

MEMORANDUM

From: Jordan Manor
Client: Abe Williams
Reference: 23046-01M Jet Unit Calculations
Date: 3/31/2023
Subject: Bristol Bay Boat Jet Unit Volume & Planing Surface Calculations

3/31/2023



Elliot Bay Design Group has been tasked with analyzing buoyant and planing surface as it relates to Bristol Bay Jet Boats. The Ultra Jet model 340 HT is analyzed for the buoyant volume, and the planing surface calculation is provided for a Hill Jet Hi400. Sketches and 3D renderings of the transom with the Hill Jet Hi400 are included in the body of the memo. Vendor data for both jet units is included in the Appendix.

Methodology

Buoyant volumes are found by first determining the internal volume of the jet, taking the published entrained water weight, and dividing it by saltwater density. The volume of the jet mounting box is found by calculating the gross volume of the mounting box and deducting the tunnel volume. The volume values are compared to see the gain or the loss resulting from the analyzed vessel components.

Planing surface is the surface area in contact with the water while on plane. The surface area of the intake opening is a simple rectangular area, ignoring the surface area of the grates. Next, the surface area of the jet propulsion unit itself is calculated using a projected view.

Calculations and Results

Buoyant Volume (Floatation): The entrained water weight for Ultra Jet is 147.7 lbs., resulting in an internal jet volume of 2.31 Ft³. The jet mounting box volume is based on the box dimensions of 31 x 31 x 5 in., less the volume of the 19 in. tunnel through the box. The increase in buoyant volume due to the box is less than the volume lost from entrained water in the jet.

Jet Brand	Ultra Jet 340 HT
Jet Mounting Box Volume (Gain)	1.96 Ft ³
Jet Intake Volume (Loss)	2.31 Ft ³
Net Increase/Decrease	0.35 Ft ³ Decrease

Planing Surface: The Hill Hi 400 jet has a water intake of 20 in. by 30 in., resulting in a planing surface loss of 600 in². The Jet planing surface according to Hill Jets is 587 in².

In analyzing the Hill Jets the loss of 600 in² planing surface resulting from the jet intake is less than the projected jet surface area of 587 in², resulting in a small net decrease in planing surface.

Jet Brand	Hill Jet Hi400
Jet intake Surface (Loss)	600 in ²
Jet Unit Bottom Surface (Gain)	587 in ²
Net Increase/Decrease	13 in ² Decrease

