



Tualatin Basin
WATER SUPPLY

Tualatin Basin Water Supply Project

Scoggins Dam Raise Appraisal Study

Water Managers Group Meeting

August 19, 2009



SUSTAINING OUR ECONOMY, WATERSHED, AND COMMUNITY



Tualatin Basin
WATER SUPPLY

Presentation Overview

- 1. Reclamation's Safety of Dams Program**
- 2. Dam Raise Appraisal Study Information**
- 3. Costs Review**
- 4. Program Issues**

Reclamation's Safety of Dams Program

■ Key points

- **Scoggins Dam is federally owned**
- **Reclamation's schedule differs from Partner's**
- **Dam raise appraisal study provides key information**
- **Reclamation continuing Risk Evaluation Process – only for the existing Dam**
- **Good coordination with Reclamation**

Reclamation's Safety of Dams Program

- **Major Program elements**
 - **Safety Evaluation of Existing Dams (SEED)**
 - 100% Reclamation Cost
 - Risk Analysis Process – Expedited actions
 - **Corrective Action Study (CAS)**
 - 85% - Federal and 15% Local cost share
 - Design and Construction of Modification/Repairs

Safety of Dams – SEED Process

- **Risk Evaluation Steps and Schedule**
 - **Seismic Review Board and Risk Analysis**
 - Risk Analysis Workshop
 - July - October 2009
 - **Dam Safety Assessment Team**
 - Decision Document
 - December 2009
 - **Interim measures to mitigate the risks**
 - January – March 2010
 - **Corrective Action Study (CAS)**
 - Scope, Budget and Schedule
 - January – March 2010

Safety of Dams – Corrective Action Study (CAS)

- **CAS Program Steps and Schedule**
 - **CAS Scope, Schedule and Budget - Spring 2010**
 - **CAS Work Tasks and Schedule**
 - Alternatives, Mod. Report, and NEPA – Summer 2010
 - Final Design Process – June 2011 – Feb. 2012
 - Congressional Approval for Design– March 2012
 - Final Design, Construction Procurement – 2013 -14
 - Congressional Approval for Construction – 2014
 - **Construction and Startup – 2014 - 2019**

Safety of Dams Program

■ Partnership Involvement

- **Participation in Risk evaluation process and Dam Safety assessment team for existing Dam**
- **Develop information on economic and other impacts for interim measures to mitigate risks, such as reservoir restriction this winter**
- **Continue collaboration with Reclamation management and staff on project elements**

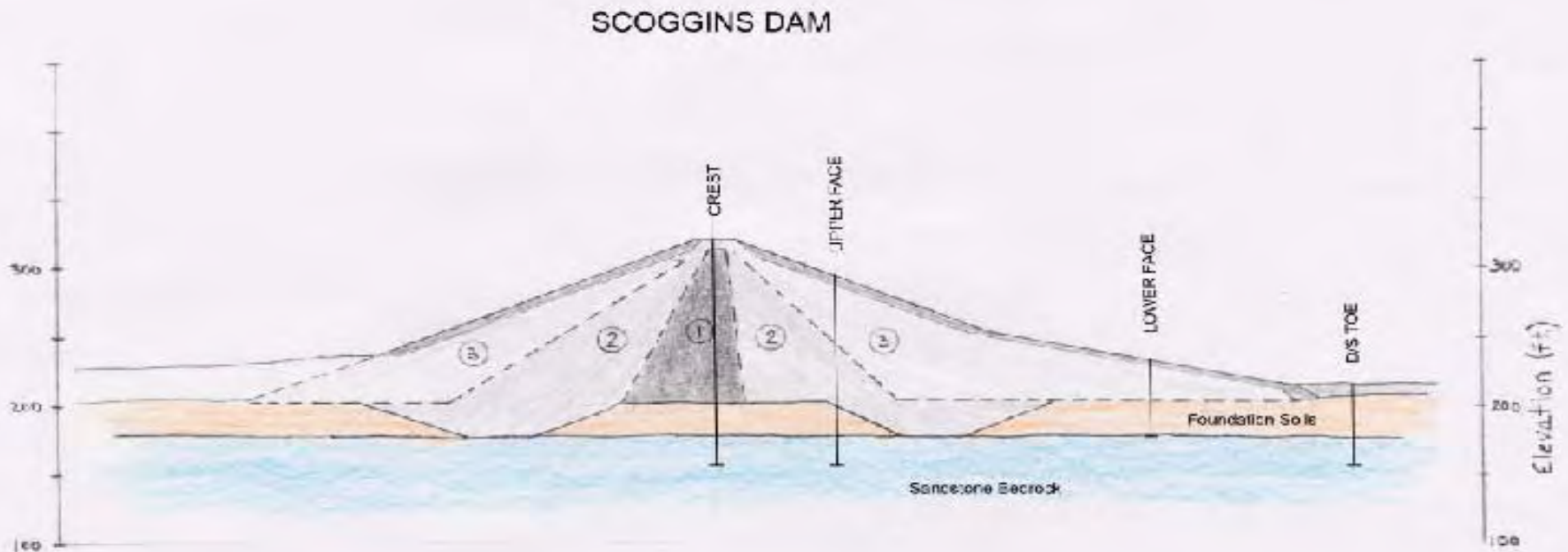
Partnership Issues

■ Concerns of schedule

- Safety of Dam Program actions have taken up to 12 years from beginning of corrective action to start-up of construction (Folsom)
- Reclamation has not determined the schedule – our estimate for dam repairs – no sooner than Spring 2019

