

# moray offshore renewables ltd

## Environmental Statement

Technical Appendix 7.3 F - Noise Propagation and SAFESIMM model outputs for marine mammal risk assessment

Telford, Stevenson, MacColl Wind Farms  
and associated Transmission Infrastructure  
Environmental Statement



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moray offshore renewables  
 limited

4th Floor  
 40 Princes Street  
 Edinburgh  
 EH2 2BY

Tel: +44 (0)131 556 7602

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The figures below represent outputs from the noise propagation and SAFESIMM outputs used in the modelling process to assess impacts of piling noise on marine mammals.

Figure 01 illustrates the piling locations on which the noise propagation was based around.

Figure number	Figure Legend
01	Location of piling events used in modelling scenarios
<b>Scenario 1: Two piling vessels within the MacCall wind farm (secondary assessment assuming no construction activities within other sites). Modelling based on installation of a 2.5 m pile at locations 1 and 2. Construction duration = 2 years.</b>	
A1	Noise propagation: harbour porpoise dB <sub>ht</sub>
A2	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
A3	Noise propagation: minke whale dB <sub>ht</sub>
A4	Noise propagation: harbour seal dB <sub>ht</sub>
A5	Noise propagation: high frequency cetaceans SEL
A6	Noise propagation: mid frequency cetaceans SEL
A7	Noise propagation: low frequency cetaceans SEL
A8	Noise propagation: pinnipeds SEL
A9	SAFESIMM model: harbour porpoise 198 dB
A10	SAFESIMM model: bottlenose dolphin 198 dB
A11	SAFESIMM model: minke whale 198 dB
A12	SAFESIMM model: harbour seal 186 dB
A13	SAFESIMM model: harbour seal 198 dB
A14	SAFESIMM model: grey seal 186 dB
A15	SAFESIMM model: grey seal 198 dB
<b>Scenario 2: Two piling vessels within the Stevenson wind farm (secondary assessment assuming no construction activities within other sites). Modelling based on installation of a 2.5 m pile at locations 4 and 6. Construction duration = 2 years.</b>	
A16	Noise propagation: harbour porpoise dB <sub>ht</sub>

<b>A17</b>	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
<b>A18</b>	Noise propagation: minke whale dB <sub>ht</sub>
<b>A19</b>	Noise propagation: harbour seal dB <sub>ht</sub>
<b>A20</b>	Noise propagation: high frequency cetaceans SEL
<b>A21</b>	Noise propagation: mid frequency cetaceans SEL
<b>A22</b>	Noise propagation: low frequency cetaceans SEL
<b>A23</b>	Noise propagation: pinnipeds SEL
<b>A24</b>	SAFESIMM model: harbour porpoise 198 dB
<b>A25</b>	SAFESIMM model: bottlenose dolphin 198 dB
<b>A26</b>	SAFESIMM model: minke whale 198 dB
<b>A27</b>	SAFESIMM model: harbour seal 186 dB
<b>A28</b>	SAFESIMM model: harbour seal 198 dB
<b>A29</b>	SAFESIMM model: grey seal 186 dB
<b>A30</b>	SAFESIMM model: grey seal 198 dB
<b>Scenario 3: Two piling vessels within the Telford wind farm (secondary assessment assuming no construction activities within other sites). Modelling based on installation of a 2.5 m pile at locations 3a and 5a. Construction duration = 2 years.</b>	
<b>A31</b>	Noise propagation: harbour porpoise dB <sub>ht</sub>
<b>A32</b>	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
<b>A33</b>	Noise propagation: minke whale dB <sub>ht</sub>
<b>A34</b>	Noise propagation: harbour seal dB <sub>ht</sub>
<b>A35</b>	Noise propagation: high frequency cetaceans SEL
<b>A36</b>	Noise propagation: mid frequency cetaceans SEL
<b>A37</b>	Noise propagation: low frequency cetaceans SEL
<b>A38</b>	Noise propagation: pinnipeds SEL
<b>A39</b>	SAFESIMM model: harbour porpoise 198 dB
<b>A40</b>	SAFESIMM model: bottlenose dolphin 198 dB

<b>A41</b>	SAFESIMM model: minke whale 198 dB
<b>A42</b>	SAFESIMM model: harbour seal 186 dB
<b>A43</b>	SAFESIMM model: harbour seal 198 dB
<b>A44</b>	SAFESIMM model: grey seal 186 dB
<b>A45</b>	SAFESIMM model: grey seal 198 dB
<b>Scenario 4: OFTI. Modelling based on the installation of a 3 m pile at location 2.</b>	
<b>B1</b>	Noise propagation: harbour porpoise dB <sub>ht</sub>
<b>B2</b>	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
<b>B3</b>	Noise propagation: minke whale dB <sub>ht</sub>
<b>B4</b>	Noise propagation: harbour seal dB <sub>ht</sub>
<b>B5</b>	Noise propagation: high frequency cetaceans SEL
<b>B6</b>	Noise propagation: mid frequency cetaceans SEL
<b>B7</b>	Noise propagation: low frequency cetaceans SEL
<b>B8</b>	Noise propagation: pinnipeds SEL
<b>B9</b>	SAFESIMM model: harbour porpoise 198 dB
<b>B10</b>	SAFESIMM model: bottlenose dolphin 198 dB
<b>B11</b>	SAFESIMM model: minke whale 198 dB
<b>B12</b>	SAFESIMM model: harbour seal 186 dB
<b>B13</b>	SAFESIMM model: harbour seal 198 dB
<b>B14</b>	SAFESIMM model: grey seal 186 dB
<b>B15</b>	SAFESIMM model: grey seal 198 dB
<b>Scenario 5: Meteorological Mast. Modelling based on the installation of a 4.5 m monopole within the Stevenson wind farm.</b>	
<b>C1</b>	Noise propagation: harbour porpoise dB <sub>ht</sub>
<b>C2</b>	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
<b>C3</b>	Noise propagation: minke whale dB <sub>ht</sub>
<b>C4</b>	Noise propagation: harbour seal dB <sub>ht</sub>

<b>C5</b>	Noise propagation: high frequency cetaceans SEL
<b>C6</b>	Noise propagation: mid frequency cetaceans SEL
<b>C7</b>	Noise propagation: low frequency cetaceans SEL
<b>C8</b>	Noise propagation: pinnipeds SEL
<b>Scenario A: Cumulative piling within the EDA. Single piling vessel building all three win farms. Model based on the installation of a 2.5 m pile at location 1. Construction duration = 5 years.</b>	
<b>D1</b>	Noise propagation: harbour porpoise dB <sub>ht</sub>
<b>D2</b>	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
<b>D3</b>	Noise propagation: minke whale dB <sub>ht</sub>
<b>D4</b>	Noise propagation: harbour seal dB <sub>ht</sub>
<b>D5</b>	Noise propagation: high frequency cetaceans SEL
<b>D6</b>	Noise propagation: mid frequency cetaceans SEL
<b>D7</b>	Noise propagation: low frequency cetaceans SEL
<b>D8</b>	Noise propagation: pinnipeds SEL
<b>D9</b>	SAFESIMM model: harbour porpoise 198 dB
<b>D10</b>	SAFESIMM model: bottlenose dolphin 198 dB
<b>D11</b>	SAFESIMM model: minke whale 198 dB
<b>D12</b>	SAFESIMM model: harbour seal 186 dB
<b>D13</b>	SAFESIMM model: harbour seal 198 dB
<b>D14</b>	SAFESIMM model: grey seal 186 dB
<b>D15</b>	SAFESIMM model: grey seal 198 dB
<b>Scenario B: Cumulative piling within the EDA. Two piling vessels to build all three wind farms. Model based on the installation of a 2.5 m pile at locations 1 and 5. Construction duration = 3 years.</b>	
<b>D16</b>	Noise propagation: harbour porpoise dB <sub>ht</sub>
<b>D17</b>	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
<b>D18</b>	Noise propagation: minke whale dB <sub>ht</sub>

D19	Noise propagation: harbour seal dB <sub>ht</sub>
D20	Noise propagation: high frequency cetaceans SEL
D21	Noise propagation: mid frequency cetaceans SEL
D22	Noise propagation: low frequency cetaceans SEL
D23	Noise propagation: pinnipeds SEL
D24	SAFESIMM model: harbour porpoise 198 dB
D25	SAFESIMM model: bottlenose dolphin 198 dB
D26	SAFESIMM model: minke whale 198 dB
D27	SAFESIMM model: harbour seal 186 dB
D28	SAFESIMM model: harbour seal 198 dB
D29	SAFESIMM model: grey seal 186 dB
D30	SAFESIMM model: grey seal 198 dB
<b>Scenario C: Cumulative piling within the EDA. Six piling vessels to build all three wind farms. Model based on the installation of a 2.5 m pile at locations 1, 2, 3, 4, 5 and 6. Construction duration = 2 years.</b>	
D31	Noise propagation: harbour porpoise dB <sub>ht</sub>
D32	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
D33	Noise propagation: minke whale dB <sub>ht</sub>
D34	Noise propagation: harbour seal dB <sub>ht</sub>
D35	Noise propagation: high frequency cetaceans SEL
D36	Noise propagation: mid frequency cetaceans SEL
D37	Noise propagation: low frequency cetaceans SEL
D38	Noise propagation: pinnipeds SEL
D39	SAFESIMM model: harbour porpoise 198 dB
D40	SAFESIMM model: bottlenose dolphin 198 dB
D41	SAFESIMM model: minke whale 198 dB
D42	SAFESIMM model: harbour seal 186 dB

<b>D43</b>	SAFESIMM model: harbour seal 198 dB
<b>D44</b>	SAFESIMM model: grey seal 186 dB
<b>D45</b>	SAFESIMM model: grey seal 198 dB
<p>In order to obtain the required construction combinations for the cumulative impact assessment, the modelling of perceived noise propagations and associated behavioural displacement, along with SAFESIMM modelling to predict potential PTS exposure, were undertaken in yearly stages. This presents a difference from the modelling undertaken for the Generating Station and the OfTI works, in which disturbance and potential for PTS onset were modelled for the first year of construction, and then equal levels of disturbance and PTS onset assumed for all subsequent years of the construction phase .</p> <p>The yearly noise modelling outputs presented here were then used to calculate the maximum number of animals potentially displaced and to suffer PTS onset (through SAFESIMM) over the course of the full construction phases of both projects.</p>	
<p><b>Scenario D: Cumulative piling within the Moray Firth. Two vessels piling within the BOWL site for two years (2014-2015) immediately followed by two vessels piling within the MORL site for three years (2016-2018). Modelling based on piling occurring at locations A and B within the BOWL site and locations 1 and 5 within the MORL EDA.</b></p> <p>The noise propagation outputs detailed below are for piling at locations A and B within the BOWL site. These were used in combination with the outputs from Scenario B for the population modelling.</p>	
<b>E1</b>	Noise propagation: harbour porpoise dB <sub>ht</sub>
<b>E2</b>	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
<b>E3</b>	Noise propagation: minke whale dB <sub>ht</sub>
<b>E4</b>	Noise propagation: harbour seal dB <sub>ht</sub>
<b>E5</b>	Noise propagation: high frequency cetaceans SEL
<b>E6</b>	Noise propagation: mid frequency cetaceans SEL
<b>E7</b>	Noise propagation: low frequency cetaceans SEL
<b>E8</b>	Noise propagation: pinnipeds SEL
<b>E9</b>	SAFESIMM model: harbour porpoise 198 dB
<b>E10</b>	SAFESIMM model: bottlenose dolphin 198 dB
<b>E11</b>	SAFESIMM model: minke whale 198 dB
<b>E12</b>	SAFESIMM model: harbour seal 186 dB
<b>E13</b>	SAFESIMM model: harbour seal 198 dB
<b>E14</b>	SAFESIMM model: grey seal 186 dB



<b>E15</b>	SAFESIMM model: grey seal 198 dB
<p><b>Scenario E: Cumulative piling within the Moray Firth. One vessel piling within the BOWL site for three years (2014-2016), overlapping with a single vessel piling within the MORL site during 2016 followed by four years of a single vessel on MORL only. Modelling based on piling occurring at location A within the BOWL site and location 1 within the MORL EDA.</b></p> <p>Figures E16-30 represents modelling outputs based on piling at location A within the BOWL site. Figures E31-45 represent model outputs for piling occurring at location A within the BOLW site and location 1 within the MORL EDS simultaneously. These were used in combination with the outputs from Scenario 3 for the population modelling.</p>	
<b>E16</b>	Noise propagation: harbour porpoise dB <sub>ht</sub>
<b>E17</b>	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
<b>E18</b>	Noise propagation: minke whale dB <sub>ht</sub>
<b>E19</b>	Noise propagation: harbour seal dB <sub>ht</sub>
<b>E20</b>	Noise propagation: high frequency cetaceans SEL
<b>E21</b>	Noise propagation: mid frequency cetaceans SEL
<b>E22</b>	Noise propagation: low frequency cetaceans SEL
<b>E23</b>	Noise propagation: pinnipeds SEL
<b>E24</b>	SAFESIMM model: harbour porpoise 198 dB
<b>E25</b>	SAFESIMM model: bottlenose dolphin 198 dB
<b>E26</b>	SAFESIMM model: minke whale 198 dB
<b>E27</b>	SAFESIMM model: harbour seal 186 dB
<b>E28</b>	SAFESIMM model: harbour seal 198 dB
<b>E29</b>	SAFESIMM model: grey seal 186 dB
<b>E30</b>	SAFESIMM model: grey seal 198 dB
<b>E31</b>	Noise propagation: harbour porpoise dB <sub>ht</sub>
<b>E32</b>	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
<b>E33</b>	Noise propagation: minke whale dB <sub>ht</sub>
<b>E34</b>	Noise propagation: harbour seal dB <sub>ht</sub>
<b>E35</b>	Noise propagation: high frequency cetaceans SEL

<b>E36</b>	Noise propagation: mid frequency cetaceans SEL
<b>E37</b>	Noise propagation: low frequency cetaceans SEL
<b>E38</b>	Noise propagation: pinnipeds SEL
<b>E39</b>	SAFESIMM model: harbour porpoise 198 dB
<b>E40</b>	SAFESIMM model: bottlenose dolphin 198 dB
<b>E41</b>	SAFESIMM model: minke whale 198 dB
<b>E42</b>	SAFESIMM model: harbour seal 186 dB
<b>E43</b>	SAFESIMM model: harbour seal 198 dB
<b>E44</b>	SAFESIMM model: grey seal 186 dB
<b>E45</b>	SAFESIMM model: grey seal 198 dB
<p><b>Scenario F: Cumulative piling within the Moray Firth. Eight piling vessels to be working simultaneously, two within the BOWL wind farm and six within the MORL EDA. Modelling based on installation of 2.4 m piles at locations A and B within the BOWL site and of 2.5 m piles at locations 1, 2, 3, 4, 5, 6 within the MORL sites.</b></p> <p>This scenario was derived by adding the outputs of Scenario C and Scenario D. As a result there are no noise propagation outputs based on piling occurring at eight simultaneous locations. Instead, a composite map was created based on the outputs from Scenario's C and D, which are shown below. As a result, these figures do not have contour lines.</p> <p>This is considered an over-estimation as it derived from simply adding the individuals with predicted PTS from BOWL with those from MORL, while in reality these individuals are common to both sets of figures and so the figure unlikely to be double that expected.</p>	
<b>E46</b>	Noise propagation: harbour porpoise dB <sub>ht</sub>
<b>E47</b>	Noise propagation: bottlenose dolphin dB <sub>ht</sub>
<b>E48</b>	Noise propagation: minke whale dB <sub>ht</sub>
<b>E49</b>	Noise propagation: harbour seal dB <sub>ht</sub>



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KEY

- Telford
- Stevenson
- MacColl
- Beatrice
- MORL piling location
- BOWL piling location

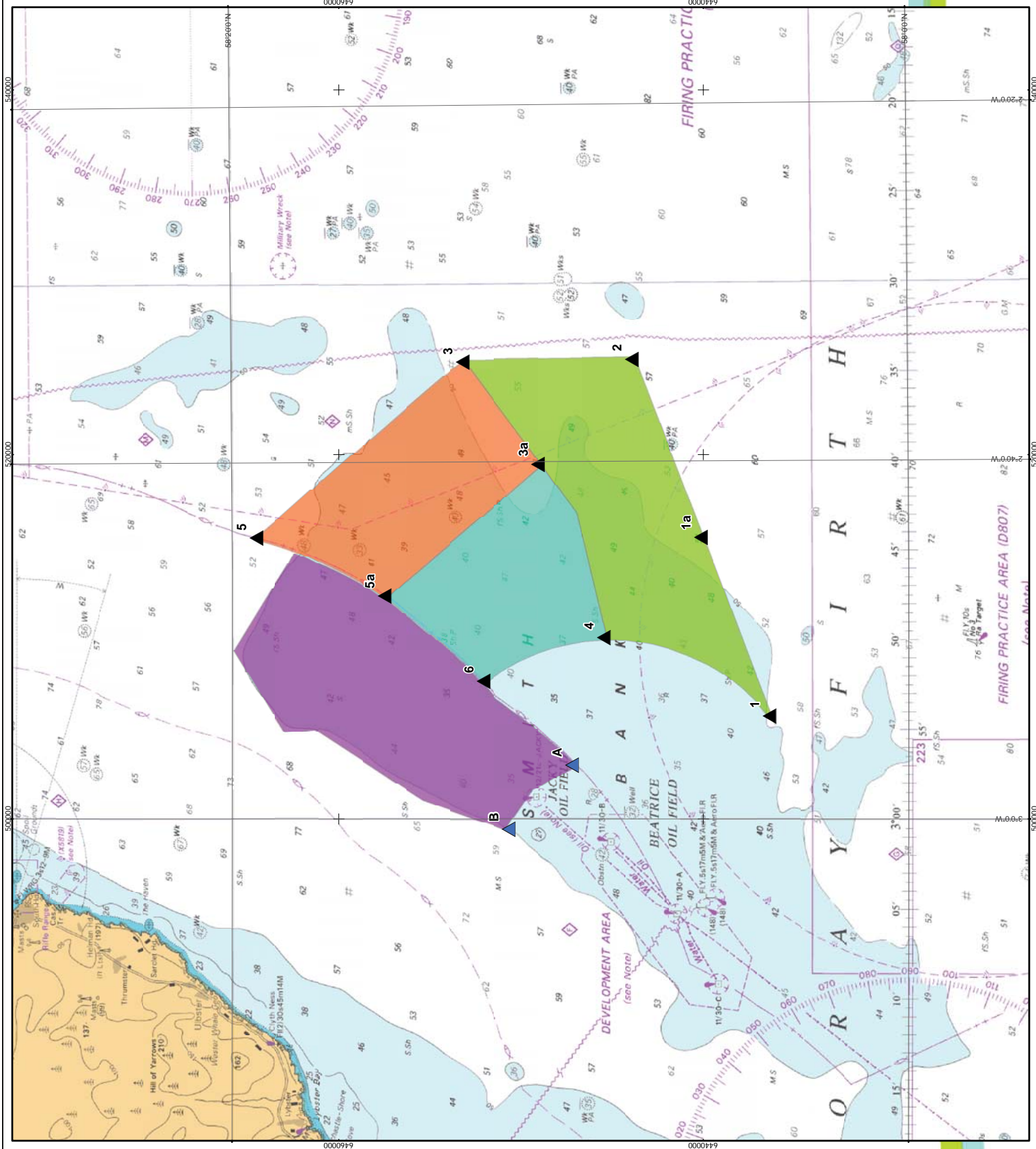
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Horizontal Scale: 1:200,000 A3 Chart N  
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Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 25/04/2012 Revision: B  
 REF: 8460001-PPW0200-NPW-MAP-072

Figure O1: Location of Piles used in Model Scenarios

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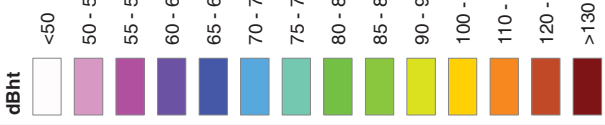


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KEY

- Telford, Stevenson and MacColl
- MORL piling location

dBht



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Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 27/04/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-082

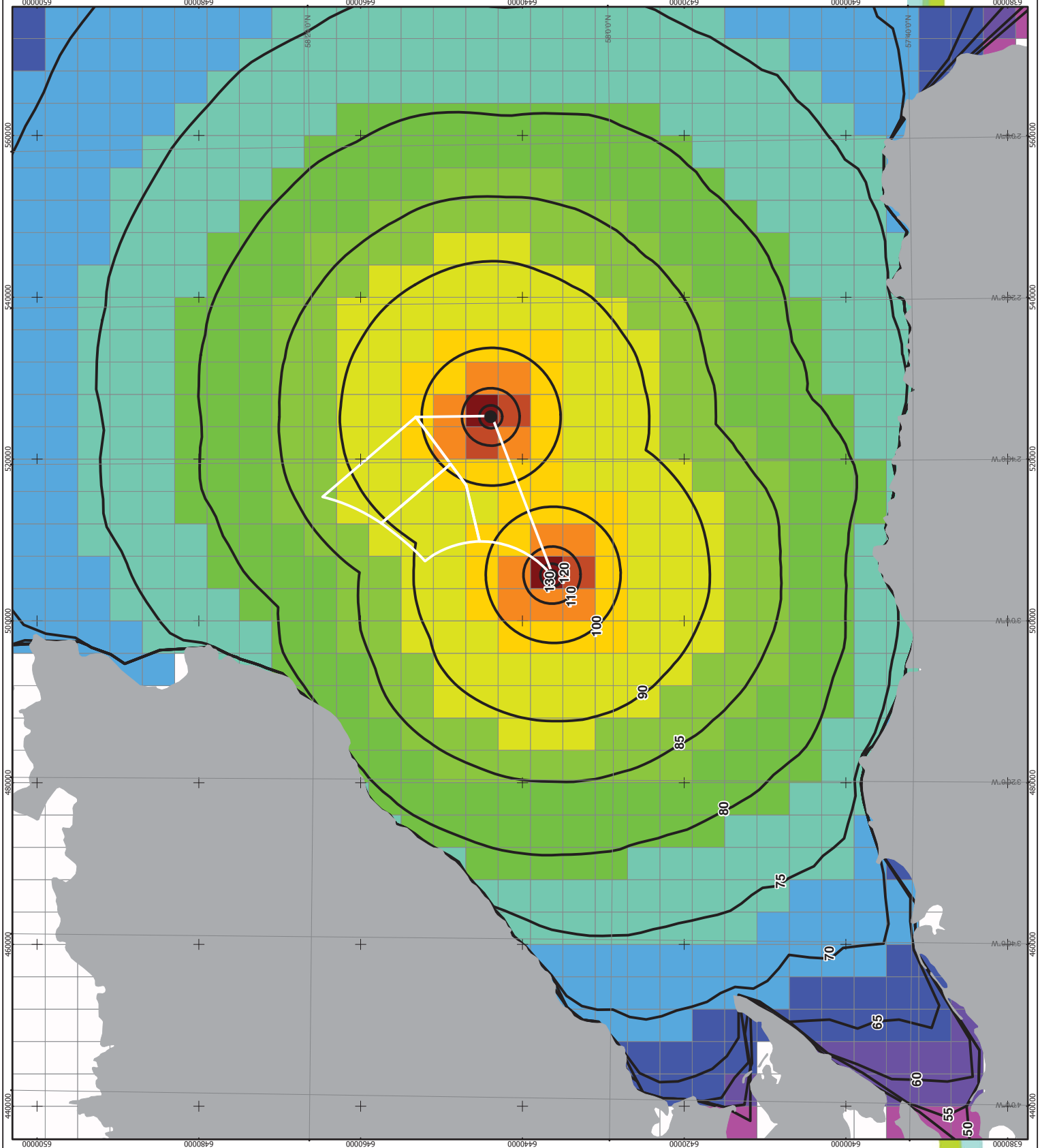
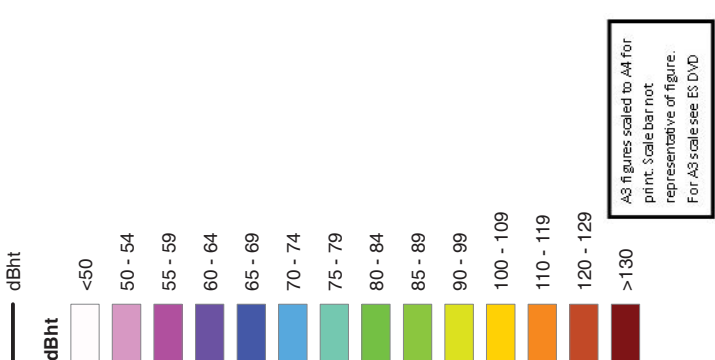


Figure A1: Scenario 1  
Harbour Porpoise dBht

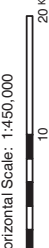
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**KEY**

- Telford, Stevenson and MacColl
- MORL piling location
- dBht



Horizontal Scale: 1:450,000    A3 Chart    N



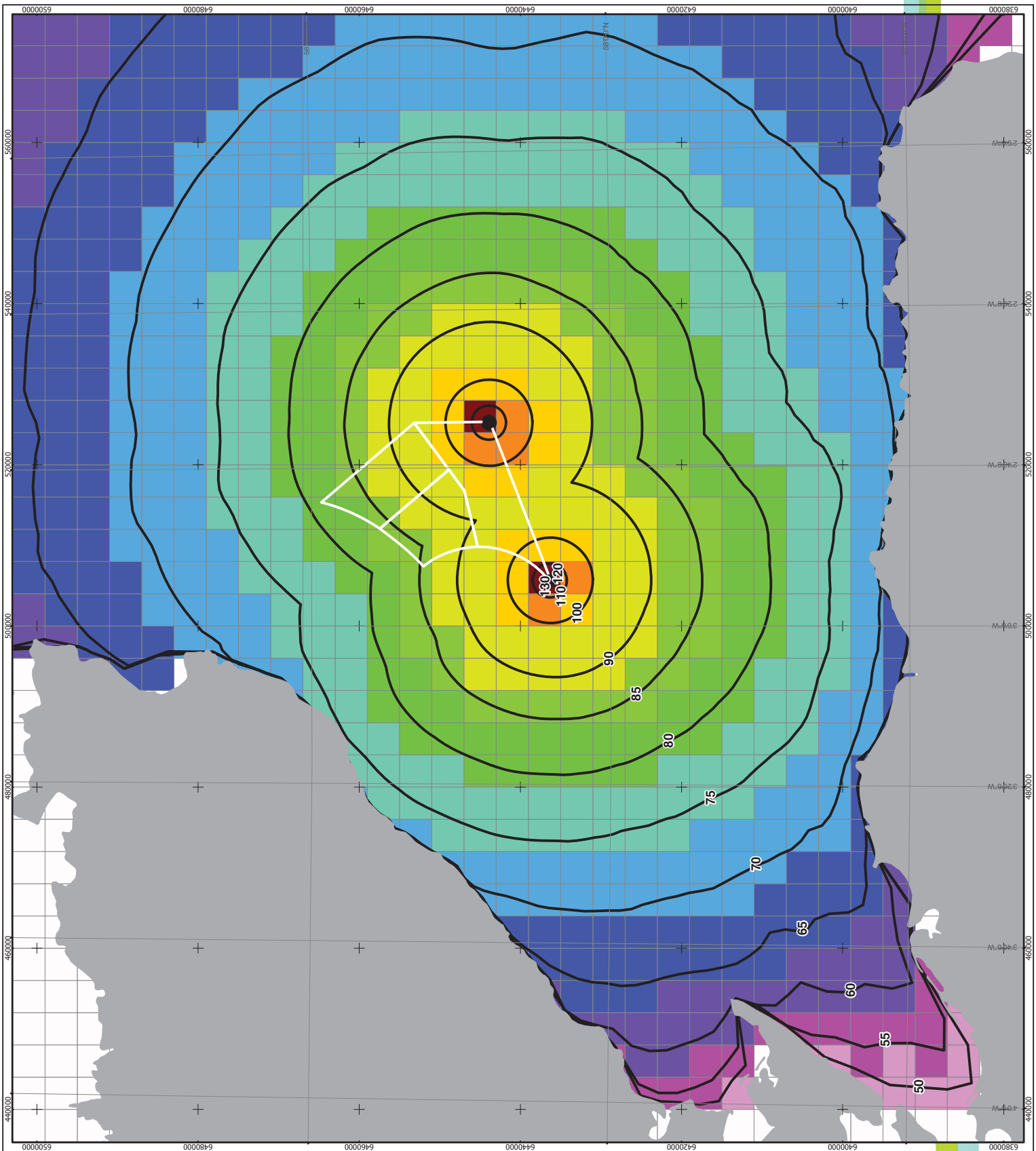
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Approved: CJP

Date: 27/04/2012    Revision: A

REF: 8460001-PPW0200-NPW-MAP-081

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**Figure A2: Scenario 1**  
Bottlenose Dolphin dBht

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KEY

□ Telford, Stevenson and MacColl

● MORL piling location

— dBht

dBht

<50

50 - 54

55 - 59

60 - 64

65 - 69

70 - 74

75 - 79

80 - 84

85 - 89

90 - 99

100 - 109

110 - 119

120 - 129

>130

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
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 REF: 8460001-PPW0200-NPW-MAP-084

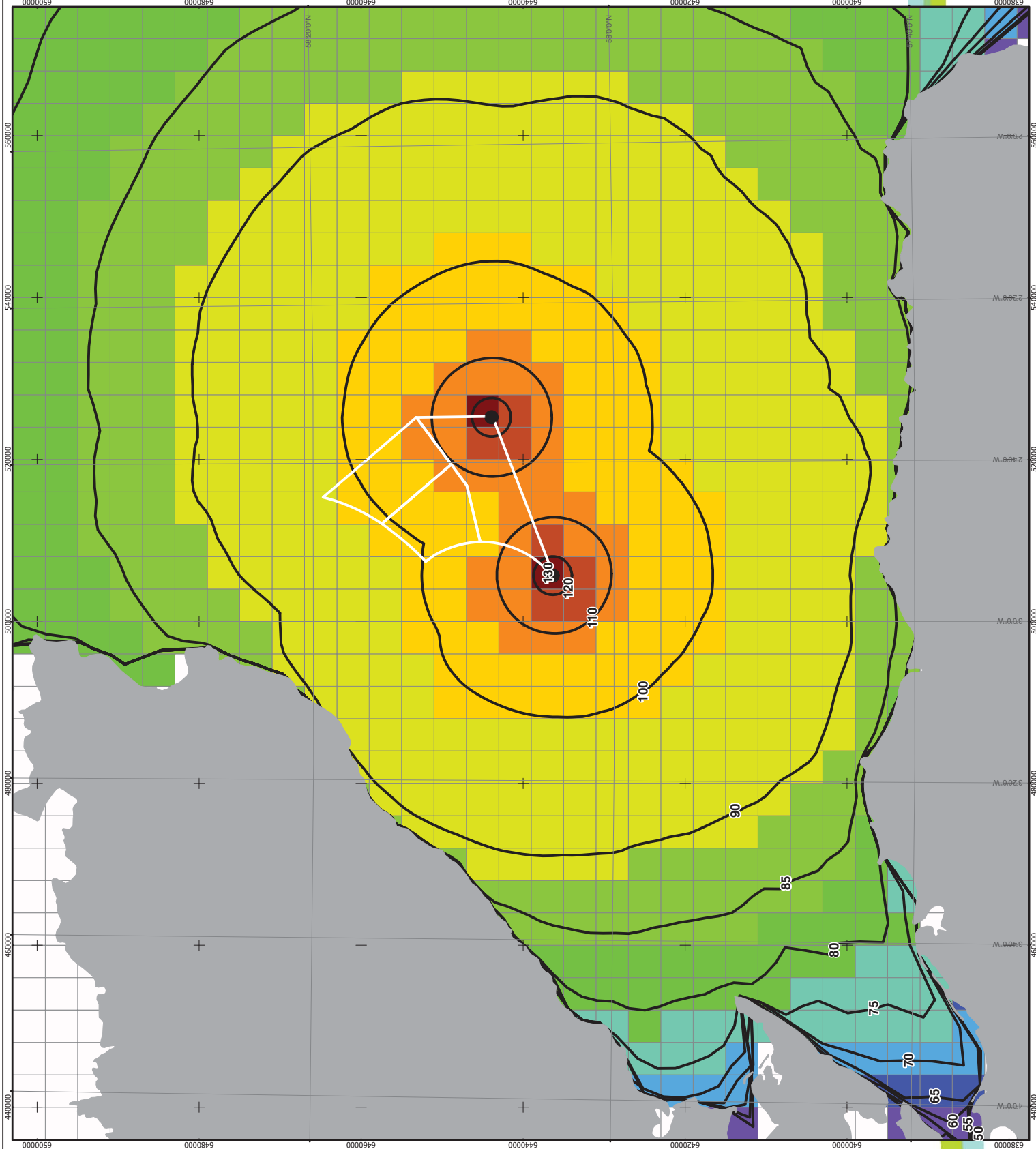


Figure A3: Scenario 1  
 Minke Whale dBht

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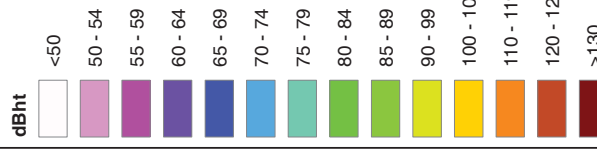


KEY

 Telford, Stevenson and MacColl  
 MORL piling location

 dBht

dBht



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Horizontal Scale: 1:450,000    A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
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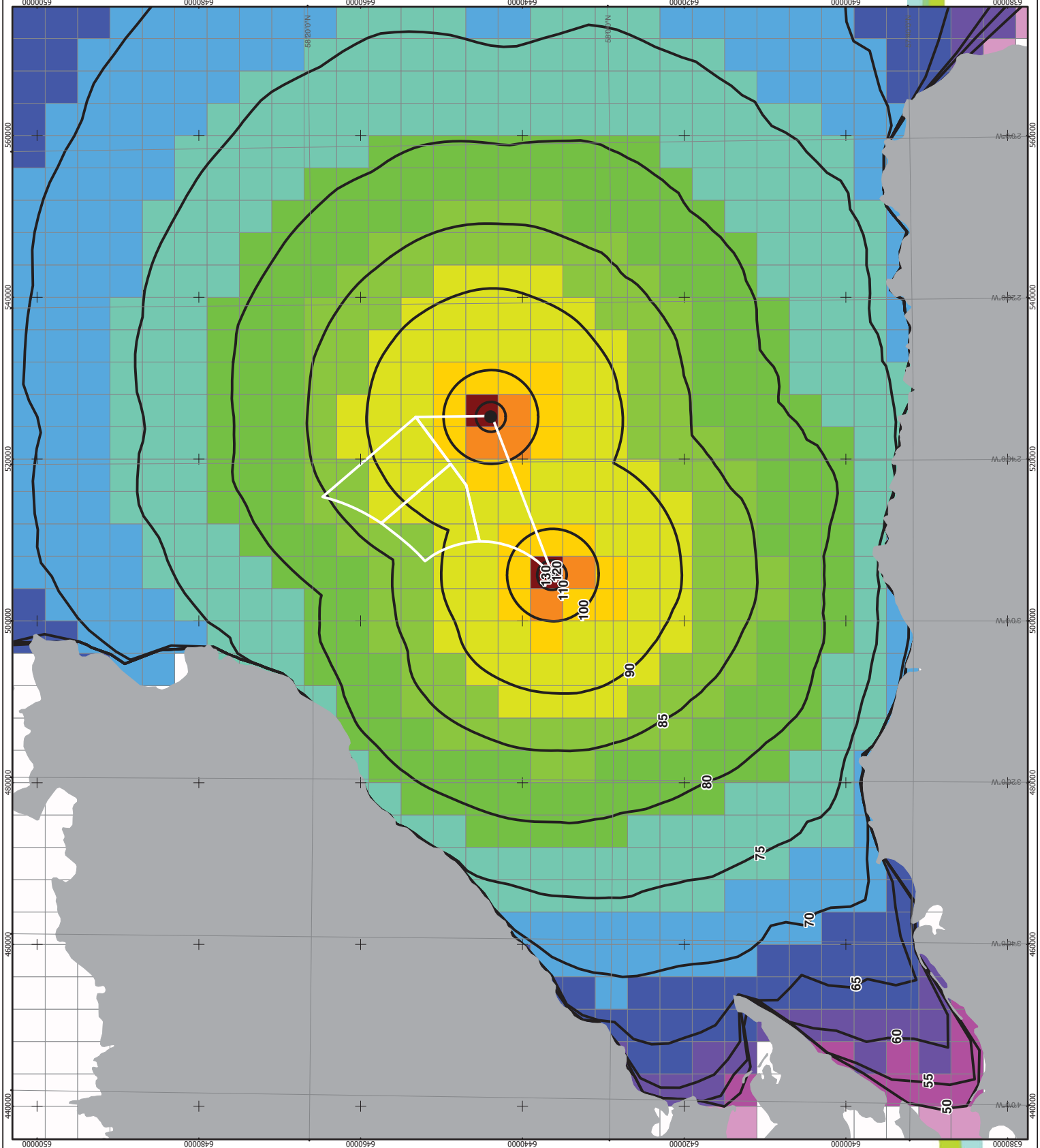












Figure A4: Scenario 1 Harbour Seal dBht

KEY

-  Telford, Stevenson and MacColl
-  MORL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

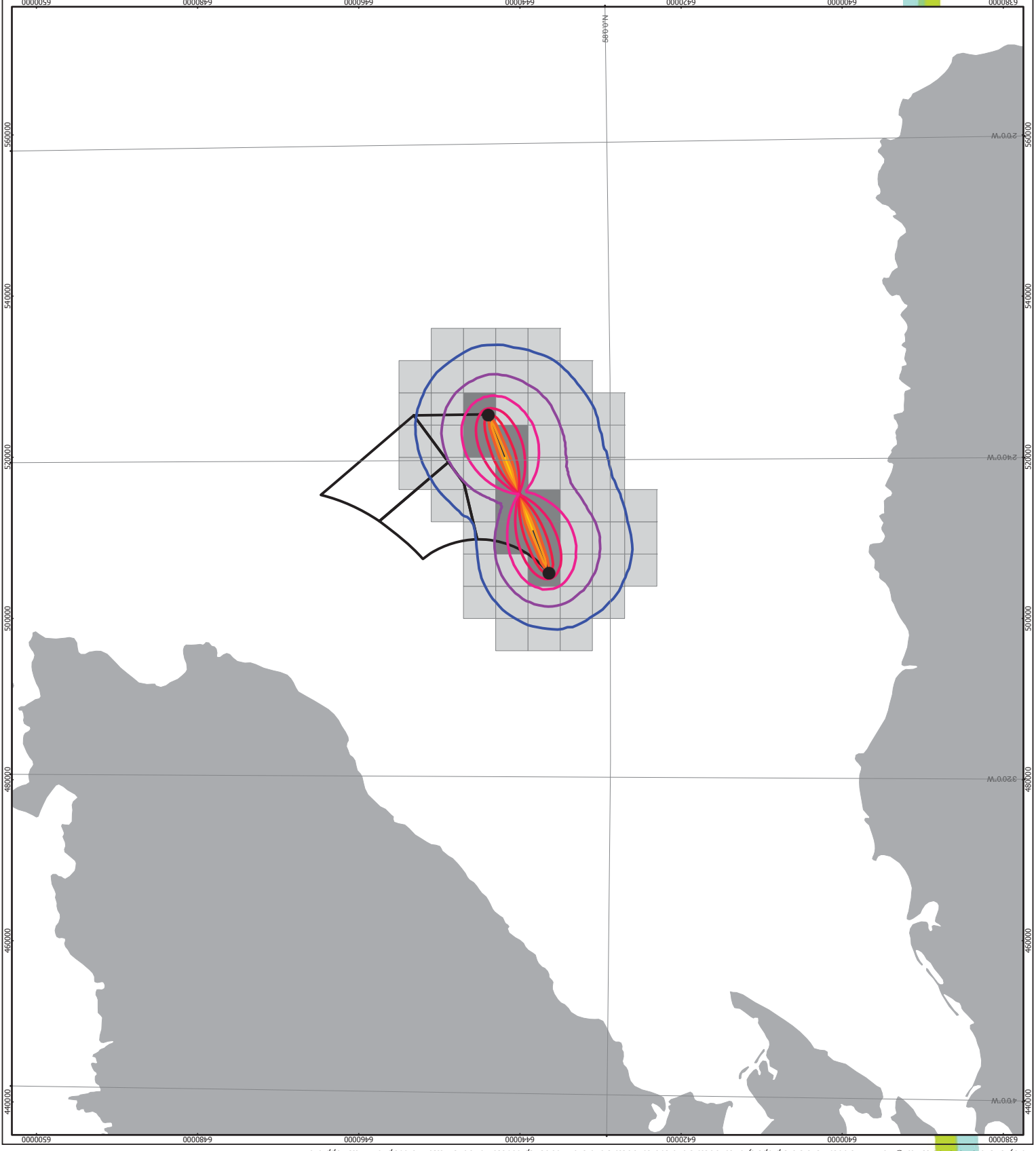
-  186 - 196
-  197 - 200

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Geodetic Parameters: WGS84 UTM Zone 30N	
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Figure A5: Scenario 1  
High Frequency Cetaceans  
SEL





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KEY



Telford, Stevenson and MacColl



MORL piling location

dB



186



188



190



192



194



196



198



200

Max dB



186 - 196



197 - 200

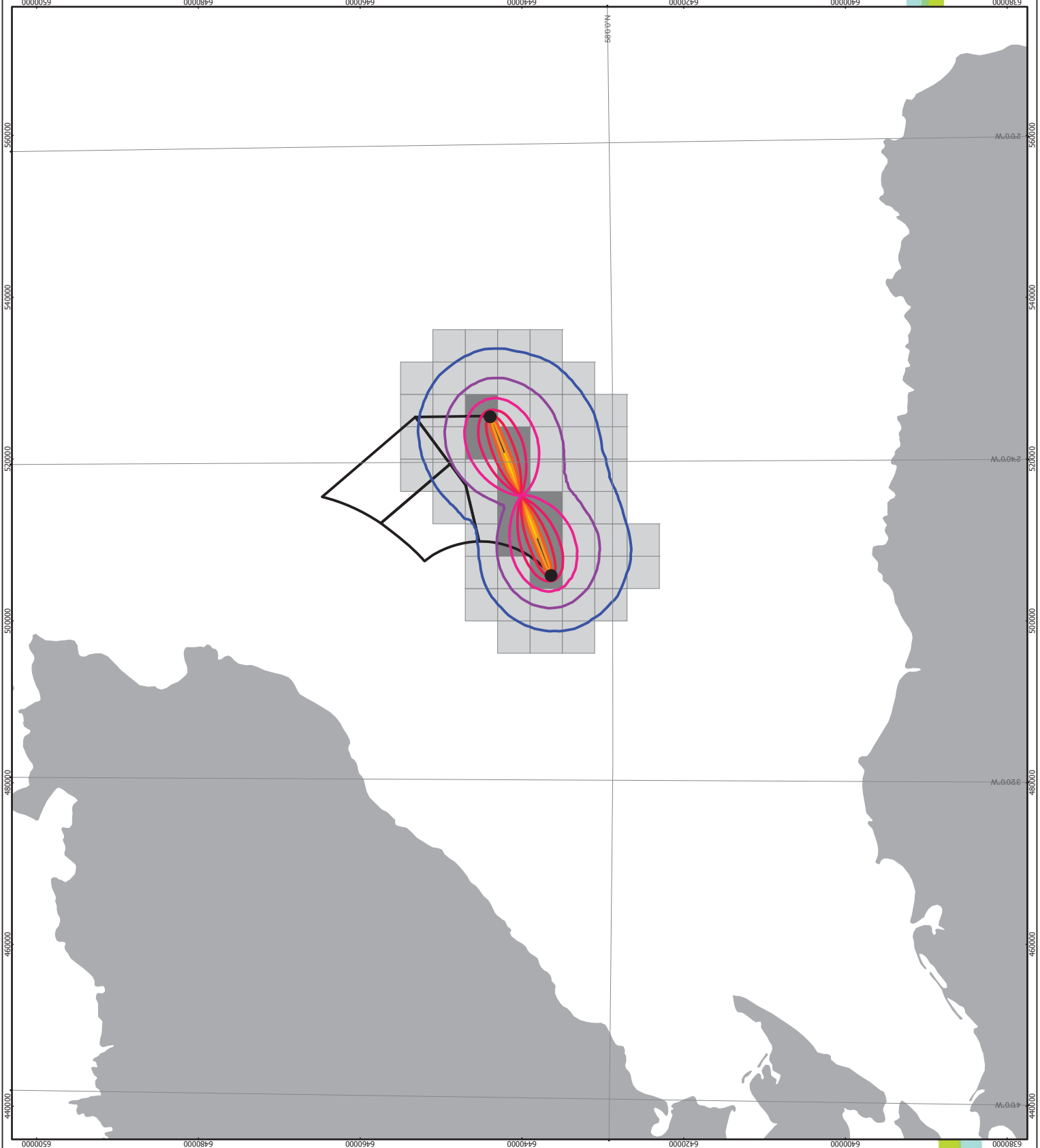
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Geodetic Parameters: WGS84 UTM Zone 30N	
Produced: LG	Reviewed: SC
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Date: 30/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-087	

Figure A6: Scenario 1  
Mid Frequency Cetaceans  
SEL









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KEY

-  Telford, Stevenson and MacColl
-  MORL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

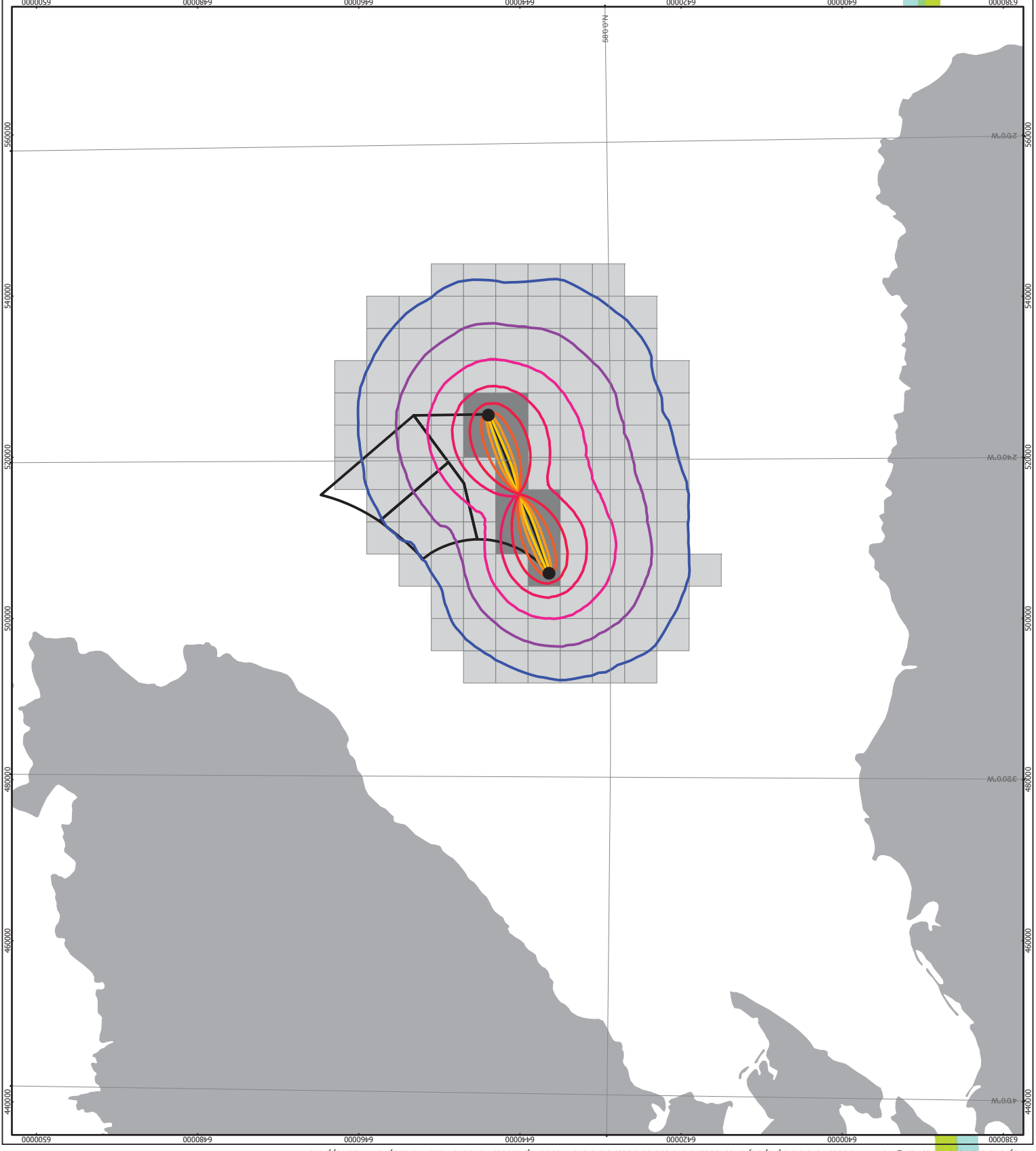
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Geodetic Parameters: WGS84 UTM Zone 30N	
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Date: 30/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-086	

Figure A7: Scenario 1  
 Low Frequency Cetaceans  
 SEL



KEY



Telford, Stevenson and MacColl



MORL piling location

dB



186



188



190



192



194



196



198



200

Max dB



186 - 196



197 - 200

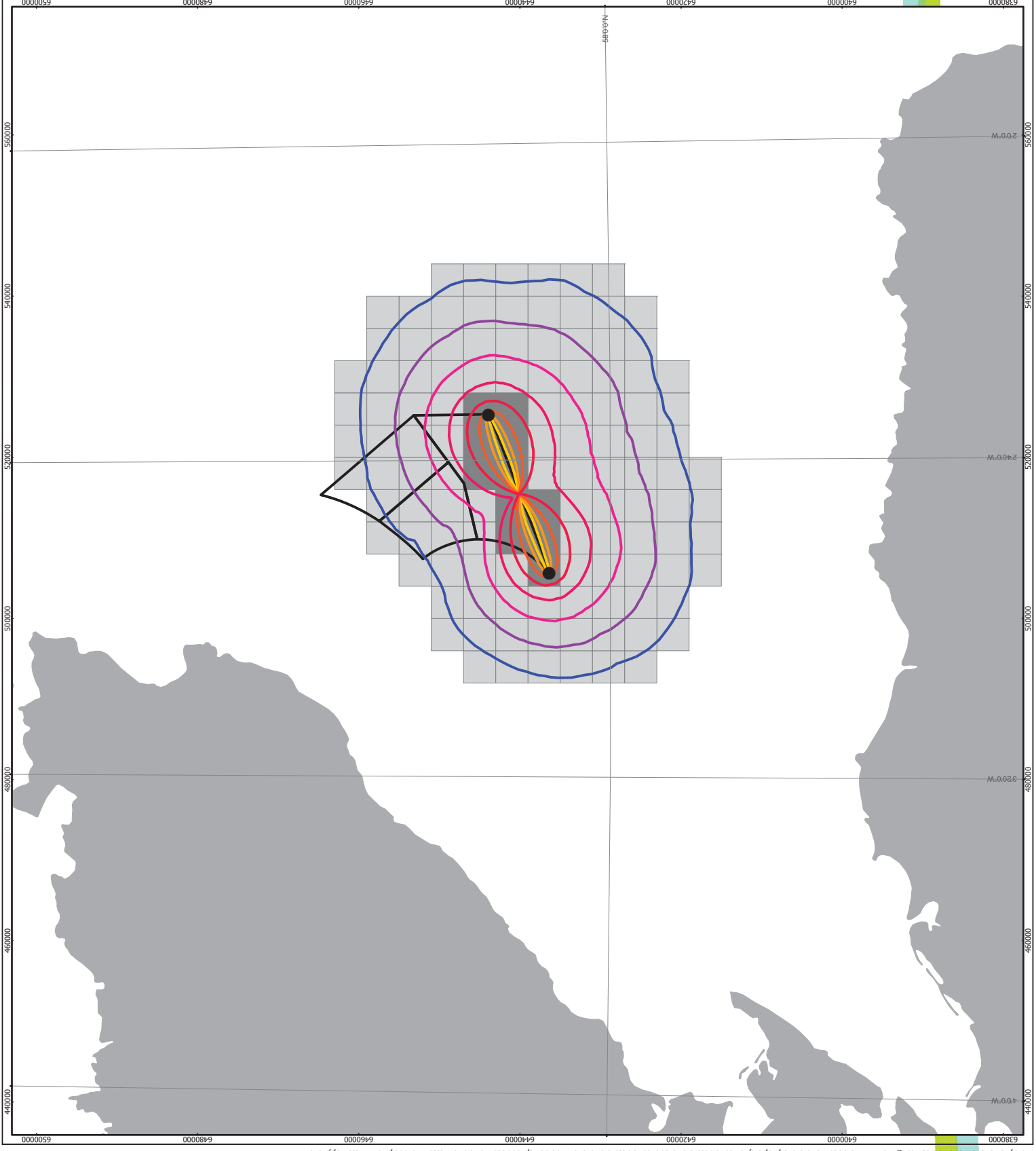
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Geodetic Parameters: WGS84 UTM Zone 30N	
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Date: 30/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-088	

Figure A8: Scenario 1  
Pinnipeds  
SEL

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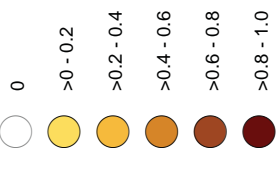


**KEY**


	Telford
	Stevenson
	MacCoil

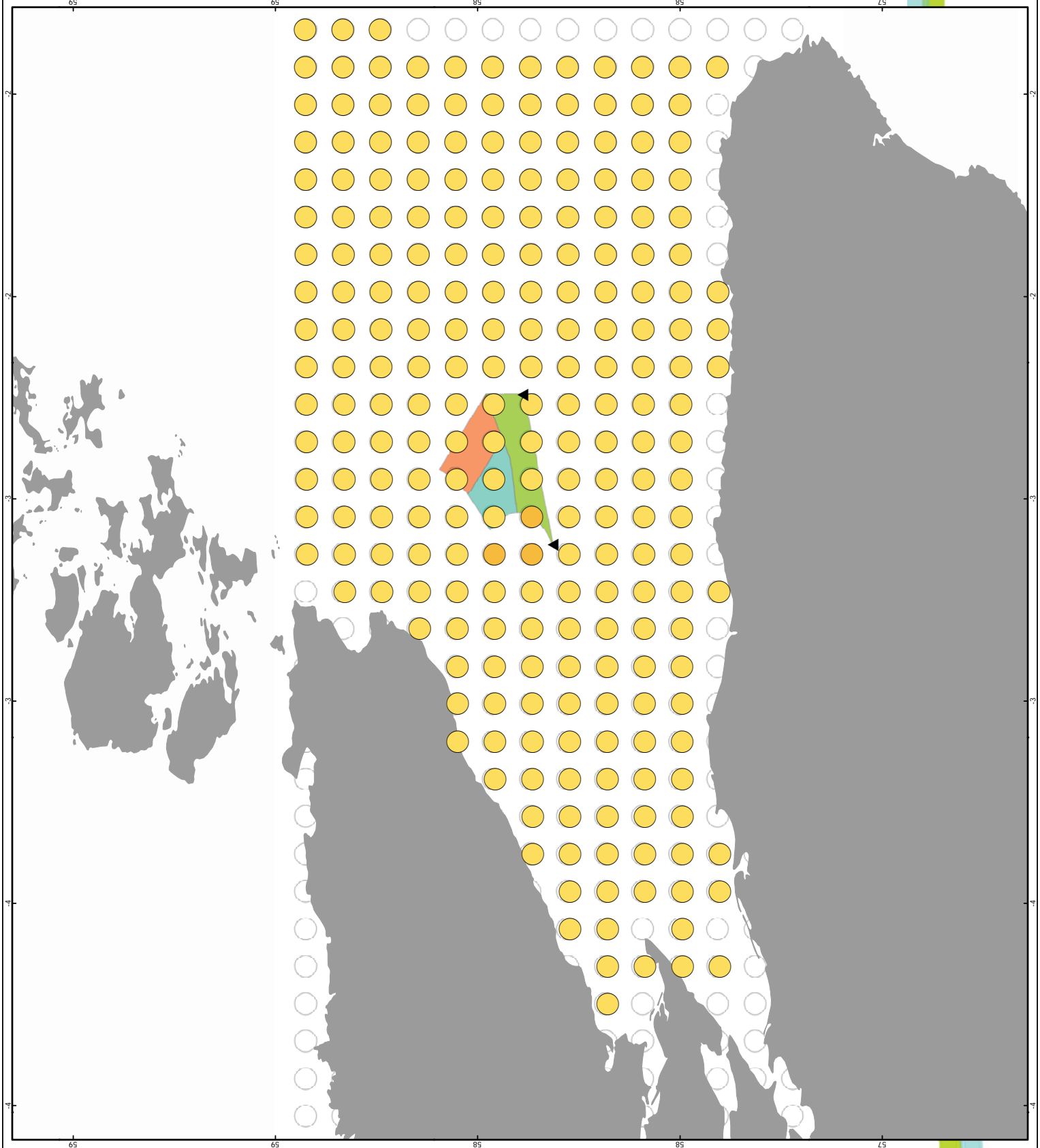
▲ MORL piling location

Number of harbour porpoise predicted to receive SELs sufficient to induce PTS onset



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000		A3 Chart N	
			
Geodetic Parameters: WGS 1984			
Produced: LG			
Reviewed: SC			
Approved: CJP			
Date: 18/04/2012		Revision: A	
REF: 8460001-PPW0200-NPW-MAP-185			








KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of bottlenose dolphins predicted to receive SELs sufficient to induce PTS onset

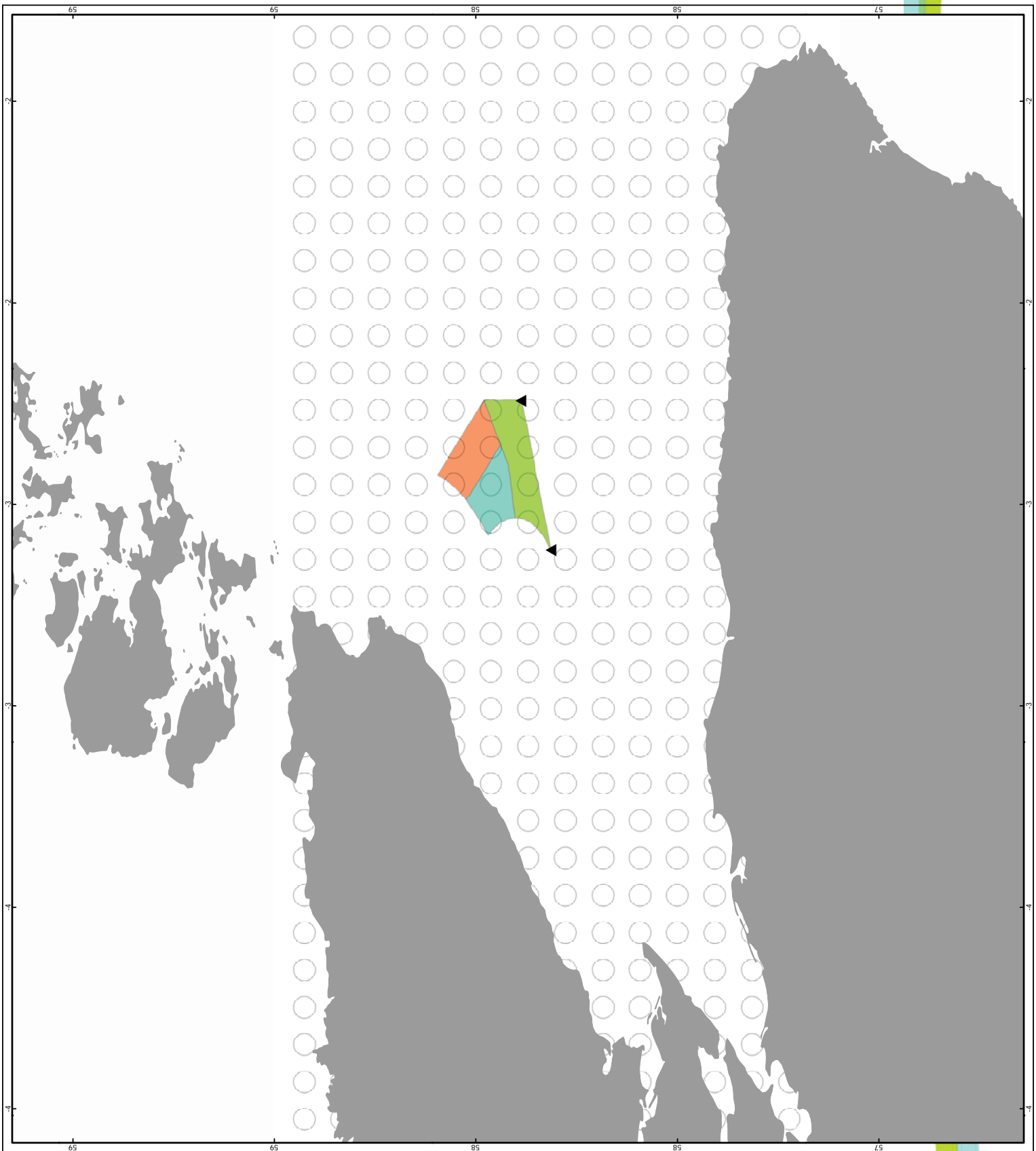
-  0
-  0.01
-  0.02

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 18/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-187	

Figure A10: Scenario 1  
**SAFESIMM**  
 Bottlenose Dolphin 198 dB  
 Moray Offshore Renewables Ltd



- KEY**
- Telford
  - Stevenson
  - MacColl

▲ MORL piling location

Number of minke whale predicted to receive SELs sufficient to induce PTS onset

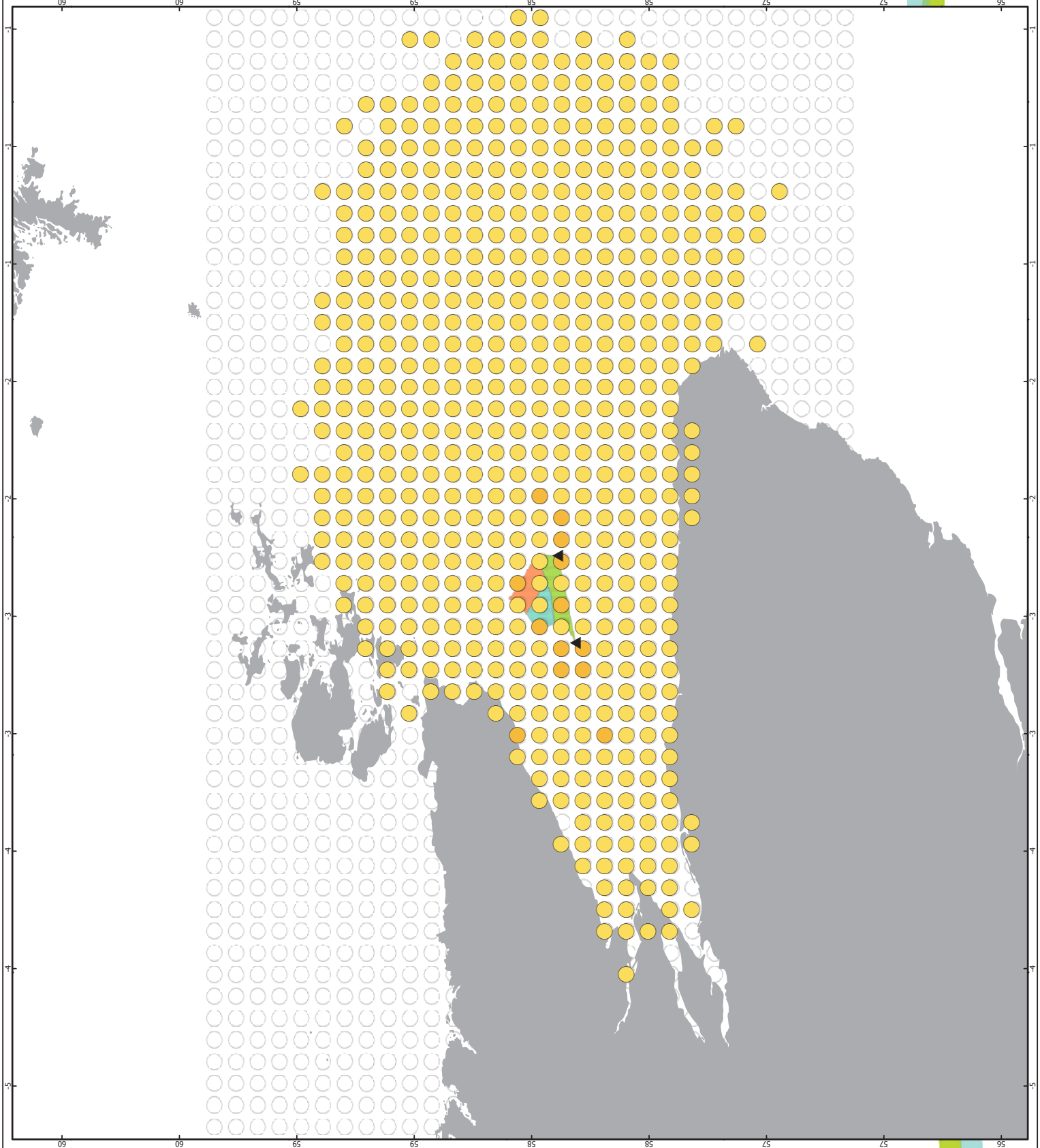
- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:1,550,000      A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 08/05/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-188	

**Figure A11: Scenario 1**  
**SAFESIMM**  
 Minke Whale 198 dB  
 Moray Offshore Renewables Ltd

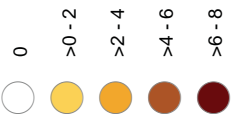


**KEY**


- Telford
- Stevenson
- MacColl

▲ MORL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

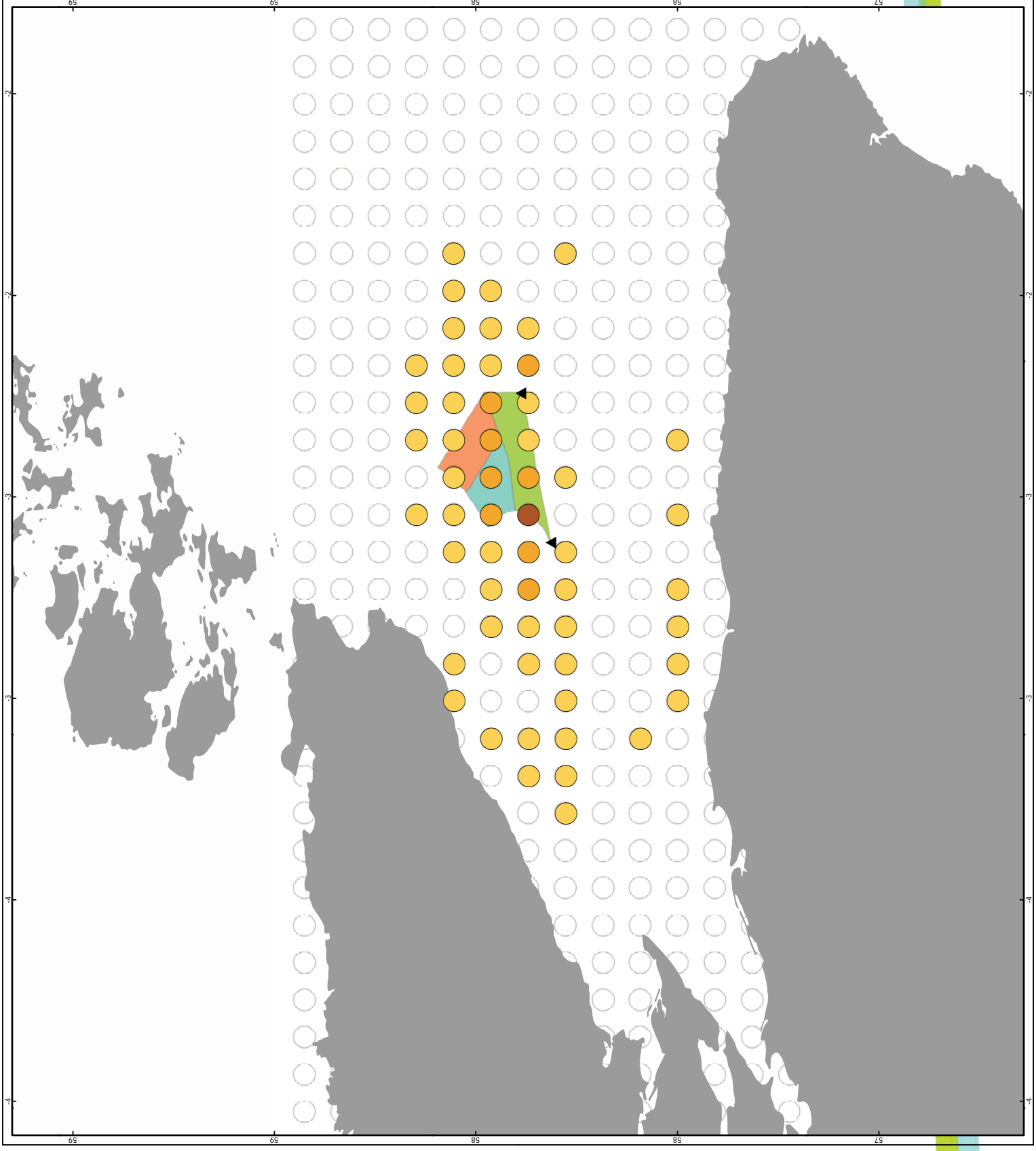


A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-189

**Figure A12: Scenario 1**  
**SAFESIMM**  
 Harbour Seal 186 dB  
 Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

KEY

- Telford
- Stevenson
- MacColl

▲ MORL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

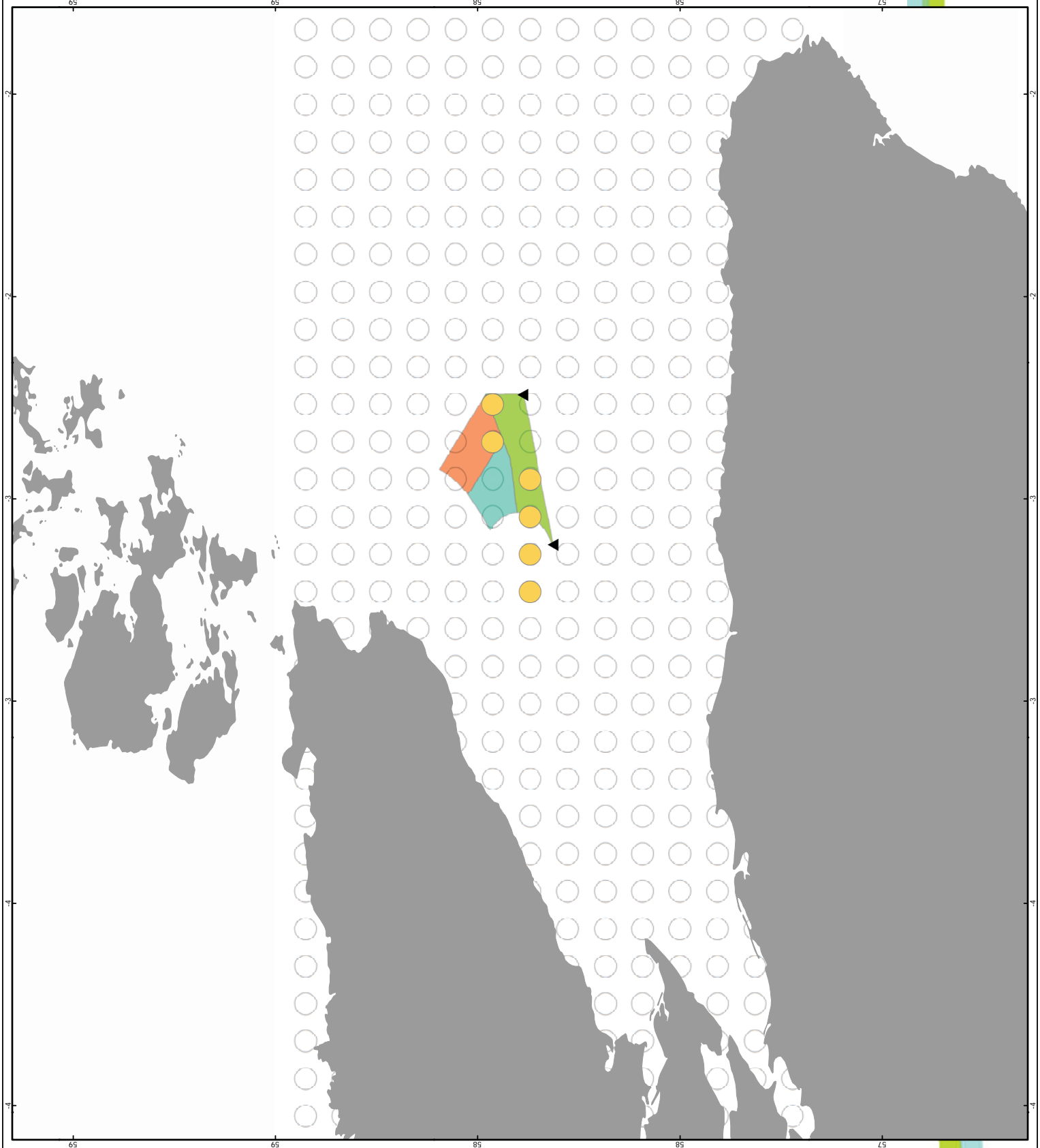
- 0
- >0 - 2
- >2 - 4
- >4 - 6
- >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD




Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 18/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-190	

Figure A13: Scenario 1  
 SAFESIMM  
 Harbour Seal 198 dB  
 Moray Offshore Renewables Ltd









KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

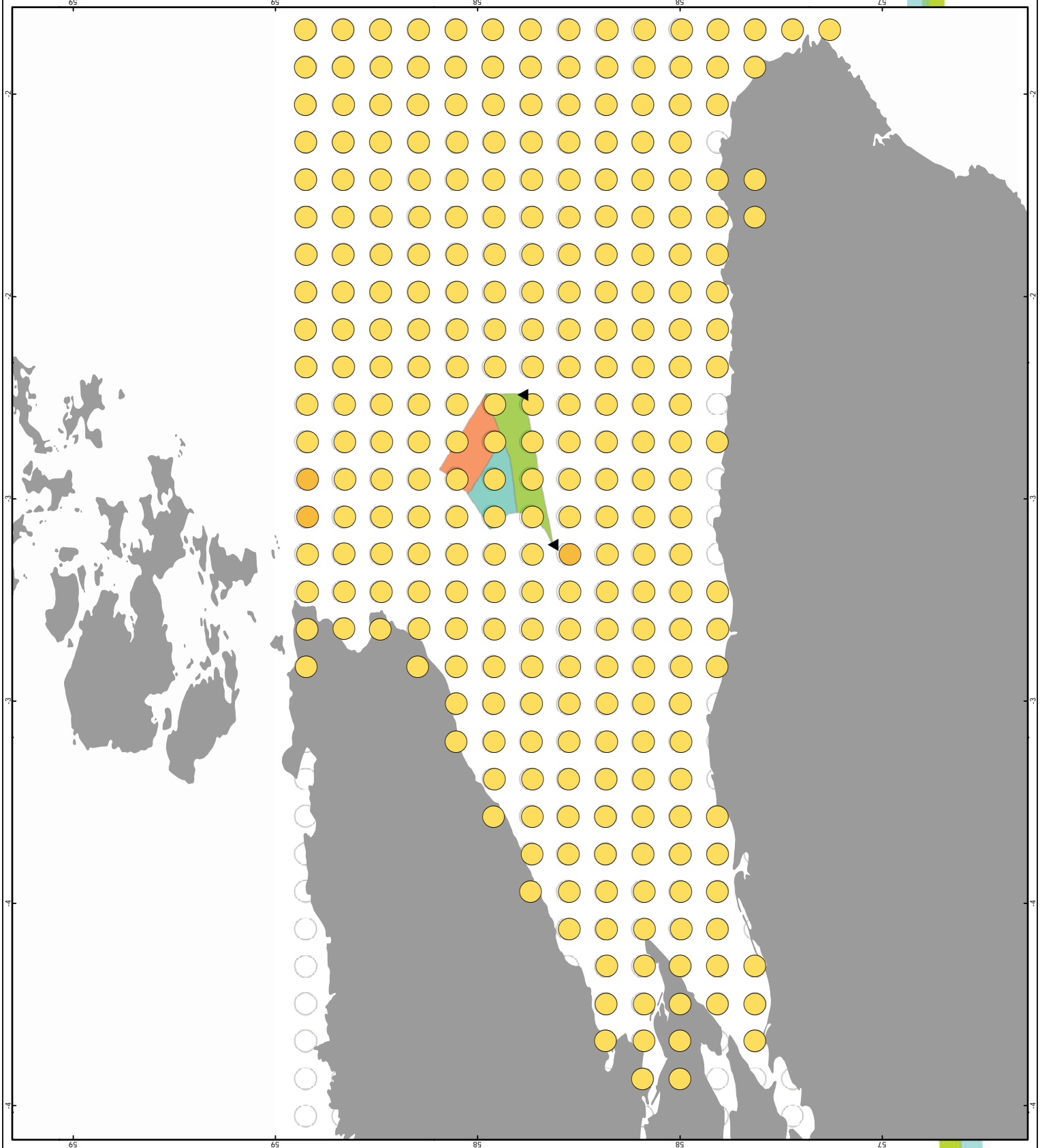
-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 18/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-191	

Figure A14: Scenario 1  
 SAFESIMM  
 Grey Seal 186 dB  
 Moray Offshore Renewables Ltd



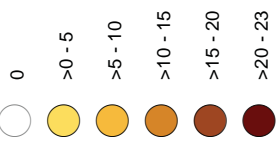


**KEY**

- Telford
- Stevenson
- MacColl


▲ MORL piling location

**Number of grey seals predicted to receive SELs sufficient to induce PTS onset**



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N

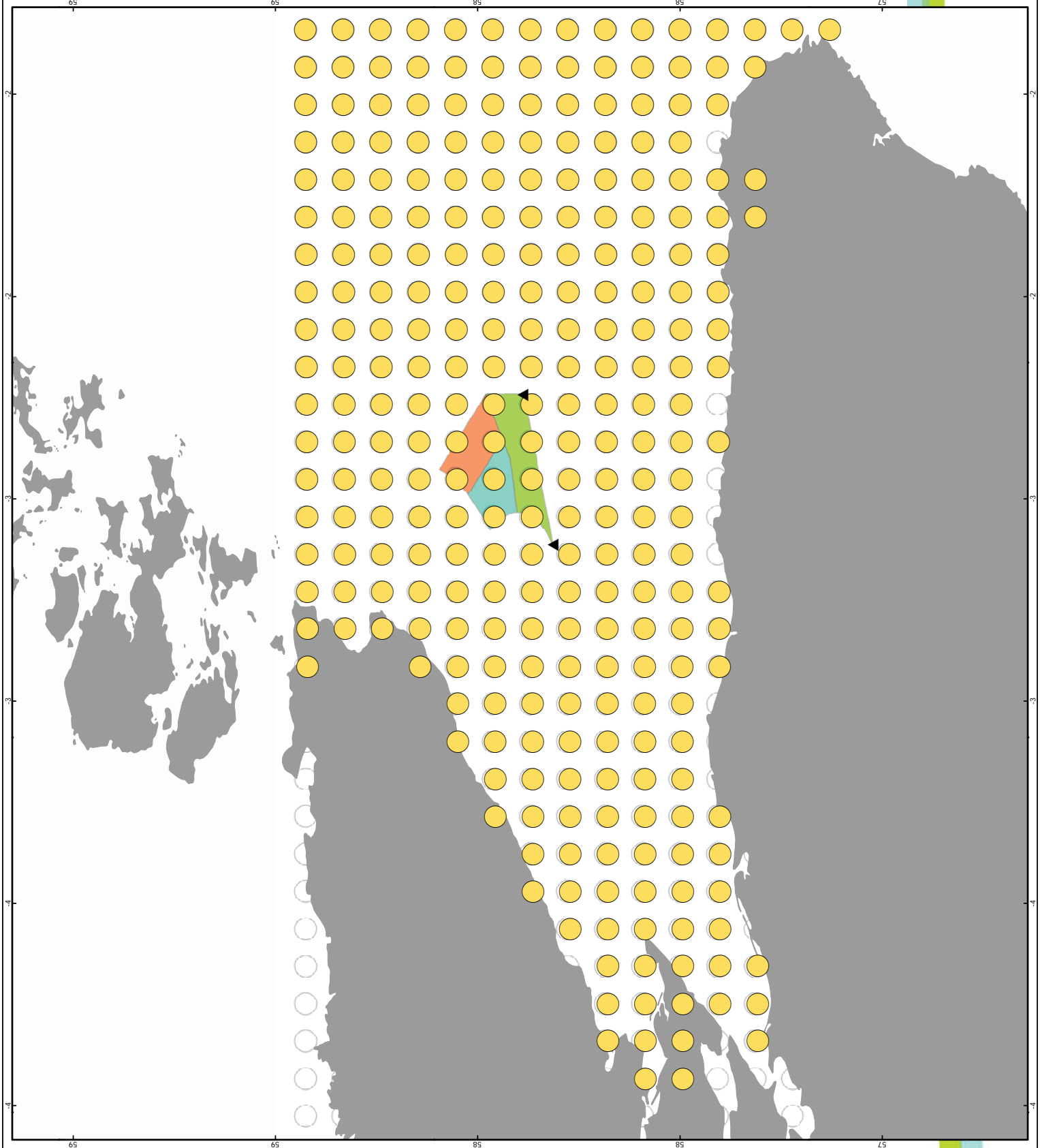


Geodetic Parameters: WGS 1984

Produced: LG  
Reviewed: SC  
Approved: CJP

Date: 18/04/2012 Revision: A

REF: 8460001-PPW0200-NPW-MAP-192

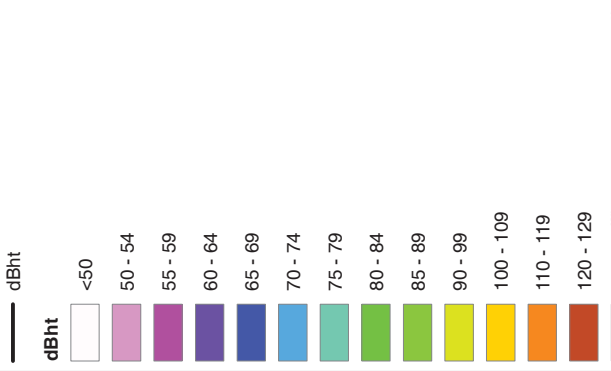


**Figure A15: Scenario 1**  
**SAFESIMM**  
 Grey Seal 198 dB  
 Moray Offshore Renewables Ltd



**KEY**

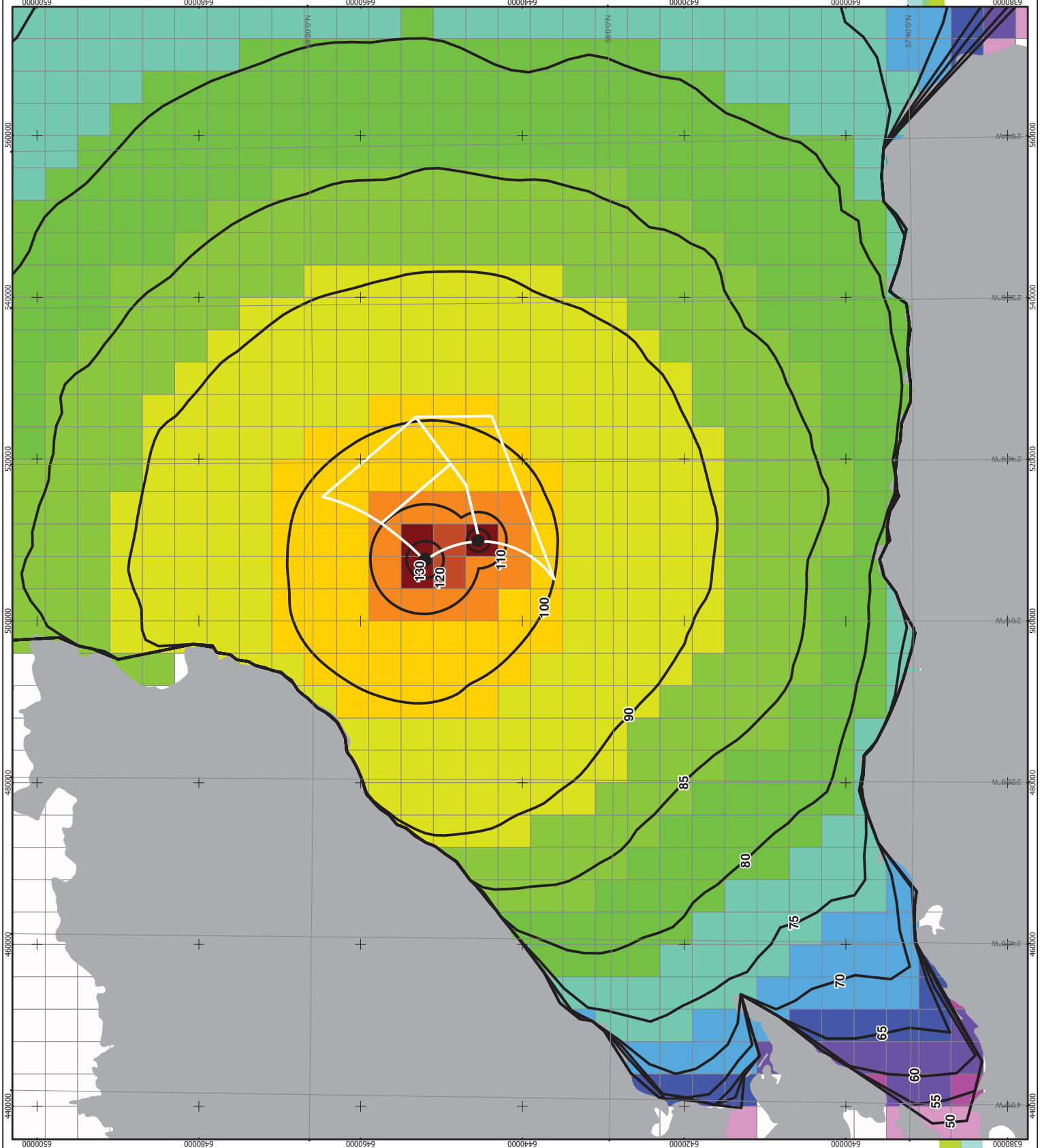
- Telford, Stevenson and MacColl
- MORL piling location
- dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 01/05/2012    Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-090



