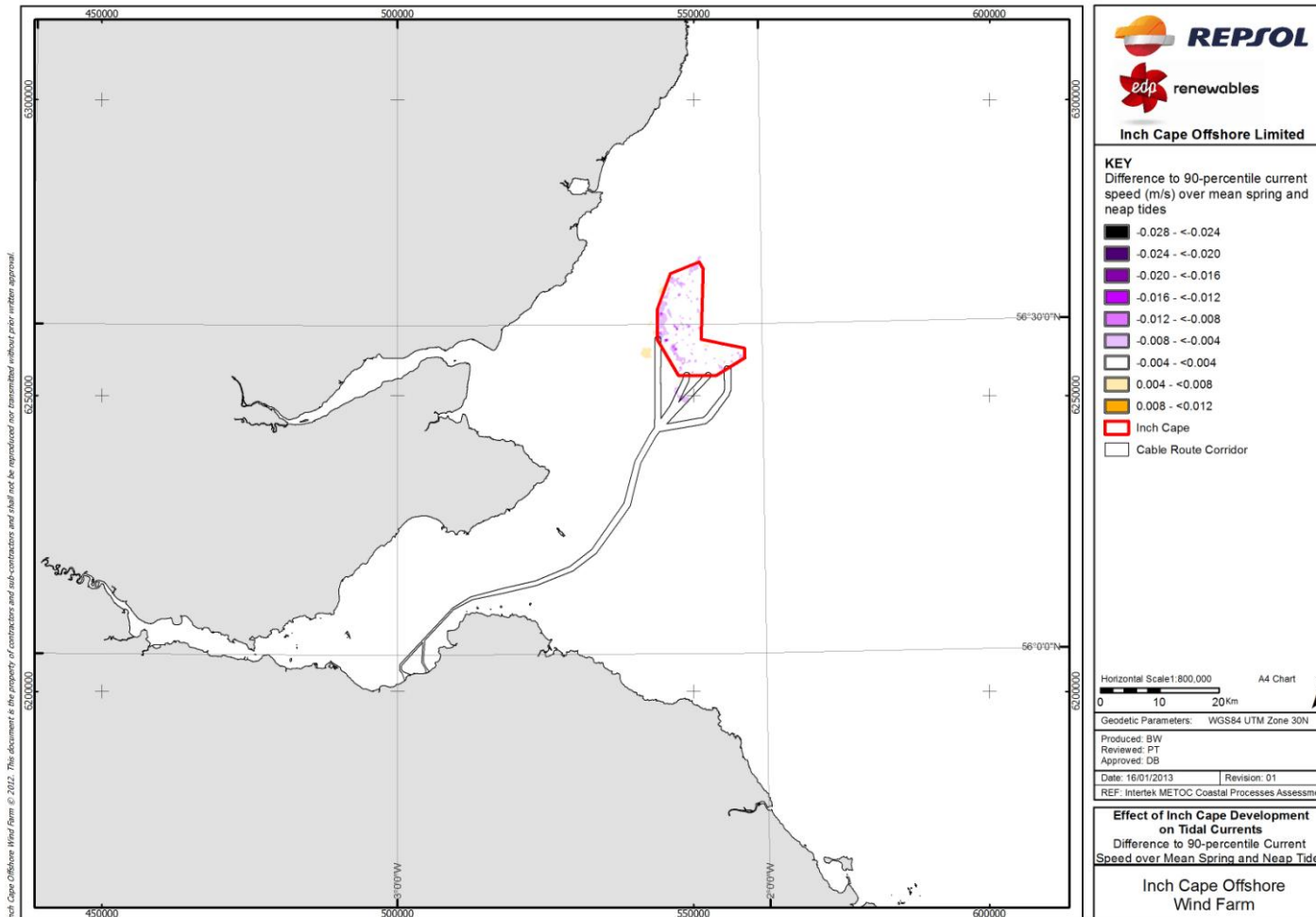


10A.7.21: Difference in 50-percentile current speed (m/s) – far-field

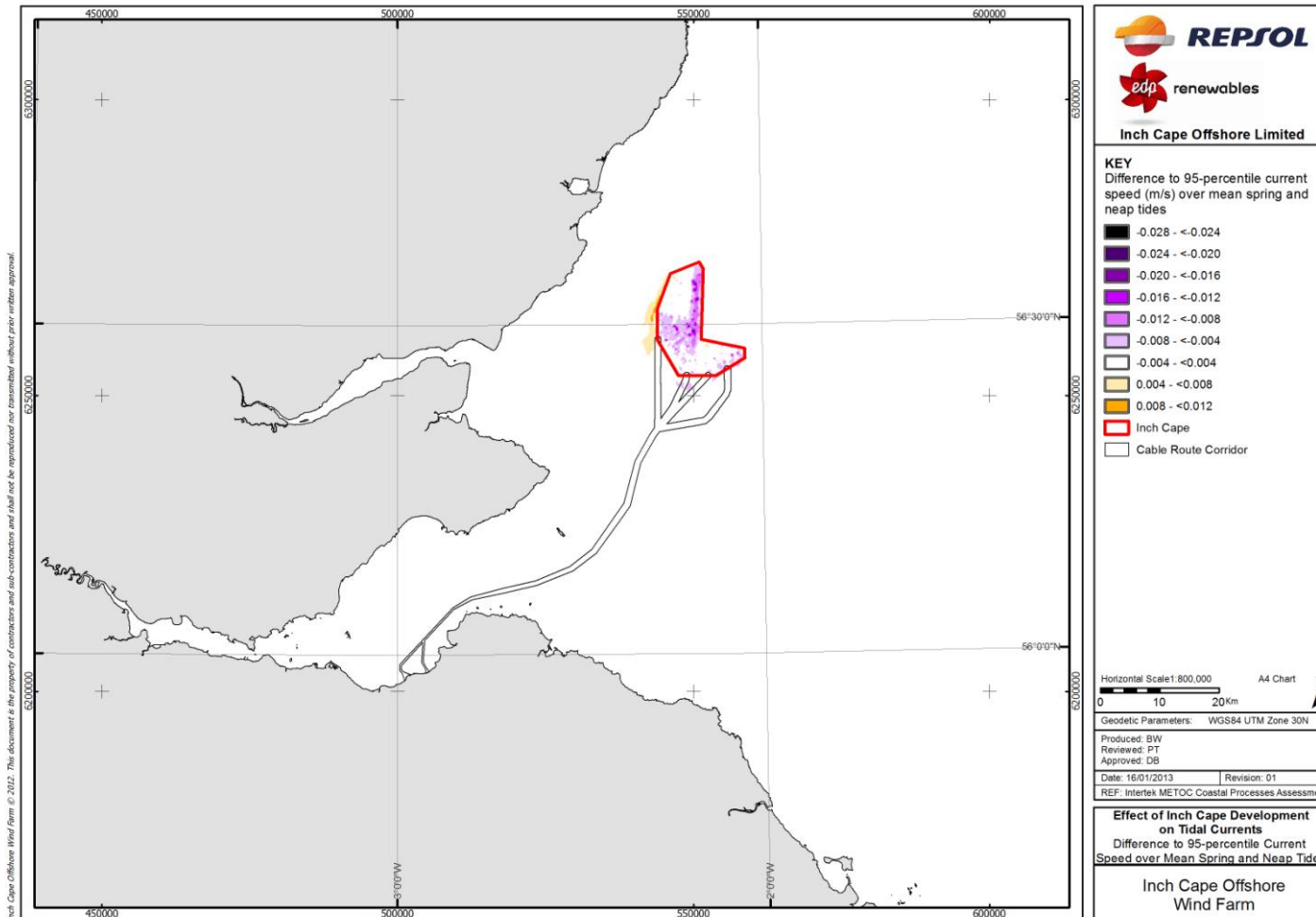




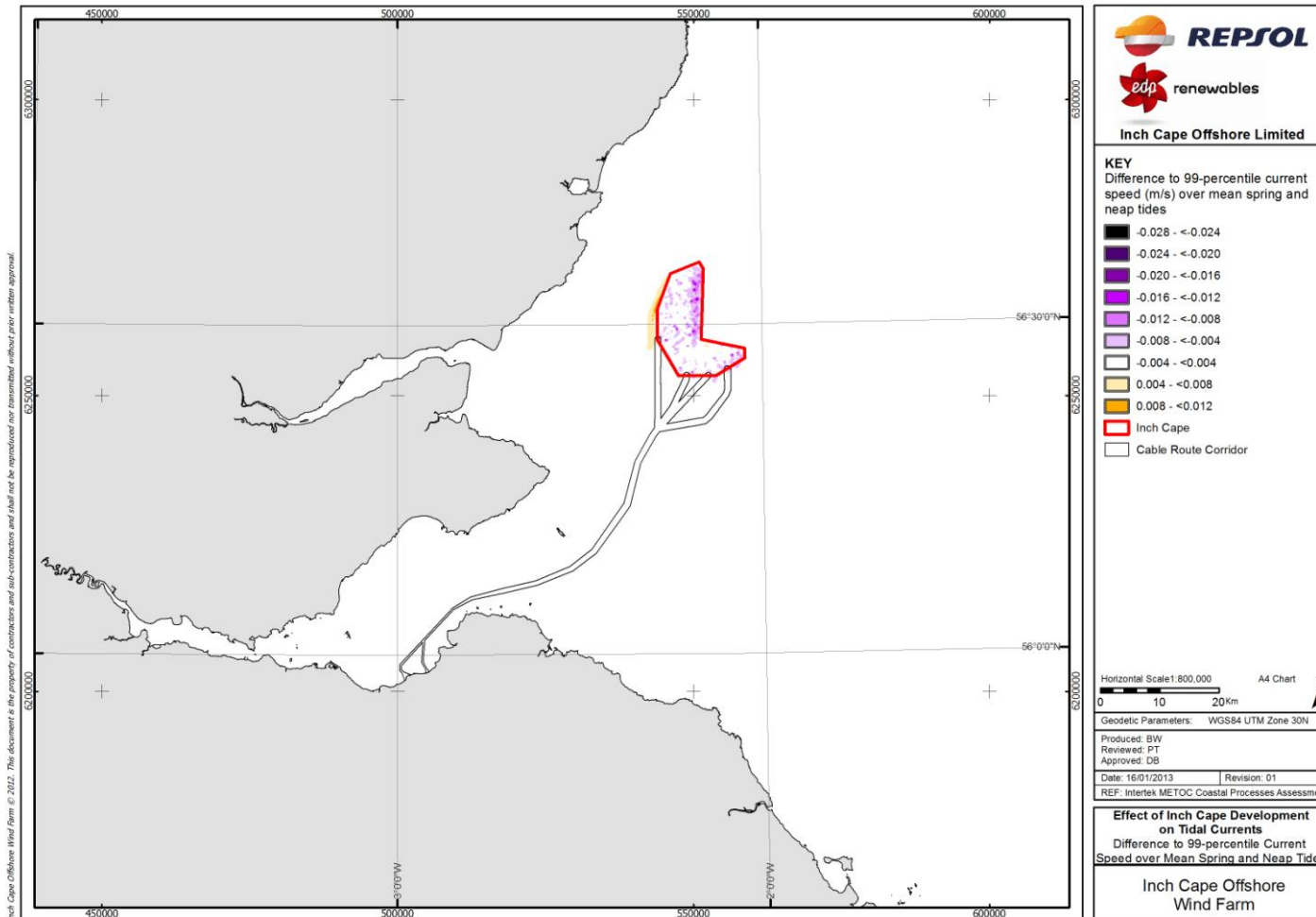
10A.7.22: Difference in 90-percentile current speed (m/s) – far-field



10A.7.23: Difference in 95-percentile current speed (m/s) – far-field

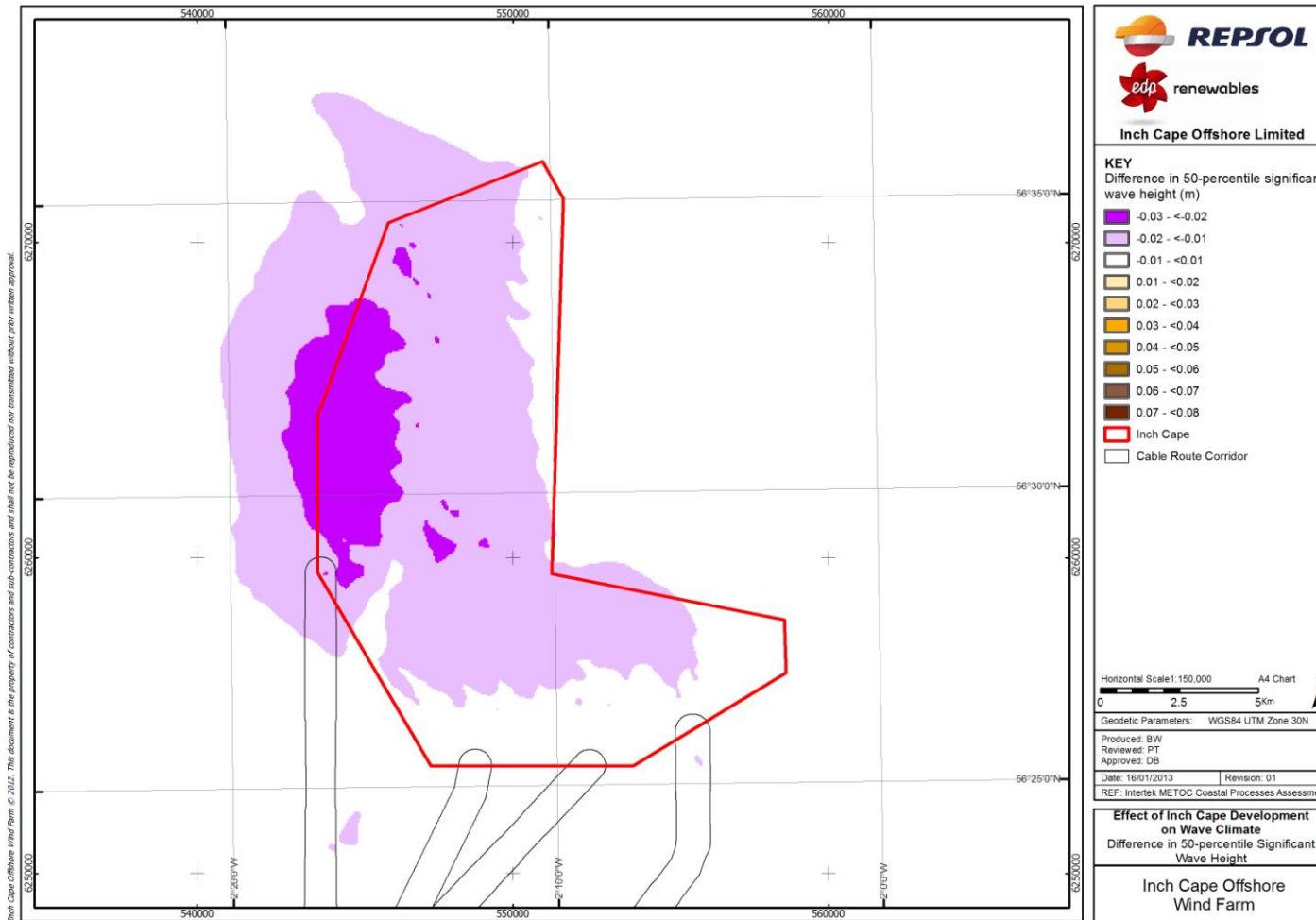


10A.7.24: Difference in 99-percentile current speed (m/s) – far-field

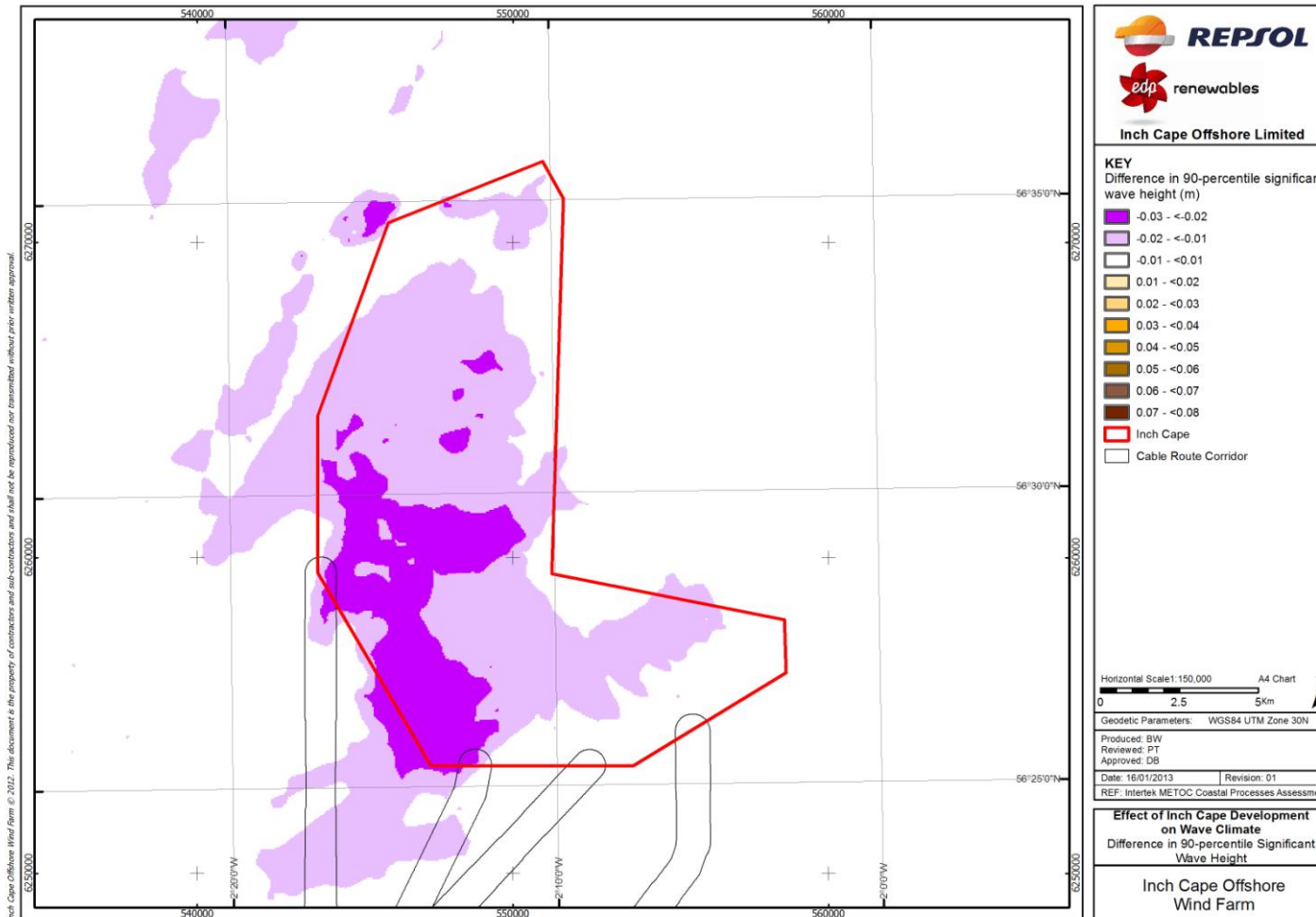


**Wave climate**

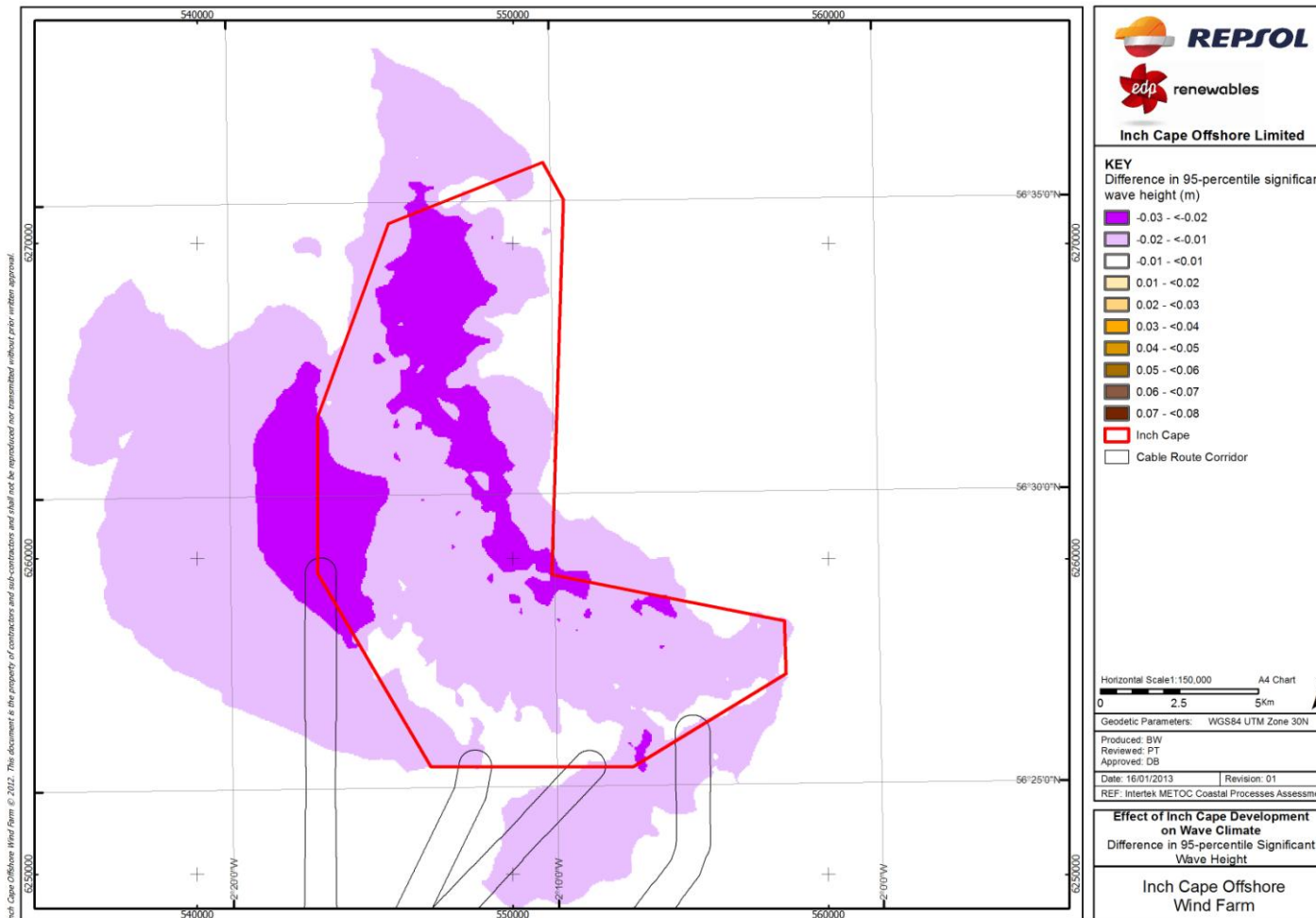
**10A.7.25: Difference in 50-percentile significant wave height (m) – near-field**



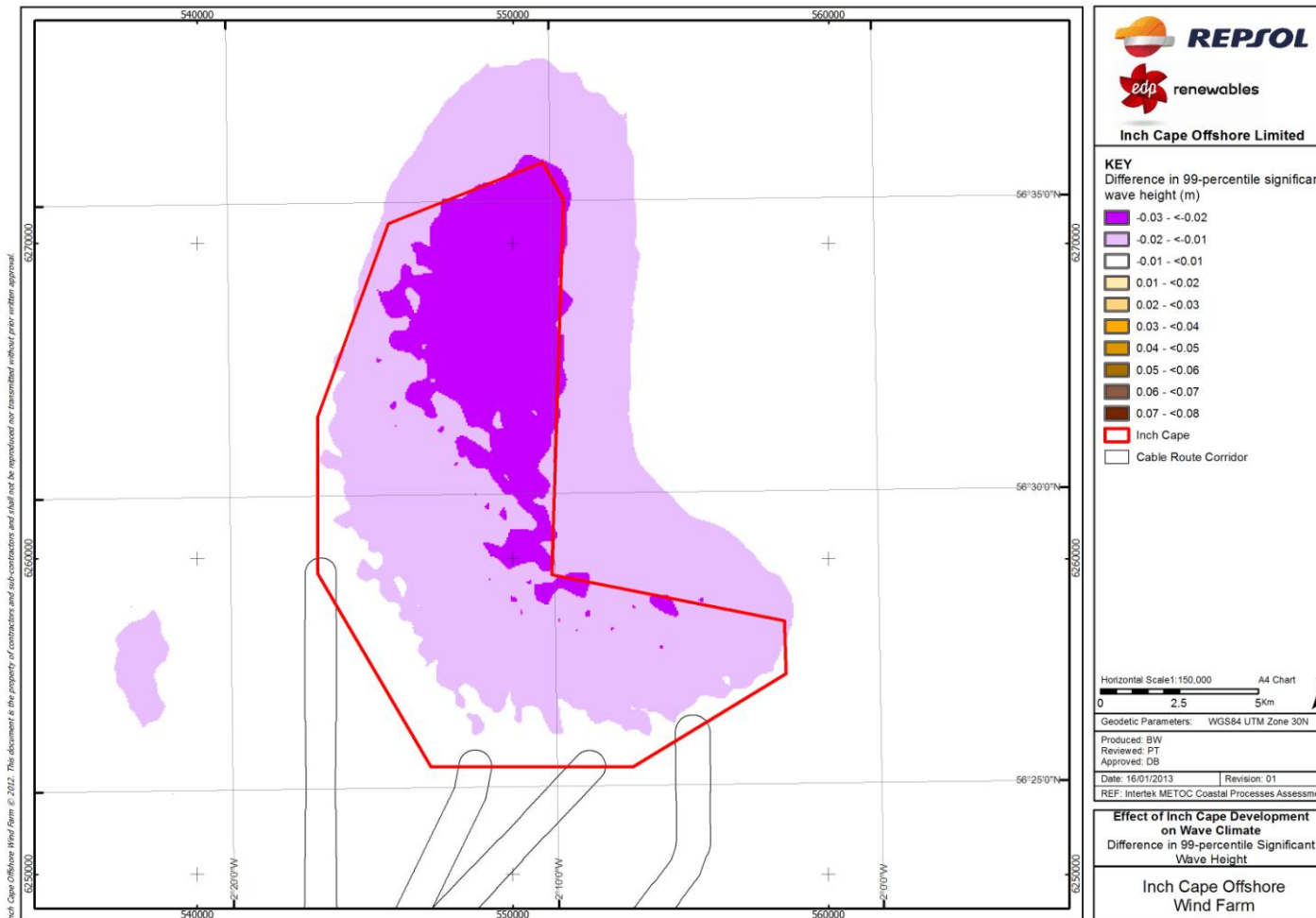
10A.7.26: Difference in 90-percentile significant wave height (m) – near-field



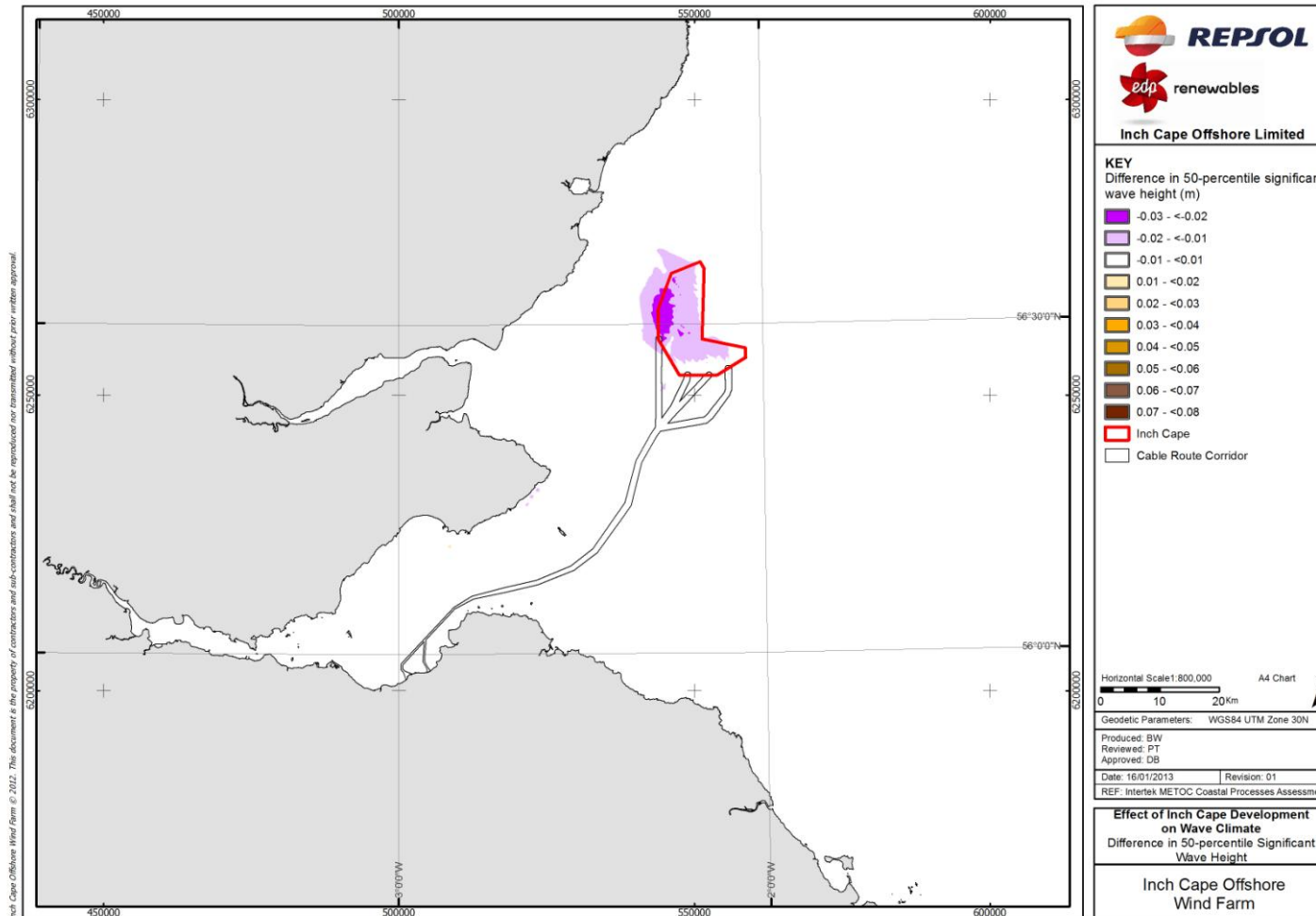
10A.7.27: Difference in 95-percentile significant wave height (m) – near-field



10A.7.28: Difference in 99-percentile significant wave height (m) – near-field

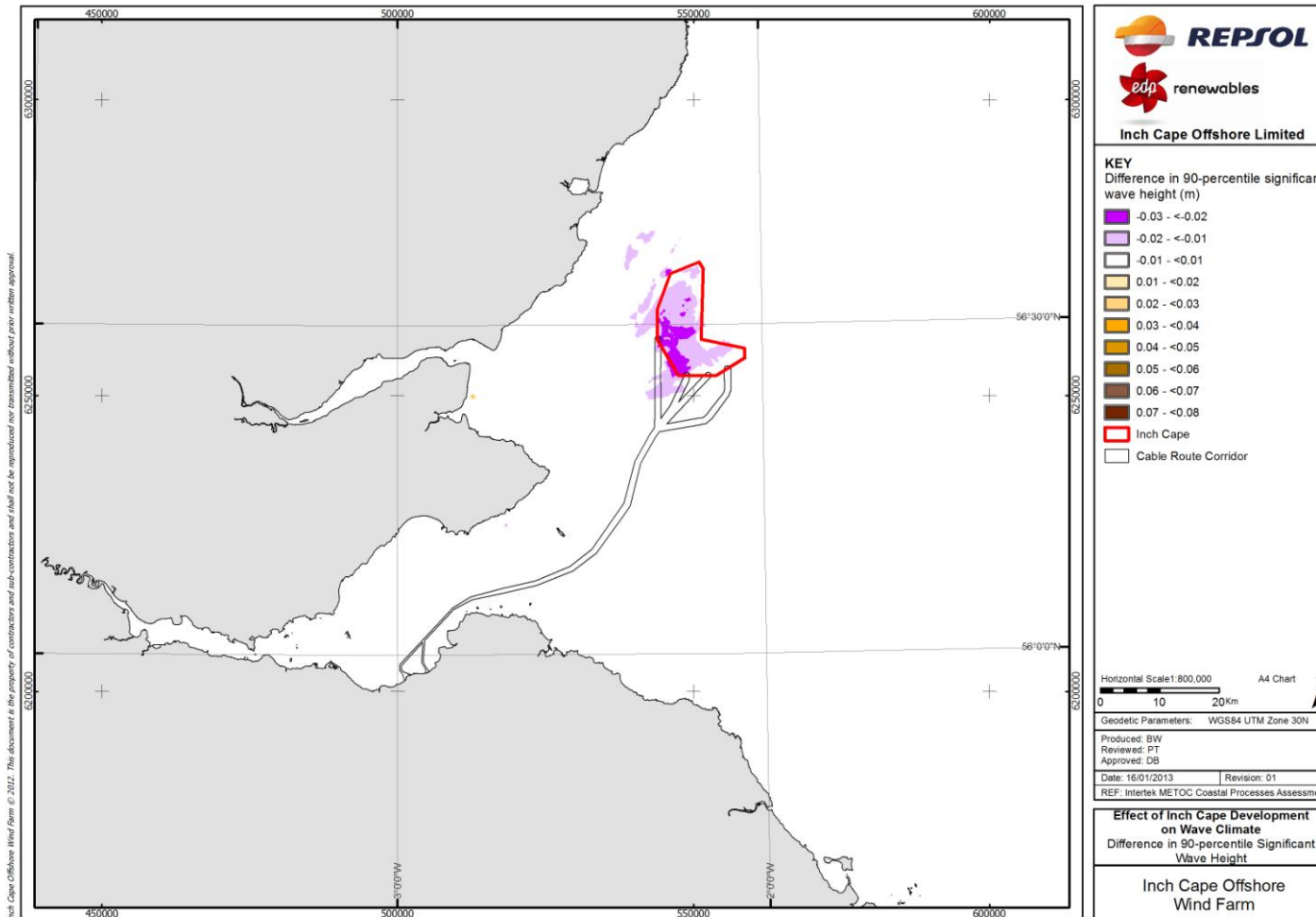


10A.7.29: Difference in 50-percentile significant wave height (m) – far-field

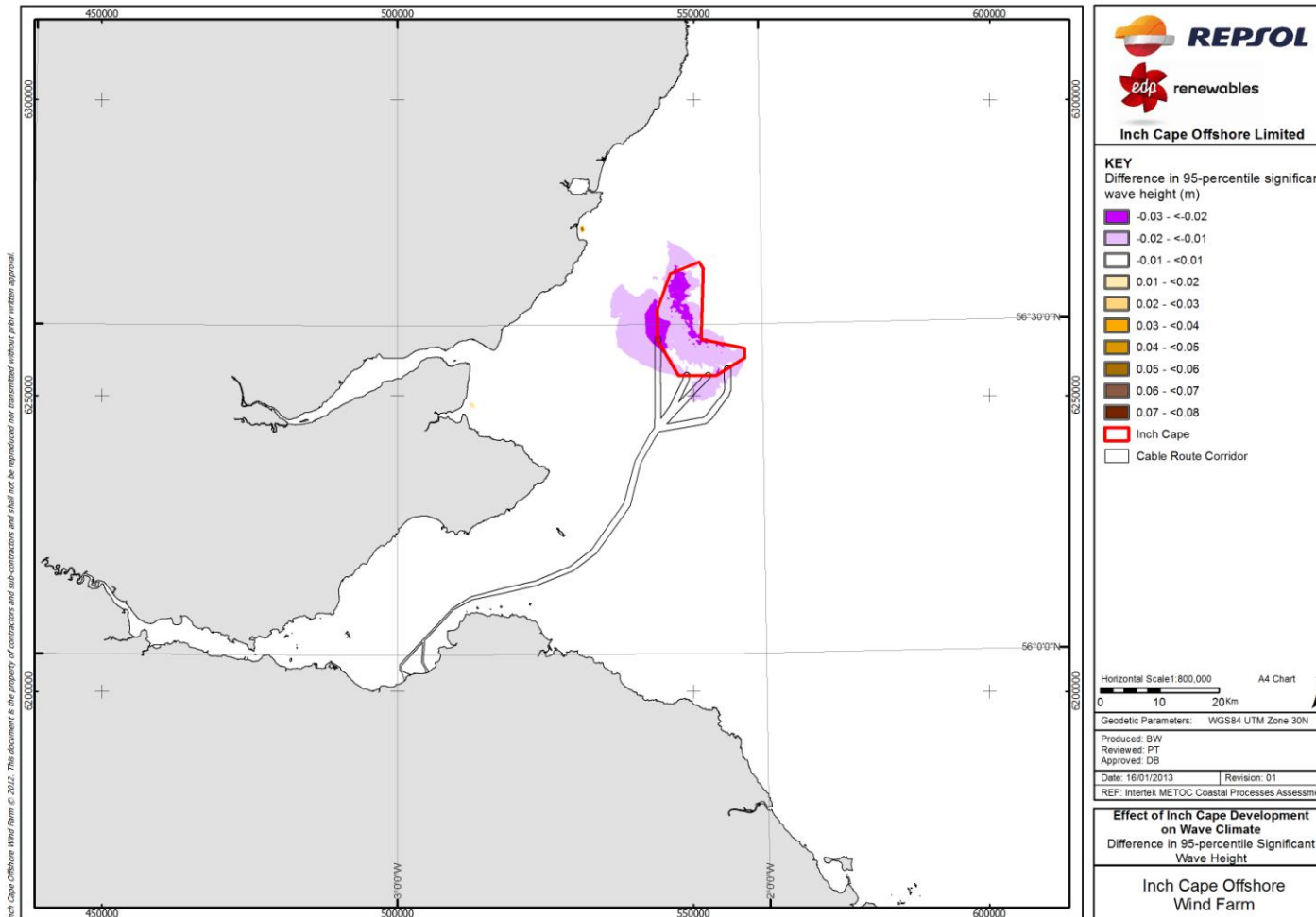




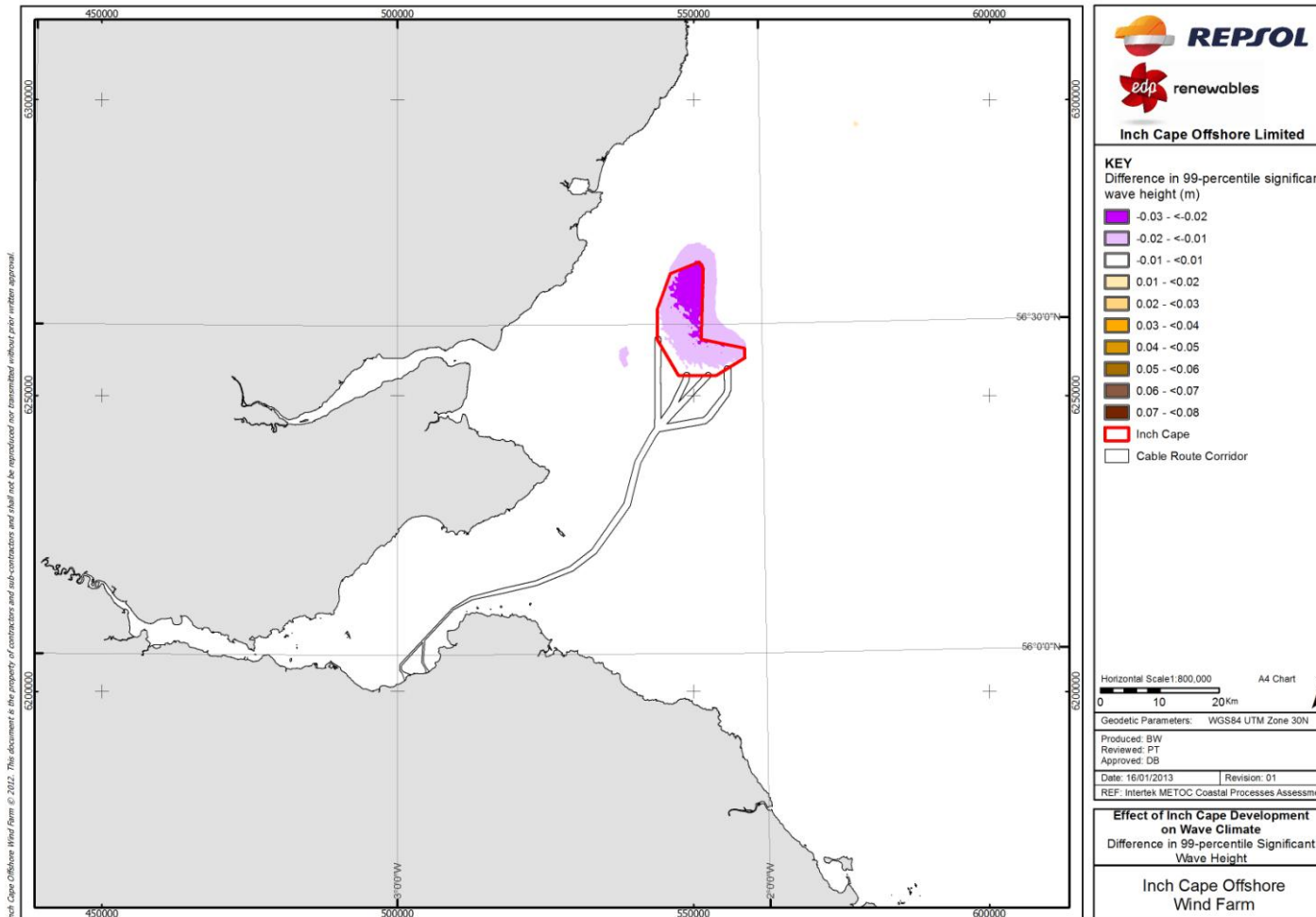
10A.7.30: Difference in 90-percentile significant wave height (m) – far-field



10A.7.31: Difference in 95-percentile significant wave height (m) – far-field

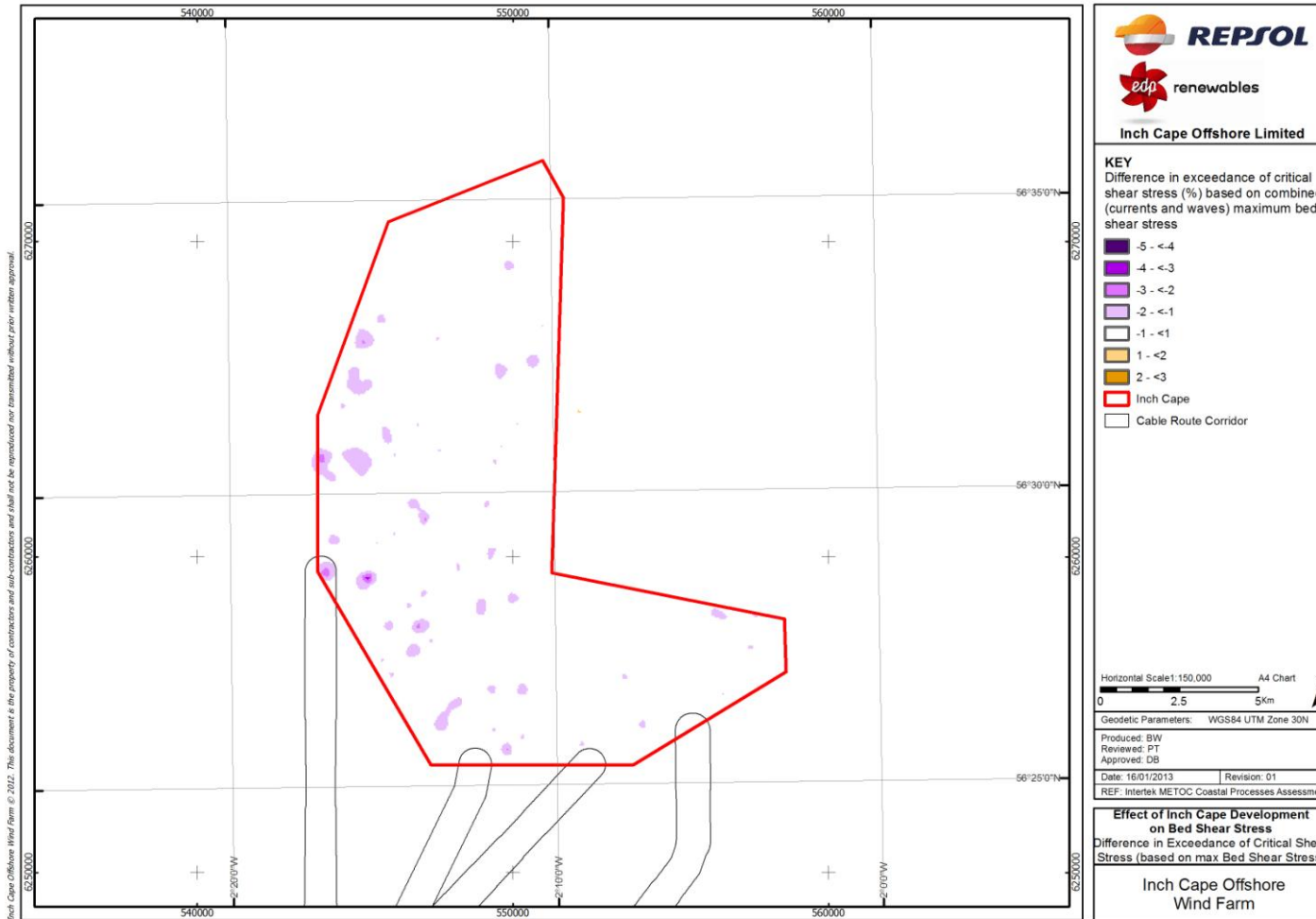


10A.7.32: Difference in 99-percentile significant wave height (m) – far-field

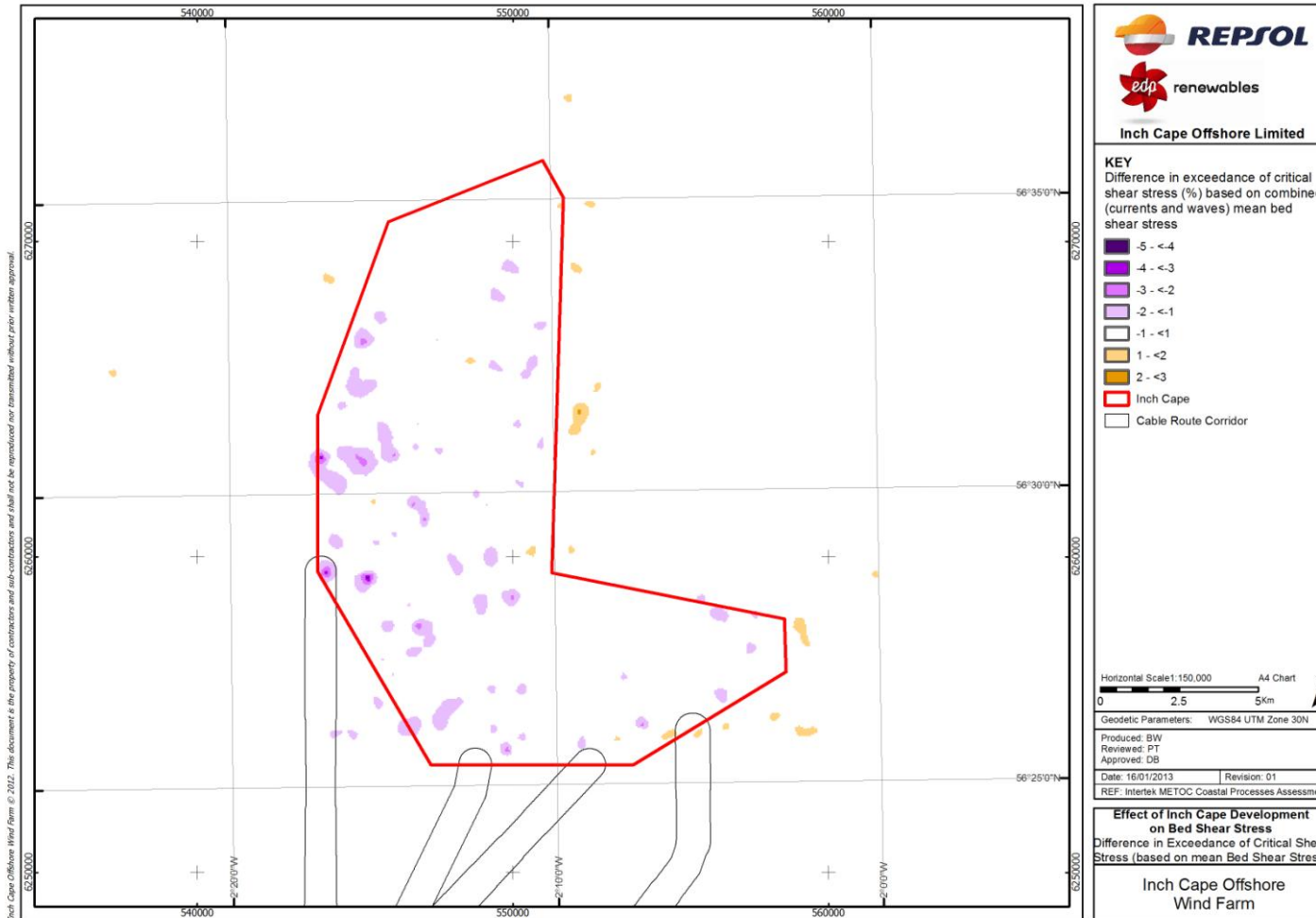


### Sediment regime

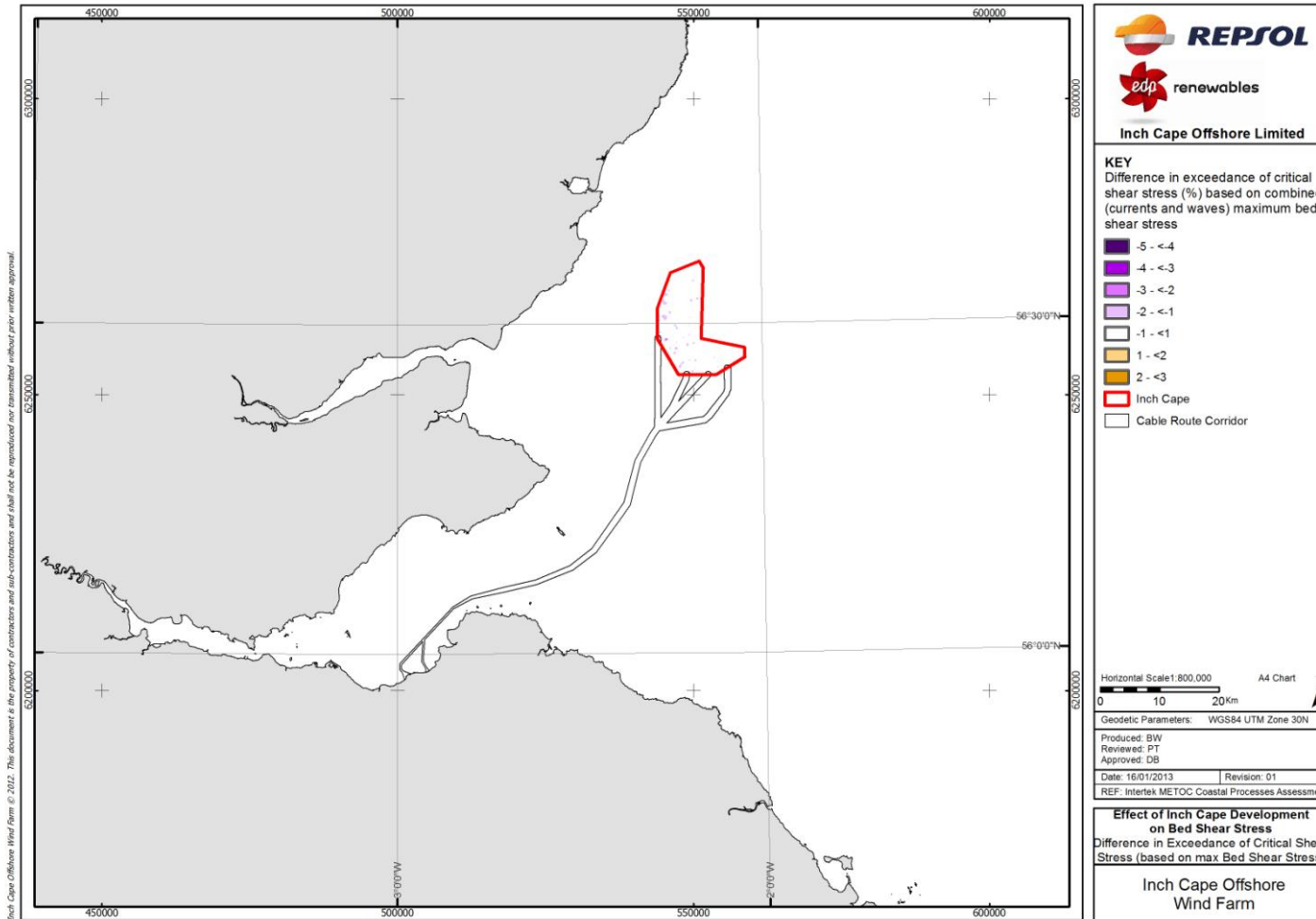
10A.7.33: Difference in the exceedance of critical shear stress (N/m<sup>2</sup>) – based on the combined (currents plus waves) maximum bed shear stress – near-field



