




GUEMES ISLAND FERRY REPLACEMENT Preliminary Cost Estimate

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References

1. *Guemes Island Ferry Replacement, Preliminary Design Report*, Glosten Inc., Report No. 17097.02-053-02.
2. *Guemes Island Ferry Replacement, General Arrangement*, Glosten Inc., Drawing No. 17097.02-070-02.
3. *Anacortes / Guemes Island Ferry Replacement, 30% Review Set*, PND Engineers Inc., Project No. FEMP-5.
4. *28-Car Options Cost Estimate*, Glosten Inc., Project Memorandum 17097.01, 30 March 2018.
5. U.S. Bureau of Labor Statistics, <https://data.bls.gov/PDQWeb/pc>, September 24, 2020.

Summary

A capital cost estimate has been developed commensurate with the preliminary vessel and terminal design shown in References 1 through 3. The total program cost is estimated to be between \$17.6 and \$22.8 million, with a nominal price of \$19.5 million. Approximately 70% of the cost is associated with vessel construction, 20% for shoreside charging equipment, and 10% for terminal upgrades. The low to high range considers a variable labor rate (representing shipyards across the United States), a range of vessel electrical system costs, a range of shoreside electrical equipment costs, and a range of terminal upgrade and modifications costs.

Using appropriate line items for a direct and comparable comparison, the previous estimate (Reference 4) was \$20.4M. The current nominal cost estimate of \$19.5M is therefore well in line with past estimates.

Assumptions

The following metrics were used to develop the cost estimate:

- \$65 to \$85/hr shipyard labor rate – representing a national range.
- 70 hrs/LT production rate for steel.
- 300 hrs/LT production rate for aluminum.
- 20% plate wastage.
- 10% shape wastage.
- 15% material markup – to cover associated material shipping, storage, handling.
- 10% estimating allowance.
- 2% builders risk insurance and bonding.
- 4% non-Skagit County construction management.
- 0% tax for the vessel.

- 0% tax on shore electrical improvements per RCW 82.08.996 (electric vessels exempt).
- 8.8% tax on terminal improvements not related to above exemption.

Cost Breakdown

Table 1 represents the anticipated capital cost breakdown of the vessel, shoreside charging infrastructure, terminal upgrades, and other components necessary for a complete and functional electric vessel. A breakdown of the shipyard construction cost estimate is provided in Table 2.

Table 1 Preliminary capital cost estimate for the replacement ferry program, cost x \$1,000

Description	High	Nominal	Low
Total Replacement Program Cost	22,842	19,512	17,583
Vessel Construction Total	15,518	13,557	12,530
Outside Construction Management (4%)	597	521	482
Vessel Construction	14,921	13,036	12,048
Bonding and Risk Insurance (2%)	293	256	236
Material Markup (15%)	860	860	860
Estimating Allowance (10%)	1,252	1,084	996
Shipyard Engineering and Services	2,245	2,061	1,877
Structure	2,692	2,455	2,218
Propulsion	832	826	820
Electric Plant	3,780	2,741	2,502
Command and Surveillance	489	467	444
Auxiliary Systems	933	871	810
Outfit & Furnishings	1,548	1,416	1,285
Shoreside Electrical Total	5,230	3,953	3,144
Outside Construction Management (4%)	179	134	106
PSE Utility Connection	123	123	123
Electrical Construction	4,480	3,360	2,650
Estimating Allowance (10%)	448	336	265
Shore Electrical System	2,000	1,500	1,300
Charging Apparatus	1,600	1,300	1,000
Shipping, installation, commissioning	880	560	350
Terminal Total	2,093	2,001	1,910
Construction Management (by Skagit)	-	-	-
Permitting	75	75	75
Terminal Construction	2,018	1,926	1,835
Terminal Tax (8.8%)	143	136	130
Estimating Allowance (10%)	171	163	155
Dolphin Upgrades	604	576	549
Apron Replacement	433	413	393
Wing Wall and Mooring Upgrades	413	394	376
Charging Platform and Access (tax exempt)	255	244	232

Table 2 Shipyard construction cost estimate, with variable labor rate, cost x \$1000

Description	Labor (hrs)	Materials	High	Nominal	Low	Percent
Shipyard Contract Total			14,922	13,036	12,048	
Labor rate per hour			85	75	65	
Bonding and Risk Insurance	2%		293	256	236	
Material Markup (% of Materials)	15%		860	860	860	
Estimating Allowance (% of Subtotal)	10%		1,252	1,084	996	
Shipyard Contract Subtotal	68,064	5,732	12,517	10,837	9,956	
Shipyard Engineering & Services	18,367	683	2,245	2,061	1,877	18.5%
Structure	23,712	676	2,692	2,455	2,218	21.9%
Propulsion	600	781	832	826	820	8.1%
Electric Plant	3,868	2,451	3,780	2,741	2,502	26.6%
Command and Surveillance	2,220	300	489	467	444	4.4%
Auxiliary Systems	6,182	408	933	871	810	8.0%
Outfit & Furnishings	13,116	433	1,548	1,416	1,285	12.7%

Interpretation

While the above costs do not include an explicit contingency, the High cost estimate of \$22.8M could be considered an upper budgetary cost. It includes a high shipyard labor rate of \$85/hour plus high vessel electrical costs, shoreside electrical costs, and terminal costs.

The previous cost estimates published in 2018 (Reference 4) showed variations of ferry size (32 and 28 car). They also included alternative charging solutions (termed Limited) that purposefully undersize the charging system to save cost but result in a ferry that would be delayed often due to weather and higher tidal currents. The ferry presented herein is fully capable of operating 95% of the time on electric power alone. With the supplemental auxiliary generator, it will be able to maintain schedule on greater than 99% of all runs.

The 28 Car cost estimate provided in Reference 4 is \$21.9M, while the 28 Car Limited cost is \$18.9M. For direct comparison, removing the design costs and county oversight categories results in a total cost of \$20.4M and \$17.5M, respectively. The nominal preliminary design estimate shown in Table 1 (\$19.5M) is well in line with previous estimates.

Shoreside electrical equipment costs have decreased since the last cost estimate. This resulted from a better understanding of the magnitude and range of possible costs informed by the RFI process.

The terminal costs have increased due to several factors. Previous estimates only included dolphin upgrades and apron modifications. As a result of advancing the planned design of the charging apparatus and supporting structure, some of the estimated cost previously attributed to the shore charging apparatus is now categorized as a terminal upgrade. Finally, new work has exposed the need to modify the wingwalls (including disposal of treated lumber).

The vessel construction cost, or shipyard contract cost, accounts for the largest portion of the total cost and the largest increase in costs (10%) from previous estimates. 40% of the increased cost is attributable to increasing the labor rate from \$70 to \$75/hr¹ and slightly increasing the estimated material markup. Much of the remaining increase is due to better estimates of the vessel's electrical system cost informed by the RFI process.

¹ The U.S. Bureau of Labor Statistics reports that the *Non-Military, Self-Propelled Ships, New Construction* producer price index (Reference 5) show a 6% increase since the 2018 cost memo (Reference 4) was prepared.

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