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Technologies to manage risk for infrastructure

Risk-Based Asset Management of Metallically Reinforced MSE Walls

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Risk-Based Protocol for Metallically Reinforced MSE Walls

Project for:

FHWA Office of Bridges and Structures

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Risk-Based Protocol for Metallically Reinforced MSE Walls

- Motivation
  - Aging of MSE walls with metallic structural components

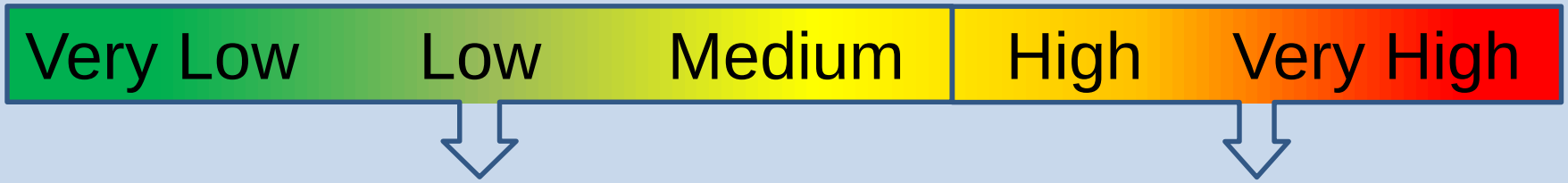
    Reinforcement | Facing | Connections
  - Service life of MSE walls is governed principally by degradation of structural metallic components
- Ultimately help answer the question: "How do I prioritize maintenance of my MSE wall inventory?"
- Produce an index that classifies walls according to five risk levels