■ Congressional appropriations delays

Scoggins Dam Design



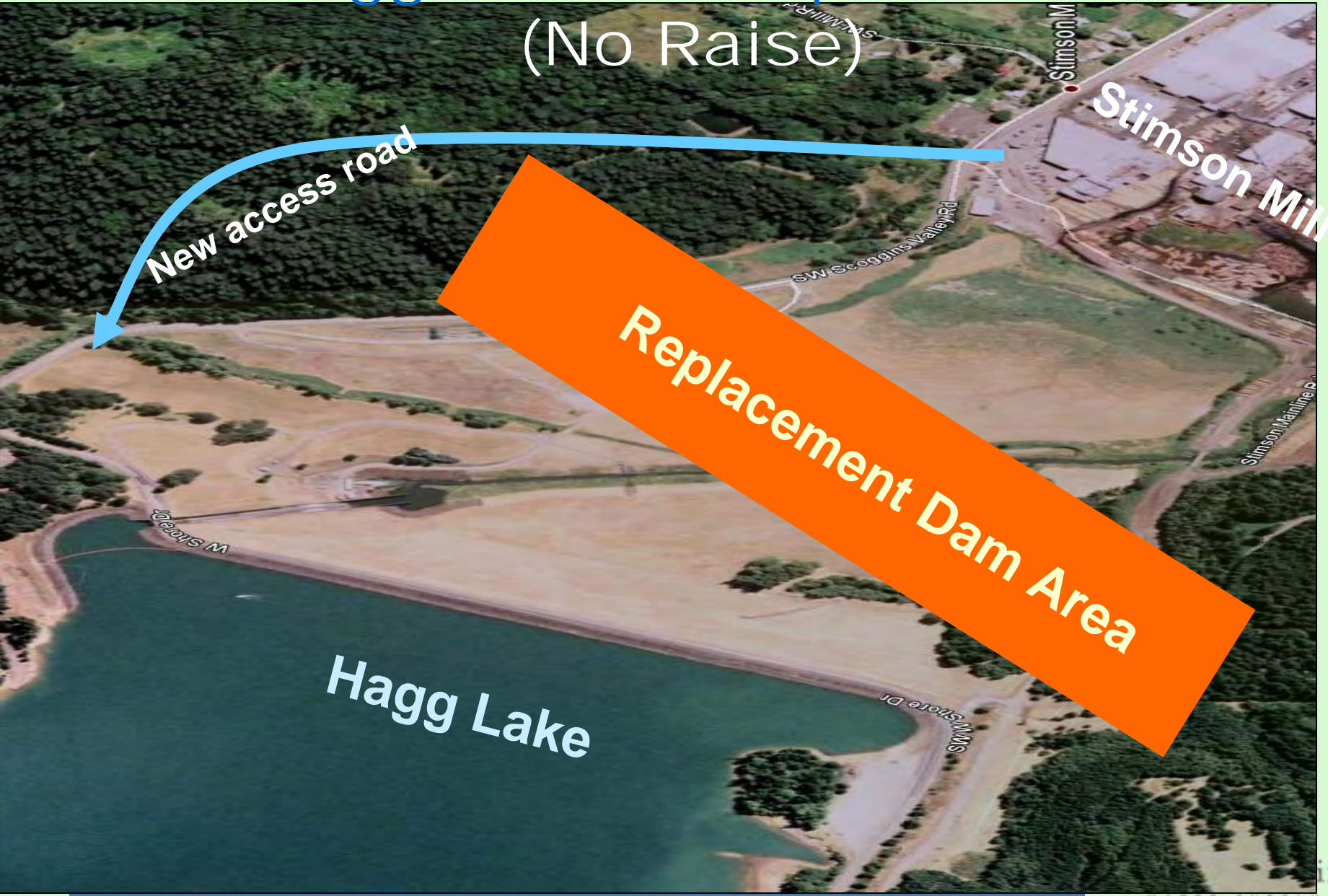
- U.S. Bureau of Reclamation - Designed and Constructed 1970's
- 151-foot-high zoned earth fill embankment
- 53,316 acre-feet active storage capacity
- 2,600 acres area for lake and lands
- 1,100 acres of water at full pool

