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Huon Aquaculture

Huon River Vessel Noise Investigation

Prepared for

Huon Aquaculture Company

Client representative

Anthony Pearce

Date

12 January 2026

Rev 2

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Prepared by — Douglas Ford, Alex Seen		**Date — 03/07/2025**
Reviewed by — Steve Edwards		**Date — 03/07/2025**
Authorised by — Andy Turner		**Date — 03/07/2025**

Revision History

Rev No.	Description	Prepared by	Reviewed by	Authorised by	Date
0	Issued as DRAFT	D. Ford / A. Seen	S. Edwards	A. Turner	24/06/25
1.3	Huon reviewed and mitigation measures updated	D. Ford / Huon Aquaculture	D. Ford / A. Seen	A. Turner	5/11/25
2	Minor text edits, Issued as FINAL	A. Seen	D. Ford	A. Turner	12/01/26

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Executive Summary

This vessel noise investigation has been prepared in response to a direction from the Tasmanian EPA to Huon Aquaculture Company Pty Ltd (Huon) issued in accordance with Section 35 of the new *Environmental Standards for Tasmanian Marine Fin Fish Farming* 2023.

The EPA has provided a summary of noise complaints that they have received over recent years, relating to Huon Aquaculture vessels, operating on the Huon River. The majority of the complaints detailed, relate to two vessels - the Ronja Huon and the Huon Supply. All complaints relate to vessels transiting past sensitive receivers in the region of Whale Point, Port Huon and Wattle Grove. The majority of the complaints (17 out of 24) were made by one complainant, located in the Wattle Grove area. None of the complaints recorded, have been identified as originating from residences further down the river.

The scope of the investigation, includes identifying if vessel noise exceeds the noise limits for vessels, required by the environmental standards. The assessment also includes recommendations for appropriate mitigation measures to control any exceedances identified.

Noise logging near the most noise exposed residence, at Bullock Point, Wattle Grove suggests that existing ambient noise conditions in this area are largely in line with the Tasmanian *Environmental Protection Policy (Noise)* acoustic indicator values for sleep disturbance and outdoor recreation. There are small exceedances, but these relate almost entirely to local traffic passing close to the logger location and are not significantly impacted on by vessels sailing on the Huon River.

The sound power level of the vessels identified was determined by making noise measurements close-in to the vessels as they transited past. This data was used to model vessel noise at the most noise exposed residences at Port Huon and Wattle Grove. The results of the modelling indicated that for some vessels, noise emissions are likely to exceed the environmental standard noise limits for some times of the day, especially at night.

A noise mitigation plan has been proposed, to minimise the exposure of residents and reduce the level of noise emitted, below the environmental standard requirements.

1. Introduction

This vessel noise investigation has been prepared in response to a direction from the Tasmanian EPA, to Huon Aquaculture Company Pty Ltd (Huon) issued in accordance with Section 35 of the new *Environmental Standards for Tasmanian Marine Fin Fish Farming* 2023.

The EPA has provided a summary of noise complaints that they have received over recent years, relating to Huon Aquaculture vessels, operating on the Huon River. The information provided is further summarised below:

Table 1 - Number of complaints lodged with the EPA regarding the two Huon Well Boats - January 2017 to May 2021

Vessel Name	Number of Complaints Received
Ronja Huon	18
Ronja Storm	0

Table 2 - Complaints lodged with the EPA - January 2023 to July 2024

Date	Time of Day	Location	Vessels Identified	Activity Identified
10 Jan 2023	1:30 am to 3:30am	Not advised	Ronja Storm & Berserker	In Transit
Dec 2023 – Jan 2024	4:30am to 7:30pm	Whale Point	Ronja Huon	Moored
26 Feb 2024	Up untill10:13pm	Whale Point	Ronja Storm & support craft	Moored
7 June 2024	Not Advised	Not Advised	None. (General increase in vessel activity)	Not Advised
1 July 2024	10:30pm	Whale Point	Ronja Huon	In Transit
4 July 2024	6:06am to 6:14am	Not advised	Huon Supply	In Transit
5 July 2024	5:45am	Whale Point	Ronja Huon	In Transit

Table 3 – Noise complaints received by the EPA from one single complainant in the Wattle Grove area – July 2024 to October 2024

Date	Time of Day	Location	Vessels Identified
5 July 2024	5:30am	Approaching Port Huon	Ronja Huon
11 July 2024	7:48am	Approaching Port Huon	Ronja Huon
21 July 2024	5:30am	Approaching Whale Point	Ronja Huon
13 Aug 2024	6:10pm	Passing Wattle Grove	Ronja Huon and Huon Supply
24 Sep 2024	7:00pm	Departing Whale Point	Ronja Huon
24 Sep 2024	7:44pm	Passing Wattle Grove	Huon Supply
25 Sep 2024	9:20pm	Departing Whale Point	Ronja Huon
27 Sep 2024	7:40pm	Passing Wattle Grove	Ronja Huon
28 Sep 2024	6:18am	Passing Wattle Grove	Huon Supply
1 Oct 2024	6:57pm	Departing Whale Point	Huon Supply
2 Oct 2024	10:12am	Approaching Whale Point	Ronja Huon
3 Oct 2024	11:40am	Travelling from Pillings Bay to Whale Point	Bulldog 13
4 Oct 2024	7:43pm	Passing Wattle Grove	Ronja Huon

Date	Time of Day	Location	Vessels Identified
4 Oct 2024	9:33pm	Passing Wattle Grove	Ronja Huon
7 Oct 2024	10:14am	Passing Wattle Grove	Bulldog 13
9 Oct 2024	8:18pm	Passing Wattle Grove	Ronja Huon
9 Oct 2024	10:21pm	Passing Wattle Grove	Ronja Huon

In Summary:

- The majority of the complaints detailed, relate to two vessels - the Ronja Huon and the Huon Supply.
- No complaints were recorded concerning Ronja Storm, except for two complaints where the noise observed has been identified by Huon as originating from smaller support craft (one of which was identified as the Berserker) operating in the near vicinity of the Ronja Storm.
- Two complaints concern the Bulldog 13.
- All complaints relate to vessels transiting past sensitive receivers in the region of Whale Point, Port Huon and Wattle Grove, as shown in Figure 1 below. The majority of the complaints (17 out of 24) were made by one complainant, located in the Wattle Grove area. None of the complaints recorded here, have been identified as originating from residences further down the river.

The scope of this investigation is limited to the vessels and area noted above, except that the Southern Condor II has been included as it has a similar function and level of noise emissions to the Huon Supply and the Ragnarok has been evaluated instead of the Berserker, as it is the loudest of the 12m work boats. The Brook M is included as complaints have been received about its operations in this area, even though they are not included in the summary details above.

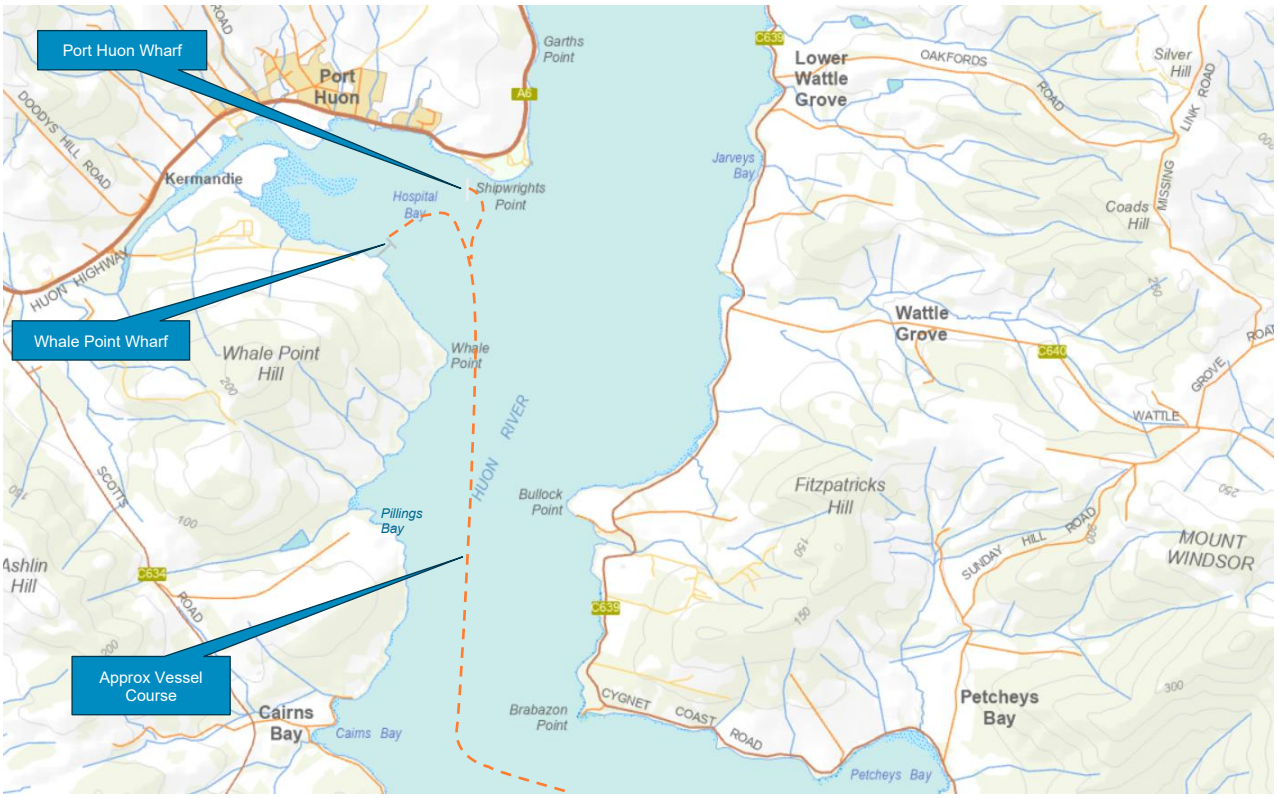

Figure 1 - Locality Map (Base image from theList) and approx. vessel course

2. Environmental Standards Noise Requirements

Division 8 of the recently enacted *Environmental Standards for Tasmanian Marine Fin Fish Farming* 2023 allows the EPA to require a fish farm licence holder to undertake a; "nuisance investigation and impact assessment", into noise emissions from their service vessels, where it believes that these noise emissions may be causing an environmental nuisance.

The investigation must assess whether the noise emissions from the vessels, as measured at any noise sensitive premises, exceed the following levels:

- $L_{eq,10min}$ 45 dB(A) between 0700 hours and 1800 hours (Day time);
- $L_{eq,10min}$ 37 dB(A) between 1800 hours and 2200 hours (Evening time); and
- $L_{eq,10min}$ 32 dB(A) between 2200 hours and 0700 hours (Night-time).

Under the standard, the noise levels would not be considered to be exceeded, if the vessel noise emissions are not audible, or if it can be demonstrated that the combined level of the vessel noise and the normal ambient noise are less than the background noise level plus 5 dB(A).

The impact assessment must include recommendations for appropriate mitigation measures to manage any noise problems identified. The fish farm licence holder must implement the recommended mitigation measures, if they are subsequently approved by the EPA.