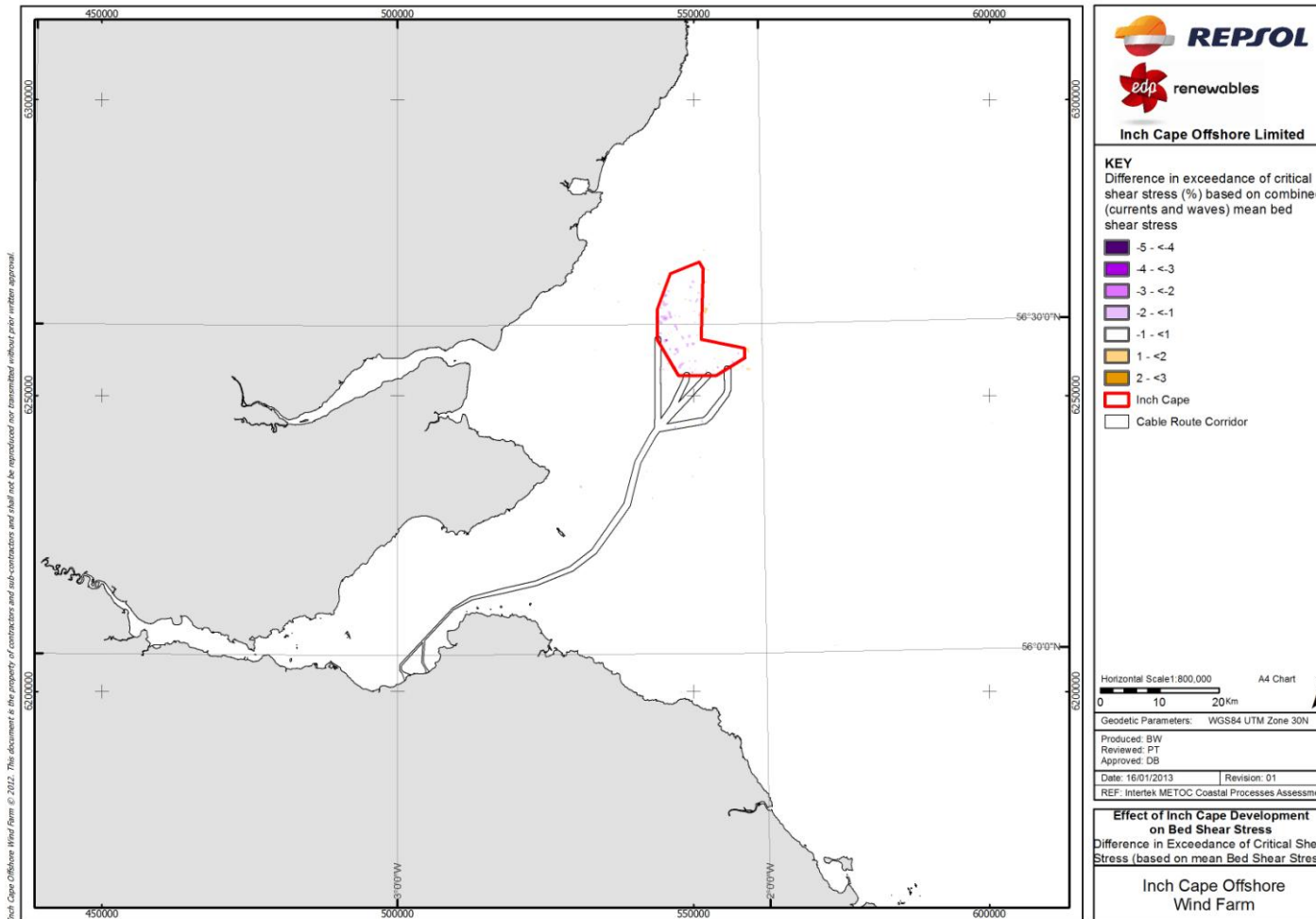
10A.7.34: Difference in the exceedance of critical shear stress (N/m<sup>2</sup>) – based on the combined (currents plus waves) mean bed shear stress – near-field



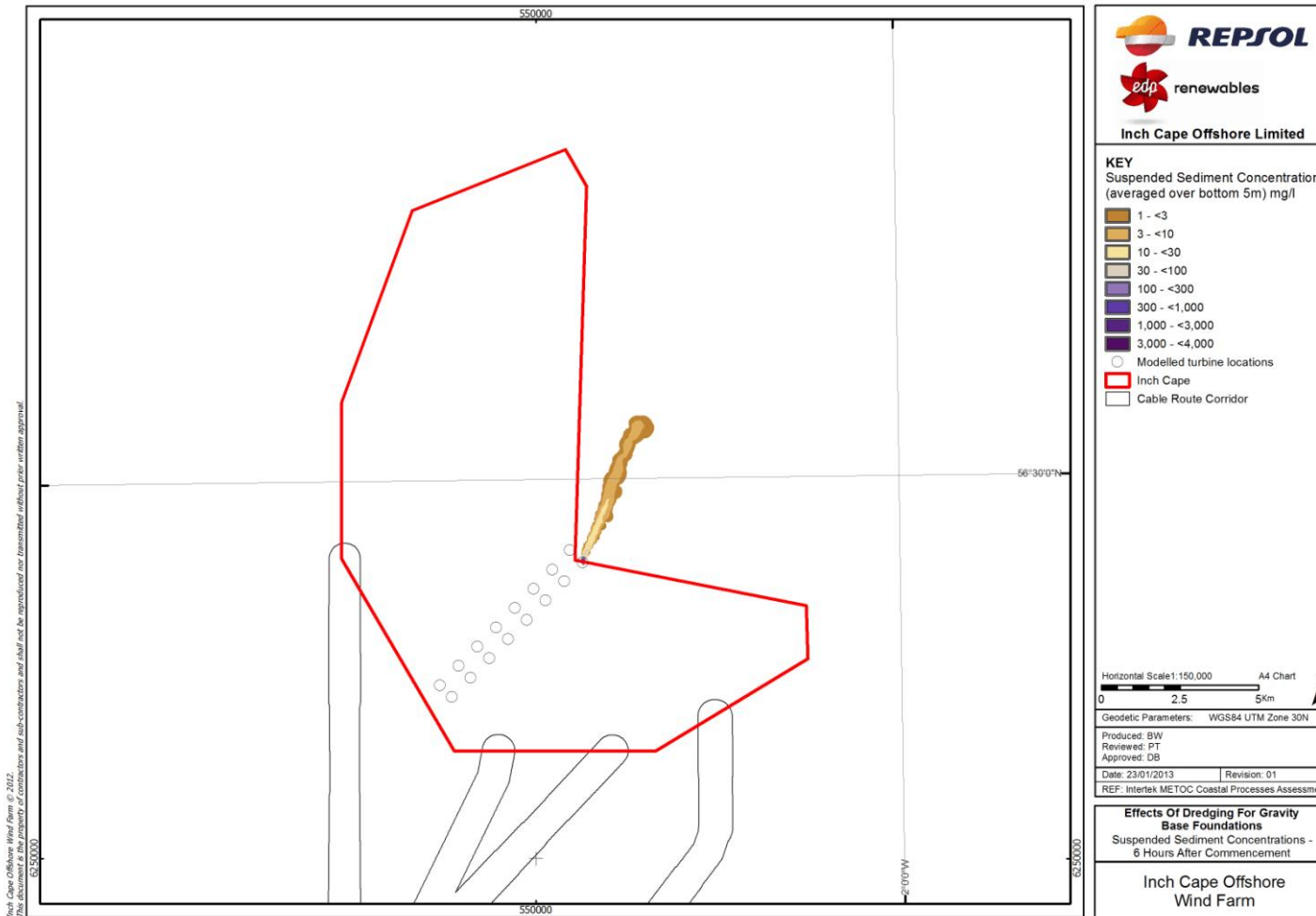
**10A.7.35: Difference in the exceedance of critical shear stress (N/m<sup>2</sup>) – based on the combined (currents plus waves) maximum bed shear stress – far-field**



**10A.7.36: Difference in the exceedance of critical shear stress (N/m<sup>2</sup>) – based on the combined (currents plus waves) mean bed shear stress – far-field**

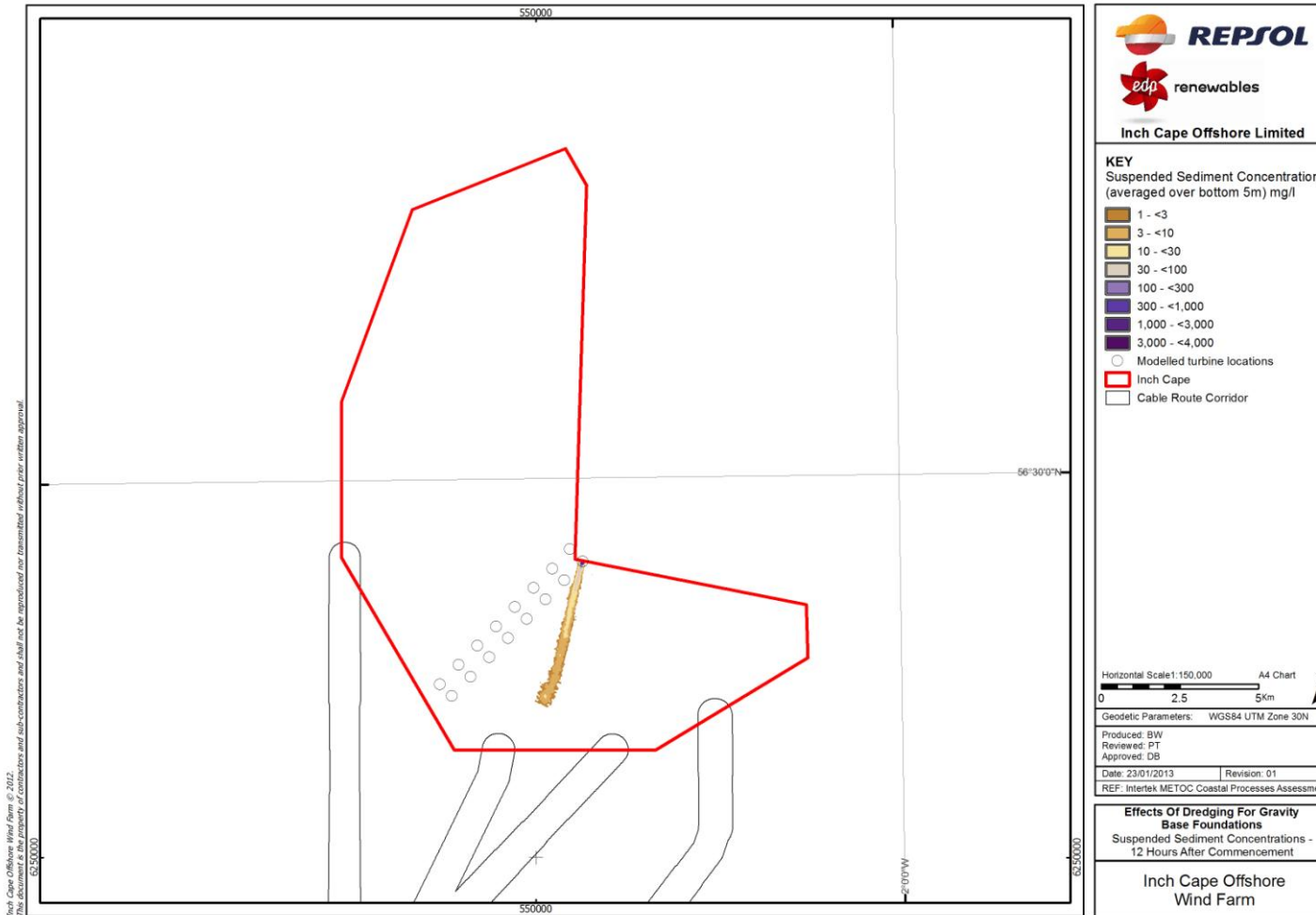


10A.7.37: Suspended sediment concentrations due to dredging: 6 hours after commencement

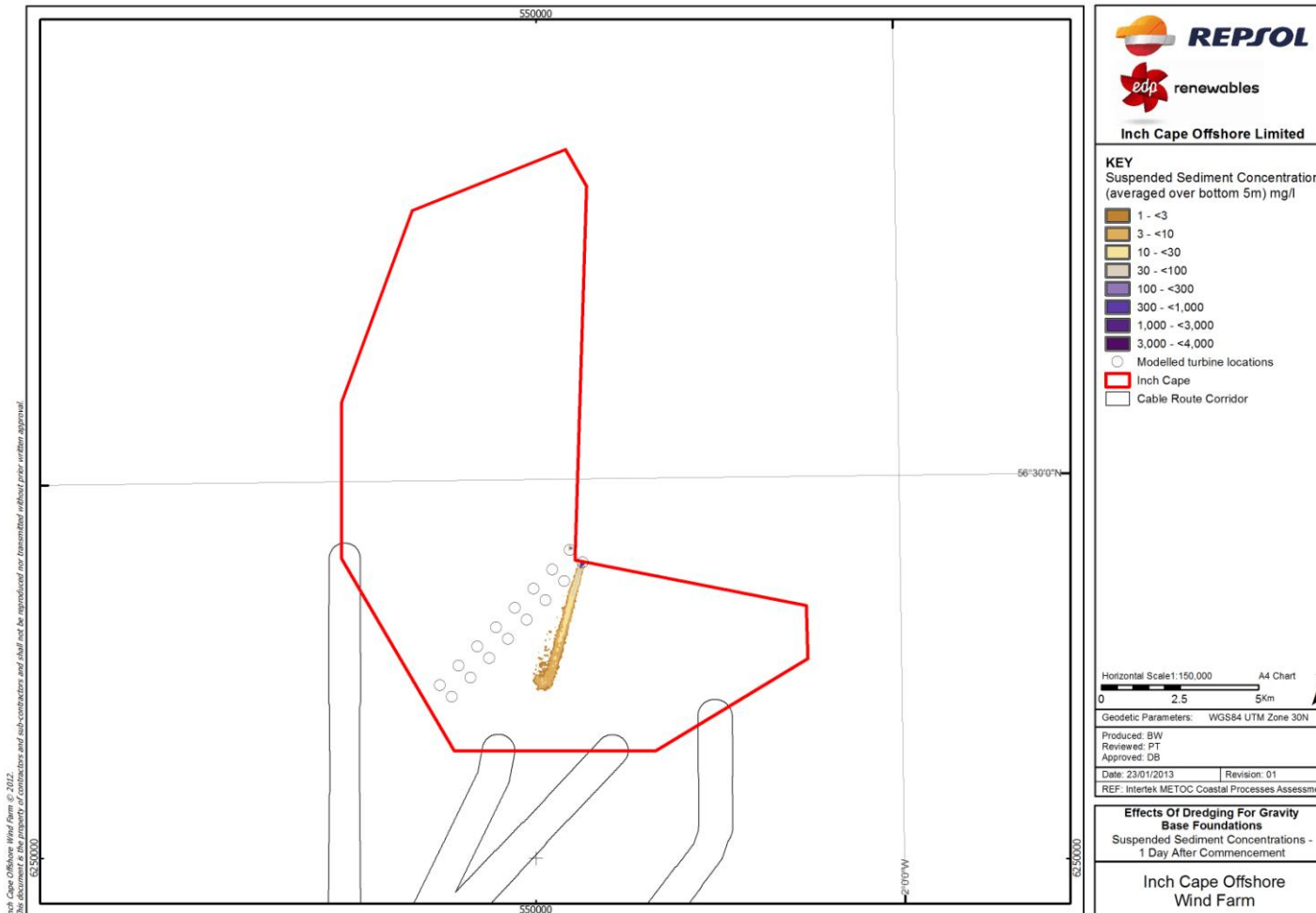




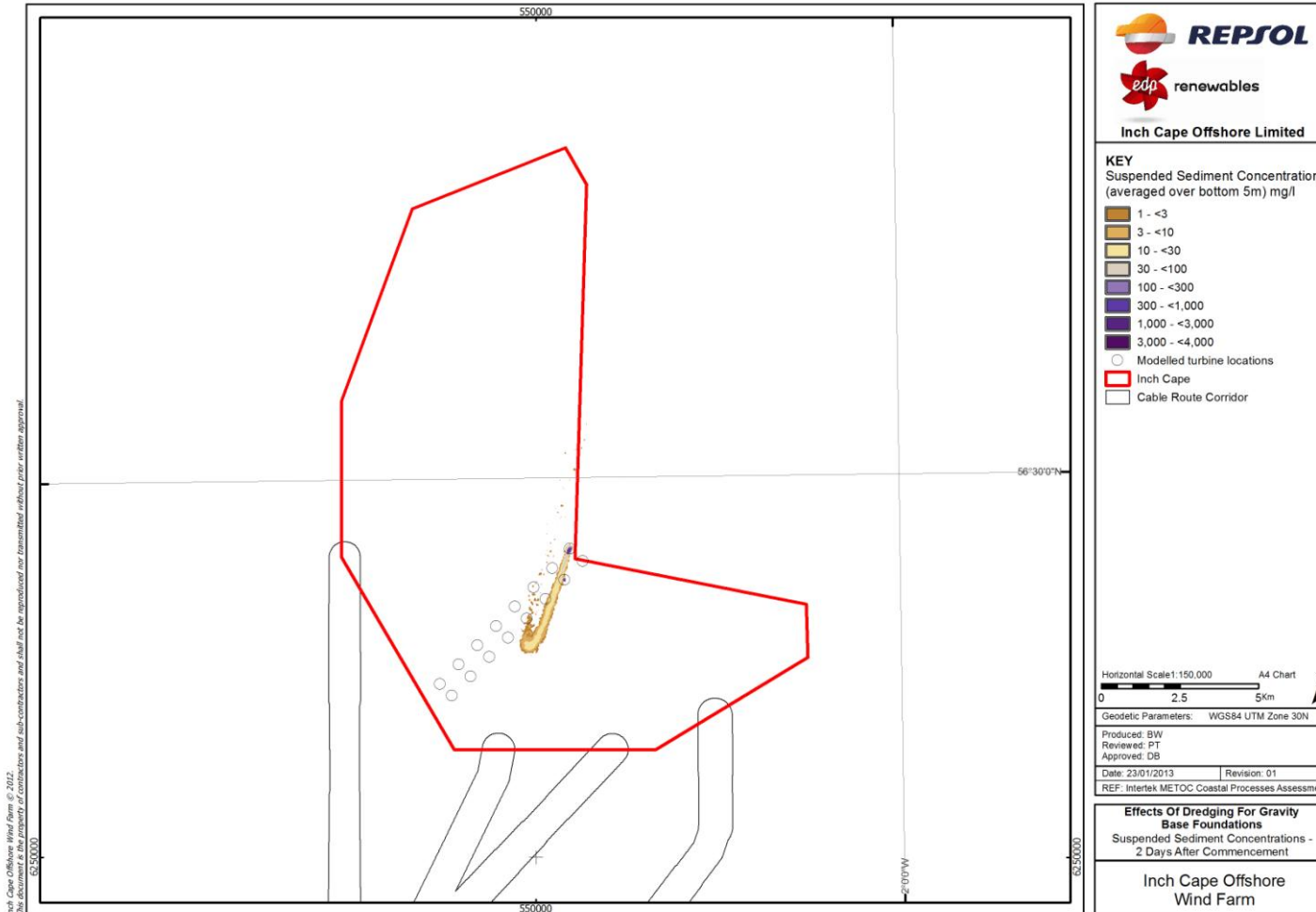
10A.7.38: Suspended sediment concentrations due to dredging: 12 hours after commencement



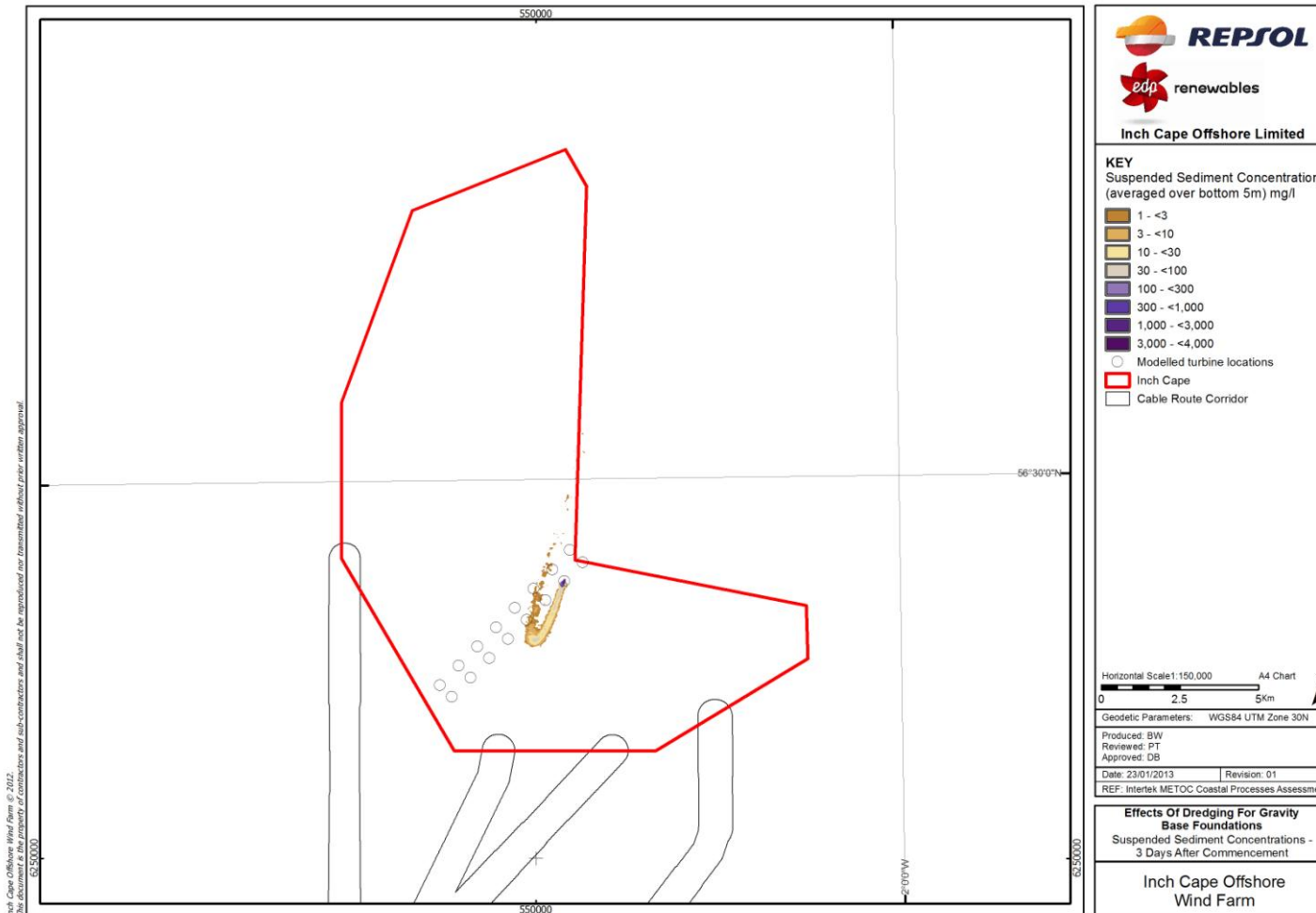
10A.7.39: Suspended sediment concentrations due to dredging: 1 day after commencement



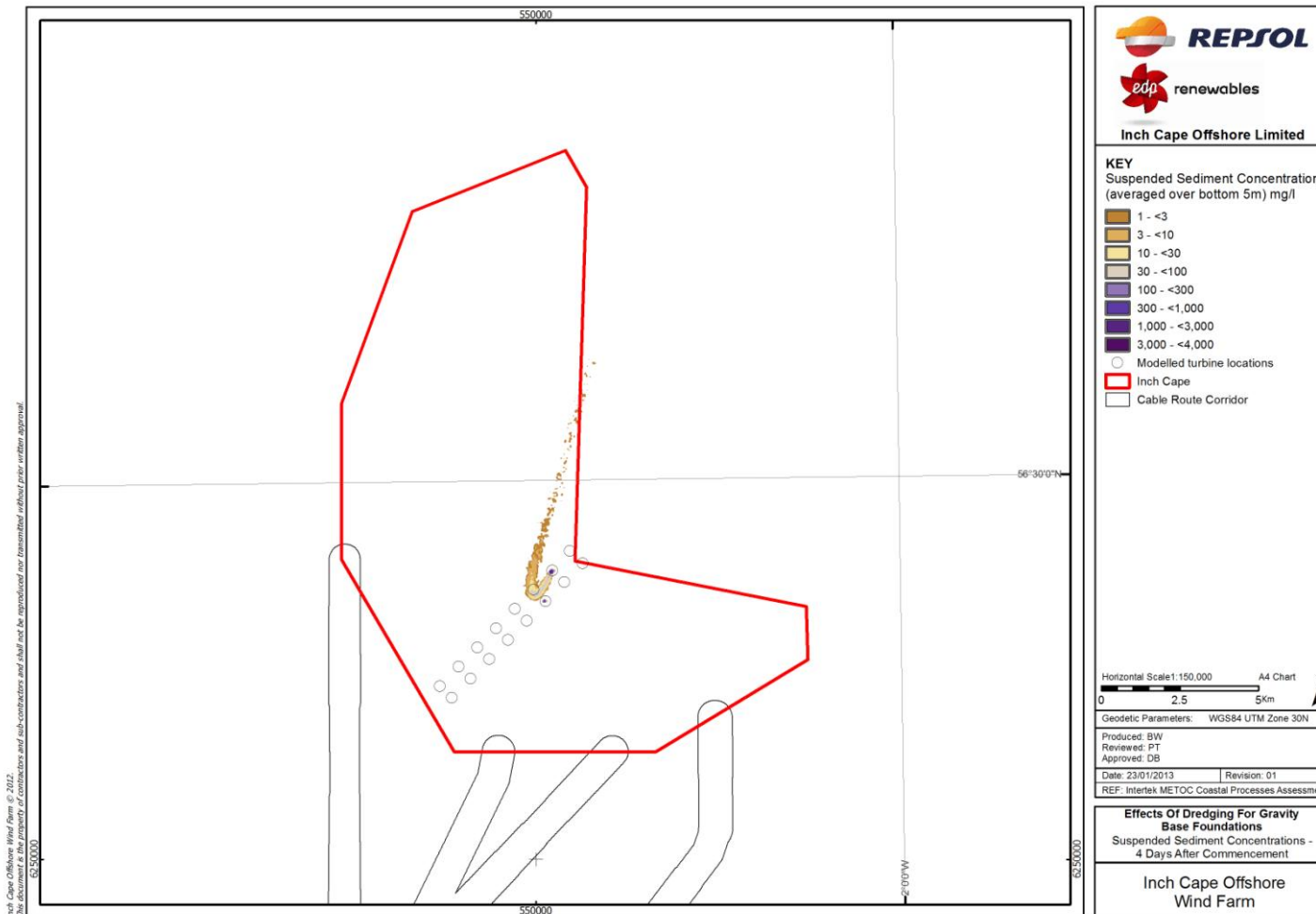
10A.7.40: Suspended sediment concentrations due to dredging: 2 days after commencement



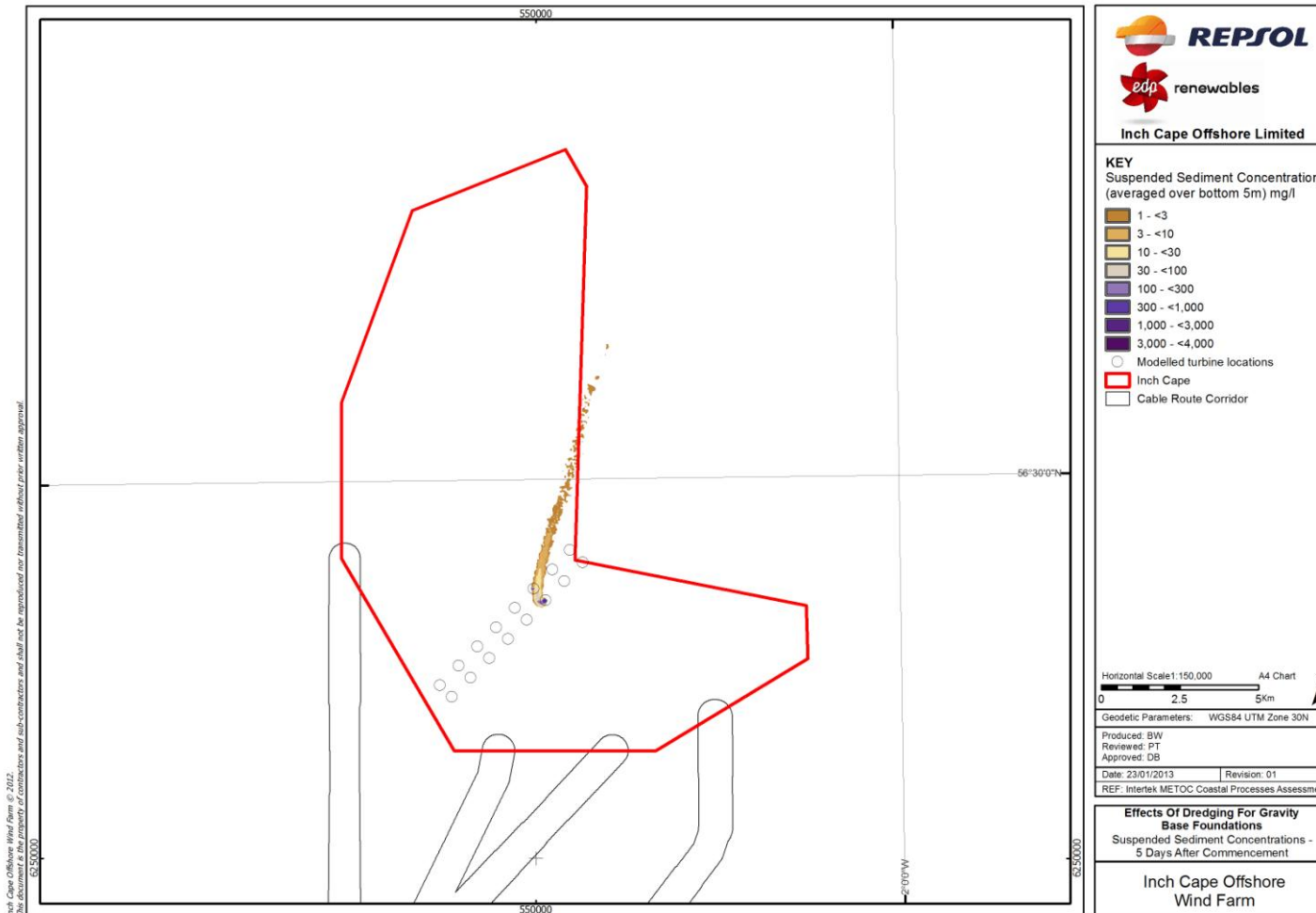
10A.7.41: Suspended sediment concentrations due to dredging: 3 days after commencement



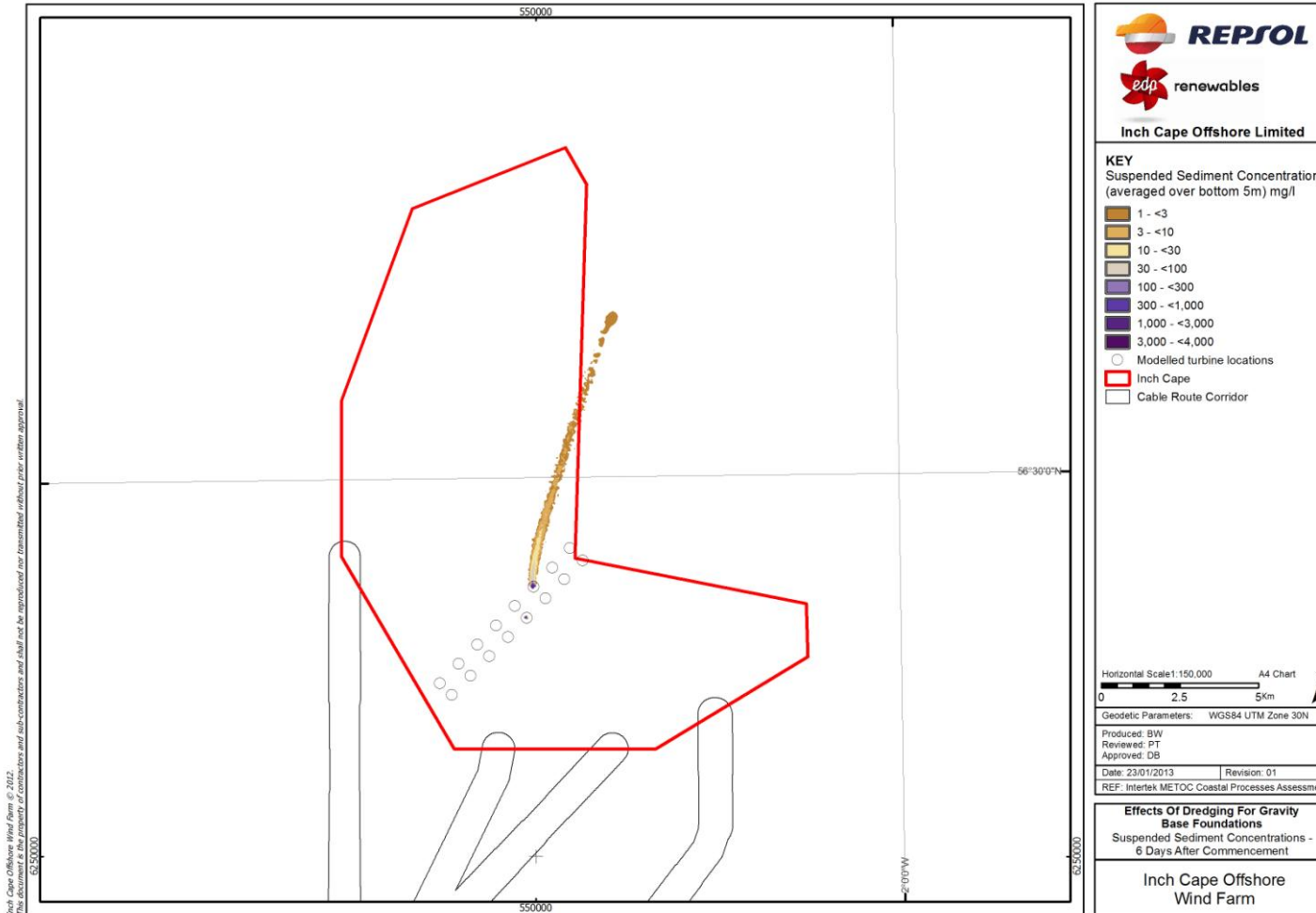
10A.7.42: Suspended sediment concentrations due to dredging: 4 days after commencement



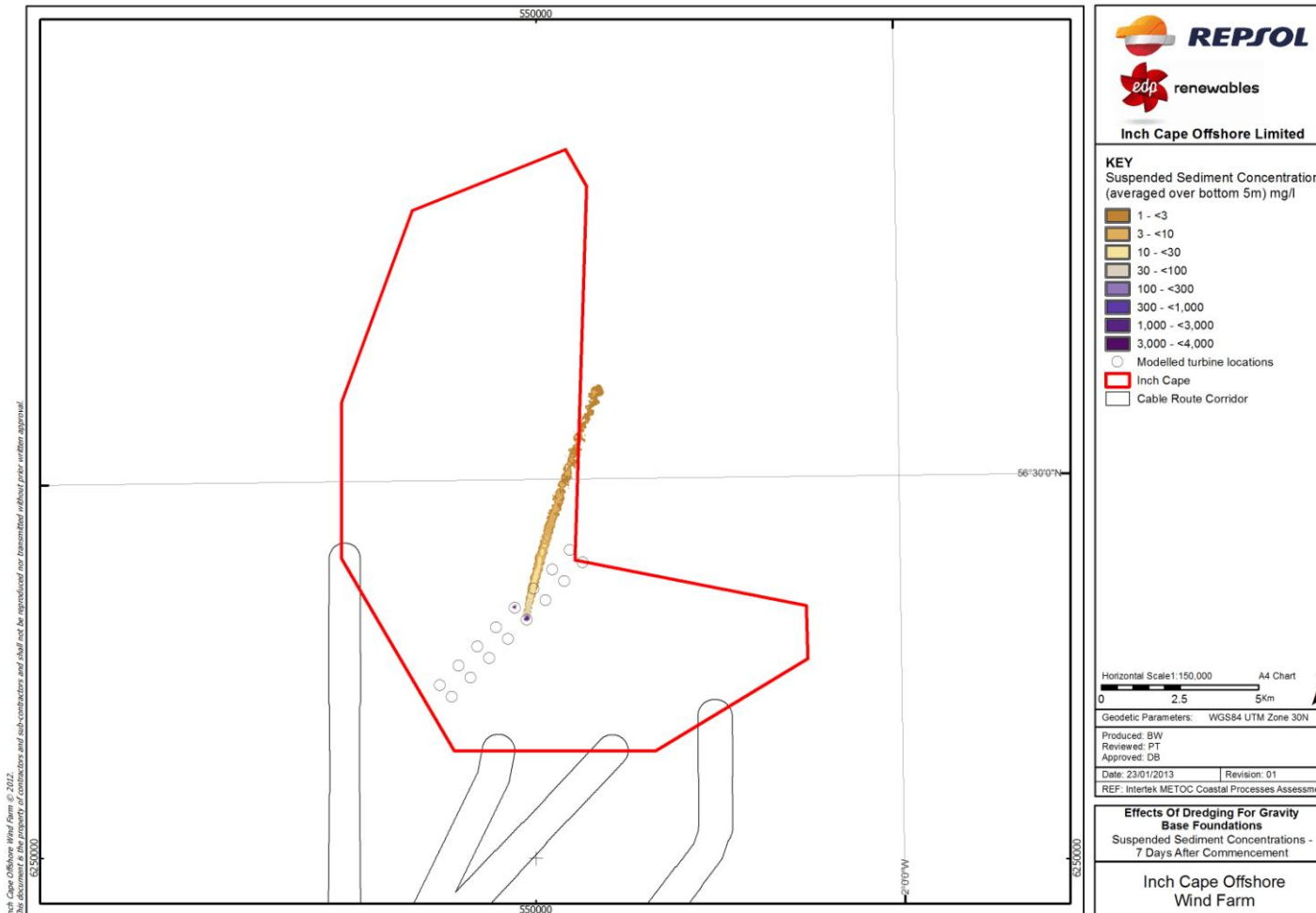
10A.7.43: Suspended sediment concentrations due to dredging: 5 days after commencement



10A.7.44: Suspended sediment concentrations due to dredging: 6 days after commencement

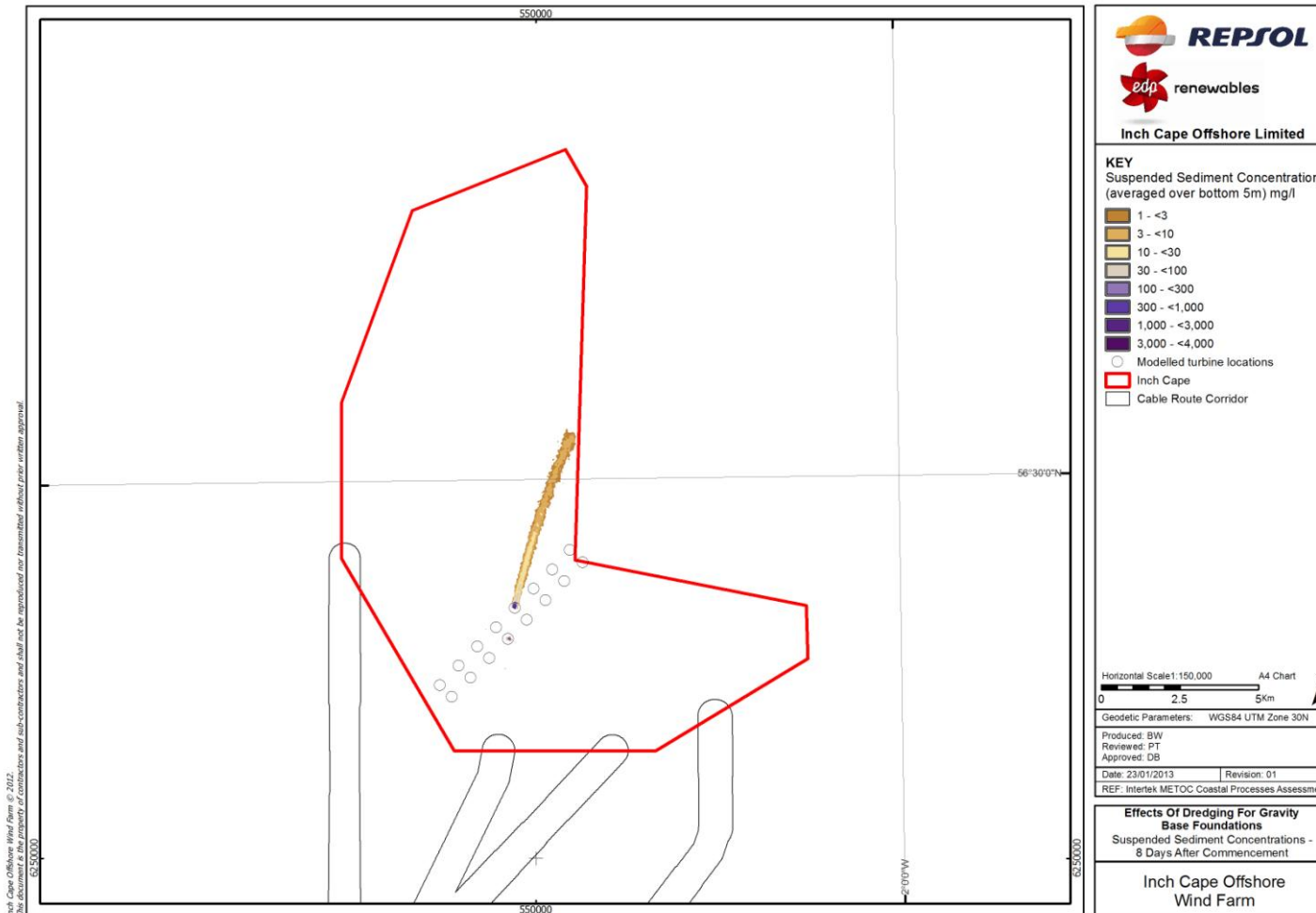


10A.7.45: Suspended sediment concentrations due to dredging: 7 days after commencement

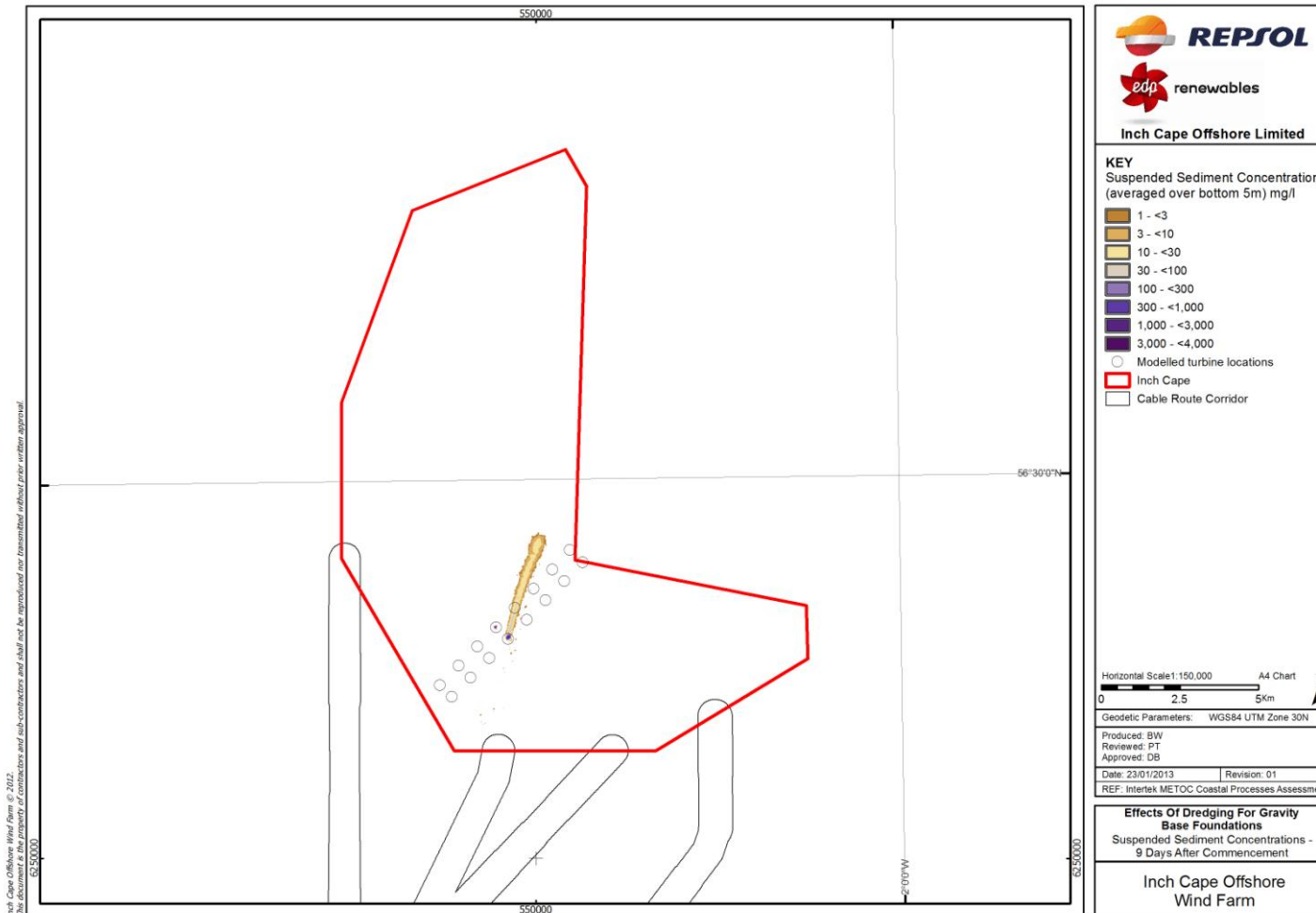




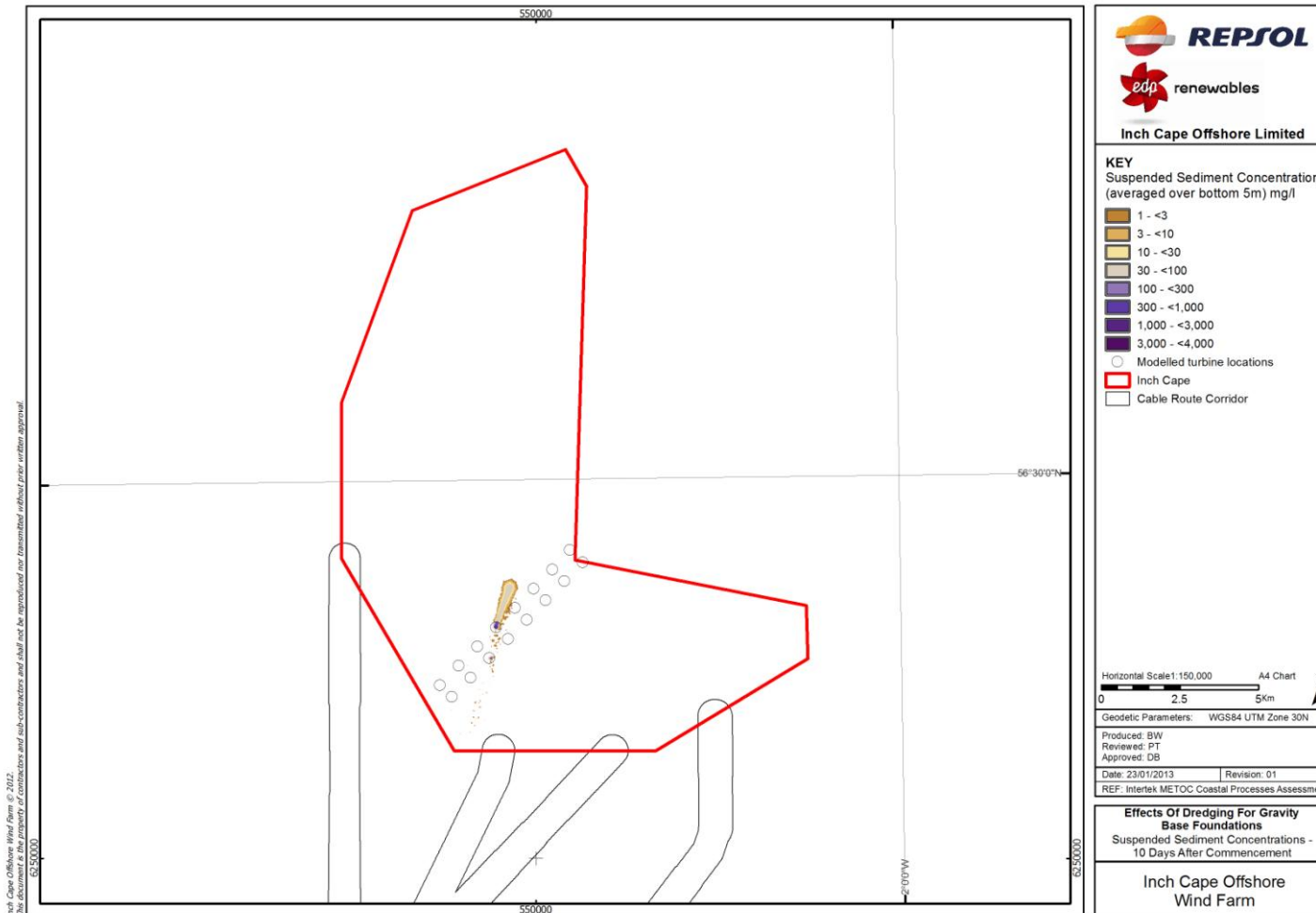
10A.7.46: Suspended sediment concentrations due to dredging: 8 days after commencement



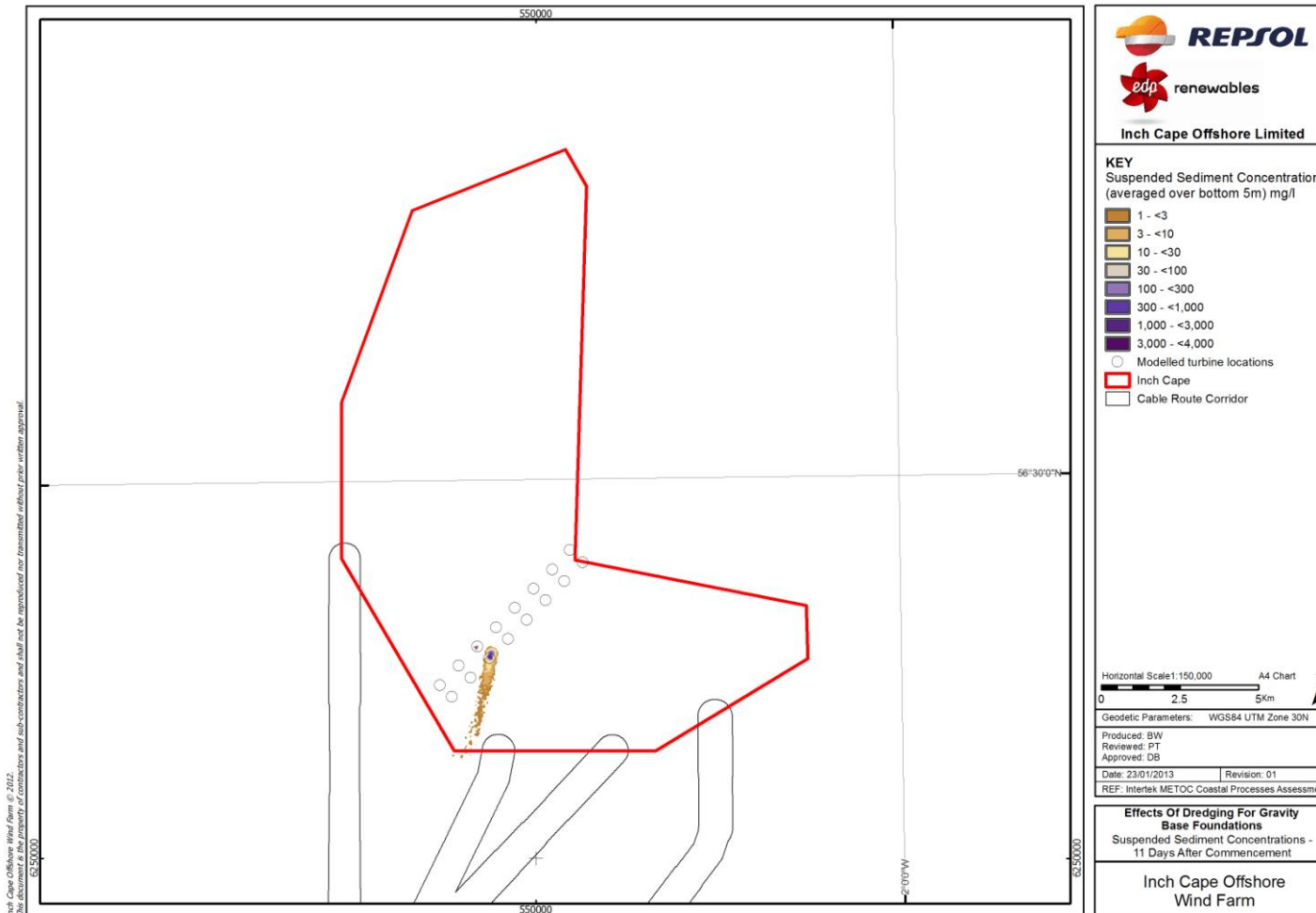
10A.7.47: Suspended sediment concentrations due to dredging: 9 days after commencement



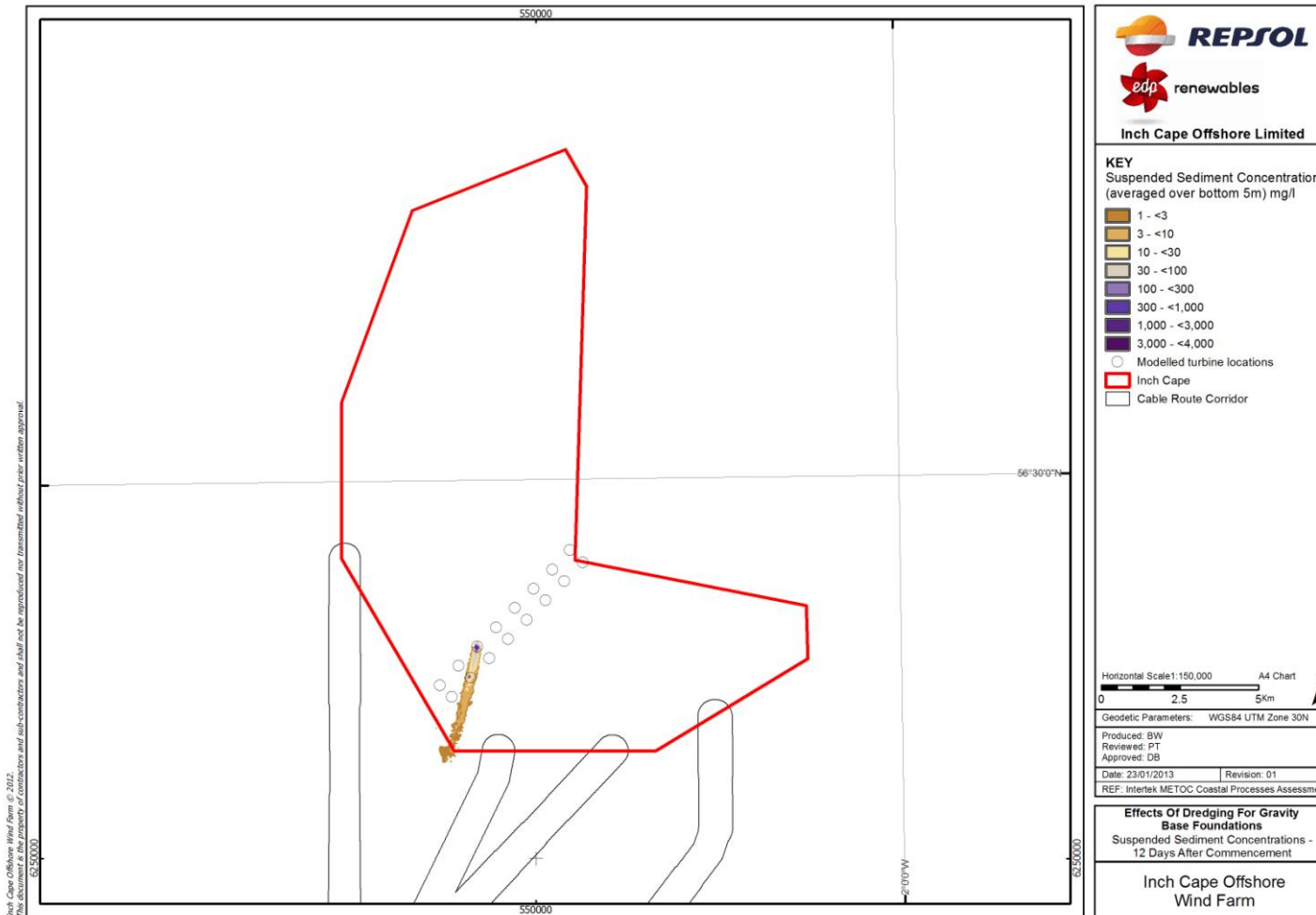
10A.7.48: Suspended sediment concentrations due to dredging: 10 days after commencement