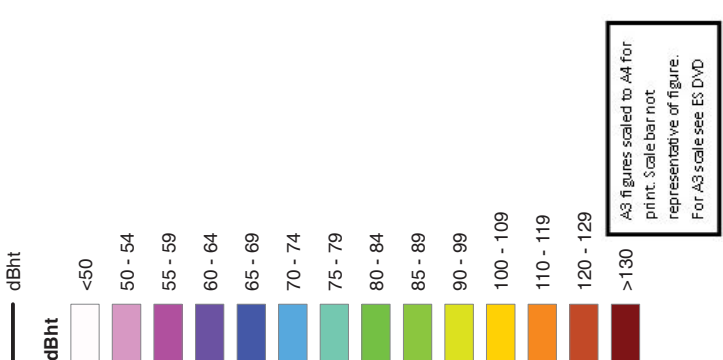
**Figure A16: Scenario 2**  
 Harbour Porpoise dBht

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

**KEY**  
 Telford, Stevenson and MacColl  
 MORL piling location



Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 01/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-089

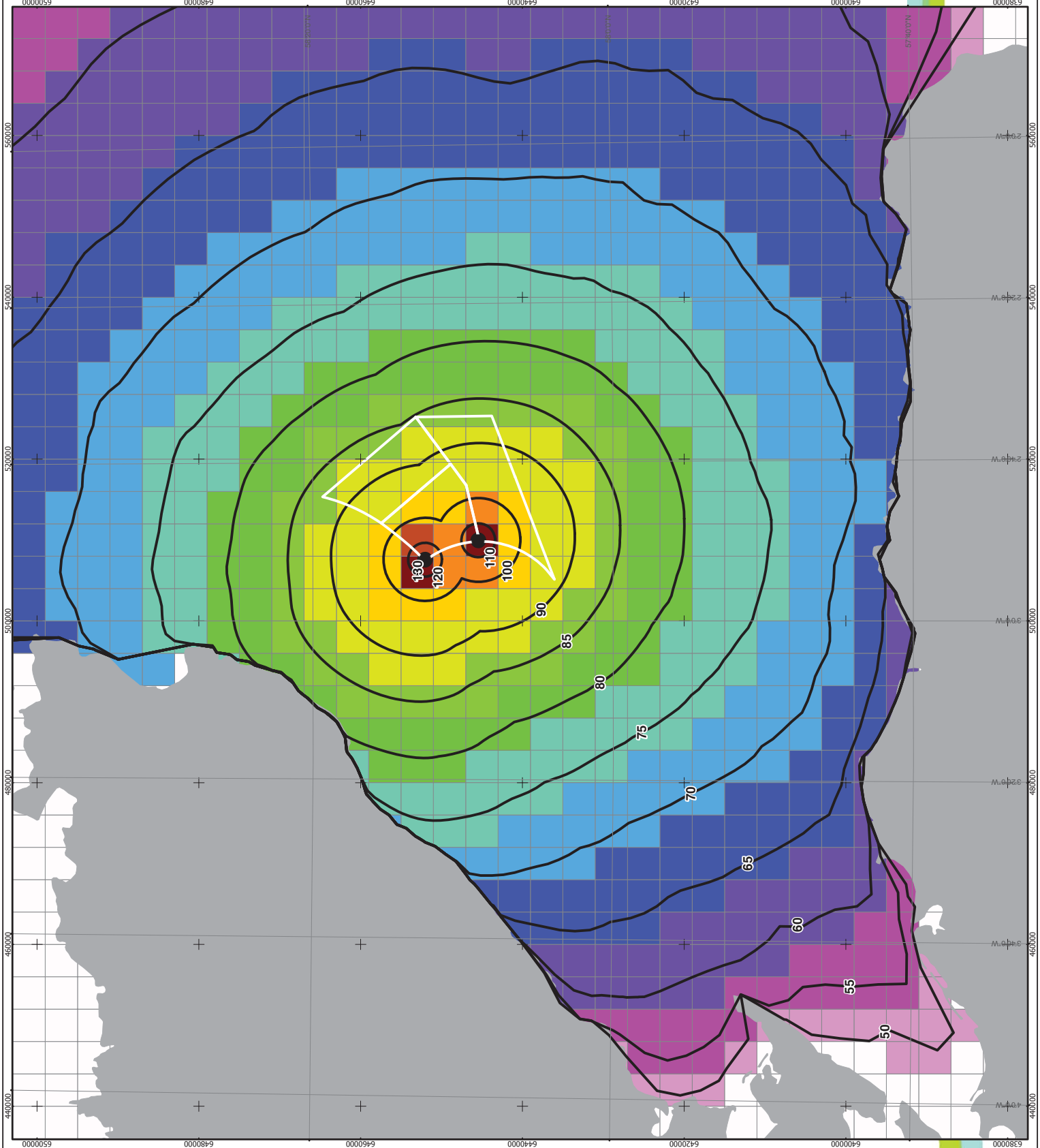


Figure A17: Scenario 2  
 Bottlenose Dolphin dBht

Moray Offshore  
 Renewables Ltd

KEY

□ Telford, Stevenson and MacColl

● MORL piling location

— dBht

dBht

<50

50 - 54

55 - 59

60 - 64

65 - 69

70 - 74

75 - 79

80 - 84

85 - 89

90 - 99

100 - 109

110 - 119

120 - 129

>130

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D/VD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 01/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-092

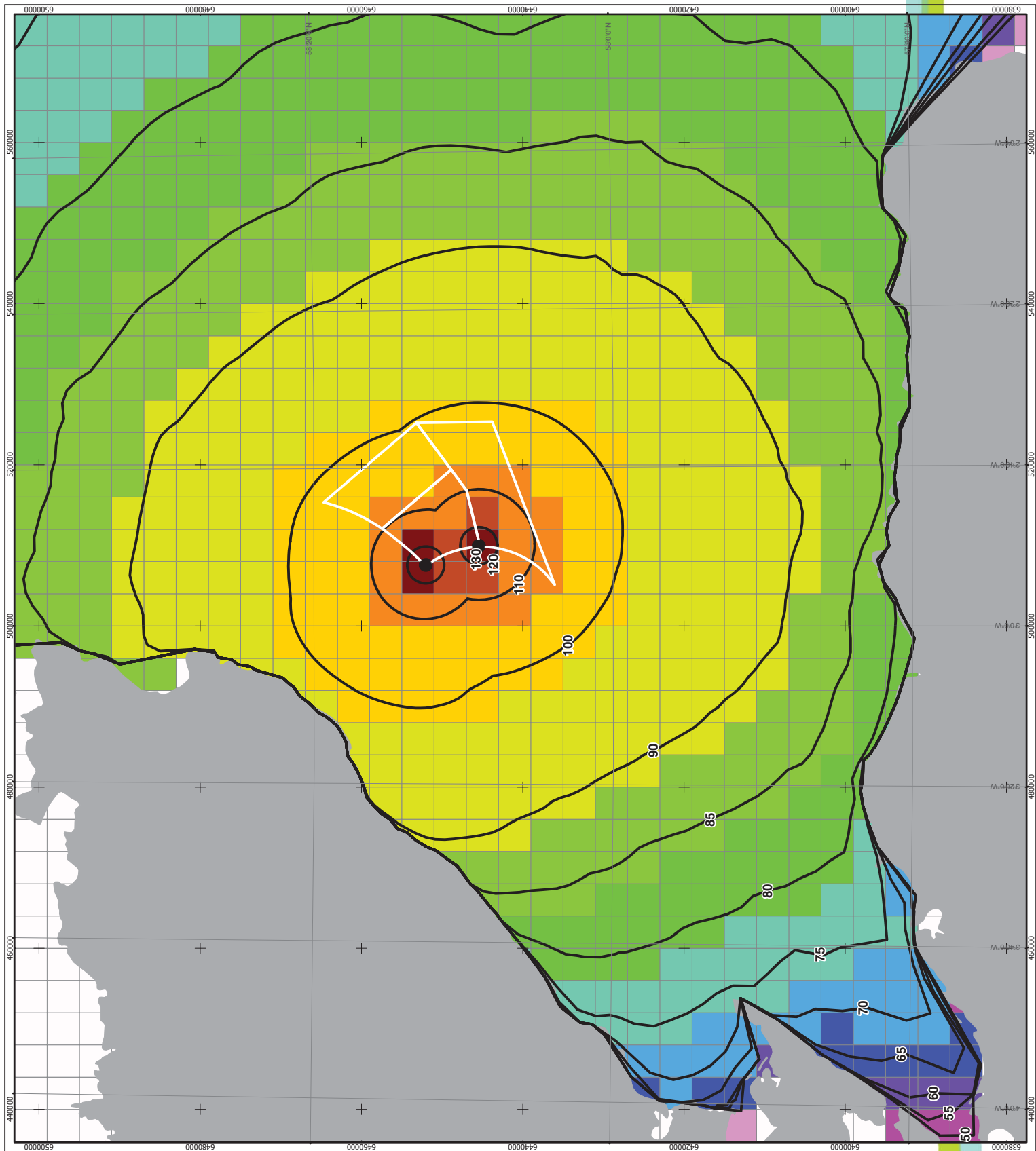


Figure A18: Scenario 2  
 Minke Whale dBht

Moray Offshore  
 Renewables Ltd

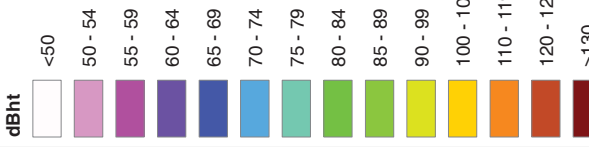


Moray Offshore Renewables Ltd

KEY

- Telford, Stevenson and MacColl
- MORL piling location
- dBht

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-091

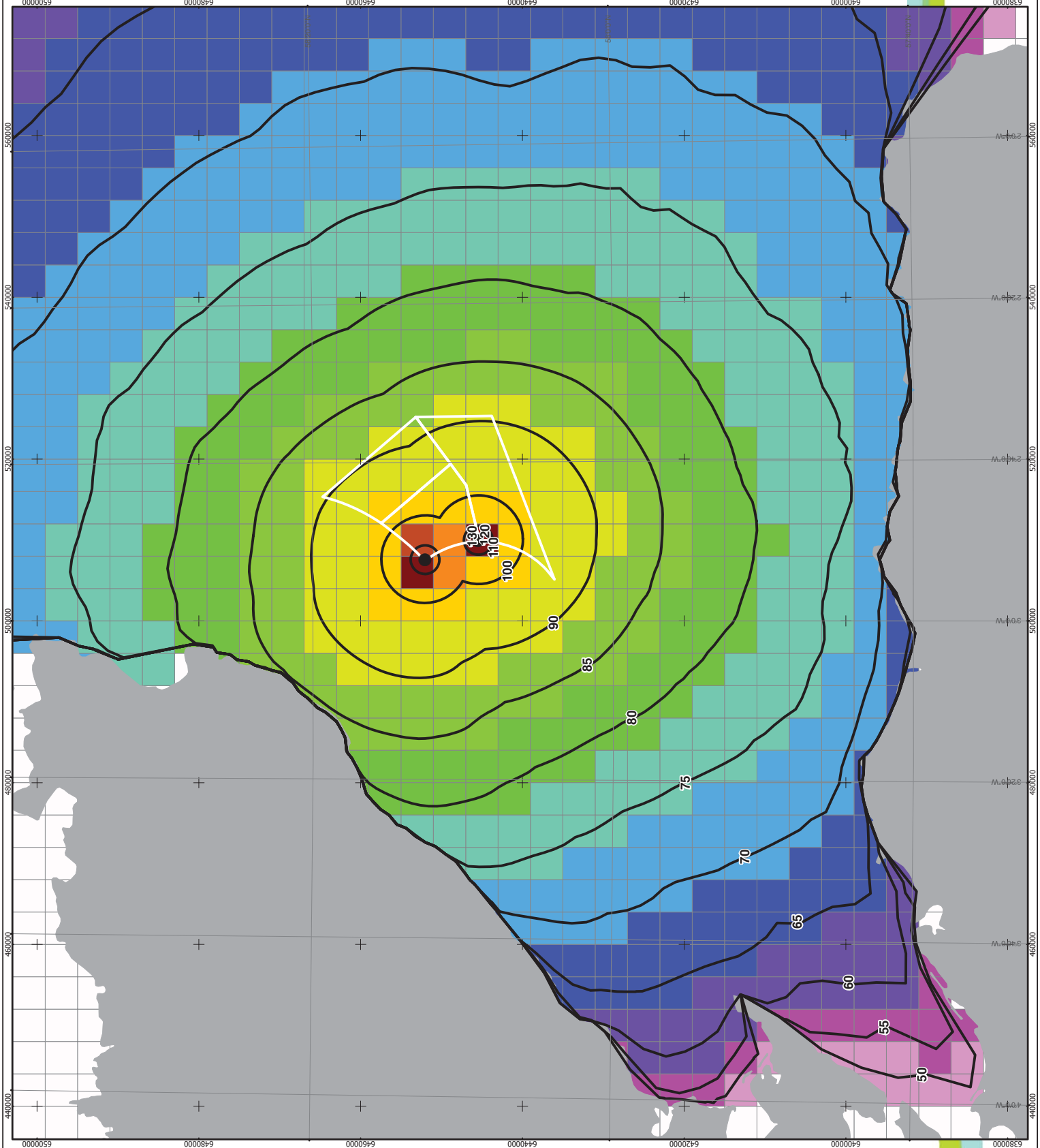




Figure A19: Scenario 2 Harbour Seal dBht

Moray Offshore Renewables Ltd











Moray Offshore Renewables Ltd



KEY

-  Telford, Stevenson and MacColl
-  MORL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

-  186 - 196
-  197 - 200

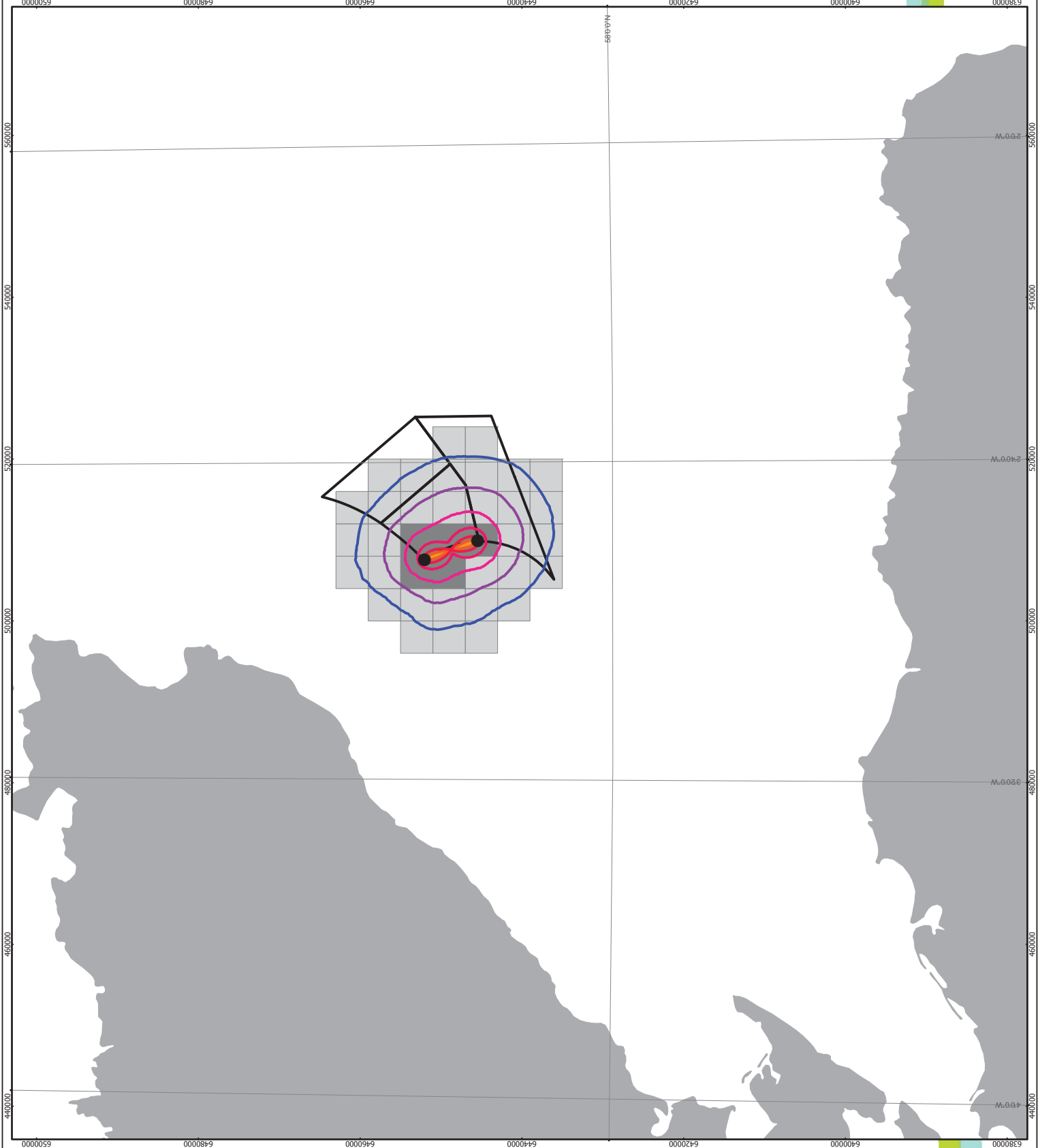
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 02/05/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-093	

Figure A20: Scenario 2  
 High Frequency Cetaceans  
 SEL

Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

KEY

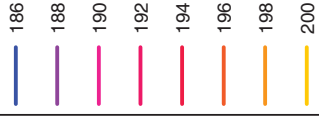


Telford, Stevenson and MacColl

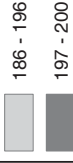


MORL piling location

dB



Max dB



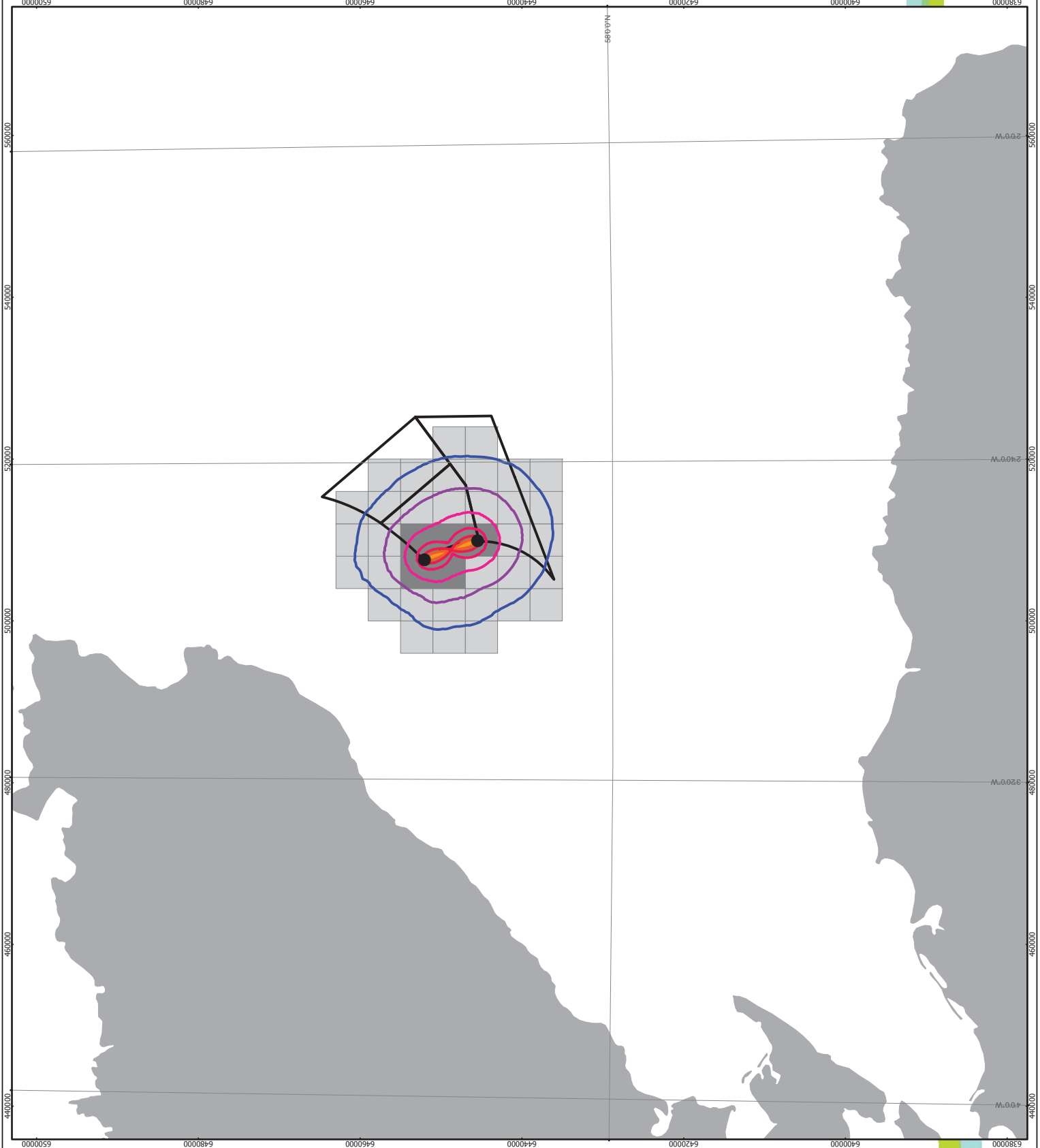
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-095

Figure A21: Scenario 2  
 Mid Frequency Cetaceans  
 SEL






Moray Offshore  
 Renewables Ltd





KEY

-  Telford, Stevenson and MacColl
-  MORL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

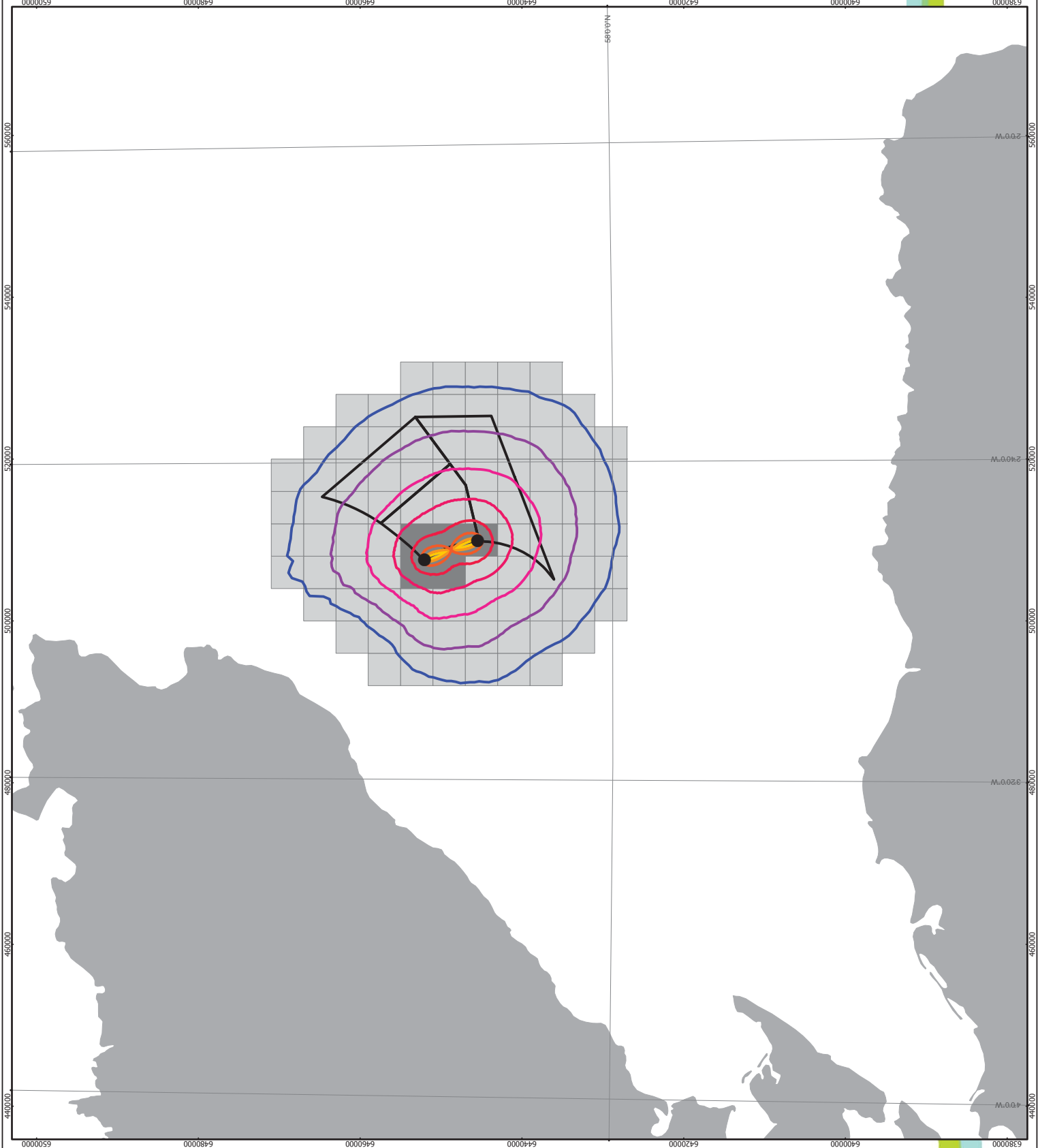
-  186 - 196
-  197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-094








Figure A22: Scenario 2  
 Low Frequency Cetaceans  
 SEL





KEY

-  Telford, Stevenson and MacColl
-  MORL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

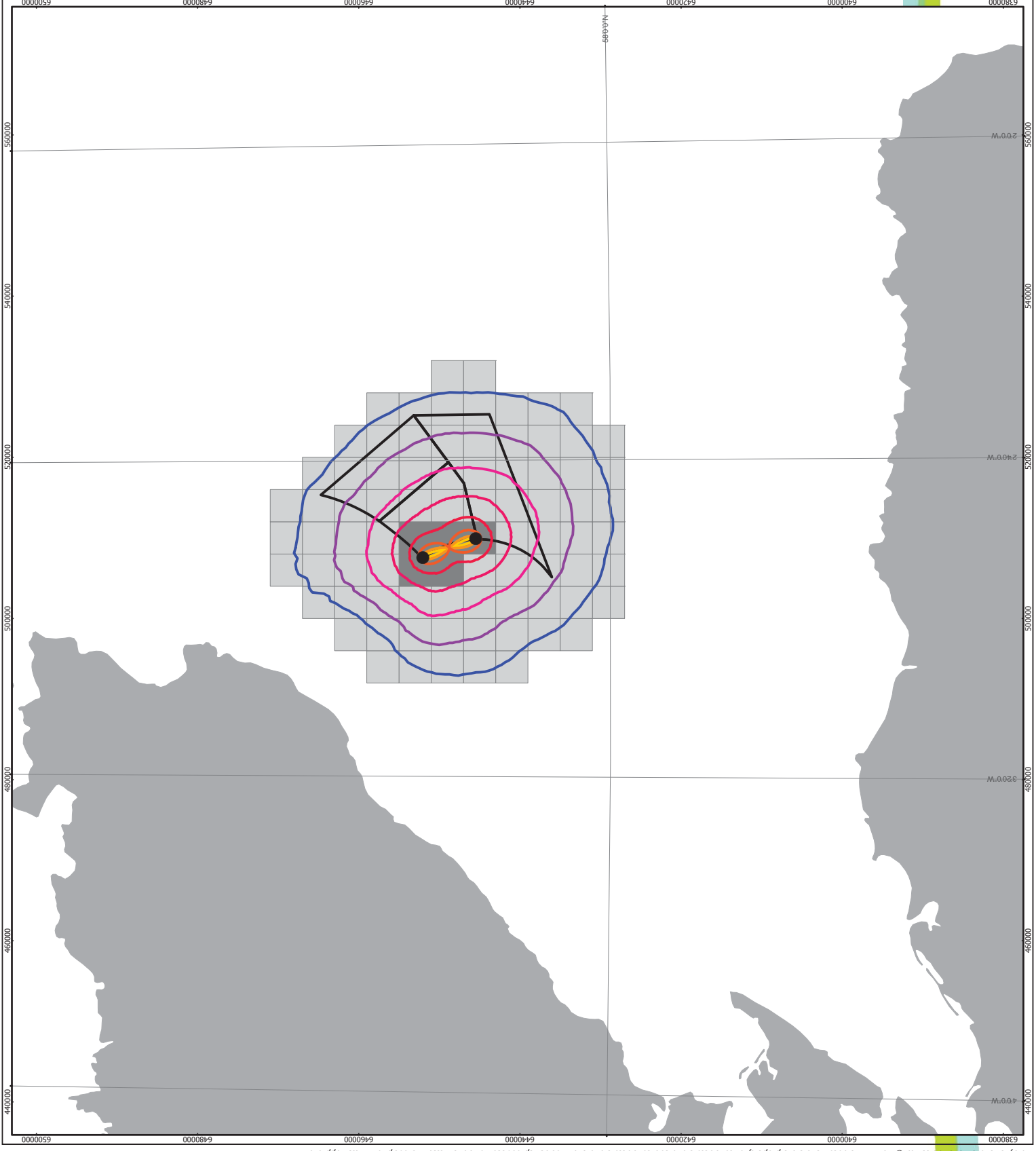
-  186 - 196
-  197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-096

Figure A23: Scenario 2  
 Pinnipeds  
 SEL






- KEY**
- Telford
  - Stevenson
  - MacColl

▲ MORL piling location

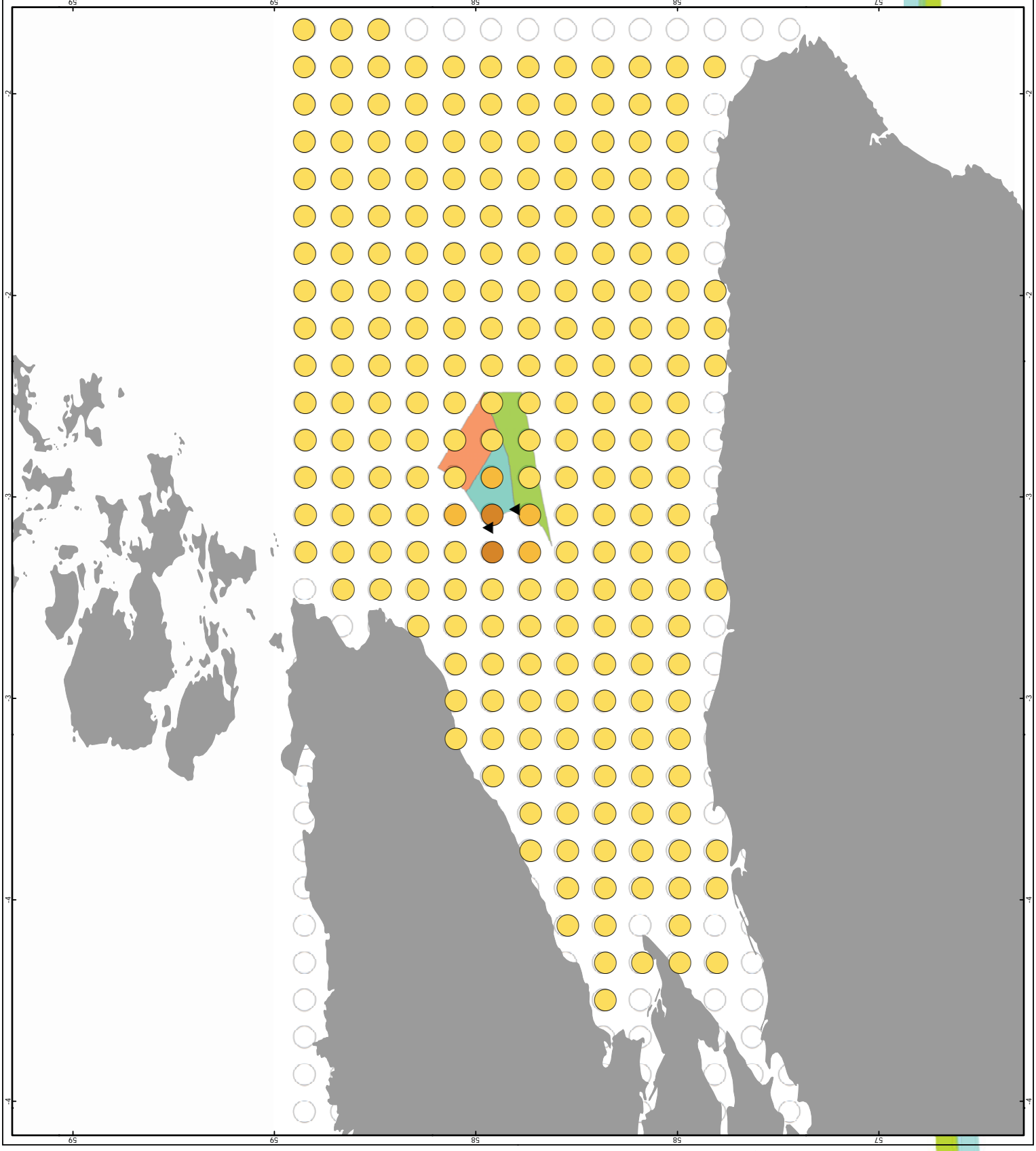
Number of harbour porpoise predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000      A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	
Reviewed: SC	
Approved: CJP	
Date: 18/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-193	



**Figure A24: Scenario 2**  
**SAFESIMM**  
 Harbour Porpoise 198 dB  
 Moray Offshore Renewables Ltd

**KEY**

- Telford
- Stevenson
- MacColl

▲ MORL piling location  
 Number of bottlenose dolphins predicted to receive SELs sufficient to induce PTS onset

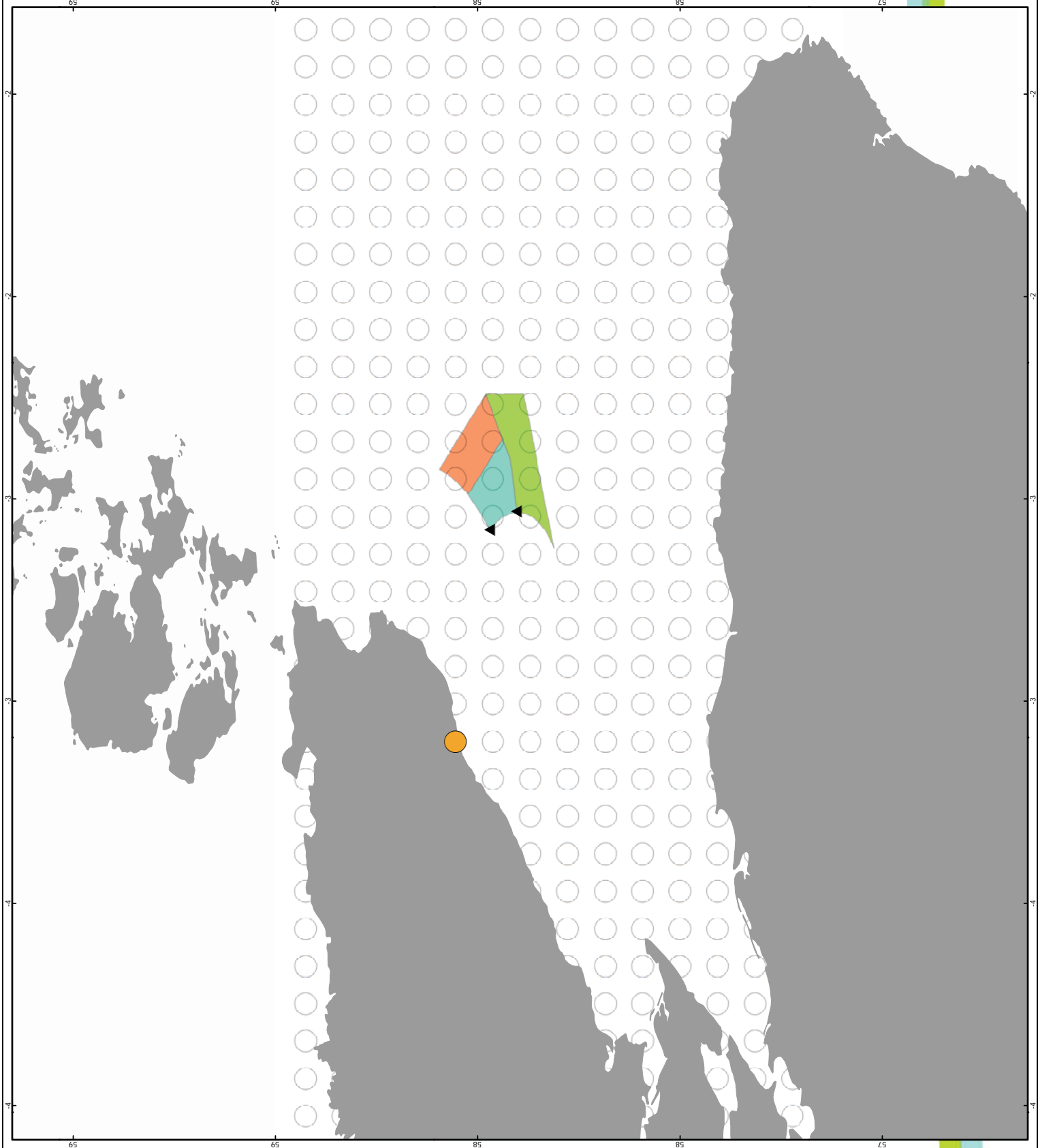
- 0
- 0.01
- 0.02

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000      A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012      Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-195

**Figure A25: Scenario 2**  
**SAFESIMM**  
 Bottlenose Dolphin 198 dB  
 Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

- KEY**
- Telford
  - Stevenson
  - MacColl

▲ MORL piling location

Number of minke whale predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:1,550,000 A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 08/05/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-196	

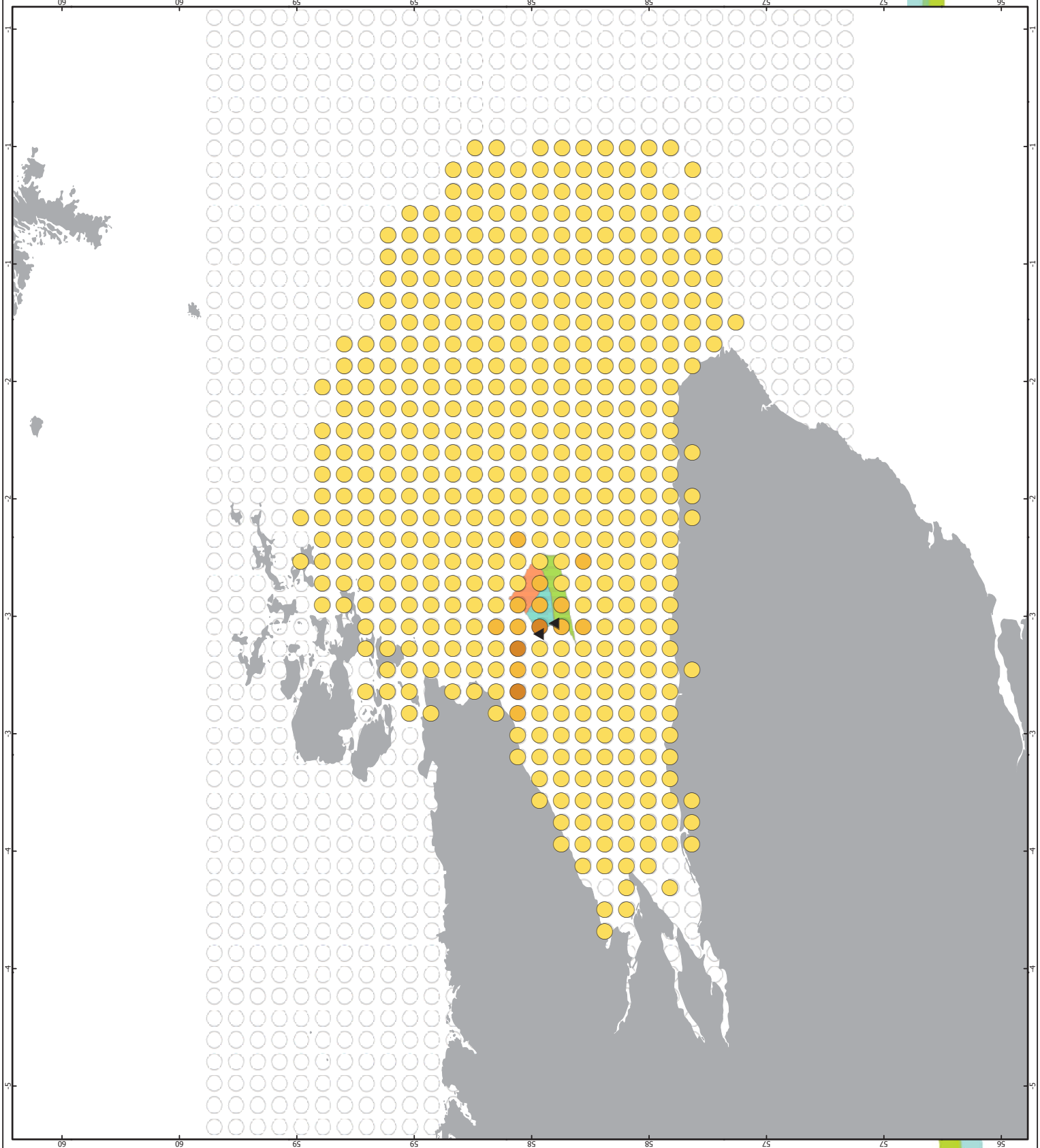


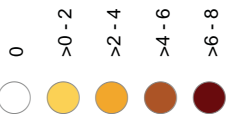
Figure A26: Scenario 2  
 SAFESIMM  
 Minke Whale 198 dB  
 Moray Offshore Renewables Ltd

**KEY**

- Telford
- Stevenson
- MacColl

▲ MORL piling location

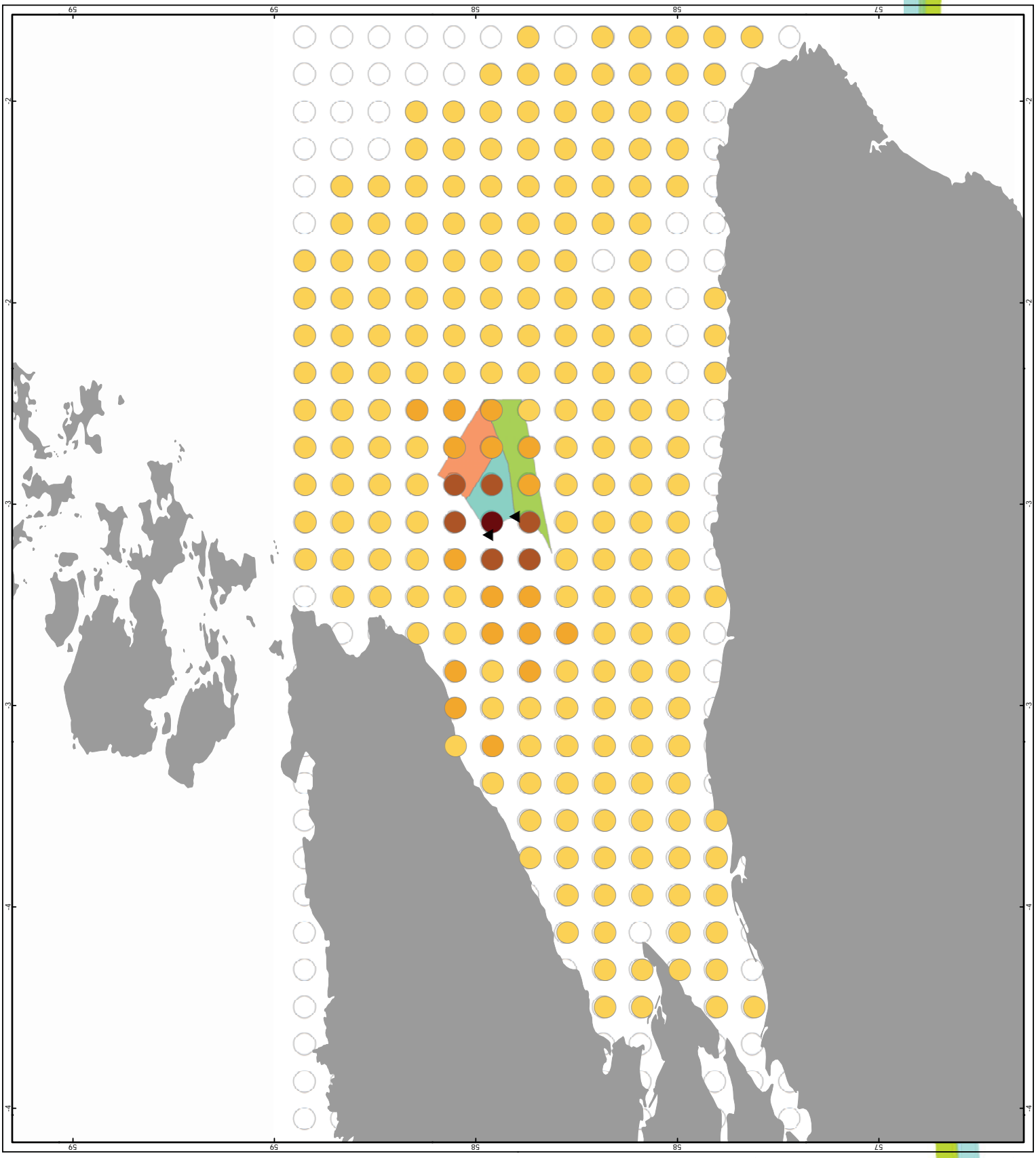
Number of harbour seals predicted to receive SELs sufficient to induce PTS onset



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-197



**Figure A27: Scenario 2**  
**SAFESIMM**  
 Harbour Seal 186 dB  
 Moray Offshore Renewables Ltd

**KEY**

- Telford
- Stevenson
- MacColl

▲ MORL piling location

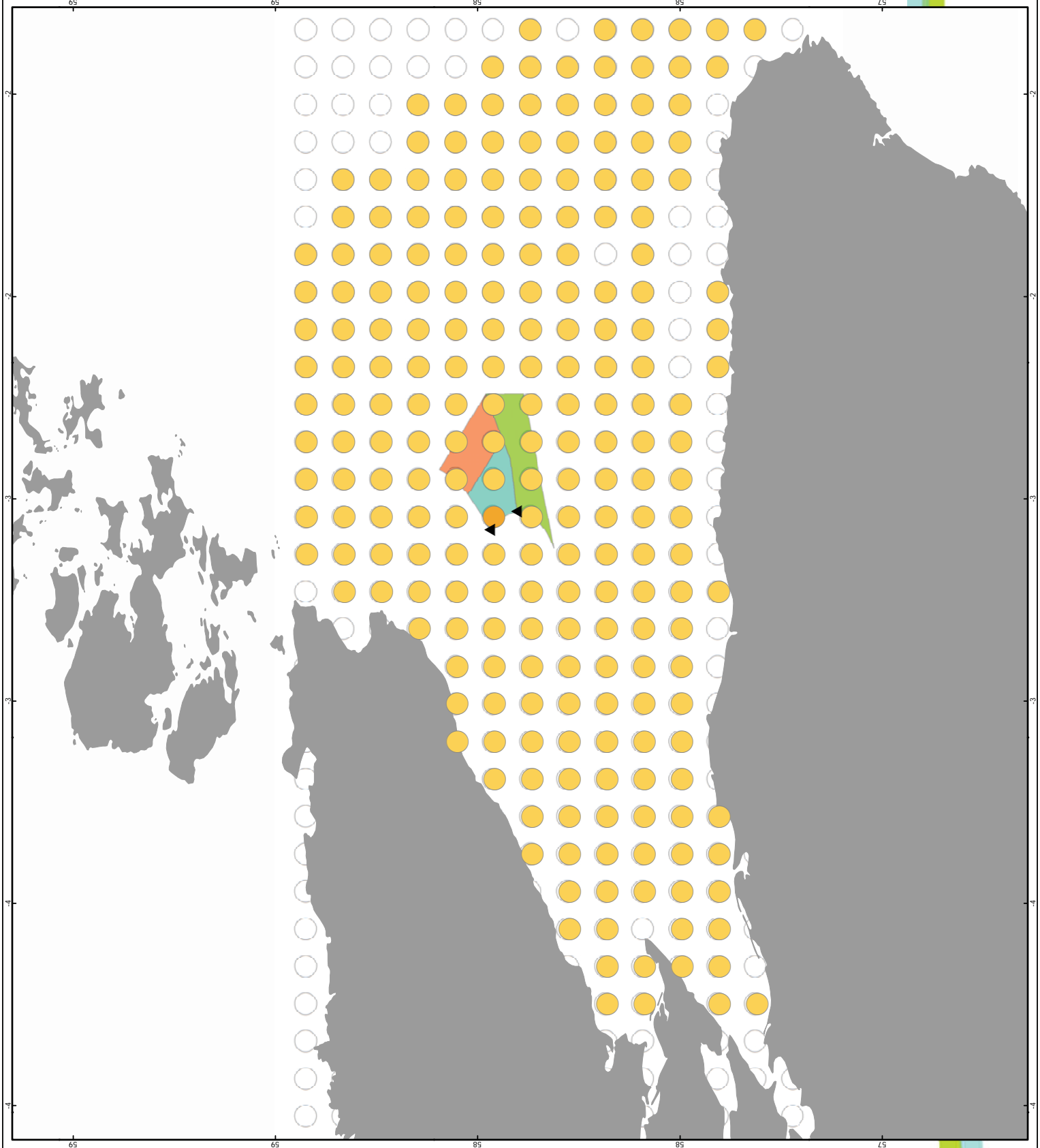
Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 2
- >2 - 4
- >4 - 6
- >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-198











KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 18/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-199	

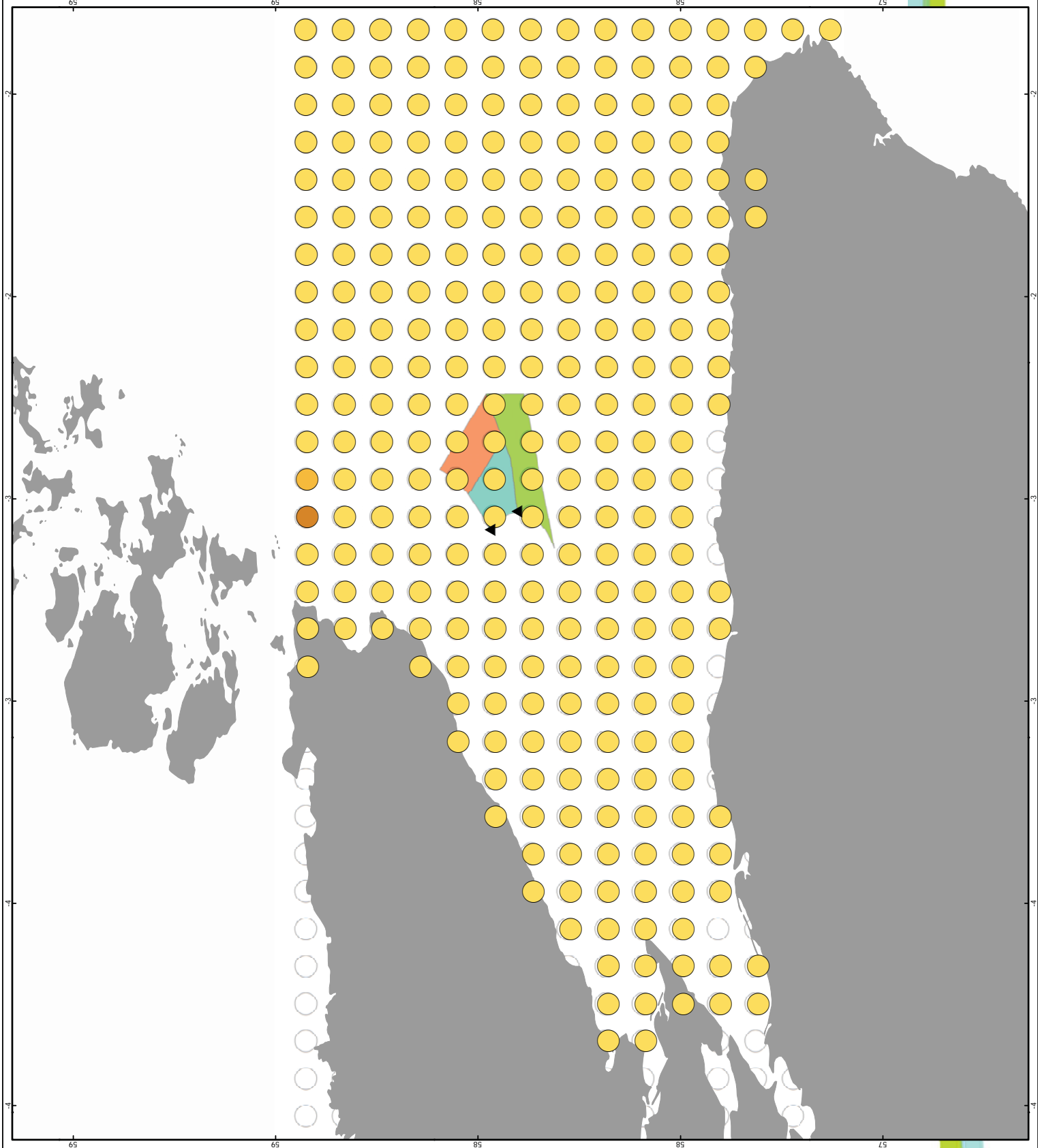


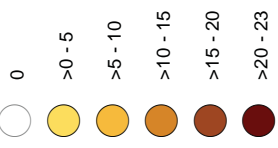
Figure A29: Scenario 2  
 SAFESIMM  
 Grey Seal 186 dB

**KEY**


- Telford
- Stevenson
- MacColl

▲ MORL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

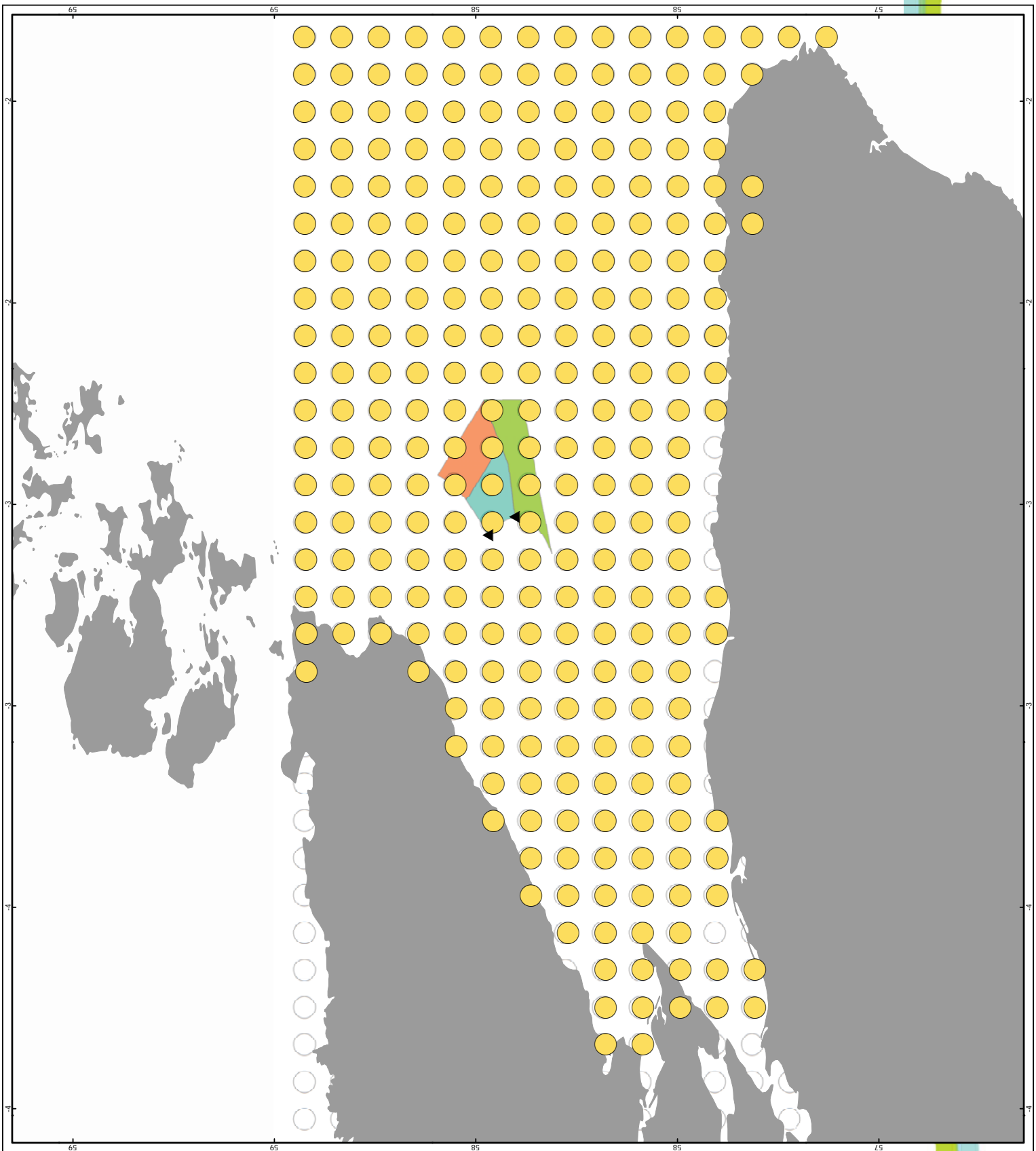


A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-200

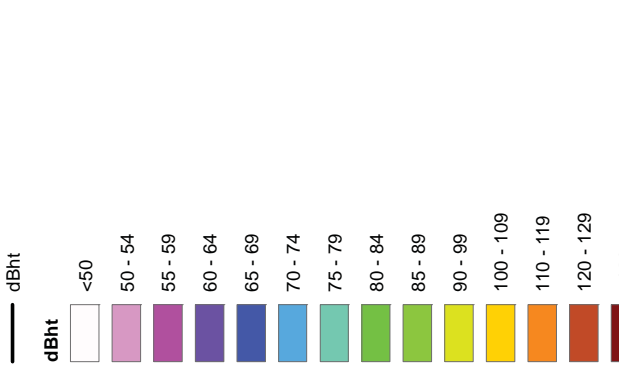
Figure A30: Scenario 2  
 SAFESIMM  
 Grey Seal 198 dB  
 Moray Offshore Renewables Ltd





**KEY**

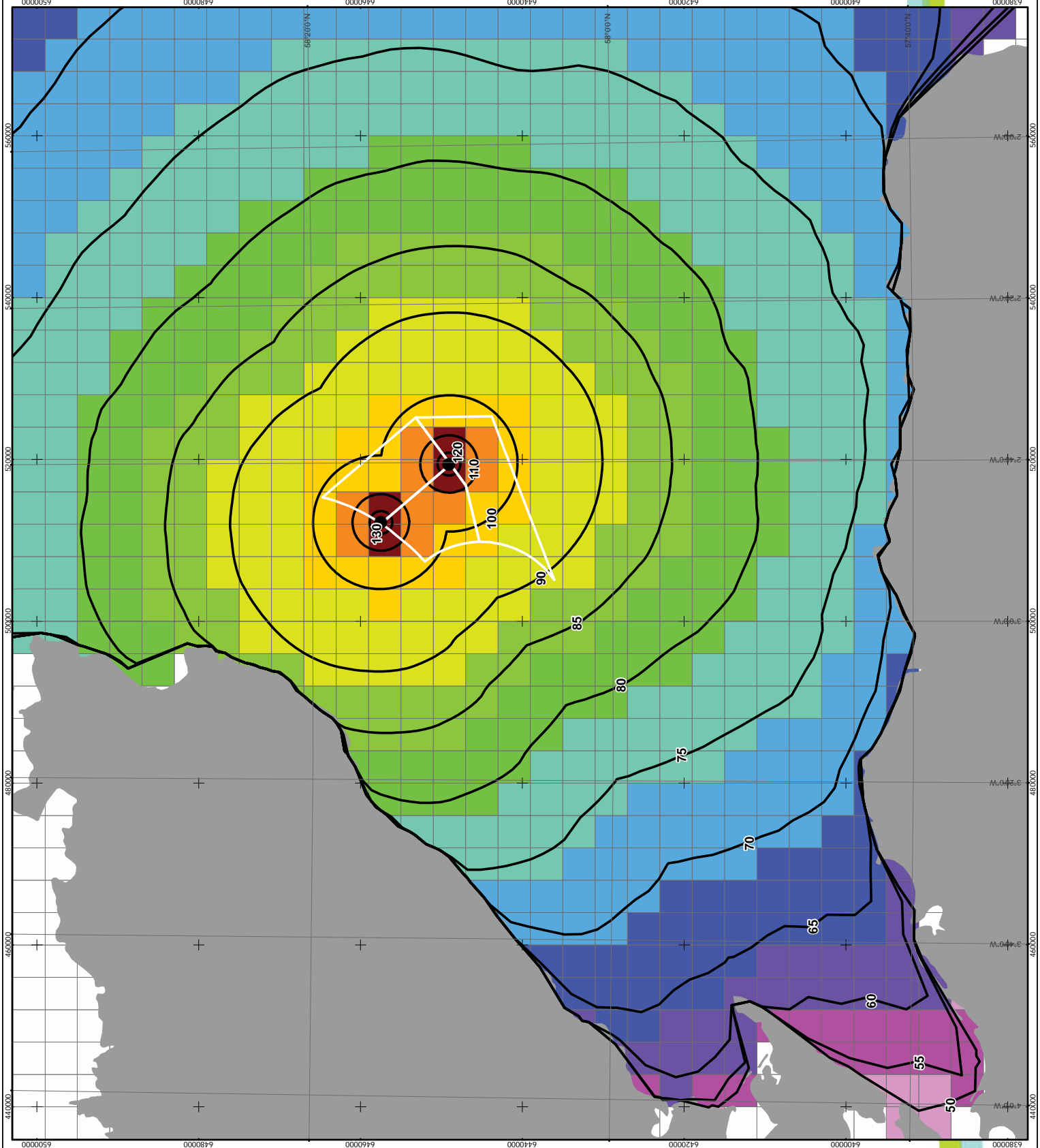
- Telford, Stevenson and MacColl
- MORL piling location
- dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-098



**Figure A31: Scenario 3**  
 Harbour Porpoise dBht

Moray Offshore Renewables Ltd

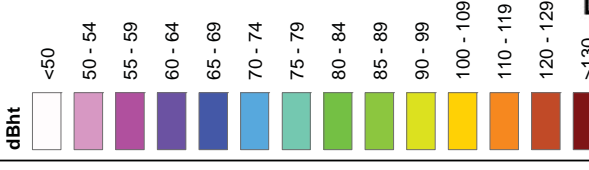


Moray Offshore Renewables Ltd

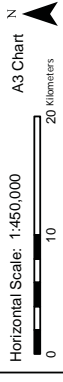
KEY

- Telford, Stevenson and MacColl
- MORL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: GL  
Reviewed: SC  
Approved: CJP  
Date: 02/05/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-097

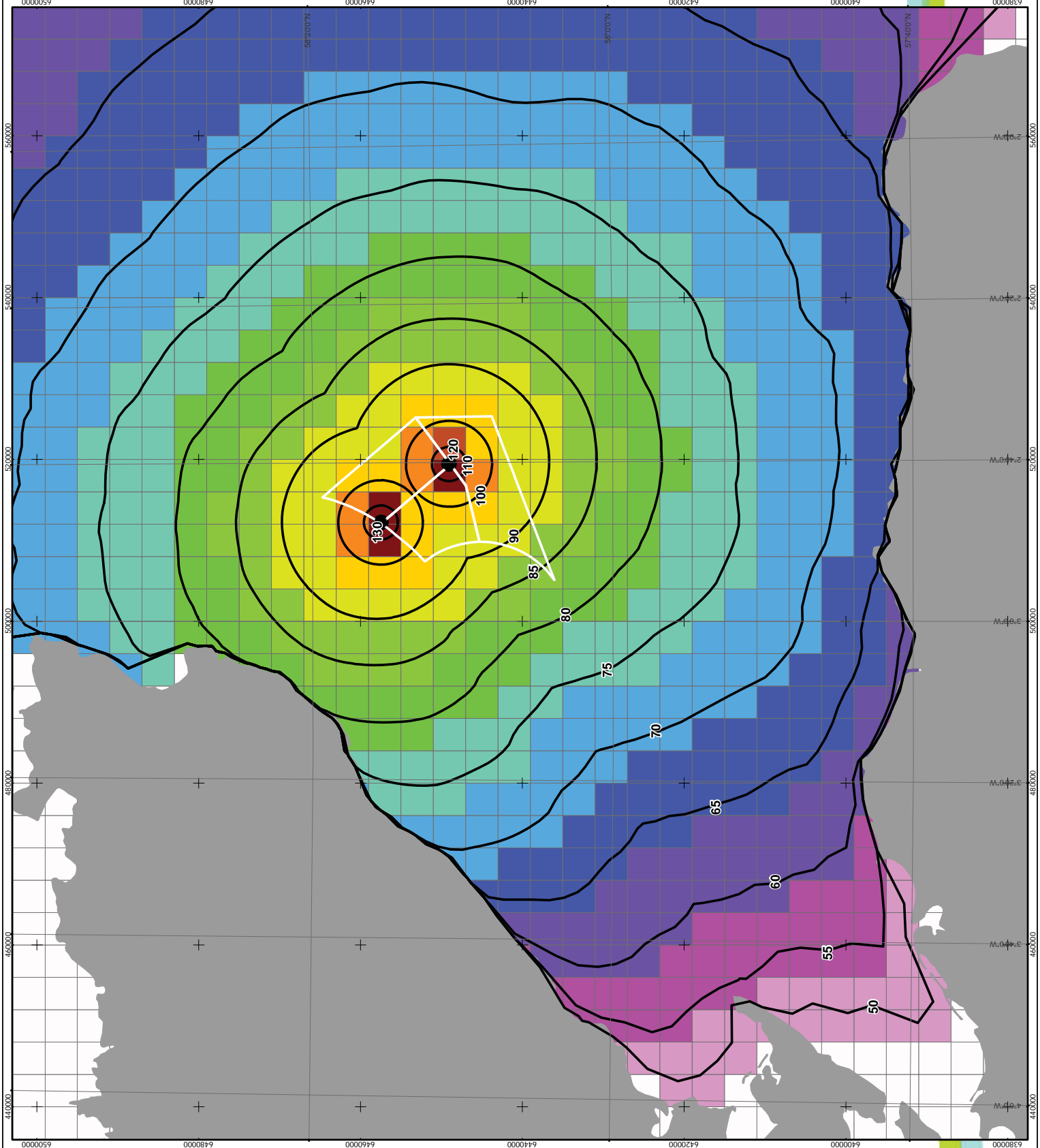


Figure A32: Scenario 3  
Bottlenose Dolphin dBht

Moray Offshore  
Renewables Ltd

KEY

□ Telford, Stevenson and MacColl

● MORL piling location

— dBht

dBht

<50

50 - 54

55 - 59

60 - 64

65 - 69

70 - 74

75 - 79

80 - 84

85 - 89

90 - 99

100 - 109

110 - 119

120 - 129

>130

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see E3 DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-100

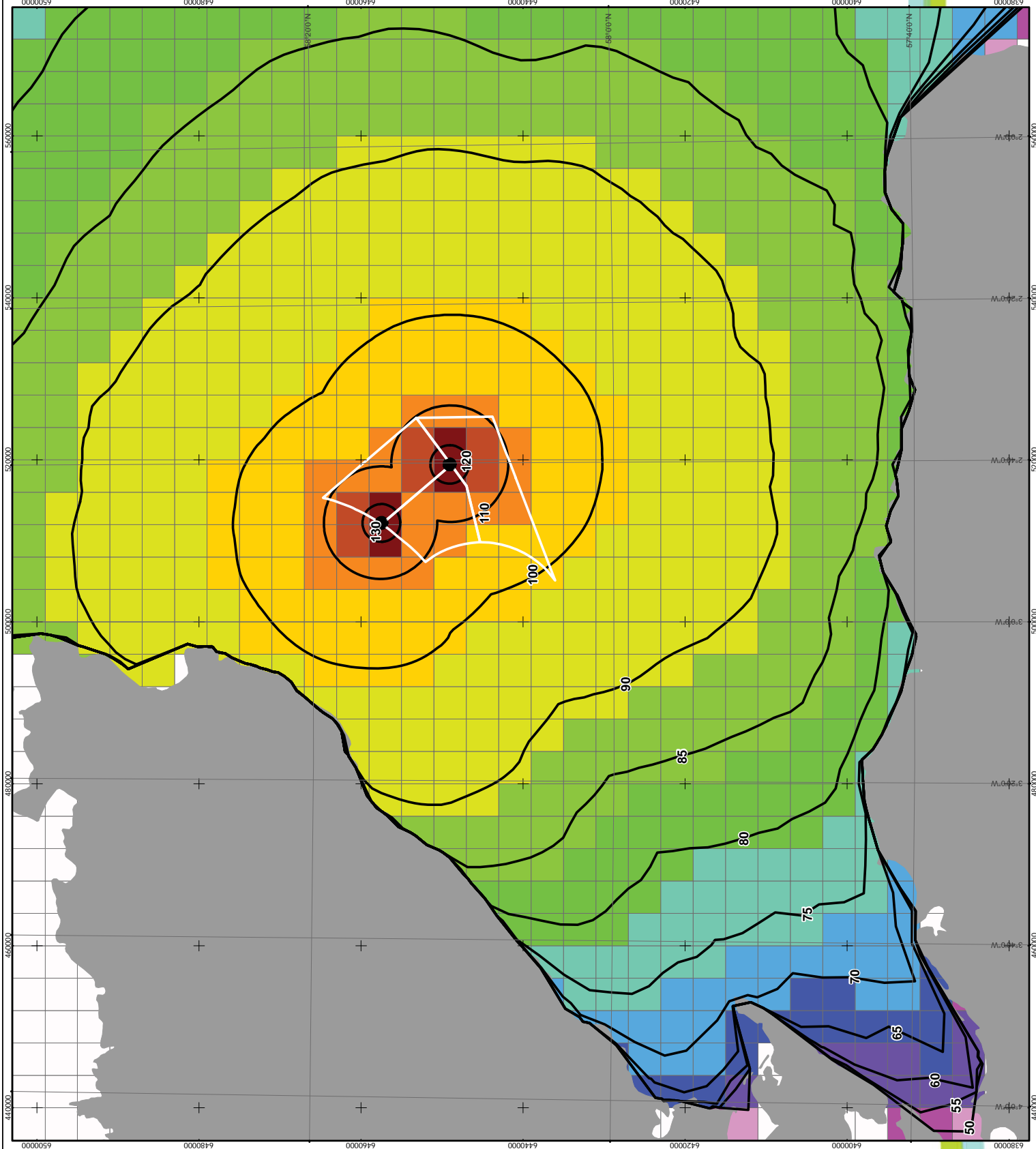
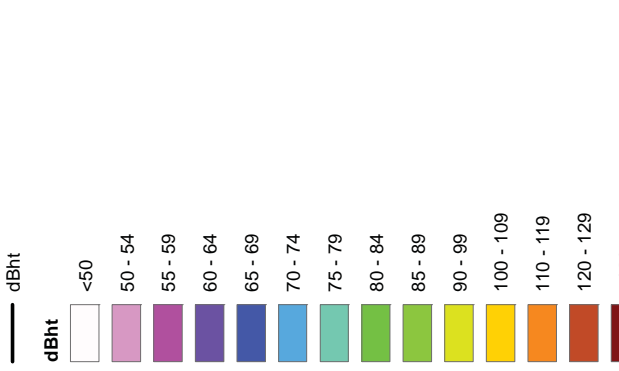


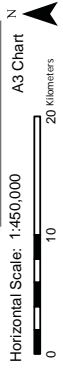
Figure A33: Scenario 3  
 Minke Whale dBht

Moray Offshore  
 Renewables Ltd

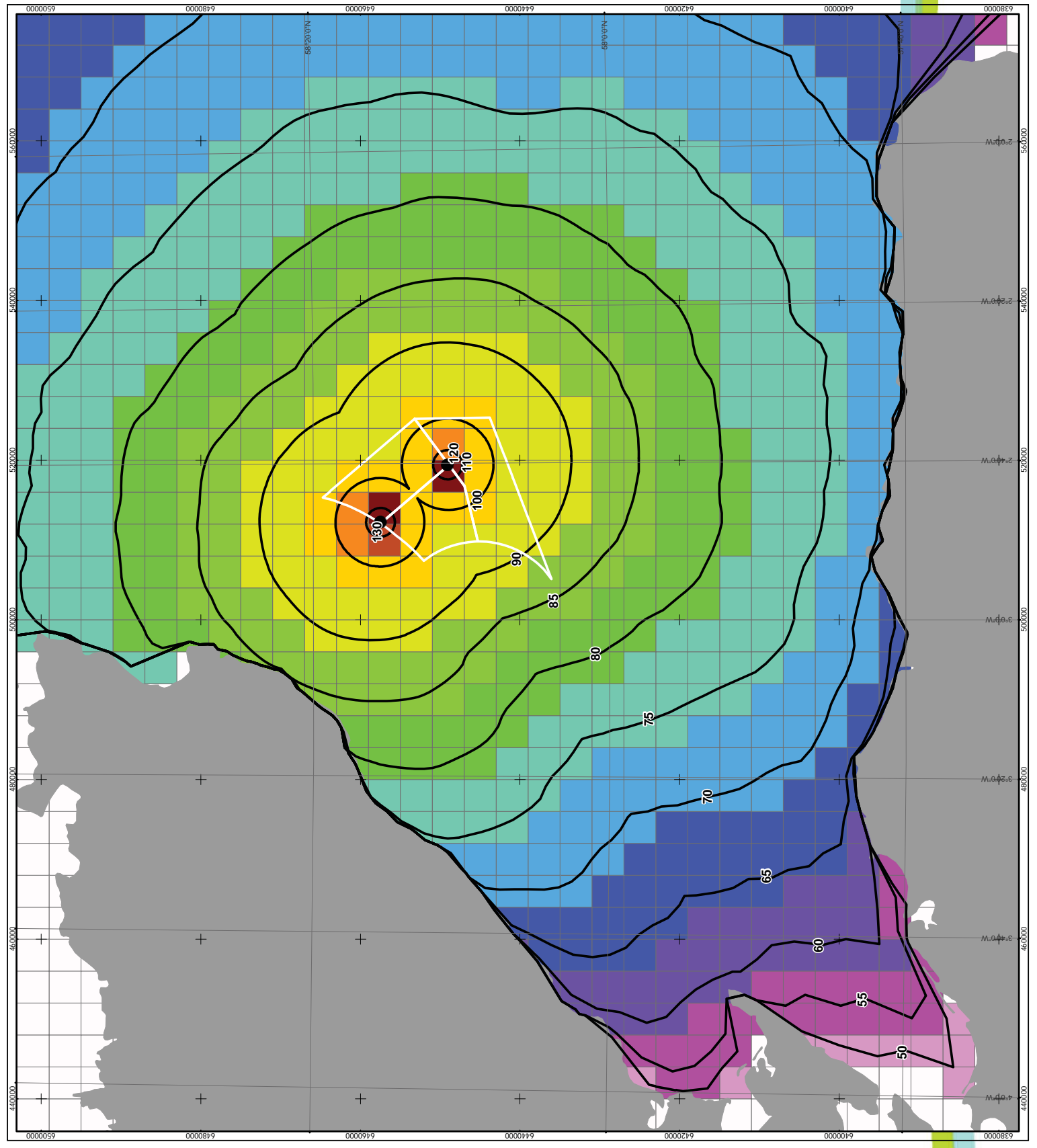
**KEY**  
 Telford, Stevenson and MacColl  
 MORL piling location  
 dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure.  
 For A3 scale see ES DWD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012  
 REF: 8460001-PPW0200-NPW-MAP-089  
 Revision: A



**Figure A34: Scenario 3**  
 Harbour Seal dBht  
 Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY



Telford, Stevenson and MacColl



MORL piling location

dB



186



188



190



192



194



196



198



200

Max dB



186 - 196



197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LG

Reviewed: SC

Approved: CJP

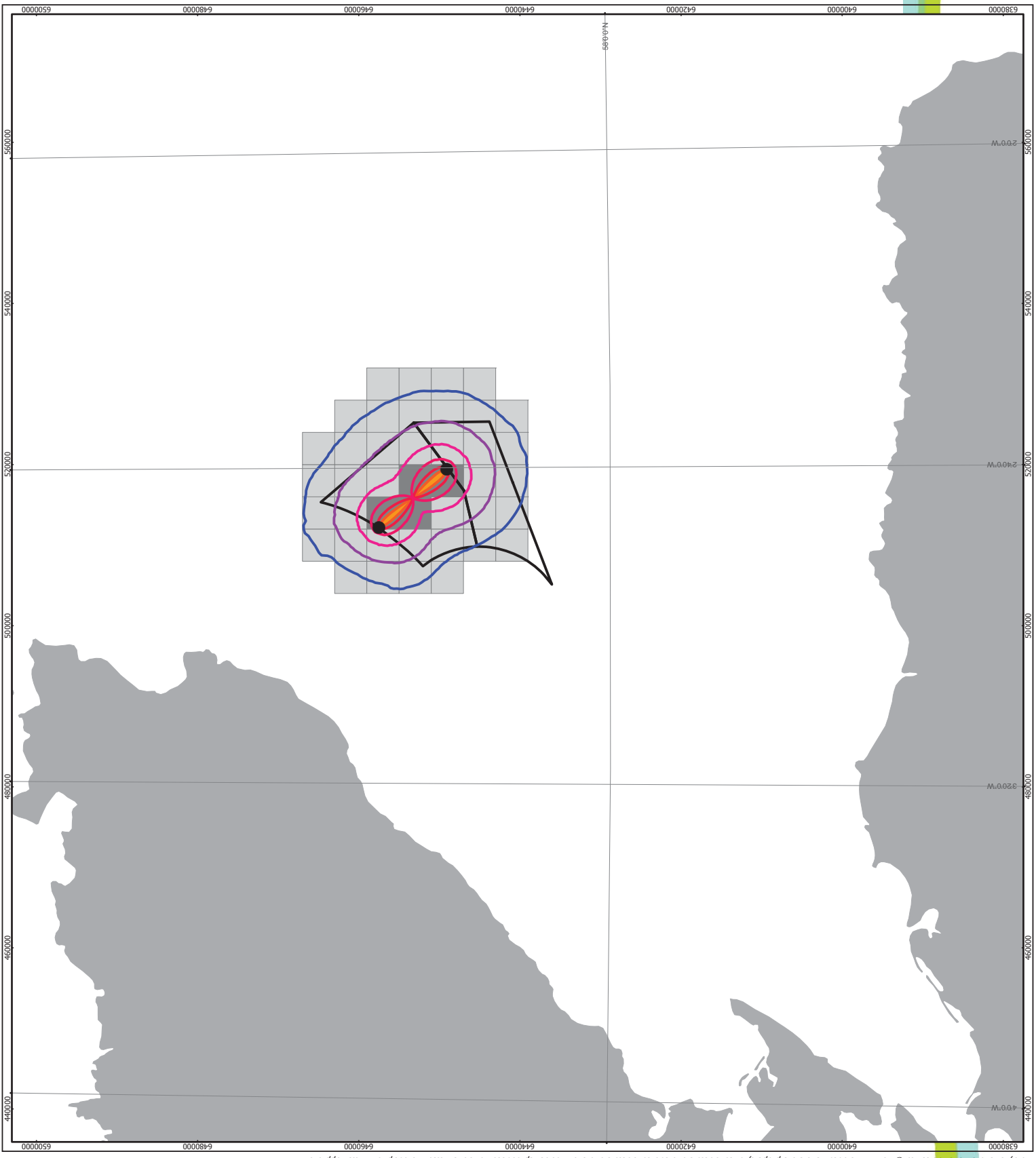
Date: 02/05/2012

Revision: A

REF: 8460001-PPW0200-NPW-MAP-101

Figure A35: Scenario 3  
 High Frequency Cetaceans  
 SEL

Moray Offshore  
 Renewables Ltd





Moray Offshore Renewables Ltd

KEY

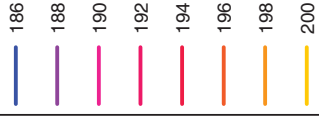


Telford, Stevenson and MacColl

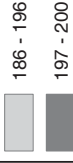


MORL piling location

dB



Max dB



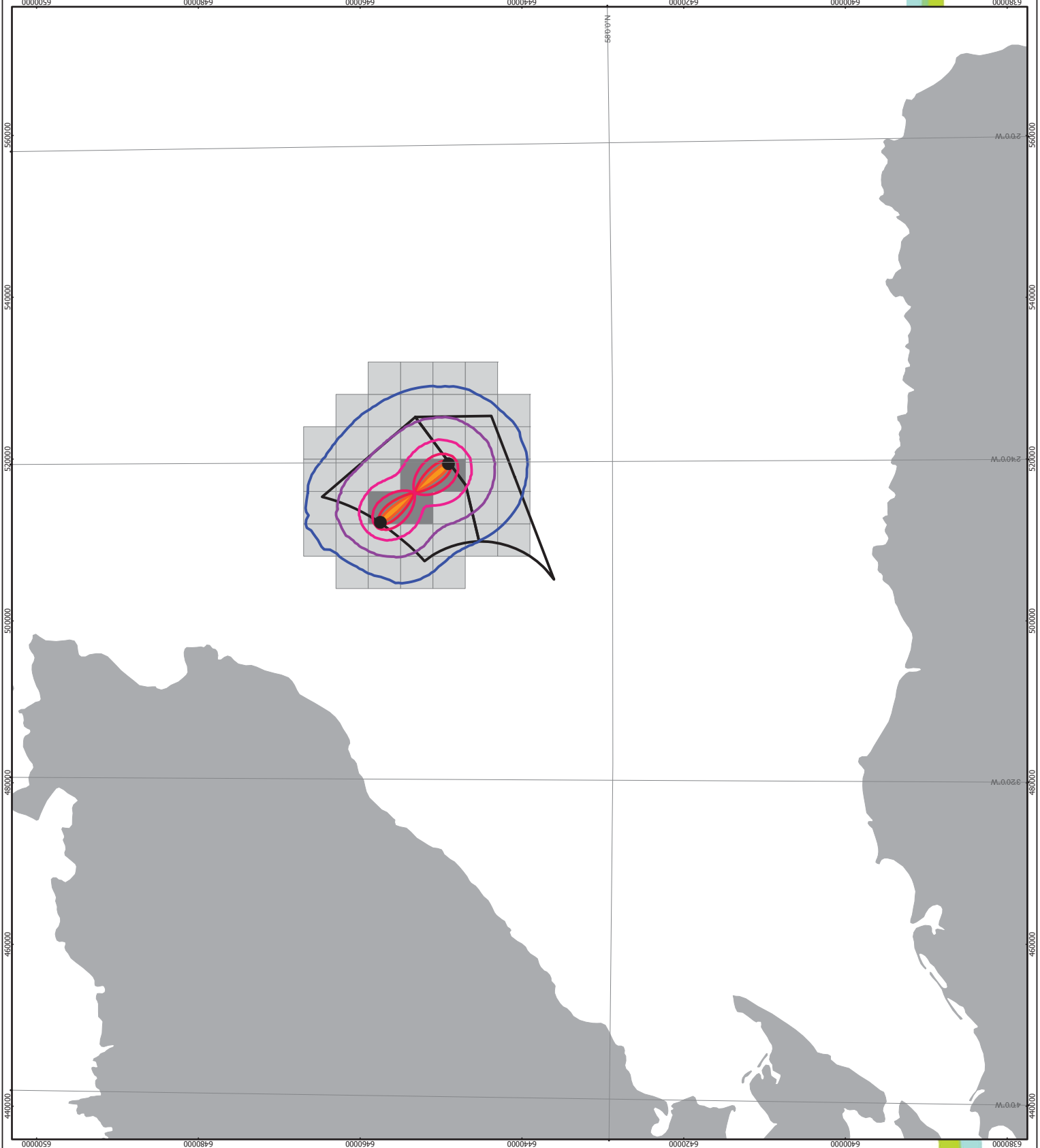
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-103

