

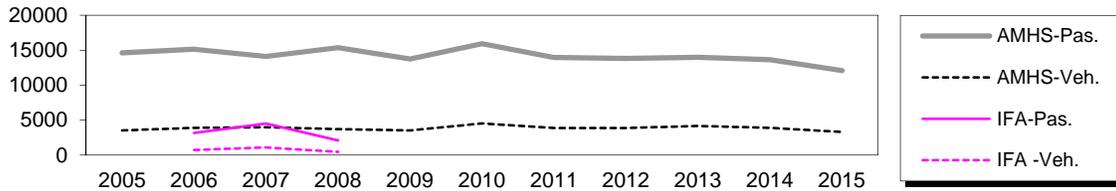
Wrangell Ferry Terminal

1/4 mile Stikine Ave.

Owner: State of Alaska

Terminal Manager: Pamela McCloskey – 907-305-0280

Terminal Description: The Wrangell Ferry Terminal is located at the north end of town, along Stikine Avenue. Wrangell is a side-loading facility consisting of a transfer bridge, cable supported bridge lift (Syncrolift), 10 steel pile dolphins and associated catwalks/gangways for line-handling access. Wrangell was also used by the IFA ferry from Coffman Cove and South Mitkof terminals but has not operated this route since 2008. The past 10 years of total passenger and vehicle traffic at Wrangell is shown below.



The most recent above water survey was completed on June 29, 2015. The underwater inspection occurred on August 9, 2011. The most recent fracture critical inspection occurred on September 6, 2014.

Vessels	
Name	Berthing, Alignment
All AMHS/IFA Vessels	Port/Starboard
FVF	Starboard

Tidal Data (MLLW 0.0 feet)	
EHW	22.0
MHHW	15.7
MHW	14.8
ELW	-5.5

Terminal Building	
Year Built:	1984
Square Footage:	1408 s.f.
Heating System:	Furnace
Fuel Storage:	UST
Fire Protection:	Alarm Pyrotronics
Condition:	Good

Generator & Building	
Building / Generator:	1987
Square Footage:	224 s.f.
Heating System:	Electric
Fuel Storage:	UST
Fire Protection:	Halon
Condition:	Fair

Uplands	
Short-Term Parking:	5
Long-Term Parking:	15
Staging Area:	640 lineal feet; 60 lineal feet-buses/trucks
Paint Striping:	Yes
Driving Surface:	Asphalt

Vehicle Transfer Bridge - #0801	
Type:	16'x140' twin box beam
Year Built:	1987
Shoreward support:	Concrete abutment
Seaward support:	Steel Lift Beam-Syncrolift
Coating:	Wasser Paint
Pedestrian Access:	Concrete 4' wide on bridge
Lighting:	None
Condition:	Good
Load Posting Sign:	N/A
Original Design Load:	HS 20-44

Utilities		
	at Terminal	at Ramp
Electrical:	Yes, city & backup power	
Water:	Yes	Yes
Sewer:	Yes (Septic)	Yes
Telephone:	Yes	Yes
Cable TV:	No	No
Fuel:	Yes, UST	No
Wireless Bridge:	Yes	-

Dolphins							
Dolphins	Dolphin Piles	Fender Support	Fender Face	Anodes	Built	Cond.	Notes
N5	4B, 2V	5V	Ekki Timber	No	1994	Fair	Nav Light
N4	2B, 1V	4V	Ekki Timber	No	1994	Fair	
N3	2B, 1V	4V	Ekki Timber	No	1994	Fair	
N2	2B, 1V	4V	Ekki Timber	No	1994	Fair	
N1	2B, 1V	4V	Ekki Timber	No	1987	Poor	
S1	2B, 1V	4V	Ekki Timber	No	1987	Fair	
S2	2B, 1V	4V	Ekki Timber	Yes	1978	Fair	
S3	2B, 1V	4V	Ekki Timber	No	1987	Fair	Bent Ladder
S4	2B, 1V	4V	Ekki Timber	Yes	1978	Fair	
S5	4B, 2V	5V	Ekki Timber	No	1987	Fair	Nav Light
ST	4V	-	-	No	1987	Fair	Light Pole & Windsock
NT	4V	-	-	No	1987	Fair	Light Pole

