

MOTOR VESSEL *WEE RED*
Grand Canyon Boats
Grand Canyon National Park
Grand Canyon Village
Coconino County
Arizona

HAER AZ-80
HAER AZ-80

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240

HISTORIC AMERICAN ENGINEERING RECORD

MOTOR VESSEL *WEE RED*

HAER AZ-80

Location:	Grand Canyon National Park, Grand Canyon vicinity, Coconino County, Arizona
	Motor Vessel <i>Wee Red</i> is located at latitude: 36.050189, longitude: -112.132891. The point represents the building housing the Grand Canyon National Park Museum Collection. It was obtained from Google Earth on April 22, 2021, and there is no restriction on its release to the public.
Date of Construction:	1960
Builder:	Indiana Gear Works, Inc.
Original Owner:	Unknown
Present Owner:	National Park Service
Significance:	Motor Vessel <i>Wee Red</i> is an example of a “turbocraft” built by Indiana Gear Works, Inc. in 1960 that was based on the invention of New Zealander Sir Charles William Feilden (“Bill”) Hamilton. This innovative craft was driven not by propellers but by a powerful jet of water and was highly maneuverable. <i>Wee Red</i> is significant as the only boat to have run both down and up the Colorado River through the Grand Canyon.
Description:	Motor Vessel <i>Wee Red</i> is a white 17'-5 ³ / ₄ " fiberglass inboard-outboard jet boat equipped with a 185-horsepower (hp) V8 motor with two jets. ¹ The beam is 7'-2 ⁷ / ₈ ". The engine block is situated in the center aft of the boat with the jet propulsion unit at the stern. According to uprun passenger Buzz Belknap, the plywood cover for the motor was disposed of during the Colorado River uprun in an effort to lighten the boat. A protective screen covers the intake on the bottom of the boat at the aft end. The gas tank is above it. The boat has a red top and red and white vinyl bench seats—although the vinyl is missing or torn—and is trimmed in aluminum. A steel loop is attached to the front below the top. The wood floor shows excessive wear, and the water deflection board on the front and top has lost most of its paint. There is no name painted on the craft, but it has been referred to in print and file as “Wee Red.”

¹ Motor Vessel *Wee Red* has been assigned Catalog Number GRCA 83612.

History:

Motor Vessel *Wee Red* is an example of an early “turbocraft,” which was invented by New Zealander Sir Charles William Feilden (“Bill”) Hamilton for motoring up whitewater rapids and then brought to the United States by John Buehler, who was the president and owner of Indiana Gear Works, Inc. of Indianapolis. As described in a 1959 *Sports Illustrated* article, the turbocraft operated by “inhaling water through a grille in the bottom and pumping this same water rapidly out at the stern. The pump is a water turbine driven by a standard inboard motor. The propulsion principal is the same as that of a jet aircraft, depending directly on the basic law of motion that says every action must have an equal and opposite reaction.”²

In 1960, Bill Austin organized a Colorado River trip with help from Otis “Dock” Marston, who had failed on some upriver attempts several years earlier. The group, which included Jon Hamilton (son of turbocraft inventor Bill Hamilton), Guy Mannering (also from New Zealand), and Phil Smith left Lees Ferry in the Canyon on June 18, 1960, with two 24' boats: *Big Red* and *Big Yellow*, and two 18' boats: *Wee Red* and *Wee Yellow*. The downriver portion of the run allowed the participants to test the boats in the heavy waters of the Colorado River and leave caches of gasoline along the way for the return trip. By the time they reached Phantom Ranch, the group was convinced that the 24' boats would not be suitable for the uprun and ordered two more 18' boats as replacements. The group reached Boulder City on June 28 where they immediately set about overhauling *Wee Red* and *Wee Yellow* and preparing the two new boats, named on the spot as *Kiwi* and *Dock*.

On July 6, the party embarked upon the upriver portion of the trip. The big test came at Lava Falls where it took Jon Hamilton one day and four attempts put *Kiwi* over the top. It took another whole day to get the other three boats over the rapid. In Grapevine Rapid, *Wee Yellow* sank after its deck was almost torn off, taking with it many of the group's supplies. They returned to Phantom Ranch to await replacement supplies. The remaining three boats finally made it back to Lees Ferry on July 12. The trip was detailed in Joyce Hamilton's 1963 book entitled *White Water: The Colorado Jet Boat Expedition*, which also includes photographs of *Wee Red*.

