

Four Lakes Task Force

Wixom Lake Update on Repair & Schedule

February 18, 2021



Four Lakes Task Force



AGENDA

- ❑ Introduction and Welcome – Dave Rothman
- ❑ Priority Topics – Dave Kepler
- ❑ Repairs to Restore Legal Lake Levels – Paul Drew
- ❑ Schedule – Ron Hansen
- ❑ Summary– Dave Kepler



PRIORITY TOPICS

Dave Kepler
President, Four Lakes Task Force



Restoration of Wixom Lake – A community priority



FLTF's focus is on the Restoration of Wixom Lake.

It will take community support and advocacy to make this plan work.



Today

We are covering the Dam Restoration and Time Table
At Best: 2026
For return of the lake



The dam restoration starts*: when we have a financing plan supported by the Wixom Lake communities and approved by Gladwin County

- **\$9 Million for Stabilization of Edenville Dam is Funded**
- **Updated Cost Estimate in late May for the total project**
- **A Preliminary Engineering plan completed by end of year**

* To date no county general funds or Assessments have been made

Critical Issues for the 2026 return of Wixom Lake

- ❑ **\$3-4 Million needed in 2021 to start Engineering to keep 2026**
- ❑ **Establishment of an Affordable plan for the community**
- ❑ **Environmental Restoration**
 - ❑ **It is unfair and unjust to expect the community to pay for all the environmental restoration that failed under a federally regulated private owner.**





RESTORING LEGAL LAKE LEVELS

Paul Drew
Project Manager, GEI Consultants

May 2020 Flood Damage

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- ❑ Left embankment breached
- ❑ Powerhouse and equipment damaged
- ❑ Both spillways damaged
- ❑ Embankment scoured and undermined
- ❑ M-30 causeway washed out



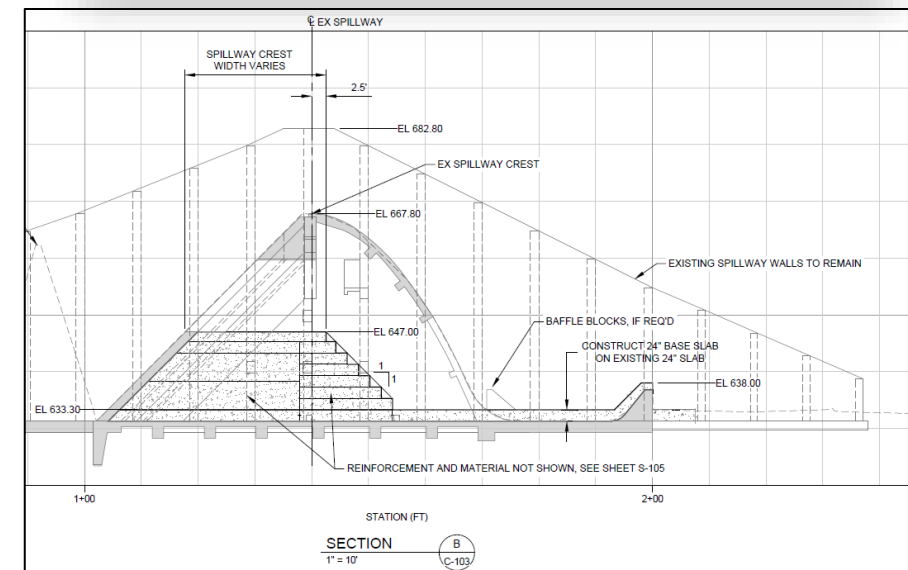
Phase I Interim Stabilization Measures at Tobacco Spillway (AECOM)

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On going Phase I construction at Tobacco includes:

- ❑ Lowering and filling existing concrete spillway
- ❑ Restoring base flow in the Tobacco River
- ❑ Lowering water level upstream of dam
- ❑ Stabilizing River immediately downstream of dam
- ❑ Spillway designed to convey approximately 11,300 cfs – approximately 200-year flood flow
- ❑ MDOT constructing temporary M-30 causeway.
- ❑ Embankment stabilization adjacent to concrete

Phase I interim repairs under a FLTF MOU with State of Michigan and NRCS. Long-term goal to incorporate of the Phase I repairs in the permanent, long-term repairs.



Phase II Interim Stabilization Measures at Edenville (GEI)

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Phase II Work at Edenville includes:

- ❑ Remove Edenville spillway to its base
- ❑ Install low dike across the breach channel
- ❑ Install sheet pile cut off wall across breach channel
- ❑ Restore base flow to original river channel
- ❑ Convey 200 storm year inflow without overtopping into breach channel
- ❑ Exploring options for the powerhouse – either demolish or re-use water passages as a low level outlet. Hydro generation is not an option
- ❑ Stabilize and restore downstream portions of the Tittabawassee River channel
- ❑ Exploring embankment stabilization options along upstream face of dike from spillway to M-30
- ❑ Installing boom on Tobacco River for safety

Phase II interim repairs also funded by State of Michigan and NRCS. Long-term goal to incorporate Phase II repairs in the permanent, long-term repairs.

