



Exeter Reservoir Dam Feasibility Study

Project Update #1

July 18, 2024

Presented By

Jacob San Antonio, PE

VHB Project Manager & Chief Engineer





Town of Exeter Water Treatment Plant

Exeter Reservoir Dam

Portsmouth Ave

NH Route 202 W

Maxar

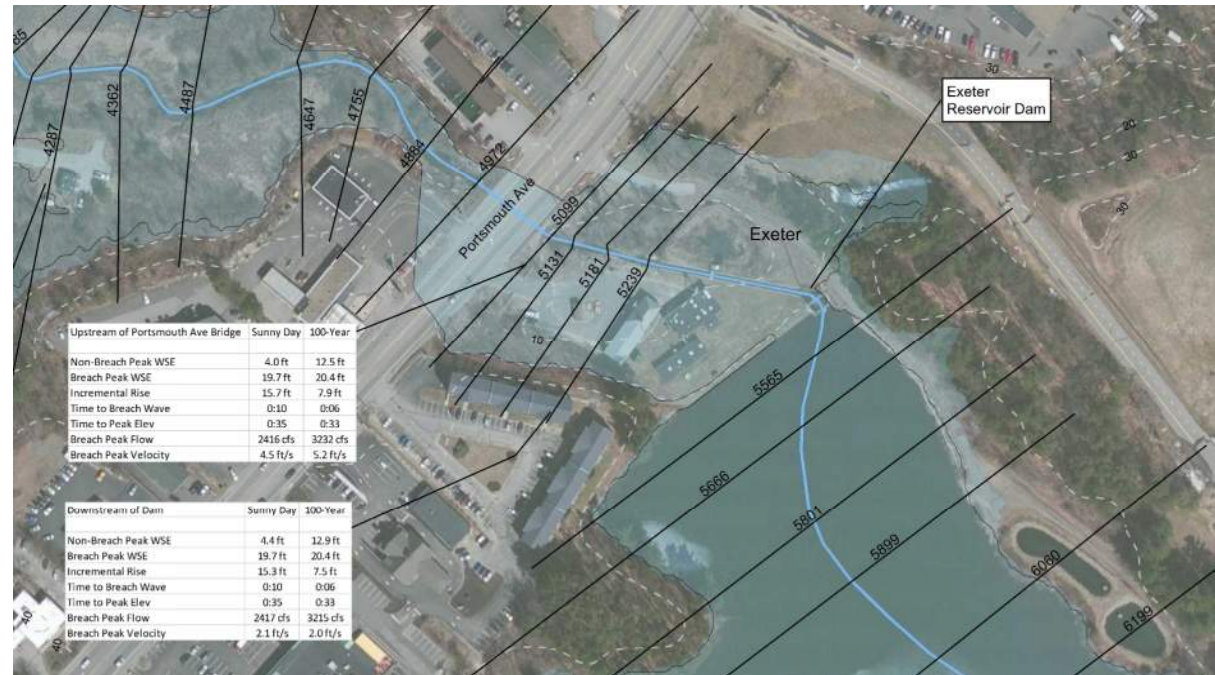
Exeter Reservoir Dam

- Commonly known as Water Works Dam
- Concrete face earth fill dam, 15' high and 248' long
- Spillway that leads into 8' wide and 220' long sluiceway
- High Hazard & Poor Condition
- Impounds Dearborn Brook and water pumped from Exeter River
- Contributing area 1.75 square miles
- Provides drinking water to 4,500 customers
- WTP downstream of dam