Risk-Based Protocol for Metallically Reinforced MSE Walls

Determine Risk Index

Rank walls in asset inventory based on Risk Index

Prioritize walls so that resources can be focused on high-risk structures



Reassessment every 5 years or when new info is available

Shortlisted for consideration of risk mitigation strategies

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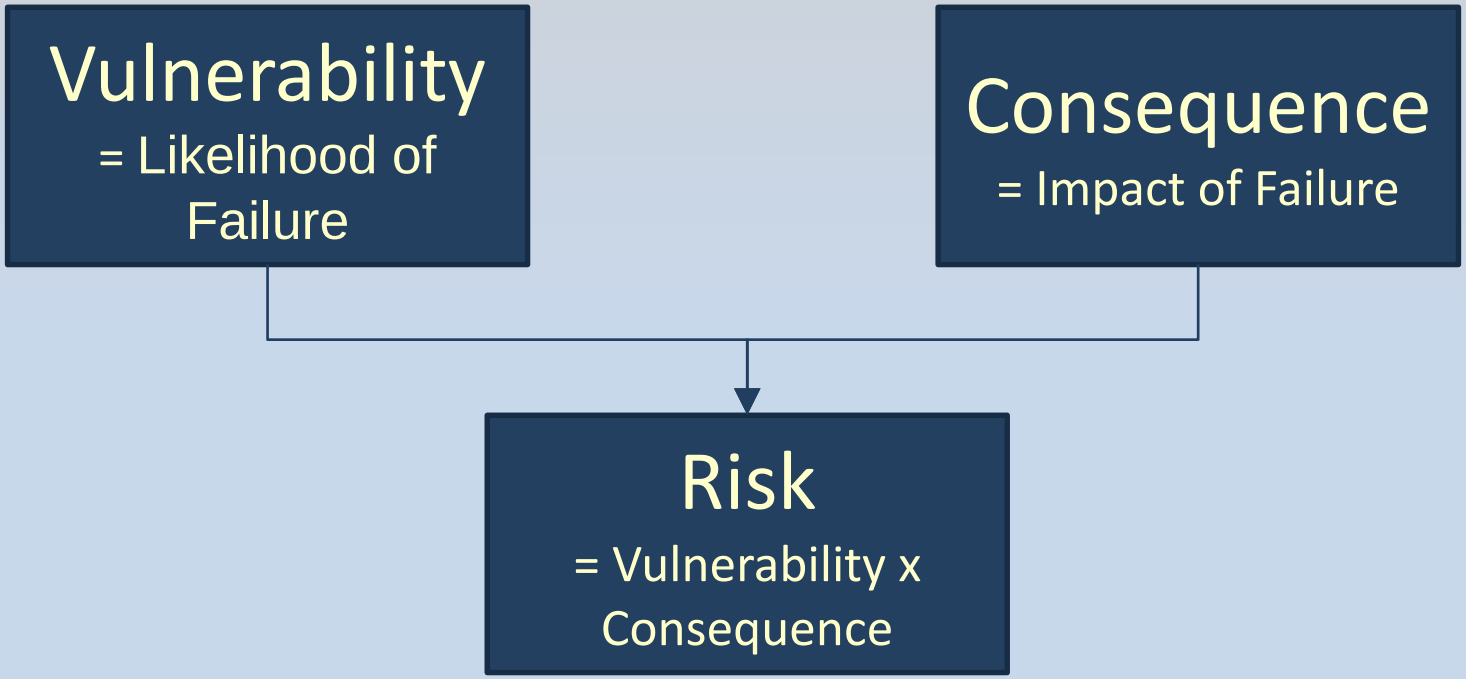
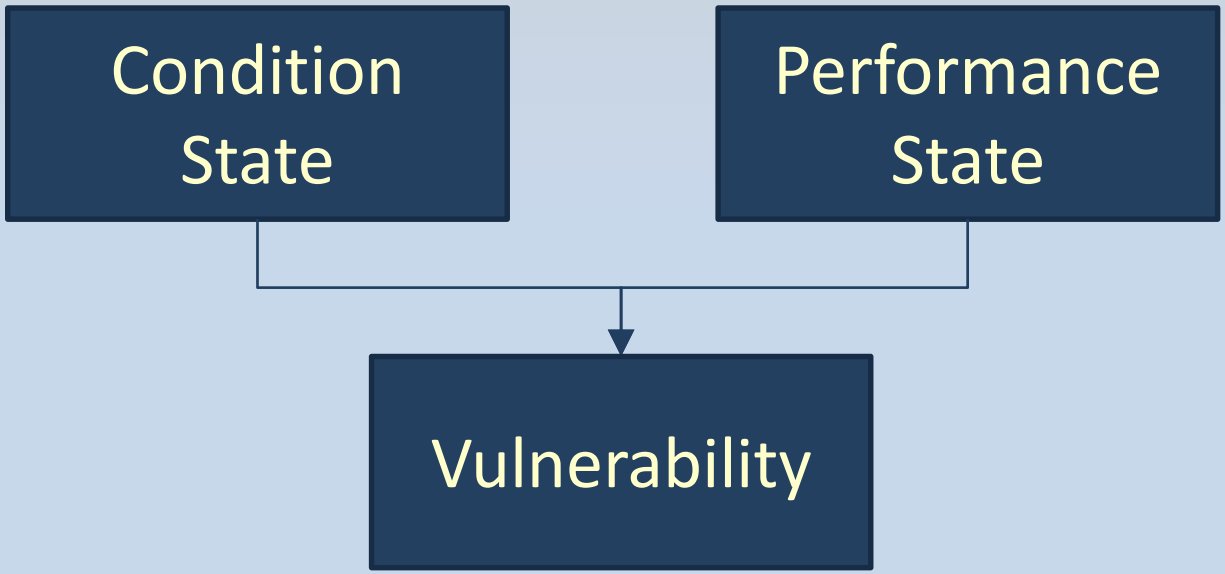
Risk

- Risk is a measure that combines the effects of vulnerability and consequence



Vulnerability

- Vulnerability = Likelihood of wall failure
- Determined from the condition and performance of the wall