Dam Raise Appraisal Study

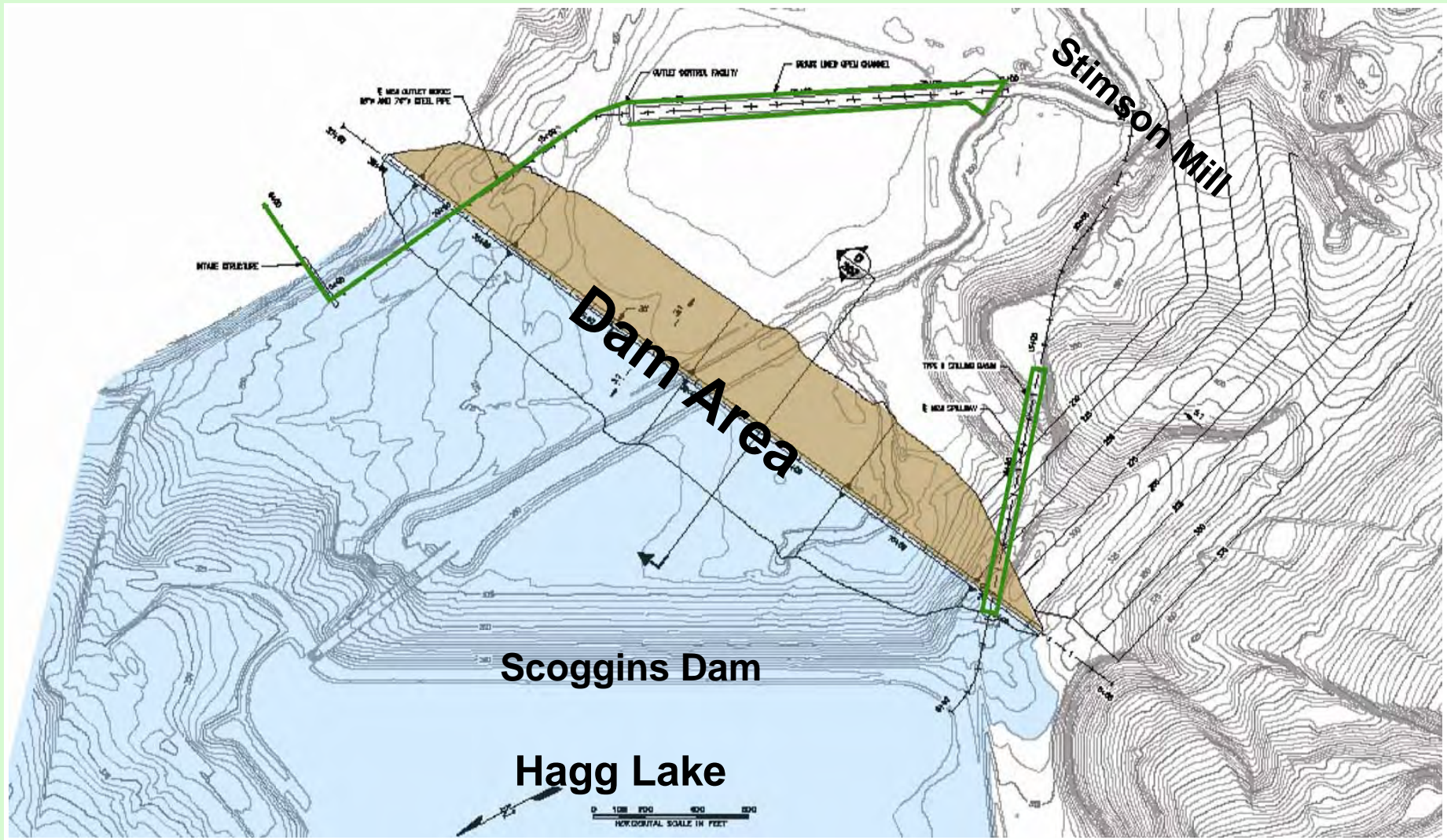
Scoggins Dam Assessment

- **Existing Dam Structure is Safe**
 - **Does not meet current earthquake guidelines**
- **Doing nothing is not an option**
- **Required Seismic Improvements for the Current Reservoir Operation**
 - **SEED - Reclamation Risk Analysis**
 - **Seismic Review Board Recommendations**
 - **May be more cost-effective to replace than to repair the existing Dam**

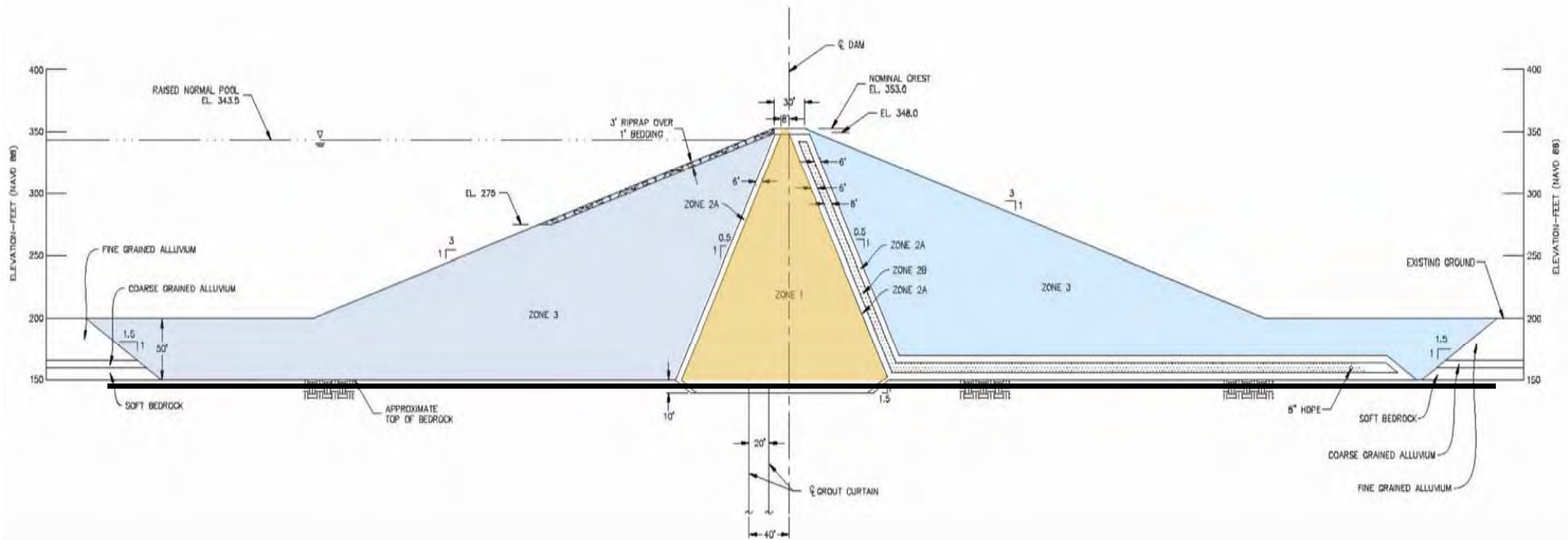
Scoggins Dam Replacement (No Raise)



