US Army Corps
of Engineers
Portland District

PUBLIC NOTICE
for PERMIT APPLICATION

Issue Date: August 30, 2004
Expiration Date: September 29, 2004
Corps of Engineers Action ID: 200400523

30-Day Notice

Interested parties are hereby notified that an application has been received for a Department of the Army permit for certain work in waters of the United States, as described below and shown on the attached plan.

Comments: Comments on the described work should reference the U.S. Army Corps of Engineers number shown above and should reach this office no later than the above expiration date of this Public Notice to become part of the record and be considered in the decision. Comments should be mailed to the following address:

U.S. Army Corps of Engineers
ATTN: CENWP-OP-GP (Ms. Kathryn L. Harris)
P.O. Box 2946
Portland, Oregon 97208-2946

Applicant: PacifiCorp
825 NE Multnomah, Suite 1500
Portland, Oregon 97232

Location: Condit Dam is located on the White Salmon River and impounds Northwestern Lake in Section 2, Township 3 North, Range 10 East, near White Salmon, Klickitat County, Washington.

Purpose: The project purpose is to restore fish passage and enhance habitat in the White Salmon River, upstream of the Condit Dam.

Project Description: The applicant proposes to remove the Condit Dam and appurtenant features, restoring access to approximately 19 miles of potential river habitat for spawning steelhead and salmon and restoring connectivity to foraging, spawning, rearing, and over-wintering habitat for bull trout in the Lower White Salmon River.

PacifiCorp entered into the Condit Hydroelectric Project Settlement Agreement (Agreement) in September 1999 to resolve issues associated with the relicensing of the Condit Dam by the Federal Energy Regulatory Commission (FERC). The Agreement and the Final Supplemental Final Environmental Impact Study (FSFEIS) completed by FERC in June 2002, concluded that removal of the dam and appurtenant features was the preferred method for restoring fish passage upstream of the structure. As described in the Agreement and FSFEIS, the project would involve removal of the dam structure, cofferdam, wood stave pipeline, wood and steel penstocks, and

concrete surge tank. PacifiCorp proposes to reconfigure the existing Condit to Bald Mountain 69 kV power line and the Condit to Bingen 69 kV power line into one direct line from Bald Mountain to Bingen, Washington. The power line that supplies power from the substation to the dam would be removed. The upper portion of the powerhouse tailrace retaining wall would be removed and the tailrace filled with approximately 2000 cubic yards (cy) of rock. The powerhouse itself would not be removed.

The proposed method of dam breaching would involve excavating a 12-foot by 18-foot tunnel into the downstream dam face. Tunneling would stop within approximately 15 feet from the upstream face of the dam. The remaining 15 feet of concrete would be removed using explosives. Prior to dam breaching, woody debris and sediment in front (upstream) of the tunnel would be removed using a barge-mounted clamshell crane. Woody debris would be stored at the boat ramp area for future placement in the river channel. Sediment would be deposited in the reservoir immediately upstream of the removal area. Dam breaching is expected to result in the discharge of 1.6 to 2.2 million cubic yards (mcy) of sediment and woody debris and 240 cubic yards of concrete rubble. The sediment consists of clay (7.4%), suspendable sediment (diameter size 0.004-0.25 mm, 68.6%), bedload sand (0.25 – 4 mm, 21.7%), and gravel (2.3%). Based on these size ranges and 2.2 mcy of material discharged into the river, approximately 673,500 cy of mostly sand sized sediment would settle out in the In-lieu site (at the mouth of the White Salmon River), 1.24 mcy of silt sized sediment would settle within the Bonneville Pool on the Columbia River, and 286,000 cy of the clay size sediments would remain in suspension to the mouth of the Columbia River. The applicant has identified no immediate plans for the removal of any sediment. The majority of sediments would be discharged within the first week after dam breaching. Sediments are expected to erode during the first year as the new river channel is formed. Additional sediments are expected to erode within the first 5 years after dam removal resulting from runoff of rain and snowmelt over newly exposed sediments. As these areas are revegetated, erosion is expected to decrease.

Sediment testing and analysis will be required to evaluate sediment quality for unconfined aquatic disposal in the Lower Columbia River as defined in the Dredged Material Evaluation Framework, Lower Columbia River Management Area (November 1998).

Approximately 29,000 cy of concrete and 2,500 cy of steel reinforced concrete will be removed from the dam site after the breaching event. After dam breaching, access roads will be constructed below the current lake level to gain access to the dam structure and other structures to be removed. The exact route will be determined after dam breaching to take advantage of the original construction access roads. The estimated volume of fill to be discharged into waters of the United States for the construction of access roads below the current lake level is unknown at this time.

The existing Northwestern Lake Bridge at the upstream end of the reservoir was designed and constructed in 1958 with the assumption of slackwater conditions. Riverine conditions are expected to return after dam breach and removal. Faster moving currents are expected to erode approximately 13 feet of sediment, exposing the piers to different forces and removing sub-grade lateral support to the piers. To provide adequate support to the piers and bridge, PacifiCorp proposes to create two cofferdams by driving steel sheet pile to refusal at bedrock depth around the two central piers in a semi-circular pattern. Concrete wing walls and crib structures would be

constructed to tie the existing bridge abutments to the new sheet pile cofferdams. Reinforced concrete grade ties will be installed to connect the existing concrete pile caps to the new concrete wing walls. The cofferdams will be backfilled with approximately 250 cubic yards of granular structural fill to finish grade elevations. Riprap will be placed along the river revetment slopes on both sides of the bridge near the abutment approaches to protect the bridge structures from high velocity flows. Existing drainage culverts will be redirected to prevent scour at the base of the bridge supports.

Northwestern Lake covers 92 acres, 34.6 acres of which are classified as vegetated shallows. Dam breaching will restore 11,000 feet of the White Salmon River and approximately 4,800 feet of tributary streams. The expected average width of the new river channel is 128 feet based on pre-dam topographic surveys of the project area. Of the 92 acres, 30 acres will be the new free flowing river, 25-30 acres are expected to be capable of revegetation, and 35-40 acres are expected to be rocky substrate, mostly located within 2,000 feet upstream of the dam site. A total of 5.7 acres of wetlands were identified adjacent to Northwestern Lake, 3.8 of which have been determined to be lake fringe wetlands artificially created and maintained by the operation of Condit Dam, while 1.9 acres are riverine and slope wetlands independent of the lake. The lake fringe wetlands are expected to be permanently impacted due to the removal of the main source of hydrology. The existing riverine and slope wetlands are not expected to be impacted by dam removal. Additional acreage of riverine and slope wetlands are expected to develop along the restored tributary channels. Downstream of the Condit Dam, 0.5 acre of riverine wetlands and 0.5 acre of lake fringe wetlands were identified adjacent to the White Salmon River. The 1.0 acre of wetlands downstream of the dam may be temporarily impacted through scouring flows and sedimentation from the dam breach.

Drawing(s): Figures 1-41, labeled Corps No. 200400523

Additional Information: Additional information may be obtained from Ms. Kathryn L. Harris, Project Manager, U.S. Army Corps of Engineers at (503) 808-4387.

Authority: This permit will be issued or denied under the following:

Section 10, Rivers and Harbors Act 1899 (33 U.S.C. 403), for work in or affecting navigable waters of the United States.

Section 404 of the Clean Water Act (33 U.S.C. 1344), for the discharge of dredged or fill material into waters of the United States.

Water Quality Certification: A permit for the described work will not be issued until certification, as required under Section 401 of the Clean Water Act (P.L. 95-217), has been received or is waived from the certifying state. Section 401 of the Federal Clean Water Act requires applicants for Federal permits or licenses to provide the Federal agency a water quality certification from the State of Washington if the proposed activity may result in a discharge to surface waters. The Washington Department of Ecology is currently reviewing the proposed project for water quality certification.

Section 404(b)(1) Evaluation: The impact of the activity on the public interest will be evaluated in accordance with the Environmental Protection Agency guidelines pursuant to Section 404(b)(1) of the Clean Water Act.

