

# Herreshoff Marine Museum Engineering Study



Roger Williams University



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## Project Goals

To determine the structural integrity and the complexity of the chosen design that minimizes cost and risk and optimizes beneficial use.

- **Feasibility:** Follows zoning restrictions, meets HMM requirements, plan for installation of model.
- **Structural Analysis:** Loads on beams and columns, dead and live loads used to design foundation.
- **Cost Estimation:** Materials and construction costs meets specified budget.
- **Risk Assessment:** Flooding, premium for flood insurance.

**Methodology:** 12 designs from RWU Architectural Students narrowed down to 3 based on initial feasibility. The final 3 designs were compared using a Radar Chart.



Marc Sullivan, Design 1



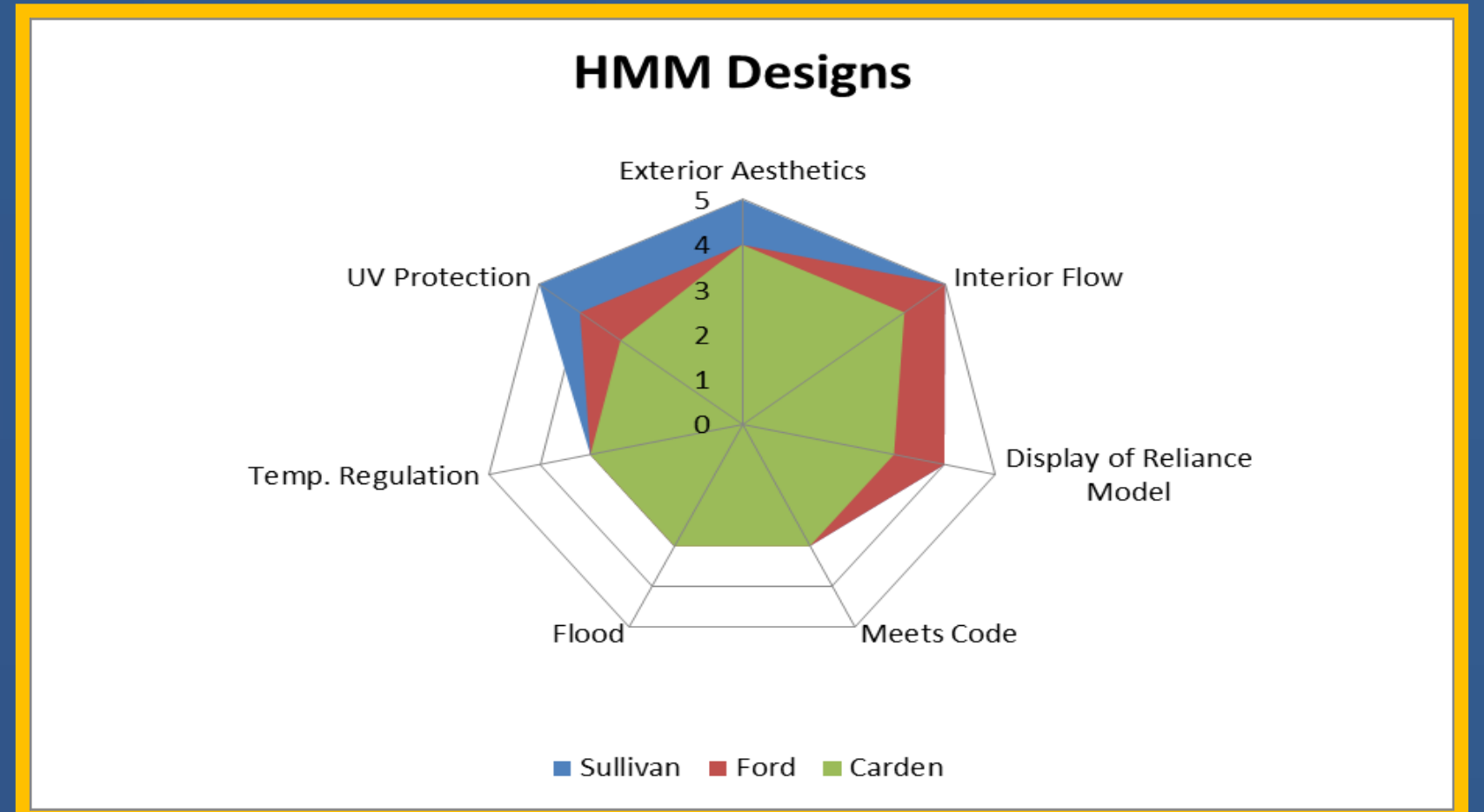
Kate Ford, Design 2



Nate Carden, Design 3



Architect's Rendering of chosen design, Design 1



**Radar Chart:** Each design was rated on a scale of 1 to 5 (5=highest) on design characteristics requested by the clients. Marc's Sullivan's design, Design 1, was selected based on having the largest area on the chart.