Figure A36: Scenario 3  
 Mid Frequency Cetaceans  
 SEL









Moray Offshore Renewables Ltd




KEY

-  Telford, Stevenson and MacColl
-  MORL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

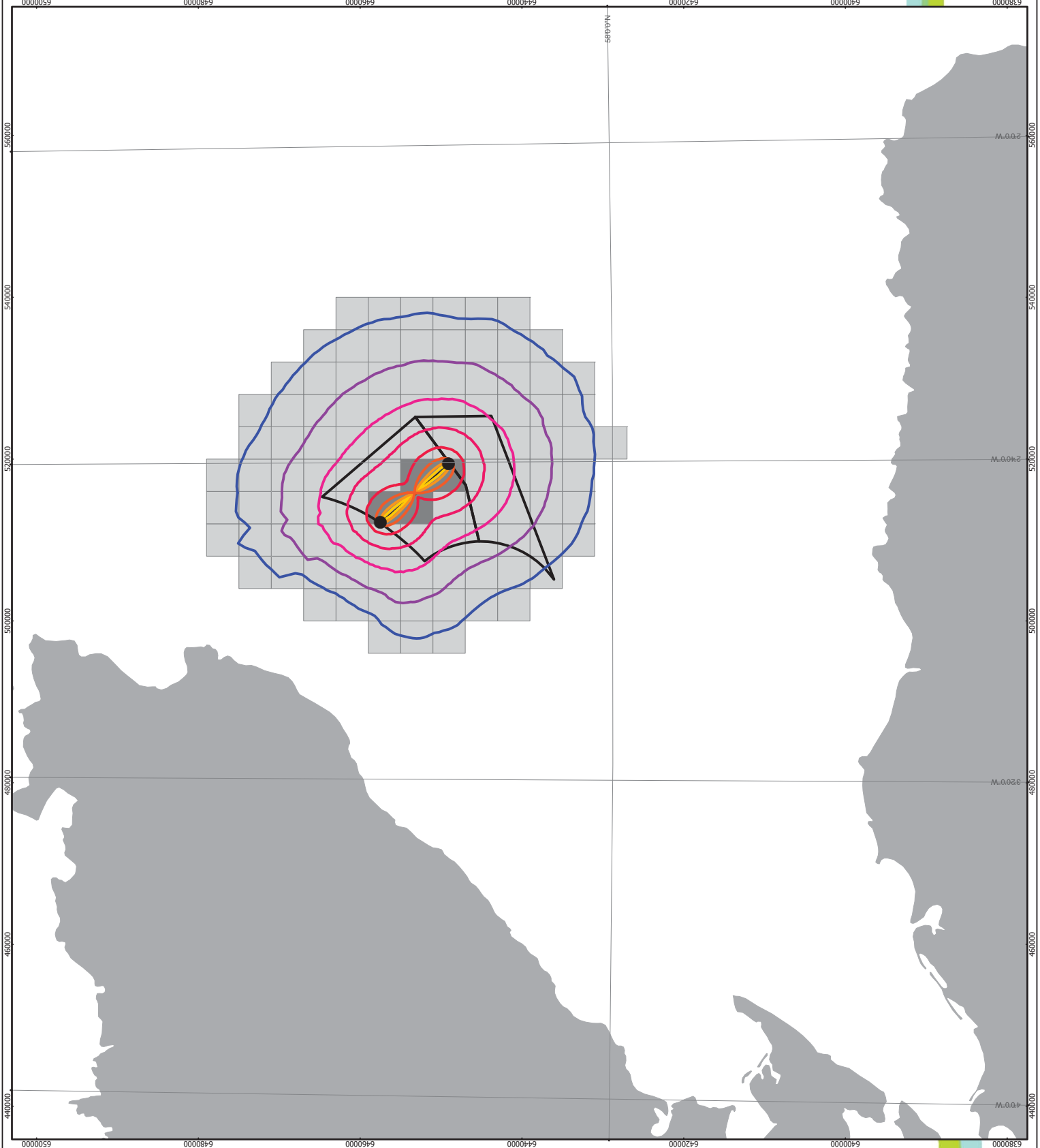
-  186 - 196
-  197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-102

Figure A37: Scenario 3  
 Low Frequency Cetaceans  
 SEL















KEY

-  Telford, Stevenson and MacColl
-  MORL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

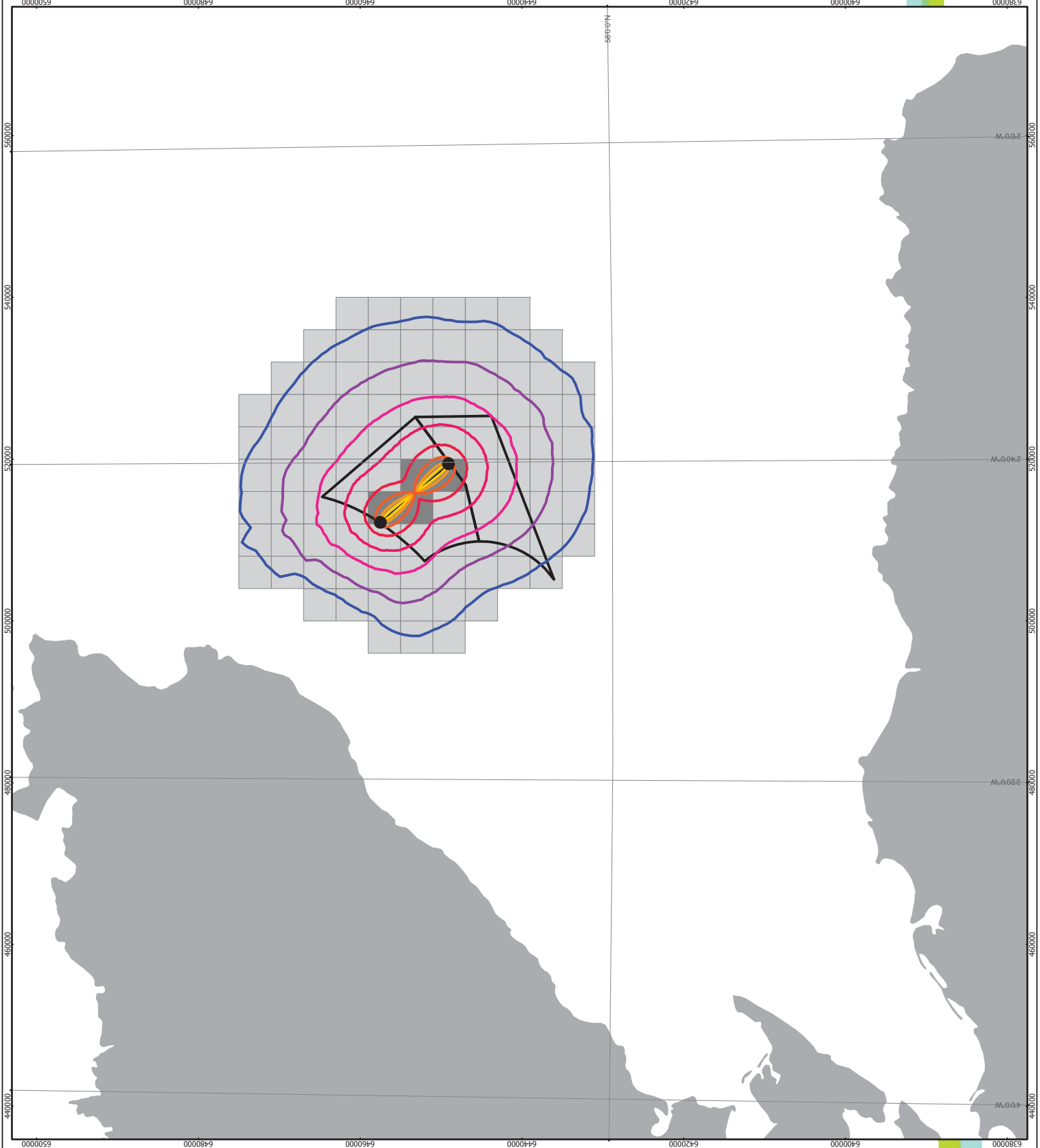
-  186 - 196
-  197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 02/05/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-104	

Figure A38: Scenario 3  
Pinnipeds  
SEL

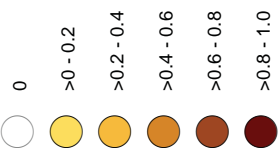


**KEY**


- Telford
- Stevenson
- MacColl

▲ MORL piling location

**Number of harbour porpoise predicted to receive SELs sufficient to induce PTS onset**

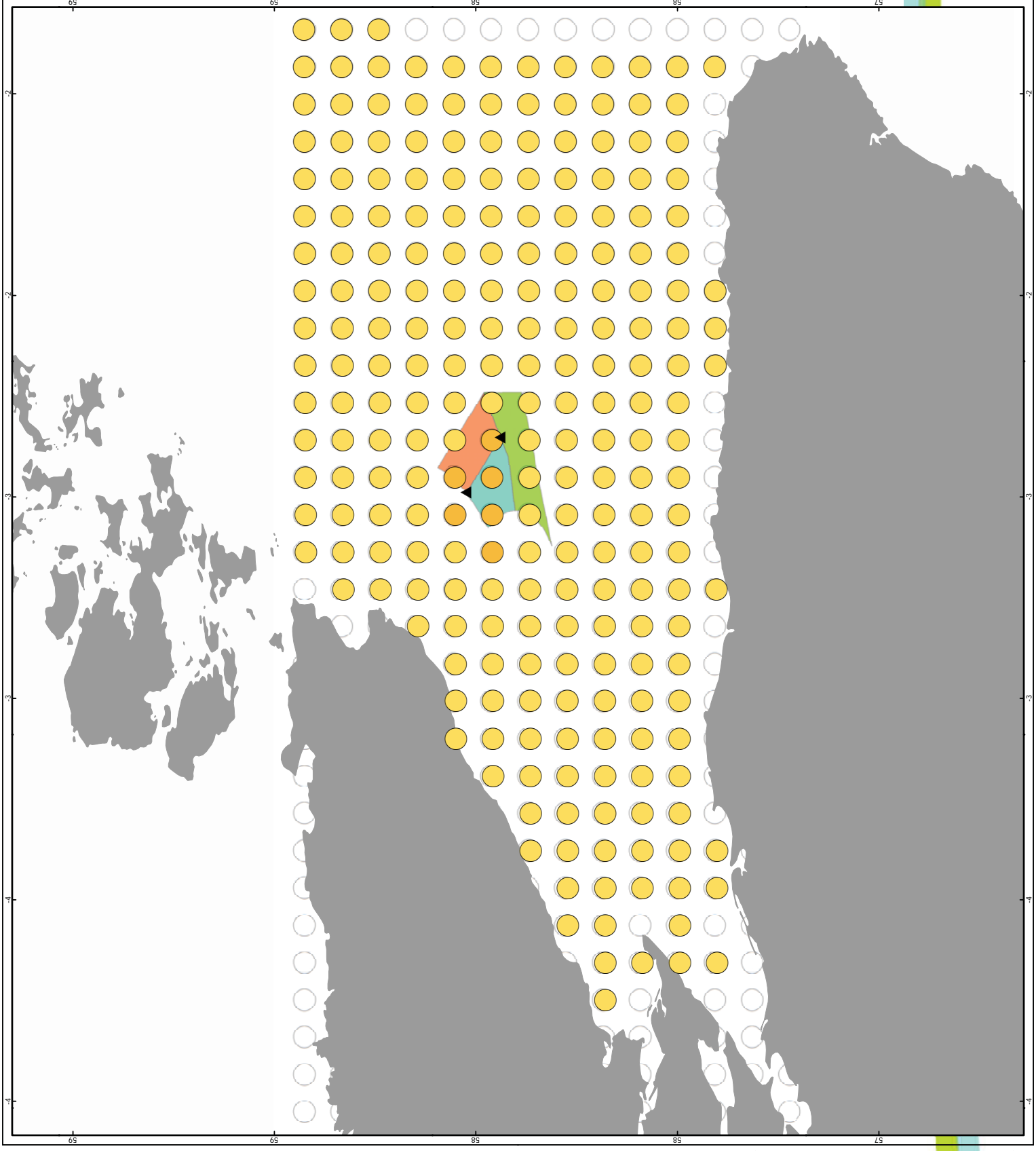


A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-201

**Figure A39: Scenario 3 SAFESIMM**  
 Harbour Porpoise 198 dB  
 Moray Offshore Renewables Ltd






KEY

-  Telford
-  Stevenson
-  MacCoil

▲ MORL piling location

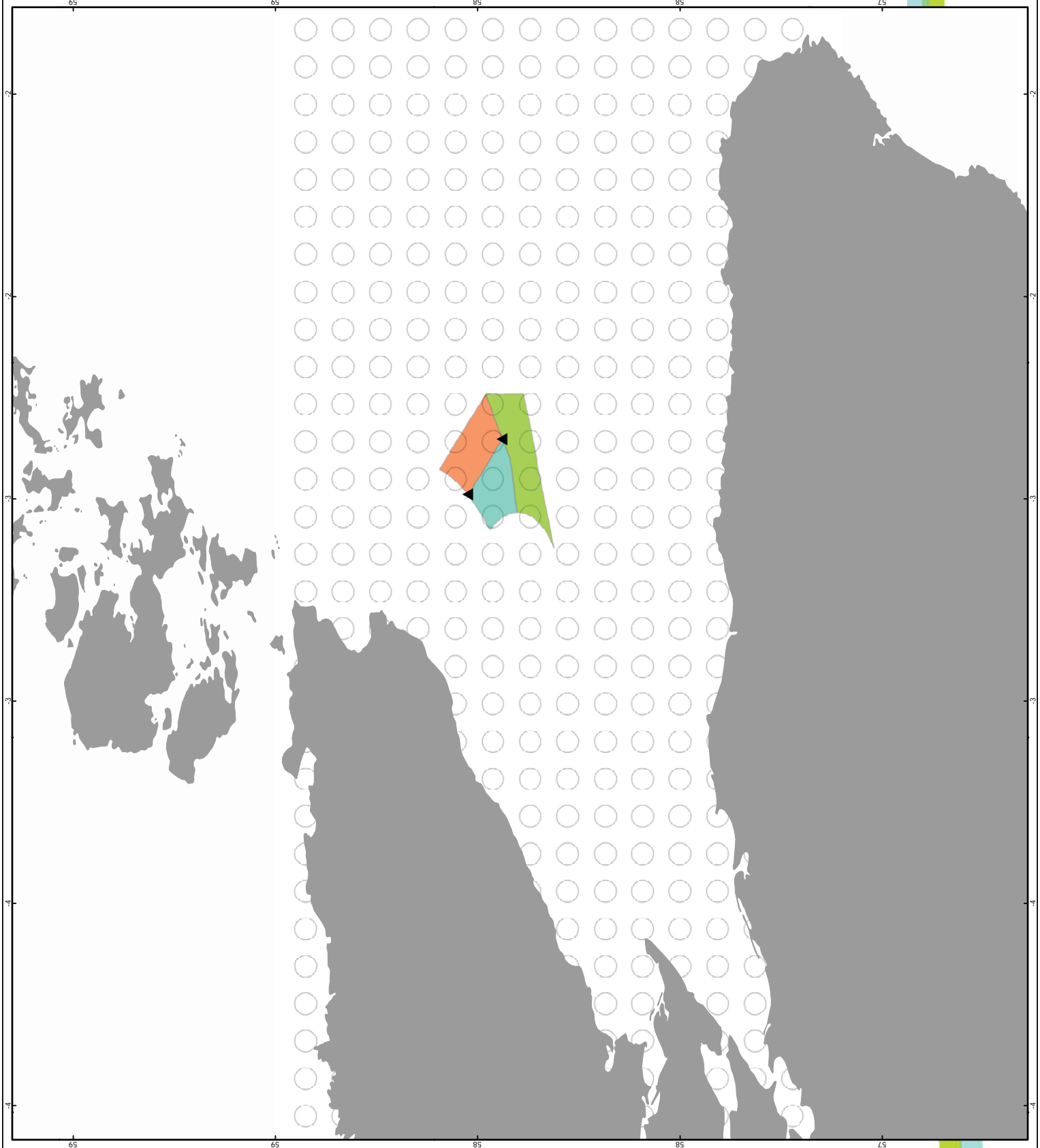
Number of bottlenose dolphins predicted to receive SELs sufficient to induce PTS onset

-  0
-  0.01
-  0.02

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-203





Moray Offshore Renewables Ltd

- KEY**
- Telford
  - Stevenson
  - MacColl

▲ MORL piling location

Number of minke whale predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DWD

Horizontal Scale: 1:1,550,000 A3 Chart N  
0 20 40 km

Geodetic Parameters: WGS 1984  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 08/05/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-204

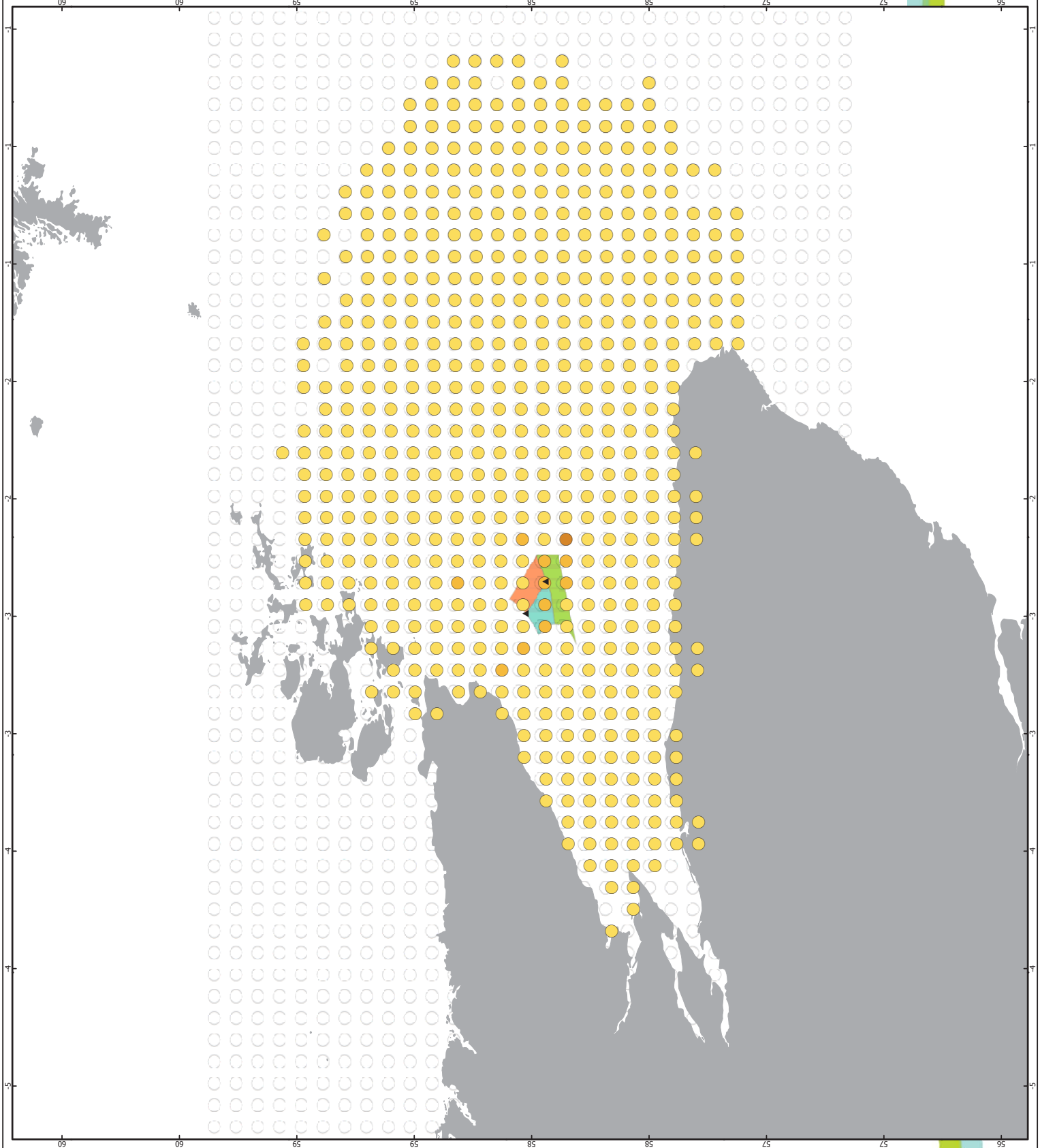







Figure A41: Scenario 3  
SAFESIMM  
Minke Whale 198 dB  
Moray Offshore Renewables Ltd

KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

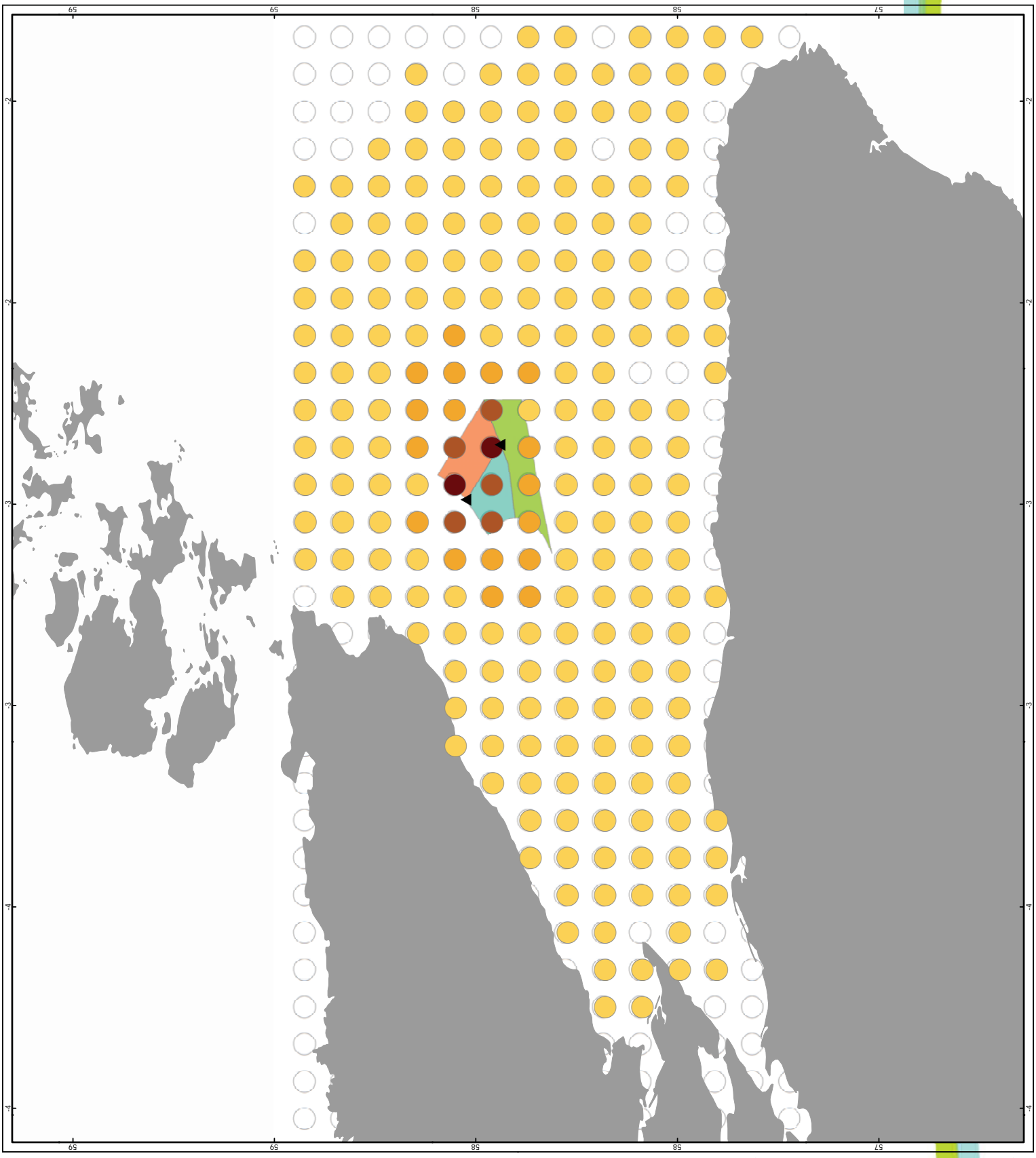
-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD




Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-205

**Figure A42: Scenario 3**  
**SAFESIMM**  
 Harbour Seal 186 dB  
 Moray Offshore Renewables Ltd








KEY


-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

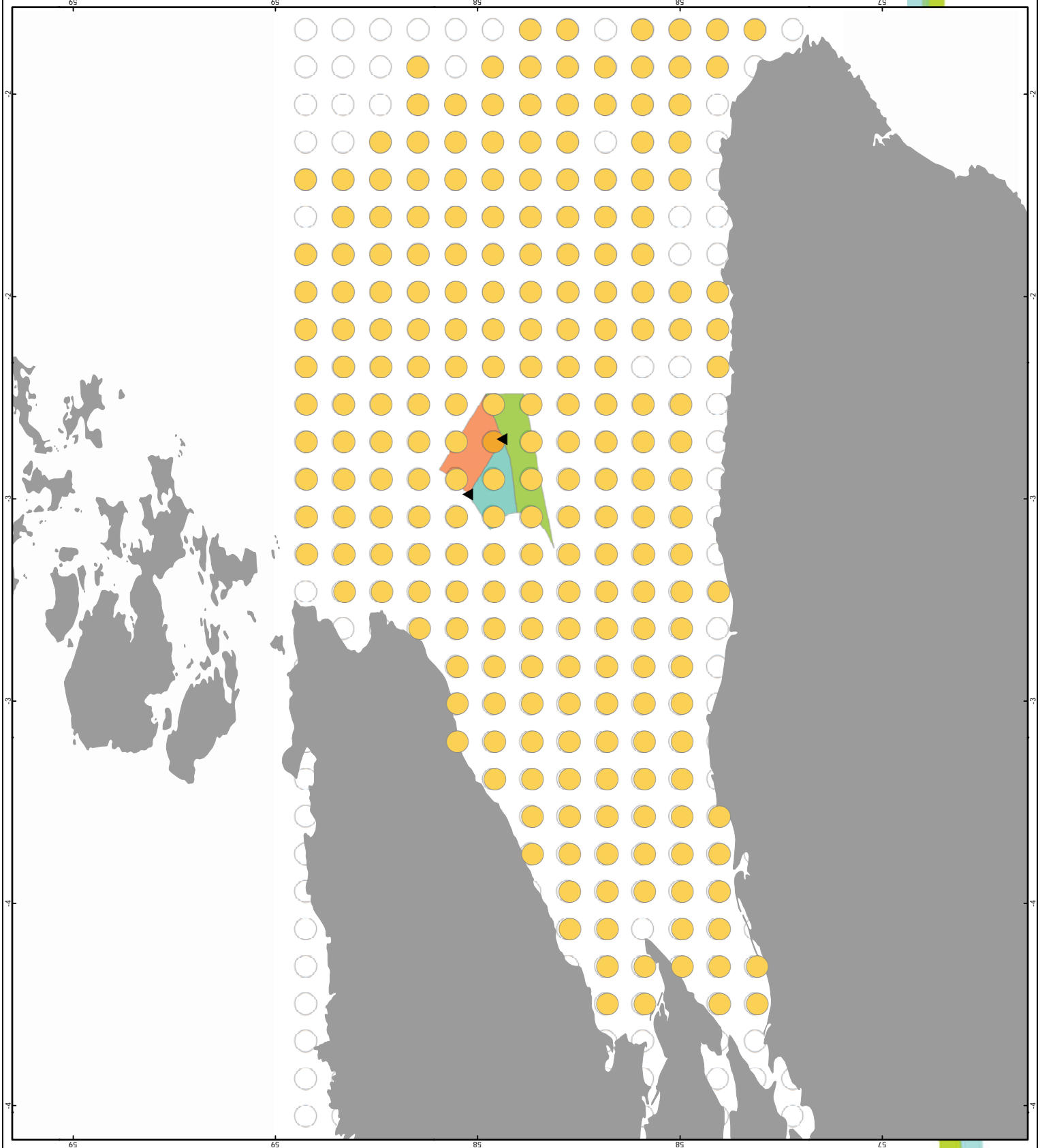
-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  





Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-206

Figure A43: Scenario 3  
 SAFESIMM  
 Harbour Seal 198 dB  
 Moray Offshore Renewables Ltd











KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-207

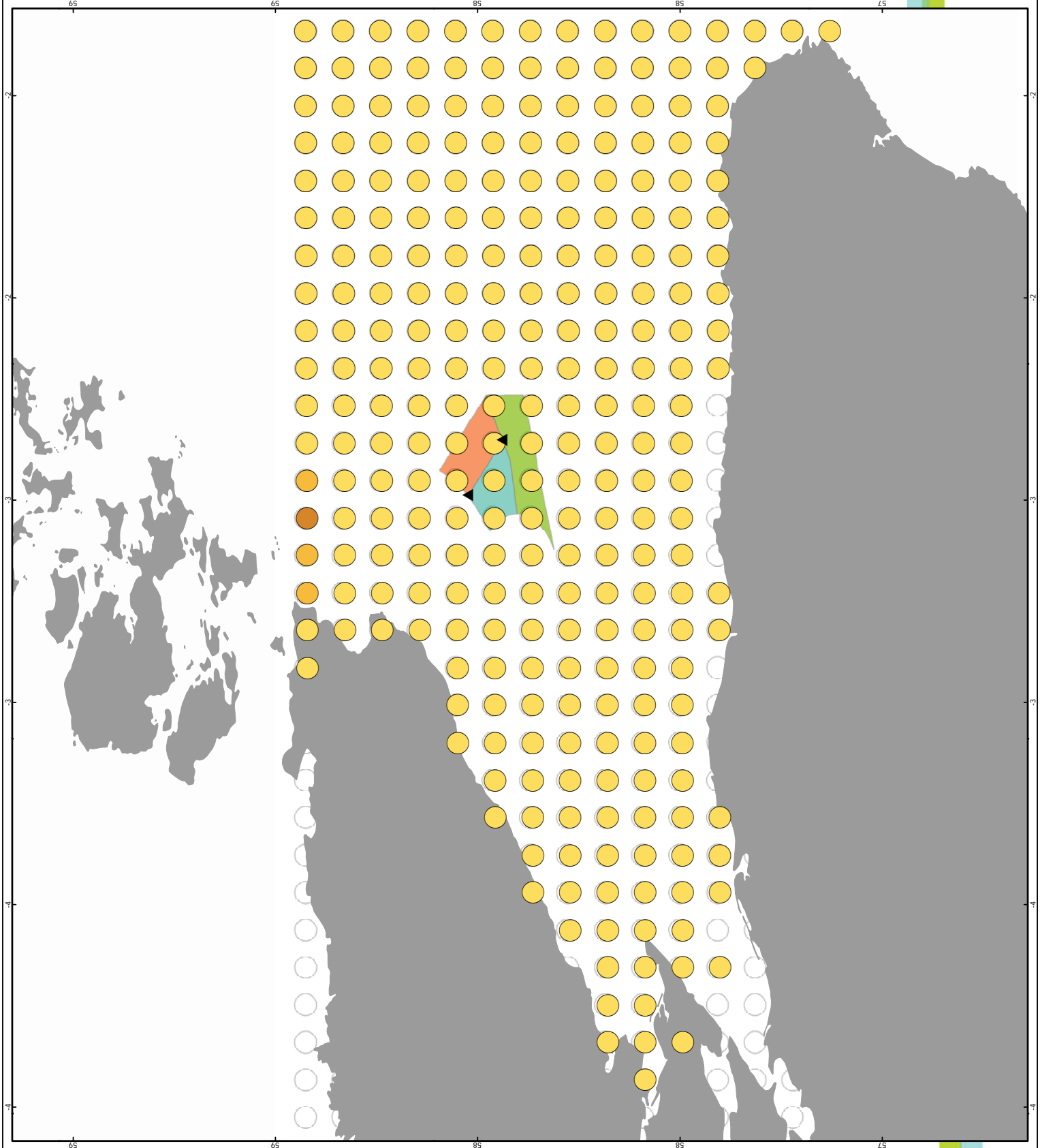


Figure A44: Scenario 3  
 SAFESIMM  
 Grey Seal 186 dB  
 Moray Offshore  
 Renewables Ltd

**KEY**

- Telford
- Stevenson
- MacColl

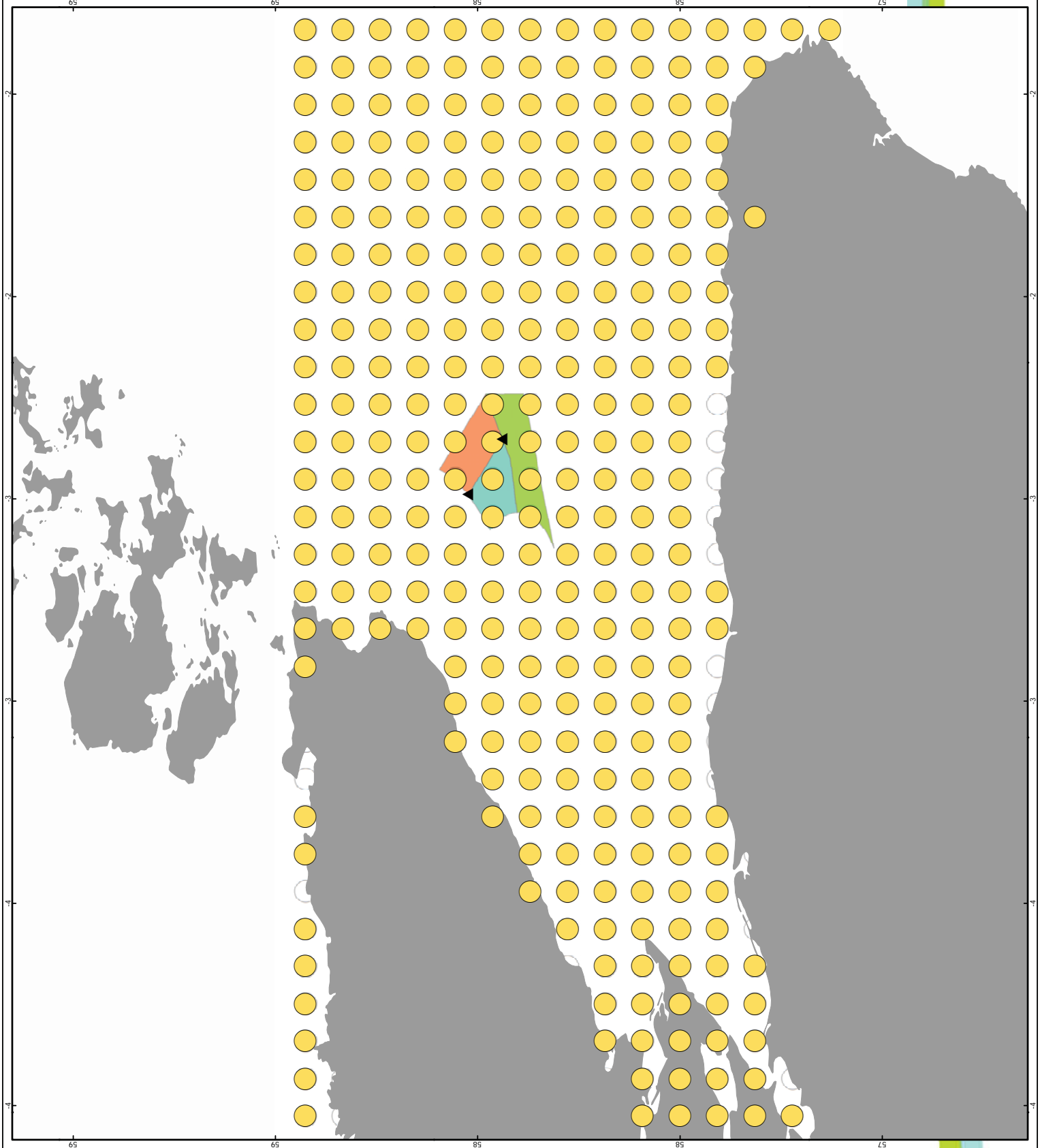
▲ MORL piling location  
**Number of grey seals predicted to receive SELs sufficient to induce PTS onset**

- 0
- >0 - 5
- >5 - 10
- >10 - 15
- >15 - 20
- >20 - 23

Horizontal Scale: 1:900,000  
 0 20 40 km  
 A3 Chart N

Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-208

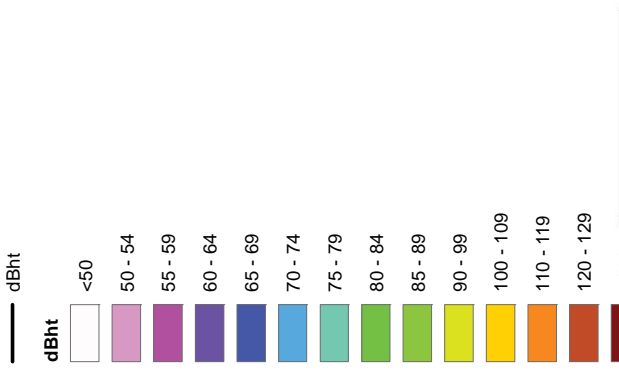
**Figure A45: Scenario 3**  
**SAFESIMM**  
 Grey Seal 198 dB  
 Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

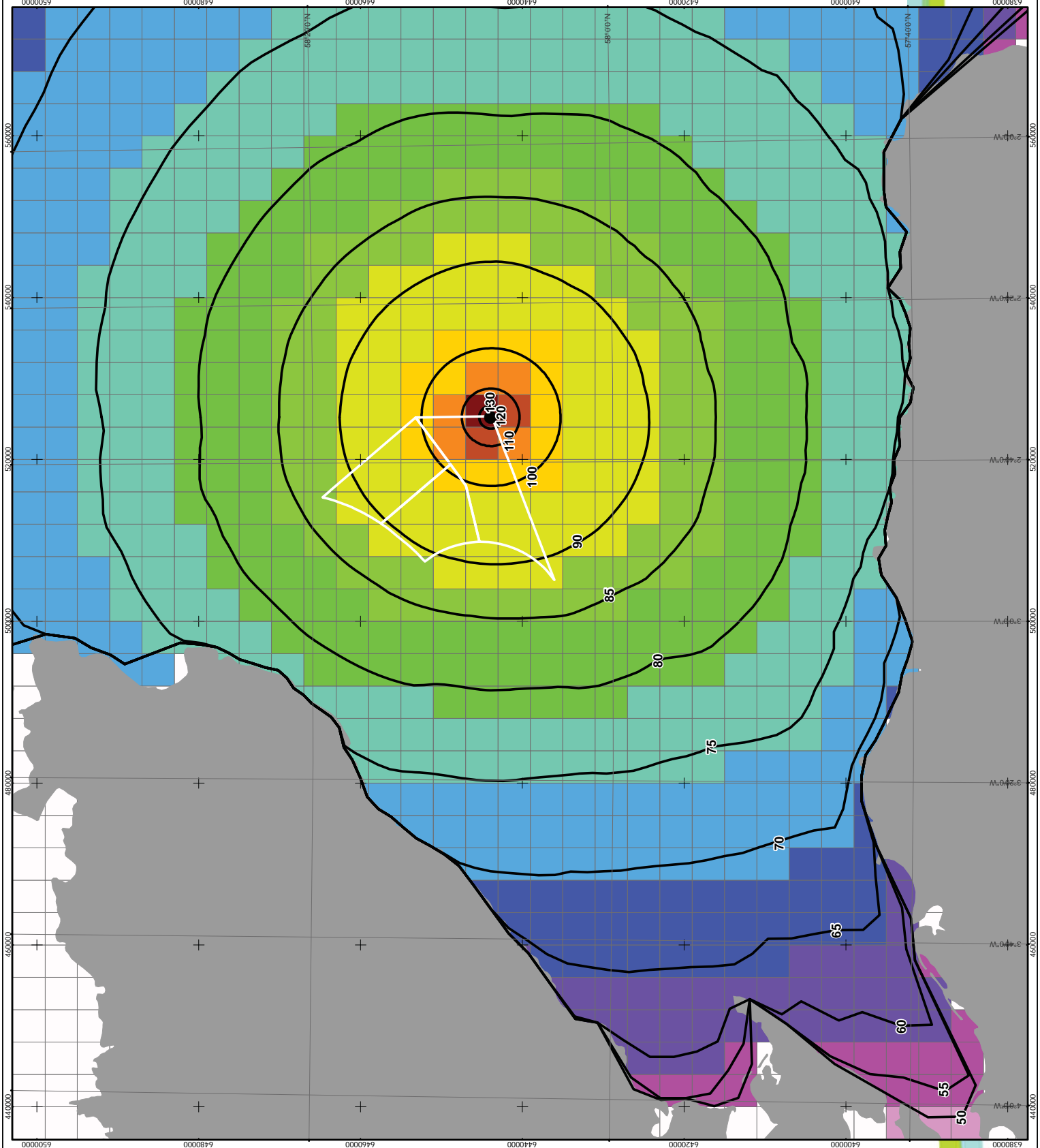
**KEY**  
 Telford, Stevenson and MacColl  
 MORL piling location



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-130

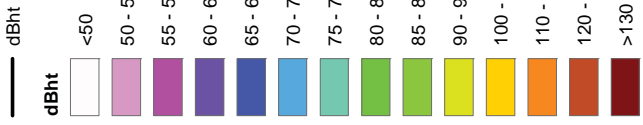


**Figure B1: Scenario 4**  
 Harbour Porpoise dBht  
 Moray Offshore Renewables Ltd

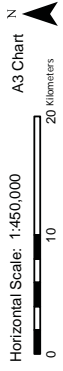


Moray Offshore Renewables Ltd

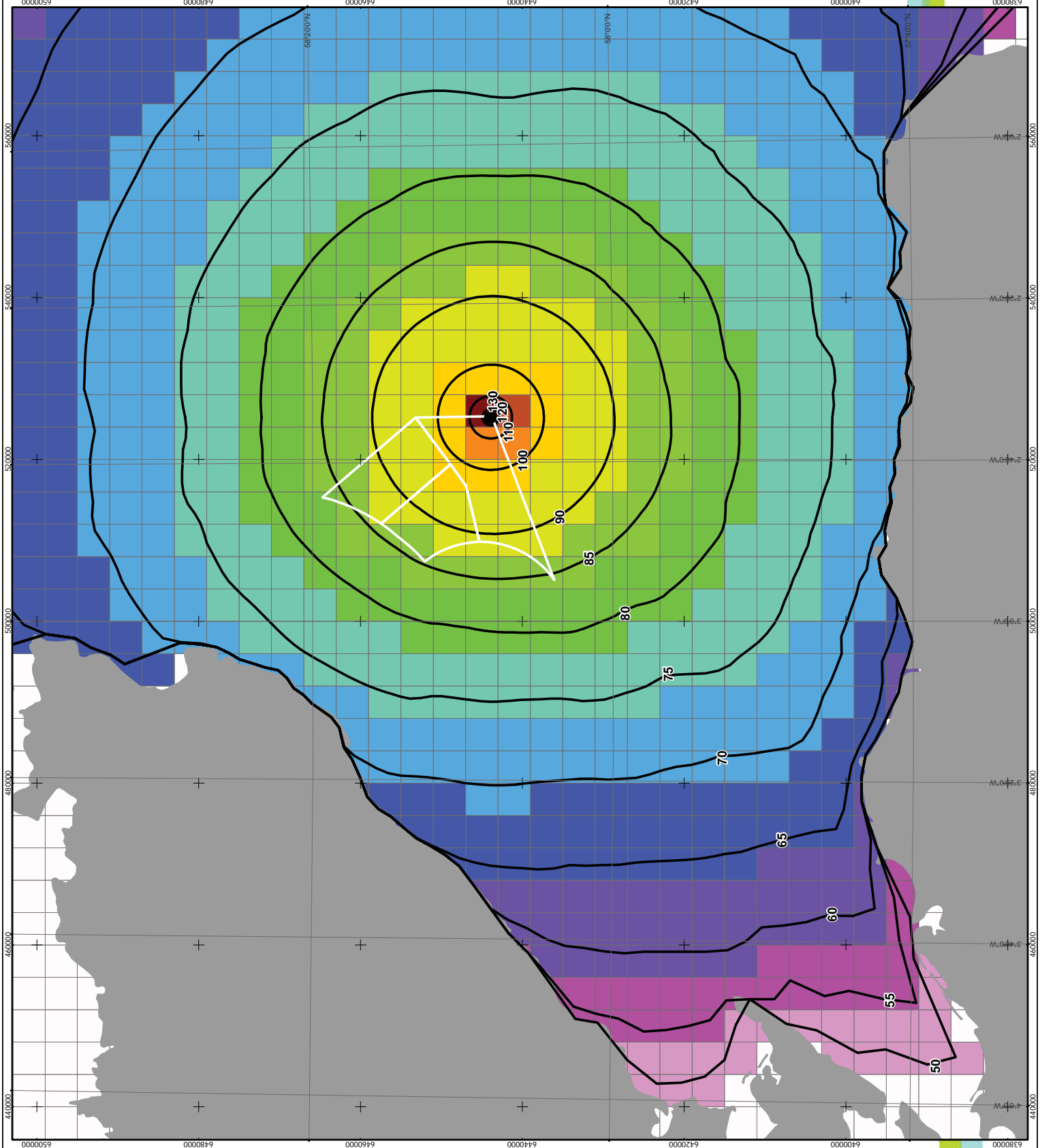
**KEY**  
 Telford, Stevenson and MacColl  
 MORL piling location



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-129

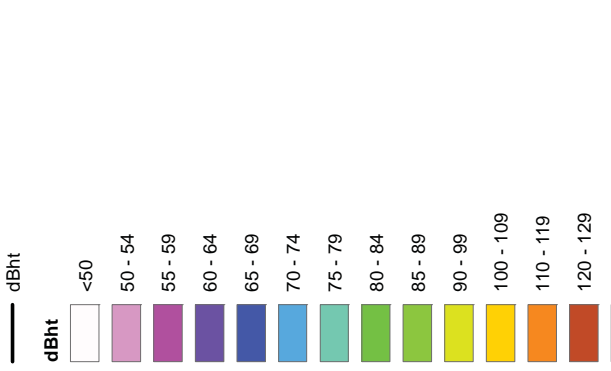


**Figure B2: Scenario 4**  
 Bottlenose Dolphin dBht  
 Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

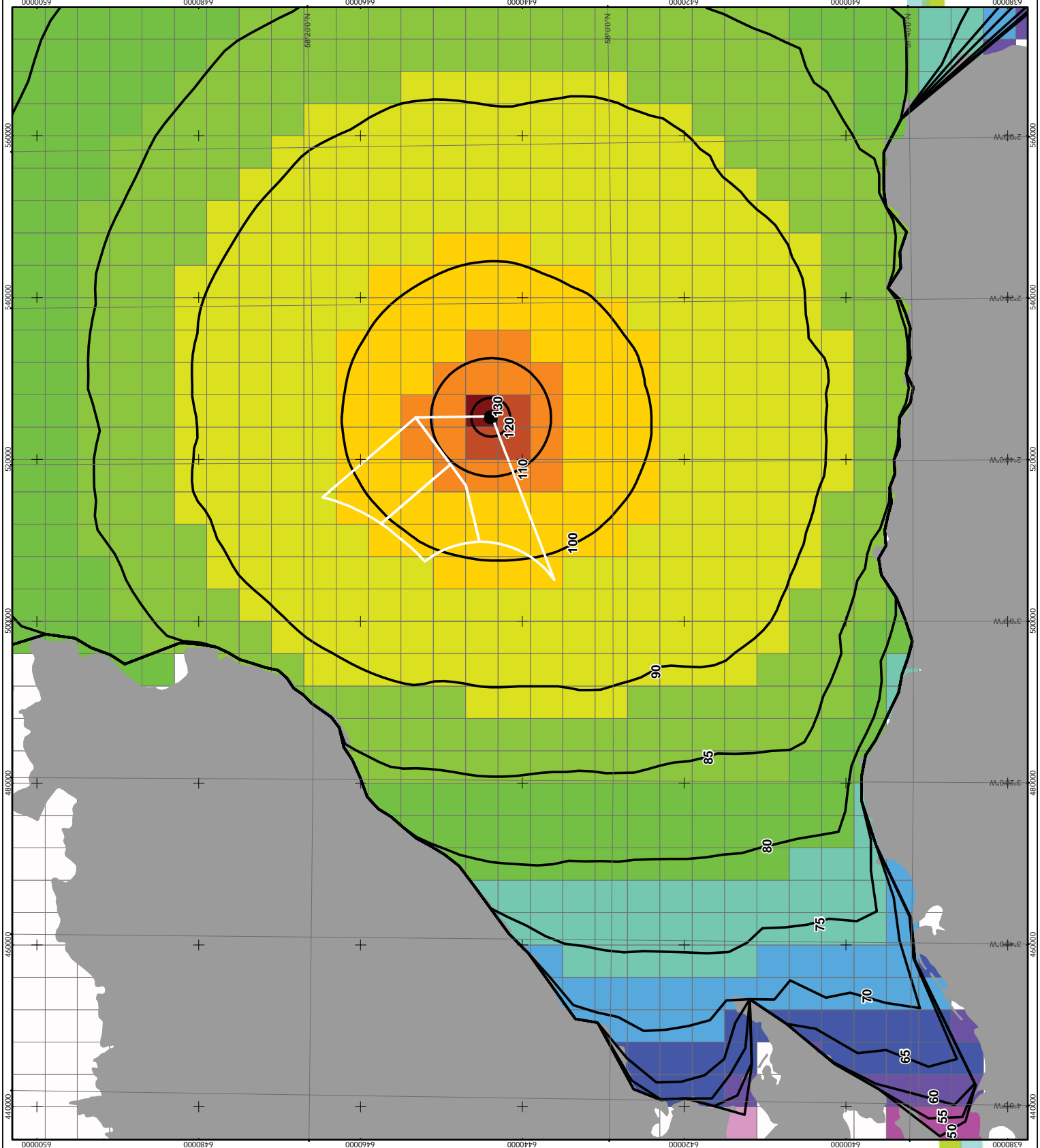
**KEY**  
 Telford, Stevenson and MacColl  
 MORL piling location



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D\VD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-132



**Figure B3: Scenario 4**  
 Minke Whale dBht

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

Telford, Stevenson and MacColl

MORL piling location

dBht

<50

50 - 54

55 - 59

60 - 64

65 - 69

70 - 74

75 - 79

80 - 84

85 - 89

90 - 99

100 - 109

110 - 119

120 - 129

>130

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: GL  
Reviewed: SC  
Approved: CJP  
Date: 02/05/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-131

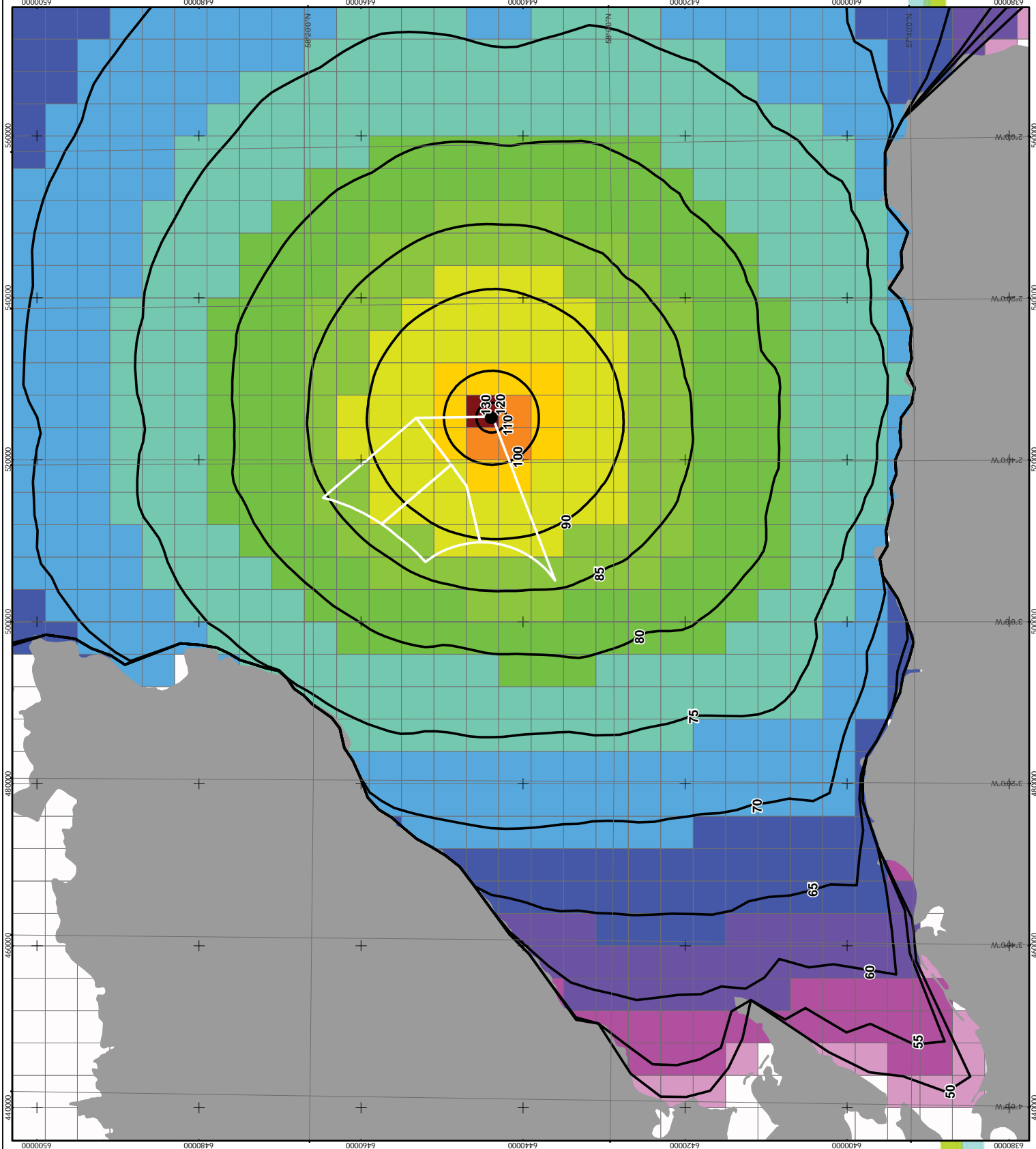


Figure B4: Scenario 4 Harbour Seal dBht

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY



Telford, Stevenson and MacColl



MORL piling location

dB



186



188



190



192



194



196

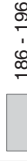


198

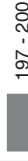


200

Max dB



186 - 196



197 - 200

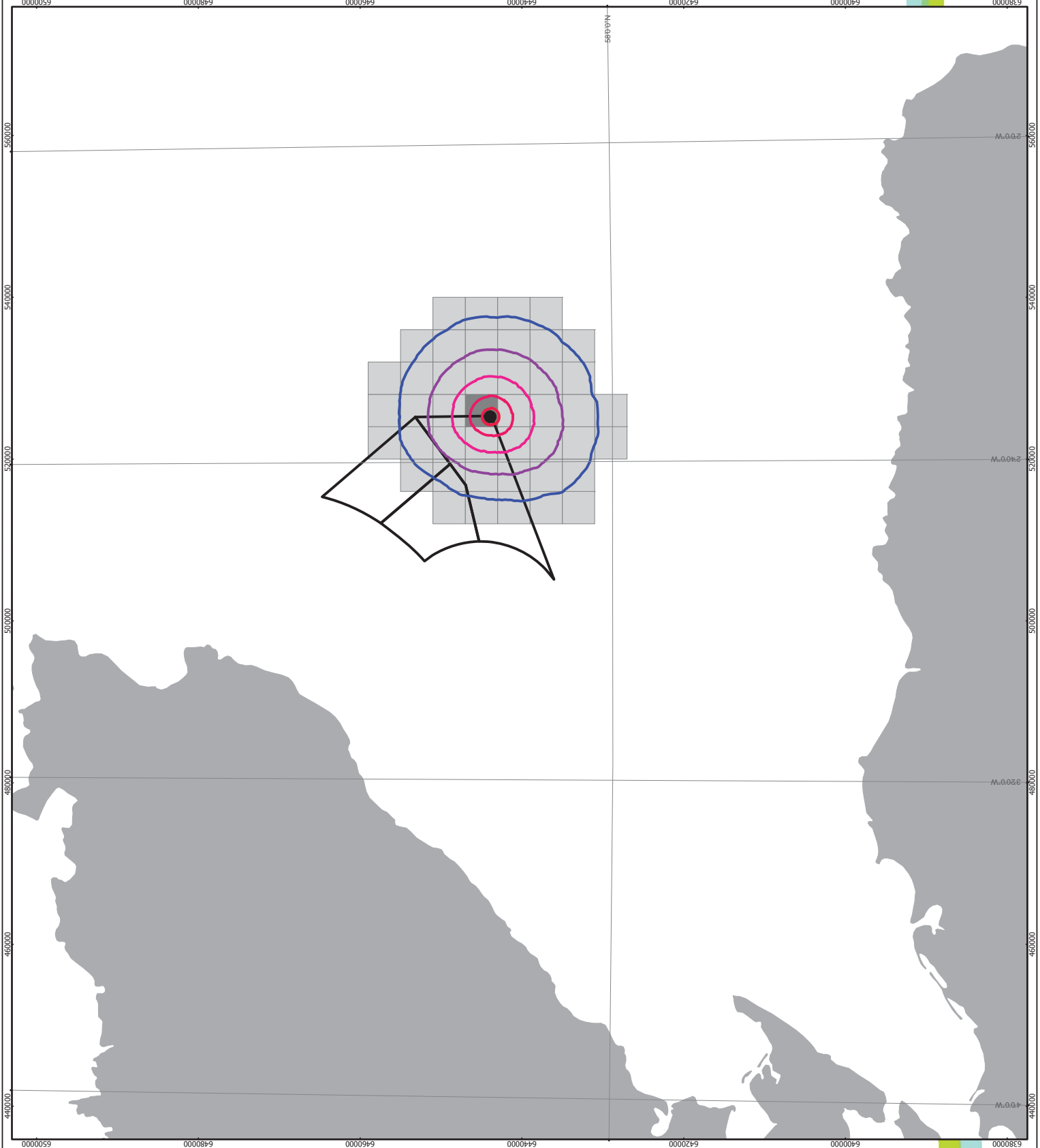
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-133

Figure B5: Scenario 4  
 High Frequency Cetaceans  
 SEL

Moray Offshore  
 Renewables Ltd







Moray Offshore Renewables Ltd

KEY



Telford, Stevenson and MacColl



MORL piling location

dB



186



188



190



192



194



196

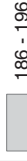


198

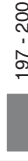


200

Max dB



186 - 196



197 - 200

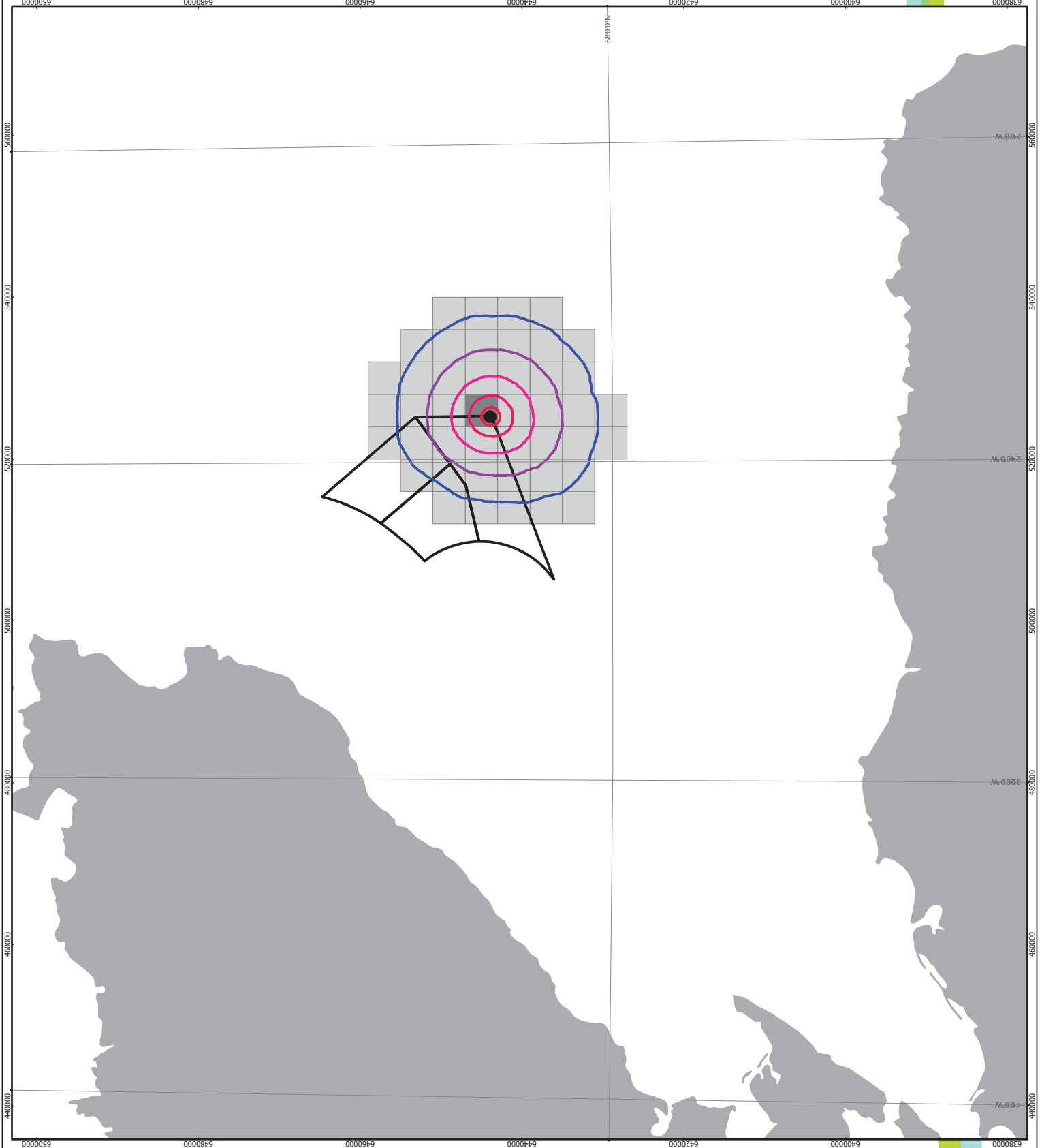
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N



Geodetic Parameters: WGS84 UTM Zone 30N	
Produced: LG	Reviewed: SC
Approved: CJP	Date: 02/05/2012
Revision: A	REF: 8460001-PPW0200-NPW-MAP-135

Figure B6: Scenario 4  
Mid Frequency Cetaceans  
SEL







Moray Offshore  
Renewables Ltd





KEY

-  Telford, Stevenson and MacColl
-  MORL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

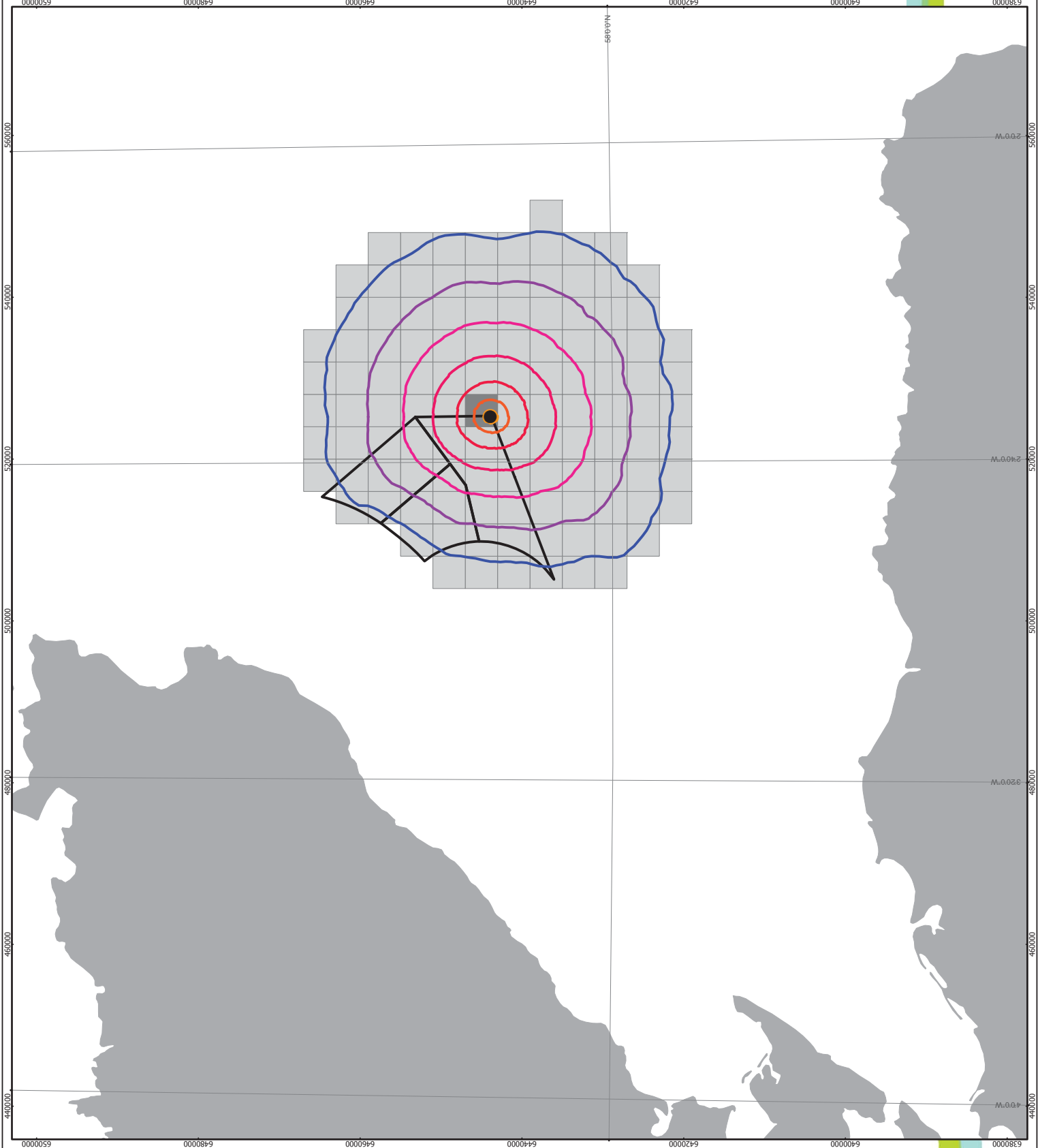
-  186 - 196
-  197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 02/05/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-134	

Figure B7: Scenario 4  
Low Frequency Cetaceans  
SEL



KEY



Telford, Stevenson and MacColl



MORL piling location

dB



186



188



190



192



194



196

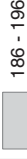


198

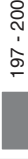


200

Max dB



186 - 196



197 - 200

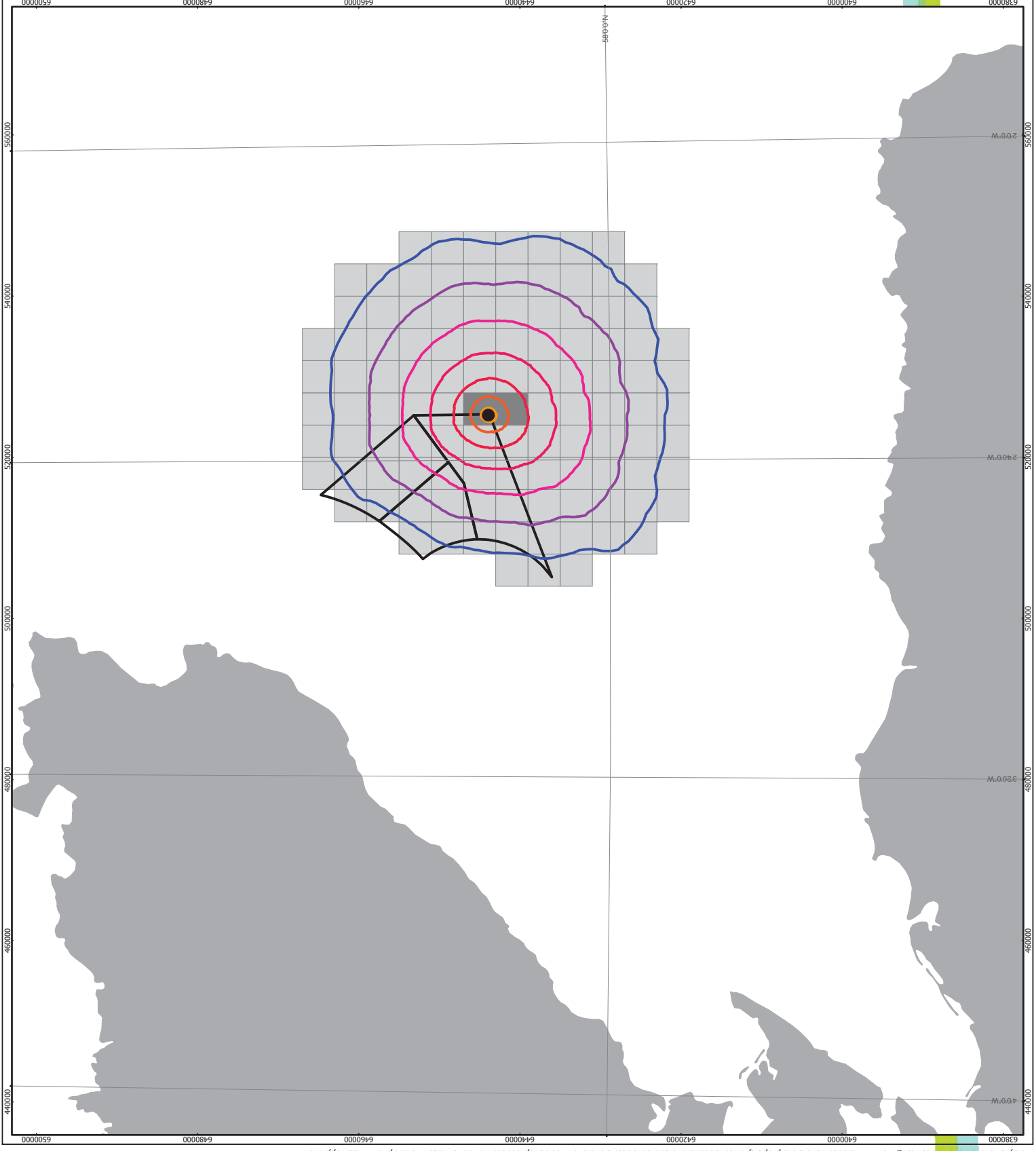
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-136

Figure B8: Scenario 4  
Pinnipeds  
SEL

Moray Offshore Renewables Ltd



- KEY**
- Telford
  - Stevenson
  - MacColl

▲ MORL piling location

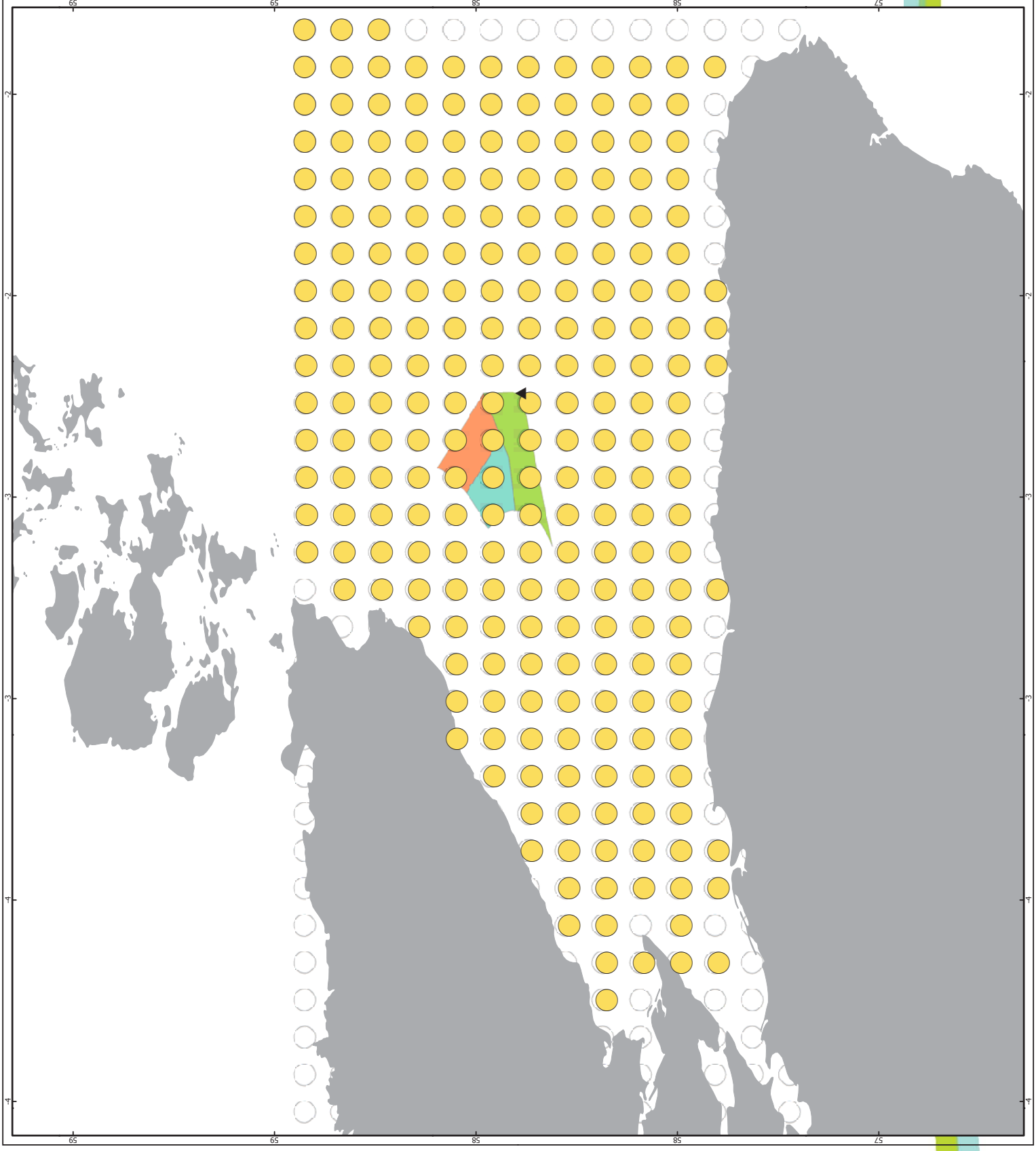
**Number of harbour porpoise predicted to receive SELs sufficient to induce PTS onset**

- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 18/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-209	



**Figure B9: Scenario 4**  
**SAFESIMM**  
 Harbour Porpoise 198 dB  
 Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

- Telford
- Stevenson
- MacColl

▲ MORL piling location

Number of bottlenose dolphins predicted to receive SELs sufficient to induce PTS onset

- 0
- 0.01
- 0.02

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

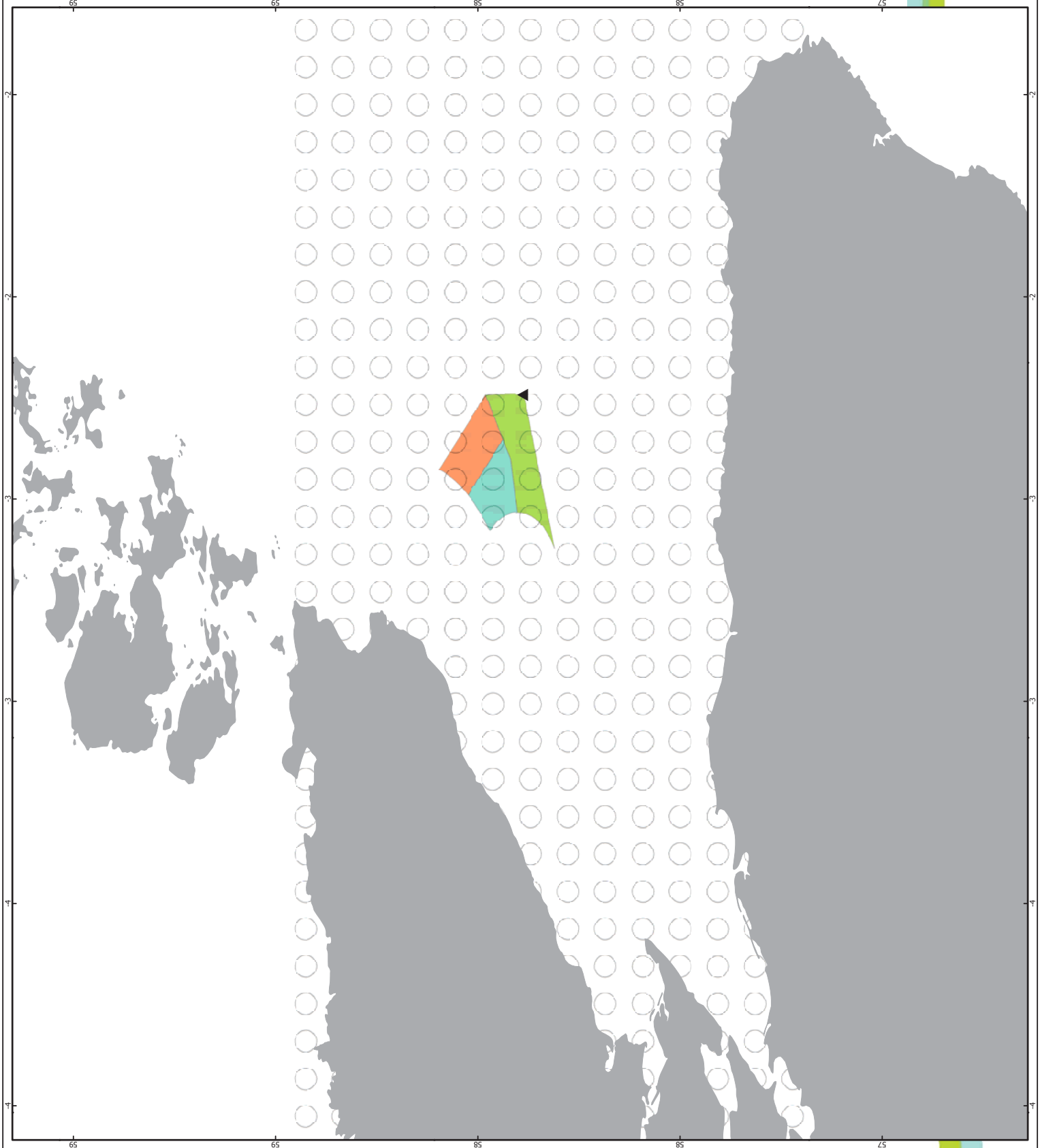
Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 18/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-211	

Figure B10: Scenario 4  
SAFESIMM

Bottlenose Dolphin 198 dB

Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

- KEY**
- Telford
  - Stevenson
  - MacColl

▲ MORL piling location

Number of minke whale predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DWD

Horizontal Scale: 1:1,550,000 A3 Chart N  
0 20 40 km

Geodetic Parameters: WGS 1984  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 08/05/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-212

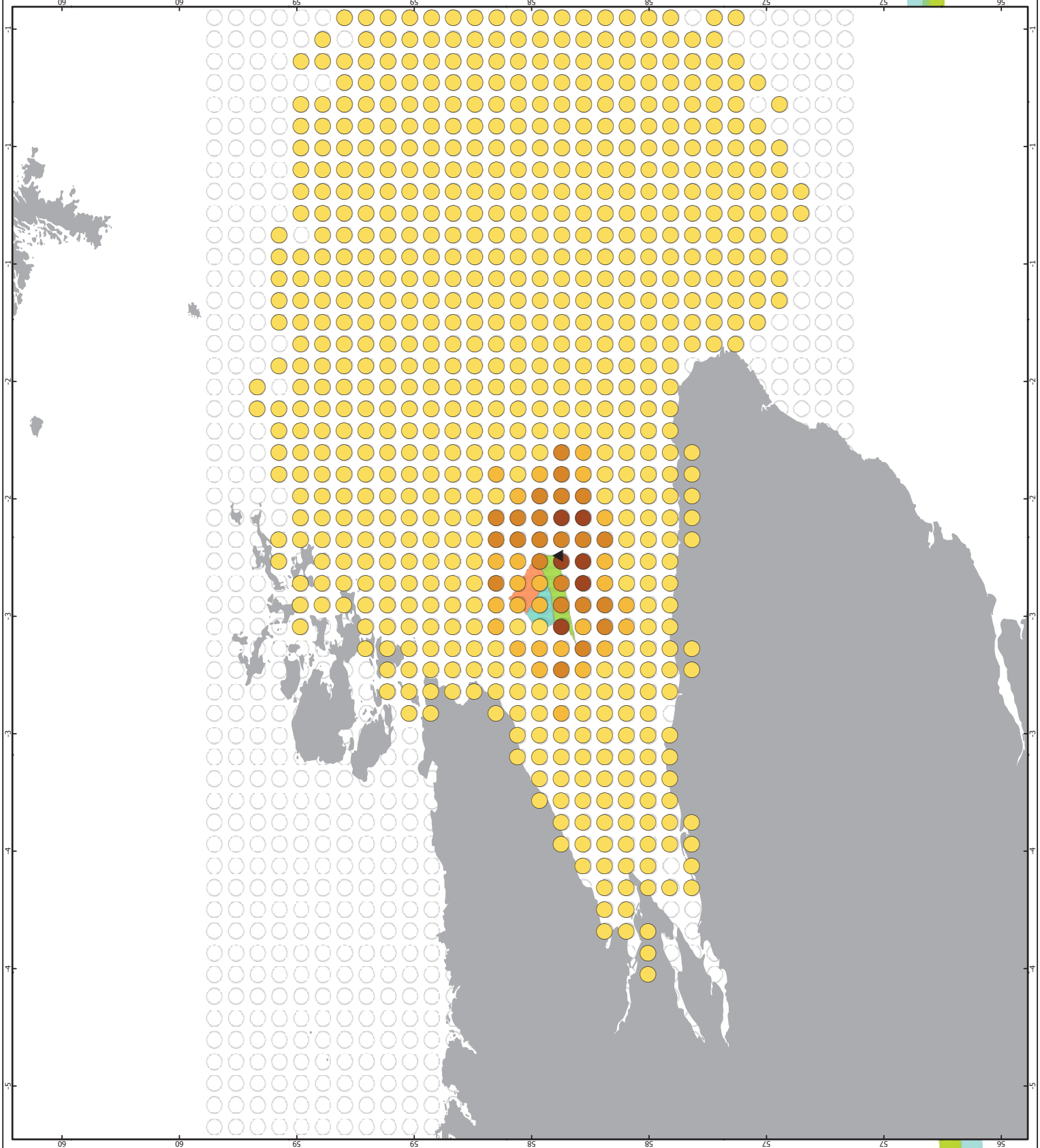










Figure B11: Scenario 4  
SAFESIMM  
Minke Whale 198 dB  
Moray Offshore Renewables Ltd

KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

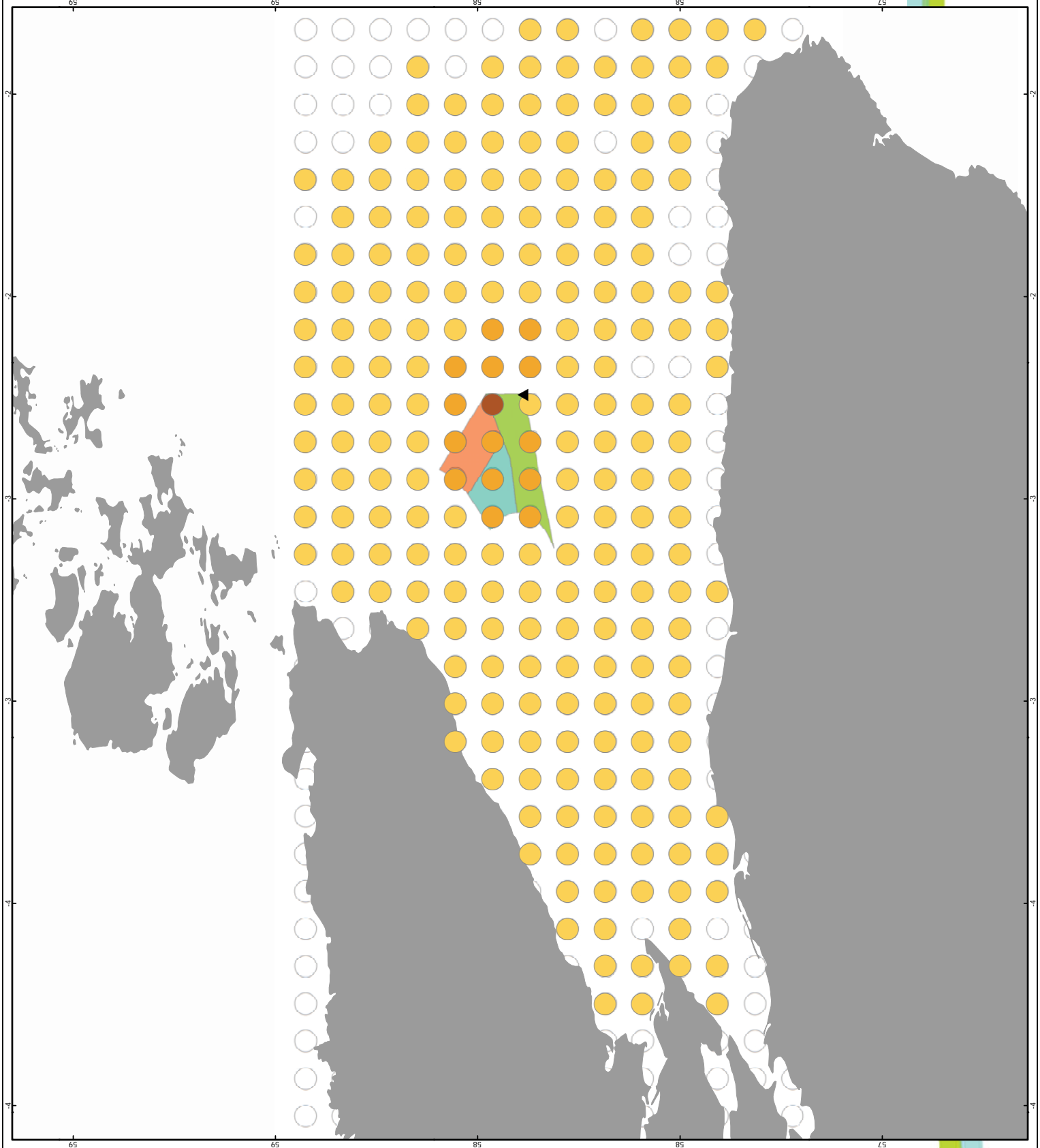
Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

