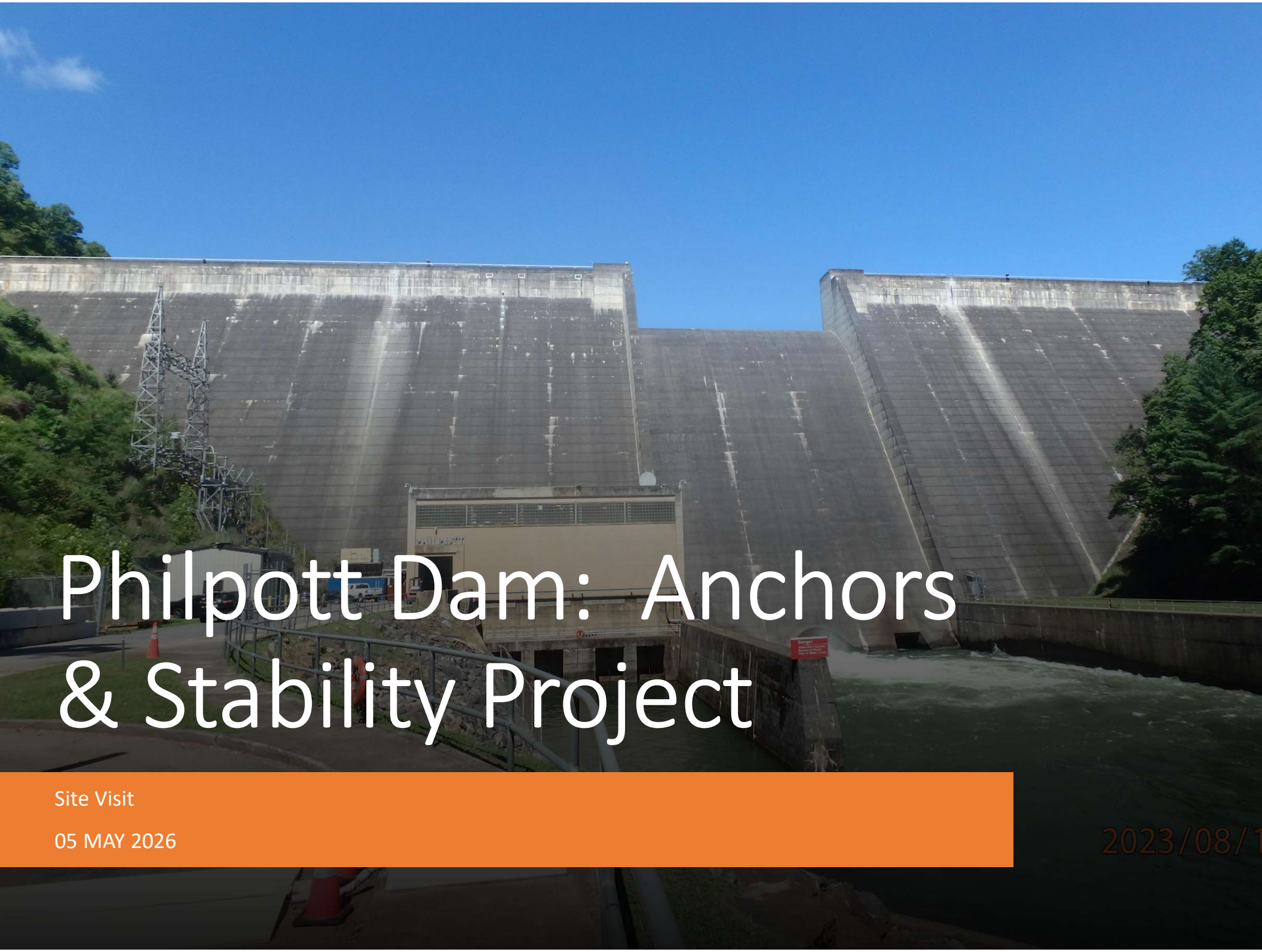

Philpott Dam: Anchors & Stability Project

Site Visit

05 MAY 2026

Discussion Agenda

- Presentation – 0800-0915
  - Project Orientation & History
  - Proposed Project Overview
    - Spillway Anchoring
    - Instrumentation
- Post Presentation Tour – 0930-1200
  - Safety Review
  - Piezometers @ Powerhouse
  - Anchors @ Top of the Dam