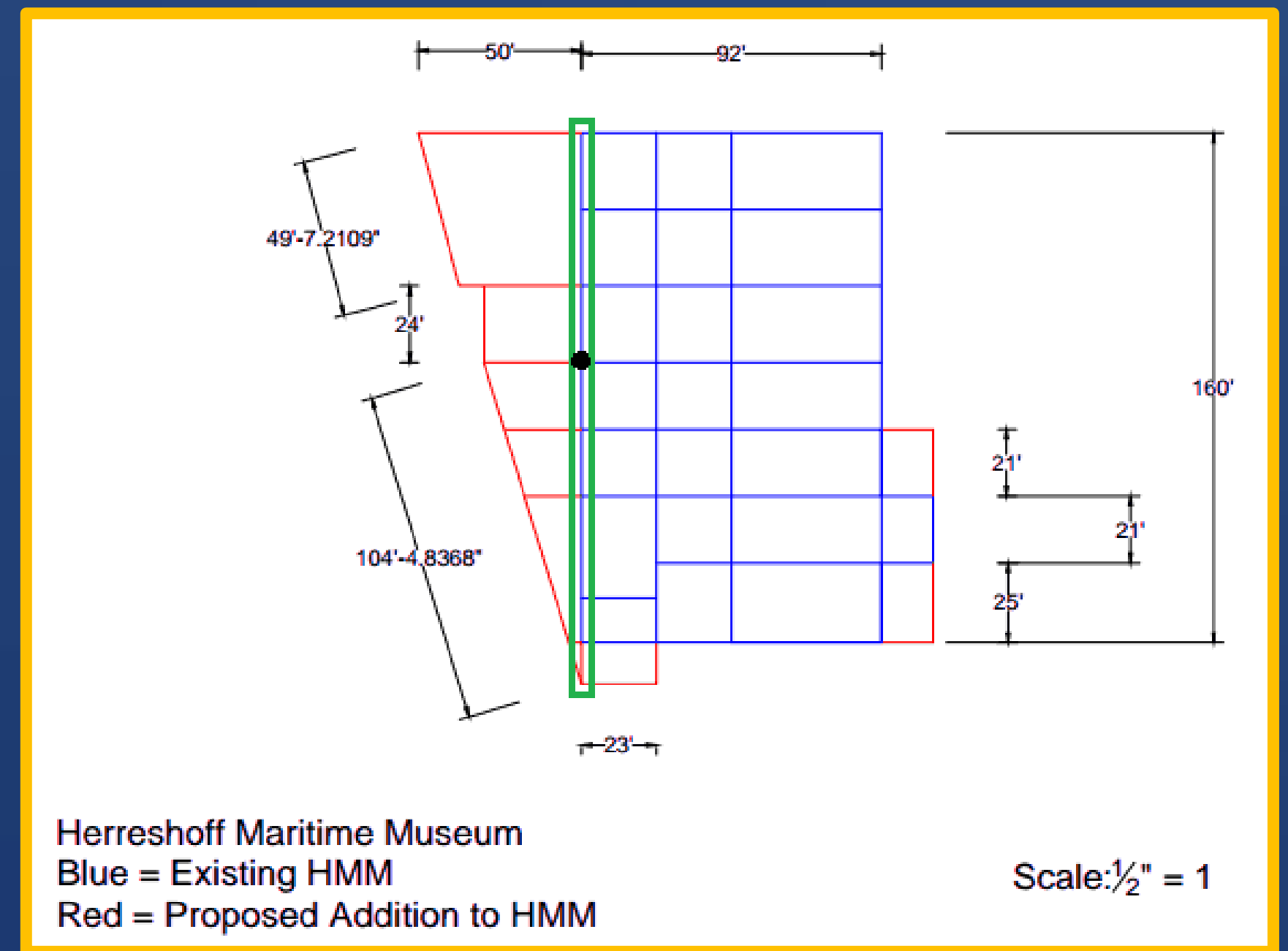
## Feasibility

- **Bristol, RI Historic District:** Select design that best fits quality and character of the Historic District
- **Zoning Restrictions:** Ensure that chosen design meets zoning criteria for Zone M in Bristol, RI
- **Flood Study:** Determine the flood zone in which HMM is located and consider protective measures for the museum (i.e flood insurance, water proofing, etc.)

## Structural Integrity

The combination of wind, snow, and green roof loads has a direct impact on the beam and column design and selection.

- **Wind Load:** Wind speed of Bristol, RI was determined using Main Wind Force Resisting System (MWFRS).
- **Snow Load:** Snow load determined from *Principles of Structural Design (Wood, Steel, and Concrete)* by Ram Gupta.
- **Green Roof Load:** Determined from saturated weight of drainage plate green roof system with 4" nominal thickness.
- **Column & Beam Design:** Column and Beam designs were performed based on worst case conditions (high winds, heavy snow, heavy rain/runoff).



Museum Floor Plan Dimensions

## Ongoing Actions

- Parking Plan
- Parametric Costs
  - Materials and Construction
- Elements of Improvement for Base Design
  - Interior Function and Flow
  - Exterior Aesthetic and Visibility of *The Reliance*
- Foundation Design
  - Raft Foundation Design
- Risk Analysis
  - Water Infiltration



1903 America's Cup Winner, *The Reliance*



Architect's Rendering of *Reliance* Exhibit