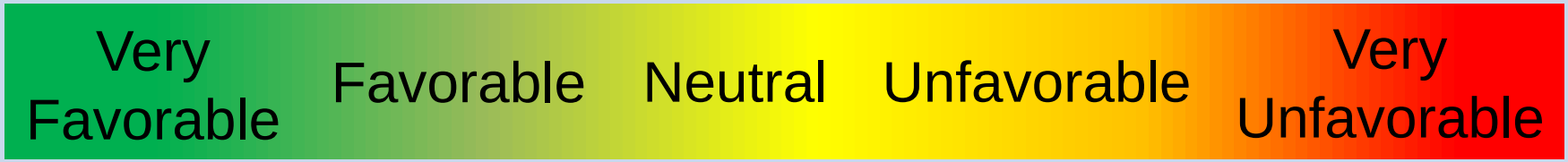


Condition of Wall

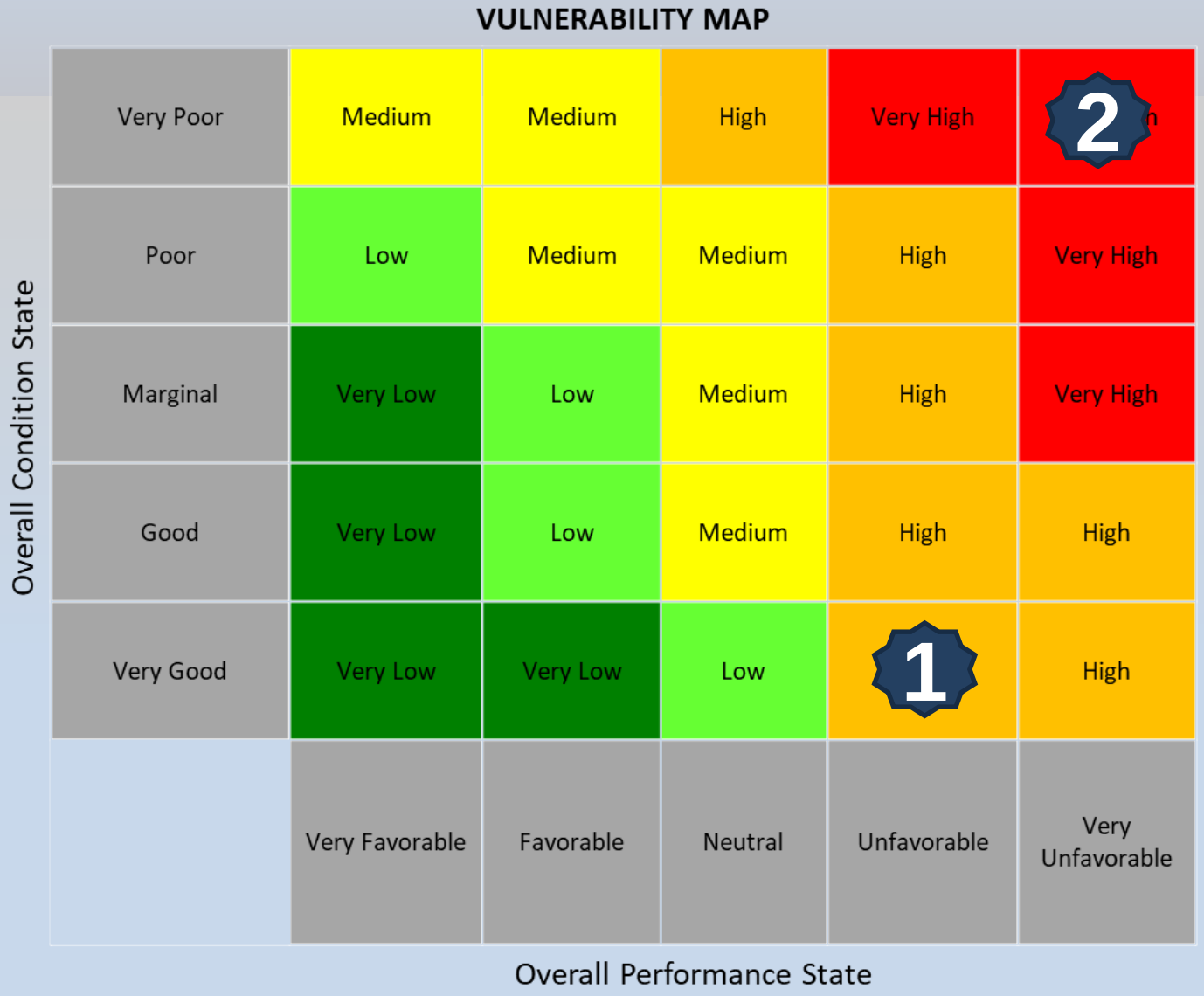
- Logical and consistent characteristics that pertain to the quality of design and construction (from desk study)
- Examples:
  - No galvanization
  - Inadequate surface drainage
- Five levels to describe wall condition evaluated using checklists

Performance of Wall

- Logical and consistent characteristics that pertain to the in-service performance of structures (from field inspections)
- Examples:
  - Excessive deformation
  - Broken reinforcements
- Five levels to describe wall performance evaluated using checklists