Plan of Replacement Dam



Section of Replacement Dam



Dam Height – 151 ft Capacity – 52,600 ac-ft
Base length – 3100 feet Base width – 700 feet
Side Slope – 3H:1V Core fill material – Clay

Dam Raise Appraisal Study

Design Alternatives

- **Existing Dam Raise**
 - **Zoned Earthfill**
- **Downstream Dam Raise**
 - **Zoned Earthfill**
- **Downstream Dam Raise – Composite**
 - **Rock Fill/Roller Compacted Concrete**

Dam Design Alternatives

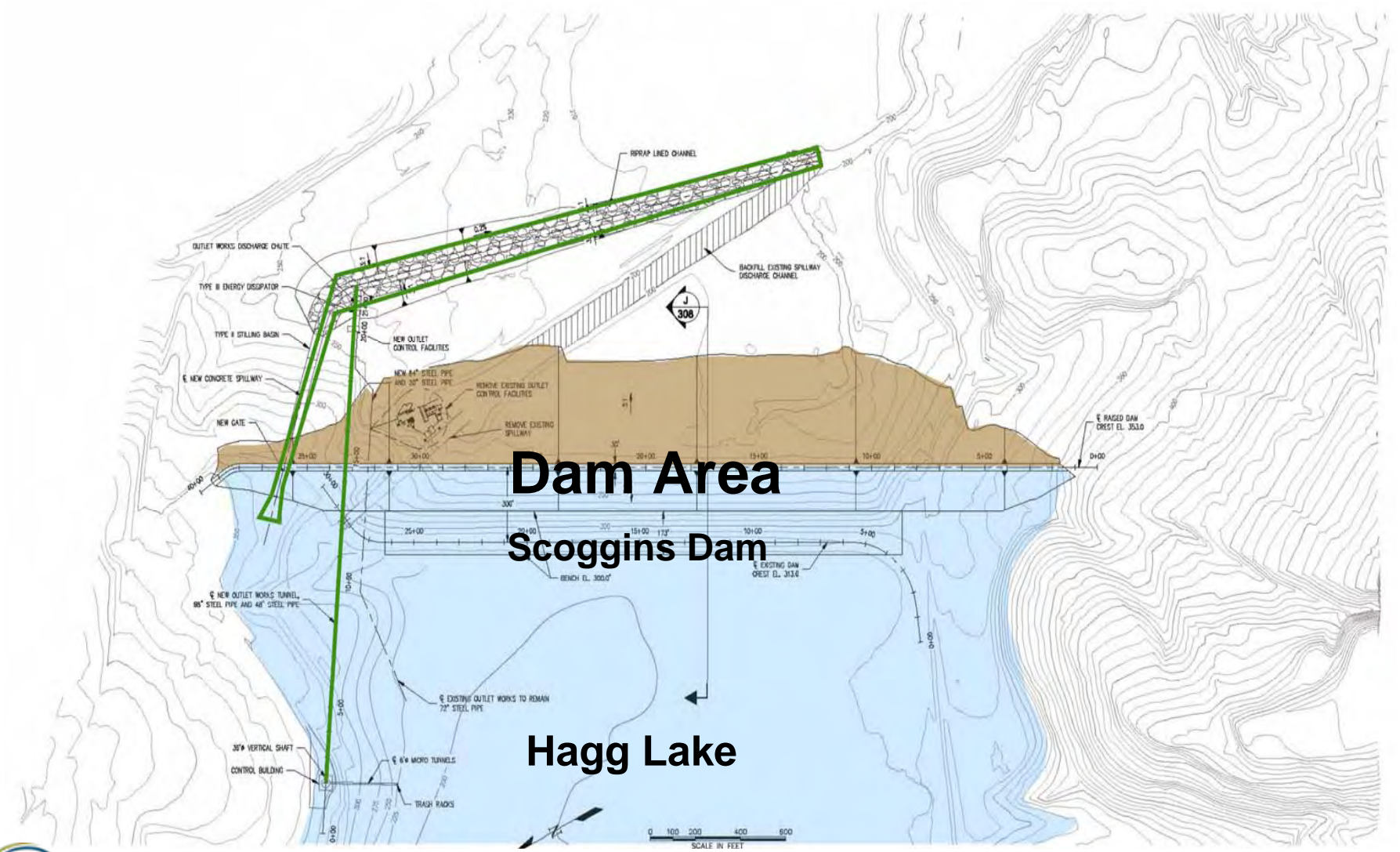
Hagg Lake

Existing Dam Raise Area
Raised Dam Area - Composite

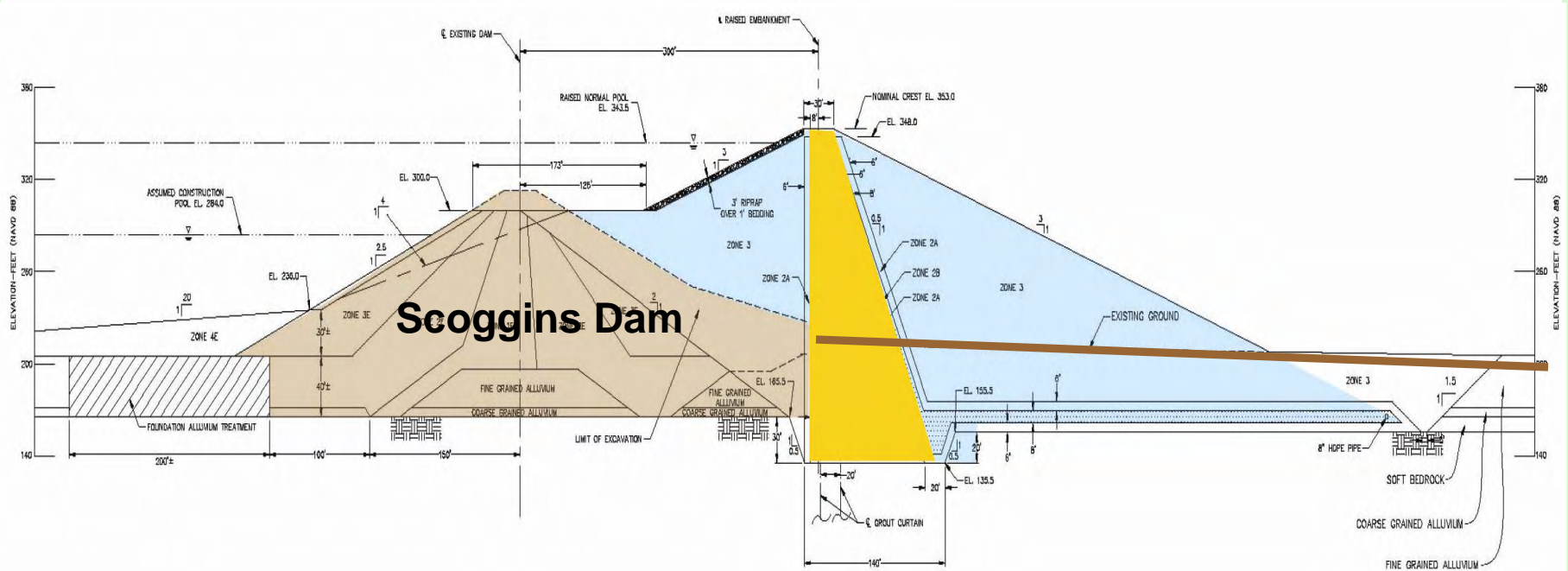
Replace Existing Dam
Downstream Dam Raise