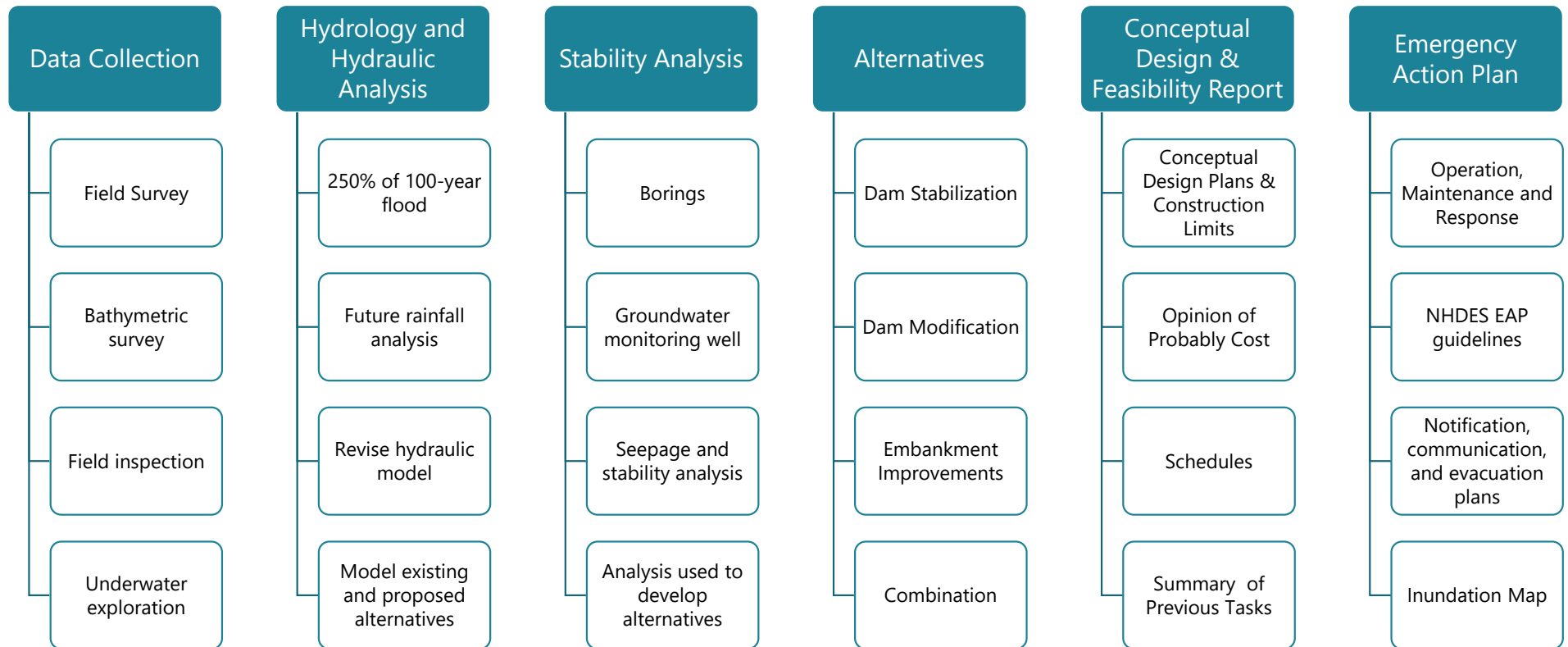


Background

- Pickpocket Dam Letter of Deficiency requesting Breach Analysis
 - Exeter Reservoir only had simplified Breach Analysis
- Breach Analysis confirmed High-Hazard Classification
 - Overtops Portsmouth Avenue
 - Flood heights greater than 1' on 1st floor of 3 residences and water treatment plan (4,500 customers)
- Feasibility Study to evaluate alternatives to bring dam into compliance



Scope of Work



Preliminary Results of Stability Analysis

- Investigation in November 2023 & June 2024
- Embedment depth of steel sheet pile cutoff wall extending should be sufficient, calculations are in process
 - Embankment Fill: 7-8' below crest, loose to medium dense sand with some silt
 - Native Soil: Extending ~35' below crest, medium to stiff clay
 - Below Native Soils: ~41' below crest, glacial till
- Upstream concrete wall is stable
- Slop stability factors of safety are acceptable, other than seismic loading conditions



Hydrologic Analysis

- Revised watershed boundaries in 2016 hydrologic HEC-HMS model
- Incorporated future rainfall analysis

STEP 6 TABLE. APPROACH FOR CALCULATING PROJECTED EXTREME PRECIPITATION ESTIMATES BASED ON TOLERANCE FOR FLOOD RISK.

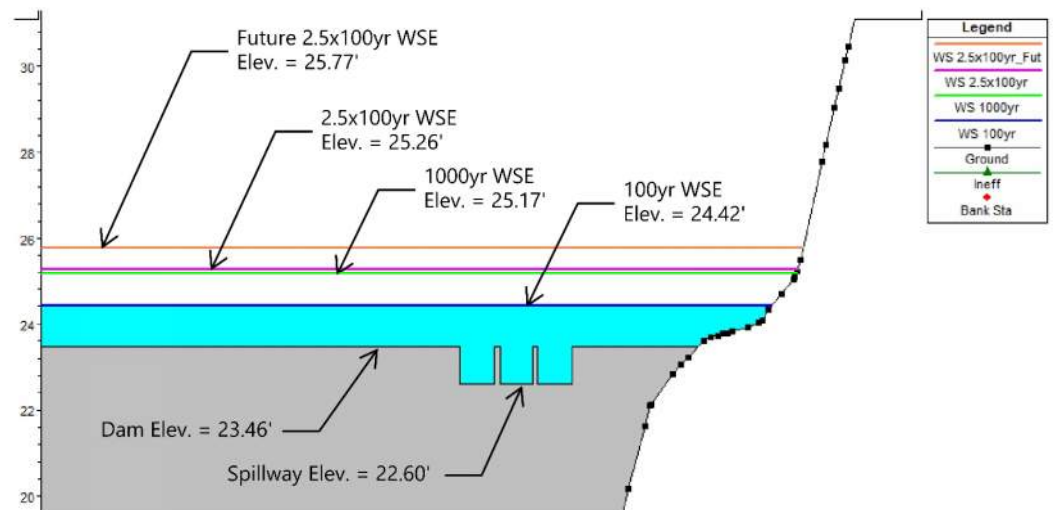
	HIGH TOLERANCE FOR FLOOD RISK	MEDIUM TOLERANCE FOR FLOOD RISK	LOW TOLERANCE FOR FLOOD RISK	VERY LOW TOLERANCE FOR FLOOD RISK
PROJECTED EXTREME PRECIPITATION ESTIMATE =	(Best available precipitation data) x (1.15)		(Best available precipitation data) x (>1.15)	

- Evaluated 1000-year event for NHDES rulemaking for Env-Wr 100-700

Design Storm	Peak Discharge (cfs)
2-year, 24-hr	90
25-year, 24-hr	300
50-year, 24-hr	600
100-year, 24-hr	900
200-year, 24-hr	1,300
500-year, 24-hr	1,700
1000-year, 24-hr	2,100
Future 100-year, 24-hr	1,300
Future 200-year, 24-hr	1,700
Future 500-year, 24-hr	2,100
Future 1000-year, 24-hr	2,500
250% of 100-year, 24-hr	2,300
250% of Future 100-year, 24-hr	3,300

Hydraulic Analysis

- Incorporated topographic and bathymetric survey data into HEC-RAS hydraulic model
- Tide elevation of 3.29 as downstream tailwater condition
- Current Spillway Capacity (top): 84 cfs
- Required Spillway Capacity: 2,300 cfs



Questions?

