FEEDER VESSEL REQUIREMENTS

AMHS Capital Plan Background Information

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Elliott Bay Design Group

Cover Photo from AMHS Website

PREPARED BY

Elliott Bay Design Group
5305 Shilshole Ave. NW, Ste. 100
Seattle, WA 98107

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EXECUTIVE SUMMARY

This report summarizes information to help define, and proposes suggested, performance requirements of a new 24/7 Feeder Vessel class for the Alaska Marine Highway System (AMHS) and assesses the suitability of the Alaska Class Ferry (ACF) design to serve as that vessel's parent craft as notionally envisioned in the Reform Initiative Phase 2 Report.

A gap analysis shows that using the existing Day Boat ACF design as the baseline for a 24/7 Feeder Vessel is feasible. Converting the ACF design to align with the 24/7 Feeder Vessels operational requirements consists of three primary modifications which include a forward starboard side door, increased crew size, and addition of crew and officers' quarters. Inclusion of a bow door will maintain flexibility to surge to Lynn Canal service if needed. Note that a 24/7 Feeder Vessel may still serve as a day boat with the smaller crewing requirements, this will result in the same operation as the ACF with only slightly increased fuel expenses.

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PROJECT BACKGROUND

Phase One of the Alaska Marine Highway System (AMHS) Strategic Operational and Business Plan was a governance study performed in 2016 [1]. The study identified alternative governance structures that could help AMHS achieve financial sustainability in the face of decreasing fare box recovery rates and a major budget shortfall for the State of Alaska. AMHS is currently a line agency of state government and operates as part of the Department of Transportation and Public Facilities (DOT&PF). The organization's funding is determined on an annual basis, resulting in schedule instability and unpredictability to plan for the long term. As part of the state government, AMHS management does not have the ability to directly negotiate with unions and is subject to political influence resulting in frequent turnovers of key leadership positions.

The Phase One recommendation was to further investigate the reorganization of AMHS into two entities. The first entity would be a public corporation, owned by the State of Alaska, to operate the vessels and terminals. The second entity would be an asset management group that would be contained within a line agency of the State of Alaska. The purpose of this reorganization would be to insulate AMHS operations from politics and to create a dedicated source of funding.

Phase Two was the development of a strategic business plan with the objective to create "a clear description of how the Alaska Marine Highway could better serve Alaskans' transportation needs as a public corporation and why it is imperative to do so." The scope of work for phase two was comprehensive and included the following five tasks:

1. Revenue Analysis
2. Operations Analysis
3. Operations Financial Model
4. Structure and Benefits of Public Corporation Governance
5. Public Process and Stakeholder Engagement

Of the many findings resulting from this work, the idea that is relevant to this report was the desire to standardize future vessels as much as practical for operational and cost efficiencies. The envisioned future fleet of standardized vessels includes dayboats for single workshift operations, 24/7 feeder vessels for multi-workshift operations, ocean capable vessels, and mainline vessels. Further, the four classes of vessels were envisioned as variations of two existing vessel designs increasing commonalities and standardization within the fleet.

- The dayboats are the Alaska Class Ferries (ACF) currently under construction.
- The 24/7 Feeder Vessel was envisioned as a modified version of the ACF design that included crew only quarters so that the vessels could serve overnight trips in Prince William Sound and Southeast Alaska.
- The ocean capable vessel is the TUSTEMENA Replacement Vessel (TRV), the design of which is materially complete.
- The mainliner vessel could be a lengthened version of the TRV, streamlining much of the engineering and design process.

Phase Three was activity by the team to support the legislative process and stakeholder engagement.

PURPOSE

The objective of this analysis is to inform the determination of vessel requirements for a 24/7 Feeder Vessel as notionally envisioned in the Reform Initiative Phase Two Report. A gap analysis between the proposed requirements and the existing Alaska Class Ferry (ACF) design is performed so that necessary design changes may be identified

1. HISTORICAL REVIEW

1.1 Operations Overview and Existing Fleet Summary

This section provides a brief overview of AMHS to serve as a foundation for the following discussions.

Many Alaskan communities are inaccessible by a land-based road system resulting in the need for an ocean-based highway system. As an alternative to a road, AMHS's purpose is not the same as a financially self-sustaining commercial ferry system. Instead, it is a public infrastructure that connect these communities with other intermodal components of State, federal and international transportation systems.

AMHS serves three regions grouped as Southeast, South-Central, and Southwest Alaska shown below in Figure 1.

Figure 1. AMHS Service Regions [2]

The Southeast region of AMHS has the most activity, operates year-round, and the inside passage provides a sheltered area for vessel operation. The Bellingham service that connects the Southeast to the "Lower 48" is AMHS's most economically productive route and 44% of the organizations operating revenue is tied to Bellingham embarkations or disembarkations.

The South-Central region's operations are concentrated around Prince William Sound, a cross gulf service connects the Southeast and South-Central regions during the summer months.

The Southwest region of Alaska consists of Kodiak Island, the Alaska Peninsula and the Aleutian Chain. This operation requires an ocean class vessel, and the peninsula and Aleutian Islands are only serviced during the summer season because of weather constraints.

The fleet that serves these routes consist of ten vessels belonging in three vessel groups referred to as mainline, day boat, and shuttle ferries based on their nature of service (as defined in AMHS publicized information). While three vessel groupings are presented, there are approximately seven vessel classes (designs). Also, while the TUSTEMNA is included as a mainline vessel, it is frequently referred to as an ocean class vessel. Unlike the other mainline vessels, she is unable to

serve the Southeast region. The KENNICOTT is frequently referred to as an ocean capable vessel because of its cross-gulf service.

Table 1. Existing Fleet Summary [2]

Vessel Group	**MAINLINE**					**DAYBOAT**		**SHUTTLE**		
Vessel Name	COLUMBIA	KENNICOTT	MALASPINA	MATANUSKA	TUSTUMENA	AURORA	LECONTE	CHENEGA	FAIRWEATHER	LITUYA
Year Built	1974	1998	1963	1963	1964	1977	1974	2005	2004	2004
Length (ft)	418	382	408	408	296	235	235	235	235	181
Beam (ft)	85	85	74	74	59	57	57	60	60	50
Service Speed (kts)	17.3	16.75	16.5	16.5	13.3	14.5	14.5	32	32	11.5
Passenger Capacity	499	450	450	450	160	250	225	210	210	125
Total Berths	292	320	234	243	60	0	0	0	0	0
20' Vehicle Capacity	133	78SE/67SW	83	83	34	33	33	31	31	15
Commercial Van Capacity	16	17	10	10	6	7	8	3	3	2
Normal Crew Capacity	63	55	47	48	38	24	24	10	10	5

The CHENEGA and FAIRWEAHTER are sized similarly to the AURORA and LECONTE but have a much higher operating speed. The LITUYA is the smallest vessel in the AMHS fleet and operates exclusively as a shuttle service between Ketchikan and Metlakatla.

1.2 Existing Vessel Routes

The current routes within Southeast Alaska are shown below in Figure 2. Most communities in Southeast Alaska receive year-round service with mainline vessels serving larger communities and day boats connecting to smaller communities. A shuttle service operates between Juneau-Sitka and Ketchikan-Metlakatla.