Public Hearing: Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing.

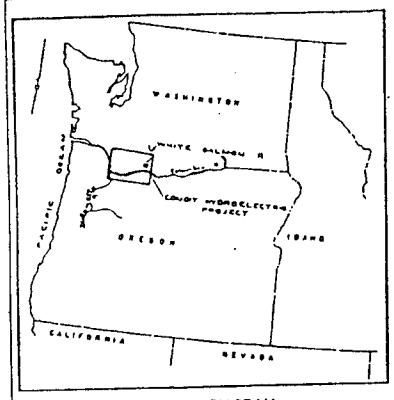
Endangered Species: FERC initiated consultation under Section 7 of the Endangered Species Act of 1973 (87 Stat. 844) with the U.S. Fish and Wildlife Service (FWS) for effects to bull trout and with the National Marine Fisheries Service (NOAA Fisheries) for effects to Middle and Upper Columbia River steelhead; Upper Columbia River spring Chinook salmon; Lower Columbia River chinook, coho, and chum salmon; Snake River steelhead; and Snake River sockeye and spring and fall Chinook salmon. The FWS issued a biological opinion with reasonable and prudent measures (RPMs) and terms and conditions (TCs) necessary and appropriate to minimize the impact of incidental take to bull trout. These RPMs and TCs would be made conditions of the Department of the Army permit authorization. The NOAA Fisheries biological opinion for effects to listed fish species has been drafted and is awaiting final review.

Cultural Resources: Review of this project under Section 106 of the National Historic Preservation Act was completed by FERC as part of the EIS. Results of the review can be found in the FSEIS.

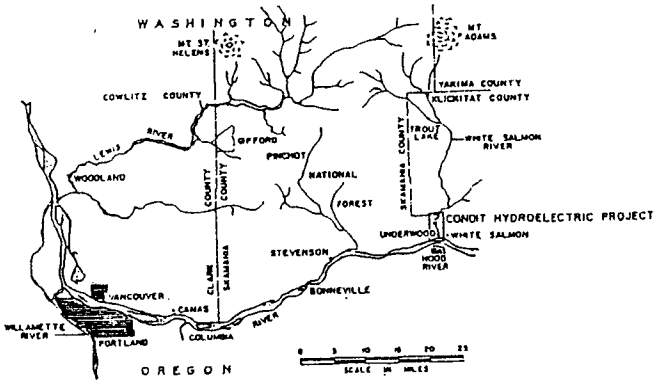
Evaluation: The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the described activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit, which reasonably may be expected to accrue from the described activity, must be balanced against its reasonably foreseeable detriments. All factors, which may be relevant to the described activity will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people.

The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

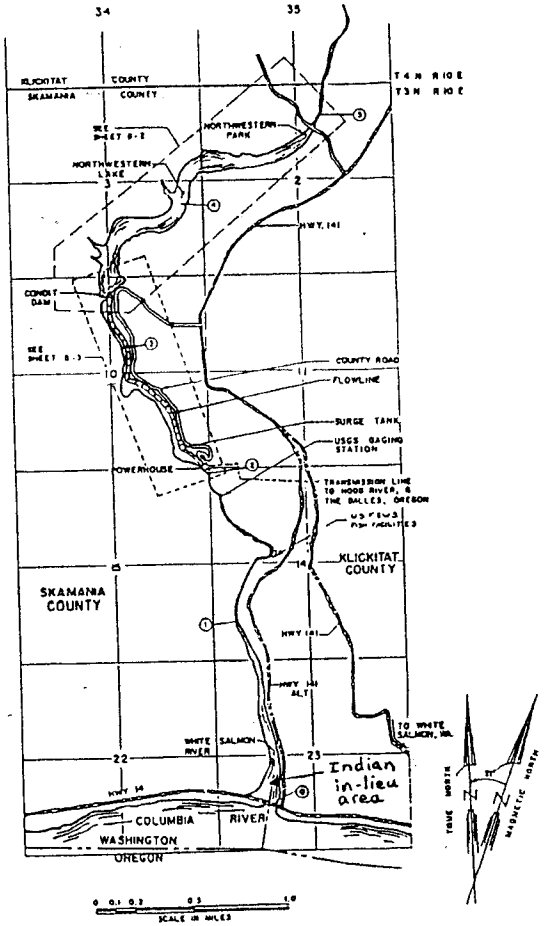
Additional Requirements: State law requires that leases, easements, or permits be obtained for certain works or activity in the described waters. These State requirements must be met, where applicable, and a Department of the Army permit must be obtained before any work within the applicable Statutory Authority, previously indicated, may be accomplished. Other local governmental agencies may also have ordinances or requirements, which must be satisfied before the work is accomplished.



LOCATION DIAGRAM



VICINITY MAP



LOCATION MAP

INDICATES RIVER MILE; DISTANCE FROM COLUMBIA RIVER CONFLUENCE.

FIGURE 1

APPLICATION FOR LICENSE
CONDIT HYDROELECTRIC PROJECT - No. 2342
PACIFICORP ELECTRIC OPERATIONS
PORTLAND, OREGON
DECEMBER, 1981
PROJECT LOCATION