*** Times are approximate, and may shorten or events occur earlier depending on progress**

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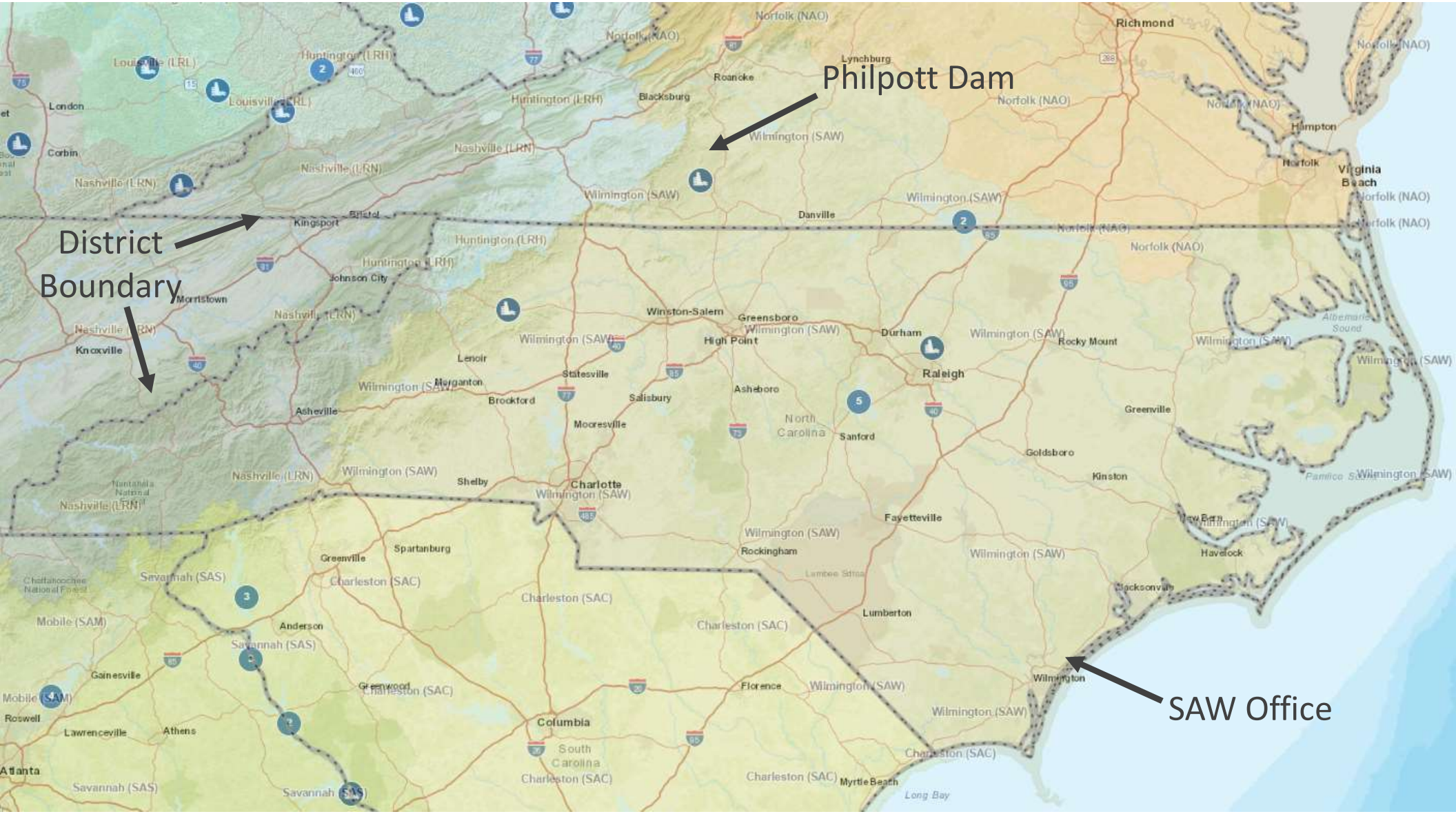
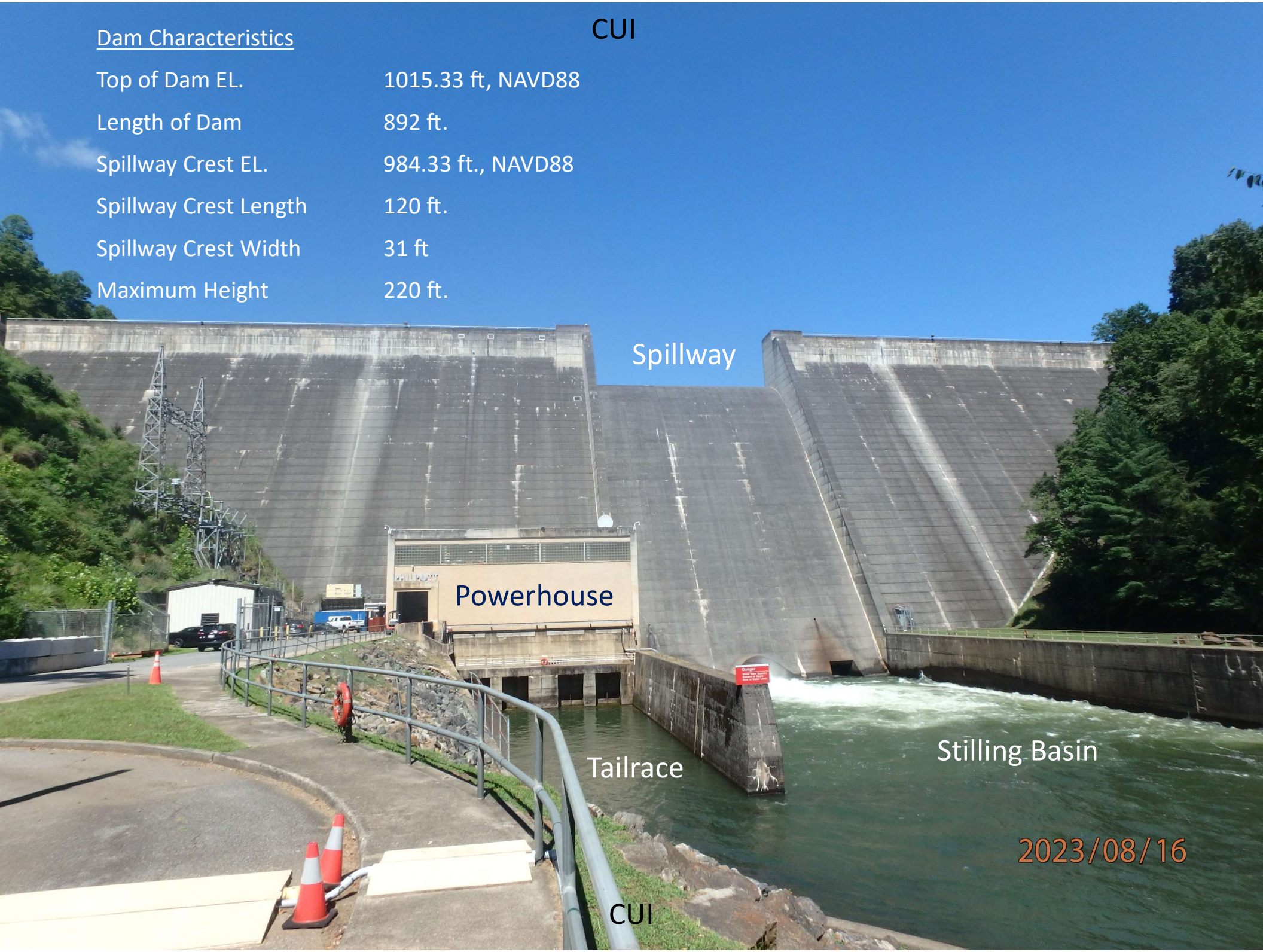
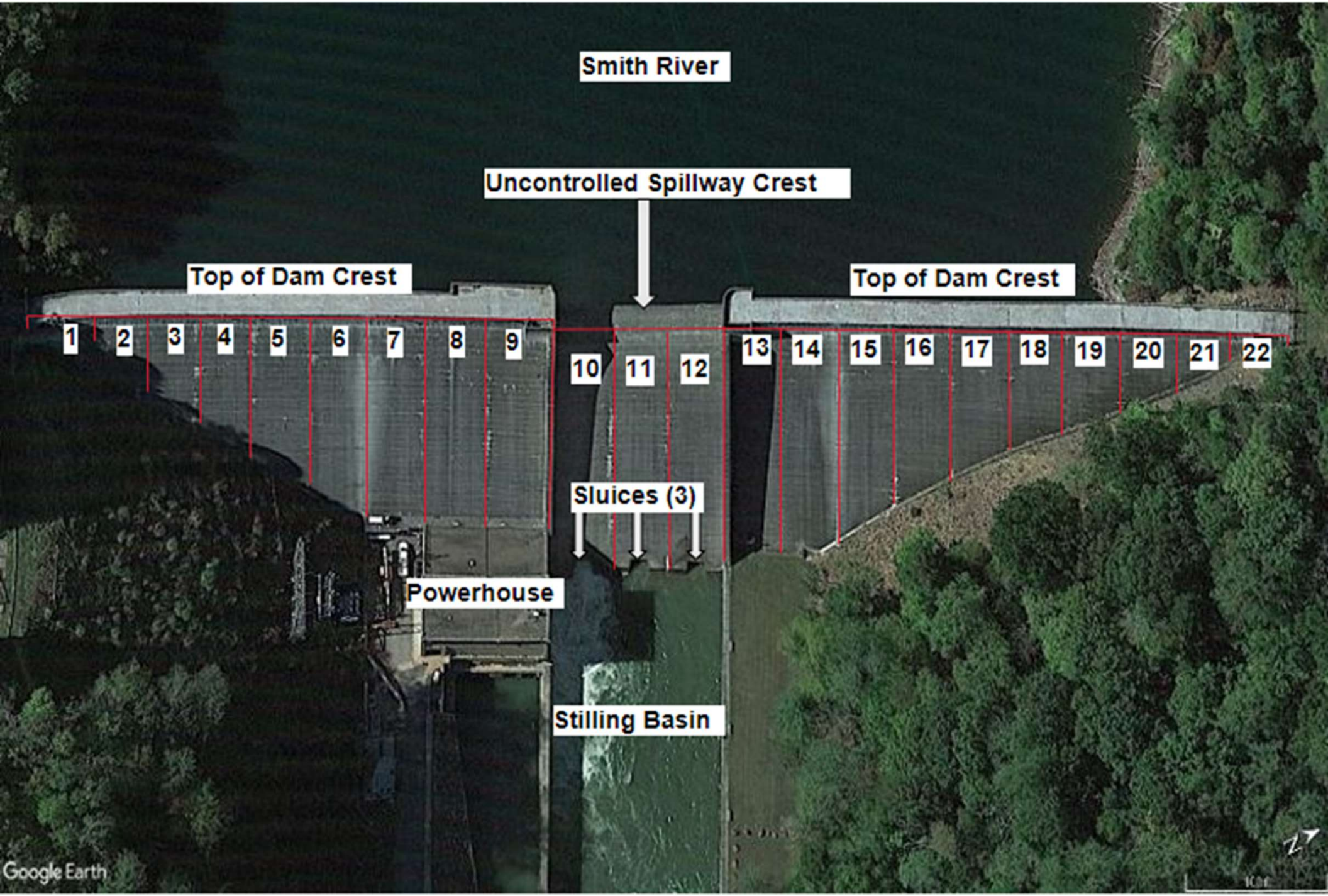
Project Location