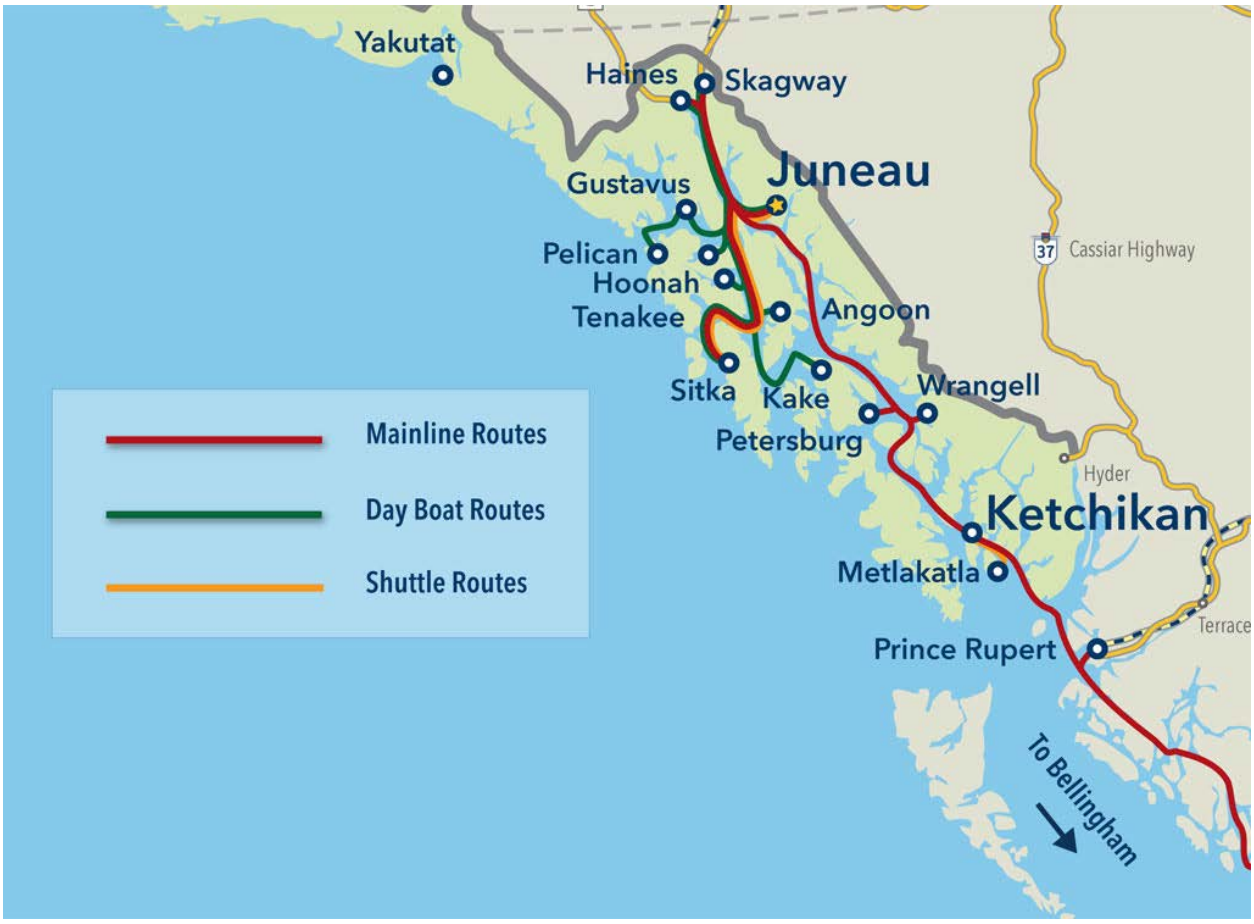

Figure 2. Southeast Alaska Current Vessel Routes [2]

The above mainline and day boat routes have the following notional breakdowns, these breakdowns are simplified representations of the complex and variable operating patterns that exist in the detailed schedule.

Mainline Routes

Bellingham→Ketchikan→Wrangell→Petersburg→Juneau→Haines→Skagway→Sitka

Prince Rupert→Ketchikan→Wrangell→Petersburg→Kake→Sitka→Juneau→Haines→Skagway

Day Boat Routes

Juneau→Tenakee→Angoon

Juneau→Gustavus→Hoonah

Juneau→Haines→Skagway

The Southeast and South-Central regions of Alaska are connected by a cross-gulf service in the summer as shown in Figure 3. The cross-gulf service is currently performed by the ocean class vessel KENNICOTT.

Figure 3. Cross-Gulf Service [2]

Operations within Prince William Sound are performed by day boat routes that concentrate around Whittier-Valdez, and Whittier-Cordova as shown in Figure 4. The ocean class vessel TUSTEMENA connects the South-Central region to the Southwest.

Note that while the KENICOTT and TUSTEMENA are both ocean class vessels they are not interchangeable because of port compatibility limitations.

Figure 4. South Central Routes and Prince Williams Sound [2]

A significant complication for AMHS route and vessel assignments is terminal and vessel compatibility summarized in the matrix included in Appendix A [3]. The compatibility is driven by vessel operating environment (partially protected vs open waters) and the arrangements of loading ramps and access doors.

1.3 Phase Two Vessel Routes

The existing routes and schedules for AMHS are complex puzzles that are pieced together carefully to balance vessel availability, crew requirements, union and United States Coast Guard (USCG) labor guidelines and regulations, vessel terminal compatibility, route demand,

seasonality, and day of the week. In contrast, the analysis performed in phase two of this reform initiative required routes to be simplified to a singular repetitive pattern in order generate a notional financial forecast.

In the phase two scenario, one 24/7 Feeder Vessel operated in a loop around the inside passage, and one 24/7 Feeder Vessel to operate in a loop around Prince William Sound (PWS) as shown below.

Prince William Sound Loop:Whittier→Valdez→Tatitlek→Cordova→Chenega→Whittier

Inside Passage Loop: Juneau→Gustavus→Pelican→Hoonah→Sitka→Tenakee→Angoon→Kake→Juneau

This is a simplified representation of the service that is currently provided by the AURORA in the South Central region, and the LECONTE in the South East region. An example of the AURORA and LECONTE's schedule for August 2018 and January 2019 is included in Appendix A. These day boats typically do not operate overnight, and their daily schedule has multiple variations. In the schedules observed, the LECONTE always begins the operational day at 7am from Juneau, and the AURORA always begins the operational day at Cordova or Valdez.

A representative schedule based on the loop concept is tabulated below.

Speed:	16.5 kts

Prince William Sound		Distance *nm*	Transit Time *hrs*	Time in Port *hrs*	
Whittier	Valdez	79	4.8	1	
Valdez	Tatitlek	39	2.4	1	
Tatitlek	Cordova	45	2.7	1	
Cordova	Chenega	95	5.8	1	
Chenega	Whittier	67	4.1	12	reset
Total		325	19.7	16	

Southeast Alaska		Distance *nm*	Transit Time *hrs*	Time in Port *hrs*	
Juneau	Gustavus	62	3.8	1	
Gustavus	Pelican	29	1.8	1	
Pelican	Hoonah	40	2.4	1	
Hoonah	Sitka	118	7.2	1	
Sitka	Tenakee	27	1.6	1	
Tenakee	Angoon	35	2.1	1	
Angoon	Kake	30	1.8	1	
Kake	Juneau	114	6.9	12	reset
Total		455	27.6	19	

Prince William Sound

23.7 hours per loop without reset
2.0 Shifts per loop
4.7 trips per week
11.8 hours - longest passenger ride*

Southeast Alaska

34.6 hours per loop without reset
2.9 shifts per loop
3.6 trips per week
17.3 hours - longest passenger ride*

*Assumed vessels reverse directions of rotation

A service speed of 16.5 knots enables two and three 12-hour crew shifts to compete a loop in each of Prince William Sound and Southeast Alaska, respectively. The service speed may decrease if the assumed 1-hour time at each port can be refined. This is in-line with the service speed that was proposed during phase two of 16 knots.

1.4 Existing Vessel Review (LECONTE and AURORA)

The LECONTE and AURORA are sister ships that were designed by Nickum & Spaulding Associates of Seattle, Washington and constructed at Peterson Builders, Inc. in Sturgeon Bay, Wisconsin in 1974 and 1977 respectively.

Both vessels are 235 feet long and 57 feet wide with a service speed of 14.5 knots. There are 660 linear feet of vehicle lanes, which is equal to approximately 33 twenty-foot vehicles.

Figure 5. LECONTE (left) and AURORA (right)

Onboard amenities include observation lounges with comfortable chairs, a covered heated solarium, a cafeteria-style restaurant, a movie lounge, and showers. Fresh towels are available upon request for a small fee. Coin operated ice machines and microwaves are also available. [2]

Both vessels are SOLAS compliant Subchapter H passenger vessels capable of operating in Lakes, Bays and Sounds within the boundaries of Prince William Sound as defined in 46 CFR 7.160 and the inside waters of Southeast Alaska, from Dixon entrance to Cape Spencer [4]. It is unknown if the vessels SOLAS certificates are up to date. The vessels are equipped with a stern ramp and port and starboard forward side doors. The vessels are compatible with all ports in the Southeast region and Prince William Sound [3].

The vessels typically operate with 24 crew and the AURORA carries up to 250 passengers where the LECONTE carries up to 225 passengers (as shown previously in Table 1). These passenger capacities are less than those allowed by the Certificate of Inspection (COI) where both vessels are allowed up to 300 passengers and 25 crew with a total capacity for 325 persons.

The crew requirements as specified by the COI and the AMHS specified crew list for the AURORA are compared below in Table 2. Most of the additional crew is a result of services offered aboard that require stewards and cooks. There are two additional positions in the deck department (Porter and Watchman) as well as the engine department (Junior Engineer and additional Oiler).