The boat was subsequently given to Glen Canyon National Recreation Area where it was stored in a custom-built shed. In spring 2008, *Wee Red* was transferred to Grand Canyon National Park to be preserved as part of the “Save Our Boats” historic boat conservation project. Western

² Mort Lund, “The Almost No-Water Boat: A New Concept in Motorboats, the Fast Turbocraft Water Jet, Passes Stiff Performance Tests,” *Sports Illustrated*, October 26, 1959, available online at <https://vault.si.com/vault/1959/10/26/the-almost-nowater-boat>, accessed April 2021.

Archeology and Conservation Center (WACC) conservator Brynn Bender thoroughly cleaned the boat in March 2009. *Wee Red* was then stored in a former auto shop until December 2013, when it was moved, along with the park's other historic boats, to a new storage area in the Powell Building.

Sources:

The report is based on information from the Grand Canyon Museum Collection and the following additional sources.

Bender, Brynn. "Saving Grand Canyon River Running History." *A/C Objects Specialty Group Postprints* 15 (2008): 85-93.

Jones, Laurel. "Jon Hamilton's Up Run of the Colorado River." May 26, 2019. Available online at <https://www.riversandoceans.com/jon-hamilton-up-run-colorado-river/>, accessed April 2021.

Lund, Mort. "The Almost No-Water Boat: A New Concept in Motorboats, The Fast Turbocraft Water Jet, Passes Stiff Performance Tests." *Sports Illustrated*. October 26, 1959. Available online at <https://vault.si.com/vault/1959/10/26/the-almost-notwater-boat>, accessed April 2021.

Project**Information:**

Motor Vessel *Wee Red* was documented as part of the Historic American Engineering Record' Maritime Recording Project. The Historic American Engineering Record (HAER) is part of Heritage Documentation Programs, a division of the National Park Service. Todd Croteau, HAER Architect, served as project manager. Ryan Pierce produced the measured drawings in 2012. Grand Canyon National Park staff provided the information for the historical report, which was formatted by Justine Christianson, HAER Historian, 2021.

HISTORIC AMERICAN ENGINEERING RECORD

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Photos were taken at the storage warehouse while on a trailer.

INDEX TO BLACK AND WHITE PHOTOGRAPHS

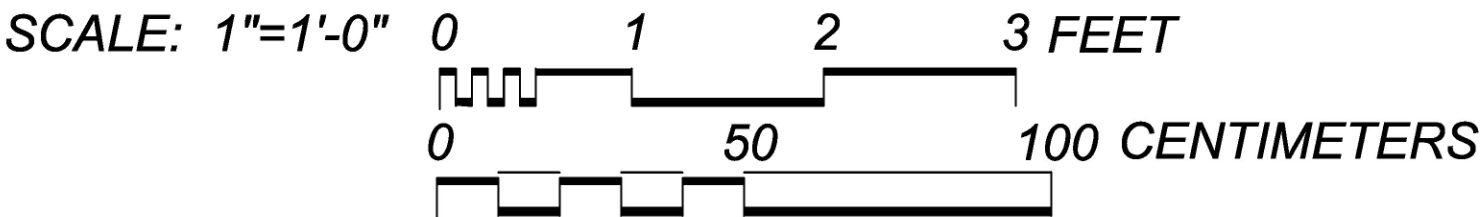
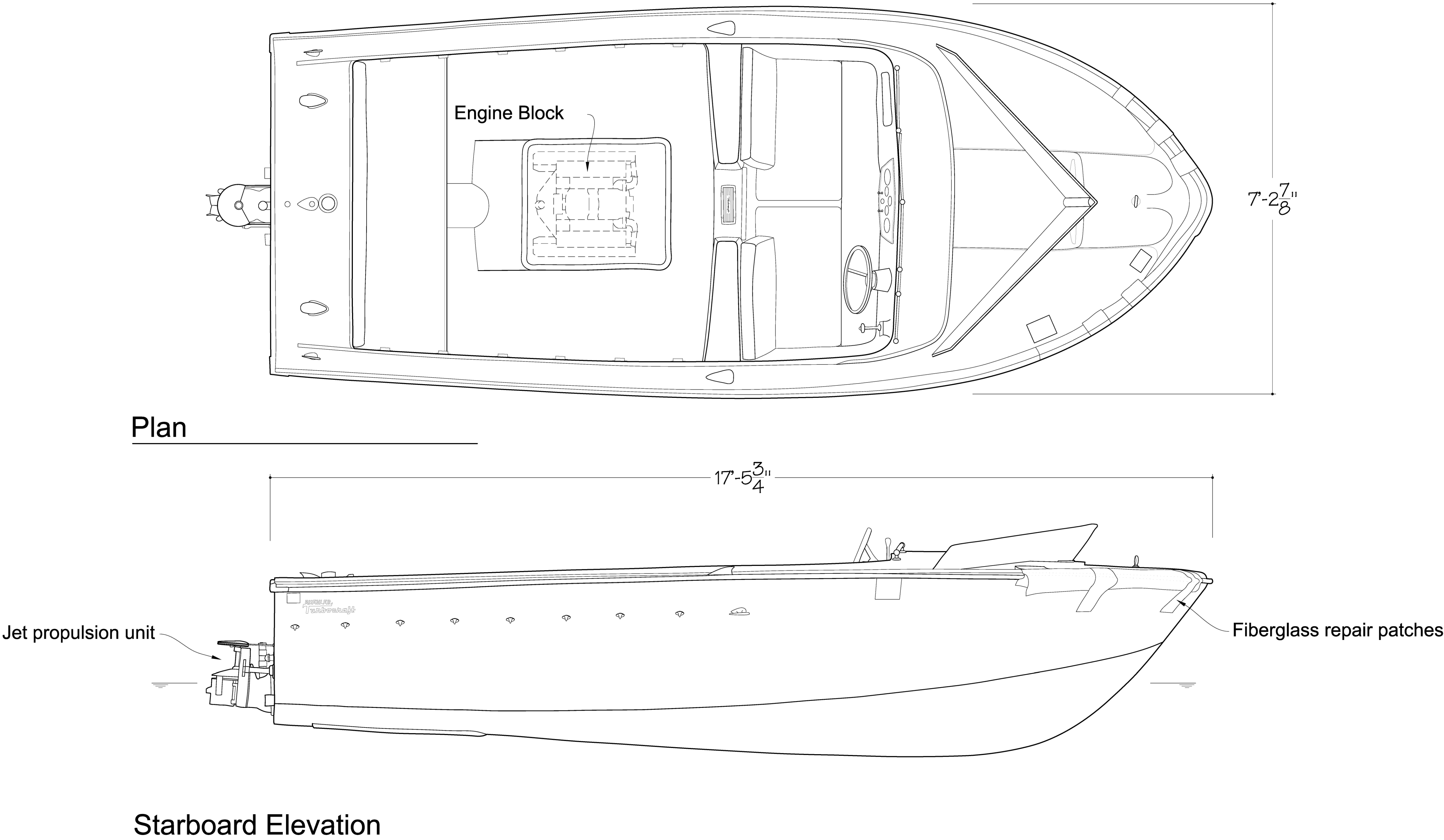
Michael C Quinn, photographer, 2012