Dam Characteristics

Top of Dam EL.	1015.33 ft, NAVD88
Length of Dam	892 ft.
Spillway Crest EL.	984.33 ft., NAVD88
Spillway Crest Length	120 ft.
Spillway Crest Width	31 ft
Maximum Height	220 ft.


Smith River
Uncontrolled Spillway Crest
Top of Dam Crest
Top of Dam Crest
1
2
3
4
5
6
7
8
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10
11
12
13
14
15
16
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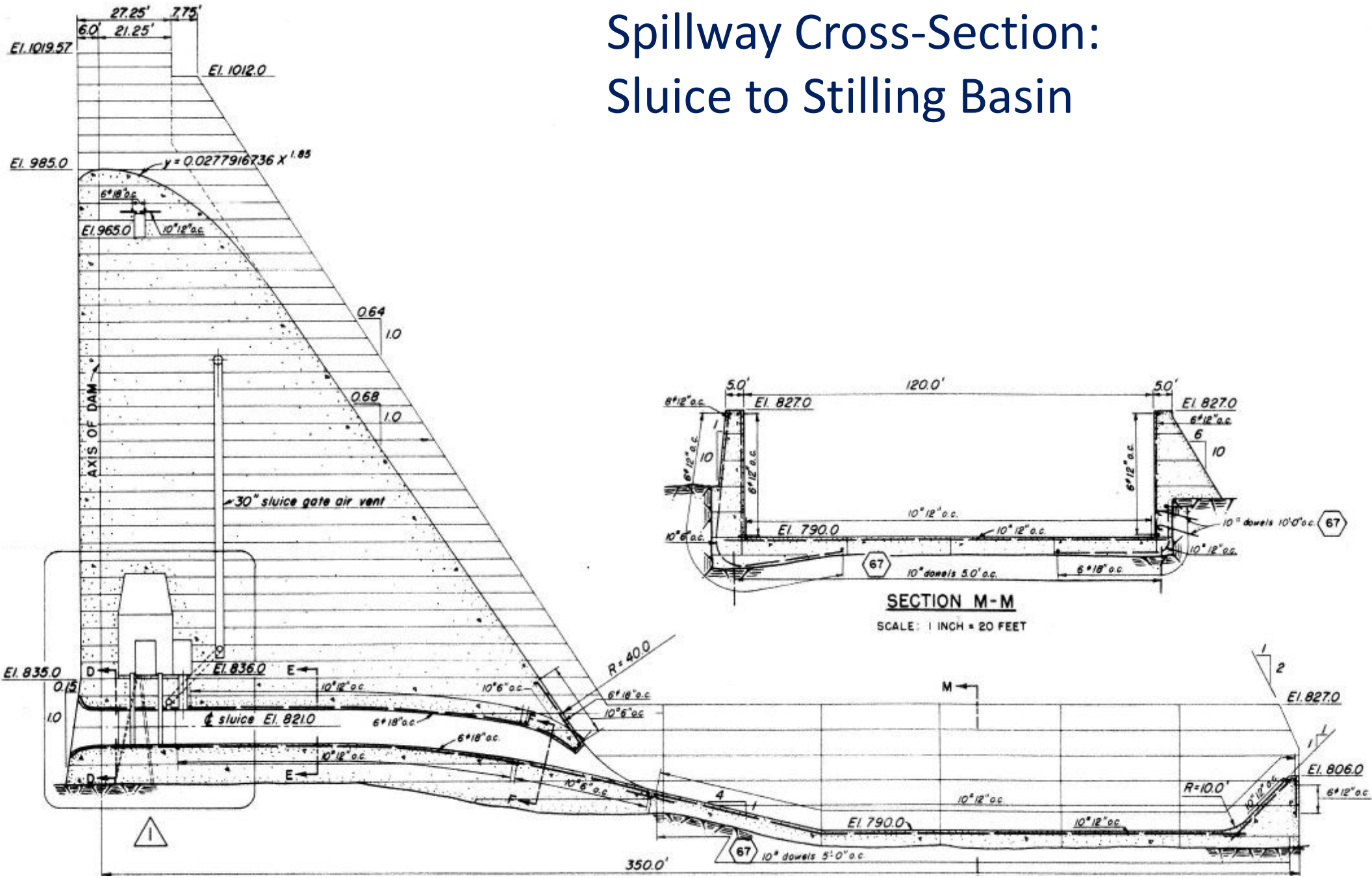
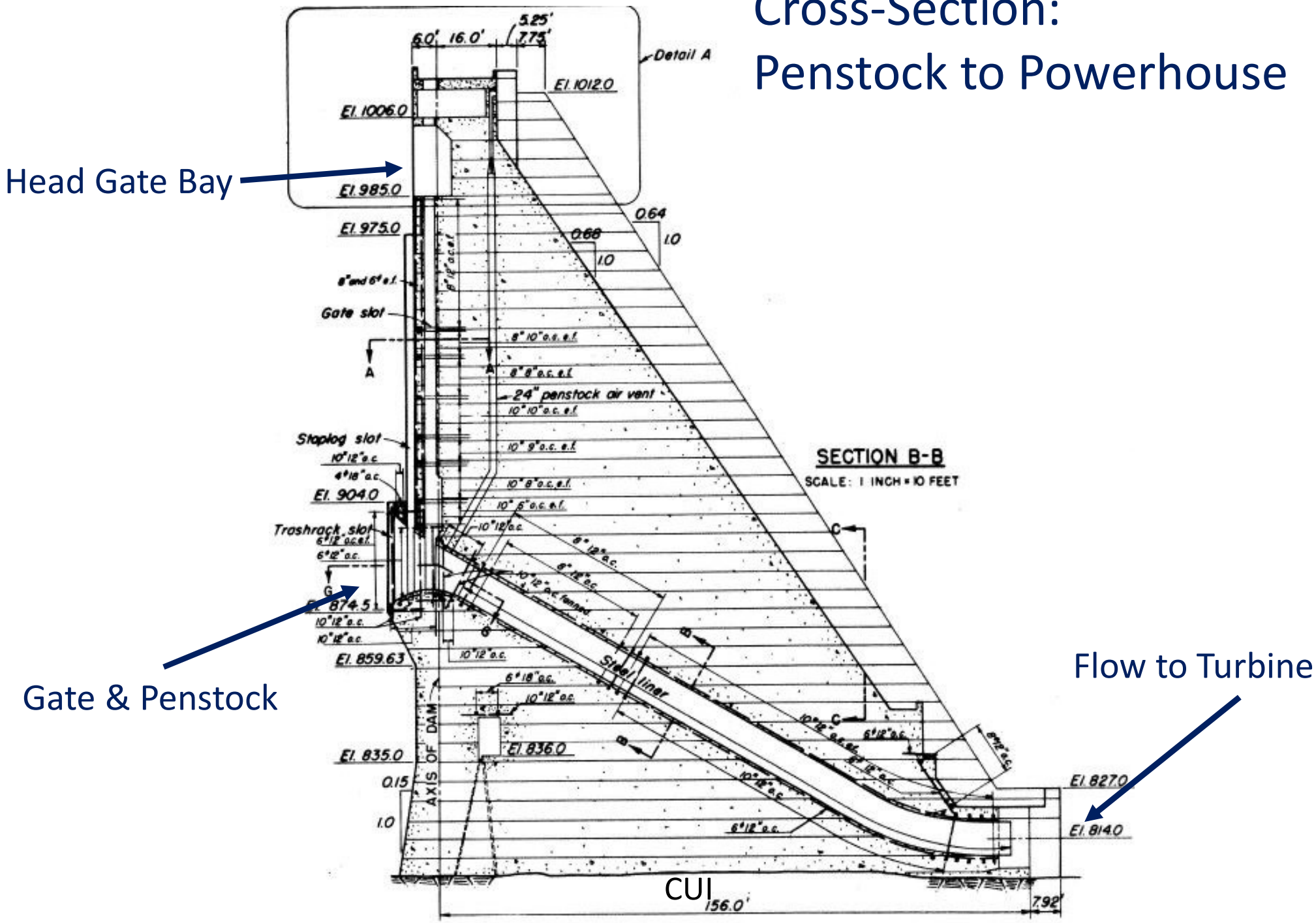
19
20
21
22
Sluices (3)
Powerhouse
Stilling Basin
Google Earth

Spillway Cross-Section: Sluice to Stilling Basin



Cross-Section: Penstock to Powerhouse



Philpott Dam: Upstream, Right Side

Philpott Dam: Upstream, Left Side

General Historical Timeline

1952 — Construction Completed

Aggregate and concrete mixtures used with ASR susceptibility.

