



PHOTO CREDIT: Daniel Schwen/[Wikimedia commons](#)

## PRELIMINARY REPORT

# Hybrid Electric Ferries: Design-Build Contracting and Procurement

Legislative Auditor's Conclusion:

The Legislature should consider revising state law to allow alternatives that increase ferry acquisition speed and the value to the state.

WSDOT Ferries Division should improve its cost estimation, payment, and other practices.

# JLARC to evaluate design-build contracting for hybrid electric ferries

- Compare WSF's policies and practices to industry best practices
- Assess opportunities to decrease vessel construction costs & ensure operational efficiencies

2022 Supplemental Transportation Budget

JLARC staff consulted with VARD Marine, Inc., a firm with expertise in marine engineering and procurement to assist with the review

# WSF is electrifying its fleet

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## Issued plans in 2019 and 2020:

- Increase fleet to 26 vessels
- Shift from diesel to plug-in hybrid electric vessels
- Consistent with direction from Governor & Legislature

## Acquiring five plug-in hybrid electric Olympic class ferries

- Capacity of 144 vehicles, four diesel vessels currently in fleet
- First vessels to be purchased under 2015 procurement laws
- RFP to be issued in first quarter of 2023



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# WSF must use a design-build, fixed price contract

Design and construction services are provided under one contract

Transfers most risk to the shipbuilder, who must:

- Meet technical requirements
- Provide the vessel at fixed price, even if there are cost overruns

Shipbuilders are likely to increase price to account for the risk

# Part 1

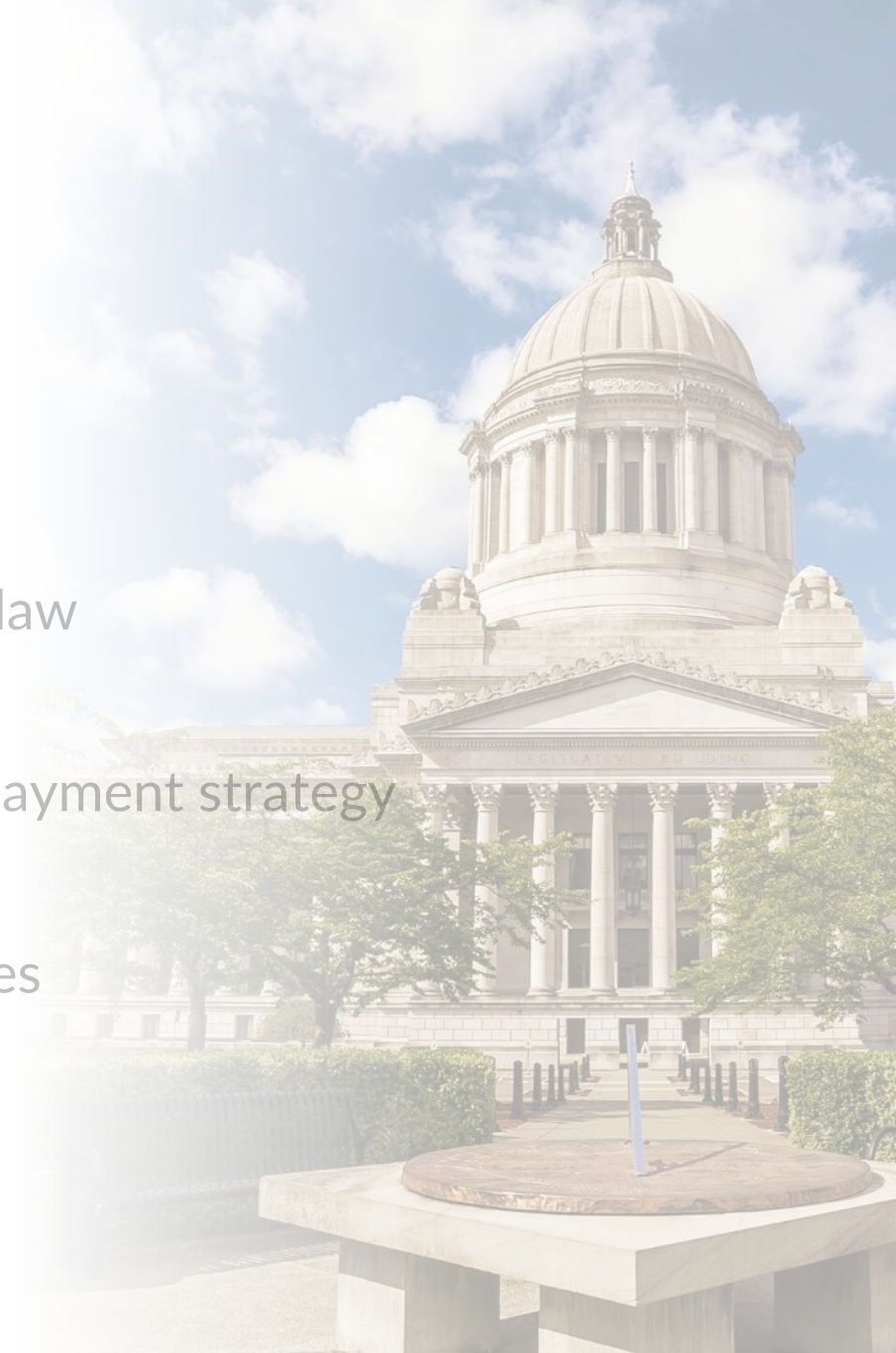
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WSF cost estimating practices