3. Environmental Protection Policy (Noise)

The Tasmanian *Environmental Protection Policy (Noise)* 2009 (the EPP) has general provisions for the regulation of proposed commercial / industrial noise sources with the objective of protecting environmental values. In summary, it requires:

- Best practice environmental management to be employed to reduce noise emissions, to the greatest extent that is reasonably practical
- Dominant or intrusive noise characteristics of noise emissions to be reduced to the greatest extent that is reasonably practical; and
- That a "reserve capacity" in the acoustic environment is retained at any location, such that the combined noise from a number of activities does not prejudice the protection of environmental values at that location.

The EPP also provides acoustic indicator levels for various noise sensitive activities, based on World Health Organisation research. These indicators relate to the total ambient noise levels at a sensitive receiver – not just the noise from the industrial source being assessed. Indicators relevant to this noise assessment include:

- Outdoor Living Areas (Serious annoyance, daytime and evening) — 55 dB(A) $L_{eq,16hours}$
- Outdoor Living Areas (Moderate annoyance, daytime and evening) — 50 dB(A) $L_{eq,16hours}$
- Outside Bedrooms (Sleep disturbance, windows open, night-time) — 45 dB(A) $L_{eq,8hours}$, 60 dB(A) L_{max}
- Inside Bedrooms (Sleep disturbance, night-time) — 30 dB(A) $L_{eq,8hours}$, 45 dB(A) L_{max}

L_{eq} is the "equivalent continuous noise level" which can be thought of as the average noise level over a specific period of time[1]. L_{max} is the maximum noise level recorded in a specific period of time.

[1] Noise levels measured in decibels are averaged logarithmically.

4. Noise Sensitive Premises

Vessels that service Huon's fish farms are based out of, or call into, both the Port Huon and the Whale Point wharfs on the upper Huon River. Port Huon Wharf is primarily a vessel maintenance facility, used for engineering operations and general upkeep. It serves as the home wharf for both of Huon's well boats. Whale Point Wharf is used for freshwater water fills and smolt deliveries by the well boats. It is only temporarily used for well boat operations when necessary.

Vessels travel down the Huon River, to access fish farms in the lower Huon River, the D'Entrecasteux Channel and Storm Bay. Vessels also visit two shore-based facilities operated by Huon, south of Port Huon - Pillings Bay and Hideaway Bay, the latter serving as the main shore base for southern marine farming operations.

Vessels pass relatively close to residences in the town of Port Huon and the locality of Wattle Grove. These areas are within the Huon Valley municipality. The residences in Port Huon are nearly all located within an area zoned residential, under the *Tasmanian Planning Scheme - Huon Valley*, however there are a smaller number of residences scattered throughout the surrounding area, which are zoned agriculture, rural or rural living, as indicated in Figure 2 below. The most noise exposed, noise sensitive premises in the area, are residences at Wattle Grove, located immediately adjoining the shore line, in the area of Bullock Point to Brabazon Point. Residences further away from the shore line, are less exposed due to greater distances to the vessel course and shielding by the land topography and intervening buildings etc. There are no residences on the western shore, in the vicinity of Whale Point, which is largely bush or grassland.

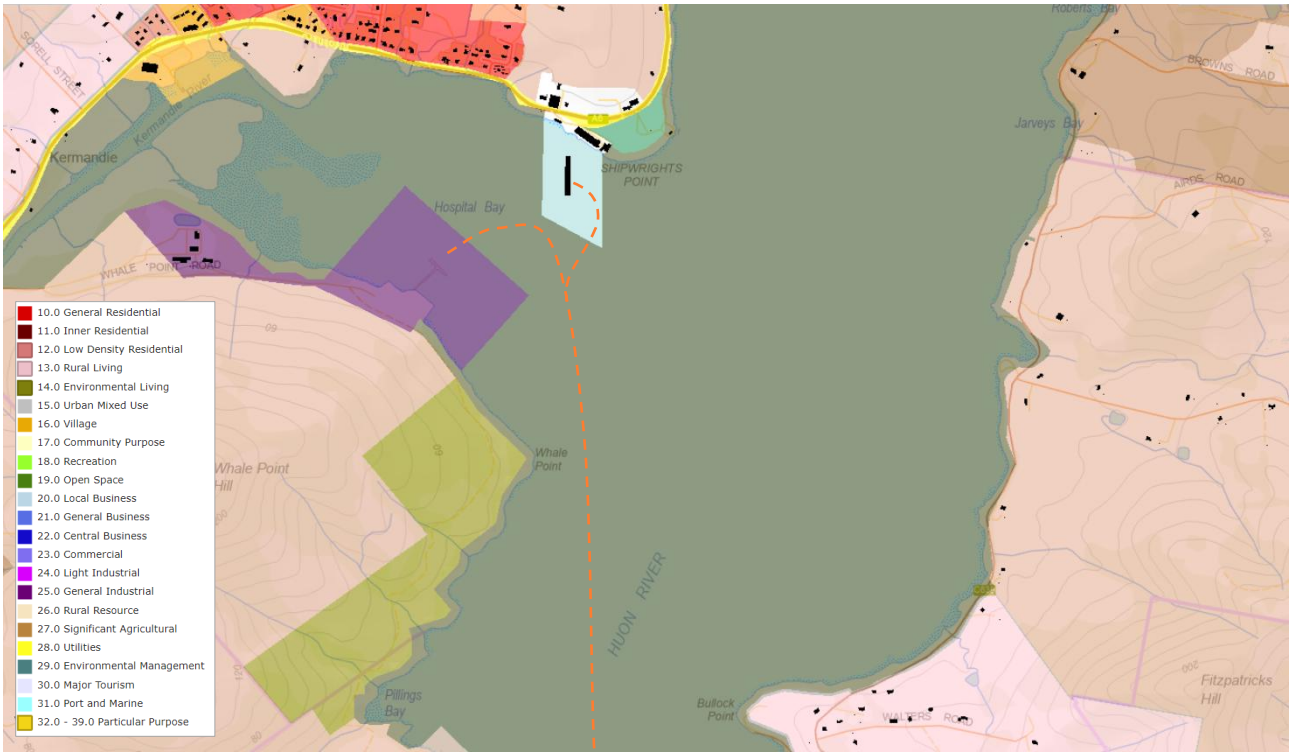

Figure 2 - Structures (which include residences) and Tasmanian Planning Scheme – Huon Valley zoning (Base image from theList)

Figure 3 - Aerial photos of nearby residential settlement – Port Huon (Left), Wattle Grove (Right)

4.1 Vessel Courses

Ronja Huon and Ronja Storm operate under a *Pilotage Exemption Certificate.* This is required as they are both greater than 35m in length and sail routinely within the *Port of Hobart Pilotage Zone 2*, which includes the Huon River and the D'Entrecasteux Channel. Under their pilotage exemption these vessels are required to sail prescribed courses, referred to as "Passage Plans". The course in the area of Bullock Point and Port Huon is shown in Figure 4, which is a screen shot taken from the Ronja Huon's Electronic Chart Display and Information System (ECDIS). As can be seen, this course, runs mostly down the centre of the waterway, which also maximises the distance from the vessel to residences that may be located near the shoreline, on both sides. Other vessels in the Huon fleet have greater flexibility of navigation, but in practice follow the same course, as it is the most efficient and takes into account appropriate navigational safety considerations.

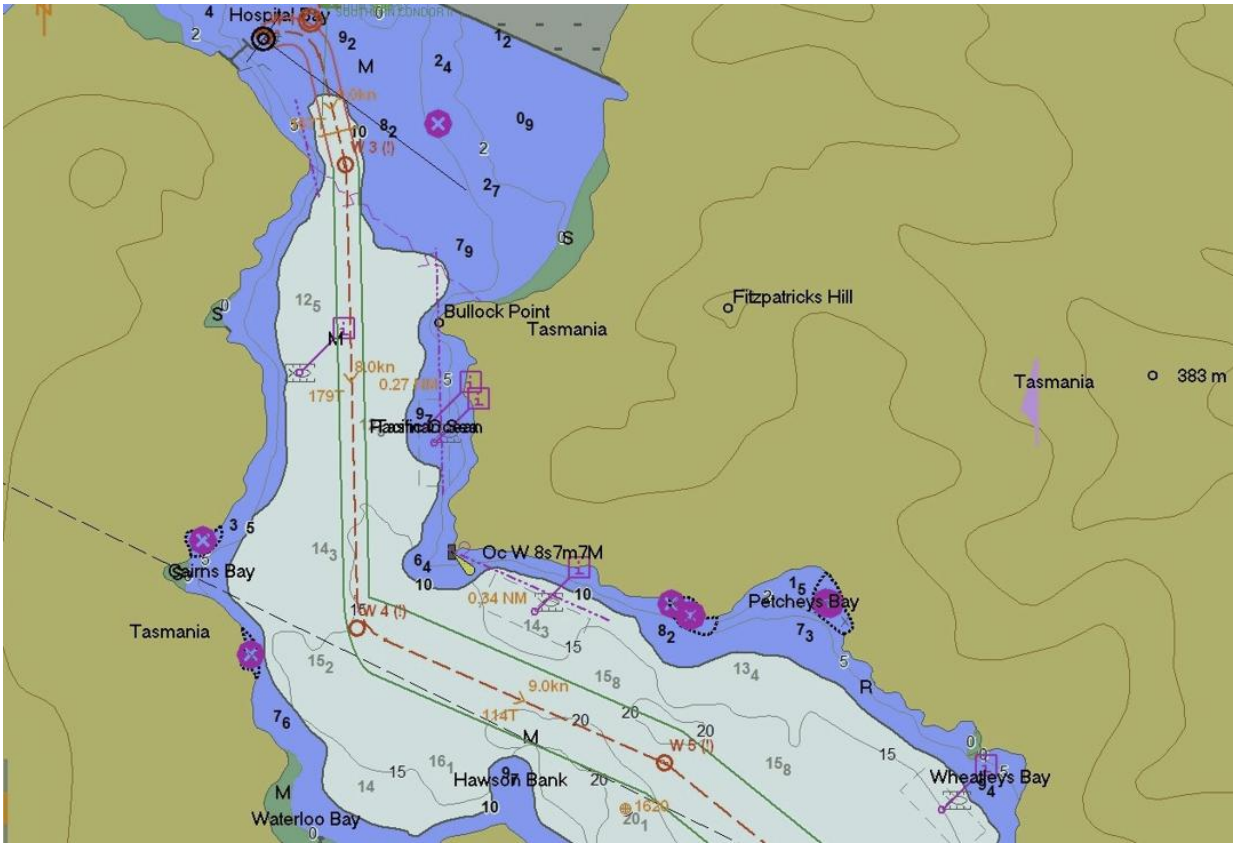

Figure 4 - Screen shot from the Ronja Huon's navigation system, showing the course into Whale Point

4.2 Proximity to Residences

The proximity of the vessel course to houses on the shoreline is summarised in Table 4 below.

Table 4 - Summary of Nearest Residence Locations

Locality	Description	Minimum Distance to Nearest Residences
Port Huon/ Whale Point	The nearest residence to the Port Huon dock or the Whale Point dock is about 280m away, to the north of the Port Huon dock.	280m
Port Huon to Bullock Point	Departing Port Huon Vessels head south down the Huon River and pass closer (150m) to the uninhabited western shore at Whale Point. Rural residences are present on the eastern shore at distances of 1 to 2 km.	Over 1km
Bullock Point to Brabazon Point	The course is generally close to the centre of the river, which is quite narrow at this point, bringing vessels within 600 to 650m of houses on the eastern shore.	600m
Brabazon Point to Police Point	The river turns SE at Brabazon Point and gradually widens. The course continues centrally, with houses present on both sides at distances of 800m to 1km, except for a few houses on a point at Herlihys Bay, that come within about 660m.	660m

4.3 Vessels Details

Huon operate a large fleet of support vessels, designed to carry out the wide variety of tasks required to maintain and operate the fish farms. Basic details of the vessels relevant to this investigation are provided in Table 5 below.

