



**Water Supply
Roadmap – Local
Storage Update**

BOARD OF DIRECTORS

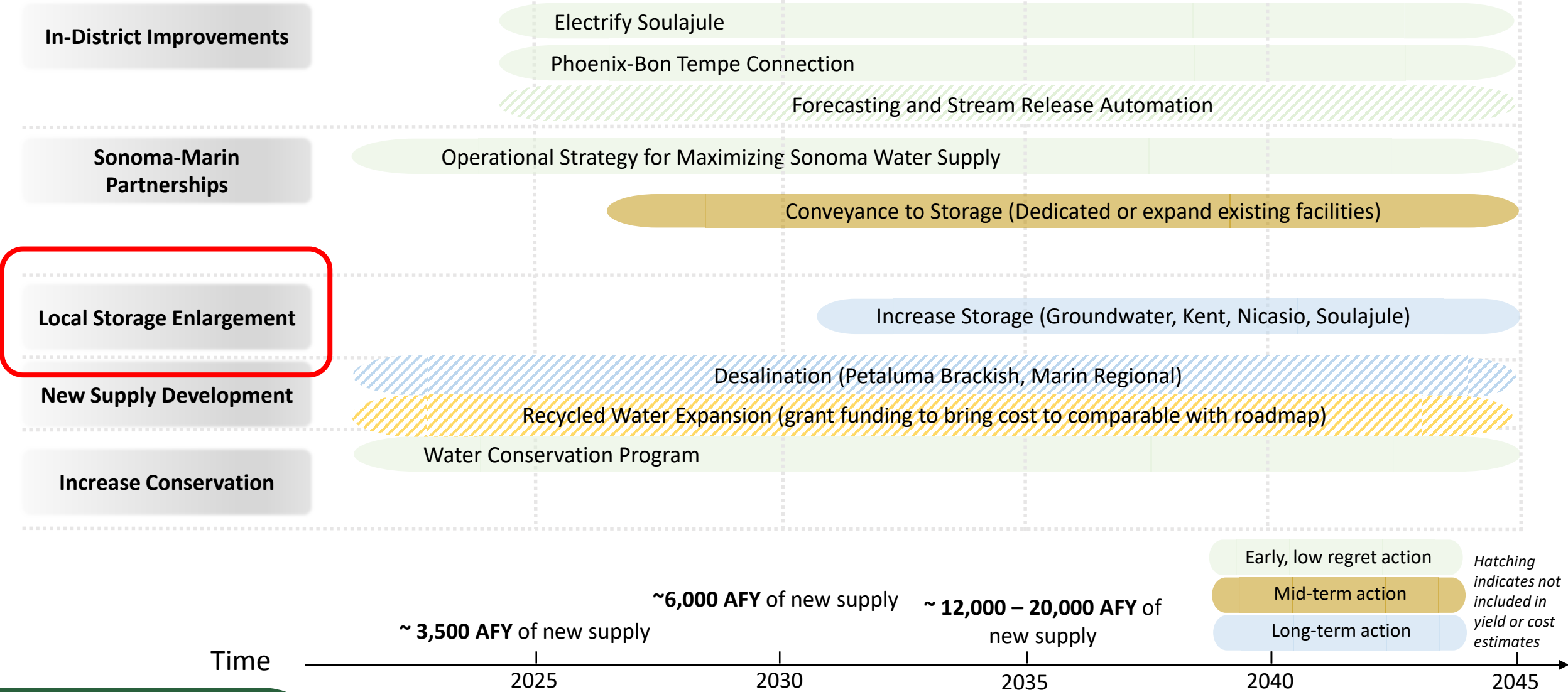
March 19, 2024



Overview: Local Storage Enhancement

- Introduction
- Process
- Review and Update on Alternatives
- Summary and Next Steps

Roadmap for Integrated Strategy



Local Storage Enhancement

Local Storage: Process

- Define alternatives
- Screen alternatives down to three or four
- Further develop shortlisted alternatives to conceptual design
- Propose preferred alternative

Local Storage: Progress to Date

- Define concepts laid out in Strategic Water Supply Assessment to feed into screening of alternatives to top 3 or 4
 - Visit sites and review existing records
 - Understand geometry of existing dams and spillways, and opportunities for expansion
 - Understand construction materials availability and characteristics
 - Evaluate local geology and geologic hazards
 - Establish limits of new inundated areas and define site constraints
- Process led to identification of new alternatives and sub-alternatives