Acquisition approaches allowed by law

Predesign studies, life cycle costs, payment strategy

Documented policies and procedures



# Cost estimates should change and become more refined over time

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WSF uses standard cost estimating methods

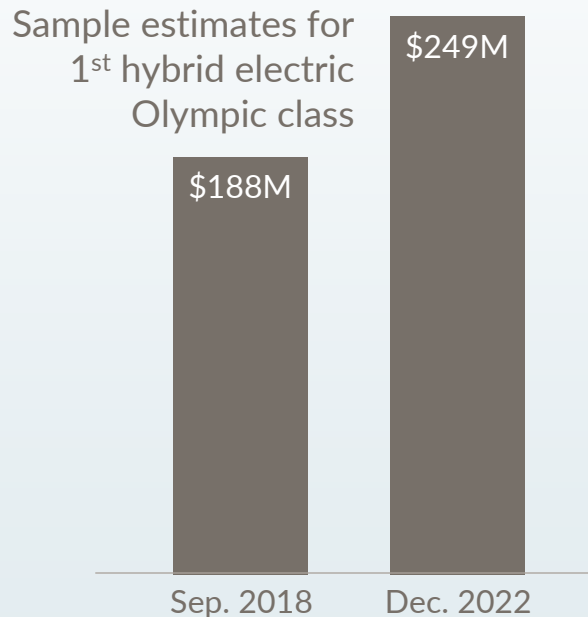
## Top-down estimates

use known data from similar vessels to predict costs of new vessel

PROJECT DESIGN PROGRESS 

**Bottom-up estimates**  
add individual line items to estimate cost of new vessel

# WSF's estimates do not convey key assumptions and uncertainty



**What caused the change?**

*(e.g., inflation, design changes, or new information)*

**What is included in the estimate?**

*(e.g., design, materials for future vessels)*

**What data and methods were used?**

**What are outstanding risks & uncertainties?**



# A probabilistic approach would help convey uncertainty

1 Determine a “most likely” cost for each line item

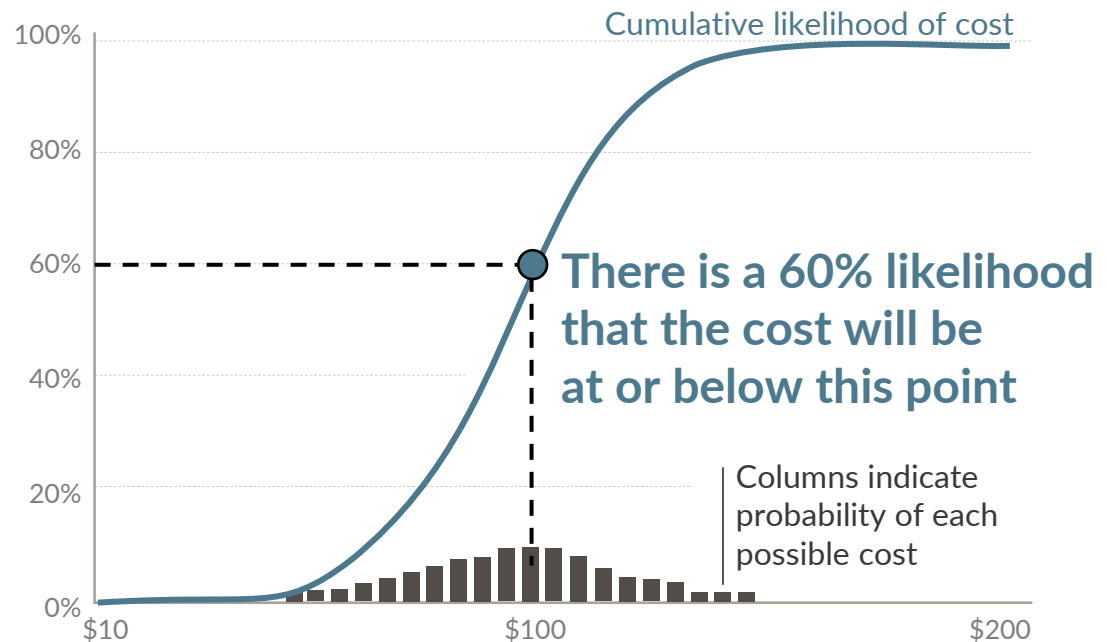
Materials, Labor, Design, Etc.