Horizontal Scale: 1:900,000 A3 Chart N  





Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 18/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-213	

**Figure B12: Scenario 4**  
**SAFESIMM**  
 Harbour Seal 186 dB  
 Moray Offshore Renewables Ltd





KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

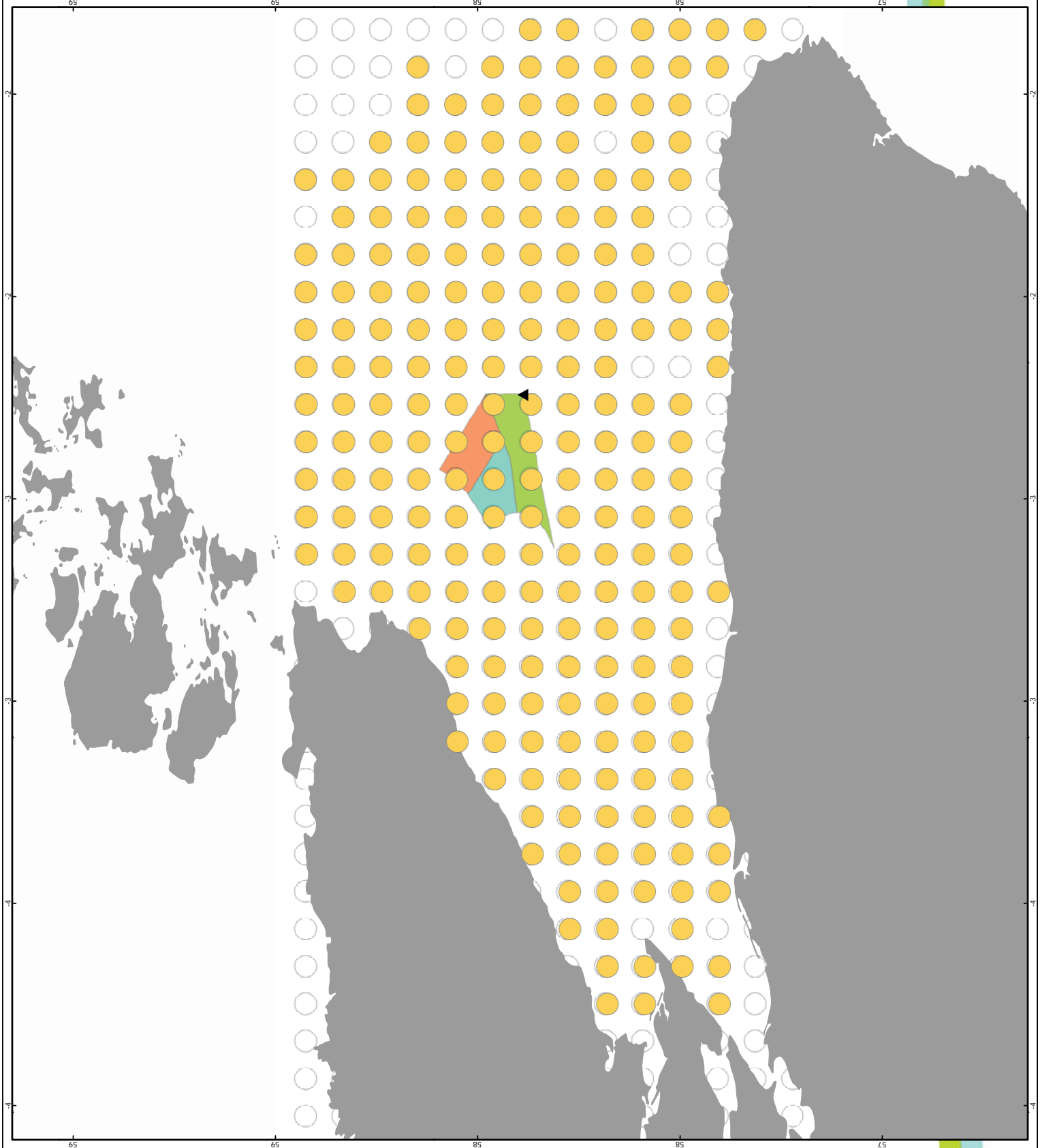
-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  
0 20 40 km

Geodetic Parameters: WGS 1984  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 18/04/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-214

Figure B13: Scenario 4  
SAFESIMM  
Harbour Seal 198 dB  
Moray Offshore Renewables Ltd









KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

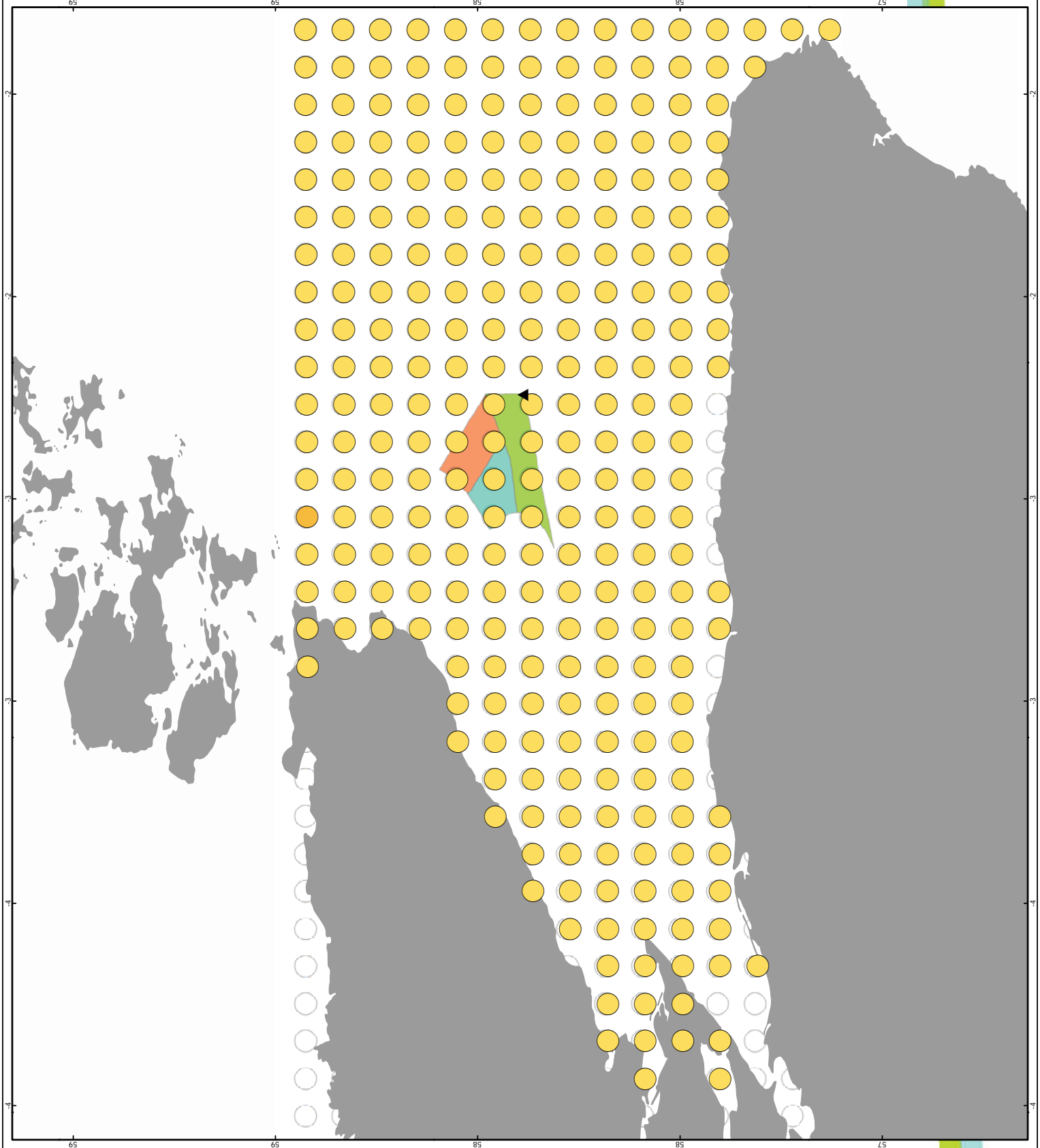
-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  
0 20 40 km

Geodetic Parameters: WGS 1984  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 18/04/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-215

Figure B14: Scenario 4  
SAFESIMM  
Grey Seal 186 dB  
Moray Offshore Renewables Ltd




**KEY**

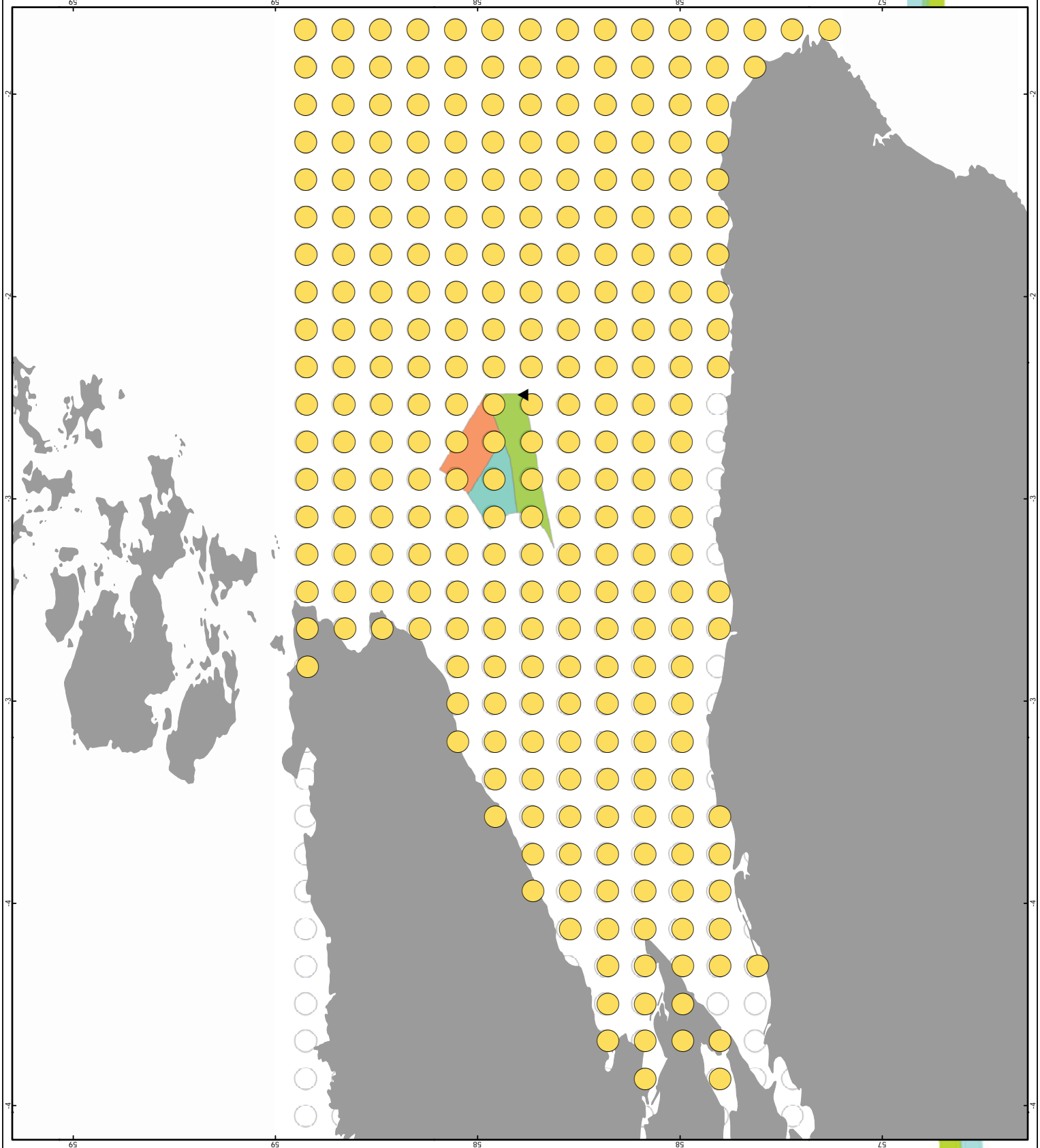
- Telford
- Stevenson
- MacColl

▲ MORL piling location  
 Number of grey seals predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 5
- >5 - 10
- >10 - 15
- >15 - 20
- >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
 For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  
  
 Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-216



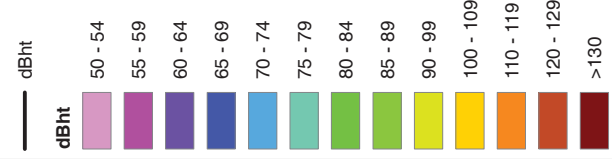
**Figure B15: Scenario 4**  
**SAFESIMM**  
 Grey Seal 198 dB  
 Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

Telford, Stevenson and MacColl  
dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 27/04/2012 Revision: B  
REF: 8460001-PPW0200-NPW-MAP-073

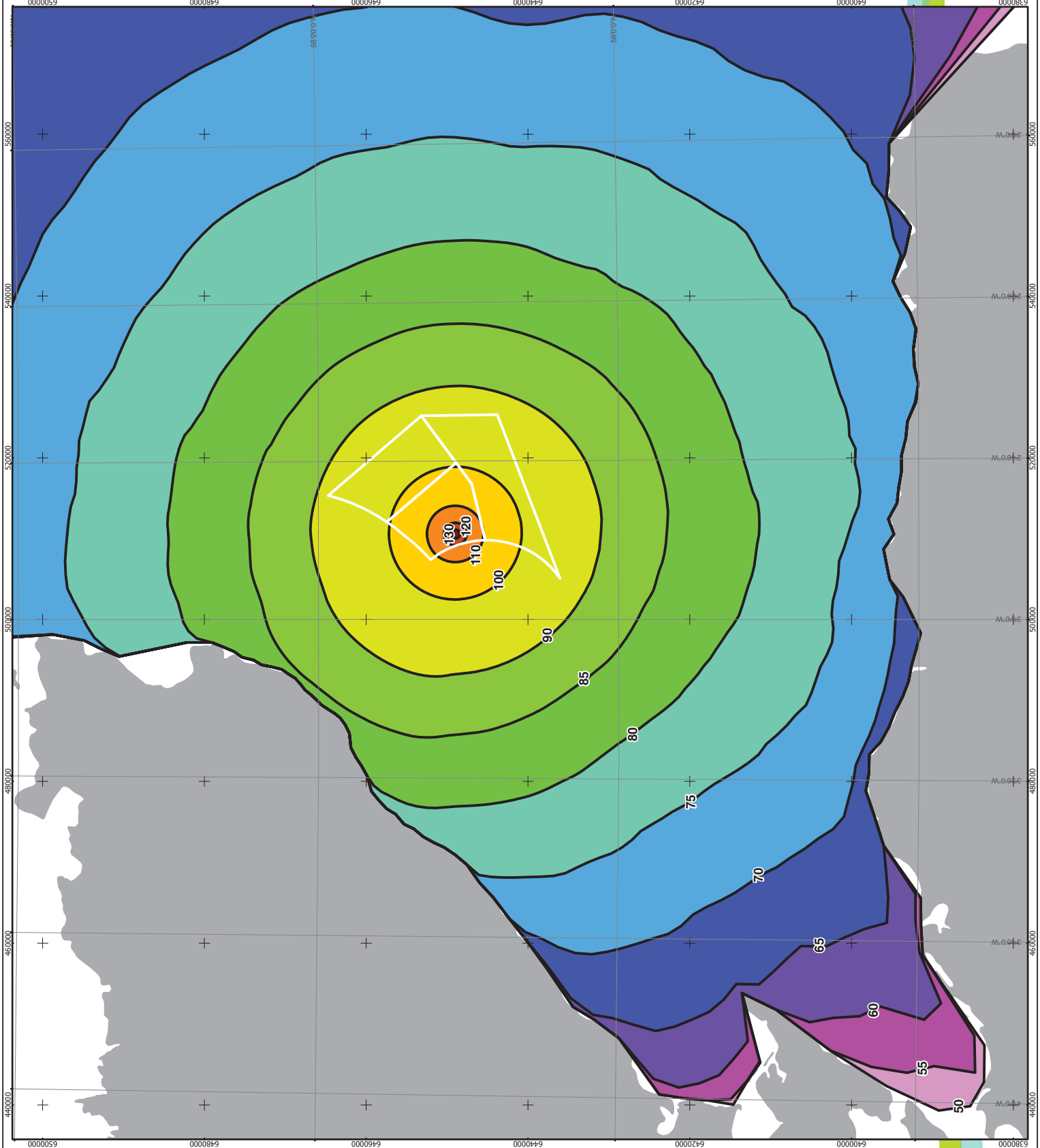
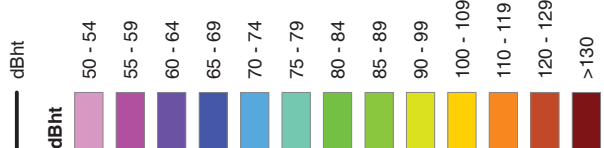


Figure C1: Metmast  
Harbour Porpoise dBht  
Moray Offshore  
Renewables Ltd

KEY  
 Telford, Stevenson and MacColl  
 dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012 Revision: B  
 REF: 8460001-PPW0200-NPW-MAP-074

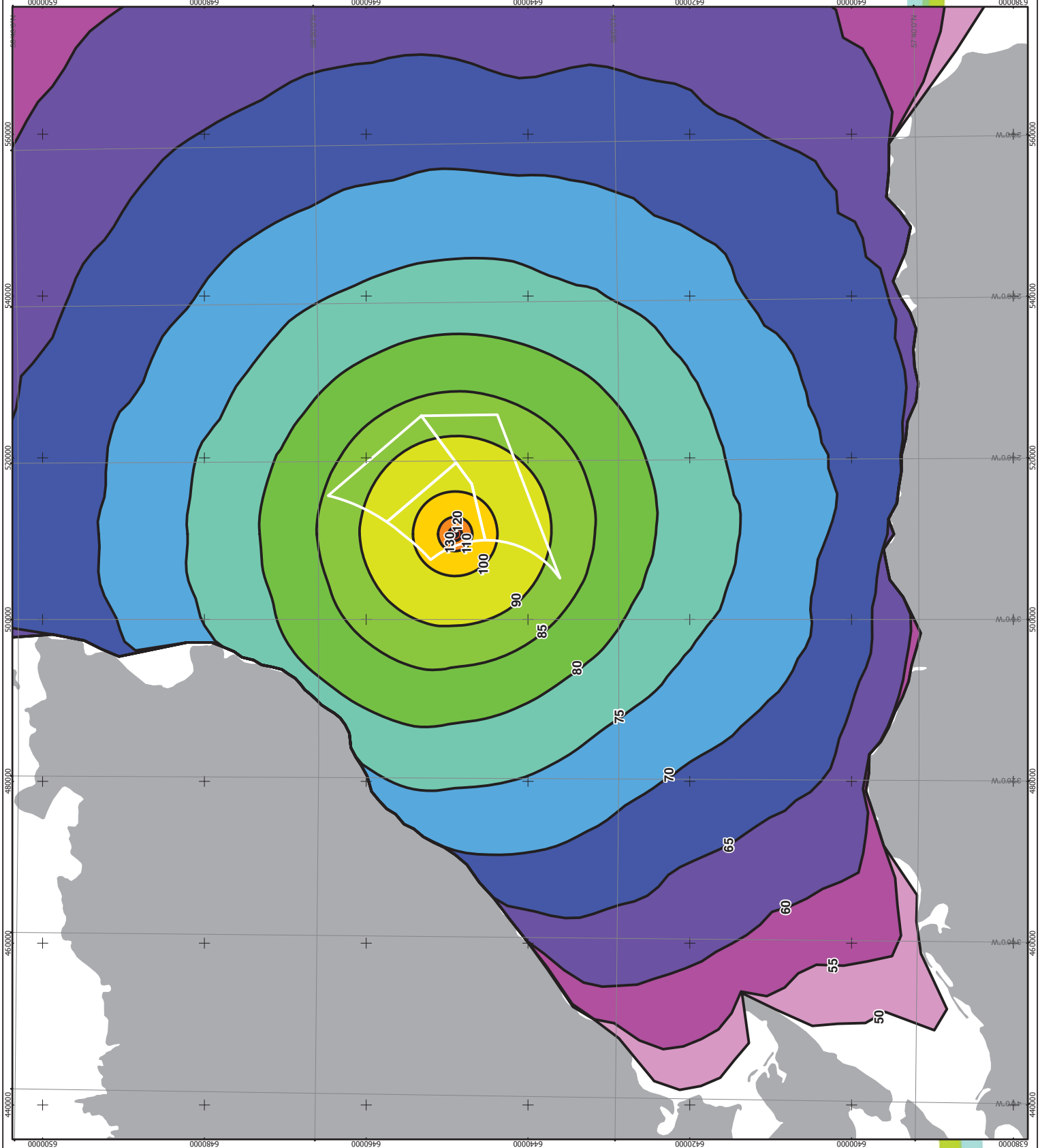


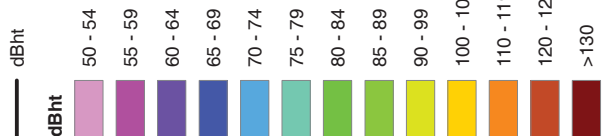
Figure C2: Metmast Bottlenose Dolphin dBht



Moray Offshore Renewables Ltd

KEY

Telford, Stevenson and MacColl  
dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  
0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 27/04/2012 Revision: B  
REF: 8460001-PPW0200-NPW-MAP-075

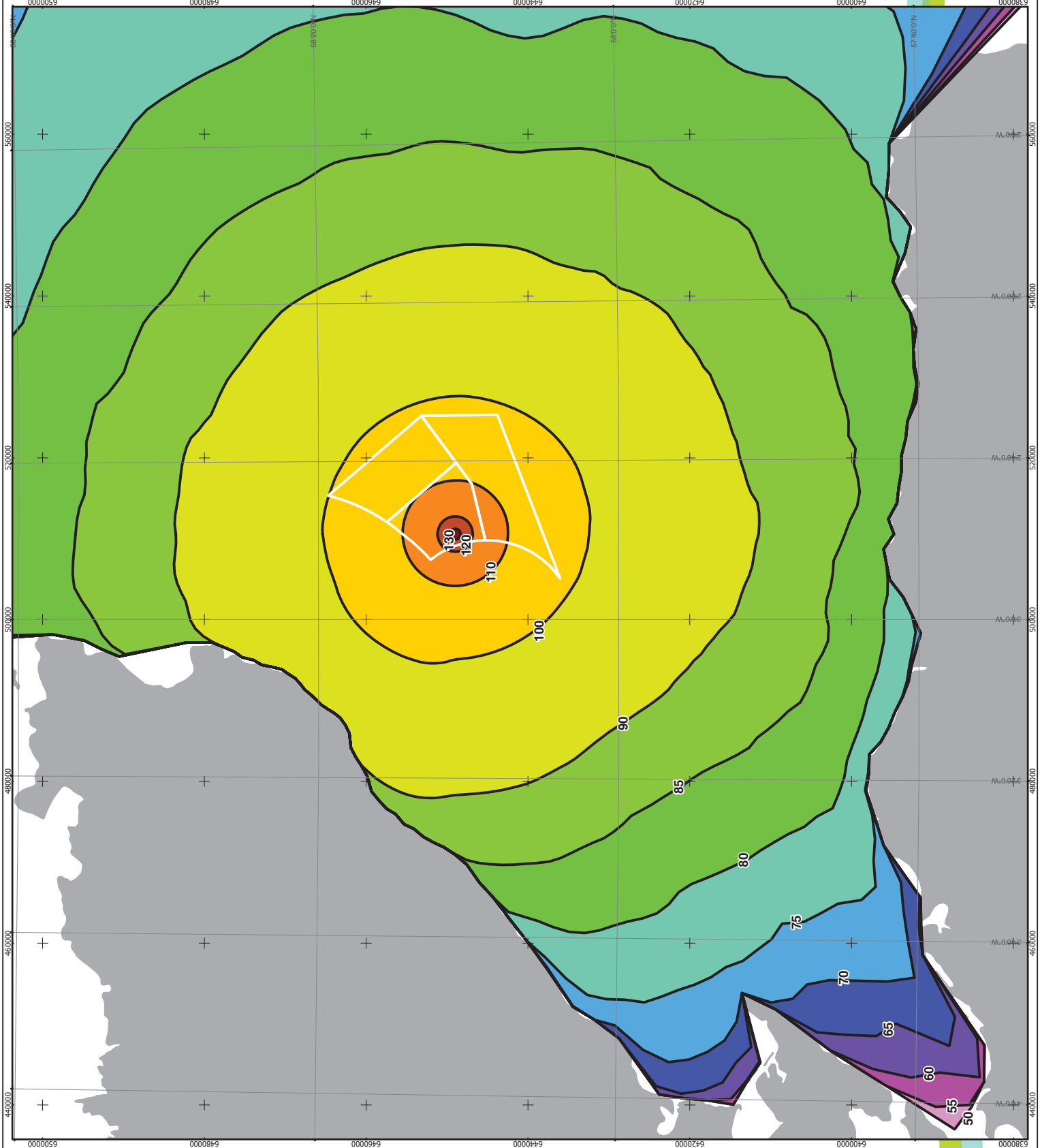


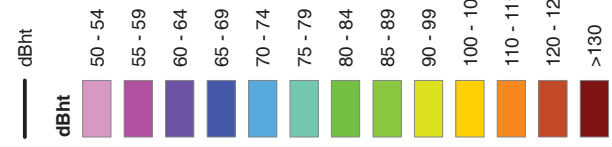
Figure C3: Metmast  
Minke Whale dBht

Moray Offshore  
Renewables Ltd



KEY

Telford, Stevenson and MacColl  
dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D.VD



Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 27/04/2012 Revision: B  
REF: 8460001-PPW0200-NPW-MAP-076

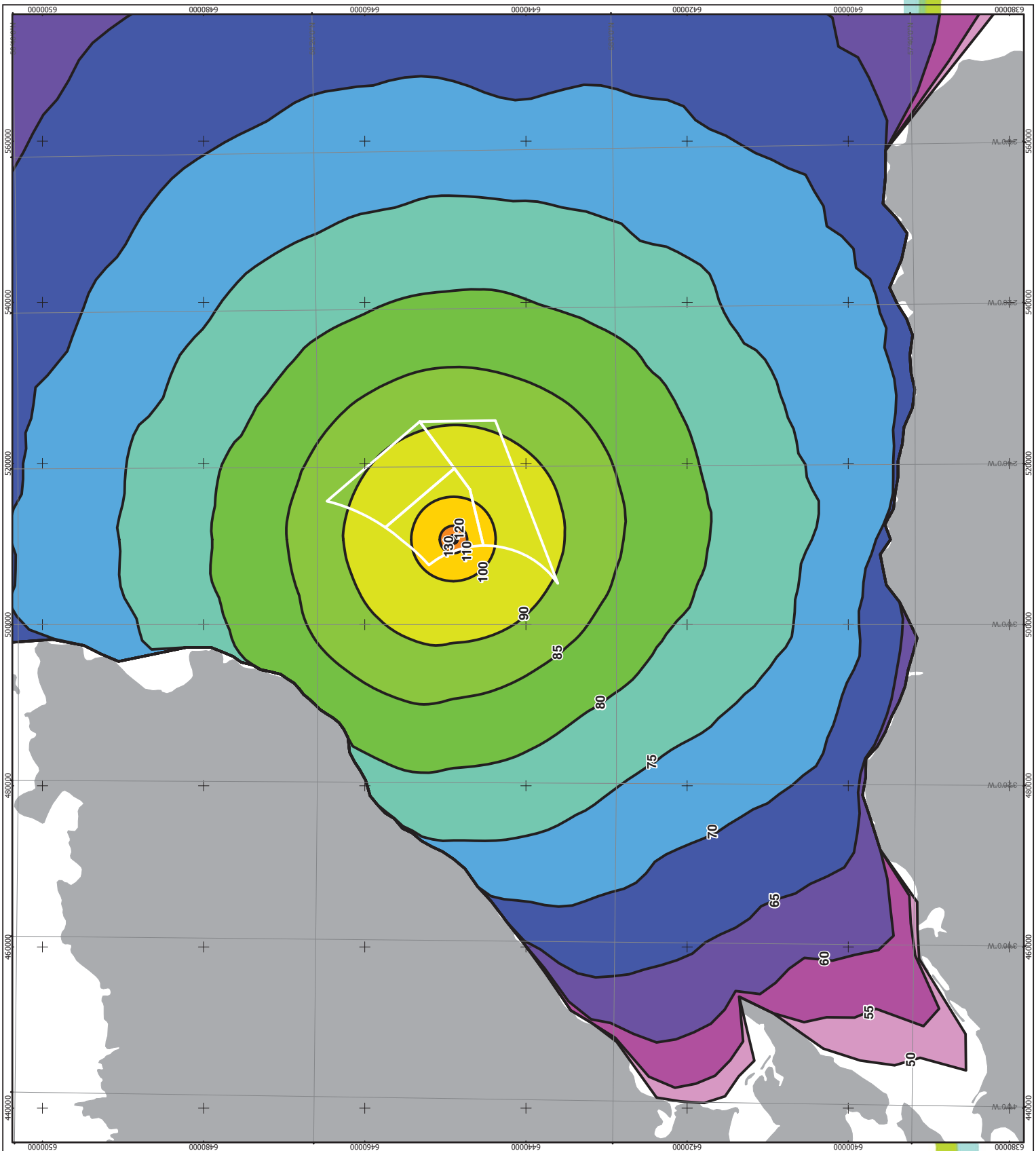


Figure C4: Metmast Seal dBht





Moray Offshore Renewables Ltd

KEY



Telford, Stevenson and MacColl



SEL 198 dB

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:400,000 A3 Chart N  
0 8 16 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LG

Reviewed: SC

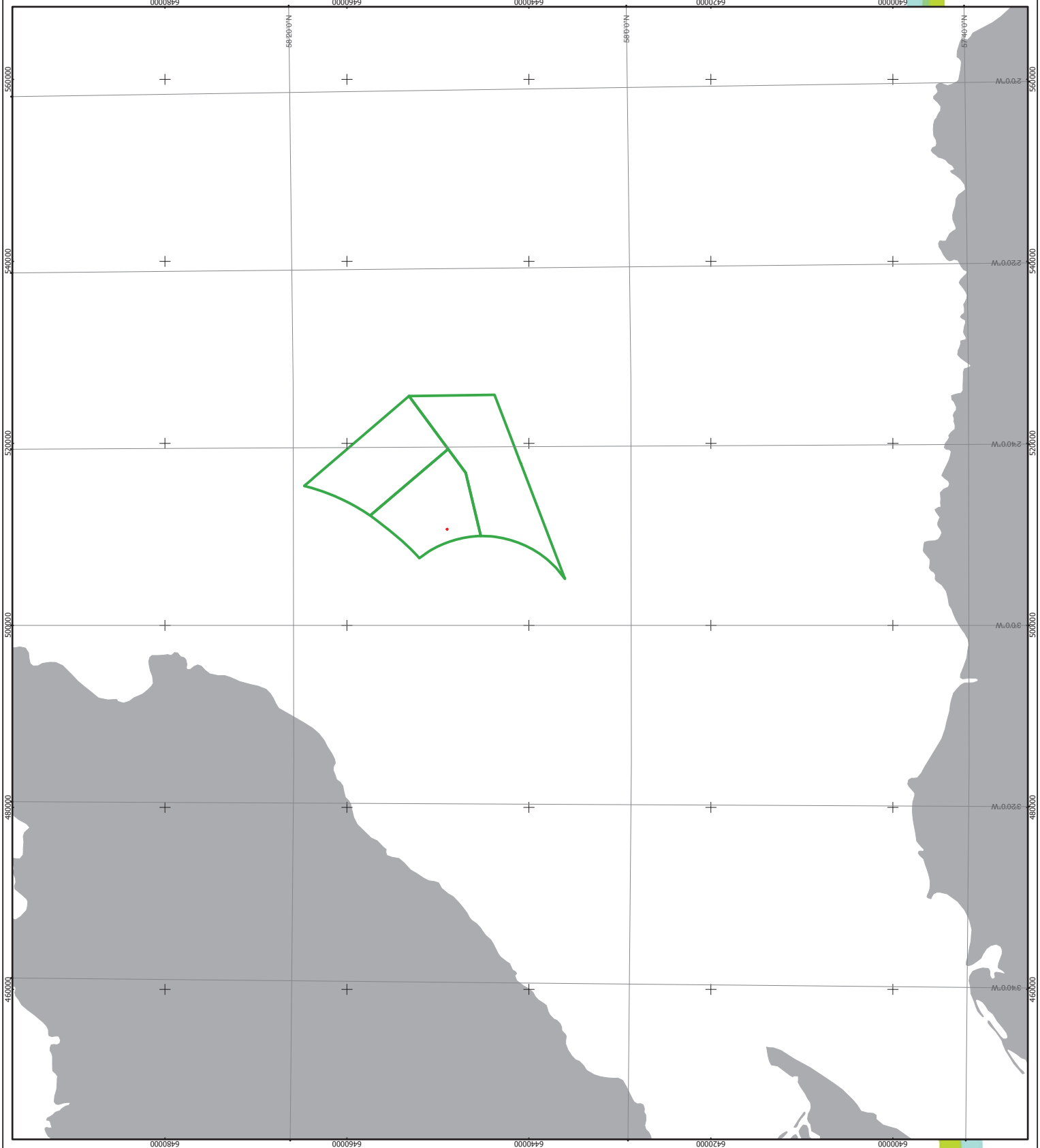
Approved: CJP

Date: 27/04/2012 Revision: B

REF: 8460001-PPW0200-NPW-MAP-077

Figure C5: Metmast  
High Frequency Cetacean  
SEL 198 dB

Moray Offshore  
Renewables Ltd





Moray Offshore Renewables Ltd

KEY



Telford, Stevenson and MacColl



SEL 198 dB

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:400,000 A3 Chart N  
0 8 16 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LG

Reviewed: SC

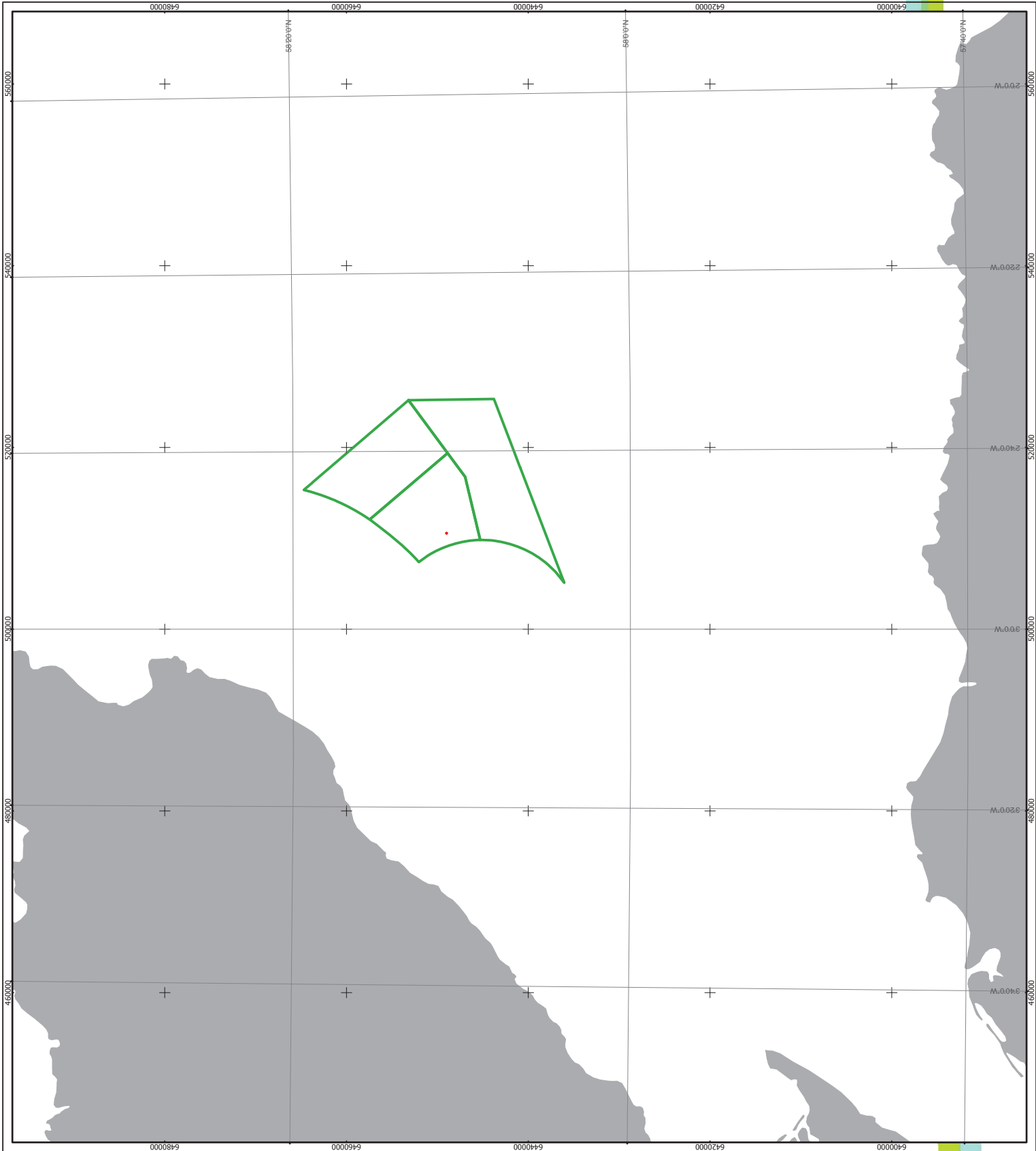
Approved: CJP

Date: 27/04/2012 Revision: B

REF: 8460001-PPW0200-NPW-MAP-078

Figure C6: Metmast  
Mid Frequency Cetacean  
SEL 198 dB

Moray Offshore  
Renewables Ltd





Moray Offshore Renewables Ltd

KEY



Telford, Stevenson and MacColl



SEL 198 dB

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:400,000 A3 Chart N  
0 8 16 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LG

Reviewed: SC

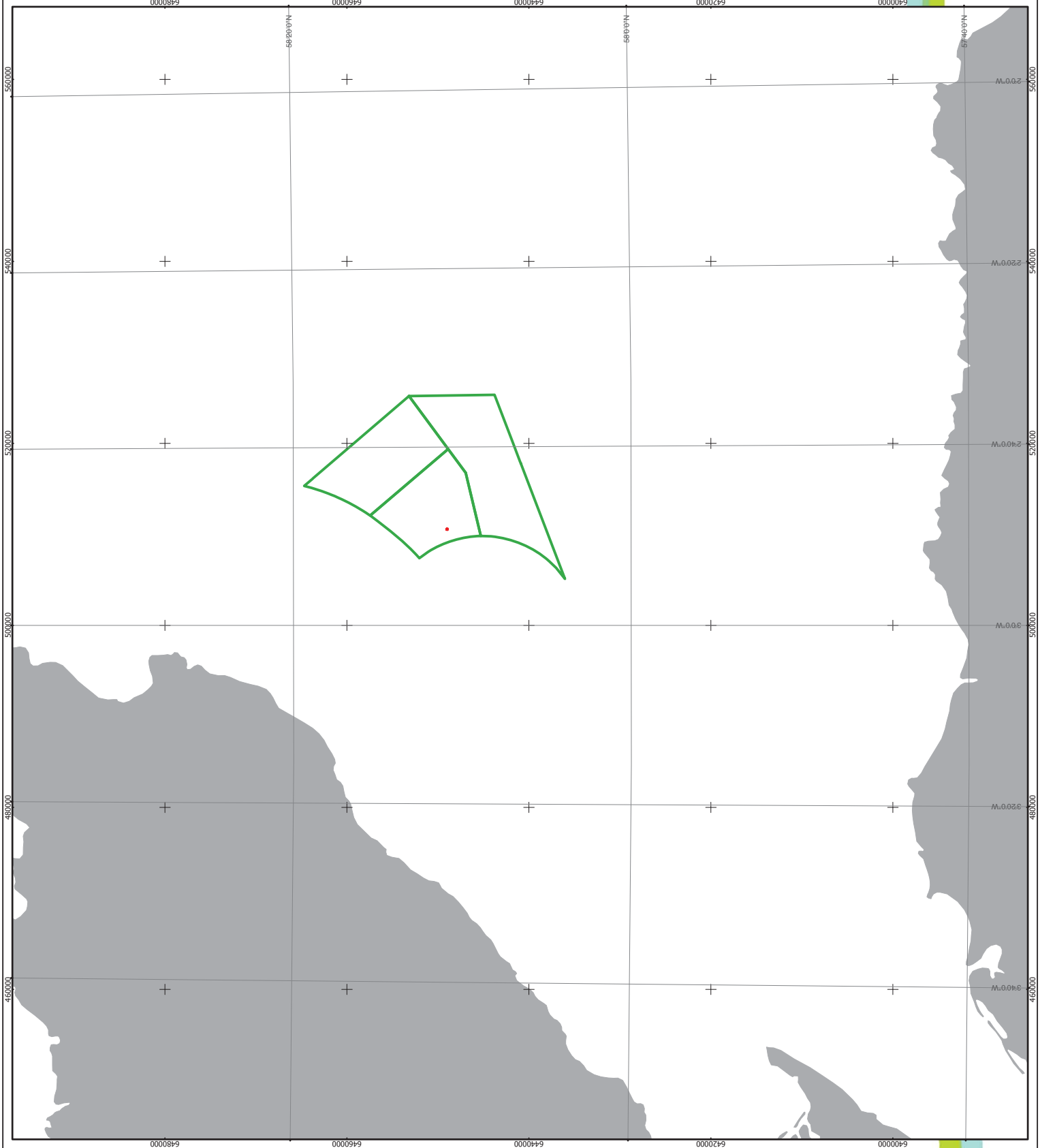
Approved: CJP

Date: 27/04/2012 Revision: B

REF: 8460001-PPW0200-NPW-MAP-079

Figure C7: Metmast  
Low Frequency Cetacean  
SEL 198 dB

Moray Offshore  
Renewables Ltd





Moray Offshore Renewables Ltd

KEY



Telford, Stevenson and MacColl



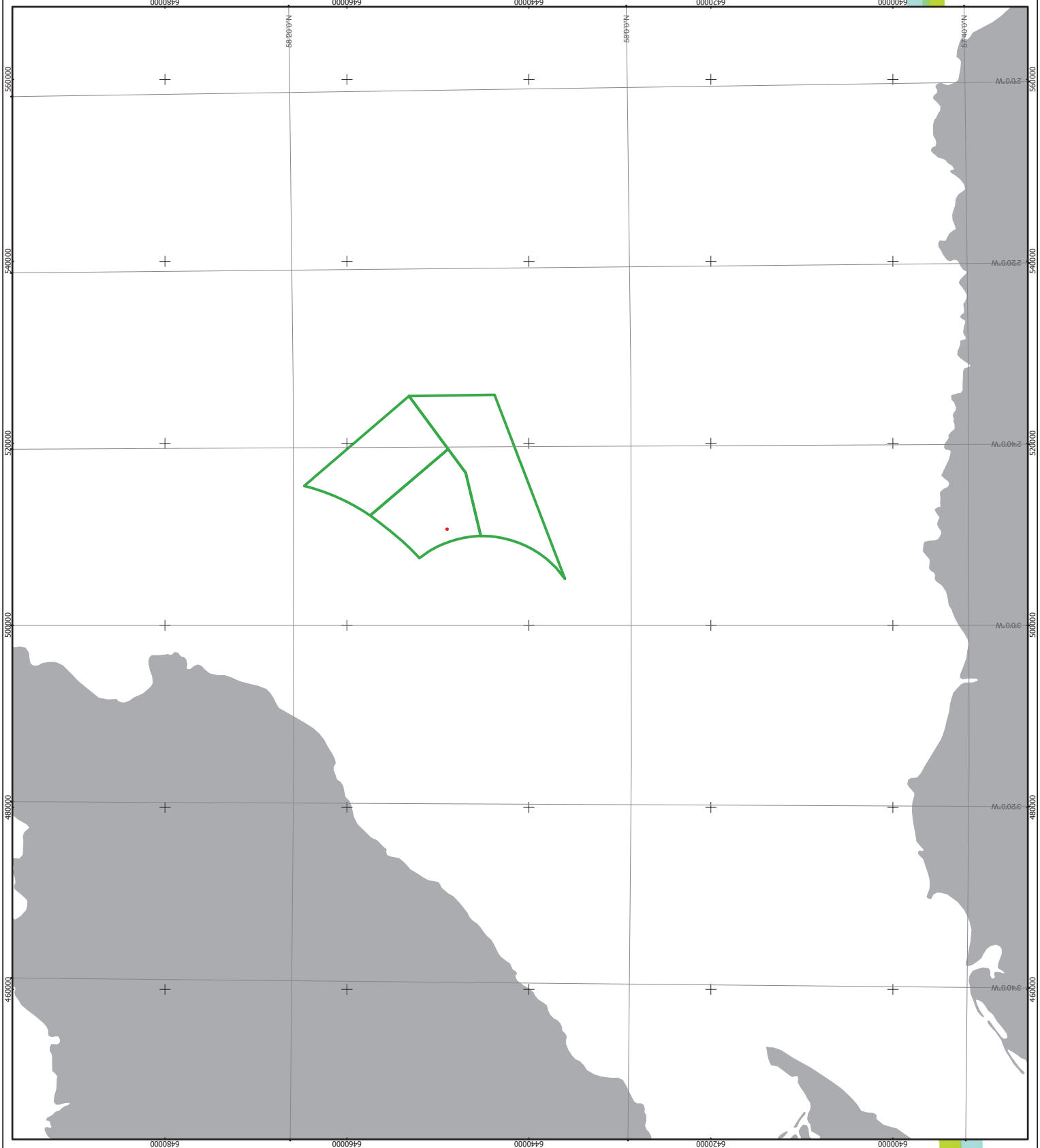
SEL 198 dB

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:400,000 A3 Chart N  
0 8 16 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 27/04/2012 Revision: B  
REF: 8460001-PPW0200-NPW-MAP-080

Figure C8: Metmast Pinniped SEL 198 dB  
Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

**KEY**

- Telford, Stevenson and MacColl
- MORL piling location

**dBht**

<50
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
75 - 79
80 - 84
85 - 89
90 - 99
100 - 109
110 - 119
120 - 129
>130

Horizontal Scale: 1:450,000 A3 Chart N  
0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: GL  
Reviewed: SC  
Approved: CJP  
Date: 02/05/2012  
Revision: A  
REF: 8460001-PPW0200-NPW-MAP-106

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

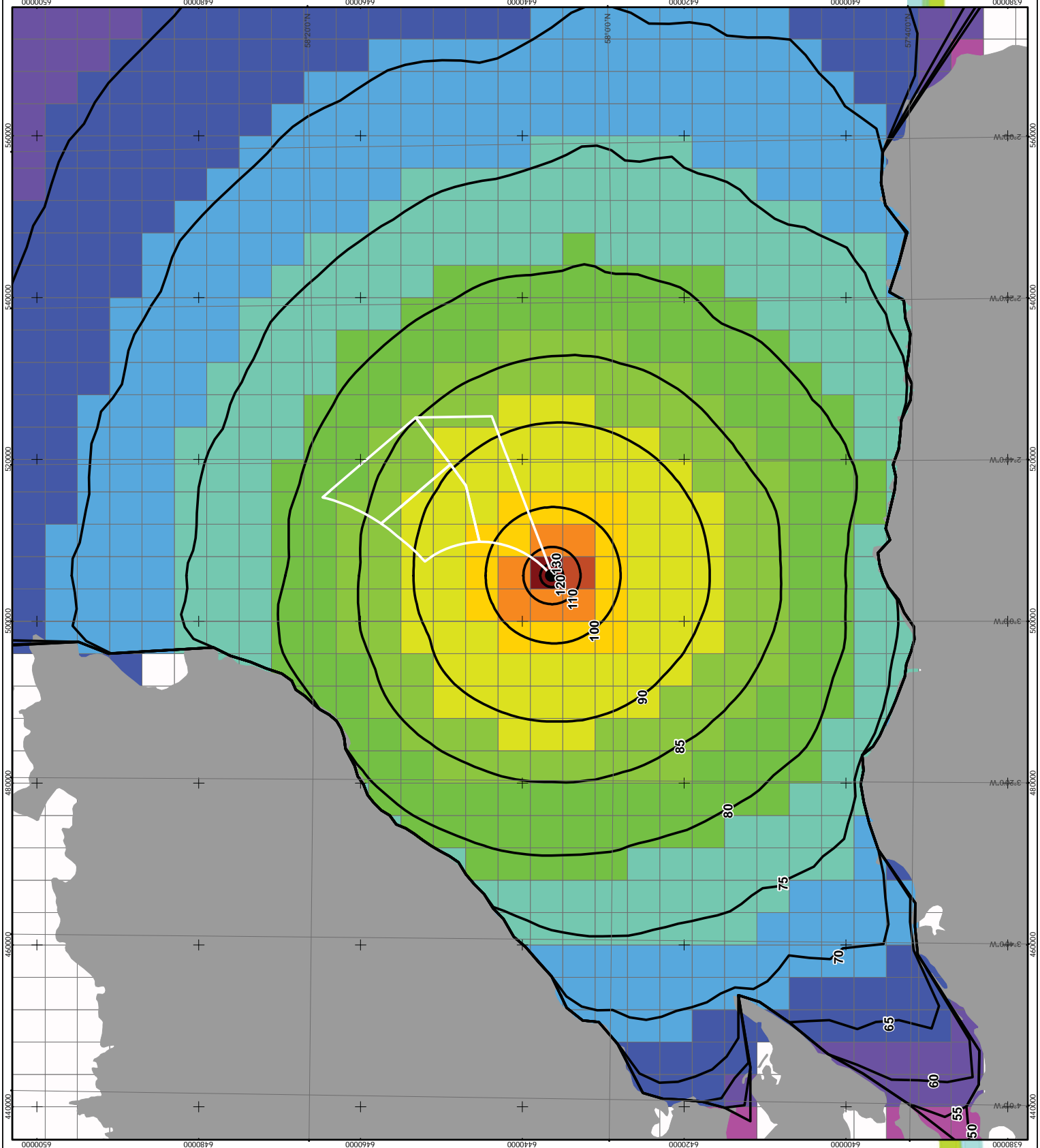


Figure D1: Scenario A  
Harbour Porpoise dBht  
Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

□ Telford, Stevenson and MacColl

● MORL piling location

— dBht

dBht

<50

50 - 54

55 - 59

60 - 64

65 - 69

70 - 74

75 - 79

80 - 84

85 - 89

90 - 99

100 - 109

110 - 119

120 - 129

>130

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: GL

Reviewed: SC

Approved: CJP

Date: 02/05/2012 Revision: A

REF: 8460001-PPW0200-NPW-MAP-105

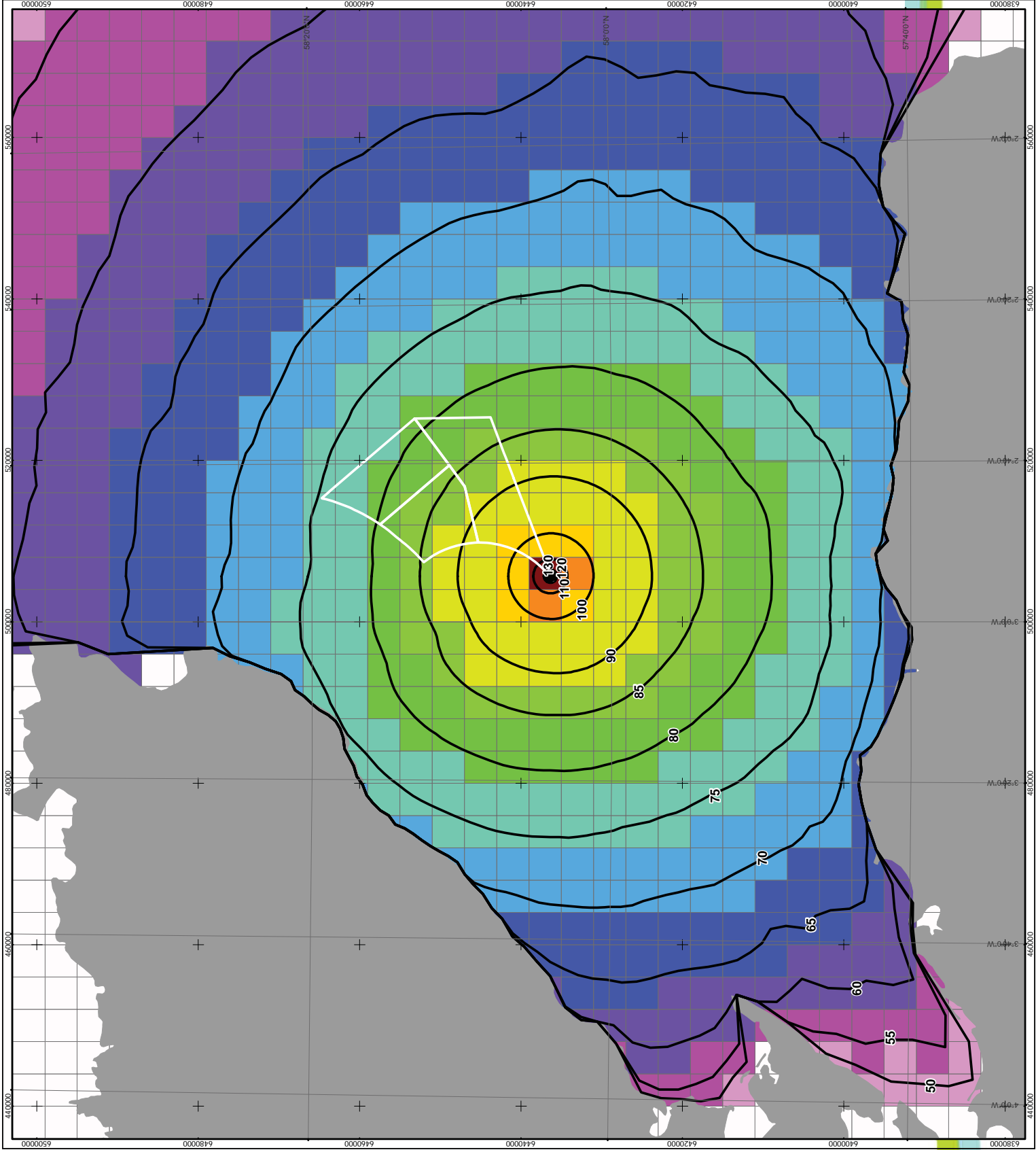
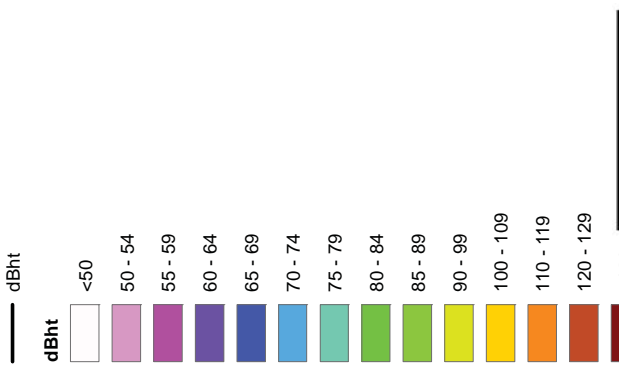


Figure D2: Scenario A  
Bottlenose Dolphin dBht

Moray Offshore  
Renewables Ltd

**KEY**

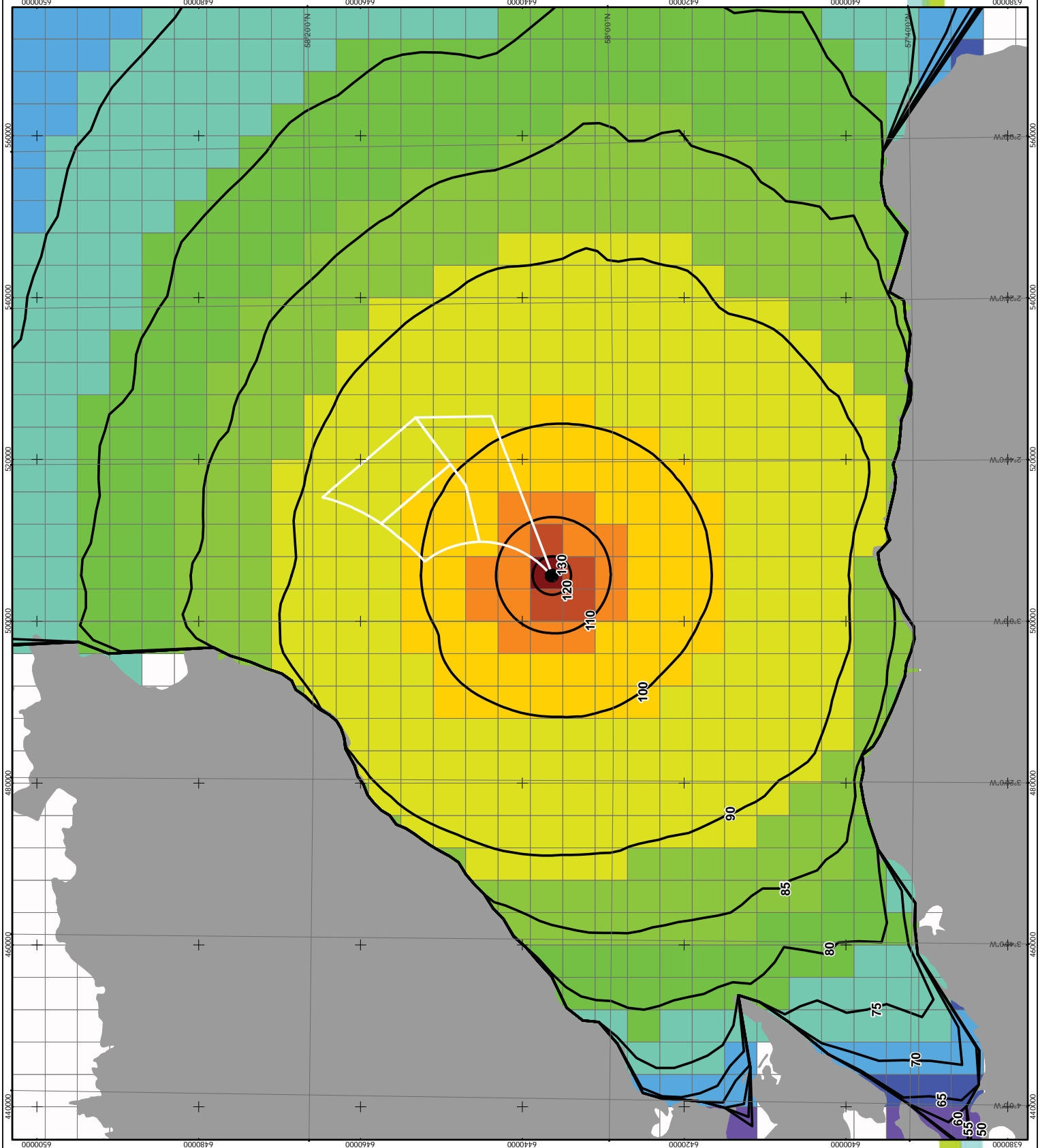
- Telford, Stevenson and MacColl
- MORL piling location
- dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D\VD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-108



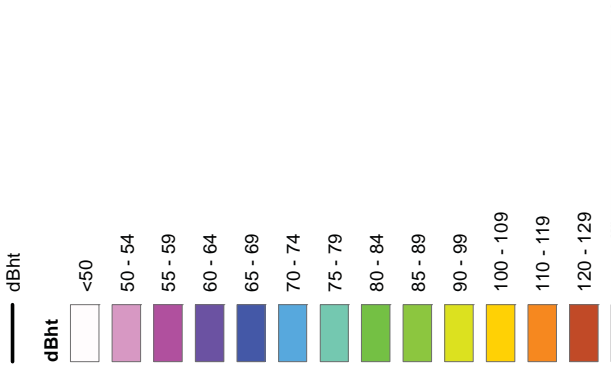
**Figure D3: Scenario A**  
 Minke Whale dBht

Moray Offshore Renewables Ltd



**KEY**

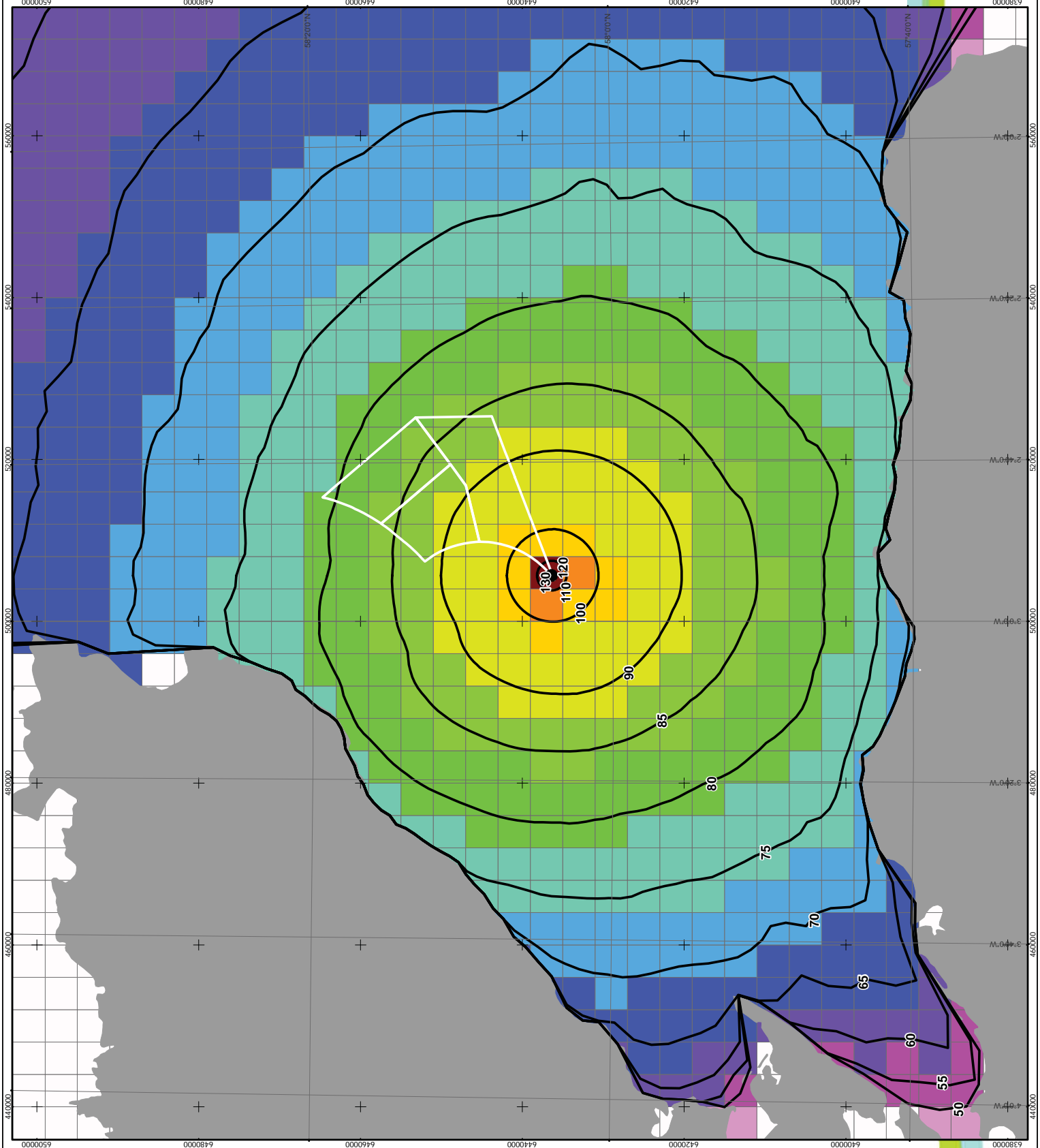
- Telford, Stevenson and MacColl
- MORL piling location
- dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-107



**Figure D4: Scenario A**  
 Harbour Seal dBht

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY



Telford, Stevenson and MacColl



MORL piling location

dB



186



188



190



192



194



196

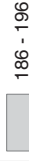


198

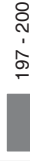


200

Max dB



186 - 196



197 - 200

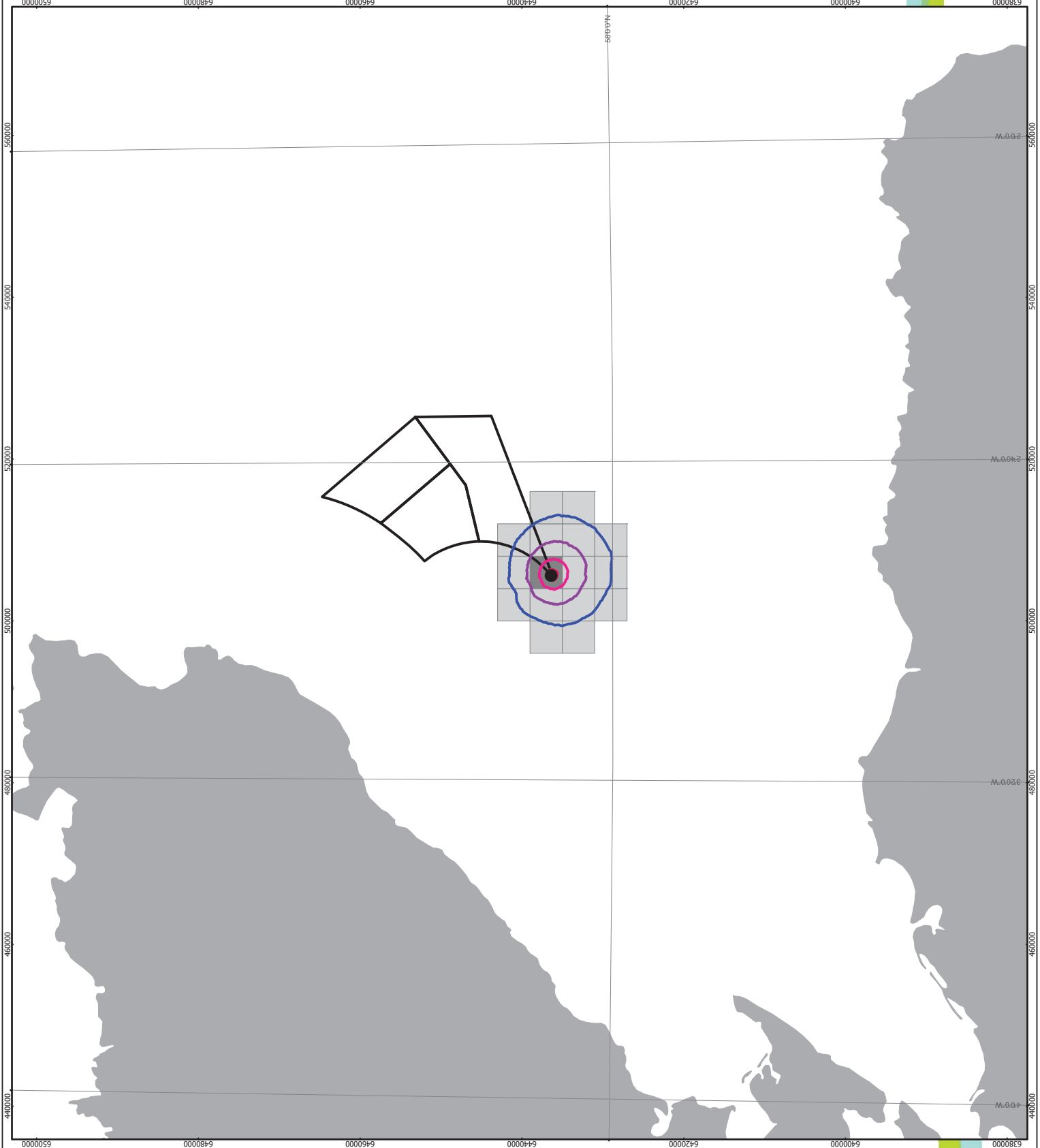
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D\VD

Horizontal Scale: 1:450,000 A3 Chart N

Geodetic Parameters: WGS84 UTM Zone 30N	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 02/05/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-109	

Figure D5: Scenario A  
 High Frequency Cetaceans  
 SEL

Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

KEY

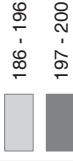
□ Telford, Stevenson and MacColl

● MORL piling location

dB



Max dB



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LG

Reviewed: SC

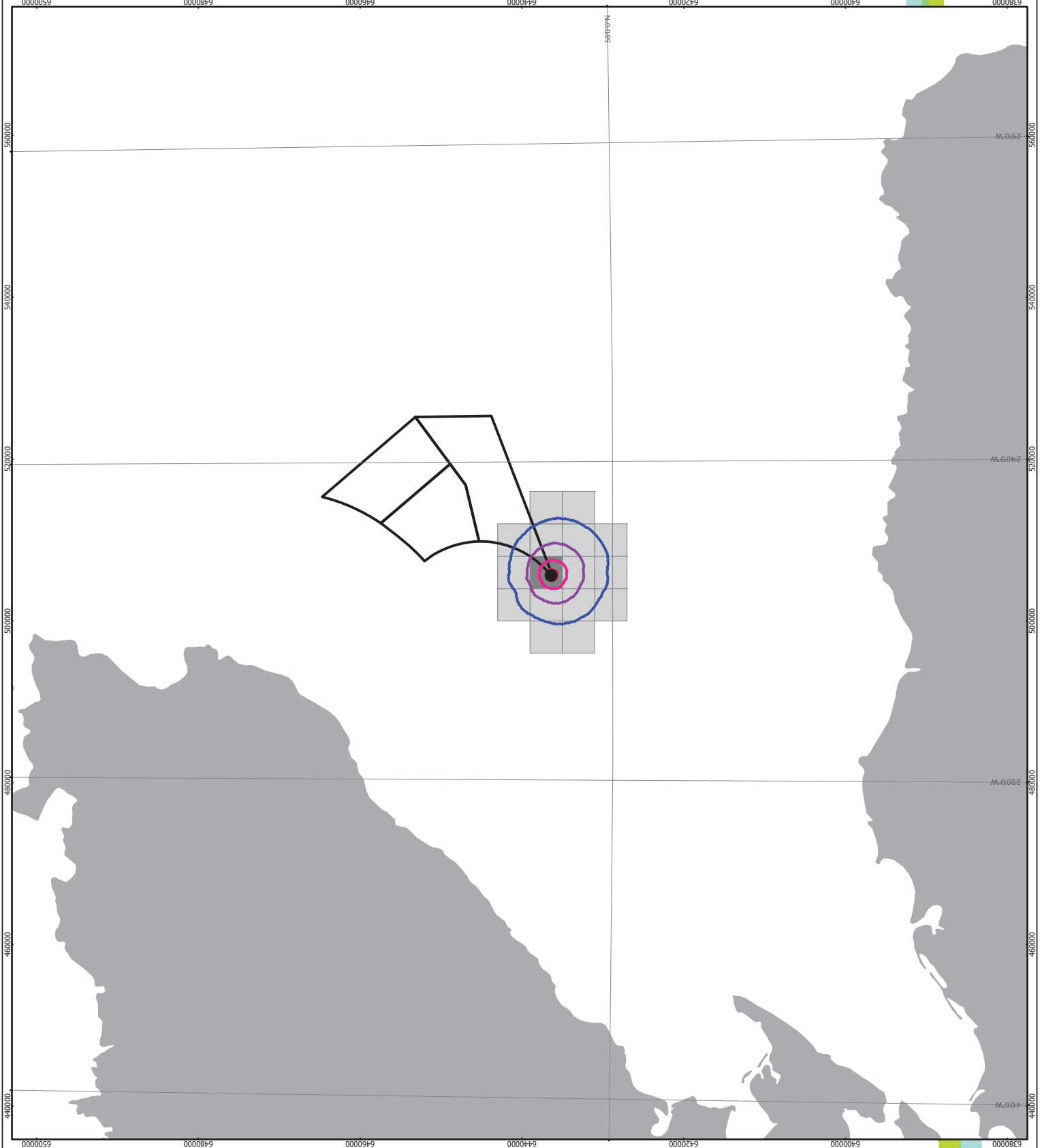
Approved: CJP

Date: 02/05/2012 Revision: A

REF: 8460001-PPW0200-NPW-MAP-111

Figure D6: Scenario A  
 Mid Frequency Cetaceans  
 SEL

Moray Offshore  
 Renewables Ltd



KEY

□ Telford, Stevenson and MacColl

● MORL piling location

dB

186

188

190

192

194

196

198

200

Max dB

186 - 196

197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LG

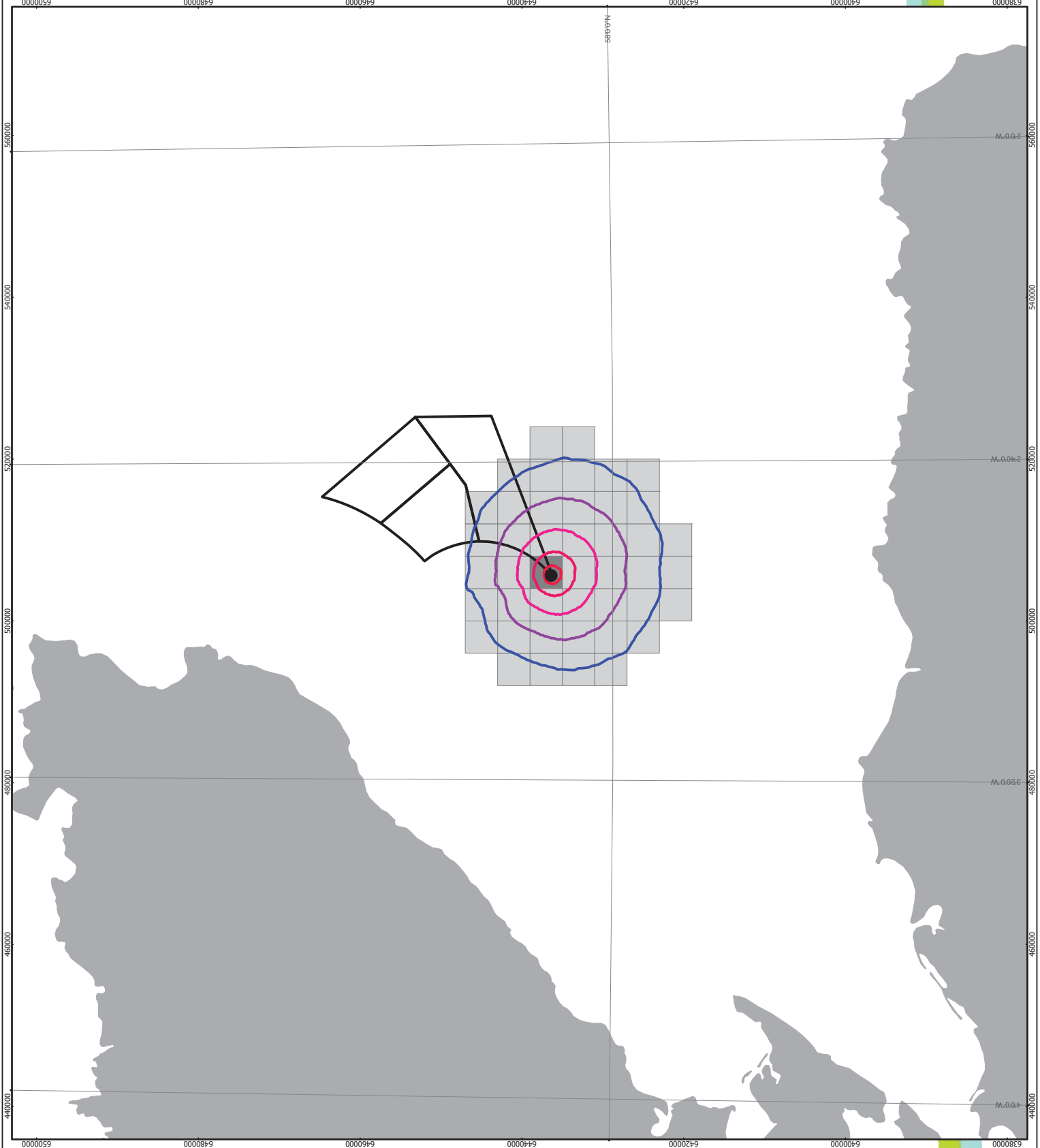
Reviewed: SC

Approved: CJP

Date: 02/05/2012 Revision: A


REF: 8460001-PPW0200-NPW-MAP-110

Figure D7: Scenario A  
 Low Frequency Cetaceans  
 SEL



KEY

 Telford, Stevenson and MacColl

 MORL piling location

dB

 186

 188

 190

 192


 194


 196

 198

 200

Max dB

 186 - 196

 197 - 200

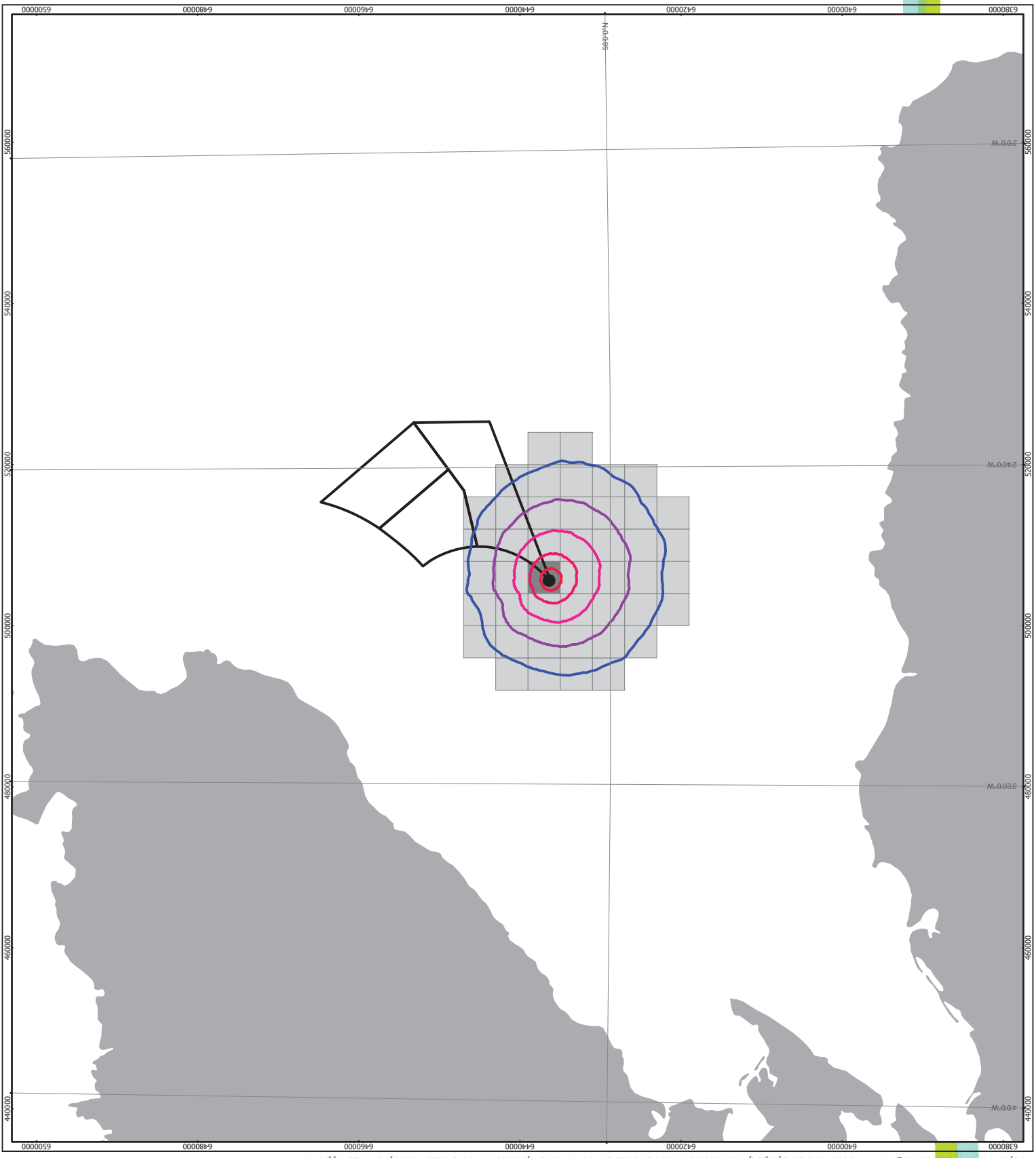
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-112

Figure D8: Scenario A  
Pinnipeds  
SEL

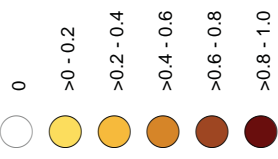
Moray Offshore  
Renewables Ltd




KEY

- Telford
- Stevenson
- MacColl

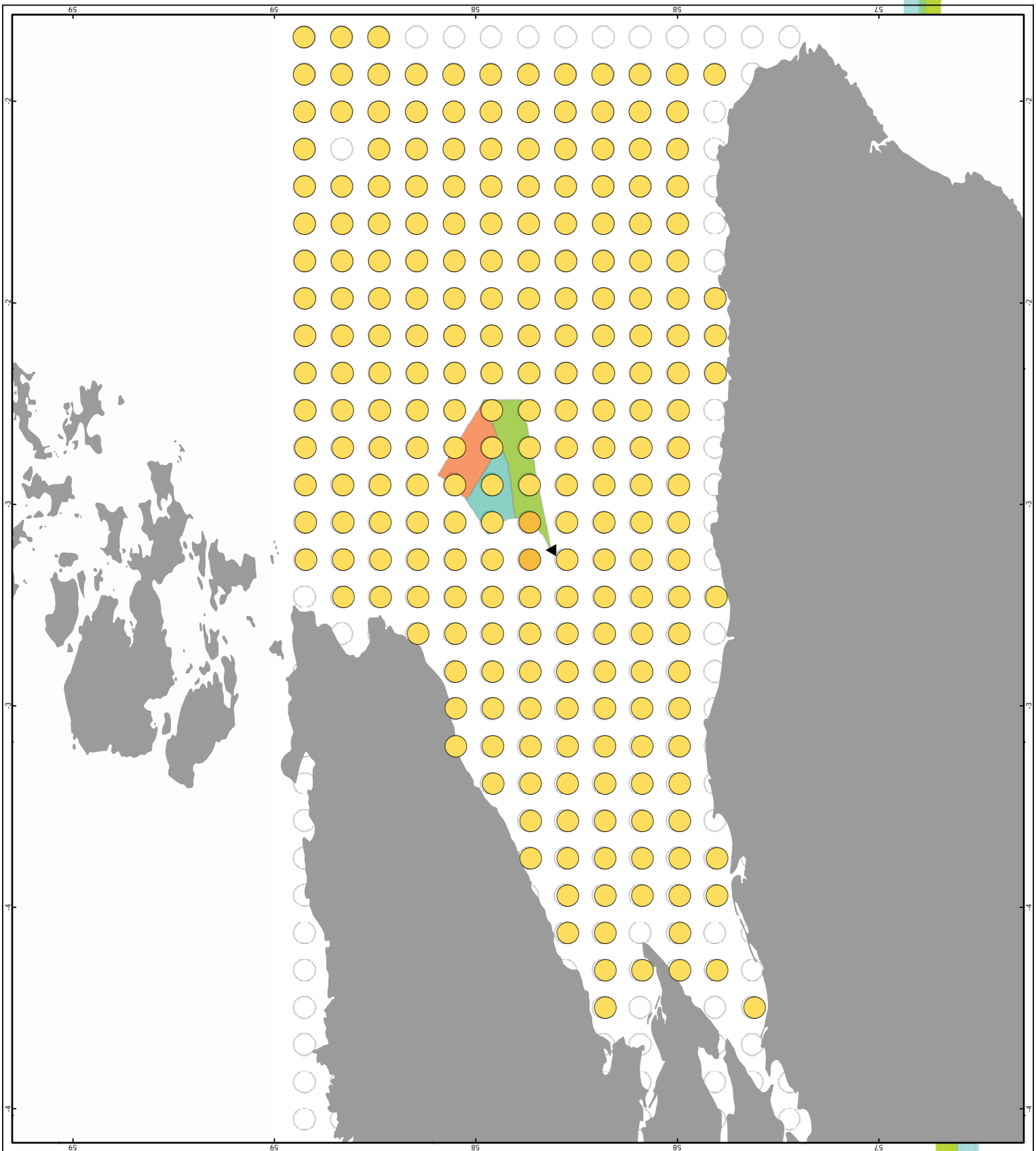
▲ 1  
 Number of harbour porpoise predicted to receive SELs sufficient to induce PTS onset