Local Storage Alternatives

■ Existing Reservoir Enlargement

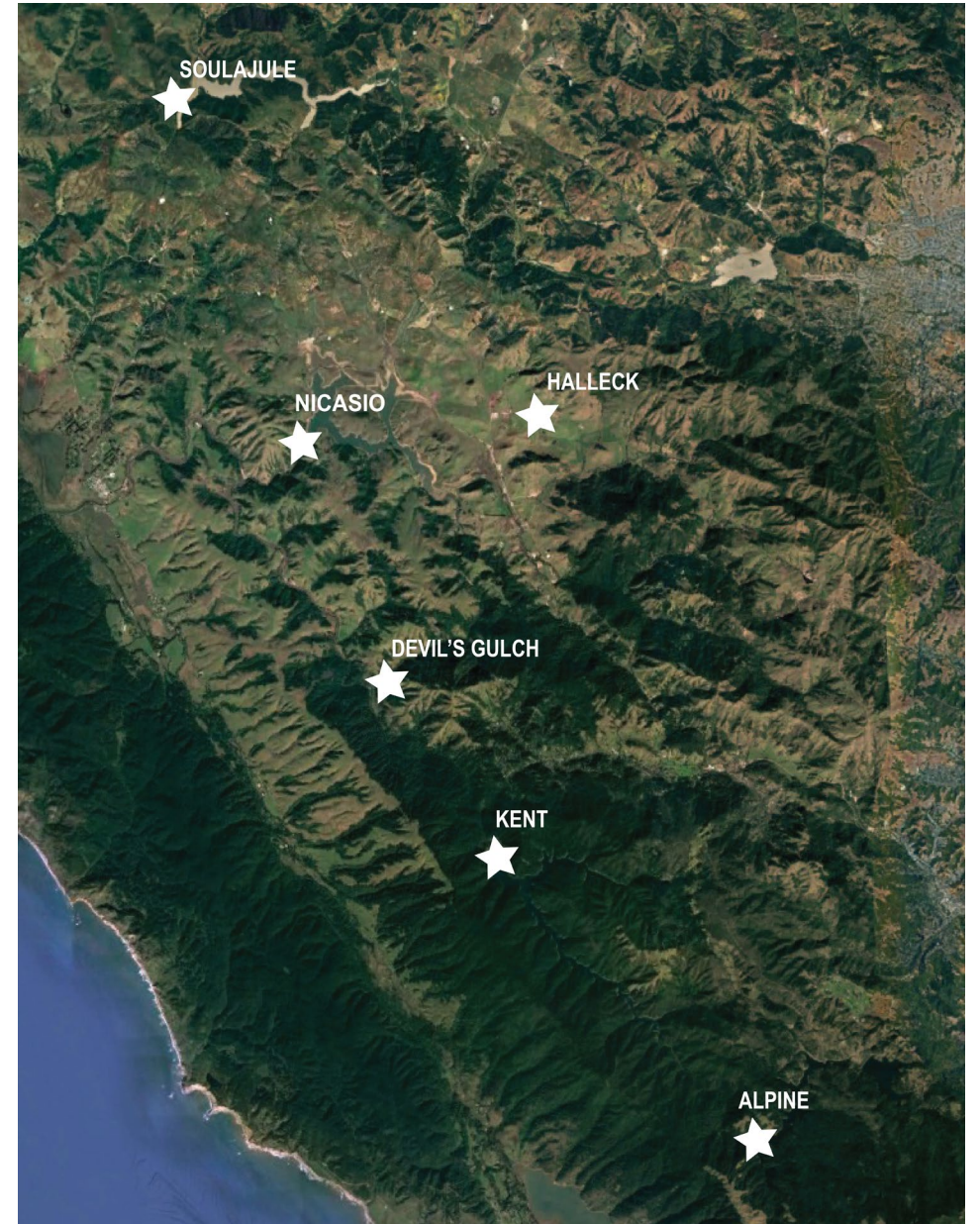
- Soulajule
- Kent
- Alpine
- Nicasio

■ New Reservoir Construction

- Devil's Gulch
- Halleck
- Upper Nicasio

■ New Spillway Gates

- Nicasio
- Soulajule
- Kent
- Alpine



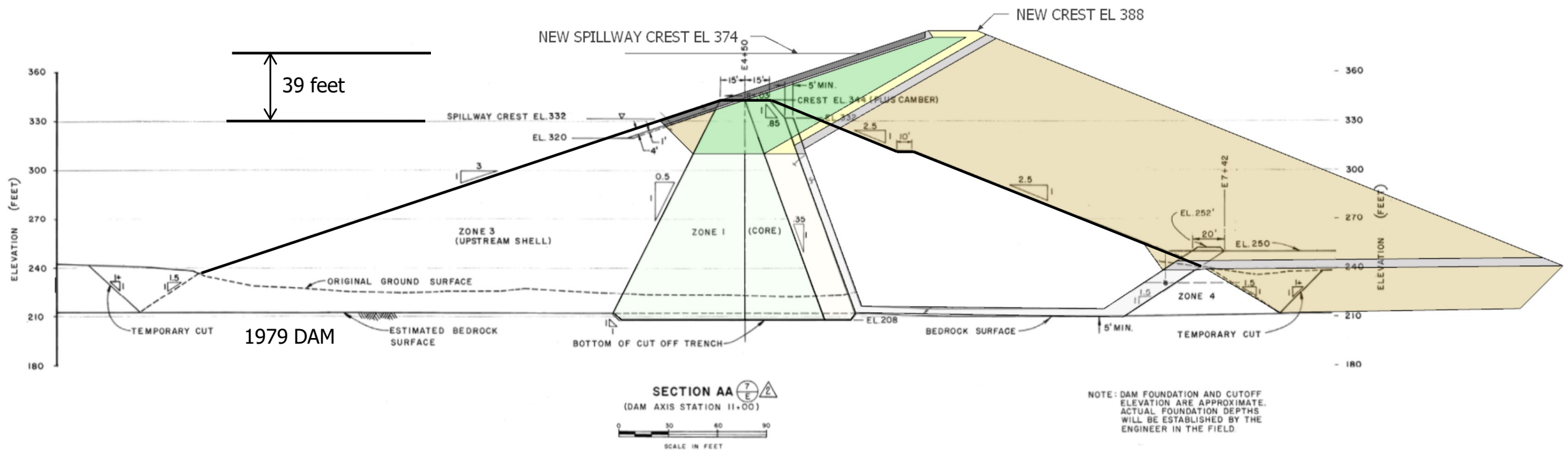
EXISTING RESERVOIR ENLARGEMENT

Soulajule Reservoir: Existing

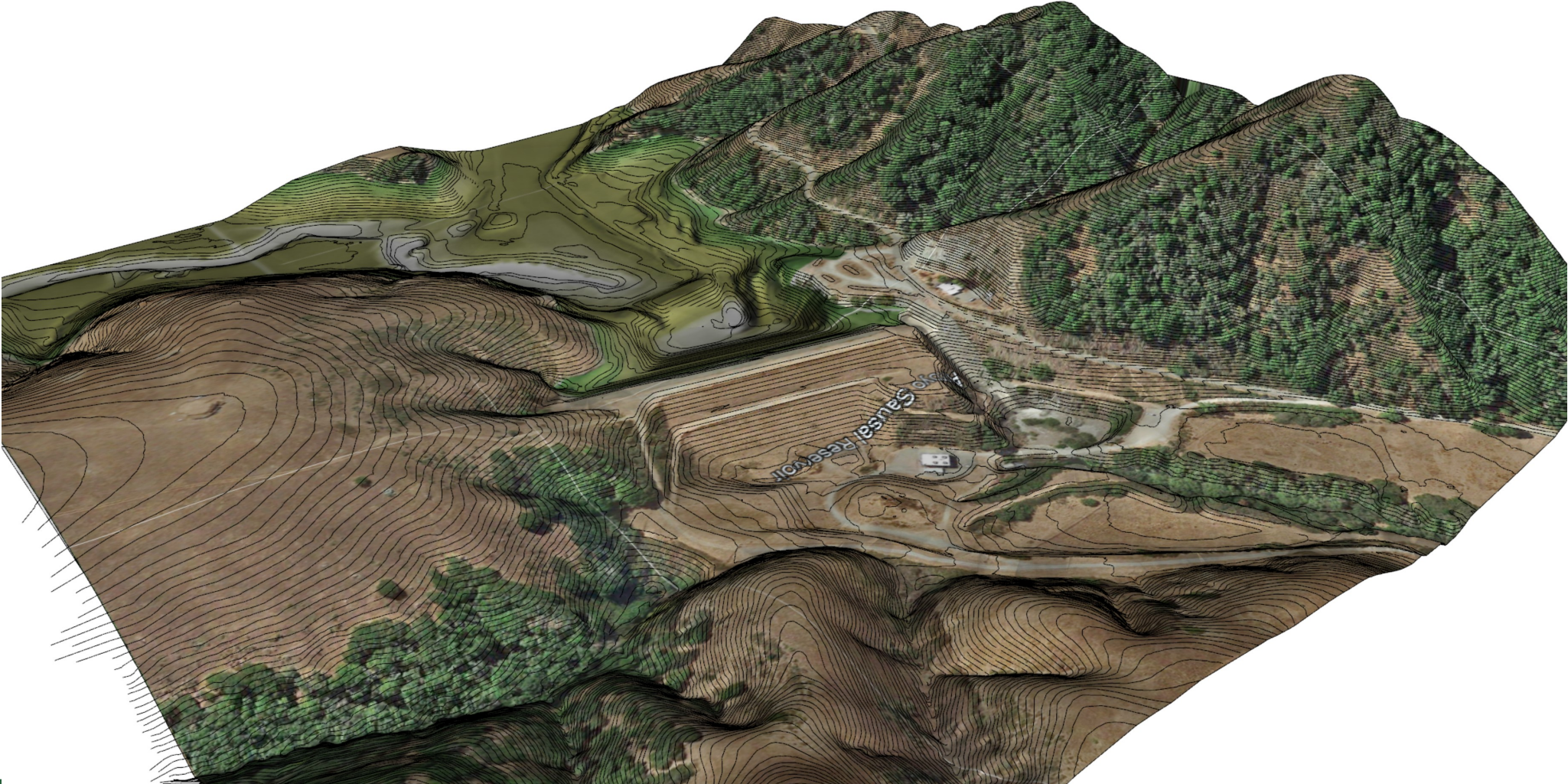


1979 DAM

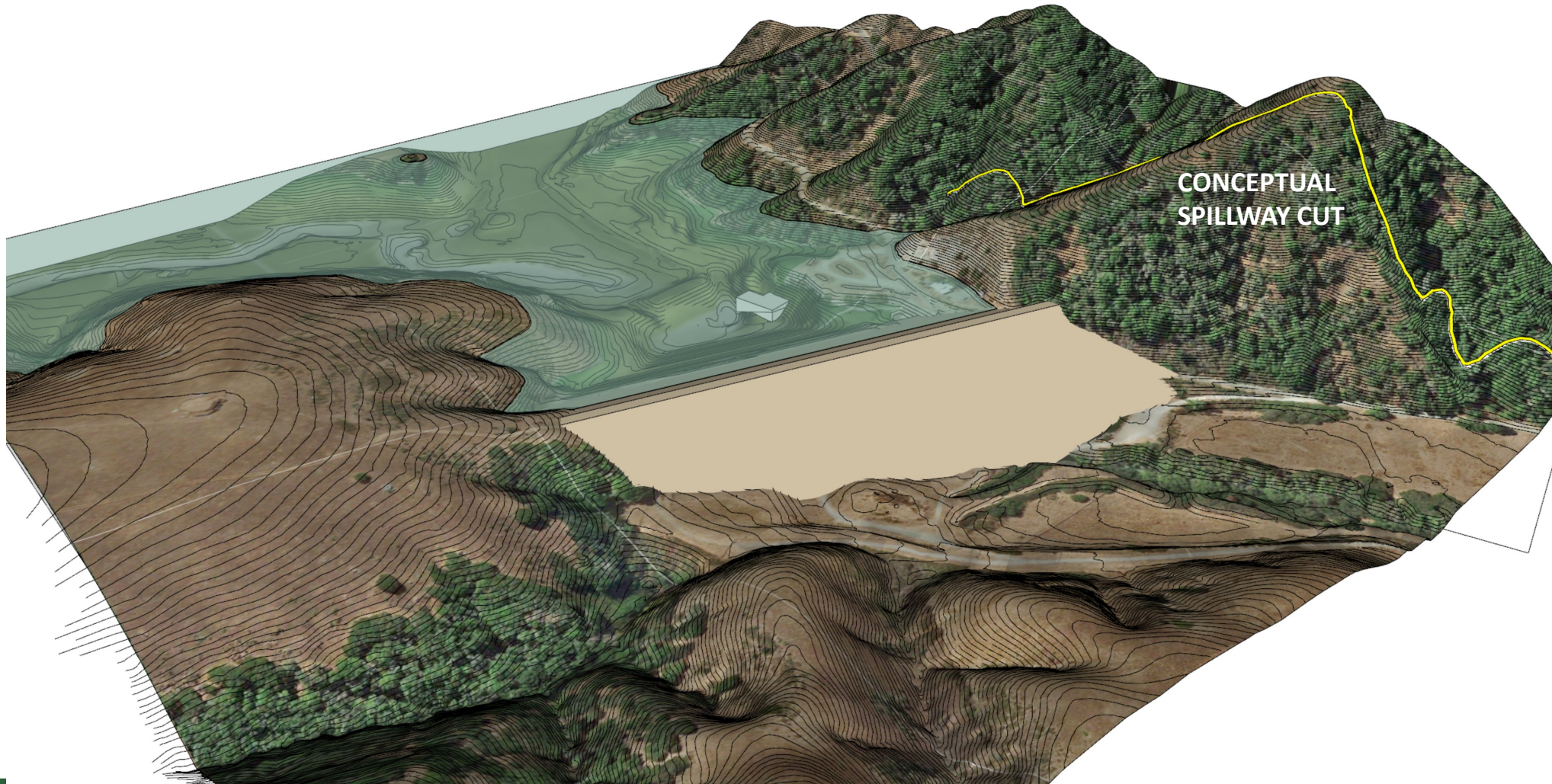
Soulajule Reservoir: 20k AF DS Section



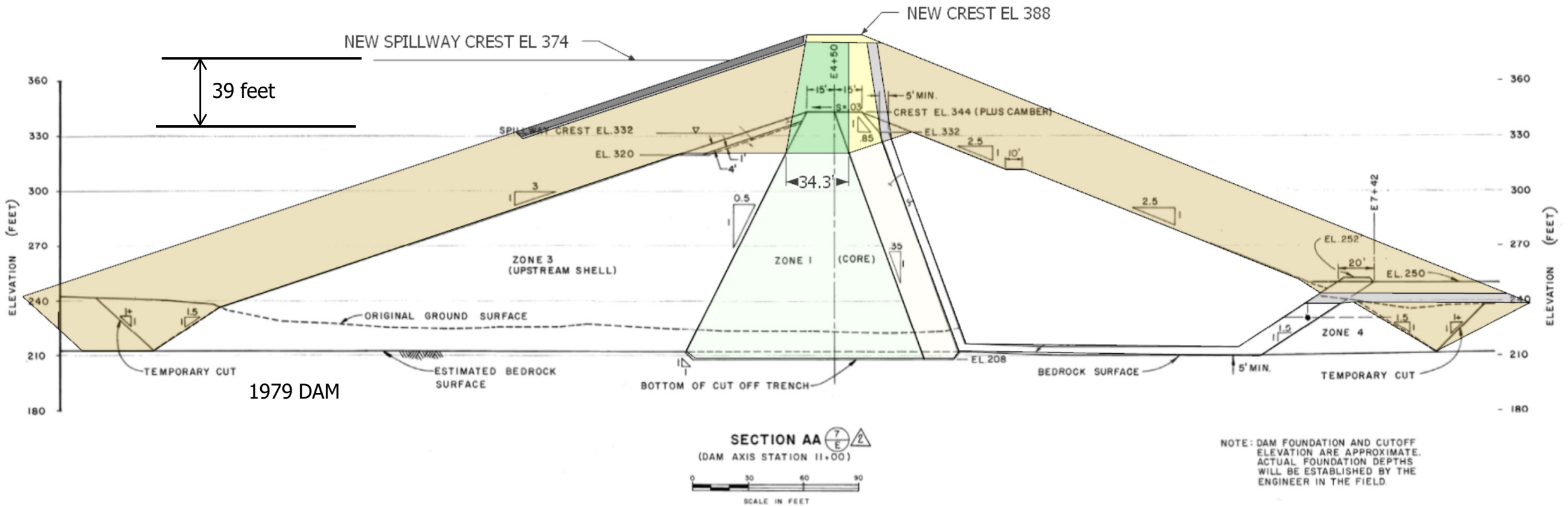
Soulajule Reservoir: Existing



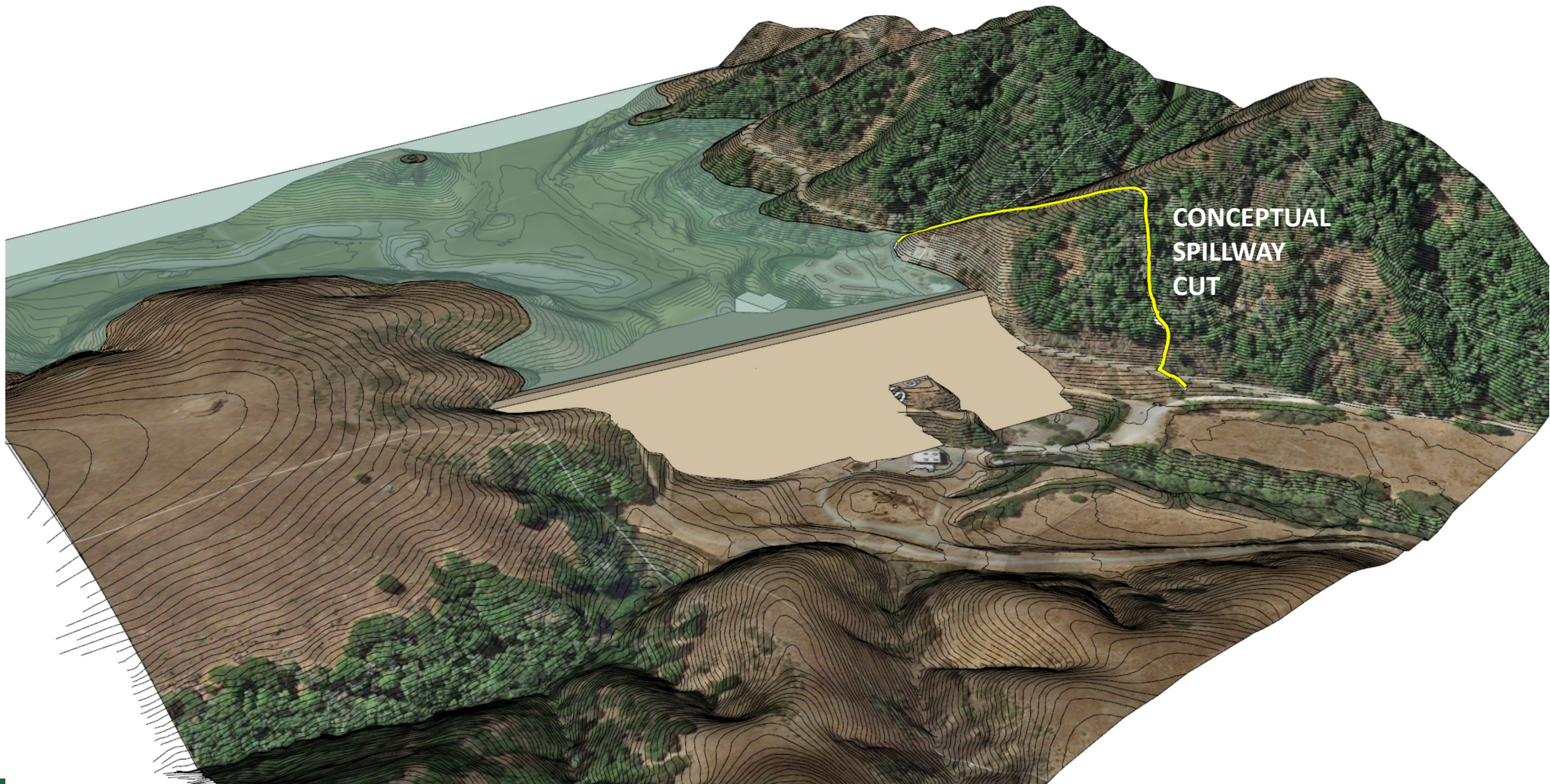
Soulajule Reservoir: 20k AF Downstream Raise



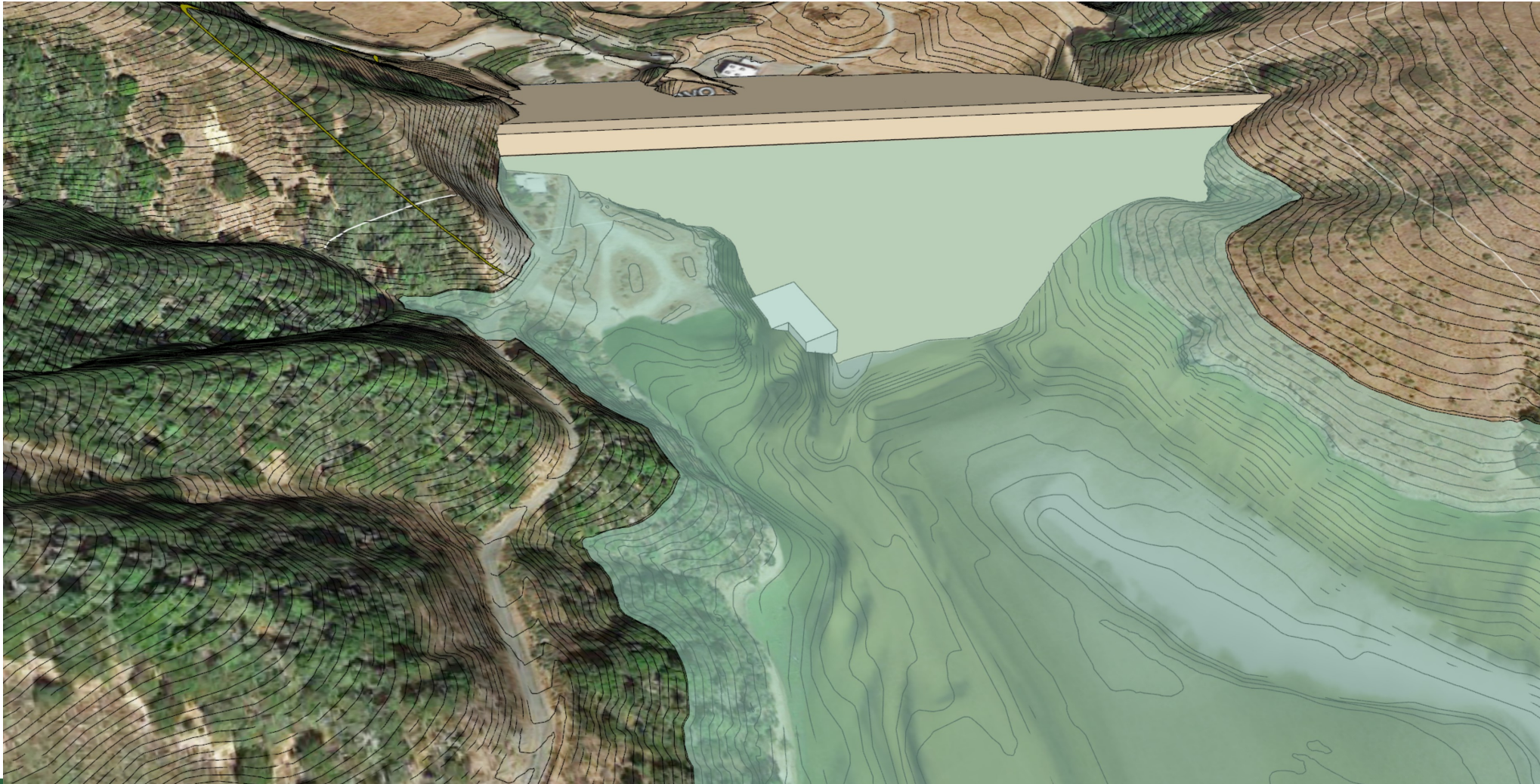
Soulajule Reservoir: Upstream & Downstream Raise



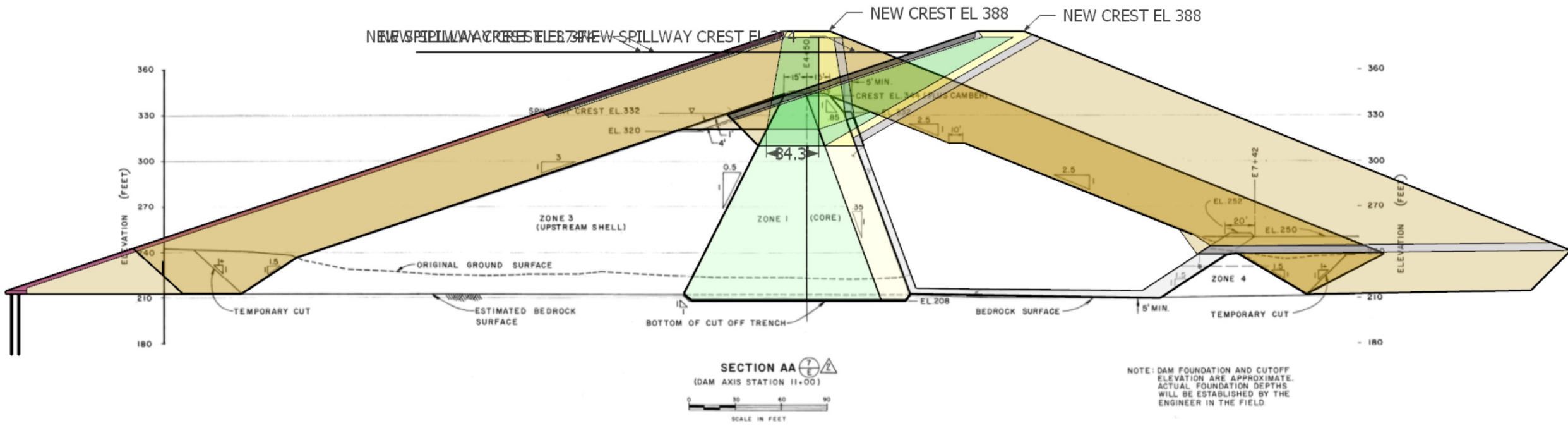
Soulajule Reservoir: Upstream & Downstream Raise



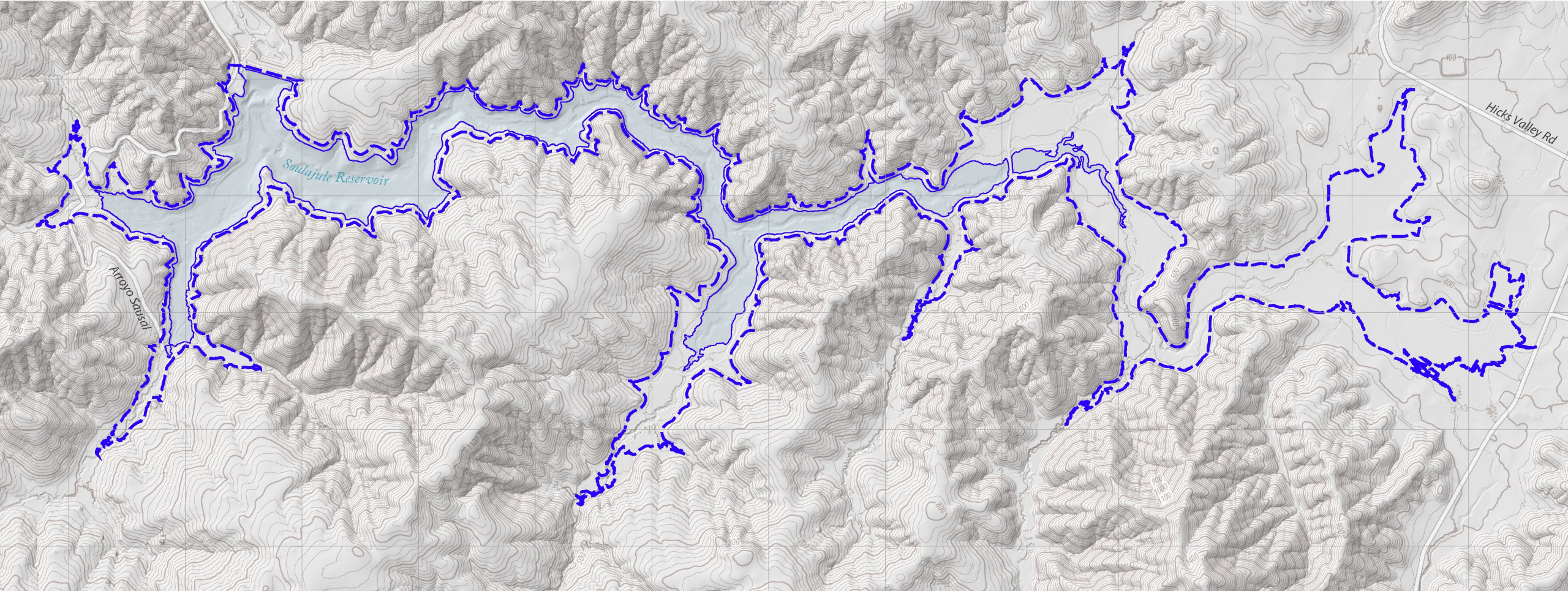
Soulajule Reservoir: Upstream & Downstream Raise