Table 5 – Summary of Vessel Details

Vessel	Operational Use	Type	Length	Engine Power	Engine Type	Crew
Ronja Huon	Well Boat	Heavy Works	74m	2 x 1920kW	Inboard	11
Ronja Storm	Well Boat	Heavy Works	116m	4 x 2250kW	Inboard	12
Berserker	Bath Support	Light Works	11.95m	2 x 244kW	Inboard	8
Ragnarok	Bath Support	Light Works	11.99m	2 x 306kW	Inboard	12
Brook M	Towing vessel	Medium Works	15.77m	2 x 336kW	Inboard	3
Southern Condor II	Feed Delivery	Heavy Works	34.95m	2 x 447kW	Inboard	6
Huon Supply	Feed Delivery	Heavy Works	64.16m	750kW	Inboard	6
Bulldog 13	Works Boat	Heavy Works	23.09m	2 x 261kW	Inboard	12

Frequency and Timing of Vessel Operations

Feed Supply: Feed supply vessels such as Southern Condor II and Huon Supply, make feed delivery trips on most days, leaving around 6 am, and normally return the same day in the late afternoon. Evening or night feed deliveries are uncommon and only occur under exceptional circumstances, such as when adverse weather conditions have disrupted regular daytime schedules. Feed delivery vessels operate out of both Port Huon and Margate.

Well Boats: The well boats, Ronja Huon and Ronja Storm, based at Port Huon, operate 24 hours per day, travelling to and from the lease areas approximately four to six times per week. Huon's bathing (well boat) operations occur during the day, evening and night as required with distinct operational shifts. Fish handling and bathing operations must be undertaken during evening and night hours, particularly during summer to meet operational and fish health requirements. The well boats also call in at Whale Point and Hideaway Bay to take on water and discharge harvested fish respectively. The use of well boats has almost eliminated towing of bathing water or fish in lined pens.

Well boat support vessels operate 24 hours per day to provide continuous support to the well boats. Their responsibilities include preparing pens for bathing, conducting mooring operations, transporting personnel, and managing general deliveries. These support vessels typically travel to and from Port Huon and Whale Point wharves approximately three times per week, as required. However, they generally remain moored in proximity to the lease areas where well boat operations are being undertaken such as Hideaway Bay or Margate Marina. In some instances, support craft may not transit the Huon River for weeks at a time, particularly during winter months when bathing requirements are reduced.

Work Vessels: General work vessels are typically used for general maintenance, transport, mooring operations, towing, and equipment delivery. They come in a range of sizes, from 8 meters up to 24 meters, and are utilised for a wide variety of tasks. Work vessels operate seven days a week, typically from 6am to 6pm, Monday through to Sunday. The majority of general works vessels are moored at Hideaway Bay in the lower Huon River, however, some works vessels are moored at Pillings Bay and Port Huon to support operations.

Tow Vessels: Empty pens are towed to lease areas for initial deployment, or when being refurbished, repositioned or decommissioned. Tow vessels such as the Brook M and occasionally heavy works vessels (Joan M) are used for this task. Huon endeavours to ensure that towing operations cause minimal disruption to residents and arrive at the intended destination such as Port Huon during daylight hours or prior to 6 pm where possible to avoid noise related issues. Pen tows are an essential, routine operation, and are required during the evening and night to meet fish health/welfare requirements or when towing equipment from remote leases.

Huon aims to schedule towing operations with sufficient buffer time to account for potential delays caused by adverse weather or other unforeseen circumstances. This planning helps ensure that tows arrive during daylight hours whenever possible. However, this is not always achievable. For instance, towing pen collars from Storm Bay to Port Huon a distance of approximately 36 nautical miles, typically takes around 36 hours. In some cases, due to weather-related delays, the tow duration can extend to 42 hours. One such tow experienced a 6 to 8 hour delay, resulting in the vessel arriving at Port Huon during the evening.

Huon remain committed to investigating any operational and planning improvements for future towing events. Additionally, Huon will continue to assess and review improvements based on available weather and environmental data for future tows.

Summary of Vessel Movements / Frequency

In summary for 2024/25 and into the future, between two and ten vessel movements per day are required from the lower Huon River (Hideaway Bay) to the upper Huon River (Port Huon). These can occur seven days per week, 24 hours per day, although more trips are undertaken during weekday, daylight hours, than at night or on weekends. Well boat operations are predominantly the only operations that need to be undertaken during the evening and night, however, some towing operations are also undertaken during this time.

Significant variations will occur day to day depending on weather conditions and in response to urgent operational requirements. It is difficult to provide accurate numbers of the number of vessel movements for each type and function of vessel as operations are dynamic and influenced by the season, weather, fish health, well boat operations, and stock flow plans.

5. Investigation Approach

Direct investigation of the complaints recorded in Tables 1, 2 and 3 above, is challenging, as much of the required information is no longer available, “after the event”. While some information has been recorded, including the name of the vessel, the time and date of the complaint and the vessel location and course, other information is not available including the location that the noise was observed at.

Direct measurement of vessel noise levels at sensitive receivers has several technical and logistical challenges. Noise propagation is significantly affected by the prevailing weather conditions including air temperature, pressure, humidity, wind direction, wind speed and atmospheric stability. This means it can be challenging to capture onsite measurements of noise propagation at the time when conditions are most favourable for noise propagation. Also, for very low noise levels, such as levels near the $L_{eq,10min}$ 32 dB(A) nighttime level, accurate measurements of the vessel noise cannot be made if there is noise from other sources (such as wind, rain, waves, vehicles, insects, agricultural equipment etc) that are generating noise at a similar or higher level. The measurement result ends up reflecting a combination of the noise from the vessel and the other noise source, not just the noise from the vessel.

To address these difficulties, the investigation has been undertaken on the following basis:

- Noise measurements were carried out “close-in” to several of Huon’s loudest vessels, including all of the vessels identified in the complaints, to establish sound power levels that can be used in noise modelling to predict noise levels at different locations and under different weather conditions. At distances close-in to the vessel, the noise from the vessel is louder than the ambient noise and can be measured accurately.

- Noise modelling was used to predict the worst case vessel noise exposure, of residences along the routes travelled by the vessels. This allows the noise level of the vessels to be predicted at all residences of interest, within the area, without needing to wait for suitable weather conditions or avoid other ambient noise sources (which may not be practicable within the required time frame).

- To provide additional confidence in the noise modelling results, ambient noise monitoring has been undertaken at Bullock Point on the Huon River, which is the point where vessels typically pass the closest to a residence while travelling to and from the lease areas.

- The times that vessels passed the monitoring location were identified from marine GPS records and the audio recording from the noise logging has been examined to determine if vessel noise was audible.

- Where this was the case, the vessel noise levels have been compared with the levels predicted by the modelling and compared with the limits in the environmental standard. This helps establish the degree of confidence that can be taken in the modelling.

- Where the predicted noise level of a vessel, exceeds the required noise limit in the environmental standard, a noise mitigation plan has been proposed.

6. Vessel Noise Measurements

Sound power levels and one third octave spectra have been established for the vessels that are known to have the greatest level of noise emissions. Noise measurements were undertaken from a fixed point, with the vessel sailing past at full cruising speed. Additional measurements were made for some vessels at reduced speed, to evaluate speed reduction as a potential noise mitigation measure. Multiple runs were recorded, from which the highest result has been used for subsequent noise modelling. Table 6 below summarises the details of the noise measurements.

Table 6 - Vessel Noise Measurements

Vessel	Date	Distance - m	Lp - dB(A)	Lw - dB(A)	Speed - Knots
Southern Condor	6/11/2024	54	61.6	103.7	8
Southern Condor	6/11/2024	85.5	59.1	105.2	8
Southern Condor	6/11/2024	55	61.8	104.1	8
Ragnarok	2/02/2023	77	65.4	110.6	30
Ragnarok	2/02/2023	55	67.7	110.0	30
Ragnarok	2/02/2023	47	69.1	110.0	30
Ragnarok	2/02/2023	41.5	70.3	110.1	30
Ragnarok	6/11/2024	22	68.5	102.8	9
Ragnarok	6/11/2024	23	67	101.7	9
Ragnarok	6/11/2024	15	69.7	100.7	9
Ronja Huon	6/02/2015	20	68.7	102.2	14
Ronja Huon	6/11/2024	43	62.4	102.6	7.5
Ronja Huon	6/11/2024	66	57.4	101.3	7.5
Huon Supply	22/11/2024	94	63.0	109.9	13
Huon Supply	22/11/2024	81.5	65.1	110.8	13
Huon Supply	22/11/2024	64	66.6	110.2	13
Huon Supply	22/11/2024	69	65.1	109.4	13
Huon Supply	22/11/2024	42.7	65.7	105.8	13
Ronja Storm	22/11/2024	20	59.3	92.8	9
Ronja Storm	22/11/2024	21	53.7	87.6	9
Ronja Storm	22/11/2024	22	55.6	89.9	9
Ronja Storm	22/11/2024	79	47.2	92.6	9
Ronja Storm	22/11/2024	35	52.3	90.7	9
Ronja Storm	22/11/2024	43.5	51.4	91.7	9
Bulldog 13	20/05/2025	26	80.1	115.9	7.7
Bulldog 13	20/05/2025	49	73.1	114.4	7.7
Bulldog 13	20/05/2025	28	76.6	113.0	7.7
Bulldog 13	20/05/2025	19.5	81.5	114.8	7.7
Brook M - Towing Fish Pen	20/05/2025	46.5	74.2	115.0	0.6
Brook M - Towing Fish Pen	20/05/2025	26.5	75.7	111.6	0.6
Brook M - Towing Fish Pen	20/05/2025	12	80.1	109.2	0.6
Brook M - Towing Fish Pen	20/05/2025	12	80.9	110.0	0.6
Brook M - Towing Fish Pen	20/05/2025	13	81.8	111.6	0.6
Brook M - No Load	20/05/2025	45.5	67.2	107.8	8
Brook M - No Load	20/05/2025	45.5	68.3	108.9	8
Brook M - No Load	20/05/2025	22	71.8	106.1	8
Brook M - No Load	20/05/2025	22	72.4	106.7	8

The 2024 and 2025 noise measurements were made using a Rion NL-42 sound pressure meter, mounted on a tripod set up in the back of one of Huon Aquaculture's work boats. The work boat would travel ahead of the vessel to be measured, stop in a suitable location, and turn off its engine. Noise levels were then recorded at 0.1 second intervals, while the vessel caught up and passed by. The distance of closest approach was determined using a rangefinder (for the 2024 measurements, or by photogrammetry for the earlier measurements). This allowed the peak sound pressure level to be captured and corresponding sound power level to be calculated.

Noise measurements of Ronja Huon were first undertaken in 2015, soon after its delivery. These measurements were conducted using a Ngara noise logger, that was temporarily installed on a buoy, while the Ronja Huon sailed past. Noise measurements were made of Ragnarok in 2023, from the Southern Condor, moored at the end of the Port Huon jetty, using a Rion NL-42 sound pressure meter.