A3 figures scaled to A4 for print. Scale bar not representative of figure.  
 For A3 scale see ES DVD

Horizontal Scale: 1:900,000    A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012    Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-217



**Figure D9: Scenario A**  
**SAFESIMM**  
 Harbour Porpoise 198 dB  
 Moray Offshore Renewables Ltd

**KEY**

- Telford
- Stevenson
- MacColl

▲ 1  
 Number of bottlenose dolphins predicted to receive SELs sufficient to induce PTS onset

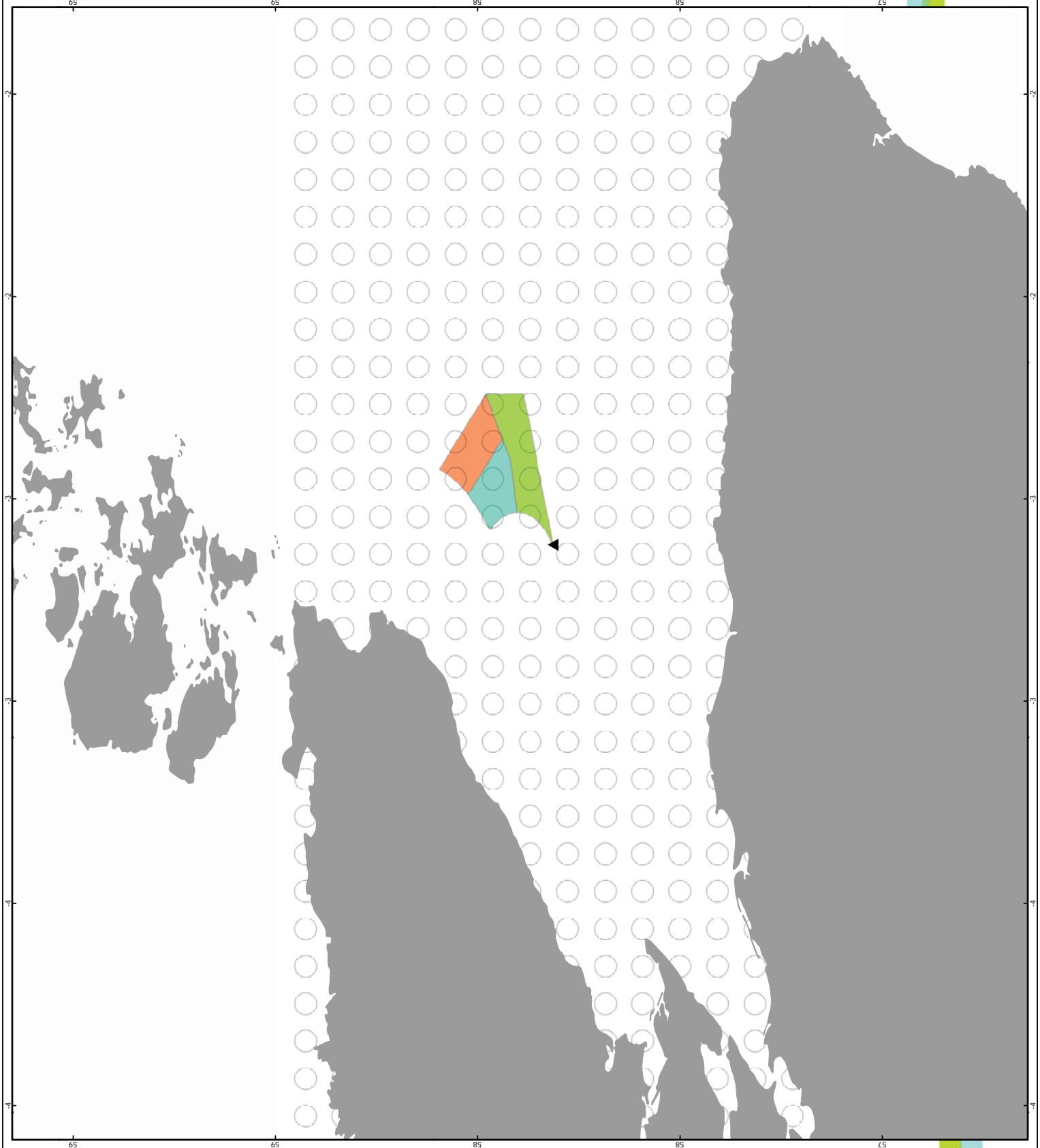
○ 0  
 ○ 0.01  
 ● 0.02

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
 For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-219

**Figure D10: Scenario A**  
**SAFESIMM**  
 Bottlenose Dolphin 198 dB  
 Moray Offshore Renewables Ltd





- KEY**
- Telford
  - Stevenson
  - MacColl

▲ MORL piling location

Number of minke whale predicted to receive SELs sufficient to induce PTS onset

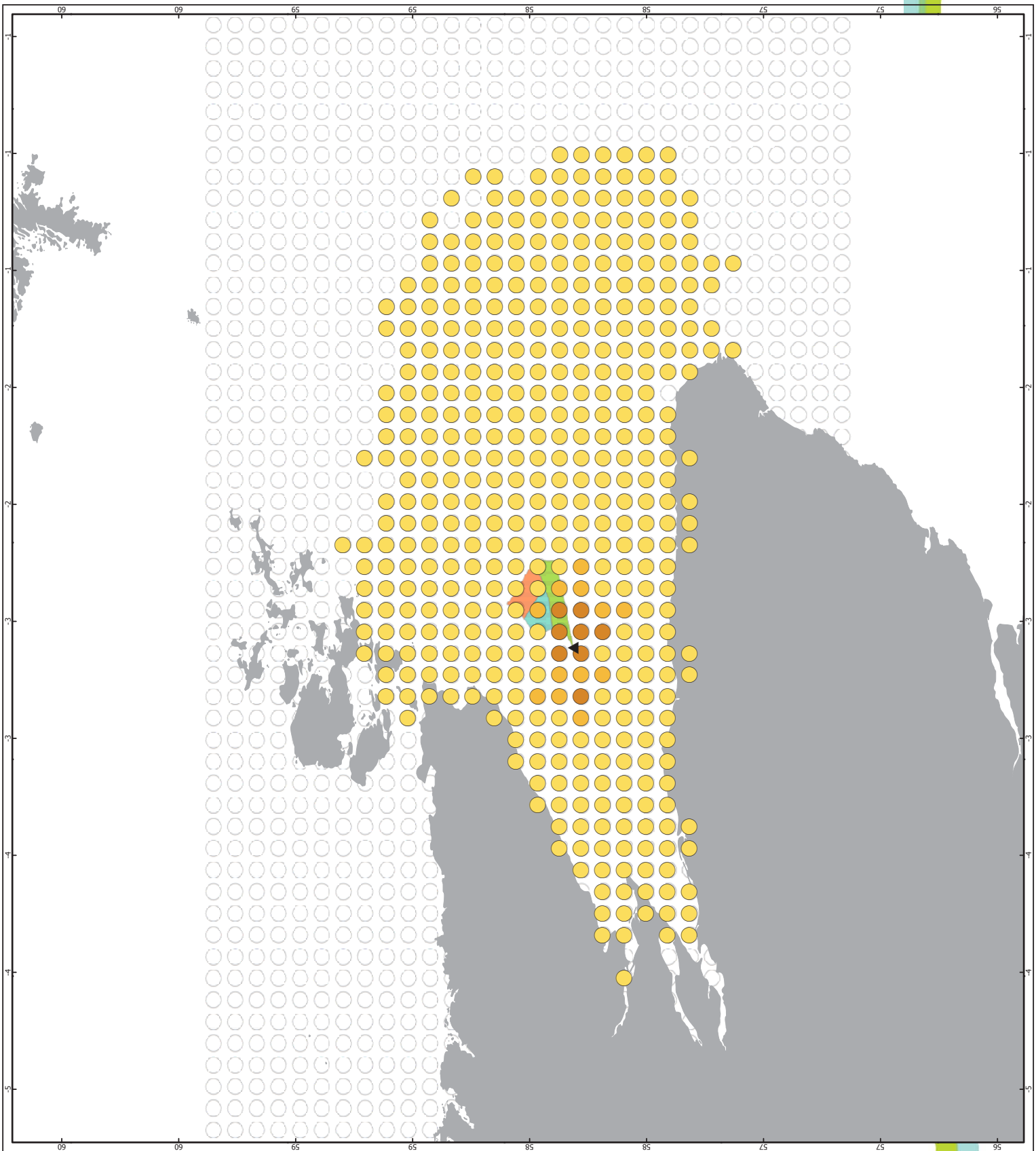
- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DWD

Horizontal Scale: 1:1,550,000 A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Revision: A
Reviewed: SC	
Approved: CJP	
Date: 08/05/2012	REF: 8460001-PPW0200-NPW-MAP-220

**Figure D11: Scenario A**  
**SAFESIMM**  
 Minke Whale 198 dB  
 Moray Offshore Renewables Ltd




- KEY**
- Telford
  - Stevenson
  - MacColl

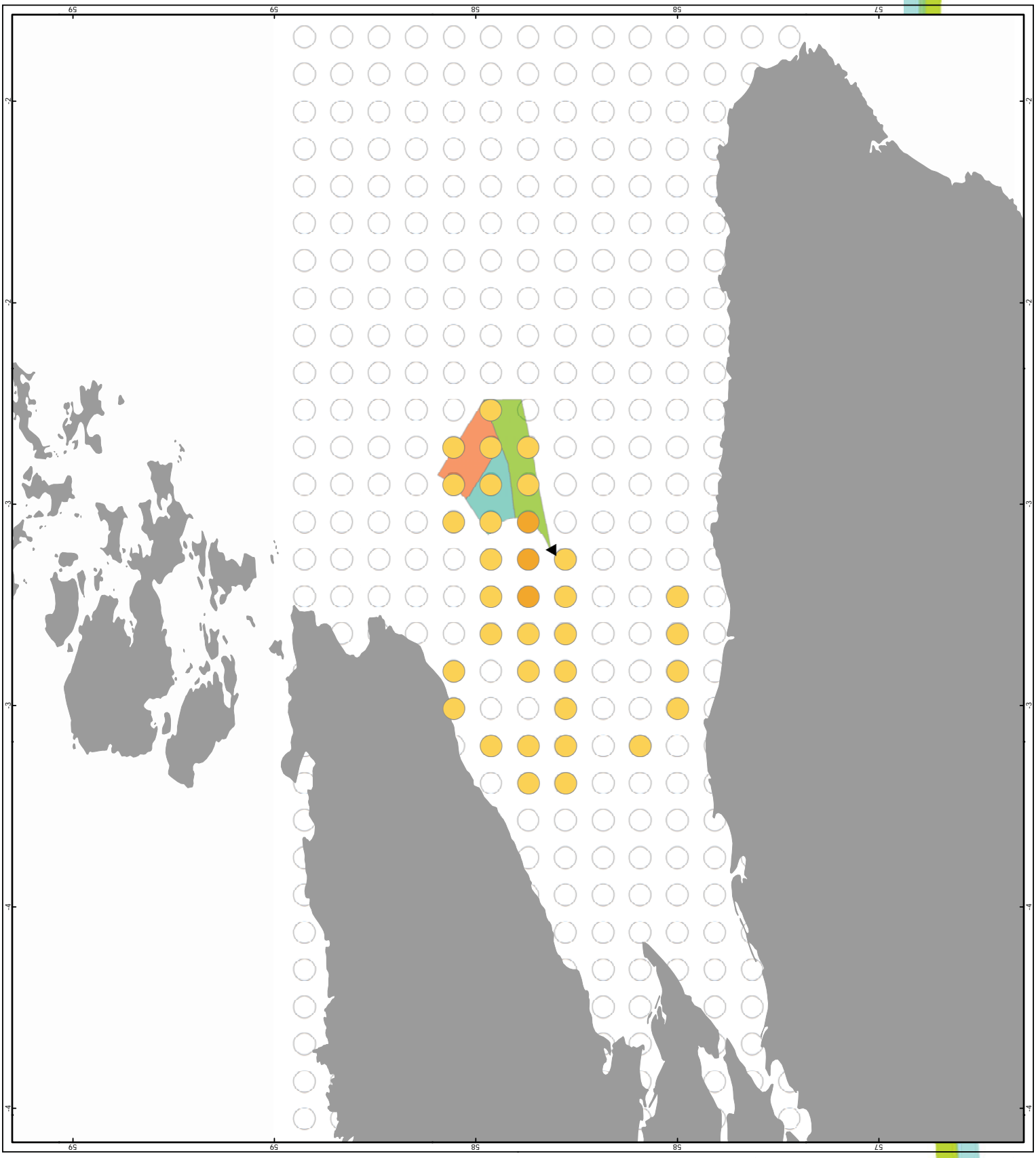
▲ 1  
**Number of harbour seals predicted to receive SELs sufficient to induce PTS onset**

- 0
- >0 - 2
- >2 - 4
- >4 - 6
- >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
 For A3 scale see ES DVD

Horizontal Scale: 1:900,000    A3 Chart N  
  
 Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012    Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-221

**Figure D12: Scenario A**  
**SAFESIMM**  
 Harbour Seal 186 dB  
 Moray Offshore Renewables Ltd








KEY

-  Telford
-  Stevenson
-  MacColl

▲ 1

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

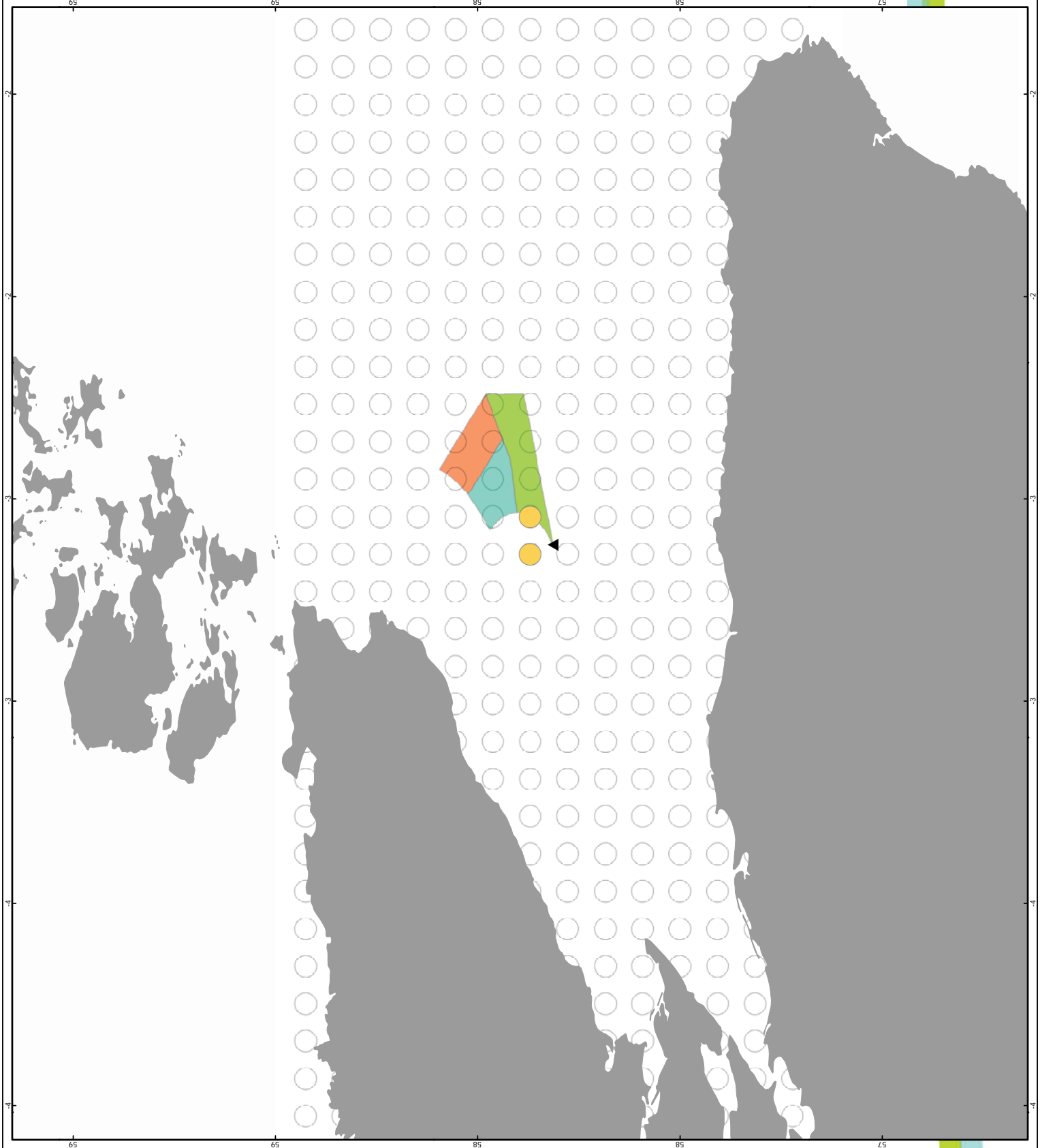
-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD




Horizontal Scale: 1:900,000 A3 Chart N  
0 20 40 km

Geodetic Parameters: WGS 1984  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 18/04/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-222

Figure D13: Scenario A  
SAFESIMM  
Harbour Seal 198 dB  
Moray Offshore Renewables Ltd









KEY


-  Telford
-  Stevenson
-  MacColl



Number of grey seals predicted to receive SELs sufficient to induce PTS onset

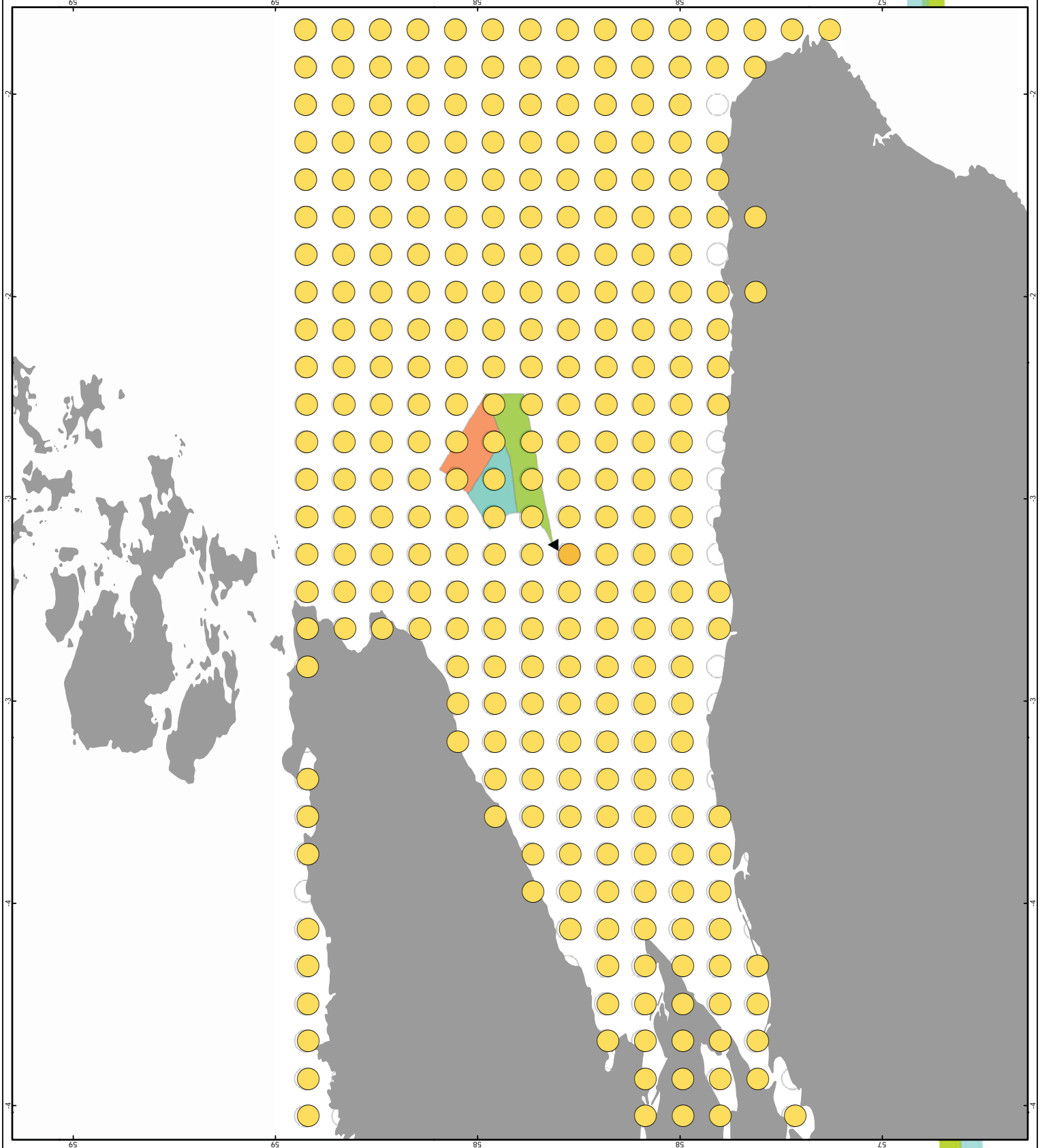
-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-223

**Figure D14: Scenario A**  
**SAFESIMM**  
 Grey Seal 186 dB  
 Moray Offshore Renewables Ltd

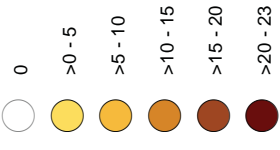


**KEY**


- Telford
- Stevenson
- MacColl

▲ 1

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

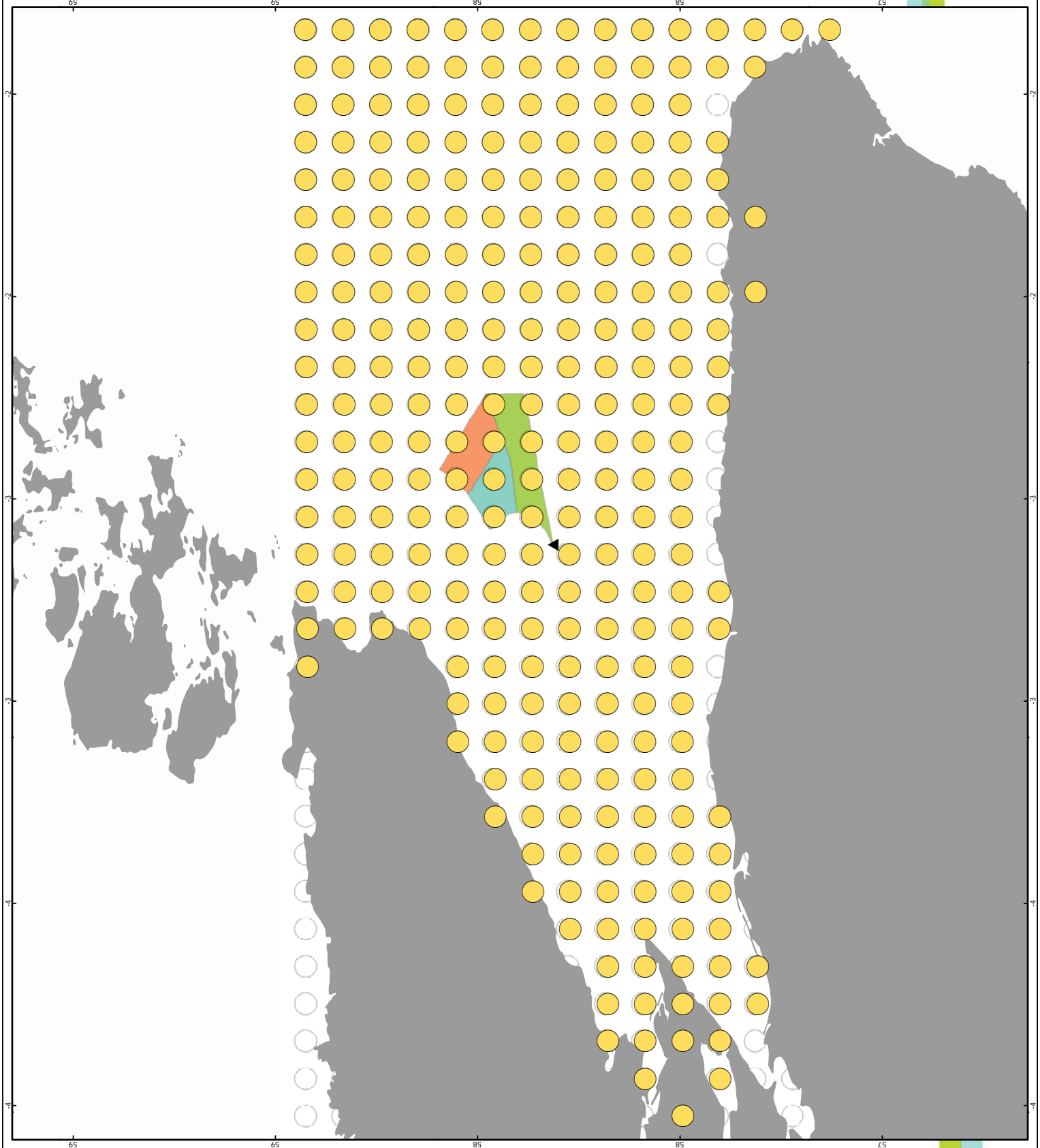


A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-224

**Figure D15: Scenario A**  
**SAFESIMM**  
 Grey Seal 198 dB  
 Moray Offshore Renewables Ltd





KEY

□ Telford, Stevenson and MacColl

● MORL piling location

— dBht

dBht

□ <50

□ 50 - 54

□ 55 - 59

□ 60 - 64

□ 65 - 69

□ 70 - 74

□ 75 - 79

□ 80 - 84

□ 85 - 89

□ 90 - 99

□ 100 - 109

□ 110 - 119

□ 120 - 129

□ >130

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scales see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: GL

Reviewed: SC

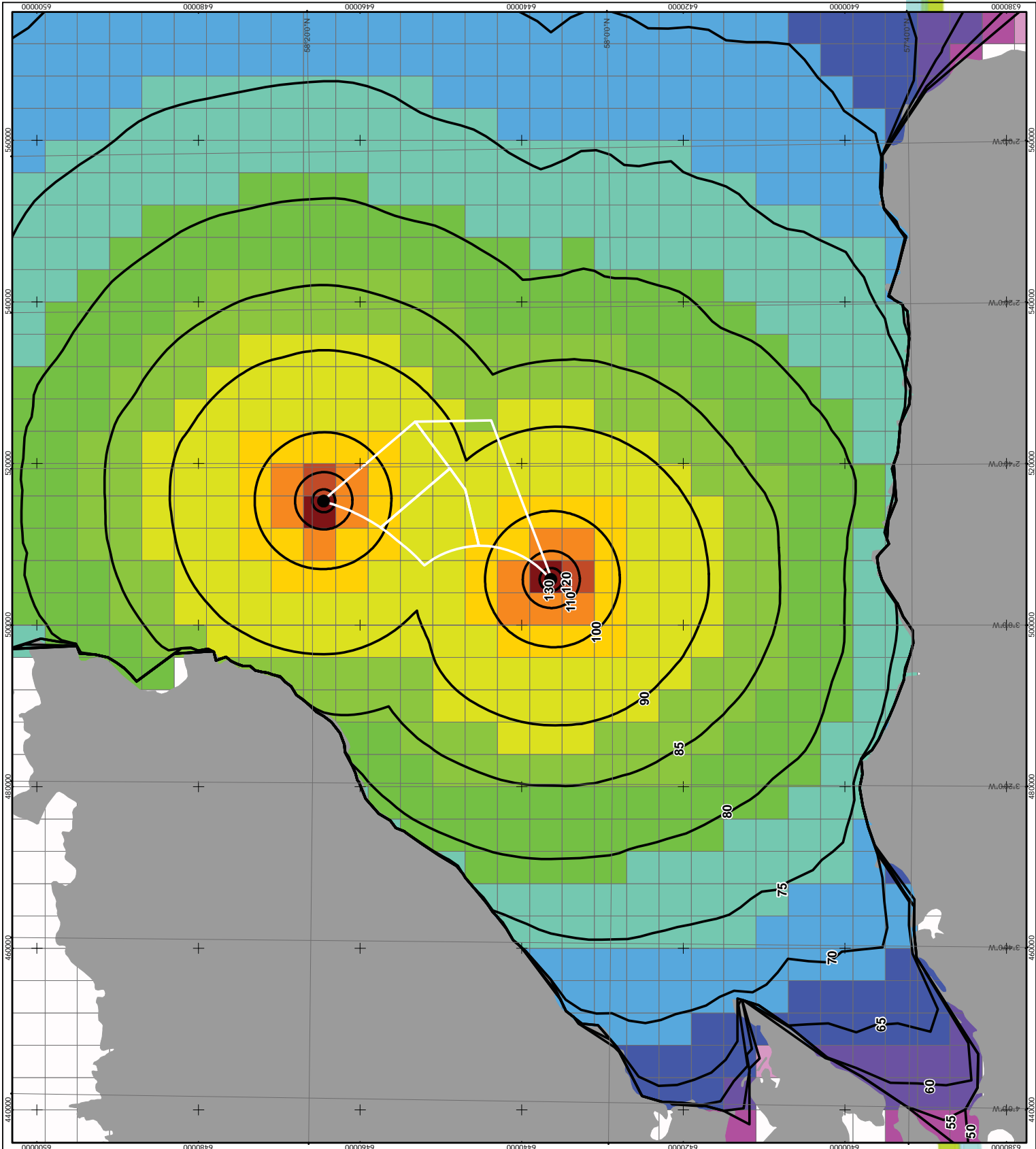
Approved: CJP

Date: 02/05/2012 Revision: A

REF: 8460001-PPW0200-NPW-MAP-114

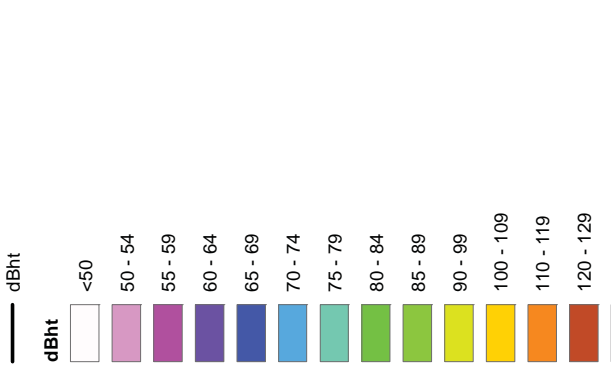
Figure D16: Scenario B  
 Harbour Porpoise dBht

Moray Offshore  
 Renewables Ltd



**KEY**

- Telford, Stevenson and MacColl
- MORL piling location
- dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-113

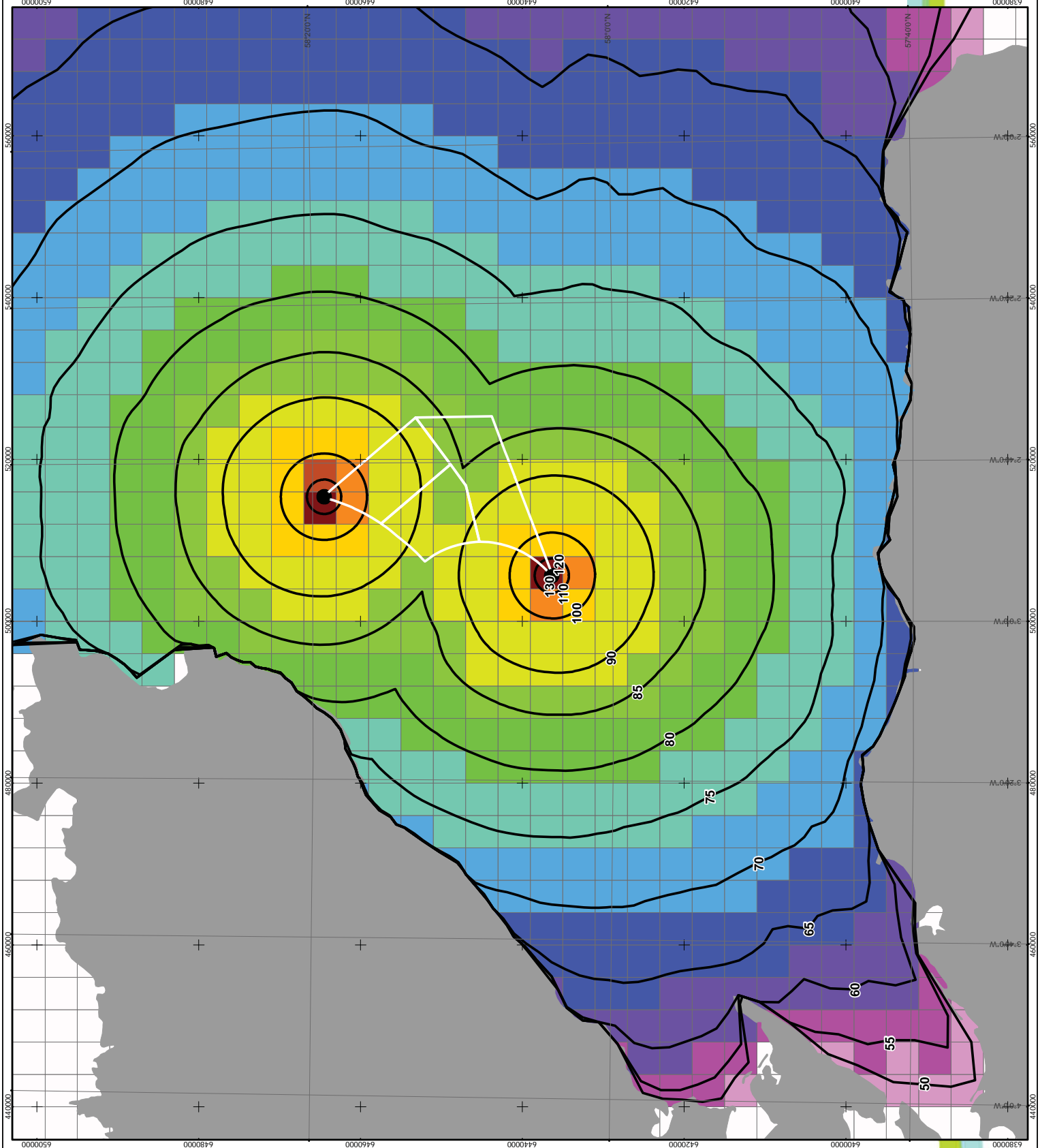


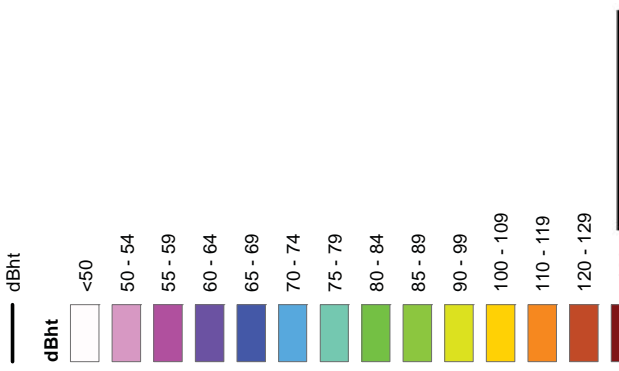
Figure D17: Scenario B  
 Bottlenose Dolphin dBht

Moray Offshore  
 Renewables Ltd



**KEY**

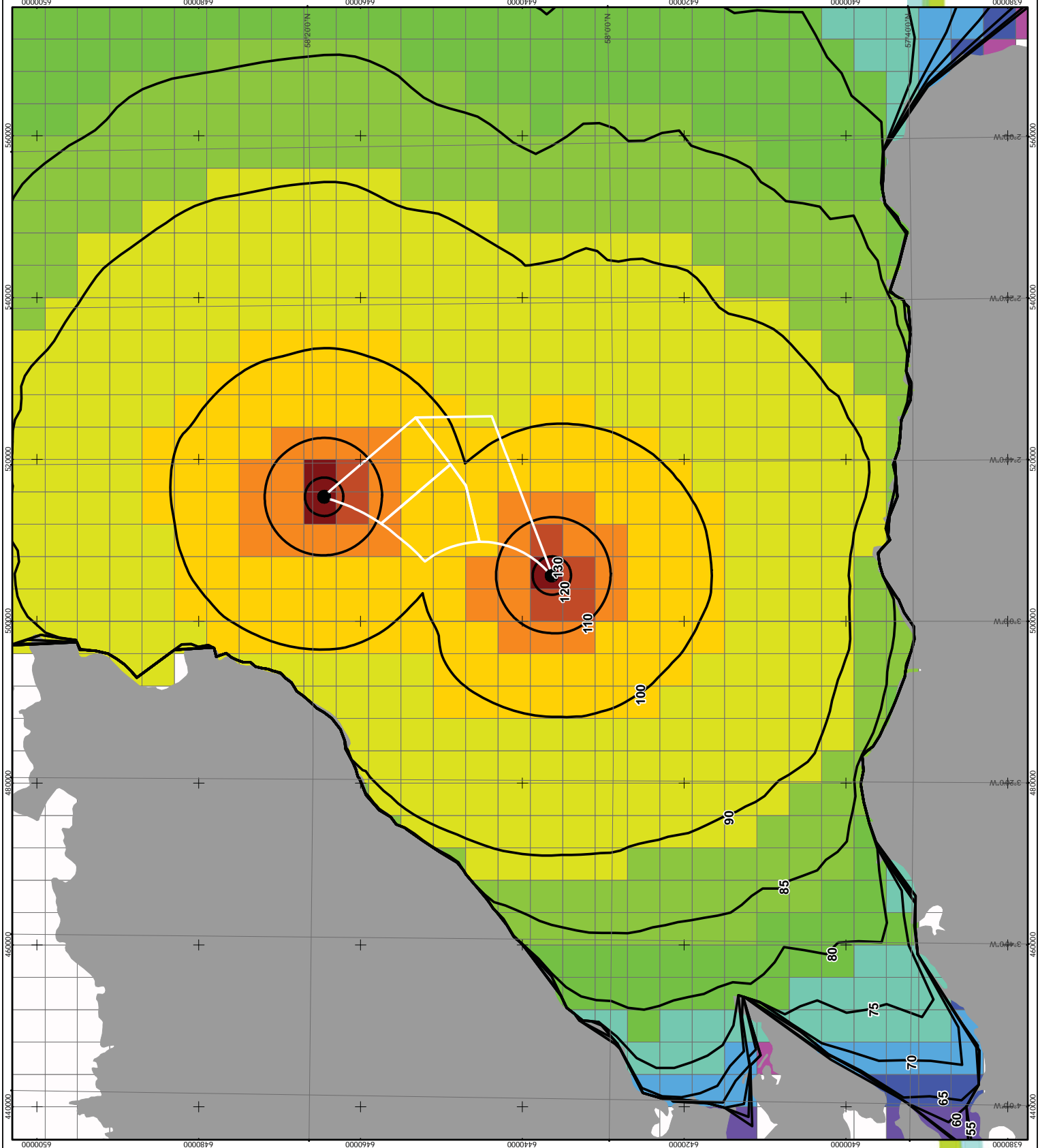
- Telford, Stevenson and MacColl
- MORL piling location
- dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D\VD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-116



**Figure D18: Scenario B**  
 Minke Whale dBht

Moray Offshore Renewables Ltd

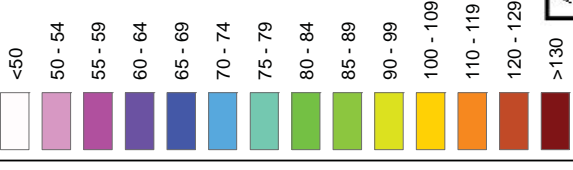


Moray Offshore Renewables Ltd

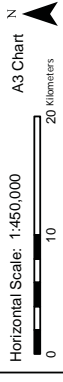
KEY

- Telford, Stevenson and MacColl
- MORL piling location
- dBht

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-115

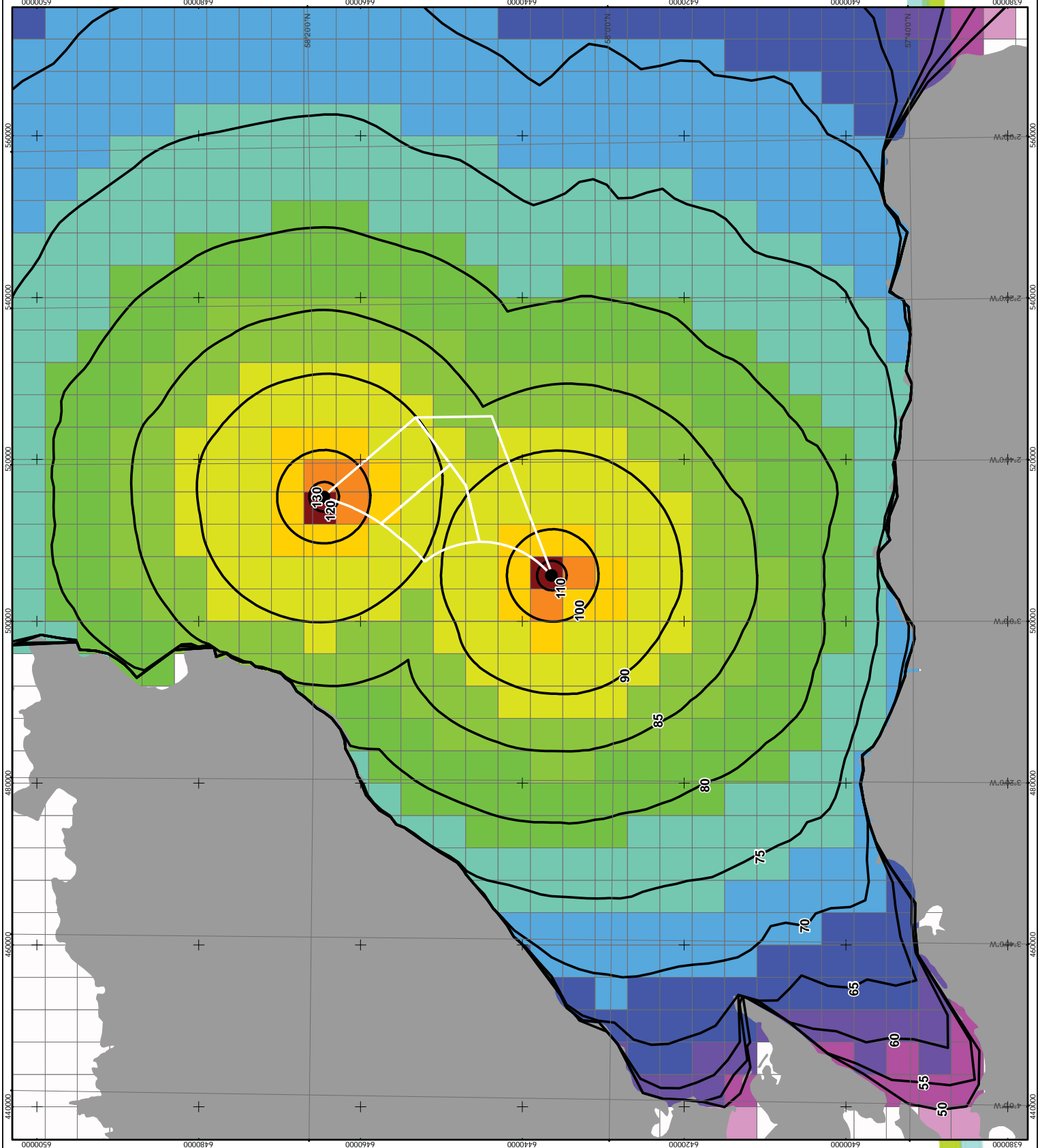


Figure D19: Scenario B Harbour Seal dBht

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY



Telford, Stevenson and MacColl



MORL piling location

dB



186



188



190



192



194



196

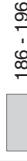


198

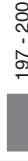


200

Max dB



186 - 196



197 - 200

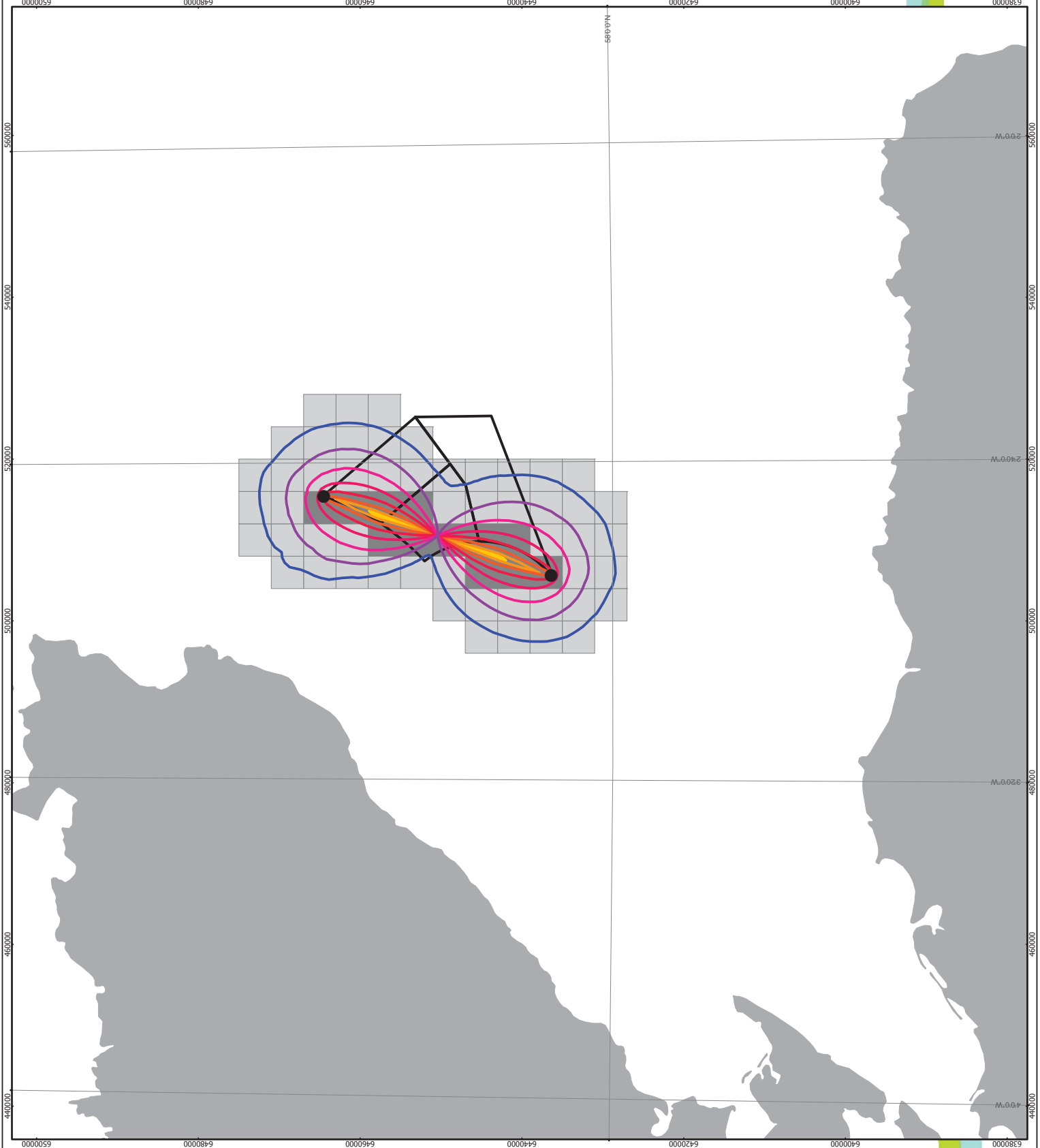
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N

Geodetic Parameters: WGS84 UTM Zone 30N	
Produced: LG	Reviewed: SC
Approved: CJP	Date: 02/05/2012
Revision: A	REF: 8460001-PPW0200-NPW-MAP-117

Figure D20: Scenario B  
 High Frequency Cetaceans  
 SEL

Moray Offshore  
 Renewables Ltd





Moray Offshore Renewables Ltd

KEY



Telford, Stevenson and MacColl



MORL piling location

dB



186



188



190



192



194



196

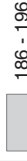


198

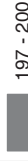


200

Max dB



186 - 196



197 - 200

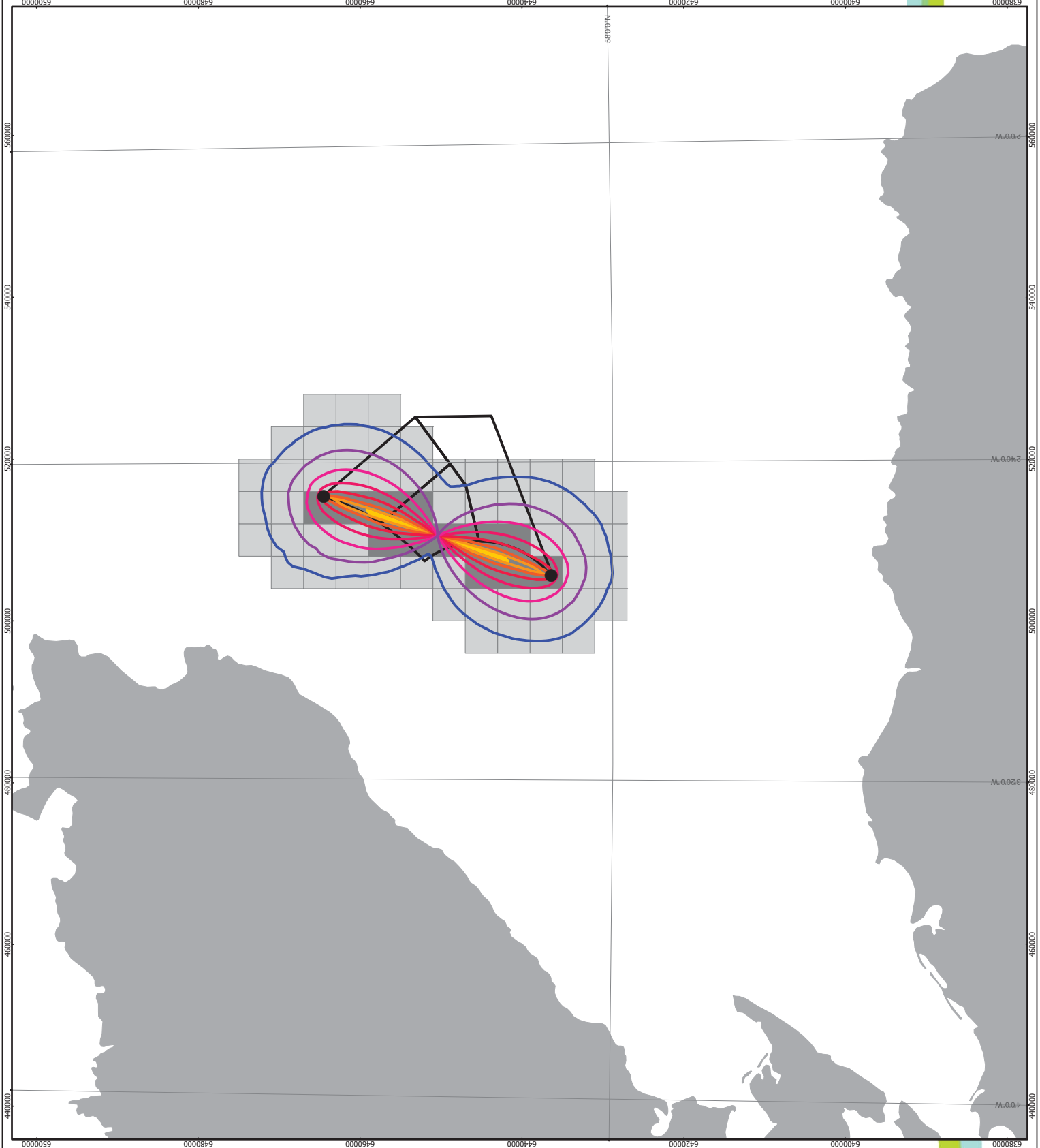
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N

Geodetic Parameters: WGS84 UTM Zone 30N	
Produced: LG	Reviewed: SC
Approved: CJP	Date: 02/05/2012
REF: 8460001-PPW0200-NPW-MAP-119	Revision: A

Figure D21: Scenario B  
 Mid Frequency Cetaceans  
 SEL

Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

KEY

□ Telford, Stevenson and MacColl

● MORL piling location

dB

186

188

190

192

194

196

198

200

Max dB

186 - 196

197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LG

Reviewed: SC

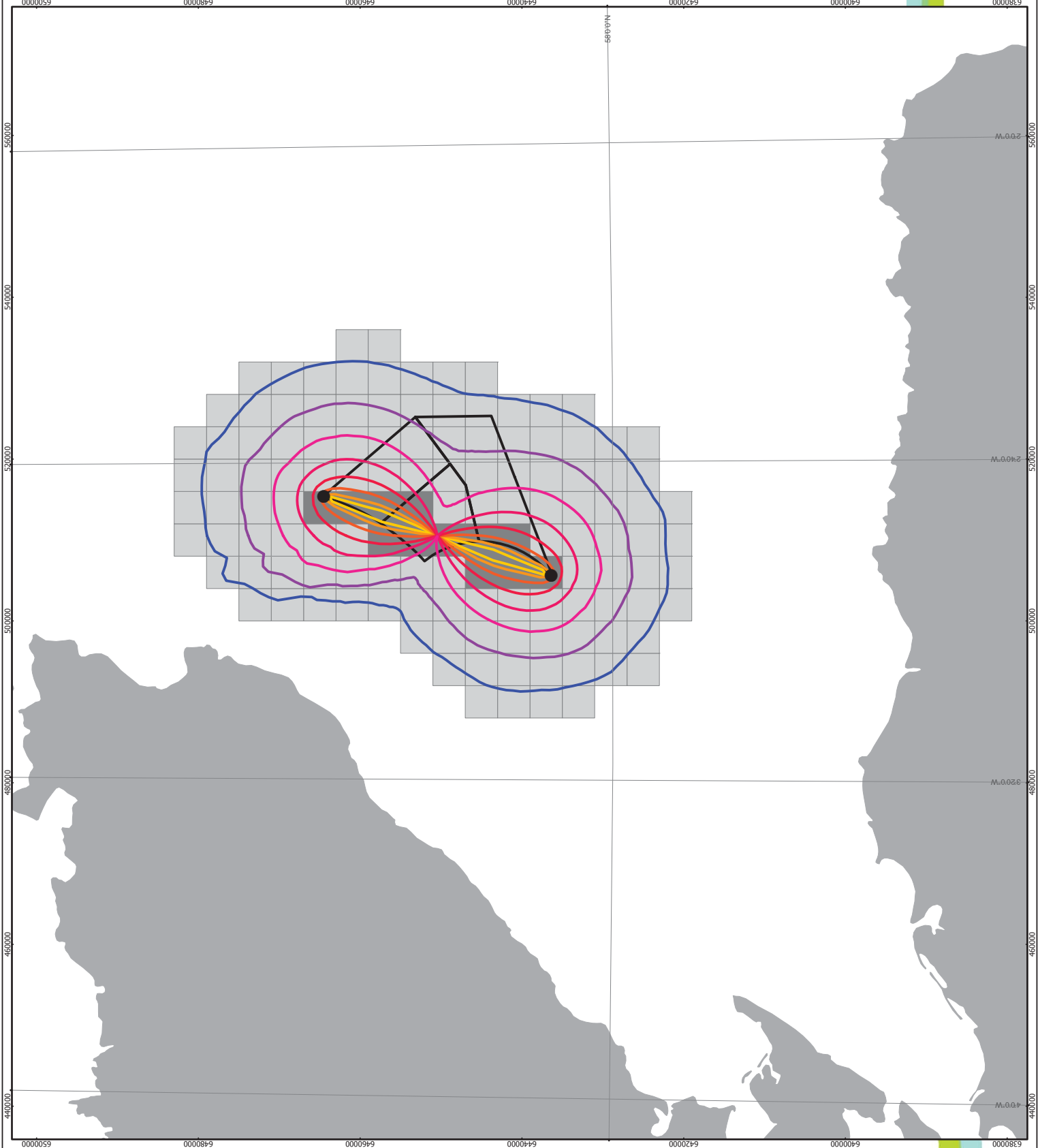
Approved: CJP

Date: 02/05/2012 Revision: A

REF: 8460001-PPW0200-NPW-MAP-118

Figure D22: Scenario B  
 Low Frequency Cetaceans  
 SEL








Moray Offshore  
 Renewables Ltd





KEY

-  Telford, Stevenson and MacColl
-  MORL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

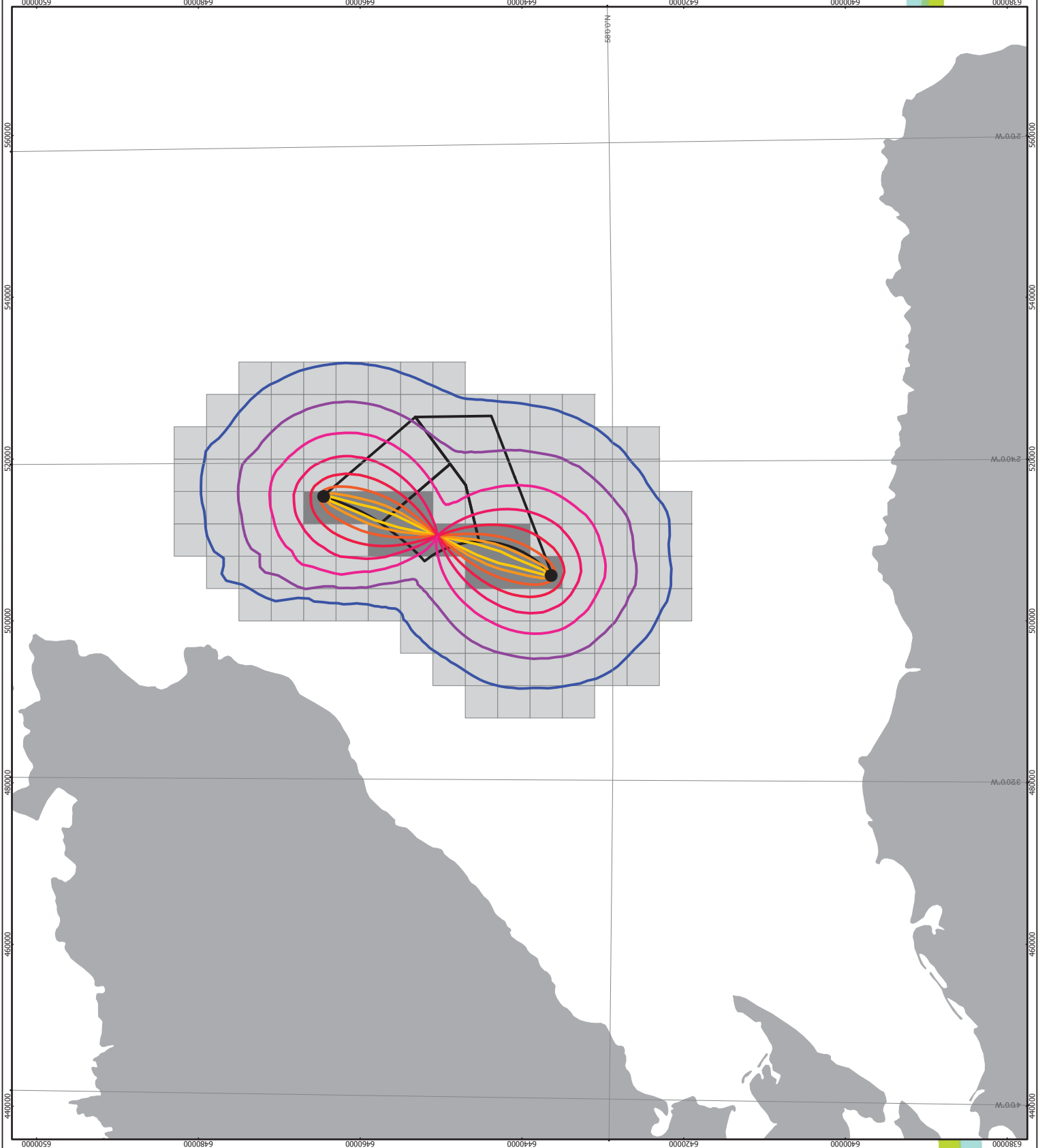
-  186 - 196
-  197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-120

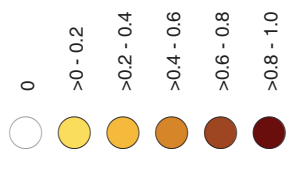
Figure D23: Scenario B  
Pinnipeds  
SEL



**KEY**  
 Telford  
 Stevenson  
 MacColl

▲ MORL piling location

Number of harbour porpoise predicted to receive SELs sufficient to induce PTS onset



A3 figures scaled to A4 for print. Scale bar not representative of figure.  
 For A3 scale see ES DVD


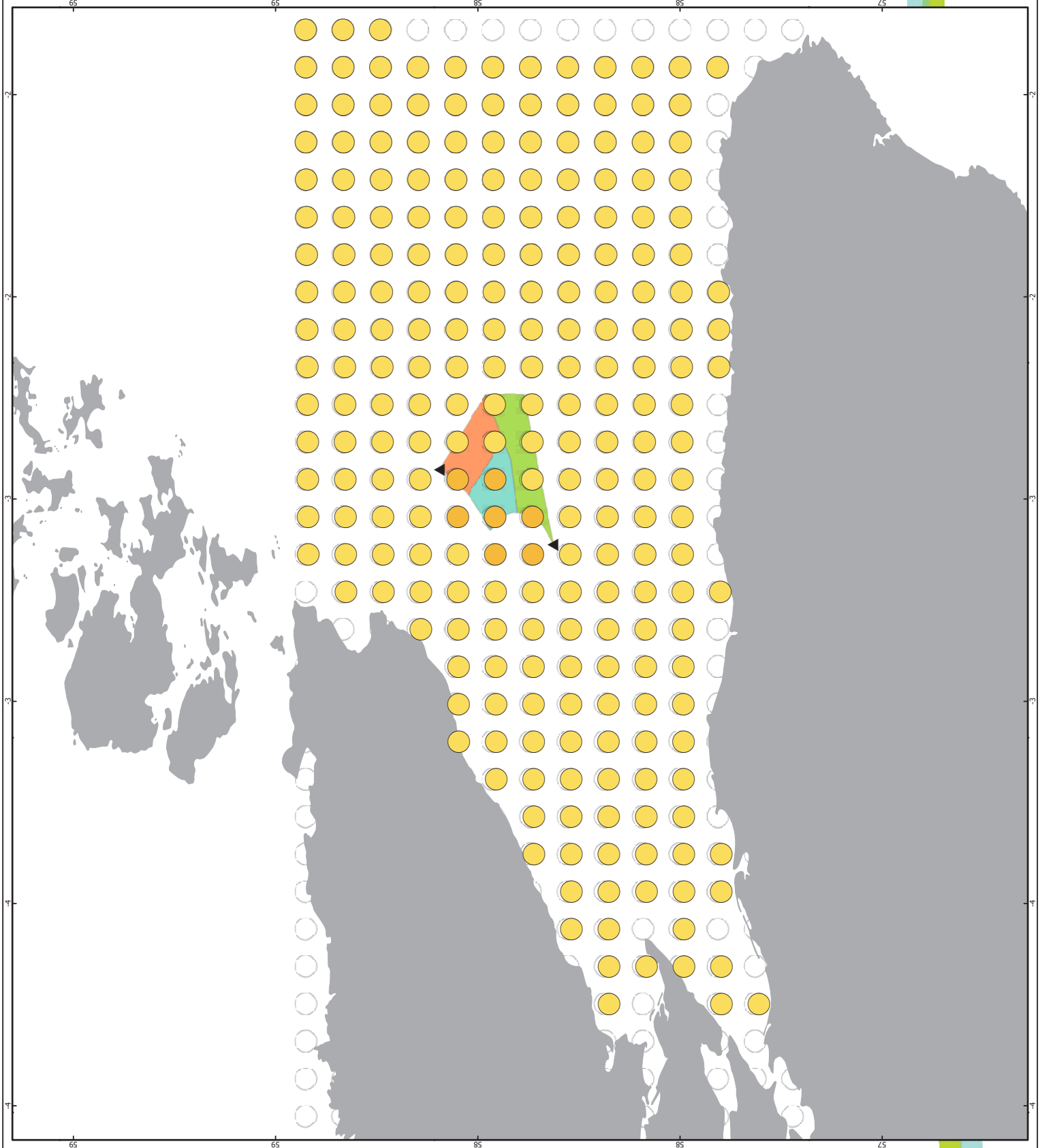
Horizontal Scale: 1:900,000 A3 Chart N  
  
 Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-225

Figure D24: Scenario B  
 SAFESIMM  
 Harbour Porpoise 198 dB  
 Moray Offshore Renewables Ltd







Moray Offshore Renewables Ltd

KEY

- Telford
- Stevenson
- MacColl

▲ MORL piling location

Number of bottlenose dolphins predicted to receive SELs sufficient to induce PTS onset

- 0
- 0.01
- 0.02

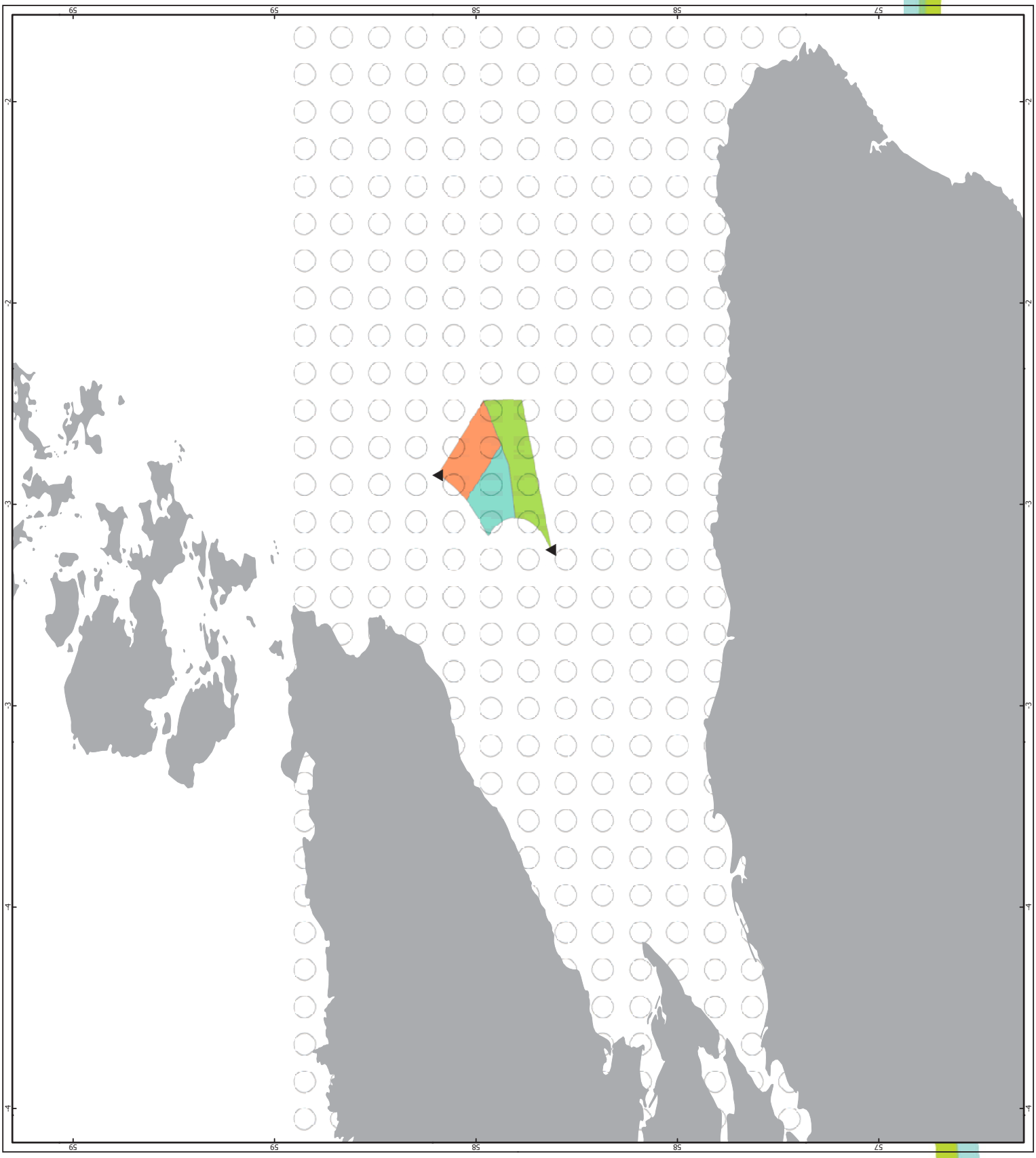
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 18/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-227	

Figure D25: Scenario B  
 SAFESIMM

Bottlenose Dolphin 198 dB  
 Moray Offshore Renewables Ltd



**KEY**

- Telford
- Stevenson
- MacColl

▲ MORL piling location

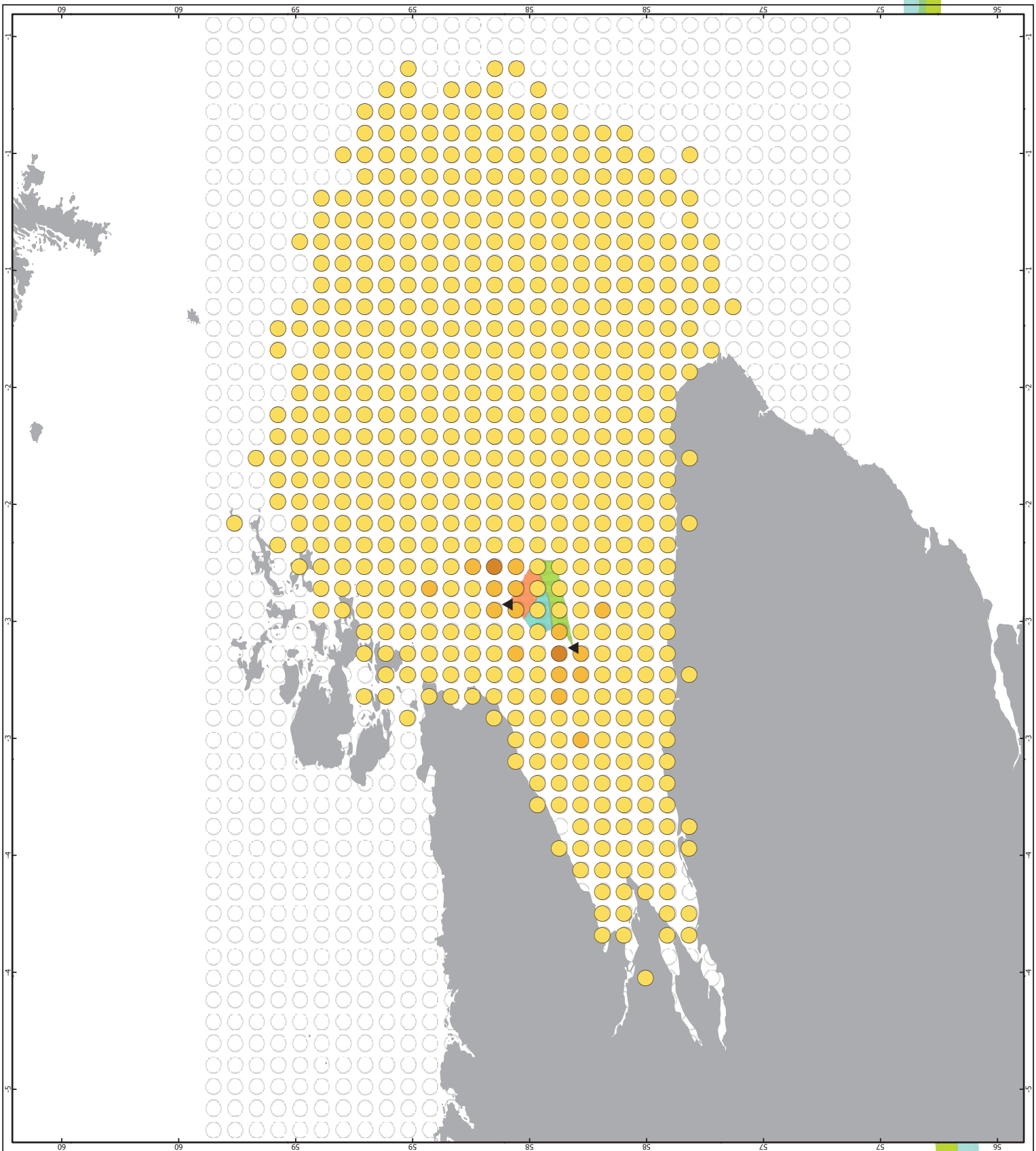
Number of minke whale predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:1,550,000 A3 Chart N  


Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 08/05/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-228	








**Figure D26: Scenario B**  
**SAFESIMM**  
 Minke Whale 198 dB  
 Moray Offshore Renewables Ltd

KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

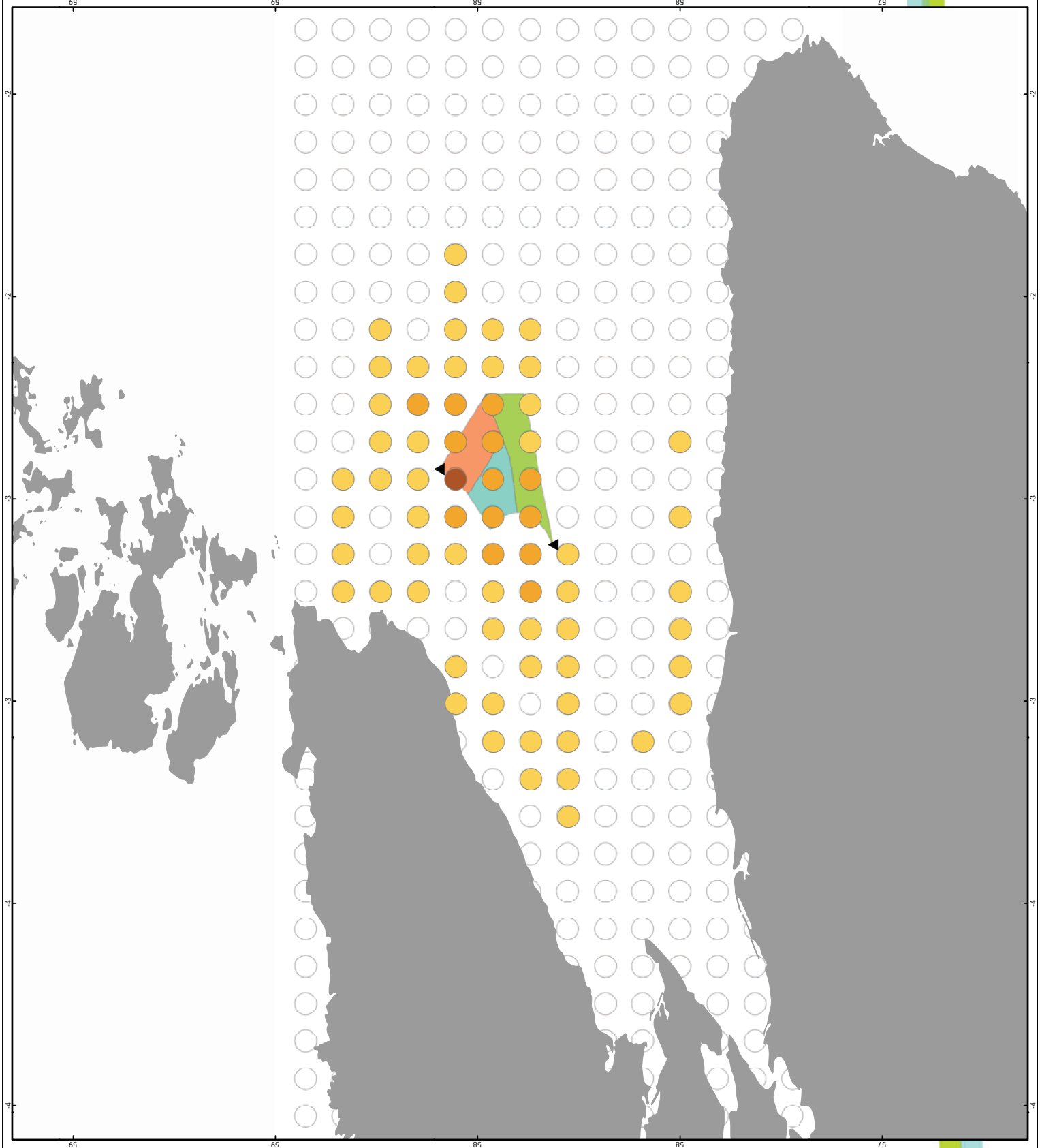
-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  
0 20 40 km

Geodetic Parameters: WGS 1984  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 18/04/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-229

Figure D27: Scenario B  
SAFESIMM  
Harbour Seal 186 dB  
Moray Offshore Renewables Ltd






KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

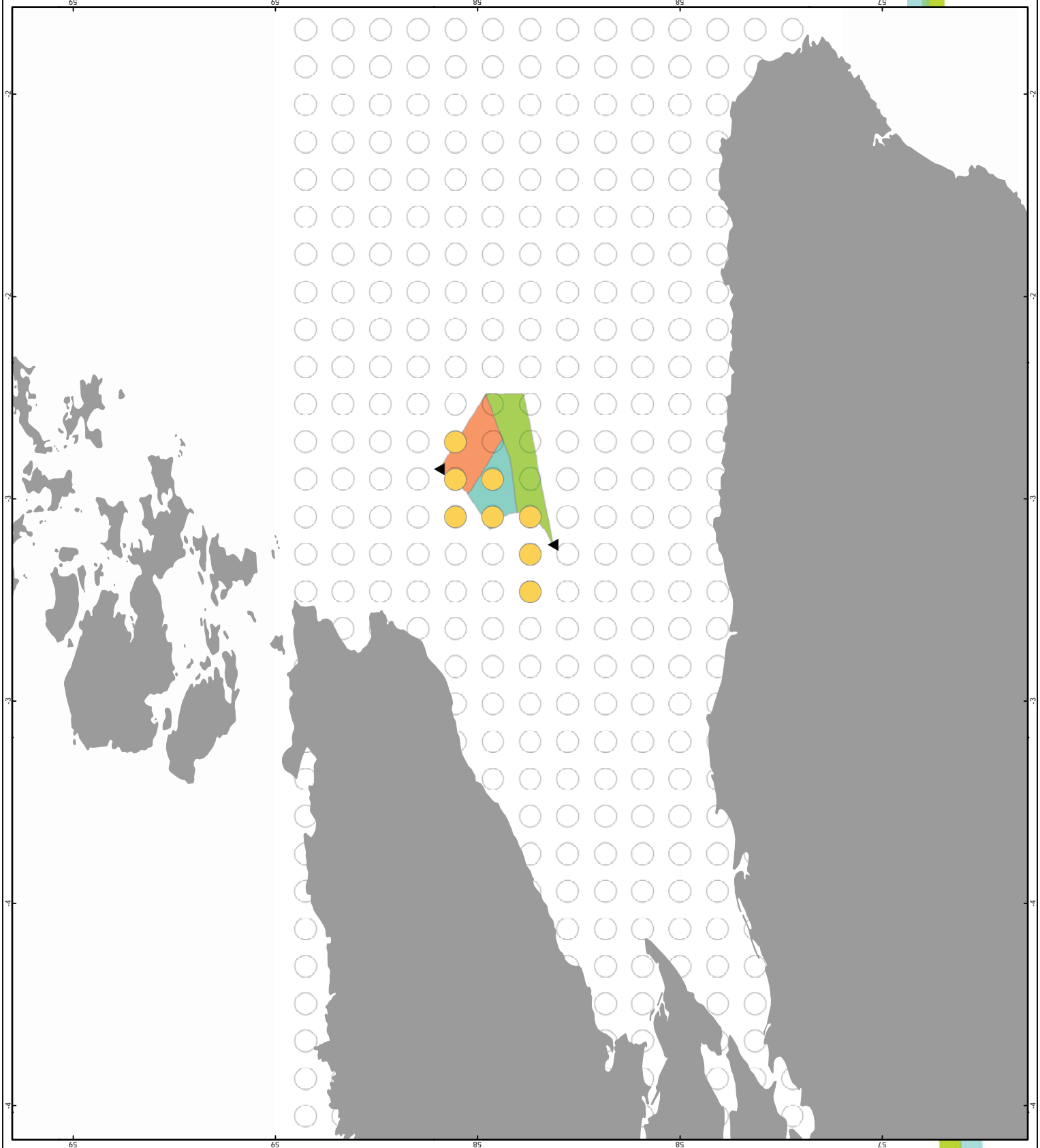
-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD




Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-230

**Figure D28: Scenario B**  
**SAFESIMM**  
 Harbour Seal 198 dB  
 Moray Offshore Renewables Ltd









KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  

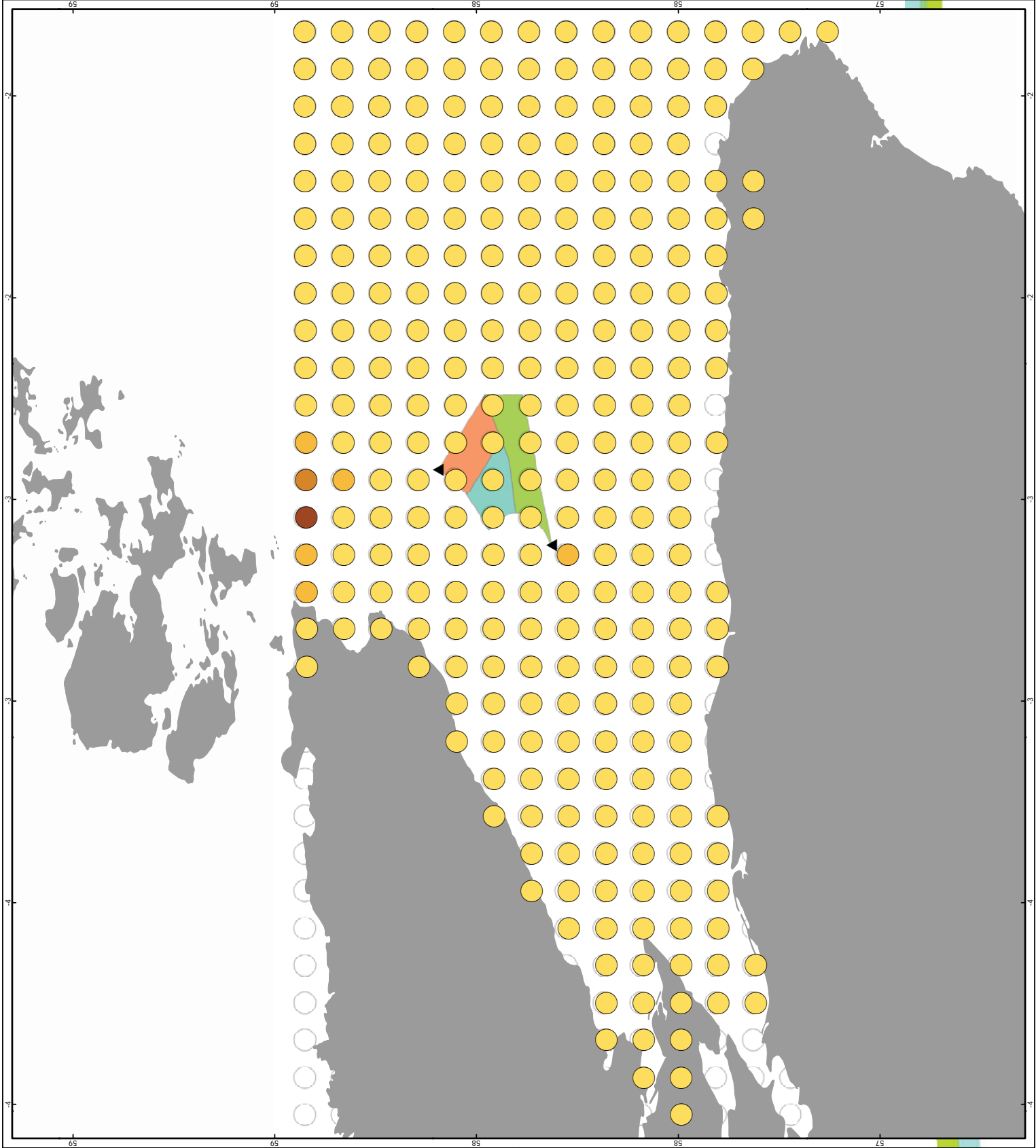

Geodetic Parameters: WGS 1984

Produced: LG  
 Reviewed: SC  
 Approved: CJP

Date: 18/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-231




Figure D29: Scenario B  
 SAFESIMM  
 Grey Seal 186 dB

Moray Offshore  
 Renewables Ltd











KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

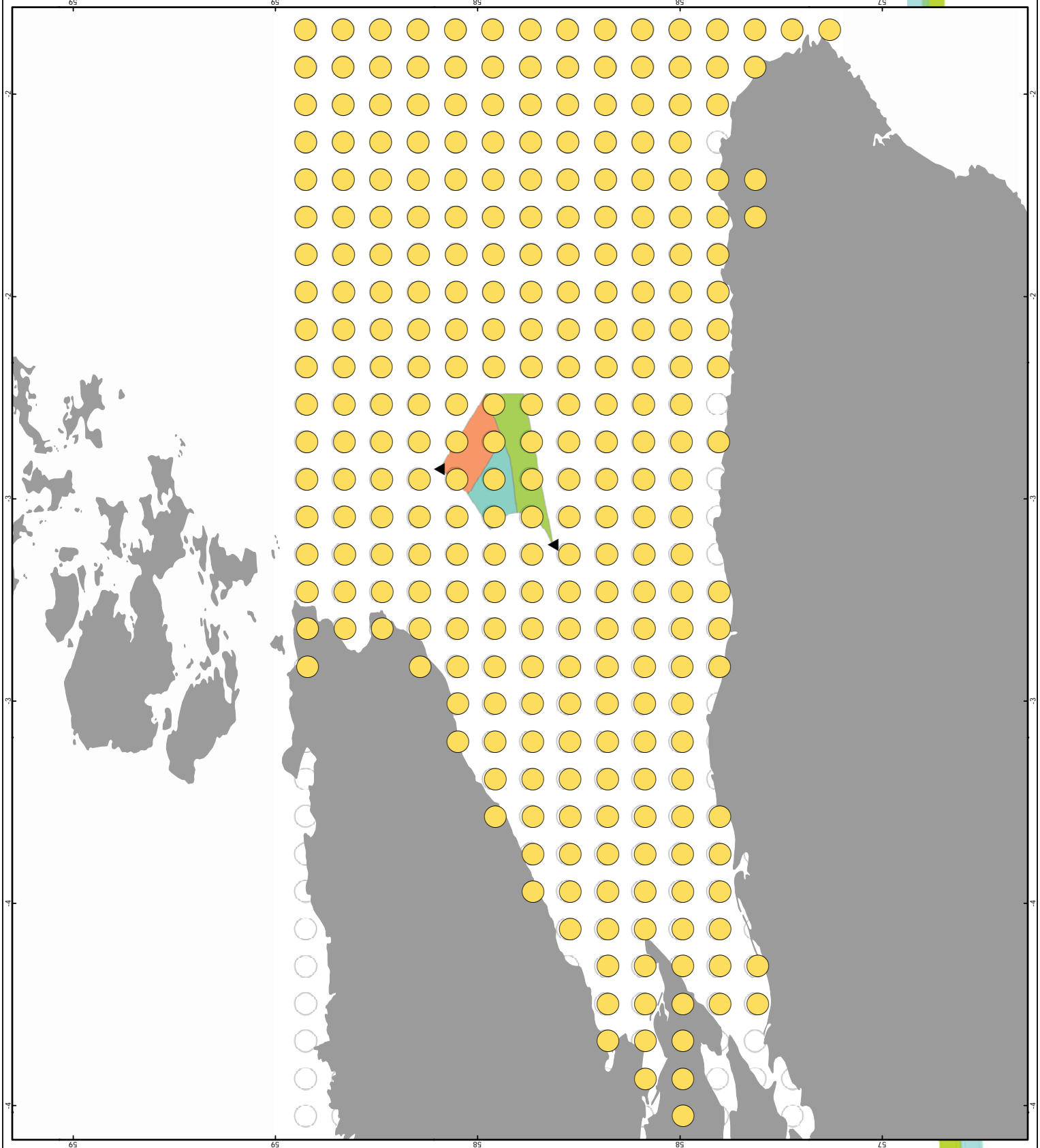
-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  
0 20 40 km