LEGEND

ET = East Lift Tower
G1 = Gangway

V = Vertical Steel Pipe Piling
EBP = East Bridge Platform

B = Battered Steel Pipe Piling

Catwalks / Gangways								
#	From Struc.	To Struc.	Length / Style / Main Members	Built	Safety Chains?	Cond.	Lighting	Notes
C1	N5	N4	59' / Catwalk / 12" x12" Tube Girders	1994	Yes	Good	Jelly Jars	
C2	N4	N3	59' / Catwalk / 12" x12" Tube Girders	1994	Yes	Good	Jelly Jars	
C3	N3	N2	47' / Catwalk / 12" x12" Tube Girders	1994	Yes	Good	Jelly Jars	
C4	N2	N1	59' / Catwalk / 12" x12" Tube Girders	1994	Yes	Good	Jelly Jars	
G1	ET	EBP	53' / Gangway / S 4x9.5 Bottom Chord	1984	Yes	Good	Jelly Jars	
G2	WT	WBP	53' / Gangway / S 4x9.5 Bottom Chord	1984	Yes	Good	Jelly Jars	
C5	S2	S1	36' / Catwalk / 10" x10" Tube Girders	1987	Yes	Good	Jelly Jars	
C3	S3	S2	71' / Catwalk / 10" x10" Tube Girders	1987	Yes	Good	Jelly Jars	
C2	S4	S3	48' / Catwalk / 10" x10" Tube Girders	1987	Yes	Good	Jelly Jars	
C1	S5	S4	91' / Catwalk / 10" x10" Tube Girders	1987	Yes	Good	Jelly Jars	

Terminal Projects			
Year	Project #	Project Name	Description
1963	N/A	WRG Ferry Terminal	Original construction of the terminal structures: timber vehicle bridge, timber lift towers & counterweight system, timber dock & timber mooring dolphins.
1978	RS-0943(14)	Ferry Terminal Facilities at Wrangell	Replace two timber dolphins with steel dolphins, retrofit the dock, install new catwalk.
1984	H78017	WRG Marine Terminal Building	Extension of uplands, construction of the current terminal building.
1987	A70022/F-095-3 (1)	WRG Ferry Terminal	Removed all timber structures and replaced with steel: new vehicle bridge, new lift towers and syncrolift system, new dolphins and catwalks.

Terminal Projects (continued)			
Year	Project #	Project Name	Description
1994	75279 / STP-095-3 (2)	WRG Ferry Terminal Fendering & Mooring Improvements	Installed steel dolphins, and catwalks, extending the north fender line and providing port/starboard mooring. Retrofit and upgraded southern mooring dolphin fender panels and batter piles. Improved the rock armor shore protection.
2006	67927 / CA-0003 (69)	WRG Ferry Terminal Modifications	Connected the transfer bridge to City sewer and water and installed hawse masts for the IFA vessel use. Installed fender panel extensions to dolphins S1-S3 for FVF vessels.
2008	73003(3)	Wrangell FT Carpet Replacement	Replaced carpet in the terminal building.
2008	69050 / SHAK-0005 (575)	Wrangell - Ferry Dock Hoist Upgrade	Replaced the existing relay-based control panel for the transfer bridge lift system with a PLC-based control panel.
2008	73741(4)	WRG Ferry Terminal Transfer Bridge Repairs	Repaired failed welds between the first floor beam and girders of the Transfer Bridge. Work completed under a maintenance contract in October, '08.
2013	69432 / SHAK-MGE-STP-0943(25)	WRG Ferry Terminal Transfer Bridge Repairs	Replaced fender panels on dolphins N1-3, S1; replaced dolphin S2; refurbished transfer bridge lift beam; replaced the pursers shelter; installed a security gate at the head of bridge; installed anodes on all dolphins, shortened the catwalk to dolphin S3; reconstructed the catwalk lighting system.