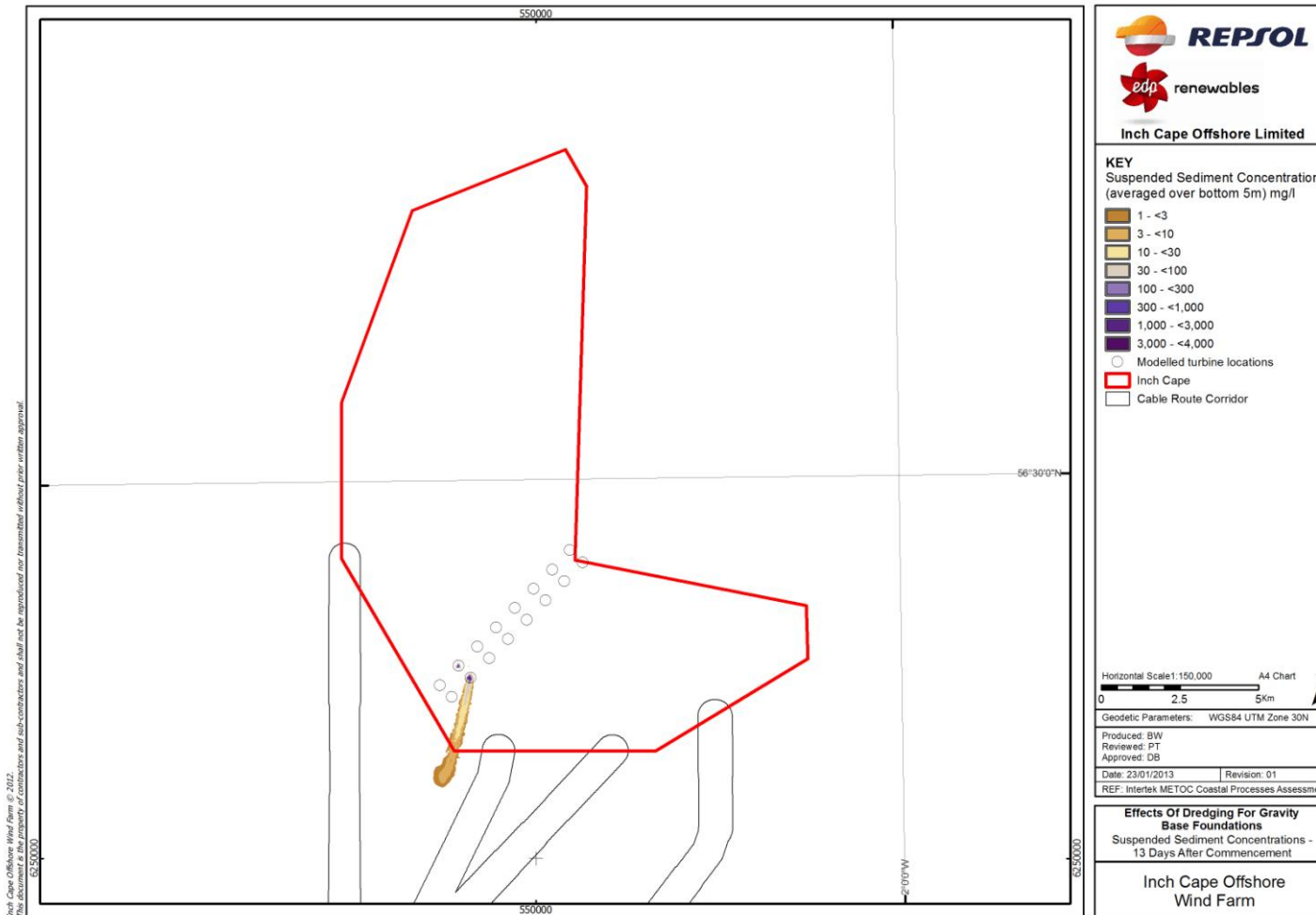
10A.7.49: Suspended sediment concentrations due to dredging: 11 days after commencement



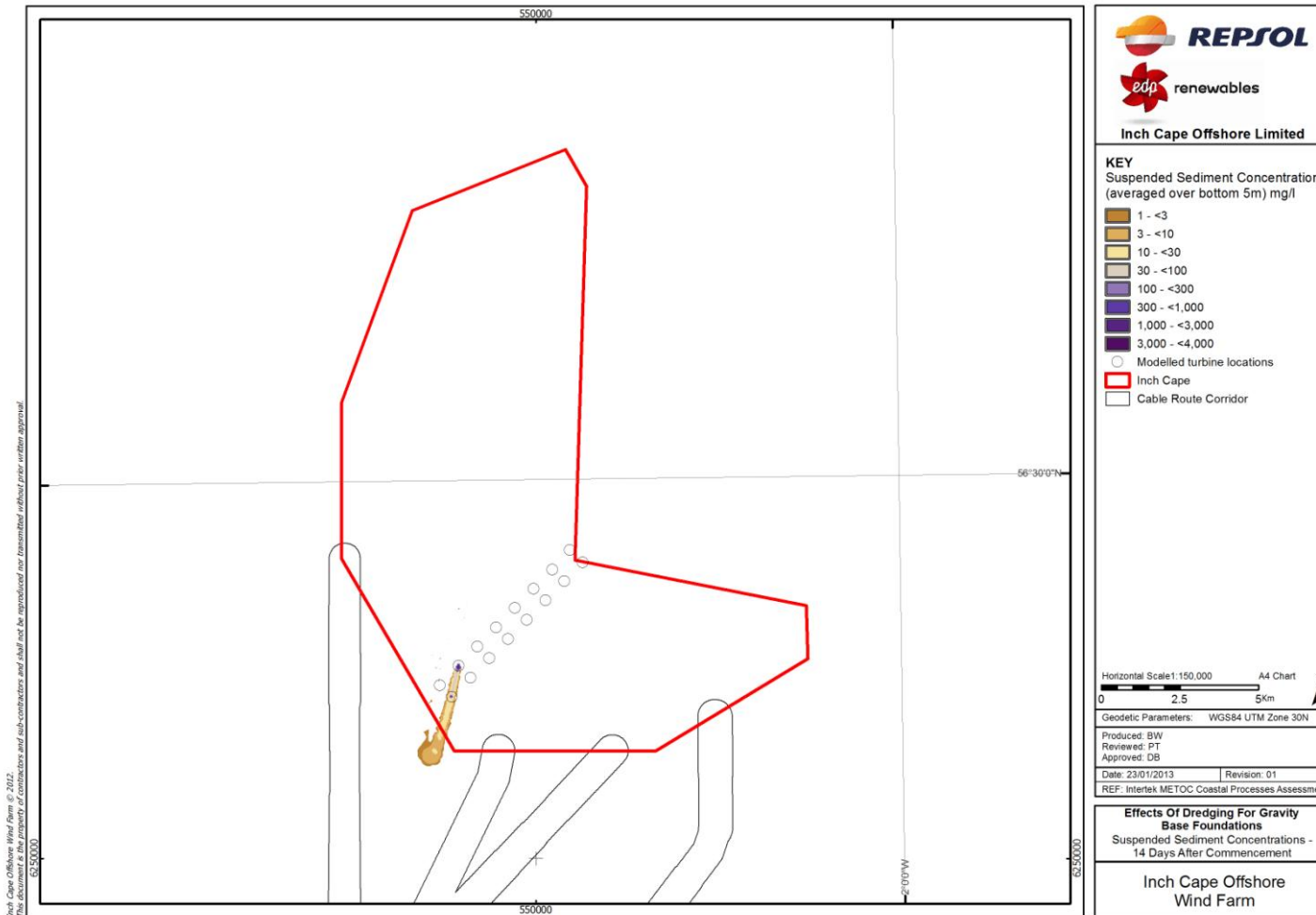
10A.7.50: Suspended sediment concentrations due to dredging: 12 days after commencement



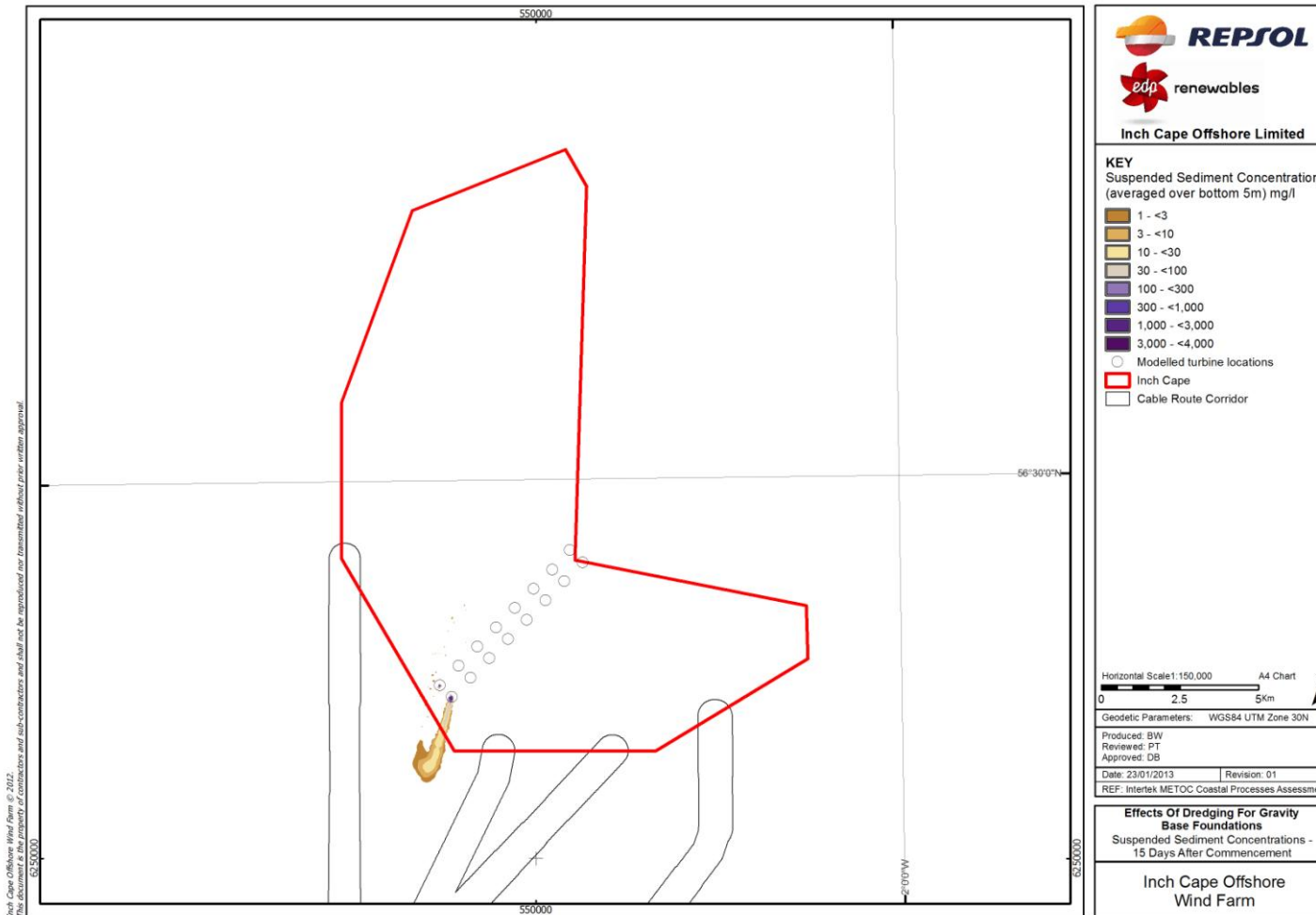
10A.7.51: Suspended sediment concentrations due to dredging: 13 days after commencement



10A.7.52: Suspended sediment concentrations due to dredging: 14 days after commencement

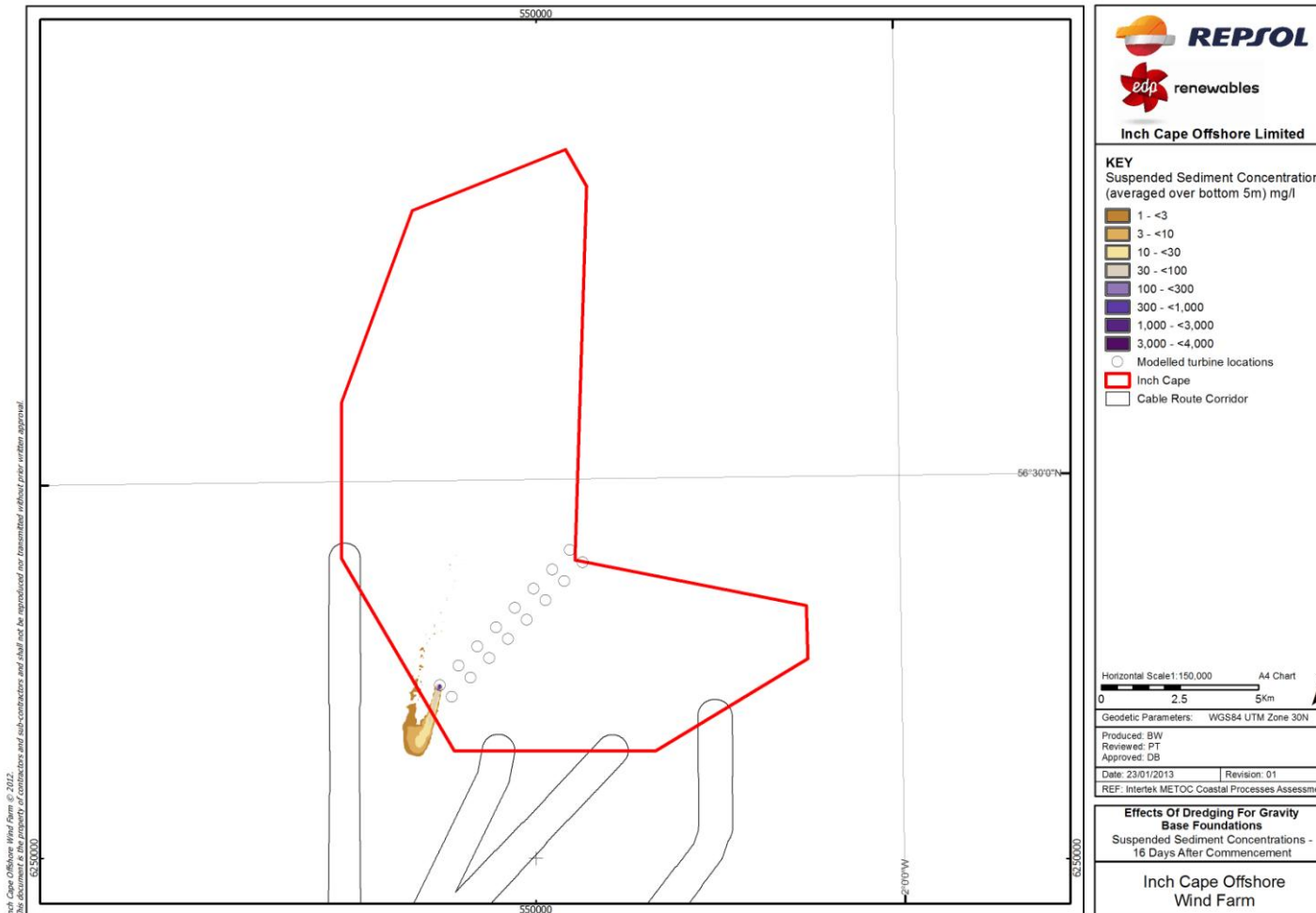


10A.7.53: Suspended sediment concentrations due to dredging: 15 days after commencement

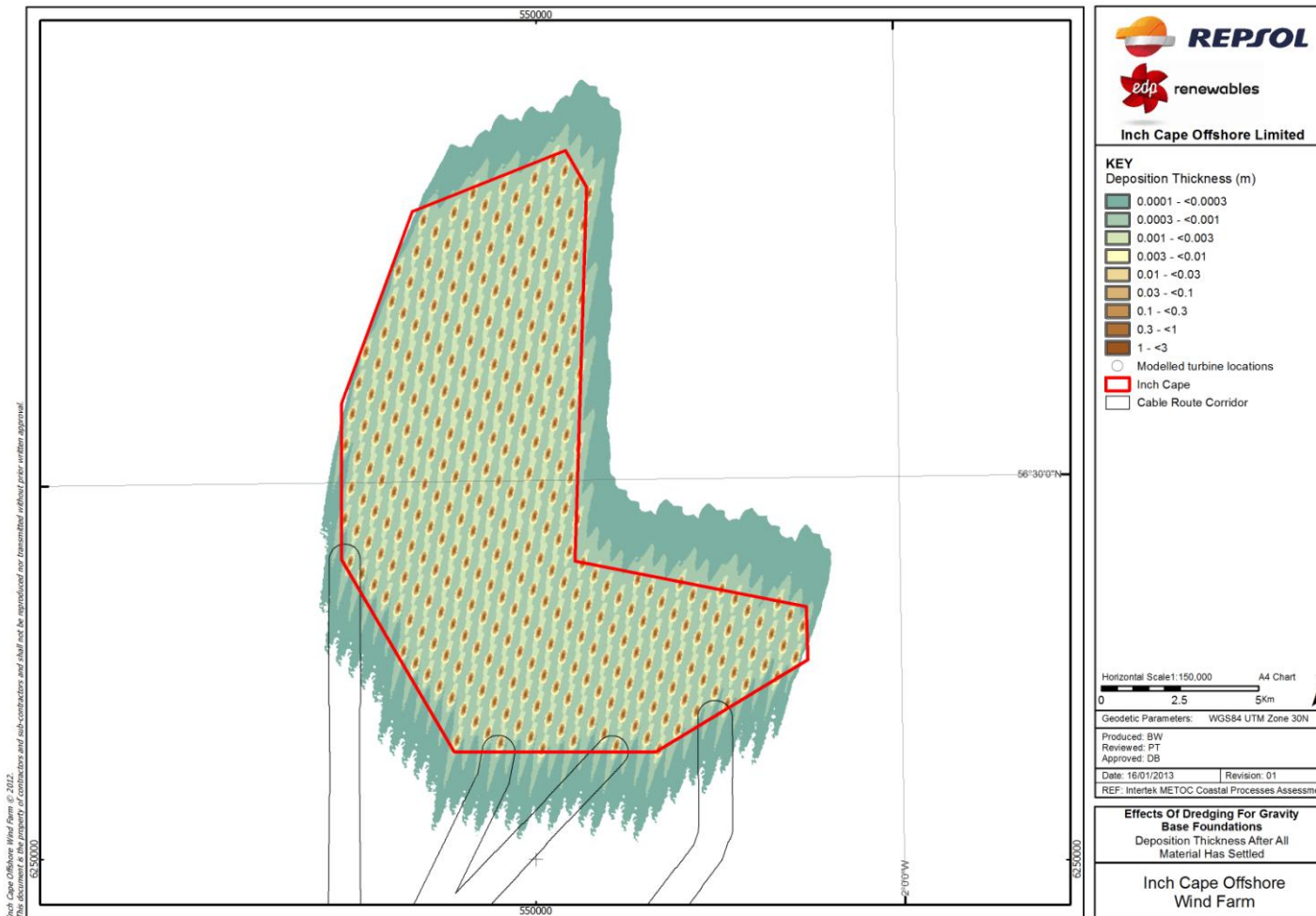




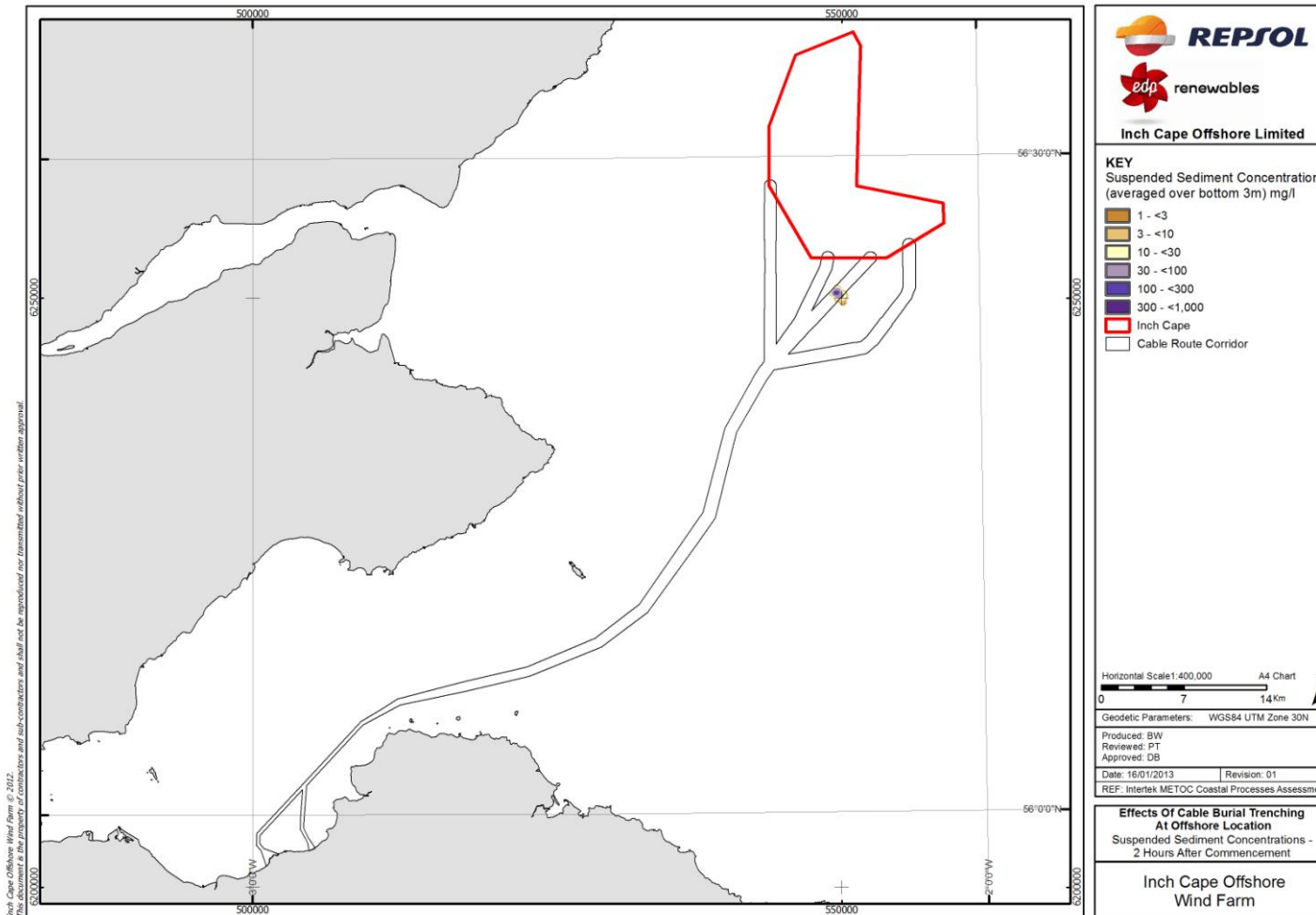
10A.7.54: Suspended sediment concentrations due to dredging: 16 days after commencement



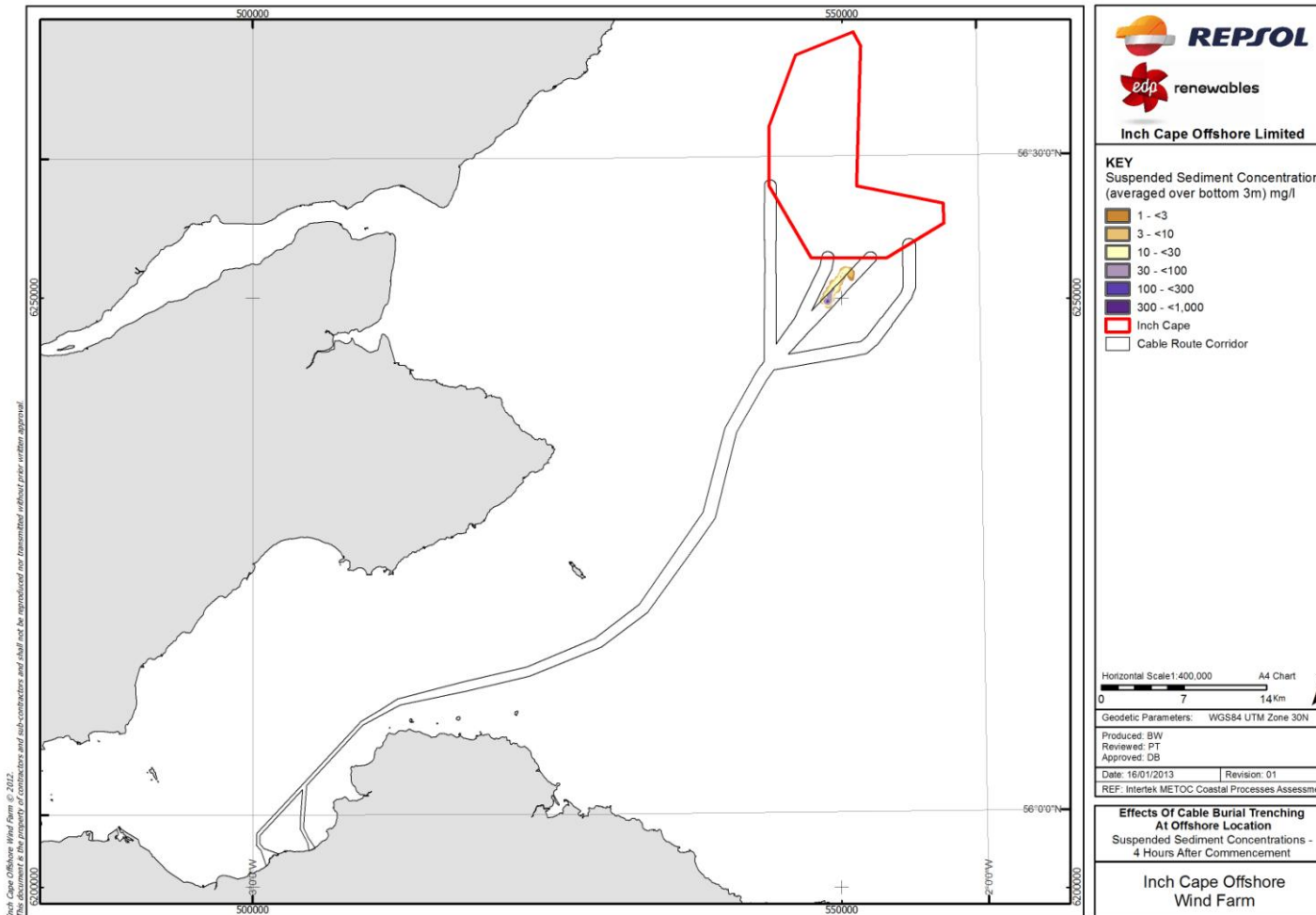
10A.7.55: Deposition thickness due to dredging – after all material has settled



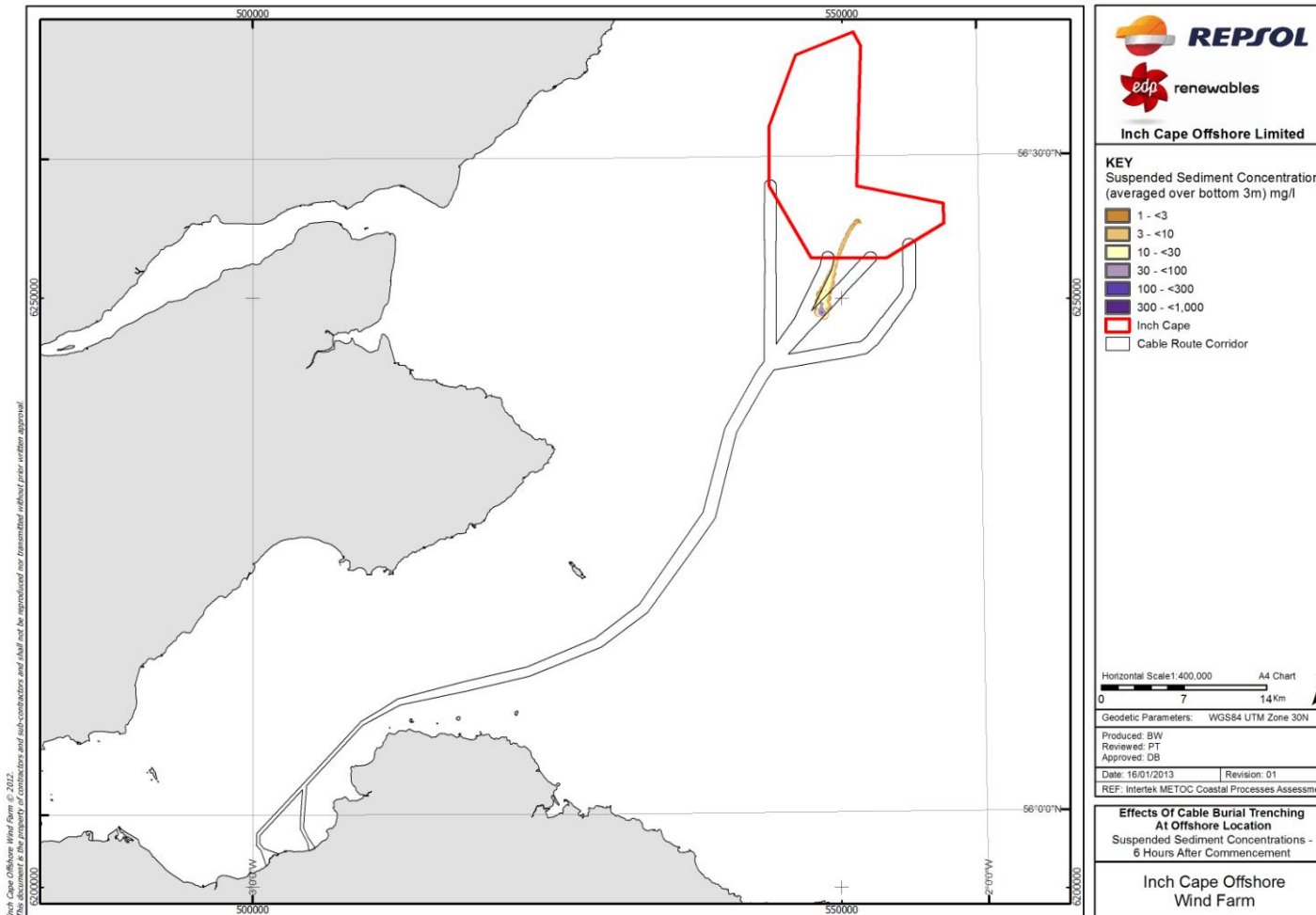
10A.7.56: Suspended sediment concentration due to cable trenching – offshore area: 2 hours after commencement



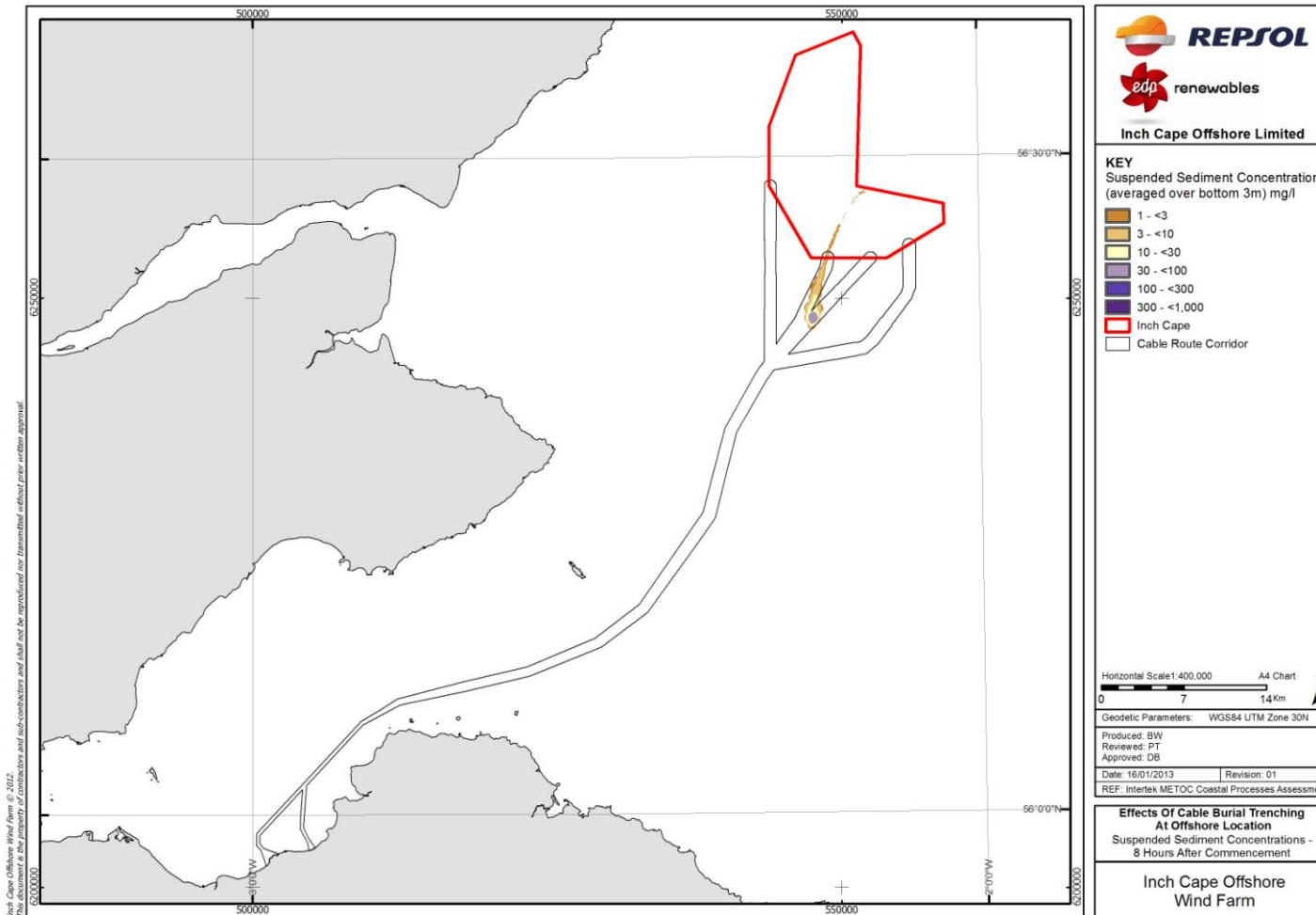
10A.7.57: Suspended sediment concentration due to cable trenching – offshore area: 4 hours after commencement



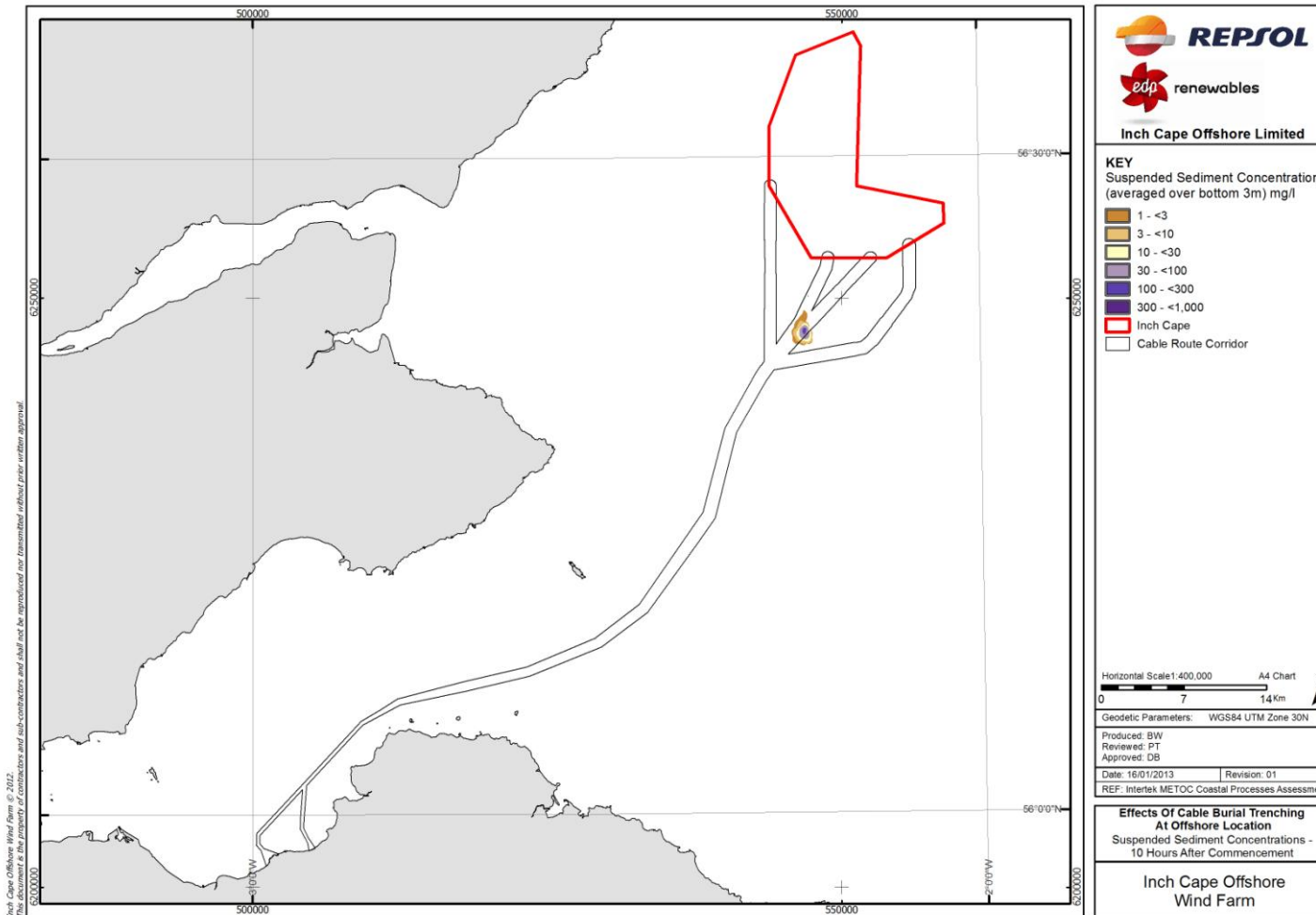
10A.7.58: Suspended sediment concentration due to cable trenching – offshore area: 6 hours after commencement



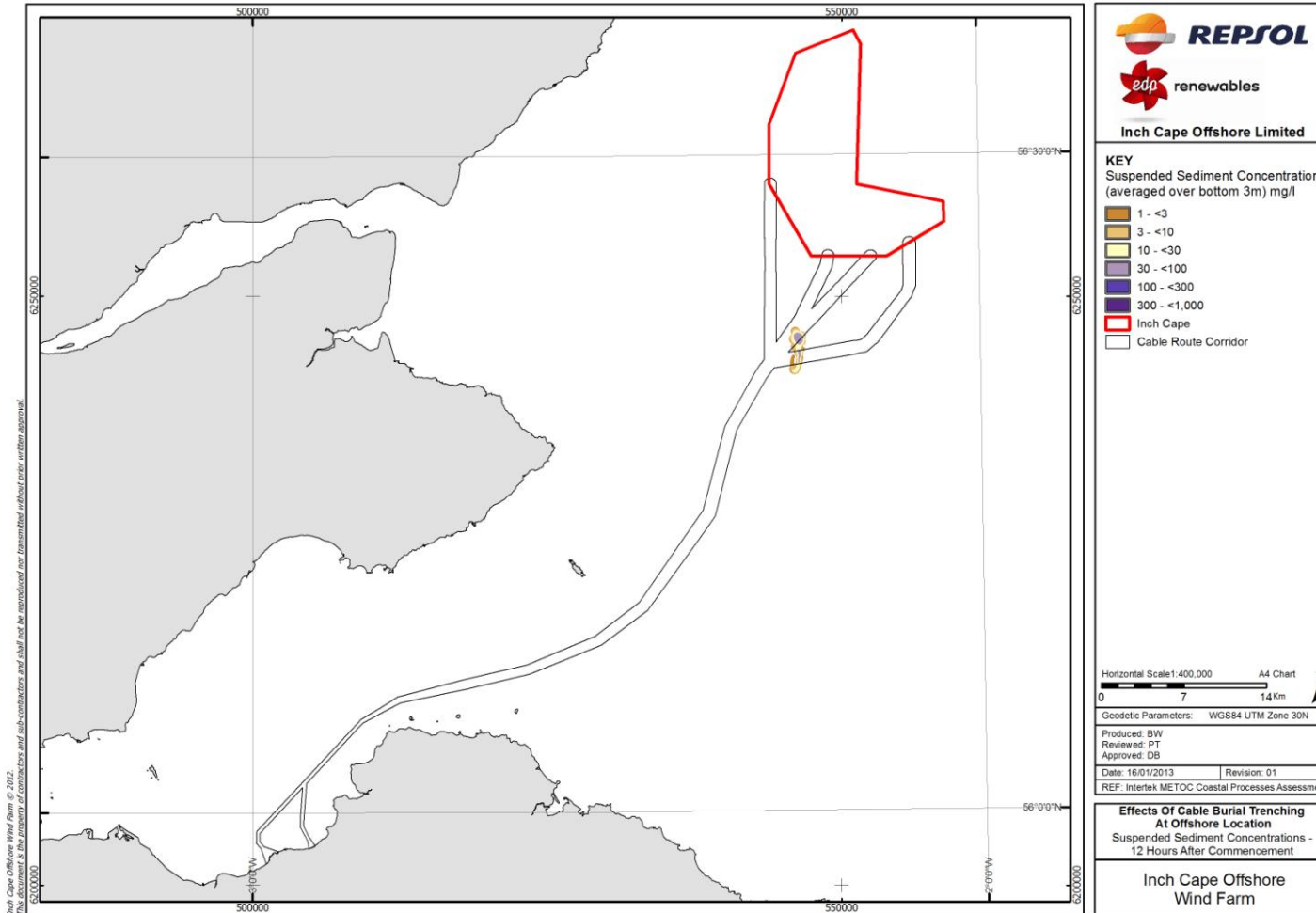
10A.7.59: Suspended sediment concentration due to cable trenching – offshore area: 8 hours after commencement



10A.7.60: Suspended sediment concentration due to cable trenching – offshore area: 10 hours after commencement

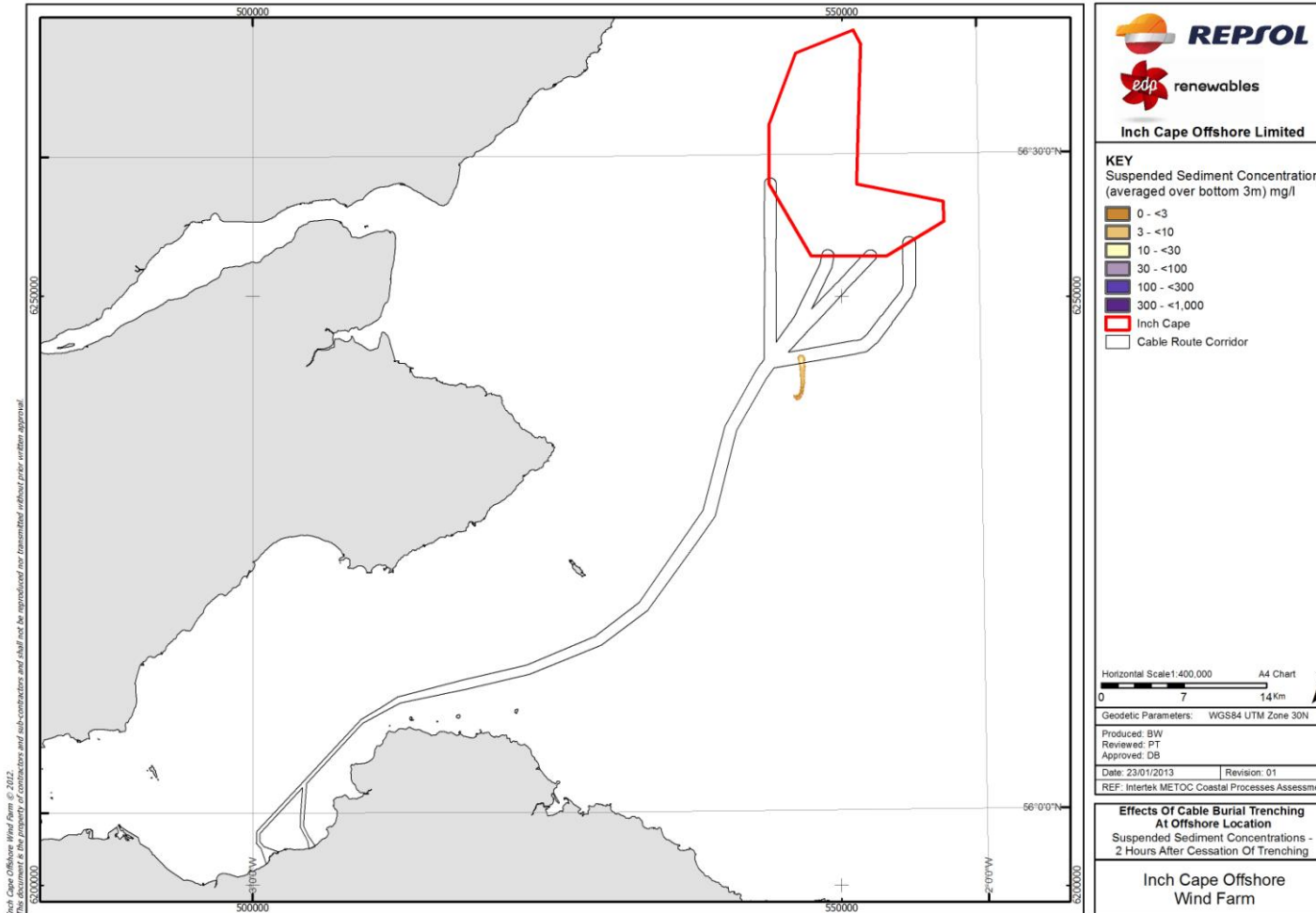


10A.7.61: Suspended sediment concentration due to cable trenching – offshore area: 12 hours after commencement

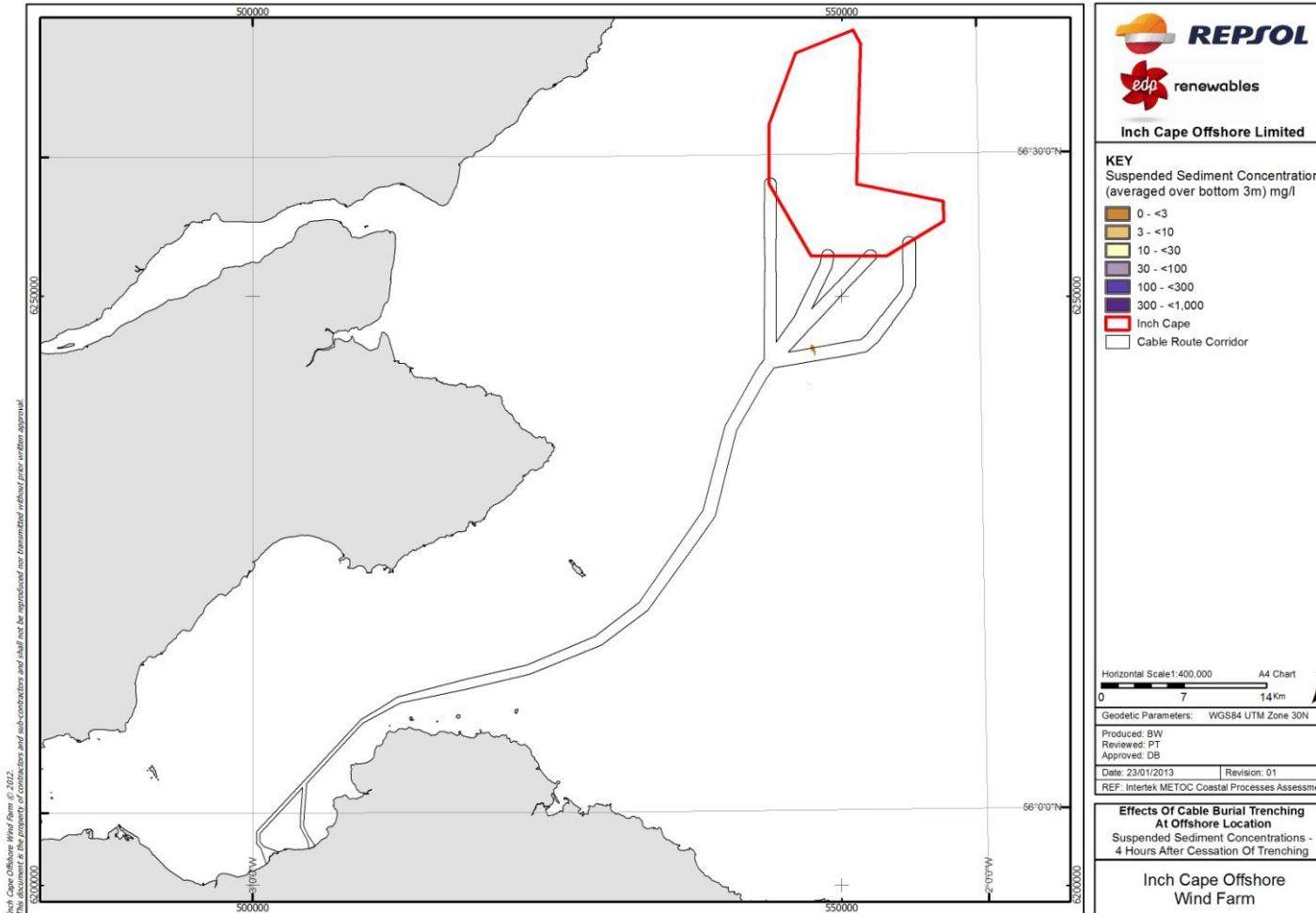




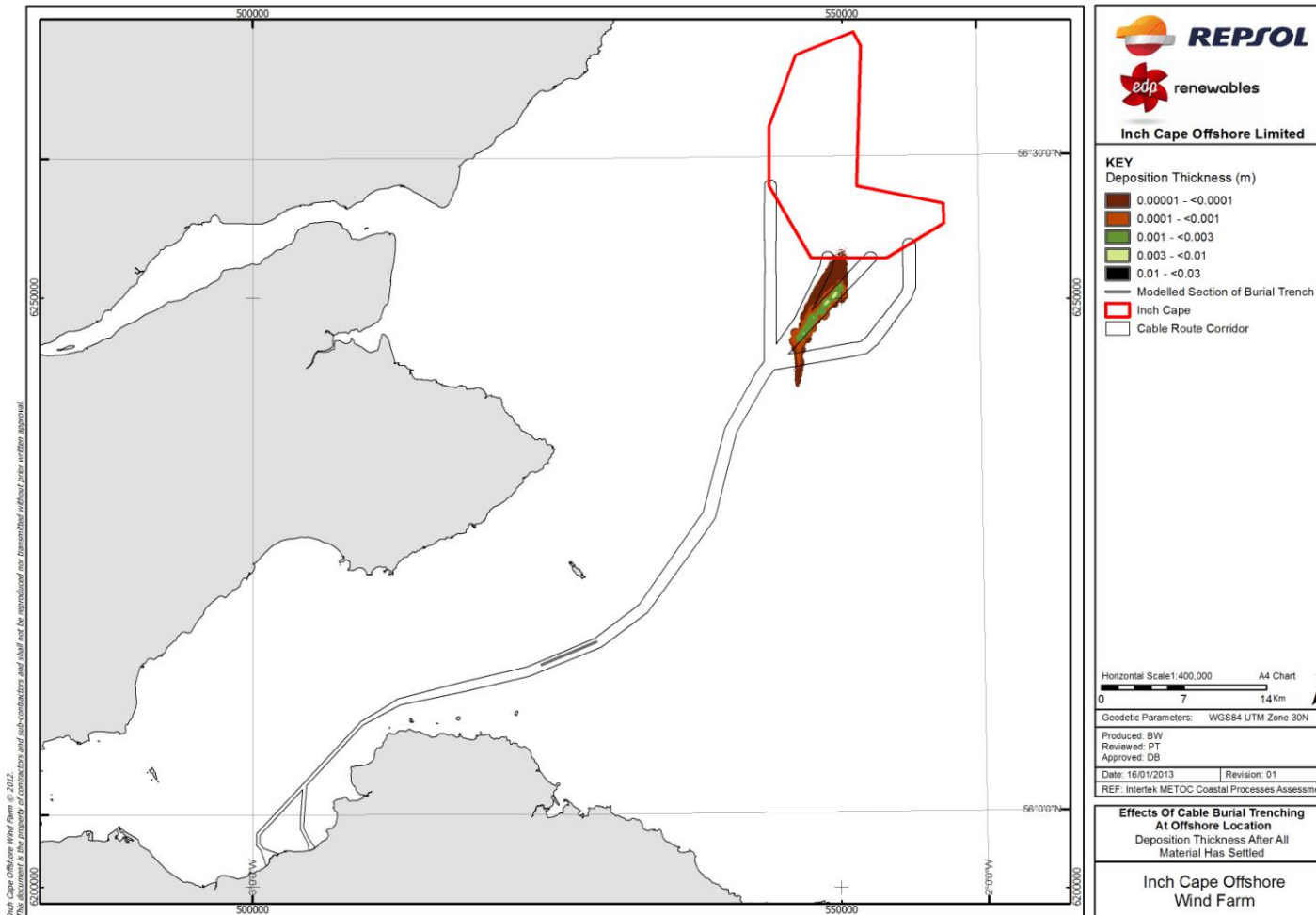
10A.7.62: Suspended sediment concentration due to cable trenching – offshore area: 2 hours after cessation of trenching



