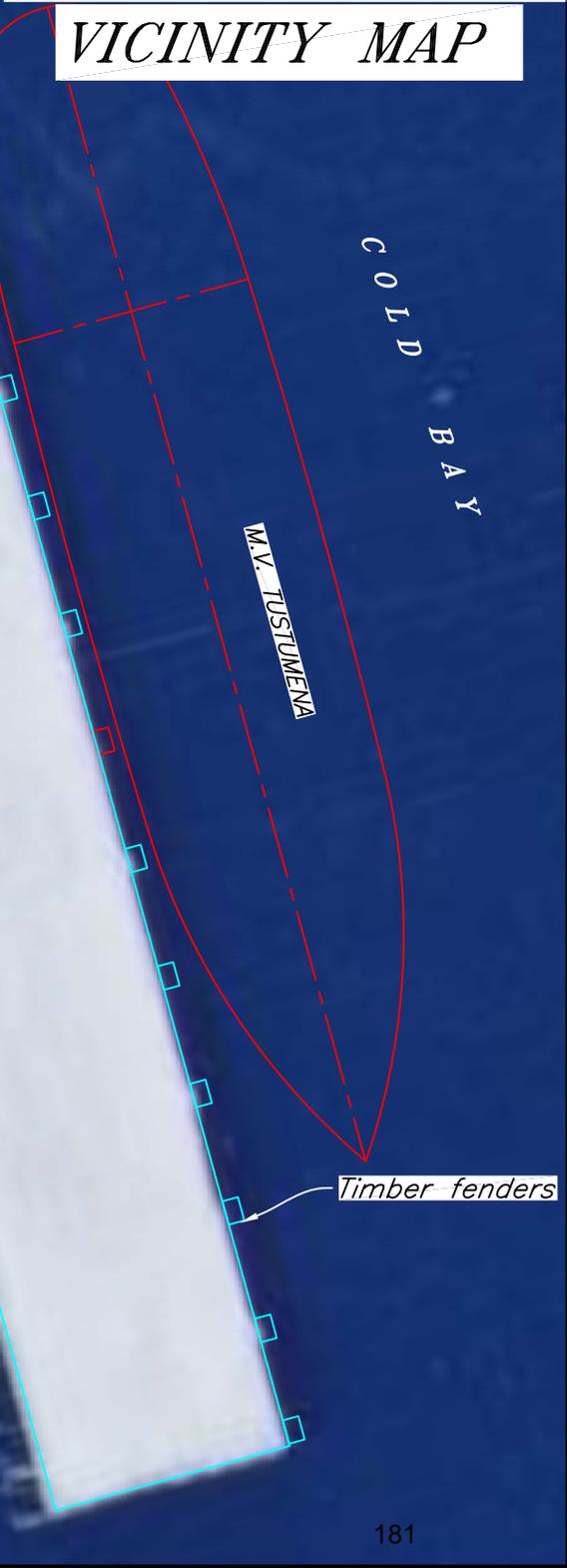