Corps No. 200400523
Figure 1

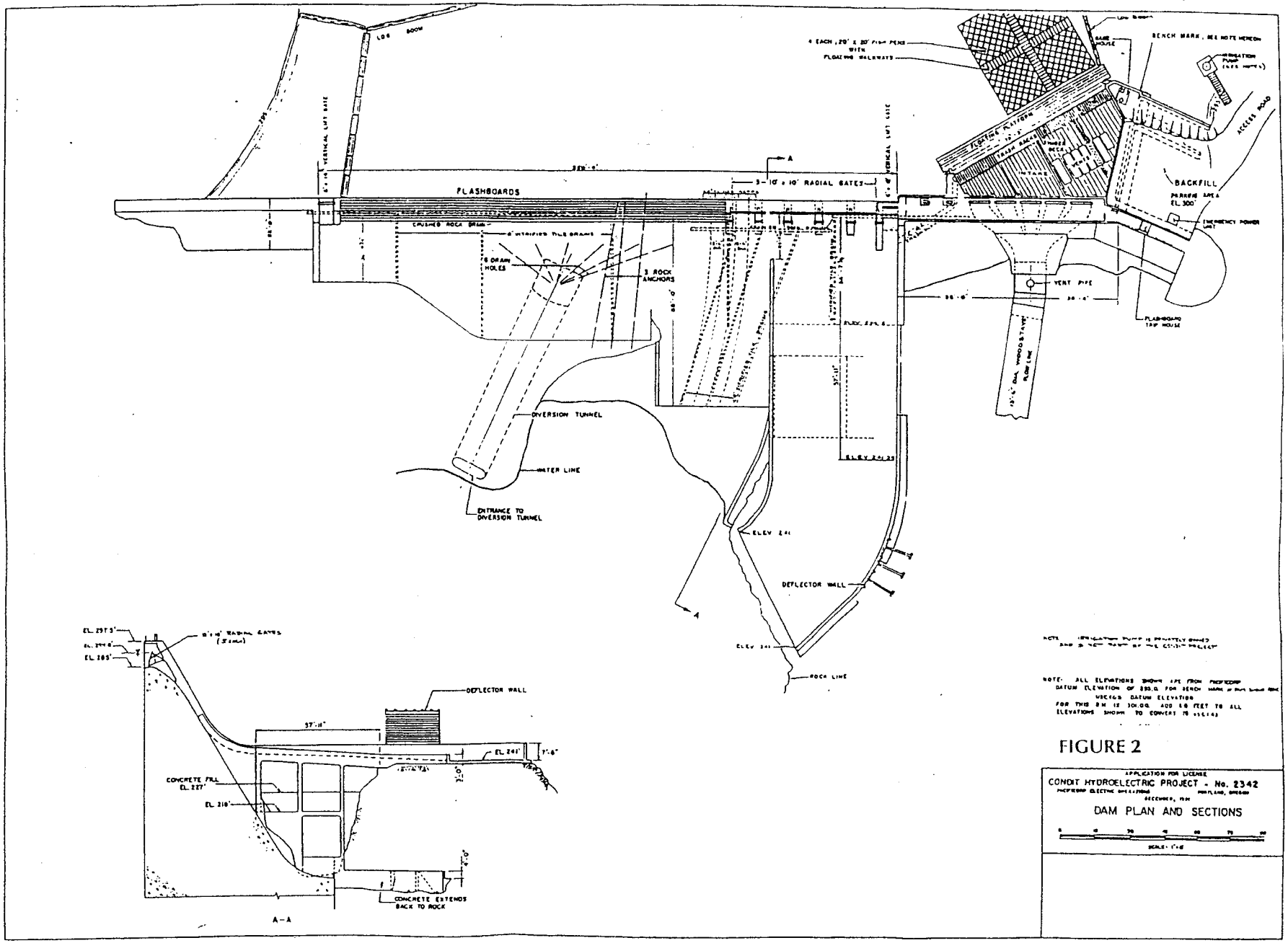
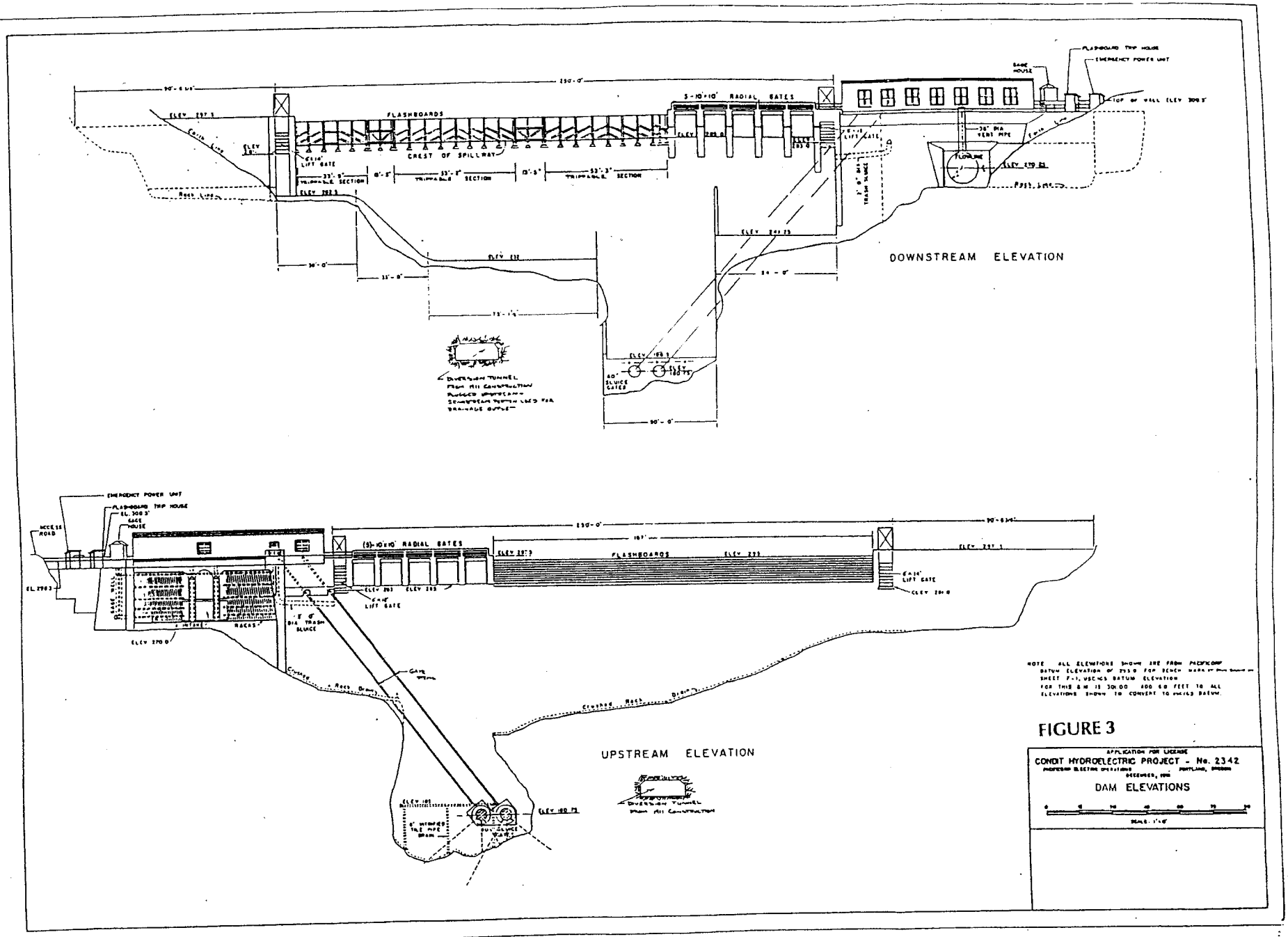