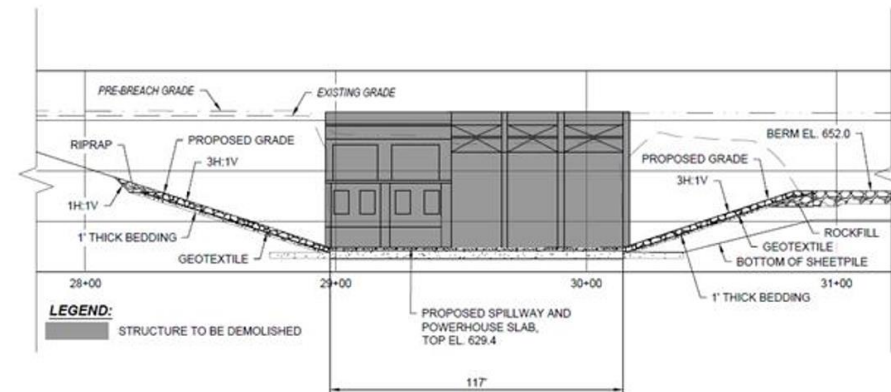


Figure 1: Option I

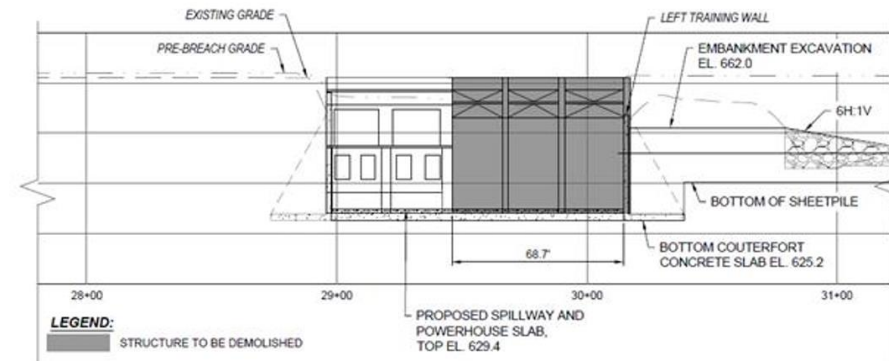


Figure 4: Option IV



Long-Term Restoration - Critical Items

- ❑ **Spillway Adequacy.** Edenville is classified a High Hazard dam. Prior to May 2020 flood, the total spillway capacity (Edenville + Tobacco) was approximately 20,670 cubic feet per second (cfs) before water would begin overtopping embankments
- ❑ Prior State of Michigan 1/2 PMF was 25,000 cfs
 - ❑ Based on current on-going studies and recent flood, this will increase
- ❑ FLTF study currently estimating future spillway requirement being 52,275 cfs
- ❑ Spillway requirements still being finalized based on
 - ❑ PMP and PMF studies
 - ❑ Inflow Design Flood Study
 - ❑ State of Michigan Dam Safety Task Force
 - ❑ EGLE approval



A risk-based flood study will be required to determine the final capacity criteria.

Risk Based Design Approach

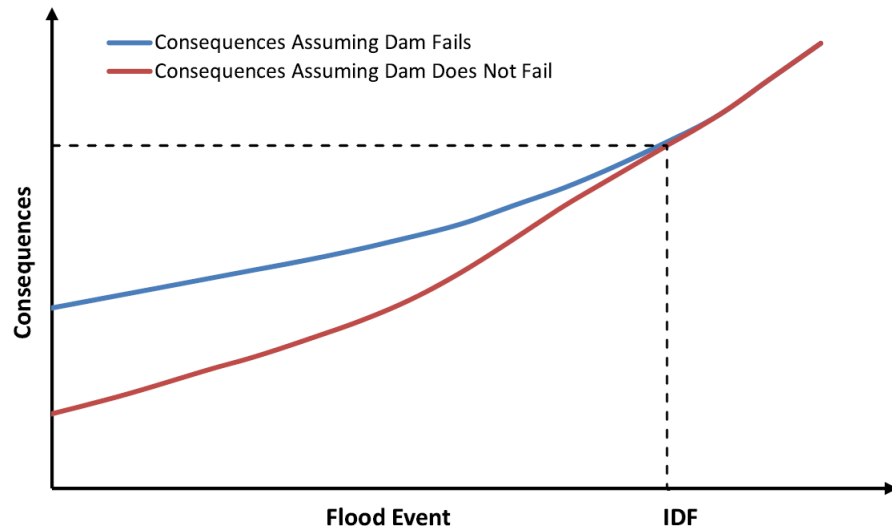
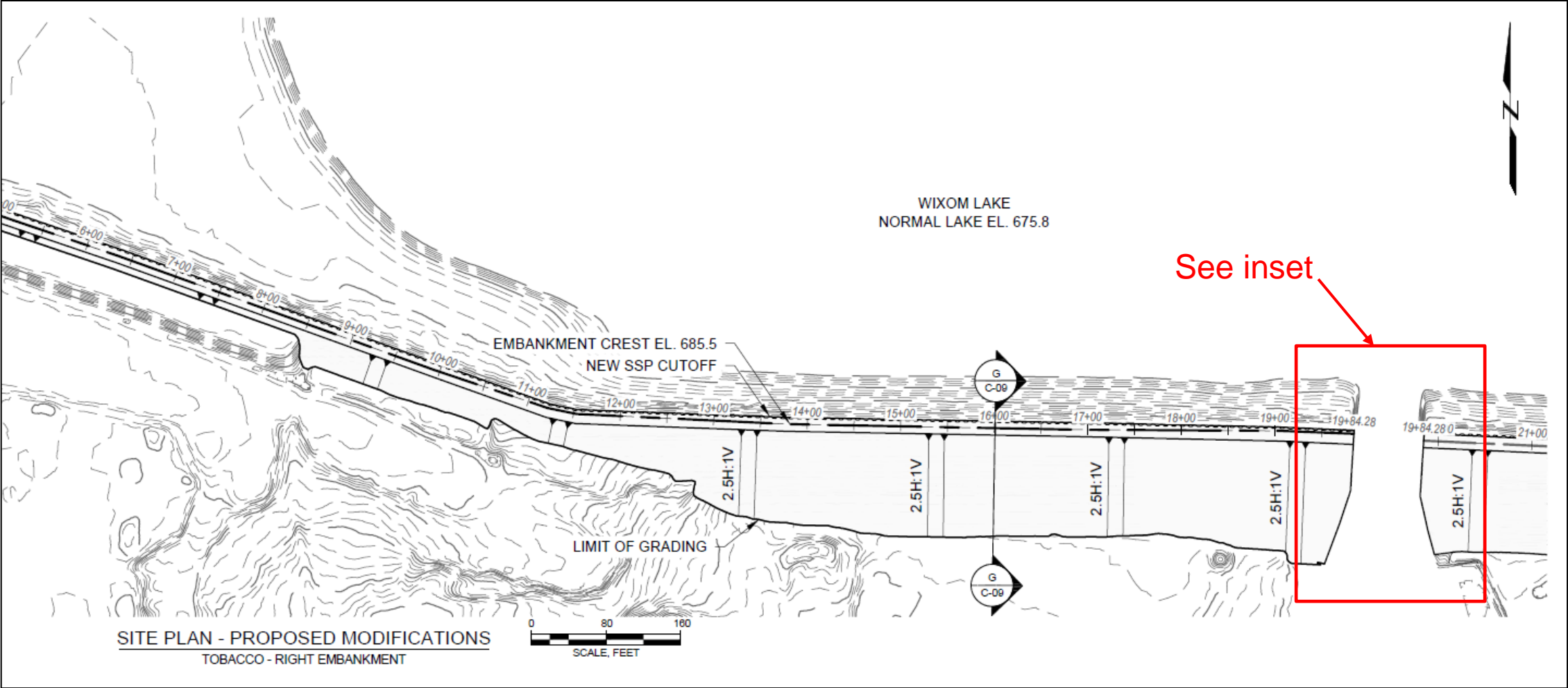


