Reservoir Alternatives Considerations

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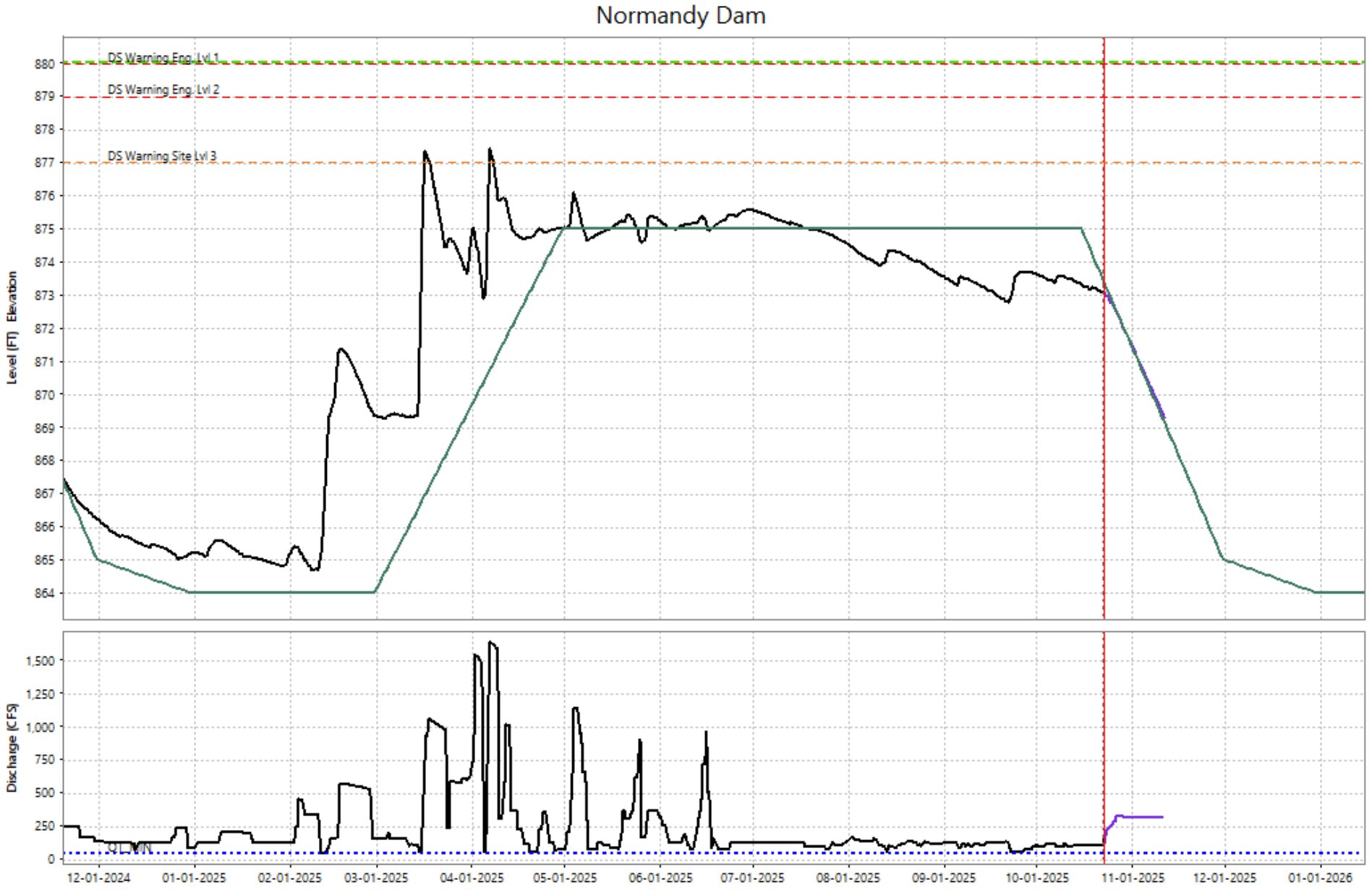
Purpose

- Provide a summary of 2025 Normandy operations and hydrology
- Summary of Optimization of Releases from Normandy Reservoir
- Provide high-level information around TVA's considerations for any type of large-scale reservoir related alternatives within the Duck River region

2025 Normandy Operations



- Last 90-days precip. has been close to normal in the Duck River watershed and CYTD precip. has trended slightly above normal
- Entering the drawdown period about 1 full month earlier than 2024
- Entirety of the Upper Duck is completely free of any drought designation