Observations

1. The Wrangell staging area was expanded, paved, and illuminated in 1987; it is adequately sized for current AMHS operations. The terminal has a covered walkway from the terminal building to the head of the transfer bridge. This facility does not comply with all requirements of the Americans with Disabilities Act (ADA). Parking striping needs to be modified to provide required ADA complying parking spaces and the curbs and sidewalks need to be modified to provide ADA compliant access to the terminal building.
A generator building and small storage building was constructed to the north of the bridge approach in 1987. The generator building fire suppression system is currently inoperative, the exterior needs a new paint coating, and the roof should be replaced. The underground emergency generator fuel storage tank was replaced in 2000 to meet current regulations.
2. The 1,408 square foot terminal building was constructed in 1984. The terminal building waiting area is small and at times passengers are forced to congregate outside in the parking area. The office area is undersized and ventilation is poor. Some of the fixed seating in the waiting area is unstable and tips over easily. An expansion or refurbishment of the building may be due. Otherwise the building appears to be in good condition. The existing purser's shelter had structural and electrical deficiencies. It was replaced with a prefabricated shelter on the 2013 project.
3. The bridge has an adjustable intermediate ramp that also supports the apron. Sections of the expanded metal on the apron are missing and need to be replaced. The bridge is supported on the seaward end by a SyncroLift system. The shore side end is supported by bearings on a concrete abutment. The solid-state controls for the lift system were replaced with digital PLC controls in 2008. Vehicles bottom out on the steel transition plate while the bridge is at its steepest incline during extreme low tide. Maintenance has chipped away concrete on the top of the abutment to drop the transition plate down, but only made an incremental change.
The bridge was re-coated in 1994 and remains in good condition. There is some spot rust and slight pitting on the underside of the girders. An area of damaged coating on the seaward side of the FB0 to Girder connection appears to be a weld indication. Laminating corrosion exists along the full length of stringer #1, located beneath the left pedestrian walkway. Deicing chemicals are most likely the cause.

Observations (continued)

The coating failed on the seaward lifting beam and the bridge hinge bearings, and significant corrosion coated the surface. It was assumed that the bearing movement was compromised by the pack rust between hinge plates. The 2013 project replaced the bridge lift beam & hinges.

The access platform mounted on the RT of the lifting beam was rubbing against the nearest tower support pile. Maintenance cut two sections of grating off to stop the steel-on-steel abrasion. The platform on the LT side does not rub on the vertical pile, suggesting a misalignment of the lift beam or movement in the RT tower. A geodetic survey was made of the bridge and lift towers in 2009. A follow-up survey, performed in 2011, found no movement in the lift tower. The 2013 project replaced the access platform on the new lift beam.

In the 2006 Fracture Critical bridge inspection, cracks were found in the welded connection between the box girders and the first floor beam. The cracked welds were removed and replaced according to AWS specifications in October, 2008 under an AMHS Maintenance contract.

The interior of the box girders were prime coated, but not top coated. They currently have widespread surface corrosion on the lower flange. The most severe corrosion is at the shoreward girder entrance door and at a rapidly corroding conduit fitting in Girder 2, Floorbeam 0.

The 2014 Fracture Critical (FC) bridge inspection found the following:

- Isolated areas of advancing surface corrosion on the pedestrian walkway form soffit between floorbeam locations, and on bottom and top flanges of Stringer 1.
- Several of the utility clamps, fastened to the bottom of the floorbeams, are corroded with section loss or missing.
- The seaward lifting beam is immersed in seawater regularly and as a result has extensive surface corrosion on the flanges and web. There is up to 1/8" pitting evident on both sides of the web for 2/3 of the member's depth across its length. The lifting beam is inclined slightly towards shore and as a result, ponding seawater is present at the far side bottom web-flange intersection.

The expanded metal is installed backwards and a section is missing in the middle of the apron. There is a light switch on the north lift system that sits in standing water and has duck tape around the housing.

The bridge lift beam was replaced on the 2013 project. Electrical conduit under bridge floor beams were corroding. Conduits were moved to the top of the girder on the 2013 project.

4. In 2006, water and sewer lines were added to the transfer bridge to serve IFA vessels. Fender extensions and hawser masts were added to dolphins S1, S2, and S3. Hawser mast only was added to dolphin N1. Fender modifications accommodate the fast vehicle ferries.
5. The original mooring structures to the south were refurbished in 1987 to allow starboard side mooring. In 1994, additional mooring structures N2-N5 were installed to the north, allowing either port or starboard side mooring.

A vessel severely impacted the mooring dolphin N1 in 1999. Damage to the tower railing, stairs, and catwalk was repaired by maintenance. The 2003 inspection also noted the fender system on this dolphin had settled more since the 1999 inspection. The 2006 underwater inspection revealed that three of the four fender piles were undermined a maximum of 8 in. vertical, the piles just sitting on bedrock without penetration, and the entire fender unit had settled and racked to the South. The donuts were stretched vertically and the corners were beginning to split. The 2013 project replaced the leaning fender panels with rock socketed pile supports.