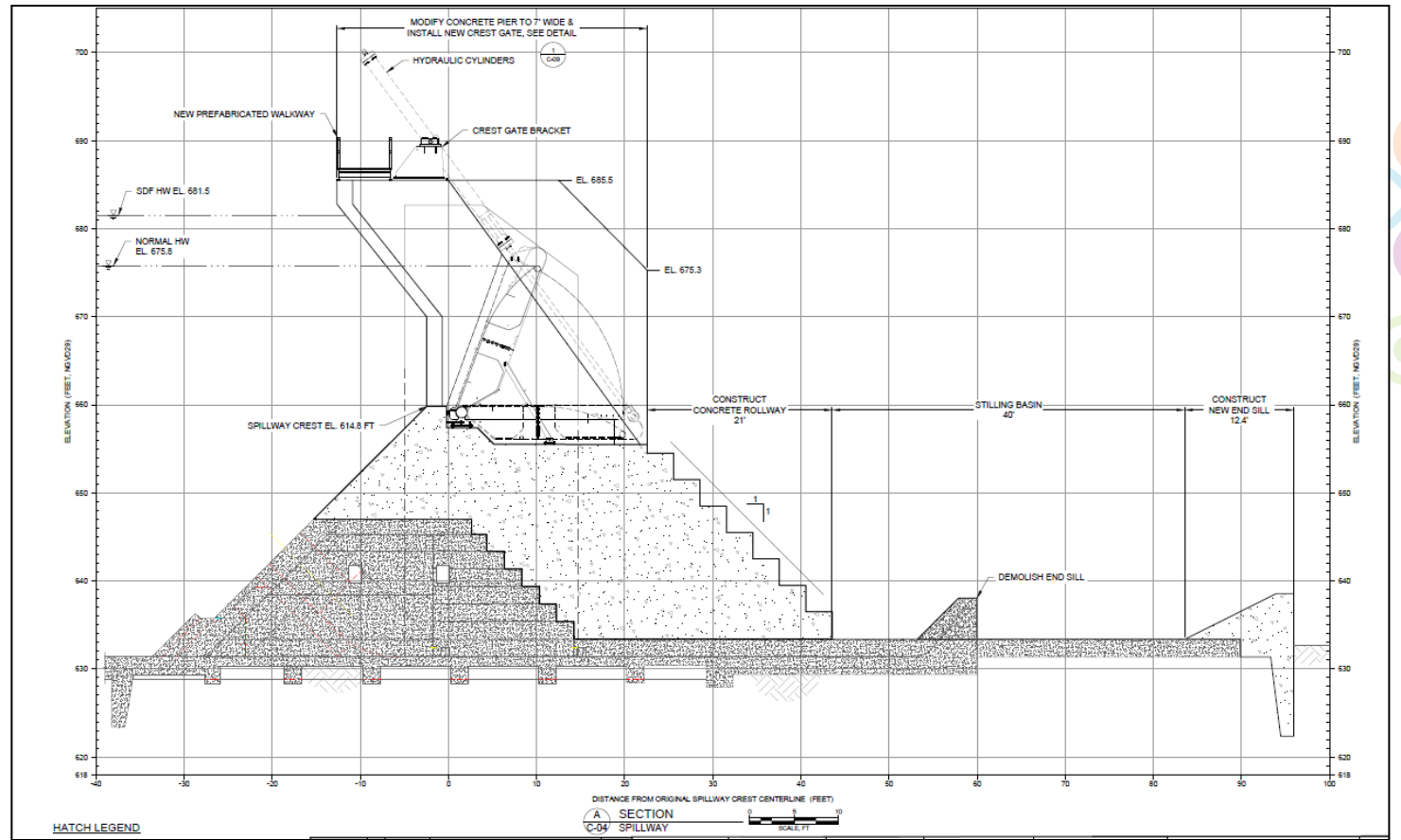
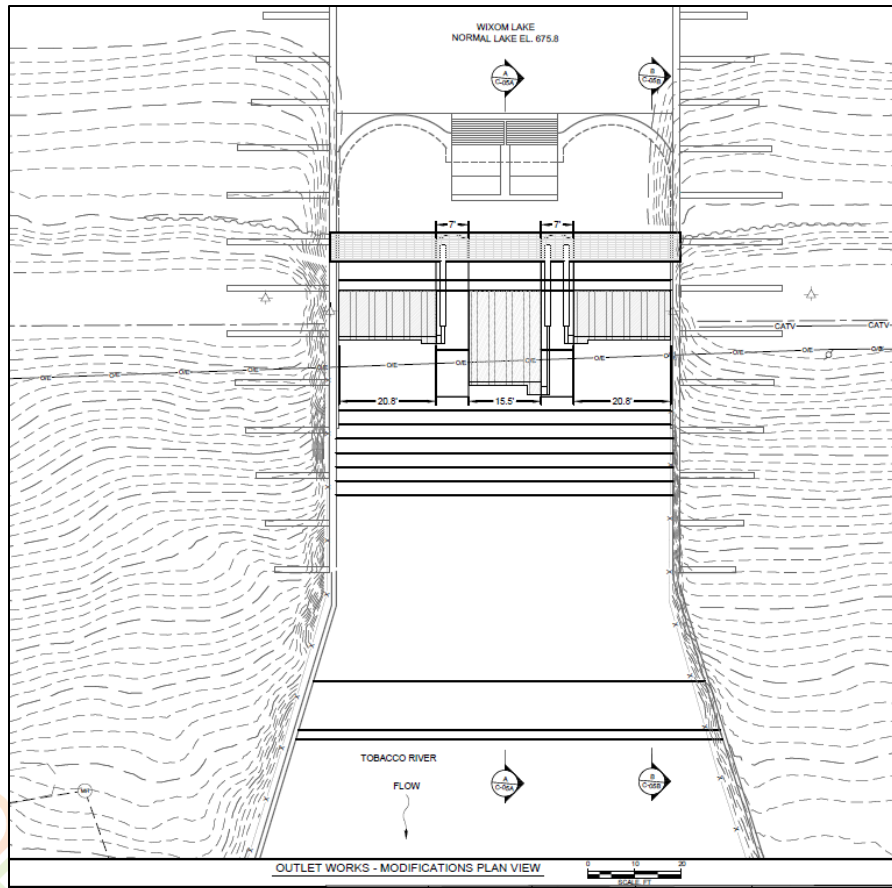
Figure 1 Conceptual Comparison of Incremental Consequences

