

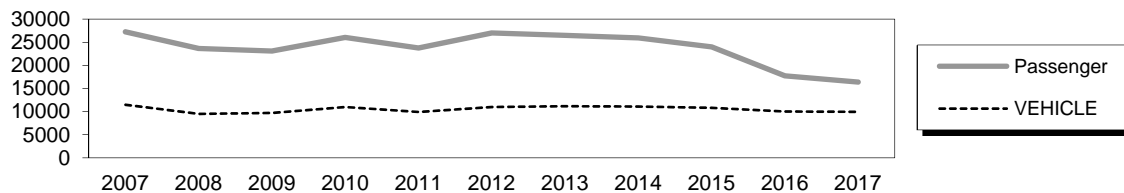
# Bellingham Ferry Terminal

335 Harris Ave. – Ste. 101

**Owner:** Port of Bellingham

**Terminal Manager:** Dave Warter – 360-676-2500

**Terminal Description:** Bellingham Ferry Terminal, built in 1989, is the southern terminus for the Alaska Marine Highway System (AMHS). Bellingham is a stern-loading facility consisting of a steel transfer bridge, supported by a steel framed lift tower and counterweight system at the seaward end, with two stern dolphins and five breasting dolphins connected by timber catwalks. The terminal building differs from AMHS owned facilities in that it is a multiple use facility. The terminal building lies on a concrete dock supported by steel pipe piles. The dock extends around the northern, eastern, and western faces of the terminal building. The staging area has separate long and short term parking areas. Bellingham's past 10 years of total passenger and vehicle traffic are shown below.



The most recent above water survey was completed on September 29, 2017.

Vessels	
Name	Berthing, Alignment
Mat/Mal/Ken/Col	Stern

Tidal Data (MLLW 0.0 feet)	
EHW	11.5
MHHW	8.6
MHW	7.8
ELW	-4.5

Terminal Building	
Year Built:	1989
Square Footage:	22,509 s.f.
Heating System:	Boiler
Fuel Storage:	UST
Fire Protection:	Yes
Condition:	Good

Generator & Building	
The vessel's generator powers the vehicle ramp during shorepower outages.	

Uplands	
Short-Term Parking:	12 cars, 1 HCP
Long-Term Parking:	80 cars
Staging Area:	3200 lineal feet - cars; 800 lineal feet - trucks;
Paint Striping:	Yes
Driving Surface:	Asphalt

Utilities		
	at Terminal	at Ramp
Electrical:	Yes	Yes
Water:	Yes	Yes
Sewer:	Yes	Yes
Telephone:	Yes	Yes
Cable TV:	Yes	No
Fuel:	UST	Yes
Wireless Bridge:	Yes	-

Pedestrian Bridge	
Type:	8' x 77' Steel Truss
Year Built:	1989
Shoreward support:	Hinge bearings
Seaward support:	Cable hoist support on steel lift towers
Apron lift:	Hydraulic
Coating:	Sherwin Williams Paint
Lighting:	Overhead fixtures
Condition:	Good

<b>Vehicle Transfer Bridge</b>	
Type:	22' x 120' twin steel girder
Year Built:	1989
Shoreward support:	Hinge bearings
Seaward support:	Counterweighted cable
Coating:	Hydraulic
Pedestrian Access:	Sherwin Williams Paint
Lighting:	Lights on Lift Towers
Condition:	Good
Load Posting Sign:	10 Tons Max Axle Load
Original Design Load:	AASHTO HS 20-44

<b>Dolphins</b>							
<b>Dolphins</b>	<b>Dolphin Piles</b>	<b>Fender Support</b>	<b>Fender Face</b>	<b>Anodes</b>	<b>Built</b>	<b>Cond.</b>	<b>Notes</b>
N6	1BC, 3VC	-	-	-	1989	Good	Red Nav Light & Windsock
N5	3BC, 5VC	4V	Sitka Spruce	Yes	1989	Good	
N4	2T	-	-	-	1989	Good	
N3	3BC, 5VC	4V	Sitka Spruce	Yes	1989	Good	
N2	2BS, 2VS	Chains	UHMW	Yes	1997	Good	
N1	3BC, 5VC	4V	Sitka Spruce	Yes	1989	Good	
W1	12BH, 20VH	-	Sitka Spruce	Yes	1989	Fair	
E1	10BC	4V	Sitka Spruce	Yes	1989	Good	
WT	7BC, 4VC	-	-	-	1989	Good	
ET	7BC, 4VC	-	-	-	1989	Good	

**LEGEND**

WT = West Bridge Lift Tower Dolphin  
VC = Vertical Concrete Piling  
C1 = Catwalk

BH = Battered Steel H-Piling  
BS = Battered Steel Pipe Piling

<b>Catwalks / Gangways</b>									
<b>#</b>	<b>From Struc.</b>	<b>To Struc.</b>	<b>Lenth / Style / Main Members</b>	<b>Built</b>	<b>Safety Chaines?</b>	<b>Cond.</b>	<b>Lighting</b>	<b>Notes</b>	
C1	Dock	N6	380' / Catwalk / Timber stringers on piles spaced 50' (roughly) apart	1989	No	Good	Lightpoles		

<b>Terminal Projects</b>			
<b>Year</b>	<b>Project #</b>	<b>Project Name</b>	<b>Description</b>
1989	N/A	Bellingham Ferry Terminal	Construction of new terminal structures. Uplands fill, vehicle parking/staging, landscaping, fencing and new terminal building.
1997	75562	Ocean Class Vessel Dock Modifications	Constructed new breasting dolphin N2, mondified bridge apron for the Kennicott and installed new hydraulic lift for apron.
1999	N/A	Fairhaven Terminal Passenger Ramp Apron Modifications	Replaced the existing apron with a new retractable apron.