Table 2. AURORA crew requirements

	USCG COI	

	Minimum	Minimum for voyages less than 12 hours	AMHS Operating Crew List
Master	1	1	1
Licensed Mates	2	2	2
Able Seamen	4	2	4
Ordinary Seamen (OS)	2	1	2
OS Porter	0	0	1
Watchman	0	0	1
Chief Engineer	1	1	1
Licensed Engineers	2	1	2
Junior Engineer	0	0	1
Oilers	2	0	3
Crew Member	1	0	0
Patrolman	1	1	0
Chief Steward	0	0	1
Chief Cook	0	0	1
Second Cook	0	0	1
Mess Steward	0	0	1
Other Stewards	0	0	1
Chief Purser	0	0	1
Total	**16**	**9**	**24**
Certified Lifeboatmen*	10	8	

*Number of crew members within the total that must be certified lifeboatmen.

Crew accommodations on these vessels are split between the crew quarters on the gallery deck, and the officers' quarters on the bridge/sun deck. Crew quarters rooms have access to bathroom facilities shared between two rooms. Officers' quarters are equipped with private bathrooms. Each accommodation area is equipped with a communal laundry room.

1.5 Historical Development of the ACF Design

The ACF design has a long and complex evolutionary history. Many years of indecision regarding the operational nature of the vessel, primarily whether the vessel should be limited to a 12-hour operational day, or have the ability serve a variety of routes that may exceed the 12-hour limit resulted in multiple design study reports (DSR), concept discussions, and changes in design direction. The following discussion is lengthy but the historical context is relevant and informative in understanding the operational requirements identified for each of the design iterations (highlighted in gray). If nothing else, the convoluted history of the ACF design demonstrates that AMHS requires insulation from politics to be empowered to plan for the long term Historical names attributed to the ACF design at various points in time are identified using *italics*.

AMHS aims to attain a vessel service life of 64-years. Changing environmental regulations in the early 2000's resulted in the sale of the BARTLETT, a stern/bow roll on-roll off (RORO) ferry that would have required extensive and expensive upgrades to be allowed to continue operations. Replacement vessels for the fleet were first being conceptualized starting in 2004.

A mainliner design study was submitted by EBDG to AMHS in October 2004 [5]. The study was performed in light of the 120 million dollar budget called for by the 2004-2006 State Transportation Improvement Plan (STIP) and found that a new mainline design could be procured within a $105~120 million range depending on service requirements. It also identified that a bare hull renovation of an existing mainline vessel could be performed for approximately 10-25% less.

The *Southern Gateway Shuttle Ferry* was being investigated concurrently with the mainliner design study to provide service between Prince Rupert and Ketchikan. The Glosten Associates completed a DSR for this vessel in May 2005. The selected concept presented in this DSR was a narrow and fast design that would complete a round trip within one 12-hour day with a capacity for 59 vehicles.

The Juneau Access project, an ongoing effort since 1972 to connect Juneau to Haines and Skagway by road gained momentum around 2005, the Alaska DOT&PF announced that the connection was to be provided partly by road and partly by fast ferry. As a result, on June 28, 2006 the DOT&PF issued a Request for Proposal for a vessel described as the *Southeast Shuttle Ferry* with the following criteria:

1. Vessel Type: Roll On-Roll Off Passenger Ferry
2. Overall Length: 255ft to 305ft
3. Passenger Capacity: 450 (interior seating for 300 passengers)
4. Vehicle Capacity: 48-60 plus
5. Loading Ability: Bow, Stern and Side
6. Cruise Speed: 18 knots (20 knot sprint speed)
7. Operation: Day boat Operations (12 hours)

Unlike the *Southern Gateway Shuttle Ferry*, this design was intended to primarily serve Haines – Auke Bay(Juneau) and potentially the Skagway – Auke Bay routes in the Lynn Canal. A 12-hour operation was desired because of the advantage of smaller crews which greatly reduces operating costs.

Governor Murkowski was succeeded by Governor Palin on December 4th, 2006.

EBDG was selected as the design team for the *Southeast Shuttle Ferry* and the first meeting between AMHS and EBDG was held in October 2006. The double-ended nature of the vessel and whether the vessel had to be a stern/bow RORO instead of a stern/side RORO was investigated in detail. Some of the issues surrounding this design decision were:

- The $15 million in terminal modifications at Haines that would result in stern-loading compatible berths, but a restriction to side loading in the meantime.

- The non-suitability of a conventional double-ended vessel to the Lynn Canal, which would require specialized watertight bow doors.
- The decision between a knighthead bow or similar, the inclusion of a bow ramp, or a combination of the two.

The resulting non-conventional design with a complex door arrangement was estimated to cost more than $50 million and take more than two years for construction.

EBDG completed a DSR in May 2007 and preliminary concept design sketches above the waterline were prepared. This DSR noted that the environmental condition encountered in the Lynn Canal is more severe than those encountered in most protected routes which increases vessel motions and the likelihood of seasickness. The most effective way to mitigate vessel motions is to increase the vessel length and displacement. As a result, a vessel length of 300 ft was recommended to ensure adequate pitch behavior in the head and following seas that are predominant in the operating area [6].

However, the project was put on hold in January 2008 at the design progress review meeting because of possible conflicts between the Lynn Canal centric shuttle ferry and the Juneau Access project which had proposed a Lynn Canal highway, a 47.9 mile stretch of road that would connect Juneau and Skagway.

In the meantime, the mission of the *Southeast Shuttle Ferry* was reexamined in light of the new STIP. It was decided that to be able to continue to serve AMHS after the completion of the Lynn Canal highway the vessel would need to be as flexible as possible. New routes were examined including Ketchikan – Prince Rupert, the routes originally envisioned for the *Southern Gateway Shuttle Ferry*. However, increasing fuel costs began competing with crew costs which made a fast speed vessel undesirable. The increased operating area and rising fuel costs drove the vessel design away from the 12-hour operating day mission of the *Southeast Shuttle Ferry*. The addition of new routes would require overnight crew accommodations, SOLAS certification as well as additional passenger amenities. Flexibility to fit anywhere into the AMHS system was now seen as key.

In late 2008, AMHS worked with other departments within the DOT&PF to broaden the mission of the vessel to operate in all routes within inside waters. This expanded vessel mission supported the needs of the STIP, the Southeast Alaska Transportation Plan (SATP), and Phase I of the AMHS System Analysis. The *Alaska Class Ferry* design study of 2009 [7] is the result of this mission expansion, the vessel requirements noted in the executive summary are listed below.

1. The *Alaska Class Ferry* will primarily be designed for daily round trip routes of between 60 nm and 100 nm in length to be operated in the Southeast and Prince William Sound regions of Alaska.
2. The vessel will be capable of servicing routes greater than 100 nm but will likely not perform these routes with one round trip per day. Due to the relatively short sailing time of the vessel, the ferry will not be equipped with overnight passenger accommodations.

3. Overnight crew accommodations will be provided to allow vessel operation on routes where the operational day exceeds 12 hours.
4. The ferry will be American Bureau of Shipping (ABS) classed as well as inspected by the United States Coast Guard (USCG) as a subchapter H passenger vessel. To enable international service to Prince Rupert the vessel will also meet all applicable Safety of Life At Sea (SOLAS) requirements.
5. The overall length of the ferry will be approximately 350 ft long with a maximum draft of 17 ft. A schedule reliability of 99% in Sea State 4 is required.
6. The ferry will be single ended with an enclosed Car Deck with port and starboard side doors forward and a stern door for vehicle unloading and loading, similar to most of the existing AMHS fleet.
7. It will have capacity for 60 Alaska Standard Vehicles (ASV) and seating for 300 passengers and the overall passenger capacity will be less than 500.
8. The ferry will have a conventional propulsion system with twin propeller shafts using controllable pitch propellers. Each shaft will be mechanically driven by a medium speed diesel engine.
9. The cruise speed will be 17 knots with the capability for a 19 knot sprint speed.

This design report concluded that the added weight forward and the broader bow inherent with the "knight's head" configuration will likely result in a 3 to 5% fuel efficiency penalty, and an estimated added construction cost of $2.6 million. Because the 12-hour operational day was no longer a critical design feature, providing simultaneous passenger and vehicular loading and unloading was determined to be a more cost-effective solution than a bow door to gain some loading/unloading efficiency.

Governor Palin was succeeded by Governor Parnell on July 26th, 2009.

The 2010 Alaska State Legislature appropriated $60 million of state general funds toward building the first *Alaska Class Ferry*. The appropriation matched $68 million in Federal Highway Administration funds. Later that year, Governor Parnell "defederalized" the *Alaska Class Ferry* project and the department transferred approximately $1.5 million that had been expended for design to other state transportation projects. Defederalizing the project aligned with the Governor's and legislature's intent that the vessel be built in Alaska to support Alaskan jobs, but also meant that there would only be one shipyard available for the contract which could increase construction costs. The sole source situation could result in inflated construction costs because of the absence of competing market forces. To mitigate this risk a project delivery method known as Construction Manager/General Contractor (CMGC) was adopted. The federal funds that had been appropriated were later redistributed to other transportation projects in Alaska.