Stimson Mill

Plan of Existing Dam Raise



Section of Existing Dam Raise

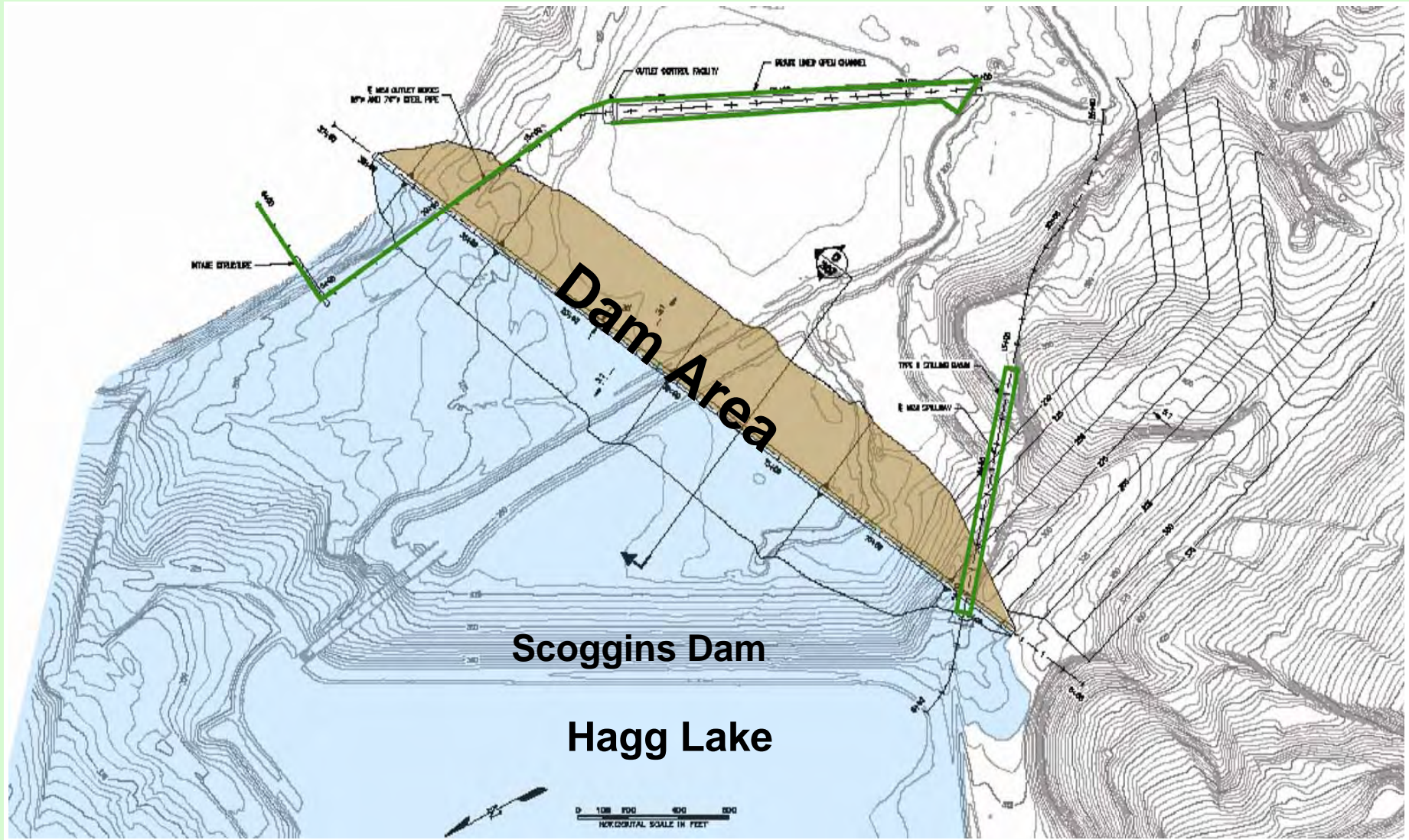


Dam Height – 220 ft Capacity – 110,000 ac-ft

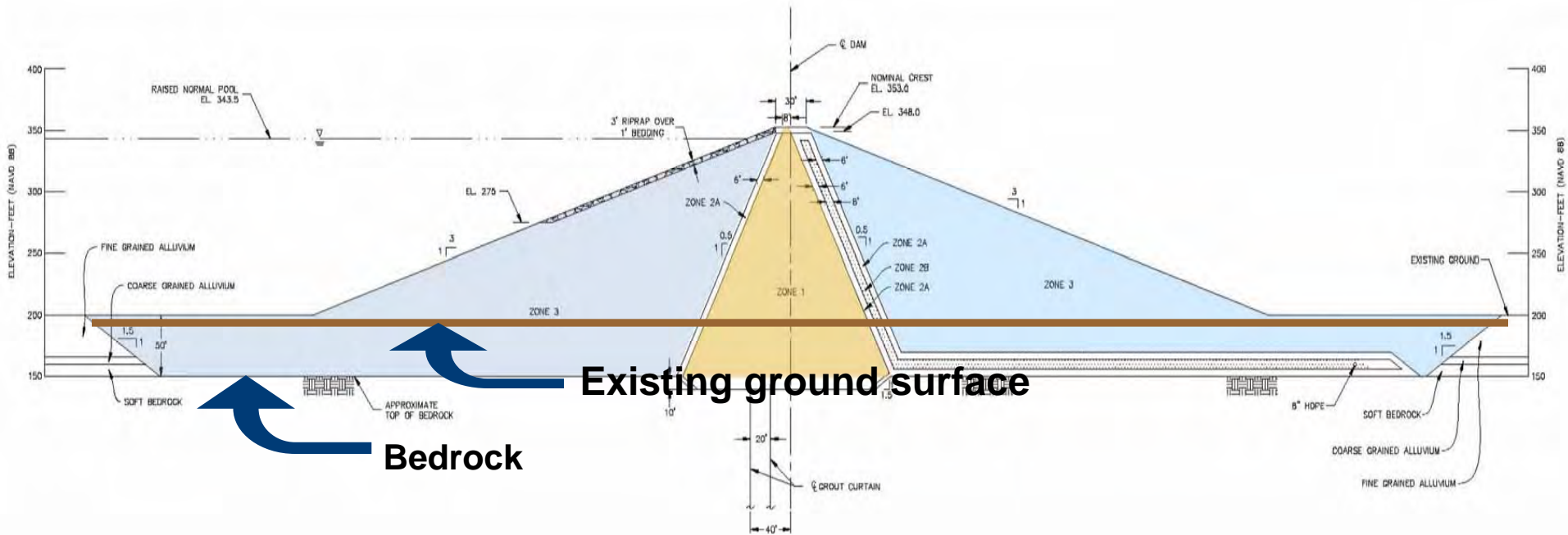
Base length – 3800 feet Base width – 1200 feet (includes existing dam foundation – 500 ft)