- **The IDF/risk-based approach aligns with FEMA guidelines and recommendations of the Michigan Dam Safety Task Force guidelines for Michigan dams**
- **Inflow Design Flood that requires these steps:**
 1. Site-specific Regional Probable Maximum Precipitation (PMP) studies which are underway.
 2. Perform downstream Inundation mapping assuming dam failure for a range of flows starting from the 100-year flood up to the PMF
 3. Determine the incremental hazard increase and consequences of failure for a range of flood flows up to the PMF
 4. Use risk-based, IDF approach to inform the design spillway capacity – no less than 200-year but possibly less than the $\frac{1}{2}$ PMF

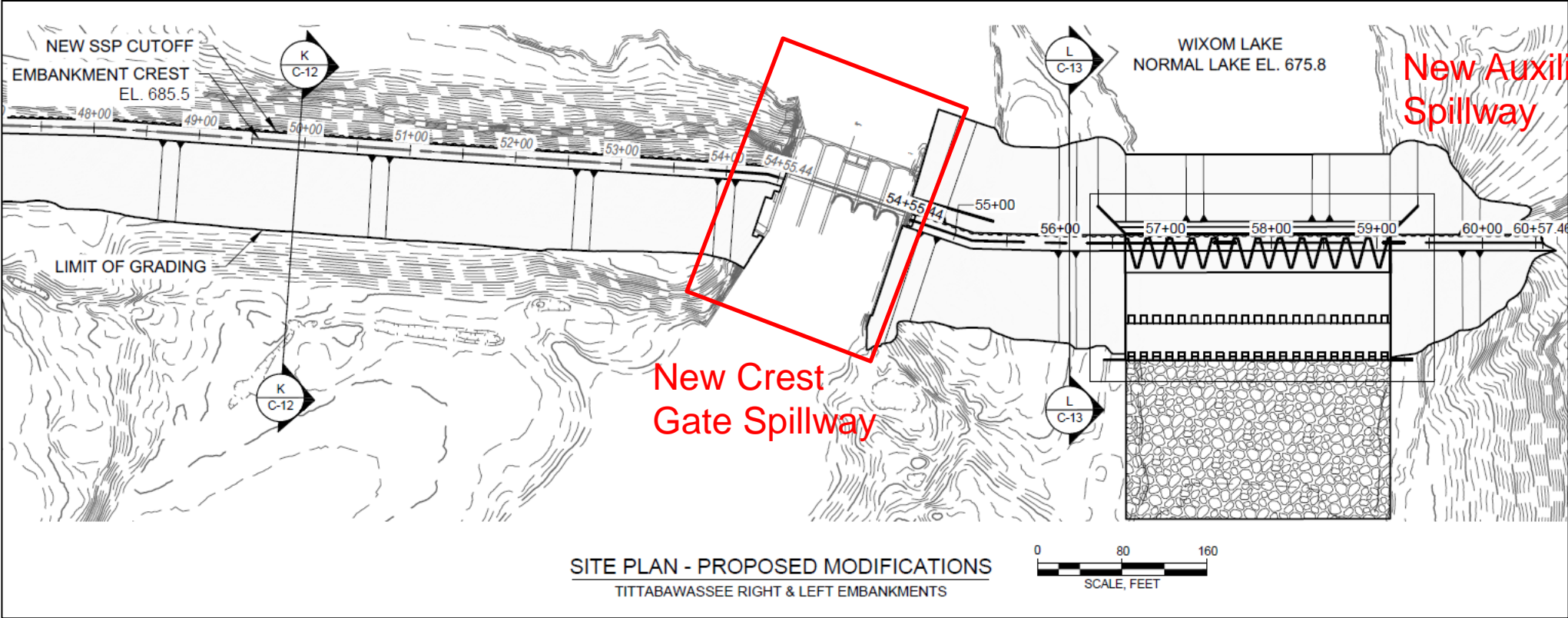
Tobacco River – Proposed Plan View of Permanent Repairs