In the meantime, the Lynn Canal Highway was unable to move forward because alignment along the preferred route incurred a loss of 70 acres of wetlands, 68 acres of old-growth forest, the possibility of up to a 26% reduction in the brown bear habitat, and disturbances to bald eagle nesting territory. The resulting dispute and law suits resulted in the court ruling for the environmental impact statement to be rewritten. The work on a new draft supplemental

environmental impact statement (SEIS) began in 2011 when the state lost its options to appeal the ruling.

In fall 2012 the conceptual design had reached a point where the project cost could be agreed upon by the CMGC process. These estimates showed the total project cost at between $150-$167 million. This cost estimate exceeded the amount of funding that was available for construction which resulted in a re-evaluation of the vessel's mission.

The high cost of the *Alaska Class Ferry* and the stagnation of the Lynn Canal Highway resulted in Governor Parnell reverting the vessel's mission to a shuttle ferry design in December 2012.

Coastwise Corporation published a design concept report (DCR) in February 25, 2013 with the following mission for the *Day Boat ACF*.

1. **Payload:** The vessel must carry a minimum of 53 Alaska Standard Vehicles. The vessel shall have a certificate for 300 passengers and provide seating for at least 200 passengers.
2. **Speed:** The vessel shall operate at a 15.5-knot schedule speed. The vessel shall be capable of making a 16.0-knot service speed at 85% of the Maximum Continuous Rating (MCR) of the engines.
3. **Bow Configuration:** The vessel shall feature bow vehicle unloading, with self-propelled mooring to hold to the terminal. The bow shall have a door which shall be able to be opened just prior to landing. The bow door shall be simple, strong, and reliable. The bow shall reduce spray generation during winter operation. The vessel shall not have forward side doors.
4. **Stern Configuration:** The vessel must have a center stern door and at least one port side door aft. An additional starboard side door at the stern may be considered as an option.
5. **Maneuverability:** Maneuverability is a key part of each vessel's daily operation. The vessel must be able to turn and back quickly into a dock, one or more times per day. The vessel must therefore be highly maneuverable. Excellent visibility astern from the wheelhouse is required. Three rudders or a stern thruster are options to consider for enhanced maneuverability.
6. **Manning:** The vessel design shall safely minimize the required manning. Close attention shall be paid to the arrangements for lifesaving and vessel evacuation requirements. An un-manned engine room shall be considered. There shall be no galley or food service other than vending machines. Mooring operations must not increase manning.
7. **Accommodations:** Good accommodations shall be provided for passengers and crew. Passenger spaces shall be broken into multiple rooms, so that passengers have a choice of seating and activities during transit. At least four of the passenger areas shall have lights available during non-daylight hours of operation. A small separate deck shall be available for crew. Crew accommodations shall provide an officer mess, crew mess, break room, quiet room, and lockers and gear storage.

The above requirements represent a smaller and slower version of the *Southeast Shuttle Ferry* design criteria that was presented in 2006. These requirements are well aligned with the objective of reducing vessel costs. Unlike the *Southeast Shuttle Ferry*, the above DCR identified numerous potential routes for this vessel, within three main geographic areas:

1. Lynn Canal – From Auke Bay (Juneau) north to Haines and Skagway, including intermediate and yet-to-be-developed terminal sites
2. Northern Southeast – From Auke Bay (Juneau) south to Angoon and Tenakee Springs, and east to Hoonah and Gustavus
3. Prince William Sound – including Cordova, Whittier and Valdez

Serving the above routes without overnight crew accommodations with a maximum service speed of 16 knots requires some logistical creativity. The DCR identified alternate means of operating the day boat such as using two 8-hour per day crew shifts or overnighting the crew at a shore facility to make the return trip on the following day.

The 15.5 knot speed means that the *Day Boat ACF* cannot operate the existing three stop Lynn Canal route (Auke Bay – Haines – Skagway – Haines – Auke Bay) in a 12-hour period. Instead the priority for these new vessels will be for one vessel to serve a round trip between Auke Bay and Haines while the other vessel serves multiple round trips between Haines and Skagway. This effectively requires two vessels to operate within the Lynn Canal to connect all three communities within a day.

A DSR to meet the new *Day Boat ACF* requirements was submitted by EBDG on July 10th, 2013 [8]. The design process for the *Day Boat ACF* began in 2013. The keel for two *Day Boat ACF*s were laid on December 10th, 2014.

Governor Parnell was succeeded by Governor Walker on December 1st, 2014.

The final design of the *Day Boat ACF* includes a variety of passenger spaces including a children's play area, a quiet library, and a cafeteria. Note that the *Day Boat ACF* was originally envisioned to have a stern ramp, an aft port door, a forward starboard door, and a bow door/ramp. The forward starboard door was included so the vessel could effectively serve Haines while the two bow-loading compatible berths were under construction. Since then, the forward starboard door has been eliminated because it was no longer necessary for the intended routes. This means that if the *Day Boat ACF* is to be operated outside of the Lynn Canal it currently cannot support a stern-side RORO operation and may require some additional time for loading and unloading vehicles. The only terminal that is explicitly known to be compatible with the bow door/ramp is Haines.

The change in political climate resulted in conversations for converting *Day Boat ACF* to include overnight crew accommodations resuming in 2015. A decision to add crew quarters to the two Day Boat ACFs was announced by the DOT&PF Commissioner on September 13th, 2018 during Southeast Conference's annual fall meeting. A final decision on the crew quarters was subsequently deferred to the next legislative session.

Governor Walker was succeeded by Governor Dunleavy on December 3rd, 2018.

2. OPERATIONAL REQUIREMENTS DEVELOPMENT

EBDG reviewed the operational requirements of a potential feeder vessel with AMHS on September 10th. The existing feeder vessels (AURORA and LECONTE) were identified as currently providing sufficient service for their assigned routes.

2.1 Detailed Schedule Considerations

The history of the ACF design demonstrates that vessel operations and arrangements are heavily influenced by the desire to minimize operational expenses which is largely driven by route length and subsequent crew costs. Because of the large number of terminals that are served by AMHS there are many possible route combinations that could be considered, for the purposes of a big picture financial forecast the phase two analysis simplified the route combinations by drawing loops around the Inside Passage and Prince William Sound as discussed in Section 1.3. The simplicity of the loop creates predictability which could in turn increase ridership. However, whether vessels operating in the night will generate as much revenue as vessels operating in the day is a significant unknown.

A 16.5 knot service speed was identified as a potentially beneficial for the loop routes with respect to organizing 12-hour crew shifts. For the purposes of operating as a day boat, to successfully meet a 12-hour operational day it is recommended to limit the planned run time of the vessel to approximately 10 hours so that time can be allocated for departure and arrival maneuvering as well as potential weather and current delays.

The existing routes served by the LECONTE in the Southeast region (excluding the Lynn Canal) is summarized below, and the current 14.5 knot service speed was compared against the 16.5 knot service speed. The analysis is simplified to transit time and does not account for vessel light-off, maneuvering or mooring times.

Table 3. Transit Speed Comparison for Southeast Alaska

Southeast Alaska			Transit Speed Comparison			
			14.5 Knots		16.5 Knots	
			Transit Time	Time in Port	Transit Time	Time in Port
			hours	*hours*	*hours*	*hours*
1A	Juneau	Gustavus	4.5	1	4.0	1
	Gustavus	Hoonah	1.8	1	1.5	1
	Hoonah	Juneau	3.3		2.9	
		Route Total	**11.5**		**10.3**	
1B	Juneau	Hoonah	3.3	1	2.9	1
	Hoonah	Gustavus	1.8	1	1.5	1
	Gustavus	Juneau	4.5		4.0	
		Route Total	**11.5**		**10.3**	
2A	Juneau	Tenakee	4.5	0.5	4.0	0.5
	Tenakee	Angoon	2.5	0.5	2.2	0.5
	Angoon	Juneau	5.3		4.6	
		Route Total	**13.3**		**11.8**	
2B	Juneau	Angoon	5.3	0.5	4.6	0.5
	Angoon	Tenakee	2.5	0.5	2.2	0.5
	Tenakee	Juneau	4.5		4.0	
		Route Total	**13.3**		**11.8**	
3	Juneau	Sitka	10.0	2.5	8.8	2.5
	Sitka	Juneau	10.0		8.8	
		Route Total	**22.5**		**20.1**	

Table 3 shows that increasing the service speed to 16.5 knots will most likely not result in any significant operational cost savings. All routes will still have run times in excess of 10 hours and it will be necessary to carry additional crew to accommodate the 12-hour work shift requirement.

The same analysis was performed using the representative routes for the AURORA in the South Central region.