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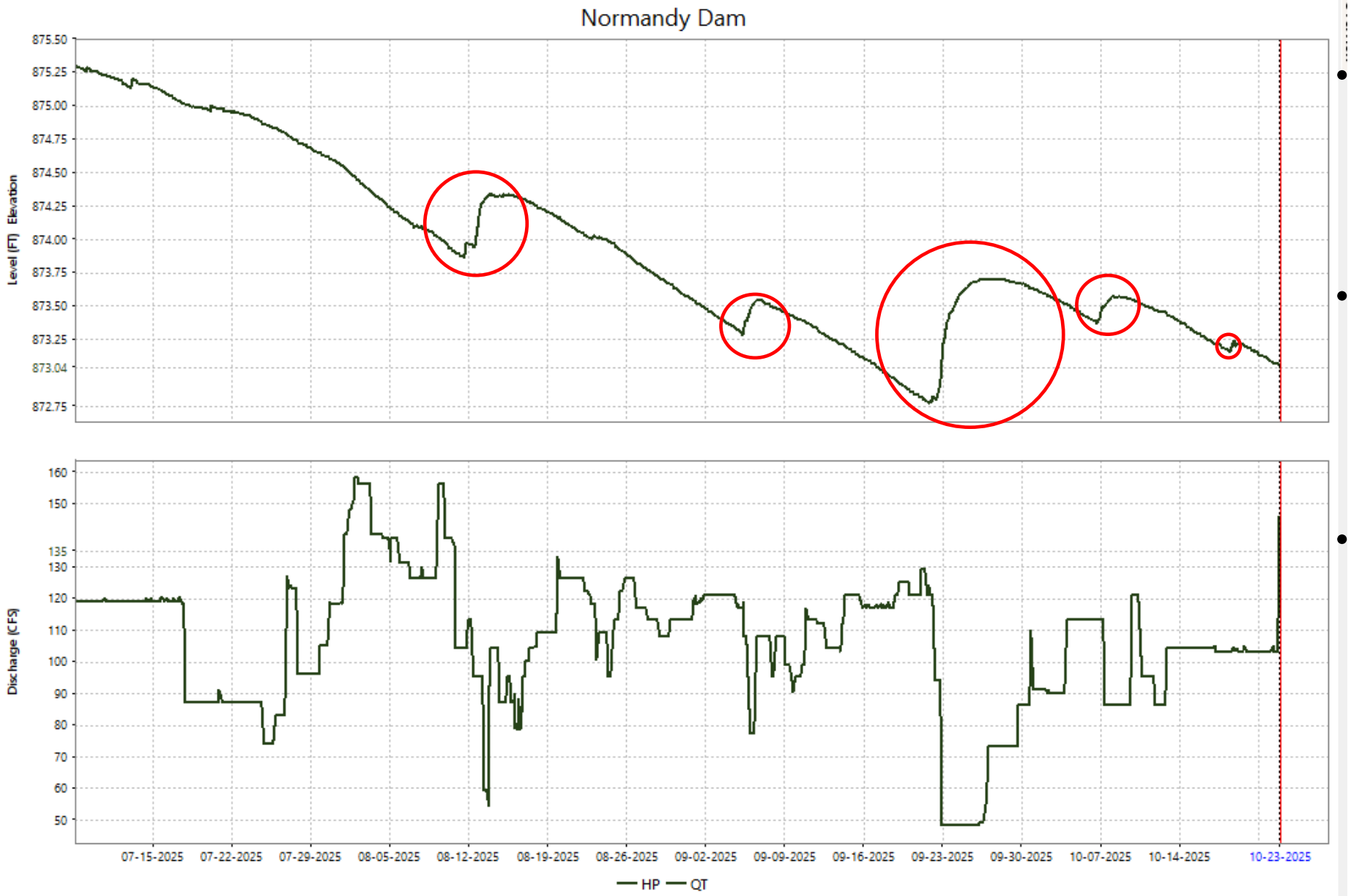
Optimization of Normandy Releases



- Saving 1 cfs over a period of 38 hours yields a volume of 1 Million Gallons!
- Estimation of **<u>285 million gallons</u>** conserved in Normandy Reservoir from July 26 through Oct. 23
- Driven by varying magnitudes of hydrologic events, timing and flow averaging