The noisiest vessel in the fleet is the Brook M towing vessel. Other particularly loud vessels are Ragnarok, a high speed, 12m long workboat and the Huon Supply, a 64m feed supply vessel.

The well boat Ronja Huon (74m) is somewhat quieter than Ragnarok and Huon Supply. The well boat Ronja Storm, is much quieter than Ronja Huon, despite being significantly larger, at 135m long.

Photographs of the vessels at the time of the noise measurements are included below.

Figure 5 - Ragnarok Noise Measurement

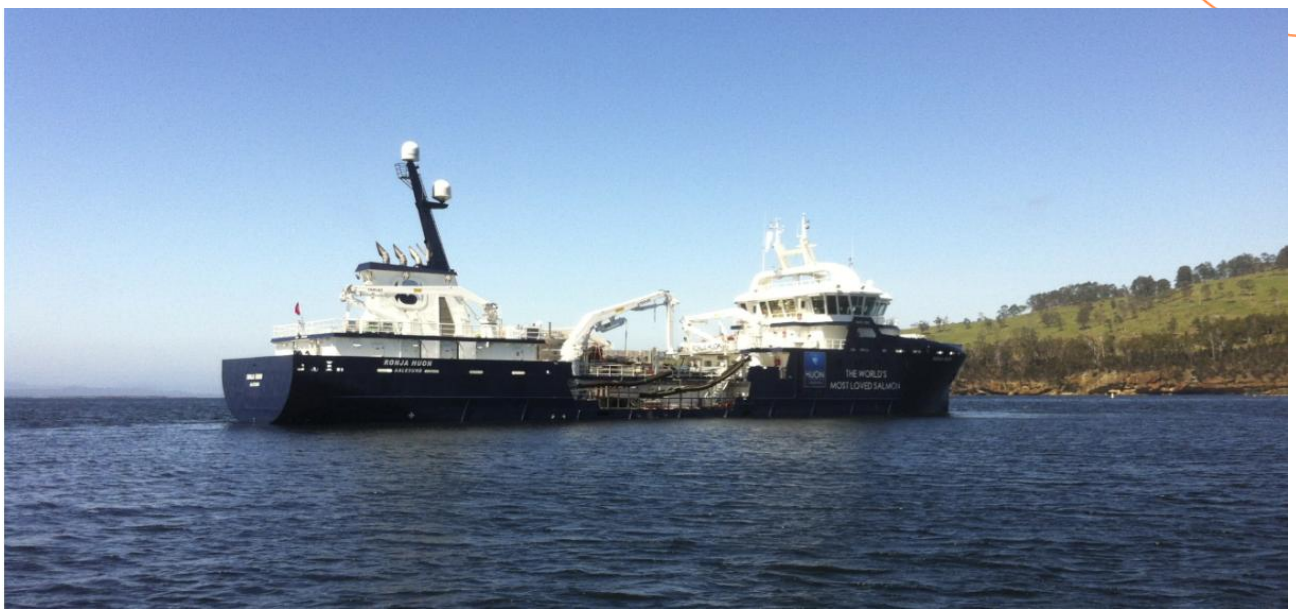

Figure 6 - Ronja Huon

Figure 7 - Ronja Storm

Figure 8 - Southern Condor II

Figure 9 - Huon Supply

Figure 10 - Bulldog 13

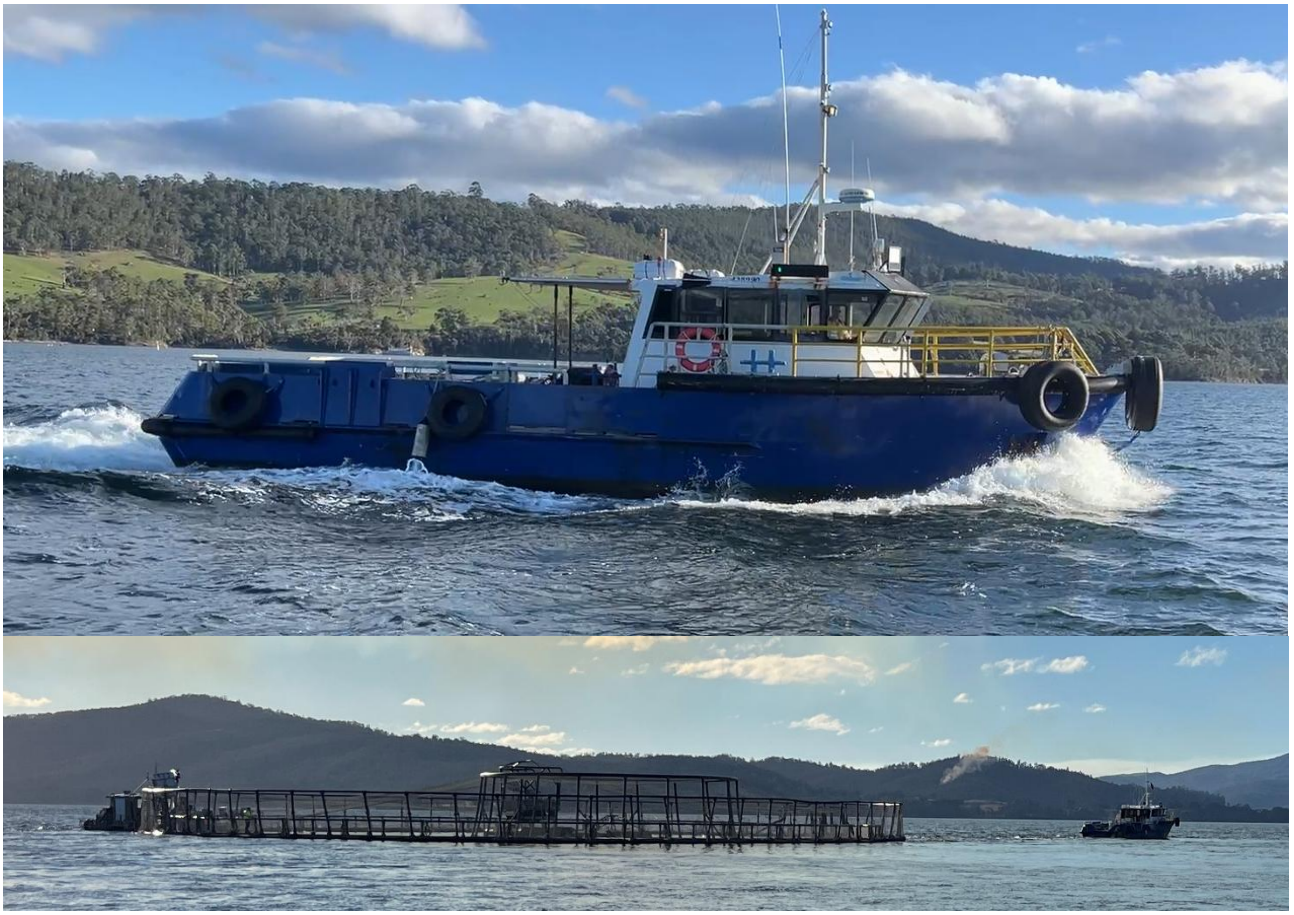

Figure 11 - Brook M. Top: Close up of vessel. Bottom: Vessel towing fish pen.

7. Existing Acoustic Environment

The residences affected by vessels in transit are predominantly located on large rural blocks, such as in the Wattle Grove area or within the small town of Port Huon. For the rural residences, traffic volumes on nearby roads are generally quite low, especially at night. As a result, ambient noise levels can be very low at times. Some locations will normally be exposed to significant wave and wind noise, but even at these locations, ambient noise levels will be very low on occasions when there is low wind, low swell conditions. These occasions may coincide with conditions promoting enhanced noise propagation, such as at night / early morning with an atmospheric inversion present. Worst case noise propagation conditions most commonly occur in the early morning, when there is an inversion and a light breeze blowing in the direction from the noise source to the noise receiver.

Noise logging was undertaken at Bullock Point between the 7th and 21st of November 2024, as part of an EIS relating to the Storm Bay lease. The details of this logging are summarised in Table 7 below including aggregated results for day evening and night-time periods, excluding any periods of high wind and/or rainy weather. It is noted that while traffic volumes on Cygnet Coast Road are generally quite low, there is significant early morning traffic from 5am, with a short peak between 5am and 5:30am, immediately after which typical daytime noise levels are maintained, as is readily apparent in the scatterplot below in Figure 13. This significantly raises the L_{eq} for the overall night-time period (10pm to 7am) to 46.3 dB(A), compared with the remainder of the period, for which the L_{eq} is only 35.7 dB(A). Similarly L_{max} results at night typically varied between 30 and 60 dB(A), with a small number of peaks reaching 65 dB(A) in the night-time period up until 5am. After 5am, L_{max} ranged between 50 and 80 dB(A).

In addition to weather related noise, noise from wildlife including, crickets, cicadas, penguins, Tasmanian native hens, plovers, seagulls, dogs, cows, geese and seals can occur throughout the day and night and is frequently prominent in 10 minute noise measurements, especially at night. Due to the generally lower traffic volumes, individual vehicle movements, many of which occur very close to residences are often prominent.

Within the town of Port Huon and on the Huon Highway traffic, traffic volumes are much higher resulting in higher background noise levels throughout the day, including in the early morning and night-time.

Figure 13 below shows the variation in ambient noise level verses hour of the day for the Bullock Point logging site. As expected, background noise levels are very low overnight (in the 25 to 30 dB(A) region) from about 11pm until between 4am and 5am when there is a rapid increase to higher daytime levels in the 30 to 45 dB(A) range. The minimum background noise level measured between 6am and 7am was 31.2 dB(A) which is relevant as vessels often depart from Port Huon at 6am. Figure 16 below shows the frequency of occurrence of different background noise levels, across the entire Bullock Point logging period, expressed as a “percentage exceeding”.

