

Technical Memorandum



To: Lisa Obermeyer, Montgomery Watson Harza

From: Jim Dabkowski, Greg Rollins, PE

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Date: February 19, 2002

Subject: Preliminary Scoggins Dam Alternative Site

BACKGROUND

The existing Scoggins Dam is a zoned embankment structure located approximately 25 miles west of Portland, Oregon on the east slope of the coastal range. The dam consists of approximately 4,000,000 cubic yards of material, storing approximately 53,600 acre-feet of water at a normal water elevation of 305 feet above mean sea level. It has been determined that the existing capacity will be deficient of future needs and therefore additional storage will be required. (Montgomery Watson, 1999)

URS was asked to perform a preliminary economic comparison of raising the existing dam with construction of a new dam at a downstream site. We assured that the new dam would be similar in form to the existing Scoggins Dam. We considered four scenarios:

SCENARIOS

Scenario 1 – No Action (El. 313')

The existing Scoggins Dam is about 2,700 feet long and rises to a height of 313 feet with a normal water elevation of 305 feet.

Scenario 2 – Raise Existing Dam (El. 333')

Raise the existing 2,700 foot long Scoggins Dam to a height of 333 feet with a normal water elevation of 325 feet.

Scenario 3 – Construct New Dam (El. 313')

Construct a new dam approximately 2200 feet downstream of Scoggins Dam. The new dam would be about 2,300 feet long and extend to a height of 313 feet with a normal water elevation of 305 feet. This is the same height and normal water surface elevation as Scoggins Dam. Figure 1 shows an approximate cross-section of the new dam. Constructing a new dam to these parameters would require an additional 166 acres of land as shown in Figure 2.

Scenario 4 – Construct New Dam (El. 333')

Construct a new dam about 2,600 feet long and to a height of 333 feet with a normal water elevation of 325 feet, approximately 2200 feet downstream of Scoggins Dam. Figure 1 shows an approximate cross-section of the new dam. Constructing a new dam to these parameters would require an additional 182 acres of land as shown in Figure 3.

Montgomery Watson completed a preliminary feasibility study in January of 1999 for the Water Managers Group. Cost comparison of the four scenarios was based on information contained in the feasibility study. Conceptual cross-sections of the new scenarios and drawings showing additional dam and inundation areas are attached to this memorandum. The plane and cross-sections that were used for comparison were based on those presented in the Montgomery Watson report, available USGS topographic maps and 10-meter digital elevation models.

COST COMPARISON

A preliminary cost comparison is presented in the table below. Costs used are based on the cost estimates provided in the Montgomery Watson Feasibility Study. The additional storage for Scenarios 3 and 4 are illustrated in Figure 4. Supporting cost and volume information is provided in the tables attached to this report. These costs are intended for this preliminary economic comparison and should not be used for budgeting purposes.

Cost Comparison Table

Scenario	Cost	Total Storage (acre-ft)	Additional Storage (acre-ft)	Cost per Additional Storage (\$/acre-ft)
1	\$0	53,600	0	\$0
2	\$62,001,000	80,200	26,600	\$2,331
3	\$107,473,000	64,807	11,207	\$9,590
4	\$153,191,000	101,654	48,054	\$3,188

COMPARISON ASSUMPTIONS

- no allowance is made for construction monitoring and testing
- a \$1 million dollar allowances for breach of the existing dam is included in Scenarios 3 and 4
- no land acquisition costs are included
- a \$3 million dollar allowance for intake work is included in Scenarios 3 and 4
- a \$3 million dollar allowance for a new bridge and relocation of the southern road is included in Scenarios 3 and 4
- landslide and seepage issues were assumed to be similar at all sites

Dam Volume & Water Storage Table

Scenario	Dam El.	Normal Water El.	Dam Length	Dam Area	Dam Vol.	2D Water	2D Water	3D Bottom	3D Bottom	Area of Dam in Water	Vol. of Dam in Water	Vol. of New Storage	Vol. of New Storage	Vol. of New Storage
	ft	ft	ft	ft2	yd3	S.A. ft2	S.A. acres	S.A. ft2	S.A. acres	ft2	yd3	yd3	MG	Acre-Ft
3	313	305	2,240	42,200	3,501,037	7,118,816	163	7,219,727	166	18,695	1,550,993	18,080,404	3,652	11,207
4	333	325	2,590	53,905	5,170,887	7,816,064	179	7,954,230	183	23,486	2,252,916	34,612,628	6,991	21,454

For comparison purposes, the additional volume of 26,600 Acre-Ft from raising the existing dam from 313' to 333' has not been included in the above volume estimates.