Geodetic Parameters: WGS 1984  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 18/04/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-232

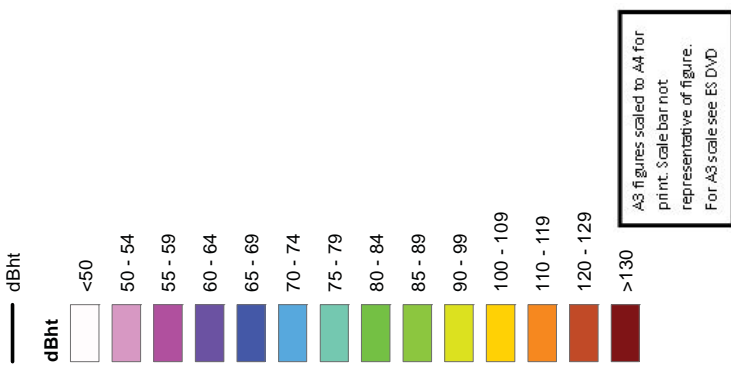
Figure D30: Scenario B  
SAFESIMM  
Grey Seal 198 dB  
Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

**KEY**  
 Telford, Stevenson and MacColl  
 MORL piling location



Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: GL  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-122

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

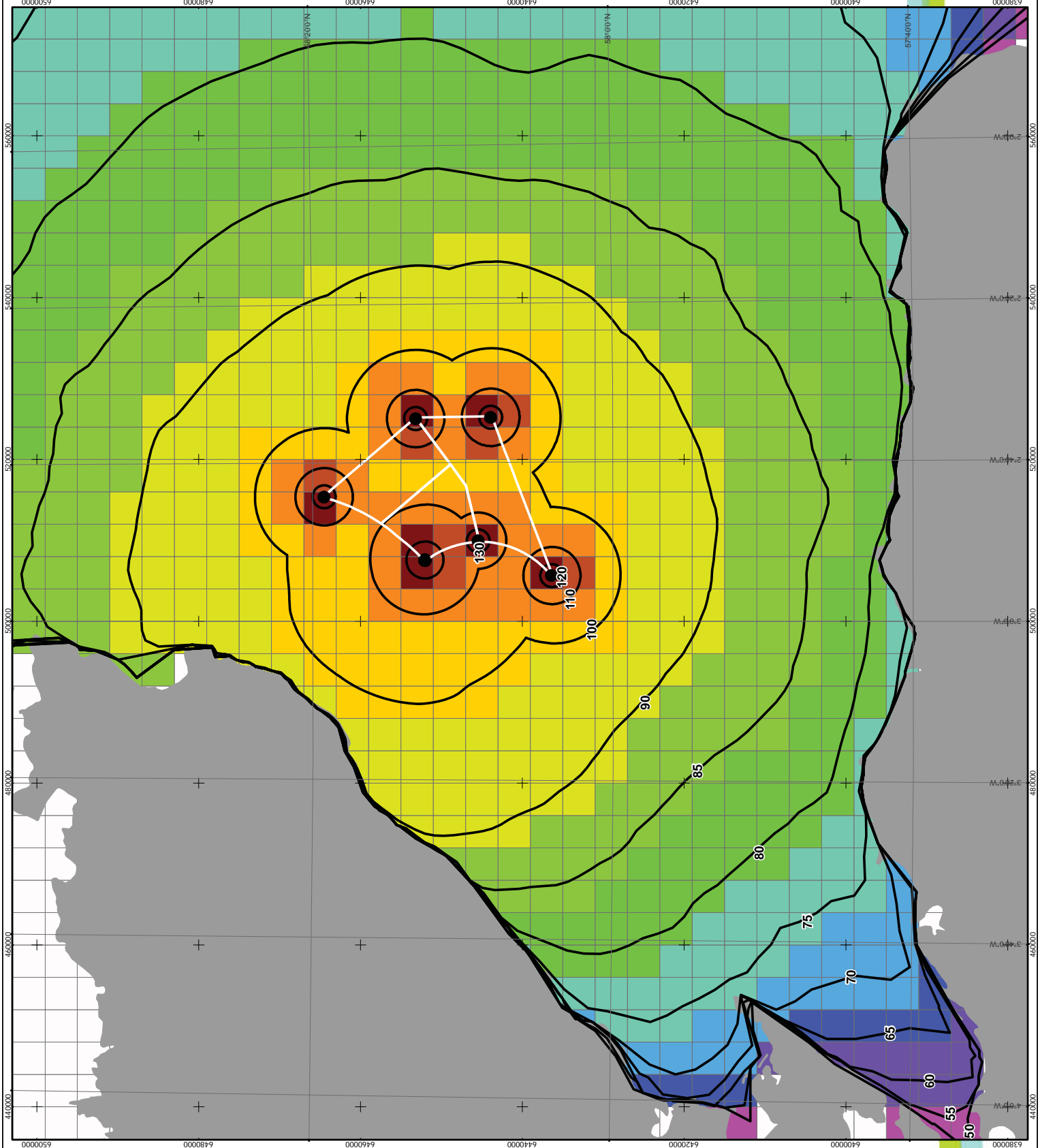


Figure D31: Scenario C  
 Harbour Porpoise dBht  
 Moray Offshore Renewables Ltd



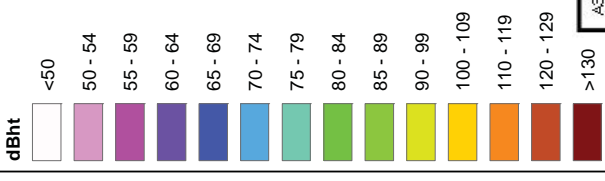


Moray Offshore Renewables Ltd

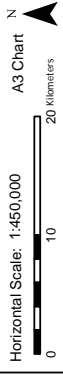
KEY

- Telford, Stevenson and MacColl
- MORL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: GL  
Reviewed: SC  
Approved: CJP  
Date: 02/05/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-121

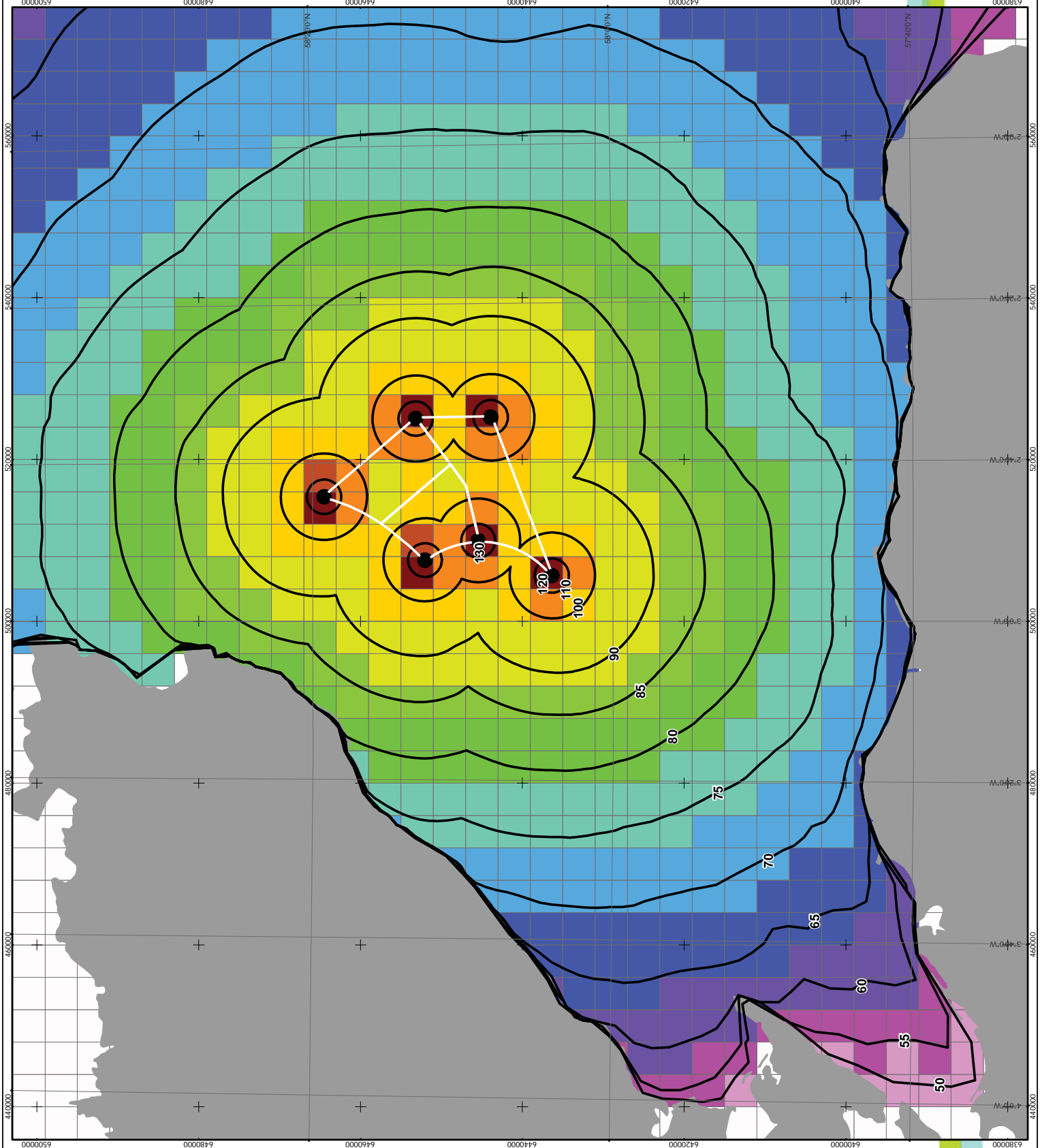


Figure D32: Scenario C  
Bottlenose Dolphin dBht

Moray Offshore  
Renewables Ltd

KEY

□ Telford, Stevenson and MacColl

● MORL piling location

— dBht

dBht

<50

50 - 54

55 - 59

60 - 64

65 - 69

70 - 74

75 - 79

80 - 84

85 - 89

90 - 99

100 - 109

110 - 119

120 - 129

>130

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-124

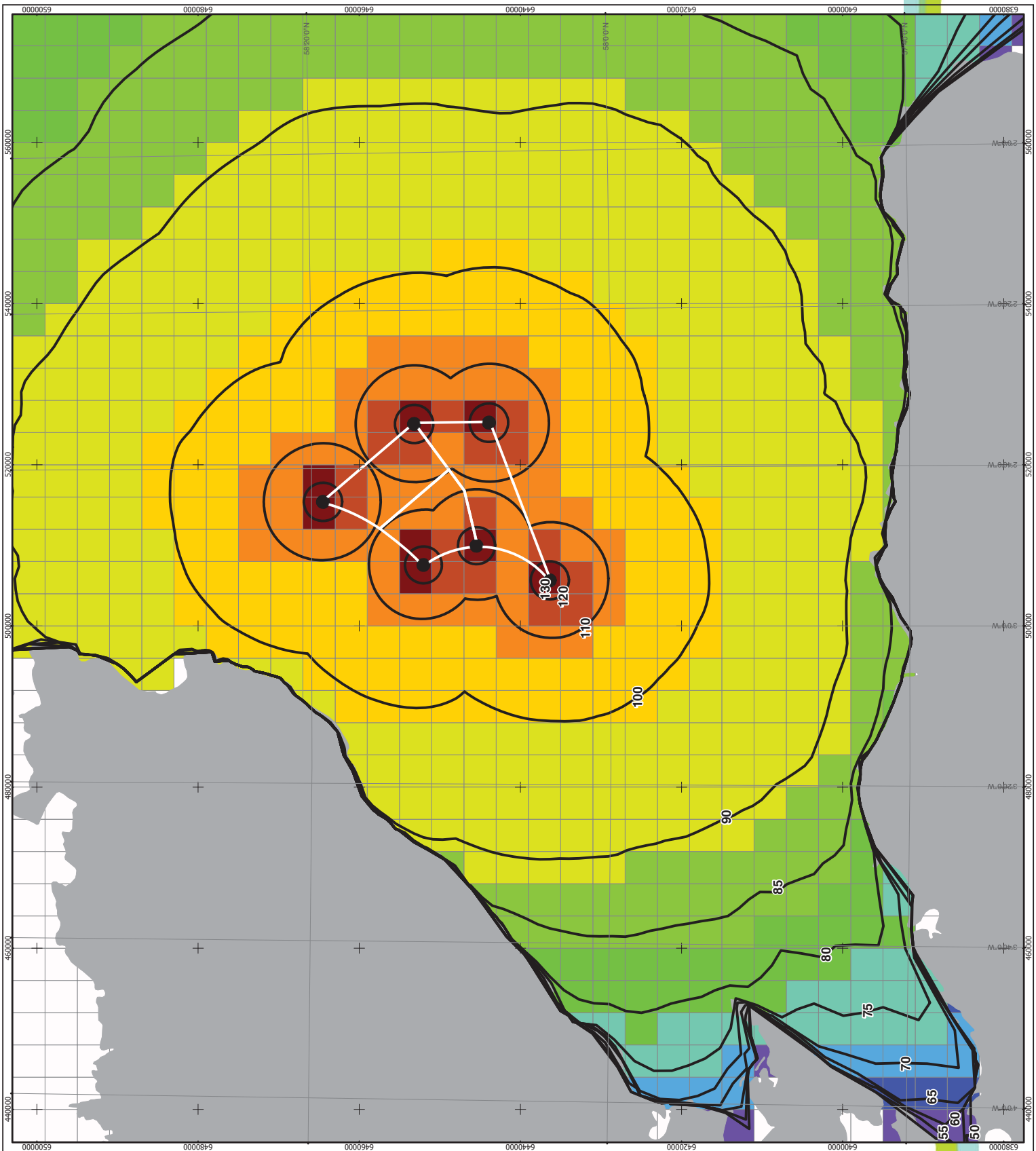
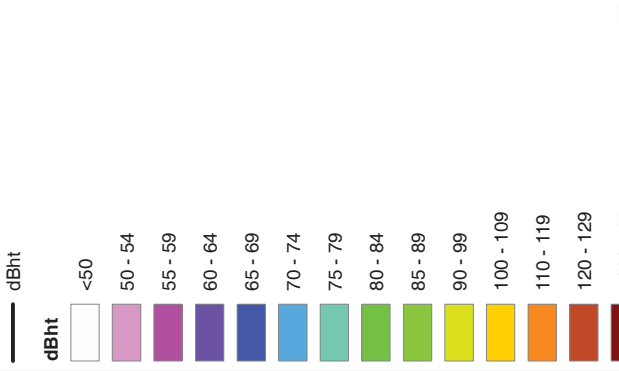


Figure D33: Scenario C  
 Minke Whale dBht

**KEY**

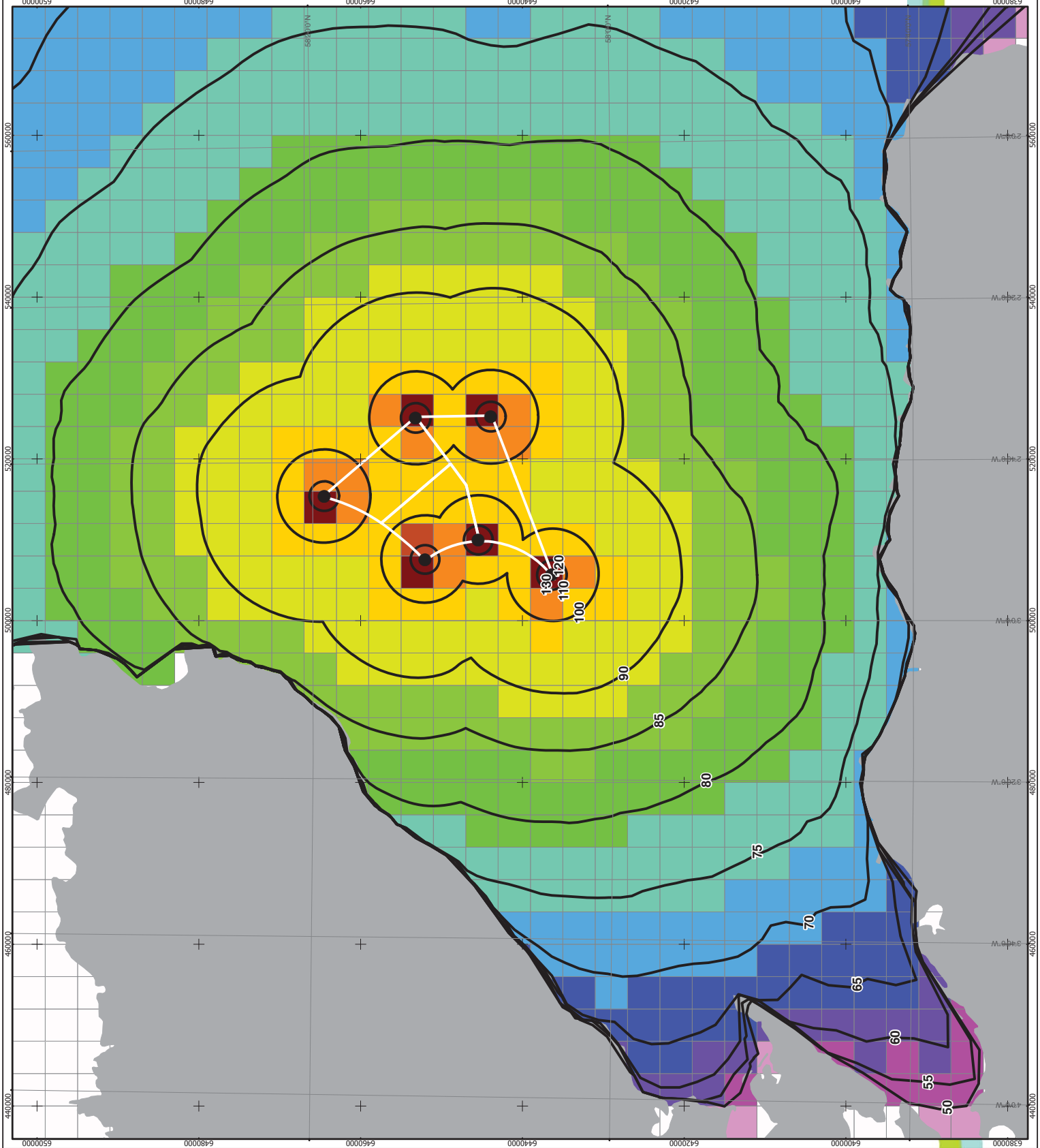
- Telford, Stevenson and MacColl
- MORL piling location
- dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000  
 0 10 20 Kilometers  
 A3 Chart N

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-123



**Figure D34: Scenario C**  
 Harbour Seal dBht

Moray Offshore Renewables Ltd

KEY

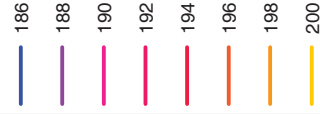


Telford, Stevenson and MacColl

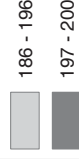


MORL piling location

dB



Max dB

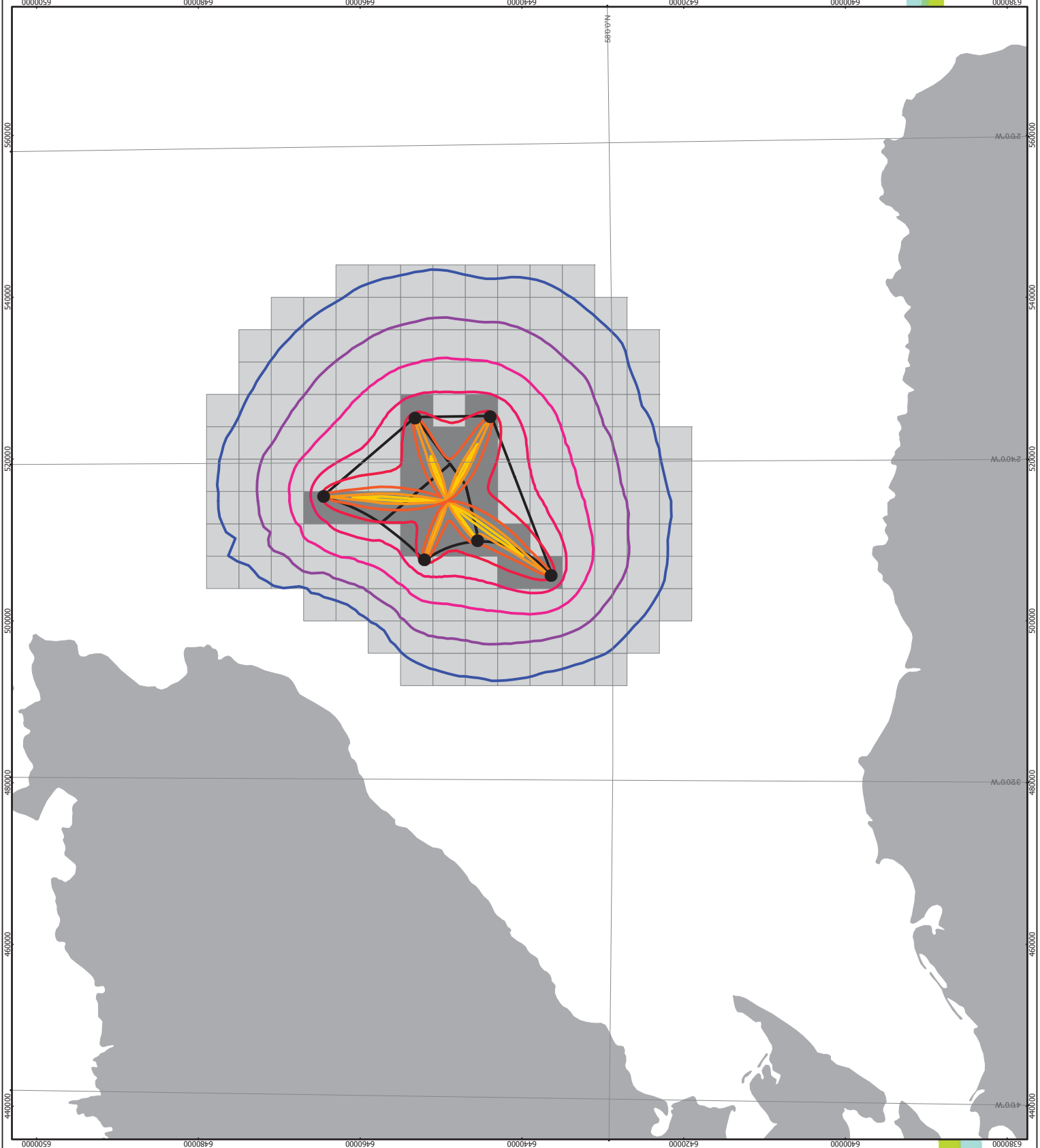


A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N	
Produced: LG	Reviewed: SC
Approved: CJP	Date: 02/05/2012
REF: 8460001-PPW0200-NPW-MAP-125	Revision: A

Figure D35: Scenario C  
High Frequency Cetaceans  
SEL



KEY



Telford, Stevenson and MacColl



MORL piling location

dB



186



188



190



192



194



196

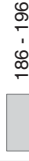


198

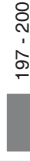


200

Max dB



186 - 196



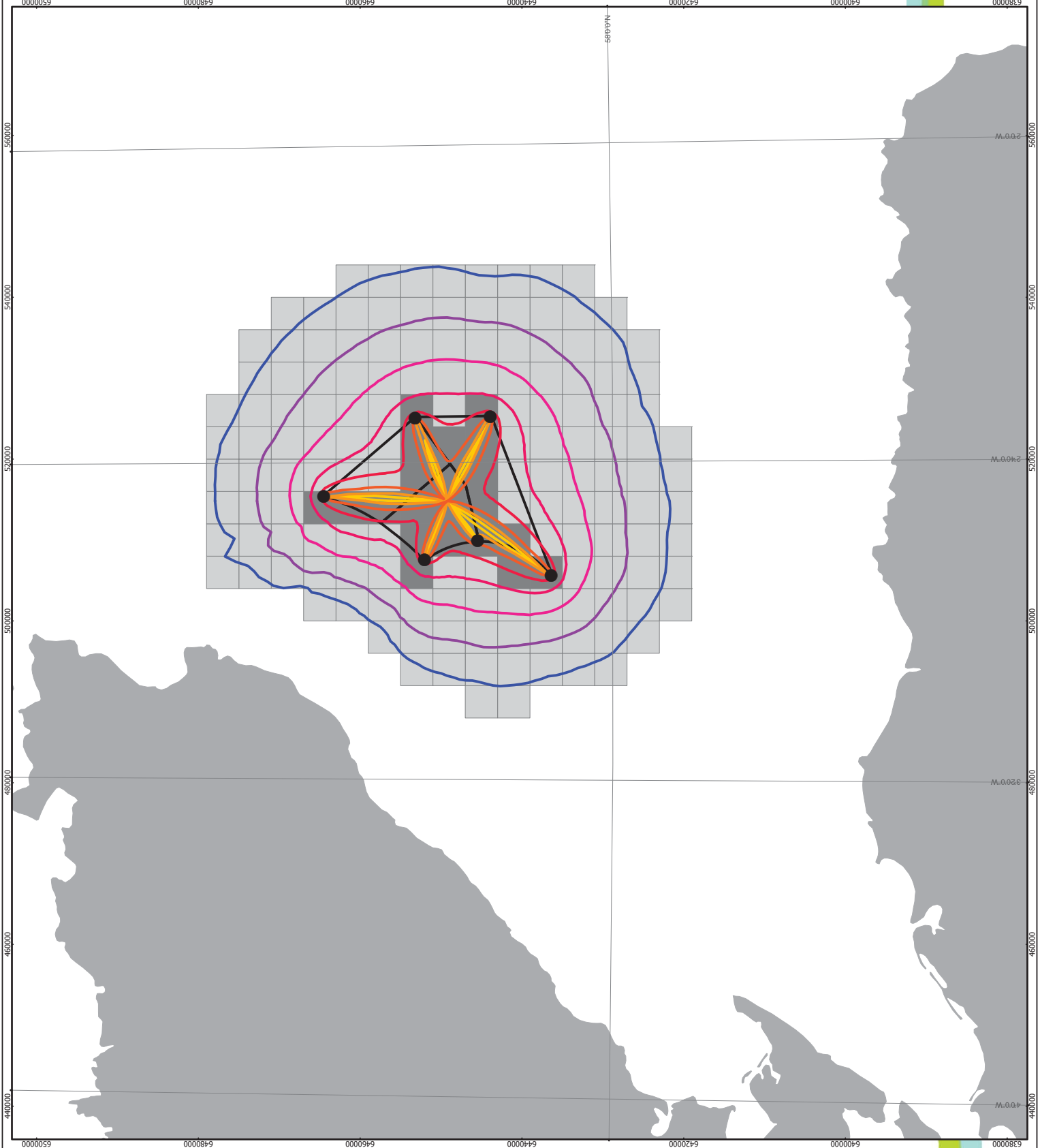
197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-127

Figure D36: Scenario C  
 Mid Frequency Cetaceans  
 SEL



KEY

□ Telford, Stevenson and MacColl

● MORL piling location

dB

186

188

190

192

194

196

198

200

Max dB

186 - 196

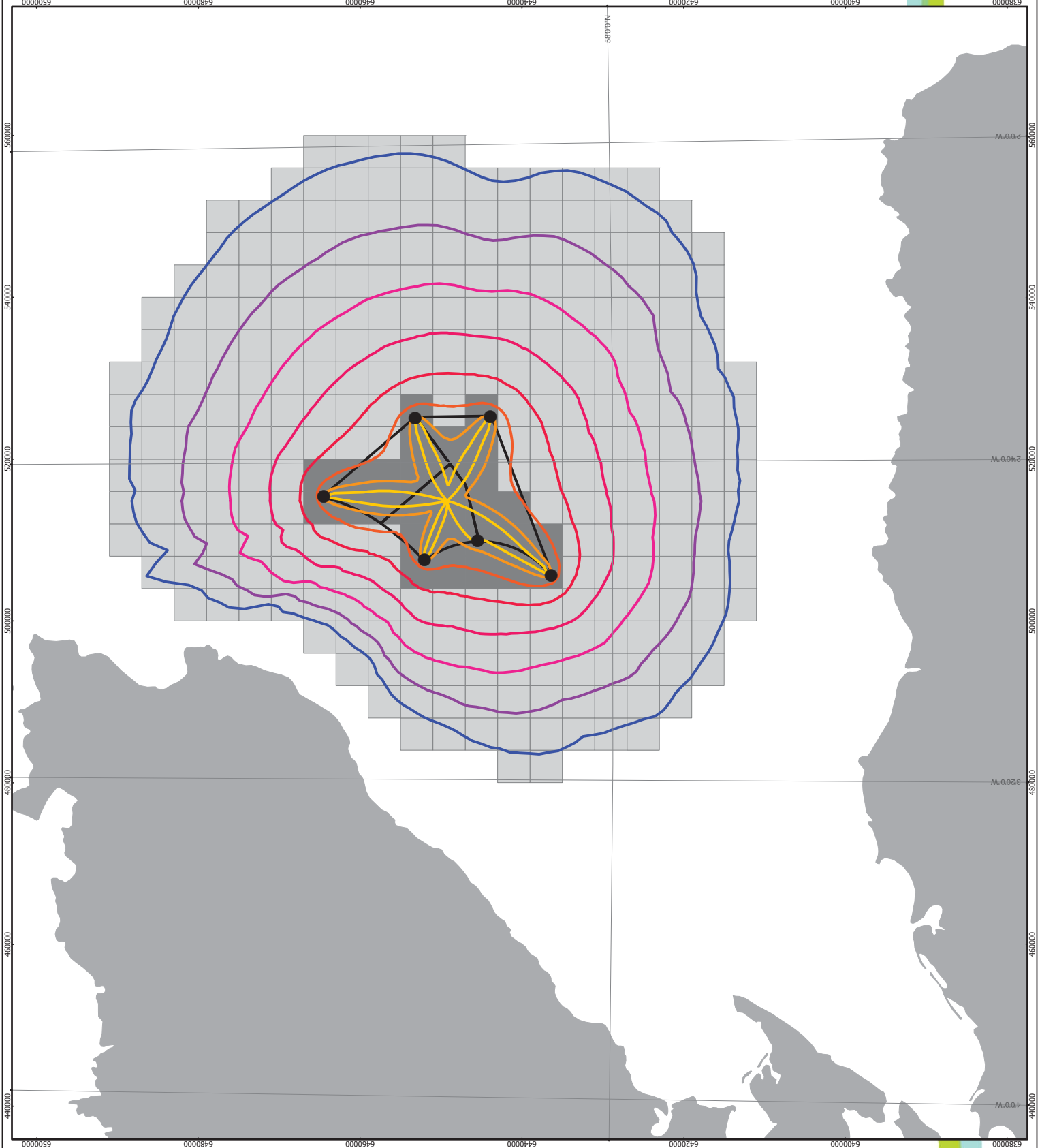
197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-126

Figure D37: Scenario C  
 Low Frequency Cetaceans  
 SEL



KEY

 Telford, Stevenson and MacColl


 MORL piling location

dB

 186

 188

 190

 192


 194


 196

 198

 200

Max dB

 186 - 196

 197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LG

Reviewed: SC

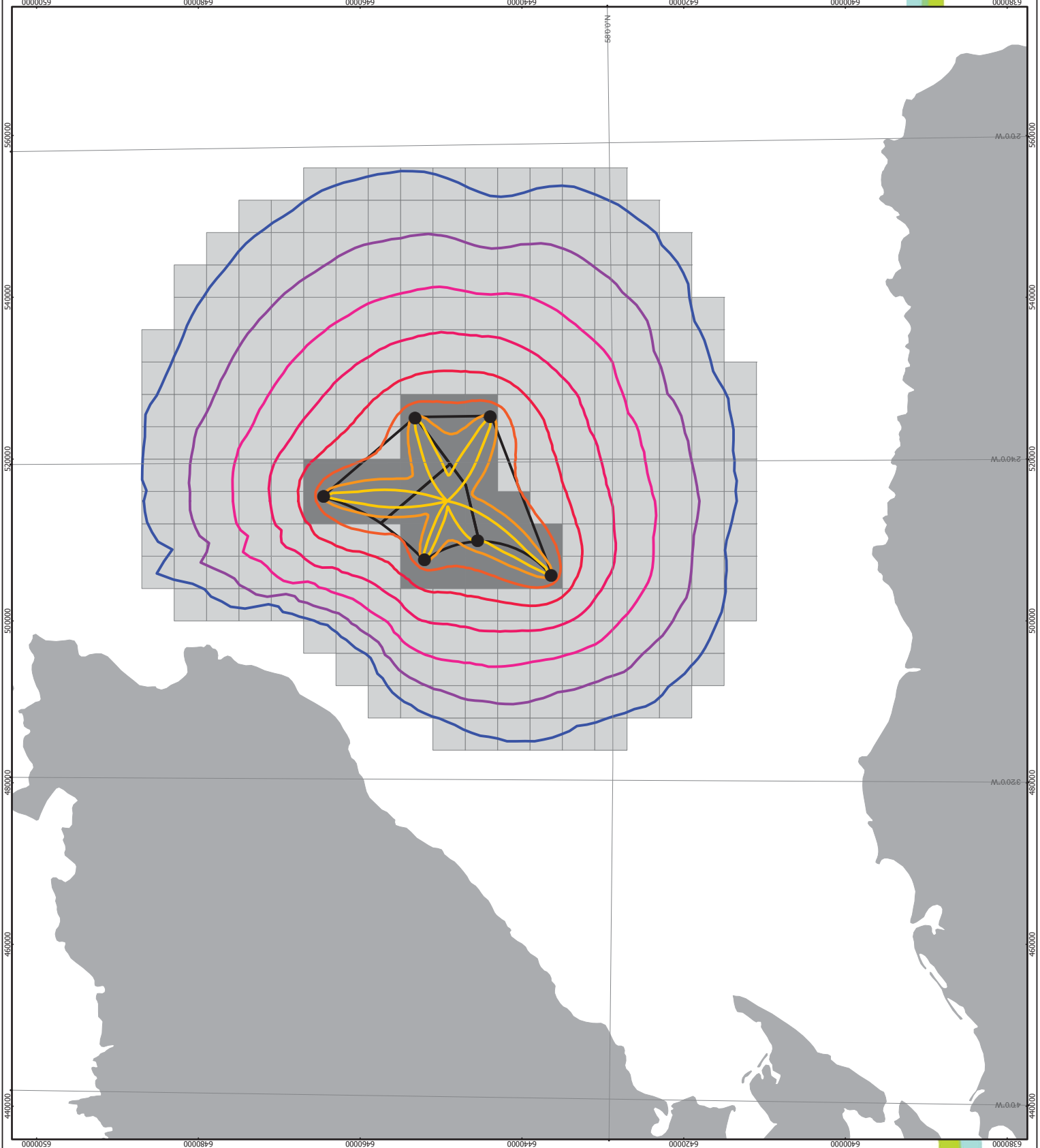
Approved: CJP

Date: 02/05/2012 Revision: A

REF: 8460001-PPW0200-NPW-MAP-128

Figure D38: Scenario C  
Pinnipeds  
SEL

Moray Offshore  
Renewables Ltd



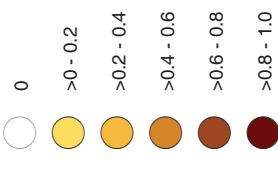


**KEY**

- Telford
- Stevenson
- MacColl

▲ MORL piling location

Number of harbour porpoise predicted to receive SELs sufficient to induce PTS onset



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  
 0 20 40 km

Geodetic Parameters: WGS 1984

Produced: LG  
 Reviewed: SC  
 Approved: CJP

Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-233

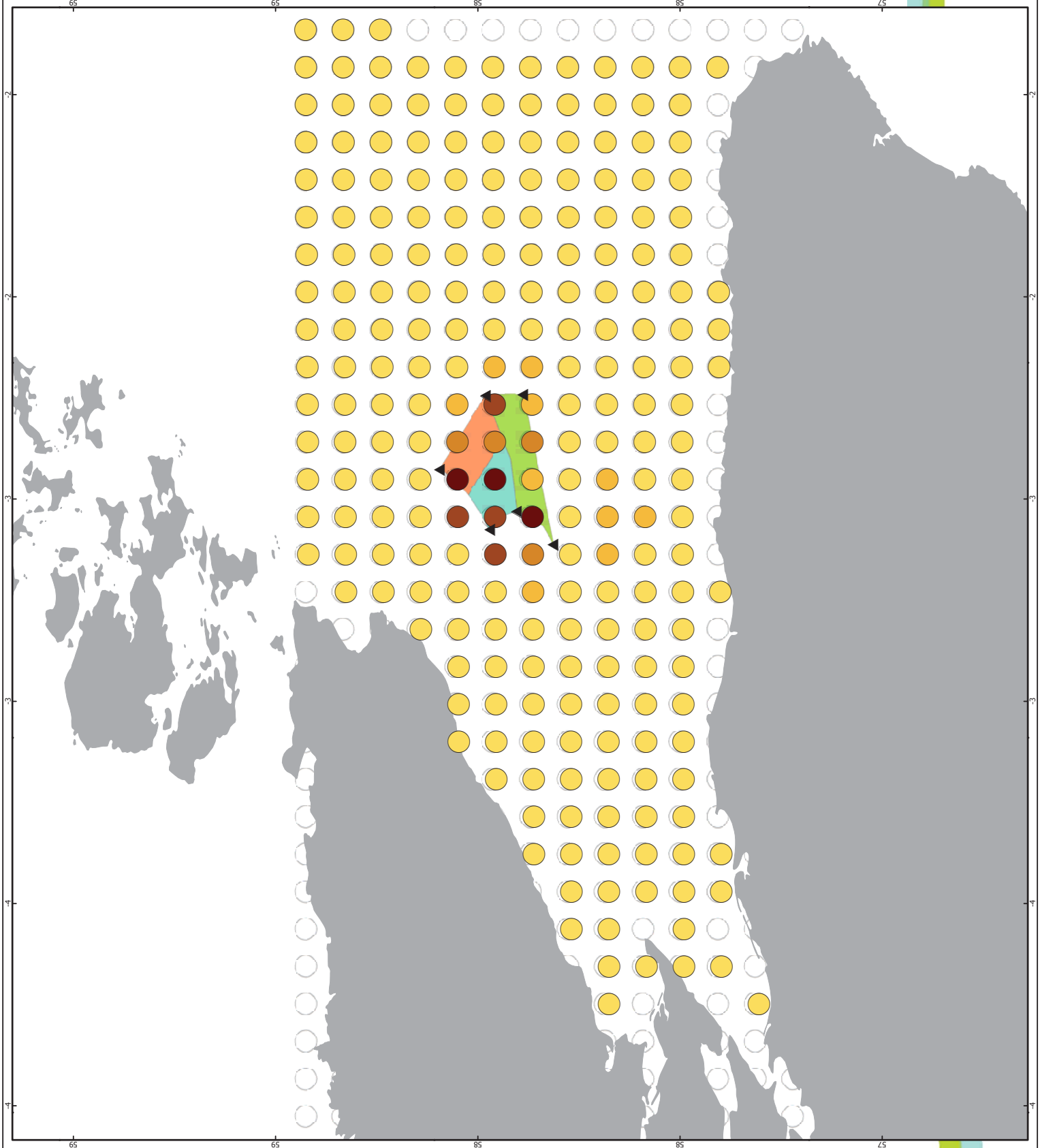




Figure D39: Scenario C  
 SAFES-IMM  
 Harbour Porpoise 198 dB  
 Moray Offshore  
 Renewables Ltd

KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of bottlenose dolphins predicted to receive SELs sufficient to induce PTS onset

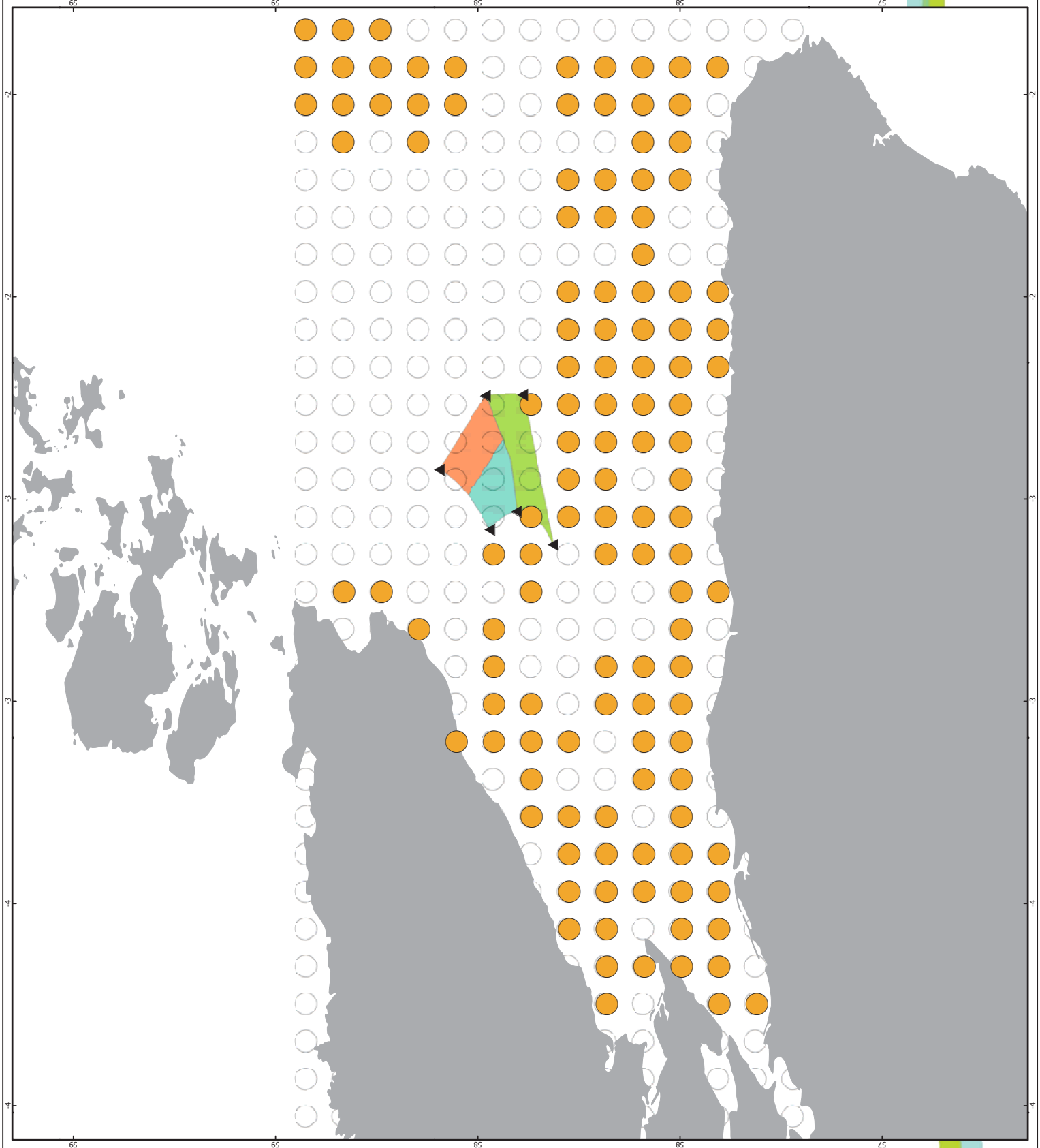
-  0
-  0.01
-  0.02

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  
0 20 40 km

Geodetic Parameters: WGS 1984  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 23/04/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-235

Figure D40: Scenario C  
SAFESIMM  
Bottlenose Dolphin 198 dB  
Moray Offshore Renewables Ltd



- KEY**
- Telford
  - Stevenson
  - MacColl

▲ MORL piling location

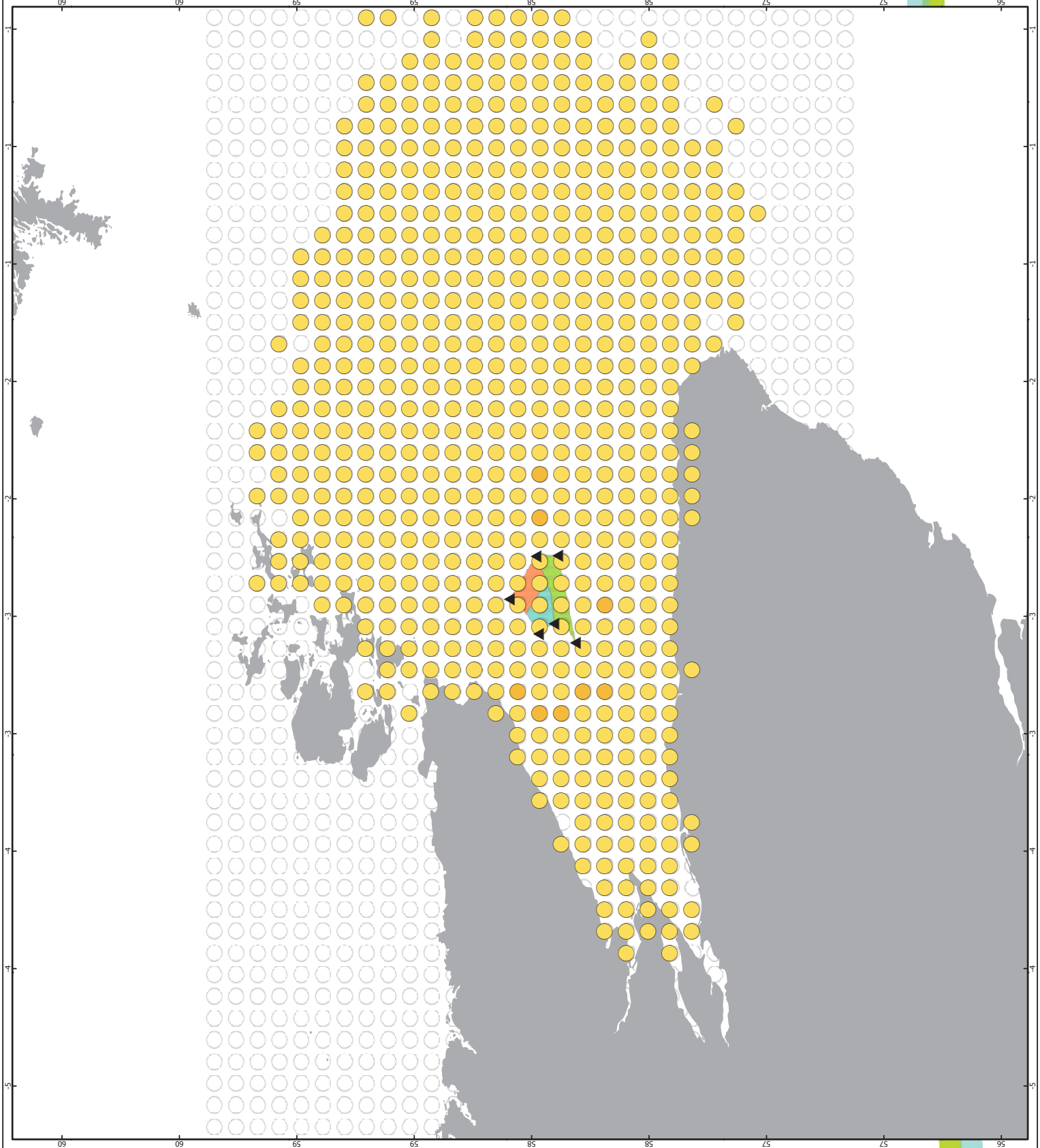
Number of minke whale predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DWD

Horizontal Scale: 1:1,550,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 08/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-236



**Figure D41: Scenario C**  
**SAFESIMM**  
 Minke Whale 198 dB  
 Moray Offshore Renewables Ltd

KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

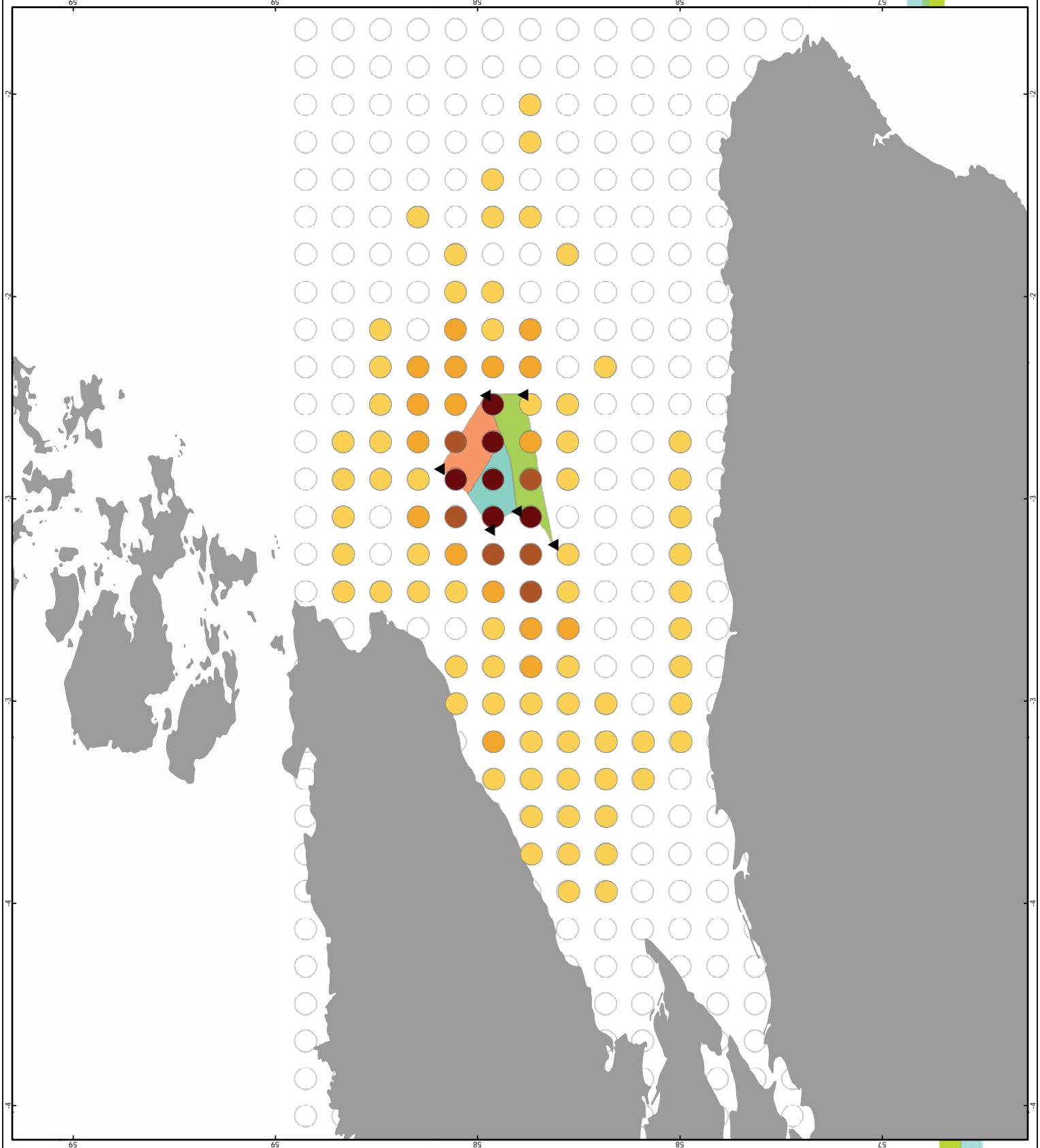
Number of harbour seals predicted to receive SELs sufficient to induce PTS onset






A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-237








KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

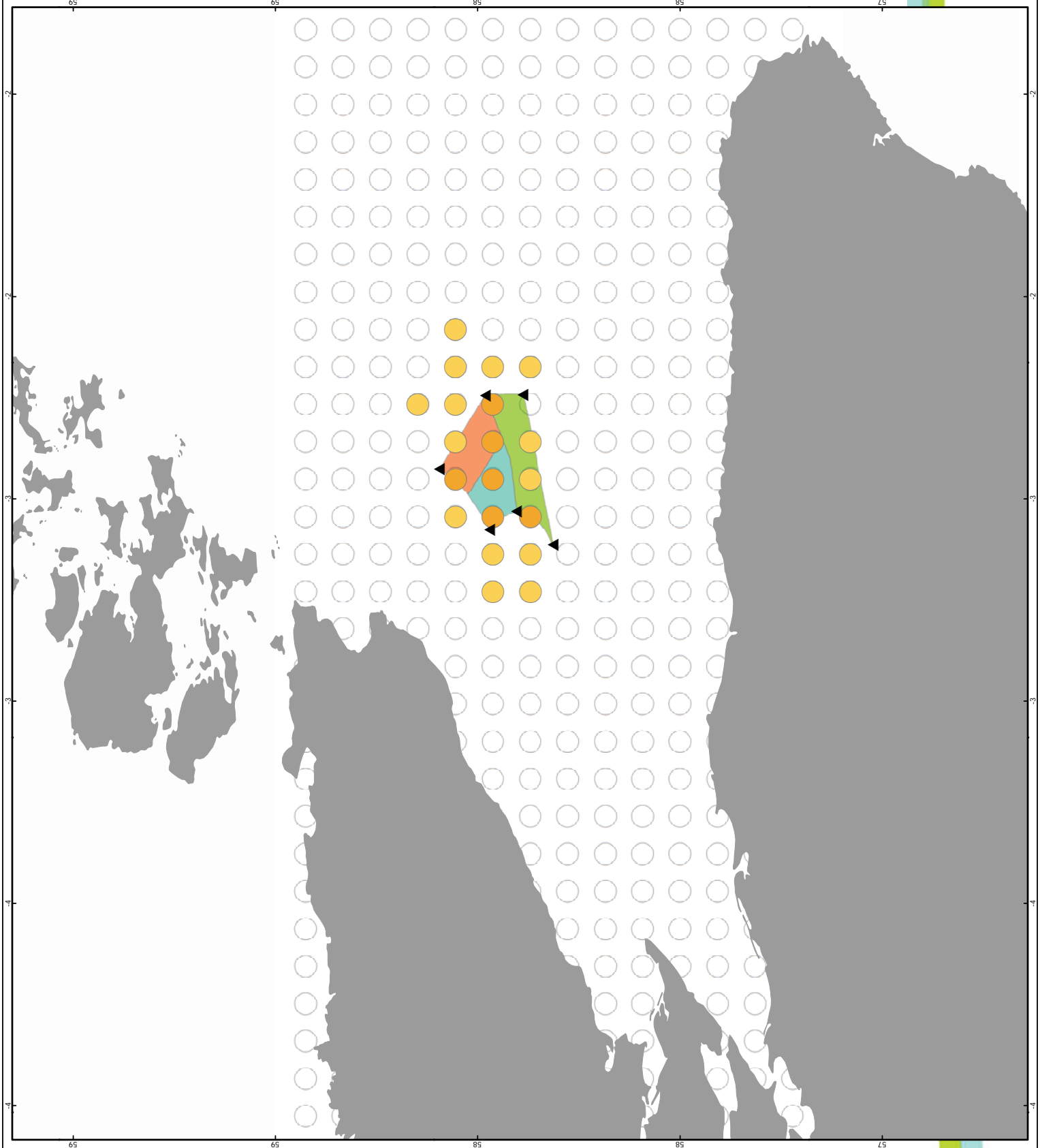
-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  
0 20 40 km

Geodetic Parameters: WGS 1984  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 23/04/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-238

Figure D43: Scenario C  
SAFESIMM  
Harbour Seal 198 dB  
Moray Offshore Renewables Ltd





**KEY**

- Telford
- Stevenson
- MacColl

▲ MORL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

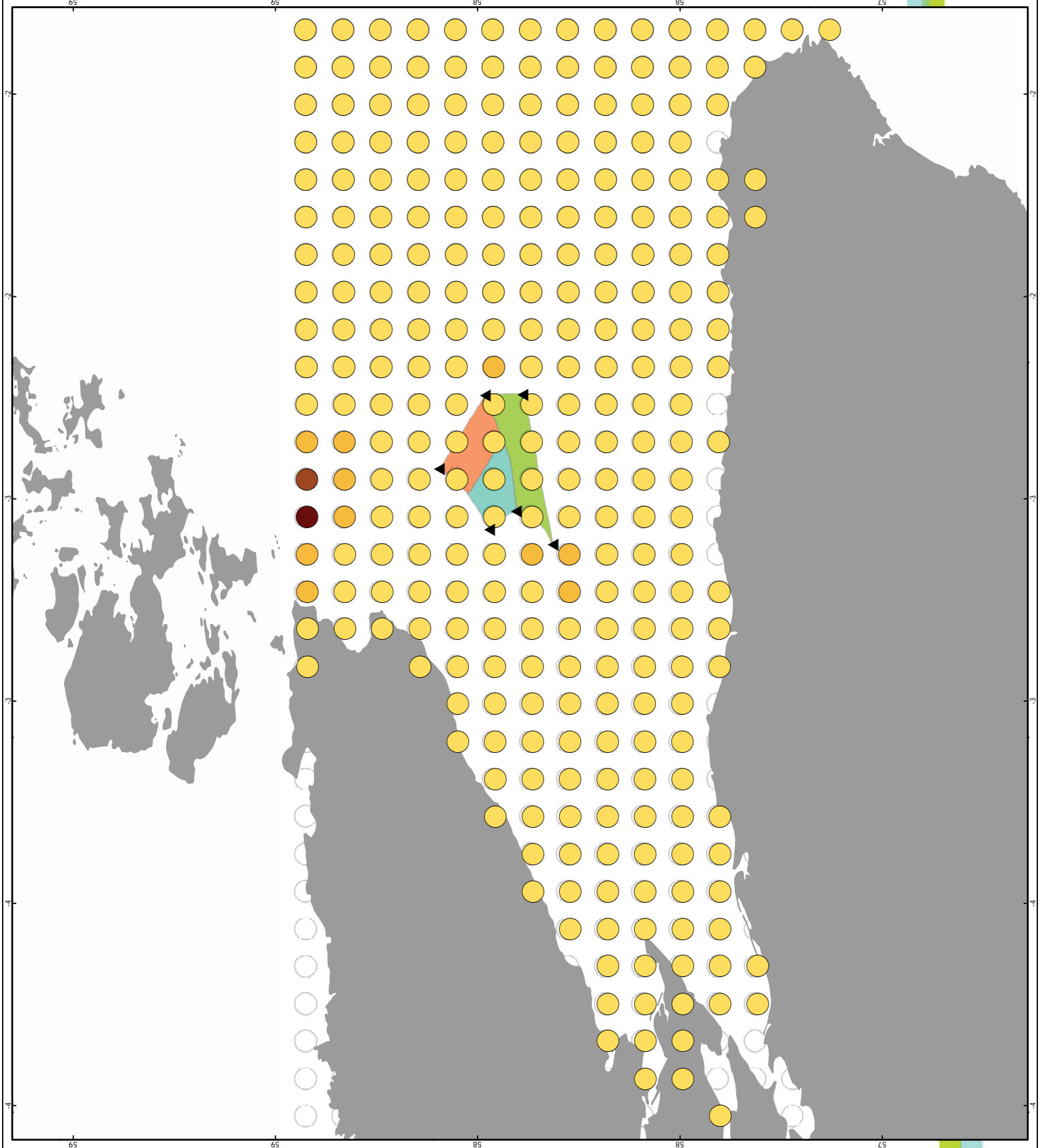
- 0
- >0 - 5
- >5 - 10
- >10 - 15
- >15 - 20
- >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-239

**Figure D44: Scenario C**  
**SAFESIMM**  
 Grey Seal 186 dB  
 Moray Offshore Renewables Ltd

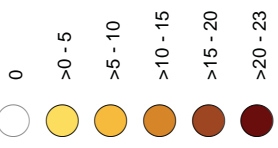


KEY

-  Telford
-  Stevenson
-  MacColl

▲ MORL piling location

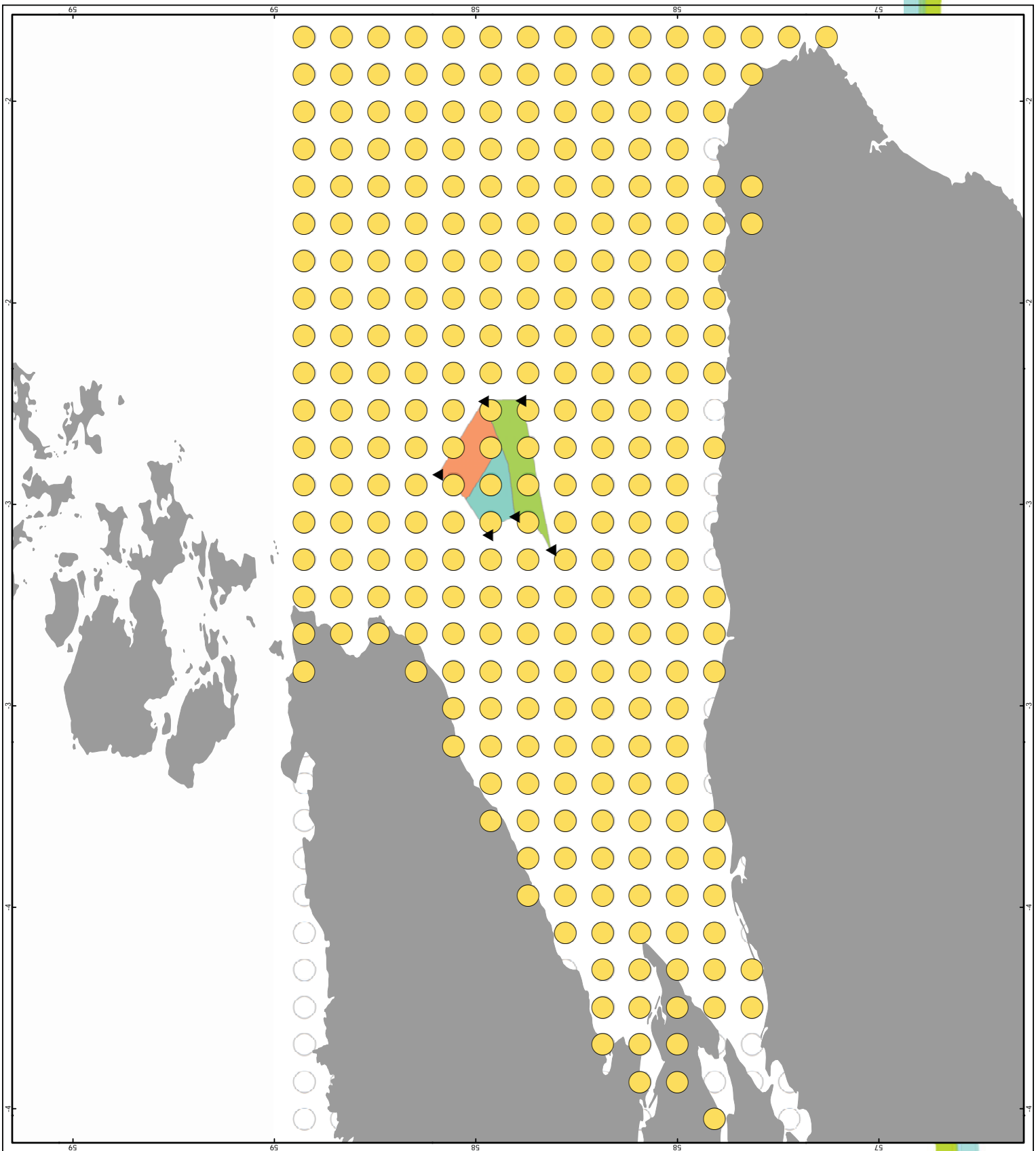
Number of grey seals predicted to receive SELs sufficient to induce PTS onset



Horizontal Scale: 1:900,000  
 0 20 40 km  
 A3 Chart N

Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-240

**Figure D45: Scenario C**  
**SAFESIMM**  
 Grey Seal 198 dB  
 Moray Offshore Renewables Ltd



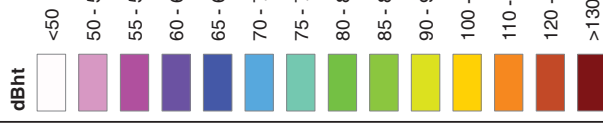


KEY

Telford, Stevenson, MacColl and Beatrice

BOWL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D/VD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-138

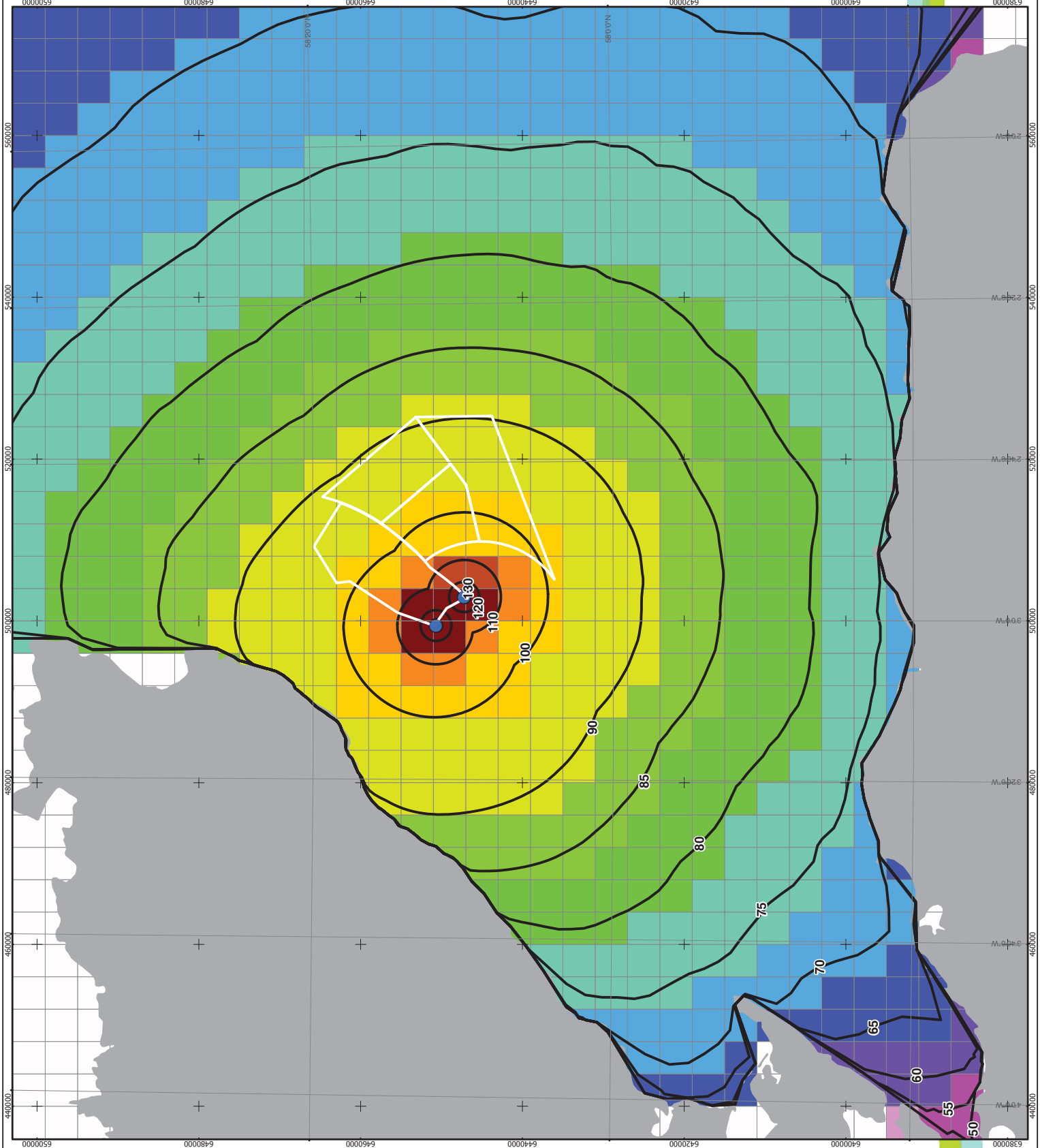


Figure E1: Scenario D  
Harbour Porpoise dBht

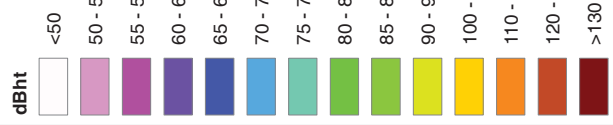
Moray Offshore Renewables Ltd

KEY

Telford, Stevenson, MacColl and Beatrice

BOWL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D/D



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-137

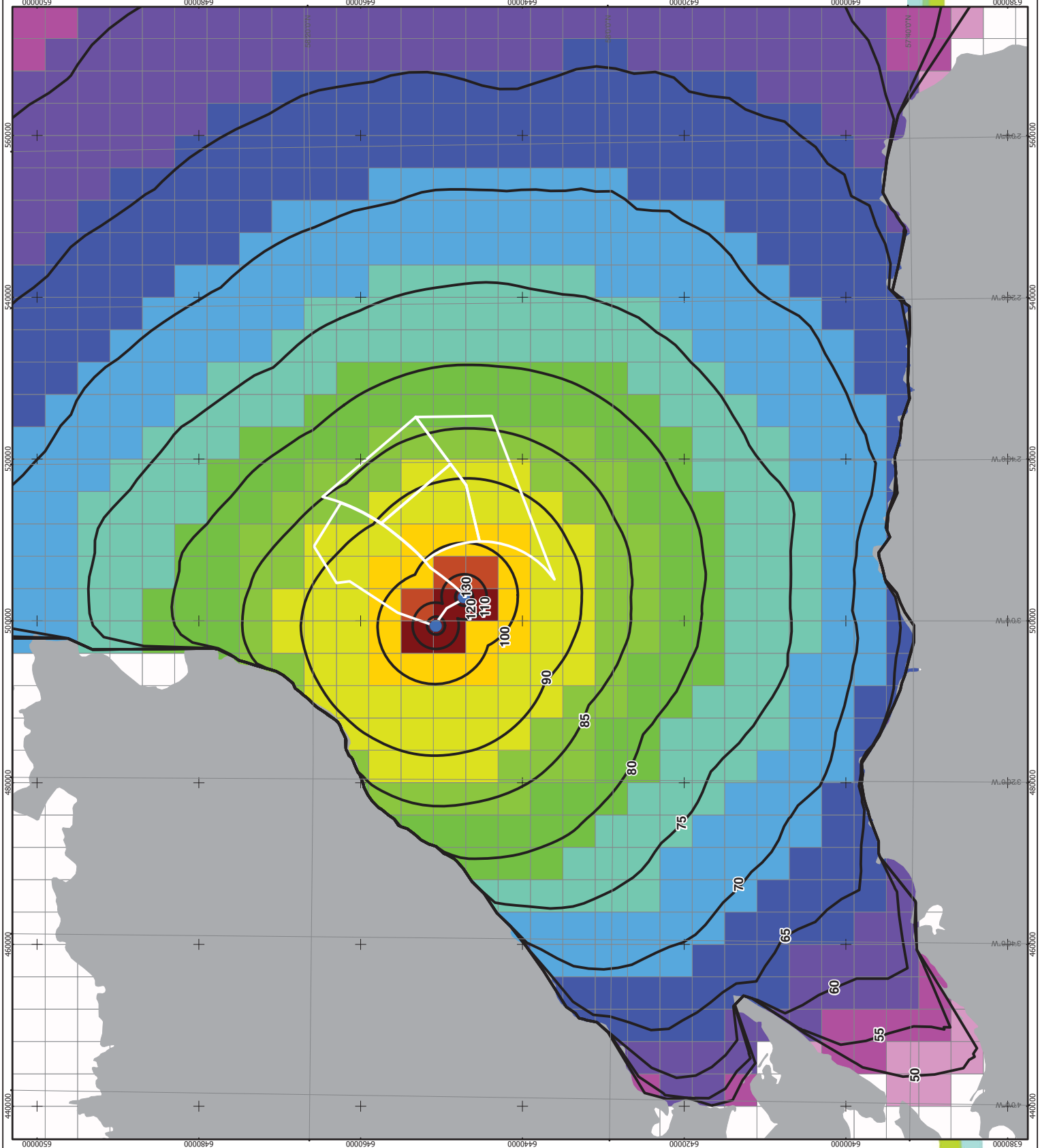


Figure E2: Scenario D  
 Bottlenose Dolphin dBht

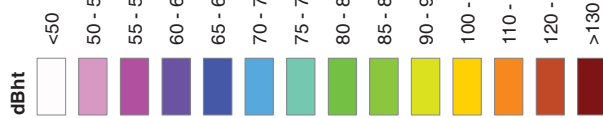
Moray Offshore  
 Renewables Ltd

KEY

Telford, Stevenson, MacColl and Beatrice

BOWL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-140

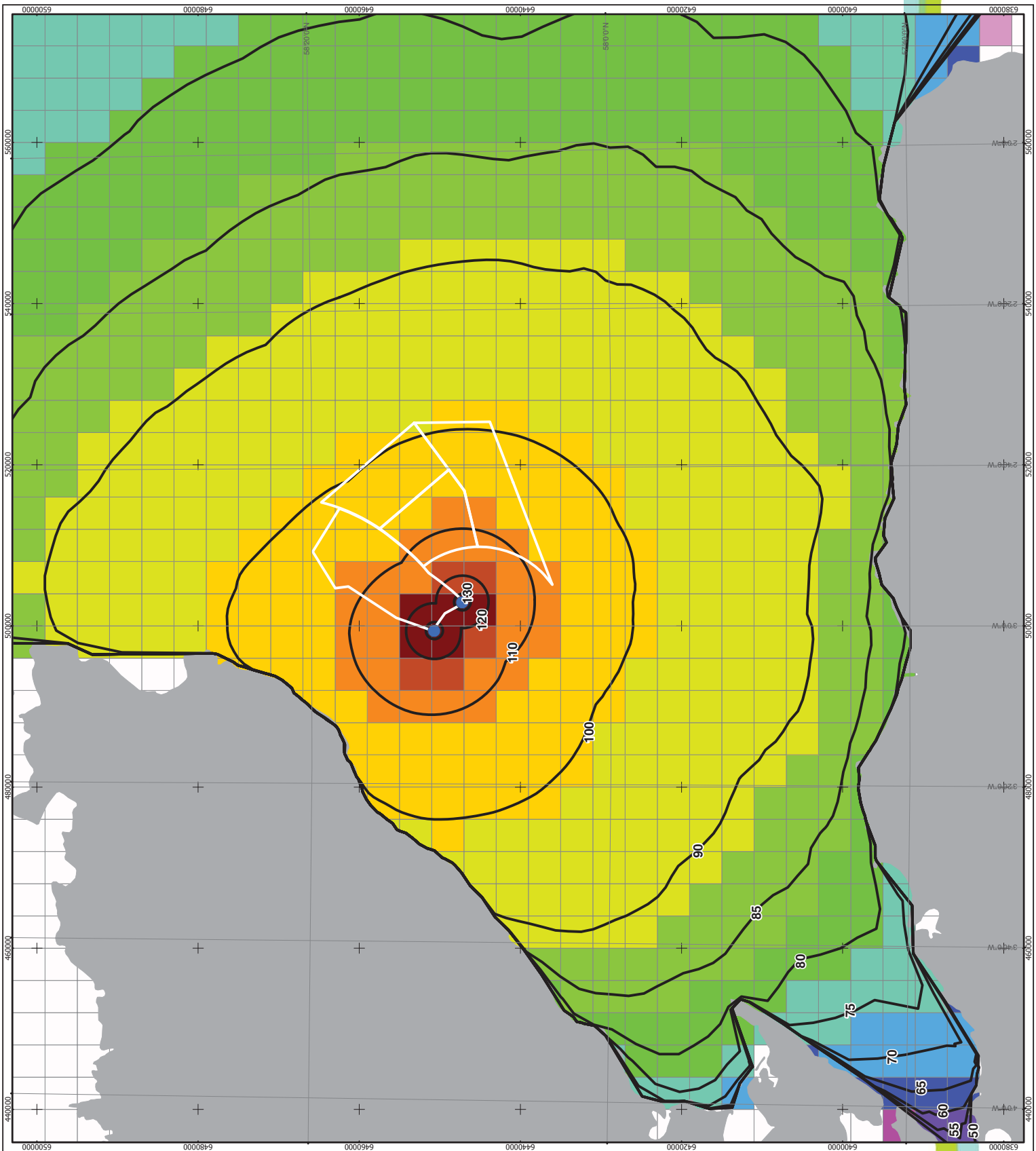


Figure E3: Scenario D  
 Minke Whale dBht

Moray Offshore Renewables Ltd



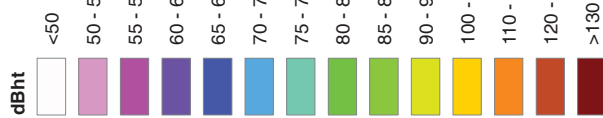
Moray Offshore Renewables Ltd

KEY

Telford, Stevenson, MacColl and Beatrice

BOWL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-139

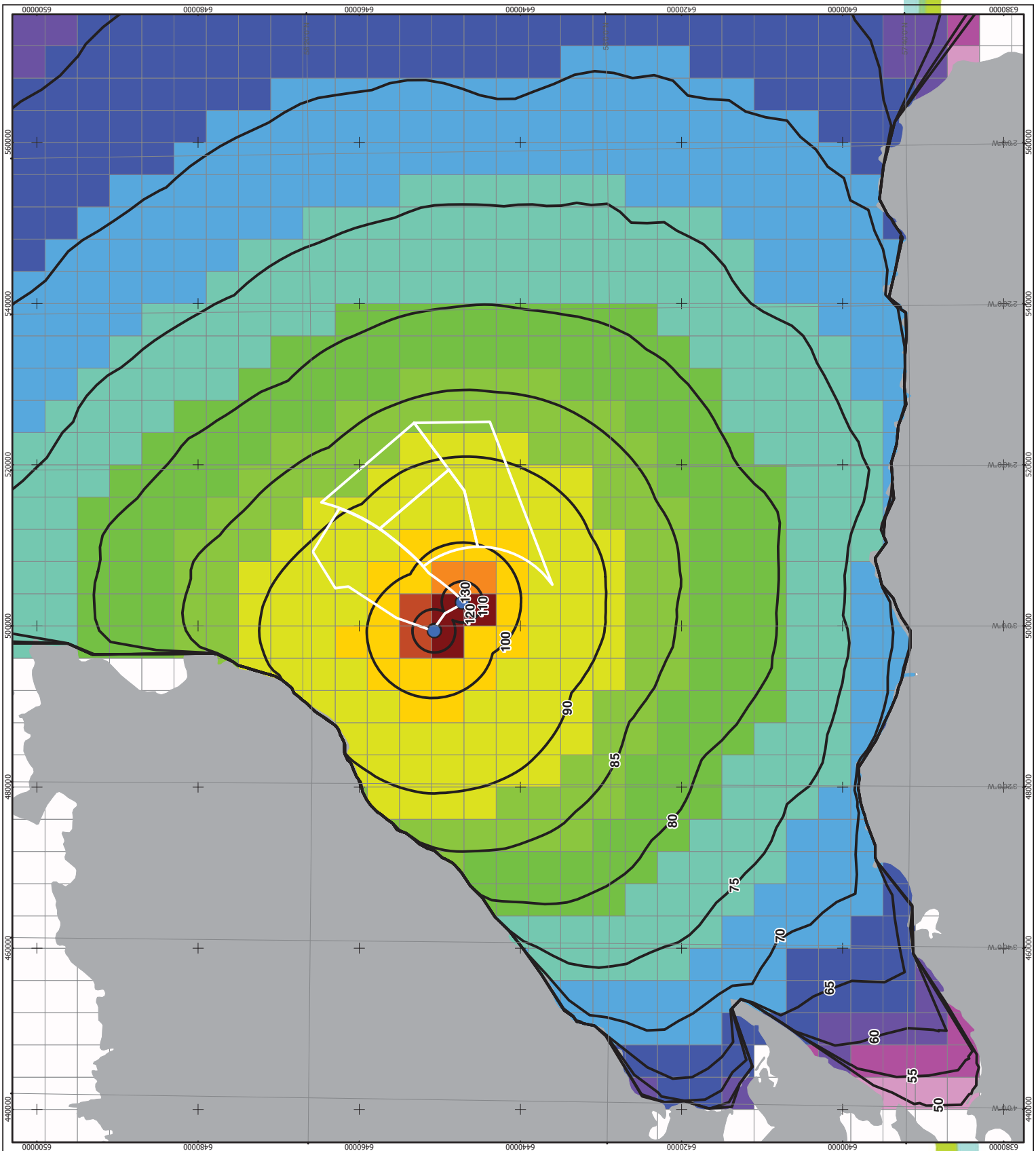


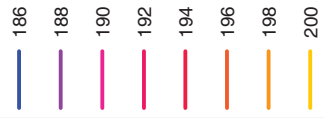
Figure E4: Scenario D Harbour Seal dBht

Moray Offshore Renewables Ltd

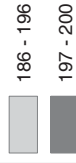
KEY

 Telford, Stevenson, MacColl and Beatrice  
 BOWL piling location

dB



Max dB

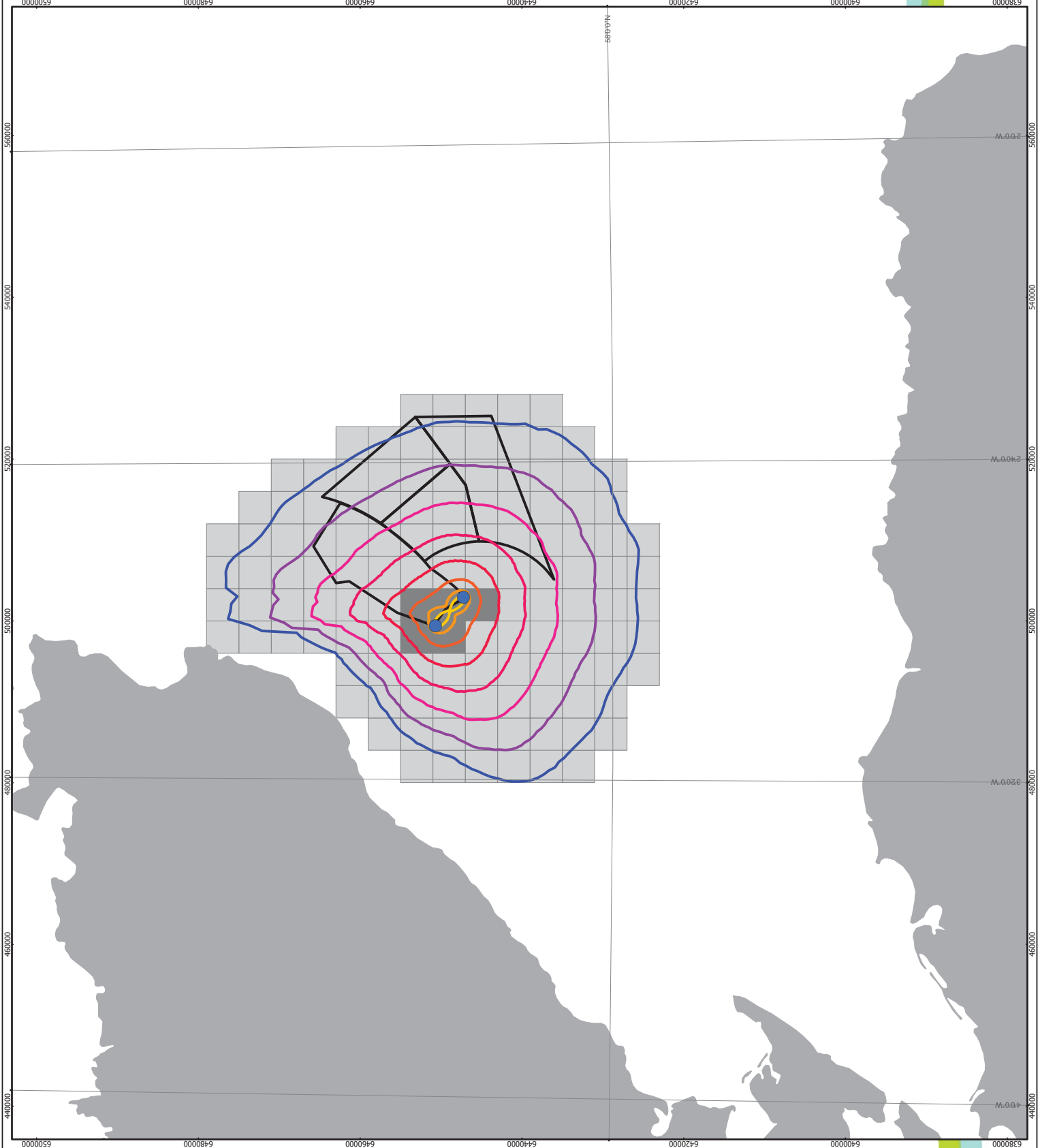


A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D\VD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-141