Table 7 - Ambient Noise Logging Details

Location	Longitude Latitude	Deployment Dates	Logging Duration Days	Ambient Noise Level dB(A)			Background (RBL) Noise Level dB(A)		
				D	E	N	D	E	N
Bullock Point	146° 59' 10" E 43° 10' 50" S	07- 21 November 2024	14	55.5	46.3	47.6	32.2	28.7	25.6

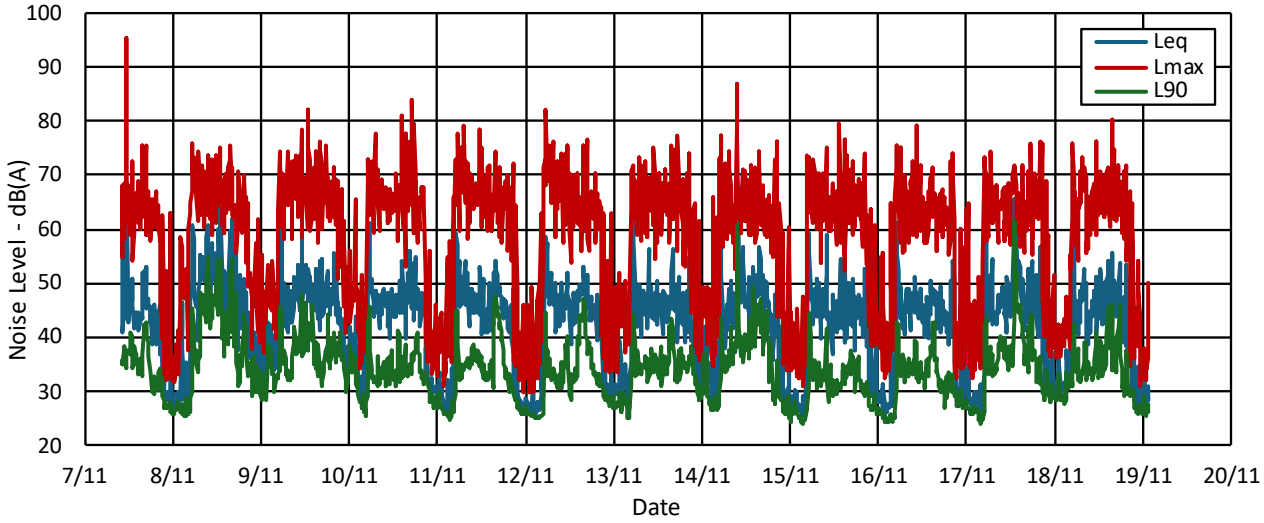

Figure 12 - Noise Logging Plot

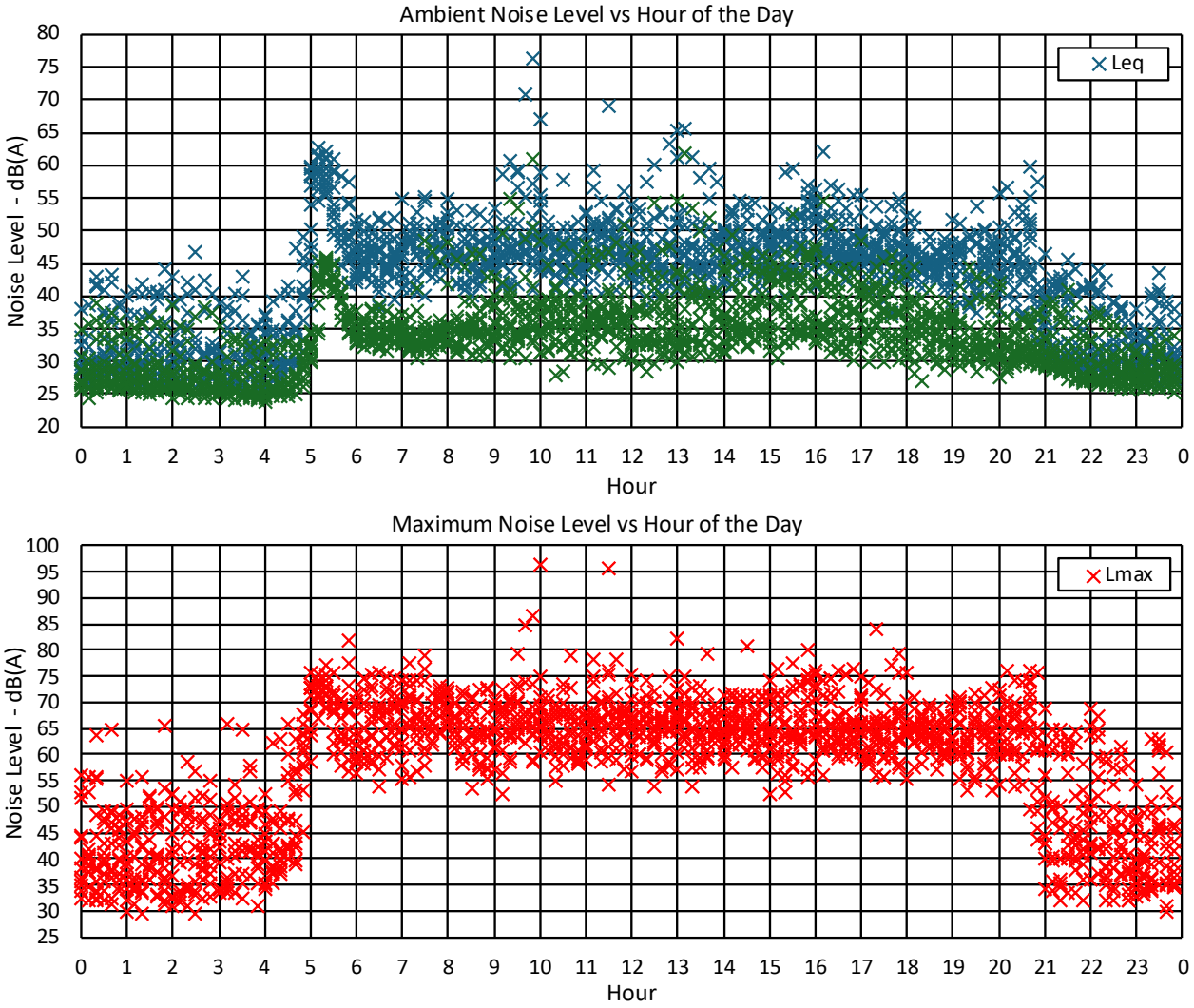

Figure 13 – Bullock Point Noise Logging Results – $L_{90,}$ L_{eq} and L_{max} vs Hour of the Day

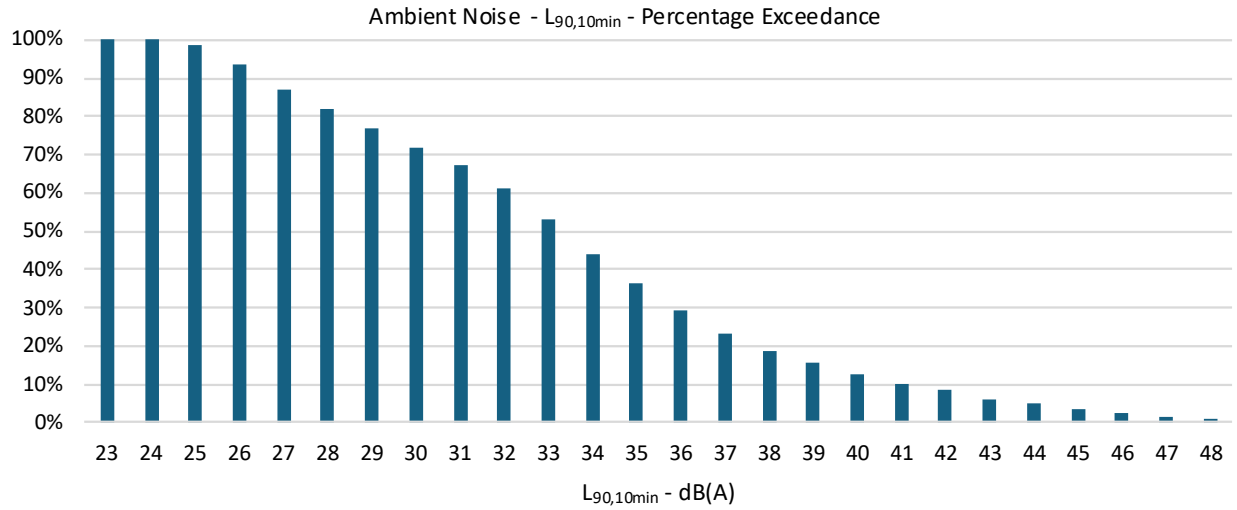

Figure 14 - Bullock Point Background Noise Level - Frequency of Occurrence over a 24 hour period

EPP Indicators

Huon's fleet was operating as normal during the two week period of the noise logging, so noise from transits of the larger vessels including Huon Supply, Southern Condor II, Ronja Huon and Ronja Storm are included in the combined noise level results recorded at Bullock Point, along with contributions from local traffic and environmental noise, as described above.

The following observations are made:

- The L_{eq} for the nighttime period from 10pm to 5am, meets the EPP 45 dB(A) L_{eq} sleep disturbance by a very wide margin. When the full nighttime period to 7am is considered, the indicator is exceeded by only a small margin and this exceedance is entirely due to local traffic between 5am and 7am.
- There were a small number of exceedances of the EPP 60 dB(A) L_{max} sleep disturbance indicator, during the nighttime period, up until 5am and a large number between 5am and 7am. None of these exceedances may be attributed to vessel movements, as the vessel peak noise levels are much lower than the EPP indicator.
- The EPP L_{eq} indicator of 55 dB(A) for *Outdoor Recreation – Serious Annoyance,* is just reached during the daytime, but is not exceeded during the evening. The indicator of 50 dB(A) for *Outdoor Recreation – Serious* Annoyance is also not exceeded during the evening. These results are most greatly influenced by local traffic, due to the relatively close proximity of the road to the noise logging location.

8. Noise Modelling

Noise modelling was carried out in accordance with the Tasmanian DEPHA *Noise Measurement Procedures Manual*, 2008. Noise level calculations were implemented using *SoundPLAN 8.2* environmental noise modelling software.

Calculation Methodology

The CONCAWE[2] noise calculation methodology was used within SoundPLAN, set to "worst case" meteorological conditions for sound propagation (i.e. a light wind blowing from the source to the receiver and the presence of a stable atmosphere). These conditions occur frequently at night and in the early morning, but rarely during the day. This will be a conservative setting for the majority of vessel movements which occur during the daytime or when the wind is blowing away from the receiver, or there is no wind or a strong wind. Results are also presented for the ISO 9613-2 calculation standard, as required by the *Noise Measurement Procedures Manual.* ISO is setup to include the same worst case meteorology (whereas CONCAWE can be set for varying meteorology). Both ISO and CONCAWE are based on relationships derived from large empirical data sets. As a result, varying results are often obtained from each, for the same input conditions. CONCAWE is generally more conservative. Both methodologies are based on data sets collected over land, a limitation that is explicitly noted in the ISO standard. Atmospheric stability behaves differently over land compared with water. This may potentially affect the propagation of sound, but prediction of noise over water, under different weather and sea conditions has not been as well investigated or codified.

Meteorology Settings

Section 4 of CONCAWE defines six "Meteorological Categories" as shown in Figure 15 below, based on a combination of the Pasquil Stability Categories (A to G) and vector wind speeds in m/s. Stability Class D generally implies the presence of a "weak" inversion, F a "moderate" inversion and G a "strong" inversion[3]. Meteorological Category 4 is described as "neutral", where atmospheric attenuation has no influence of the predicted result. Categories 1 to 3 result in additional attenuation and 5 to 6, less attenuation. Category 6 models "worst case" propagation. This can occur with stability class C to E and the wind blowing from the source to the receiver at over 3m/s. It can also occur at stability class F or G, again with the wind blowing from the source to the receiver, at 0.5 to 3m/s.

ISO9613-2 assumes a fixed set of meteorological settings, which are broadly equivalent to CONCAWE's Category 6, i.e. defined as noise propagation with the wind direction within +/- 45º of the direction from the source to receiver, the wind speed between 1 m/s and 5 m/s, or "average propagation under a well-developed, moderate, ground based, temperature inversion"[4], i.e. stability class F.

For both CONCAWE and ISO9613-2, air absorption (which varies with air temperature, pressure and humidity) is calculated separately for the meteorological effects described above and, in both cases, SoundPLAN uses the ISO 9613-1 methodology for calculating air absorption.