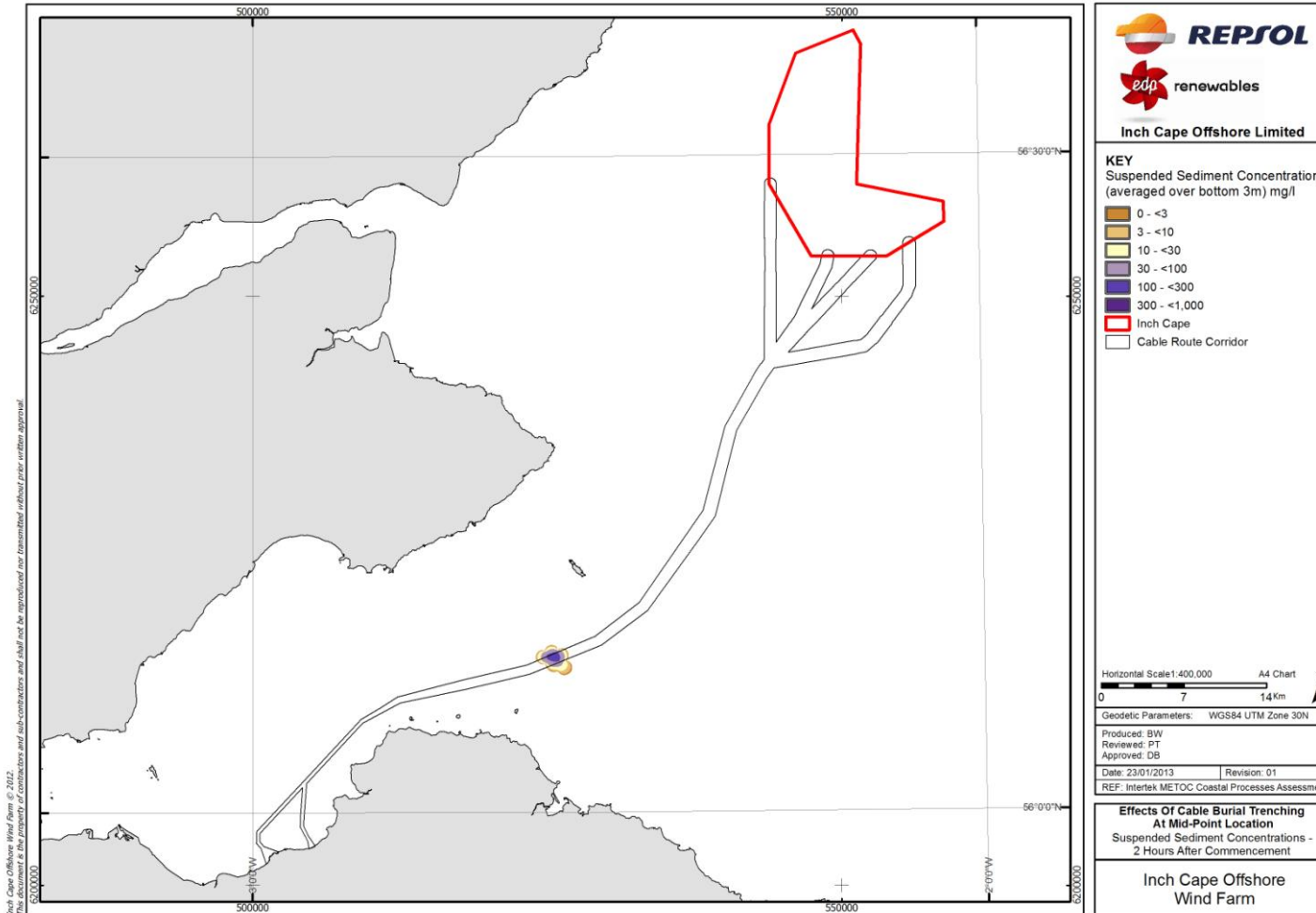
10A.7.63: Suspended sediment concentration due to cable trenching – offshore area: 4 hours after cessation of trenching



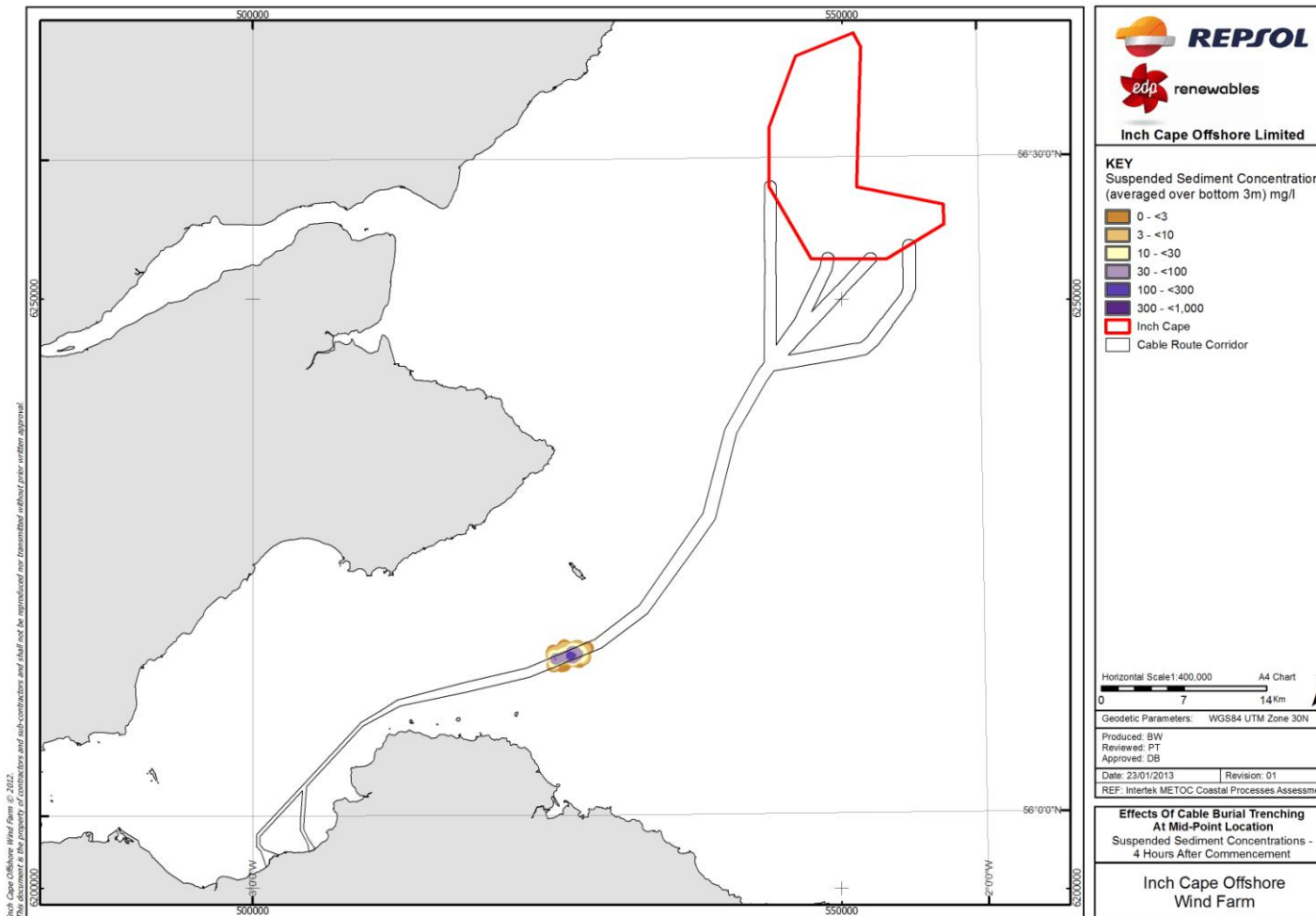
10A.7.64: Deposition thickness due to cable trenching – offshore area: after all disturbed material has settled



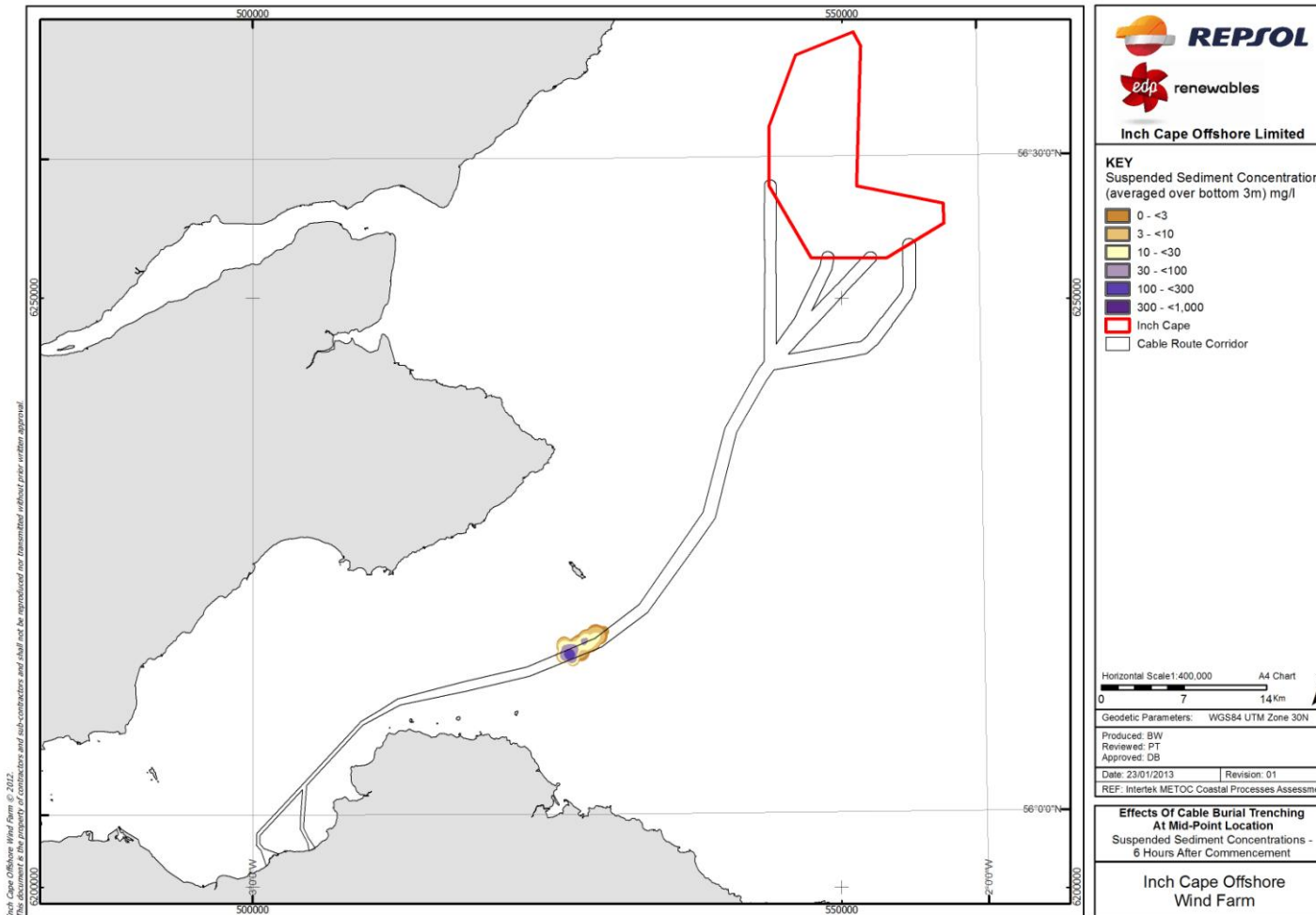
10A.7.65: Suspended sediment concentration due to cable trenching – midpoint area: 2 hours after commencement



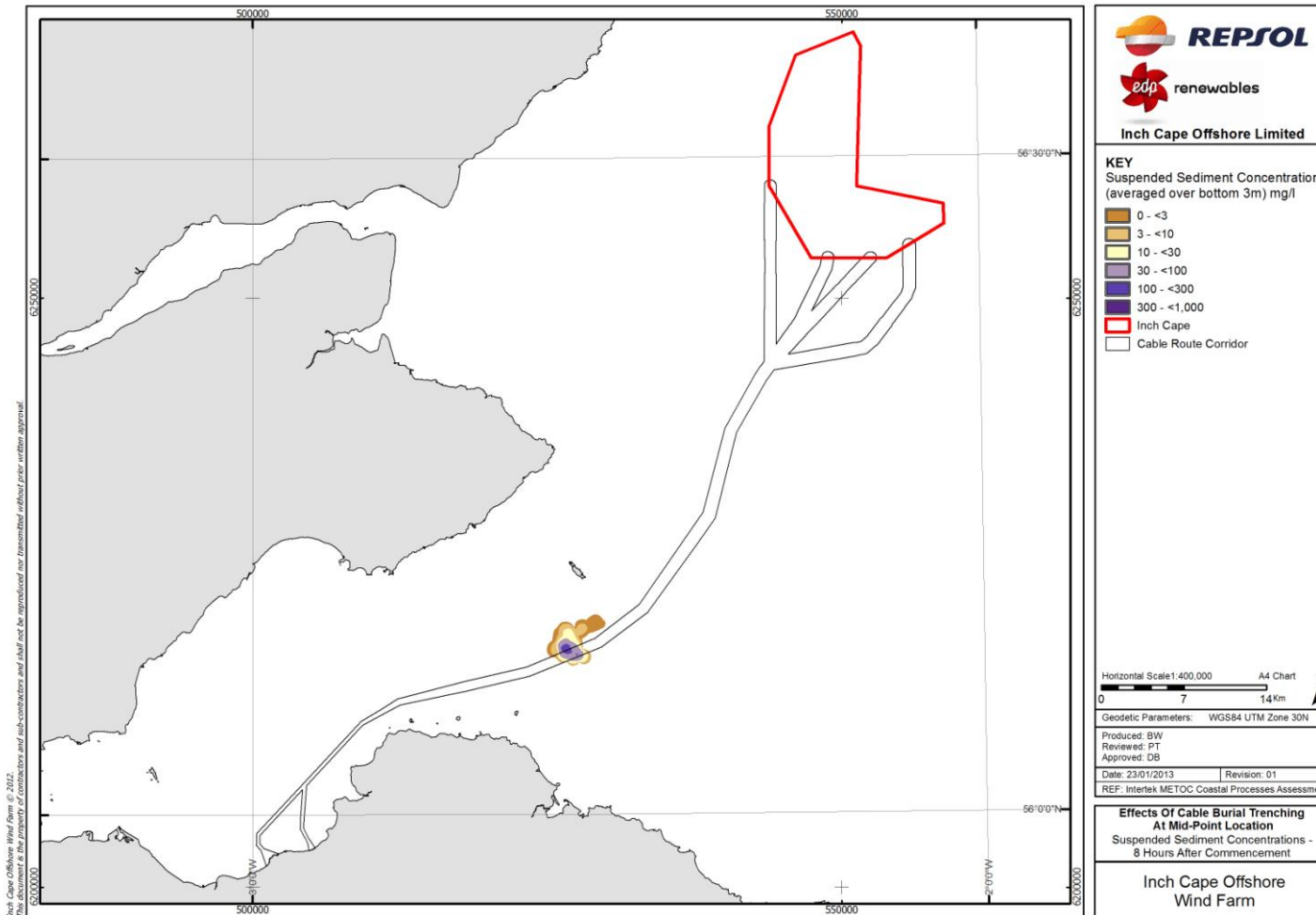
10A.7.66: Suspended sediment concentration due to cable trenching – midpoint area: 4 hours after commencement



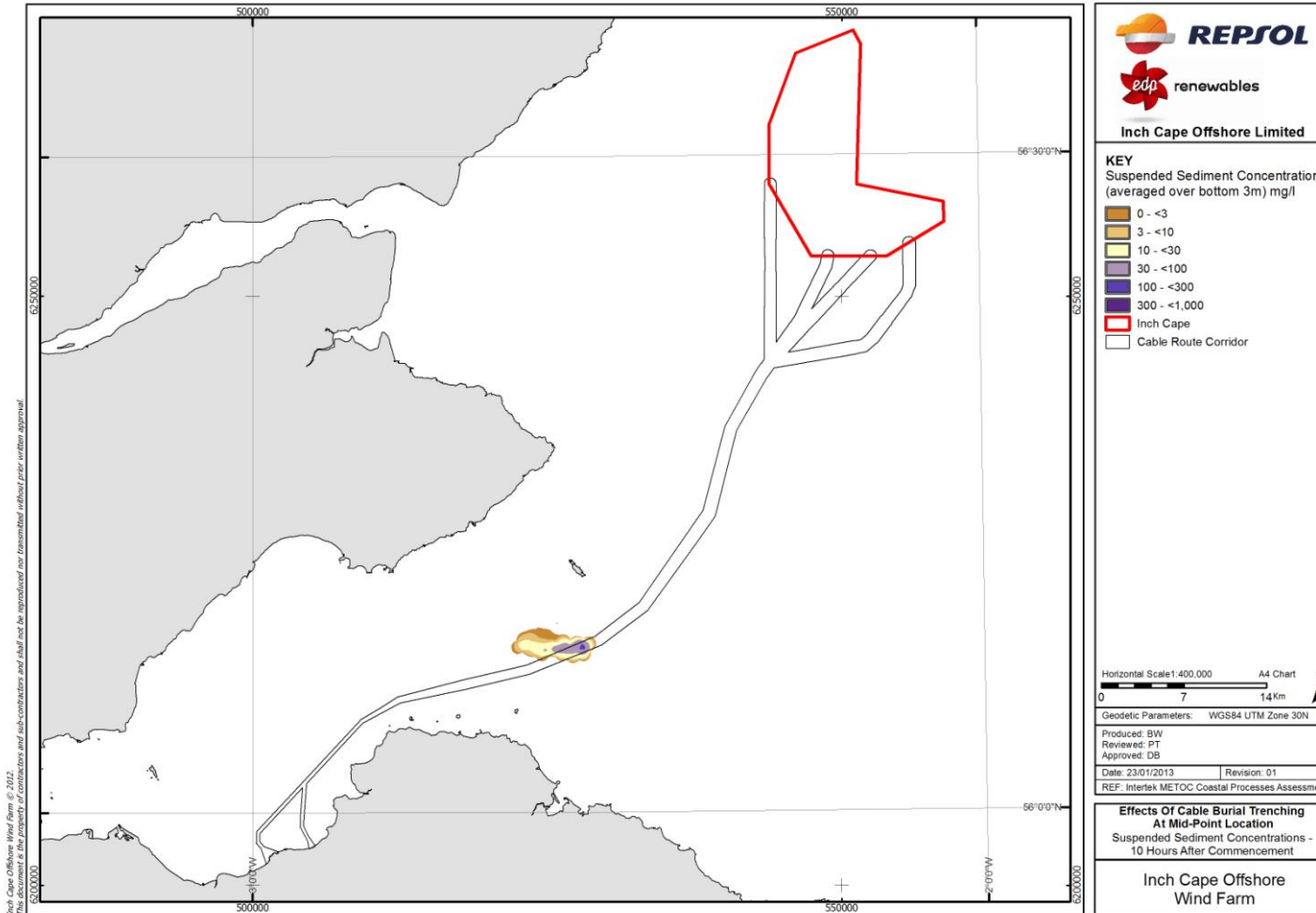
10A.7.67: Suspended sediment concentration due to cable trenching – midpoint area: 6 hours after commencement



10A.7.68: Suspended sediment concentration due to cable trenching – midpoint area: 8 hours after commencement

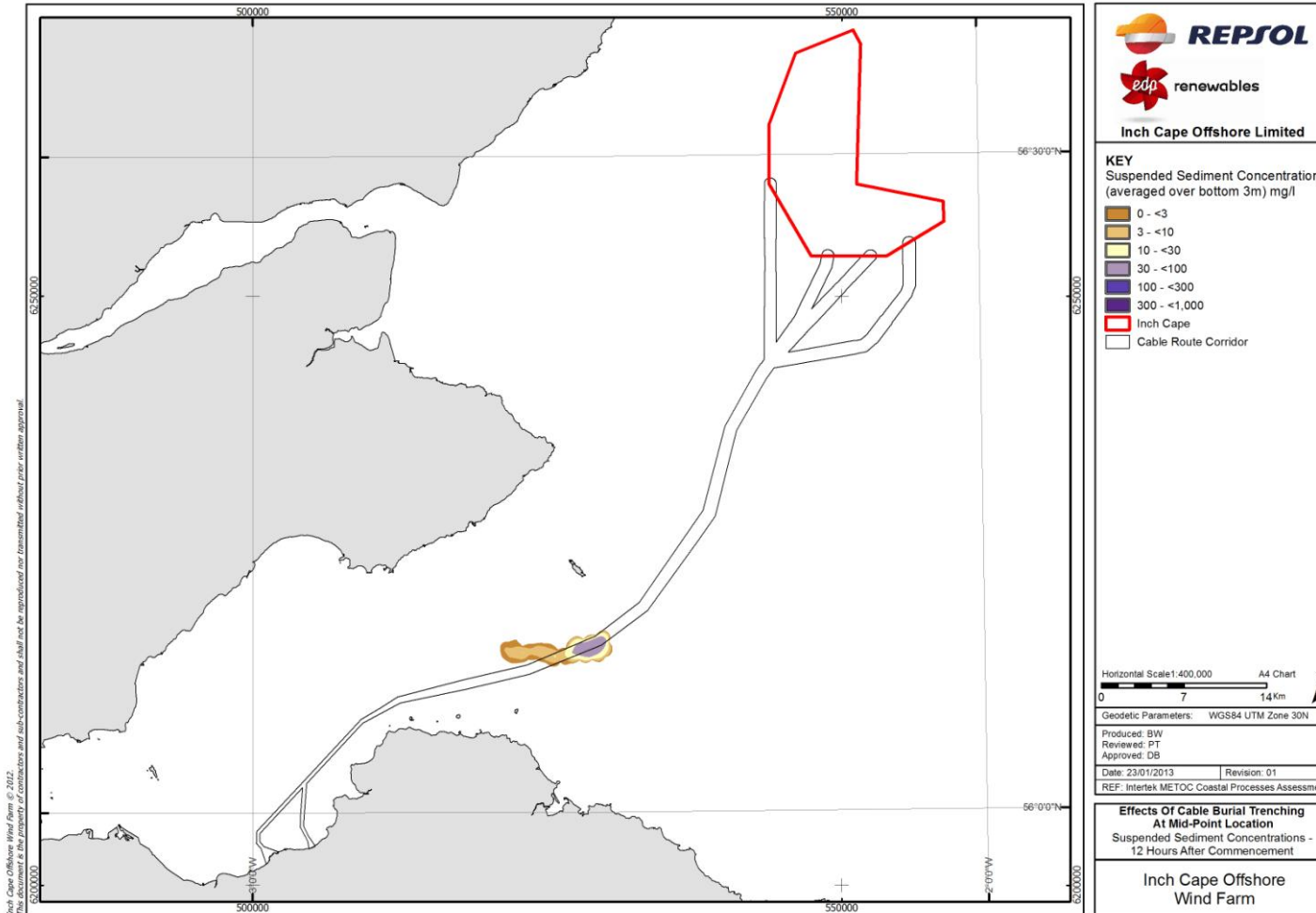


10A.7.69: Suspended sediment concentration due to cable trenching – midpoint area: 10 hours after commencement

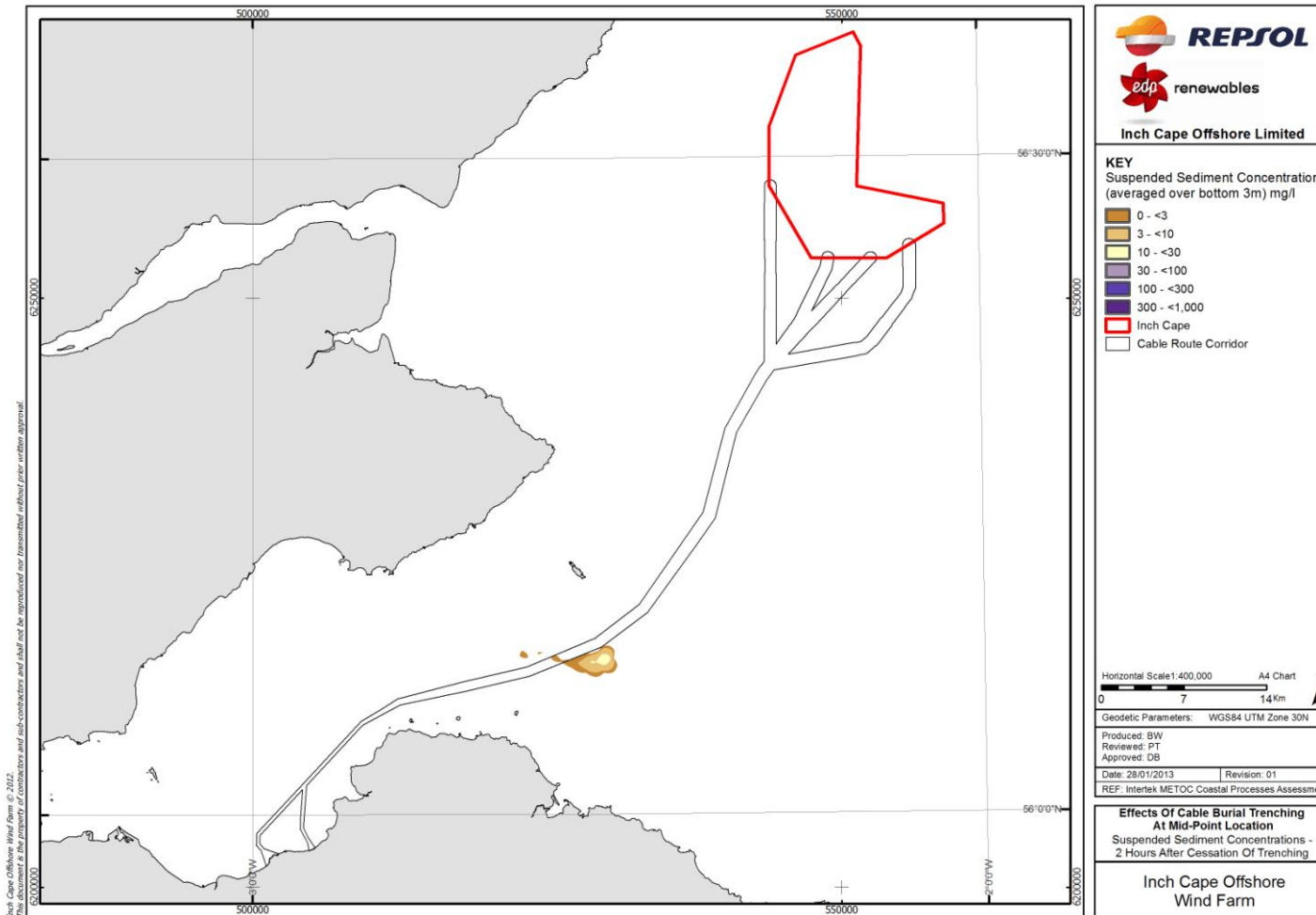




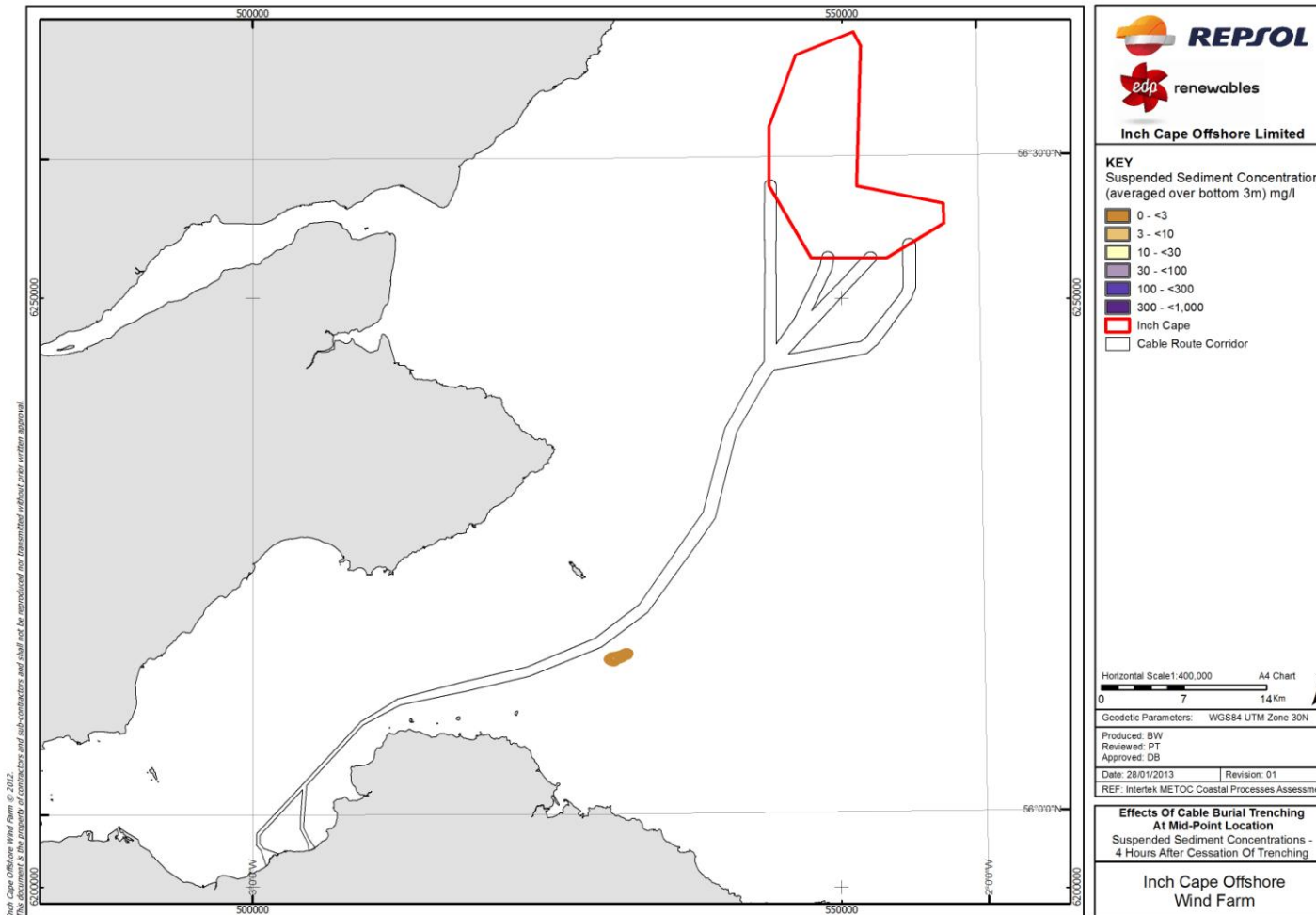
10A.7.70: Suspended sediment concentration due to cable trenching – midpoint area: 12 hours after commencement



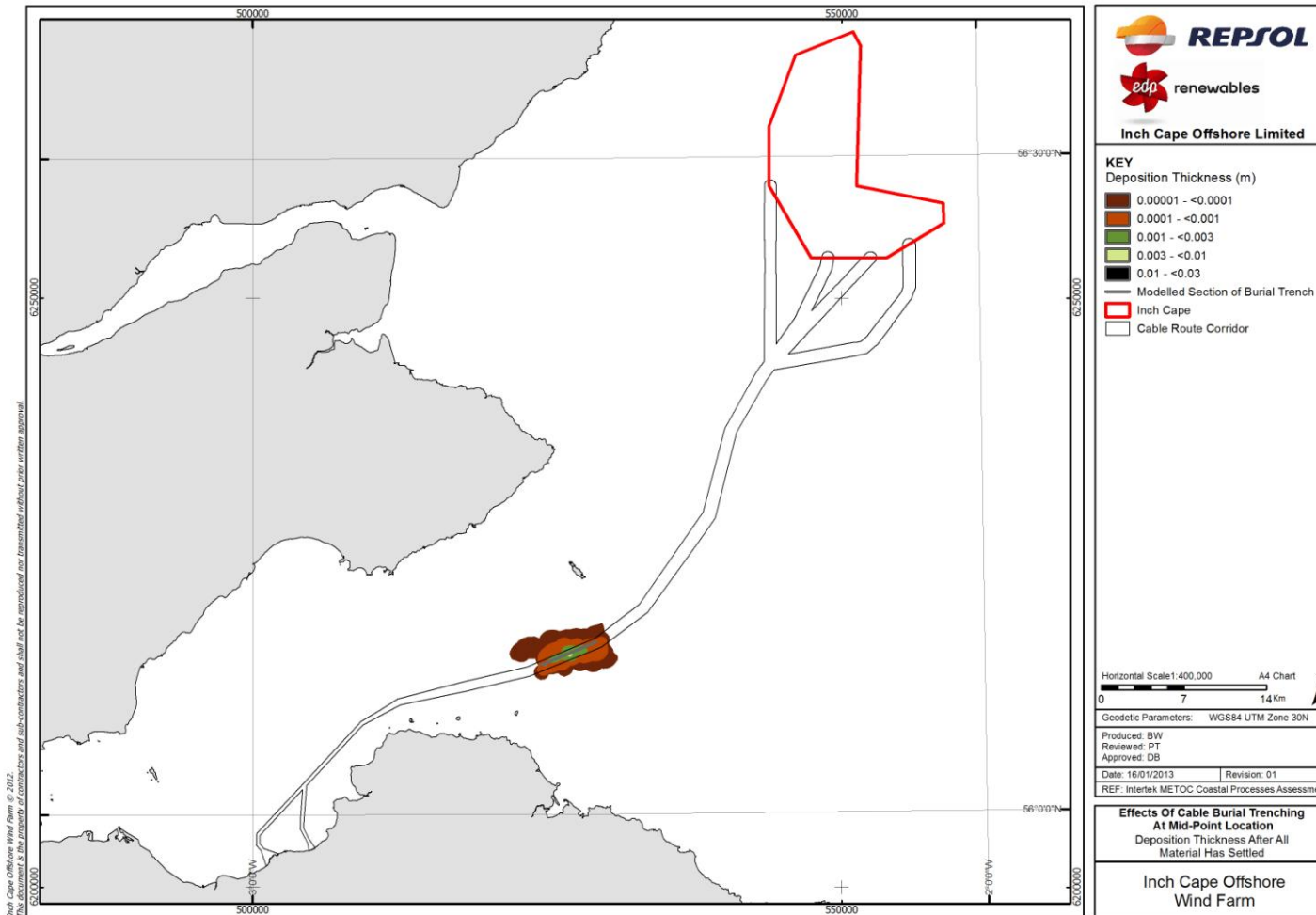
10A.7.71: Suspended sediment concentration due to cable trenching – midpoint area: 2 hours after cessation of trenching



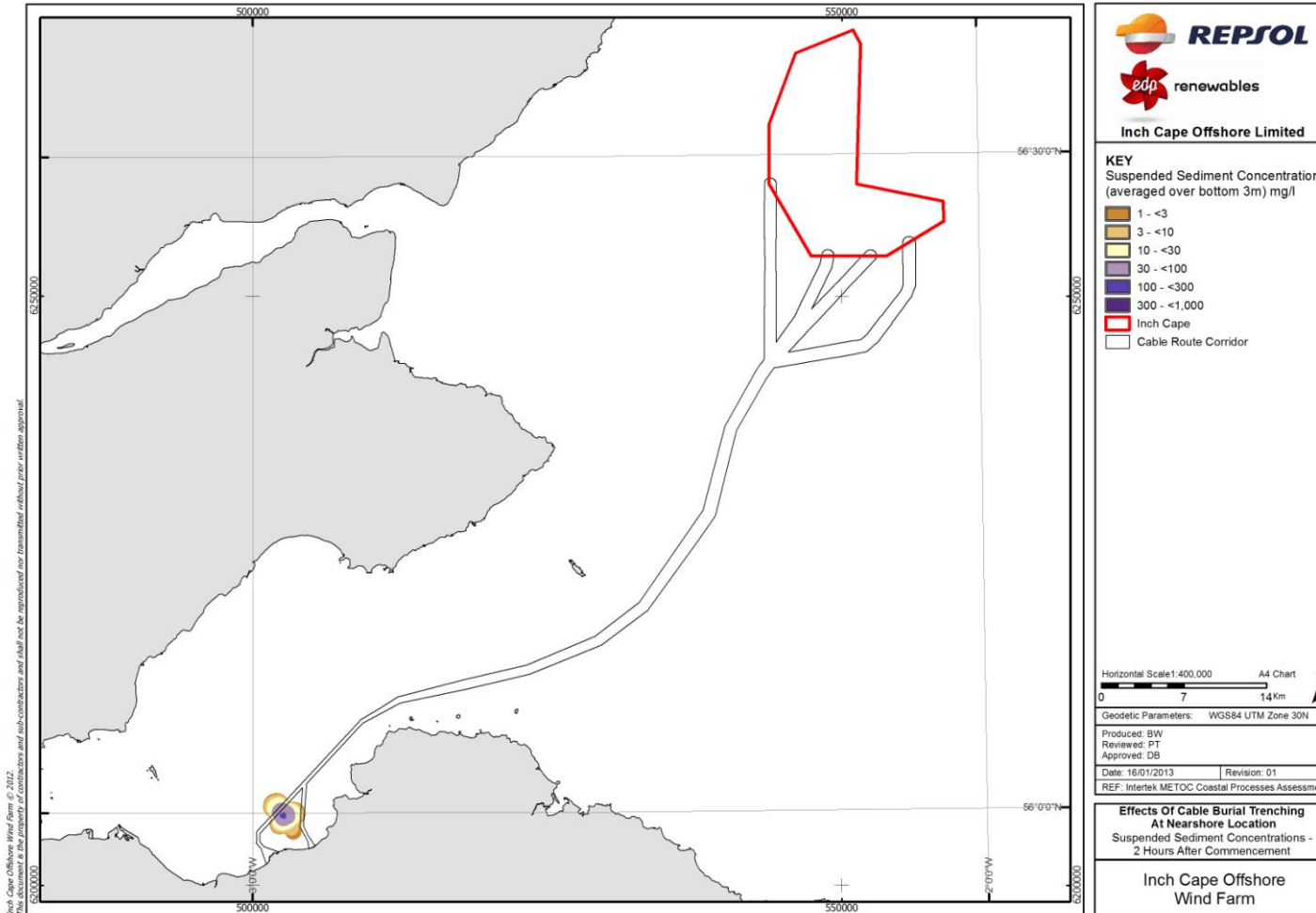
10A.7.72: Suspended sediment concentration due to cable trenching – midpoint area: 4 hours after cessation of trenching



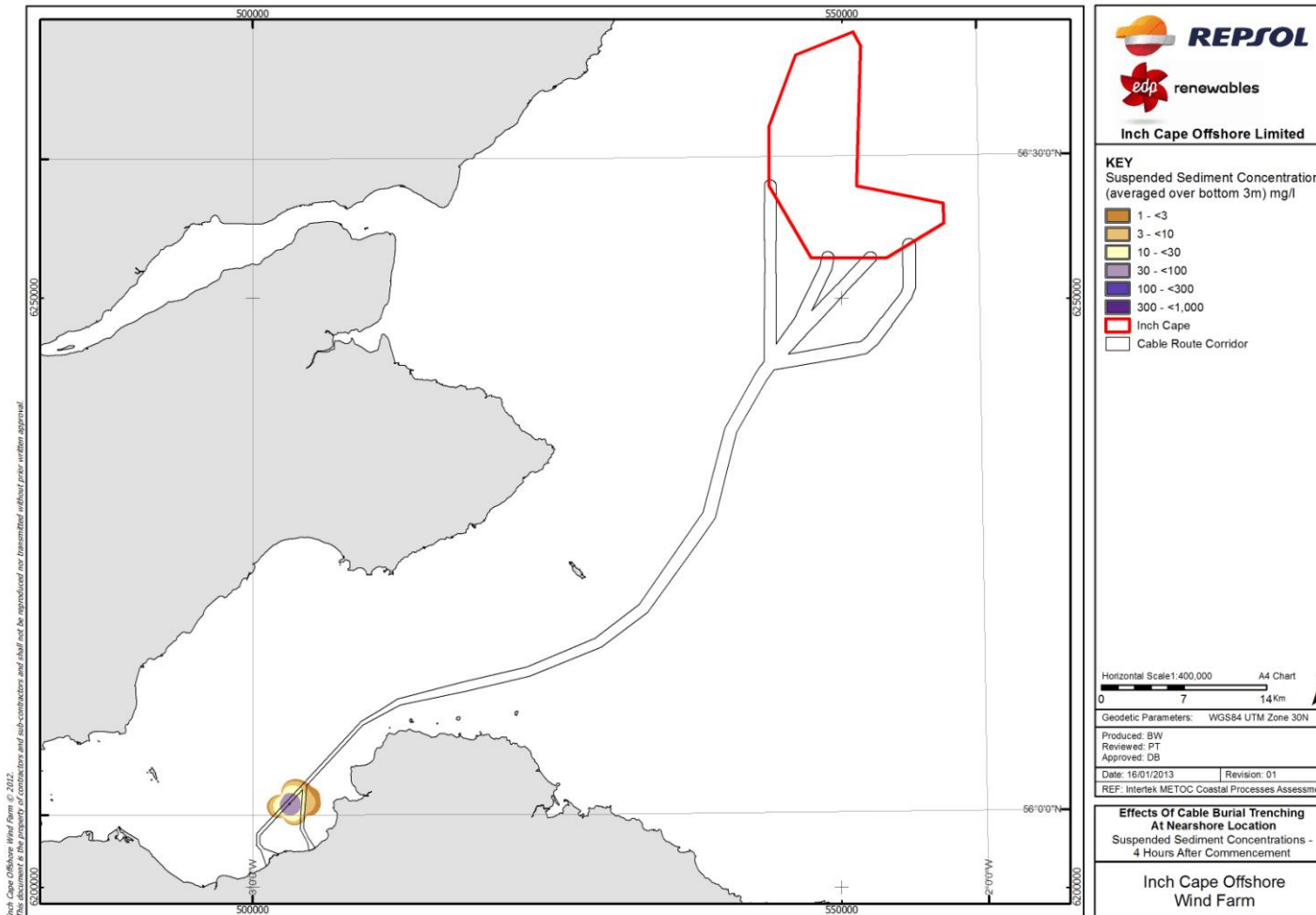
10A.7.73: Deposition thickness due to cable trenching – midpoint area: after all disturbed material has settled



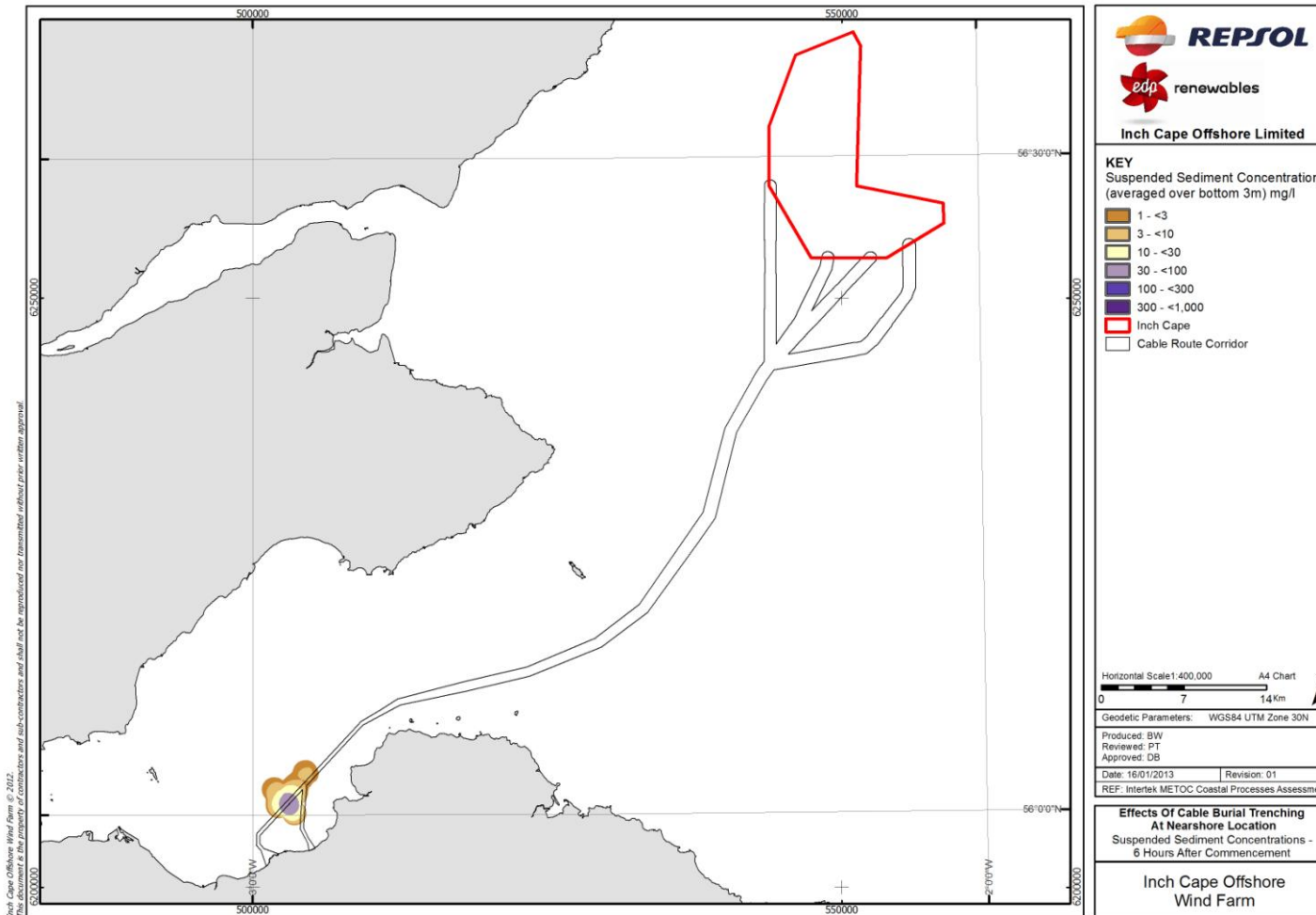
10A.7.74: Suspended sediment concentration due to cable trenching – nearshore area: 2 hours after commencement



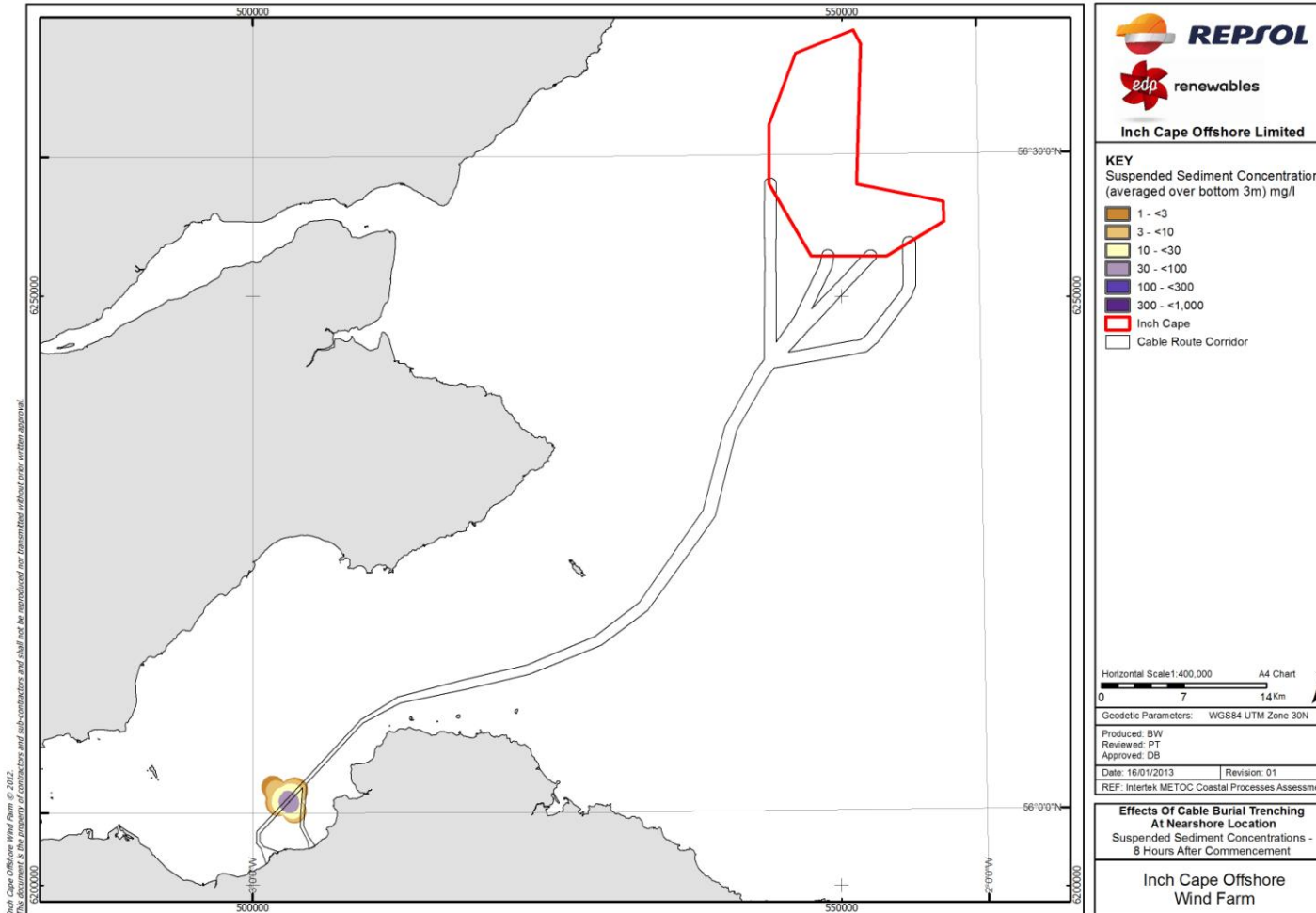
10A.7.75: Suspended sediment concentration due to cable trenching – nearshore area: 4 hours after commencement



10A.7.76: Suspended sediment concentration due to cable trenching – nearshore area: 6 hours after commencement

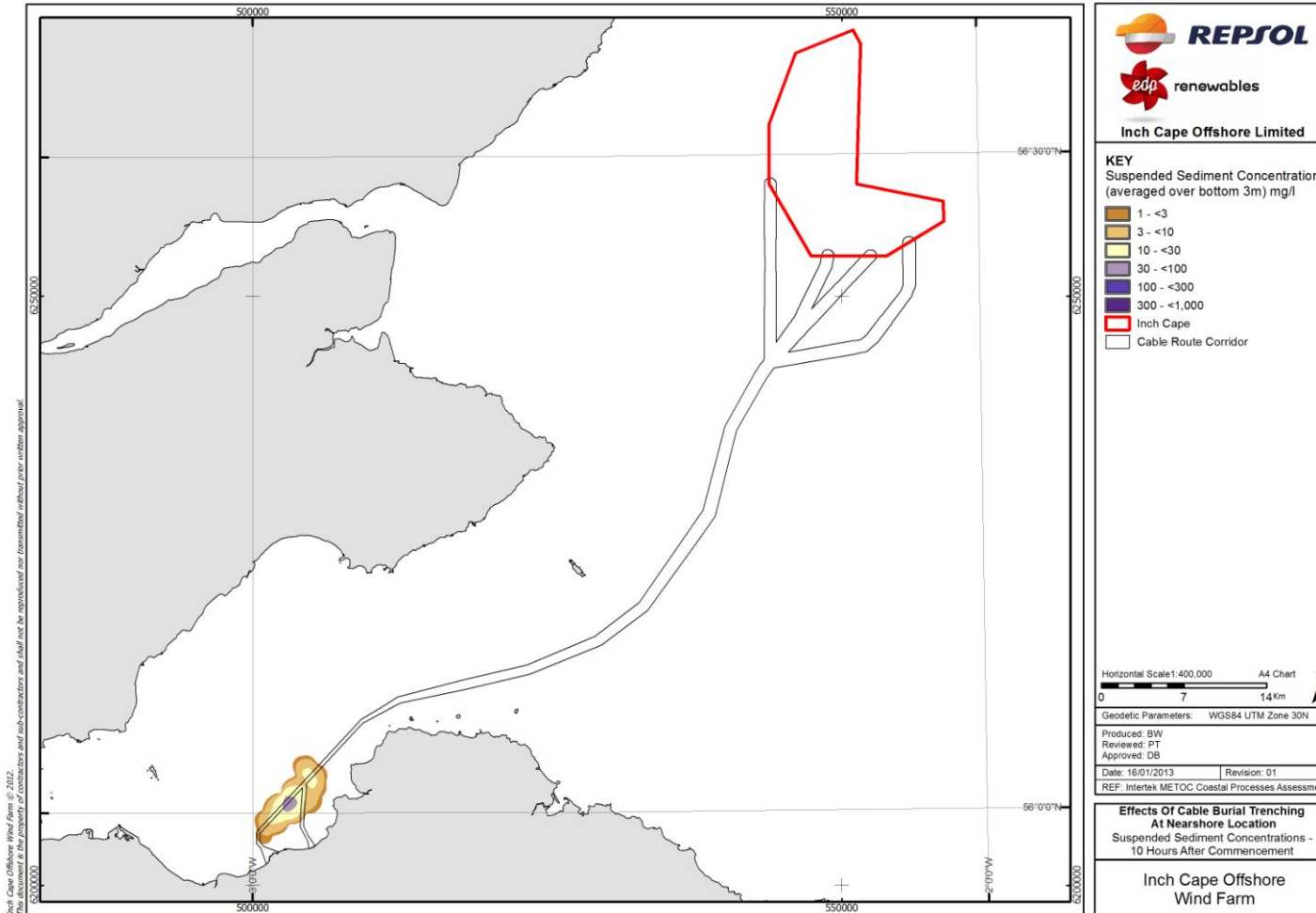


10A.7.77: Suspended sediment concentration due to cable trenching – nearshore area: 8 hours after commencement