Soulajule Reservoir: Upstream & Downstream Raise



Soulajule Reservoir: Inundation Map



Kent Reservoir:

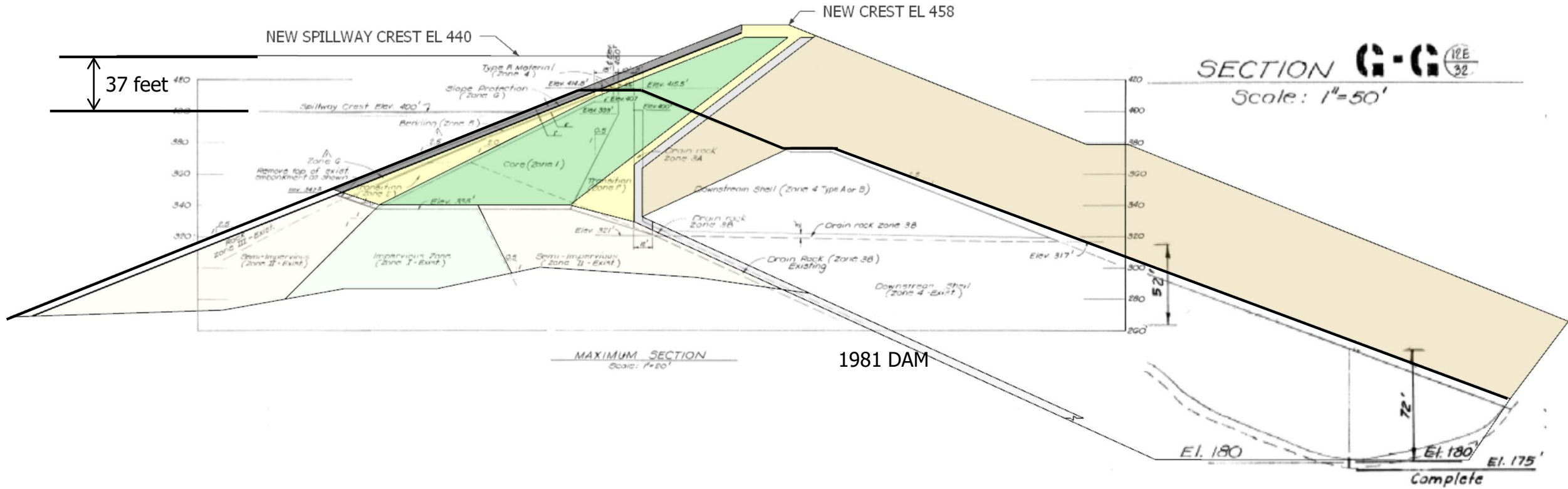


1981 DAM

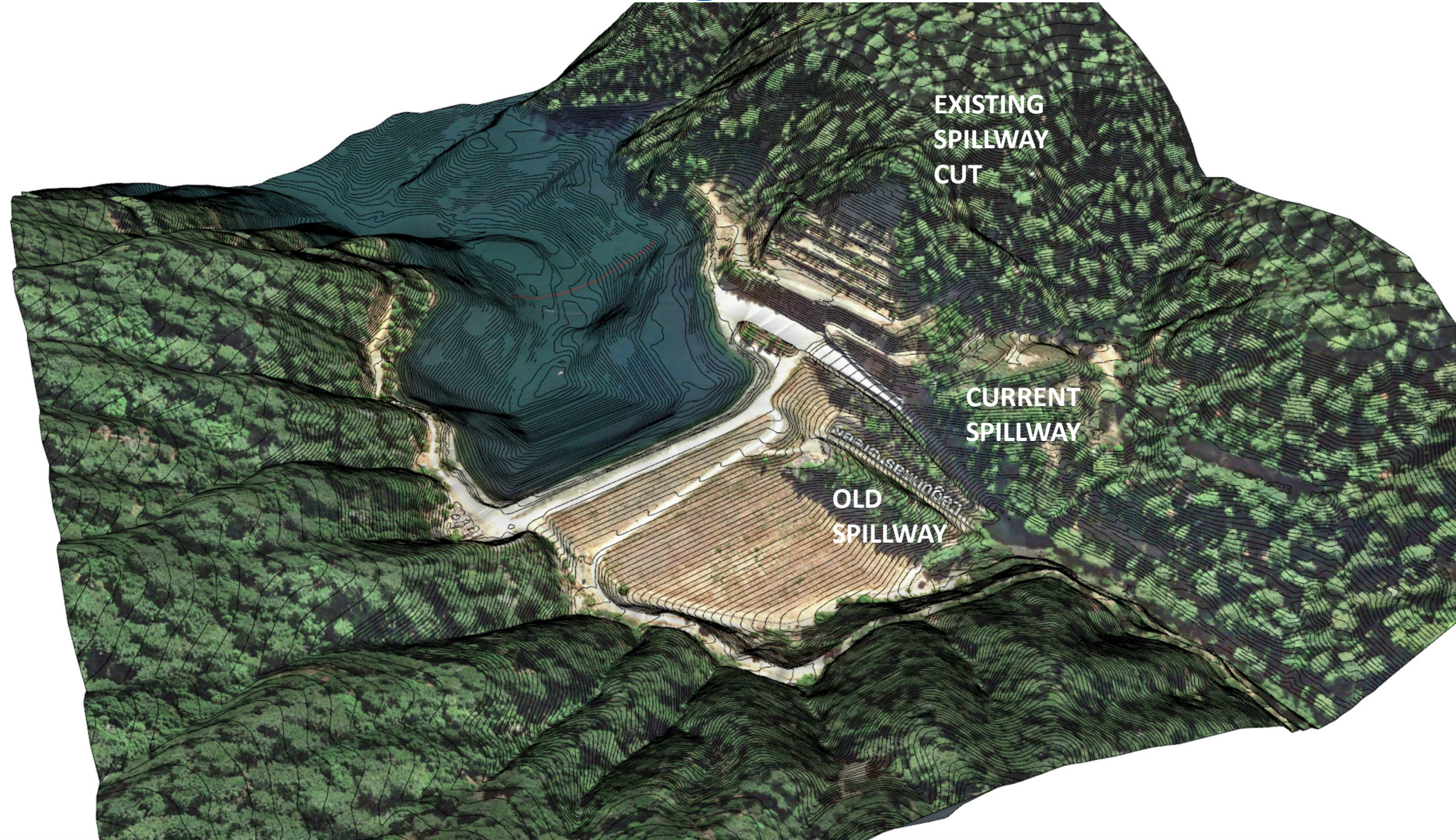
OLD
SPILLWAY

CURRENT
SPILLWAY

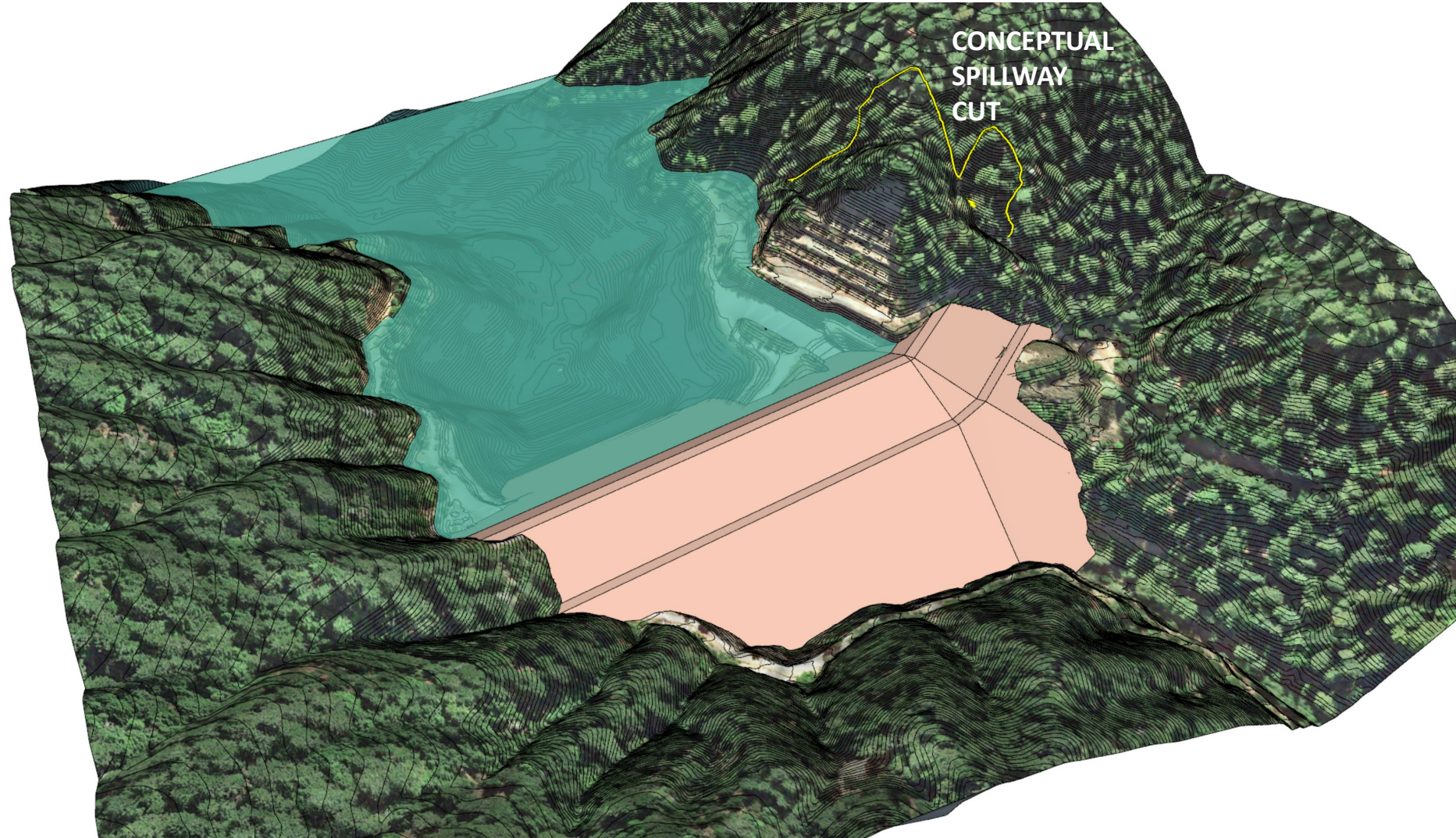
Kent Reservoir: 20k AF Downstream Raise



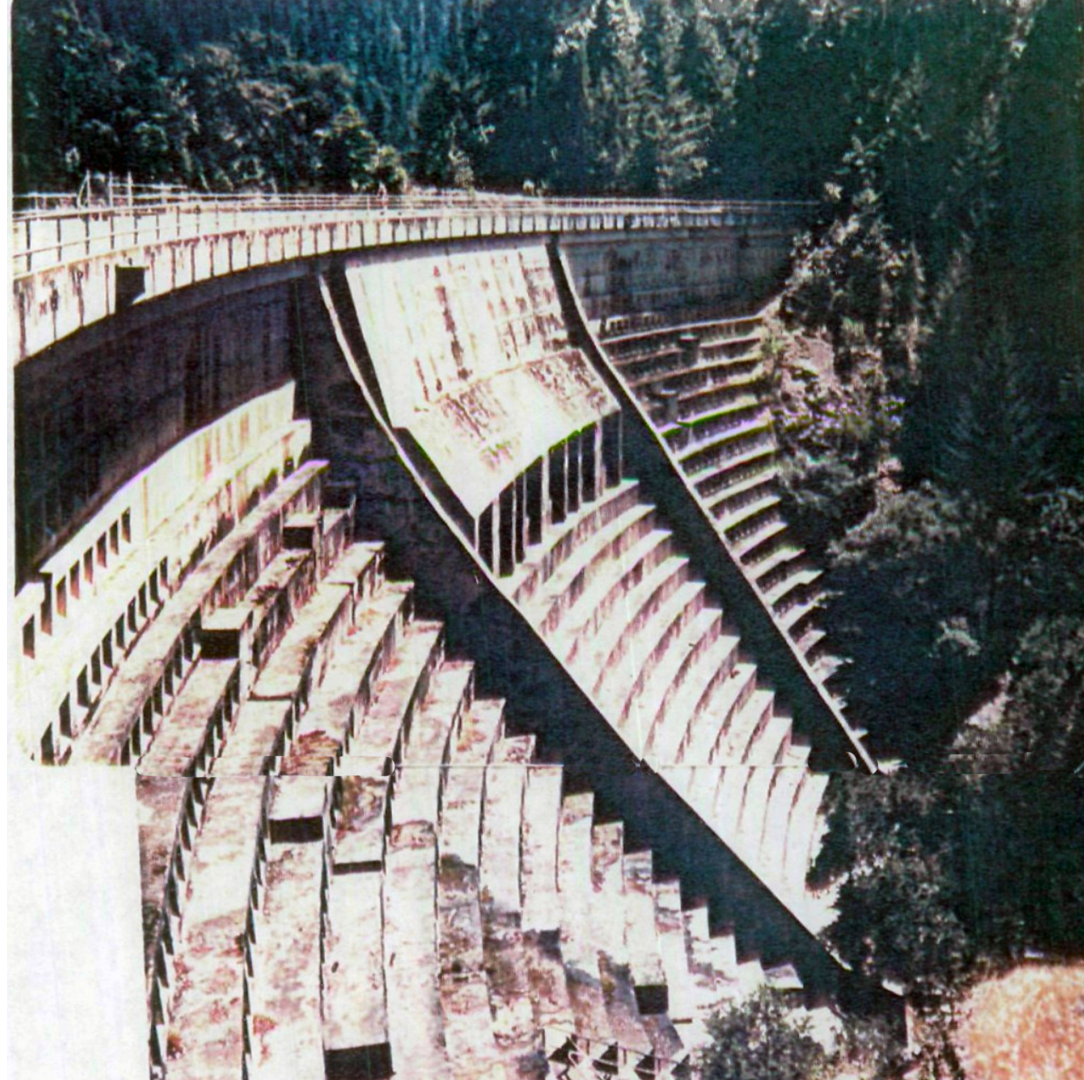
Kent Reservoir: Existing Dam 3D Model



Kent Reservoir: 20k AF Downstream Raise

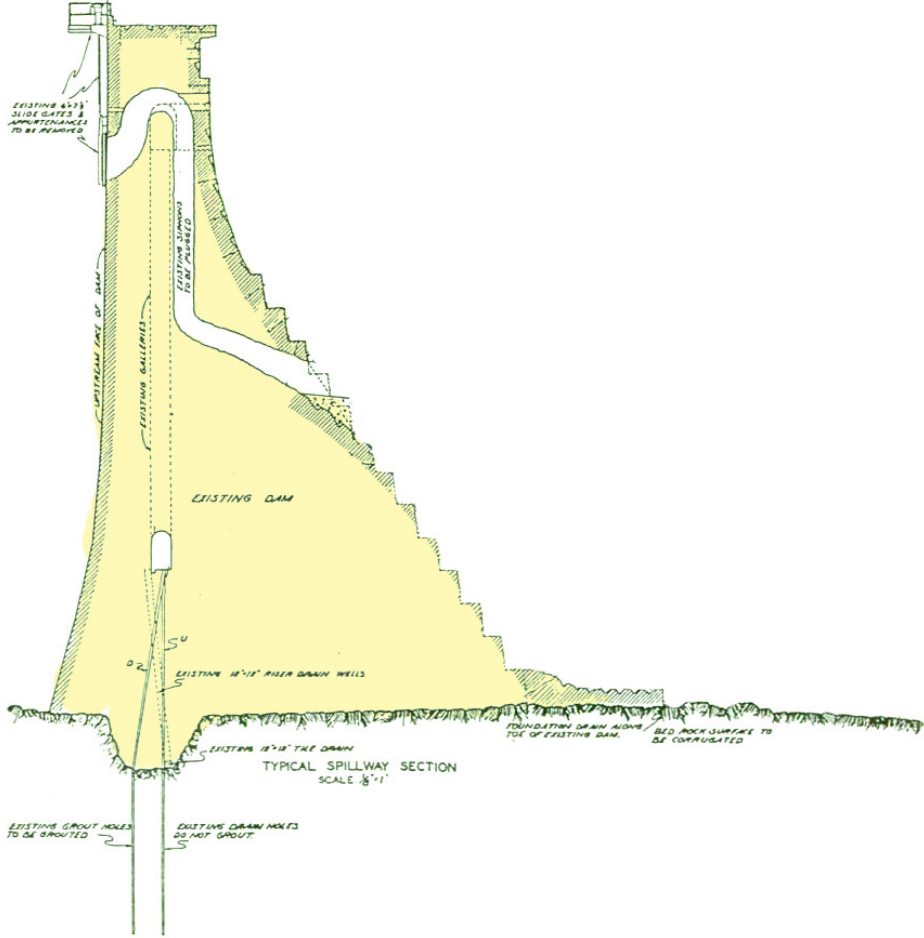


Alpine Reservoir:

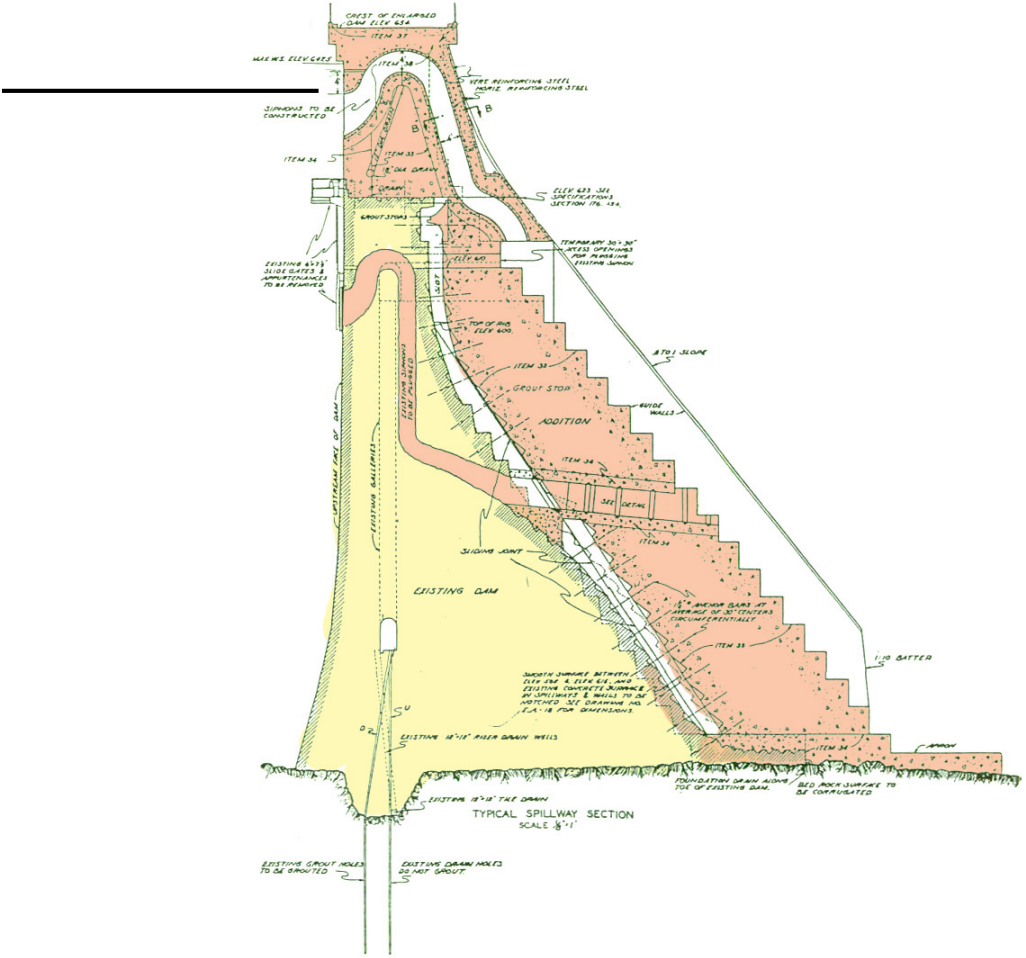


1941 DAM

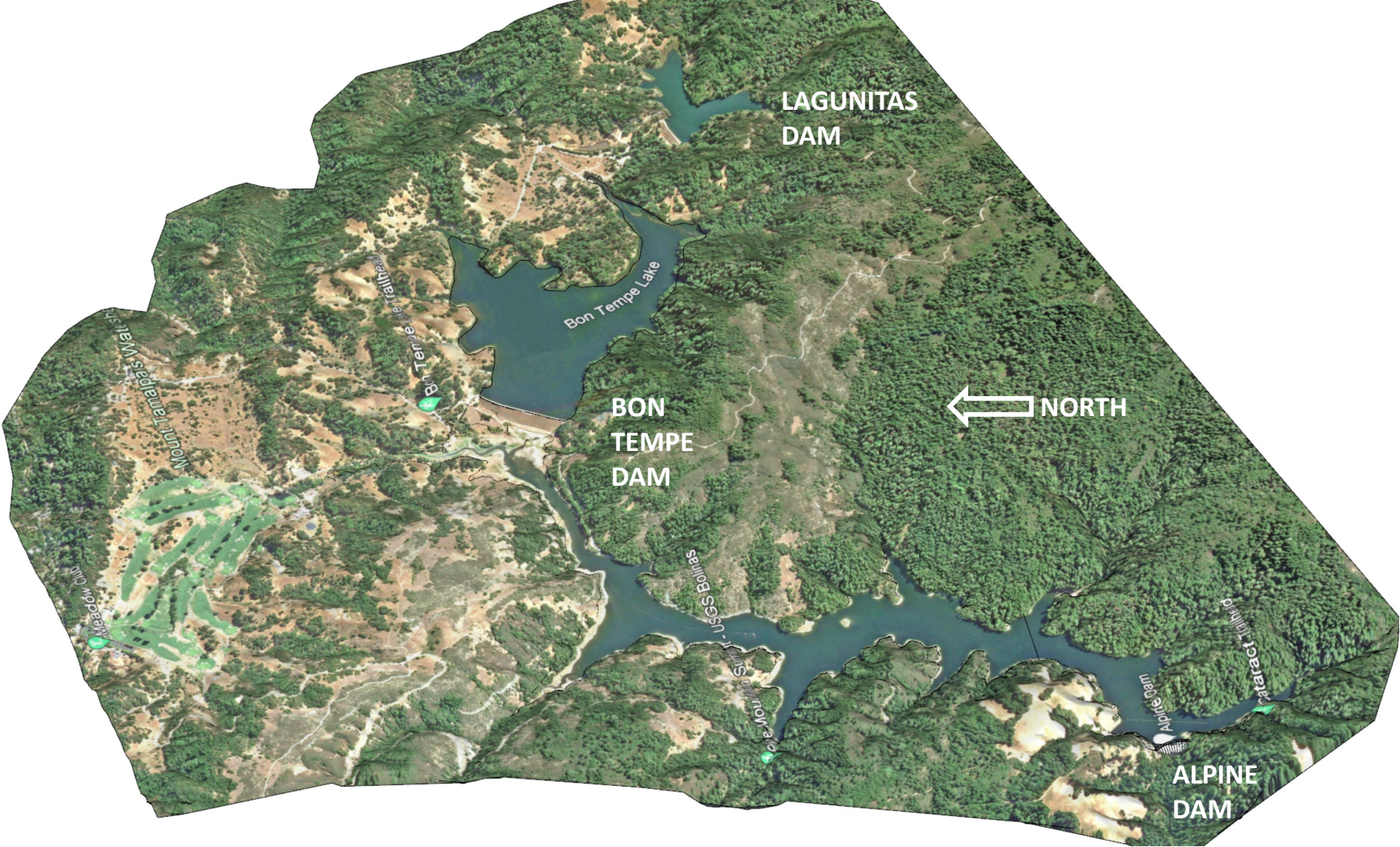
Alpine Reservoir: 1918-1924 Dam Section



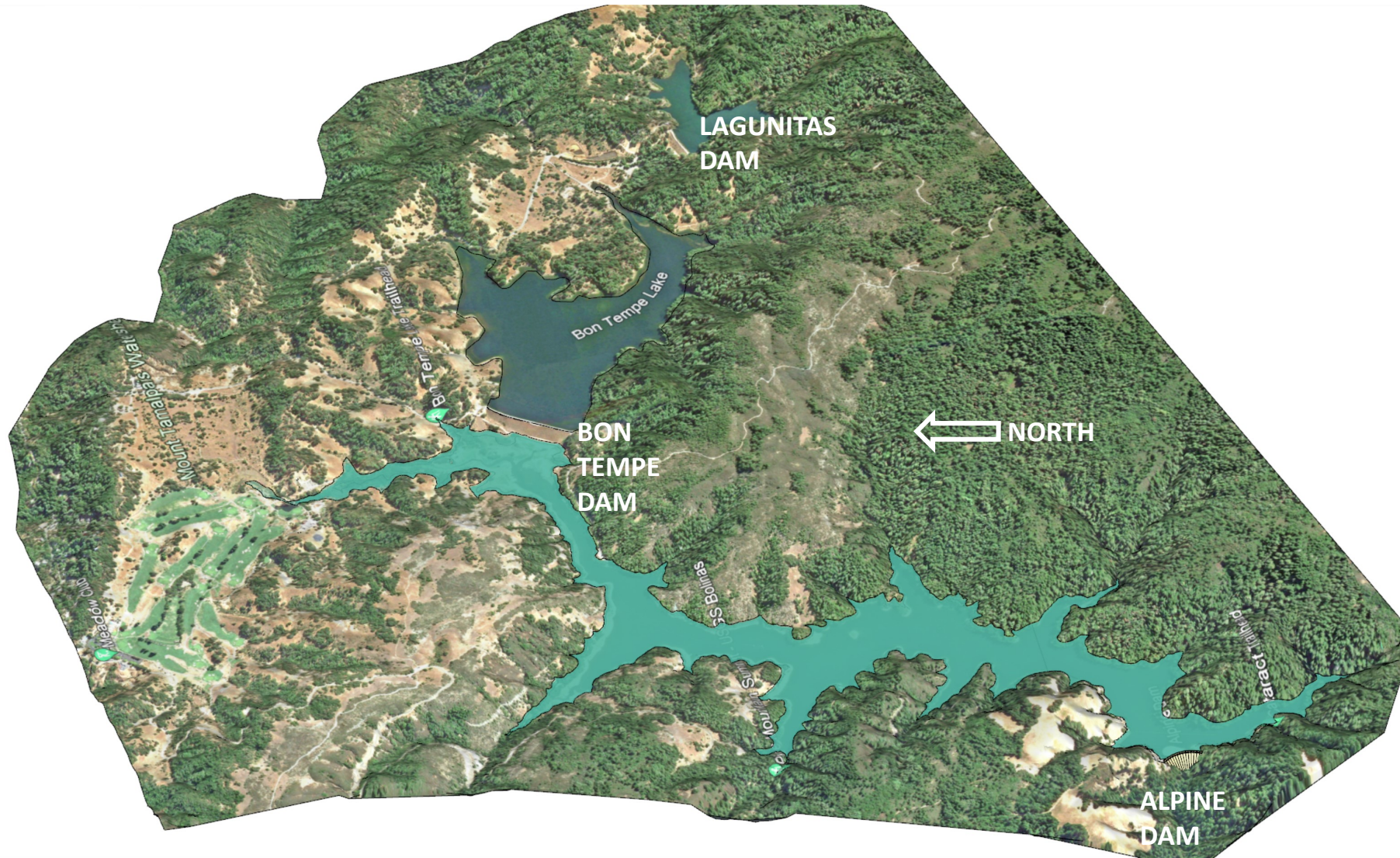
Alpine Reservoir: 1941 Dam Section



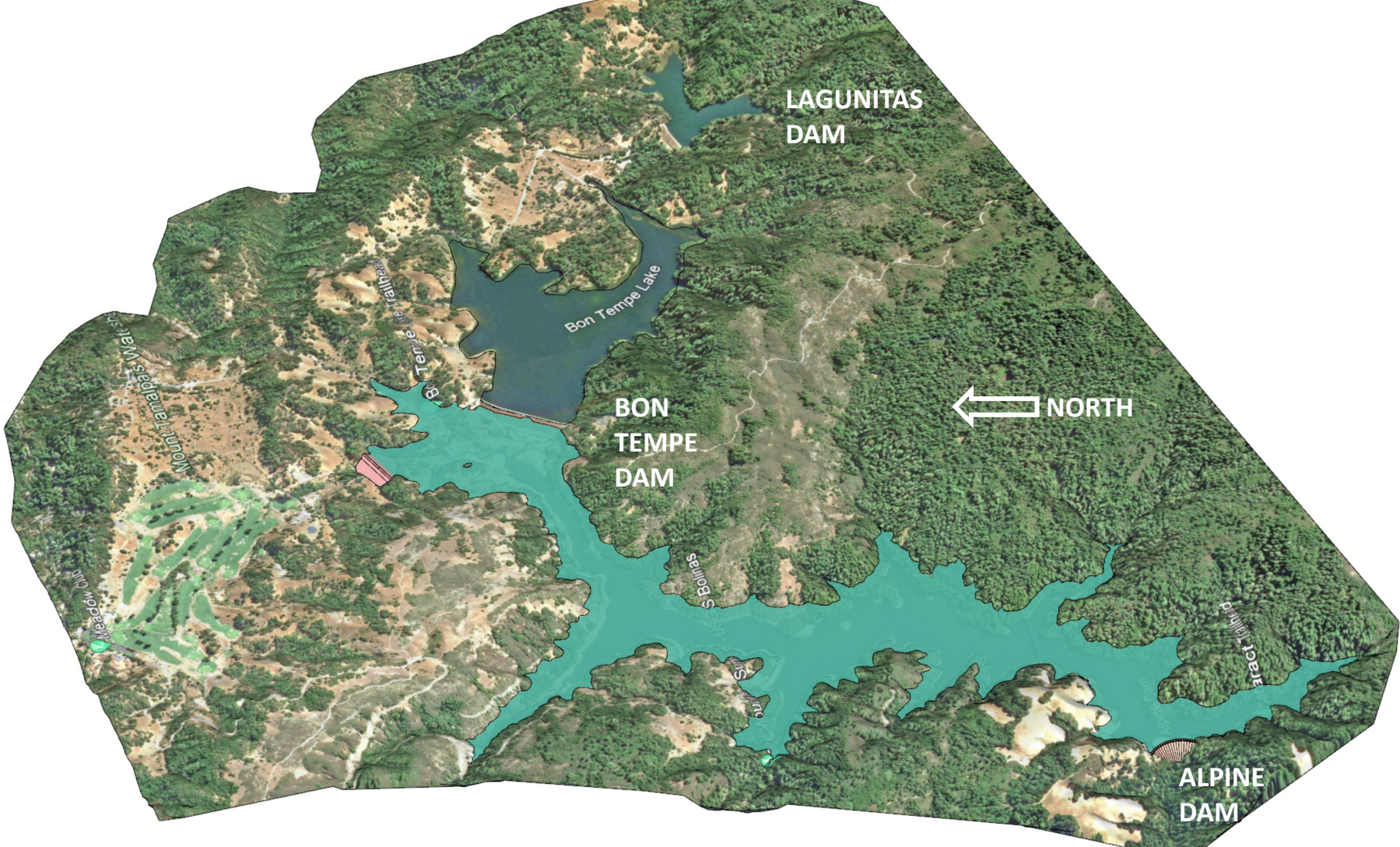
Alpine Reservoir: Existing 3D Model



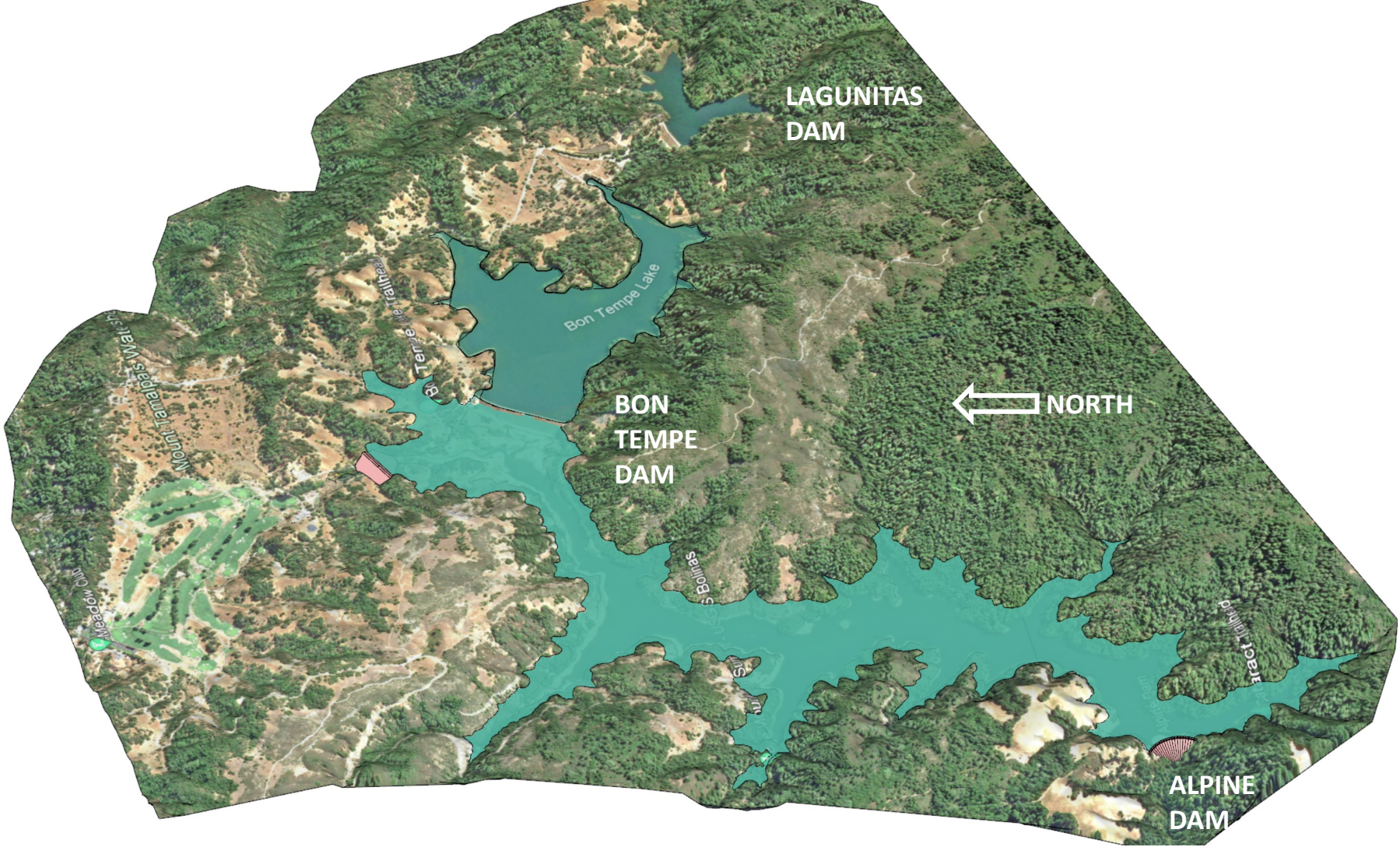
Alpine Reservoir: 5k AF 3D Model



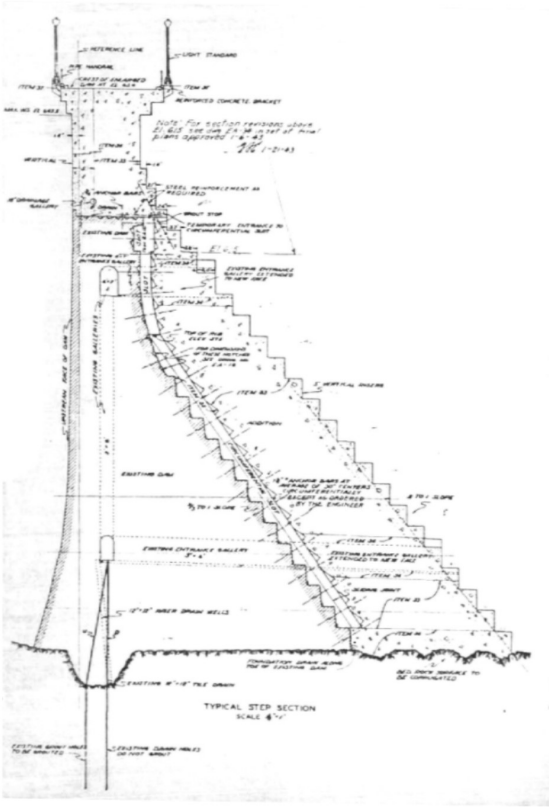
Alpine Reservoir: 20k AF 3D Model



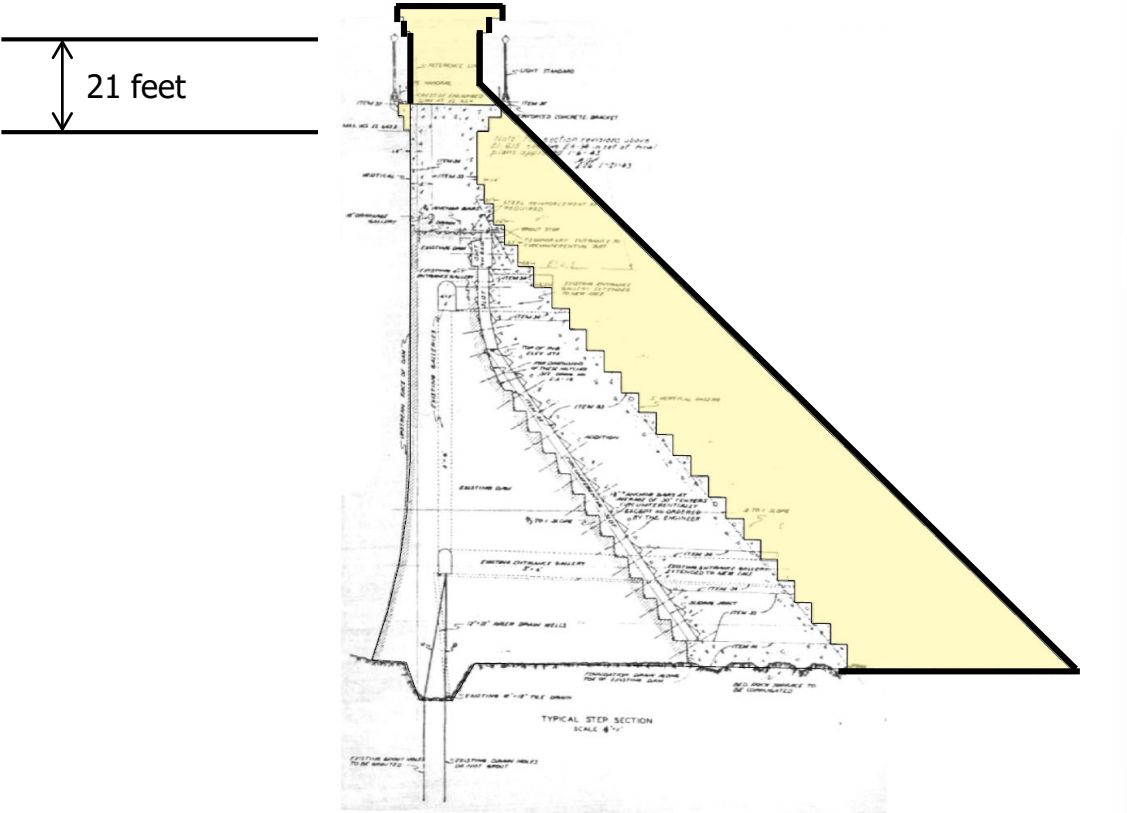