1966 — Crack observations and measurements begin

1968 — PI No.2 Recommendation: Spillway Remediation (Anchors)

1969 — Spillway Anchor Installations

1980s — Subsequent Crack Mapping Efforts

1993

Alkali-Aggregate Reaction (AAR)

- Alkali-Silica Reaction (ASR)
  - Amorphous or microcrystalline silica aggregate (common in stream beds)
  - Strained quartz-bearing aggregate
  - Amphibolite aggregate
- Philpott Dam aggregate: locally sourced braided stream bars

1969 Spillway Repair (IAW PI #2 (OCT 1968))

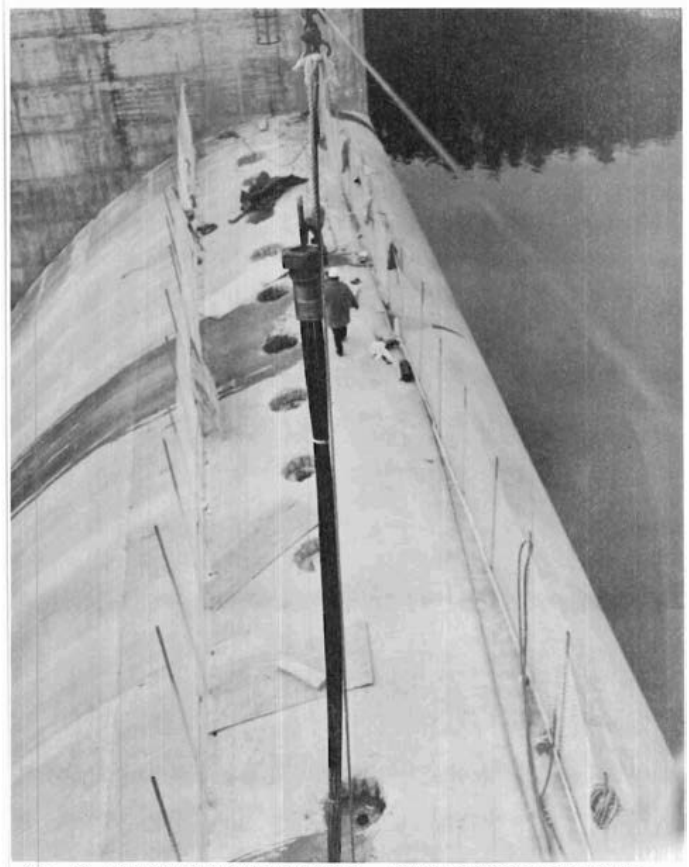
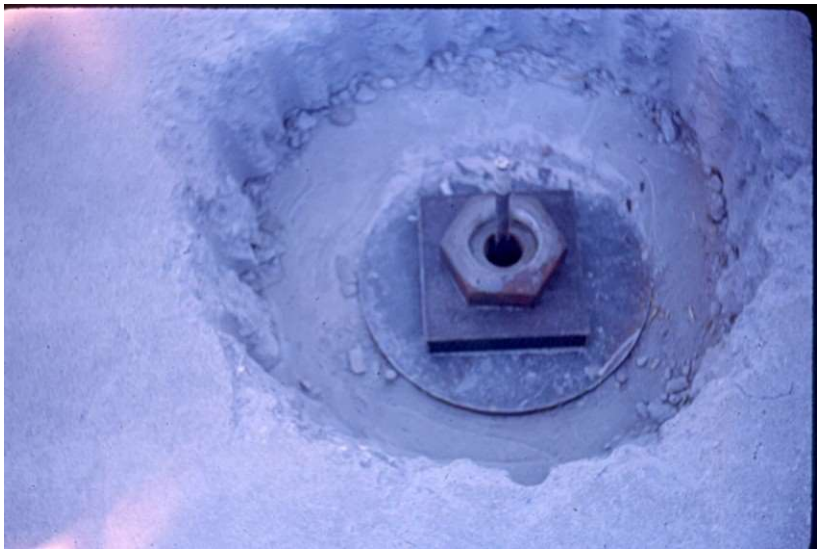
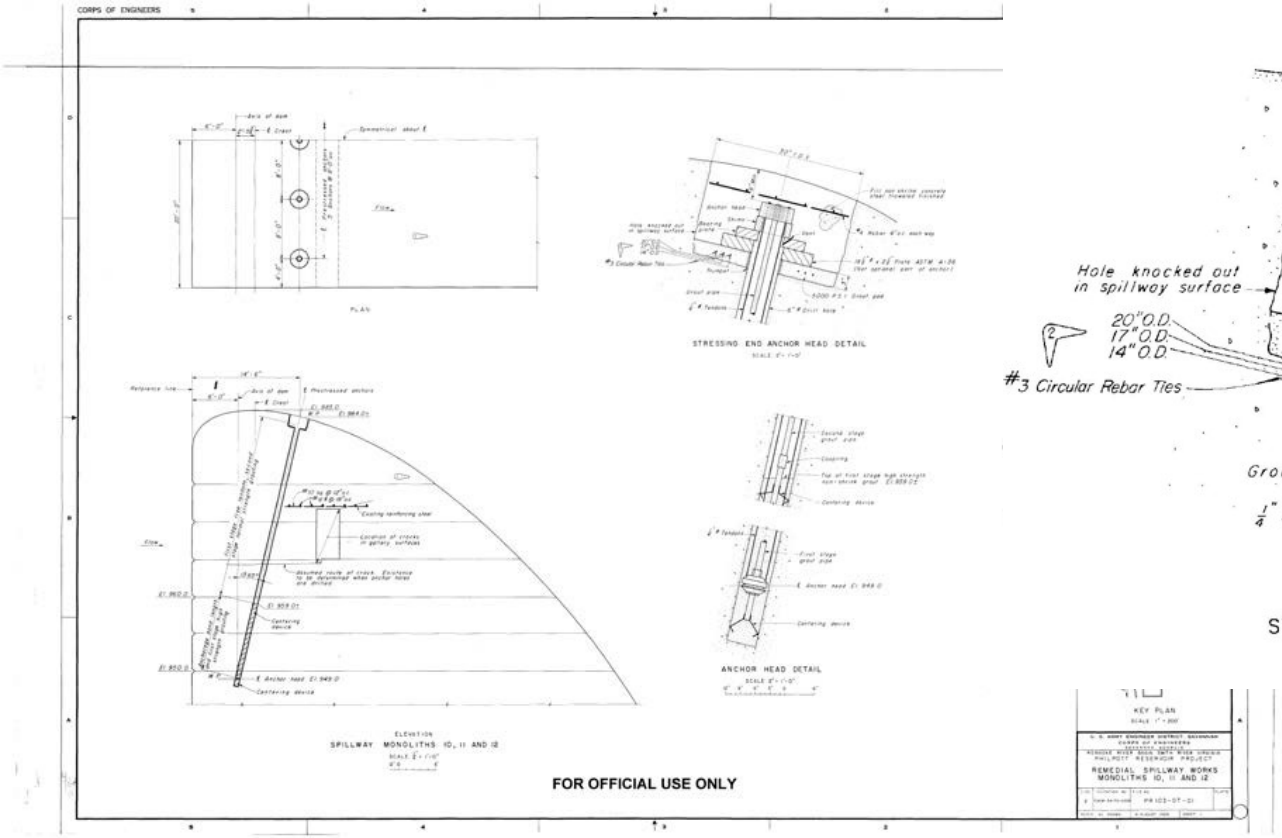