Decreasing Attenuation

Meteorological Category	Pasquill Stability Category		
	A, B	C, D, E	F, G
1	v < –3.0	–	–
2	–3.0 < v < –0.5	v < –3.0	–
3	–0.5 < v < + 0.5	–3.0 < v < –0.5	v < –3.0
4*	+0.5 < v < +3.0	–0.5 < v < +0.5	–3.0 < v < –0.5
5	v > +3.0	+0.5 < v < +3.0	–0.5 < v < +0.5
6	–	v > +3.0	+0.5 < v < +3.0

* Category with assumed zero meteorological influence

Figure 2: Meteorological Attenuation Curves - 63 Hz
(Experimental Data not available for Category 1)

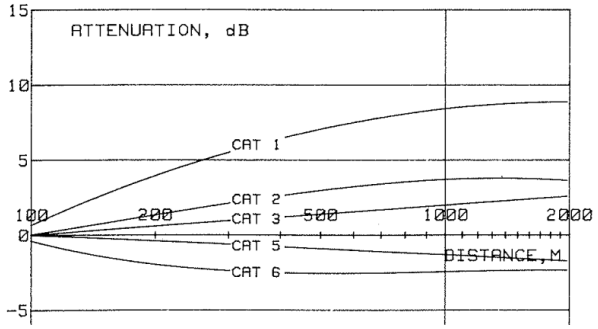

Figure 15 - Meteorological categories and example attenuation factors vs distance plot for 63 Hz, reproduced from CONCAWE.

[2] Manning, C.J., *The propagation of noise from petroleum and petrochemical complexes*, CONCAWE Special Taskforce on Noise Propagation, May 1981.
[3] Fact Sheet D of the NSW *Noise Policy for Industry*, Oct 2017.
[4] Section 5, ISO 9613-2, 1996.

Model Confidence Limits

Section 5.2 of CONCAWE provides guidance on the confidence limits of the results predicted by the methodology, based on a statistical comparison of the prediction and the original measured input data. The confidence limits vary with Meteorological Category as shown in Figure 16 below. For Category 6 (worst case) the 95% confidence limit is +/- 4.5 dB(A).

95% Confidence Limits for Final Model								
Meteorological Category	dB(A)	Octave Band Centre Frequency, Hz						
		63	125	250	500	1k	2k	4k
2	6.8	5.4	5.4	9.1	9.4	7.8	9.8	12.4
3	6.9	5.0	6.2	9.4	10.1	8.5	8.5	9.4
4	5.7	4.8	6.5	8.7	9.8	6.6	5.6	6.7
5	4.7	3.9	5.4	8.4	8.1	5.2	5.6	6.7
6	4.5	5.2	6.1	6.7	9.3	4.9	5.5	8.2

Figure 16 - 95% Confidence Limits, reproduced from CONCAWE

ISO9613-2 Section 9, Table 5 provides an estimate of the accuracy of the predicted results, assuming that weather conditions are within the defined range. It suggests an estimated accuracy of +/- 3 dB(A) for an average source and receiver height of 0 to 5m, out to a distance of 1000m from the source.

It should also be noted that additional uncertainties apply to how well known input data such as source sound power levels, spectra, heights and distances, are.

SoundPLAN General Modelling assumptions and settings include:

- A ground absorption factor of G=0 was used for the sea/river and G=1 for the narrow strip of land between the residences under consideration (which are all residences with direct sea frontages) and the shoreline. These residences typically only have gardens and coastal vegetation between them and the water line. High tide is assumed, with G=0 up to the high-water mark.
- The location of the shoreline, buildings and roads etc were sourced from *theList* and checked against aerial photography.
- Terrain topography was obtained from 5 metre contour data sourced from the *theList*.
- Moving vessels were modelled as line sources, with the length of the line set to the distance travelled in 10 minutes as a vessel approaches and then travels away from the location under consideration. Noise source details used, are as per Table 8 below. Sound power levels, including one third octave spectra derived from vessel noise measurements were used.

Table 8 - Noise Source Details

Vessel	Speed knots	Nominal Noise Source Height m	Sound Power Level dB(A)	Distance Travelled in 10 Minutes km
Huon Supply	13	9	110.8	4.0
Ragnarok	9	0.5	102.8	2.8
Ragnarok	30	0.5	110.6	9.3
Ronja Huon	7.5	11	102.6	2.3
Ronja Storm	9	16	92.8	2.8
Southern Condor II	8	7.2	105.2	2.5
Brook M – Cruising	8	0.5	107.8	2.5
Brook M – Towing Fish Pens	0.6	0.5	115.0	0.2
Bulldog 13	7.7	5	115.9	2.4

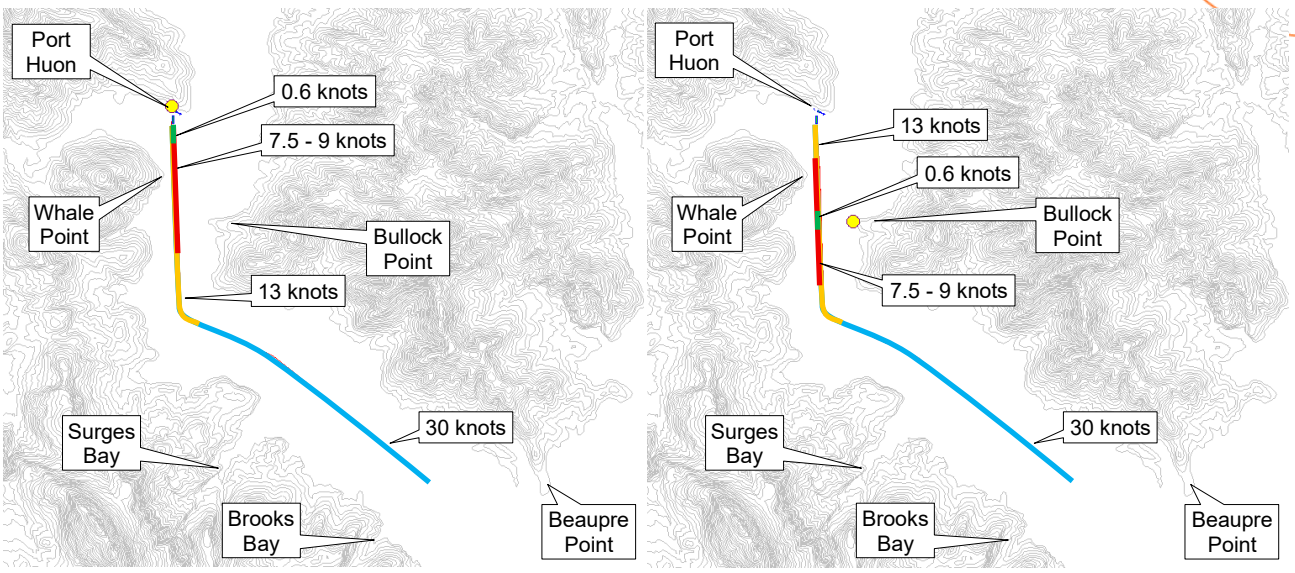

Figure 17: Layout of SoundPLAN noise model, including vessel paths over a 10 minute period. Left: Scenario for Port Huon receiver. Right: Scenario for Bullock Point receiver.

8.1 Comparison of Noise Measurements with Modelling Results

Verifying the accuracy of the noise model predictions against actual measurements is challenging.

The peak noise level of most vessels passing a point on the coastline, at a distance of 600m or more is relatively low. The $L_{eq,10min}$, measurement required to evaluate the Environment Standard noise limit, is significantly quieter than the peak noise level at point of closest approach. To make accurate noise level measurements, ideally the noise from the source under investigation should be at least 10 dB(A) louder than any other noise occurring at the same time, otherwise the results reflect a combination of the noise from the two (or more) noise sources. For vessel noise in the low thirty decibel range (i.e. noise levels in the vicinity of the 32 dB(A) environmental standard night-time limit) ambient noise should therefore be in the low twenty decibel range. This is rarely the case. The lowest $L_{eq,10min}$ recorded at Bullock Point was 25.3 dB(A). Noise from wind, waves, passing vehicles, insects, birds, even electrical transformers, frequently approaches or exceeds the noise level of the passing vessel, for part or all of a ten minute noise measurement.

Furthermore, the noise level of the same vessel passing the same location, at the same speed, can vary on different occasions by several decibels depending on the weather. The most favourable noise propagation occurs when a light wind is blowing from the source to the receiver and there is an inversion present in the atmosphere. These conditions are most likely to occur on cold, relatively still mornings prior to dawn. When stronger winds are blowing, especially in directions away from the receiver, the noise level is greatly reduced. The CONCAWE noise calculation methodology is able to predict the effect of varying wind and stability conditions, to some extent, although as noted above there is a degree of uncertainty associated with the results that are predicted.

As described previously, two weeks of noise logging was undertaken at Bullock Point primarily to help characterise ambient noise levels at this location. This data has also been used to try and evaluate the noise level of vessels that passed Bullock Point during this time and compare the measured levels, with those predicted by the modelling. The times that vessels passed Bullock Point were established from vessel GPS data obtained from the *Marine Traffic*, vessel tracking website. Twenty vessel transits were identified during the logging period, at times of the day likely to be relatively quiet. Details of each vessel transit are shown in Table 7 below. Estimates of wind speed and direction for the time of each transit were obtained from the Bureau of Meteorology Grove weather Station, which is the nearest weather station to Bullock Point. Weather conditions at Grove are generally quite similar to weather conditions at Bullock Point and provide a reasonable indication of the likely wind conditions that would affect noise propagation. More reliable results could be obtained by the use of an onsite weather station, which would be able to provide wind speed, wind direction and infer atmospheric stability, but this was beyond the scope of the current investigation. L_{eq}, L_{90} and L_{max} for the ten minute period corresponding to the time of closest approach were extracted from the logging data. The audio recording for each identified time was examined to try and identify vessel noise.

As indicated in the comments in the table, only on one occasion out of the twenty checked, was vessel noise able to be clearly identified. On many of the remaining times, a faint background hum was present for part of the time period. It was difficult to discern if this was from a vessel passing or not. There was some possibility that it may have related to a nearby pole mounted electricity transformer.