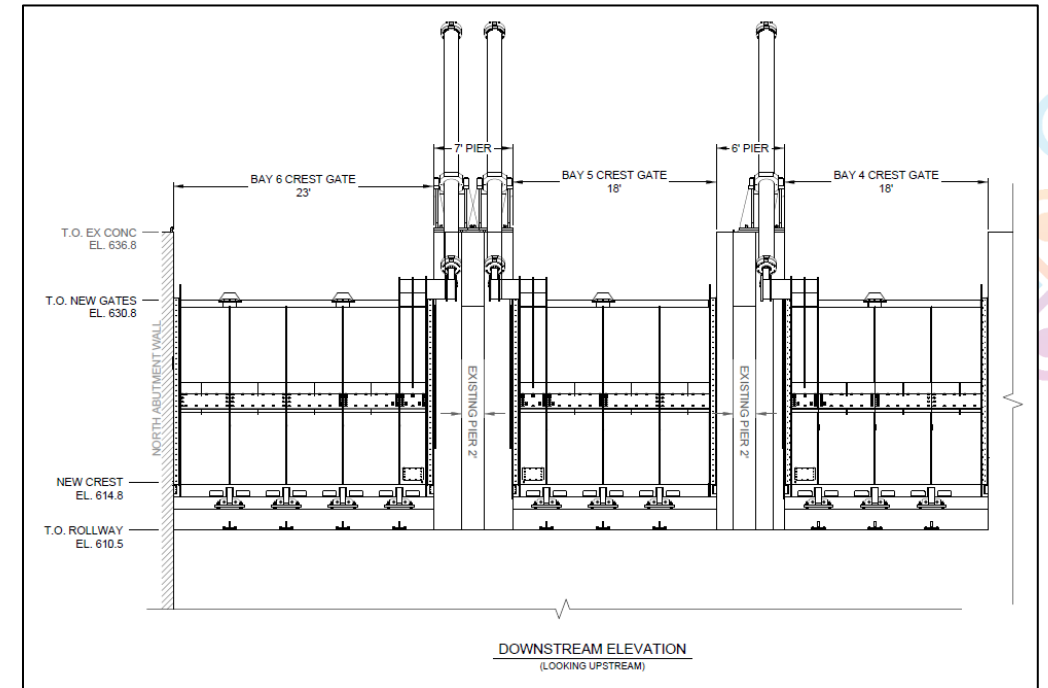
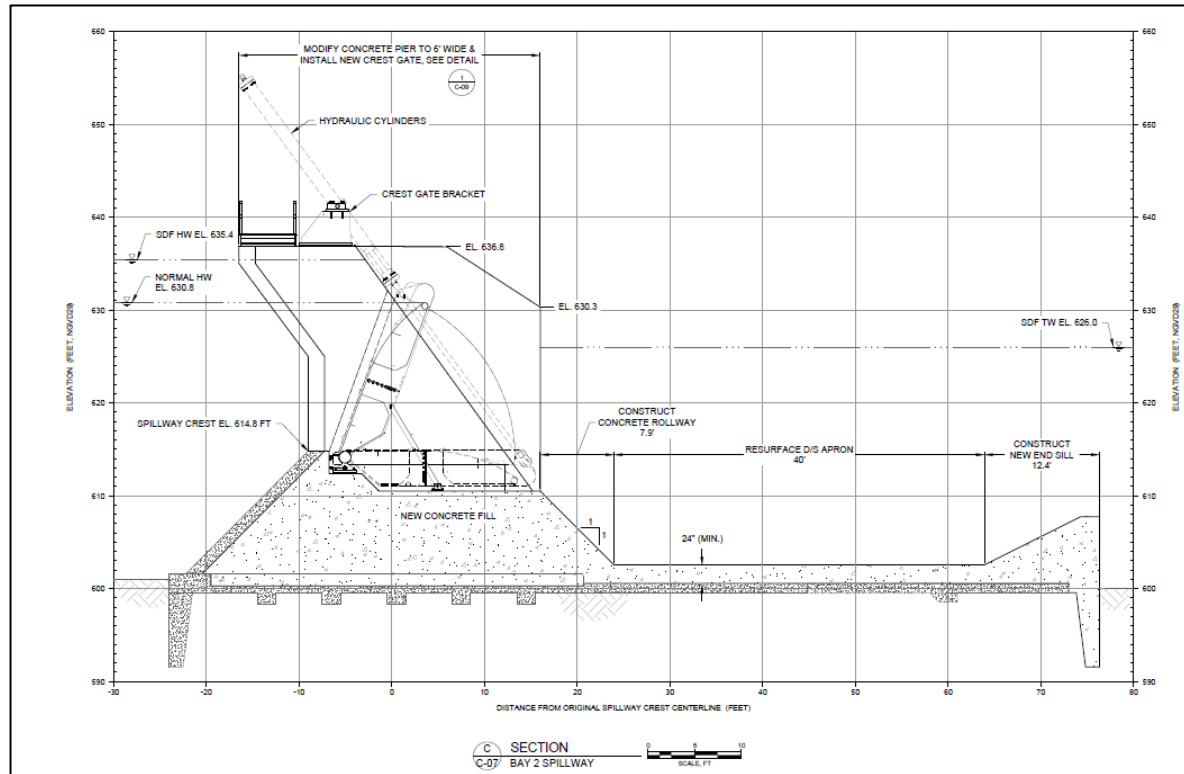
Proposed Permanent Repairs – Tobacco Spillway



