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Client

Village of Menomonee Falls
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Project

Lepper Dam Failure Analysis

Overview/Description

Lepper Dam is located with the Village of Menomonee Falls, WI, on the Menomonee River. The dam received a Wisconsin DNR rating of “significant” hazard potential. A dam failure (dam break) analysis was needed as part of reclassifying the hazard potential to “low” and creating an emergency management plan by the Village.

Concerns/Challenges

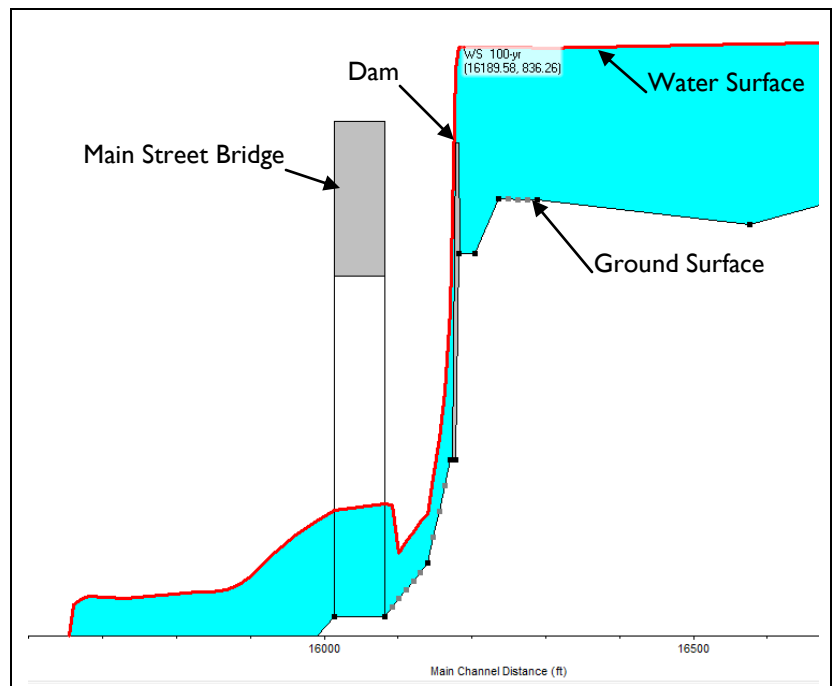
- The Lepper Dam has a 5-acre impoundment with 18’ of elevation change from the top to the toe of the dam.
- The existing hydraulic model showed many deficiencies for running an unsteady-model for dam failure analysis
- In order to satisfy the “low” hazard rating, the dam must have a spillway that allows for safe passage of a 100-year event, not impact (flood) homes downstream if a break were to occur and have zoning downstream of the dam that prevents building within the flood zone (hydraulic shadow)

Actions Addressing Challenges

- SSE modified the existing flood model (steady flow), and performed **Un-Steady** flow modeling with HEC-RAS software.
- An alternative modeling approach required estimation of a hydraulic shadow based on topography and impoundment volume
- **Flood mapping** of the hydraulic shadow downstream of the dam was prepared for the Village
- DNR approved the study/modeling approach but required enactment of a flood zoning district downstream of the dam to meet all criteria of the “low” hazard classification.
- Village’s conservation practice of preserving **green-space** along the riparian areas was to credit for no previous development within the flood zone!



Existing Concrete Lined Channel at Railroad Crossing



Profile of 100-year Flood at Dam and Main Street Bridge



Main Street Bridge with Dam/falls behind



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