AZ-80-1	Port side elevation.
AZ-80-2	Port side elevation from above showing interior.
AZ-80-3	Starboard side elevation aft end.
AZ-80-4	Starboard side elevation forward end.
AZ-80-5	View from above showing forward interior from starboard side.
AZ-80-6	View from above showing aft interior from starboard side.
AZ-80-7	Straight on bow elevation.
AZ-80-8	Straight on stern elevation showing transom with jet drive nozzle.
AZ-80-9	View from above looking aft from the bow showing foredeck and interior.
AZ-80-10	View from above showing interior from the port side with helm station.
AZ-80-11	View from above showing interior from the port side with engine visible at center.
AZ-80-12	View from above showing interior from aft looking forward with engine and helm station.
AZ-80-13	View from above showing interior from forward looking aft with helm station and engine.

M/V *Wee Red* (Buehler Turbocraft)

Colorado River Boat - First up-run through the Grand Canyon

Plan/Profile

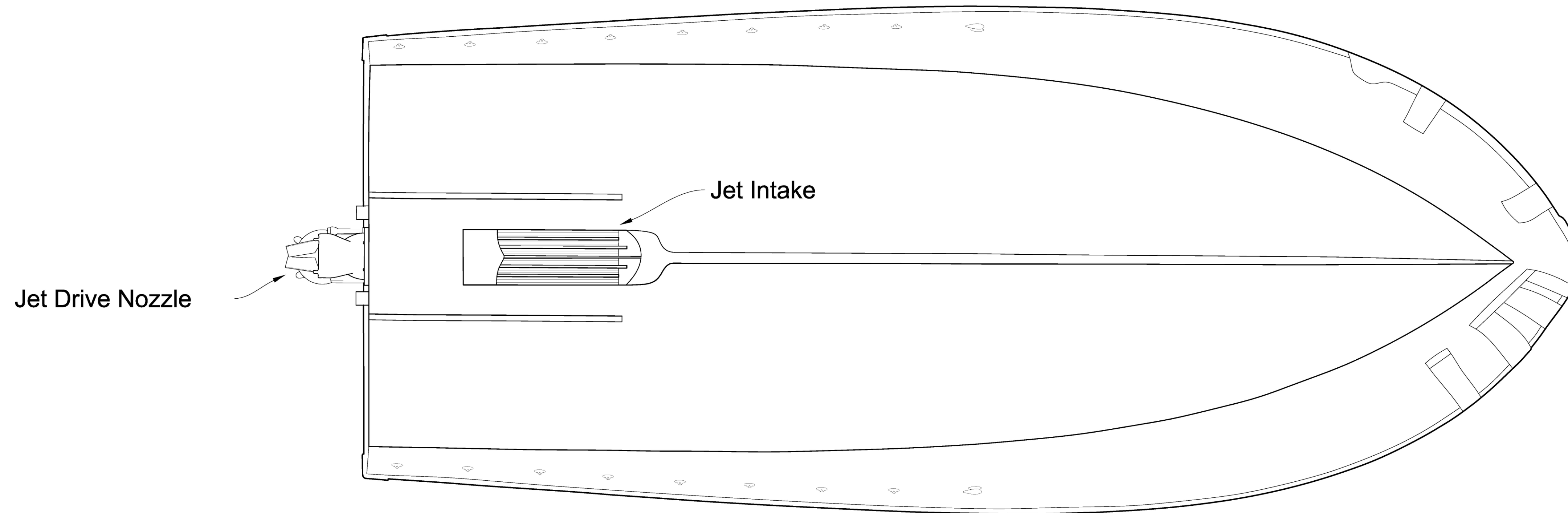


Note: This boat was drawn "as is", including deformations and repairs, from a LEICA Scanstation pointcloud and field measurements.

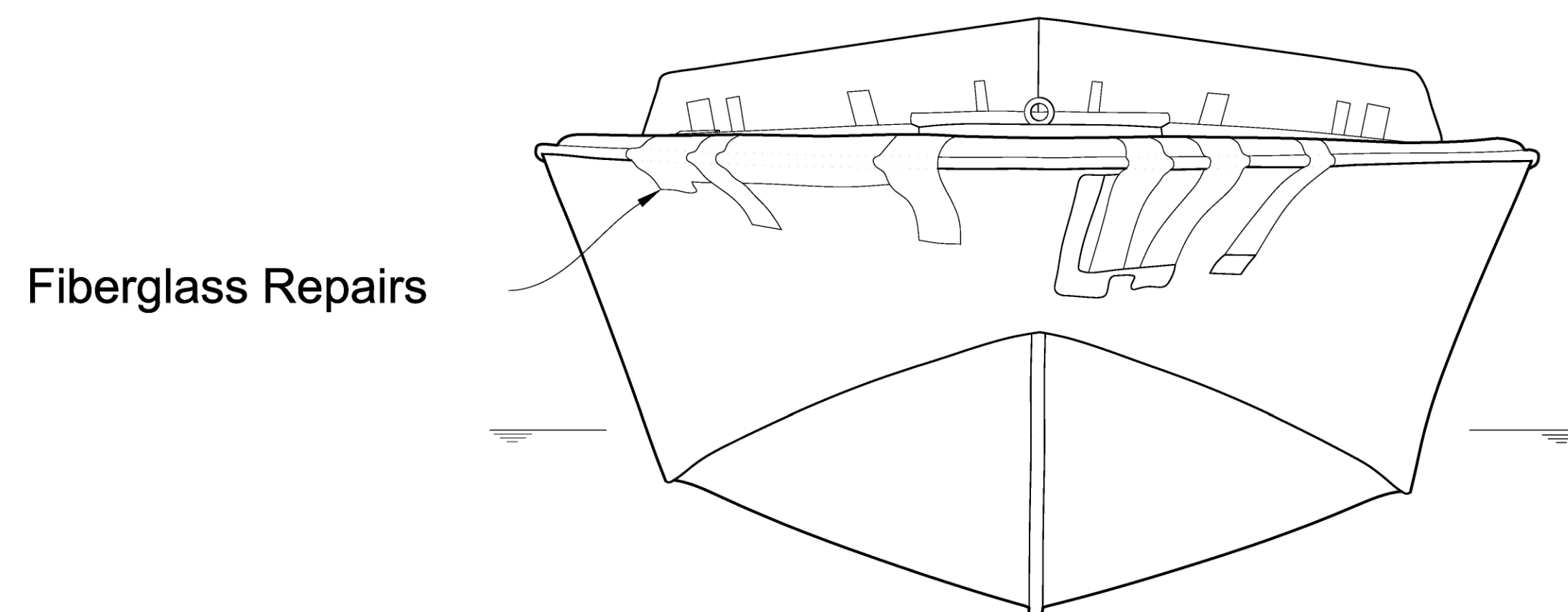
M/V *Wee Red* (Buehler Turbocraft)