Side Slope – 3H:1V Core Fill Material - Clay

Plan of Downstream Raised Dam



Section of Downstream Raised Dam



Bedrock

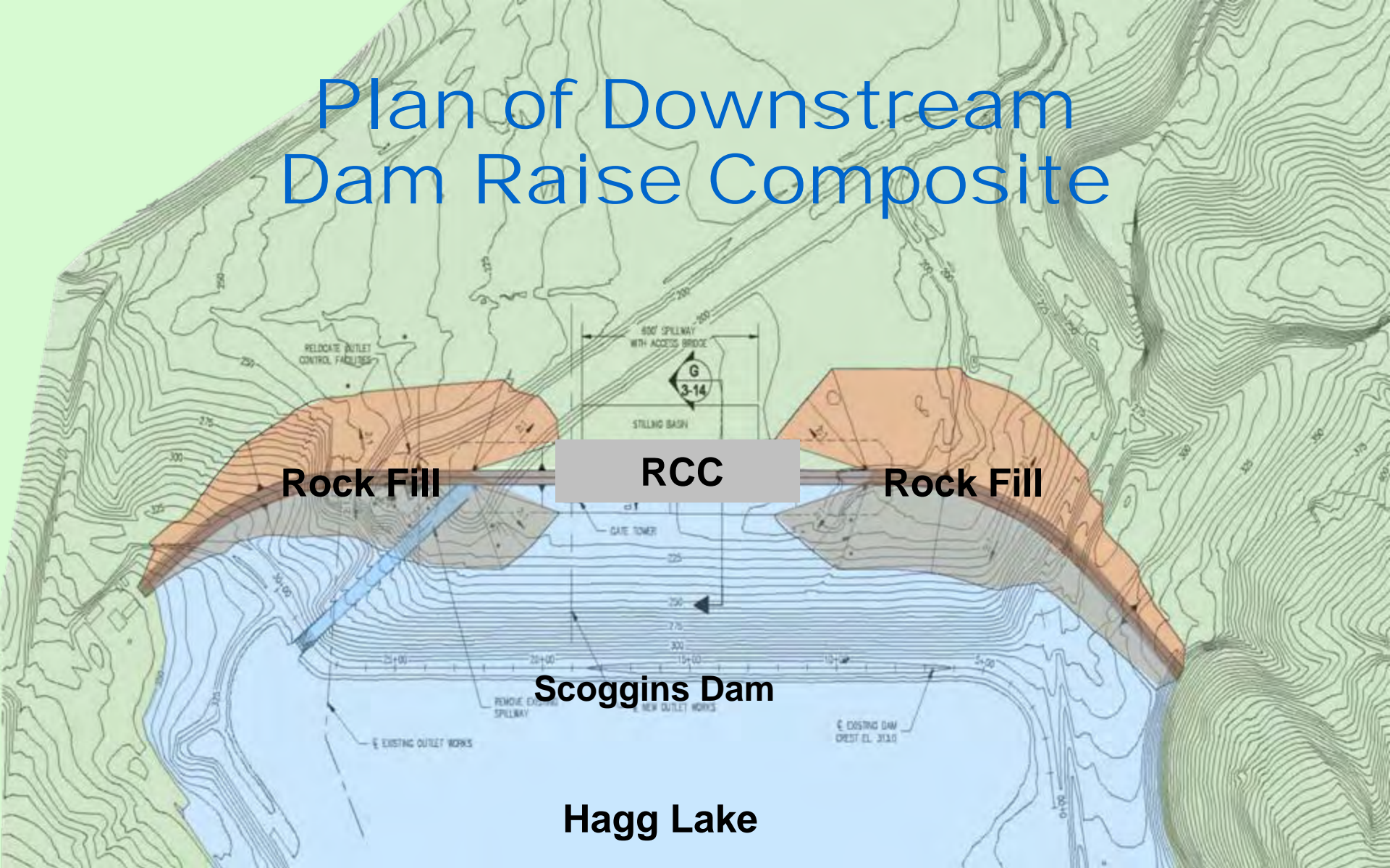
Existing ground surface

Dam Height – 220 ft Capacity – 110,000 ac-ft

Base length – 3500 ft Base width – 850 ft

Side Slope – 3H:1V

Plan of Downstream Dam Raise Composite



Dam Raise Project

■ Issues

- **Construction Cost Estimates – 15% Level**
- **Construction Impacts**
 - **Reduced Reservoir Level**
 - **Water Supply/Recreation**
- **Existing Dam Structure - Liability**
- **Private Property Impacts**
- **Dam Access Roads**
- **New dam features – Tunnel, Spillway and Outlet Works**
- **Environmental Impacts**
- **Community impacts**

Decision Model for Dam Designs Evaluation Process

- **Multi-Level Screening Criteria with Weighted Factors**
 - **Community Impacts**
 - **Institutional Issues**
 - **Environmental Impacts**
 - **Operational Impacts**
 - **Design Performance**