FIGURE 2

APPLICATION FOR LICENSE
CONDIT HYDROELECTRIC PROJECT - No. 2342
DECEMBER, 1961
DAM PLAN AND SECTIONS

Corps No. 20040523
Figure 2

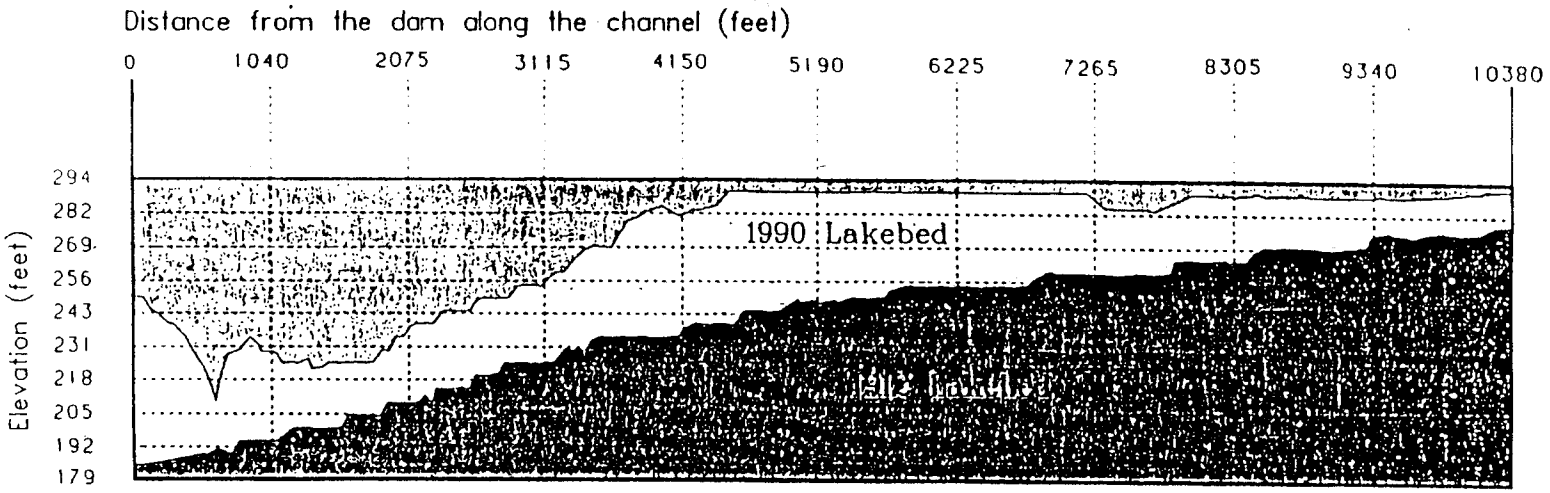


Corps No. 20040523
Figure 3

Condit Hydroelectric Project

Pacific Power & Light Company

Portland, Oregon



Approximate channel profiles for Northwestern Lake in 1912 and 1990

Version 1.02 October 11, 1990 Copyright 1990, VESTRA Resources, Inc, Redding CA

Prepared by VESTRA RESOURCES Redding, California

FIGURE 4
APPROXIMATE CHANNEL PROFILE
NORTHWESTERN LAKE IN 1912 & 1990
Corps No. 20040523
Figure 4

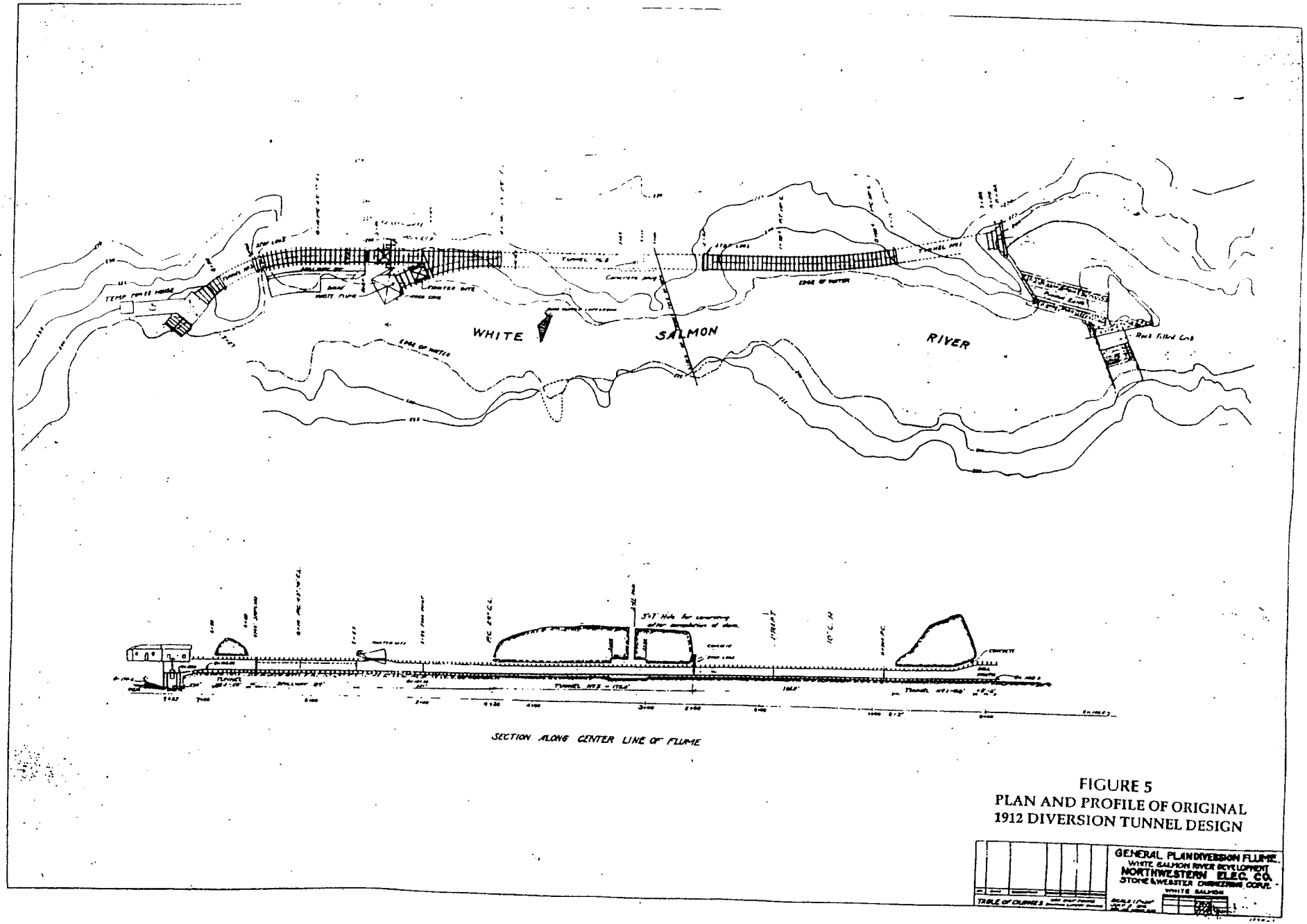
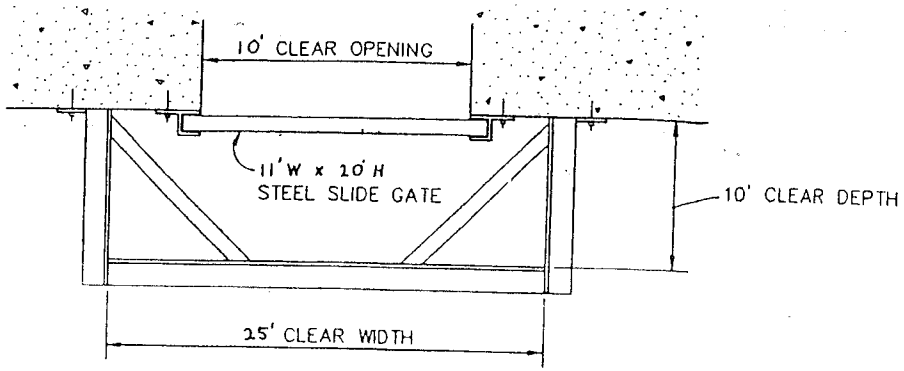
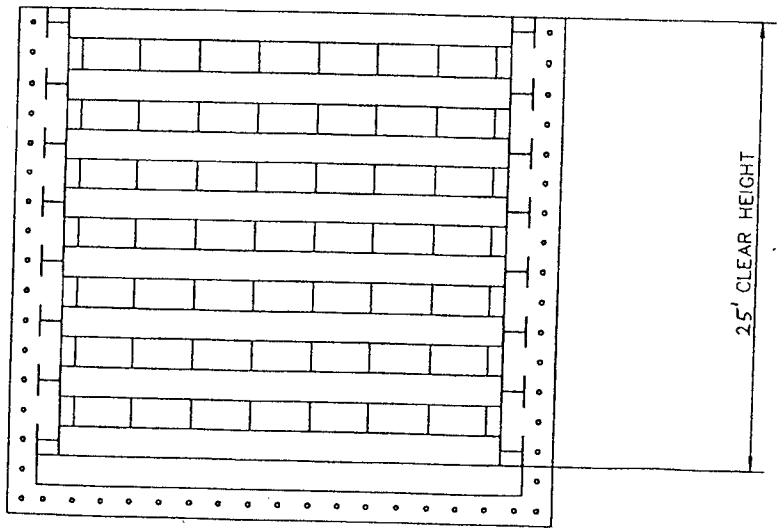


FIGURE 5
PLAN AND PROFILE OF ORIGINAL
1912 DIVERSION TUNNEL DESIGN

Corps No. 200400523
Figure 5



PLAN



ELEVATION

BULKHEAD

NOTES:

1. BULKHEAD COMPRISED OF INNER STEEL SKIN PLATES WITH STRUCTURAL BEAMS FOR RIGIDITY AND SUPPORT.
2. BULKHEAD SECURED TO UPSTREAM FACE OF DAM USING EXPANSION BOLTS OR OTHER SUITABLE UNDER WATER BOLTED CONSTRUCTION.
3. BULKHEAD PROVIDED WITH CONCRETE BALLAST OR SEALED COMPARTMENTS THAT CAN BE FILLED/DRAINED OF WATER TO PROVIDE NEUTRAL BUOYANCY AS REQUIRED FOR EASE OF HANDLING.