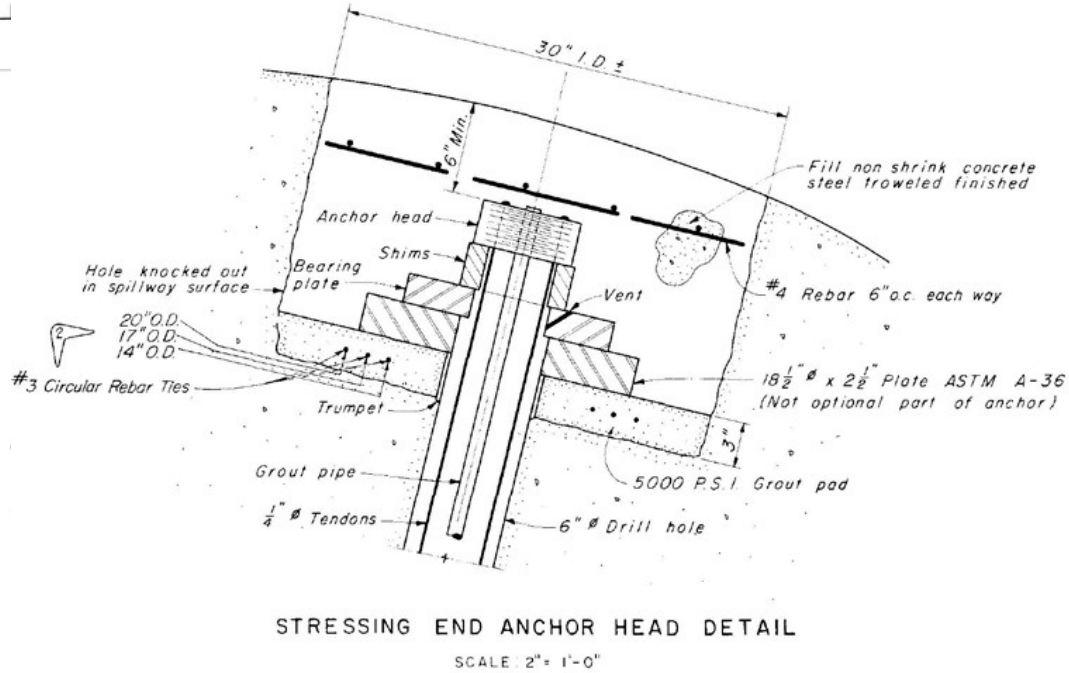
FIG. 10. PHILPOTT DAM SPILLWAY REPAIR. LOWERING POST TENSIONING UNIT INTO DRILLED HOLE. NOTE TREMIE PIPE, JACKING HEAD, AND NUT. 25 NOVEMBER 1969. (286/69).



Philpott Spillway Tendon Installation in 1969.

Philpott Dam – 1969 Spillway Repair





Philpott Spillway Tendon Installation in 1969.

BUILDING STRONG®

Spillway Anchors (1969)

General Historical Timeline (continued)

2004 | 2009 | 2010 | 2012

ERDC (USACE)
Crack mapping completed for:

-Interior and DS face of the dam

-Headgate bay area

Other Specifics:

-Six cores drilled

-Pulse velocity testing

-Compressive strength

-Petrographic exam

Robin Charlwood, Ph.D.
Completed an independent technical review of concrete cracking at the dam.

Findings:
- ASR Cracking
- Potential anchor failure & spillway crest separation
- Headgate Bay cracking

Recommendations:
- Headgate Bay Structural Analysis
- Finite Element Analysis of Spillway

HDR
Crack mapping completed:

- Interior of the dam
- Headgate bay area

Also completed:

3D Finite Element Analysis of Spillway Monoliths

Structural Analysis of headgate bay area

Proposals/Cost estimates for recommended repairs

Recommended more thorough 3D Finite Element Analysis and bonding of lifts

SEAMAR
Crack mapping of US and DS faces of the dam, below the waterline to EL 835-ft NGVD29.

General Historical Timeline (continued)

2014

2015

<u>Army Dive Team</u>
Crack mapping completed for:

-Monoliths 8 and 9 from below water surface to invert of penstock intake, in each gate slot.

-Concrete entrances to each of three sluice gates.

<u>MVK (USACE)</u>
Investigated Face Drains in Monoliths 8 and 9 to determine where water is entering the drains.

Video inspected and pressure-jet cleaned all Joint Drains, and Foundation Drains.

<u>NAP (USACE)</u>
Crack mapping completed for:

-Complete DS face of the dam.

-US face of the dam to water surface.

Sufficient data gathered and investigations completed to pursue repair options.