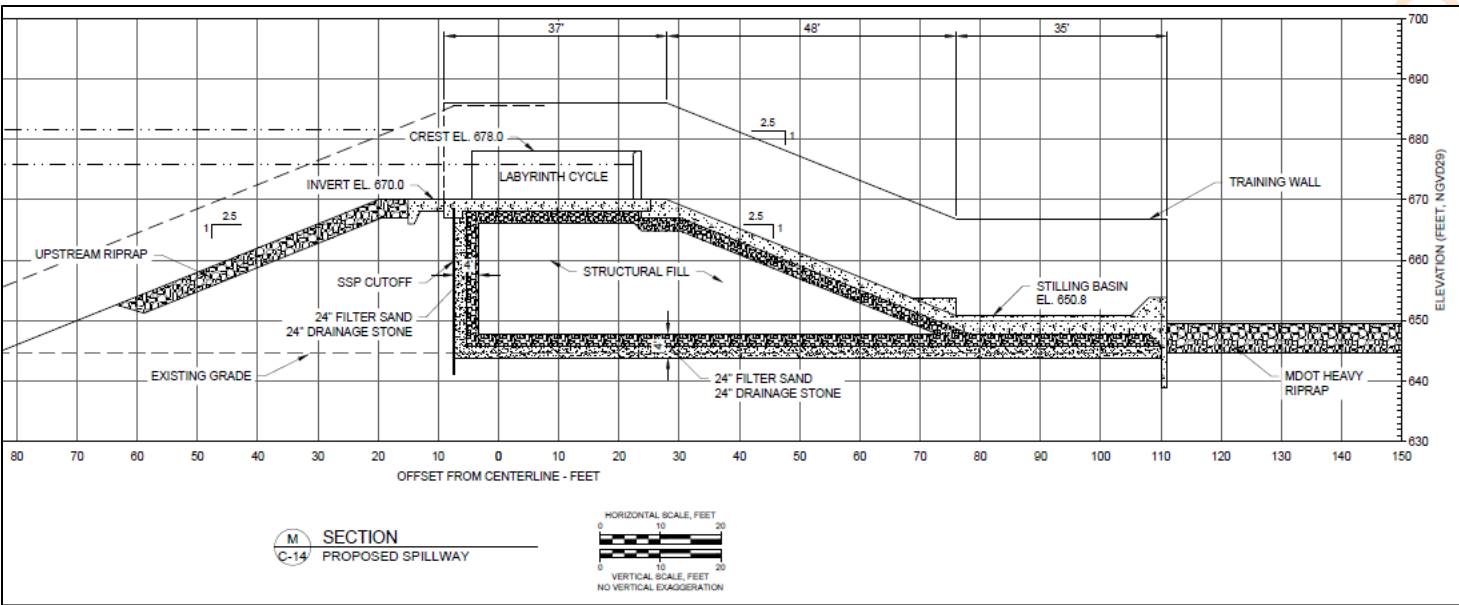
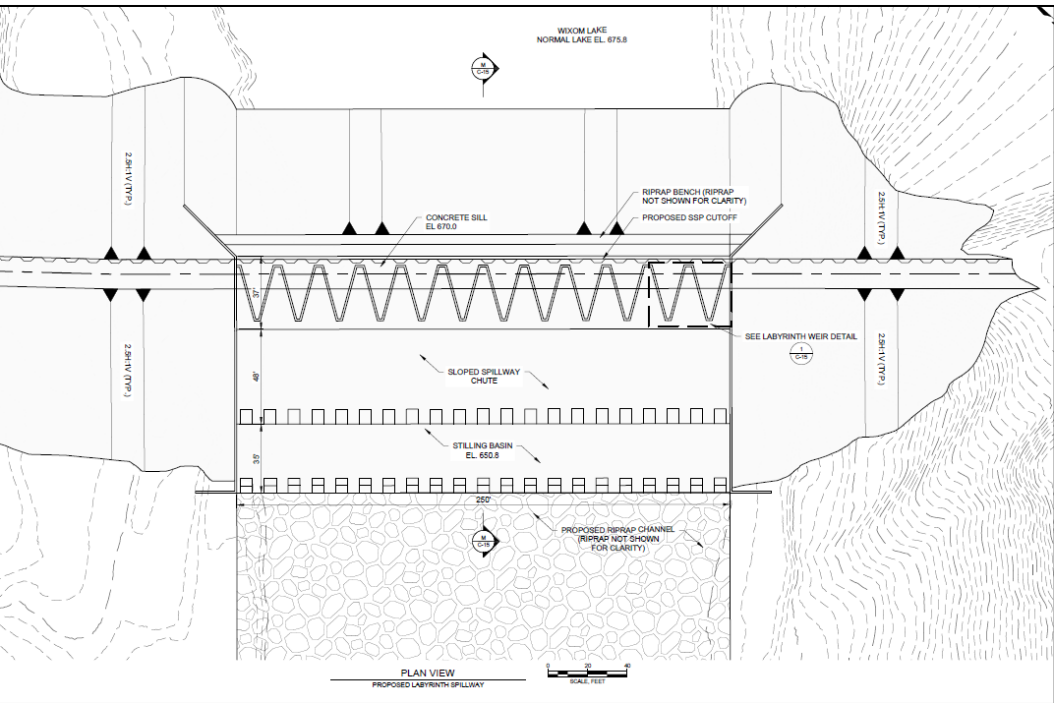
Tittabawasse River – Proposed Plan View of Permanent Repairs



Proposed Permanent Repairs – Tittabawasse Spillway



Proposed Permanent Repairs - Labyrinth Auxiliary Spillway at Tittabawassee Breach Channel