GRAPHIC SCALE:

5 0 5 10 15 20

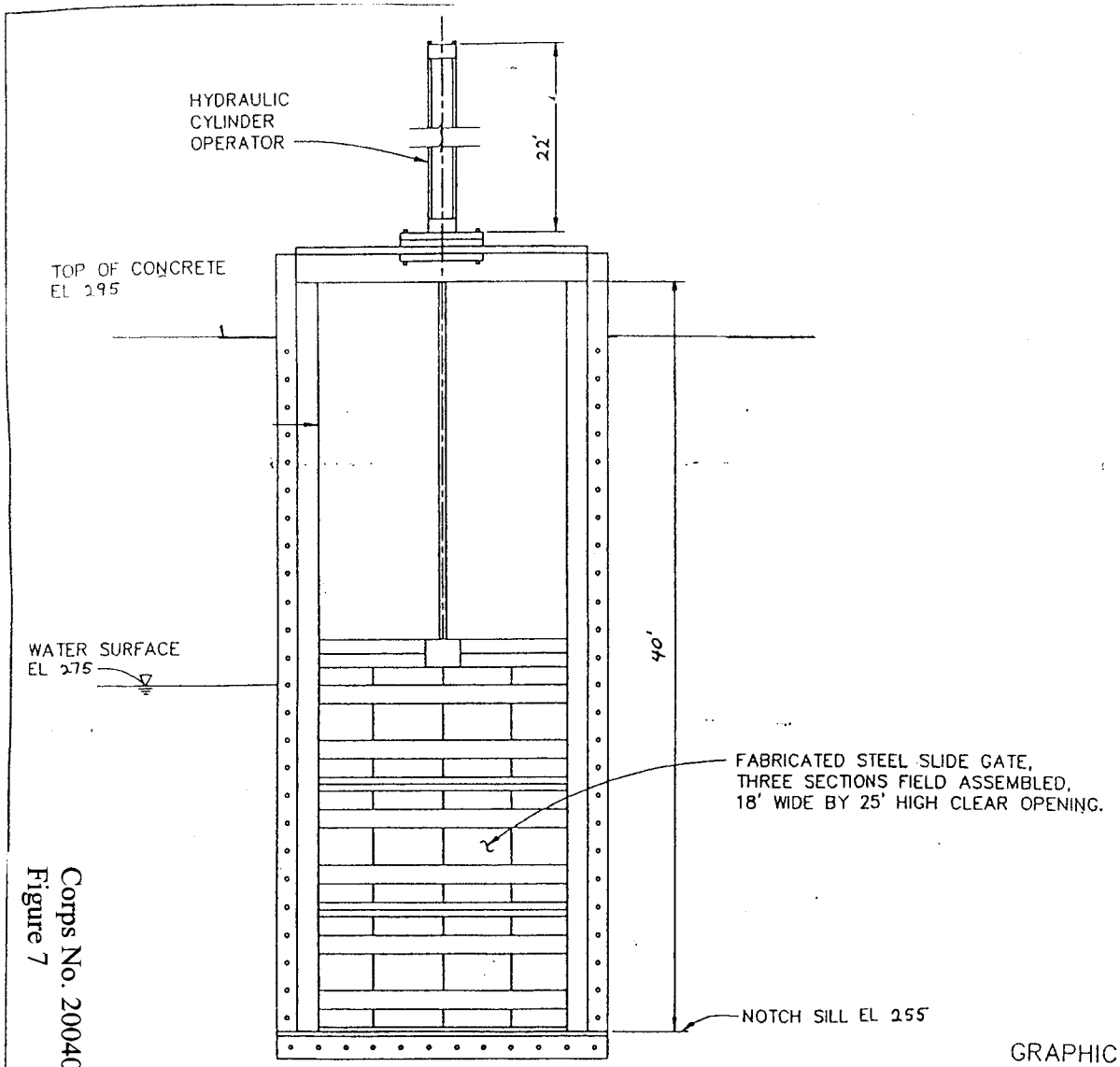
1/8" = 1'-0"

FIGURE 6

TEMPORARY BULKHEAD FOR SLIDE GATE INSTALLATION

R.W. BECK

Corps No. 20040523
Figure 6



ELEVATION

SLIDE GATE

GRAPHIC SCALE:

5 0 5 10 15 20

1/8" = 1'-0"

NOTES:

1. SLIDE GATE DESIGNED TO REGULATE RELEASES TO CONTROL DRAWDOWN RATE.
2. SLIDE GATE FRAME COMPRISED OF STEEL CHANNEL SECTIONS SECURED TO UPSTREAM FACE OF DAM USING EXPANSION BOLTS OR OTHER SUITABLE BOLTED CONSTRUCTION
3. LAYOUT SHOWN IS FOR THE INITIAL NOTCH BYPASS.

FIGURE 7

SLIDE GATE FOR DIVERSION CONTROL THROUGH NOTCH

R.W. BECK AND ASSOCIATES

Corps No. 20040523
Figure 7

Condit Project Description
Access Roads, Work Areas and Staging Areas
Tabulation & Locations

This section describes the access roads staging areas and work areas that are proposed to facilitate the work described in the Settlement Agreement. The locations are described and shown on aerial photos to a level of detail sufficient for permitting purposes. Final vertical and horizontal layout will be made to minimize impacts to immediate and adjacent uses as well as to fulfill the requirements that may be imposed as part of final permitting. The final proposed layouts will then be reviewed for suitability based on the following minimum key parameters:

1) Property ownership and/or agreements,
2) Wetland designations,
3) Cultural resources, and
4) Final permitting.

The following table summarizes the work areas, access roads and staging areas and their associated descriptions and purposes.

Photo #	Designation	Name	Use
1	WA-1	Work Area at Dam Site	Dam removal and dam access
2	AR-1	Powerhouse Road to dam	Access to downstream side of dam to facilitate drain tunnel construction and to support dam removal.
3	AR-2	Powerhouse Road to dam	Access to upstream side of dam.
4	SA-1	Staging Area adjacent to Powerhouse Road at dam	Staging area for work at dam site. PacifiCorp Property
5	SA-2	Staging Area at Powerhouse Road Bend	Staging area for work at dam site.
6	AR-3	Access Road to dam and SA-3	Access road to dam and SA-3
7	AR-4	Powerhouse Road to SA-3	Access to SA-3 via Tamarack Lane
8	SA-3	Staging Area 3	Staging area and stockpile materials
9	AR-5	Powerhouse Road to dam (Lower)	Access road to downstream side of dam and flowline.
10	WA-2	Work Area for Flowline Removal	Remove flowline, approx. 1 mile
11	AR-6	Powerhouse Road to Flowline (Upper)	Access to upper portion of flowline
12	AR-7	Powerhouse Road to Flowline (Lower)	Access to lower portion of flowline
13	SA-4	Staging Area for Flowline (Upper)	Staging area for removal of flowline
14	WA-3	Penstock Removal	Remove two 9 foot diameter penstocks, each approx 650 feet long
15	AR-8	Access Road for Penstock Removal (Upper)	Access to upper portion of penstocks
16	AR-9	Access Road for Penstock Removal (Lower)	Access to lower portion of penstocks at the powerhouse
17	WA-4	Work Area for Surge Tank Removal	Remove surge tank
18	WA-5	Work Area for Tail Race Backfill	Fill in tail race
19	AR-10	Access Road for Tail Race	Access road for tail race backfill

Corps No. 200400523
Figure 8

Photo #	Designation	Name	Use
		Backfill	
20	AR-11	Access Road for Tail Race Grading	Access road for tail race grading around powerhouse
21	WA-6	Work Area for Substation Removal	Remove substation and reconnect to BPA lines
22	AR-12	Access Road for Substation Removal	Access road for substation removal
23	WA-7	Work Area for Powerline Removal	Removal of approx 1 mile of powerline from the powerhouse to the dam
24	AR-13	Access Road from Powerhouse to SA-5	Access road from powerhouse to staging area 5
25	SA-5	Staging Area at Becker Site	Staging area for flowline materials and dam removal equipment.
26	AR-14	Graves Road to Lake	Access road to lake for management of unstable slopes and large woody debris
27	AR-15	Cabin Road to Lower Lake	Access road to lower lake for management of unstable slopes and large woody debris
28	AR-16	Cabin Road to Mid Lake	Access road to mid lake for management of unstable slopes and large woody debris
The following additional areas will also be utilized but are not shown on Aerial Photos.			
NA	AR-17	Highway 141-A and Powerhouse Road	Primary access to Condit Hydroelectric Project area
NA	AR-18	Highway 141-A to Big White Fish Ponds	Access to Big White Fish Ponds
NA	WA-8	Big White Fish Ponds	Cleaning ponds of any sediment and woody debris
NA	AR-19	Northwestern Lake Road to Northwestern Lake Park	Access to Northwestern Lake Park
NA	WA-9	Northwestern Lake Bridge	Enable modifications to the bridge.
NA	WA-10	Northwestern Lake (Entire Lake Below High Water Mark)	Sediment stabilization, woody debris management, boat dock removal & coffer dam removal.
NA	WA-11	Northwestern Lake Water Line Located 1 mile above Dam.	Work area for the reestablishment of the water below sediment level.