Cost Comparison

Scenario	Cost	Total Storage (Acre-Ft)	Additional Storage (Acre-Ft)	Cost per Additional Storage (\$/Acre-Ft)	Cost per Total Storage (\$/Acre-Ft)
1. Do Nothing	\$ -	53,600	0	\$ -	\$ -
2. Raise Exist. to El. 333	\$ 62,001,000	80,200	26,600	\$ 2,331	\$ 773
3. Build New to El. 313	\$ 107,473,000	64,807	11,207	\$ 9,590	\$ 1,658
4. Build New to El. 333	\$ 153,191,000	101,654	48,054	\$ 3,188	\$ 1,507

Cost Study

Scenario 3 - Downstream Location - El. 313

Item	Units	Est. Quantity	Unit Price	Cost
Dewatering	LS	1	\$ 100,000	\$ 100,000
Clearing & Grubbing	AC	166	\$ 5,000	\$ 828,707
Excavation	CY	1,012,978	\$ 4	\$ 4,051,911
Dam Fill				
Core Zone (select)	CY	530,548	\$ 10	\$ 5,305,481
Main Fill (random)	CY	2,970,489	\$ 10	\$ 29,704,889
Riprap	CY	62,222	\$ 22	\$ 1,368,889
Bedding (riprap)	CY	22,400	\$ 22	\$ 492,800
Chimney & Blanket Drain	CY	290,370	\$ 15	\$ 4,355,556
Instrumentation	LS	1	\$ 50,000	\$ 50,000
Seepage Control (left abutment)	LS	1	\$ 2,000,000	\$ 2,000,000
Landslide Remediation (perimeter road slides)	LS	1	\$ 3,000,000	\$ 3,000,000
Total				\$ 51,258,233

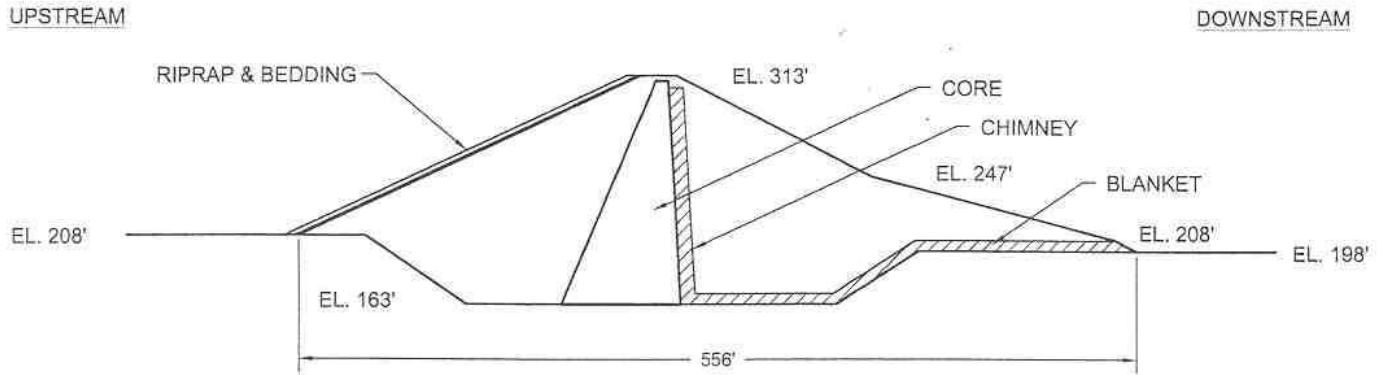
Scenario 4 - Downstream Location - El. 333