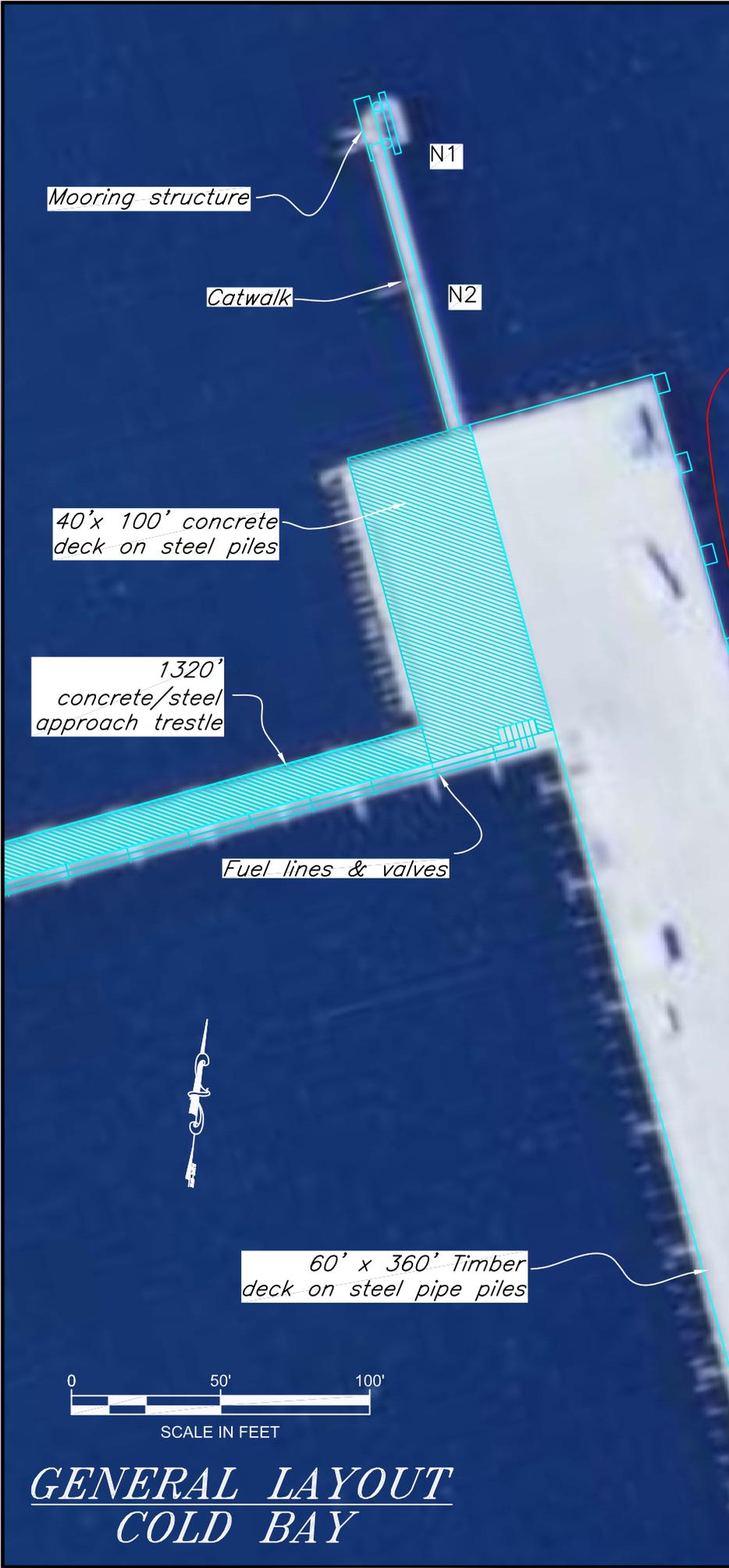