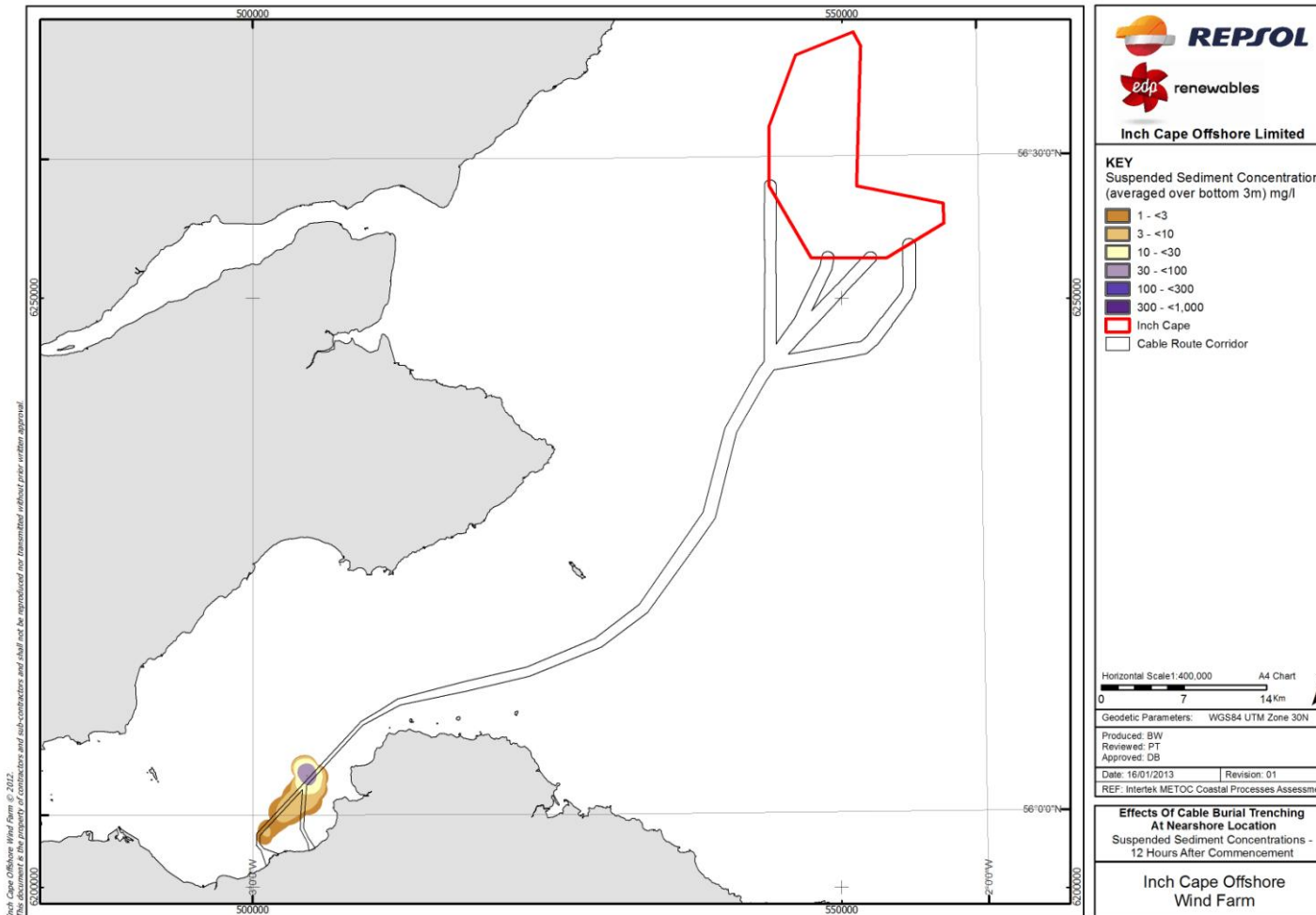




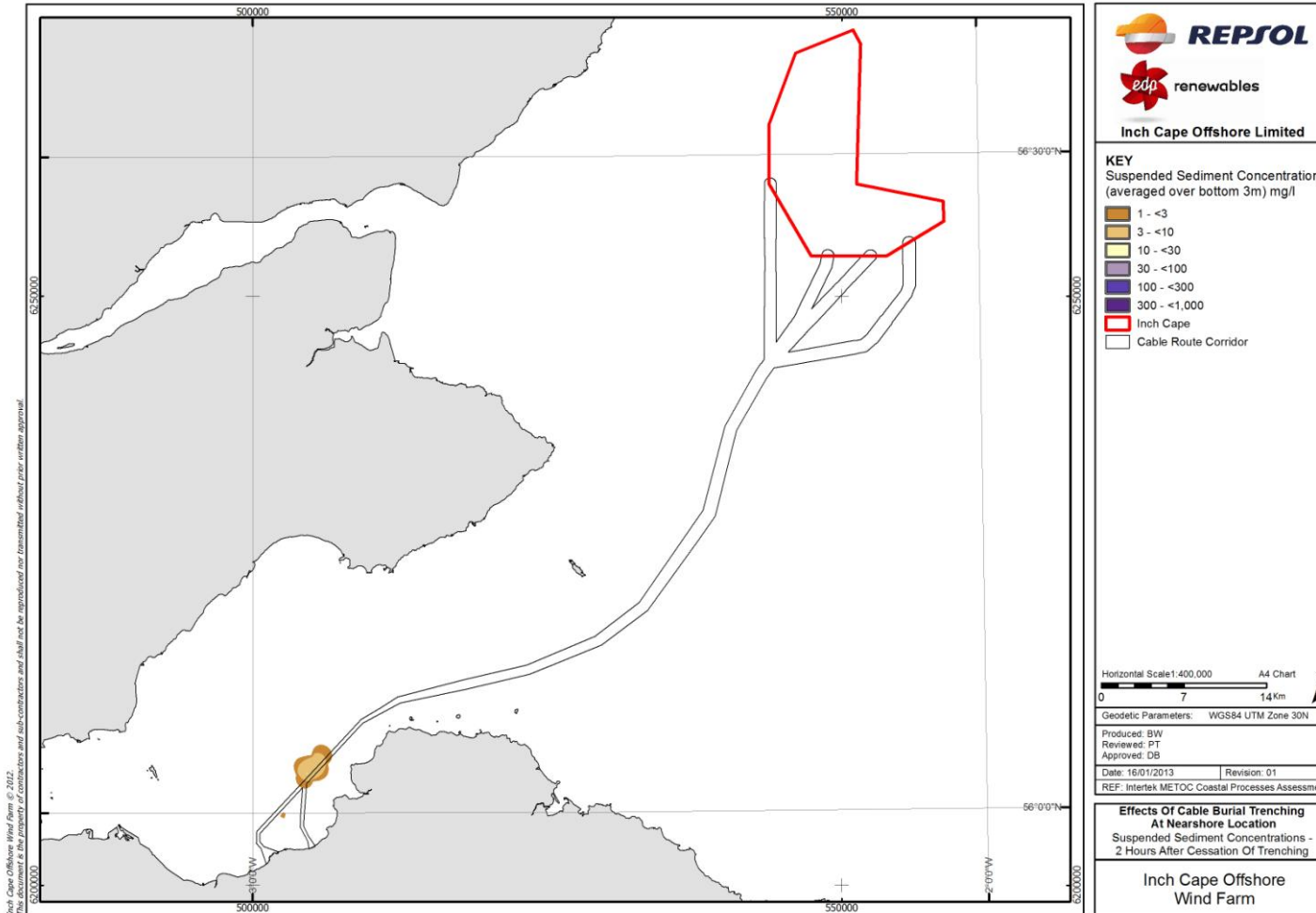
10A.7.78: Suspended sediment concentration due to cable trenching – nearshore area: 10 hours after commencement



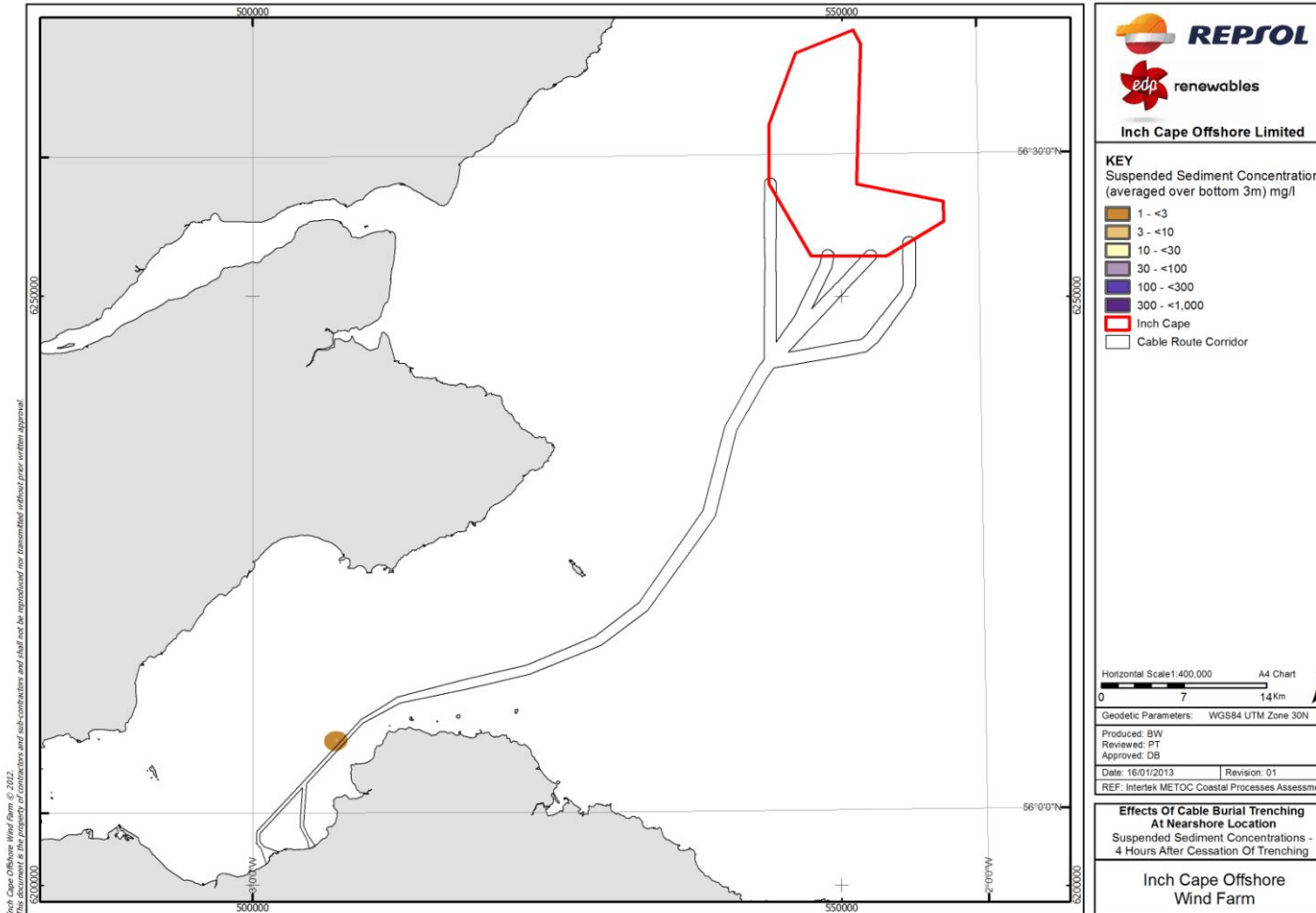
10A.7.79: Suspended sediment concentration due to cable trenching – nearshore area: 12 hours after commencement



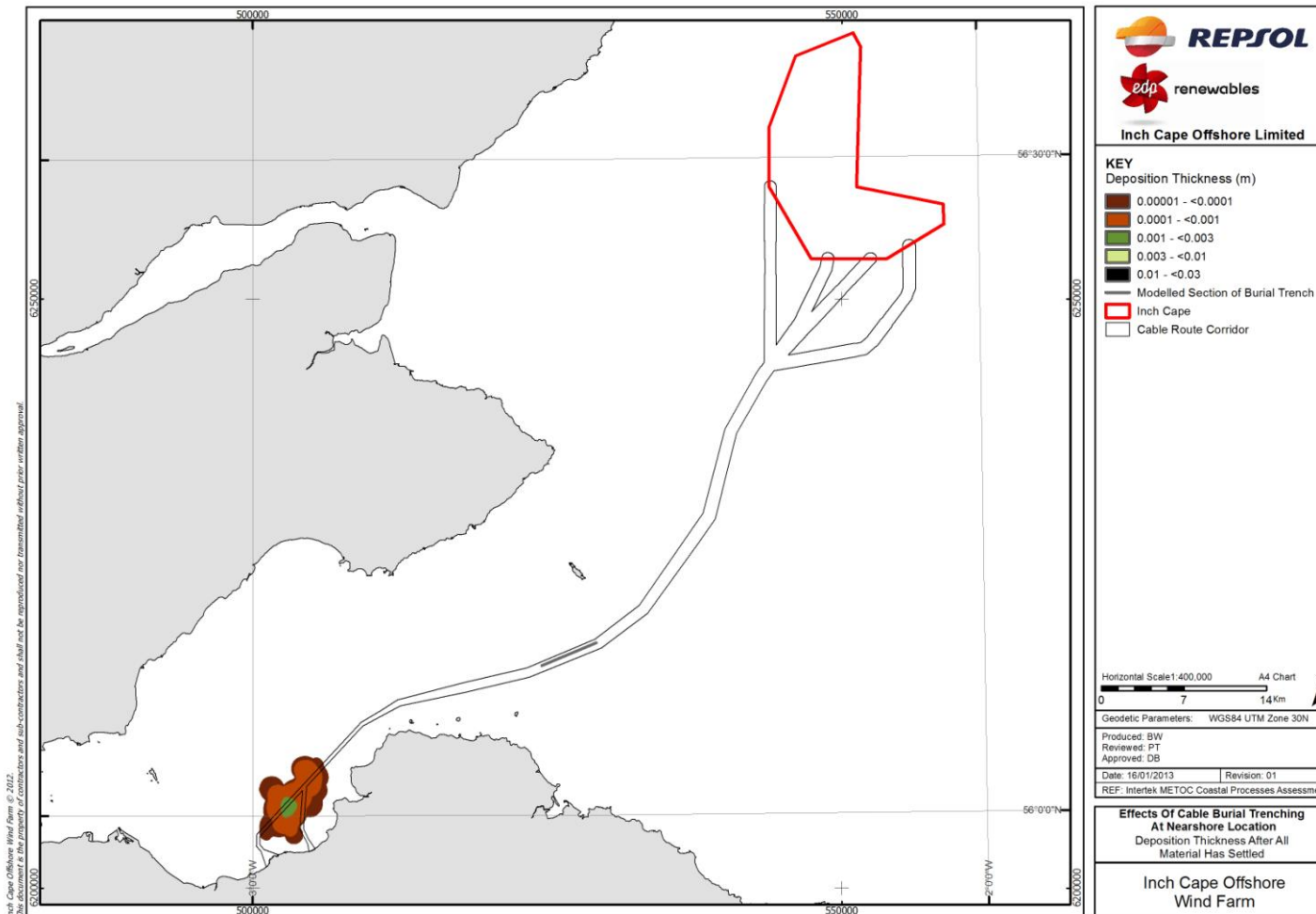
10A.7.80: Suspended sediment concentration due to cable trenching – nearshore area: 2 hours after cessation of trenching



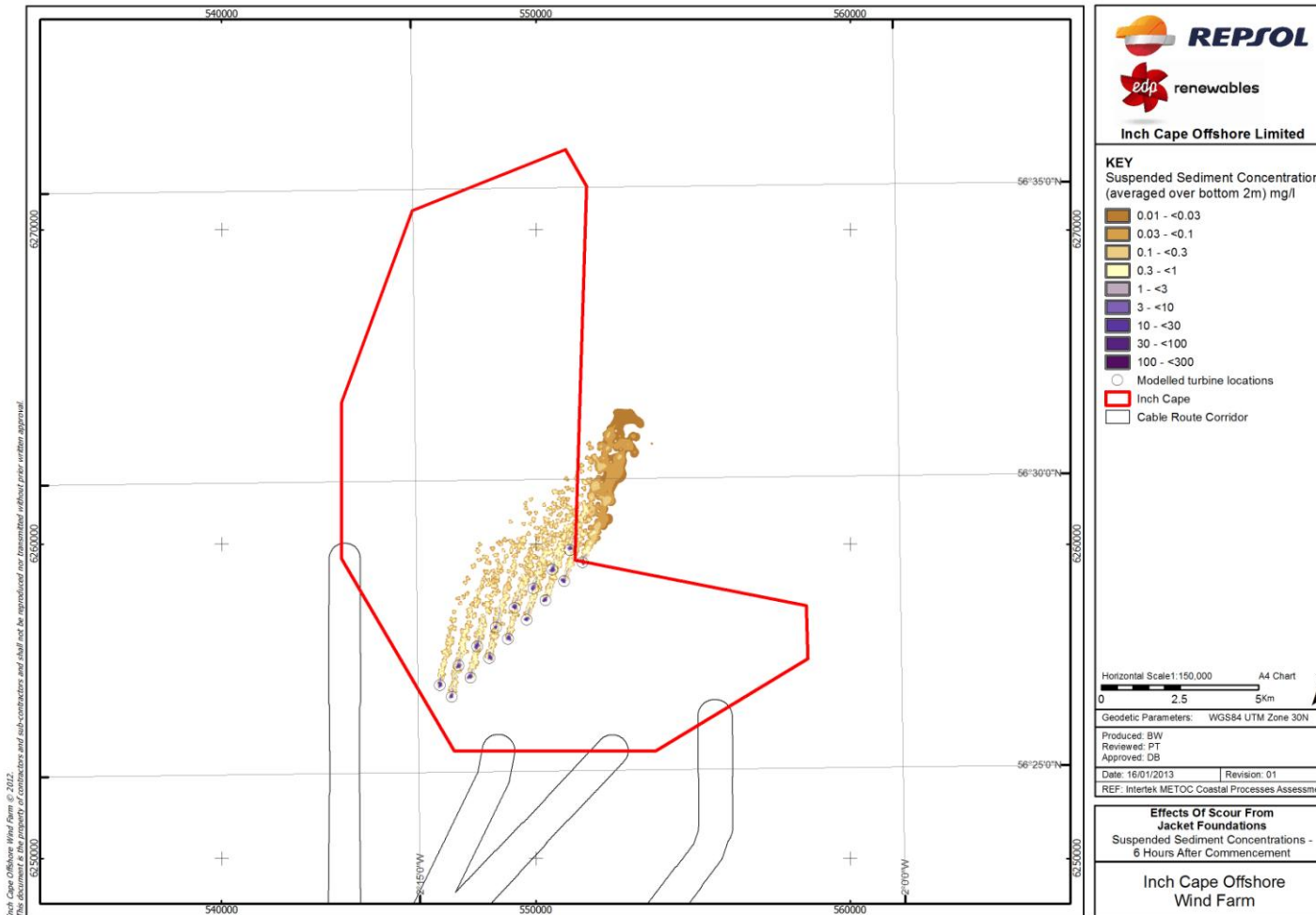
10A.7.81: Suspended sediment concentration due to cable trenching – nearshore area: 4 hours after cessation of trenching



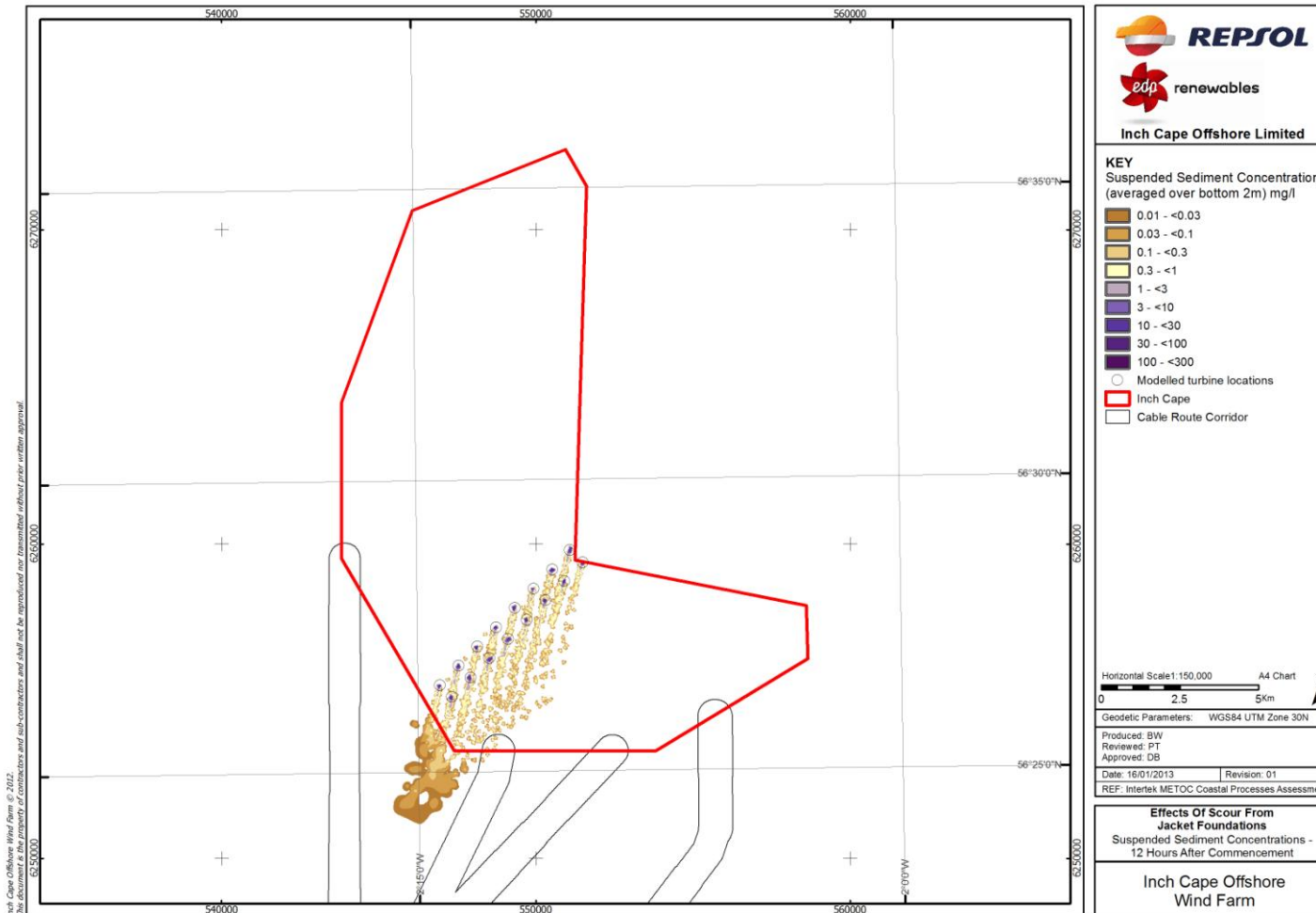
10A.7.82: Deposition thickness due to cable trenching – nearshore area: after all disturbed material has settled



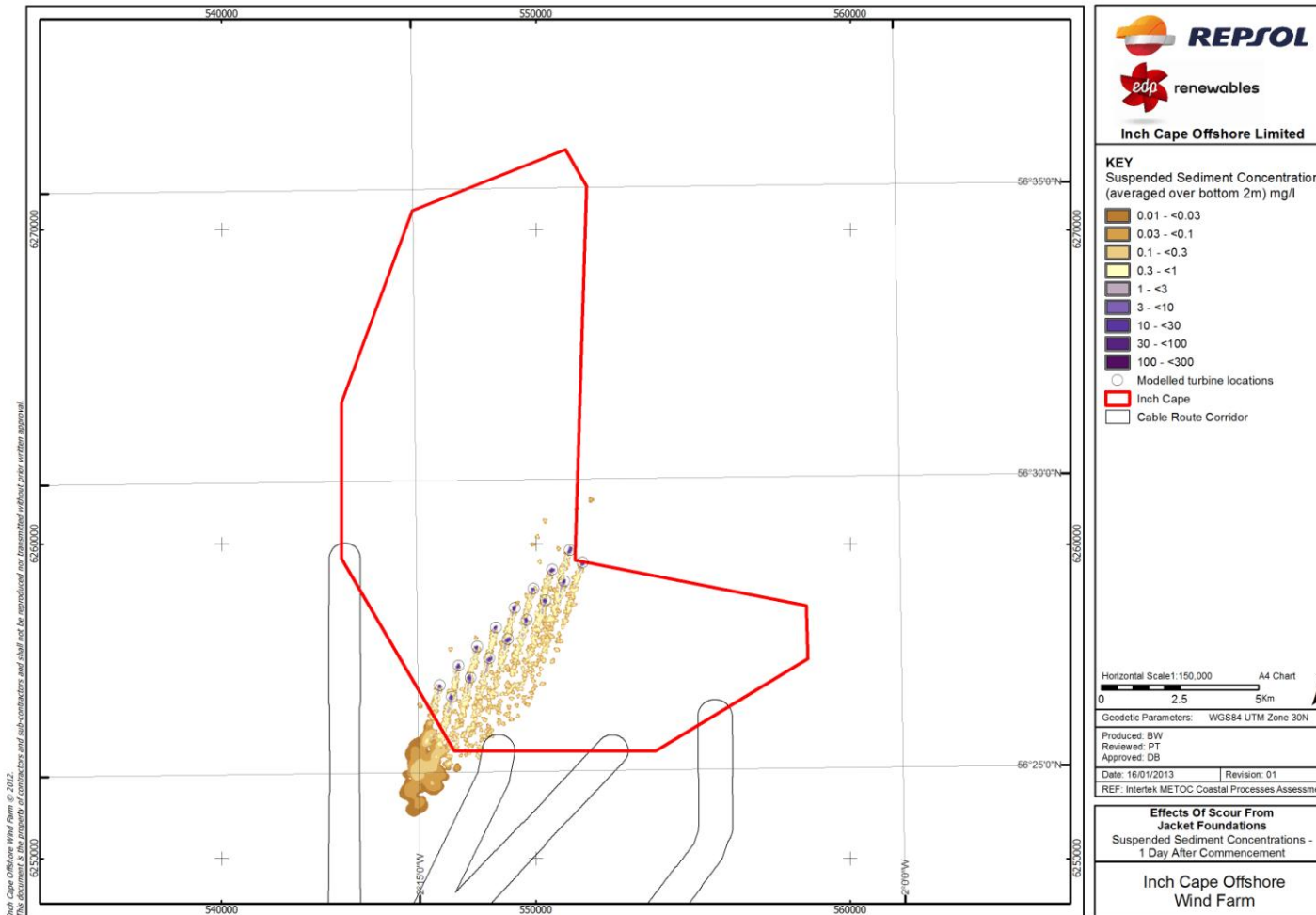
10A.7.83: Suspended sediment concentration due to scouring around turbine bases – 6 hours after ‘commencement’



10A.7.84: Suspended sediment concentration due to scouring around turbine bases – 12 hours after ‘commencement’

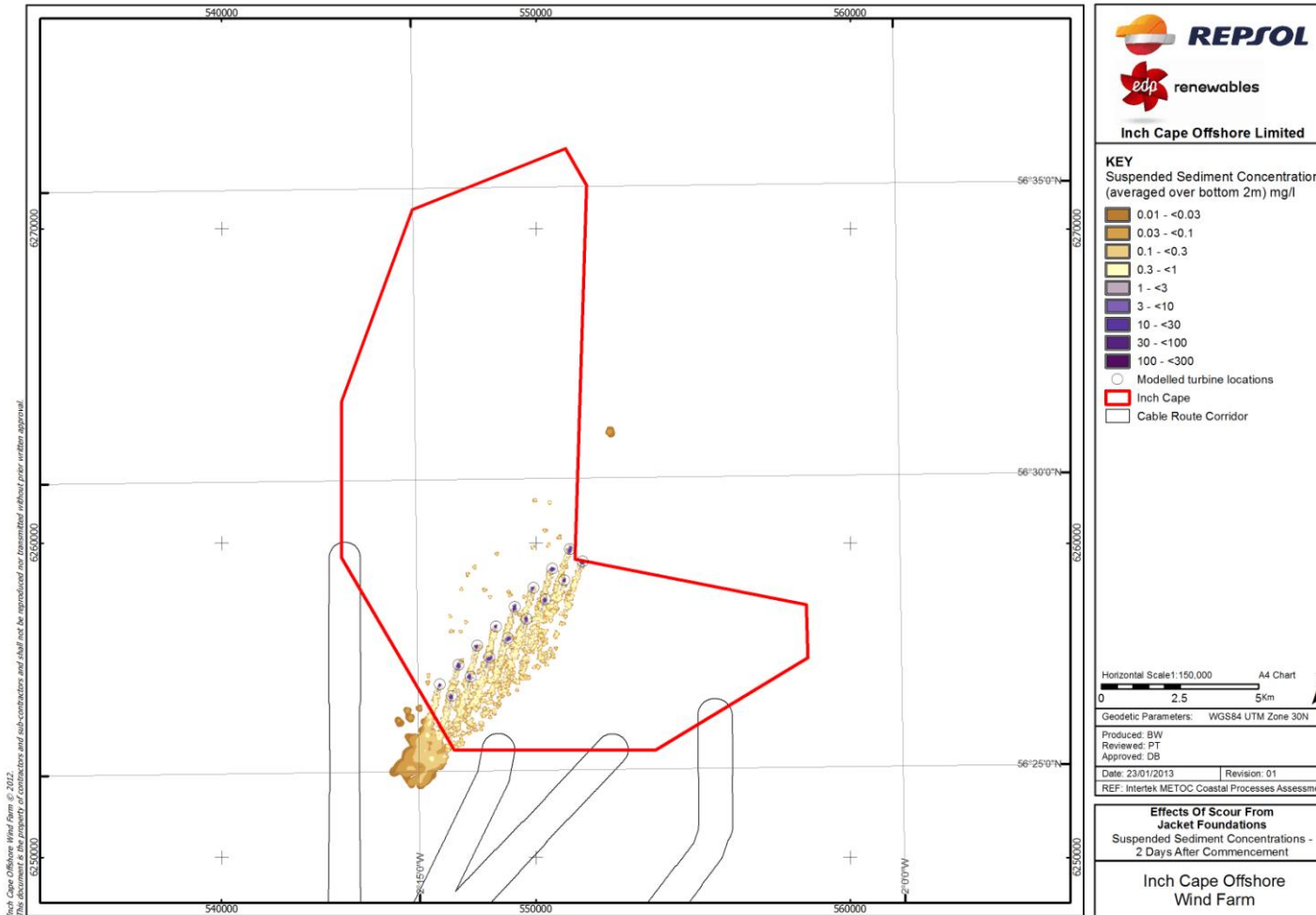


10A.7.85: Suspended sediment concentration due to scouring around turbine bases – 1 day after ‘commencement’

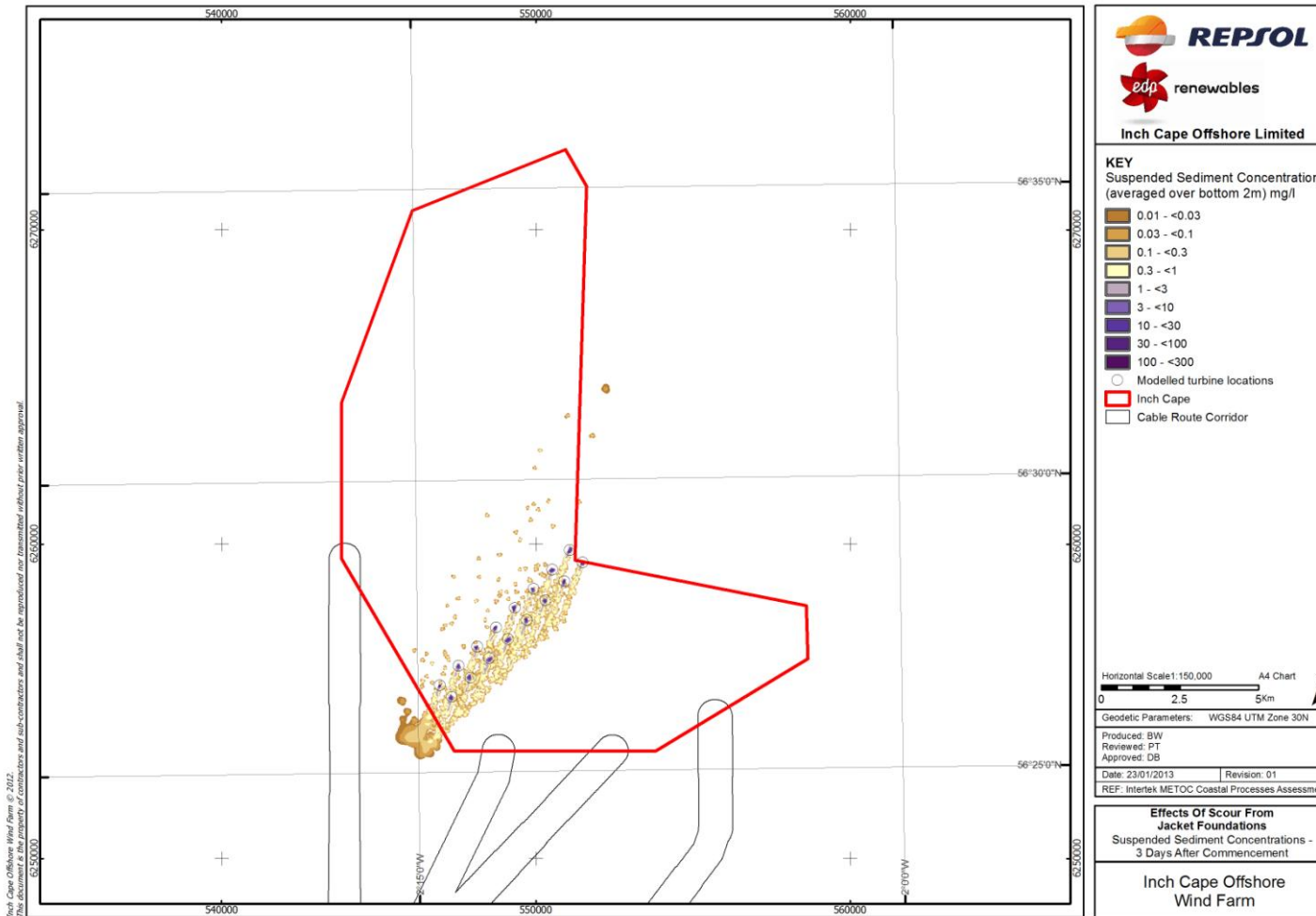




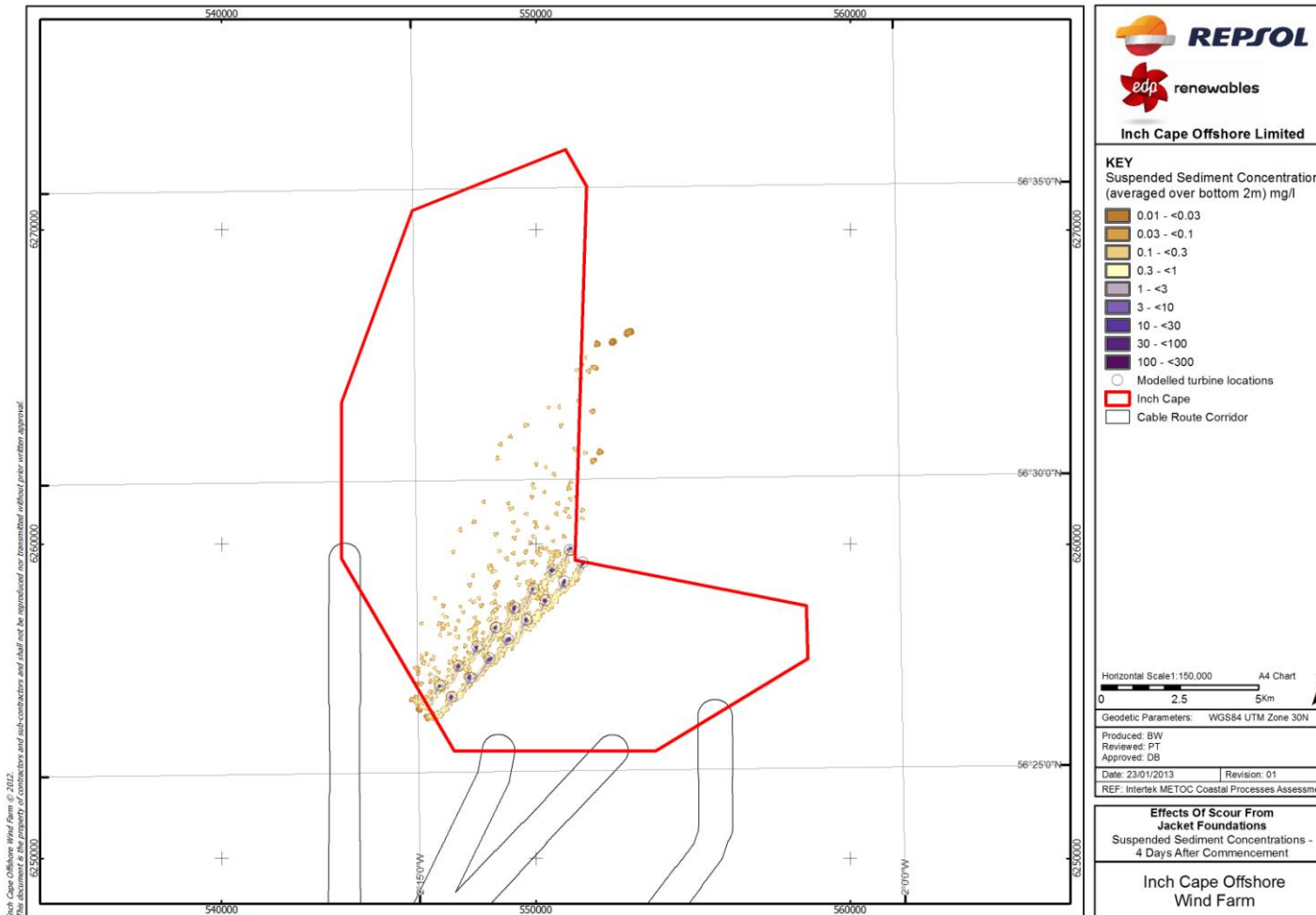
10A.7.86: Suspended sediment concentration due to scouring around turbine bases – 2 days after ‘commencement’



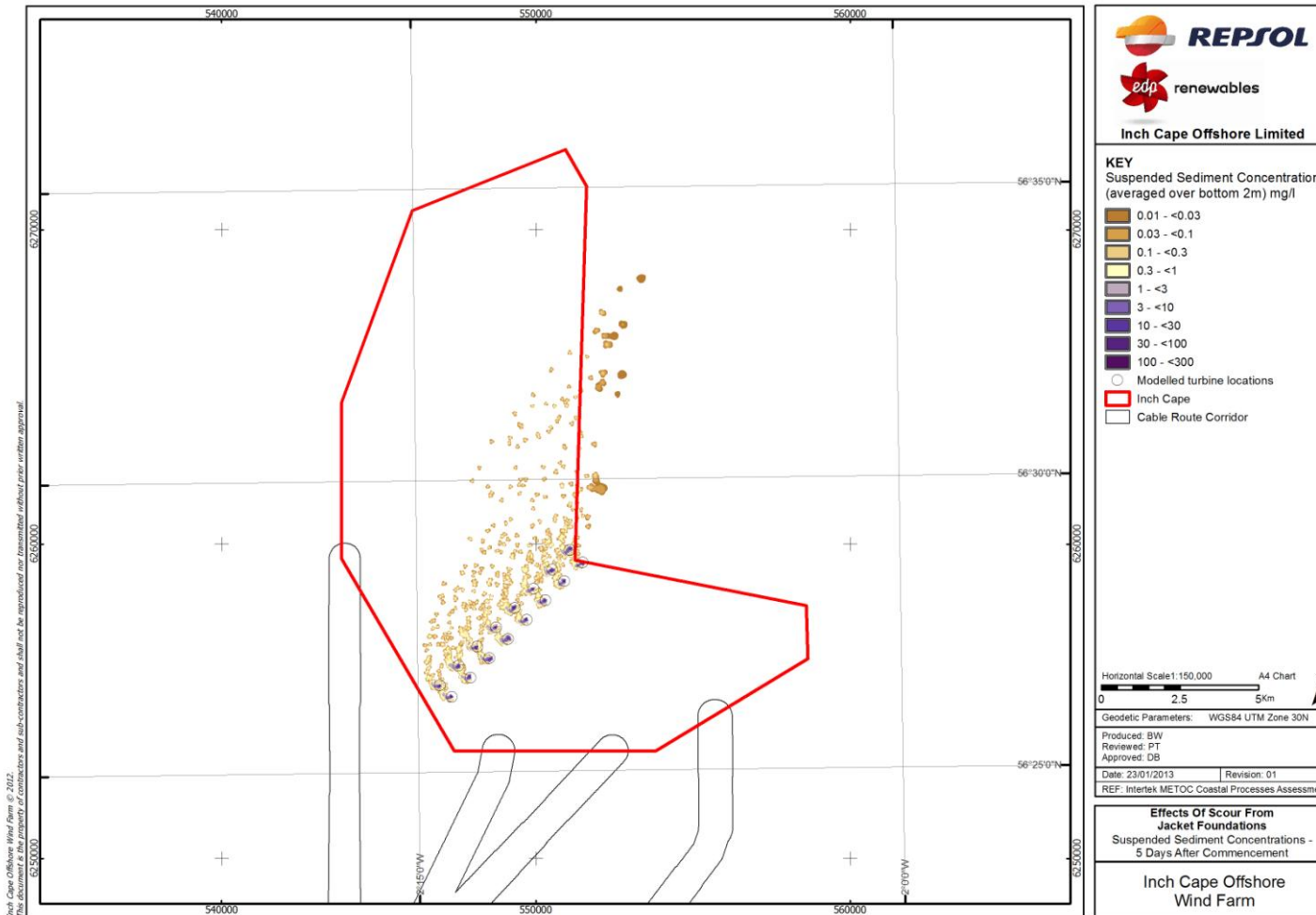
10A.7.87: Suspended sediment concentration due to scouring around turbine bases – 3 days after ‘commencement’



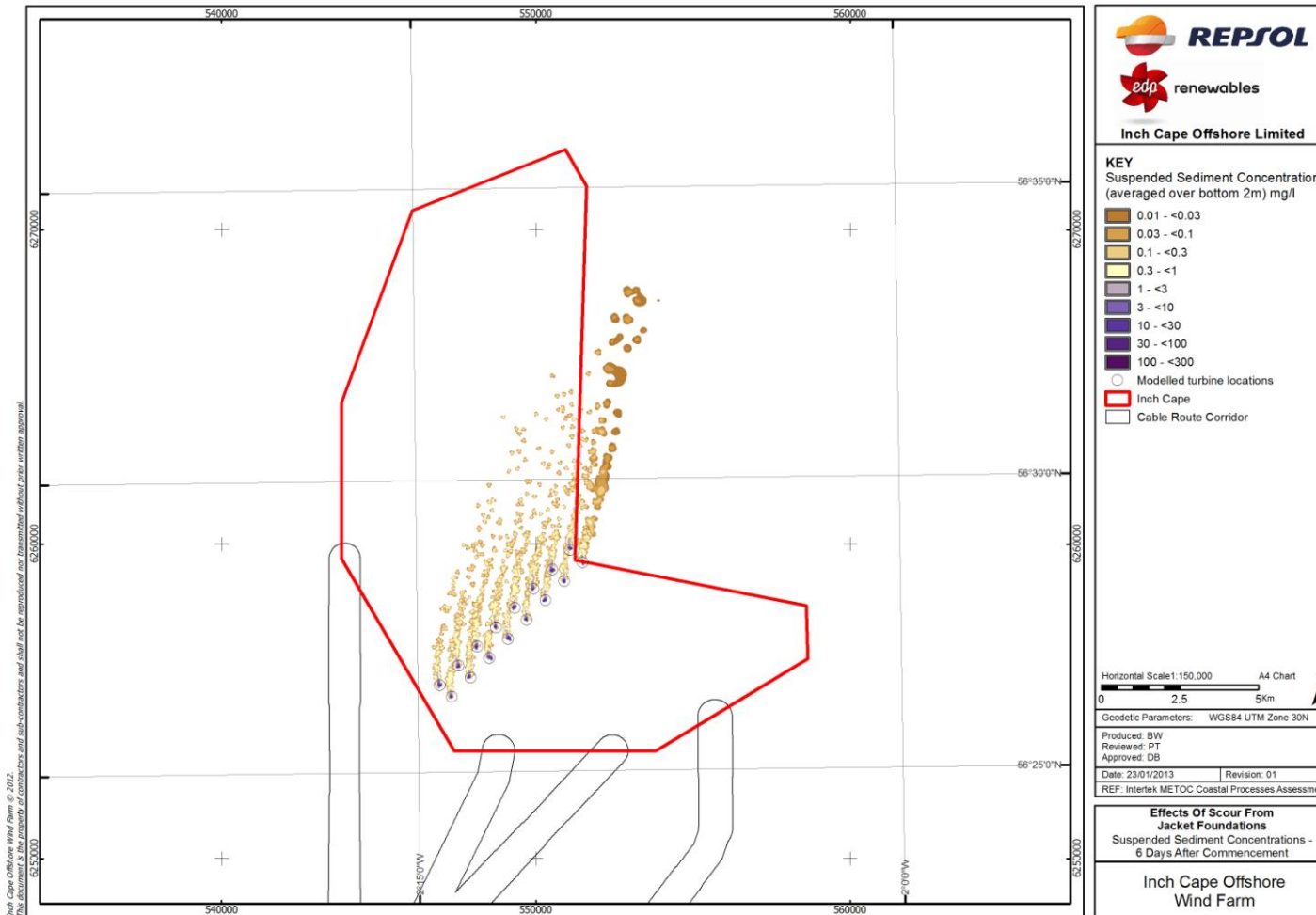
10A.7.88: Suspended sediment concentration due to scouring around turbine bases – 4 days after ‘commencement’



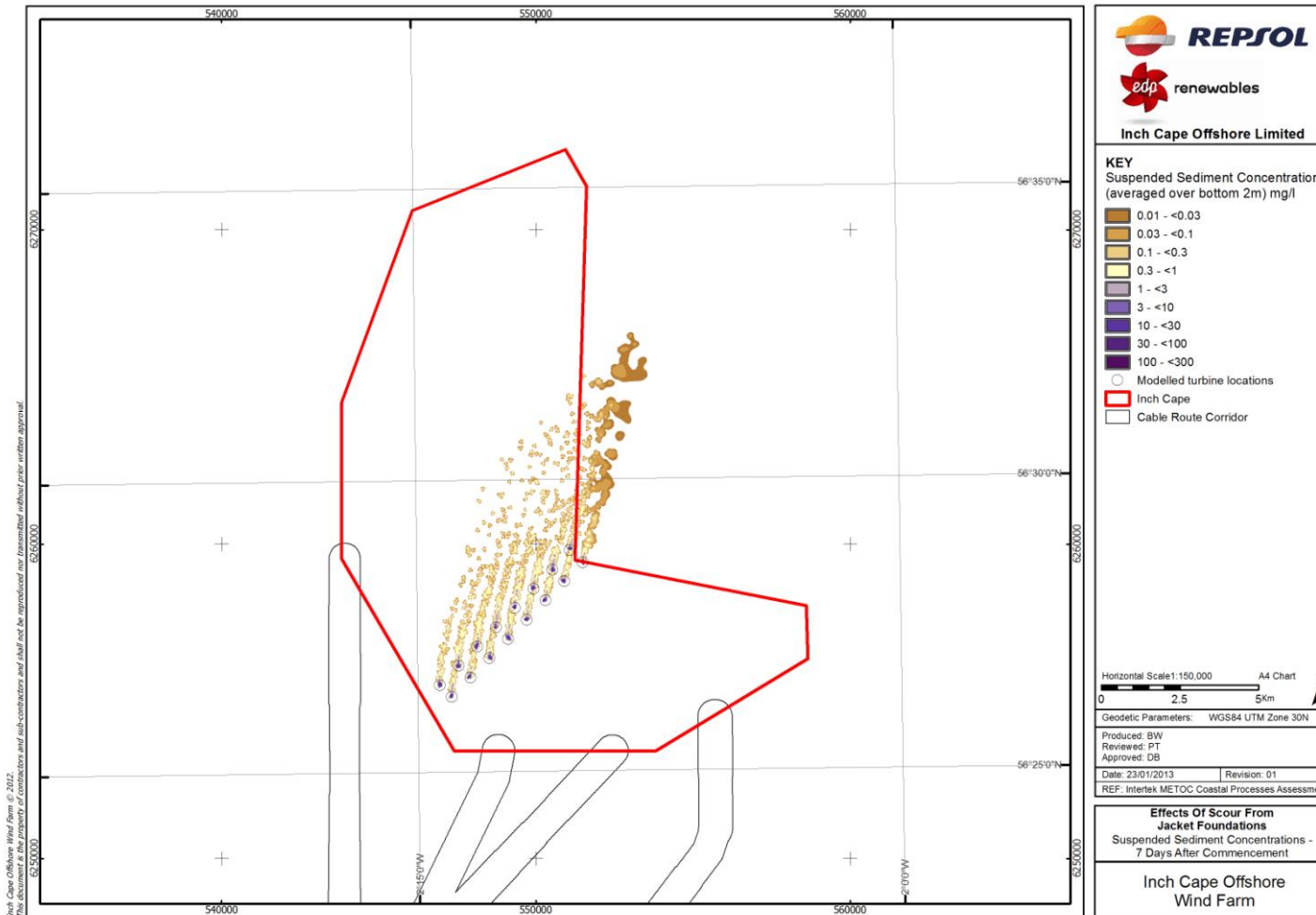
10A.7.89: Suspended sediment concentration due to scouring around turbine bases – 5 days after ‘commencement’



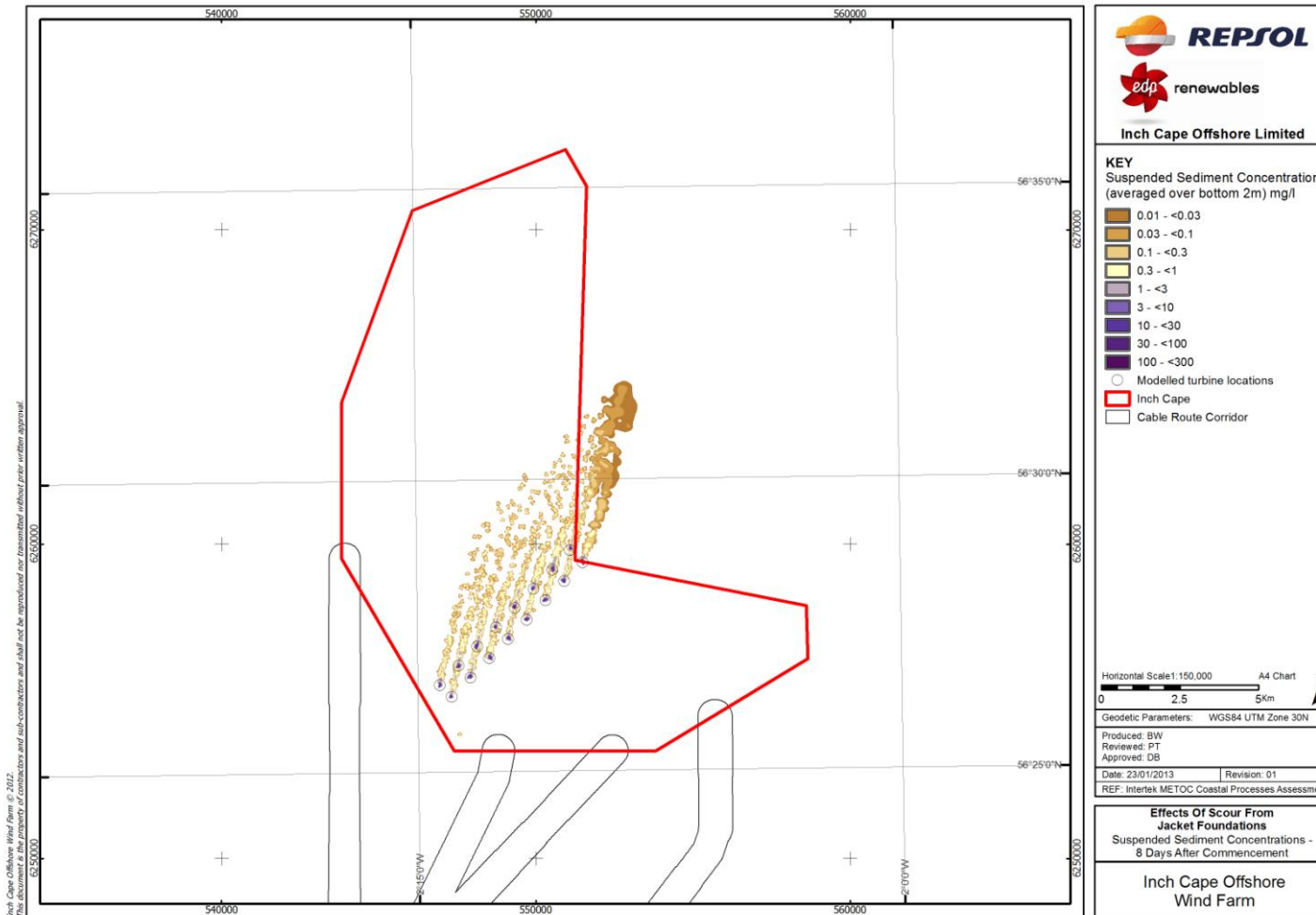
10A.7.90: Suspended sediment concentration due to scouring around turbine bases – 6 days after ‘commencement’



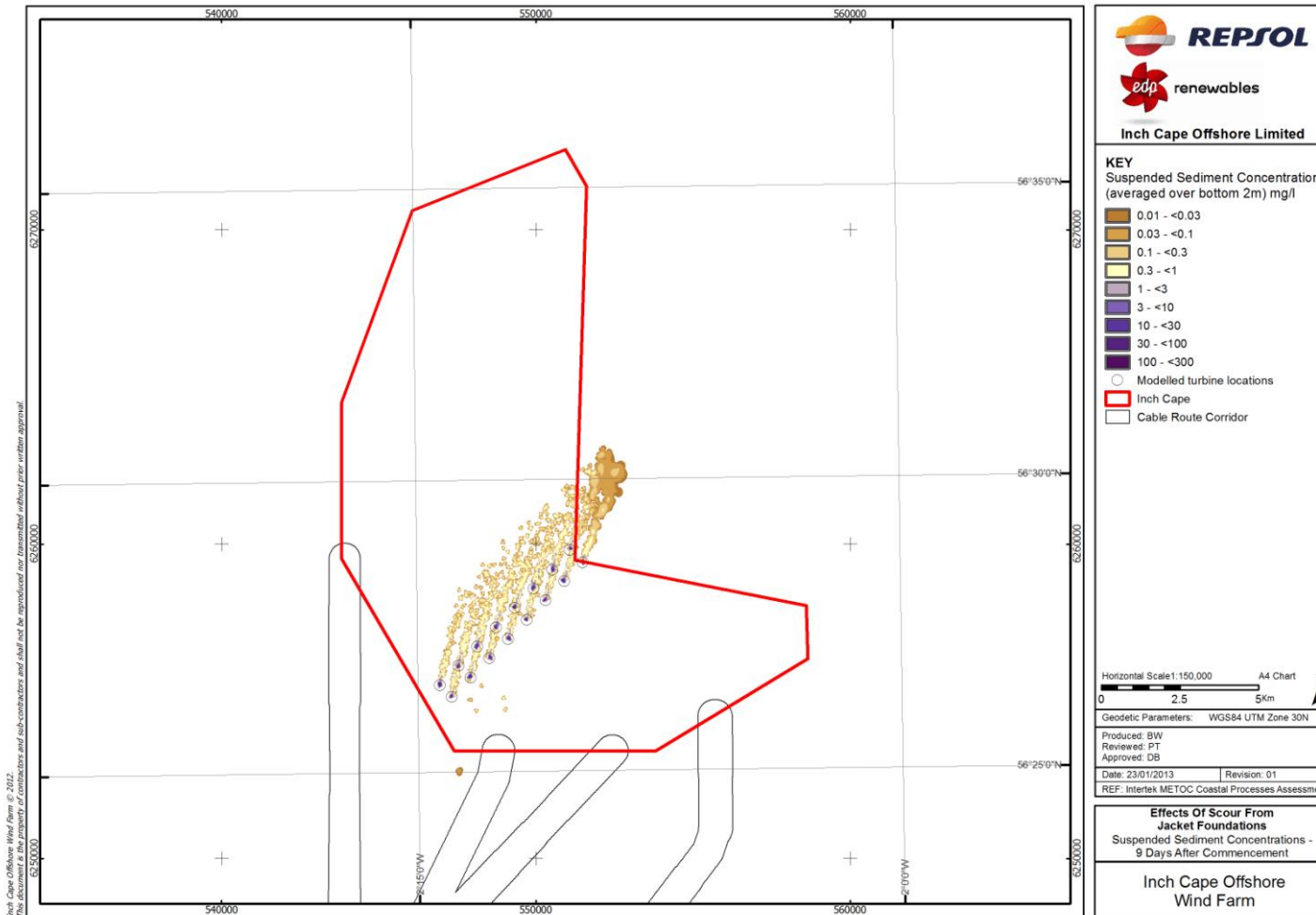
10A.7.91: Suspended sediment concentration due to scouring around turbine bases – 7 days after ‘commencement’