2 Determine the confidence level of the cost based on the source of the data

High confidence | Supplier quote  
Low confidence | Other projects

3 Add the costs together.  
Create a distribution of possible total costs

4 Consider the cumulative likelihood to set the budget amount.





A photograph of the Washington State Capitol building, featuring a large dome and classical architectural elements, set against a bright sky. The building is partially obscured by a semi-transparent white overlay on the right side of the slide.

# Legislative Auditor's Recommendations

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WSF should ensure that cost estimates provided to OFM, legislative staff, and the Legislature are clear and well documented.

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WSF should apply probabilistic approaches to its cost estimates and clearly indicate the likelihood of the cost falling at or below the funding level requested.

# Part 2

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WSF cost estimating practices

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# WSF must select a shipbuilder based on low bid, not best value

## LOW BID

Price is the only factor, if proposals are technically acceptable

*(RCW 47.60.820)*

## BEST VALUE

Other factors equally or more important than price

### Best value selection criteria could include:

- Lower life cycle cost
- Build location
- Use of small or minority-owned businesses.
- Shipbuilder's facilities, expertise, etc.
- Other priorities

# Best value selection is an industry best practice

Commonly used in federal procurements

Approved in WA for use by:

- WSDOT civil engineering projects
- Any county that purchases electric ferries

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# Legislative Auditor's Recommendation

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The Legislature should consider amending state law to allow WSF to use a best value selection process for ferry acquisition.

# By law, a WSF ferry RFP is initially restricted to in-state bids

## PHASE 1

WSF issues RFP

- Includes estimated price
- Requires vessel to be built in WA

## PHASE 2

Shipbuilders submit proposal

WSF accepts or rejects each proposal

## PHASE 3

Shipbuilders submit fixed price bid

WSF awards design-build contract to WA shipbuilder based on lowest price

*OR  
if all responses are more than 5% above the engineer's estimate:*

WSF rejects all bids and issues new RFP nationally

Ch. 47.60 RCW

# Shipbuilder price is compared to an engineer's estimate of cost

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The price for each design must be compared to an engineer's estimate of the cost for that specific design.

- Price includes cost, profit, risk tolerance, other assumptions
- Engineer's estimate is a bottom-up estimate that focuses on cost

## PHASE 3

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Shipbuilders submit fixed price bid

WSF awards design-build contract to WA shipbuilder based on lowest price

OR

*if all responses are more than 5% above the engineer's estimate:*

WSF rejects all bids and issues new RFP nationally



# Seeking out-of-state bids would require a new RFP process

## PHASE 1

WSF issues RFP

- Includes estimated price
- Requires vessel to be built in WA

## PHASE 2

Shipbuilders submit proposal

WSF accepts or rejects each proposal

## PHASE 3

Shipbuilders submit fixed price bid

WSF awards design-build contract to WA shipbuilder based on lowest price

OR

*if all responses are more than 5% above the engineer's estimate:*

WSF rejects all bids and issues new RFP nationally

WSF estimates that a second RFP process would add more than a year to the project schedule

# Other states use a single RFP that includes in-state preferences

Additional evaluation points

Select in-state bidder that is within a set percentage of low bid (if low bid is out-of-state)

Give preference to out-of-state firms with in-state partners

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# Legislative Auditor's Recommendation

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The Legislature should consider amending state law to allow WSF to offer a single nationwide RFP that increases competition, offers in-state preference, and protects against the risk of a longer procurement process.