Table 4. Transit Speed Comparison for South Central Alaska

South Central Alaska			Transit Speed Comparison			
			14.5 Knots		16.5 Knots	
			Transit Time	Time in Port	Transit Time	Time in Port
			hours	*hours*	*hours*	*hours*
1	Cordova	Valdez	5.0	0.75	4.4	0.75
	Valdez	Tatitlek	3.3	0.5	2.9	0.5
	Tatitlek	Cordova	3.8		3.3	
		Route Total	**13.3**		**11.8**	
2	Cordova	Whittier	6.8	0.75	5.9	0.75
	Whittier	Valdez	5.8	1	5.1	1
	Valdez	Cordova	5.0		4.4	
		Route Total	**19.3**		**17.1**	
3	Cordova	Whittier	6.8	1.5	5.9	1.5
	Whittier	Cordova	6.8		5.9	
		Route Total	**15.0**		**13.4**	
4	Cordova	Chenega	6.3	0.5	5.5	0.5
	Chenga	Whittier	5.0	0.75	4.4	0.75
	Whittier	Cordova	6.8		5.9	
		Route Total	**19.3**		**17.1**	
5	Cordova	Whittier	6.8	0.75	5.9	0.75
	Whittier	Tatitlek	5.0	0.5	4.4	0.5
	Tatitlek	Valdez	2.8		2.4	
		Route Total	**15.8**		**14.0**	
6	Valdez	Whittier	5.8	1.3	5.1	1.3
	Whittier	Cordova	6.8		5.9	
		Route Total	**13.8**		**12.2**	
7	Valdez	Tatitlek	2.8	0.5	2.4	0.5
	Tatitlek	Whittier	5.0	1.0	4.4	1.0
	Whittier	Cordova	6.8		5.9	
		Route Total	**16.0**		**14.2**	

Again, Table 4 shows that a service speed of 16.5 knots is not fast enough to reduce the number of crew shifts.

The run time of the routes identified above at varying vessel speeds in 2knot increments is summarized below in Table 5. Run times that are less than 10 hours and compatible with a 12 hour day boat operation are identified using green fill. The table demonstrates that significant increases in speed are required to reduce the number of crew shifts in the routes currently served by the AURORA and LECONTE. Having all routes compatible with day boat requirements would require a fast vehicle ferry with speeds in excess of 30 knots.

Table 5. Summary of Run Time vs Speed Analysis

Route Run Time (Hrs) at Varying Vessel Speeds										
Region	Route No.	Vessel Speed in Knots								
		14.5	**16.5**	**18.5**	**20.5**	**22.5**	**24.5**	**26.5**	**28.5**	**30.5**
Southeast Alaska	1	11.5	10.3	9.4	8.7	8.1	7.6	7.2	6.8	6.5
	2	13.3	11.8	10.6	9.7	8.9	8.3	7.7	7.2	6.8
	3	22.5	20.1	18.2	16.6	15.4	14.3	13.4	12.7	12
South Central Alaska	1	13.3	11.8	10.7	9.7	9	8.4	7.8	7.4	7
	2	19.3	17.1	15.5	14.1	13	12.1	11.3	10.7	10.1
	3	15	13.4	12.1	11	10.2	9.5	8.9	8.4	7.9
	4	19.3	17.1	15.4	14	12.9	11.9	11.1	10.4	9.8
	5	15.8	14	12.6	11.5	10.6	9.8	9.2	8.6	8.1
	6	13.8	12.2	11	10.1	9.3	8.6	8.1	7.6	7.2
	7	16	14.2	12.9	11.8	10.8	10.1	9.4	8.9	8.4

While increasing the vessel speed can reduce the number of crew shifts, any operational cost efficiencies gained must be significant enough to offset the increased vessel construction and operational expense impacts such as fuel, capital, maintenance, and training costs.

If an intermediate speed is selected the added complexity to crew assignments and dispatch resulting from a combination of day boat routes and other multi-shift routes must be considered.

Note that the relationship of vessel speed to fuel consumption is non-linear. In other words, increases in vessel speed will require an exponential increase in fuel consumption and consequently fuel cost. It is possible to operate a higher speed vessel at lower operating speeds to reduce fuel consumption as allowed by specific routes. While this will decrease the vessels fuel consumption it will require running the engine away from its most efficient operating point.

In this instance, determining the breakeven point of decreased crew costs and increased fuel costs would require extensive analysis of an entire calendar years' worth of complex schedules at varying service speeds and fuel price points. Based on the above and the observation from AMHS personnel that the LECONTE and AURORA's operational capabilities are currently sufficient for the routes, it is determined that the operational speed of 14.5 knots is adequate.

2.2 Ridership Considerations

The passenger and vehicular ridership for the routes and area served were tabulated by examining ATVR data from 2015. Data was not available for some route segments that were not operated in 2015, it is assumed that the passenger and vehicular demand for these segments would be negligible if implemented.

Because of the wide variations in passenger and vehicle numbers carried on any given trip, the data is presented to show the 2015 maximum as well as the average for any given route segment. The notionally required vessel capacity is calculated as the Route Max. The Route Max depends on the nature of the route and was calculated as follows:

- Routes with Two Terminals: Route Max shows the maximum value carried in either direction
- Routes with Three Terminals: Route Max shows the maximum value carried in the two combined segments A+B or B+C
- Loop Routes: Route Max shows the maximum value carried for half of the loop

The loop route ridership analysis was limited to one direction, it is possible that operating the loop in the opposite direction may encounter different demands. For the purposes of this analysis it was assumed the results would be similar.

Table 6. Theoretical Ridership for Prince William Sound Loop

Prince William Sound		**Ridership Analysis** *Source Data: 2015 ATVR Data for AURORA*					
		MAXIMUM			AVERAGE		
		PAX	*VEH*	*VEH Length*	*PAX*	*VEH*	*VEH Length*
Whittier	Valdez	123	33	671	52.8	17.3	347.4
Valdez	Tatitlek	2	3	75	1.4	1.0	22.6
Tatitlek	Cordova	22	2	38	12.0	1.0	19.0
Cordova	Chenega	*AMHS did not operate Cordova-Chenega in 2015*					
Chenega	Whittier	11	3	66	8.5	2.5	50.5
Route Max		**147**	**38**	**784**	**66.2**	**19.3**	**389.0**

Table 7. Theoretical Ridership for Southeast Alaska Loop

Southeast Alaska		**Ridership Analysis** *Source Data: 2015 ATVR Data for LECONTE **					
		MAXIMUM			AVERAGE		
		PAX	*VEH*	*VEH Length*	*PAX*	*VEH*	*VEH Length*
Juneau	Gustavus	154	36	714	37.3	12.6	254.0
Gustavus	Pelican	13	0	0	7.0	0.0	0.0
Pelican	Hoonah	1	1	25	1.0	1.0	25.0
Hoonah	Sitka	15	4	69	3.9	1.5	28.1
Sitka	Tenakee	*AMHS did not operate Sitka-Tenakee in 2015*					
Tenakee	Angoon	18	1	48	4.9	0.1	16.7
Angoon	Kake	*AMHS did not operate Angoon-Kake in 2015*					
Kake	Juneau	57	11	286	12.6	2.8	51.4
Route Max		**183**	**41**	**808**	**49.2**	**15.0**	**307.1**

**Gray data was obtained from fleet wide information*

Table 8. Ridership for LECONTE routes in Southeast Alaska

Southeast Alaska			Ridership Analysis *Source Data: 2015 ATVR Data for LECONTE **					
			MAXIMUM			AVERAGE		
			PAX	*VEH*	*VEH Length*	*PAX*	*VEH*	*VEH Length*
1A	Juneau	Gustavus	154	36	714	37.3	12.6	254.0
	Gustavus	Hoonah	39	16	318	19.8	8.8	182.4
	Hoonah	Juneau	147	36	723	37.8	13.5	273.8
		Route Max	**193**	**52**	**1041**	**57.6**	**22.4**	**456.3**
1B	Juneau	Hoonah	151	30	583	31.0	11.5	237.3
	Hoonah	Gustavus	76	23	470	25.4	11.2	227.9
	Gustavus	Juneau	112	35	705	41.7	14.4	287.3
		Route Max	**227**	**58**	**1175**	**67.1**	**25.7**	**515.2**
2A	Juneau	Tenakee	105	6	245	21.8	1.1	34.8
	Tenakee	Angoon	18	1	48	4.9	0.1	16.7
	Angoon	Juneau	104	17	325	31.0	7.9	158.1
		Route Max	**123**	**18**	**373**	**36.0**	**8.0**	**174.8**
2B	Juneau	Angoon	109	24	432	28.4	6.6	122.9
	Angoon	Tenakee	18	1	41	5.9	0.2	8.1
	Tenakee	Juneau	115	4	80	19.9	0.7	20.2
		Route Max	**133**	**25**	**473**	**34.2**	**6.7**	**131.0**
3	Juneau	Sitka	222	35	686	50.6	14.2	280.0
	Sitka	Juneau	191	44	774	61.3	17.5	344.5
		Route Max	***222***	***44***	***774***	***61.3***	***17.5***	***344.5***