Table 9 – Details of Vessel Transits past Bullock Point During November 2024 Noise Logging

Vessel Transit	Wind Speed & Direction	$L_{eq,10min}$	$L_{90,10min}$	L_{max}	Comment
Ronja Storm 07-Nov 15:01 5 knots	15 kmh - SW	42.9	34.7	61.2	Maybe a very faint background hum, not sure if it is the ship, wind or something else. Car passed at 15:02-15:03
Ronja Huon 08-Nov 03:45 6 knots	6 kmh - NE	31.9	26.1	47.4	Vessel clearly audible
Southern Condor II 08-Nov 07:42 8.5 knots	13 mph - N	51	46.6	62.8	No vessel audible, only wind, birds and a passing car at 41 minutes and 44 minutes.
Southern Condor II 08-Nov 12:42 7.6 knots	24 kmh - WNW	52.4	46.9	65.8	No vessel audible, only wind
Huon Supply 09-Nov 06:14 11.6 knots	28 kmh - W	49.9	36.4	70.1	Background hum (possibly the ship) from 12 to 13 minutes (not wind affected during reported period)
Huon Supply 09-Nov 17:25 11.5 knots	15 kmh - WNW	46.5	35.5	64.9	Background hum (possibly the ship) around 22 to 25 minutes
Southern Condor II 10-Nov 15:05 8.2 knots	13 kmh - SSW	47	32.7	70.9	Background hum (possibly the ship) around 2 - 6 minutes. Car passed at 8:20
Ronja Storm 11-Nov 00:29 7.5 knots	4 kmh - NNW	30.2	28.6	34.1	Couldn't hear anything
Ronja Huon 11-Nov 04:03 4.5 knots	6 kmh - NNE	34.2	28.2	39.8	Very faint background noise between 0:00 and 2:30. Wasn't really audible in recording but visualiser line was moving slightly
Ronja Huon 12-Nov 05:58 4.8 knots	7 kmh - NE	57.4	37	82	Could only hear birds chirping
Huon Supply 12-Nov 06:28 11.2 knots	7 kmh - NE	50.3	33.7	72.5	Car passing at 28:50. Faint background noise between 26:30 and 29:00
Ronja Huon 13-Nov 04:41 5.2 knots	6 kmh - NE	35	31.3	47.3	Crickets/Insects - Very faint background hum (possibly the ship) between 40:30 and 42:30
Huon Supply 14-Nov 19:00 11.6 knots	17 kmh - WSW	42	36.9	62.1	Background hum between 52 and 55. Kind of sounds like a car in the distance at points.
Ronja Huon 15-Nov 06:34 8.9 knots	CALM	42.2	32.2	62	Very faint background noise between 32:30 and 36:30. Really hard to hear

Vessel Transit	Wind Speed & Direction	$L_{eq,10min}$	$L_{90,10min}$	L_{max}	Comment
Southern Condor 15-Nov 15:18 8.6 knots	24 kmh - ESE	53.4	32.2	76.5	Very faint background noise between 15:30 and 17. Really hard to hear
Ronja Storm 15-Nov 20:42 7.8 knots	9 kmh - NE	50.3	31.3	69.7	Very faint background noise between 41 and 43. Really hard to hear
Ronja Storm 15-Nov 22:39 6.6 knots	7 kmh - N	29.1	26.7	38.3	Background hum (possibly the ship), increasing from 38:30 to 44
Ronja Huon 17-Nov 00:02 7.8 knots	6 kmh - WSW	33.5	28.2	53	Background hum from 0 to 5 minutes
Southern Condor 17-Nov 06:22 7.8 knots	17 kmh - NNE	45.3	33.1	69.1	Background hum from 21:15 to 23 minutes, faintly audible underneath birds chirping
Ronja Huon 18-Nov 01:13 7.6 knots	CALM	32.1	29.4	40.7	Very faint background hum from 10 to 15:30
Ronja Huon 18-Nov 03:23 4.8 knots	6 kmh - SW	37.5	33.6	47.6	Very faint background hum from 21:40 to 23:30
Southern Condor 19-Nov 07:48 7.9 knots	9 kmh - SW	43.9	30.3	62.4	Too hard to tell, 2 cars pass around the same time
Southern Condor 19-Nov 15:42 7.7 knots	19 kmh - SW	51.4	38.1	71.5	Windy. Vessel not audible.
Ronja Storm 20-Nov 01:26 7.1 knots	9 kmh - NE	32.6	29.6	51	Background hum between 25 and 28 minutes

For comparison, the noise levels for several of the vessel transits were predicted using SoundPLAN with CONCAWE set to the wind speed and direction occurring at the time. These results are shown below. The Ronja Huon result compares well with the measured value, with a conservative result, well within the CONCAWE confidence interval. Unfortunately, the other results corelate very poorly to the measurement results. This would seem to reflect the presence of interference from ambient noise sources closer to the noise logger (than the vessel), whereas for the Ronja Huon result, the vessel noise was dominant, with little interference apparent on the recording.

Unfortunately, except for the first result, it can only be concluded that there is too much interference from ambient noise, to make any useful conclusions about the accuracy of the modelling methodology, other than to say the predicted levels appear to be likely to be “in the ballpark.

Table 10 – Comparison of Vessel Transit Measurements and CONCAWE Modelling Results

Vessel	Date & Time	Wind Speed & Direction	Measured		Predicted	Variance to Measured	
			$L_{eq,10min}$ dB(A)	$L_{90,10min}$ dB(A)	$L_{eq,10min}$ dB(A)	$L_{eq,10min}$ dB(A)	$L_{90,10min}$ dB(A)
Ronja Huon	08-Nov 03:45	6 km/h NE	31.9	26.1	32.7	+0.8	+6.6
Southern Condor II	08-Nov 07:42	13 km/h N	51.0	46.6	35.9	-15.1	-10.7
Southern Condor II	08-Nov 12:42	24 km/h WNW	52.4	46.9	38.4	-14.0	-8.5
Huon Supply	09-Nov 06:14	28 km/h W	49.9	36.4	36.7	-13.2	+0.3
Huon Supply	09-Nov 17:20	18 km/h W	46.5	35.5	39.2	-7.3	+3.7
Southern Condor II	10-Nov 15:00	13 km/h SSW	47.0	32.7	40.1	-6.9	+7.4

8.2 Modelling Results

Vessels in Transit

The results of SoundPLAN modelling of noise from the vessels in transit (using both ISO 9613-2 and CONCAWE) are shown in Table 13 and 14 below, including corrections for low frequency content and tonality, calculated as per the *Noise Measurement Procedures Manual*. Results are presented for the most noise affected residence on the course, which is at Bullock Point (498725N, 5219463E) on the Huon River. Compliance of the predicted results with the Environmental Standard noise limits of Daytime(D) 45 dB(A), Evening(E) 37 dB(A) and Night time(N) 32 dB(A) is indicated in the right hand column. "M" in this column denotes that the predicted noise level does not exceed the minimum background noise level + 5 dB(A) logged at Bullock Point for the "Morning" period of 6am to 7am, which was 33.1+5=38.4 dB(A). This hour of the day is the last hour of the night time period to which the 32 dB(A) limit applies, however background noise levels are already rising quickly at this time of day as a result of early morning traffic. Results with a tick in the "LF" column, include a 5 dB(A) low frequency correction.

Table 11 - Predicted SoundPLAN noise levels from vessels passing Bullock Point - $L_{eq,10min}$ dB(A).

Receiver	Calculation Results				Result Compliance	
	ISO 9613-2	LF	CONCAWE Worst Case	LF	ISO 9613-2	CONCAWE Worst Case
Huon Supply	37.7	✓	44.9	✓	*MD--*	*-D--*
Ragnarok – 9 knots	39.1	✓	42.9	✓	*MD--*	*-D--*
Ragnarok – 30 knots	31.2		40.3		*MDEN*	*-D--*
Ronja Huon	37.3	✓	43.7	✓	*MD--*	*-D--*
Ronja Storm	26.1	✓	33.4	✓	*MDEN*	*MDE-*
Southern Condor	42.1	✓	46.6	✓	*-D--*	----
Brook M (Cruising)	41.1	✓	46.8		*-D--*	----
Brook M (Towing)	46.7		56.4		----	----
Bulldog 13	45.9		51.6		----	----

The modelling results should be interpreted with some caution, bearing in mind the accuracy limitations of the calculation methodologies and the reliance on empirically derived methodologies that do not include input data for noise propagation over water. Bearing this in mind, the following observations are made:

- Brook M and Bulldog 13 clearly exceeds the environmental standard limits for all times of the day and require noise mitigation.
- Southern Condor and Huon Supply are marginal in meeting the daytime limit. Although they normally operate only during the daytime, ideally they should meet the evening limit in case they are "late" back into port. Noise mitigation is recommended.
- Ronja Huon meets the daytime limit with a reasonable margin, however for 24 hour operation, to meet the evening and night-time limits, noise mitigation is required.
- Ragnarok meets the daytime limit with some margin, but compliance with the evening limit is less clear. Noise

mitigation would be required to assure evening and night time operation, below the limits. Perversely, reducing speed from 30 knots to 9 knots makes the noise level "worse", because at lower speeds there is less high frequency wake noise, while low frequency engine noise does not reduce as much, resulting in the 5 dB(A) low frequency correction being required.

- Ronja Storm meets the daytime and evening limits with a significant margin, but the ISO and CONCAWE results are somewhat divergent, with the CONCAWE result showing a small exceedance of the night time limit and ISO being well below. It is also noted that the ISO result is less than all 10 minute, night-time, background+5 levels measured during the logging and the CONCAWE results is lower than 51% of them. Additional noise mitigation is likely to not be required. In any case, Huon will further investigate potential noise mitigation measures on the Ronja Storm.

Vessels Departing or Arriving at Port Huon

Table 12 presents results for vessels departing or arriving at Port Huon, calculated at the nearest sensitive receiver (a property hosting several short term accommodation units) to the Port Huon wharf, which is at 2 Doctor Dicks Drive, Port Huon (497807N, 5221759E). Ambient noise logging was not undertaken at Port Huon as part of this investigation, however a conservative estimate of the 6am to 7am background noise level would be 35 dBA, giving a background + 5 noise level of 35+5=40 dB(A).

The predicted noise levels are generally lower than those predicted for Bullock Point, as on average across the 10 minute measurement period, the departing or approaching vessels are at a greater distance from the receiver.

Table 12 - Predicted SoundPLAN noise levels from vessels departing Port Huon - $L_{eq,10min}$ dB(A).

Receiver	Calculation Results				Result Compliance	
	ISO 9613-2	LF	CONCAWE Worst Case	LF	ISO 9613-2	CONCAWE Worst Case
Huon Supply	35.5	✓	40.1	✓	*MDE-*	*-D--*
Ragnarok – 9 knots	40.2	✓	39.3	✓	*MD--*	*MD--*
Ragnarok – 30 knots	28.9		35.6		*MDEN*	*MDE-*
Ronja Huon	38.3	✓	40.0	✓	*MD--*	*MD--*
Ronja Storm	26.4	✓	30.2	✓	*MDEN*	*MDEN*
Southern Condor	43.2	✓	43.0	✓	*-D--*	*-D--*
Brook M (Cruising)	38.8	✓	43.2		*MD--*	*-D--*
Brook M (Towing)	53.1	✓	55.7		----	----
Bulldog 13	44.1		47.0		*-D--*	----

9. Vessel Noise Mitigation Plan

The following noise mitigation measures are proposed, to minimise the impact of vessel noise on residents living on adjacent shorelines, based on the predicted SoundPLAN results for the most noise exposed residences on the transit route between Port Huon and the lease areas.

9.1 General Mitigation Measures

- All vessels traveling to and from the lease areas will follow a defined course which generally runs central to the channel, to minimise noise impact on residences on both sides, noting that this is the only permissible course that the Ronja Huon and the Ronja Storm are able to navigate under their pilotage exemptions.
- When multiple vessels would otherwise depart at the same time, vessel departure times will be separated by at least ten minutes, to avoid more than one vessel passing a house at the same time.
- All vessels meet the environmental standard daytime noise limit of 45 dB(A) and may sail during the daytime (7am to 6pm) without any additional restrictions or mitigation measures (except for Brook M while towing and Bulldog 13 – refer to vessel specific mitigation measures below).

- Doors to engine rooms and equipment compartments housing noisy machinery will be closed while passing coastal residences.
- All exposed non-essential noise emitting equipment will be powered down where possible, when passing coastal residences.
- Staff will regularly conduct vessel inspections and checks to minimise potential noise risks in accordance with SOP's and vessel start up procedures.
- Noise mitigation infrastructure and equipment will be integrated into future vessel designs.