# Part 3

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WSF cost estimating practices

Acquisition approaches allowed by law

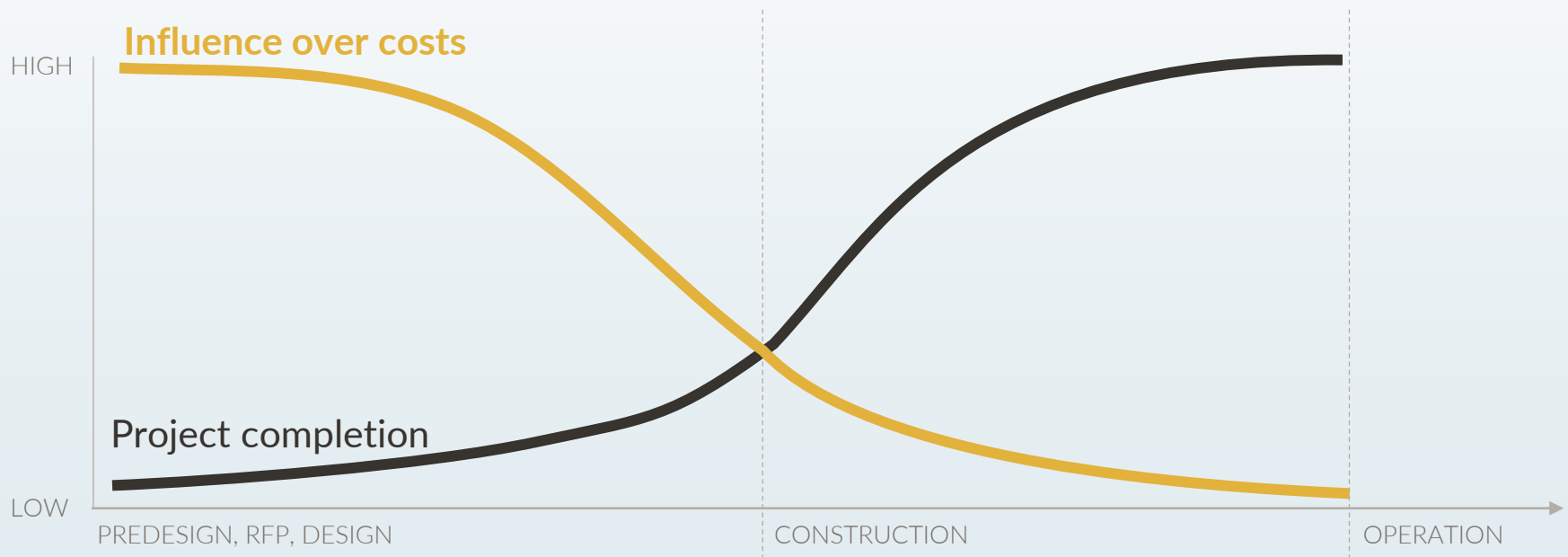
**Predesign studies, life cycle costs, payment strategy**

Documented policies and procedures



# The best opportunities to control life cycle costs occur early in a project

~70% of a vessel's life cycle costs are experienced after construction



# WSF predesign studies could better assess life cycle costs

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## Completed studies have informed the vessel's technical requirements

- ✓ Vessel wake
- ✓ Battery bank design
- ✓ Conversion to plug-in hybrid electric propulsion

## Predesign topic selection:

- ✓ Reflects stakeholder feedback and industry trends
- ✗ May exclude topics that affect life cycle cost

## Predesign studies address life cycle costs related to:

- ✓ Fuel efficiency
- ✓ Preservation
- ✗ Staffing

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# Legislative Auditor's Recommendation

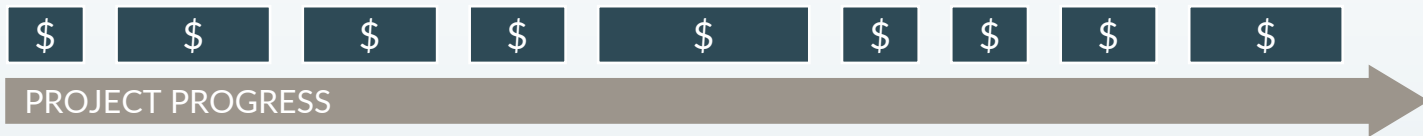
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WSF should ensure predesign studies evaluate long-term costs as directed by statute and that the suite of studies for each acquisition project addresses the most significant potential life cycle cost drivers.