Vulnerability



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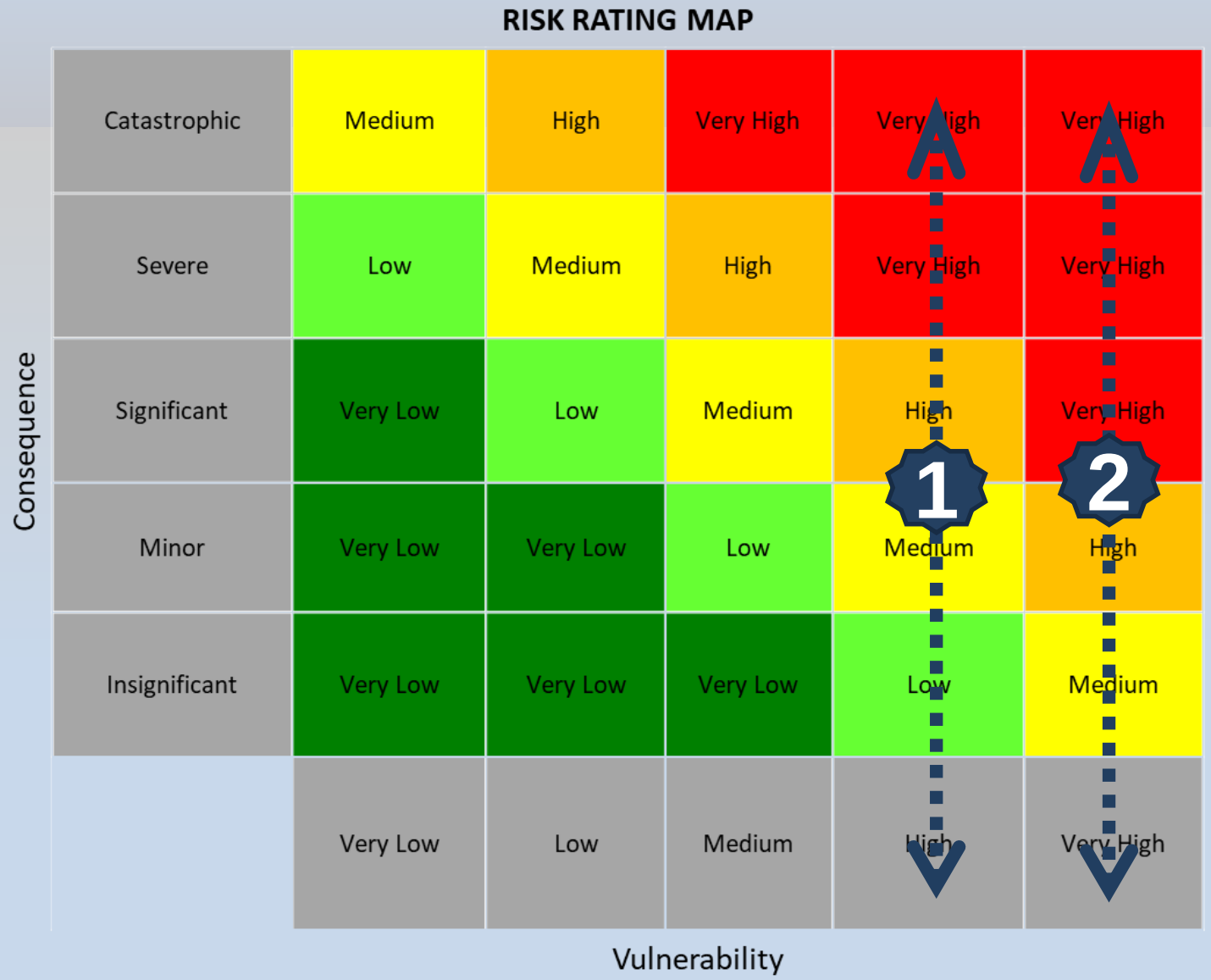
Consequences

- Indicator of the potential impact of wall failure
  - Injuries/fatalities
  - Financial loss
  - Damage to assets
  - Disruption to business functions
- Five levels of consequences

Risk



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Concluding Remarks

- Protocol provides a framework to rank assets by risk to support efficient use of resources for long-term sustainability, accountability, and performance of MSE assets with metallic components.
- Relatively easy to use by non-specialists to obtain consistent evaluation across entire portfolio of metallic MSE assets.
- May need refinement based on local conditions and owner experience.
- Approach can be adapted to other kinds of assets.