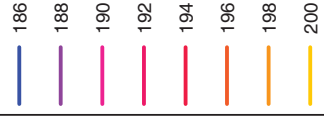
Figure E5: Scenario D  
 High Frequency Cetaceans  
 SEL



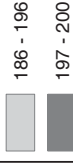
KEY

 Telford, Stevenson, MacColl and Beatrice  
 BOWL piling location

dB



Max dB

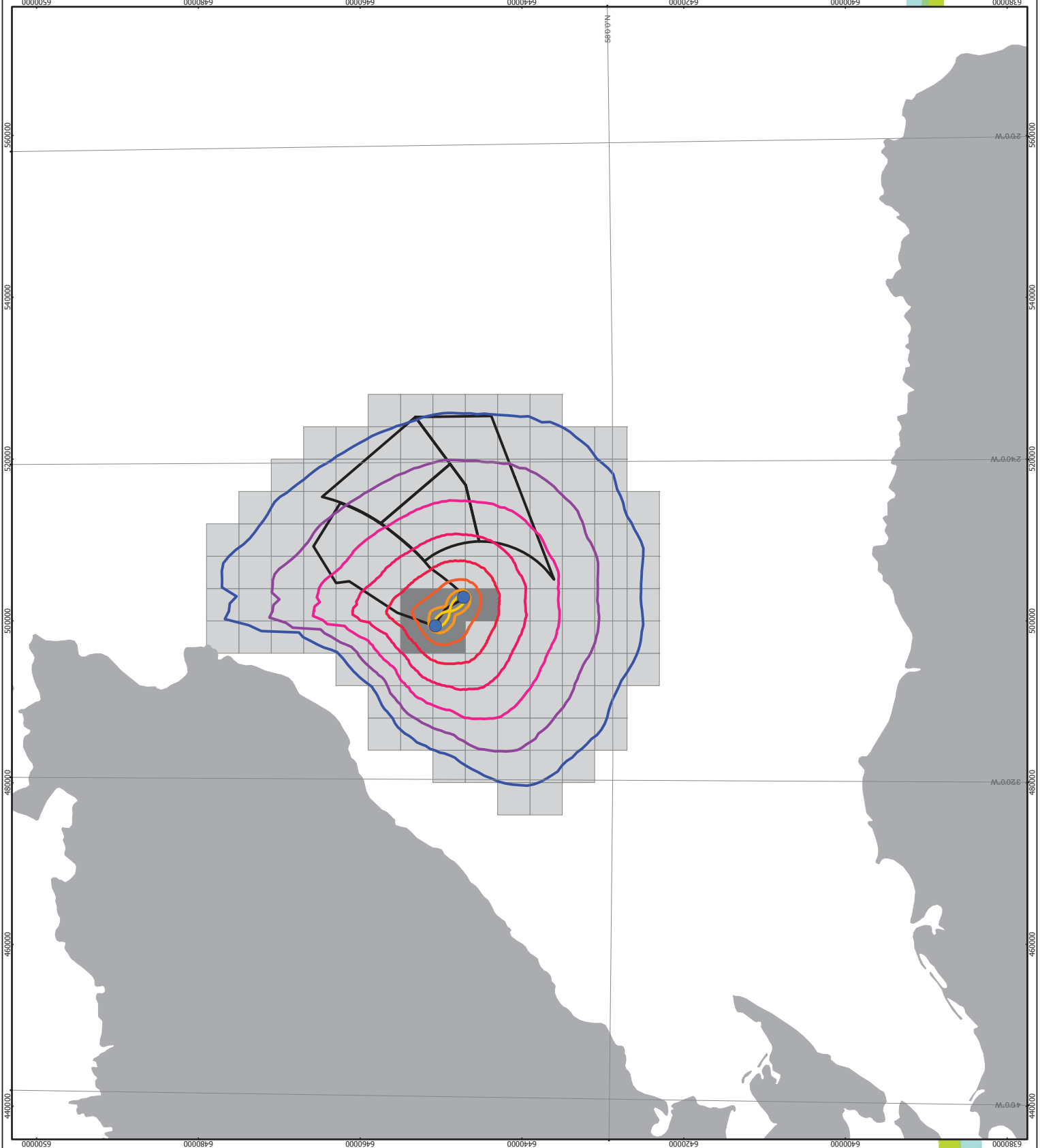


A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D\VD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-143

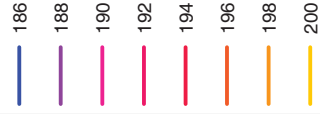
Figure E6: Scenario D  
 Mid Frequency Cetaceans  
 SEL



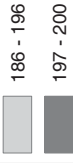
KEY

 Telford, Stevenson, MacColl and Beatrice  
 BOWL piling location

dB



Max dB

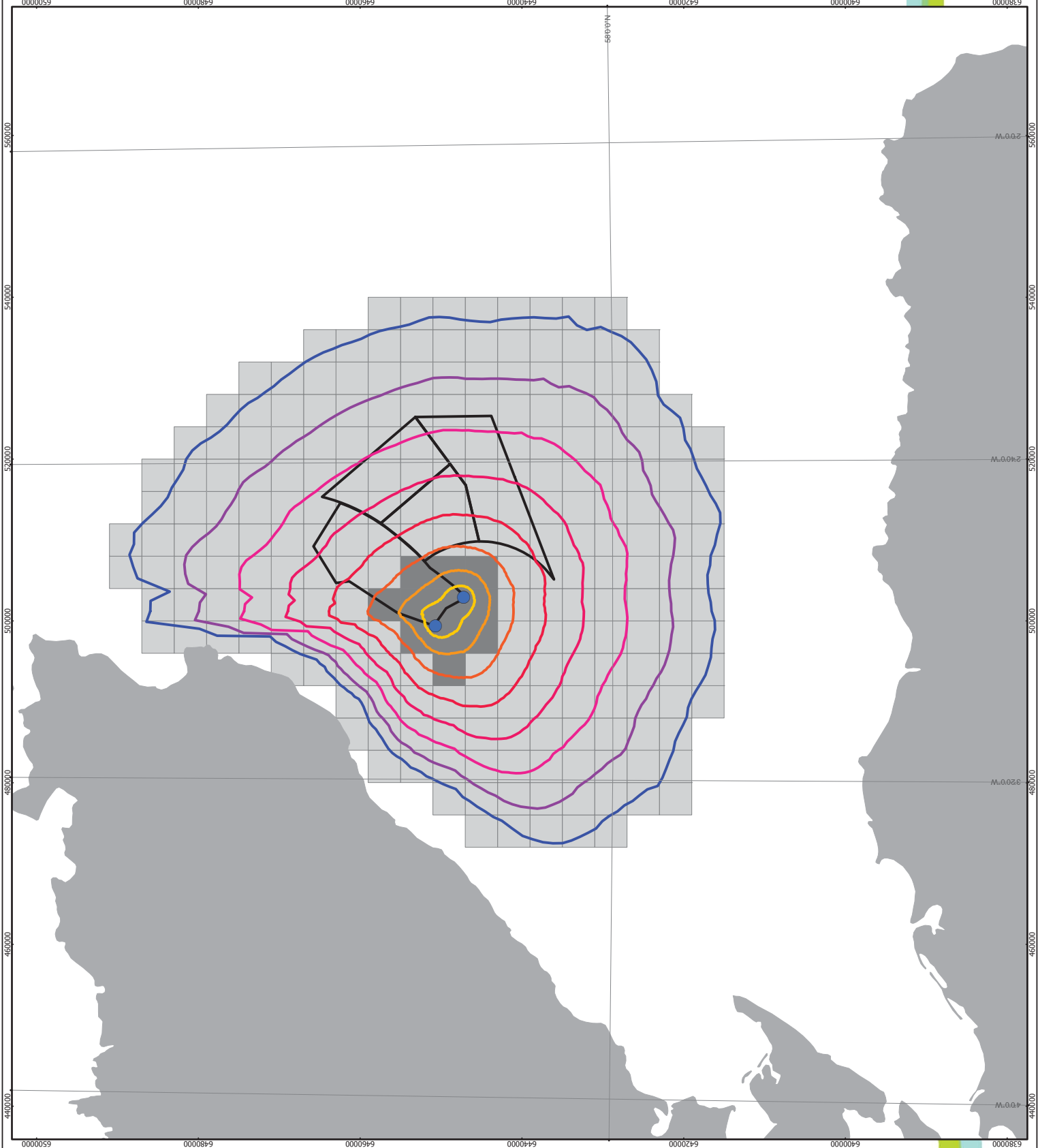


A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-142

Figure E7: Scenario D  
 Low Frequency Cetaceans  
 SEL















KEY

 Telford, Stevenson, MacColl and Beatrice  
 BOWL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

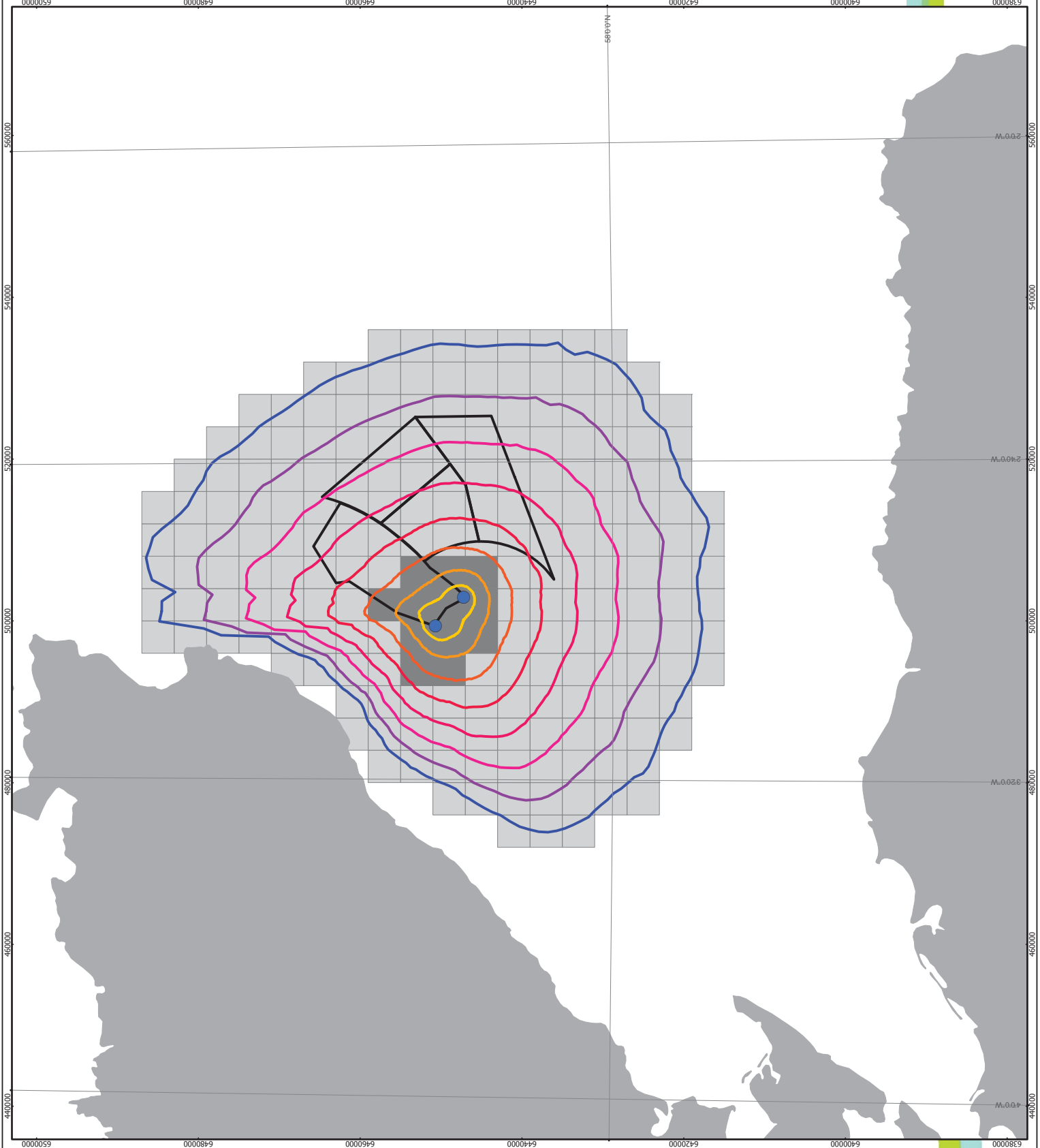
-  186 - 196
-  197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D\VD





Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-144







Figure E8: Scenario D  
Pinnipeds  
SEL




KEY

-  Telford
-  Stevenson
-  MacColl
-  Beatrice

 BOWL piling location  
 Number of harbour porpoise predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 0.2
-  >0.2 - 0.4
-  >0.4 - 0.6
-  >0.6 - 0.8
-  >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
 For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-241

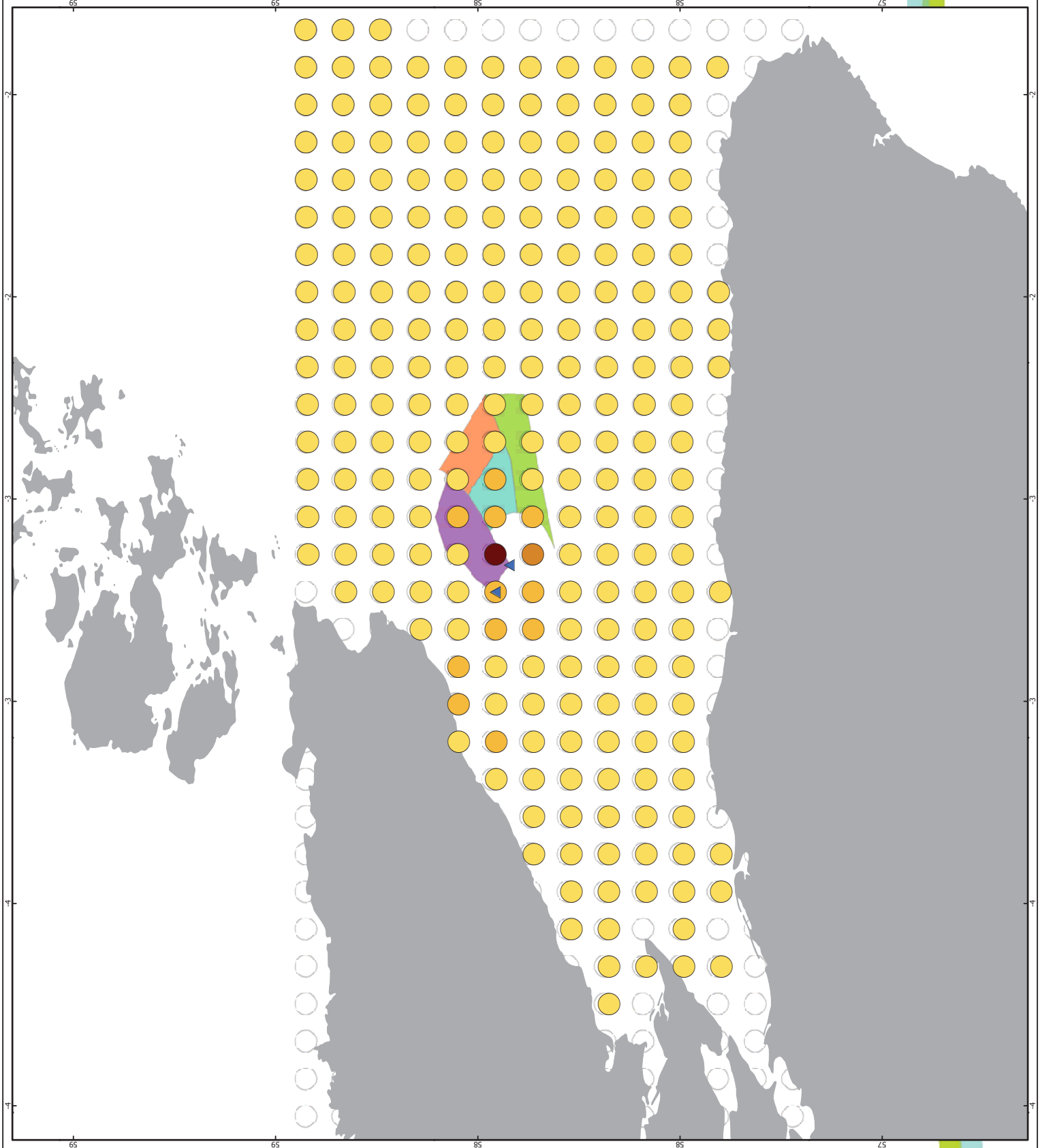


Figure E9: Scenario D  
 SAFESIMM  
 Harbour Porpoise 198 dB  
 Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

- Telford
- Stevenson
- MacColl
- Beatrice



Number of bottlenose dolphins predicted to receive SELs sufficient to induce PTS onset

- 0
- 0.01
- 0.02

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DWD

Horizontal Scale: 1:900,000 A3 Chart N

Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 23/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-243	

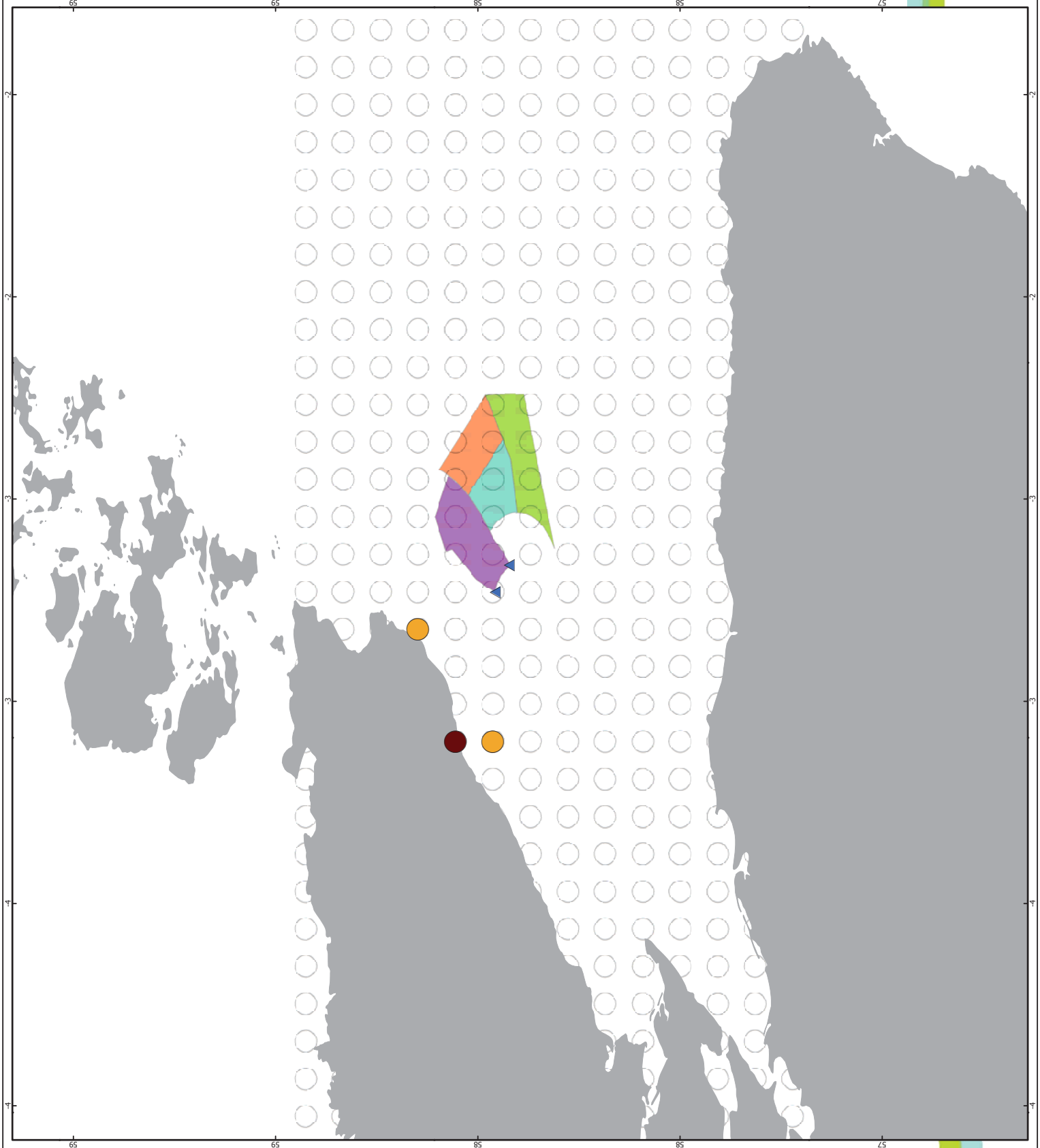


Figure E10: Scenario D  
SAFESIMM

Bottlenose Dolphin 198 dB

Moray Offshore  
Renewables Ltd


- KEY**
- Telford
  - Stevenson
  - MacColl
  - Beatrice
  - BOWL piling location

Number of minke whale predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DWD

Horizontal Scale: 1:1,550,000 A3 Chart N

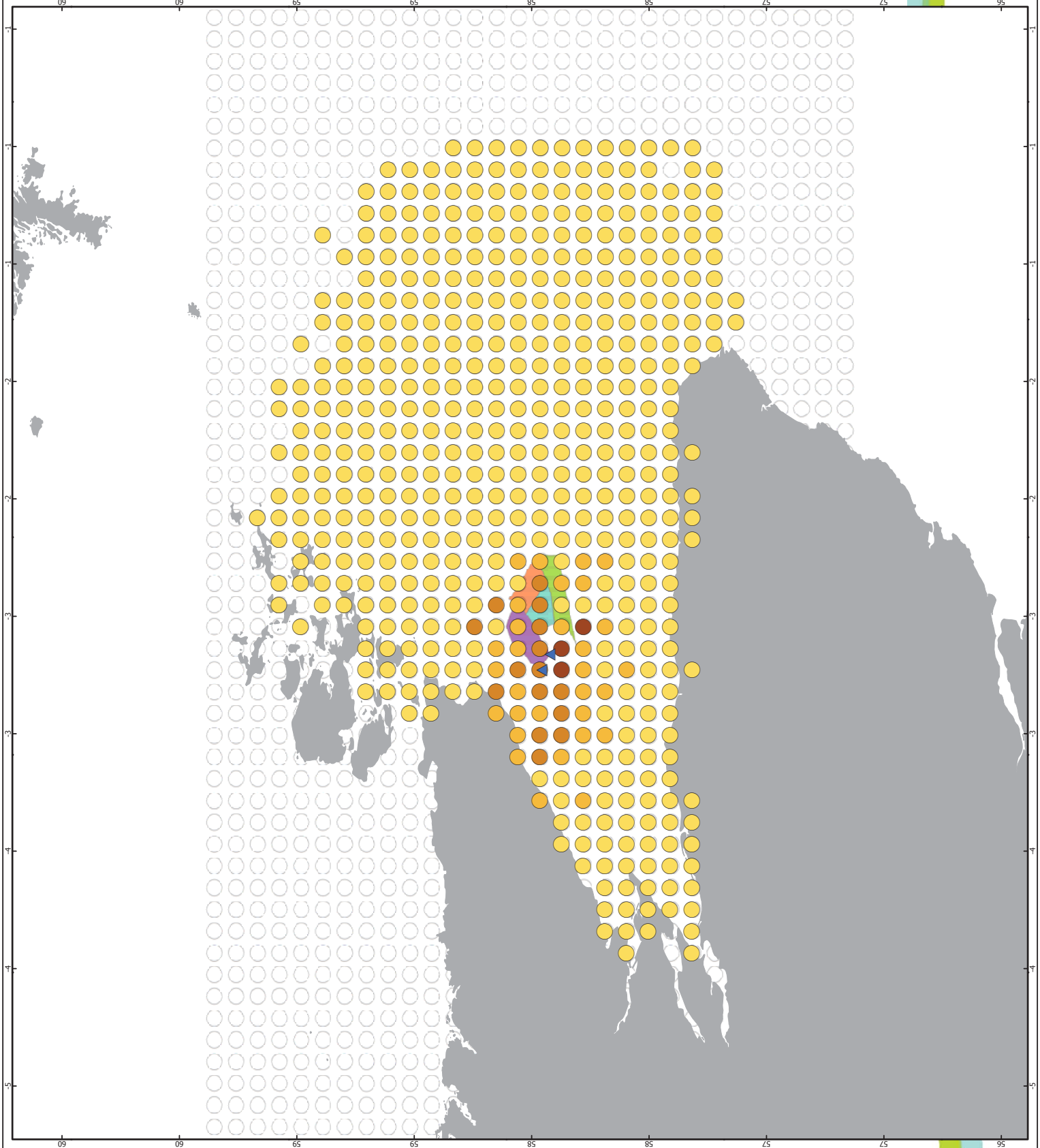


Geodetic Parameters: WGS 1984

Produced: LG  
Reviewed: SC  
Approved: CJP

Date: 08/05/2012 Revision: A


REF: 8460001-PPW0200-NPW-MAP-244








**Figure E11: Scenario D**  
**SAFESIMM**  
 Minke Whale 198 dB  
 Moray Offshore Renewables Ltd

KEY

-  Telford
-  Stevenson
-  MacColl
-  Beatrice

 BOWL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

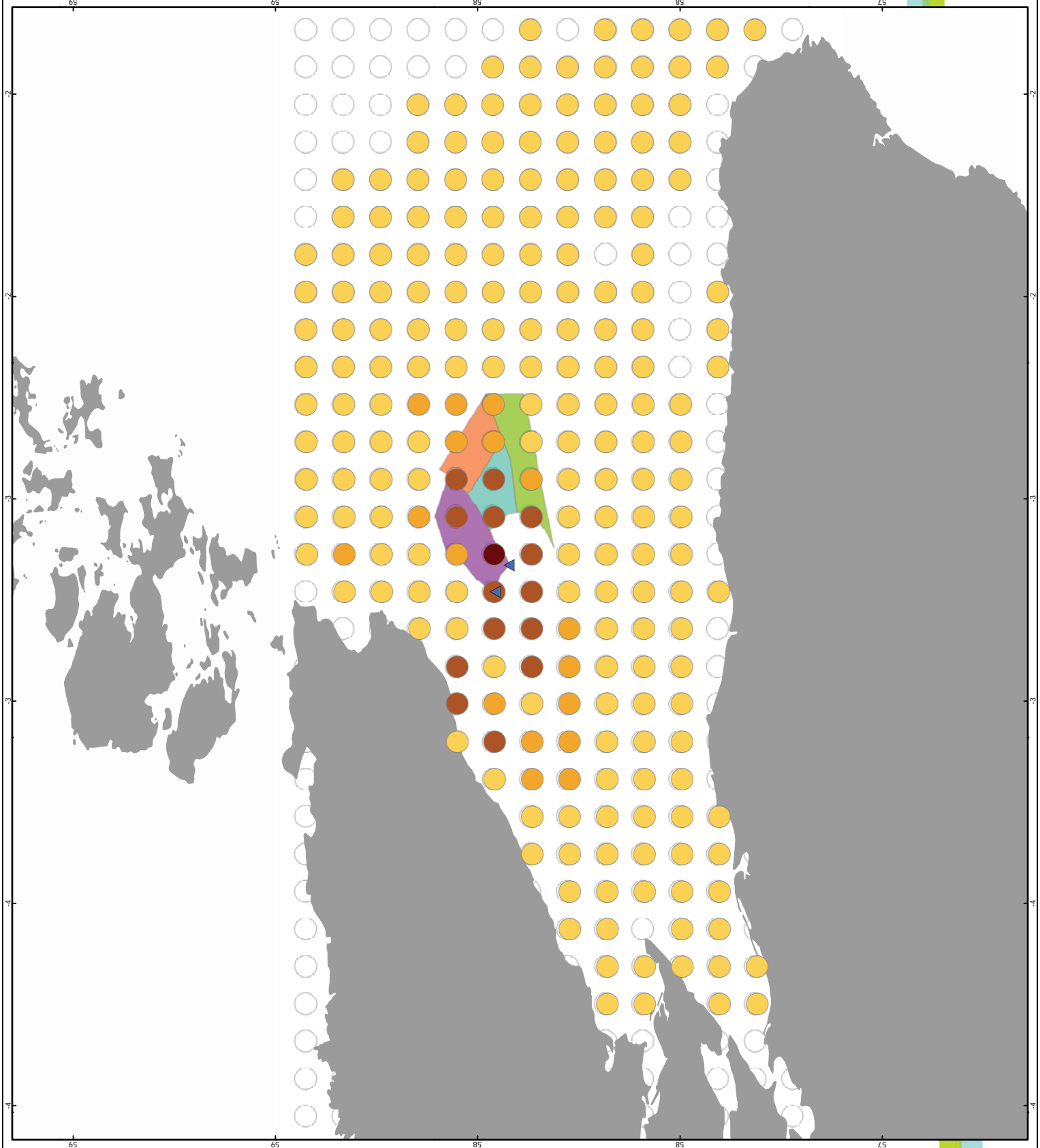
-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  







Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-245

Figure E12: Scenario D  
 SAFESIMM  
 Harbour Seal 186 dB  
 Moray Offshore Renewables Ltd










KEY


-  Telford
-  Stevenson
-  MacColl
-  Beatrice
-  BOWL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DWD

Horizontal Scale: 1:900,000 A3 Chart N



Geodetic Parameters: WGS 1984

Produced: LG  
Reviewed: SC  
Approved: CJP

Date: 23/04/2012 Revision: A

REF: 8460001-PPW0200-NPW-MAP-246

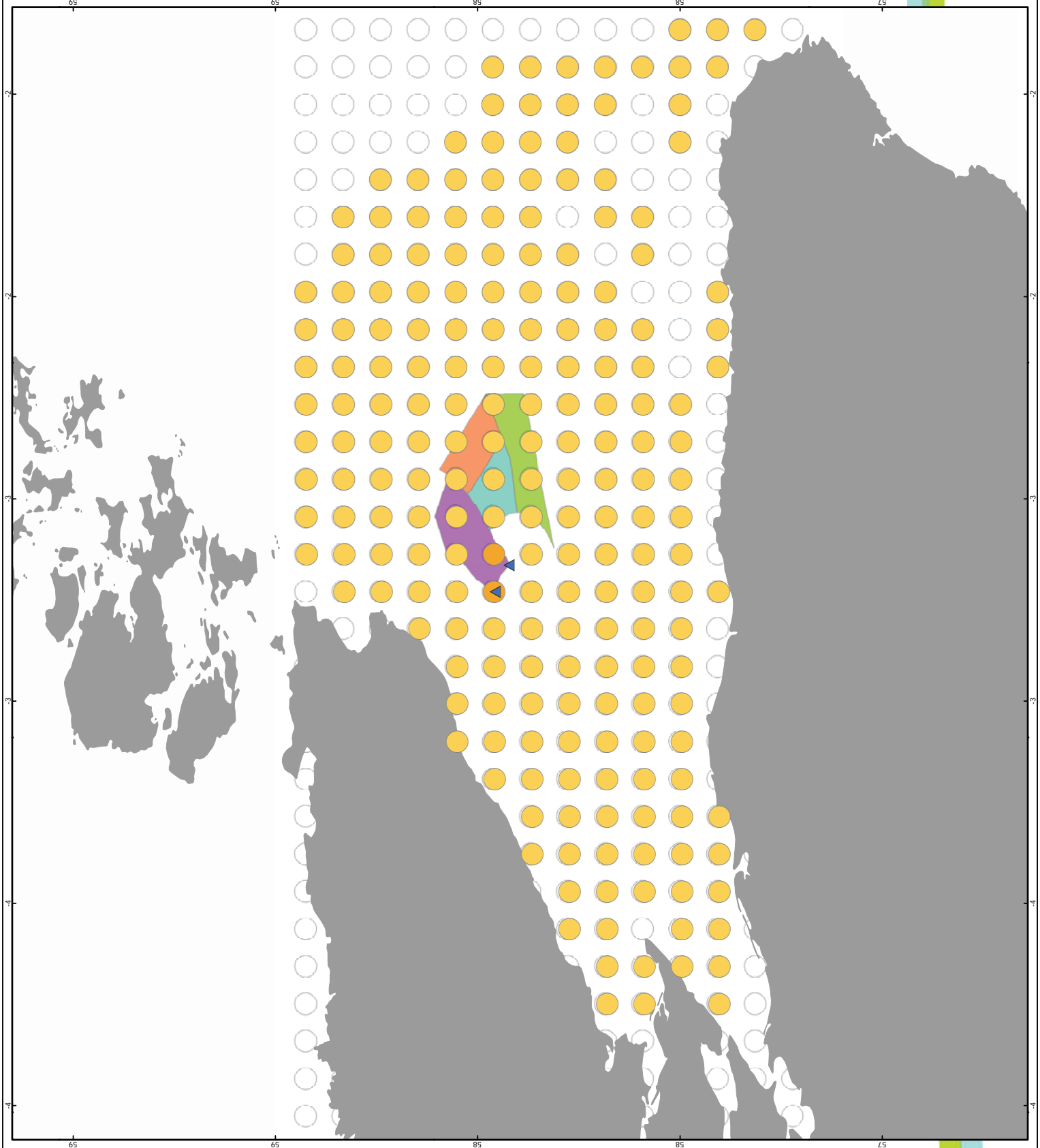










Figure E13: Scenario D  
SAFESIMM  
Harbour Seal 198  
Moray Offshore  
Renewables Ltd

KEY


-  Telford
-  Stevenson
-  MacColl
-  Beatrice

 BOWL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-247

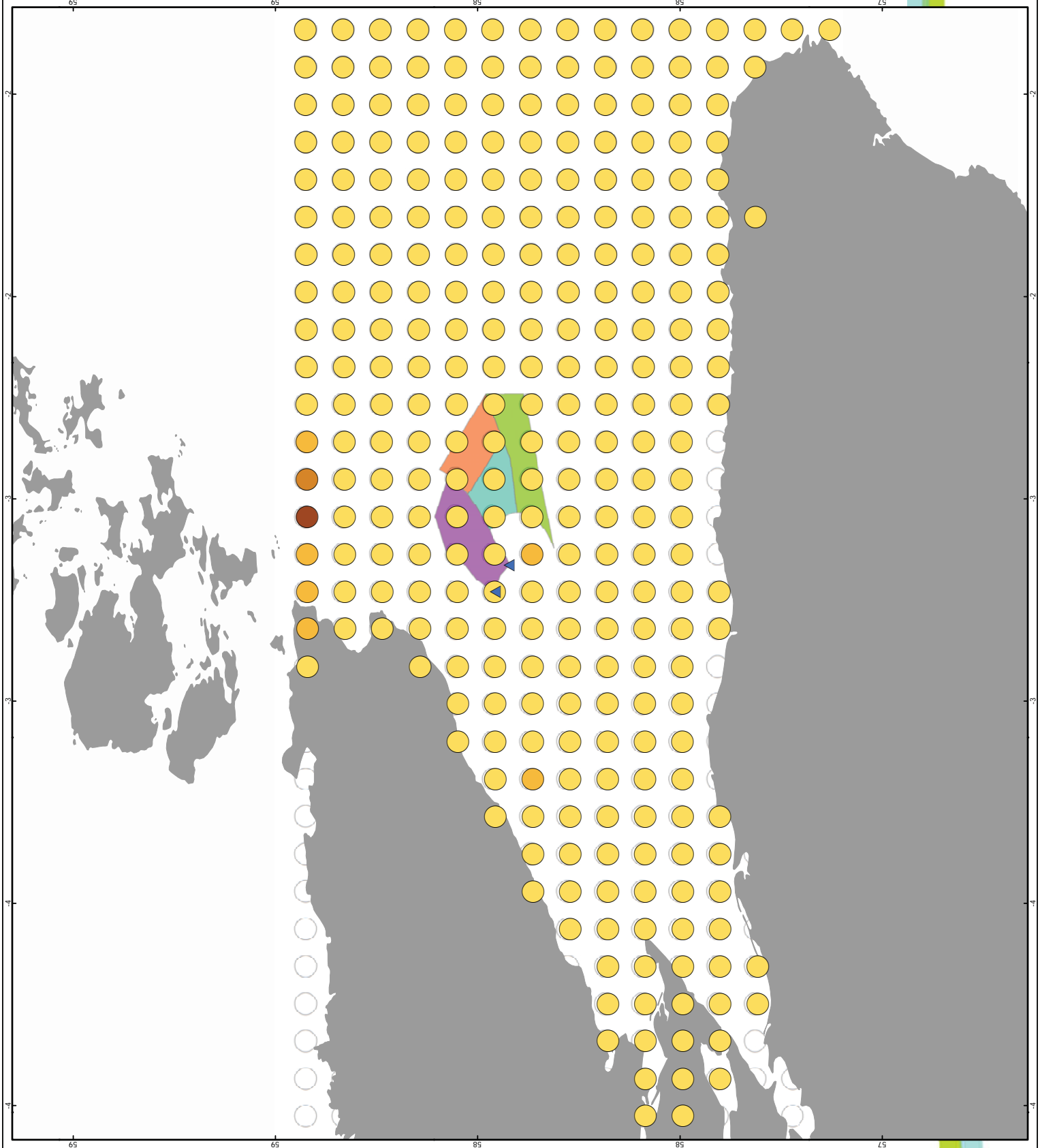






Figure E14: Scenario D  
 SAFESIMM  
 Grey Seal 186 dB  
 Moray Offshore Renewables Ltd









KEY


-  Telford
-  Stevenson
-  MacColl
-  Beatrice

 BOWL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-248

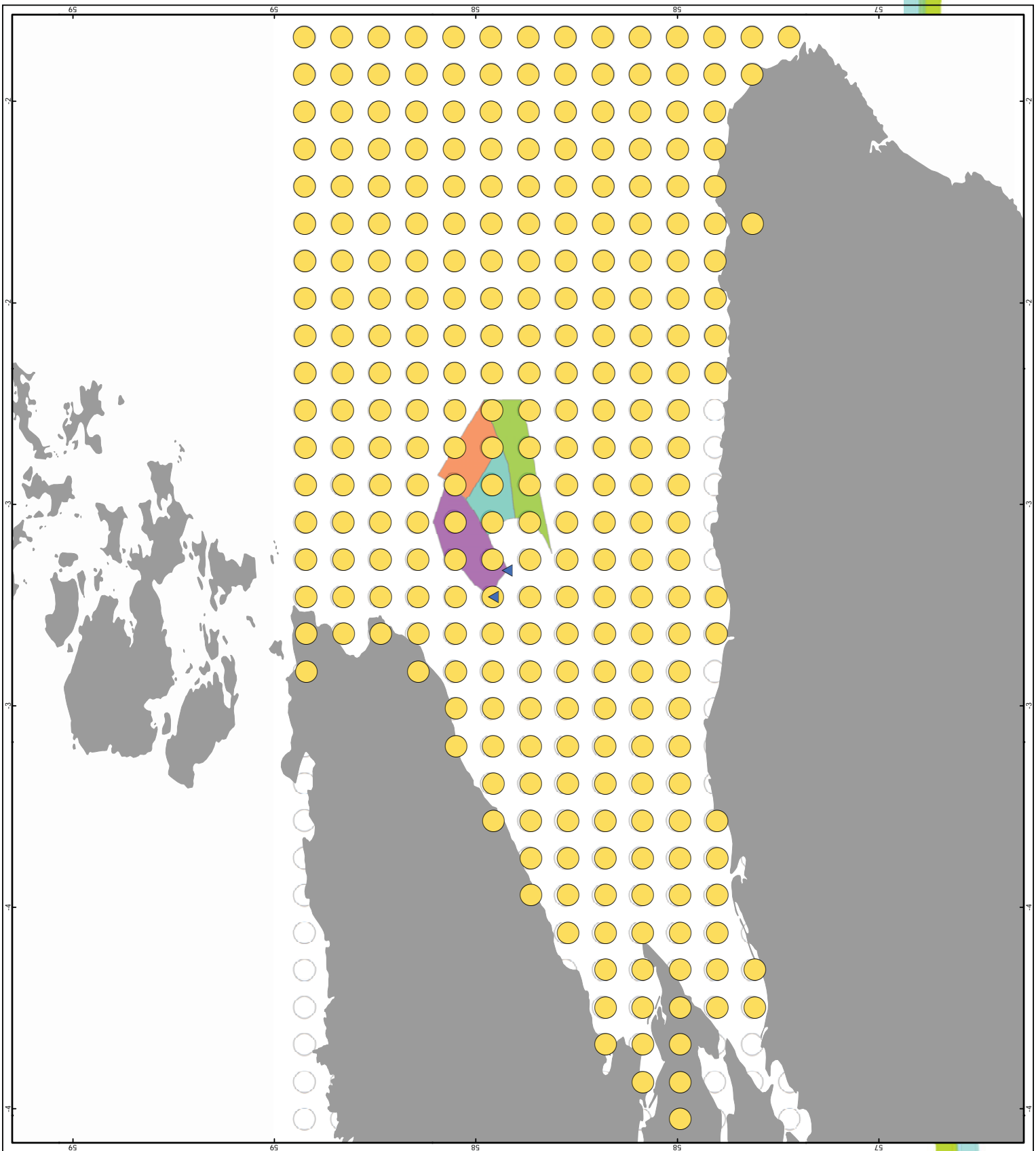


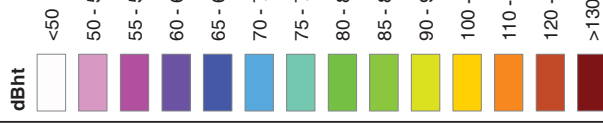
Figure E15: Scenario D  
 SAFESIMM  
 Grey Seal 198 dB  
 Moray Offshore  
 Renewables Ltd

KEY

Telford, Stevenson, MacColl and Beatrice

BOWL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD



Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 27/04/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-146

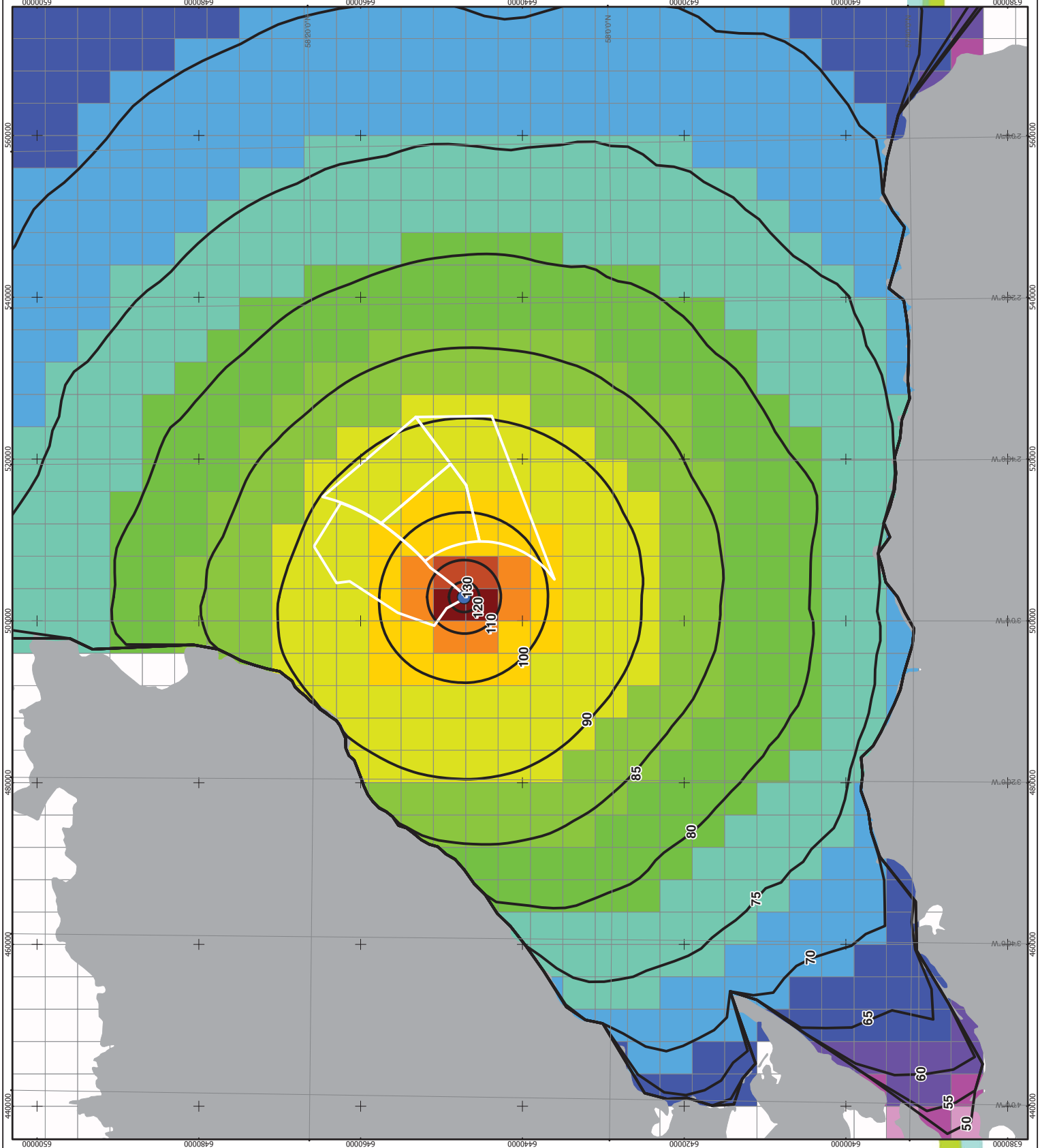


Figure E16: Scenario E Harbour Porpoise dBht

Moray Offshore Renewables Ltd

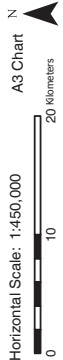
**KEY**  
 Telford, Stevenson, MacColl and Beatrice

● BOWL piling location

— dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES D\VD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-145

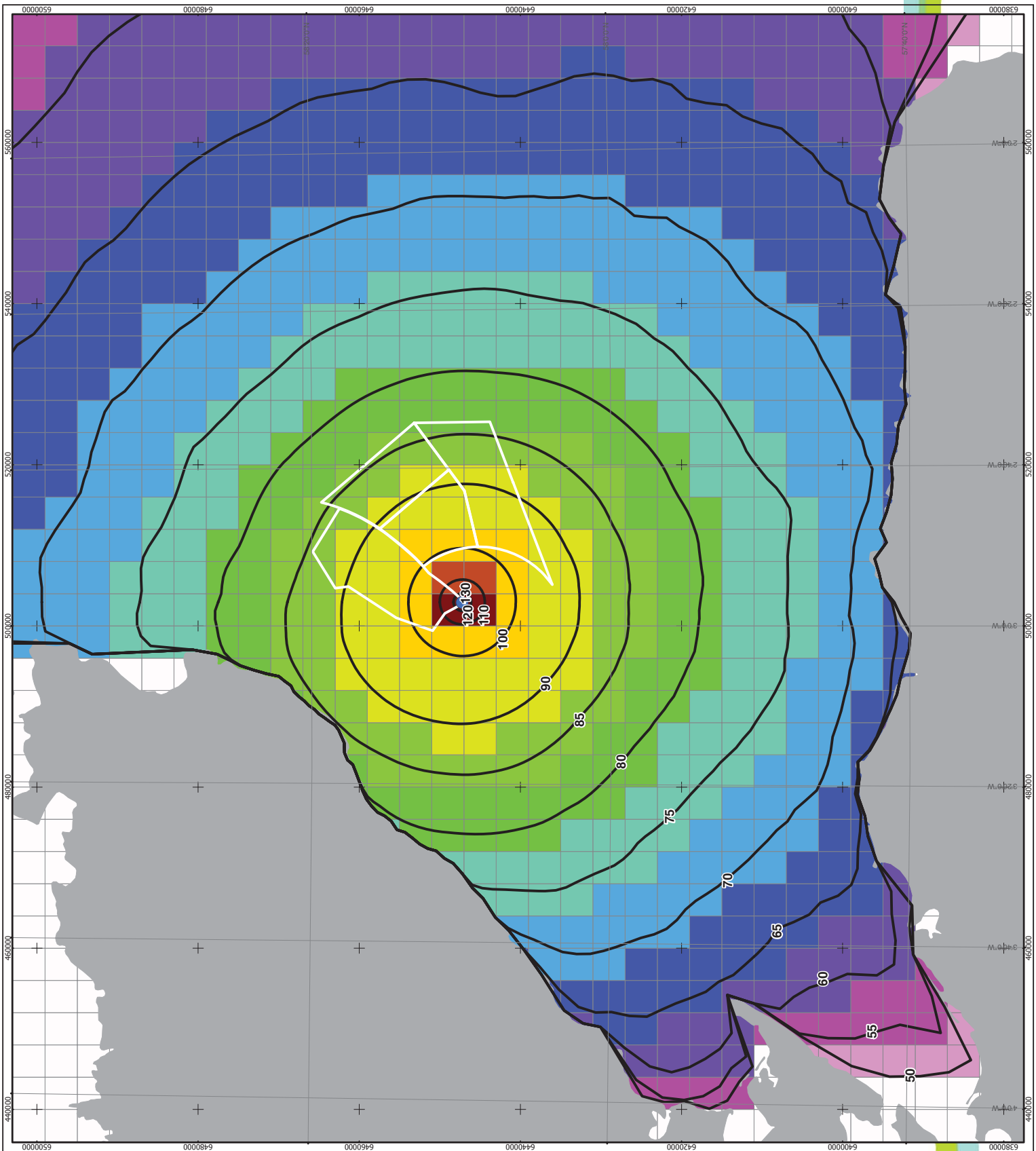


Figure E17: Scenario E  
 Bottlenose Dolphin dBht

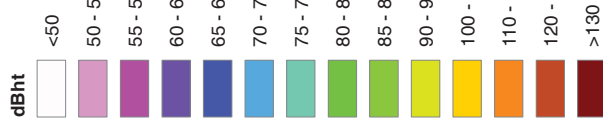
Moray Offshore  
 Renewables Ltd

KEY

Telford, Stevenson, MacColl and Beatrice

BOWL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-148

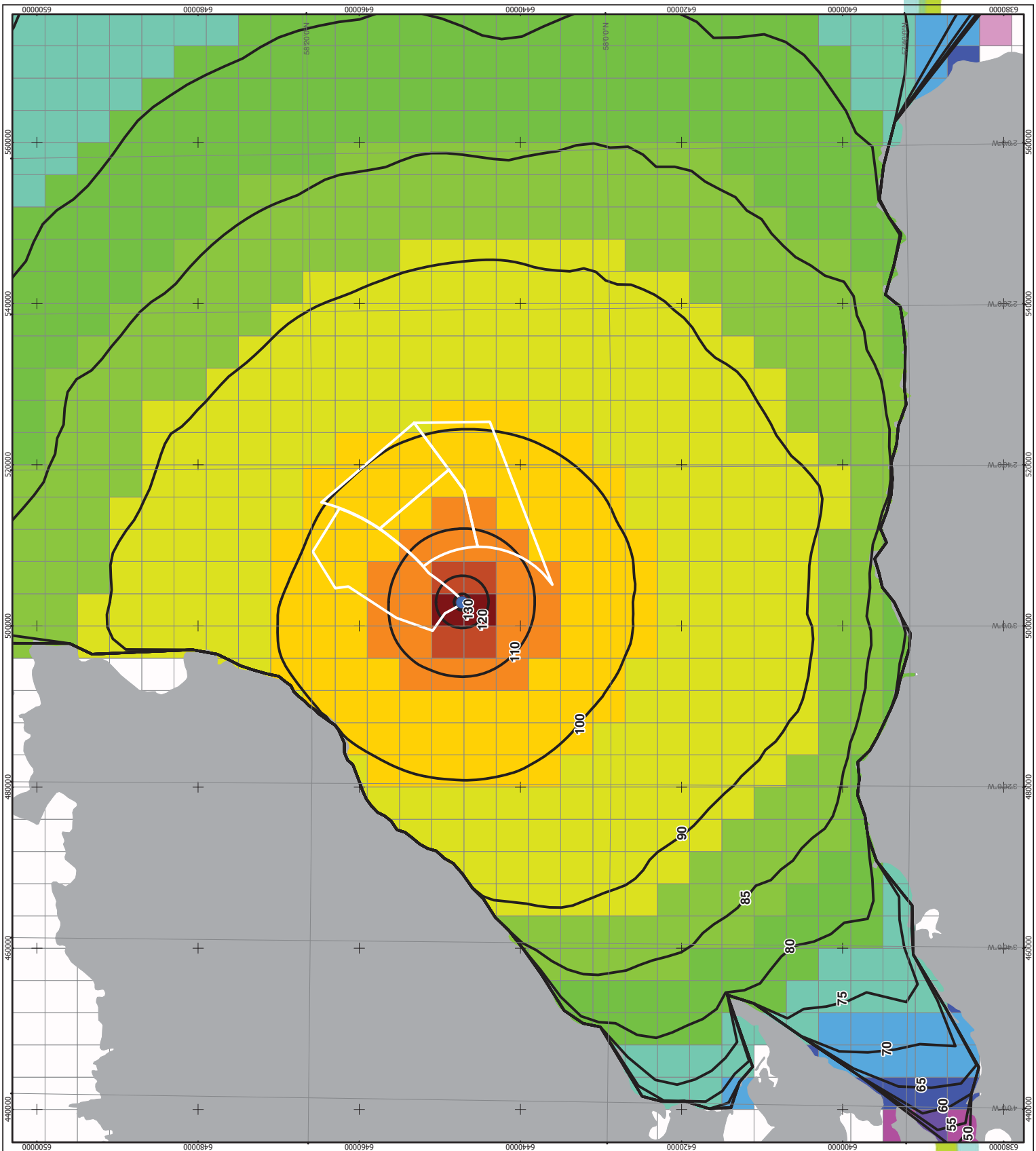
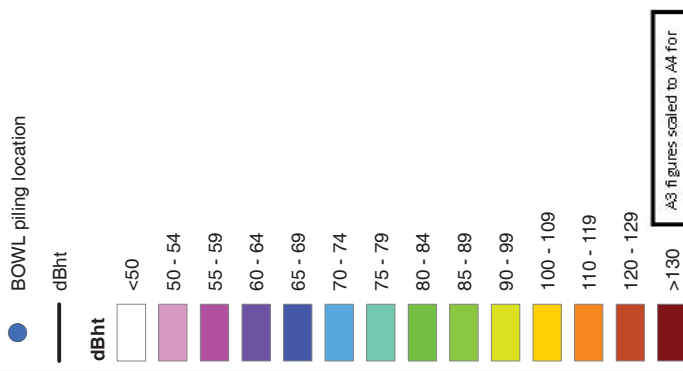


Figure E18: Scenario E  
 Minke Whale dBht

Moray Offshore  
 Renewables Ltd

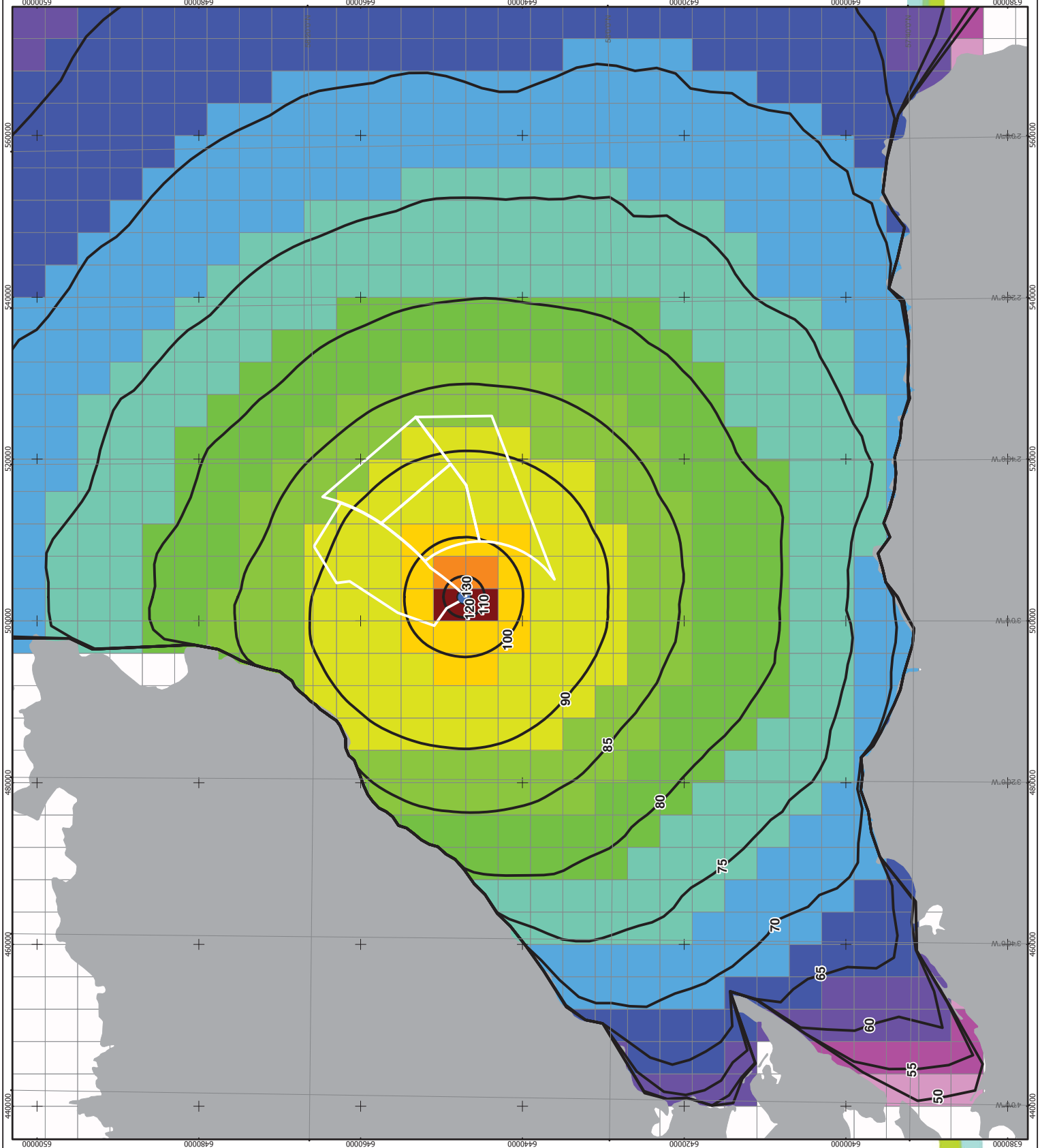
**KEY**  
 Telford, Stevenson, MacColl and Beatrice  
 BOWL piling location



A3 Figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012  
 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-147



**Figure E19: Scenario E**  
 Harbour Seal dBht  
 Moray Offshore Renewables Ltd

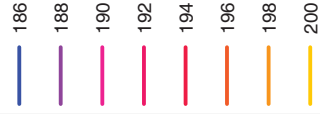


Moray Offshore Renewables Ltd

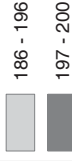
KEY

 Telford, Stevenson, MacColl and Beatrice  
 BOWL piling location

dB



Max dB



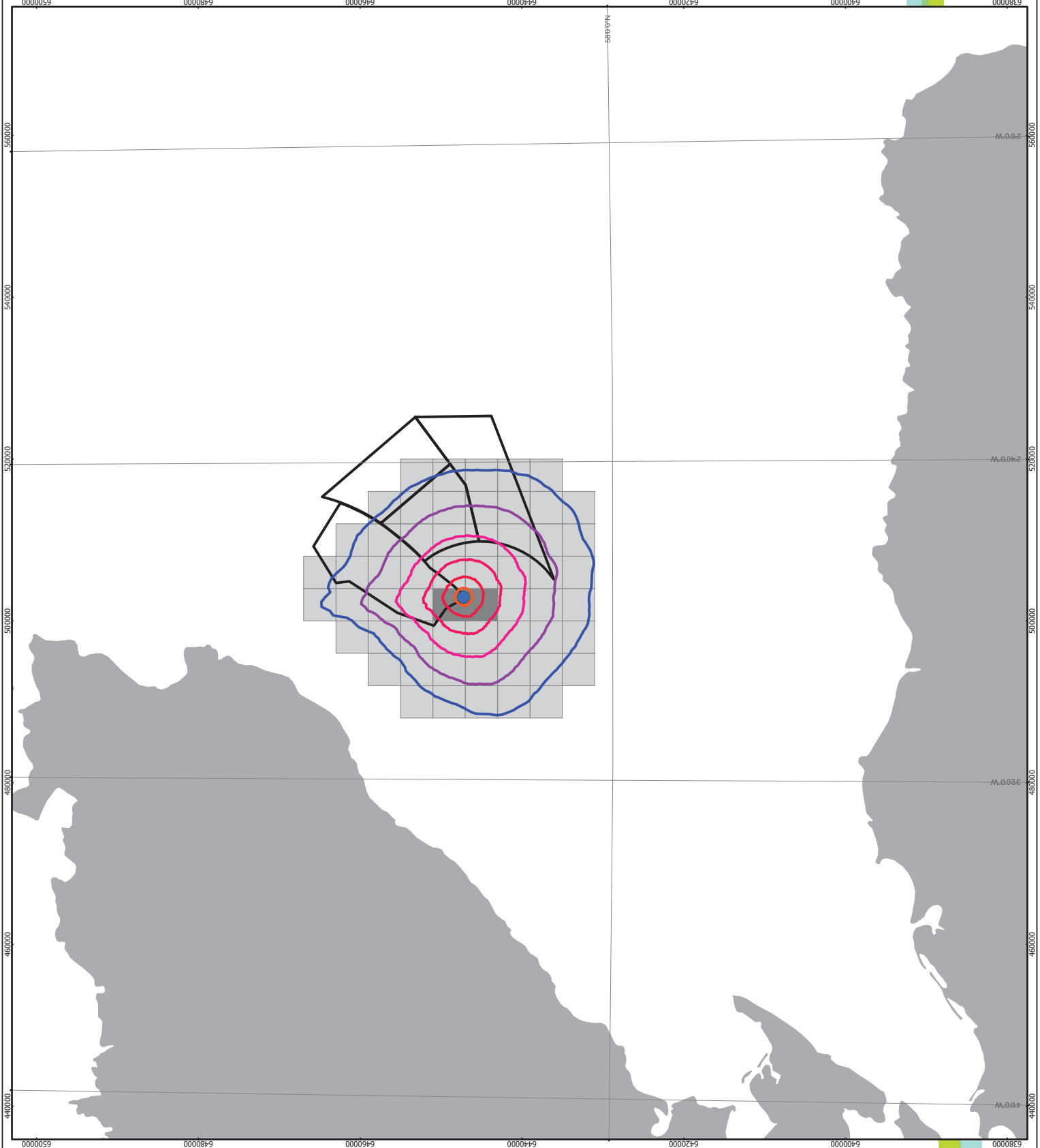
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-149

Figure E20: Scenario E High Frequency Cetaceans SEL

Moray Offshore Renewables Ltd

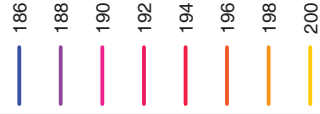




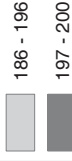
KEY

 Telford, Stevenson, MacColl and Beatrice  
 BOWL piling location

dB



Max dB

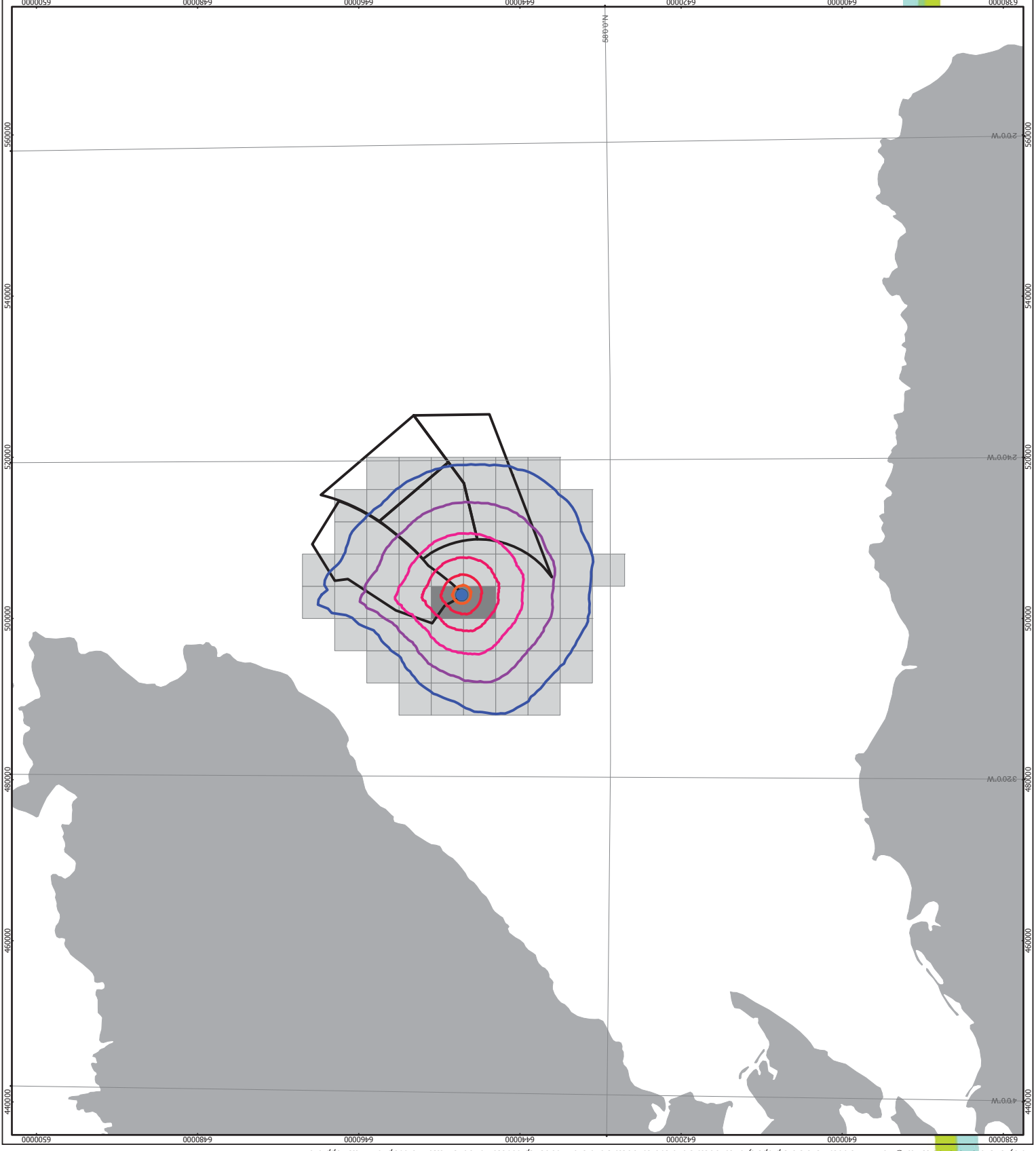


A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-151









Figure E21: Scenario E  
 Mid Frequency Cetaceans  
 SEL



KEY

 Telford, Stevenson, MacColl and Beatrice  
 BOWL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

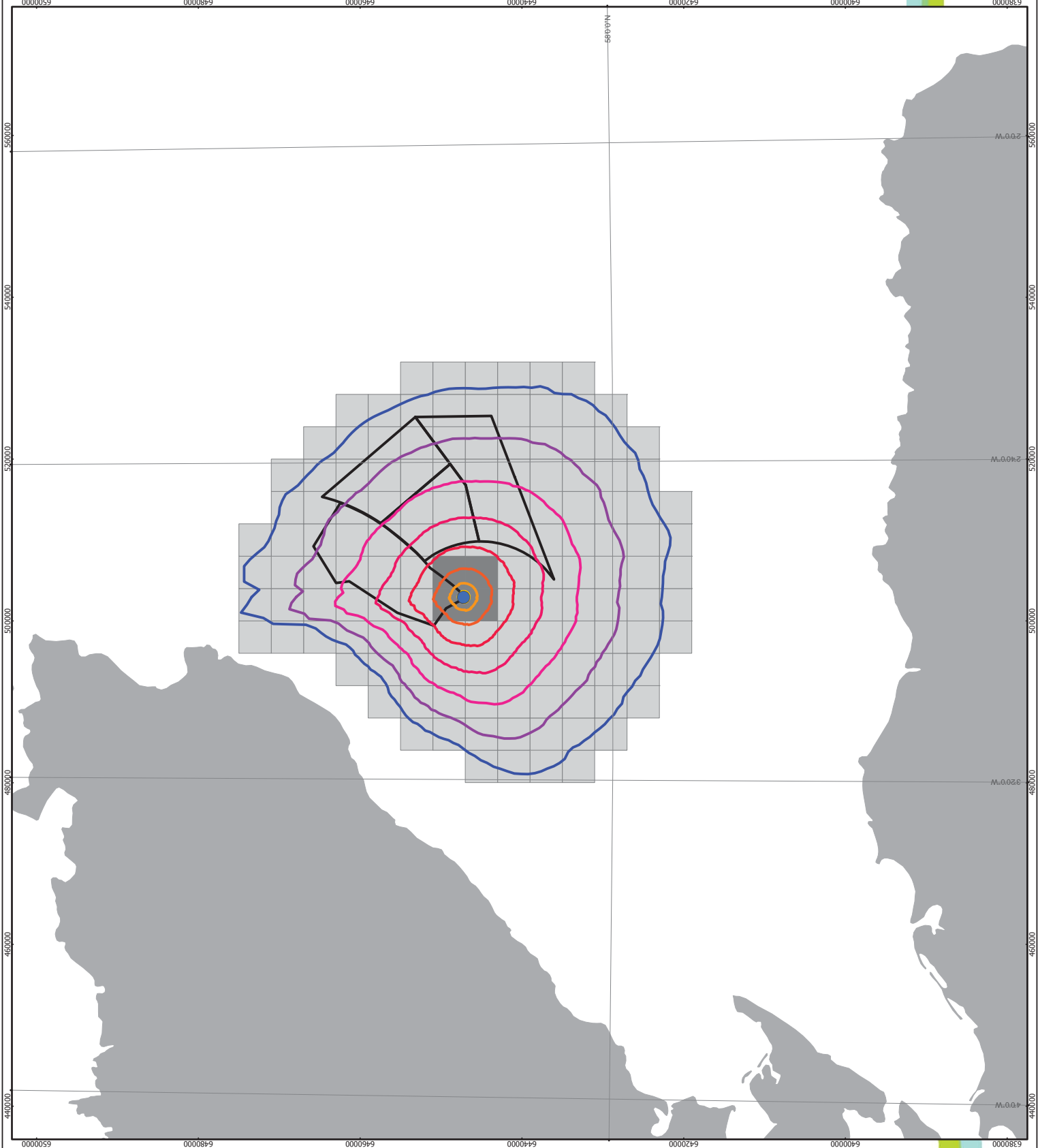
-  186 - 196
-  197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-150

Figure E22: Scenario E  
 Low Frequency Cetaceans  
 SEL

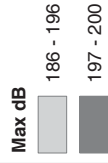
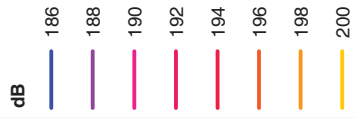




Moray Offshore Renewables Ltd

KEY

 Telford, Stevenson, MacColl and Beatrice  
 BOWL piling location



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD



Geodetic Parameters: WGS84 UTM Zone 30N

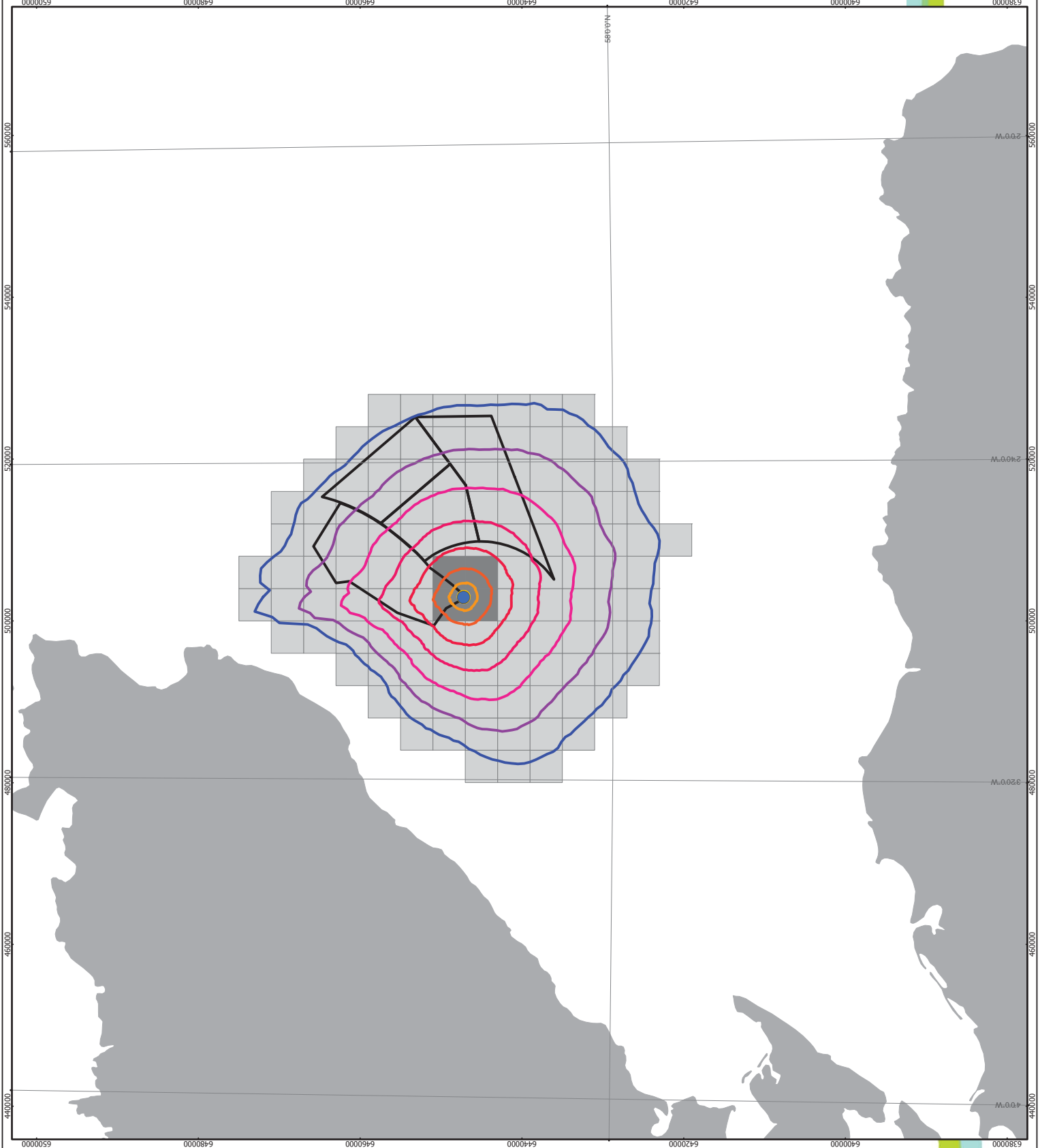
Produced: LG  
 Reviewed: SC  
 Approved: CJP

Date: 02/05/2012 Revision: A

REF: 8460001-PPW0200-NPW-MAP-152


Figure E23: Scenario E  
Pinnipeds  
SEL

Moray Offshore Renewables Ltd









KEY

-  Telford
-  Stevenson
-  MacColl
-  Beatrice

 BOWL piling location

Number of harbour porpoise predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 0.2
-  >0.2 - 0.4
-  >0.4 - 0.6
-  >0.6 - 0.8
-  >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DVD

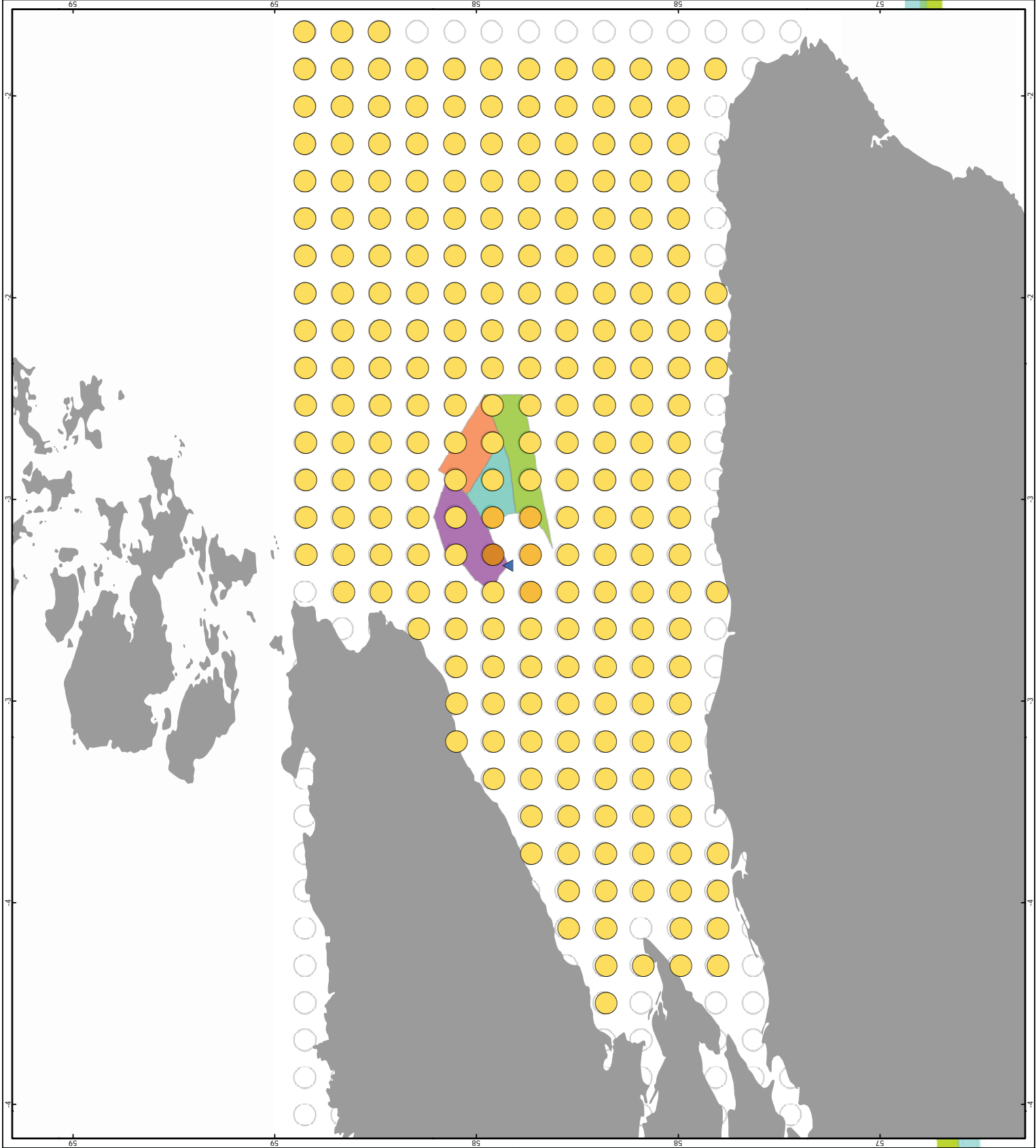
Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 23/04/2012 Revision: A  
REF: 8460001-PPW0200-NPW-MAP-249

Figure E24: ScenarioE SAFESIMM

Harbour Porpoise 198 dB

Moray Offshore Renewables Ltd





Moray Offshore Renewables Ltd

KEY

- Telford
- Stevenson
- MacColl
- Beatrice



Number of bottlenose dolphins predicted to receive SELs sufficient to induce PTS onset

- 0
- 0.01
- 0.02

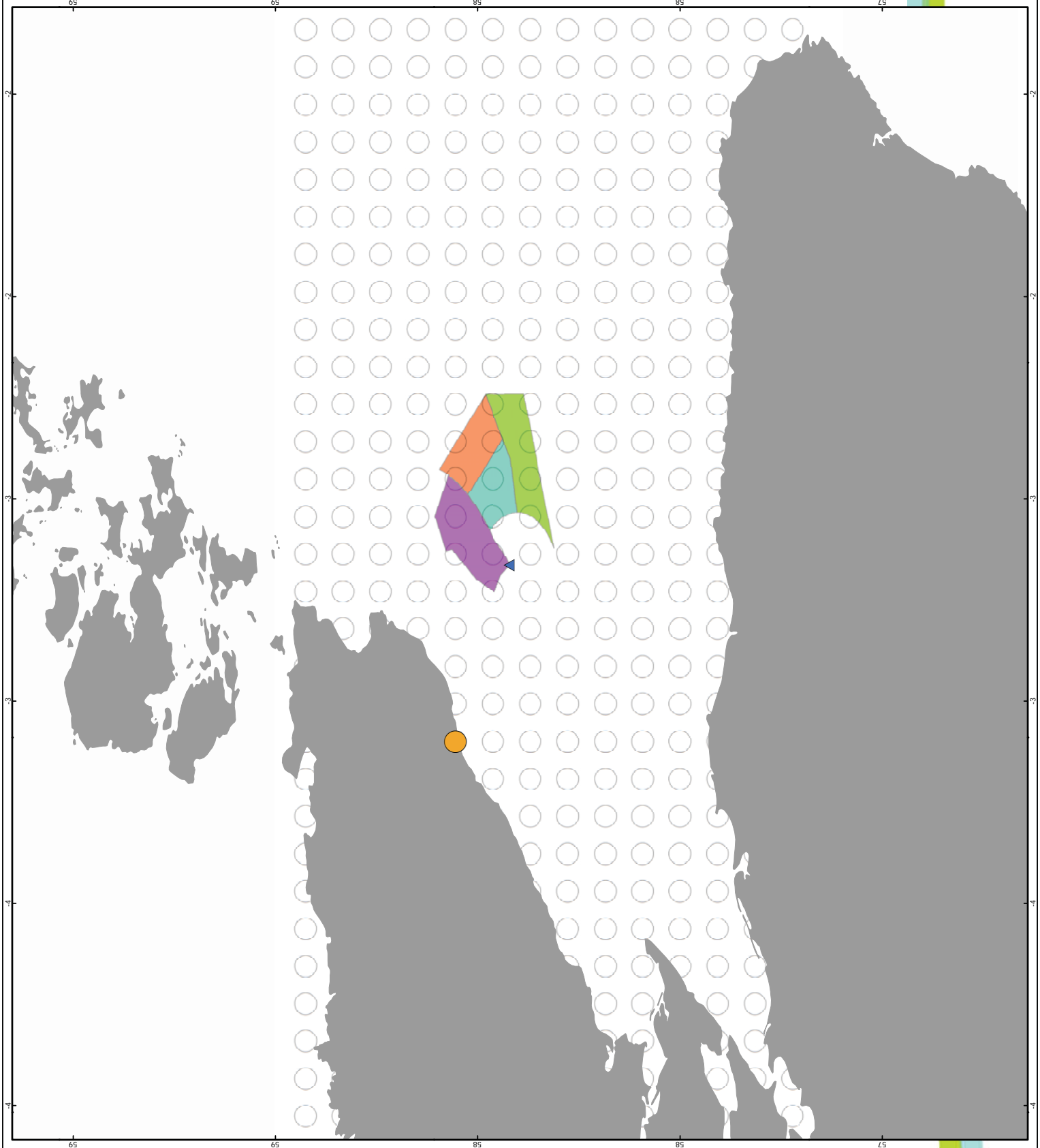
A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DWD