Corps No. 200400523
Figure 9

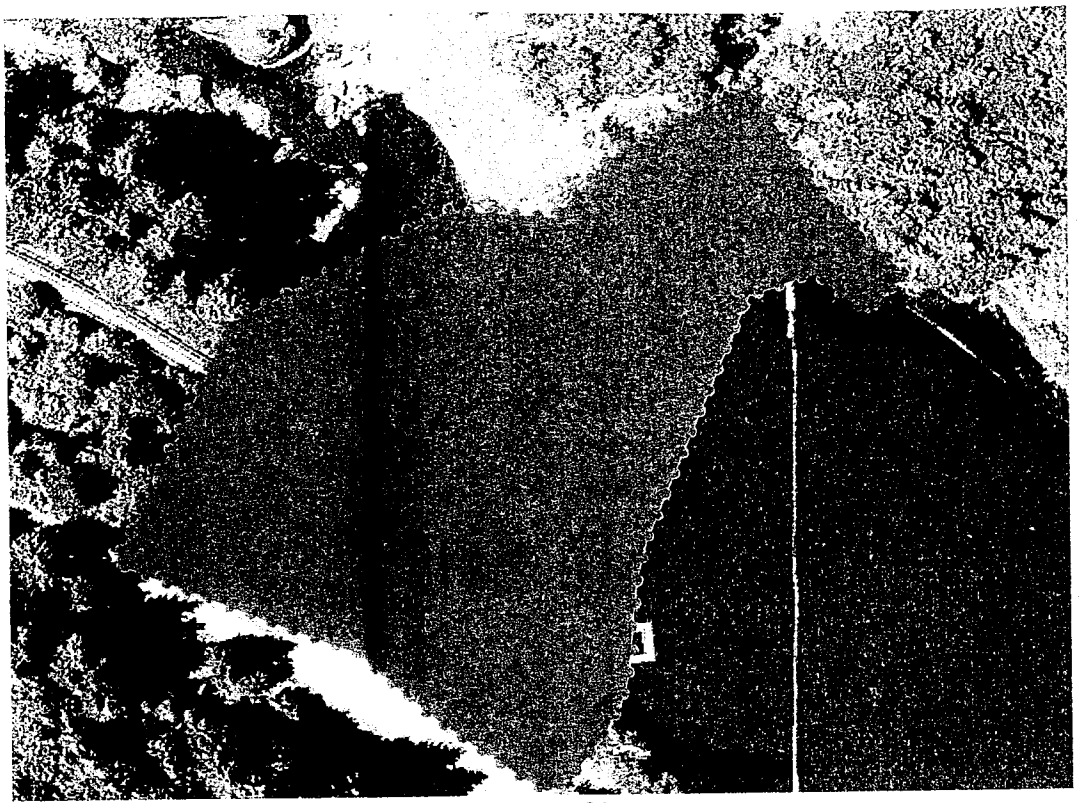


Photo 1: WA-1 – Work Area at Dam Site



Photo 2: AR-1 - Powerhouse Road to Dam (downstream)