**VICINITY MAP**



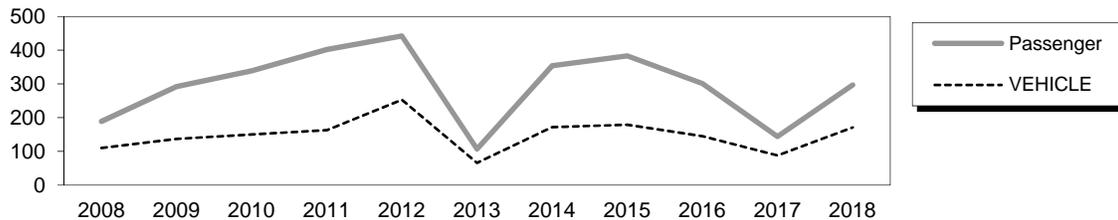
**GENERAL LAYOUT  
COLD BAY**

# Cold Bay Dock

**Owner:** Aleutians East Borough

**Contact:** Kurt Uttecht, Public Works Director, City of Cold Bay 907-532-2684

**Terminal Description:** The M/V TUSTUMENA docks at the Cold Bay Dock during its East/West passage through the Aleutian Chain. The Cold Bay facility is made up of two dock sections that were constructed at different times. The original structure, designed and built by the State in 1978 consisted of a 100' x 40' concrete panel dock and a 1,320' long concrete panel approach. There is a mooring dolphin and catwalk northwest of the original dock. In 1993, a 360' x 60' addition was constructed to the northeast of the original dock; the newer dock abuts the face of the original structure. The facility is owned by the Aleutian East Borough and managed by the City of Cold Bay. The past 10 years of total passenger and vehicle traffic at Cold Bay is shown below. The M/V Tustumena was out of service most of 2013, causing a steep dropoff in traffic at the terminal.



The most recent above water survey & fracture critical inspection were completed on September 21 & August 13, 2018. The most recent underwater inspection occurred on July 15, 2014.

Vessels	
Name	Berthing, Alignment
Tustumena	Starboard

Tidal Data (MLLW=0.0 feet)	
Highest Observed	11.6
MHHW	7.2
MHW	6.5
Lowest Observed	-3.7

Terminal Building
This facility does not have a terminal building.

Generator & Building
This facility does not have a generator on-site.

Utilities @ Dock	
Water:	Yes (lines replaced in 1998)
Fuel:	Yes (lines replaced in 2006)

Uplands	
Short-Term Parking:	N/A
Long-Term Parking:	N/A
Staging Area:	N/A

Original L-Shaped Dock - #1755	
Type:	12' x 1824' concrete panel approach & 42' x 100' concrete dy-core panel dock
Year Built:	1978
Dock Support:	16" dia. Steel piles with steel WF-beam pile caps
Pile Coating:	Epoxy/Galvanizing
Anodes:	Yes, welded directly to piling with bond cables to pile caps. Cables replaced in 1998.
Lighting:	None
Condition:	Fair
Notes:	The approach has two vehicle turnouts, located on the northwest side of the trestle.
Load Posting Sign:	20 Ton Max
Original Design Load:	HS 20-44 / 400 psf

<b>Dock Addition</b>	
Type:	360' x 60' steel beam and timber decking
Year Built:	1993
Dock Support:	Steel pile bents spaced ~30' o.c. Each bent has (4)-26"dia. Vertical steel piles & (1) batter pile connected to steel H-pile caps. Salvaged W36x182 bridge beams span the length, with pressure-treated 12x12 timber stringers and 4x12 timber decking above.
Pile Coating:	All steel is uncoated.
Fenders:	13 timber-faced pin pile fender units, spaced roughly 30' o.c. along northeast face of dock. The ends and southwest face of the dock are protected with treated timber pile fenders.
Anodes:	(39) 200# aluminum anodes suspended from the superstructures by galvanized wire rope. The City replaced the cables in 1998.
Lighting:	None
Condition:	Poor
Load Posting Sign:	N/A
Original Design Load:	HS 20-44 / 350 psf

**LEGEND**

V = Vertical Steel Pipe Piling

B = Battered Steel Pipe Piling

<b>Catwalks / Gangways</b>							
#	From Struct.	To Struct.	Length / Style	Built	Safety Chains?	Cond.	Lighting
C1	Dock	N2	54' / Catwalk / W21x55 Girders	1978	Yes	Good	None
C2	N2	N1	54' / Catwalk / W21x55 Girders	1978	Yes	Good	None

<b>Dolphins</b>							
Dolphin	Dolphin Piles	Fender Support	Fender Face	Anodes	Built	Cond.	Notes
N1	1B, 2V	4V	Sitka Spruce	Yes	1978	Good	Red Navlight
N2	1V	-	-	Yes	1978	Good	

**Observations**

- The undersides of the concrete deck panels are covered with efflorescence, an indication of water intrusion. The Fracture Critical (FC) reports note that panels spanning the final two bents (75 & 76) at the end of the approach trestle have three full-length cracks up to 1/4" wide. There is also a 24" long x full-width delaminated section. On the underside soffit of panel 76, there is a hole 18" long x 6" wide within the delaminated section that extends into the hollow-core of the panel.

