Fishguard

Technical Clarifications – Further Information Request

Fishguard
Replacement
Linkspan

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Document status

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V01	Further Information	Various			

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Contents

Figures

1 Technical Clarifications

1.1 Items 3, 6 & 10 – Historic Recording

Dr Julian Whitewright RCAHMW has carried out a recording of the former lifeboat and deposited the archive at the website https://skfb.ly/pzYsS which has removed need for WSI.

1.2 Item 37 – Amended Figure 10-14 ES Vol 1 Main Text, Part 1

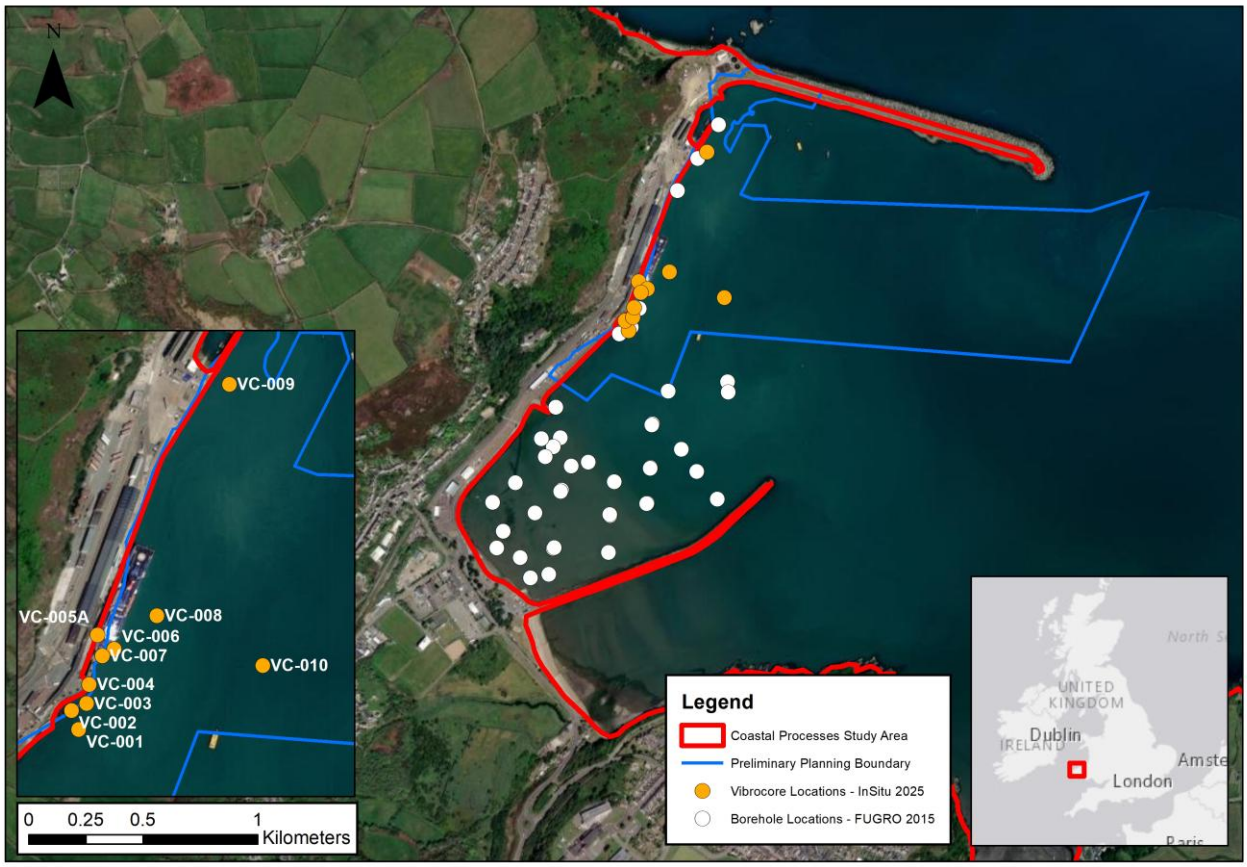

Figure 1-1 Vibrocore and borehole locations analysed within the InSitu and FUGRO site investigation surveys