Corps No. 200400523
Figure 10

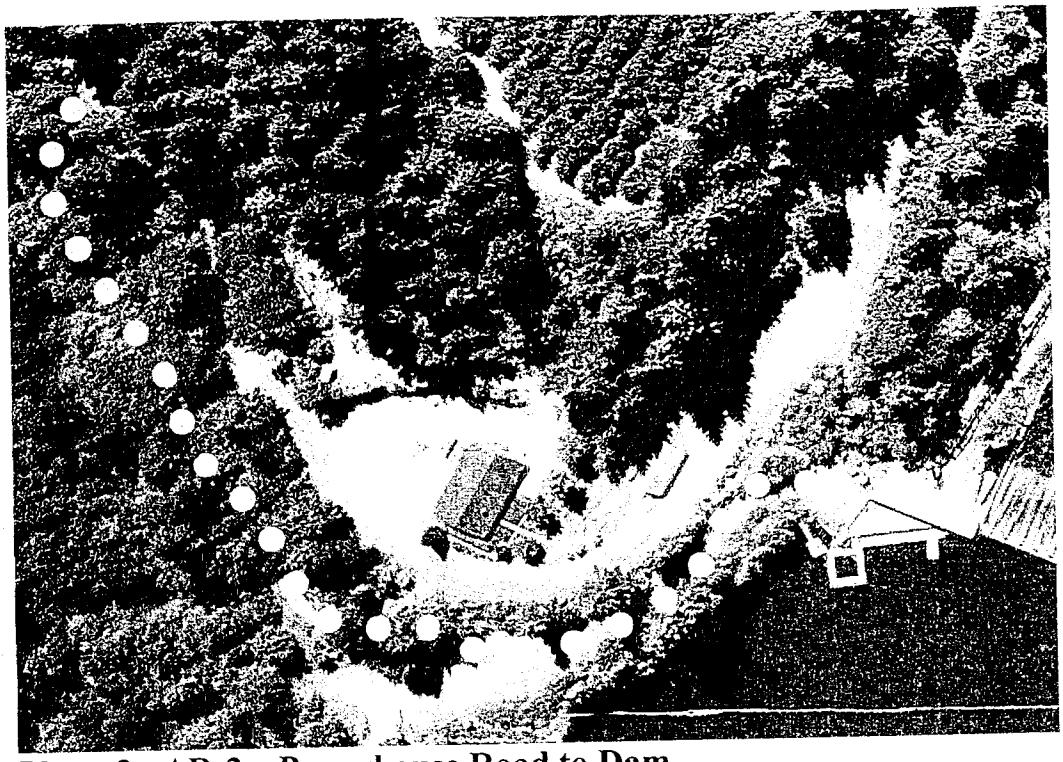


Photo 3: AR-2 – Powerhouse Road to Dam



Photo 4: SA-1 – Staging Area adjacent to Powerhouse Road at Dam

Corps No. 200400523
Figure 11

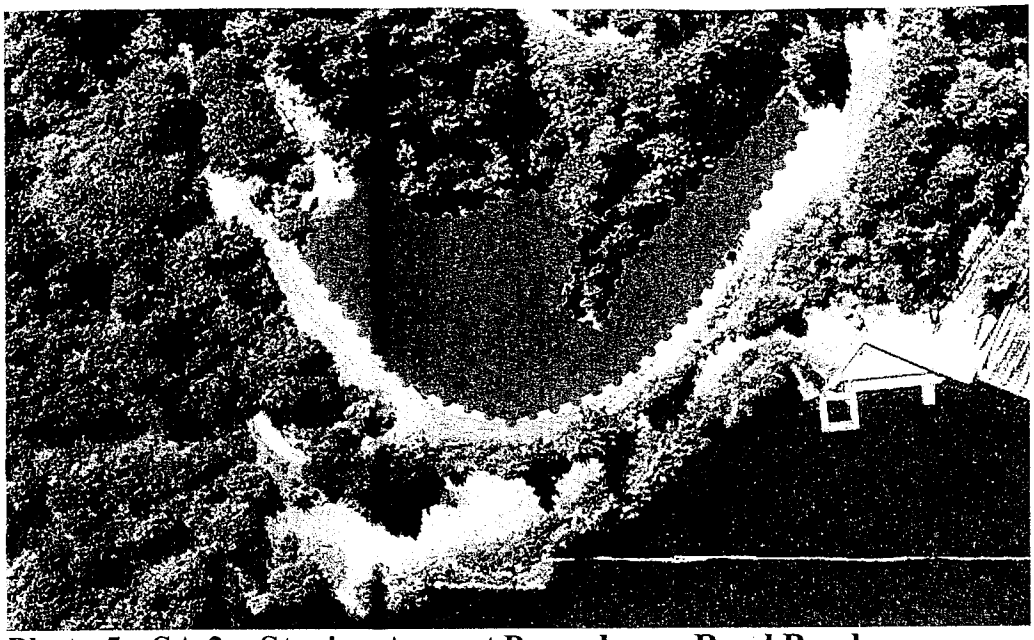


Photo 5: SA-2 – Staging Area at Powerhouse Road Bend

Corps No. 200400523
Figure 12

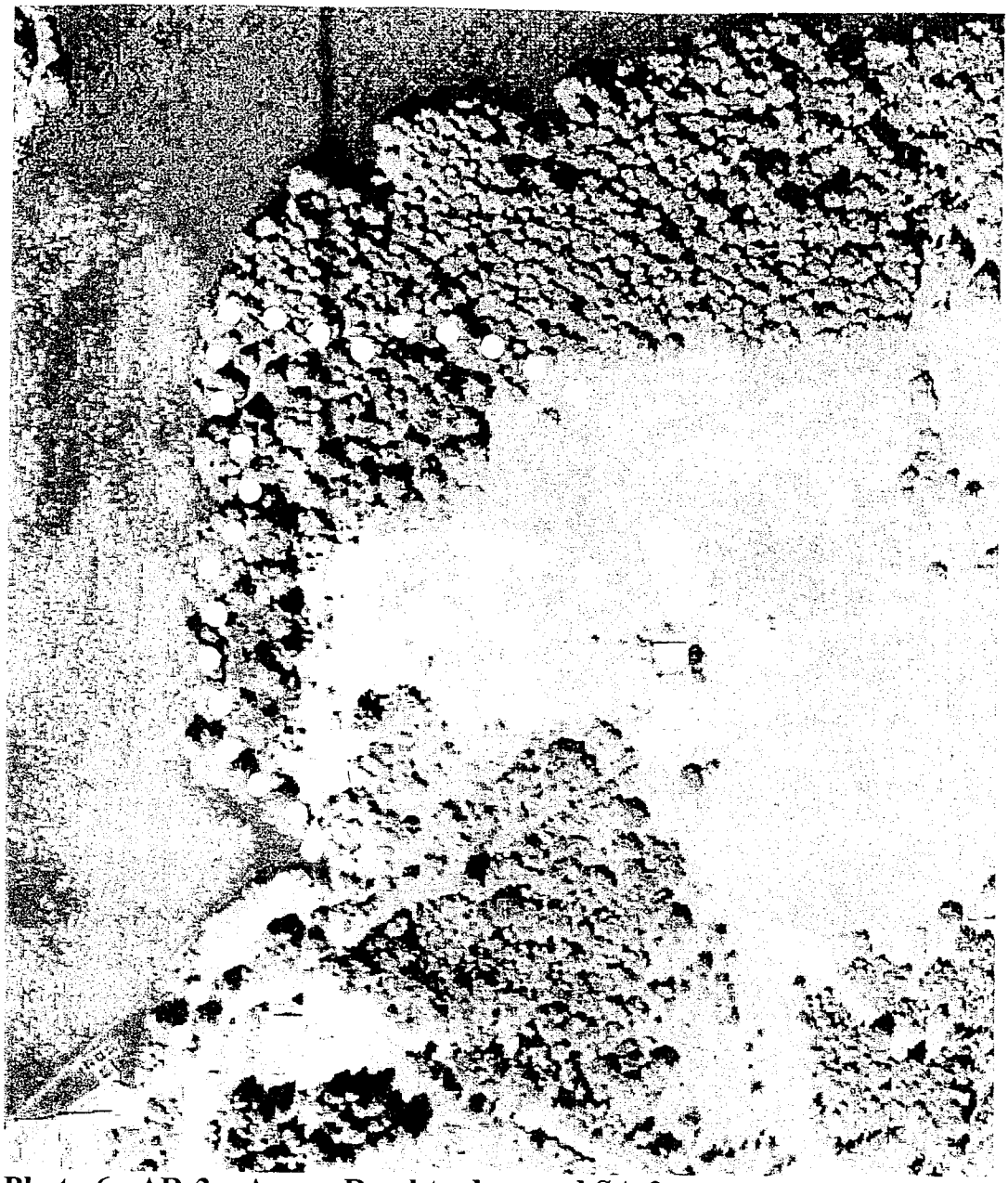


Photo 6: AR-3 – Access Road to dam and SA-3

Corps No. 200400523
Figure 13



Photo 7: AR-4 – Powerhouse Road to SA-3