**Gray data was obtained from fleet wide information*

Table 9. Ridership for AURORA routes in South Central Alaska

South Central Alaska			Ridership Analysis *Source Data: 2015 ATVR Data for AURORA*					
			MAXIMUM			AVERAGE		
			PAX	*VEH*	*VEH Length*	*PAX*	*VEH*	*VEH Length*
1	Cordova	Valdez	63	15	290	13.5	4.8	100.1
	Valdez	Tatitlek	2	3	75	1.4	1.0	22.6
	Tatitlek	Cordova	22	2	38	12.0	1.0	19.0
		Route Max	**65**	**18**	**365**	**14.9**	**5.8**	**122.7**
2	Cordova	Whittier	134	35	711	24.1	11.4	244.2
	Whittier	Valdez	123	33	671	52.8	17.3	347.4
	Valdez	Cordova	43	9	211	10.5	4.4	91.7
		Route Max	**257**	**68**	**1382**	**76.9**	**28.7**	**591.5**

3	Cordova	Whittier	134	35	711	24.1	11.4	244.2
	Whittier	Cordova	115	32	668	24.9	11.6	243.8
		Route Max	**134**	**35**	**711**	**24.9**	**11.6**	**244.2**
4	Cordova	Chenega	*AMHS did not operate Cordova-Chenega in 2015*					
	Chenga	Whittier	11	3	66	9	3	51
	Whittier	Cordova	115	32	668	25	12	244
		Route Max	**126**	**35**	**734**	**33**	**14**	**294**
5	Cordova	Whittier	134	35	711	24	11	244
	Whittier	Tatitlek	1	0	20	1	0	10
	Tatitlek	Valdez	5	3	75	2	1	23
		Route Max	**140**	**38**	**806**	**27**	**12**	**277**
6	Valdez	Whittier	161	43	765	81	25	497
	Whittier	Cordova	115	32	668	25	12	244
		Route Max	**161**	**43**	**765**	**81**	**25**	**497**
7	Valdez	Tatitlek	2	3	75	1	1	23
	Tatitlek	Whittier	22	2	38	12	1	19
	Whittier	Cordova	115	32	668	25	12	244
		Route Max	**139**	**37**	**781**	**38**	**14**	**285**

The above tables show that the current operational passenger capacities of 250/225 seen on the AURORA and LECONTE are adequate to serve all routes. While the vehicular capacity of 33 standard Alaskan vehicles is sufficient for the majority of the time (represented by the average values), a higher vehicular capacity could be utilized.

AMHS constructs vessels with a 60-year horizon in mind. Whether or not vessel ridership will increase and decrease in the future depends on many factors including price, other methods of transportation available, and Alaska's state economy.

2.3 Operational Requirements Summary

Based on the above analysis and the understanding from AMHS that the AURORA and LECONTE are currently providing satisfactory service on routes similar to those that would be served by the 24/7 Feeder Vessel, the following operational requirements are recommended.

1. ABS Classed, USCG Subchapter H Passenger Vessel
2. Compatible with all terminals in the Southeast and Prince William Sound regions as defined in 46 CFR 7.160
3. Length at least 235 feet, less than 305 feet
    a. Schedule reliability of 99% in Sea State 4 is required
4. Draft limit of 13'-8"
5. Cruise speed of at least 14.5 knots
    a. Higher speeds may provide increased flexibility for scheduling and overcoming weather/current delays
6. Separate vehicular and passenger loading
7. Single Ended with an enclosed Car Deck
8. Vehicle capacity for at least 33 Alaska Standard Vehicles (ASV), higher capacities may be beneficial
    a. Capable of loading standard tractor-trailers
    b. Stern ramp and forward side doors; no bow door (but design for the option if needed at a later date)
    c. An ASV is defined as a 20ft by 10ft block
9. Passenger capacity of at least 250 (no overnight passenger cabins)
10. Basic showers, food and entertainment services
11. Operational Crew size of 24, including food and steward services in addition to USCG COI requirements
12. Overnight crew accommodations
13. SOLAS ready

3. GAP ANALYSIS

3.1 Operational Requirements Comparison

The operational requirements identified for the 24/7 Feeder Vessel are compared to the current *Day Boat ACF* design in Table 11. (✓ = requirement met, Δ = requires discussion with potential modification, × = requires modification)

Discussion of differences follows in Section 3.2.

Table 10. Operational Requirements Comparison

Requirement No.	24/7 Feeder Vessel	Day Boat ACF	Comparison
1	ABS Classed, Subchapter H Passenger Vessel	ABS Classed, Subchapter H Passenger Vessel	✓
2	Compatible with All Terminals in Operating Area	Notionally Compatible with All Terminals	Δ
3	Length of at least 235 feet, less than 305 feet	Length of 280 feet	✓
4	Draft Limit of 13'-8"	Current design draft of 12’-6”	✓
5	Cruise Speed of at least 14.5 knots	Cruise Speed of 16.5 knots	✓
6	Separate vehicular and passenger loading	Separate vehicular and passenger loading	✓
7	Single ended with enclosed car deck, stern ramp and side door	Double ended with enclosed car deck, bow door/ramp will not be used outside of Haines. Has stern ramp and aft side door	Δ
8	Vehicular capacity of at least 33 ASV, higher capacity maybe beneficial	Vehicular capacity of 53 ASV	✓
9	Passenger Capacity of 250	Passenger Capacity of 300	✓
10	Showers, food and entertainment services	Equipped with cafeteria, children’s play area, quiet library etc.	✓
11	Operational Crew Size of 24	Operational Crew Size of 9	×
12	Overnight Crew Accommodations	No existing overnight crew accommodations	×
13	SOLAS ready	Not SOLAS ready	Δ

3.2 Required Design Changes

3.2.1 Requirement 2: Compatible with all terminals

A terminal compatibility study was performed for the *Day Boat ACF* for select terminals within its intended operating region during the design phase. Expanding the vessels operational mission to serve as a 24/7 Feeder Vessel will require that the vessel have the same terminal compatibility as the AURORA and LECONTE. The six terminals where the vessels compatibility was not specifically addressed by the *Day Boat ACF* design are briefly summarized below.

- Bellingham – stern loading
- Kake – side loading
- Pelican – stern loading
- Wrangell – side loading
- Chenega – stern loading
- Tatitlek – stern loading

Based on visual examinations of the six terminal layouts it is likely that the 24/7 Feeder Vessel will physically be able to serve these terminals without issue. Note that a modified ACF will have a freeboard of 7.5 feet where the AURORA and LECONTE has a freeboard of 6.25 feet. Depending on the terminal's tidal conditions and the vessel ramp lengths there may be potential issues where the angle of the ramp is unacceptable. If this is an issue, it is possible that service to some terminals could be restricted to match tidal conditions or the terminals themselves could be modified.

3.2.2 Requirement 3: Length of at least 235 feet, less than 305 feet

The Day Boat ACF has a length of 280 feet which is well aligned with this requirement and requires no modifications. It should be noted that greater lengths and resultant displacement will be beneficial for seakeeping characteristics, especially within the Lynn Canal. The maximum length of 305 feet refers to the rule length transition where ABS scantling requirements increase.

3.2.3 Requirement 7: Single ended with enclosed car deck

The 24/7 Feeder Vessel operates on non-time sensitive routes. Consequently the time efficiency to be gained from having a stern/bow RORO is not required. Because of the intended service mission of the *Day Boat ACF* the bow door must be preserved on the existing vessels.

Currently the only terminal known to be compatible with the bow door is Haines, as such the bow door will not be used if an ACF is operated outside of the Lynn Canal. This also means that the *Day Boat ACF* is non-compatible with stern-side RORO operations because there is no forward side door. This may result in increased loading/unloading times compared to the AURORA and LECONTE. Vehicles that are parked in the forward regions of the vessel will have to be maneuvered back to the stern. Because a starboard forward door was an original design feature on the *Day Boat ACF* that has since been eliminated, re-including this feature should require minimal engineering and have negligible impacts to the design.

3.2.4 Requirement 11: Operational Crew Size of 24

The required manning for the Day Boat ACF was estimated to be nine [8], the final manning requirements as determined by the USCG was not available for review. This is the same manning requirement for the AURORA and LECONTE when operations can be completed in under 12 hours as shown in Table 2. The manning requirements for a 24/7 Feeder Vessel will be driven by operational requirements rather than minimum manning requirements dictated by the USCG. Consequently the existing operational crew requirements of the AURORA and LECONTE of 24 is presumed to apply. Note that a manning study conducted in 2015 [9] suggests that the LECONTE used to operate with one less steward and one less oiler for a total of 22 crew. Potential decreases to the operational crew requirement will be driven by how AMHS chooses to operate the vessels and crew contract requirements.