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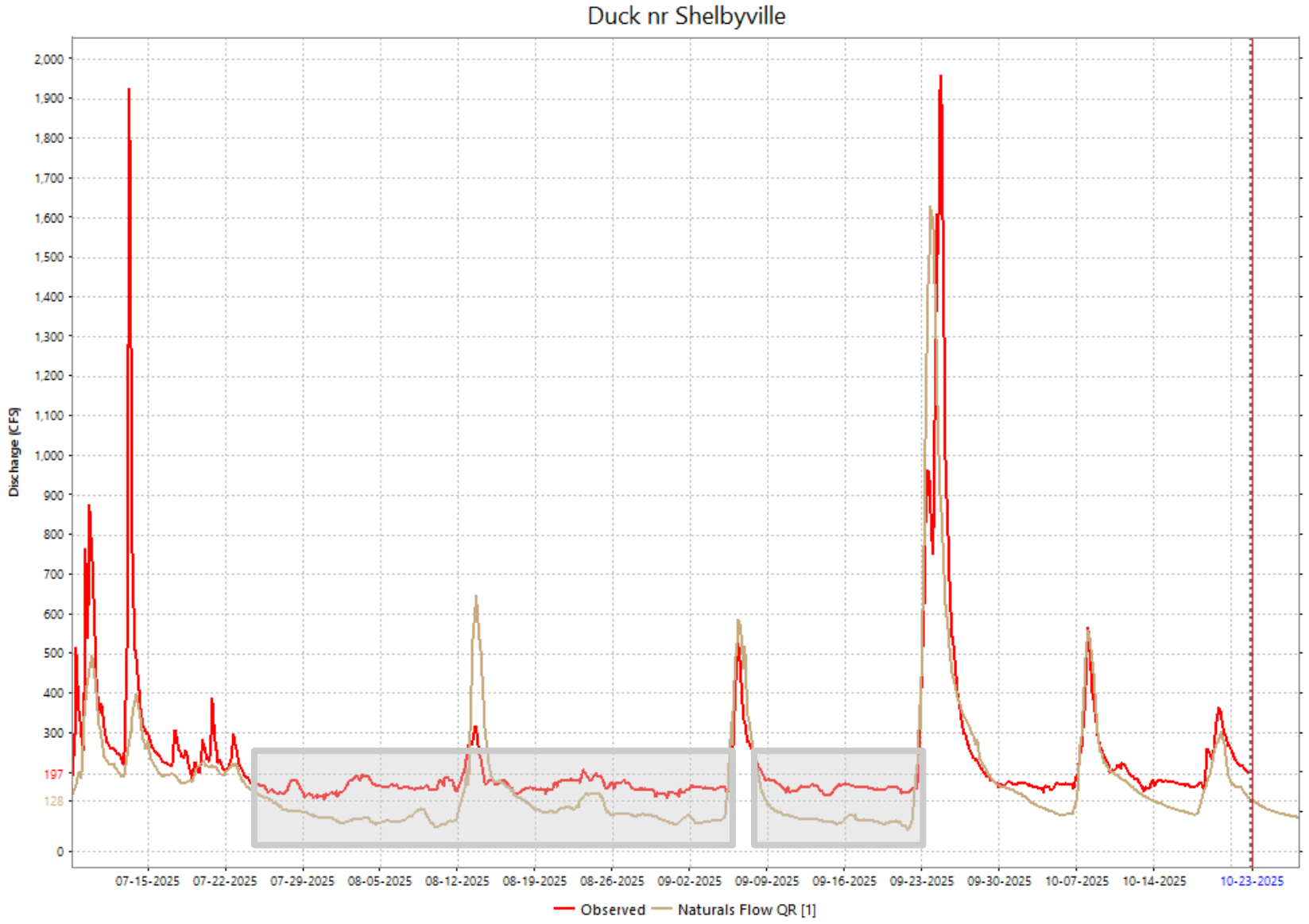
Duck River at Shelbyville (obs. vs. natural) Flow



- While conserving water, continued to meet weekly average flow volumes of 155 cfs or greater
- Provided significant flow reregulation into the system above what would have occurred under natural conditions
- Natural flows ranged from 50-100 cfs during large portions of later summer/early fall

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Requirements for Modifications at a TVA Dam

- TVA's Dam Safety Program meets the federal guidelines for Dam Safety and requires thorough and careful analysis of any modification to a dam in the interest of public safety. Considerations during proposed modification study phase include:
  - TVA oversight and direction of engineering studies and designs
  - TVA has an established program and framework for analyzing Dam Safety Risk and understanding dam hazards and consequences.
  - Governance and Oversight of the engineering phase of a project ensures compliance with industry standards, TVA Dam Safety Governance and Standards as well as engagement with independent experts and reviewers
  - TVA's institutional knowledge associated with decades of operational history for a system of dams during hydrologic extremes
- Scope, Needs Analysis, and Feasibility
  - There continue to be unknowns with flow requirements at locations downstream of Shelbyville that have TDEC permit implications
  - Consideration of ongoing activities that support Drought Resiliency (optimization, intake upgrade in Normandy)
  - Needs Clarification – yield more water to increase releases, provide more drought resiliency within reservoir?