# WSF pays shipbuilders each month based on estimated progress

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Per contract, shipbuilder's progress estimates are:

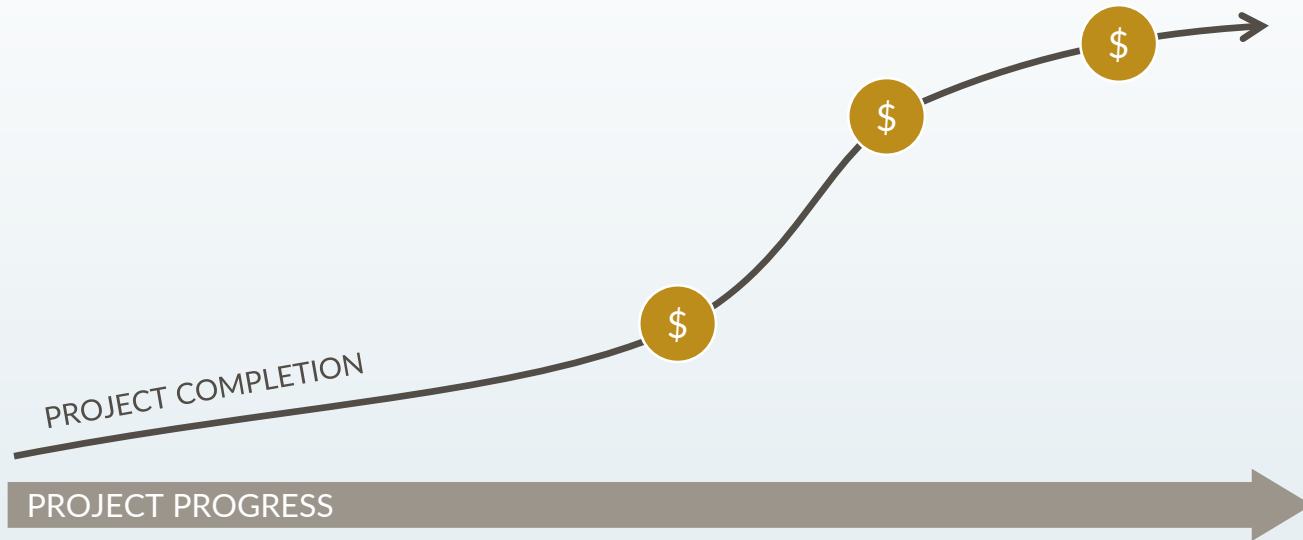
- used only for determining payments
- not evidence of actual progress

WSF reports its approach

- is administratively simple
- helps shipbuilder pay subcontractors & suppliers

BEST PRACTICE:

# Tie payment to significant milestones or measurable progress



Earned Value Management:

- is a progress-based approach and best practice
- considers cost, work completed, and schedule

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# Legislative Auditor's Recommendation

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WSF should tie shipbuilder payments to significant milestones or project progress.

# Part 4

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WSF cost estimating practices

Acquisition approaches allowed by law

Predesign studies, life cycle costs, payment strategy

**Documented policies and procedures**



# WSF's Vessel Engineering Manual does not reflect current law

**Legislature changed the ferry acquisition laws in 2015.**

- Design-build, fixed-price contracts
- Independent owner's representative
- In-state bids <5% of engineer's estimates
- Contingency limited to 5% of the contract price, with OFM approval

**WSF relies heavily on staff expertise and consultants**

**Effective documentation helps:**

- Retain organizational knowledge
- Mitigate the risk of having that knowledge limited to a few personnel
- Provide a consistent means for communicating information and knowledge

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# Legislative Auditor's Recommendation

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WSF should update its ferry acquisition policies and procedures to reflect current laws and best practices.



# Legislative Auditor's Conclusion

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## **The Legislature**

should consider revising state law to allow alternatives that increase ferry acquisition speed and the value to the state.

## **WSDOT Ferries Division**

should improve its cost estimation, payment, and other practices.



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# Two Legislative Auditor Recommendations to the Legislature

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1. Consider amending state law to allow WSF to use a best value selection process for ferry acquisition.
2. Consider amending state law to allow WSF to offer a single nationwide RFP that increases competition, offers in-state preference, and protects against the risk of a longer procurement process.

The background of the slide features a photograph of the Washington State Capitol building, showing its iconic dome and classical architecture. The image is slightly faded and serves as a backdrop for the text.

# Five Legislative Auditor Recommendations to WSF

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1. Ensure that cost estimates shared publicly are clear and well documented.
2. Apply probabilistic approaches to cost estimates.
3. Ensure predesign studies evaluate long-term costs and address significant potential life cycle cost drivers.
4. Tie shipbuilder payments to significant milestones or project progress.
5. Update ferry acquisition policies & procedures to reflect current laws and best practices.



# Next Steps

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## Proposed Final Report

May 2023

View the full report:

[www.leg.wa.gov/jlarc](http://www.leg.wa.gov/jlarc)



Video Summaries



Summary (PDF)



PDF Version





# Contact Us

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