10A.7.92: Suspended sediment concentration due to scouring around turbine bases – 8 days after ‘commencement’

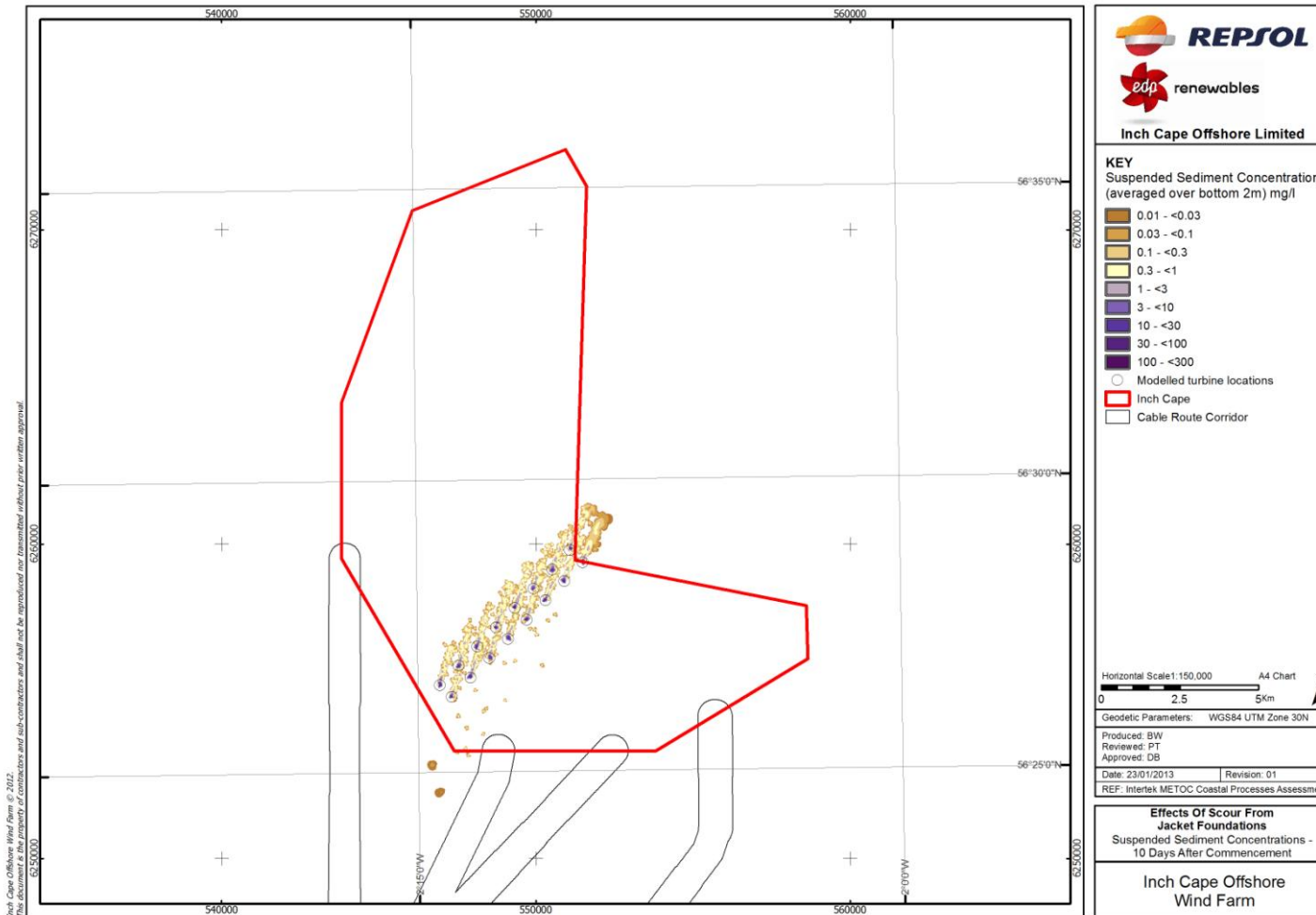


10A.7.93: Suspended sediment concentration due to scouring around turbine bases – 9 days after ‘commencement’

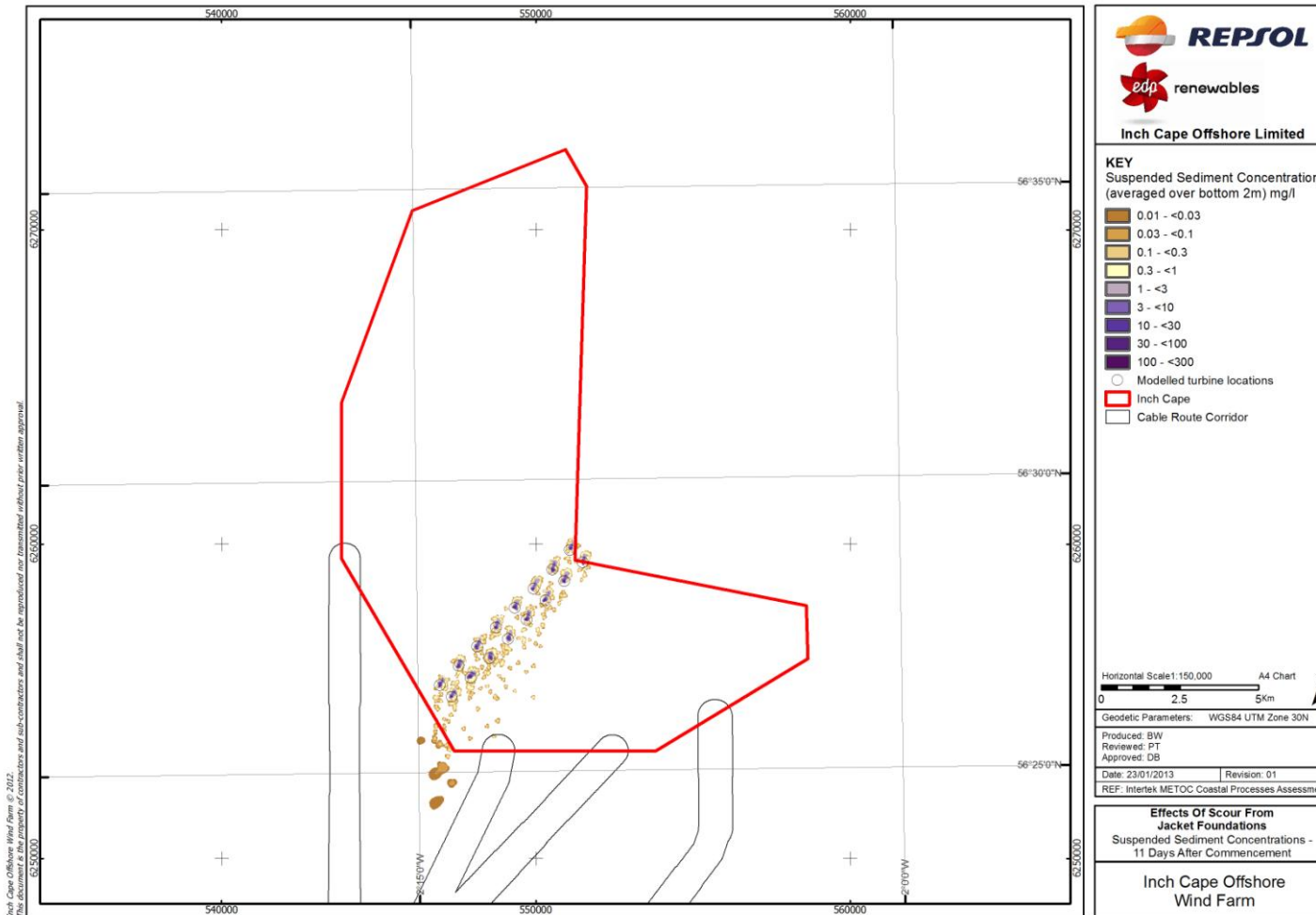




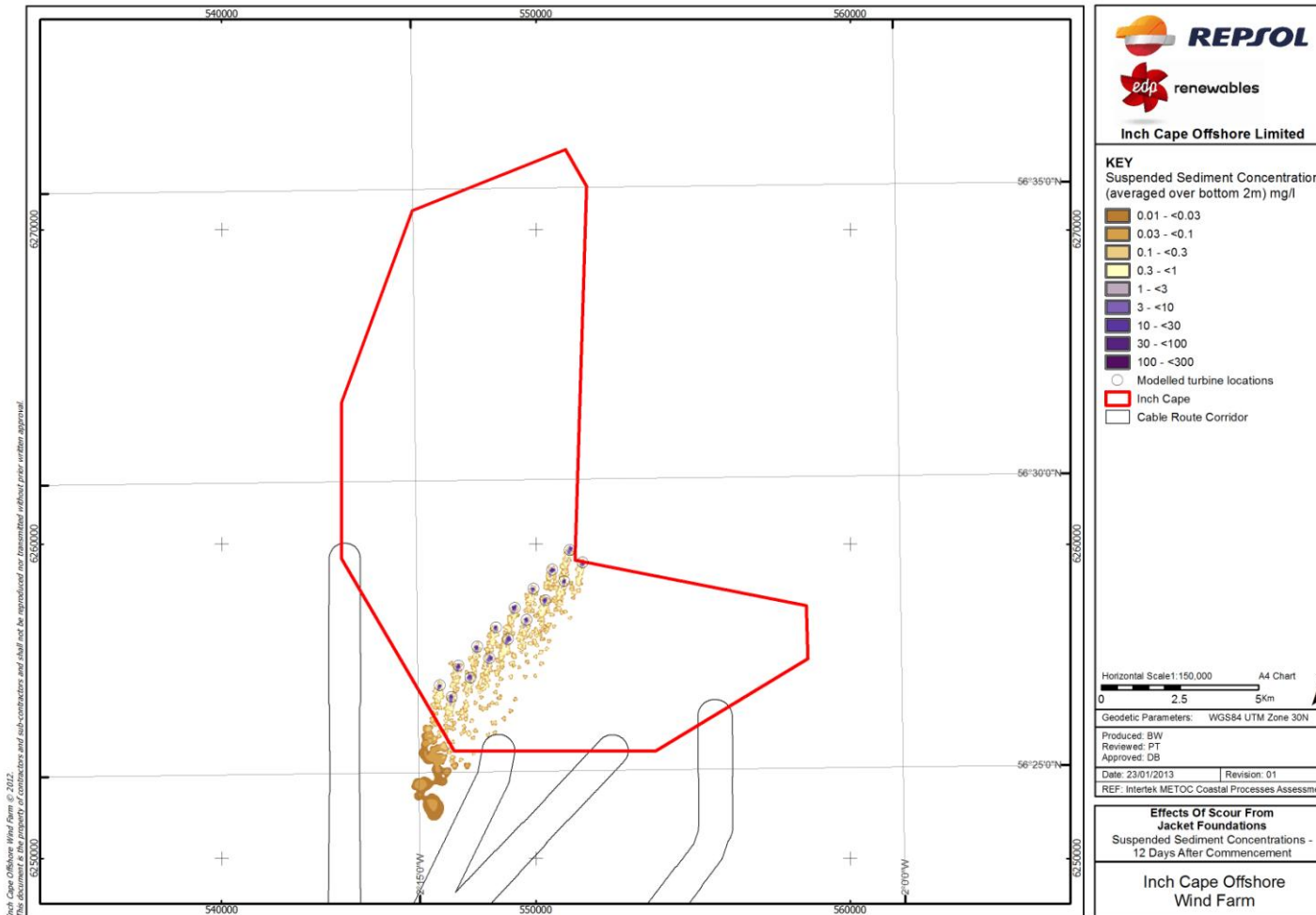
10A.7.94: Suspended sediment concentration due to scouring around turbine bases – 10 days after ‘commencement’



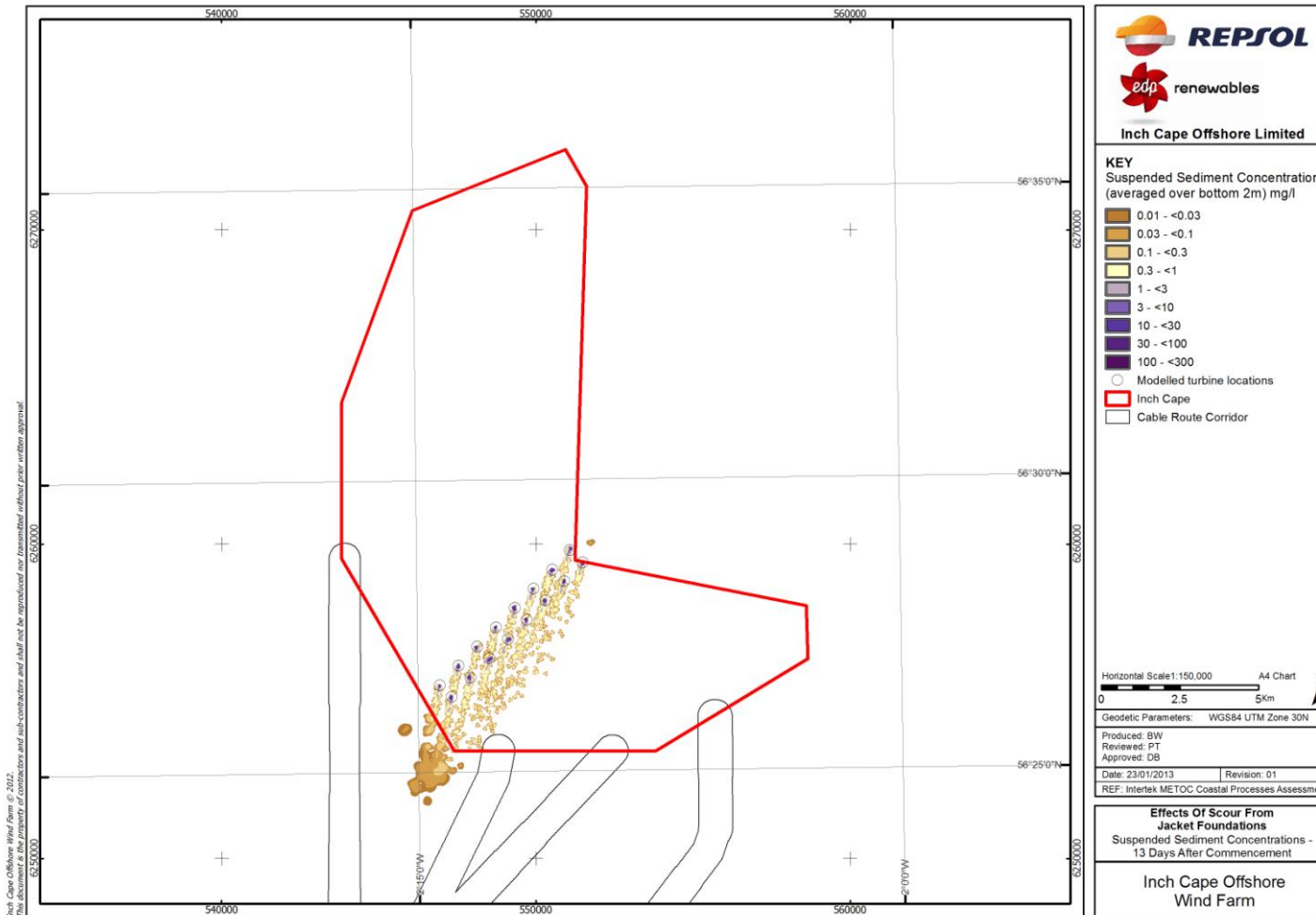
10A.7.95: Suspended sediment concentration due to scouring around turbine bases – 11 days after ‘commencement’



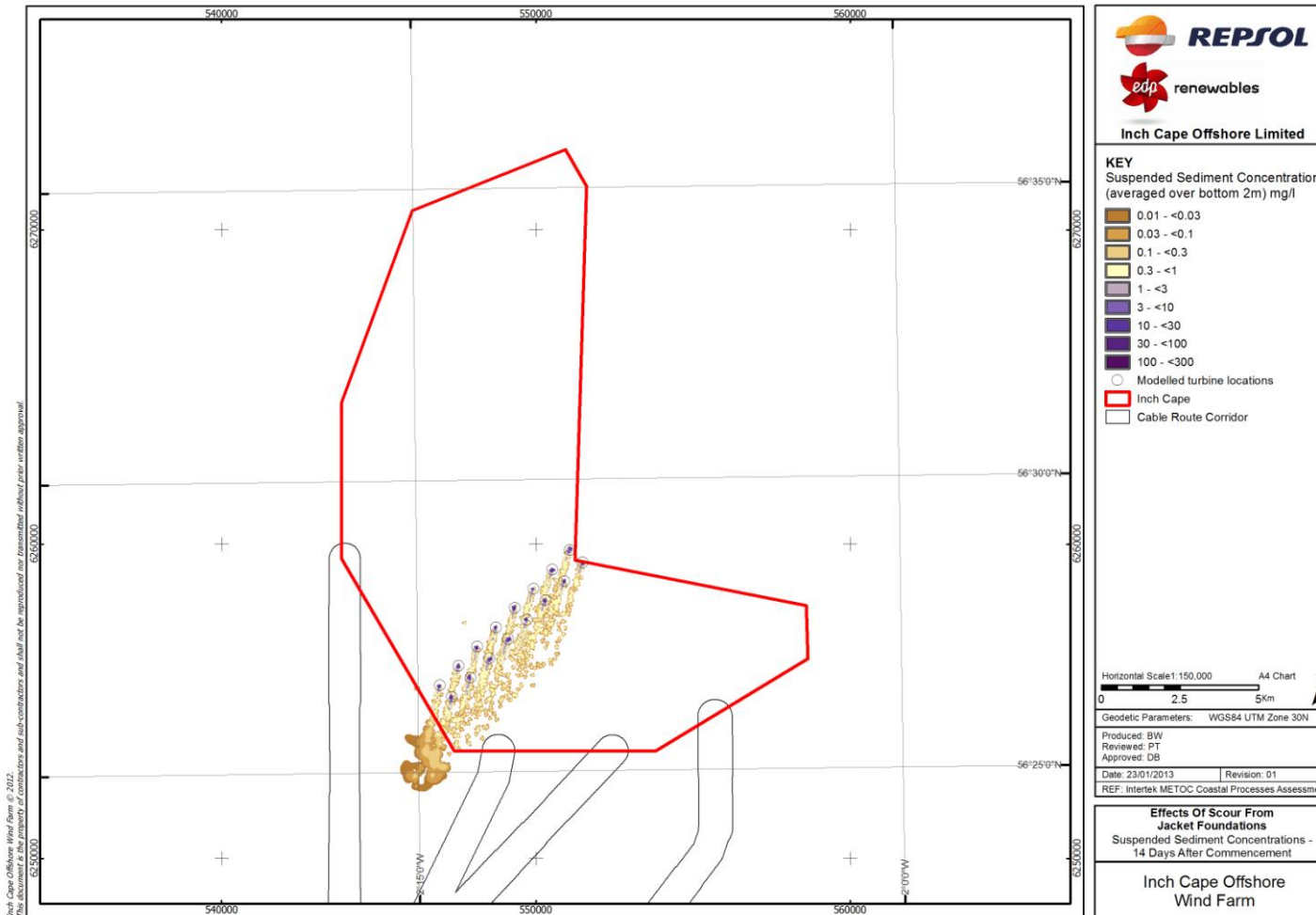
10A.7.96: Suspended sediment concentration due to scouring around turbine bases – 12 days after ‘commencement’



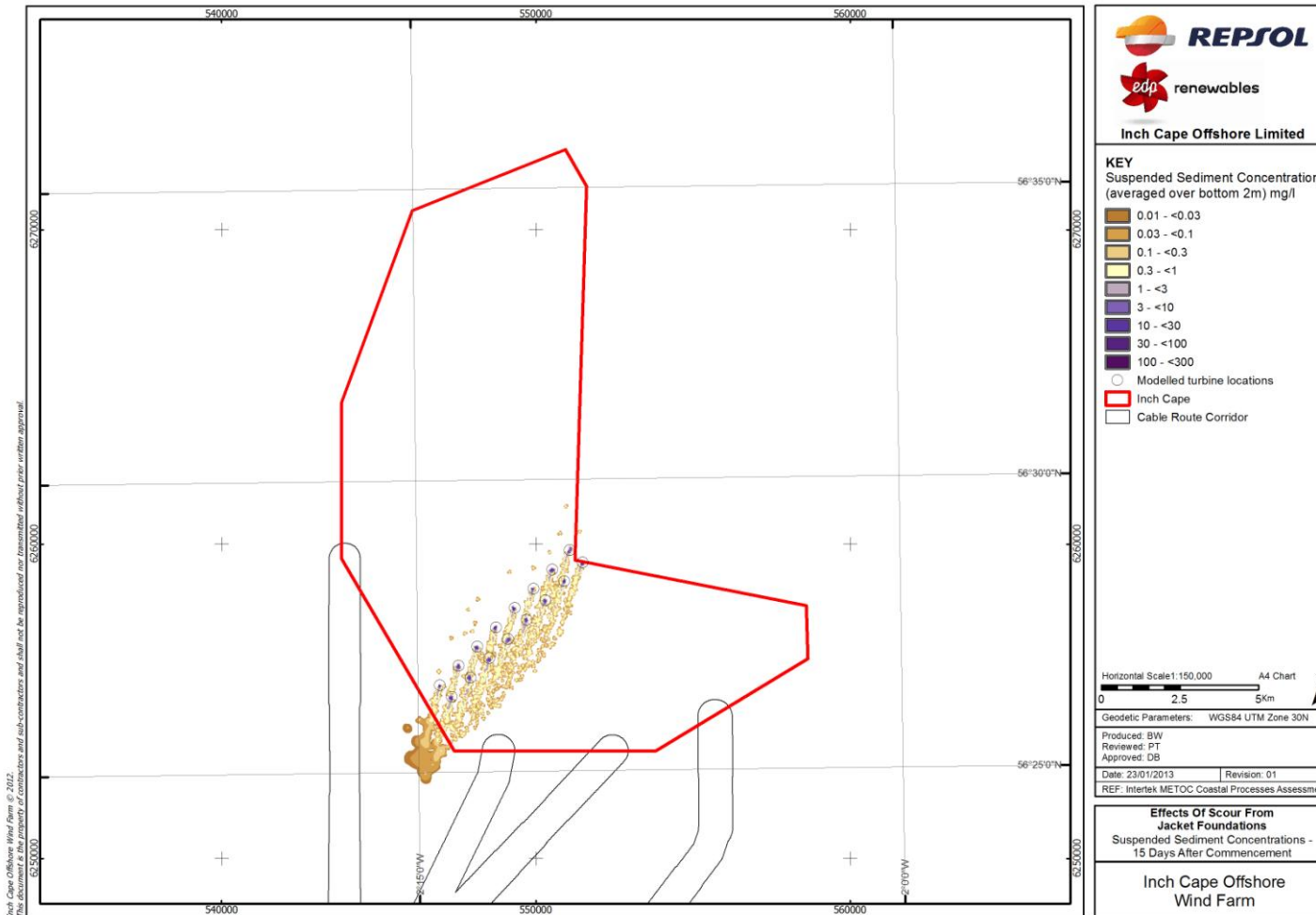
10A.7.97: Suspended sediment concentration due to scouring around turbine bases – 13 days after ‘commencement’



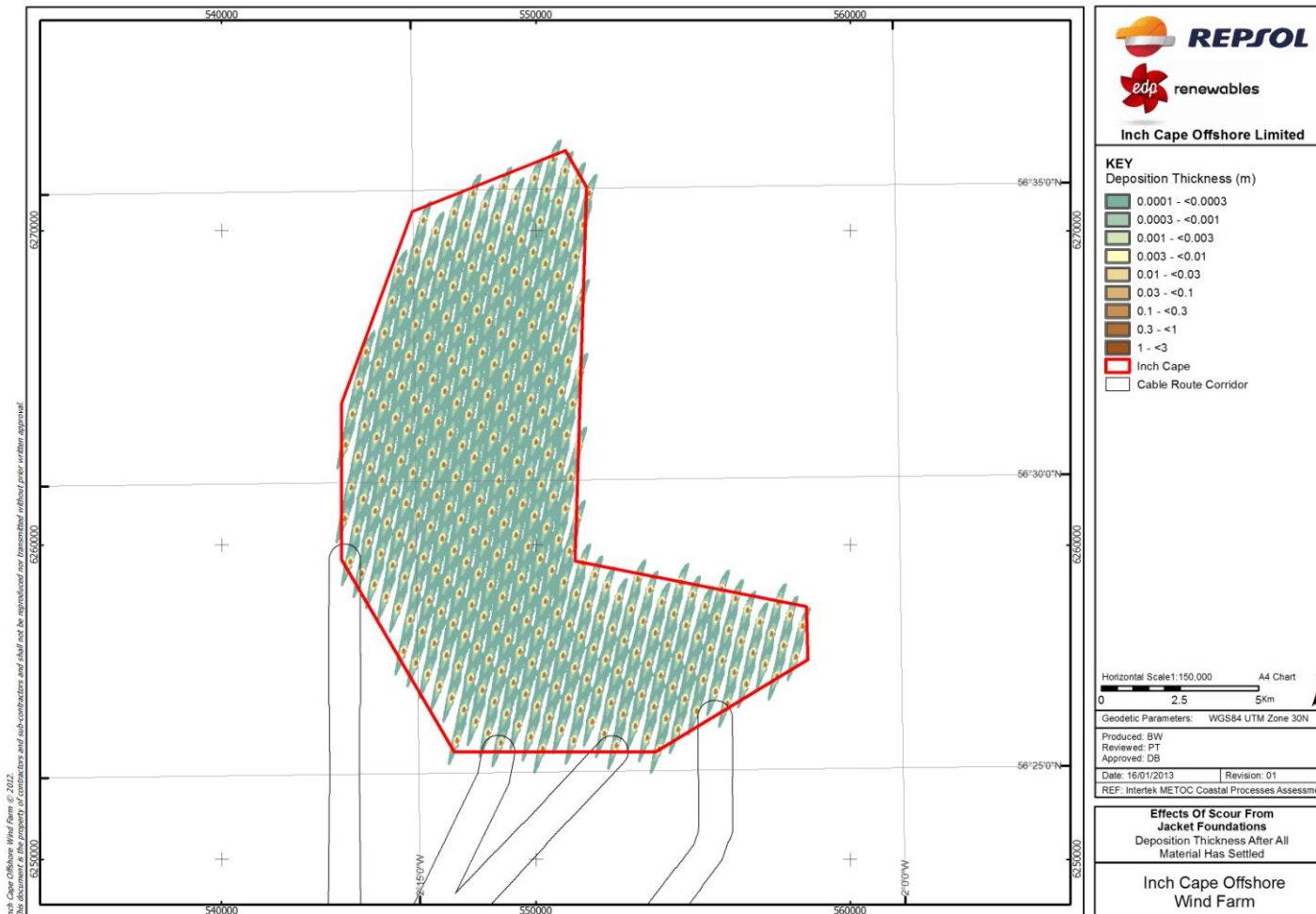
10A.7.98: Suspended sediment concentration due to scouring around turbine bases – 14 days after ‘commencement’



10A.7.99: Suspended sediment concentration due to scouring around turbine bases – 15 days after ‘commencement’

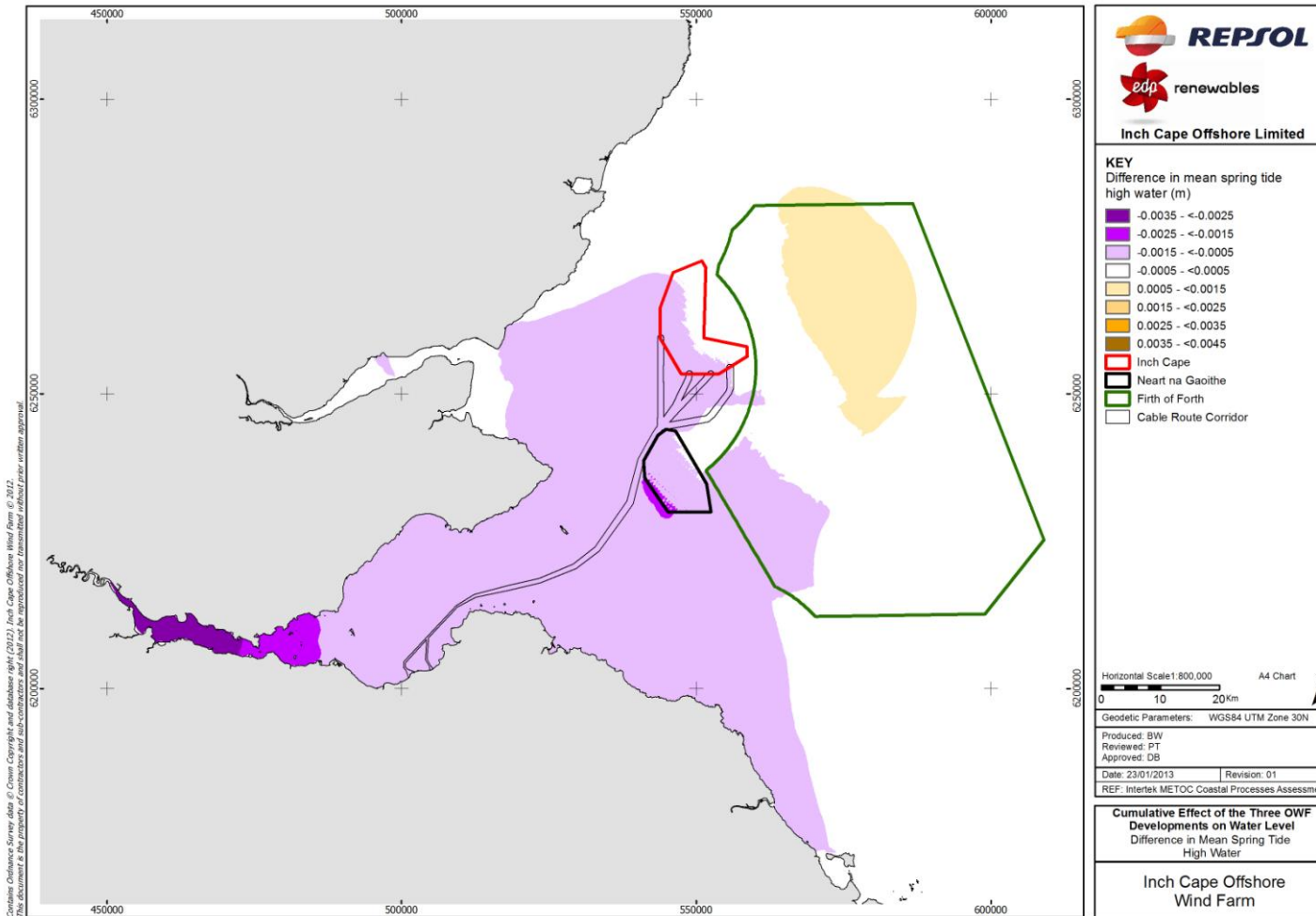


10A.7.100: Deposition thickness due to scouring around turbine bases – after all scoured material has settled



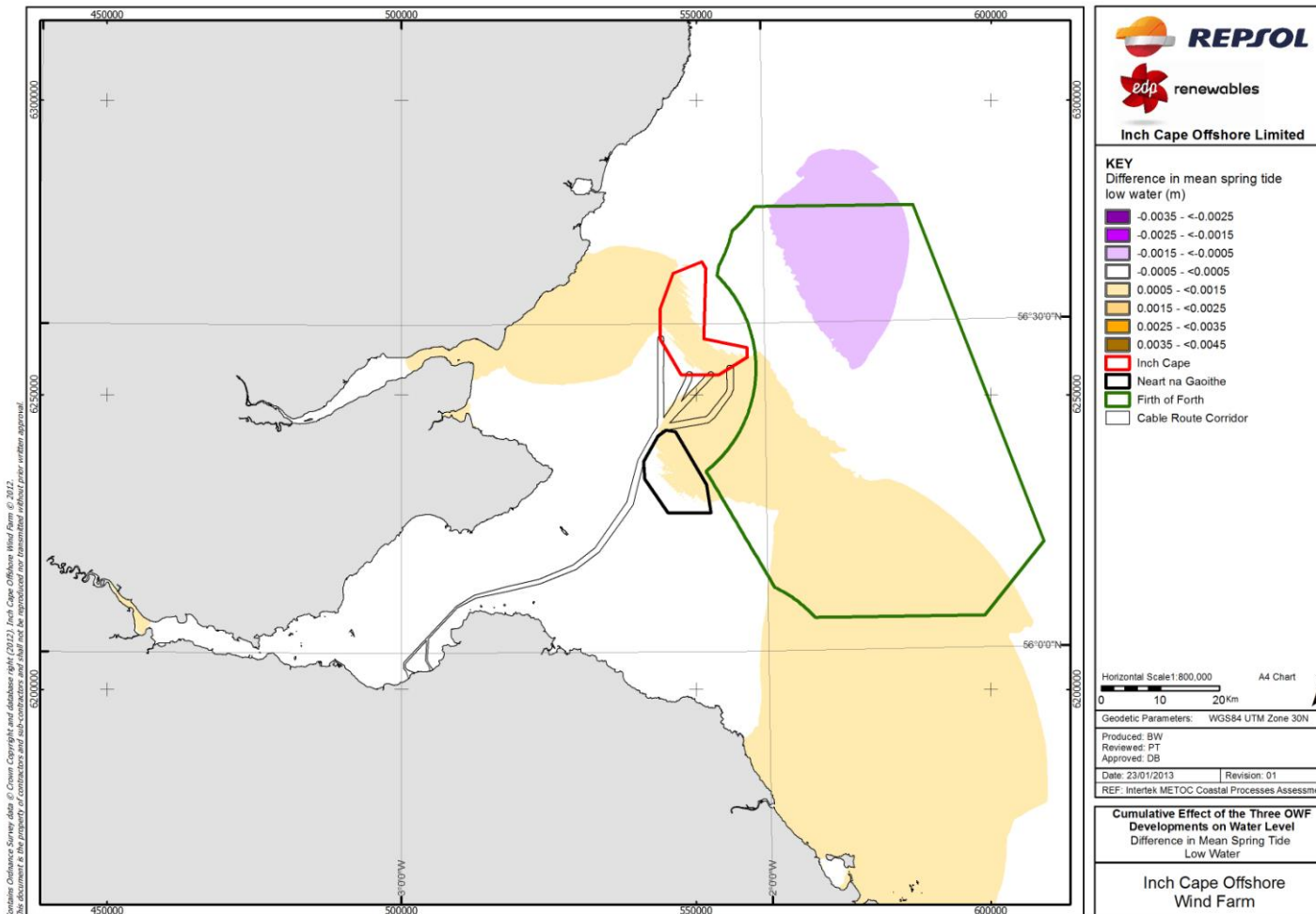
### Cumulative effects from Inch Cape, Neart na Gaoithe, and Firth of Forth OWF Developments

#### 10A.7.101: Cumulative difference to mean spring tide high water level (m)

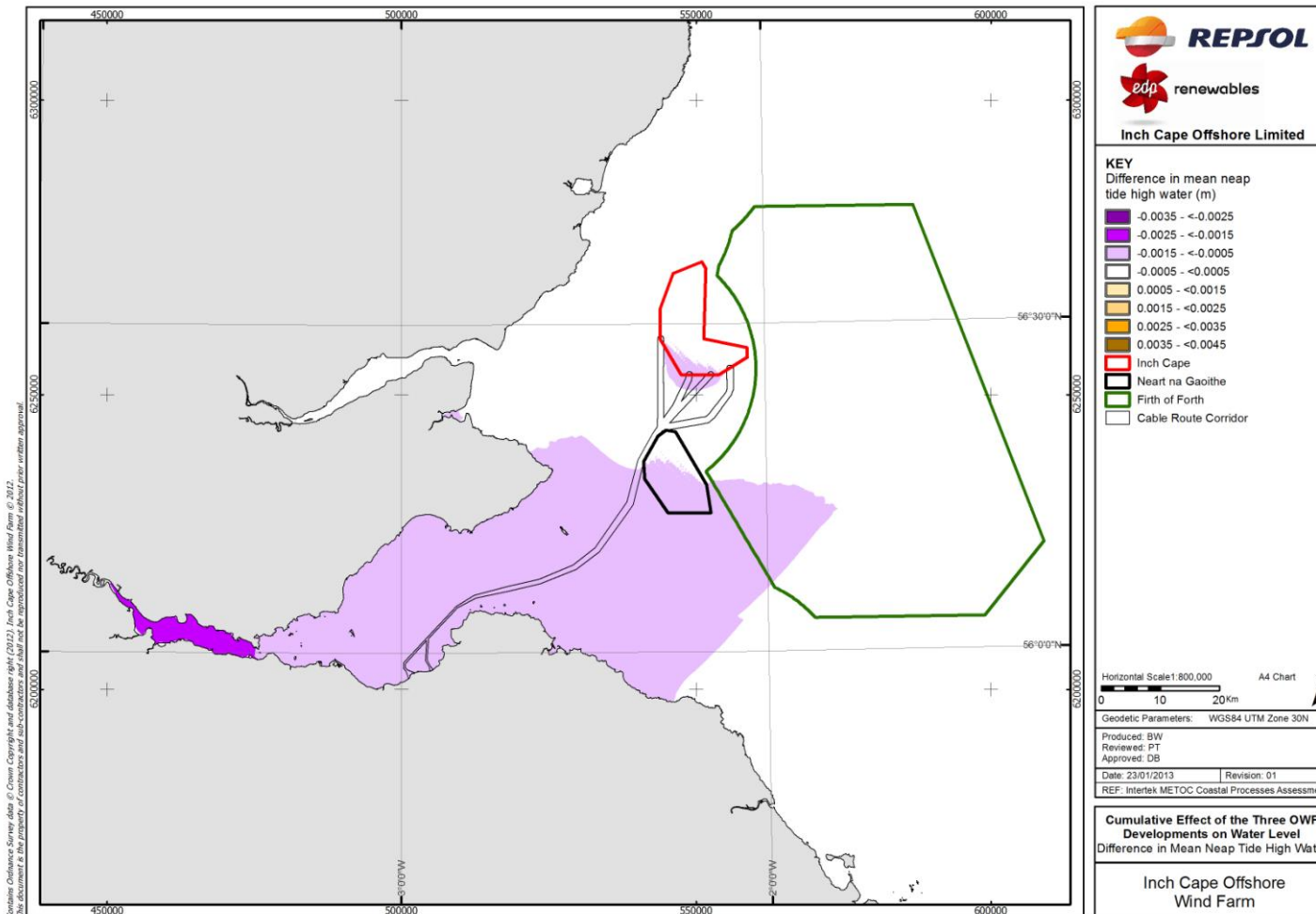




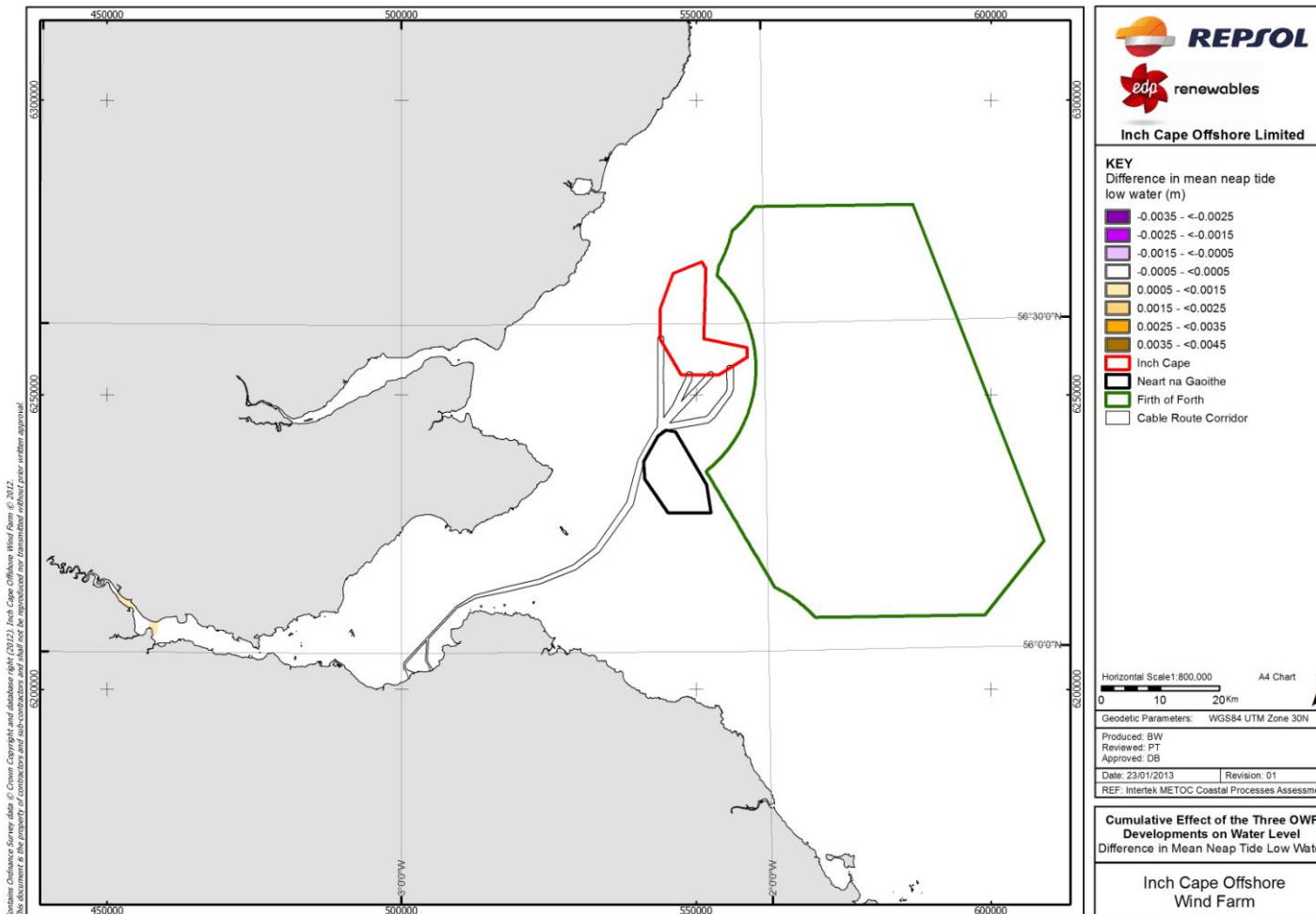
10A.7.102: Cumulative difference to mean spring tide low water level (m)



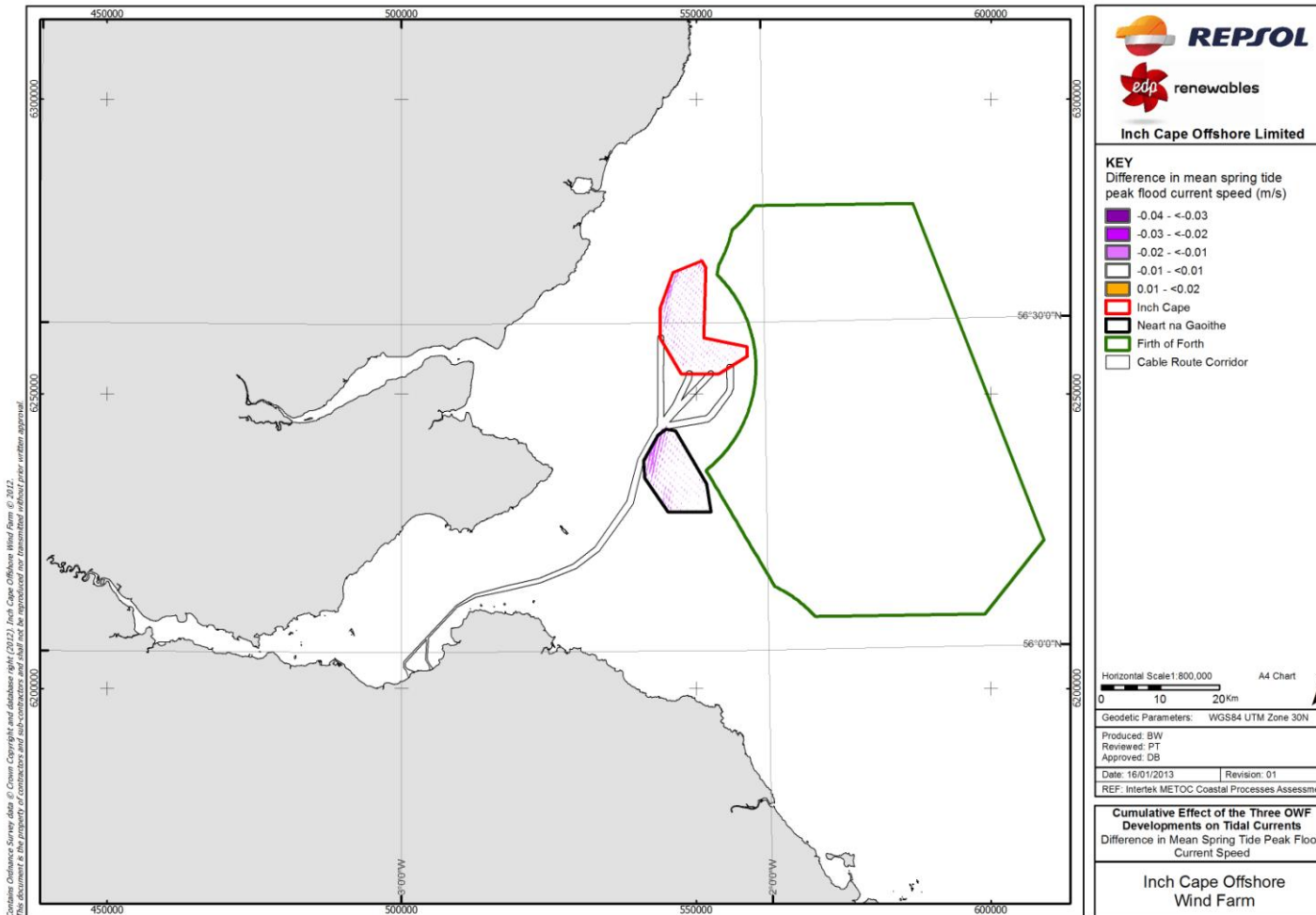
10A.7.103: Cumulative difference to mean neap tide high water level (m)



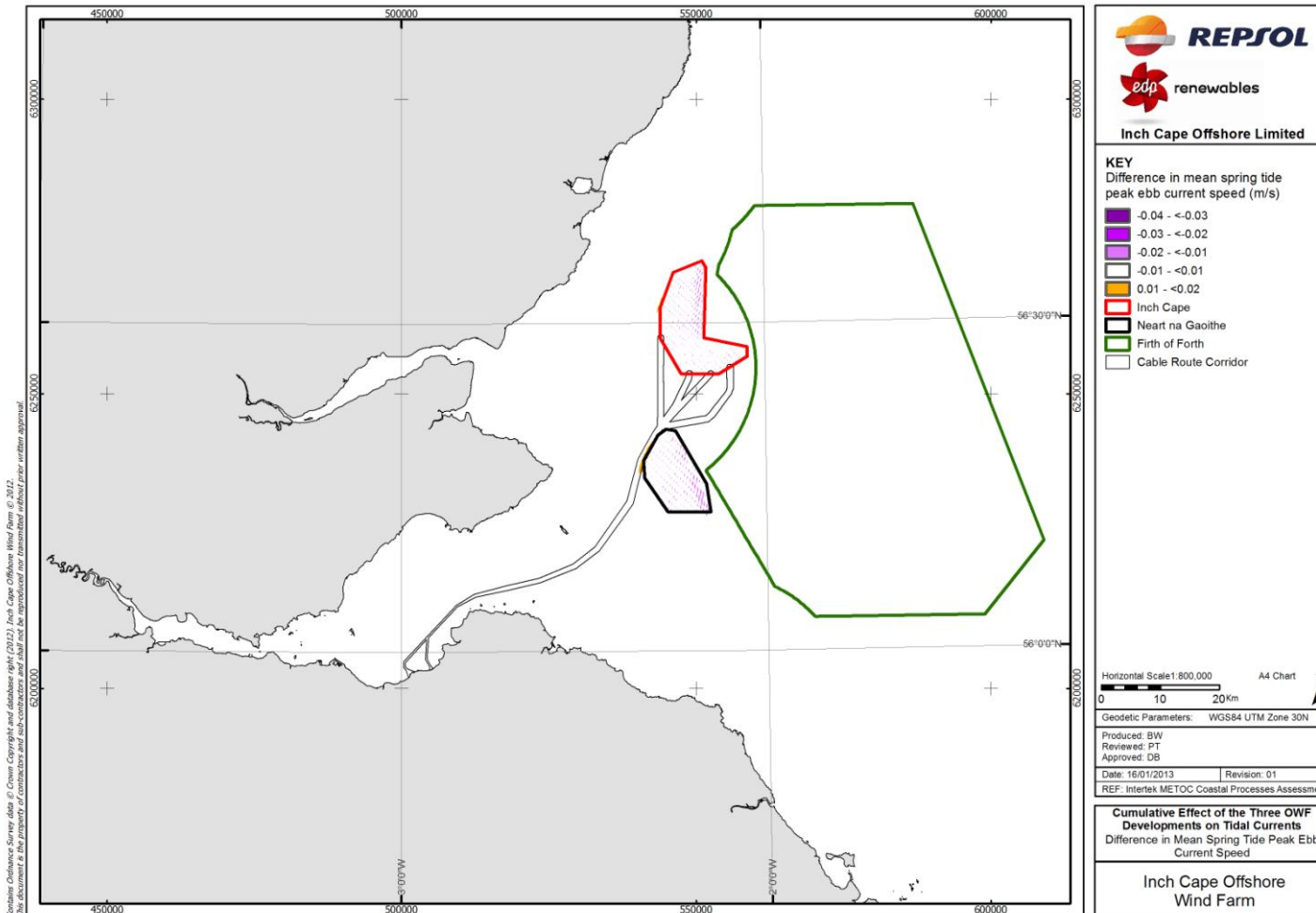
10A.7.104: Cumulative difference to mean neap tide low water level (m)



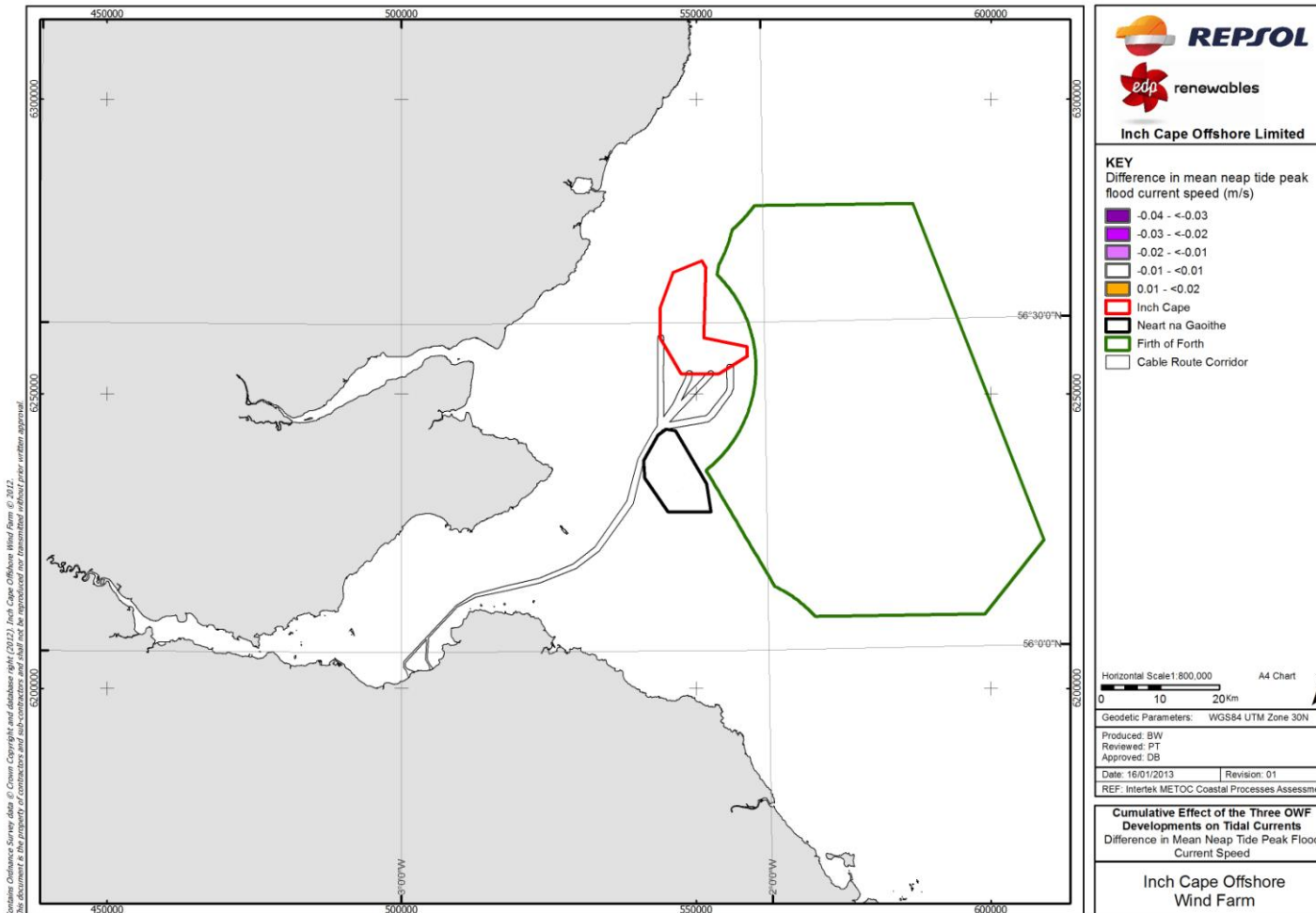
10A.7.105: Cumulative difference to mean spring tide peak flood current speed (m/s)