The poor condition of these two panels has been known for many years now, yet the load capacity of these panels has not been estimated. The first reference for the need to monitor cracks in the panels and to perform a load rating analysis was in 2001. It should be mentioned that a spall in one of the panels was noted in 1994. The cause of the cracking in these last two panels at mid-span (corrosion of prestressing strands, overloading, etc) is unknown.

The FC report also notes that there is an 8 sf area of dense longitudinal cracking and delamination with small spalls on the soffit of slab 3, span 2. There were 11 instances of small edge spalls at the soffit corners with exposed prestressing strands.

### Observations (continued)

Also found were numerous locations where shims are rusting and staining the slab soffits. This is due to the shims being partially dislodged between the deck and the top of the cap.

2. The pier caps on the approach trestle and original deck have various problems. There is a full-width, ½” deep gouge in the bottom flange of the bent 3 pier cap; a 1-5/8” crack in the stiffener to bottom flange weld at the north, far side stiffener at bent 54; a 3” distortion to the exterior edge of bottom flange of bent 1 in span 2 from vessel impacts; a 37” circumferential crack at the toe of weld between the pier cap and pipe pile on the old dock, bent 1, west; impact damage to the outboard top & bottom flanges of bent 56 pier cap near column 2 (the impact areas were flame-cut and ½” bars welded over the gaps as an attempted repair).
3. All steel used in the dock addition is neither galvanized nor coated for marine exposure. The H-pile caps and steel girders of the dock addition are rapidly corroding. The caps are covered with heavy rust and scale. The FC reports note that there is section loss on all components.

The most recent FC report notes that there is a 4” long crack at the bearing stiffener to bottom flange weld over the centerline of column 5 in bent 1. The longitudinal steel stringers are not centered over the support piling, introducing eccentricities to any load paths being transmitted to the foundation.

There is severe distortion in the Girder 1 web and bottom flange from multiple vessel impacts approximately 5’ from bent 8 in span 9. There is a 1”x 11” missing section of bottom flange at bent 3, span 3. There’s also extensive impact damage to bent 12, span 2, far side bottom flange. A replacement flange was welded to the web overlapping with the damaged/removed section of bottom flange.

4. The support piling of the approach, the original dock, and the dock addition are all in good condition in the submerged zone but in fair to poor condition in the splash zone. The epoxy coating has failed in the upper portions of the approach dock piling; the same areas on the steel piles for the new dock addition have laminating corrosion. The sides of piles supporting the original dock show signs of impact damage.

The most recent fracture critical inspection found that the piles are exhibiting 100% paint flaking and up to ½” laminar corrosion with section loss of up to ¼”.

5. There are (13 ea.) fender modules at a nominal spacing of 30 ft. across the face of the dock. There are two types: (6 ea.) that are full height of the dock with integral access ladders and (7 ea.) standard fenders that are 3 ft. shorter. The fender modules are supported on two pin piles, faced with timber beams and bear against the pile cap with a single side-loaded cylindrical rubber fender. Pipe bollards are aligned with each of the standard fenders along the dock face. The sides and shoreward face of the dock are protected with timber pile fenders. Emergency access ladders are spaced on the sides and shoreward face.

The fender units are in fair condition. Underwater inspection revealed that several of the fender units are damaged at the bottom of the pipe sleeves. The sleeves are 4” larger in diameter than the pin piles, thus allowing the bottom of the fender units to oscillate back and forth in the waves. The bottom lip of the pipe sleeve bangs against the pin pile causing appreciable wear on the pile and in some cases, cracking at the base of the sleeve. The fender units are fastened to the dock with a rubber energy-absorbing cylinder. The cylinder-retaining bracket of one fender is missing some fasteners. Fender panel access platforms, that span between the dock and the fender panels, are loose.