9.2 Vessel Specific Mitigation Measures

Ronja Storm: Is likely to be able to sail twenty-four hours a day, without exceeding the environmental standard noise limits at any coastal residences. To ensure noise impacts remain compliant, Huon has installed a HDPE muffler on the vacuum pump exhaust to minimise noise output during water filling operations at Whale Point. Huon will continue to investigate additional mitigation measures and review operational procedures to reduce noise related complaints.

SMART Goal:

- Specific: Install a HDPE muffler on the vacuum pump exhaust of *Ronja Storm* to reduce noise emissions during water filling operations at Whale Point.
- Measurable: Achieve a reduction in noise output sufficient to ensure compliance with the *Environmental Standards for Tasmanian Marine Fin Fish Farming 2023*, particularly maintaining vessel noise below 32 dB(A) during night-time operations at nearby coastal residences.
- Achievable: The HDPE muffler installation is a technically feasible solution already implemented on similar vessels and does not interfere with operational performance.
- Relevant: This action directly supports Huon's commitment to environmental compliance and community engagement by addressing noise complaints and regulatory requirements.
- Time-bound: The muffler installation was completed prior to the November 2025 revision of the vessel noise investigation report, with ongoing monitoring to confirm continued compliance planned for Q1 2026.

Ronja Huon: To comply with essential fish health and welfare requirements, vessel transits along the Huon River including to refill at Whale Point and dock at Port Huon are necessary 24/7. The following mitigation measures have been implemented to ensure on-going operations minimise noise impacts:

- The vacuum pump exhaust outlet has been redirected 90 degrees downward toward the water surface to reduce noise output.
- Supply and exhaust fans and generators will be turned off during transit where possible.
- The well boat will be connected to shore power when moored at Port Huon.
- Huon will conduct further investigations to assess feasibility of reducing general noise output from vessel machinery.
- Huon will review operational schedules and procedures to reduce noise generating activities.

SMART Goal:

- Specific: Implement targeted noise reduction strategies for Ronja Huon to ensure 24/7 vessel operations along the Huon River to remain compliant with environmental noise standards, particularly during night-time transits near sensitive coastal residences.
- Measurable: Achieve reductions in vessel noise emissions sufficient to meet *the Environmental Standards for Tasmanian Marine Fin Fish Farming 2023*, specifically maintaining levels below 32 dB(A) during night-time operations around Bullock Point and Port Huon.

- Achievable: Measures such as redirecting the vacuum pump exhaust downward, powering down fans and generators during transit, and connecting to shore power while moored have already been implemented. Further investigations into machinery noise reduction and operational scheduling are underway.
- Relevant: These actions directly support Huon's commitment to environmental compliance, community engagement, and operational continuity for fish health and welfare.
- Time-bound: Initial mitigation measures were implemented prior to the November 2025 revision of the vessel noise investigation report. Additional investigations and scheduled reviews will be completed by Q1 2026, with ongoing monitoring to ensure continued compliance.

Ragnarok (and other bath support vessels): The Ragnarok transits the Huon River infrequently so noise related impact is minimal. The following mitigation measures will be implemented if Ragnarok transits the Huon River:

- Ragnarok (and other work boats with similar sound power levels) will avoid sailing up the Huon River during night-time hours, between 10pm and 5am. In the final two hours of the night-time period (5am to 7pm), the predicted noise level from Ragnarok is unlikely to exceed the background noise level + 5dB(A). If it is necessary to sail between 10pm and 5am, Ragnarok will deviate as far to the west as possible.
- Huon will investigate potential installation of noise mitigation infrastructure on the Ragnarok and other bath support vessels.
- Going forward, when purchasing new bathing support vessels, they will include super compliant mufflers and noise mitigation infrastructure. New vessels will further reduce the frequency of the Ragnarok transiting the Huon River. Purchasing new vessels is subject to capital expenditure (CAPEX) approvals and, as such, is not anticipated to occur before 2027.

SMART Goal:

- Specific: Proposed changes to vessel movements and timings and investigate engineering solutions to reduce noise emissions from *Ragnarok* and similar bath support vessels when transiting the Huon River. Permanent restrictions on vessel movements cannot be implemented, as operations are influenced by variable factors such as weather conditions and essential fish health and welfare requirements.
- Measurable: Ensure vessel noise emissions remain below the *Environmental Standards for Tasmanian Marine Fin Fish Farming 2023* limits, particularly maintaining levels below 32 dB(A) during night-time hours (10pm–7am) at sensitive coastal residences.
- Achievable: Operational changes such as avoiding transits between 10pm and 5am, and deviating westward when night-time transit is unavoidable, are feasible and already planned. Investigations into noise mitigation infrastructure are underway, and future vessel purchases will include compliant mufflers.
- Relevant: These measures support Huon's commitment to environmental compliance and community responsiveness, while maintaining operational flexibility for fish health and welfare.
- Time-bound: Changes to vessel operational movements have been enacted. Engineering investigations will be completed by Q2 2026, and all new bath support vessels purchased from 2026/27 onward will include integrated noise mitigation infrastructure.

Huon Supply and Southern Condor II: The following mitigation measures will be implemented when feed vessels transit the Huon River:

- Where possible, vessels will avoid sailing down the Huon during the evening and night-time (6pm to 7am). These vessels typically only operate during daylight hours minimising potential noise impacts.
- Huon will shut down the bow thruster hydraulic pack on the vessels when transiting coastal residences to reduce noise where possible.
- Huon is investigating options to replace the Huon Supply with a new vessel in 2028 (subject to CAPEX approval). The new vessel will include noise mitigation infrastructure.

SMART Goal:

- Specific: Implement operational and engineering measures to reduce noise emissions from Huon Supply and Southern Condor II when transiting the Huon River, particularly near sensitive coastal residences.
- Measurable: Maintain vessel noise emissions below the limits set by *the Environmental Standards for Tasmanian Marine Fin Fish Farming 2023*, especially during evening and night-time hours (6pm–7am), with reduced reliance on bow thruster hydraulic packs and improved vessel design.
- Achievable: Daytime-only operations are already standard practice for these vessels. Shutting down the bow thruster hydraulic pack during transits is operationally feasible. Planning is underway to replace Huon Supply with a quieter vessel by 2028 (subject to approvals).
- Relevant: These actions support Huon's commitment to environmental compliance and community engagement, while ensuring reliable feed delivery to marine farming operations.
- Time-bound: Changes to vessel movements and equipment shutdowns are effective immediately. The investigation into vessel replacement is ongoing, with the new vessel potentially scheduled for deployment in 2028, incorporating noise mitigation infrastructure.

Brook M and Bulldog 13: The Bulldog 13 is a heavy works vessel predominately used during daylight hours, while the Brook M is a towing vessel that undertakes essential towing operations between Pillings Bay and Whale Point, including overnight if required. The following mitigation measures will be implemented:

- These vessels will avoid travelling to Port Huon and Whale Point during the evening and night unless necessary and will sail during the daytime where possible. Scheduled tows will be planned to arrive prior to 6 pm where possible (subject to weather, critical operations and delays).
- Huon will review towing operation schedules – already underway and enacted.
- Huon will investigate potential noise mitigation solutions for these vessels such as super compliant mufflers on the dry stack.

SMART Goal:

- Specific: Minimise noise emissions from Brook M and Bulldog 13 by reducing movements and arrivals near Port Huon and Whale Point during the night and evening to essential operations only. Huon will investigate engineering solutions such as installing super compliant mufflers on the dry stack.
- Measurable: Reduce vessel noise emissions to meet the *Environmental Standards for Tasmanian Marine Fin Fish Farming 2023,* particularly ensuring compliance with the 32 dB(A) night-time limit at sensitive coastal residences.
- Achievable: Daytime only operations are already standard for Bulldog 13, and towing schedules for Brook M have been reviewed to avoid unnecessary night time arrivals where possible. Noting, the Bulldog 13 is required to undertake tows when the Brook M is unavailable (including during the night/evening). Installation of mufflers is technically feasible and under investigation, however, is subject to engineering assessment.
- Relevant: These measures support Huon's commitment to environmental compliance and community responsiveness, while maintaining essential operational capabilities for fish pen towing and heavy works.
- Time-bound: Changes to operational vessel movements and tow arrivals to Port Huon are effective immediately. Engineering investigations into muffler installation will be completed by Q2 2026, with implementation subject to feasibility outcomes.

Please note:

Huon acknowledges that the effectiveness of the proposed mitigation measures is uncertain. Therefore, a range of engineering controls, infrastructure upgrades, and procedural changes will be investigated to ensure noise impacts are adequately addressed.

Timeframes for implementing mitigation measures are difficult to define, as they depend on engineering requirements and the availability of vessels for scheduled maintenance works (dry docking and slippage).

Engineering works for proposed mitigation measures are subject to CAPEX submission and approval. Therefore, Huon is currently undertaking engineering review and assessment to determine what mitigation measures are feasible and will provide the greatest chance of reducing noise emissions.

Noise mitigation works will be ongoing, and Huon will notify the EPA once engineering solutions have been implemented or procedural changes have been enacted.

It is important to note that the current noise limits have been applied to Huon's operations for vessels that were purchased and have been in service for several years. As such, these vessels were not originally designed to meet the newly introduced standards. Consequently, it is not feasible for Huon to replace noisy vessels or implement major engineering fixes across multiple vessels in the short/medium term. Noise mitigation is a complex that requires consultation with marine engineers and other specialists and can involve significant costs and assessment.

Huon is committed to implementing noise mitigation measures to minimise noise related complaints and will thoroughly investigate all reported noise issues where required.

10. Conclusions

Noise logging near the most noise exposed residence at Bullock Point, Wattle Grove, suggests that existing ambient noise conditions in this area are largely in line with the EPP acoustic indicator values for sleep disturbance and outdoor recreation. There are small exceedances, but these relate almost entirely to local traffic that was passing close to the logger location and is not significantly impacted on, by vessels sailing on the Huon River. This suggests that the existing level of residential amenity or environmental nuisance due to noise, in Wattle Grove, is not unreasonably poor.

Individual vessel transits are however, audible to residents of riverside dwellings, especially at night.

$L_{eq,10min}$ noise levels for vessel transiting the most noise exposed residence at Port Huon and at Bullock Point, have been predicted using accepted noise modelling software and calculation methodologies. The modelling results show that the noise from some vessels exceeds noise limits specified in E*nvironmental Standards for Tasmanian Marine Fin Fish Farming* 2023.

There are significant uncertainties, with respect to the results which have been discussed. A limited attempt was made to verify modelling accuracy, by comparing noise levels measured at Bullock Point, at the times that specific vessels were known to be passing by. On one occasion during the two week logging period, a noise sample was identified where the vessel noise was clearly identifiable. The measured noise level for this sample compared well with the modelling result. On all other occasions, the noise of the vessel was significantly obscured by noise from other sources.

However, the predicted noise emissions from some vessels, does exceed the environmental standards limits by a significant margin, as described above. A noise mitigation plan has been proposed, to minimise the exposure of residents to vessel noise in the short to medium term and Huon will explore further engineering and operational options to reduce the level of noise emitted, below the environmental standard requirements.

pitt&sherry

Huon Aquaculture

Huon River Vessel Noise Investigation

Pitt & Sherry
(Operations) Pty Ltd
ABN 67 140 184 309

Phone 1300 748 874
info@pittsh.com.au
pittsh.com.au

Located nationally —
Melbourne
Sydney
Brisbane
Hobart
Launceston
Newcastle
Devonport