$930k in FY15 Increment 4 Funds available for Headgate Bay Area Repair

General Historical Timeline (continued)

2016

2022

Saw Cuts (TVA)

Vertical relief slots for M6-7 and M14-15

Headgate Bay Crack Mitigation (TVA)

Installation of six horizontal anchors through Monolith 8

Receipt of IIJA Funding

$3.3M for…

- Comprehensive Structural Analysis
- Geotechnical Investigation
- Spillway Anchor Installation

$400K for…

- Monoliths 1 and 2 Anchors
- Plans and Specs for Anchors

Report Findings and Outcomes

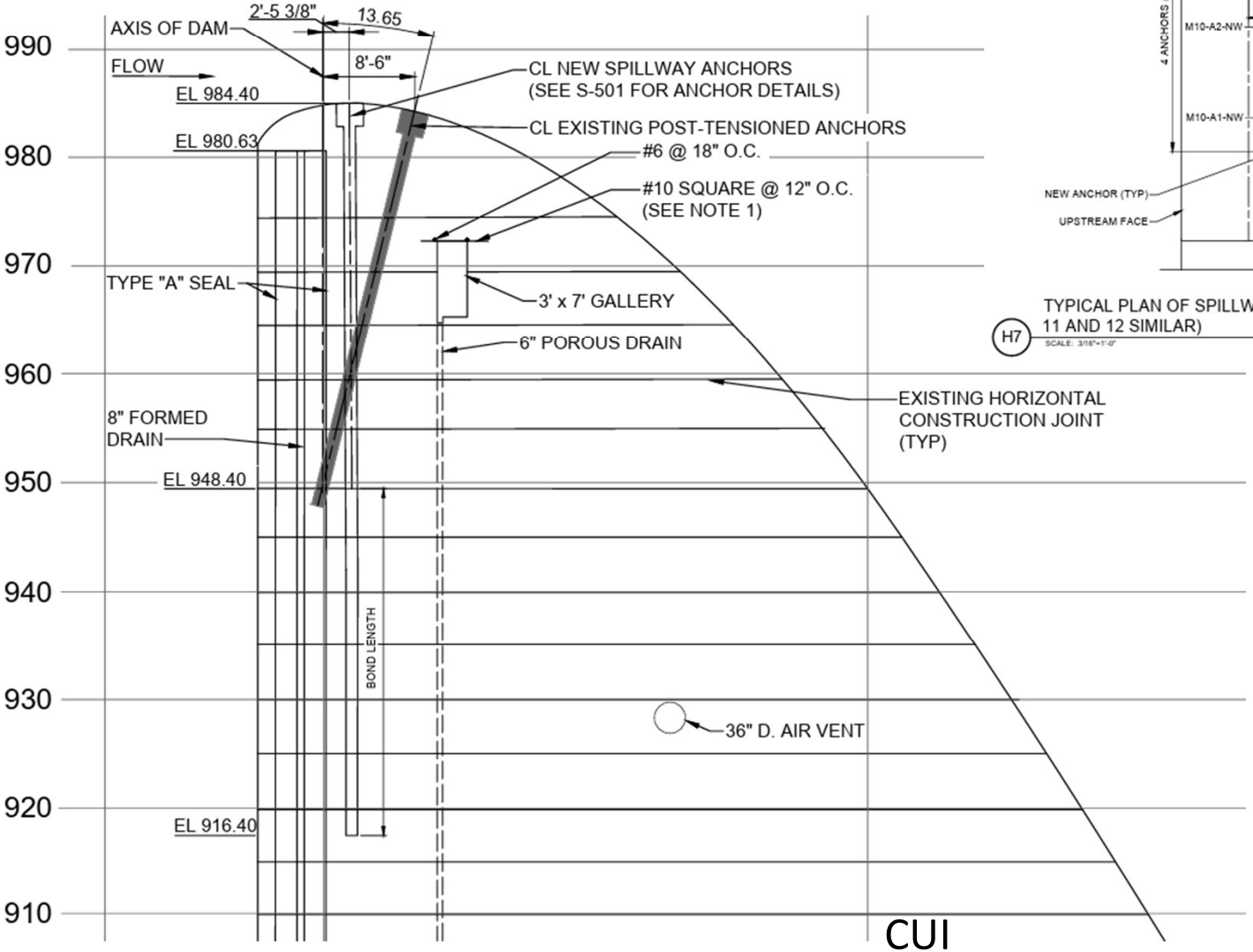
- ASR growth contributed to cracking but should slow in the future.
- 1969 Spillway anchors *STRESSED ≈ 92% GROSS ULTIMATE TENSILE STRENGTH* from ASR on unbonded/poorly prepared lift joints. Eventual anchor rupture is possible.
- Upper portions of M9 and M13 are expanding toward the spillway.

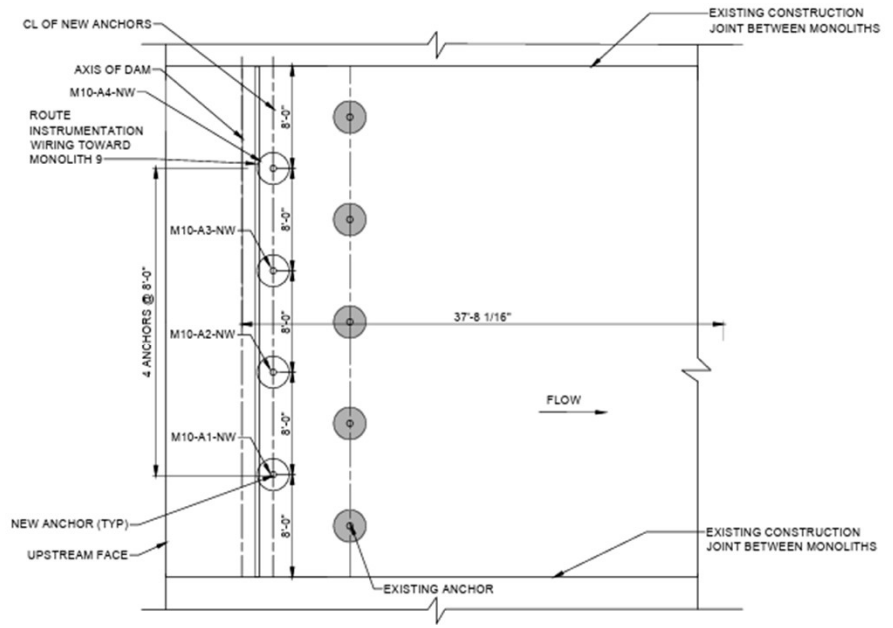
AE Design
(*Based on AE Recommendations from Stability Analysis*)

<u>Scope for FY26 Construction</u>:

- Install 12 spillway anchors with re-stressable anchors
- Install anchor load sensors.
- Install inclinometers in M-9 and M-13.
- Crack gauge and piezometer automation.