Item	Units	Est. Quantity	Unit Price	Cost
Dewatering	LS	1	\$ 100,000	\$ 100,000
Clearing & Grubbing	AC	183	\$ 5,000	\$ 913,016
Excavation	CY	1,171,256	\$ 4	\$ 4,685,022
Dam Fill				
Core Zone (select)	CY	772,204	\$ 10	\$ 7,722,037
Main Fill (random)	CY	4,398,683	\$ 10	\$ 43,986,833
Riprap	CY	86,333	\$ 22	\$ 1,899,333
Bedding (riprap)	CY	28,778	\$ 22	\$ 633,111
Chimney & Blanket Drain	CY	378,907	\$ 15	\$ 5,683,611
Instrumentation	LS	1	\$ 50,000	\$ 50,000
Seepage Control (left abutment)	LS	1	\$ 2,000,000	\$ 2,000,000
Landslide Remediation (perimeter road slides)	LS	1	\$ 3,000,000	\$ 3,000,000
Total				\$ 70,672,965

Construction Cost Estimate

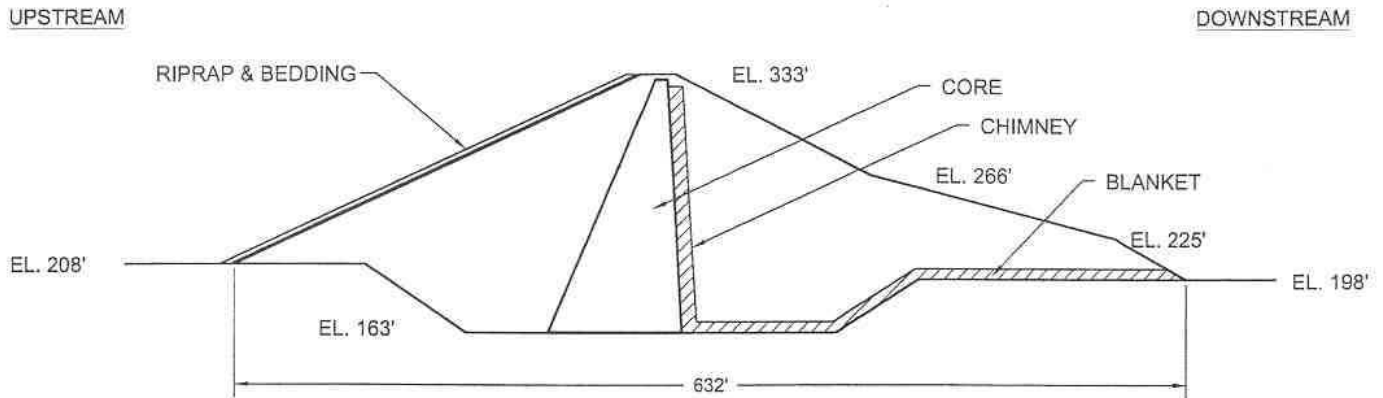
Item	Scenario 1 Cost	Scenario 2 Cost	Scenario 3 Cost	Scenario 4 Cost
Mob & Demob (5% of Construction Costs)	\$ -	\$ 1,358,000	\$ 3,416,000	\$ 4,869,000
Gen. Provisions, Permits, Bonds (5% of Construction Costs)	\$ -	\$ 2,037,000	\$ 3,416,000	\$ 4,869,000
Dam	\$ -	\$ 16,906,000	\$ 48,258,000	\$ 67,673,000
Spillway	\$ -	\$ 10,066,000	\$ 10,066,000	\$ 10,066,000
Outlet Works	\$ -	\$ 190,000	\$ 3,000,000	\$ 3,000,000
Recreation Facilities	\$ -	\$ 7,000,000	\$ -	\$ 7,000,000
Landslide Remediation	\$ -	\$ 3,000,000	\$ 3,000,000	\$ 3,000,000
Lake Road Relocation	\$ -	\$ 2,250,000	\$ -	\$ 2,250,000
Bridge Replacement	\$ -	\$ 400,000	\$ -	\$ 400,000
New Bridge & S. Road Relocation	\$ -	\$ -	\$ 3,000,000	\$ 3,000,000
Breach of Existing Dam	\$ -	\$ -	\$ 1,000,000	\$ 1,000,000
Construction Cost	\$ -	\$ 43,207,000	\$ 75,156,000	\$ 107,127,000
Contingency - 20%	\$ -	\$ 8,641,000	\$ 15,031,000	\$ 21,425,000
Administration - 5%	\$ -	\$ 2,160,000	\$ 3,758,000	\$ 5,356,000
Engineering - 8%	\$ -	\$ 3,457,000	\$ 6,012,000	\$ 8,570,000
Permits - 10%	\$ -	\$ 4,321,000	\$ 7,516,000	\$ 10,713,000
Total Capital Cost	\$ -	\$ 61,786,000	\$ 107,473,000	\$ 153,191,000

CORE AREA = 6,395 SQ. FT.
 OTHER AREA = 35,805 SQ. FT.
 EXCAVATE AREA = 12,210 SQ. FT.