Colorado River Boat - First Up-run of the Grand Canyon

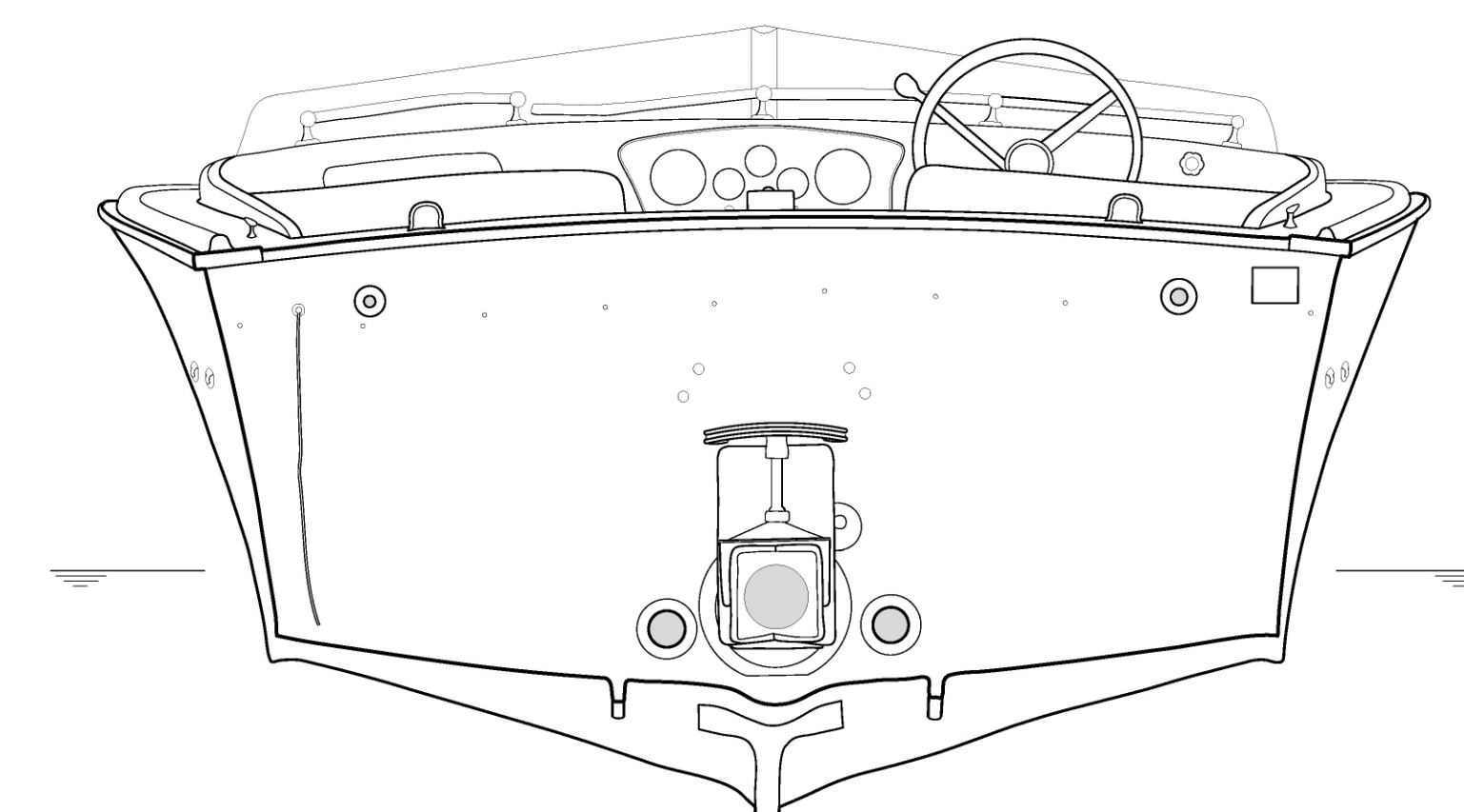
Bottom/Elevations



Bottom



Bow Elevation



Stern Elevation

SCALE: 1"=1'-0"