The bottom half of the timber fender panel on dolphin N1 is rotten and has only 10% section remaining. This dolphin is off the fender line, so does not affect vessel mooring.

6. Several of the bull rails along the concrete dock have broken supports and are sitting on the deck. The navigation light on the southeast end of the dock was not functioning. Average soundings to mudline, from the top of deck, along the face of the dock were 50’ during the 2018 inspection.
7. The south end of the catwalk bears on only a few inches of the dock, the bearing plate and connection bolts are highly corroded, and some concrete has spalled from under the supports. The catwalk and mooring dolphin are oriented on the face of the original dockline. A more functional configuration would be where the dolphins and catwalk were oriented on the face of the current dockline.

The Public Works Director reports that there is no need for dolphin structures N1 & N2 anymore. They are sometimes used for barge line tie-up, but not very often. These dolphin structures could potentially be removed.

8. Three types of anodes were noted during the underwater inspection: hanging anodes on the dock addition, welded anodes on the original portions and older anode bracelets on the original dock and

### Observations (continued)

approach. The majority of the anodes are almost completely consumed. Several hanging anodes had broken wires under the deck.

The recent 2015 project installed new anodes at various points along the facility, and cathodic protection readings on the most recent inspection averaged -1.0V. Any reading more negative than -0.8V indicates the steel is adequately protected.

9. The dock approach pile caps were shop fabricated with short stubs of piles beneath, and was spliced to field-driven POL piles during construction. The alignments of the spliced piles are slightly eccentric in most cases, and vary in style from ring stiffeners to multiple plate stiffeners.
10. Grout is failing between precast panels at pile caps along the dock approach.
11. 50% of dock approach guardrail connections are failing along the dock approach. Connections vary widely, most likely due to field repairs made over the years. Many of the welded connections are broken and freely corroding. The field repairs include coped rails, welded steel bars between rails & posts, field welded posts to rails – to name a few. Rail sections were misaligned with adjacent sections and none of the field welds appear to have been field coated.
12. There are 3 types of fuel lines (Diesel, Avgas, Autogas) and a water line that run from shore to the main dock, supported on the cantilevered pile bent cap of the approach span, right side (facing seaward).  
Utility (fuel line) supports were field welded to approach rails and many are either bent, cracked, or have cracked welds.
13. Project 67714 (2015) replaced damaged deck panels (slab #1) in spans 75 & 76 and in the old dock (slab 3, span 2 and slab 2, span 3), replaced damaged bullrails, repaired fender units, replaced access plates and refurbished an access ladder.

<b>Inspection Summary</b>		
Structure	Priority	Recommendations
<i>Category I - Safety Issues</i>		
Concrete Dock Panels	1	Monitor the condition of the hollow-core concrete deck panels.
New Dock pile caps	2	Monitor the distortions and impact-related damage in Girder 1 of the dock addition for further deformations. Program a project to replace any of the pier caps or girders whose top/bottom flanges are damaged beyond 1/4 span.
Old Dock pile caps	3	Repair the circumferential crack at toe of weld between pier cap and pipe pile on the old deck, bent 1, west.
<i>Category II - Rehabilitation Work</i>		
New Dock Piling & Superstructure	4	Sandblast and coat steel surfaces above submerged zone. Move longitudinal girders to line up over the center of the steel support piling.
Anodes	5	Maintain cathodic protection system.
Dock Approach	6	Repair the grout between precast panels at pile caps along the dock approach. Repaire failing guardrail & utility support connections along the dock approach.
<i>Category III - Upgrades Needed</i>		
Dock Replacement	11	Original dock and approach is 34 years old and in poor condition. Program a project to replace the facility with a new dock.