The fender panel at N2 leaned north and was stretching the donuts sideways between misaligned mounts. One donut was showing signs of delaminating of the rubber. Both donuts were splitting at the interior corners of the mounts. The fender panel was replaced on the 2013 project.

The galvanized coating on dolphins S2 and S4 have failed and protective anodes were installed in 2003. Vertical fender and dolphin piles at dolphins S3 & S4 have scour at the channel bottom of 6-in. deep in an 18-in. diameter around the base of each pile. Dolphin S4 is used for the spring line of the MV Kennicott, though the ship does not dock here often, it appears to be pushed up and inward. The donuts are ~25% compressed.

The vertical piles at dolphin S5 are also scoured, but less than 6-in. and entirely on the seaward side. The fender donuts are compressed and the restraint chains are tight on the dolphins. There are strong currents and heavy winds at times and vessels have made high impact landings.

Observations (continued)

The donuts on dolphin S5 have crack along the exterior, its donut brackets are bent but intact. This is a turning-style dolphin that receives heavy impact and turning loads, but is hardly used for mooring.

There are two old concrete-filled steel piles cutoff below extreme low water (ELW) behind dolphin N1. AMHS maintenance performed weld repairs to damaged fender restraint brackets on dolphins N1-N3 in February, 2012.

The 2011 Underwater Inspection noted that the fender panels for dolphins N1-3 & S1-2 are racked due to undermining of support piles. The 2013 project replaced the undermined fender panels with new panels socketed into the bedrock.

Galvanizing on submerged steel has been consumed below mean tide. All piles of dolphin and lift towers freely corroding. Anodes were installed on all piling on the 2013 project.

6. There is a gap in the railing on the small stairways between the lift towers and dolphins N1/S1. The lowest stair has a large gap behind it and is not connected to the upper stair assembly. Some handrail pipes are split due to expansion off ice from trapped condensation. Hinge pins on the lift tower gangway supports are loose.

In January, 2009 the Taku was tying up her bow line to Dolphin S2 when the bollard sheared off. The crew was able to save the bollard and it was reinstalled later that month by AMHS maintenance.

7. IFA hasn't operated their northern route, including Wrangell, since 2008. Cables for IFA vessels remain wrapped incorrectly around the mooring bollards on dolphins and are placed loosely over the
8. AMHS mooring lines. The loop should simply be placed over the bollard, not tied around the bollard and placed over a single bollard horn.
9. The kick-plate angle on the catwalk between dolphin N1 and N2 has been damaged by the hawse rail after a hard vessel impact. Catwalk posts are not freely draining. Base of posts are damaged from the freezing of trapped water.

Inspection Summary		
Structure	Priority	Recommendations
<i>Category I - Safety Repairs</i>		
Nothing required.		
<i>Category II - Rehabilitation Work</i>		
Transfer Bridge	1	Install neoprene gasket in the girder entrance door and secure the door with bolts. Monitor corrosion within the interior of the girders. Replace the sodium-based deicing chemicals with an inert product. Replace unistrut brackets & conduit supports where they're corroding beneath the bridge. Monitor the gap between the bottom of the shoreward hinge bearing plate and the top of the abutment. Re-coat the bridge. Re-grade the approach slab and install a flat transition plate.
Dolphins	2	Replace the cracked rubber donuts & bent brackets, install navlight and windcone on Dolphin S5. Repair the bent ladder posts on Dolphin S3. Remove IFA mooring lines & set aside until service is re-established.
Lift tower access stairway	3	Install an extension to the pipe railing on the stairway and connect the lower stair to the upper stair assembly with chains or cables and an angle kick plate in the back. Drill weep holes at the bottom of all pipe railing. Tighten hinge pins on lift tower gangway supports.
Bridge Apron	4	Remove and reinstall damaged and incorrectly installed expanded metal grating in correct orientation to reduce slippage during low tide events.
Catwalks/Gangways	5	Railing posts should be drilled for weep holes and those that are split should be weld repaired. Check hinge pins for gangways and replace as necessary. Clean catwalks and dolphin caps; repair catwalk guide bolts.
Lift Towers	6	Move the light switch to a fixed location above the standing water.
Generator Bldg	7	Refurbish the fire suppression system. Paint the exterior and replace the roof.
<i>Category III - Upgrades Needed</i>		
Terminal Building	8	Investigate terminal building expansion/refurbishment.