



# GUEMES ISLAND FERRY REPLACEMENT 28-Car Option Cost Estimate

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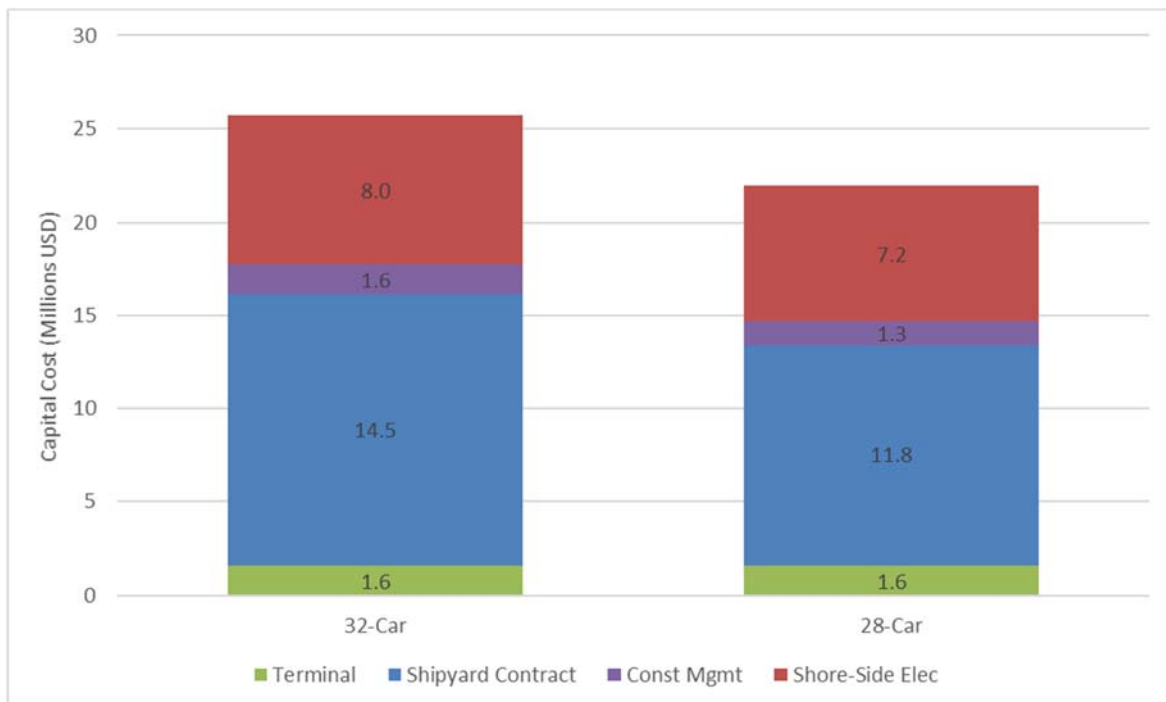
## References

1. *Guemes Island Ferry Replacement, Concept Design Report*, Glosten Inc., Report No. 17097-053-01.
2. *Guemes Island Ferry Replacement, Engineer's Cost Estimate*, Glosten Inc., Report No 17097-043-01.

## Summary

At the request of Skagit County Public Works, a capital cost estimate has been developed for an All-Electric 28-Car variant of the 32-Car ferry previously designed and detailed in Reference 1. Cost metrics used in Reference 2 were applied in this analysis. Only the All-Electric propulsion system option is evaluated; it is anticipated that the Plug-In Hybrid option will scale similarly.

Figure 1 shows the overall cost breakdown of the two vessel variants. The 28-Car option represents a 15% reduction in overall capital cost as compared to the 32-Car ferry. While this analysis does not evaluate the impacts on operational costs, a reduction in the overall vessel size from a capacity of 32 cars to 28 cars will generally reduce the operating costs.



**Figure 1 Program capital cost estimate by vessel option**

## Details

Two ferry variants are discussed below.

1. 32-Car: this is the ferry designed and detailed in Reference 1.
2. 28-Car: this represents a smaller ferry capable of holding approximately 28 vehicles. The length and depth of the vessel as well as the size of the deckhouse have been reduced. Vessel displacement and installed power have been reduced accordingly.

Table 1 shows the principal characteristics of the two vessel variants. Table 2 shows the resulting battery and shore side electrical connection capacity for each vessel variant.

**Table 1 Principal characteristics of vessel options**

	<b>32-Car</b>	<b>28-Car</b>
Full Load Displacement (LT)	699.0	504.3
LS WT (LT)	566.60	405.5
LWL (ft)	170.10	151.76
BWL (ft)	40.27	39.76
Draft (ft)	7.635	7.1

**Table 2 Vessel and shore side electrical characteristics**

	<b>32-Car</b>	<b>28-Car</b>
Vessel Batteries (kWh)	1050	800
Shore-Side Batt (kWh)	1400	1200
Shore Connection (MW)	4.0	3.2
Utility Connection (kW)	1050	830

Table 3 represents the anticipated capital cost breakdown of the two variants. The terminal upgrades costs are kept the same for both options. While it may be possible to reduce the scope of the dolphin upgrades for the lighter 28-Car ferry, it is prudent to keep funding for upgrades should they be necessary.

The utility connection cost has been reduced from the 32-Car original cost estimate (Reference 2) based on discussions with Puget Sound Energy (PSE). The cost estimates now represent a 50/50 cost share between Skagit County and PSE for the cost to upgrade the utility connection to the ferry terminal.

The emergency services costs primarily consist of the shore-side backup generator for the All-Electric vessel. Savings for this component can only be realized if the generator size can be reduced. Unfortunately, the costs are a step function and cannot be reduced for the 28-Car option.

**Table 3 Updated cost estimate for the 32 and 28 car ferry options, cost x \$1,000**

<b>Description</b>	<b>32-Car</b>	<b>28-Car</b>
<b>Total Replacement Cost</b>	<b>25,723</b>	<b>21,920</b>
<b>Vessel Total</b>	<b>16,111</b>	<b>13,092</b>
County Oversight	290	236
Vessel Design	726	590
Construction Management	581	472
Shipyards Contract	14,514	11,794
Bonding and Risk Insurance	285	231
Material Markup	684	552
Estimating Allowance	2,258	1,835
Shipyards Engineering & Services	1,886	1,583
Structure	2,799	2,311
Propulsion	1,298	934
Electric Plant	2,223	1,673
Command and Surveillance	772	662
Auxiliary Systems	806	730
Outfit & Furnishings	1,503	1,284
<b>Shore-Side Electrical Total</b>	<b>7,991</b>	<b>7,208</b>
Utility Connection	260	117
County Oversight	140	130
Permitting	70	65
Shore-Side Design	500	400
Shore-Side Electrical Subtotal	7,020	6,495
Infrastructure	3,099	2,933
Charging Apparatus	3,592	3,233
Emergency Services Generator	329	329
<b>Terminal Improvements Total</b>	<b>1,621</b>	<b>1,621</b>
County Oversight	29	29
Terminal Design	145	145
Terminal Improvements Subtotal	1,447	1,447
Apron Modifications	345	345
Dolphin Upgrades	1,102	1,102