SCENARIO 3 - NEW DAM TO EL. 313' MSL

CORE AREA = 8,050 SQ. FT.
 OTHER AREA = 45,855 SQ. FT.
 EXCAVATE AREA = 12,210 SQ. FT.



SCENARIO 4 - NEW DAM TO EL. 333' MSL

PROPOSED DAM SECTIONS



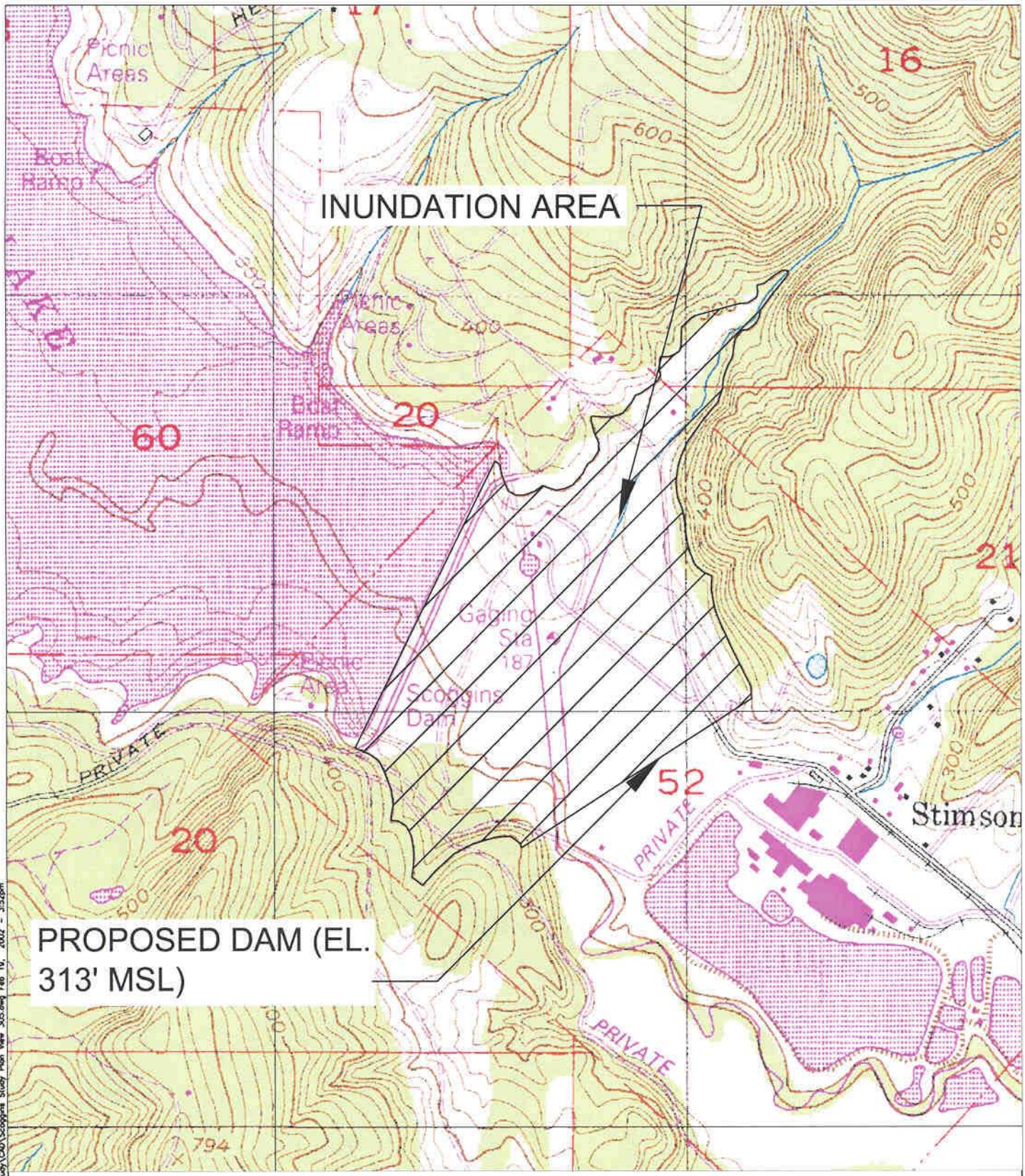
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Montgomery Watson
 Scoggins Dam
 Washington County, Oregon