0 1 2 3 FEET

0 50 100 CENTIMETERS

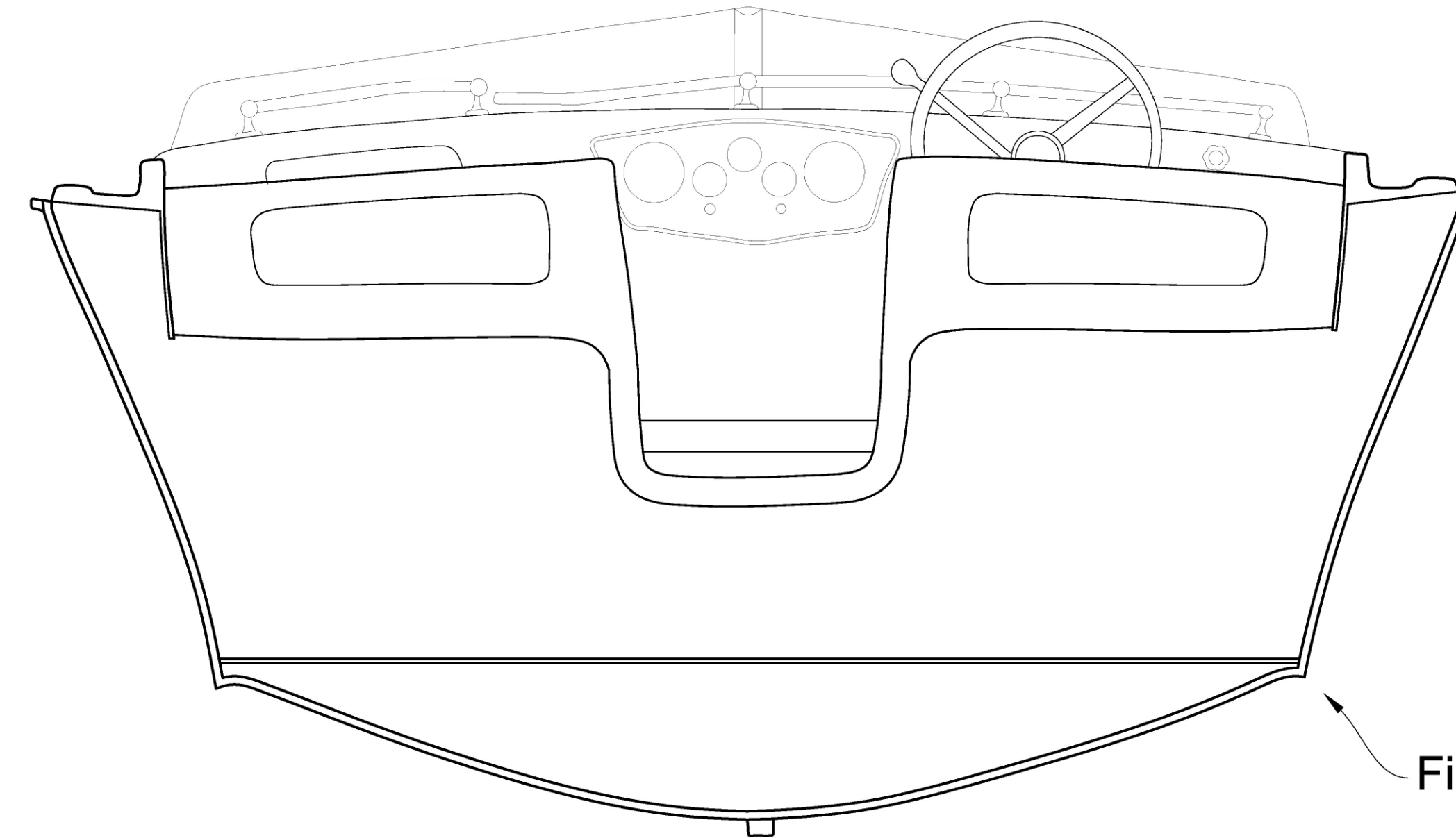
Note: This boat was drawn "as is", including deformations and repairs, from a LEICA Scanstation pointcloud and field measurements.

M/V *Wee Red* (Buehler Turbocraft)