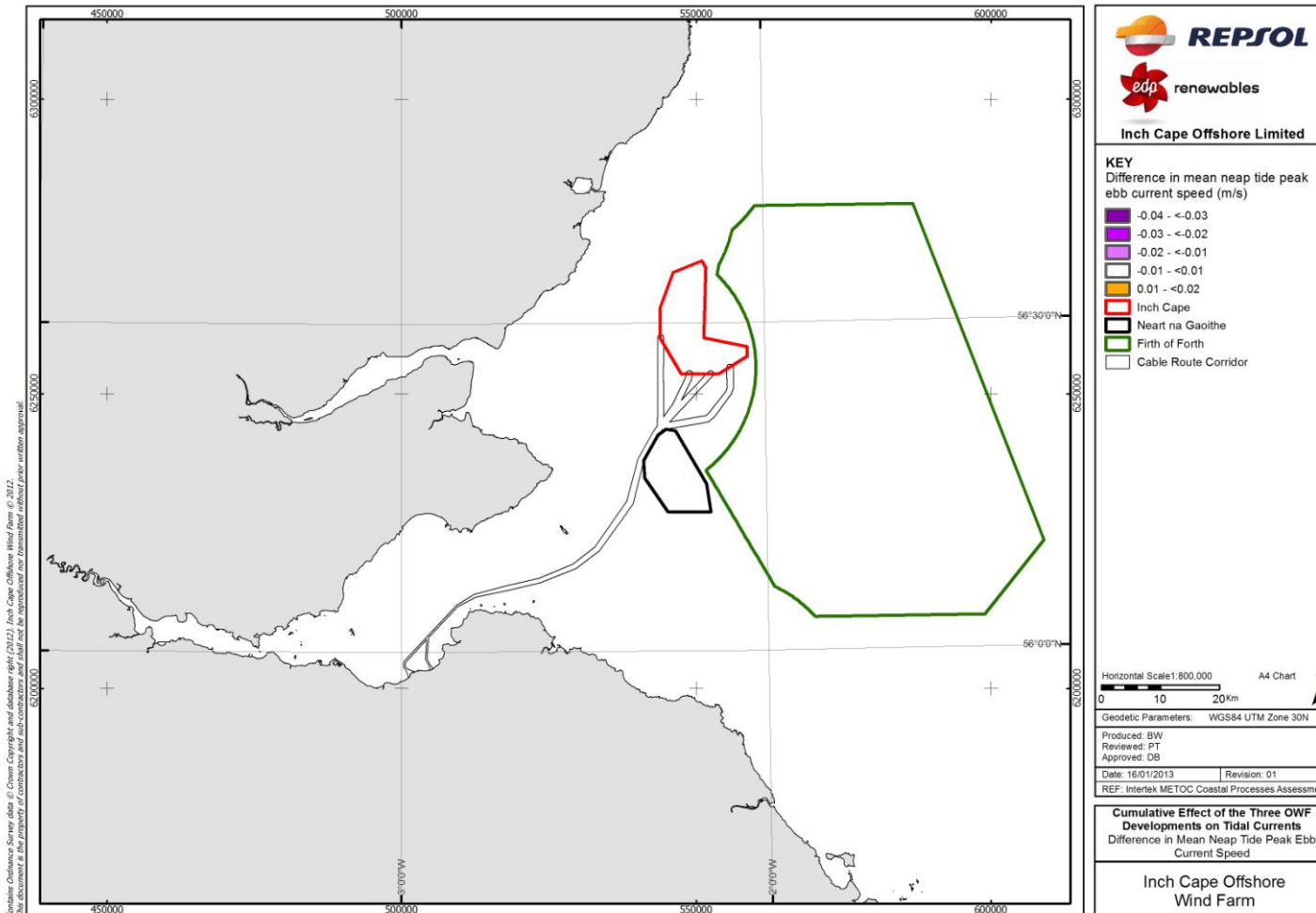
10A.7.106: Cumulative difference to mean spring tide peak ebb current speed (m/s)



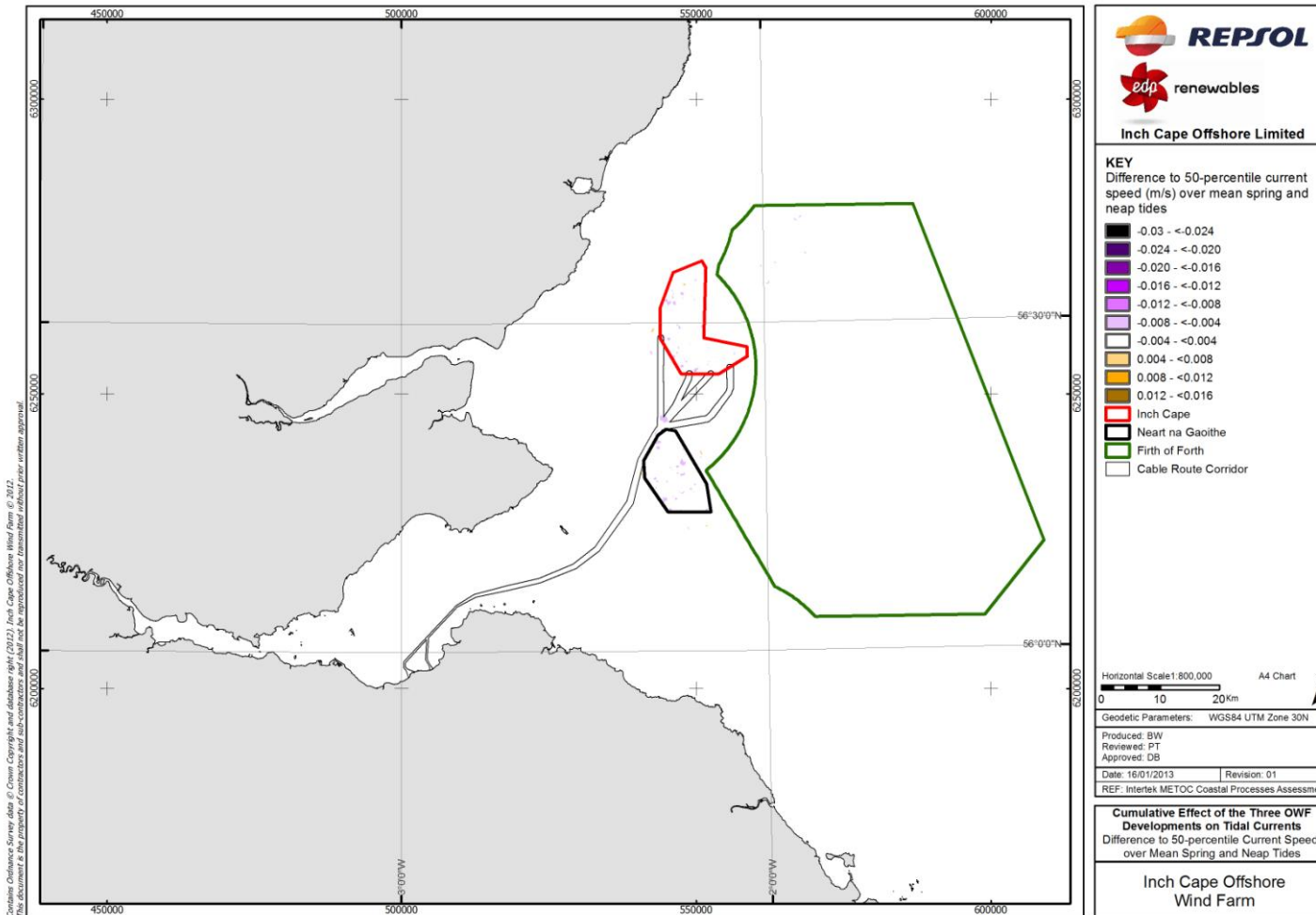
10A.7.107: Cumulative difference to mean neap tide peak flood current speed (m/s)



10A.7.108: Cumulative difference to mean neap tide peak ebb current speed (m/s)

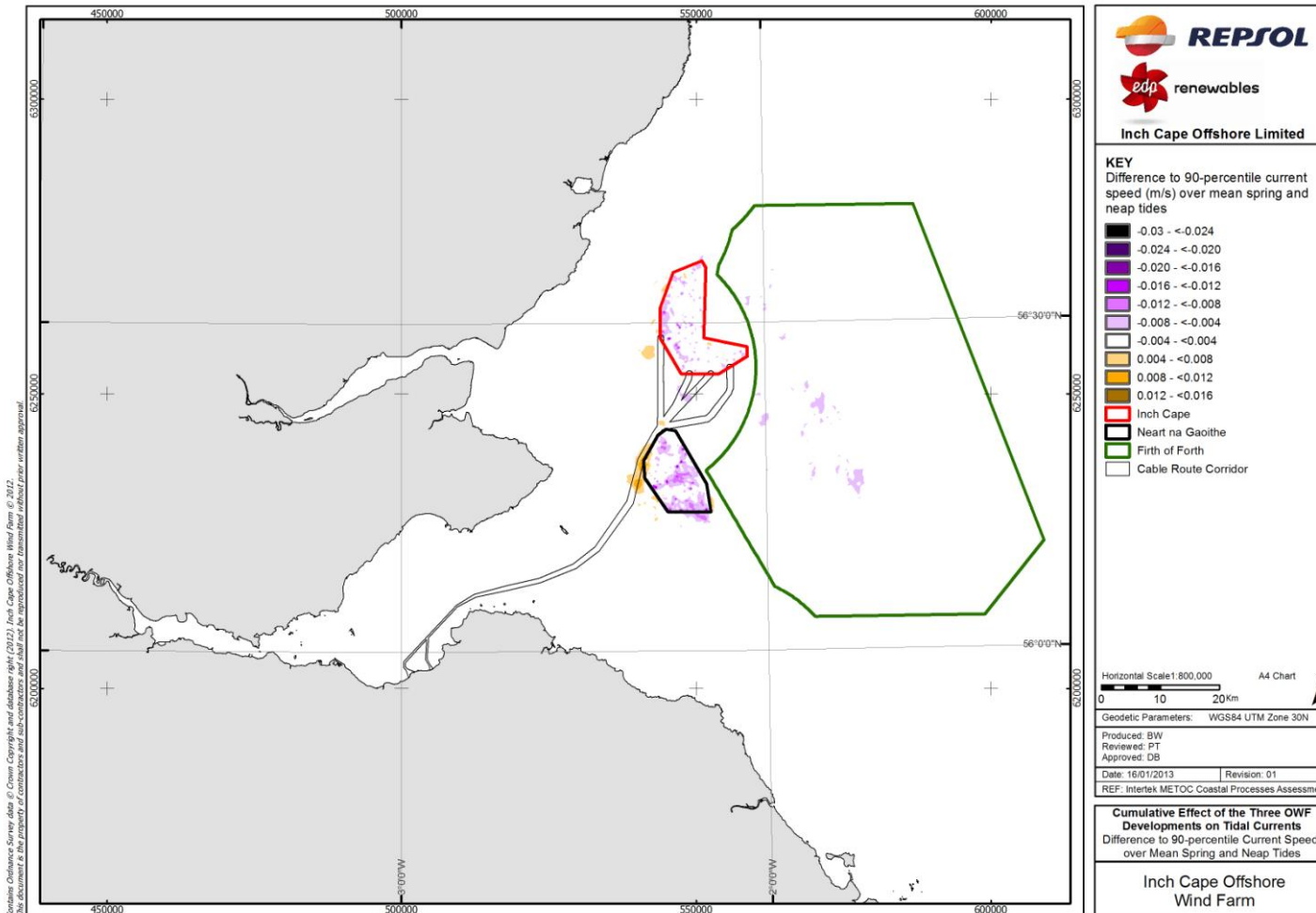


10A.7.109: Cumulative difference to 50-percentile current speed (m/s)

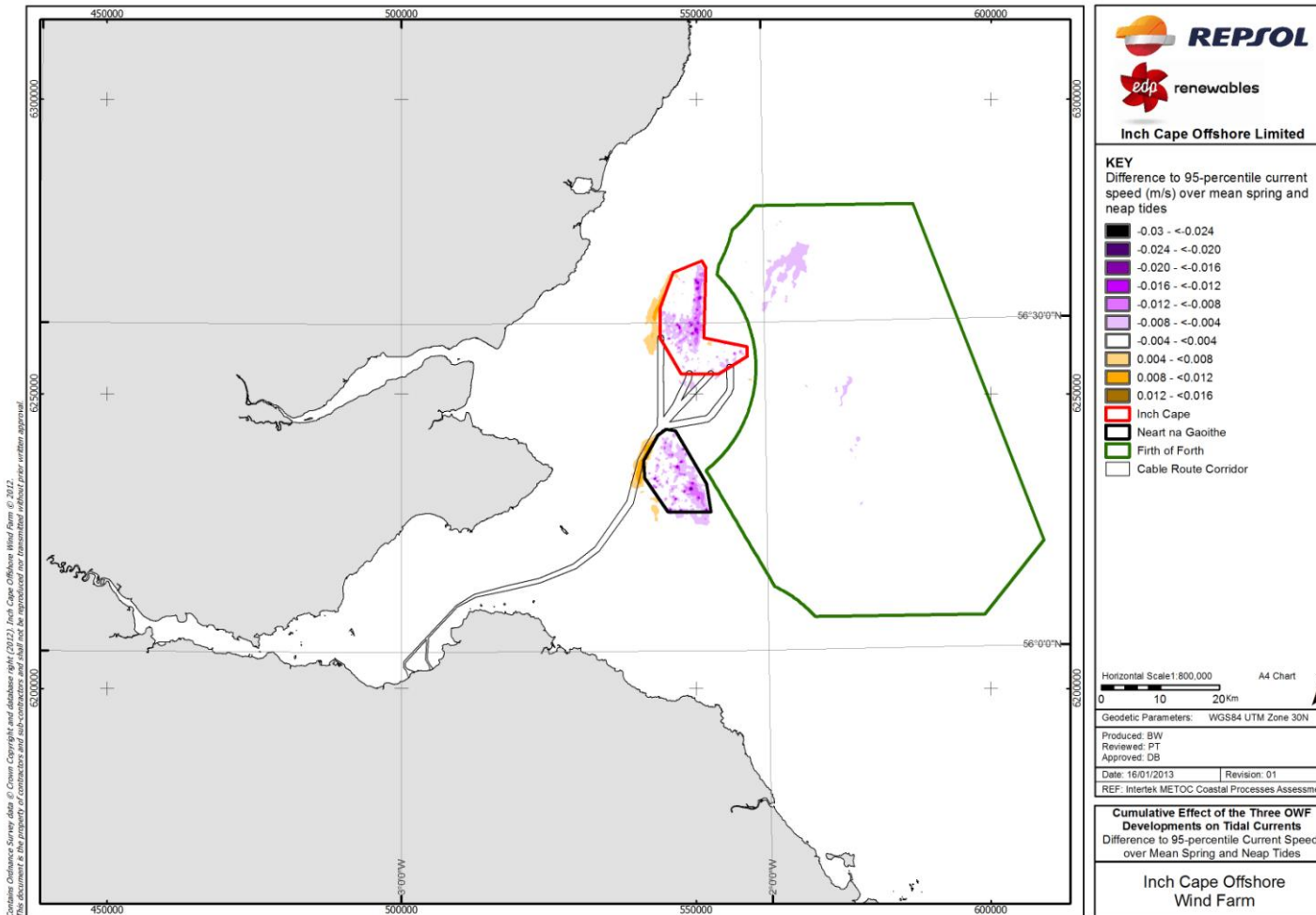




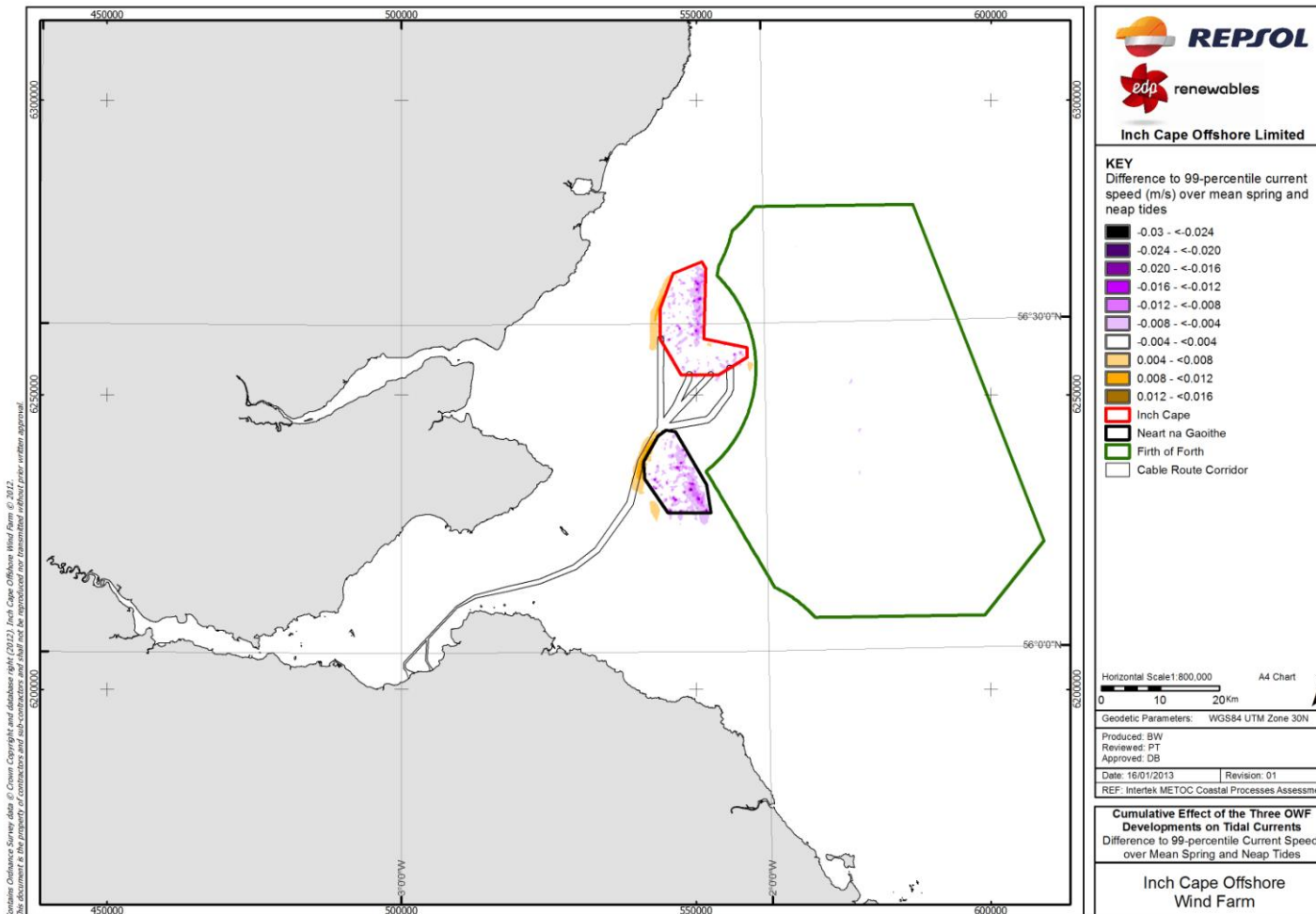
10A.7.110: Cumulative difference to 90-percentile current speed (m/s)



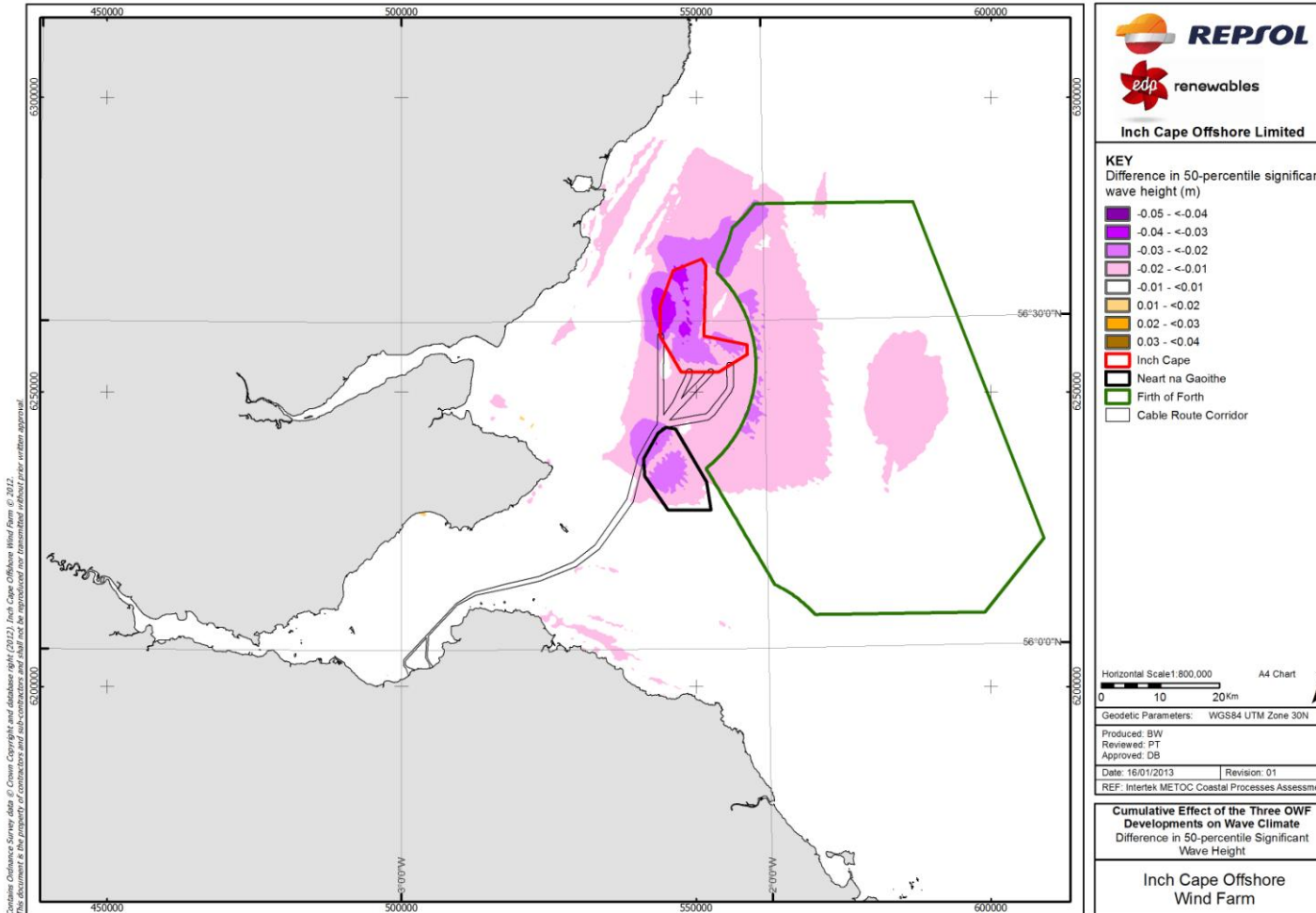
10A.7.111: Cumulative difference to 95-percentile current speed (m/s)



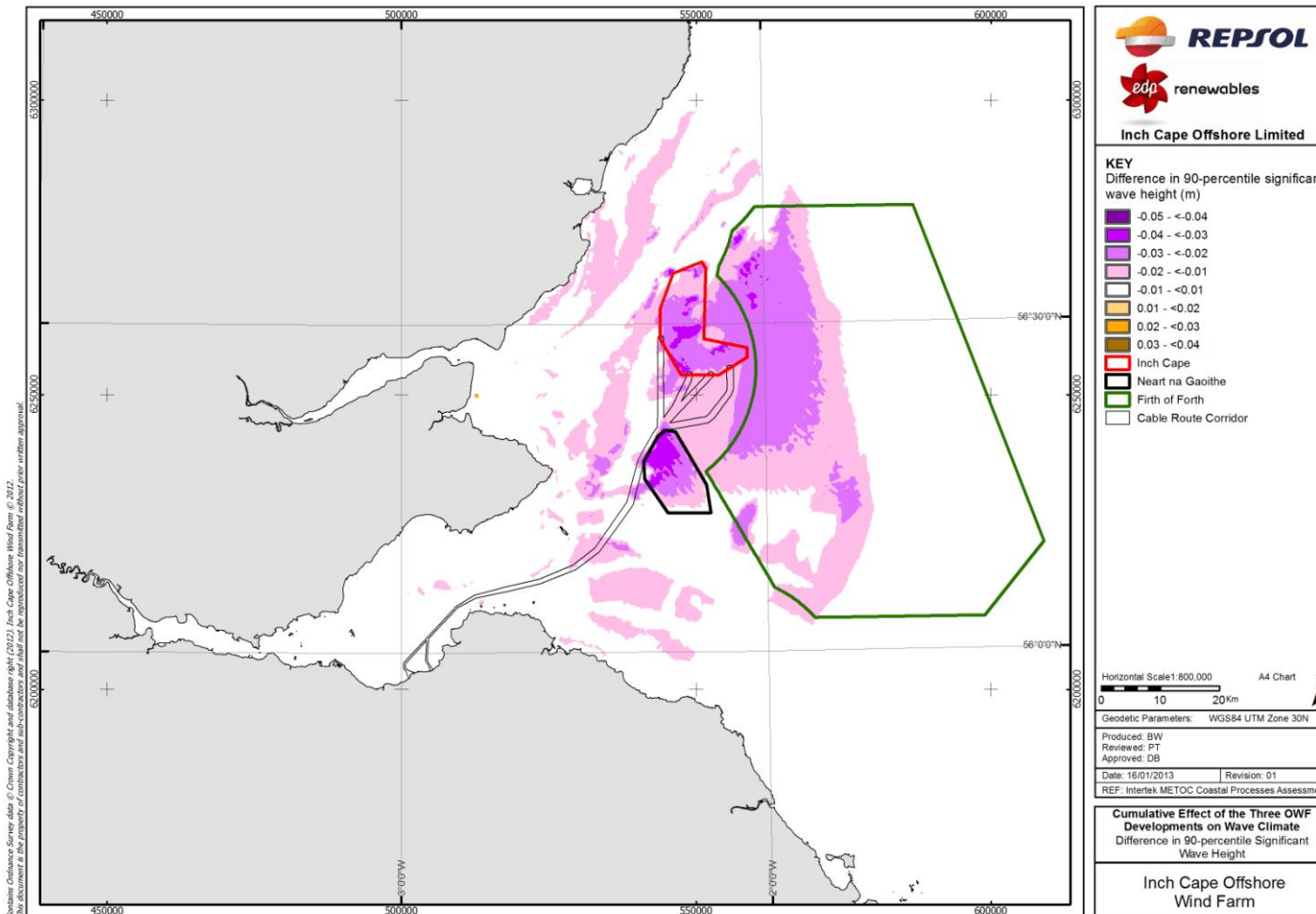
10A.7.112: Cumulative difference to 99-percentile current speed (m/s)



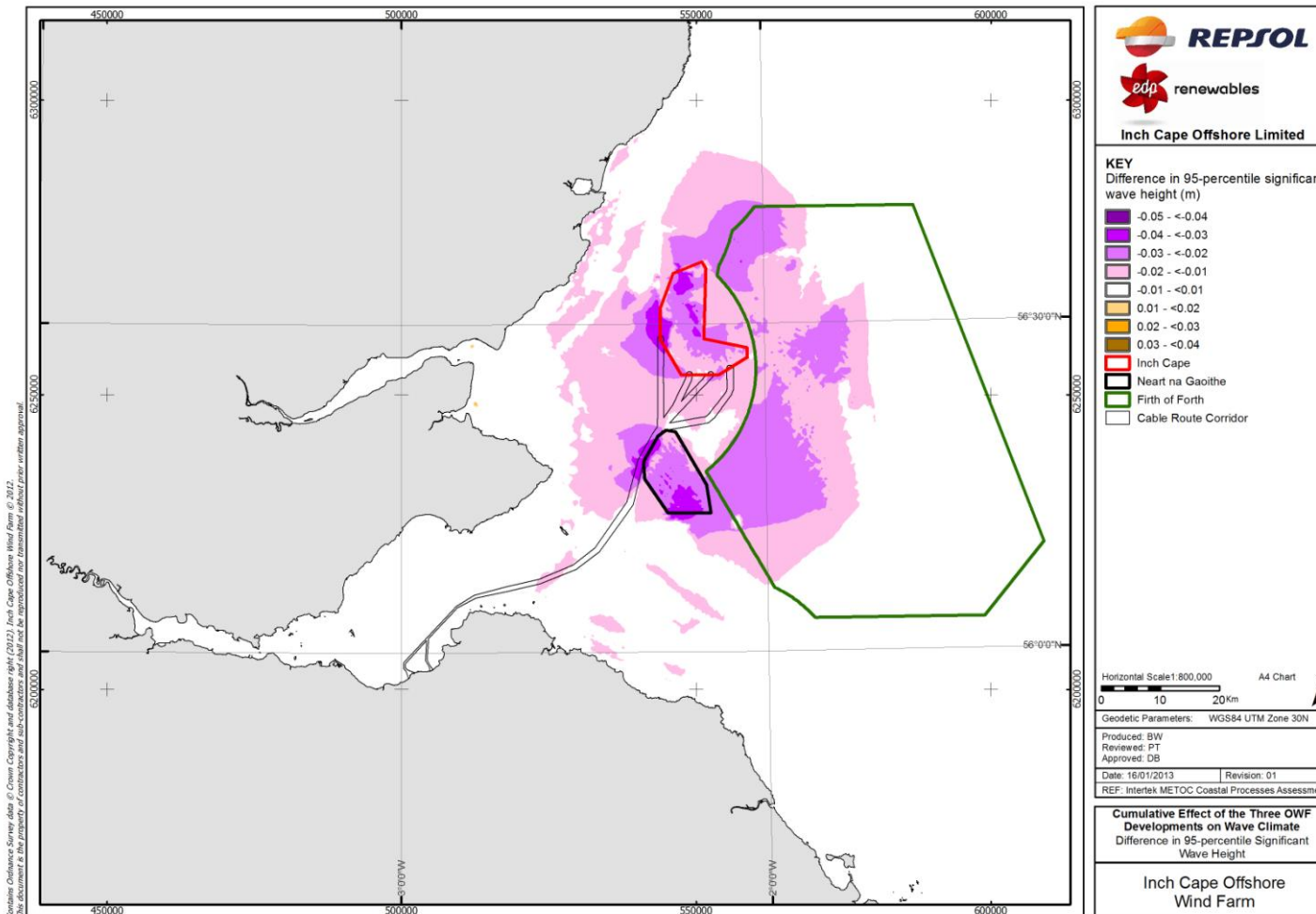
10A.7.113: Cumulative difference to 50-percentile significant wave height (m)



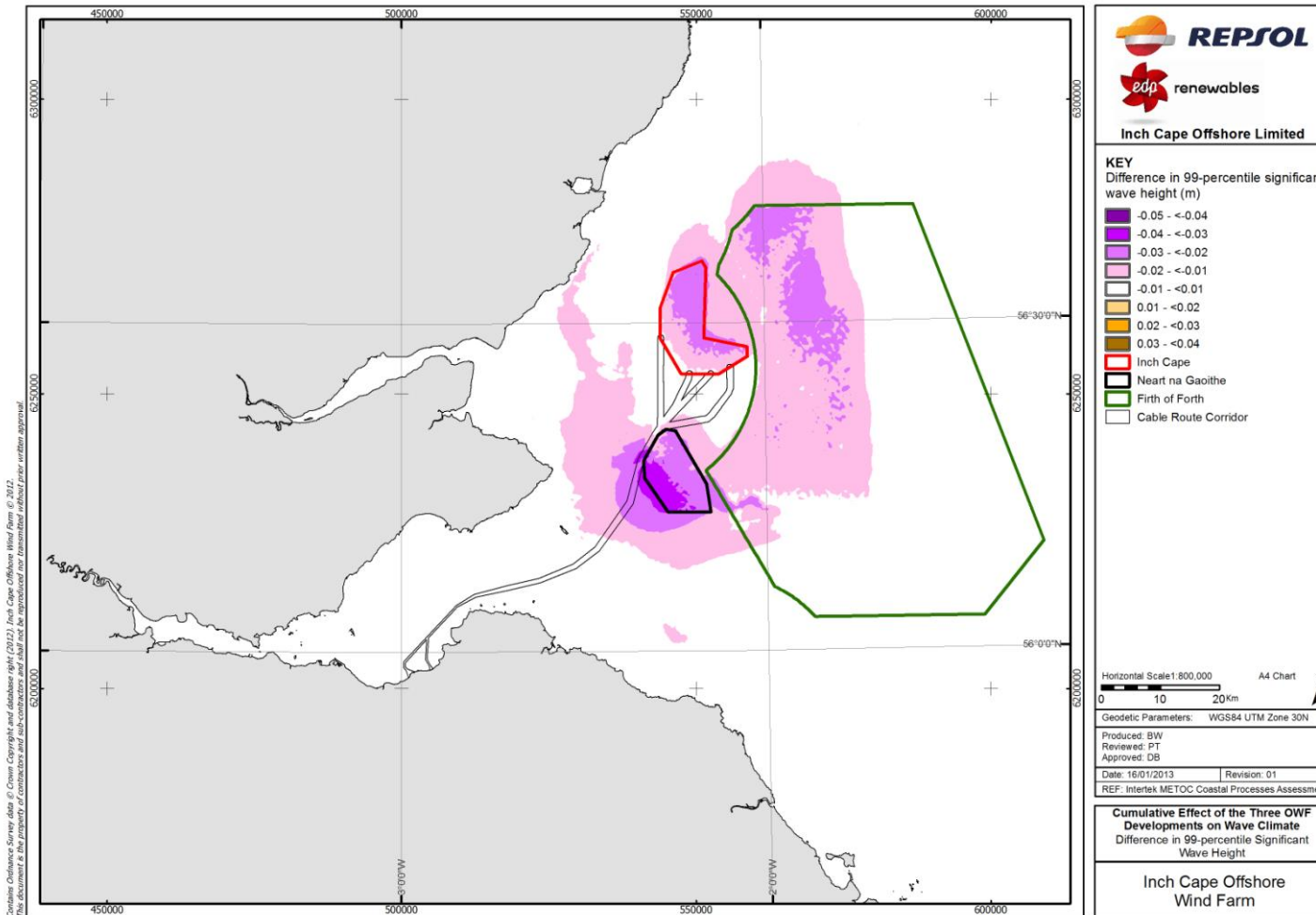
10A.7.114: Cumulative difference to 90-percentile significant wave height (m)



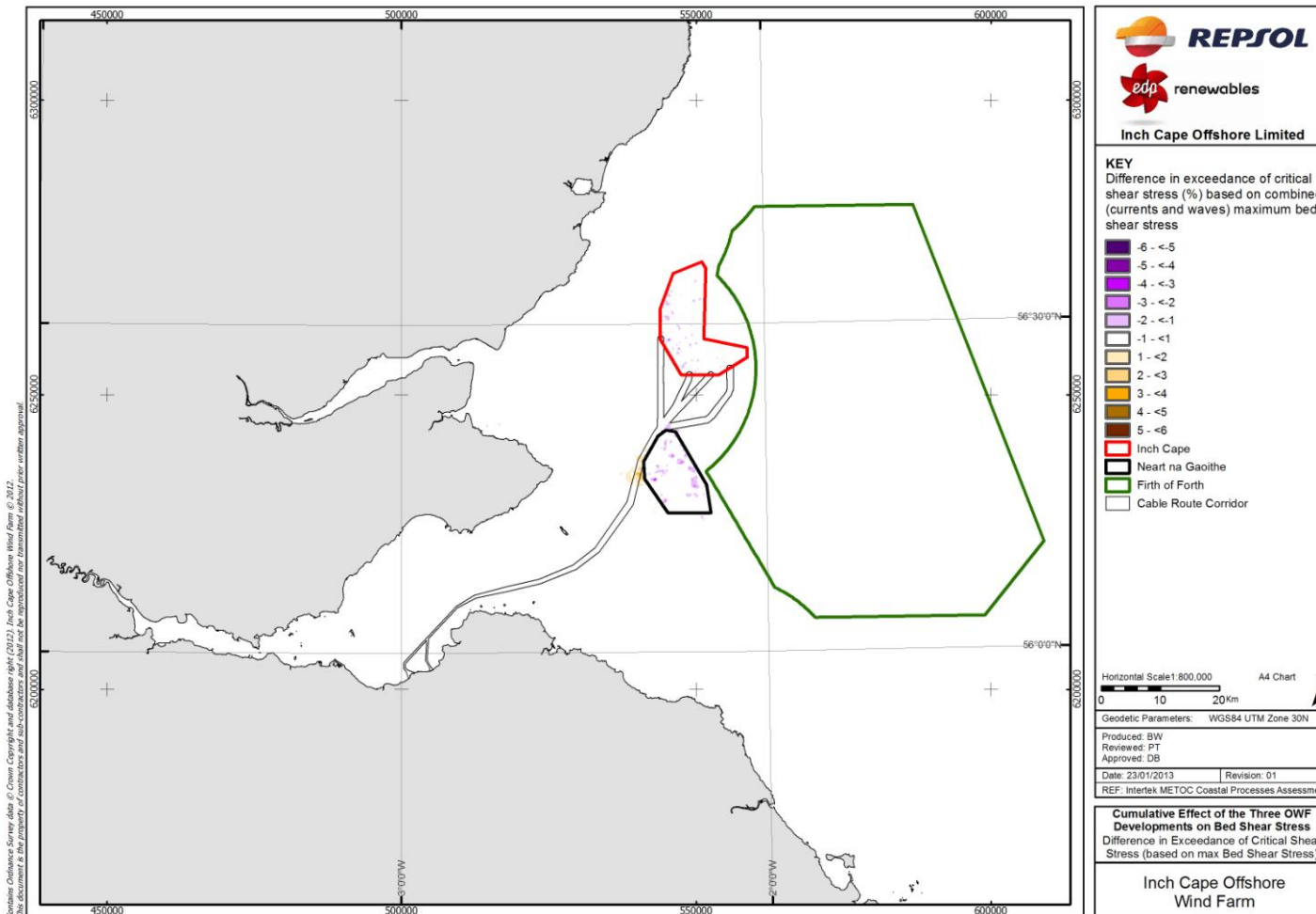
10A.7.115: Cumulative difference to 95-percentile significant wave height (m)



10A.7.116: Cumulative difference to 99-percentile significant wave height (m)

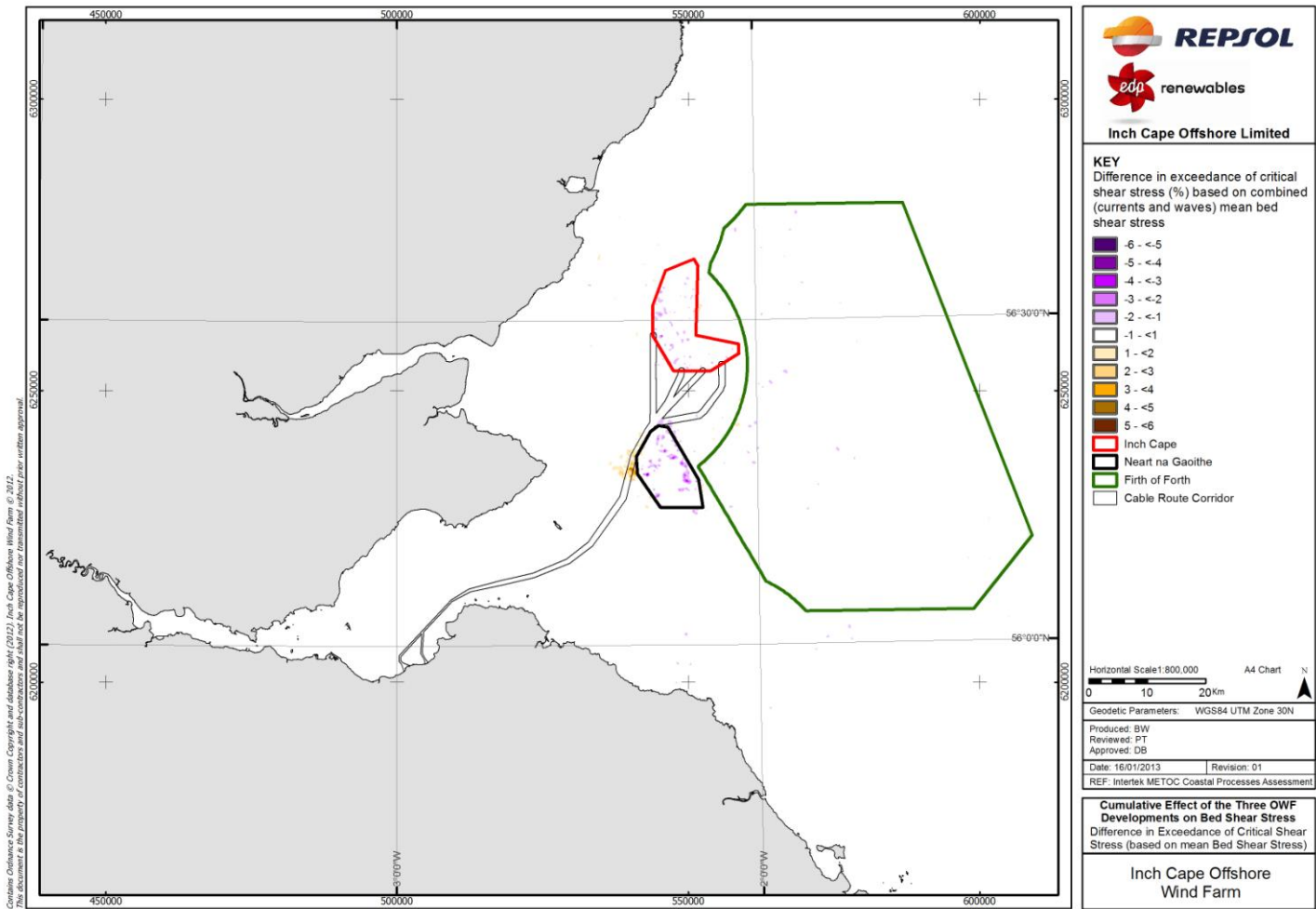


10A.7.117: Cumulative difference to exceedance of critical shear stress – based on combined (currents plus waves) maximum bed shear stress

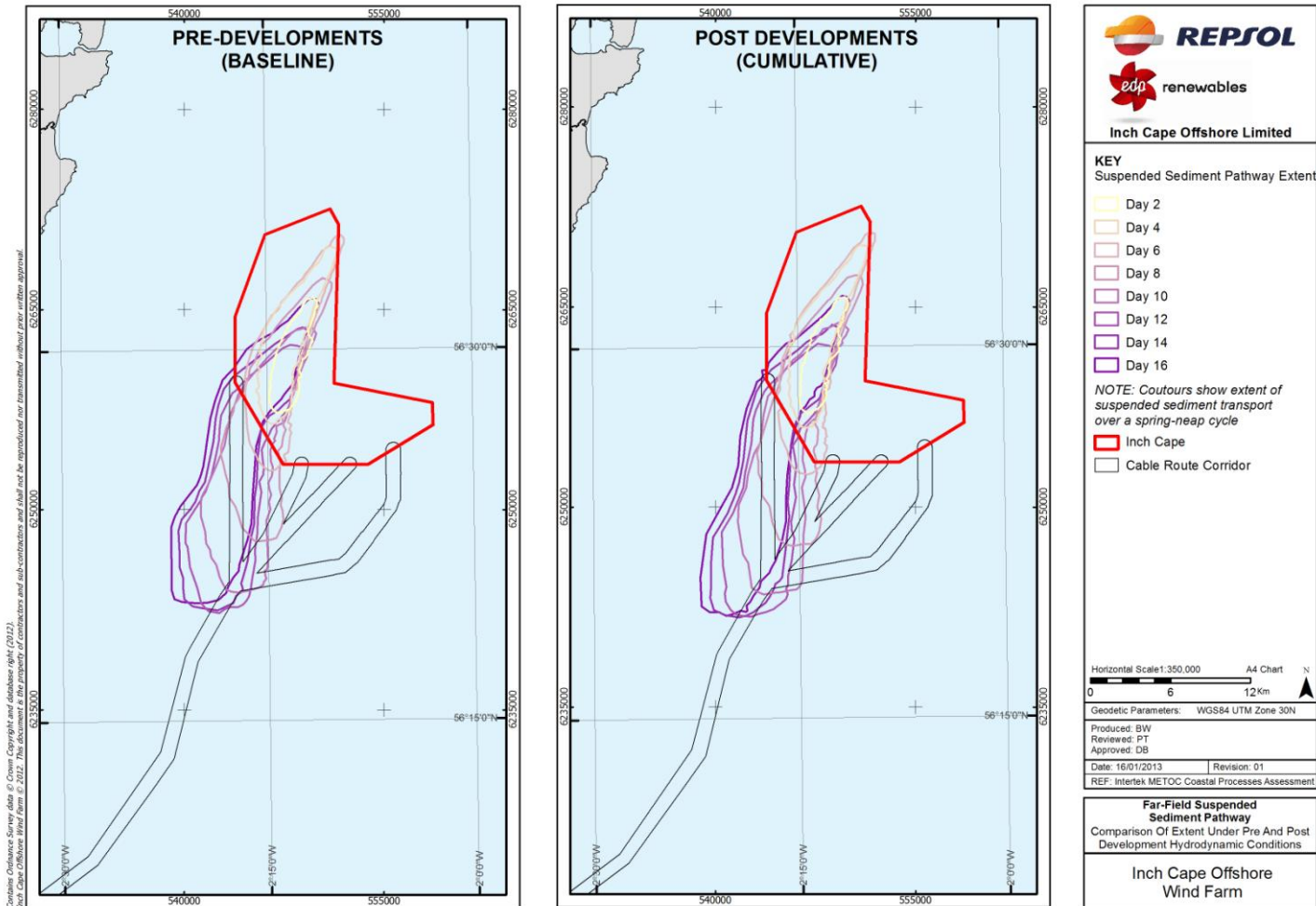




10A.7.118: Cumulative difference to exceedance of critical shear stress – based on combined (currents plus waves) mean bed shear stress

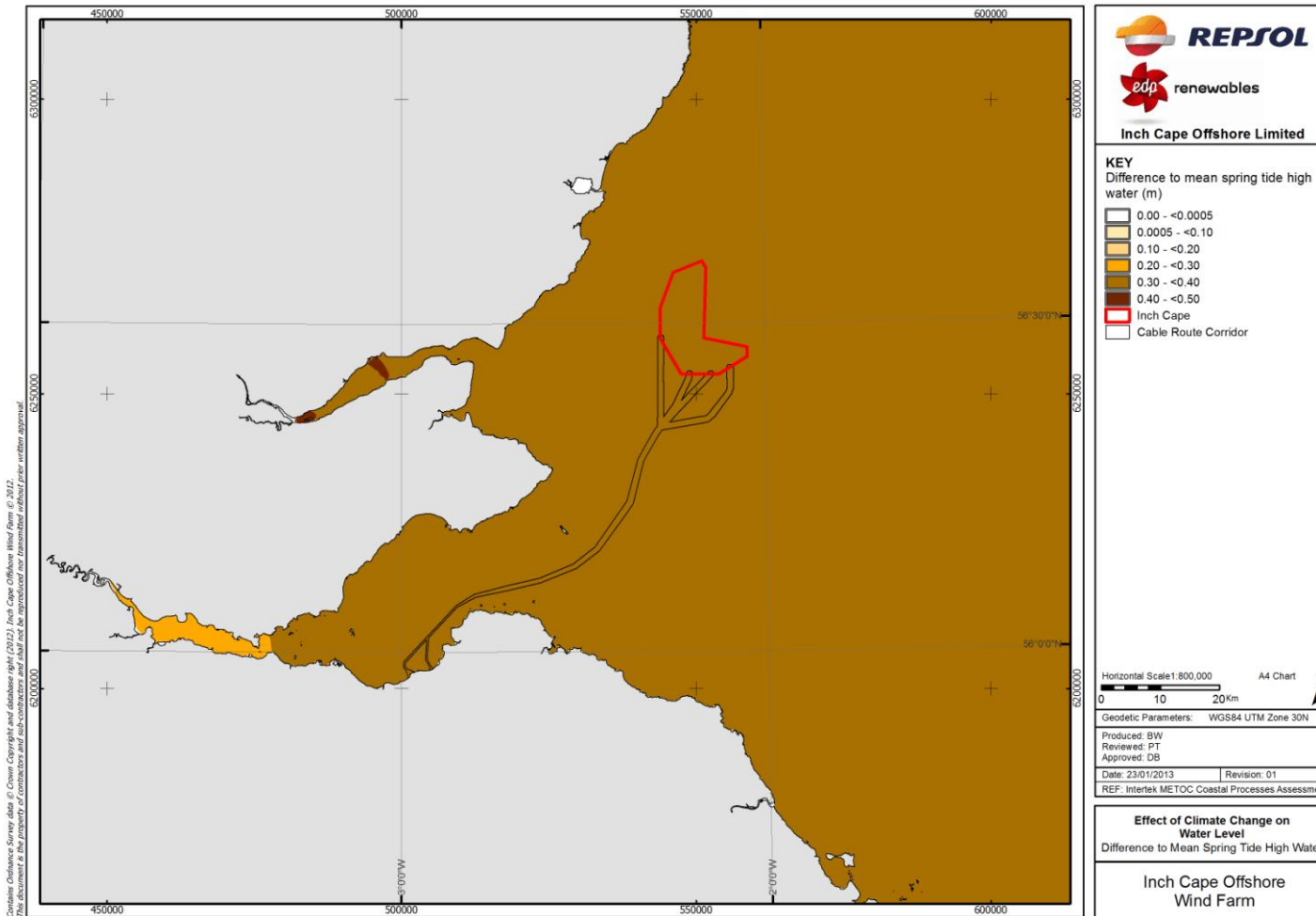


10A.7.119: Far-field suspended sediment transport pathways – pre and post developments

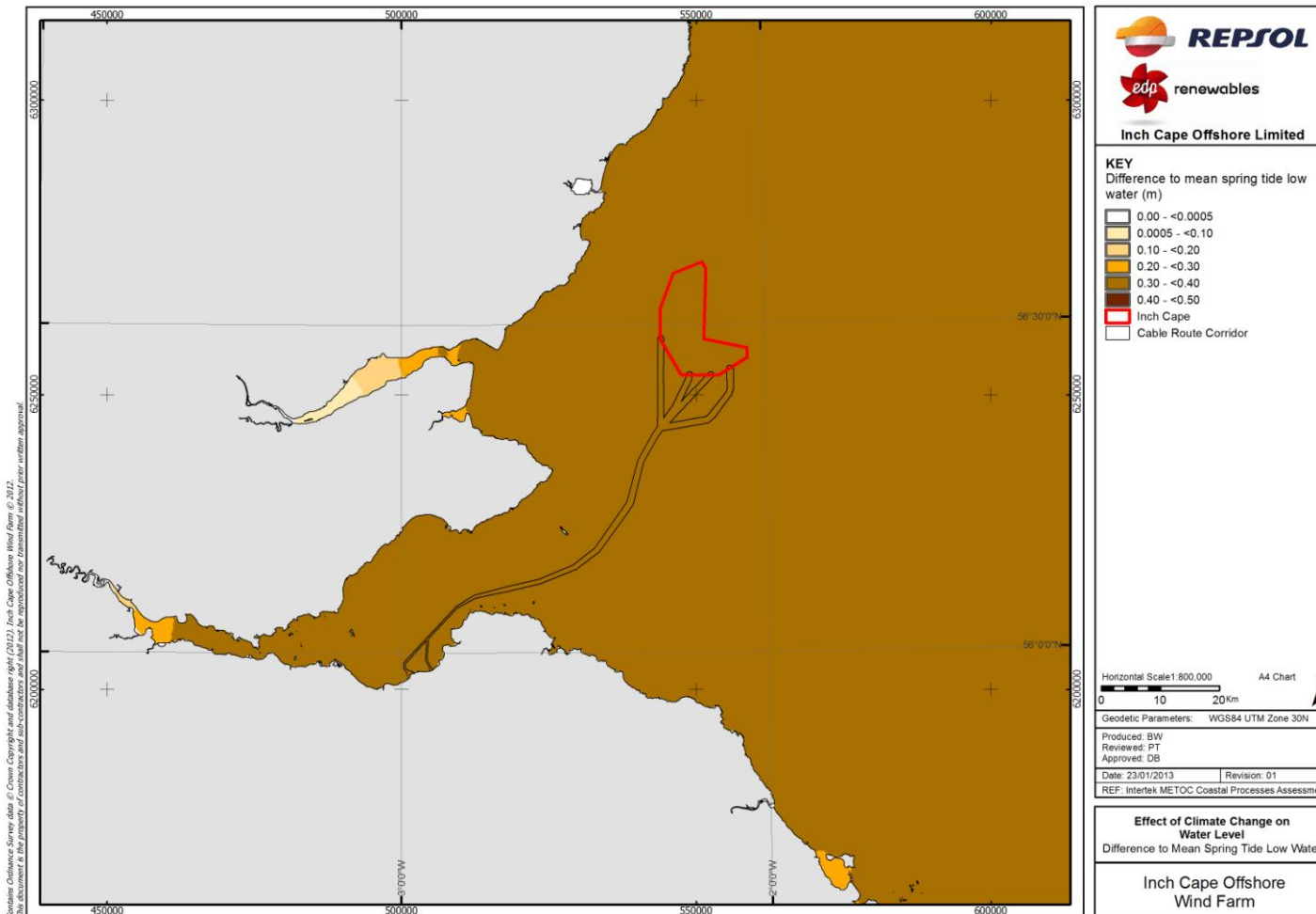


### Effects due to potential climate change

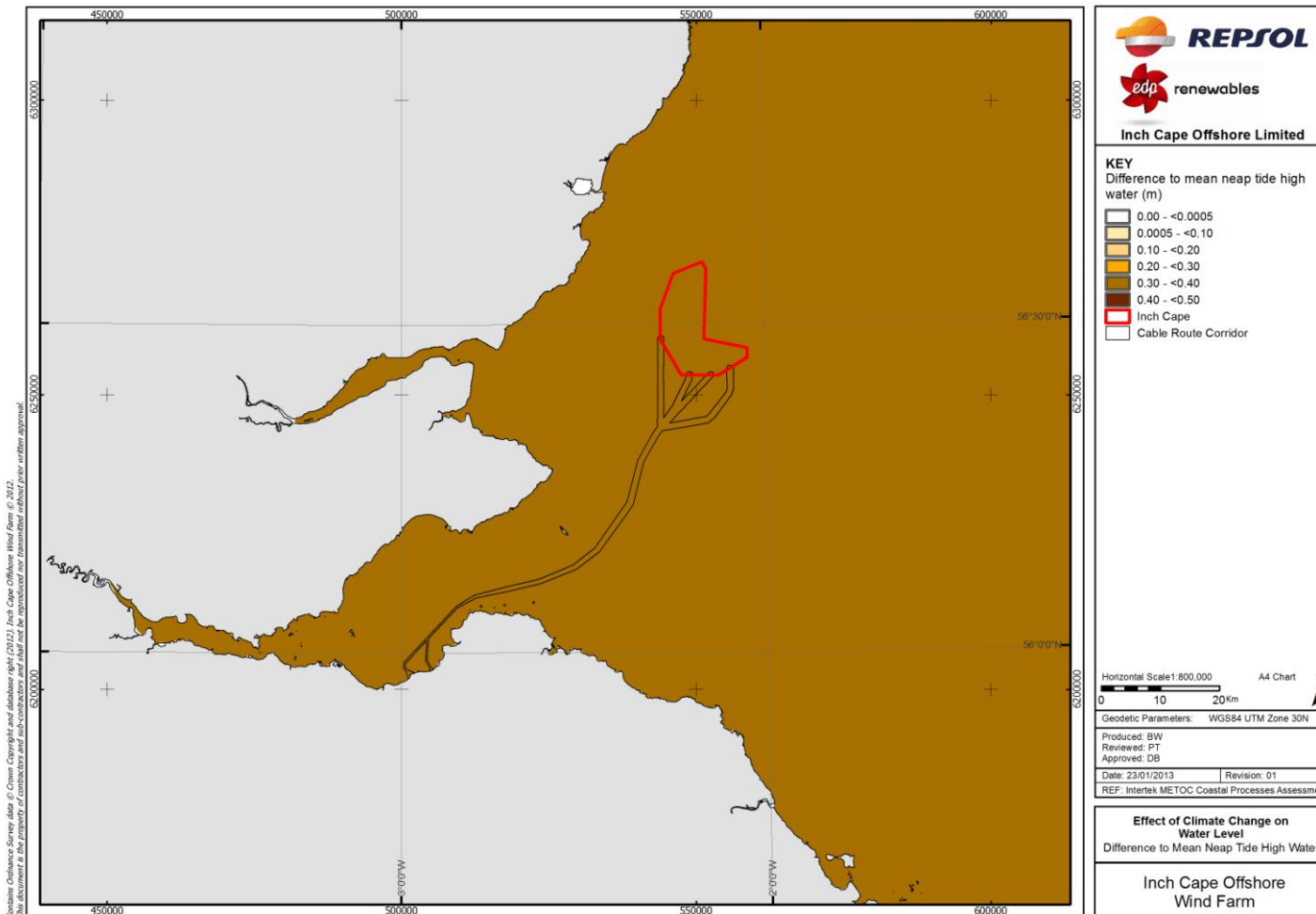
#### 10A.7.120: Difference due to potential climate change to mean spring tide high water level (m) – far-field