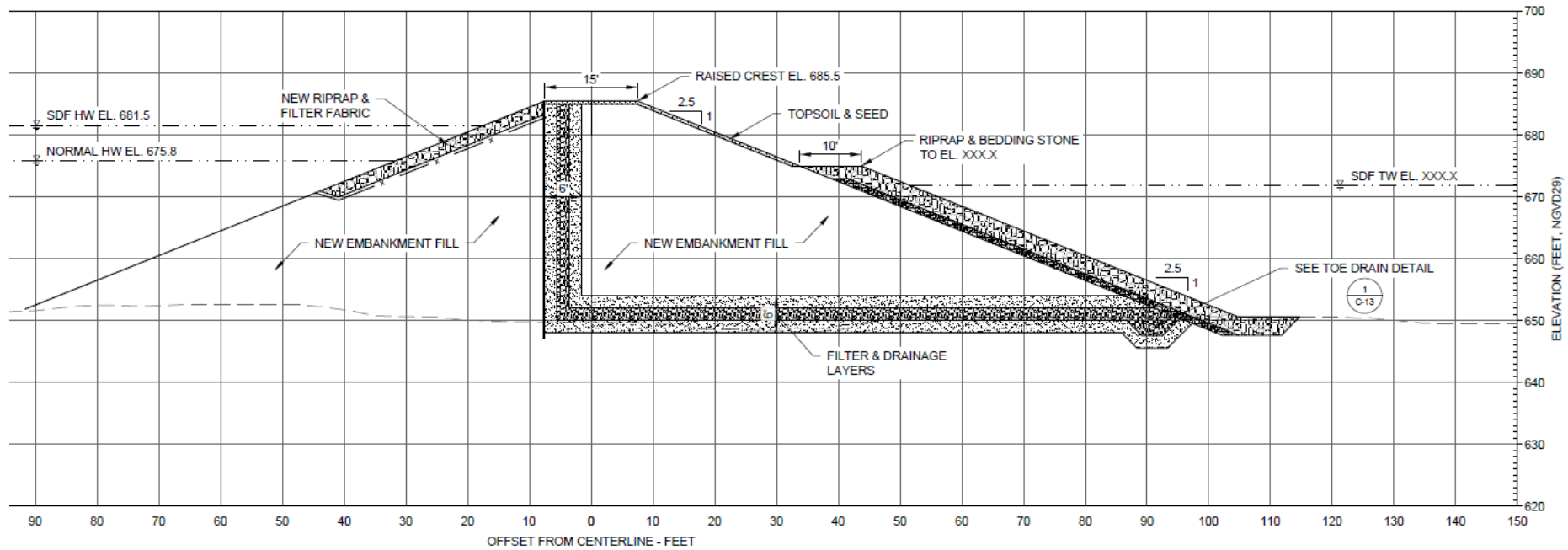
Critical Repair Items

- ❑ **Water Retaining Structures** – The left embankment completely breached. Portions of the remaining embankments were damaged due to rapid reservoir drawdown and scour
- ❑ Remaining embankment slopes are steep and don't meet stability criteria
- ❑ Embankments leak excessively. No seepage cutoff and no internal filter zones to protect against seepage-induced internal erosion
- ❑ Total spillway capacity is significantly lacking

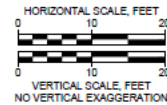


- *Geotechnical investigations and structural analyses are required to support design of new embankments and repair of existing embankments.*
- *All water retaining structures will need to be thoroughly evaluated and designed to meet State and Federal dam safety standards.*

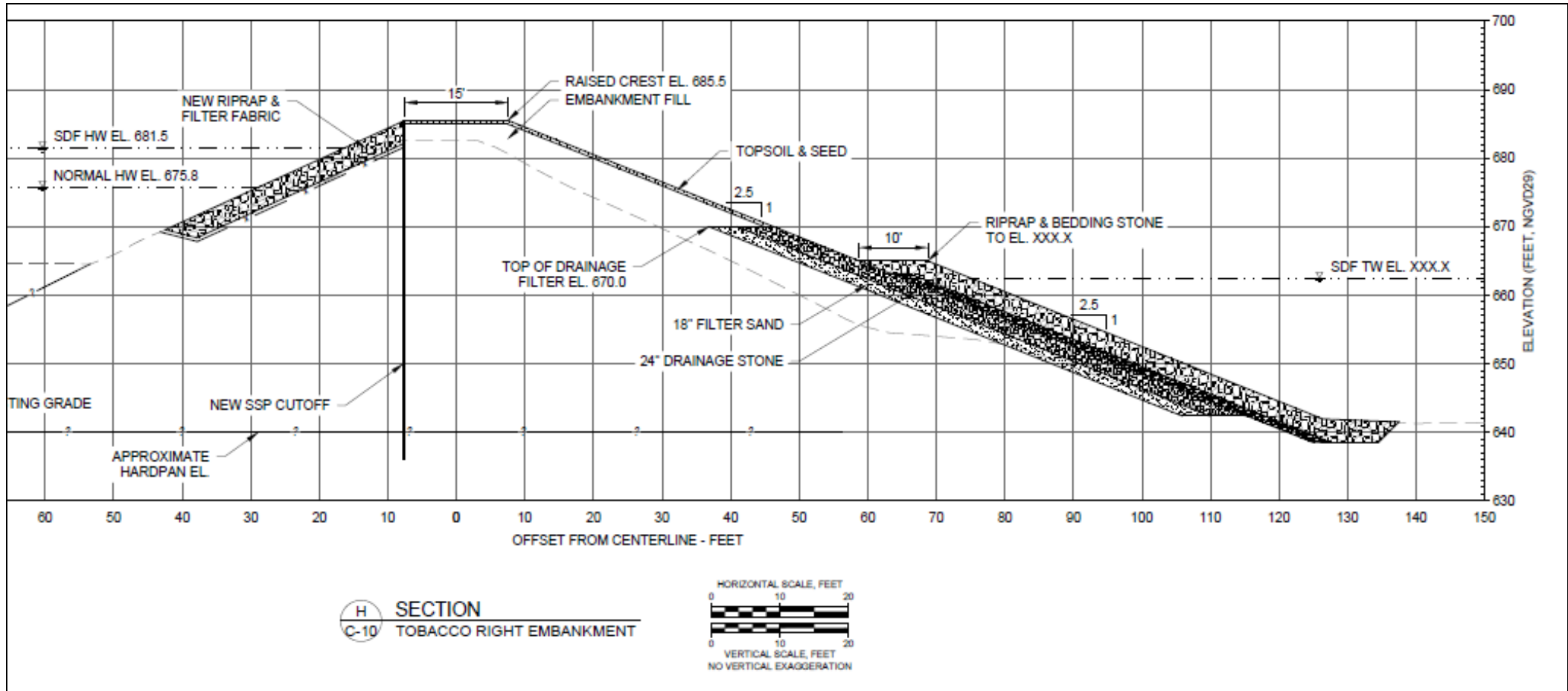
Proposed Permanent Repairs – New Embankments at Breach Channel



(L) SECTION
C-12 TITTABAWASSEE LEFT EMBANKMENT



Proposed Permanent Repairs – Embankment Stabilization





SCHEDULES AND TIMING

Ron Hansen
Engineer for FLTF, Spicer Group. Inc



Schedule Considerations and Constraints



We all have a duty of care to keep people safe.

There is a significant amount of work being done now.

Final construction timeline is dependent on receiving regulatory permits, financing approval, establishment of the assessment rolls and county approval.



Part 307, Michigan statutes dictate the process, and USDA has requirements

We are running parallel paths to get to the start of construction.



Engineering Design Phase

Engineering is more than just design and building of a dam. There is significant modeling, environmental impact study and permitting required.