Requirements for Modifications at a TVA Dam cont.…

- Hydrologic Feasibility
  - Complete a downstream and comprehensive (HCP driven or growth/demand driven?) needs analysis.
  - Determine the hydrologic yield available in the Upper Duck River system above Normandy to determine probability of realized increased yields annually
  - Better understanding of the karst and losing reaches of flow downstream of Normandy (2024 impacts)
- Dam Safety Risk Assessment
  - Considerations for changes to dam safety risk under new loading conditions
  - Geotechnical investigations including impacts or risk of leakage due to karst near the foundation and in the rim
  - Determination of impacts to flood risk and downstream consequences

Requirements for Modifications at a TVA Dam cont.…

- Other Considerations
  - Water quality modeling and considerations for reservoir water quality and oxygen impacts downstream
  - Environmental impacts to habitat, shoreline, cultural and other impacts typically vetted through an Environmental Impact Statement (EIS)
  - Impacts to public and privately owned land and infrastructure around the reservoir (roads, structures, bridges), including land and easement acquisition
  - Construction complexity and study durations, local impacts during construction, operational impacts during construction

Columbia Dam Considerations

- TVA's records of decision in 2001 documenting transfer of reservoir lands and long-term water supply needs for lower Duck River region
- Additional land acquisition needed to complete
- Unknowns around infrastructure that has been built in the previously acquired and unacquired land
- Cost/benefit analysis was challenged several decades ago, estimates have not been updated in many decades, and construction costs (and project benefits) could show a similar picture today
- Habitat and Threatened and Endangered species considerations
- Lack of Hydropower potential and cost challenges

Dam Safety Modification Process (Conceptual)

Project Scoping
- Define Objectives
- Define Problems
- Define Opportunities
- Identify Constraints
- Understand how to evaluate and compare alternatives
- Strategize collaboration with all stakeholders

Alternatives Brainstorming
- Structural Alternatives (i.e., Raise Normandy Dam)
  - How high? How?
- non-structural Alternatives

DS RIDM

FWAC Risk Evaluation
- What does project risk look like in 50 years?

10% Risk Screening
- What does project risk look like in 50 years?

DESIGN

10% Design
- Produce initial designs of all alternatives

NEPA

NEPA Scoping

Examples of constraints:
- *Do no harm*
- *Regulatory compliance*
- *Do not increase downstream flood risk*
- *Environmental stewardship*

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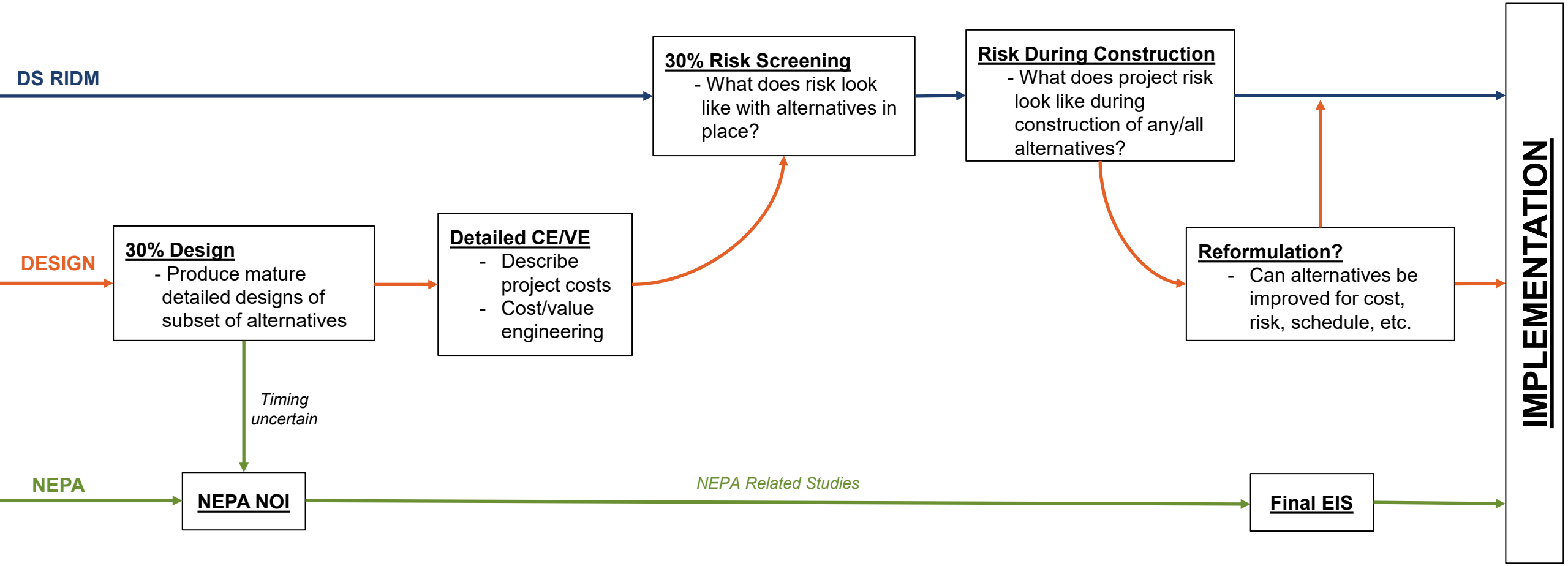

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