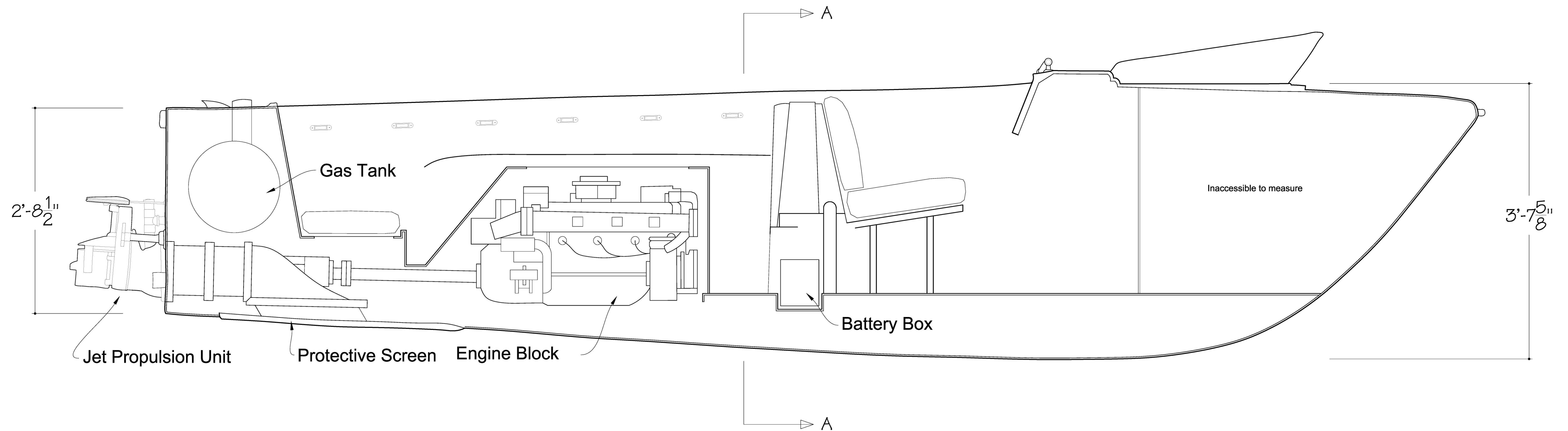
Inboard Profile

Colorado River Boat - First up-run through the Grand Canyon

BUEHLER
Turbocraft



Section A-A



Inboard Profile

SCALE: 1 1/2"=1'-0"

0 1 2 FEET

0 50 CENTIMETERS

Note: This boat was drawn "as is", including deformations and repairs, from a LEICA Scanstation pointcloud and field measurements.

M/V *Wee Red* (Buehler Turbocraft)