Flood Study

PMP and PMF Study

IDF Finalization

Surveying and Easements

Inspections

Soil Borings

Embankment Analysis

Spillway and Gate Analysis

Contractor Pre-qualifications

Environmental Analysis

Wetlands, Streams,

Floodplains, Mussels, Ecosystem,

Recreation

Final Design Engineering

Geotechnical

Structural

Hydraulics

Environmental

Transportation

Drainage

Electrical

Mechanical

Soil Erosion

Landscape/Restoration

EGLE Approval

USDA Financing Approval

Local Approval

Contract Documents

Specifications

Bidding

Computation of Cost

Notice to Proceed

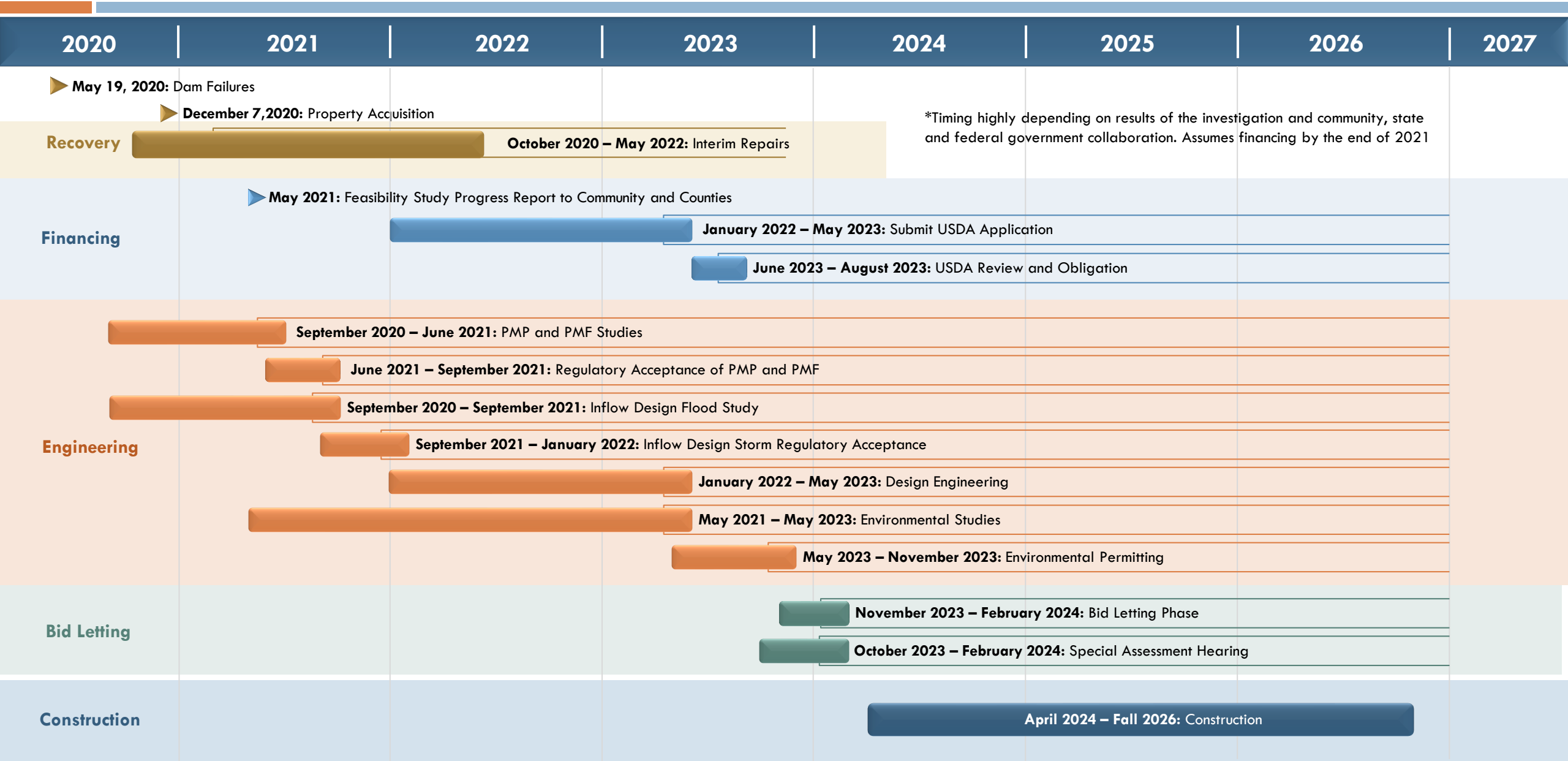


Before Construction May Begin We Need:

- ❑ Independent forensic investigation report
- ❑ Engineering
 - ❑ Preliminary engineering reports
 - ❑ Inflow Design Flood needs to be established
 - ❑ Final design and construction plans
- ❑ Submittal and Approval for USDA funding approval
- ❑ Environmental Studies and EGLE Permitting
- ❑ Bid letting and Computation of costs
- ❑ Special assessment hearings and appeals
- ❑ Approval of special assessment roll by county



Edenville Dam Recovery and Restoration Plan* (With USDA financing and engineering funded by grants)



*Timing highly depending on results of the investigation and community, state and federal government collaboration. Assumes financing by the end of 2021



SUMMARY

Dave Kepler
President, Four Lakes Task Force



Financial Situation Considerations

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- **FLTF has allocated the funds to get the Edenville Dam stabilized**
 - ▣ We still need to raise funds to do all the engineering for the Edenville Dam
 - ▣ If we don't this could add an extra year to the project

- **The costs presented in December will not be updated until the May report**
 - ▣ Those costs are based on the lake property owners paying 100% of the costs
 - ▣ It will take to the end of the year to determine if we have an affordable plan

- **Special Assessment District is legal and “Part 307” is the legal process for funding**
 - ▣ We will be recommending ~\$200 per Lake owner(\$50-backlot) yearly transitional assessment
 - ▣ *The SAD website will be updated this month & webinar in March will provide more detail*

- **Hydropower will not reduce the assessments in the next decade**
 - ▣ And would add to the time and costs to bring Wixom up



Closing Thoughts on Wixom Lake

- ❑ **We understand the urgency to restore the lake levels for county, property owners and local businesses**
 - ❑ Our first priority has been public safety
 - ❑ We have to find an affordable path forward
- ❑ **THERE IS A COST FOR ABANDONMENT!**
- ❑ **We are committed to BRING BACK WIXOM LAKE!**
 - ❑ It is the best long term alternative for the community and the county.
 - ❑ It will take state and federal support to accomplish this
 - ❑ It will take community advocacy





THANK
YOU

- ❑ See website for future meetings
- ❑ Sign up for weekly updates at bit.ly/FLTF-subs
- ❑ Send questions to info@fourlakestaskforce.org