DRAS-Dam Replacement Cost

Cost Element	Existing Dam Replacement – Downstream (\$Millions)
Site work, Dewatering, access Roads	11
Foundation Excavation (3 million yards)	43
Embankment (7 Million yards)	194
Spillway and Outlet Works	30
Base Construction Cost (BCS)	278
Contingencies, Unscheduled items, Eng., Legal, Admin.	111
Total Construction Cost	\$389
Federal Share – 85% = \$331	Local Share – 15% =\$58

Dam Safety Program – Local Share

Repayment Contractor	Total Contracted Volume (AF)	% share*	Cost Share (\$Millions)
Tualatin Valley Irrigation District (27,020 af- stored)	37,000*	54.5	31.61
CleanWater Services (12,618 af storage)	16,900*	24.9	14.43
City of Hillsboro	5000	7.4	4.27
City of Forest Grove	4500	6.6	3.84
City of Beaverton	4000	5.9	3.42
Lake Oswego Corp.	500	0.74	0.43
(* includes Natural Flow volume)			
Totals	67,900		\$58

Dam Raise Cost Comparison

Cost Element	Existing Dam Raise – Earthfill (\$Millions)	Downstream Dam Raise – Earthfill (\$Millions)	Downstream Dam Raise- Composite (\$Millions)
Site Work, dewatering, access roads	12	12	11
Foundation Excavation	42	59	67
Embankment	234	295	232
Roller Compacted Concrete - RCC	--	--	273
Spillway and Outlet works - Tunnels	47	31	11
<i>Base Construction Cost</i>	335	397	594
Contingencies, Unscheduled items, Eng, Legal, Admin	251	245	274
<i>Total Construction Cost</i>	586	642	868

Dam Construction Options

Dam Raise Options	Cost (\$ M) (2009 dollars)
Replacement Dam (No Raise)* *Federal Share – 85% = \$331M Local Share – 15% = \$58 M	\$389
Existing Dam Raise	\$586
Downstream Embankment Dam Raise	\$642
Downstream Composite Dam Raise	\$868

Updated Program Costs

Program Elements	DRAS Alternatives (2009 dollars)		
	Existing Dam Raise – Earthfill (\$Millions)	Downstream Dam Raise – Earthfill (\$Millions)	Downstream Dam Raise-Composite (\$Millions)
Dam Raise and Related projects (roads, Rec.)	650	706	932
Less Safety of Dam – Federal Cost share	-331	-331	-331
Less Local Cost share	-58	-58	-58
Raw Water Pipeline	123	123	123
Intake/Pump Station	52	52	52
JWC WTP	195	195	195
Title Transfer/EIS	13	13	13
<i>Total Local Program Cost</i>	654	700	926

Water Supply Program Local Share Only

Partners	Future Allocation Volume (AF)	% share (Expansion Only)	Estimated Cost Share (\$Millions)
Tualatin Valley Water District	23,000	43.4	342
CleanWater Services	16,500	31.1	156
City of Hillsboro	11,500	21.7	171
City of Beaverton	2,000	3.8	24
City of Forest Grove (WTP and RWP)	----	----	6.9
Totals (*based on Downstream raised Dam and does not include Dam safety local share)	53,000	100	\$700

Program Issues

- **Program will be focusing on these main issues:**
 - **Program Costs Analysis**
 - Federal Funding - Safety of Dams Program
 - How much and when?
 - **Financial Plan - Partners**
 - **Finance Capacity**
 - **Rates and SDC Revenue**
 - **Operational Costs**
 - **Project Schedule Review of 2016 Deadline**
 - **Scenario Planning**
 - **Review of Issues and Options for Regional Solutions**
 - **Public/Stakeholder Review Process**

Federal Funding Elements

- **Assess how much Safety of Dams funding is needed and by when to support decision-making**
- **Program costs amplify importance of Federal participation**
- **Strategic plan for federal funding considering both Reclamation and Congressional Delegation**
- **Collaborate with Reclamation on the Safety of Dams review to improve the priority and schedule**
- **Assess risk of moving ahead without full information on federal funding and local financing**

Financial Plan – Local

- **Financial Plan**
 - **Finance Team development**
 - **Review of update costs**
 - **Assess Program phasing and schedule adjustments**
 - **Impacts on Partners financial forecasts**
 - **Operational costs analysis**
 - **Cash flow requirements**
 - **Financing Capacity – Bond Market Issues**

Impacts of Extending 2016 Deadline

• Pros

- Allow more time to develop finance plan
- Certainty on Federal funding \$\$\$
- Align with Reclamation review process
- Improves matching new supply with future demand for some partners

■ Cons

- Risk of lack of meeting demands when needed
- Issue of reservoir restrictions
- Impact to project momentum
- Escalation of program costs
- Higher costs for certain partners

Scenario Planning

Re-evaluating Water Supply Alternatives

- 1. Review of Issues and Options for regional water supply solutions**
- 2. Partnership Opportunities**
- 3. Optimize Resource opportunities**
- 4. Public/Stakeholder information process**
- 5. Strategic action and public information plans to manage potential of a reservoir restriction as a risk reduction mitigation measure**

Public Communication Strategy

- **Stakeholder Meetings**
 - **Tualatin River Watershed Council - Sept. 2**
 - **CWS Advisory Commission – Sept. 16**
 - **Policy Steering Committee – Sept 15**
 - **Other Public forums –**
 - **August through October 2009**