Horizontal Scale: 1:900,000 A3 Chart N

Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 23/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-251	

Figure E25: Scenario E  
SAFE SIMM

Bottlenose Dolphin 198 dB  
 Moray Offshore Renewables Ltd




- KEY**
- Telford
  - Stevenson
  - MacColl
  - Beatrice
  - BOWL piling location

Number of minke whale predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DvD

Horizontal Scale: 1:1,550,000      A3 Chart N



Geodetic Parameters: WGS 1984

Produced: LG  
Reviewed: SC  
Approved: CJP

Date: 08/05/2012      Revision: A

REF: 8460001-PPW0200-NPW-MAP-252

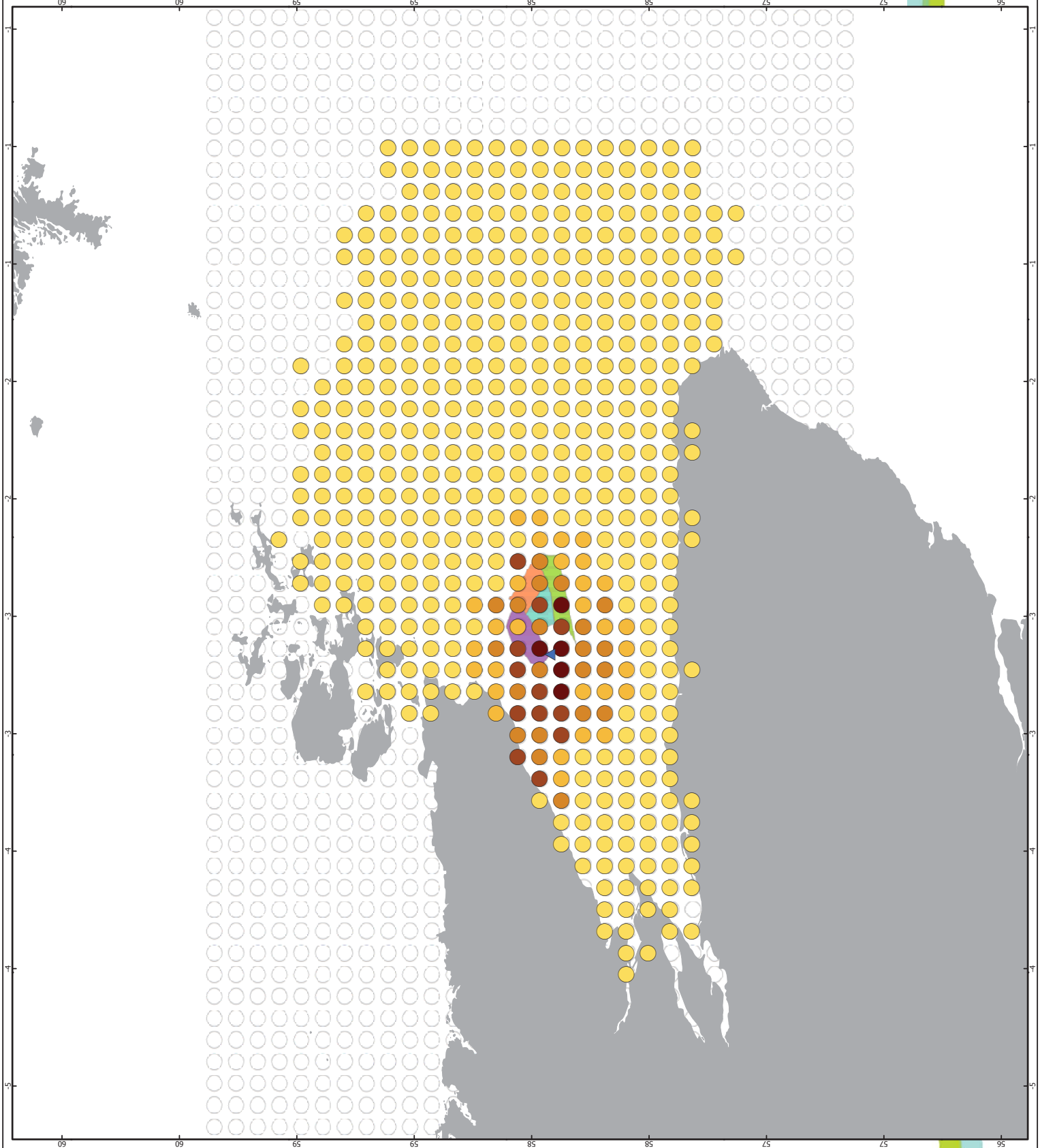












Figure E26: Scenario E  
SAFESIMM  
Minke Whale 198 dB  
Moray Offshore Renewables Ltd




KEY

-  Telford
-  Stevenson
-  MacColl
-  Beatrice
-  BOWL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

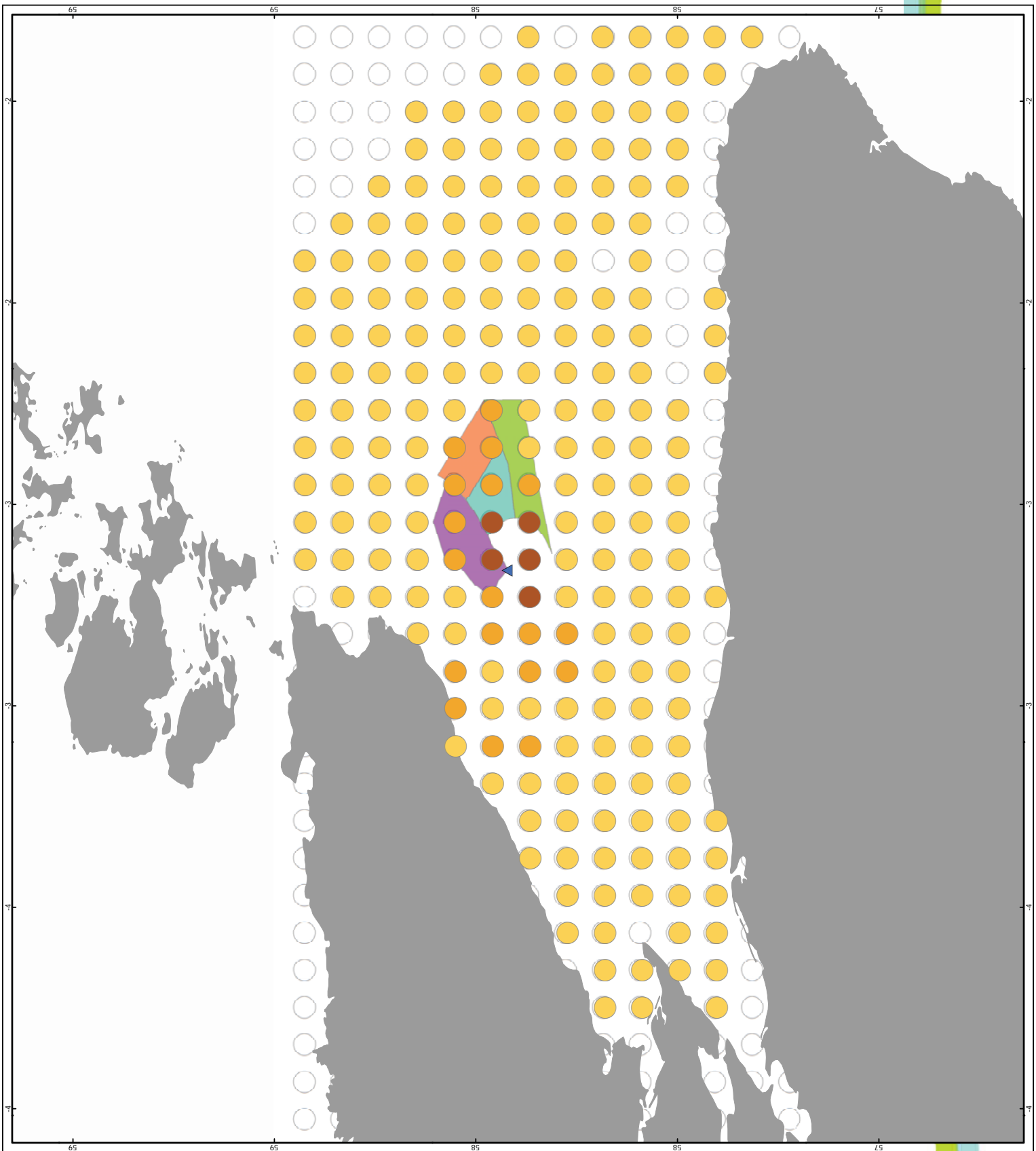
-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-253


Figure E27: Scenario E  
 SAFESIMM  
 Harbour Seal 186 dB  
 Moray Offshore Renewables Ltd










KEY

-  Telford
-  Stevenson
-  MacColl
-  Beatrice

 BOWL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 2
-  >2 - 4
-  >4 - 6
-  >6 - 8

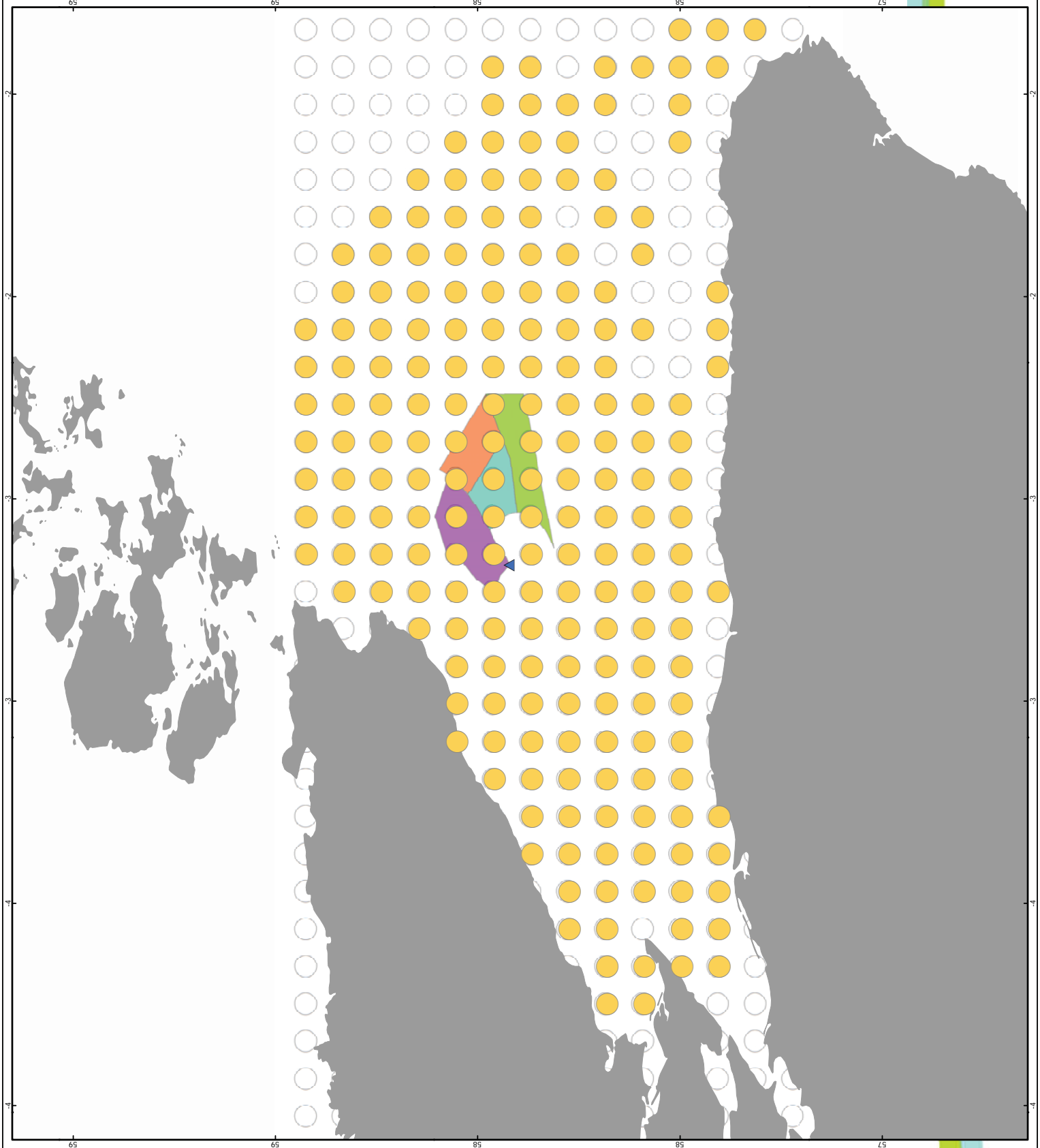
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  






Geodetic Parameters: WGS 1984	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 23/04/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-254	


Figure E28: Scenario E  
SAFE SIMM

Harbour Seal 198 dB  
Moray Offshore Renewables Ltd









KEY

-  Telford
-  Stevenson
-  MacColl
-  Beatrice

 BOWL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

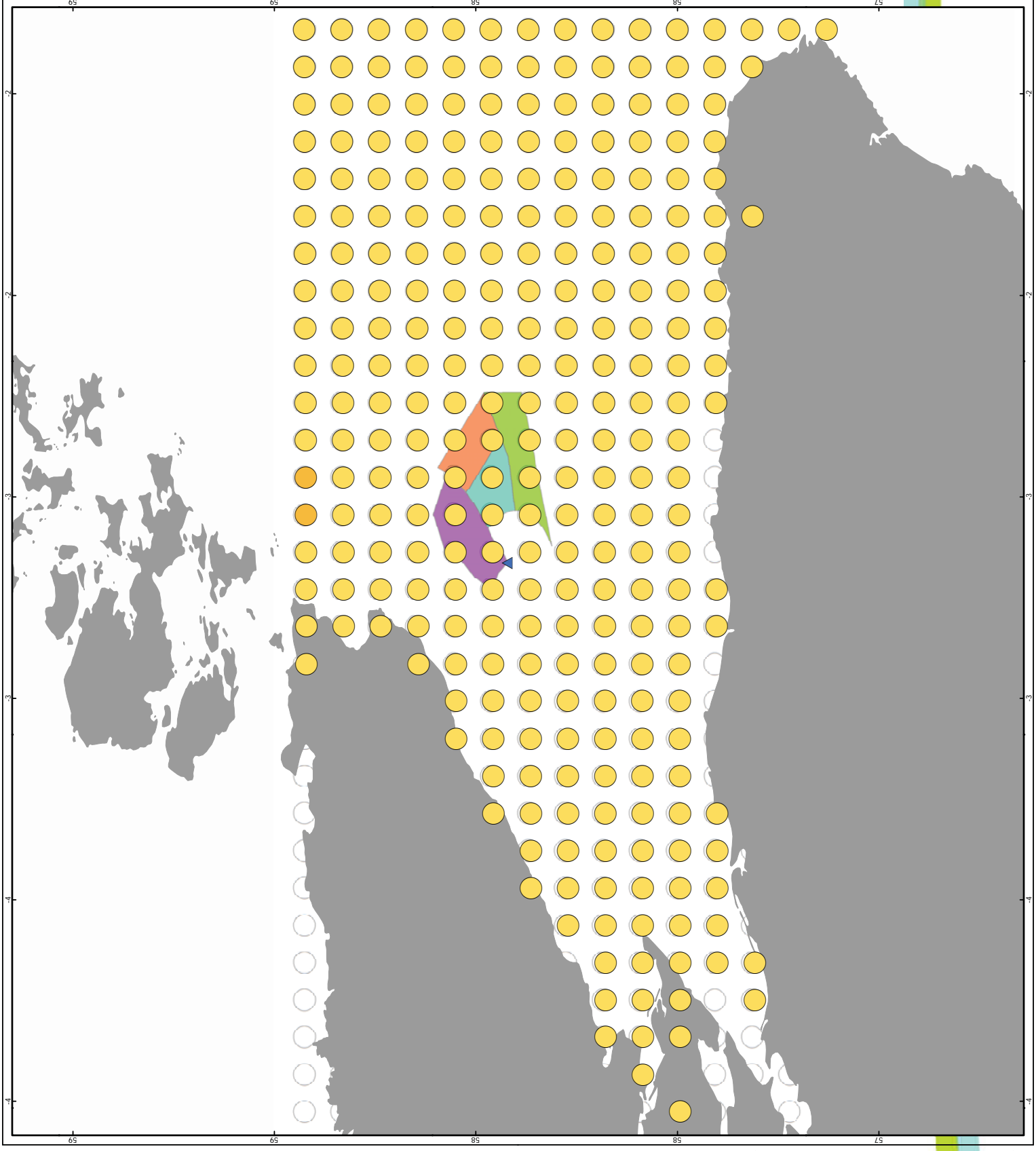
-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see E5 DvD

Horizontal Scale: 1:900,000 A3 Chart N  
 0 20 40 km


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-255

Figure E29: Scenario E  
 SAFESIMM  
 Grey Seal 186 dB  
 Moray Offshore Renewables Ltd









KEY

-  Telford
-  Stevenson
-  MacColl
-  Beatrice

 BOWL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 5
-  >5 - 10
-  >10 - 15
-  >15 - 20
-  >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  

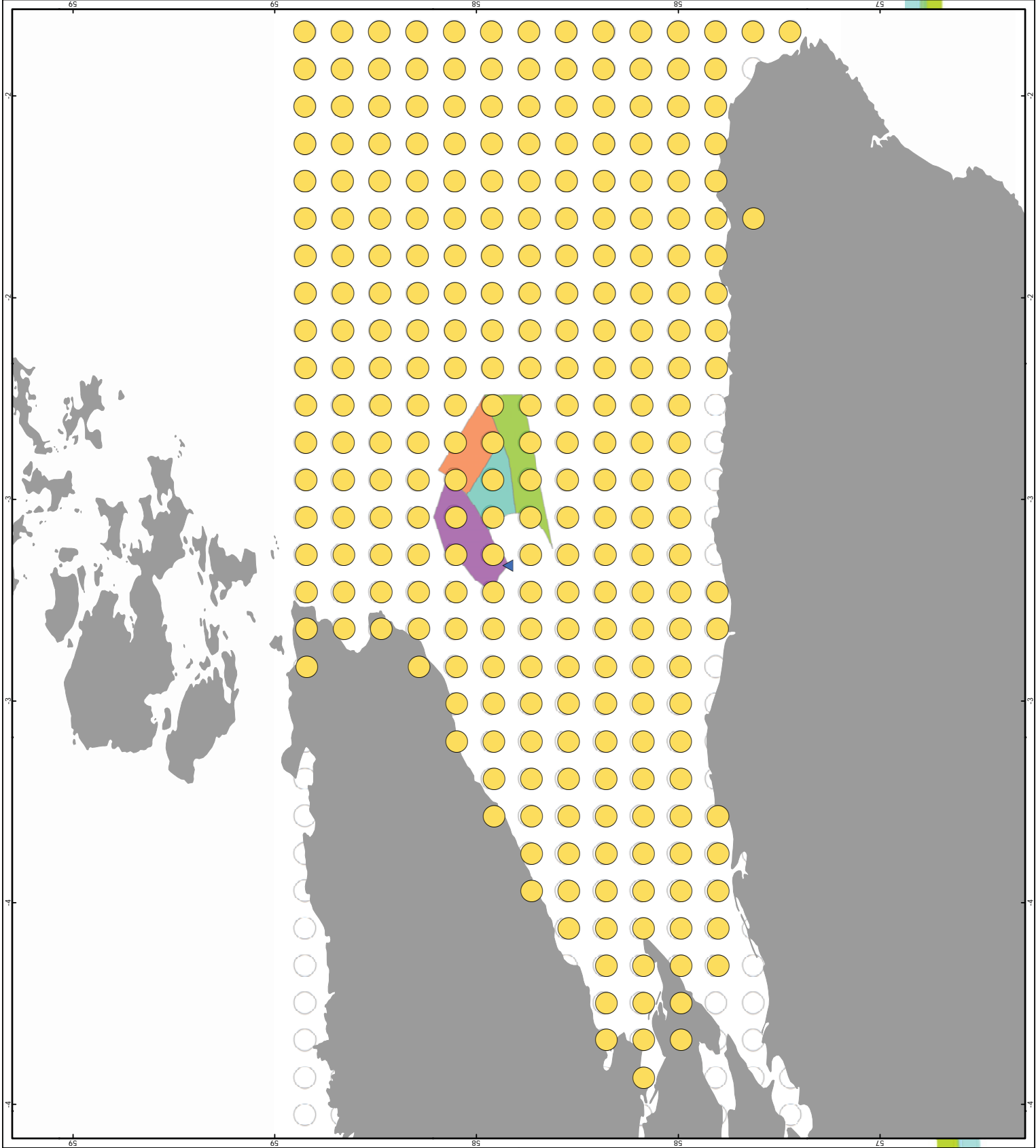

Geodetic Parameters: WGS 1984

Produced: LG  
 Reviewed: SC  
 Approved: CJP

Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-256

Figure E30: Scenario E  
 SAFESIMM

Grey Seal 198 dB  
 Moray Offshore  
 Renewables Ltd





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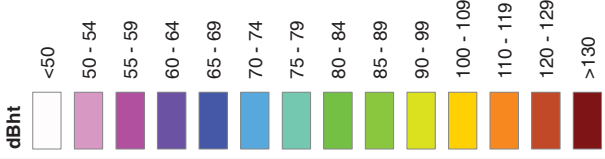
KEY

Telford, Stevenson, MacColl and Beatrice

MORL piling location

BOWL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see E3 DVD



Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 27/04/2012  
Revision: A  
REF: 8460001-PPW0200-NPW-MAP-154

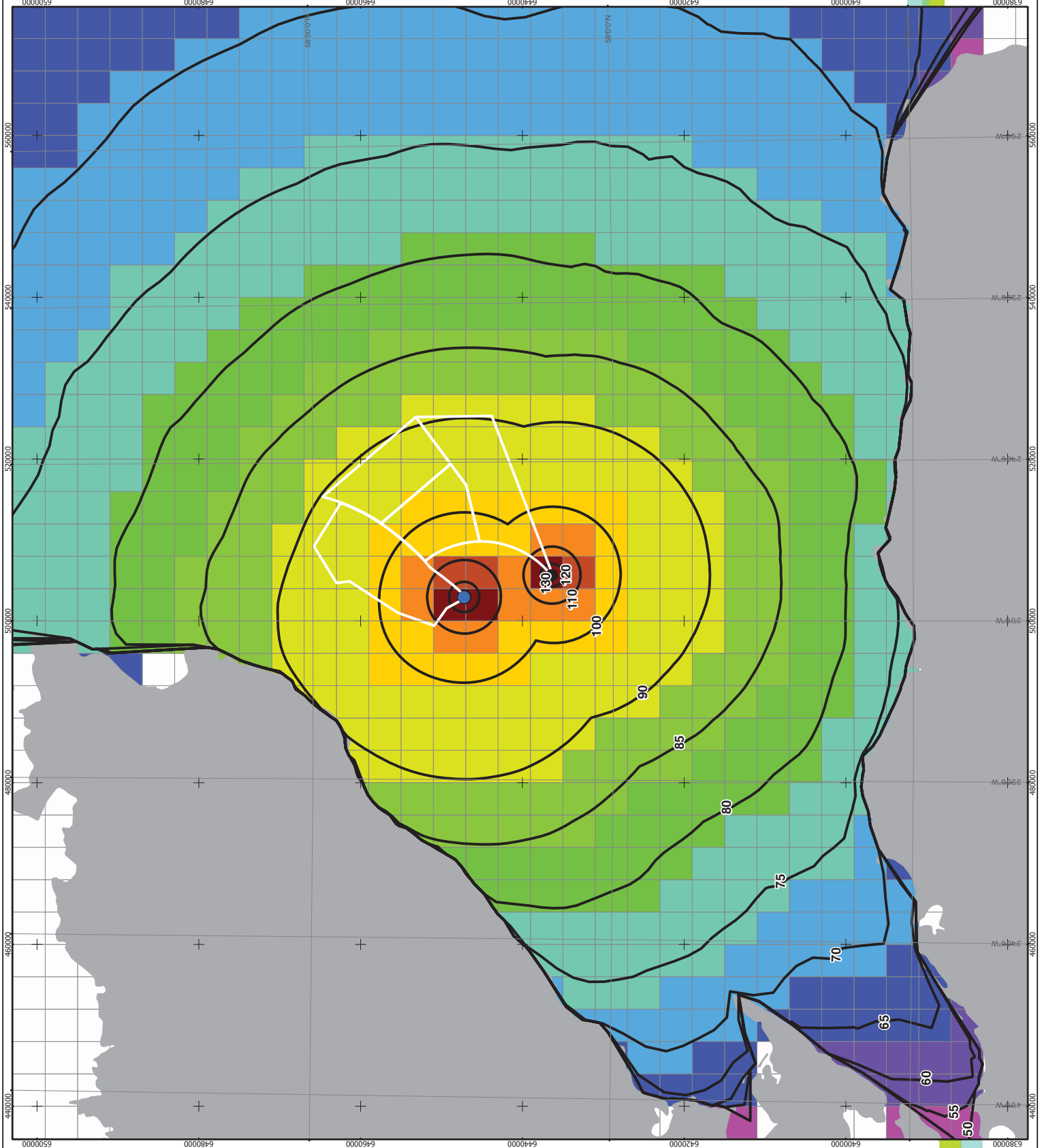


Figure E31: Scenario F Harbour Porpoise dBht

Moray Offshore Renewables Ltd



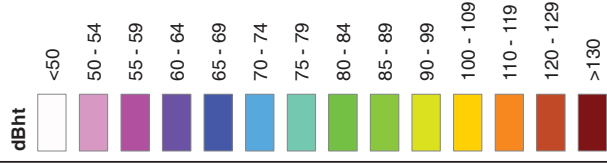
Moray Offshore Renewables Ltd

KEY

Telford, Stevenson, MacColl and Beatrice  
 MORL piling location  
 BOWL piling location

MORL piling location  
 BOWL piling location

dBht

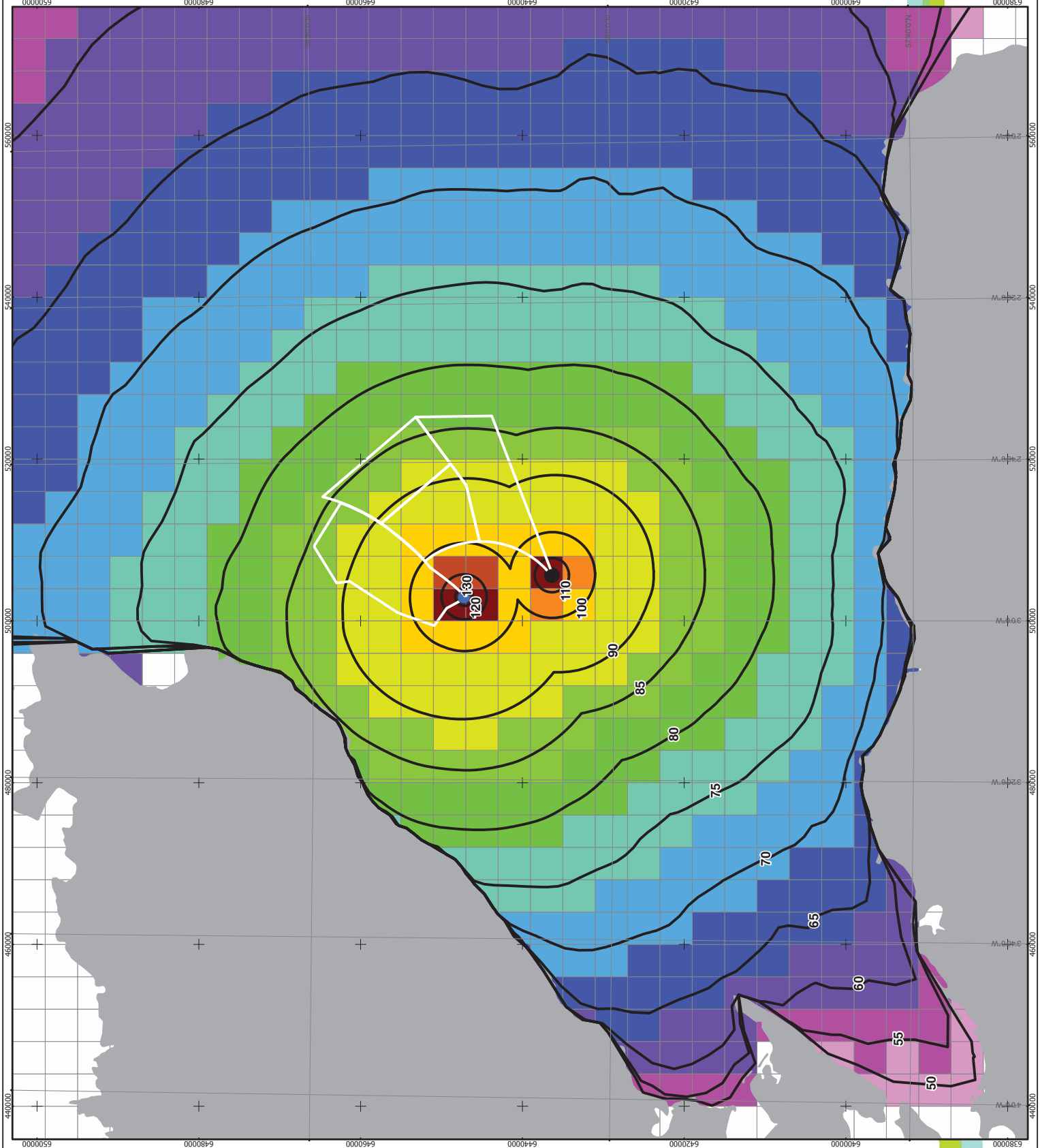


Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 27/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-153

Figure E32: Scenario F  
Bottlenose Dolphin dBht

Moray Offshore Renewables Ltd



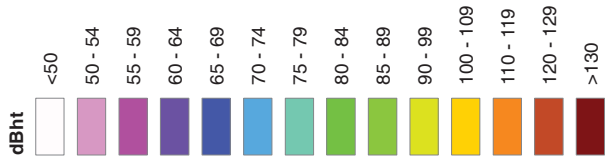
KEY

Teiford, Stevenson, MacColl and Beatrice

MORL piling location

BOWL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000  
A3 Chart  
0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 27/04/2012  
Revision: A  
REF: 8460001-PPW0200-NPW-MAP-156

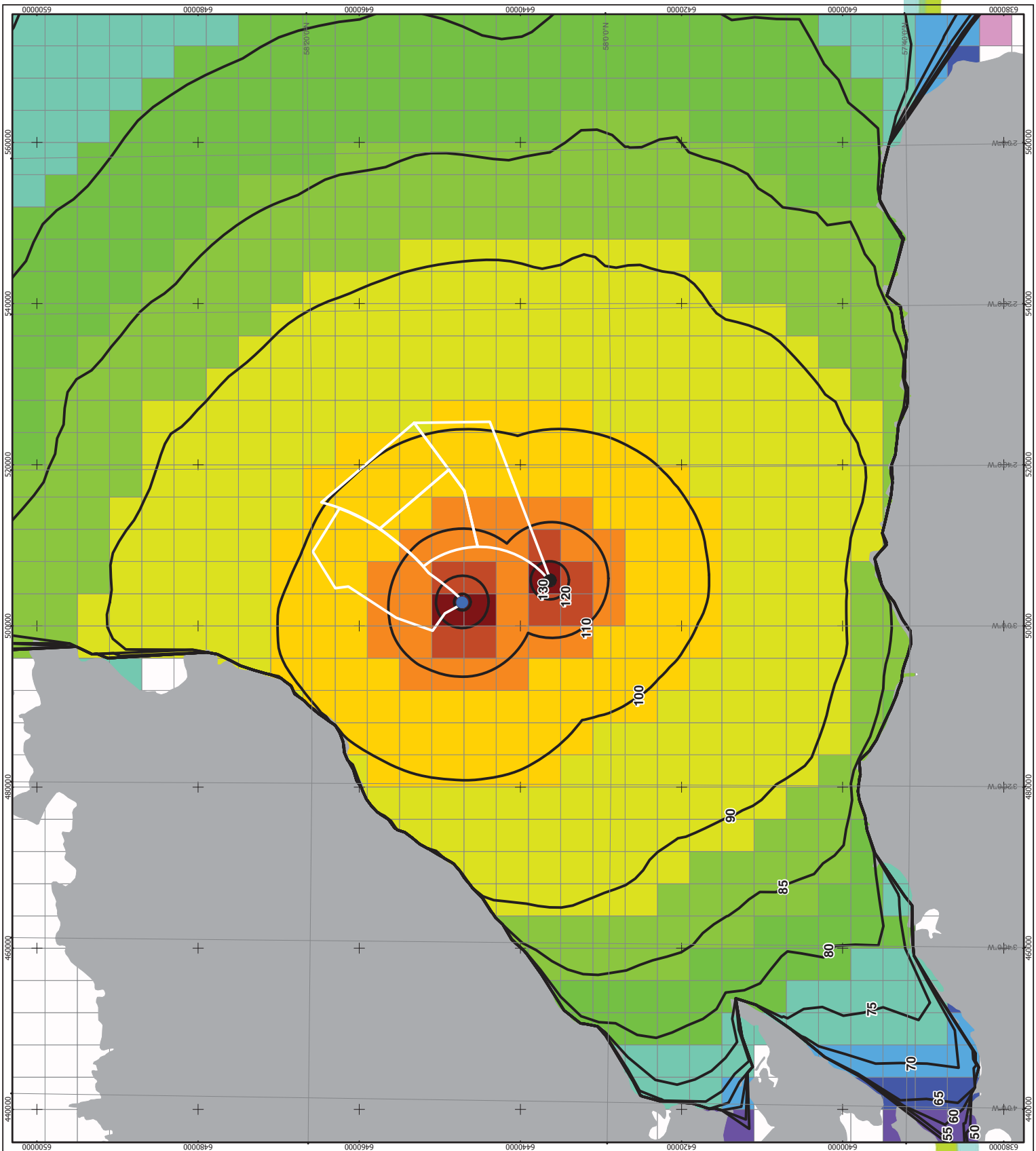


Figure E33: Scenario F  
Minke Whale dBht

Moray Offshore Renewables Ltd



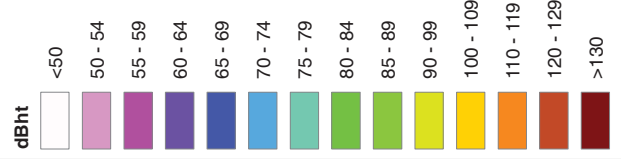
KEY

Telford, Stevenson, MacColl and Beatrice

MORL piling location

BOWL piling location

dBht



A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000  
A3 Chart  
0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
Produced: LG  
Reviewed: SC  
Approved: CJP  
Date: 27/04/2012  
Revision: A  
REF: 8460001-PPW0200-NPW-MAP-155

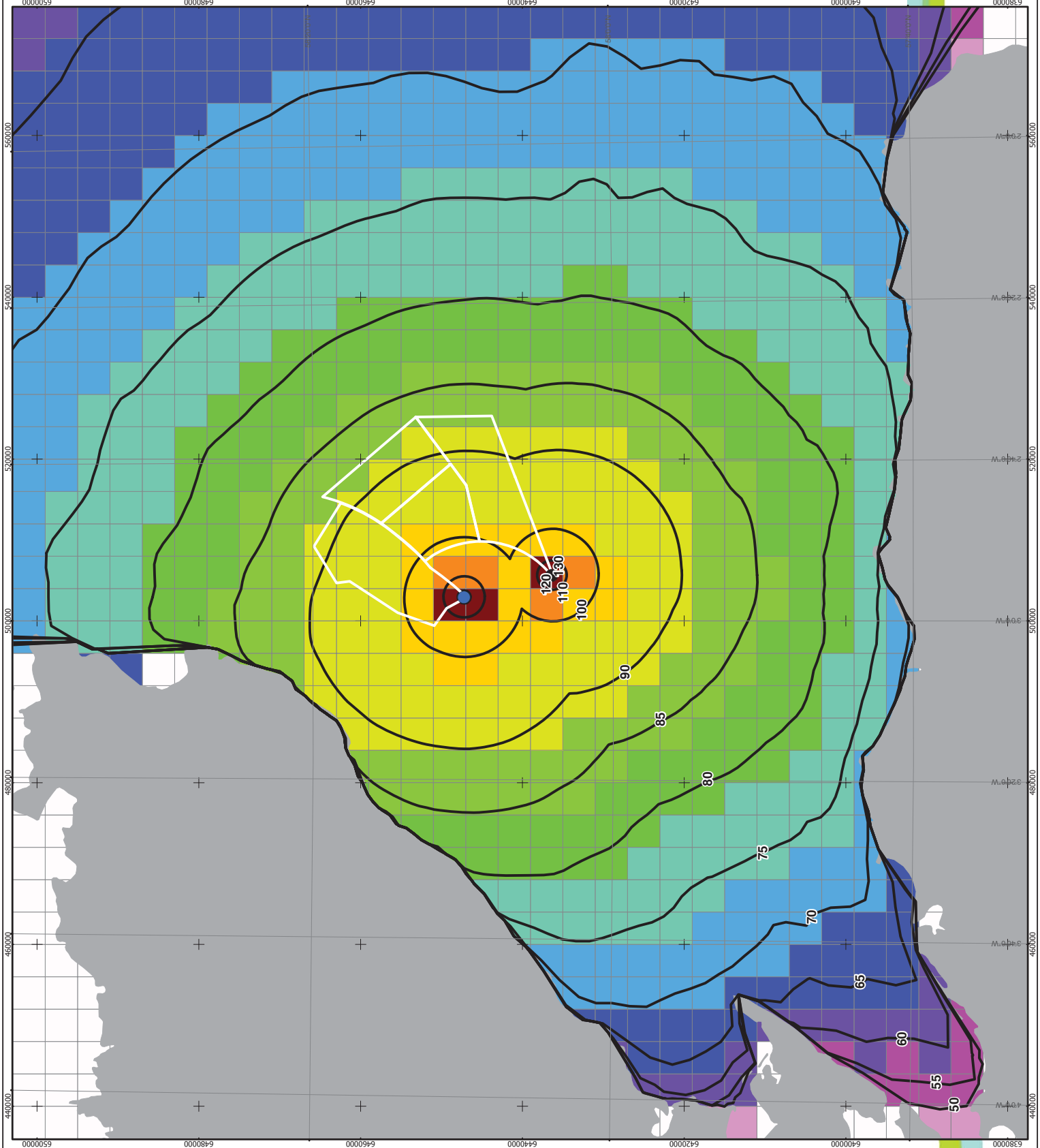


Figure E34: Scenario F Harbour Seal dBht

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY



Telford, Stevenson, MacColl and Beatrice



MORL piling location



BOWL piling location

dB



186



188



190



192



194



196



198



200

Max dB



186 - 196



197 - 200

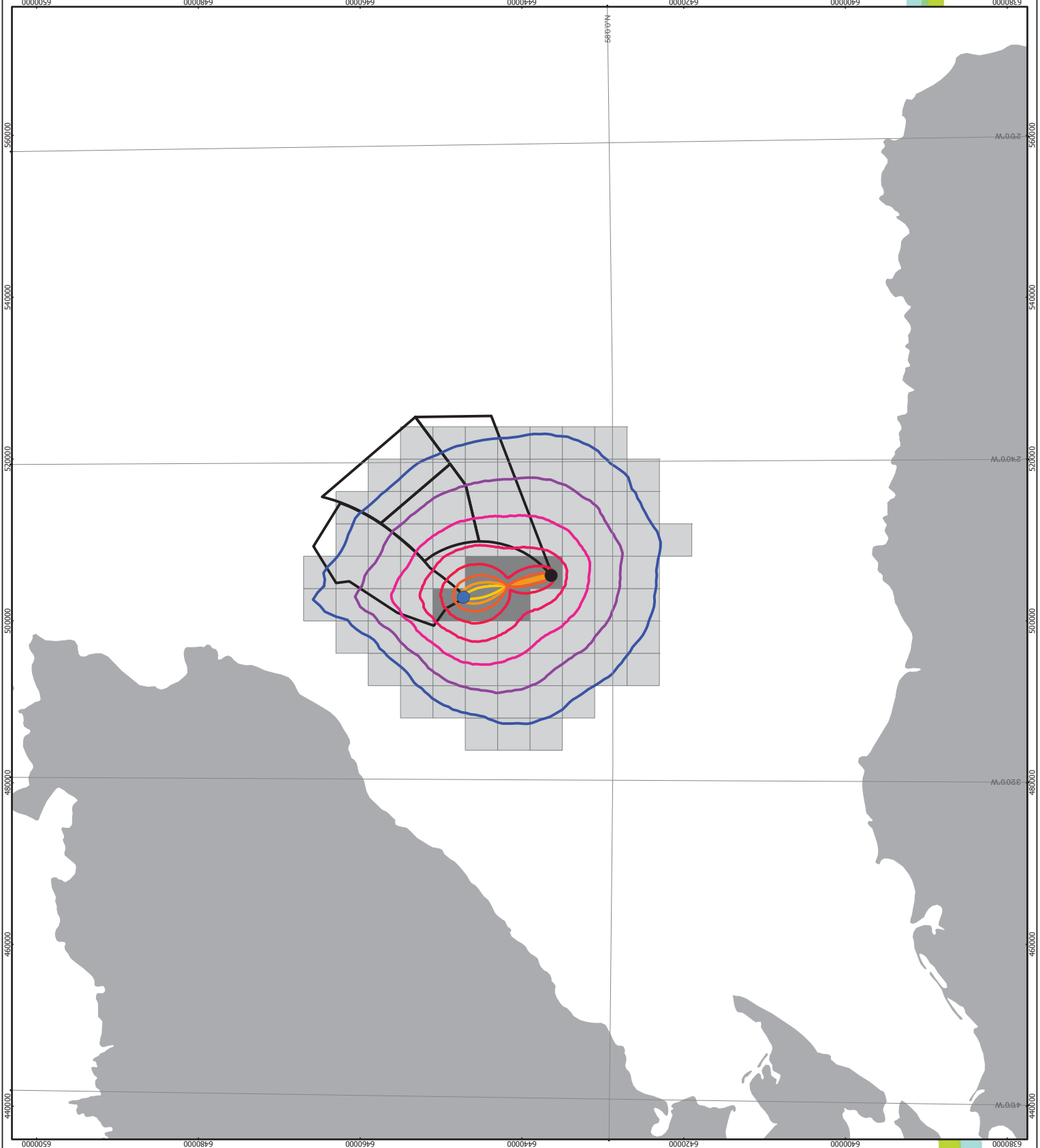
A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:450,000 A3 Chart N  
 0 10 20 Kilometers

Geodetic Parameters: WGS84 UTM Zone 30N  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 02/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-157

Figure E35: Scenario F  
 High Frequency Cetaceans  
 SEL

Moray Offshore  
 Renewables Ltd





Moray Offshore Renewables Ltd

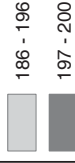
KEY

 Telford, Stevenson, MacColl and Beatrice  
 MORL piling location  
 BOWL piling location

dB



Max dB



Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LG

Reviewed: SC

Approved: CJP

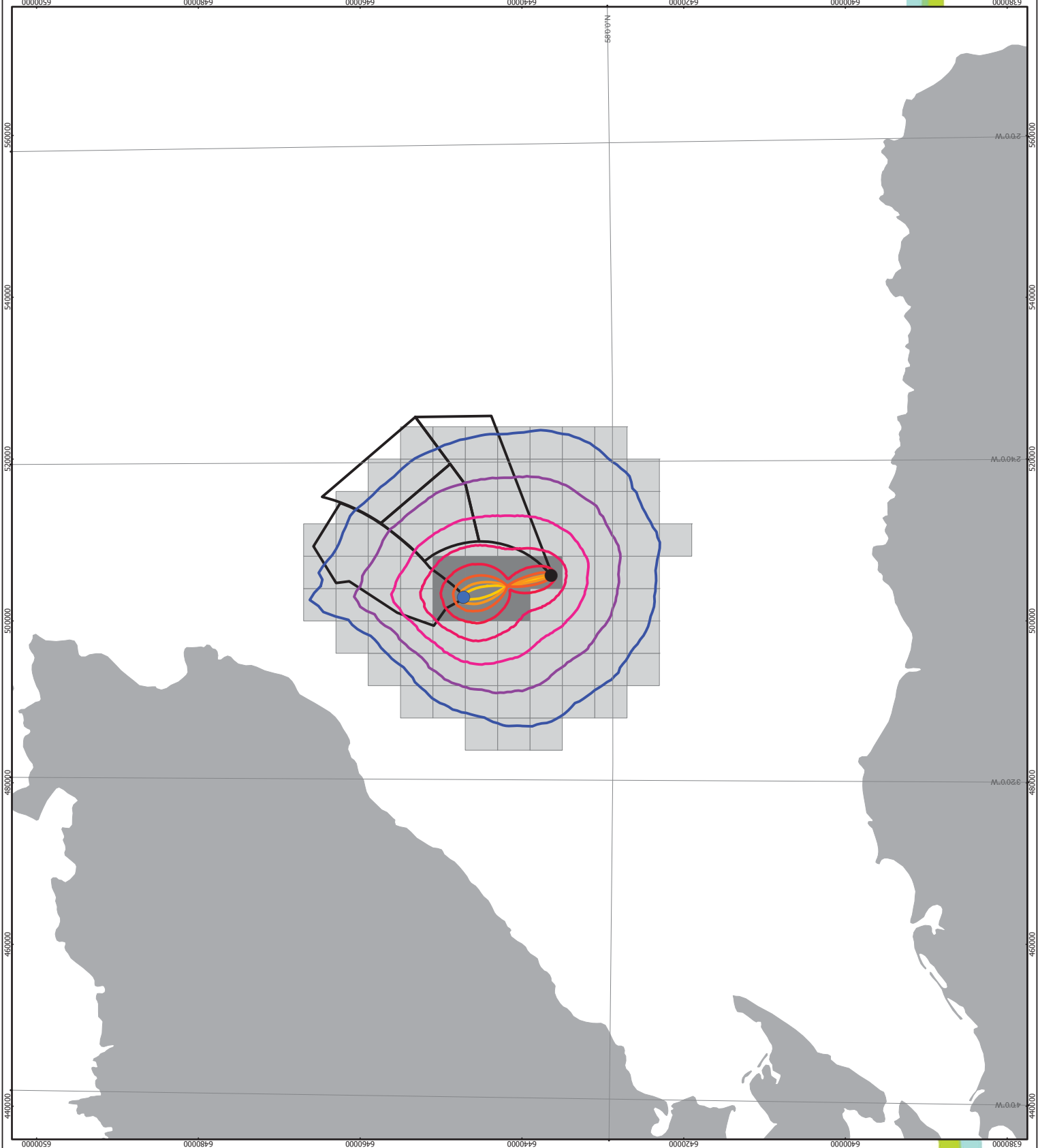
Date: 02/05/2012

Revision: A

REF: 8460001-PPW0200-NPW-MAP-159

Figure E36: Scenario F  
Mid Frequency Cetaceans  
SEL

Moray Offshore  
Renewables Ltd













Moray Offshore Renewables Ltd



KEY

 Telford, Stevenson, MacColl and Beatrice  
 MORL piling location  
 BOWL piling location

dB

-  186
-  188
-  190
-  192
-  194
-  196
-  198
-  200

Max dB

-  186 - 196
-  197 - 200

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:450,000 A3 Chart N  


Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LG

Reviewed: SC

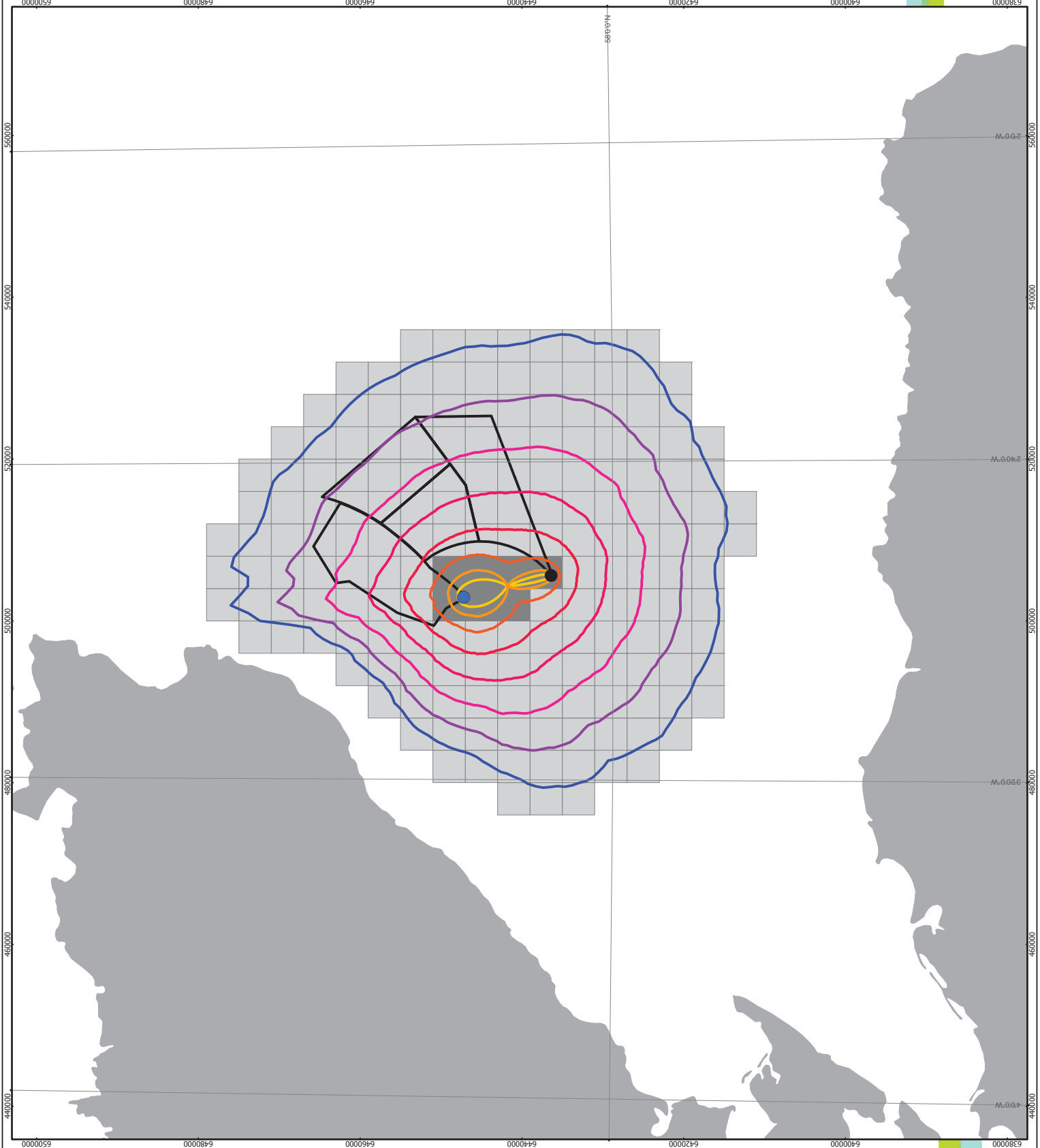
Approved: CJP

Date: 02/05/2012 Revision: A

REF: 8460001-PPW0200-NPW-MAP-158

Figure E37: Scenario F  
Low Frequency Cetaceans  
SEL

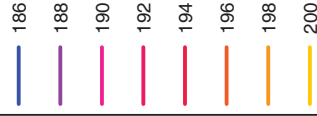
Moray Offshore  
Renewables Ltd



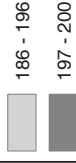
KEY

 Telford, Stevenson, MacColl and Beatrice  
 MORL piling location  
 BOWL piling location

dB



Max dB

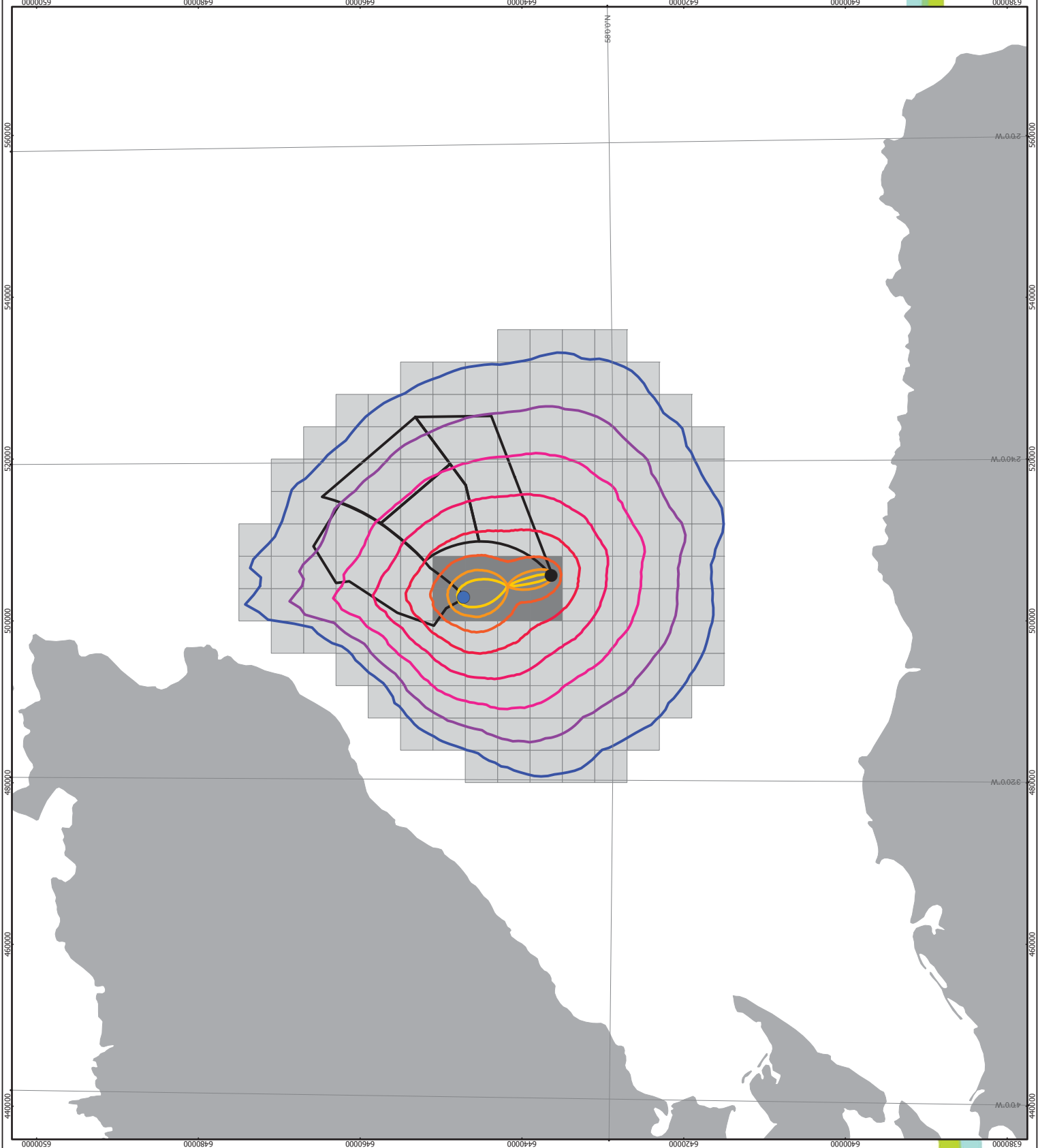


A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD





Geodetic Parameters: WGS84 UTM Zone 30N	
Produced: LG	Reviewed: SC
Approved: CJP	
Date: 02/05/2012	Revision: A
REF: 8460001-PPW0200-NPW-MAP-160	

Figure E38: Scenario F  
Pinnipeds  
SEL









KEY


-  Telford
-  Stevenson
-  MacColl
-  Beatrice

-  MORL piling location
-  BOWL piling location

Number of harbour porpoise predicted to receive SELs sufficient to induce PTS onset

-  0
-  >0 - 0.2
-  >0.2 - 0.4
-  >0.4 - 0.6
-  >0.6 - 0.8
-  >0.8 - 1.0

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DVD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-257

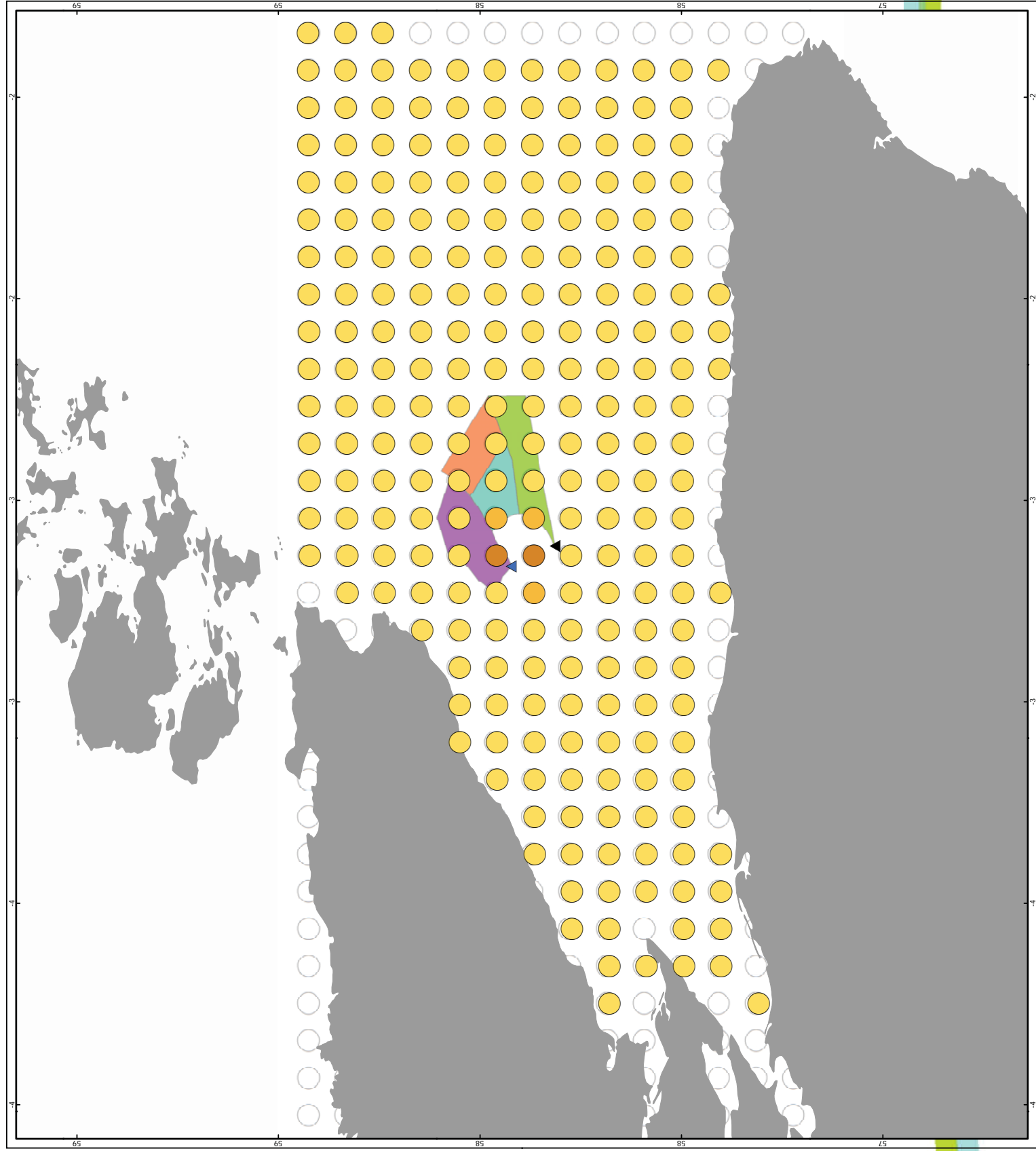







Figure E39: Scenario F  
 SAFE SIMM  
 Harbour Porpoise 198 dB  
 Moray Offshore Renewables Ltd






KEY

-  Telford
-  Stevenson
-  MacColl
-  Beatrice


-  MORL piling location
-  BOWL piling location

Number of bottlenose dolphins predicted to receive SELs sufficient to induce PTS onset

-  0
-  0.01
-  0.02

A3 figures scaled to A4 for print. Scale bar not representative of figure.  
For A3 scale see ES DWD

Horizontal Scale: 1:900,000 A3 Chart N



Geodetic Parameters: WGS 1984

Produced: LG  
Reviewed: SC  
Approved: CJP

Date: 23/04/2012 Revision: A

REF: 8460001-PPW0200-NPW-MAP-259

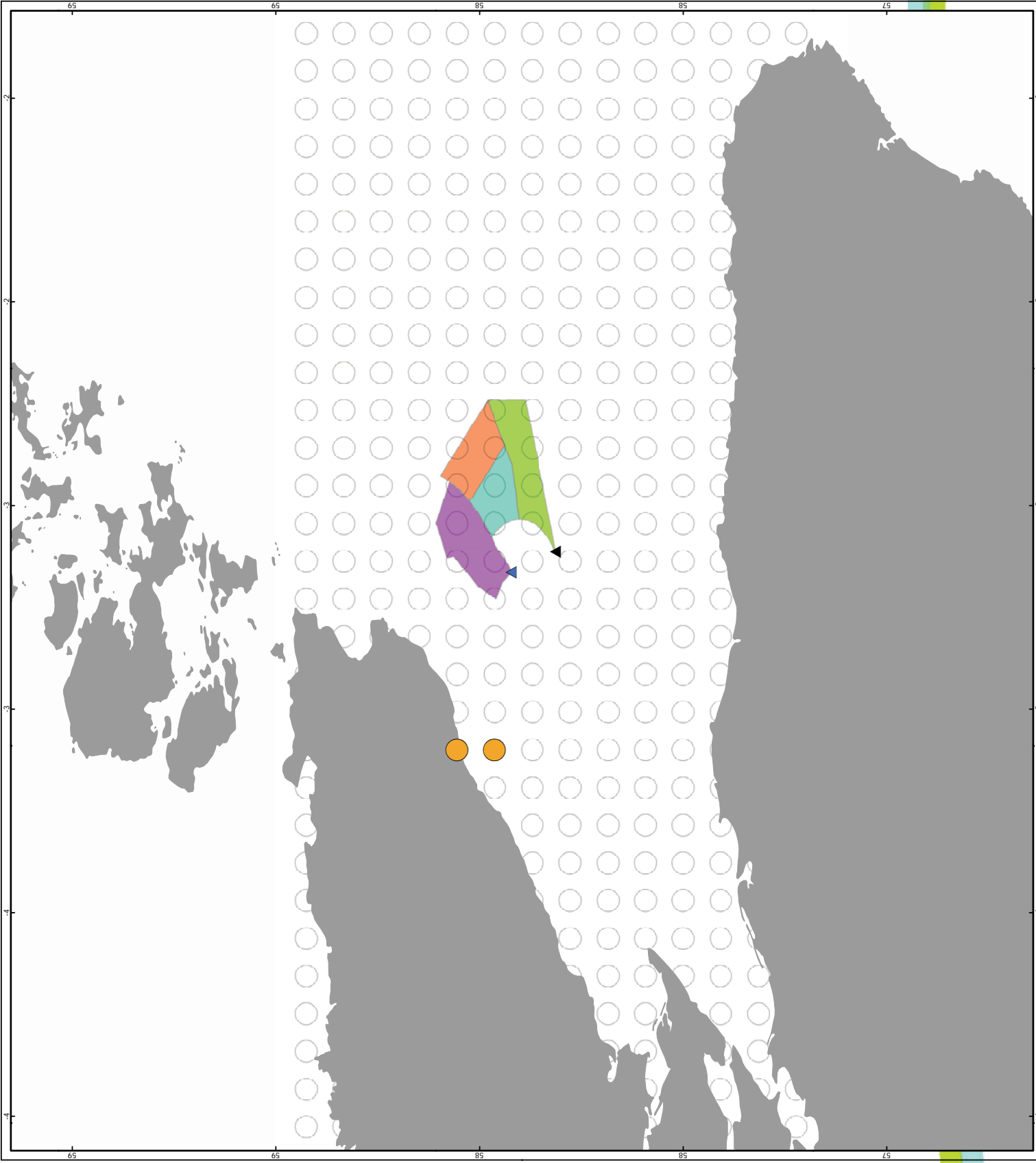


Figure E40: Scenario F  
SAFESIMM  
Bottlenose Dolphin 198 dB  
Moray Offshore  
Renewables Ltd

KEY

- Telford
- Stevenson
- MacColl
- Beatrice

- MORL piling location
- BOWL piling location

Number of minke whale predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 0.2
- >0.2 - 0.4
- >0.4 - 0.6
- >0.6 - 0.8
- >0.8 - 1.0

Horizontal Scale: 1:1,550,000 A3 Chart N  
 0 20 40 km

Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 08/05/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-260

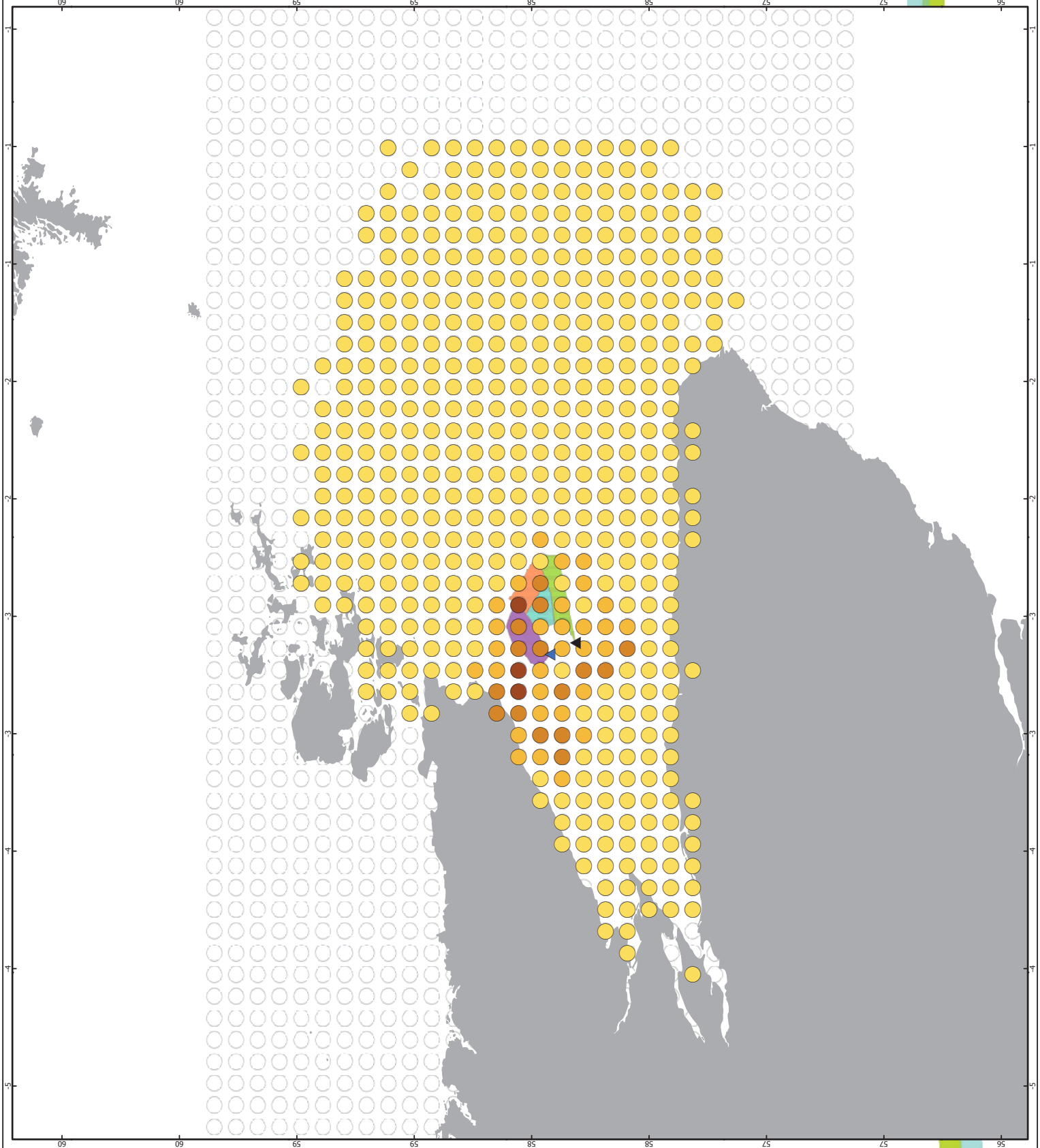


Figure E41: Scenario F  
 SAFESIMM  
 Minke Whale 198 dB  
 Moray Offshore  
 Renewables Ltd

KEY

- Telford
- Stevenson
- MacColl
- Beatrice

- MORL piling location
- BOWL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 2
- >2 - 4
- >4 - 6
- >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-261

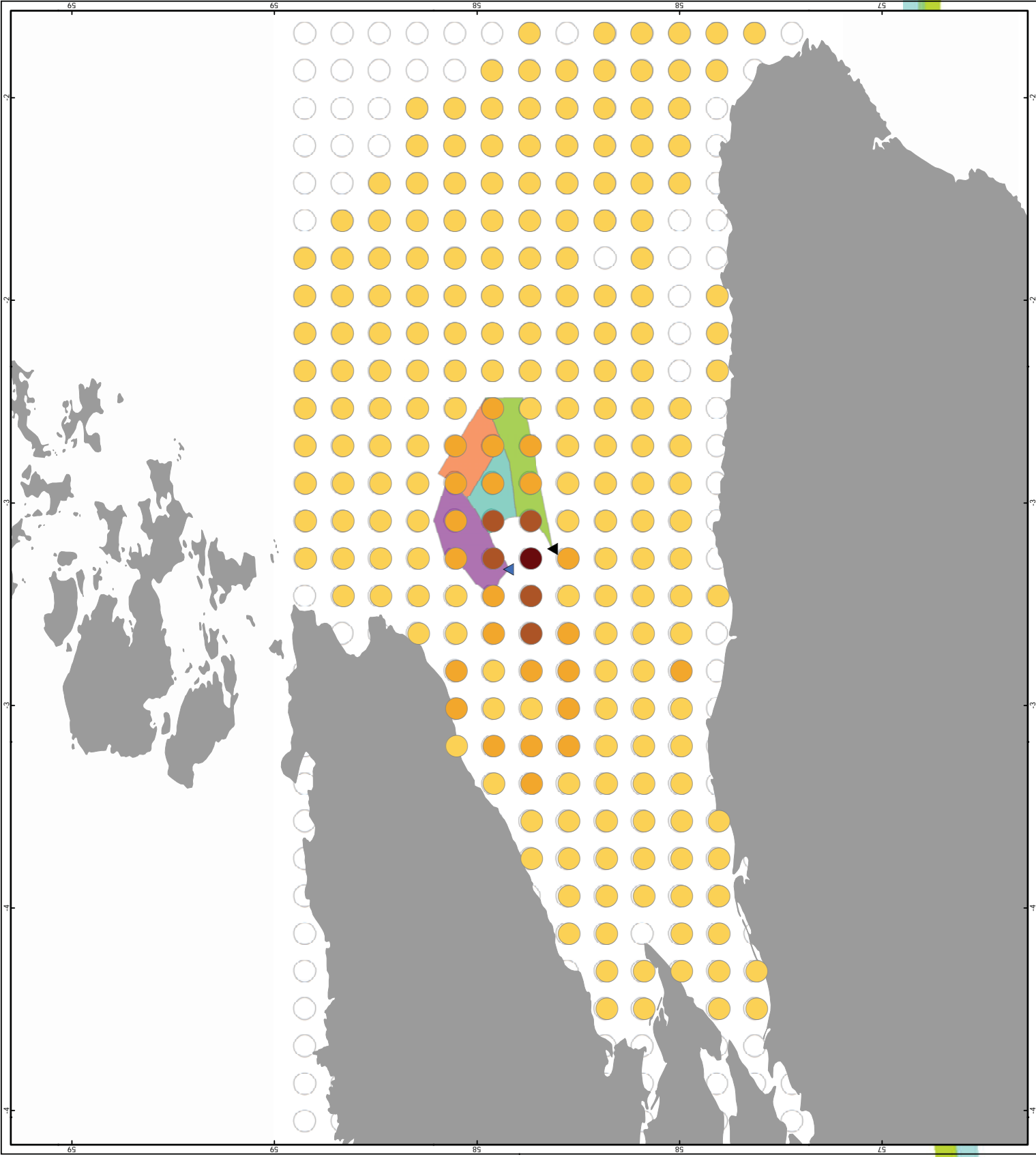


Figure E42: Scenario F  
 SAFESIMM  
 Harbour Seal 186 dB  
 Moray Offshore  
 Renewables Ltd

KEY

- Telford
- Stevenson
- MacColl
- Beatrice

- MORL piling location
- BOWL piling location

Number of harbour seals predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 2
- >2 - 4
- >4 - 6
- >6 - 8

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-262

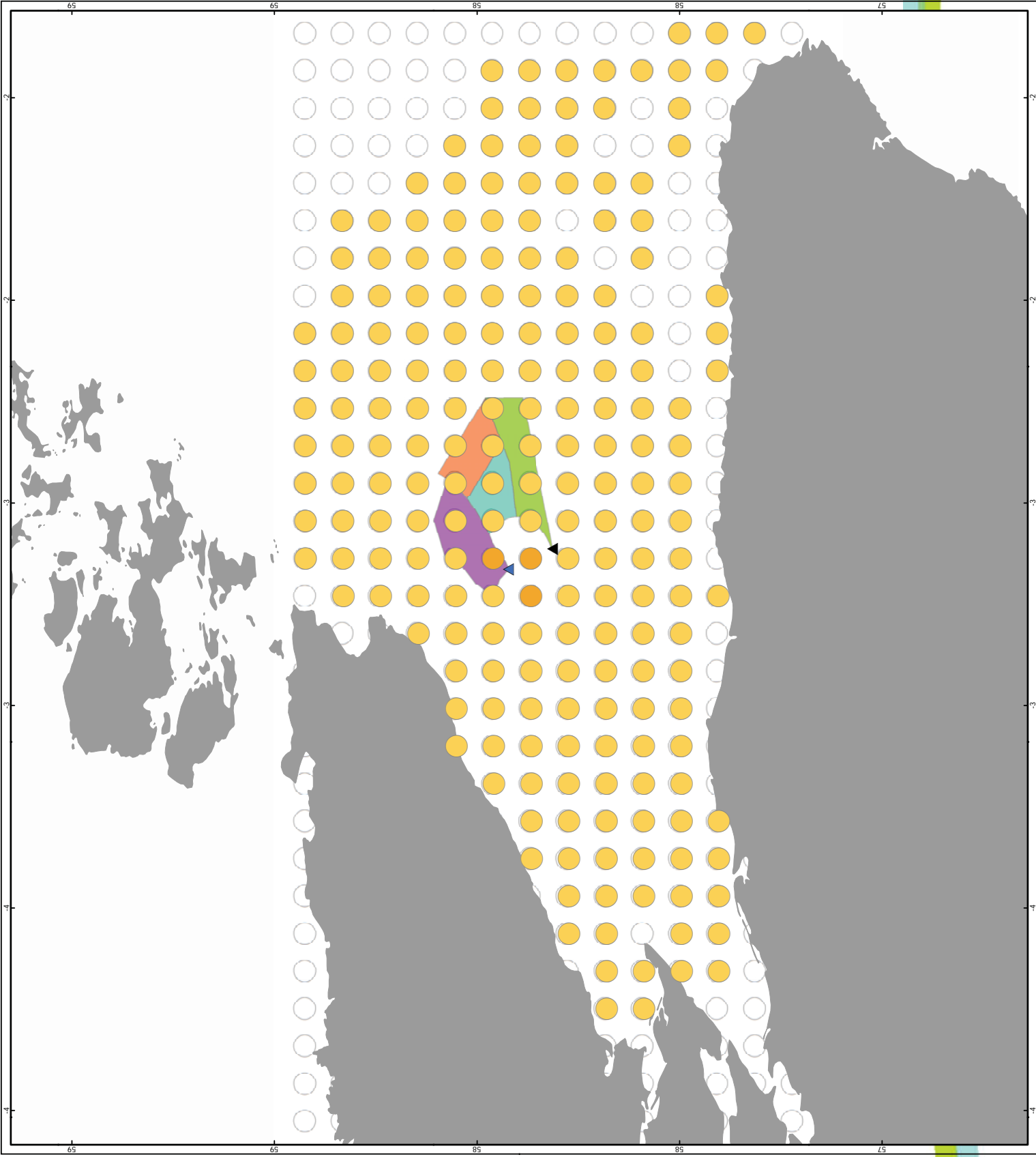


Figure E43: Scenario F  
 SAFESIMM  
 Harbour Seal 198 dB  
 Moray Offshore  
 Renewables Ltd

KEY


- Telford
- Stevenson
- MacColl
- Beatrice

- MORL piling location
- BOWL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 5
- >5 - 10
- >10 - 15
- >15 - 20
- >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-263

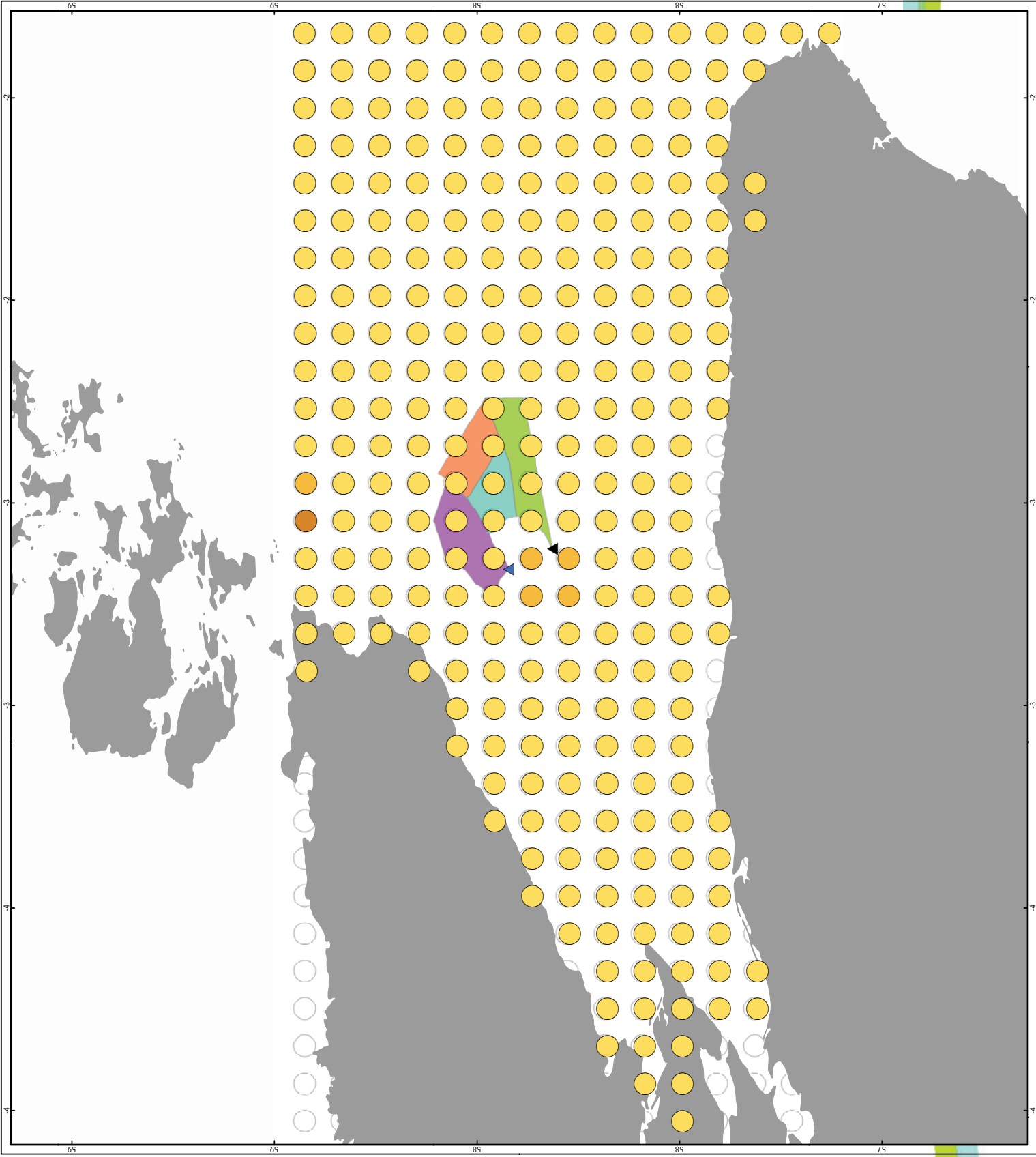


Figure E44: Scenario F  
 SAFESIMM  
 Grey Seal 186 dB  
 Moray Offshore  
 Renewables Ltd



KEY

- Telford
- Stevenson
- MacColl
- Beatrice

- MORL piling location
- BOWL piling location

Number of grey seals predicted to receive SELs sufficient to induce PTS onset

- 0
- >0 - 5
- >5 - 10
- >10 - 15
- >15 - 20
- >20 - 23

A3 figures scaled to A4 for print. Scale bar not representative of figure. For A3 scale see ES DWD

Horizontal Scale: 1:900,000 A3 Chart N  


Geodetic Parameters: WGS 1984  
 Produced: LG  
 Reviewed: SC  
 Approved: CJP  
 Date: 23/04/2012 Revision: A  
 REF: 8460001-PPW0200-NPW-MAP-264

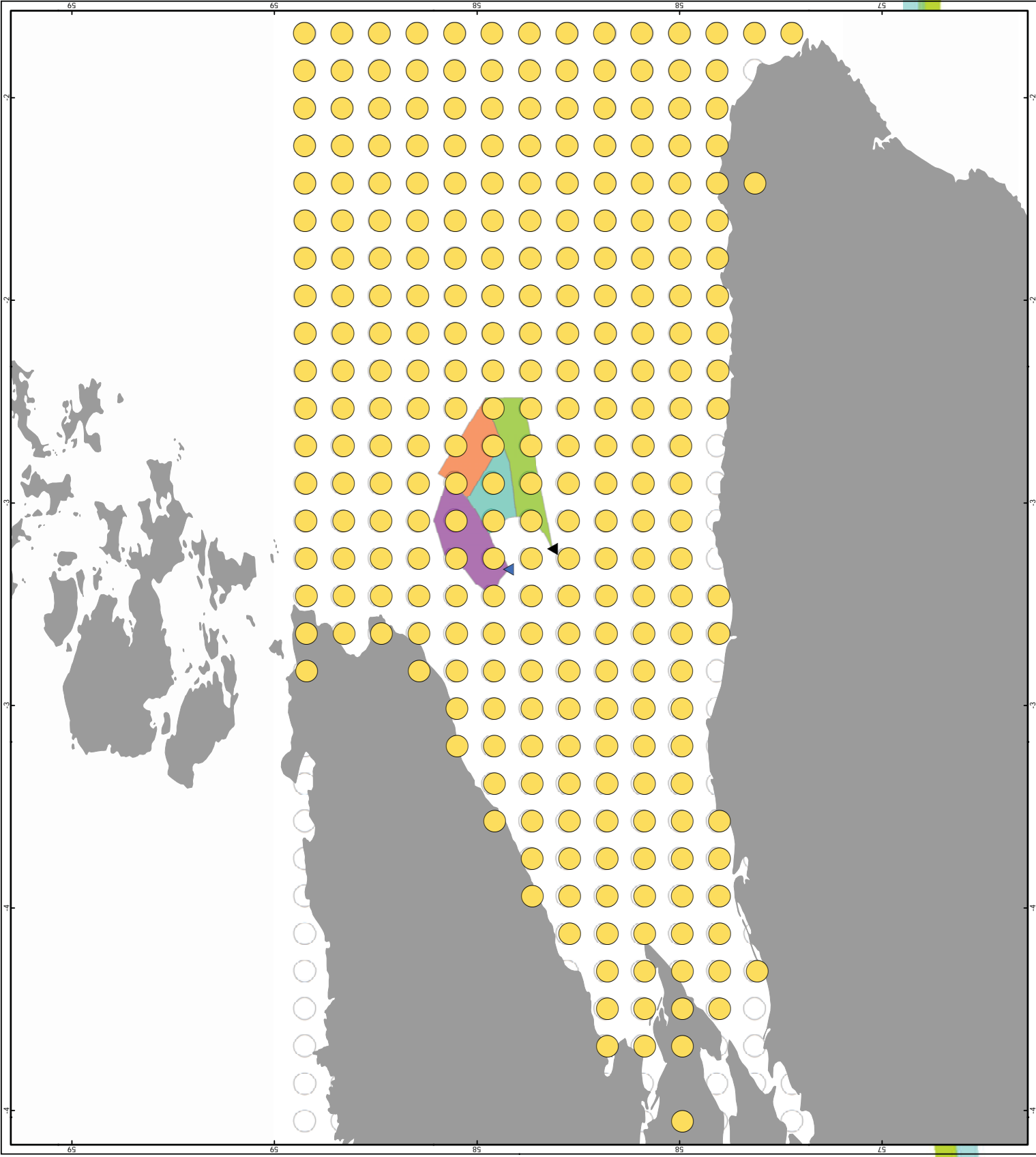


Figure E45: Scenario F  
 SAFESIMM  
 Grey Seal 198 dB  
 Moray Offshore  
 Renewables Ltd

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