Colorado River Boat - First up-run through the Grand Canyon

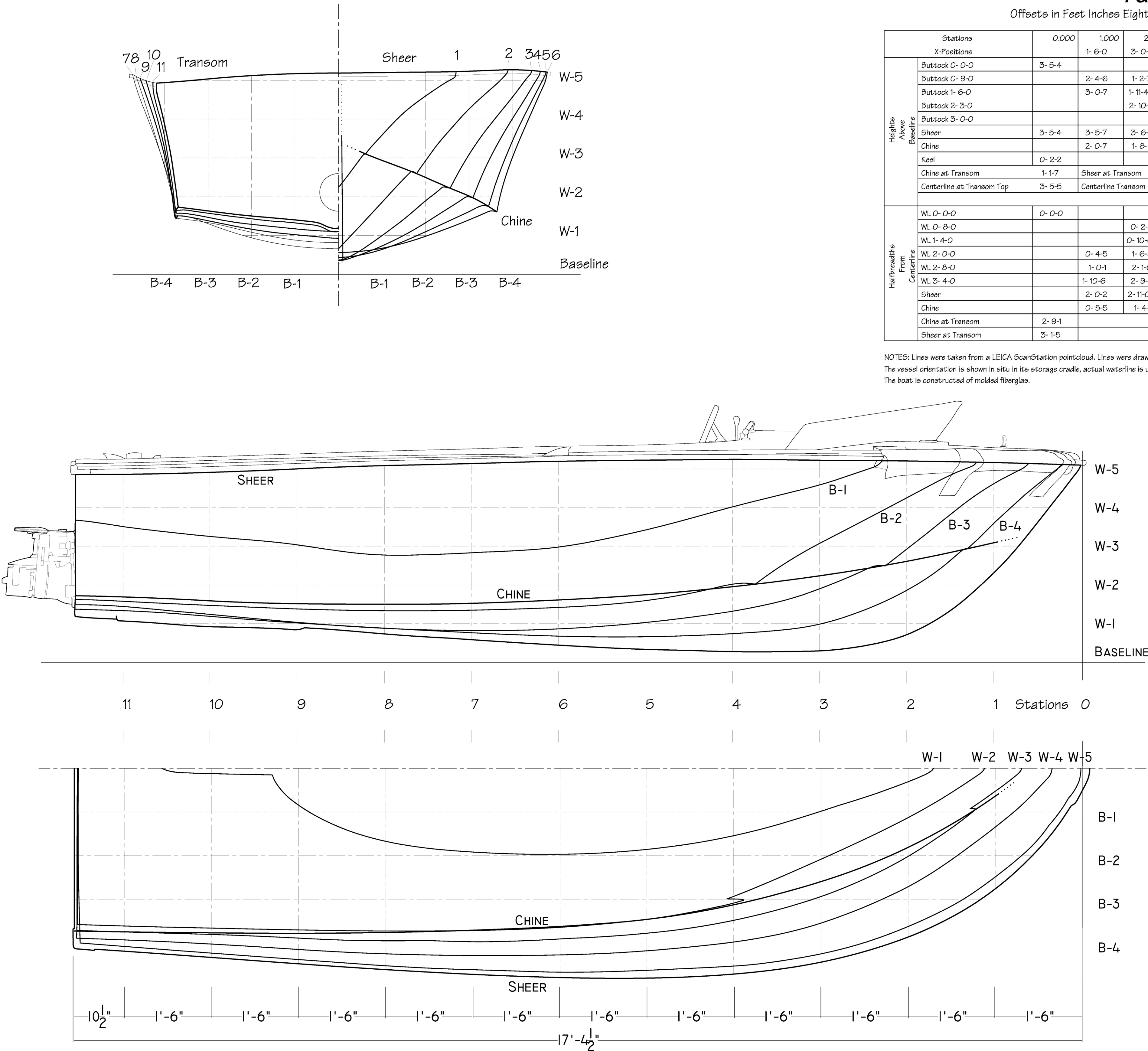
Lines

Table of Offsets

Offsets in Feet Inches Eights Offsets are to outside of skin

Stations		0.000	1.000	2.000	3.000	4.000	5.000	6.000	7.000	8.000	9.000	10.000	11.000
X-Positions			1-6-0	3-0-0	4-6-0	6-0-0	7-6-0	9-0-0	10-6-0	12-0-0	13-6-0	15-0-0	16-6-0
Heights Above Baseline	Buttock 0-0-0	3-5-4											
	Buttock 0-9-0		2-4-6	1-2-7	0-8-0	0-5-7	0-5-1	0-5-3	0-5-6	0-7-0	0-8-1	0-9-3	0-10-5
	Buttock 1-6-0		3-0-7	1-11-4	1-3-2	0-10-5	0-8-6	0-7-7	0-7-4	0-8-5	0-9-2	0-10-2	0-11-4
	Buttock 2-3-0			2-10-1	2-0-6	1-4-0	1-0-7	0-11-2	0-10-4	0-10-5	0-11-0	0-11-6	1-0-5
	Buttock 3-0-0				3-0-6	2-8-2	2-3-6	2-0-3	1-10-5	1-10-3	2-0-4	2-2-1	2-4-4
	Sheer	3-5-4	3-5-7	3-6-2	3-6-1	3-5-7	3-5-6	3-5-6	3-5-2	3-4-7	3-4-4	3-4-0	3-3-5
	Chine		2-0-7	1-8-6	1-5-6	1-3-6	1-2-0	1-0-7	1-0-0	0-11-4	1-0-1	1-0-6	1-1-2
	Keel	0-2-2											
	Chine at Transom	1-1-7	Sheer at Transom		3-3-4								
	Centerline at Transom Top	3-5-5	Centerline Transom Bottom		0-9-4								