3.2.5 Requirement 12: Overnight Crew Accommodations

Including overnight crew accommodations will notionally require the following modifications:

- Upper Deck Crew Quarters
- Bridge Deck Officers Quarters
- Passenger Deck Pursers Service Room
- Increased sizing of potable and gray water systems, additional Marine Sanitary Device (MSD) unit

The feasibility of such a conversion has been under consideration since 2015. The notional weight increase from adding overnight crew accommodations is expected to be approximately 84LT. The vessels ability to meet stability requirements will not be impacted because this weight increase is less than the 10% weight margin and 1 foot vertical center of gravity margin that was originally included in the *Day Boat ACF*'s stability analysis. [10]

Note that the Masters, Mates and Pilots Union (MMPU) has a right to discuss quarters before new vessels are acquired, constructed, or converted. Other unions may have similar requirements, however labor contracts were not reviewed in detail for the purposes of this report.

3.2.6 Requirement 13: SOLAS Ready

SOLAS stands for "Safety Of Life At Sea" and sets forth regulations that must be conformed to for international voyages. For AMHS, this means vessels must be SOLAS compliant to make call at Prince Rupert. The *Day Boat ACF* is not SOLAS ready because Prince Rupert was not part of the vessels intended operating area. Meeting SOLAS requirements will necessitate review of and modifications to the vessels life raft and other lifesaving arrangements at minimum.

Prince Rupert is currently serviced by mainliner vessels. 24/7 Feeder Vessel requirements specify SOLAS ready rather than certified because it is unclear if Prince Rupert will be part of its intended mission.

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Appendix A

Vessel and Terminal Compatibility Matrix

AURORA and LECONTE example schedules

Arrivals and Departures

August 2018: M/V Aurora

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to TAT** 06:30pm Ar TAT fr WTR **07:00pm Dp TAT to VDZ** 09:45pm Ar VDZ fr TAT	**2** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR	**3** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to VDZ** 07:15pm Ar VDZ fr WTR	**4** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR
5 **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to CDV** 08:15pm Ar CDV fr WTR	**6** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to VDZ** 07:15pm Ar VDZ fr WTR	**7** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR	**8** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to VDZ** 07:15pm Ar VDZ fr WTR	**9** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR	**10** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to VDZ** 07:15pm Ar VDZ fr WTR	**11** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR
12 **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to CDV** 08:15pm Ar CDV fr WTR	**13** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to VDZ** 07:15pm Ar VDZ fr WTR	**14** **07:00am Dp VDZ to TAT** 09:45am Ar TAT fr VDZ **10:15am Dp TAT to WTR** 03:15pm Ar WTR fr TAT **04:15pm Dp WTR to CDV** 11:00pm Ar CDV fr WTR	**15** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to TAT** 06:30pm Ar TAT fr WTR **07:00pm Dp TAT to VDZ** 09:45pm Ar VDZ fr TAT	**16** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR	**17** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to VDZ** 07:15pm Ar VDZ fr WTR	**18** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR
19 **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to CDV** 08:15pm Ar CDV fr WTR	**20** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to VDZ** 07:15pm Ar VDZ fr WTR	**21** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR	**22** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to VDZ** 07:15pm Ar VDZ fr WTR	**23** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR	**24** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to VDZ** 07:15pm Ar VDZ fr WTR	**25** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR
26 **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to CDV** 08:15pm Ar CDV fr WTR	**27** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to VDZ** 07:15pm Ar VDZ fr WTR	**28** **07:00am Dp VDZ to TAT** 09:45am Ar TAT fr VDZ **10:15am Dp TAT to WTR** 03:15pm Ar WTR fr TAT **04:15pm Dp WTR to CDV** 11:00pm Ar CDV fr WTR	**29** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to TAT** 06:30pm Ar TAT fr WTR **07:00pm Dp TAT to VDZ** 09:45pm Ar VDZ fr TAT	**30** **07:30am Dp VDZ to WTR** 01:15pm Ar WTR fr VDZ **02:30pm Dp WTR to CDV** 09:15pm Ar CDV fr WTR	**31** **05:30am Dp CDV to WTR** 12:15pm Ar WTR fr CDV **01:30pm Dp WTR to CDV** 08:15pm Ar CDV fr WTR	

Arrivals and Departures

January 2019: M/V Aurora

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 **05:00am Dp CDV to VDZ** 10:00am Ar VDZ fr CDV **10:45am Dp VDZ to TAT** 02:00pm Ar TAT fr VDZ **02:30pm Dp TAT to CDV** 06:15pm Ar CDV fr TAT	**2**	**3** **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **12:30pm Dp WTR to VDZ** 06:15pm Ar VDZ fr WTR **07:15pm Dp VDZ to CDV**	**4** 12:15am Ar CDV fr VDZ **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **01:15pm Dp WTR to CDV** 08:00pm Ar CDV fr WTR	**5**
6 **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **12:45pm Dp WTR to VDZ** 06:30pm Ar VDZ fr WTR **07:15pm Dp VDZ to CDV**	**7** 12:15am Ar CDV fr VDZ **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **01:15pm Dp WTR to CDV** 08:00pm Ar CDV fr WTR	**8** **05:00am Dp CDV to CHB** 11:15am Ar CHB fr CDV **11:45am Dp CHB to WTR** 04:45pm Ar WTR fr CHB **05:30pm Dp WTR to CDV**	**9** 12:15am Ar CDV fr WTR	**10** **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **12:30pm Dp WTR to VDZ** 06:15pm Ar VDZ fr WTR **07:15pm Dp VDZ to CDV**	**11** 12:15am Ar CDV fr VDZ **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **01:15pm Dp WTR to CDV** 08:00pm Ar CDV fr WTR	**12**
13 **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **12:45pm Dp WTR to VDZ** 06:30pm Ar VDZ fr WTR **07:15pm Dp VDZ to CDV**	**14** 12:15am Ar CDV fr VDZ **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **01:15pm Dp WTR to CDV** 08:00pm Ar CDV fr WTR	**15** **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **12:30pm Dp WTR to CHB** 05:30pm Ar CHB fr WTR **06:00pm Dp CHB to CDV**	**16** 12:15am Ar CDV fr CHB **05:00am Dp CDV to VDZ** 10:00am Ar VDZ fr CDV **11:00am Dp VDZ to WTR** 04:45pm Ar WTR fr VDZ **05:30pm Dp WTR to CDV**	**17** 12:15am Ar CDV fr WTR **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **12:30pm Dp WTR to VDZ** 06:15pm Ar VDZ fr WTR **07:15pm Dp VDZ to CDV**	**18** 12:15am Ar CDV fr VDZ **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **01:15pm Dp WTR to CDV** 08:00pm Ar CDV fr WTR	**19**
20 **05:00am Dp CDV to VDZ** 10:00am Ar VDZ fr CDV **11:00am Dp VDZ to WTR** 04:45pm Ar WTR fr VDZ **05:30pm Dp WTR to CDV**	**21** 12:15am Ar CDV fr WTR **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **01:15pm Dp WTR to CDV** 08:00pm Ar CDV fr WTR	**22** **05:00am Dp CDV to TAT** 08:45am Ar TAT fr CDV **09:15am Dp TAT to WTR** 02:15pm Ar WTR fr TAT **03:00pm Dp WTR to CDV** 09:45pm Ar CDV fr WTR	**23**	**24** **05:00am Dp CDV to WTR** 11:45am Ar WTR fr CDV **12:30pm Dp WTR to VDZ** 06:15pm Ar VDZ fr WTR **07:15pm Dp VDZ to CDV**	**25** 12:15am Ar CDV fr VDZ **05:00am Dp CDV to VDZ** 10:00am Ar VDZ fr CDV **10:45am Dp VDZ to WTR** 04:30pm Ar WTR fr VDZ **06:00pm Dp WTR to CDV**	**26** 12:45am Ar CDV fr WTR
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Arrivals and Departures