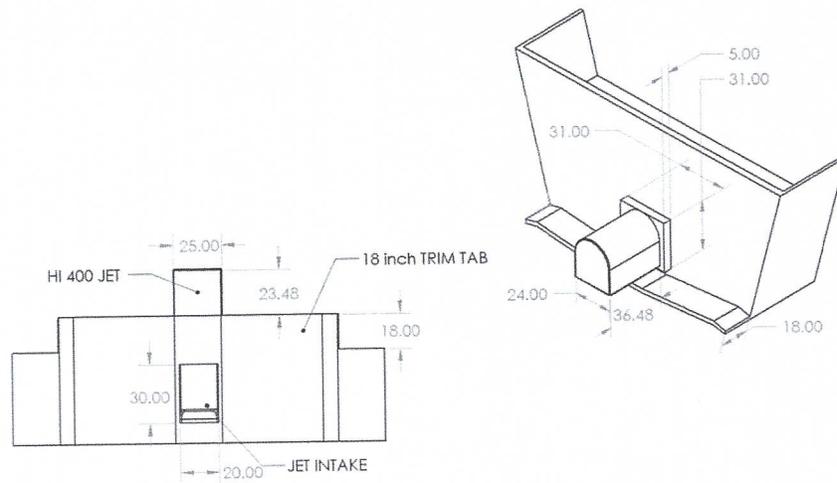


Figure 1 - Stern Bottom Plan and Transom Perspective View

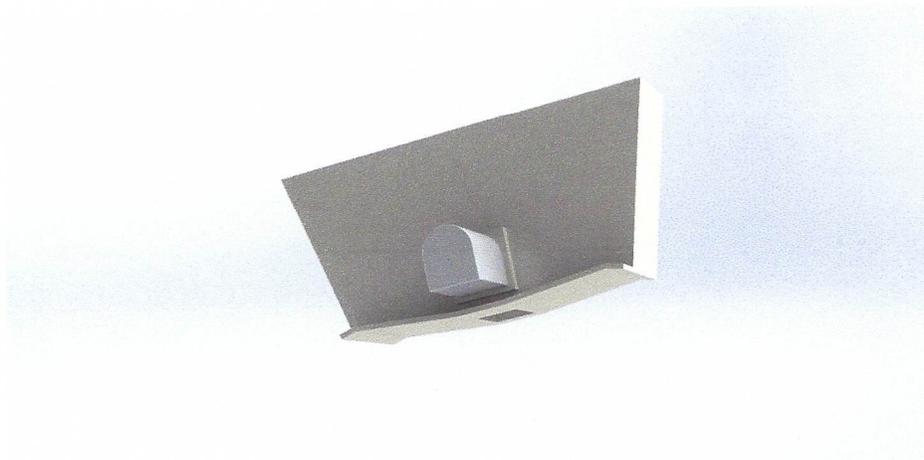


Figure 2 - Transom Rendering

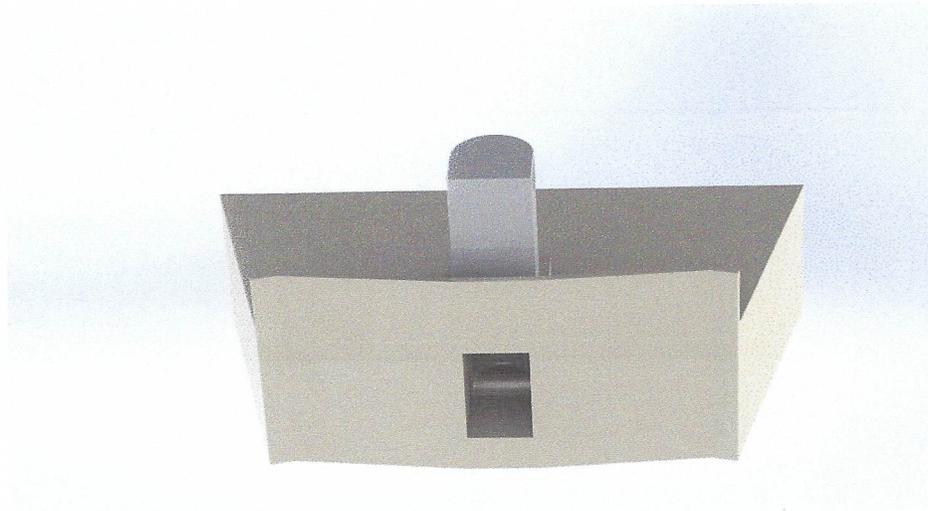


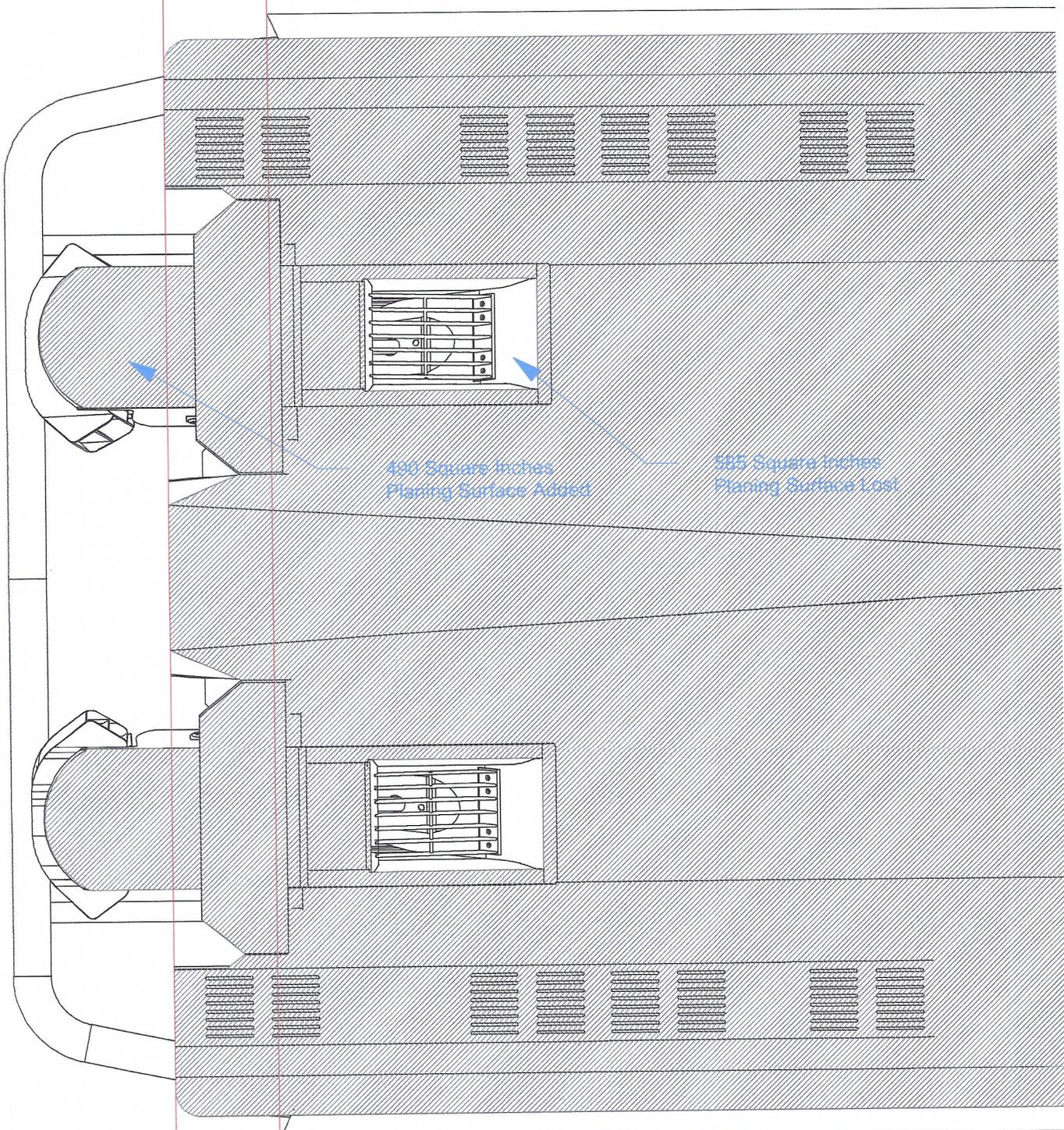
Figure 3 – Hull Bottom Rendering

References

1. Email from Abe Williams to John Peterson of March 3, 2023, with data and drawings showing jet mounting details on a Bristol Bay fishing vessel, plus jet volume and surface area calculations.

18" Trim Tab Limit

32' Length



490 Square Inches
Planing Surface Added

585 Square Inches
Planing Surface Lost