## Observations

1. AMHS rents part of a warehouse facility located directly adjacent to the vehicle loading bridge and Port of Bellingham terminal facility. The warehouse provides phone and fax services to the crew while the vessel is in port. The warehouse provides storage for vessel equipment, spare parts, and receiving items.  
The paint storage area in the warehouse is out of compliance. There are many propeller blades stored in the warehouse. Storage racks in the warehouse are unrestrained at the post bases, which is a seismic concern.
2. The terrazzo floor has cracked between the roof truss supports. The microcracks are small and don't present a tripping hazard.
3. The northern-most mooring structure (N6) and approximately sixty feet of access catwalk were damaged in 1992 by an AMHS vessel collision. The vessel was approaching the facility during high winds. The vessel stern was blown against the northwest corner of this dolphin, which has no fender protection. The Port replaced the damaged mooring structure, navigation light, windsock, and catwalk in 1994. AMHS vessel masters have requested that this structure be replaced with a wraparound turning dolphin similar to those located at the ends of the mooring structures in Ketchikan to aid vessel landing during high wind conditions. With the potential cost of this upgrade approaching one million dollars, this project has not been placed on the Port's priority list. The state will need to coordinate funding of this project with the Port of Bellingham. This dolphin has a red nav light and windsock mounted on the cap.

In 1997, AMHS added a new dolphin (N2) with a steel fender system. This dolphin was added to accommodate the M/V Kennicott. The new dolphin is a galvanized steel cap structure supporting a steel suspended fender system. The fender face is an ultra-high-molecular-weight (UHMW) black plastic. Cylindrical rubber bumpers installed between the fender system and dolphin provides vessel energy absorption. CP measurement in 2017 for dolphin N2 was below -0.8V, which indicate that the steel is unprotected from corrosion.

Several of the timbers are broken on the fender panels of dolphins N1 & N3. The energy-absorbing units of these fender dolphins are "buckling column" rubber units. These have very good energy capacity but require a large initial force to cause buckling. Most broken timbers are located in the corners of the panels where the vessel sponson contacts a single timber when berthing obliquely. It is very likely the timbers fail because the fender units are stiff and the large initial reaction causes failure of the timber prior to buckling of the rubber unit. Recommend an analysis of the fender assembly by marine engineering to ensure compatibility among the timbers, wales, rubber elements and back-up structure. If the timbers are the limiting element, a possible solution is substituting the damaged timbers with stronger members such as steel beams faced with UHMW.

4. The horizontal fender chains, mounted on the sides of the caps and fenders of dolphins N1, N3 & N5 are corroding. U-bolt chain connections to the fender and caps are undersized and corroding.
5. The towers, bridge and pedestrian ramp coatings were replaced in 2002 and remain in good condition. The non-skid coating on the pedestrian ramp-walking surface was replaced in 2002 and appears durable. The cables of the lift system and upper sheaves are inspected annually by Port staff.
6. The pedestrian gangway collapsed suddenly during service in 2012, and was not used again until January of 2016. There was litigation involved, which affected the timeline for making the repairs. During the shutdown period, pedestrians would walk down the transfer bridge car deck to load on the vessel, similar to standard AMHS port facilities.
7. The short timber catwalks between the main catwalk and the dolphin caps are fastened rigidly to their supports and do not have safety chains installed.
8. Condition of all dolphins are relatively identical to the previous inspection: coal tar epoxy coating is failing on all immersed steel structures, some fender timbers are still broken, timber catwalks have no safety chain/cable installed. Overall, dolphins are in good/fair condition.
9. Improvements to the sewer pumpout utility lines were completed in January of 2011.

<b>Inspection Summary</b>		
Structure	Priority	Recommendations
<i>Category I - Safety Repairs</i>		
Nothing recommended.		
<i>Category II - Rehabilitation Work</i>		
Ped. Gangway	1	Conduct repairs to the seaward lift system.
Dolphins	2	Replace the end dolphin N6 with a wrap-around turning dolphin. Analyze the timber fender system for capacity. Replace broken fender rubbing timbers as necessary. Replace the U-bolt chain connections on the fender and caps with properly sized pad eyes, with concrete anchor bolts for the caps. Replace the chain connecting links on the dolphin cross chains. Monitor the coating loss on the dolphin fender support piles.
Catwalks	3	Install safety chains/cables at the supports of the short timber catwalks between the main catwalk and the dolphin caps.
Terminal Building	4	Monitor the cracks in the terrazzo floor.
Sewer Line	5	Make a permanent repair to the hub of the sewer line that is repeatedly blown apart beneath the dock.
Storage Building	6	Fasten the post bases of the storage racks to the Warehouse floor, to brace in the event of seismic loading. Bring paint storage area into compliance.
<i>Category III - Upgrades Needed</i>		
Nothing recommended.		