August 2018: M/V LeConte

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 **08:30am Dp JNU to HNH** 11:45am Ar HNH fr JNU **12:45pm Dp HNH to GUS** 02:30pm Ar GUS fr HNH **03:30pm Dp GUS to JNU** 08:00pm Ar JNU fr GUS	**2** **07:00am Dp JNU to TKE** 11:30am Ar TKE fr JNU **12:00pm Dp TKE to ANG** 02:30pm Ar ANG fr TKE **03:00pm Dp ANG to JNU** 08:15pm Ar JNU fr ANG	**3** **07:00am Dp JNU to HNS** 11:30am Ar HNS fr JNU **01:00pm Dp HNS to SGY** 02:00pm Ar SGY fr HNS **03:30pm Dp SGY to HNS** 04:30pm Ar HNS fr SGY **05:30pm Dp HNS to JNU** 10:00pm Ar JNU fr HNS	**4** **07:00am Dp JNU to ANG** 12:15pm Ar ANG fr JNU **12:45pm Dp ANG to TKE** 03:15pm Ar TKE fr ANG **03:45pm Dp TKE to JNU** 08:15pm Ar JNU fr TKE
5 **07:00am Dp JNU to HNH** 10:30am Ar HNH fr JNU **11:30am Dp HNH to JNU** 03:00pm Ar JNU fr HNH	**6** **07:00am Dp JNU to GUS** 11:30am Ar GUS fr JNU **12:30pm Dp GUS to JNU** 05:00pm Ar JNU fr GUS	**7** **07:00am Dp JNU to HNS** 11:30am Ar HNS fr JNU **01:00pm Dp HNS to SGY** 02:00pm Ar SGY fr HNS **03:30pm Dp SGY to HNS** 04:30pm Ar HNS fr SGY **05:30pm Dp HNS to JNU** 10:00pm Ar JNU fr HNS	**8** **08:30am Dp JNU to GUS** 01:00pm Ar GUS fr JNU **02:00pm Dp GUS to HNH** 03:45pm Ar HNH fr GUS **04:45pm Dp HNH to JNU** 08:00pm Ar JNU fr HNH	**9** **07:00am Dp JNU to TKE** 11:30am Ar TKE fr JNU **12:00pm Dp TKE to ANG** 02:30pm Ar ANG fr TKE **03:00pm Dp ANG to JNU** 08:15pm Ar JNU fr ANG	**10** **07:00am Dp JNU to HNS** 11:30am Ar HNS fr JNU **01:00pm Dp HNS to SGY** 02:00pm Ar SGY fr HNS **03:30pm Dp SGY to HNS** 04:30pm Ar HNS fr SGY **05:30pm Dp HNS to JNU** 10:00pm Ar JNU fr HNS	**11** **07:00am Dp JNU to ANG** 12:15pm Ar ANG fr JNU **12:45pm Dp ANG to TKE** 03:15pm Ar TKE fr ANG **03:45pm Dp TKE to JNU** 08:15pm Ar JNU fr TKE
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26 **07:00am Dp JNU to HNH** 10:15am Ar HNH fr JNU **11:15am Dp HNH to PEL** 03:30pm Ar PEL fr HNH **05:30pm Dp PEL to HNH** 09:45pm Ar HNH fr PEL **10:15pm Dp HNH to JNU**	**27** 01:30am Ar JNU fr HNH **07:00am Dp JNU to GUS** 11:30am Ar GUS fr JNU **12:30pm Dp GUS to JNU** 05:00pm Ar JNU fr GUS	**28** **07:00am Dp JNU to HNS** 11:30am Ar HNS fr JNU **01:00pm Dp HNS to SGY** 02:00pm Ar SGY fr HNS **03:30pm Dp SGY to HNS** 04:30pm Ar HNS fr SGY **05:30pm Dp HNS to JNU** 10:00pm Ar JNU fr HNS	**29** **08:30am Dp JNU to HNH** 11:45am Ar HNH fr JNU **12:45pm Dp HNH to GUS** 02:30pm Ar GUS fr HNH **03:30pm Dp GUS to JNU** 08:00pm Ar JNU fr GUS	**30** **07:00am Dp JNU to TKE** 11:30am Ar TKE fr JNU **12:00pm Dp TKE to ANG** 02:30pm Ar ANG fr TKE **03:00pm Dp ANG to JNU** 08:15pm Ar JNU fr ANG	**31** **07:00am Dp JNU to HNS** 11:30am Ar HNS fr JNU **01:00pm Dp HNS to SGY** 02:00pm Ar SGY fr HNS **03:30pm Dp SGY to HNS** 04:30pm Ar HNS fr SGY **05:30pm Dp HNS to JNU** 10:00pm Ar JNU fr HNS	

Arrivals and Departures

January 2019: M/V LeConte

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 **07:00am Dp JNU to HNS** 11:30am Ar HNS fr JNU **12:00pm Dp HNS to SGY** 01:00pm Ar SGY fr HNS **02:00pm Dp SGY to HNS** 03:00pm Ar HNS fr SGY **04:00pm Dp HNS to JNU** 08:30pm Ar JNU fr HNS	**2** **07:00am Dp JNU to GUS** 11:30am Ar GUS fr JNU **12:30pm Dp GUS to HNH** 02:15pm Ar HNH fr GUS **03:15pm Dp HNH to JNU** 06:30pm Ar JNU fr HNH	**3** **07:00am Dp JNU to TKE** 11:30am Ar TKE fr JNU **12:00pm Dp TKE to ANG** 02:30pm Ar ANG fr TKE **03:00pm Dp ANG to JNU** 08:15pm Ar JNU fr ANG	**4** **07:00am Dp JNU to HNS** 11:30am Ar HNS fr JNU **12:00pm Dp HNS to SGY** 01:00pm Ar SGY fr HNS **02:00pm Dp SGY to HNS** 03:00pm Ar HNS fr SGY **04:00pm Dp HNS to JNU** 08:30pm Ar JNU fr HNS	**5** **07:00am Dp JNU to ANG** 12:15pm Ar ANG fr JNU **12:45pm Dp ANG to TKE** 03:15pm Ar TKE fr ANG **03:45pm Dp TKE to JNU** 08:15pm Ar JNU fr TKE
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For Reservations and information: visit **FerryAlaska.com** or call toll-free **1-800-642-0066**

Updated 1/25/16

NOTE: X means vessel is able to load at this dock	Angoon	Auke Bay	Auke Bay GITGOV	Bellingham	Gustavus	Haines	Hollis	Hoonah	Kake	Ketchikan Berth 1-Main	Ketchikan Berth 2-South	Ketchikan Berth 3-Stern	Metlakatla	Pelican	Petersburg	Prince Rupert	Sitka	Skagway	Tenakee	Wrangell
AURORA	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CHENEGA	X	X			X*	X				X	X	X			X		X	X		
COLUMBIA		X		X	X*	X				X	X				X		X	X		X
FAIRWEATHER	X	X			X*	X					X	X					X	X		
KENNICOTT		X		X	X**	X				X	X				X	X	X	X		X
LECONTE	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LITUYA	X*	X*		X*	X*	X*	X	X*	X*	X	X	X	X	X*	X*	X*	X*	X*		X*
MALASPINA		X		X	X*	X		X	X	X	X				X	X	X	X		X
MATANUSKA		X		X	X	X		X	X	X	X				X	X	X	X		X
TAKU		X		X	X	X		X	X	X	X				X	X	X	X	X	X
TUSTUMENA			X								NOTE									

* Not Tested

**Gustavus: Fair weather and no current due to poor line leads

TUSTUMENA Vehicle elevator & ramp does not match up with shore side Transfer bridges

Ketchikan Berth 2: Makeshift passenger & vehicle access

AMHS PORT ACCESSIBILITY - SOUTHWEST

Updated 1/25/16

NOTE: X means vessel is able to dock and load	Akutan City Pier	Akutan Trident Pier	Chignik	Chenega Bay	Cold Bay	Cordova Terminal	Cordova Ocean Dock	Dutch Harber Berth 3	Dutch Harbor USCG Piers 1&2	False Pass	King Cove	Kodiak Terminal	Kodiak City Dock	Old Harbor	Ouzinkie	Port Lions	Sand Point	Seldovia	Tatitlek	Valdez Terminal	Valdez City Dock	Valdez Container Pier	Whittier Cruise Ship Pier	Whittier	Yakutat
AURORA				X		X													X	X				X	
CHENEGA						X														X				X	
COLUMBIA						X*														X*				X*	
FAIRWEATHER						X														X				X	
KENNICOTT				X	X	X	X	X	X		X		X	X	X#	X	X	X	X	X	X*	X*		X	X
LECONTE				X*		X													X	X				X	
LITUYA						X*														X*				X*	
MALASPINA						X*														X*				X*	
MATANUSKA						X*														X*				X*	
TAKU						X*														X*				X*	
TUSTUMENA	NOTE	NOTE	NOTE	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	NOTE	X

X* Likely but not tested
X# Fair weather conditions only-Poor fit

TUSTUMENA Akutan & Chignik: Vehicle weight restrictions
Whittier: No stern door for access to Terminal. In fair weather can use Cruise Ship Dock w/special placed Yokohama fenders.