FIGURE 1

INUNDATION AREA

PROPOSED DAM (EL. 313' MSL)



AREA OF INFLUENCE AT WATER EL. 305'

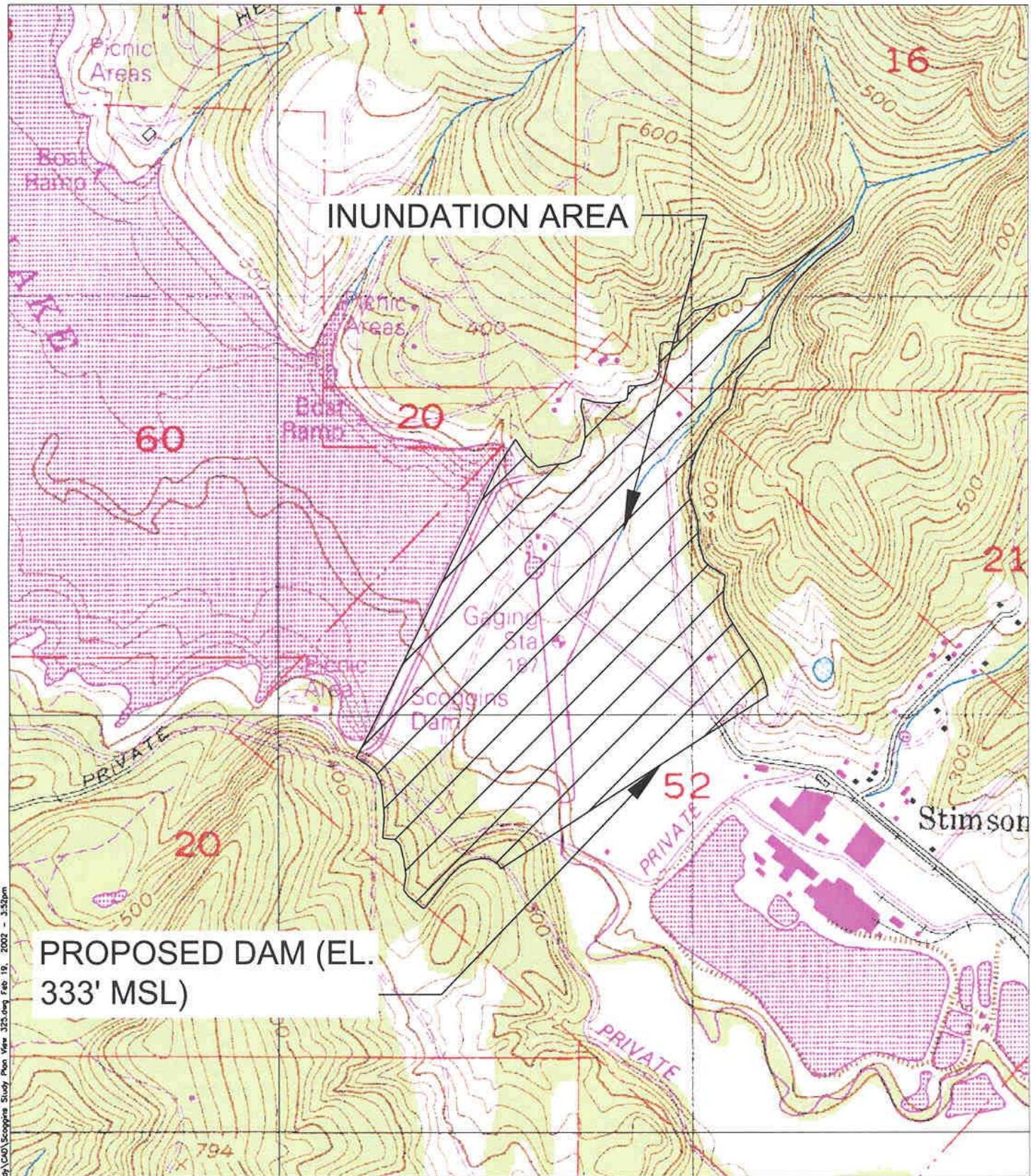


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FIGURE 2

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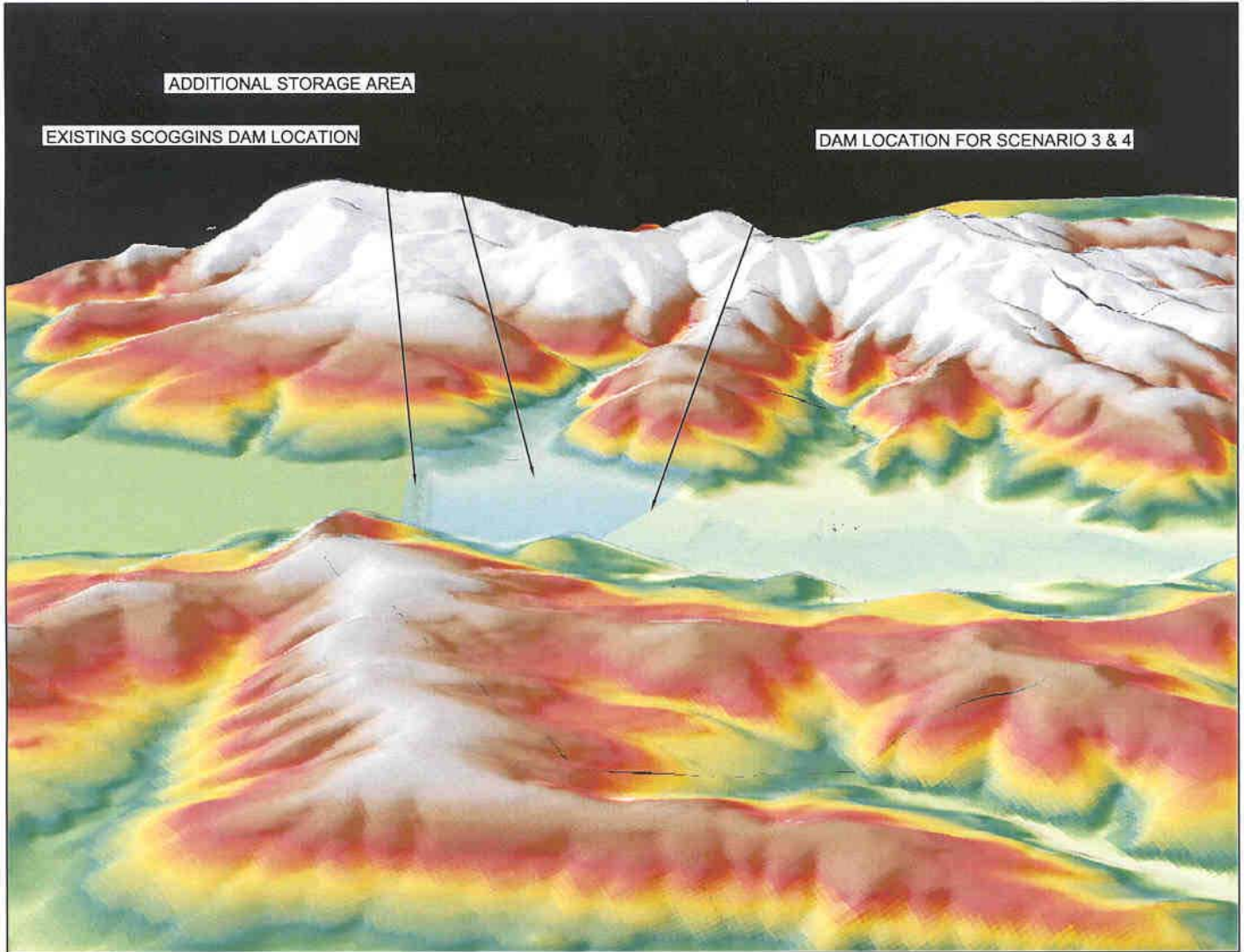
AREA OF INFLUENCE AT WATER EL. 333'

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FIGURE 3





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CONCEPTUAL AREA MODEL

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FIGURE 4