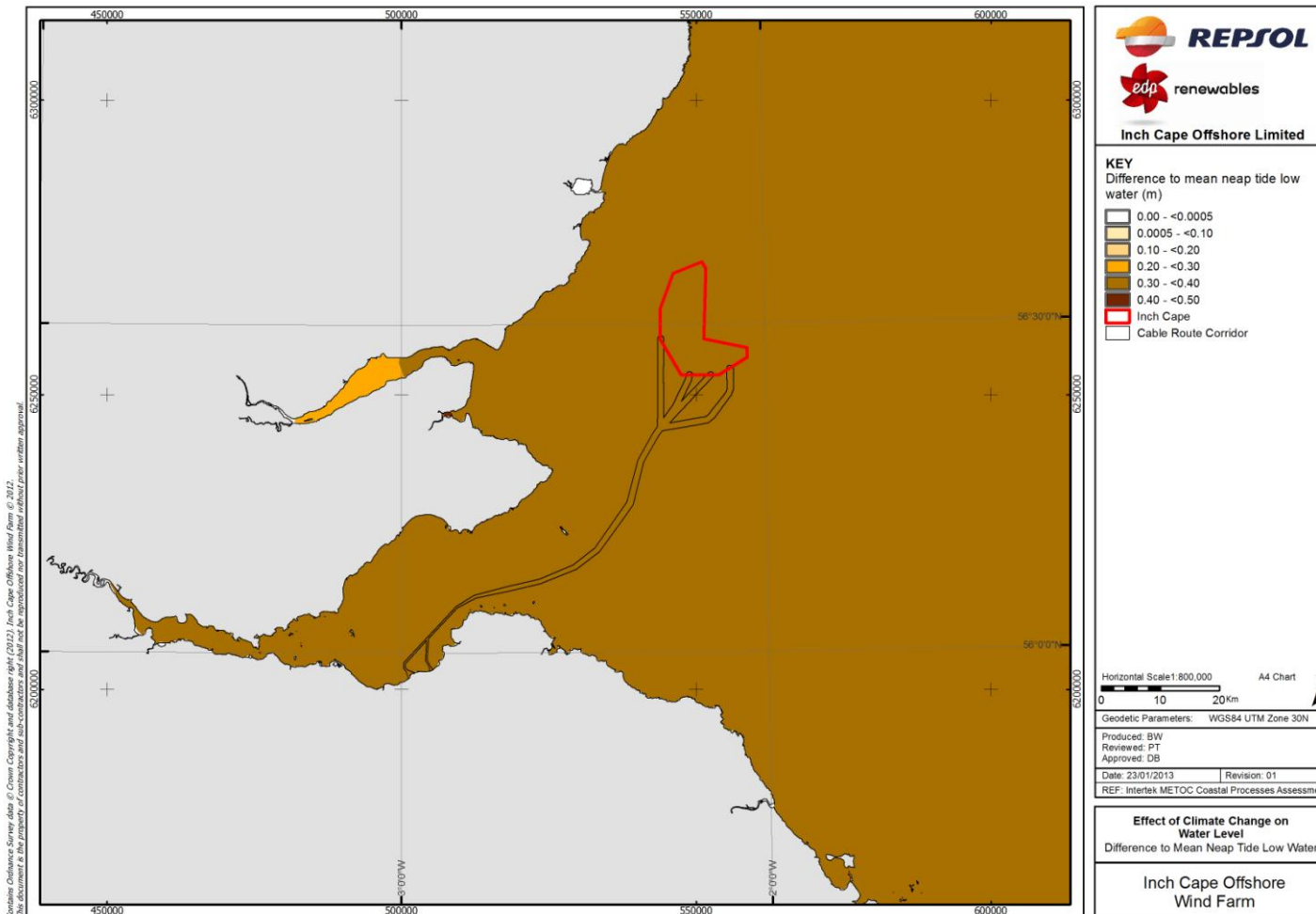
10A.7.121: Difference due to potential climate change to mean spring tide low water level (m) – far-field



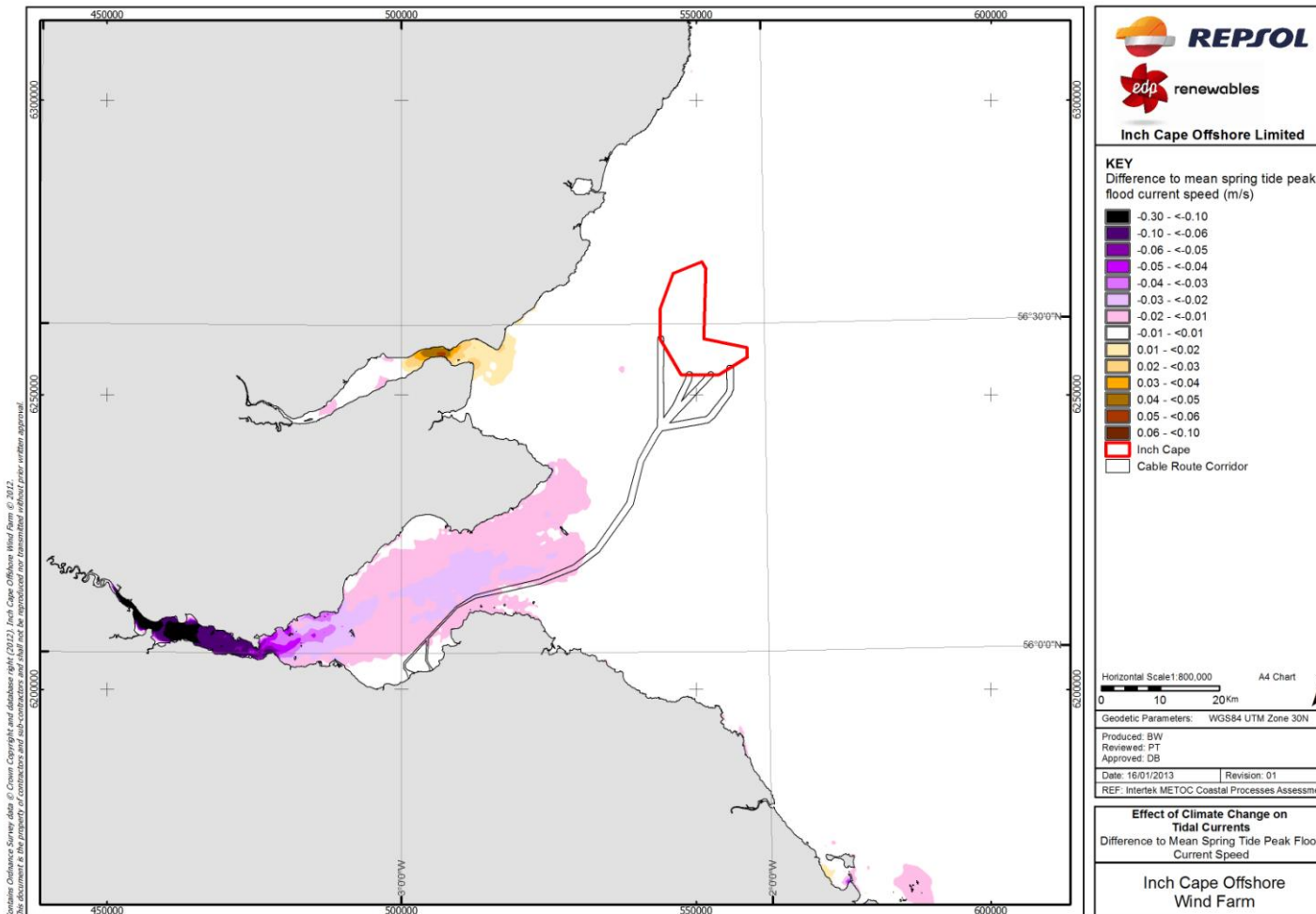
10A.7.122: Difference due to potential climate change to mean neap tide high water level (m) – far-field



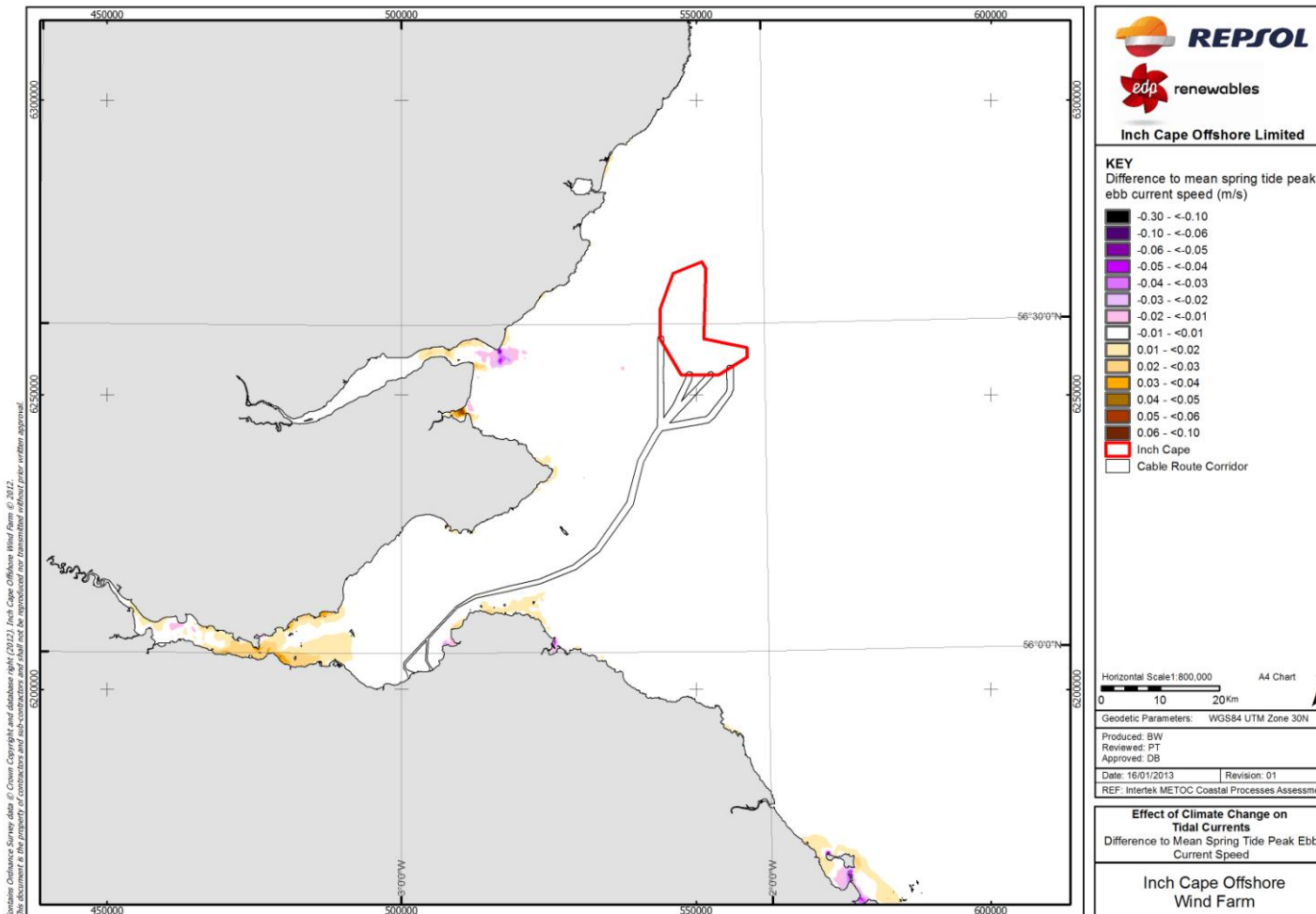
10A.7.123: Difference due to potential climate change to mean neap tide low water level (m) – far-field



10A.7.124: Difference due to potential climate change to mean spring tide peak flood current speed (m/s) – far-field

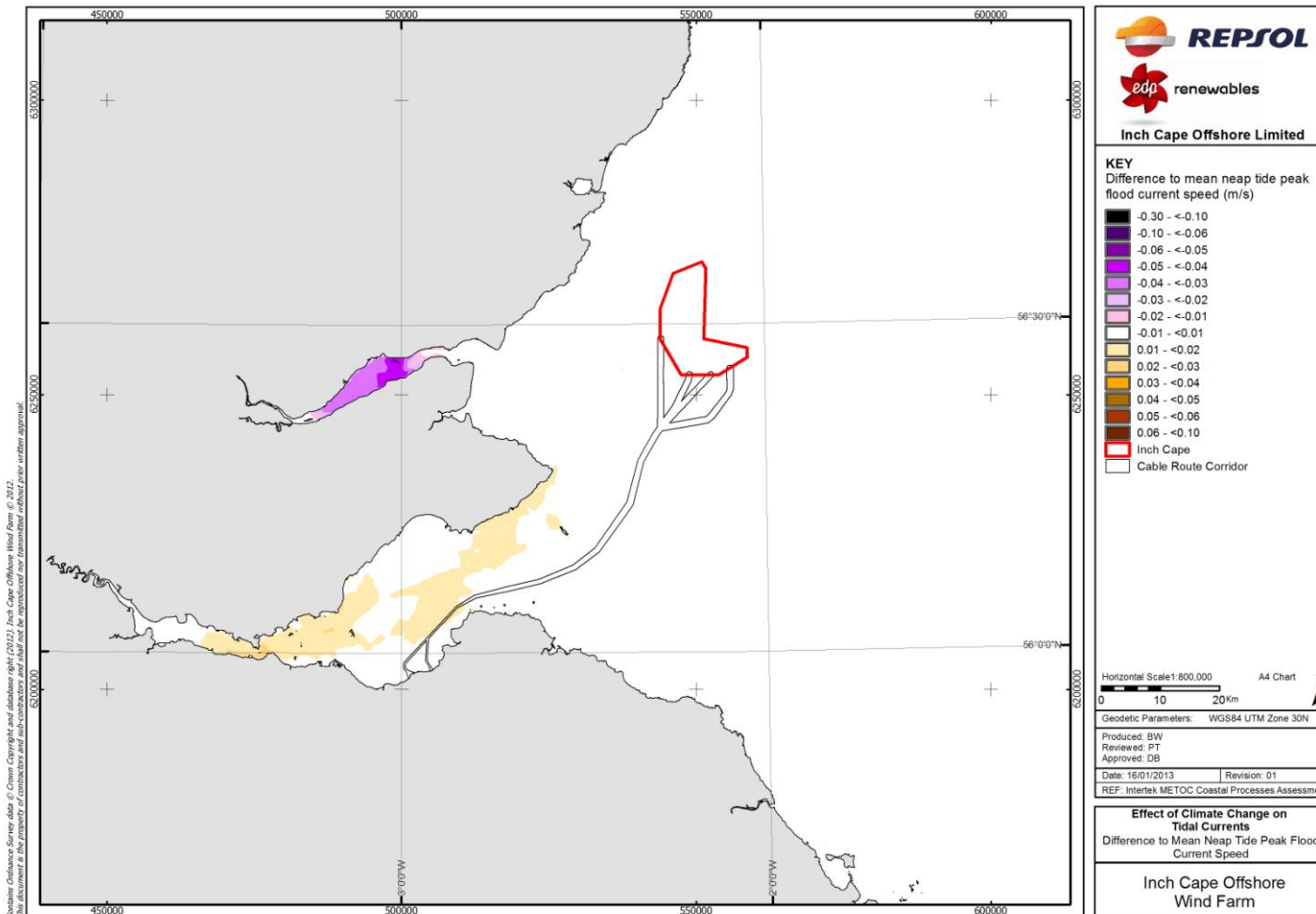


10A.7.125: Difference due to potential climate change to mean spring tide peak ebb current speed (m/s) – far-field

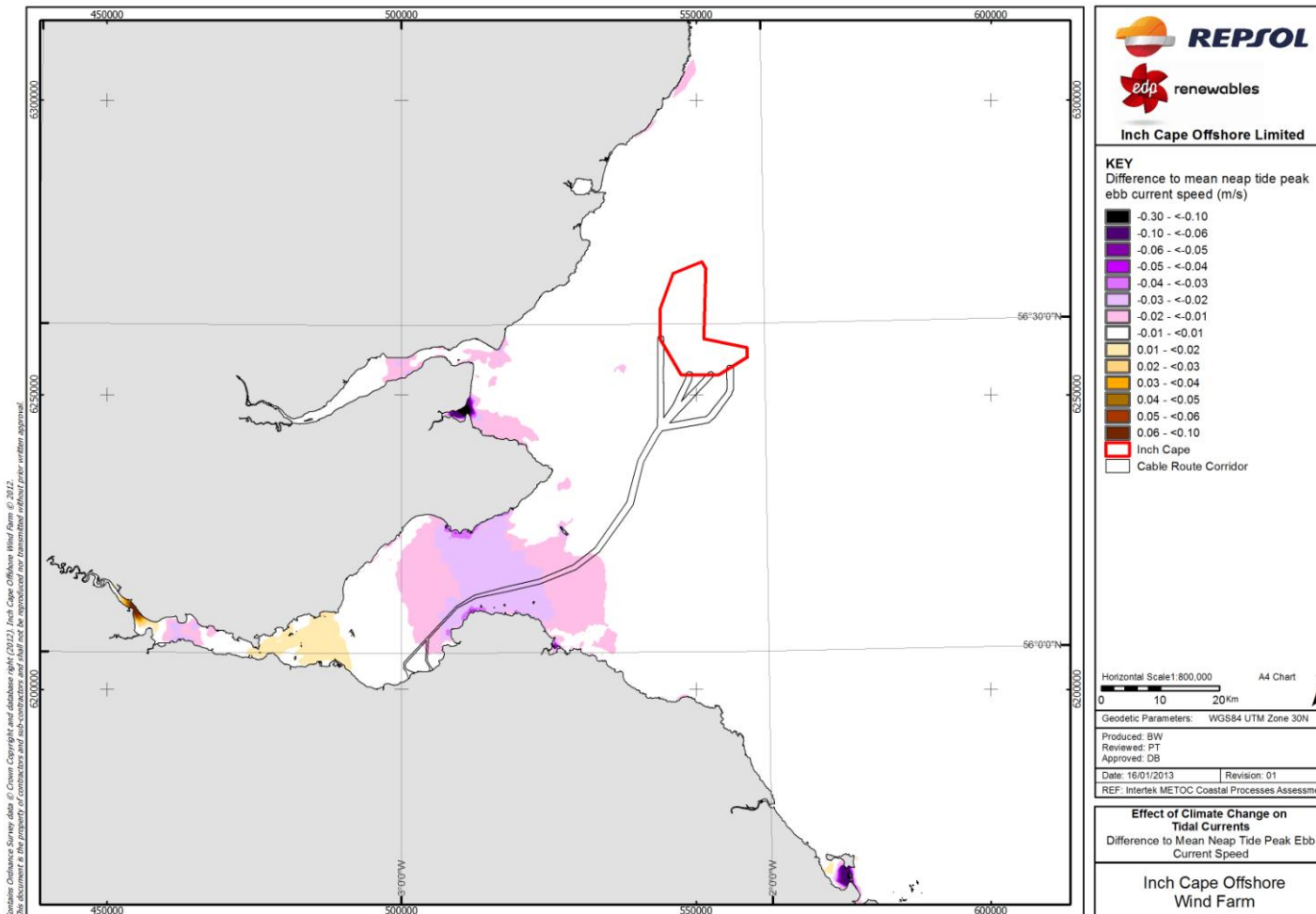




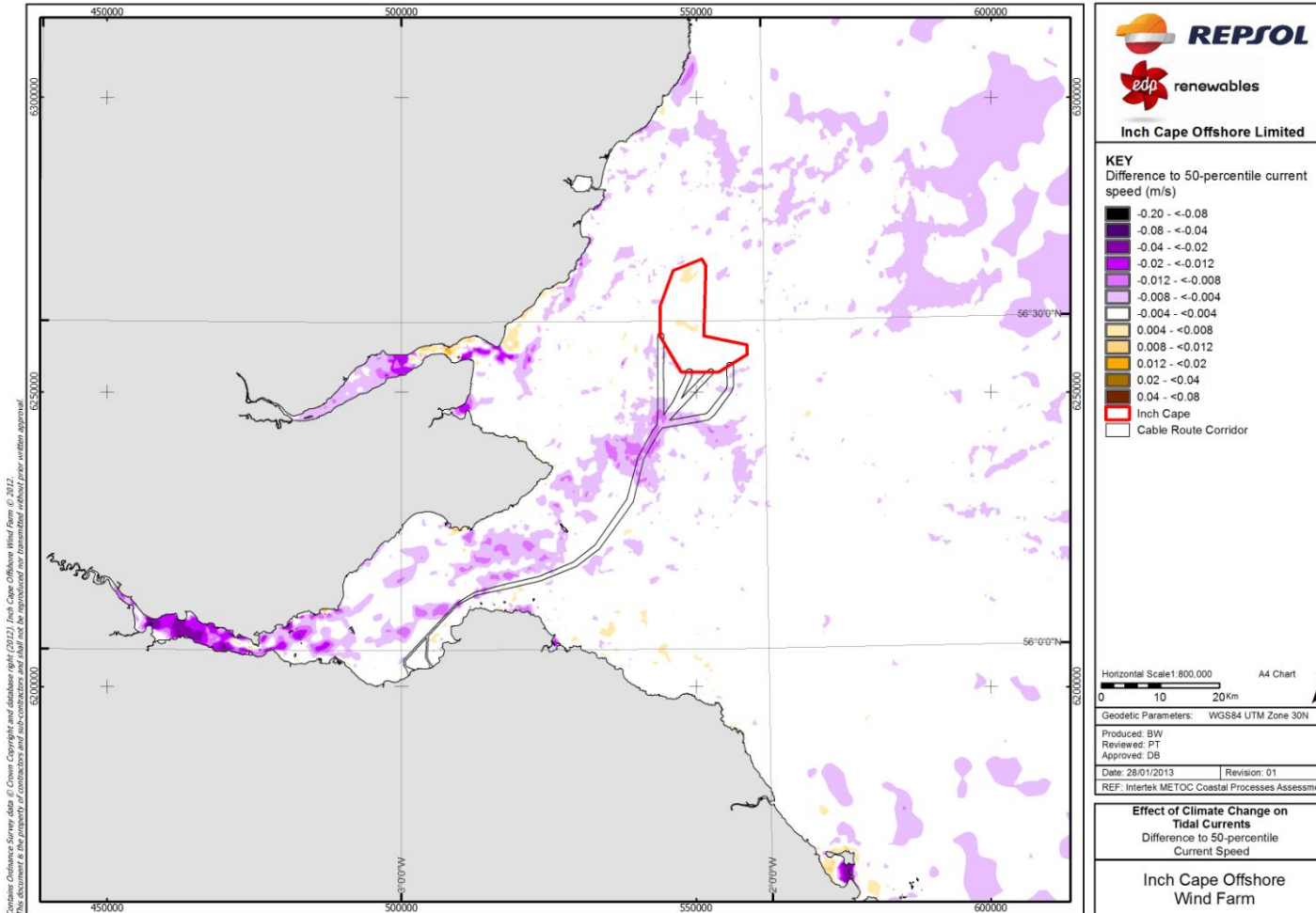
10A.7.126: Difference due to potential climate change to mean neap tide peak flood current speed (m/s) – far-field



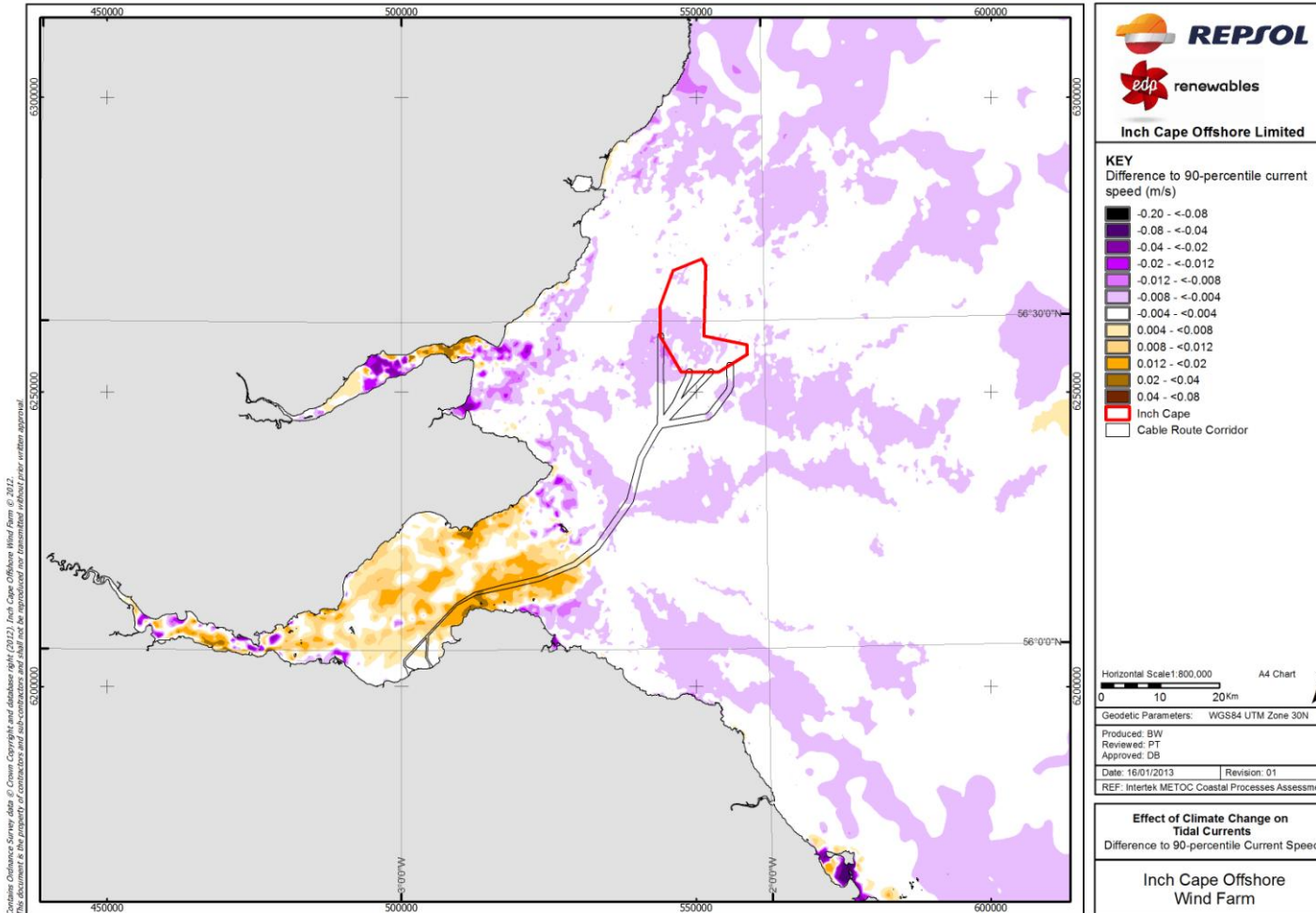
10A.7.127: Difference due to potential climate change to mean neap tide peak ebb current speed (m/s) – far-field



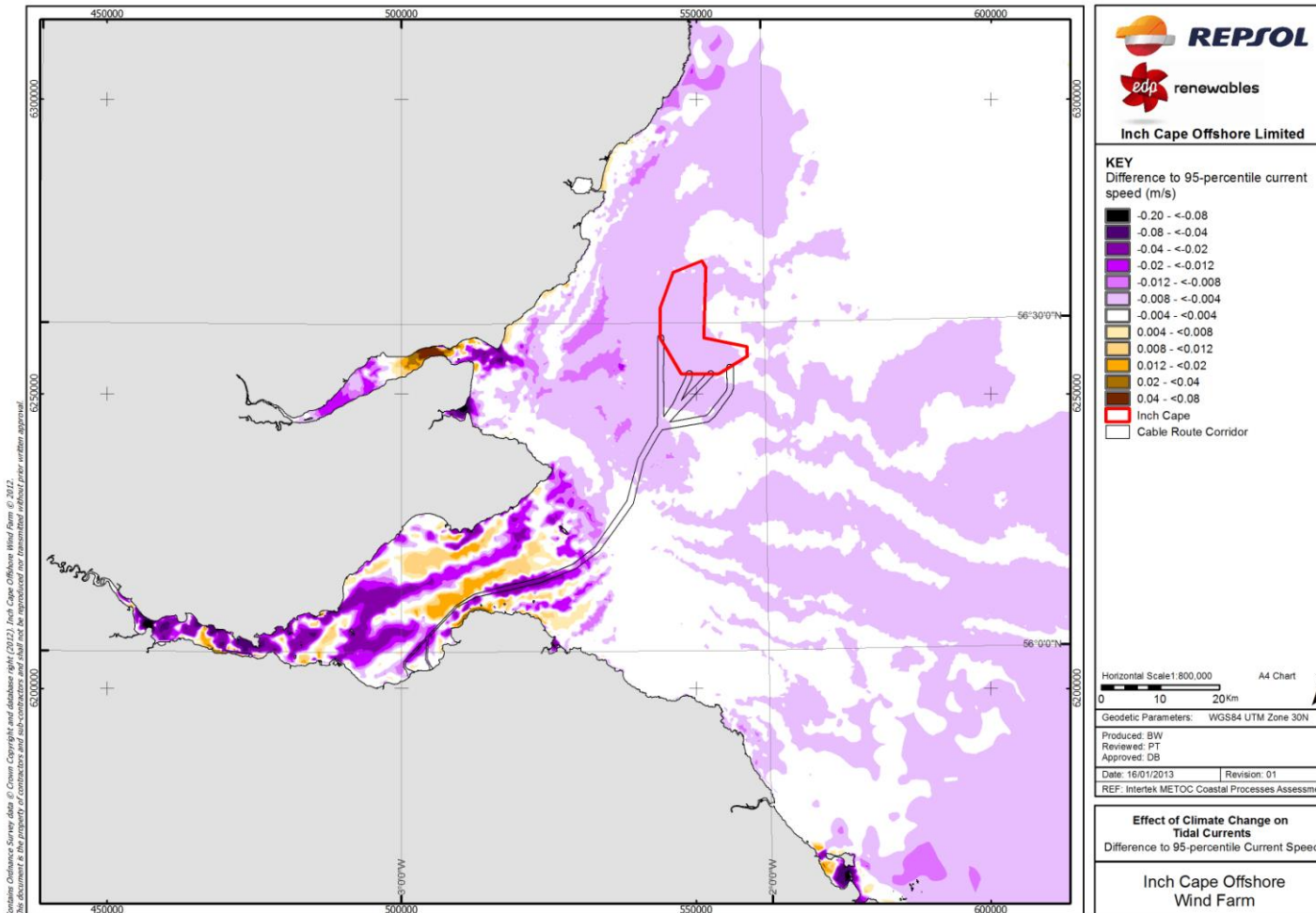
10A.7.128: Difference due to potential climate change to 50-percentile current speed (m/s) – far-field



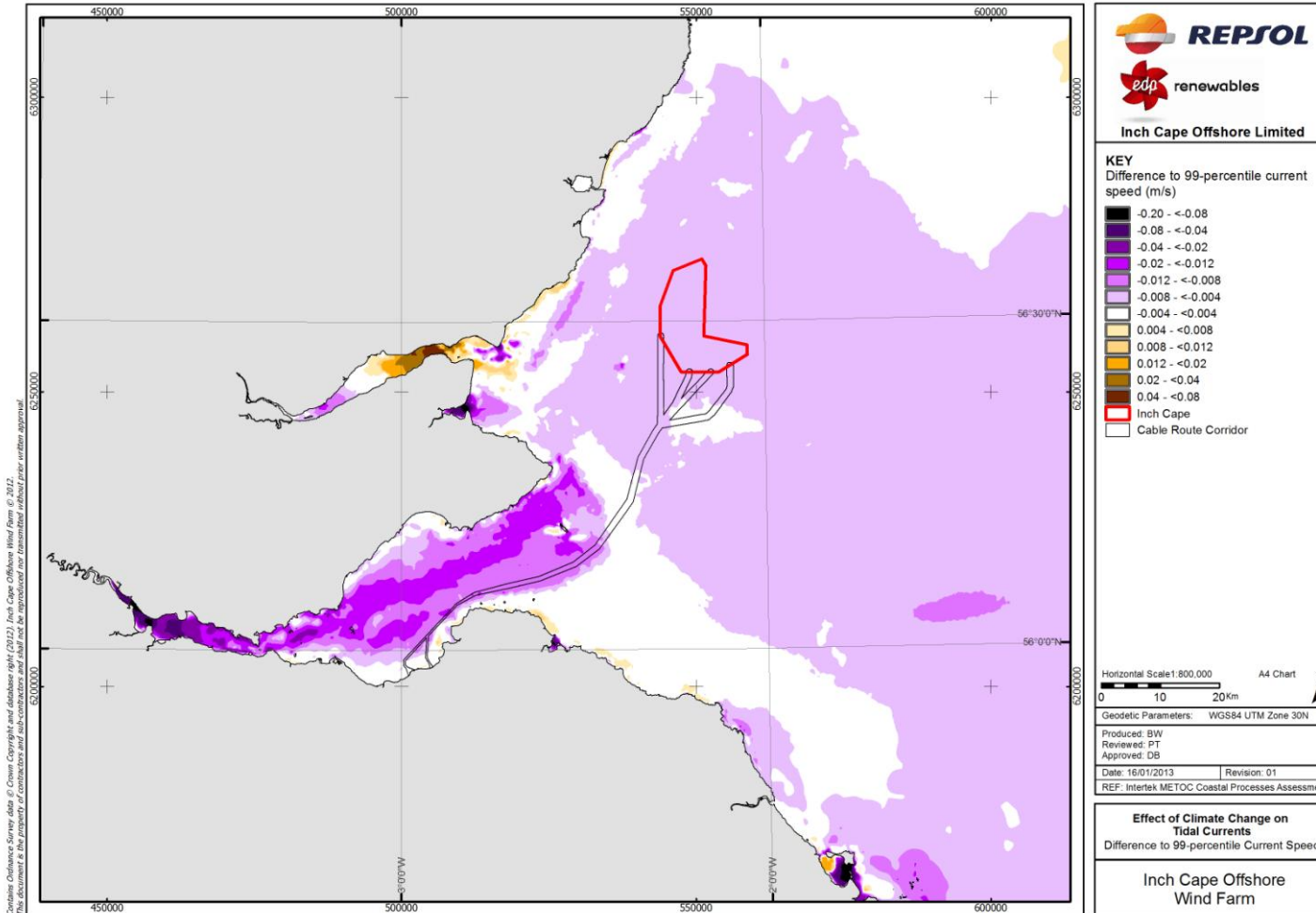
10A.7.129: Difference due to potential climate change to 90-percentile current speed (m/s) – far-field



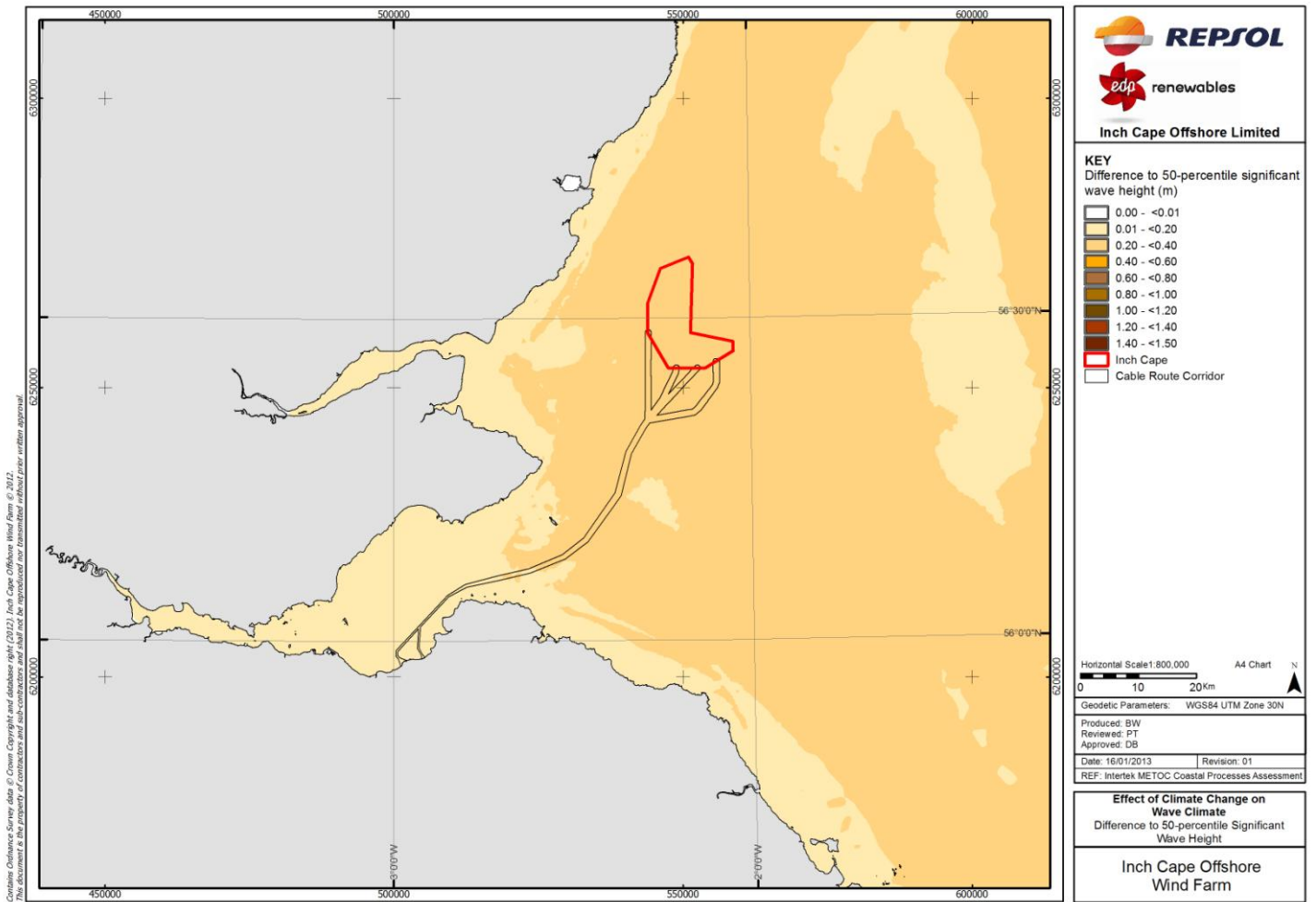
10A.7.130: Difference due to potential climate change to 95-percentile current speed (m/s) – far-field



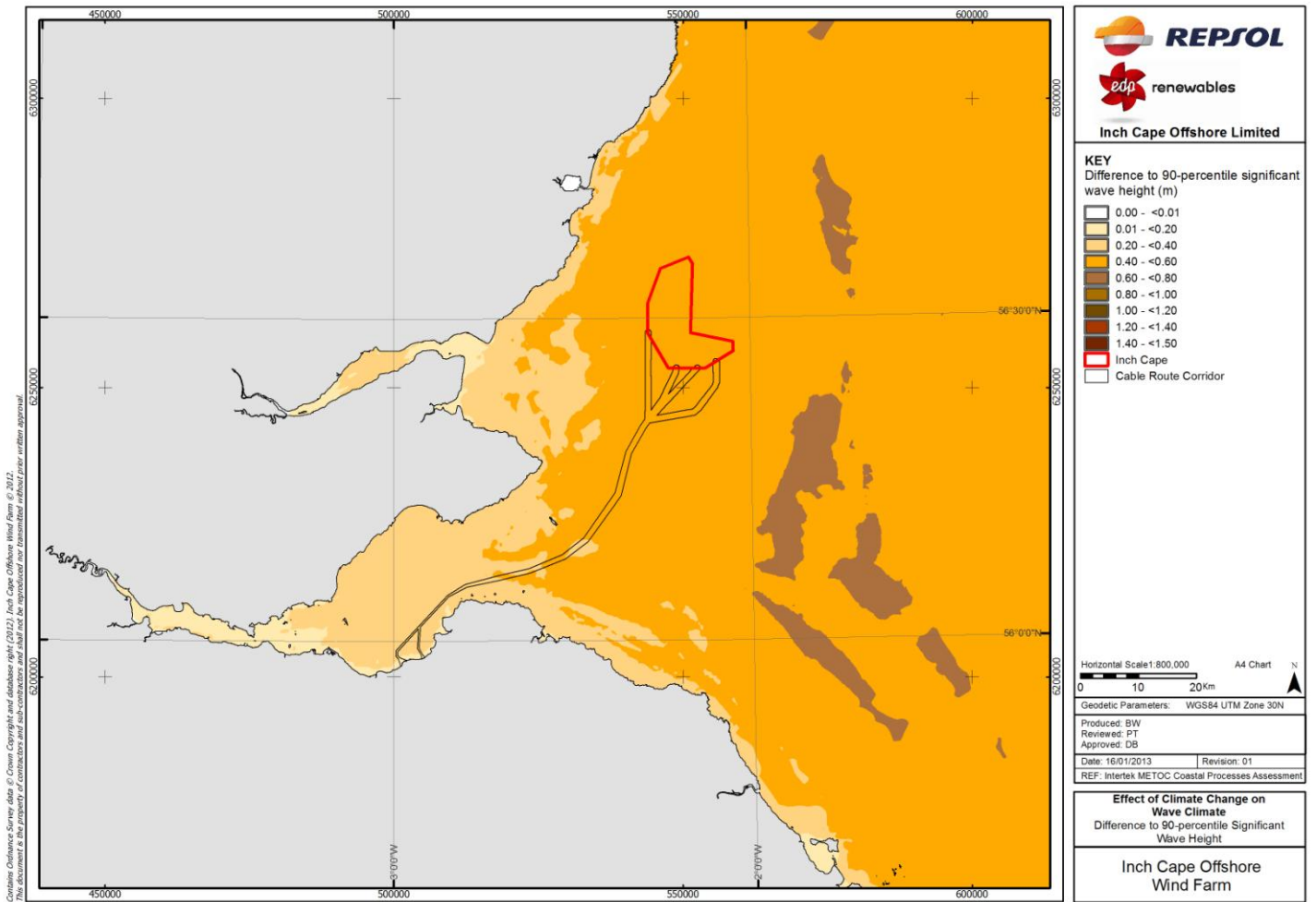
10A.7.131: Difference due to potential climate change to 99-percentile current speed (m/s) – far-field



10A.7.132: Difference due to potential climate change to 50-percentile significant wave height (m) – far-field

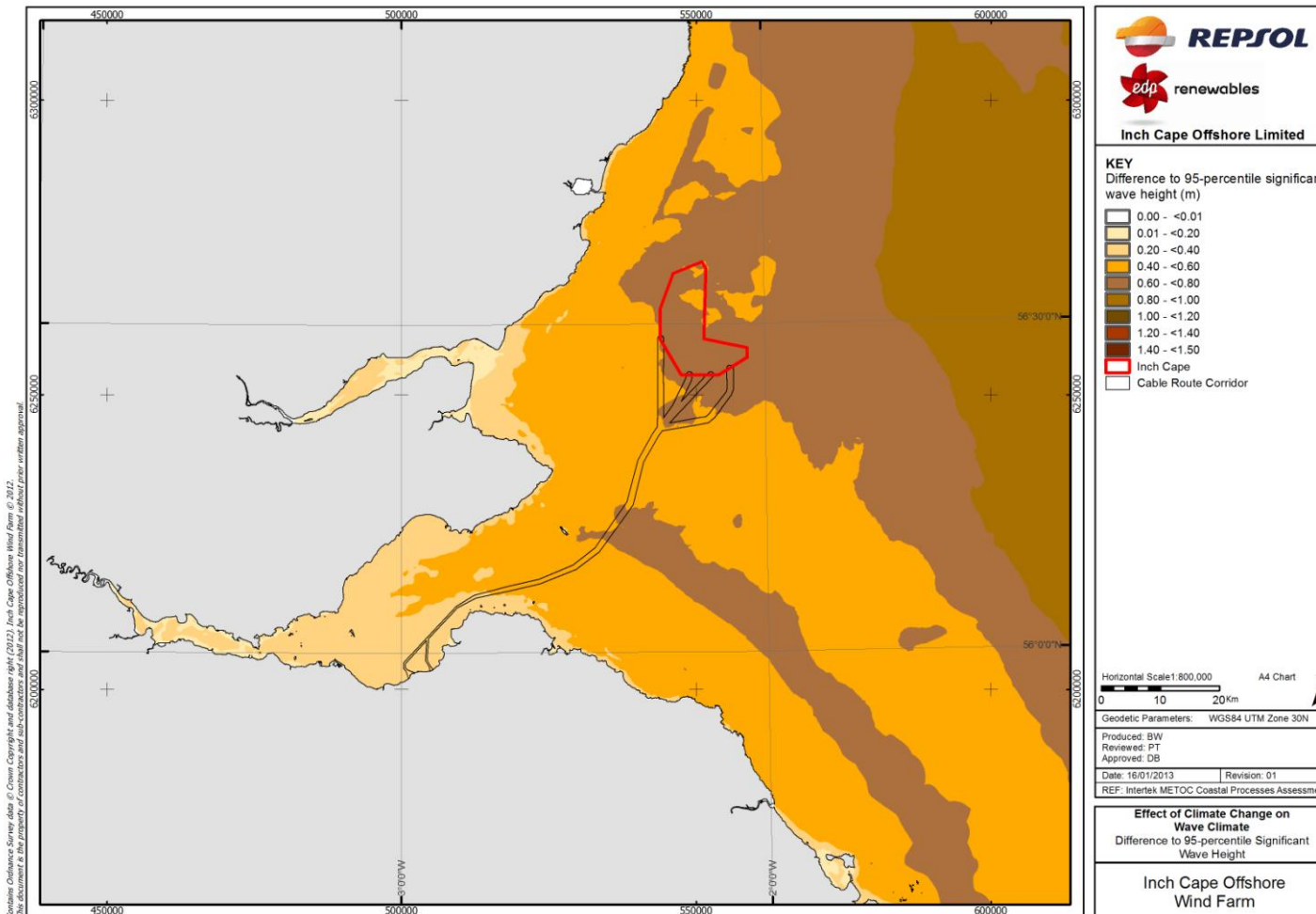


10A.7.133: Difference due to potential climate change to 90-percentile significant wave height (m) – far-field

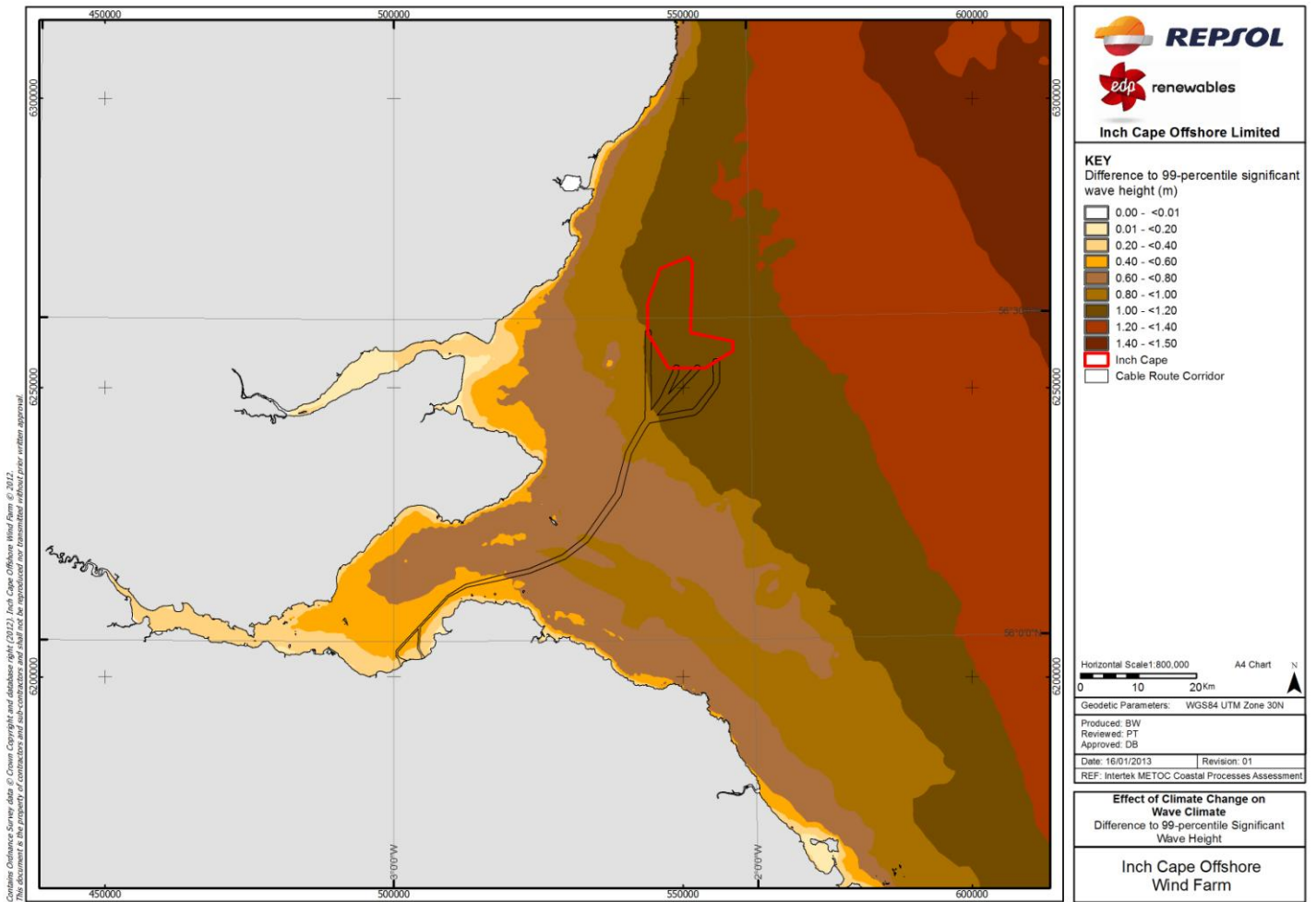




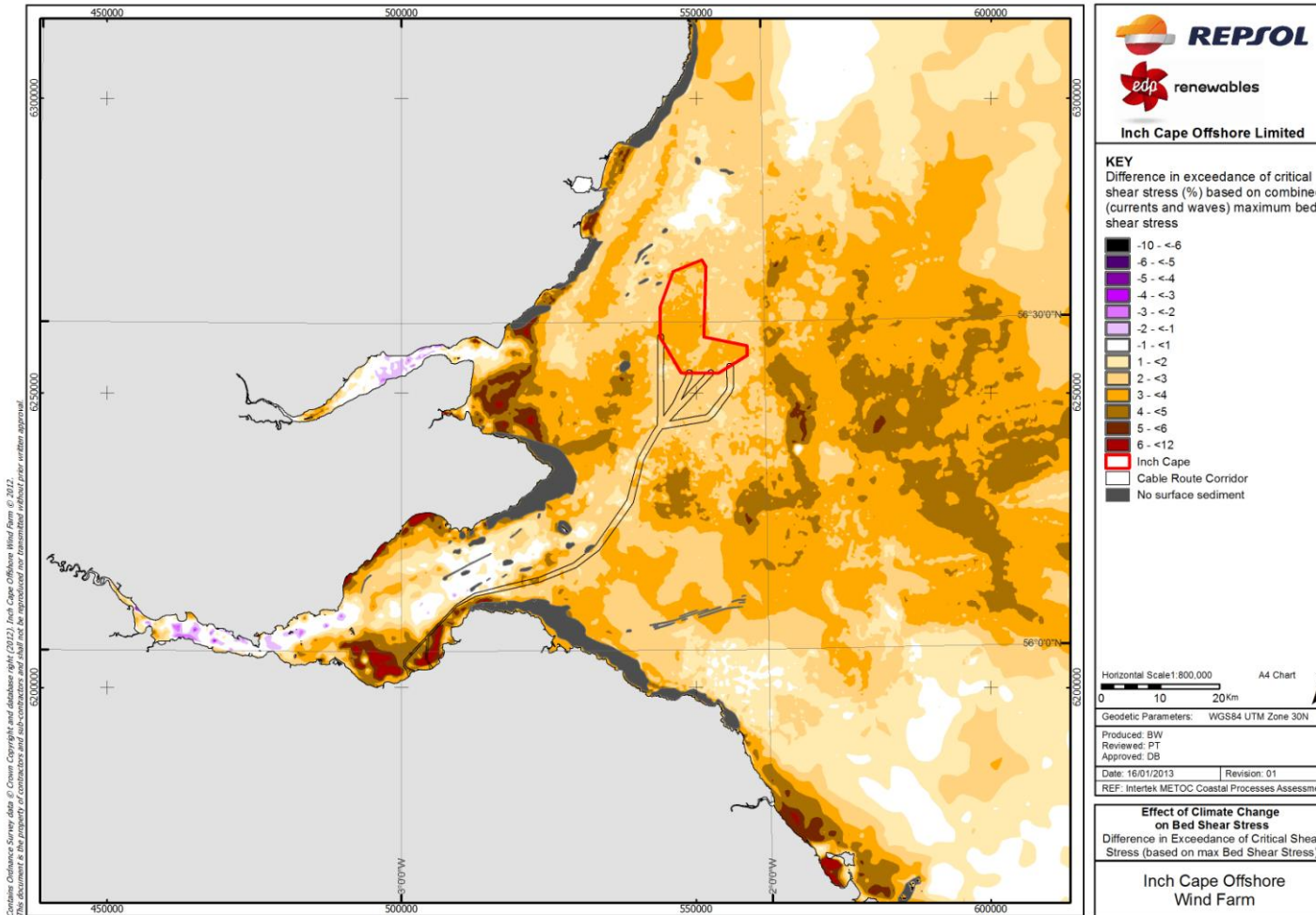
10A.7.134: Difference due to potential climate change to 95-percentile significant wave height (m) – far-field



10A.7.135: Difference due to potential climate change to 99-percentile significant wave height (m) – far-field



**10A.7.136: Difference due to potential climate change of critical shear stress – based on combined (currents plus waves) maximum bed shear stress – far-field**



**10A.7.137: Difference due to potential climate change of critical shear stress – based on combined (currents plus waves) mean bed shear stress – far-field**