Spillway Anchors Concept

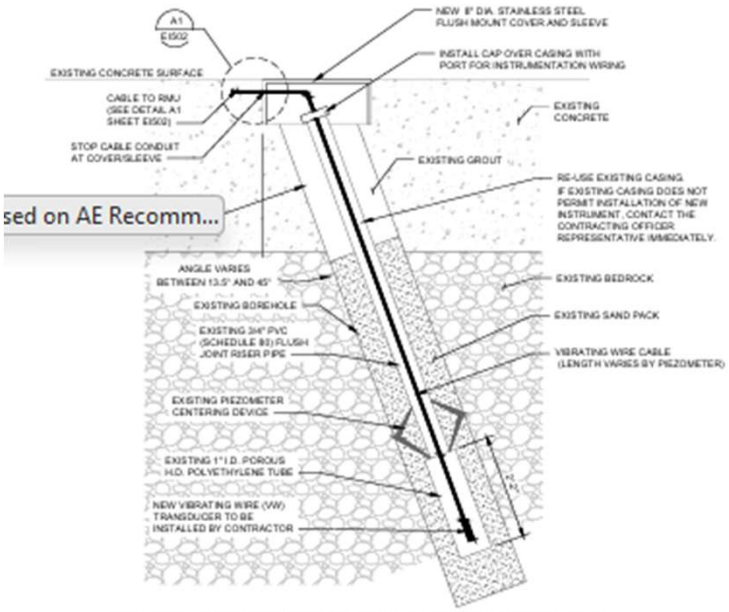




H7 TYPICAL PLAN OF SPILLWAY MONOLITH (SPILLWAY MONOLITH 10 SHOWN, MONOLITHS 11 AND 12 SIMILAR)

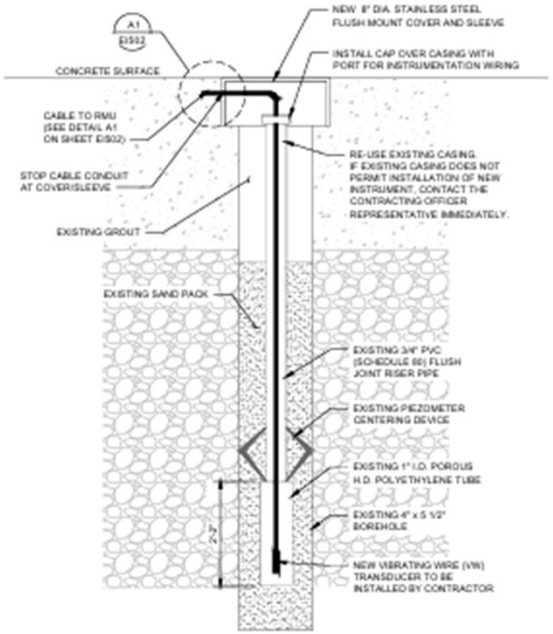
SCALE: 3/16"=1'-0"

Instrumentation Concepts

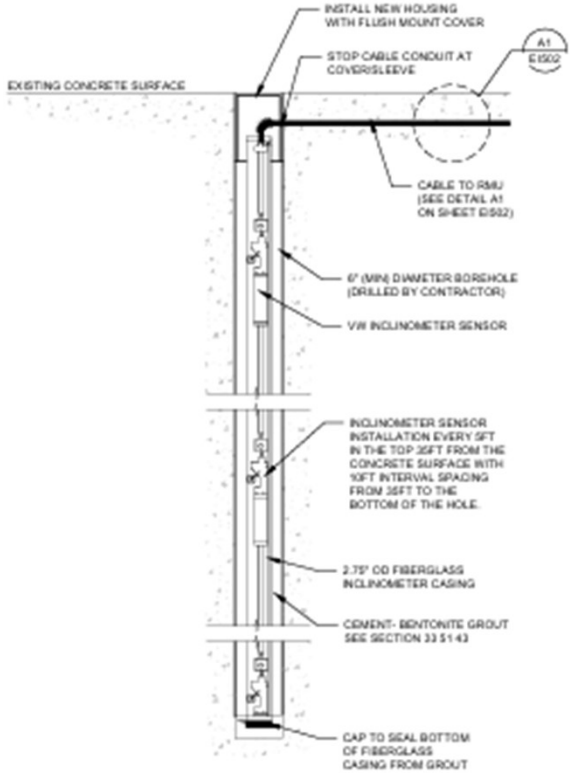


sed on AE Recomm...

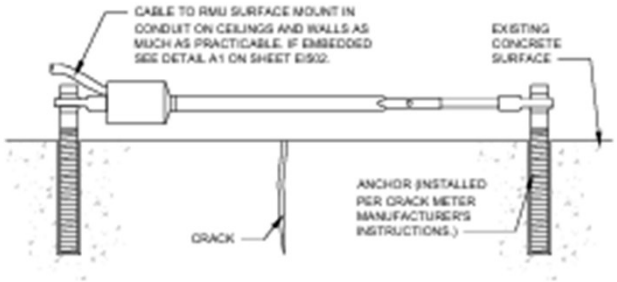
H6 INCLINED VIBRATING WIRE PIEZOMETER (PZ) (TYP PZ-2, PZ-3, PZ-5, PZ-7, PZ-8, PZ-9, PZ-14, PZ-15, AND PZ-17)
SCALE: NTS



A6 VERTICAL VIBRATING WIRE PIEZOMETER (PZ) (TYP PZ-1, PZ-4, PZ-6, AND PZ-16)
SCALE: NTS



H13 IN PLACE INCLINOMETER (IPI)
SCALE: NTS



A13 CRACK METER INSTALLATION
SCALE: NTS

Acquisition

- The Government is soliciting for Request for Proposals (RFPs) and will execute this acquisition through a negotiated procurement under FAR Part 15.
- The Government will evaluate the proposals in accordance with the following evaluation criteria: Technical Approach, Key Personnel, Past Performance, Small Business Participation Plan.
- The Government will award a firm-fixed-price contract to the responsible offeror whose proposal conforms with all the terms and conditions of the solicitation and whose proposal is determined to represent the overall best value to the Government, all factors considered.

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Discussion & AHA Review