Halfbreadths From Centerline	WL 0-0-0	0-0-0											
	WL 0-8-0			0-2-4	0-9-0	1-1-3	1-4-1	1-6-3	1-7-5	1-2-5	0-7-0		
	WL 1-4-0			0-10-0	1-7-0	2-3-7	2-7-5	2-9-3	2-10-1	2-10-3	2-10-3	2-10-2	2-10-0
	WL 2-0-0		0-4-5	1-6-3	2-2-4	2-7-2	2-10-4	2-11-7	3-0-4	3-0-4	2-11-7	2-11-5	2-11-2
	WL 2-8-0		1-0-1	2-1-0	2-8-2	2-11-7	3-2-0	3-3-2	3-3-3	3-3-0	3-2-1	3-1-3	3-0-6
	WL 3-4-0		1-10-6	2-9-3	3-2-4	3-4-6	3-6-1	3-6-3	3-6-2	3-5-4	3-4-7	3-3-6	
	Sheer		2-0-2	2-11-0	3-3-7	3-5-6	3-6-7	3-7-1	3-6-5	3-5-6	3-5-0	3-3-6	3-2-3
	Chine		0-5-5	1-4-1	1-11-2	2-3-6	2-7-0	2-8-6	2-9-3	2-9-5	2-9-7	2-9-6	2-9-5
	Chine at Transom	2-9-1											
	Sheer at Transom	3-1-5											

NOTES: Lines were taken from a LEICA ScanStation pointcloud. Lines were drawn "as is" with minimal or no fairing.
The vessel orientation is shown in situ in its storage cradle, actual waterline is unknown.
The boat is constructed of molded fiberglass.



SCALE: 1"=1'-0" 0 1 2 3 FEET
0 50 100 CENTIMETERS

Note: This boat was drawn "as is", including deformations and repairs, from a LEICA Scanstation pointcloud and field measurements.