Alpine Reservoir: 23k AF 3D Model



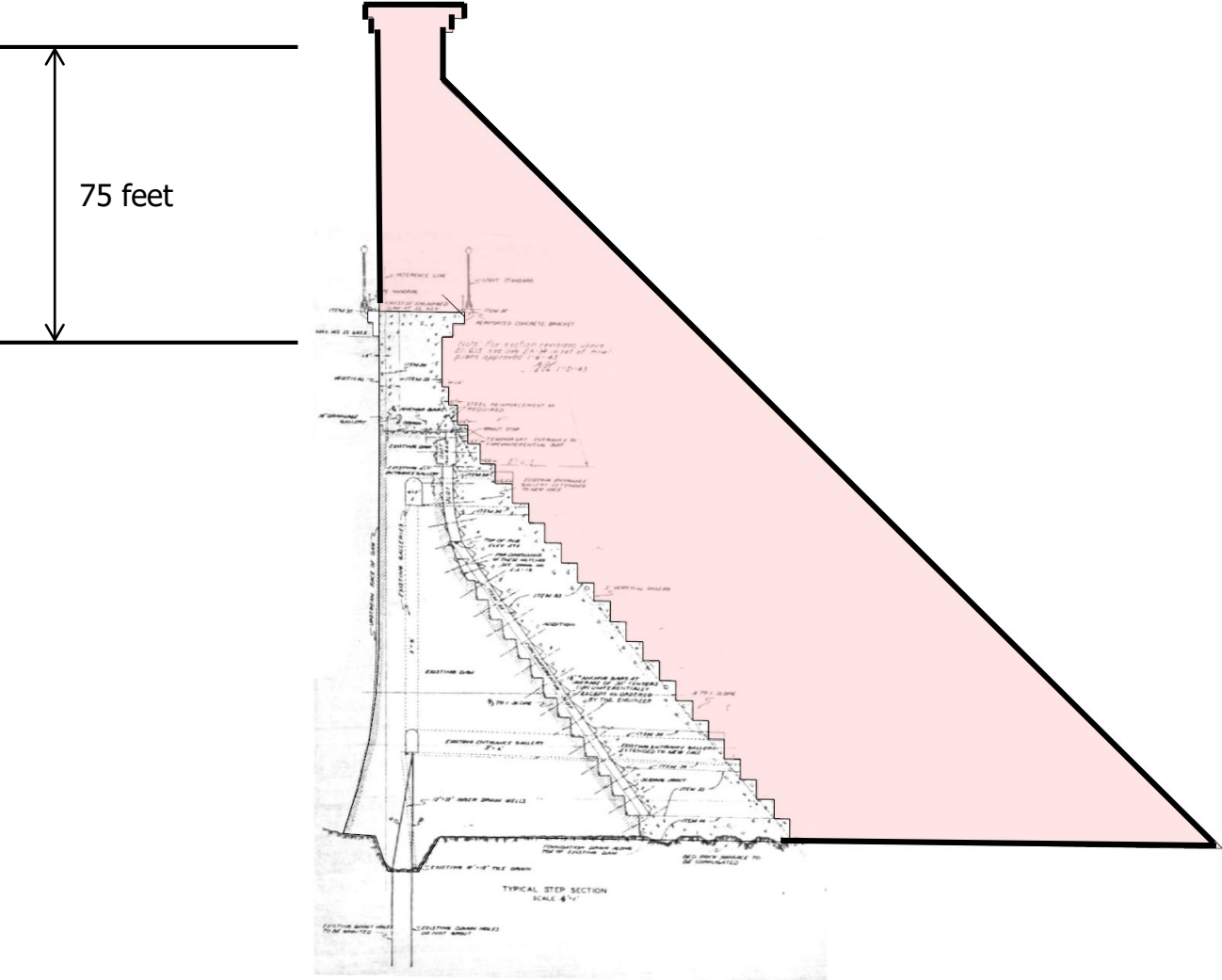
Alpine Reservoir: Existing Dam Section



Alpine Reservoir: 5k AF Dam Section



Alpine Reservoir: 23k AF Dam Section



Alpine Reservoir: Existing 3D Model



Alpine Reservoir: 23k acFT 3D Model



Nicasio Reservoir:

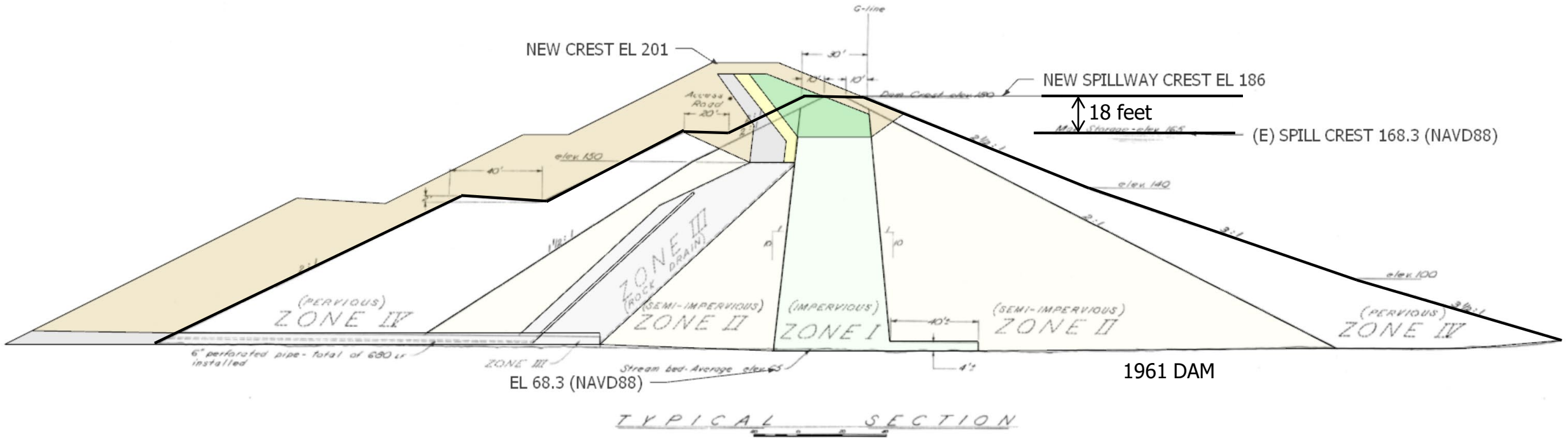


SPILLWAY
CUT AND
QUARRY

SPILLWAY

1961 DAM

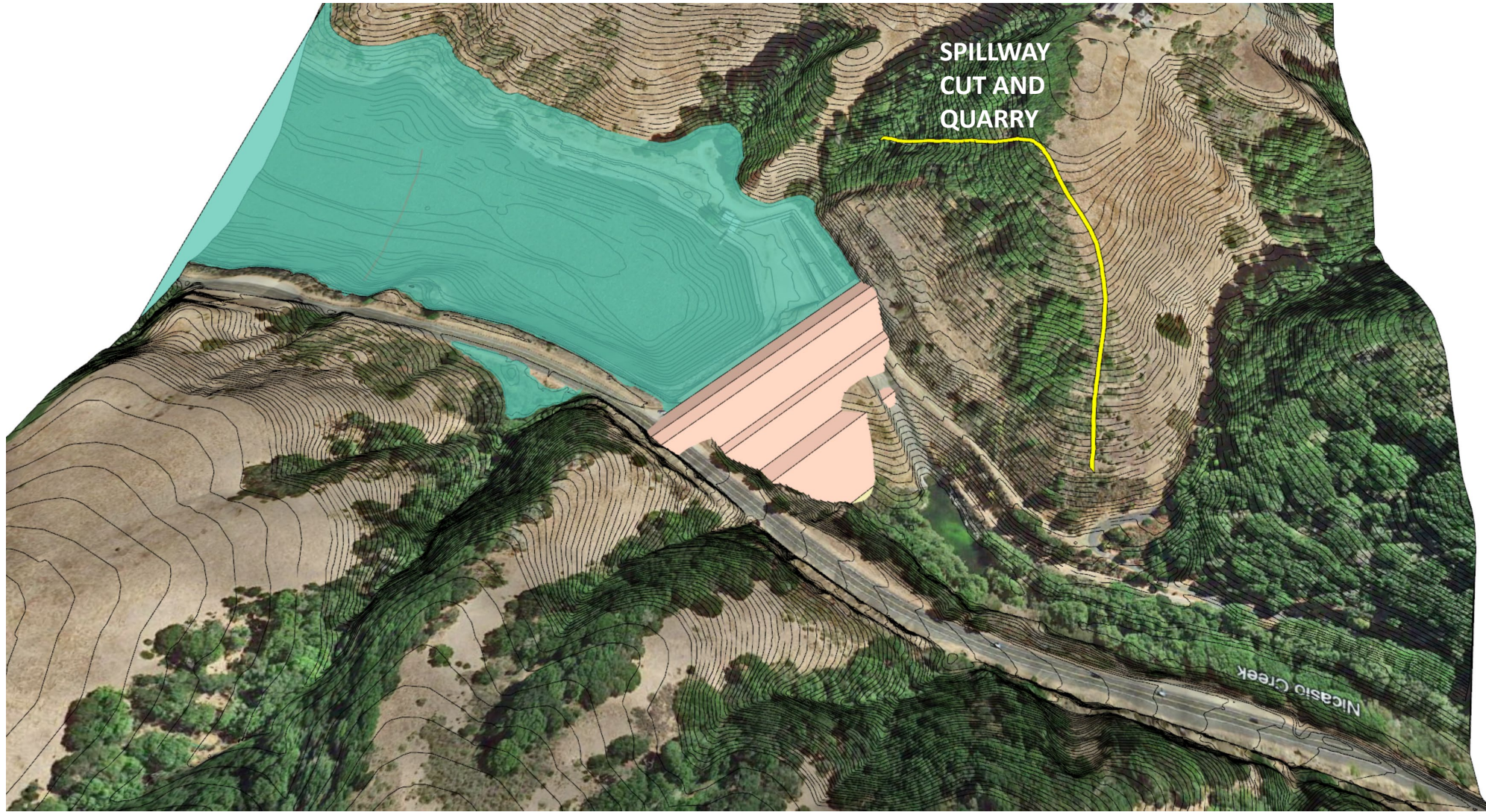
Nicasio Reservoir: 20k AF Downstream Raise Section