1.3 Item 39 – Additional Information

Additional information:

To support the information above we provide an overview of auditory effect ranges for all non-impulsive activities demonstrating that even if there was overlap (not proposed) there would be no material effect on the conclusions of the assessment:

Dredging: <10 m for AUD INJ and TTS

Demolition: <10 m for AUD INJ, up to 580 m for 90th percentile range for TTS (LF group)

Vibro piling: <10 m for AUD INJ, up to 190 m for 90th percentile range for TTS (VHF group)

Coring: <10 m for AUD INJ and TTS

Adding two sources of the same level and frequency together adds 3 dB to the noise, which under optimal conditions (very conservative) leads to a doubling of the risk range.

Adding two levels together where one is e.g. 5 dB lower than the other adds 1.1 dB to the noise (for -10 dB this is 0.4 dB).

Assuming all the above are active together: the total broadband source level would be 197 dB SPL Figure 1-2 Overview of all non-impulsive sources, 3 dB above vibro piling (194 dB) or demolition (194 dB) alone. Note that while the broadband level has increased by 3 dB, the maximal single band level is unlikely to increase and remains 188 dB SPL (Figure 1 1, compare “Demolition” and “Total”).

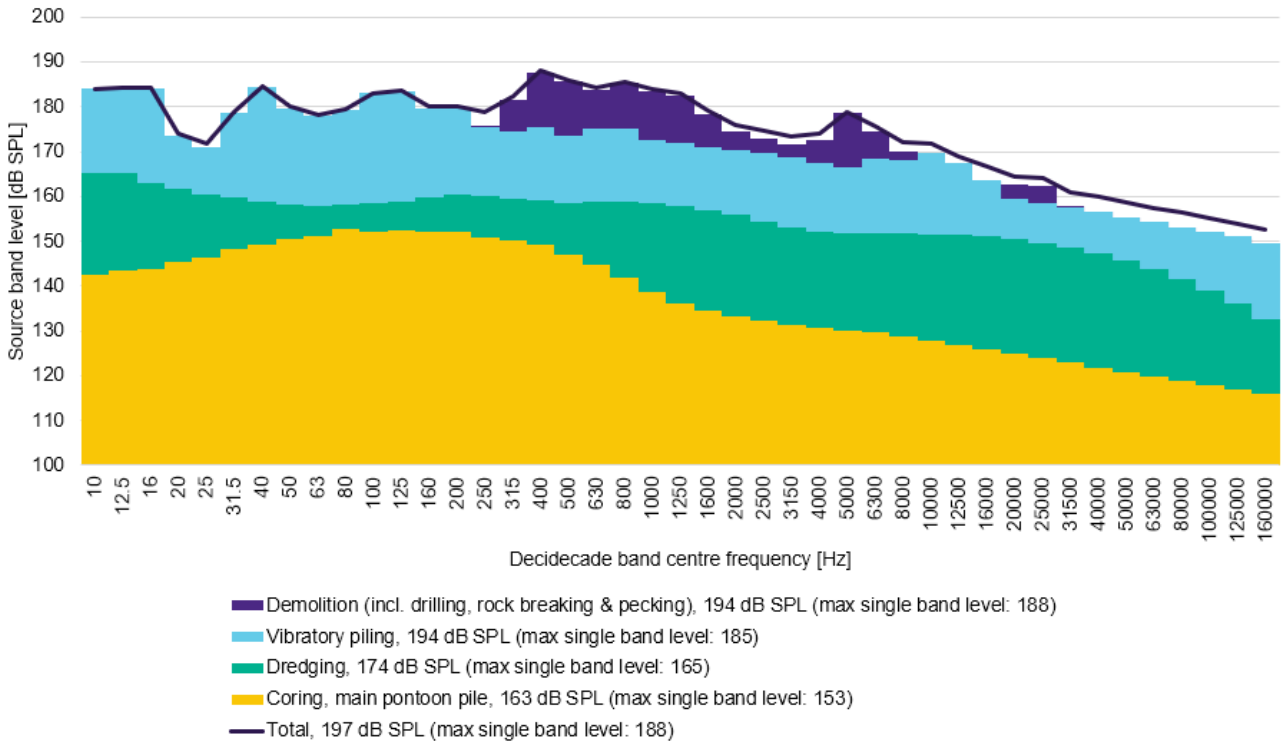

Figure 1-2 Overview of all non-impulsive sources

After applying the LF and VHF weightings we see that the total level, assuming all sources are active at the same time and in the same location, is increased by 1 dB for the LF group and by 2 dB for the VHF group.

Thus, if the following are assumed:

- Optimal sound propagation (pure cylindrical spreading), with no loss to the sediment or absorption.
- All noise source above active at the same time (crucially both vibratory installations and demolition activities).

The TTS ranges might increase to:

- LF group: Increase by a factor of 1.25 (2 dB) to c. 730 m (from 580 m)
- VHF group: increase by a factor of 1.6 (2 dB) to c. 650 m (from 410 m)

AUD INJ ranges for both to be <20 m.

Thus, even though NRW's comments are valid, the effect on the assessment is in our opinion not significant as under very conservative assumptions (unplanned concurrency in the noisiest activities) the expected increase in TTS ranges is small. We will however seek to include such considerations more clearly in future assessments if activities are likely to overlap as NRW are correct in pointing out the potential for overlapping activities to increase the risk ranges for auditory impacts.

1.4 Item 41 – Additional information

Additional Information:

The SEL threshold values of 222dB for recoverable injury and 204dB for TTS applied to the assessment have simply been converted to the corresponding noise dose as the SPL values given in Popper et al. 2014 are not thresholds to be applied to estimate the adverse effect of instantaneous intensity, but rather a statement of an exposure (intensity over time) which has an associated time element (i.e. noise dose). Taking the 170 dB SPL for continuous noise, an exposure over 48 hours could lead to recoverable injury (see Table 7.7 in Popper et al. 2014). Thus, since both a sound pressure level and a duration are given, 170 dB SPL alone (as an instantaneous received level) is not stated to have any negative effects. Converting this to SEL equates to threshold value of 222 dB. The threshold is presented as a dose as this accounts for the fact that accumulated exposure can lead to adverse effects.

Likewise, for TTS, an intensity of 158 dB SPL experience over 12 hours is equal to 207 dB SEL. Again, the threshold for TTS is specified as a constant level over a duration (i.e. a dose), not simply 158 dB SPL as an instantaneous intensity threshold.

The explanation for this approach where SPL has been converted to SEL as a threshold is provided in the notes to Table 13-4 of "Fishguard Linkspan Replacement, Environmental Statement, Chapter 13, underwater Acoustics".

In relation to the question over weightings and fish thresholds for behavioural impact, there is no weighting applied to any received levels relating to fish. Where a weighting has been applied to received levels for fish in referenced literature (some of the data contained weighted received levels for fish), this has been removed prior to inclusion here. An actual dB level was seen as preferable to a qualitative statement of high, moderate, low probability of behavioural effects at ranges of 10s, 100s, and 1000s of meters respectively (as suggested by Popper et al. 2014). The quantitative method enabled by a threshold value is seen by us as preferable, partly as it relies on data not included in the now quite old Popper et al. 2014 guidance, and as it aligns with the approach taken for marine mammals and better acknowledges that certain fishes have moderate to high sensitivity to acoustic disturbance at the suggested levels. This is thus a more conservative and probably a more accurate reflection of potential impact ranges than the qualitative categories suggested by Popper et al. 2014. We note that there is a mistake in the figure showing the fishes 126 dB SPL behavioural disturbance threshold alongside the thresholds for marine mammals, in that the vertical axis has reference to weighted levels, this is not correct for the fishes group. As stated in the report further down, all received levels for fish are unweighted.

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