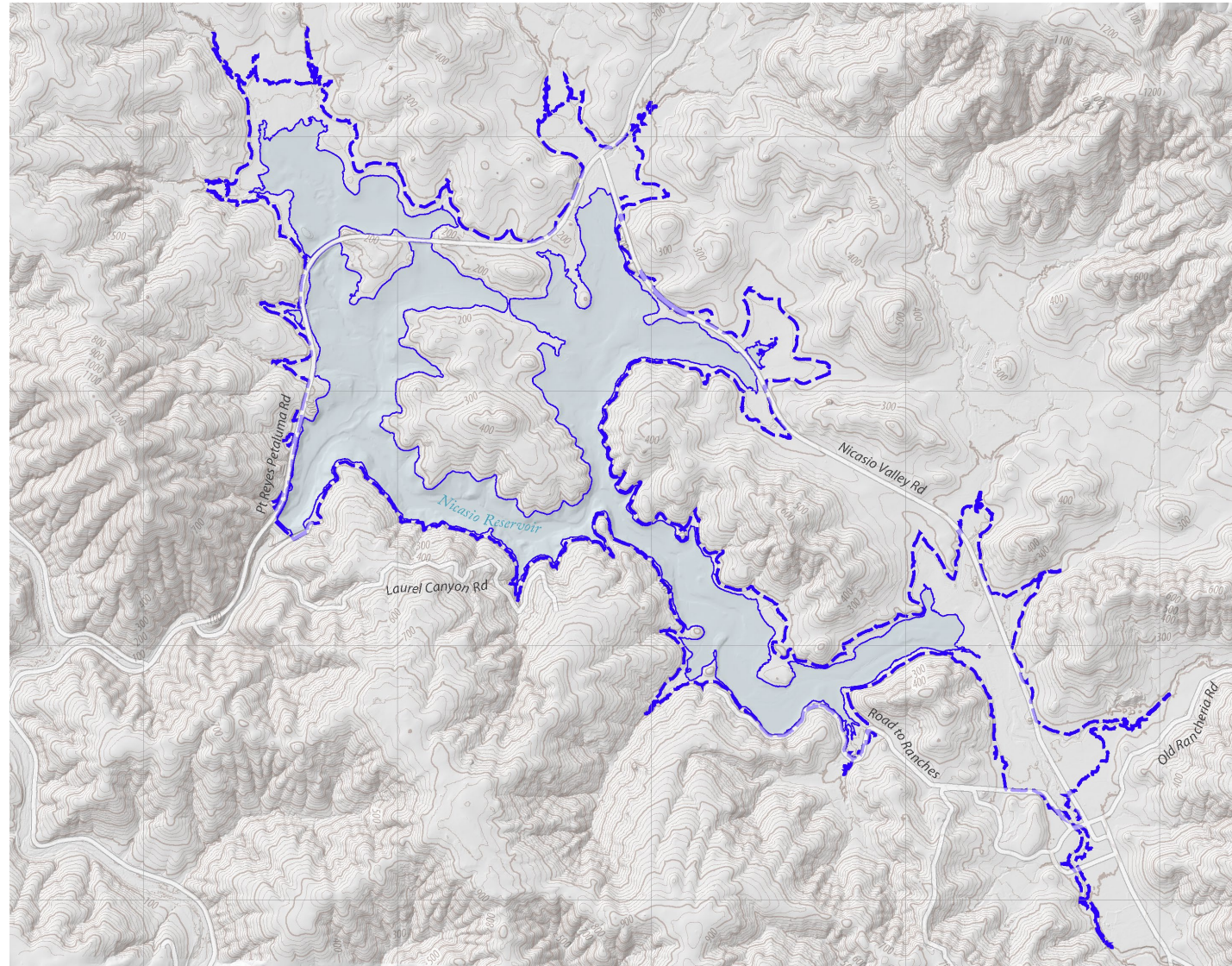
Nicasio Reservoir: Existing Dam 3D Model



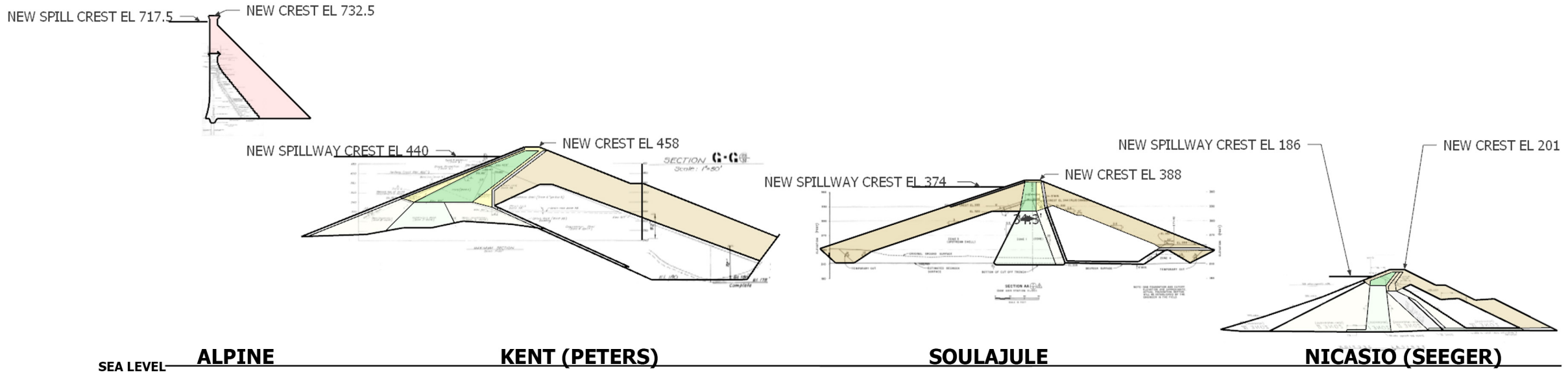
Nicasio Reservoir: 20k AF Raise 3D Model



Nicasio Reservoir: Inundation Map



Comparison of Dam Raises:



Category	Alpine	Kent (Peters)	SoulaJule	Nicasio (Seeger)
Additional Storage	23,000 AF	20,000 AF	20,000 AF	20,000 AF
Reservoir Raise	75 FT	37 FT	39 FT	18 FT
New Embankment	200,000 CY soil 240,000 CY concrete	2,900,000 CY soil	1,150,000 CY soil	180,000 CY soil
New Inundation	220 acres	180 acres	530 acres	830 acres

NEW DAM CONSTRUCTION

Local Storage Alternatives

■ Existing Reservoir Enlargement

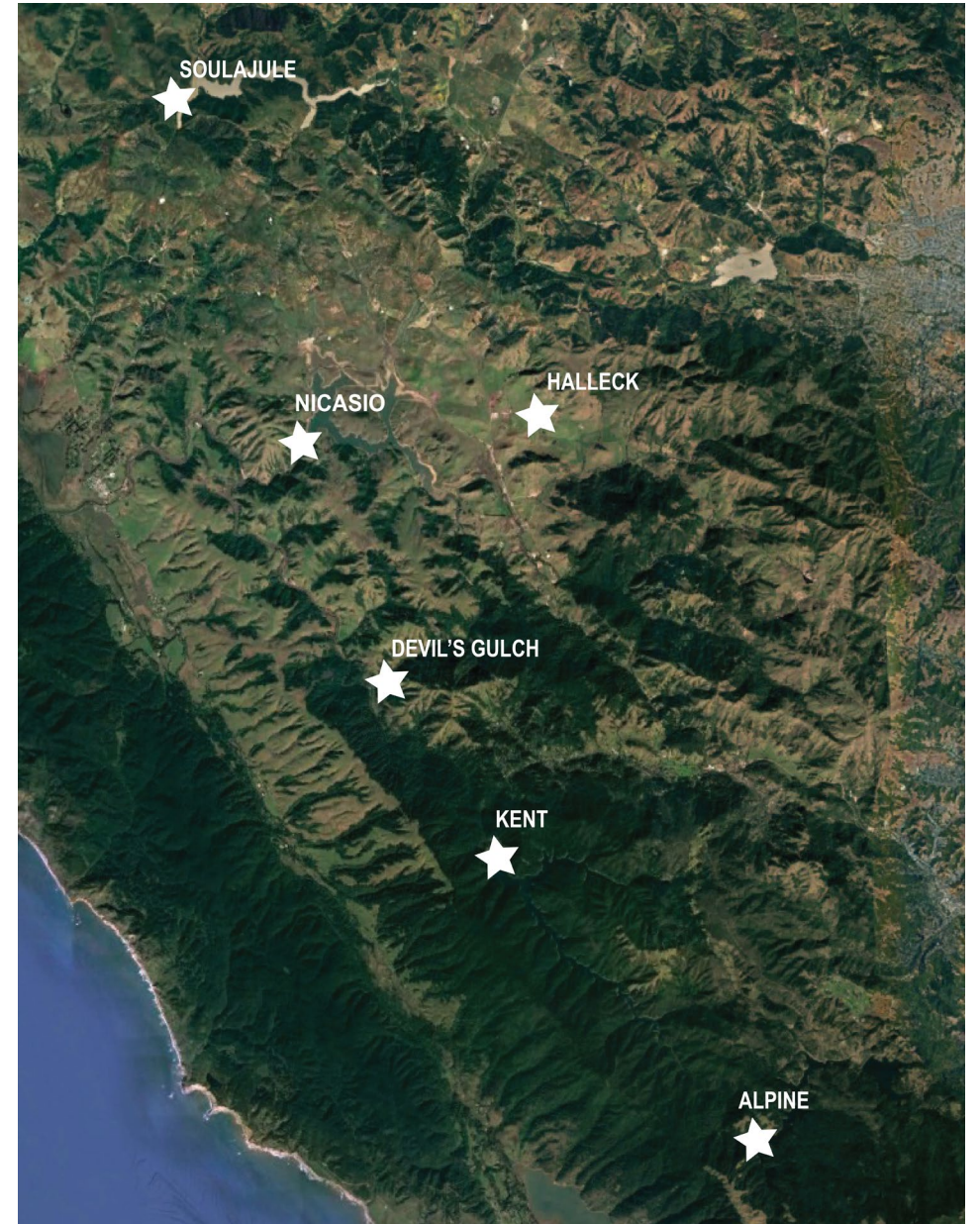
- SoulaJule
- Kent
- Alpine
- Nicasio

■ New Reservoir Construction

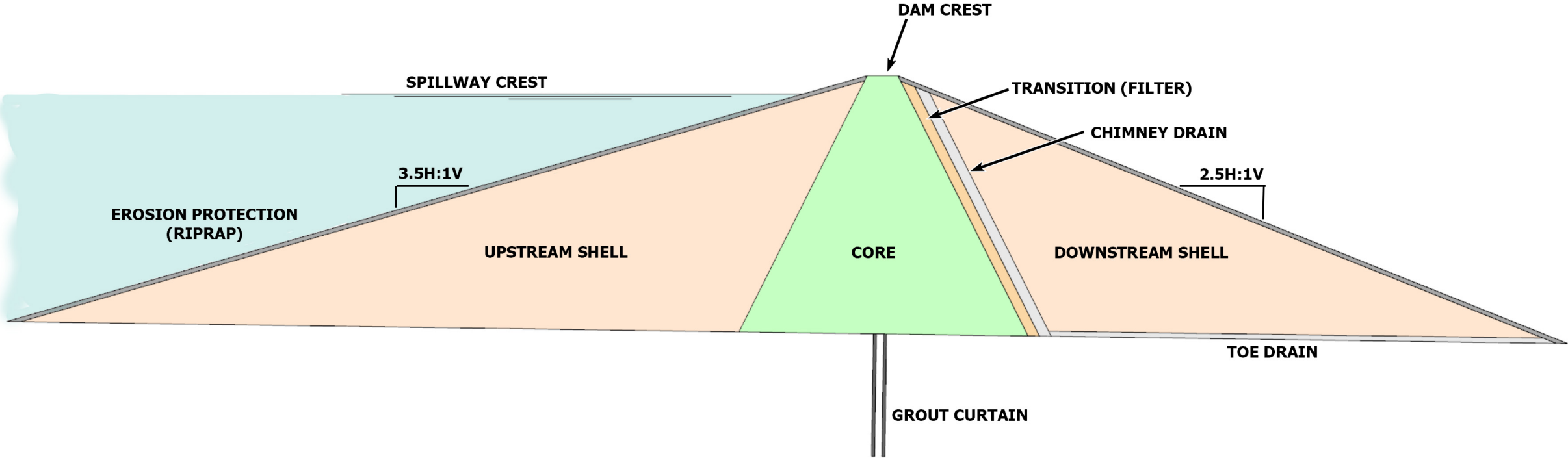
- Devil's Gulch
- Halleck
- Upper Nicasio

■ New Spillway Gates

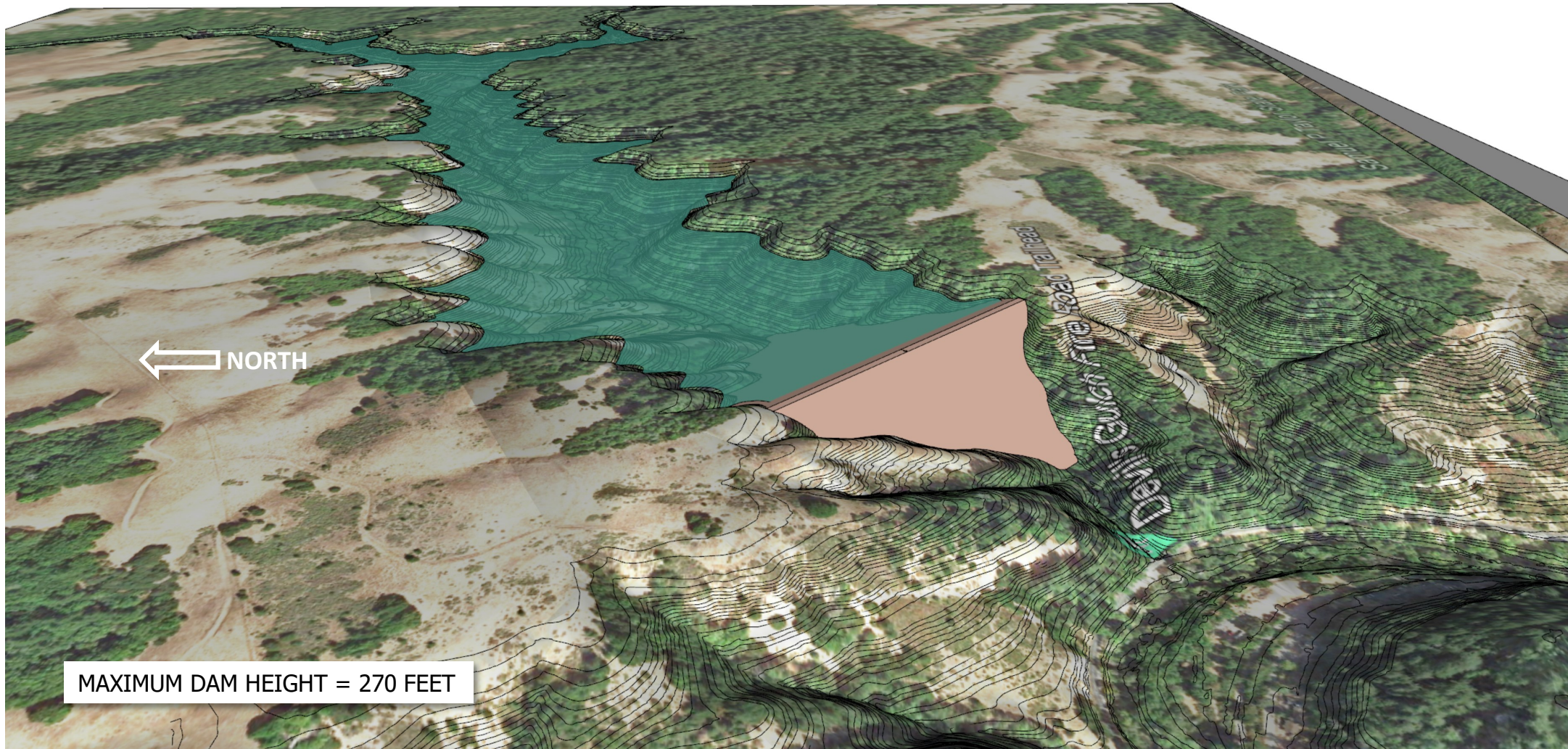
- Nicasio
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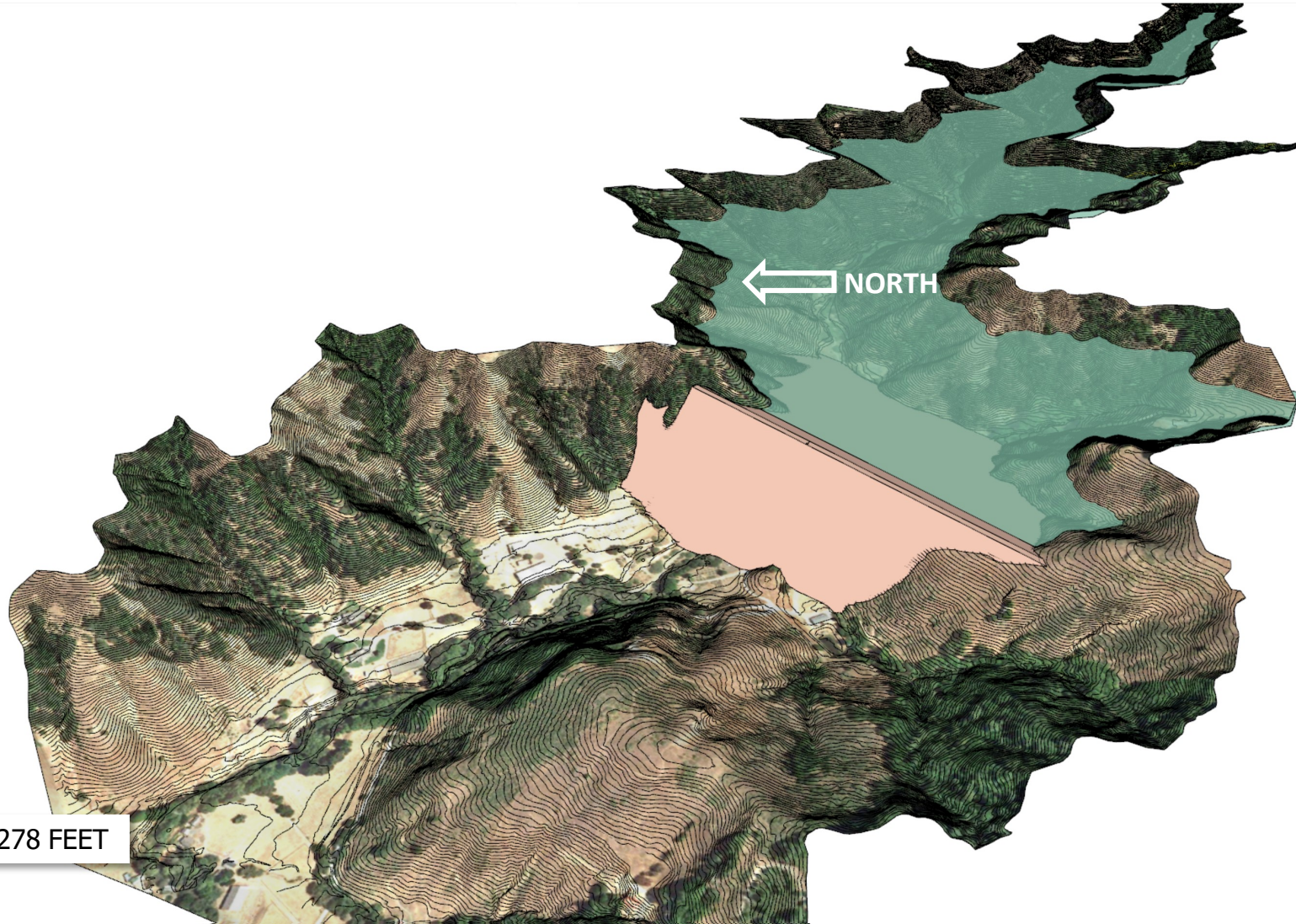
Typical New Dam Section:



Devil's Gulch Reservoir: 20k AF Reservoir



Halleck Reservoir: 20k AF Reservoir

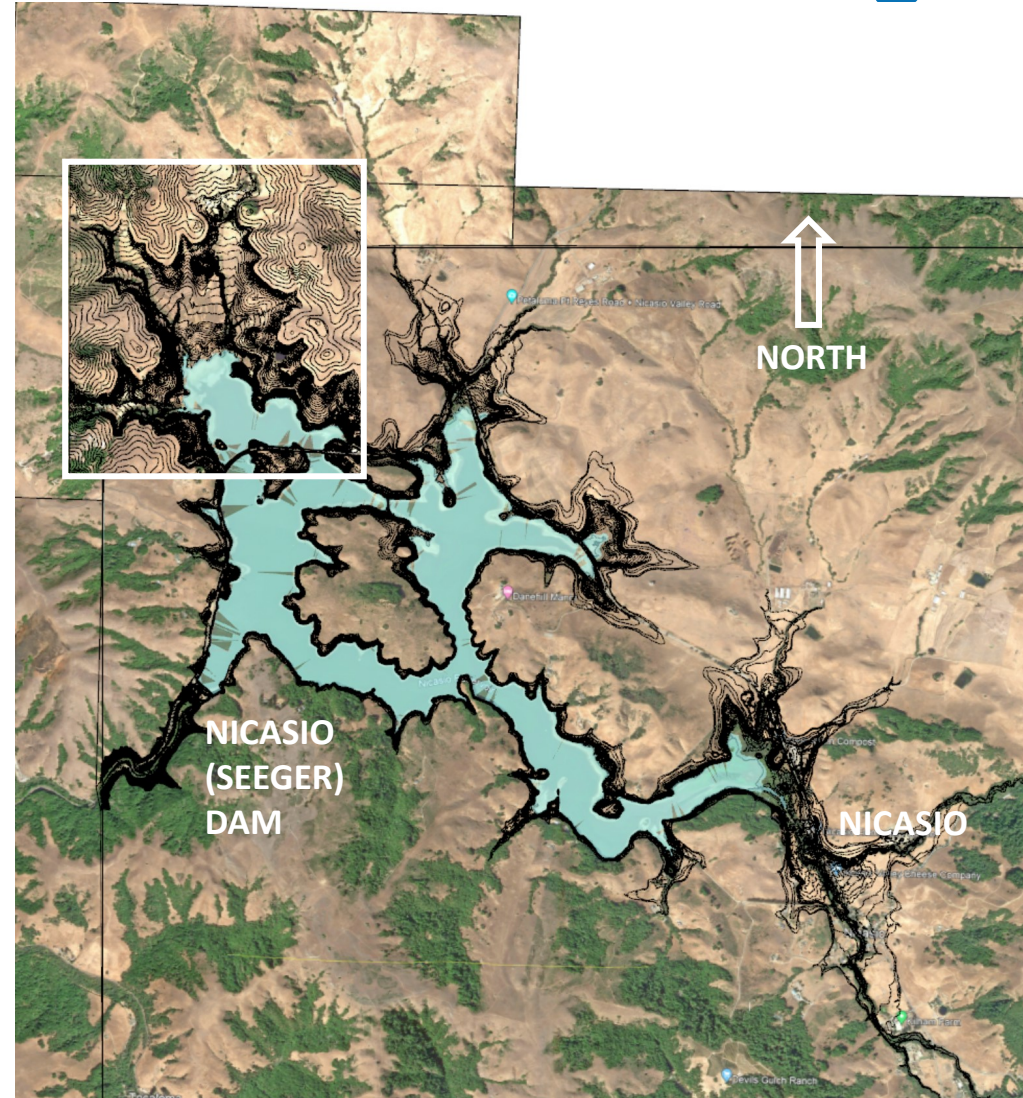


MAXIMUM DAM HEIGHT = 278 FEET

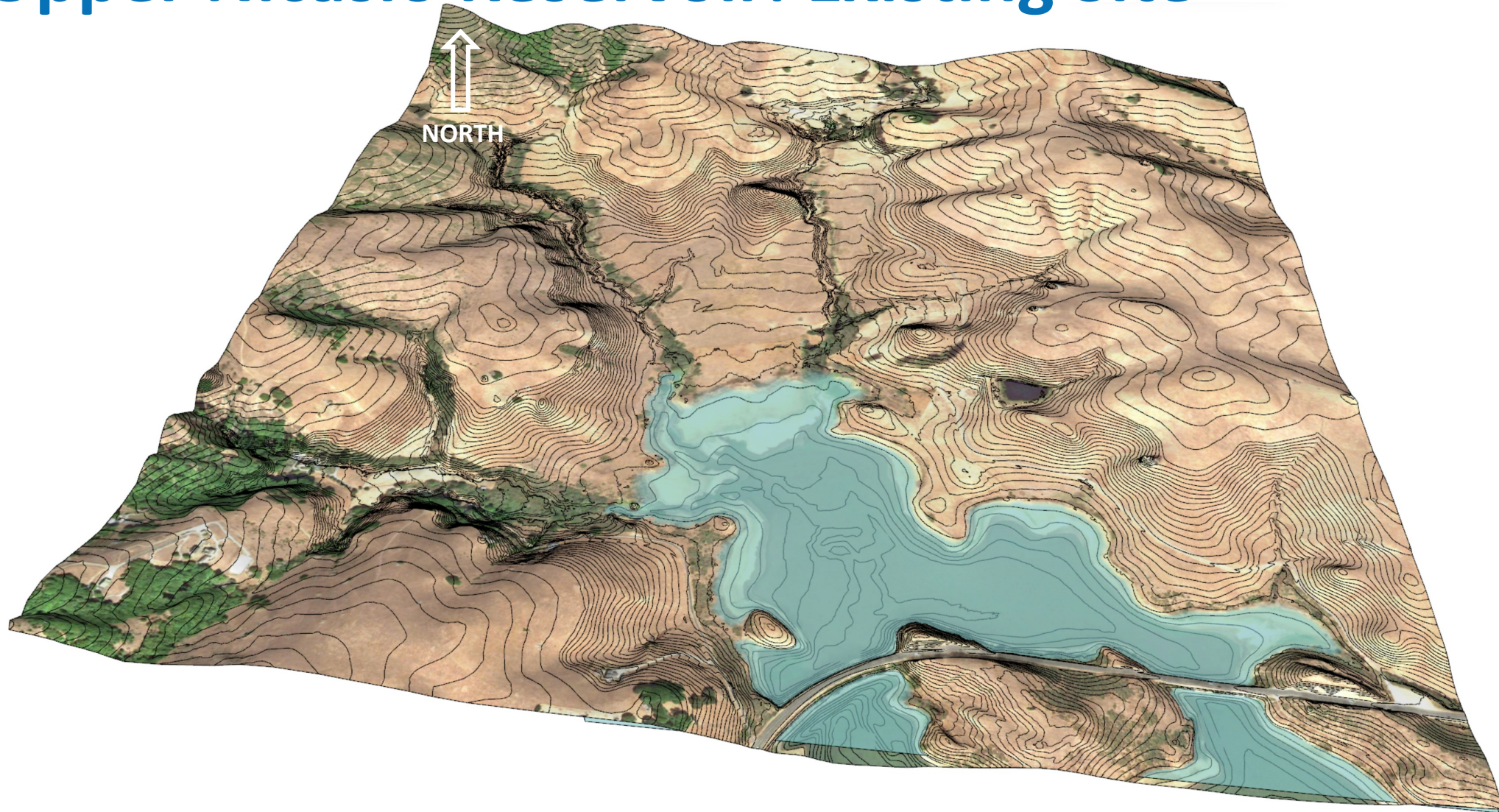
Upper Nicasio Reservoir:



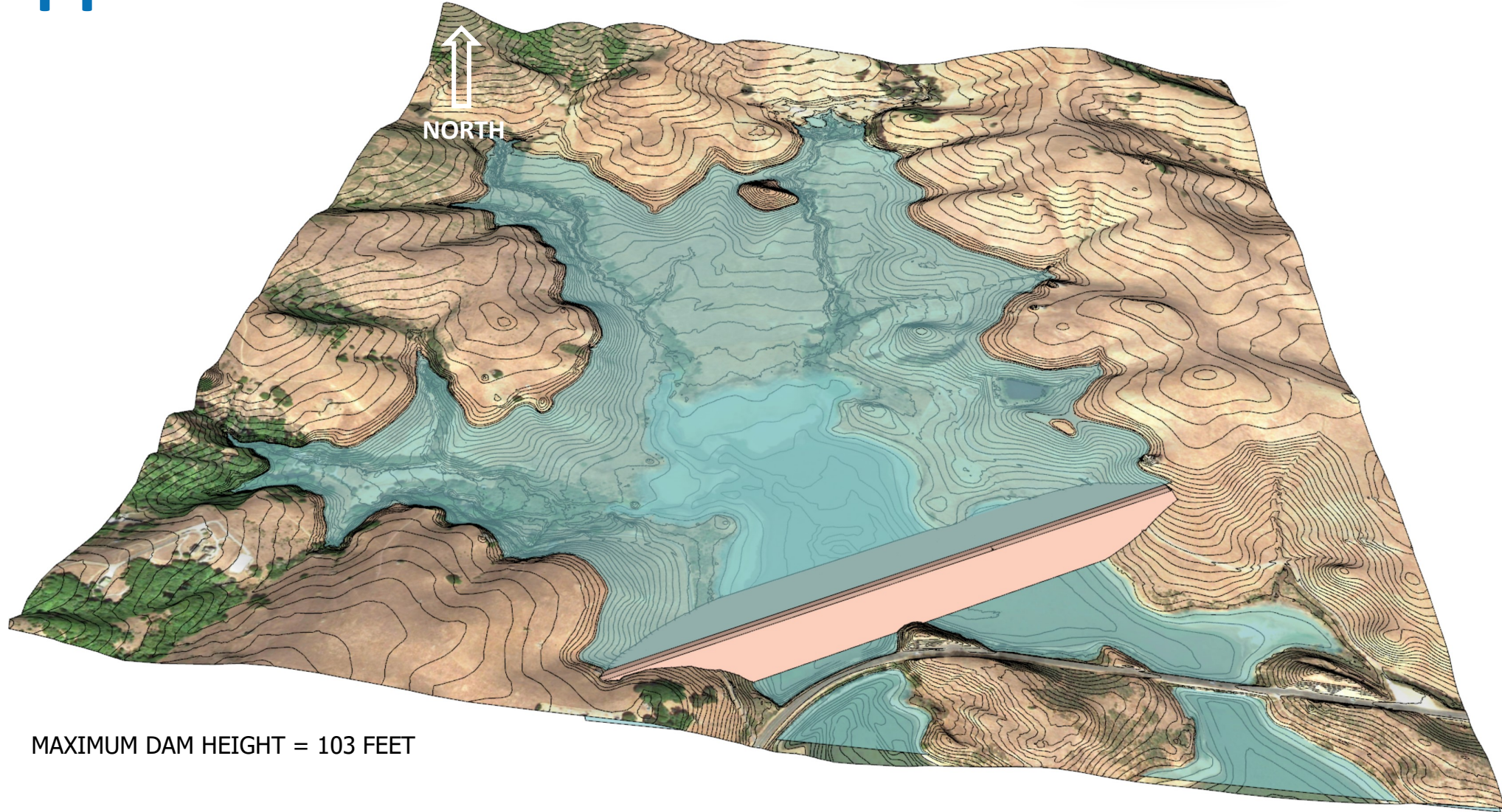
Upper Nicasio Reservoir: Existing Site



Upper Nicasio Reservoir: Existing Site

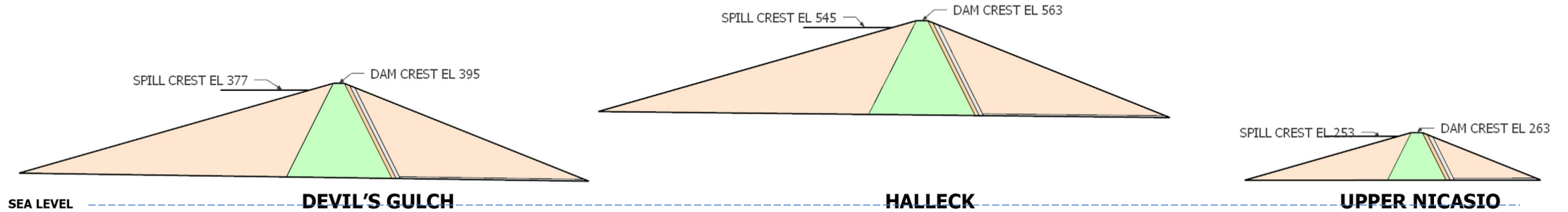


Upper Nicasio Reservoir: 20k AF Reservoir



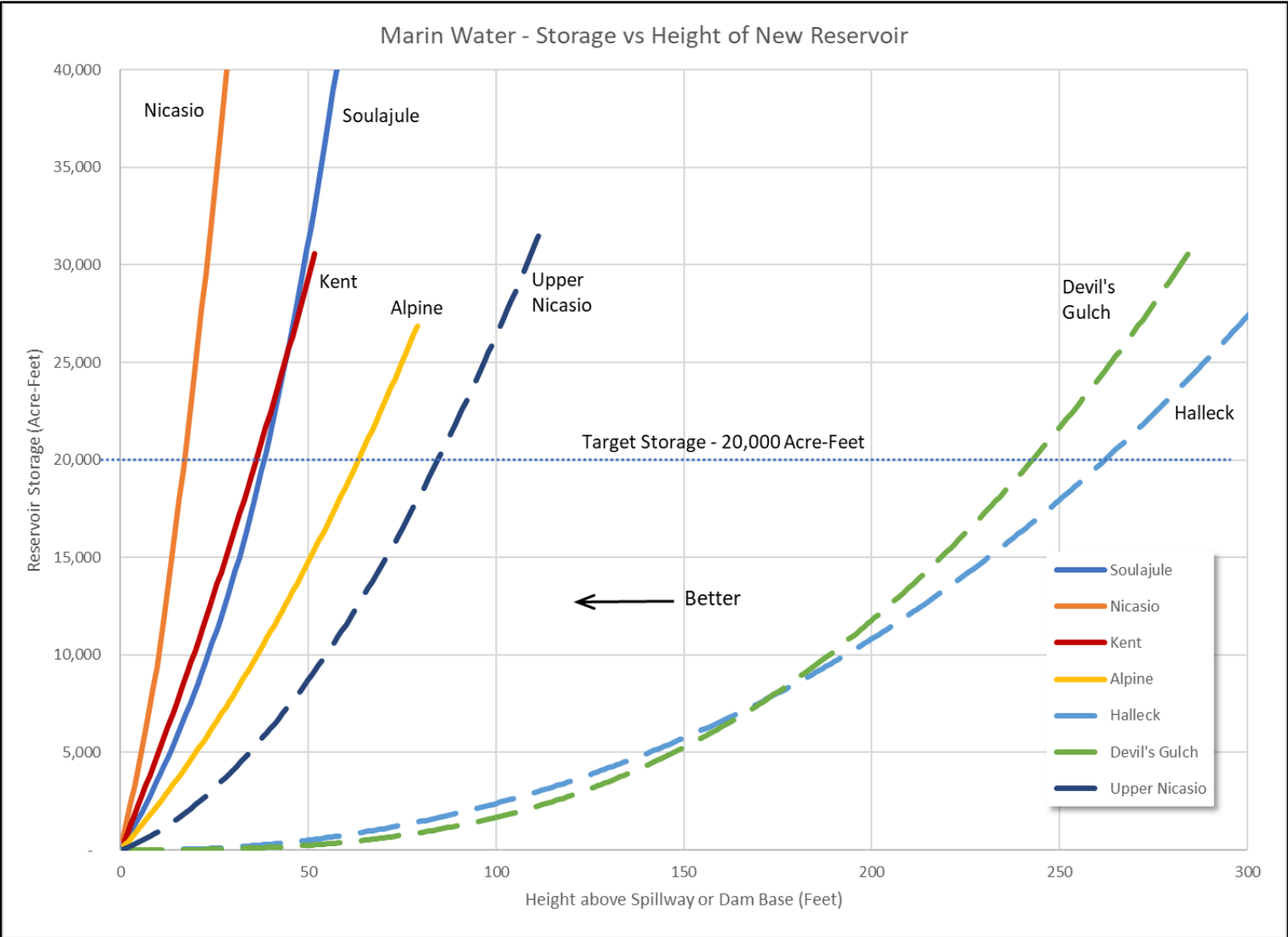
MAXIMUM DAM HEIGHT = 103 FEET

Comparison of New Dams:



Category	Devil's Gulch	Halleck	Upper Nicasio
Additional Storage	20,000 AF	20,000 AF	20,000 AF
Max Dam Height	270 FT	278 FT	103 FT
New Embankment	3,620,000 CY soil	10,400,000 CY soil	4,850,000 CY soil
New Inundation	220 acres	180 acres	310 acres

Comparison of Dam Storage/Elevation Curves:



SPILLWAY

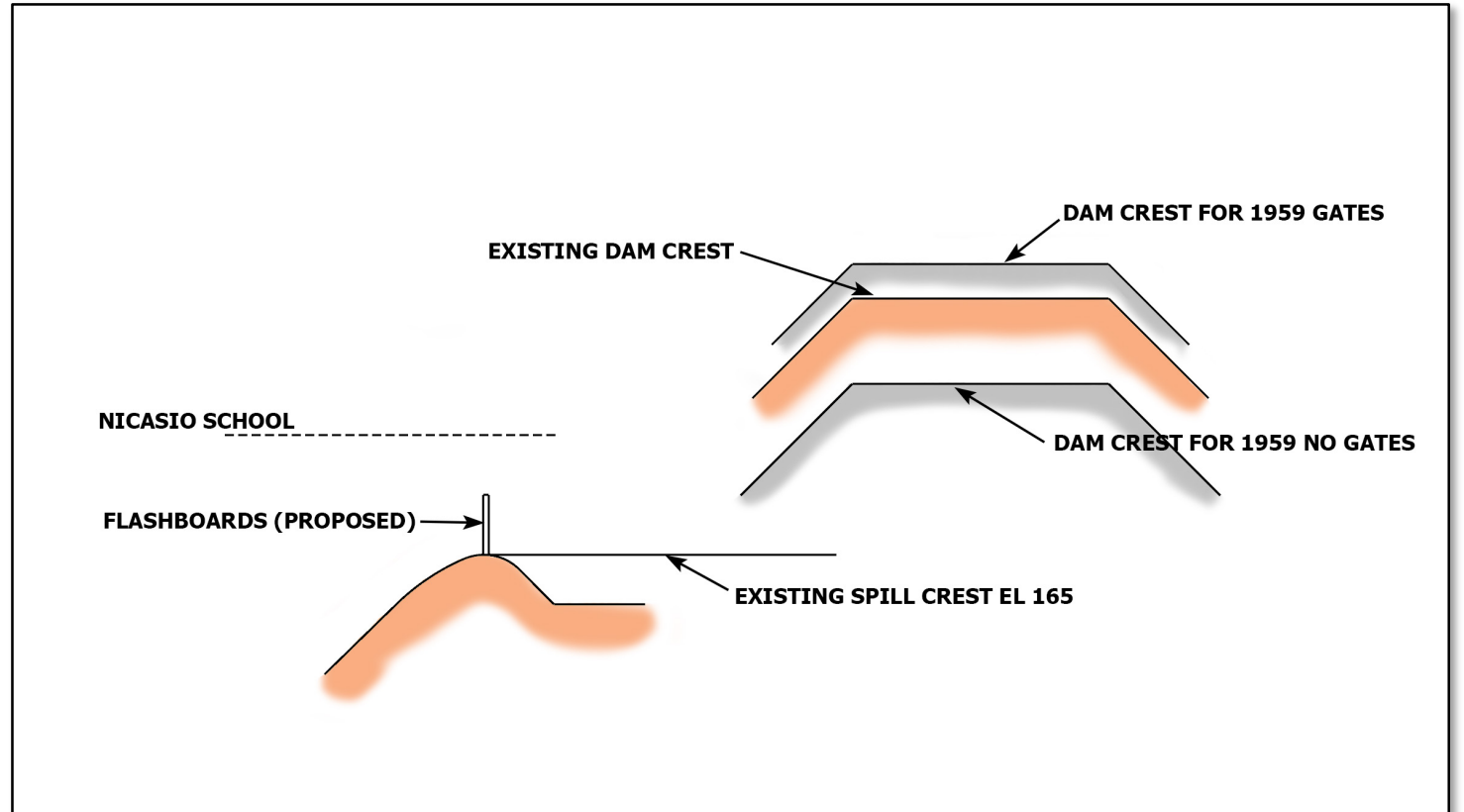
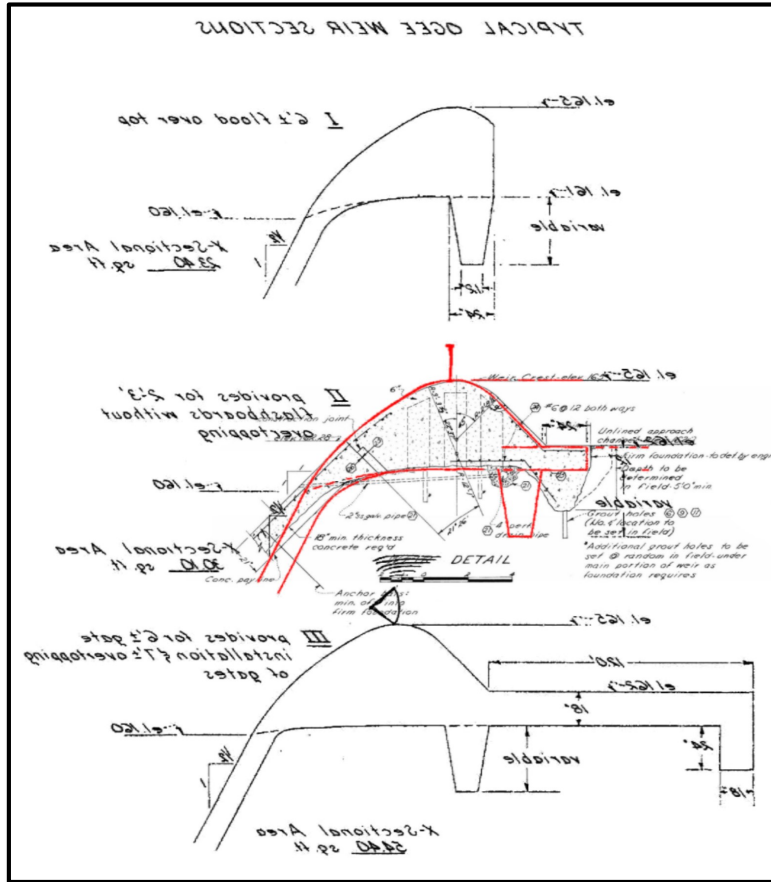
Example Flashboards



Nicasio Reservoir: Spillway

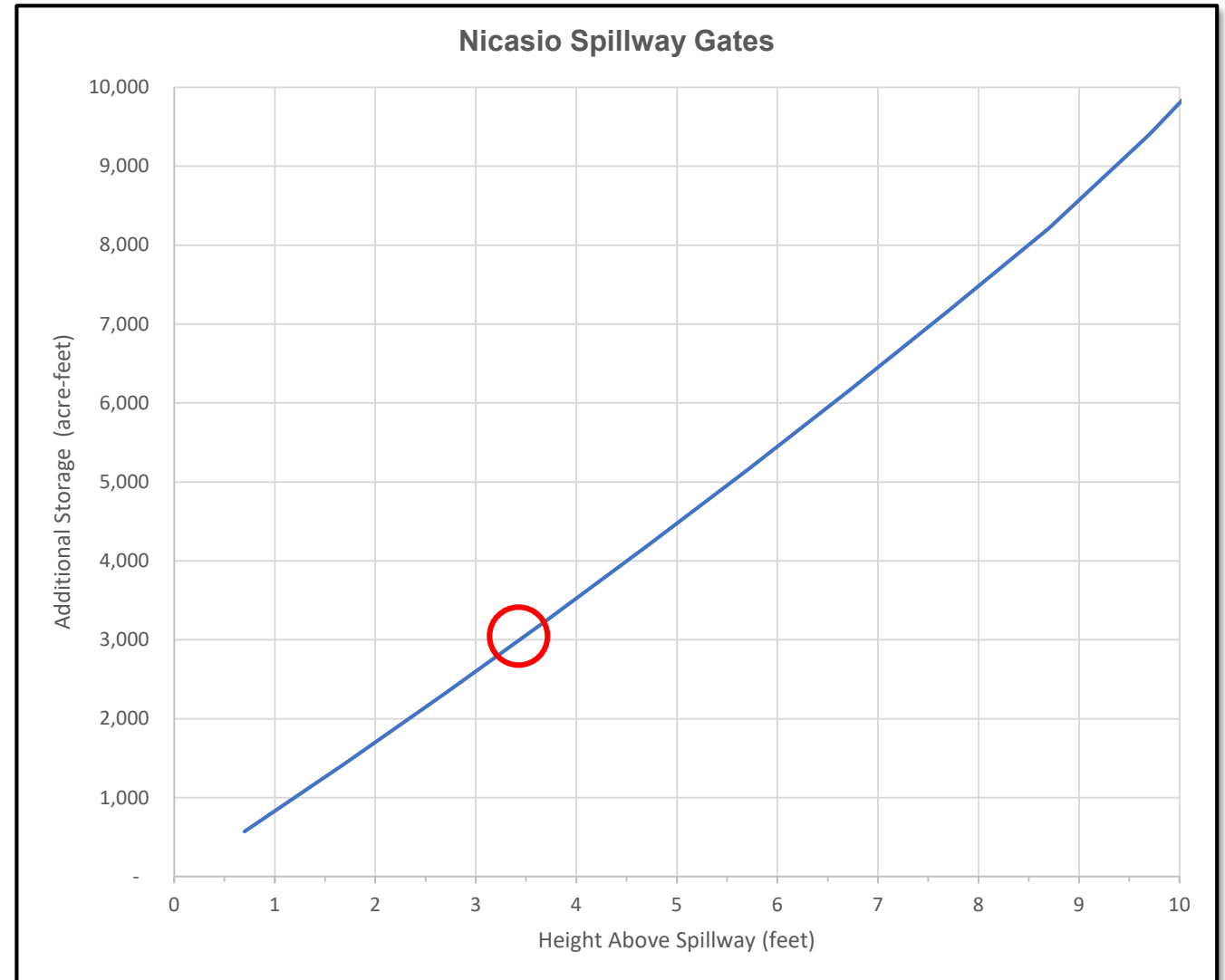


Nicasio Reservoir: Flashboards



Nicasio Reservoir: Spillway Flashboards

Nicasio Spillway Key Facts	Feet
Crest Length	278 FT
Likely Maximum Flashboard Height	3.5 FT



Summary and Next Steps

- Several enlargement alternatives appear viable to provide 20k AF of additional storage
- Flashboards at Nicasio could likely provide supplemental additional storage without any dam modification
- Next step is screening of all the alternatives down to 3 or 4
- Return to Board in May to discuss proposed short list of alternatives