Corps No. 200400523
Figure 14

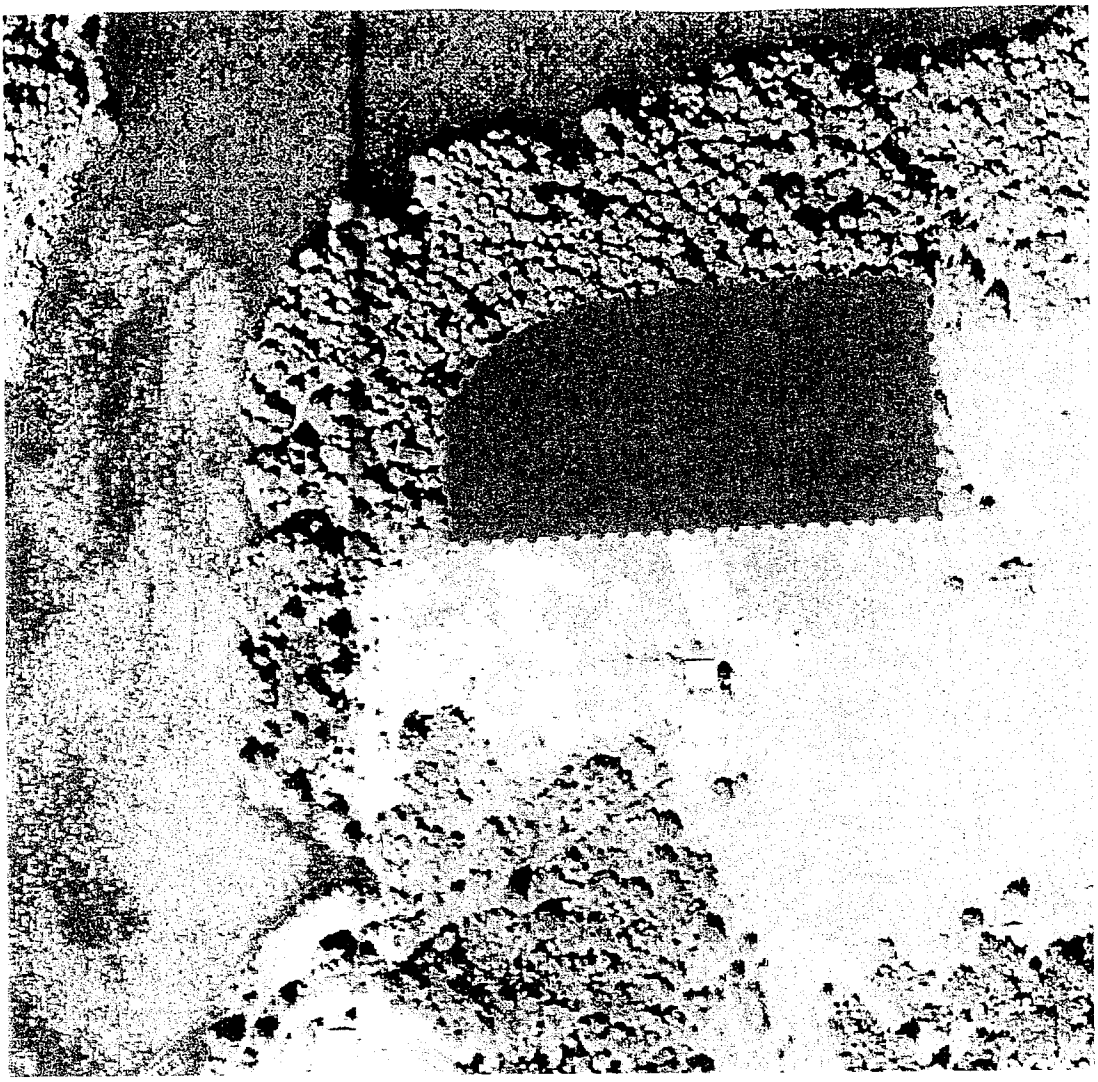


Photo 8: SA-3 – Staging Area 3

Corps No. 200400523
Figure 15



Photo 9: AR-5 – Powerhouse Road to Dam (Lower)

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Figure 16

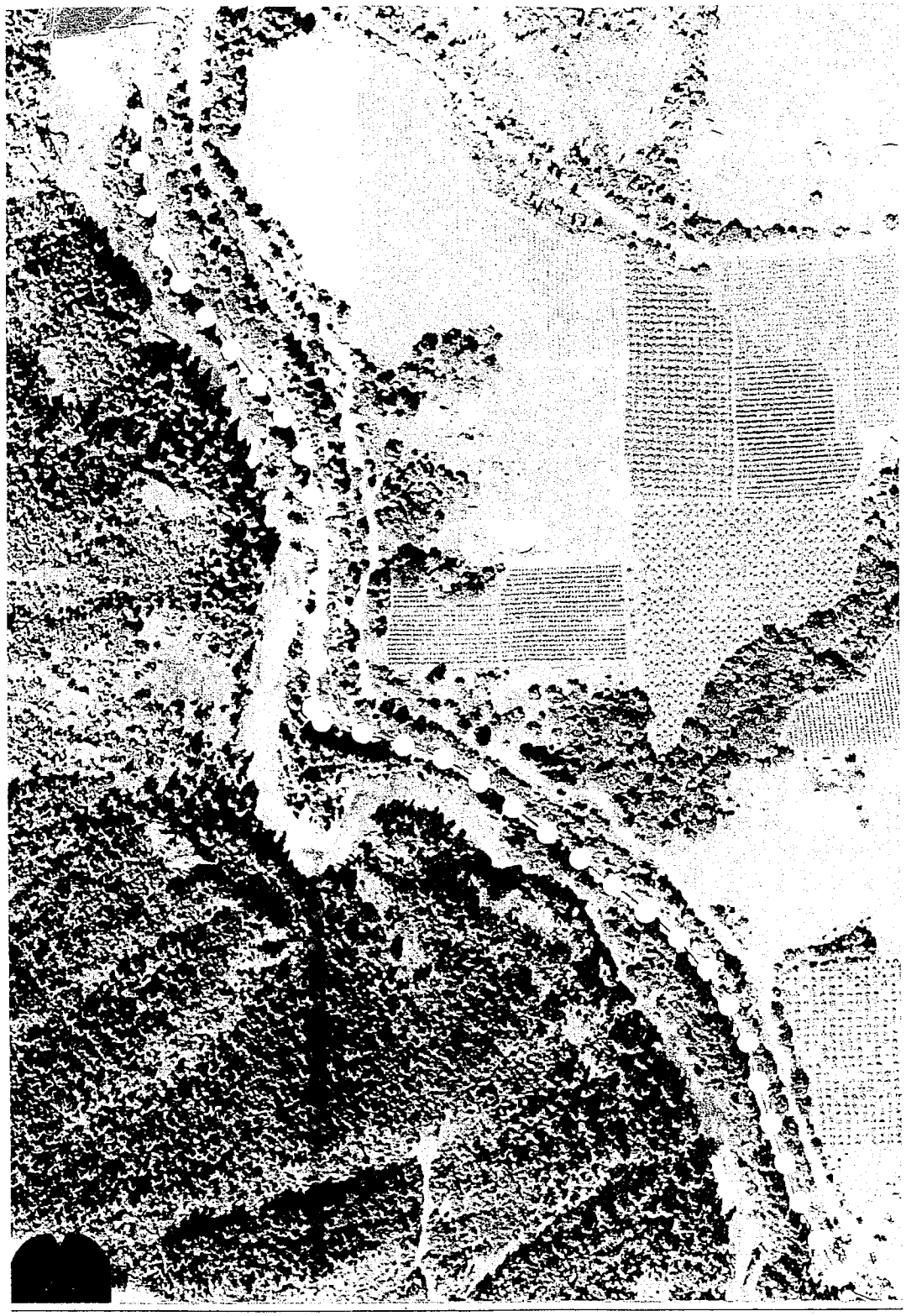


Photo 10: WA-2 – Work Area for Flowline Removal

Corps No. 200400523
Figure 17

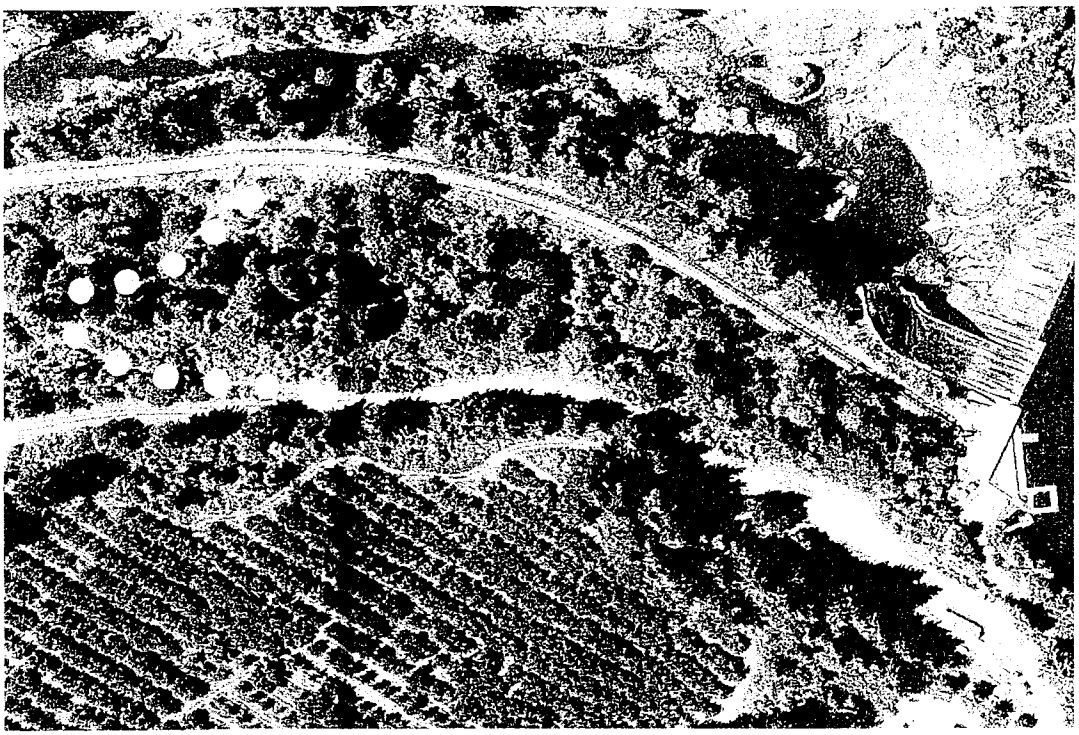


Photo 11: AR-6 – Powerhouse Road to Flowline (Upper)

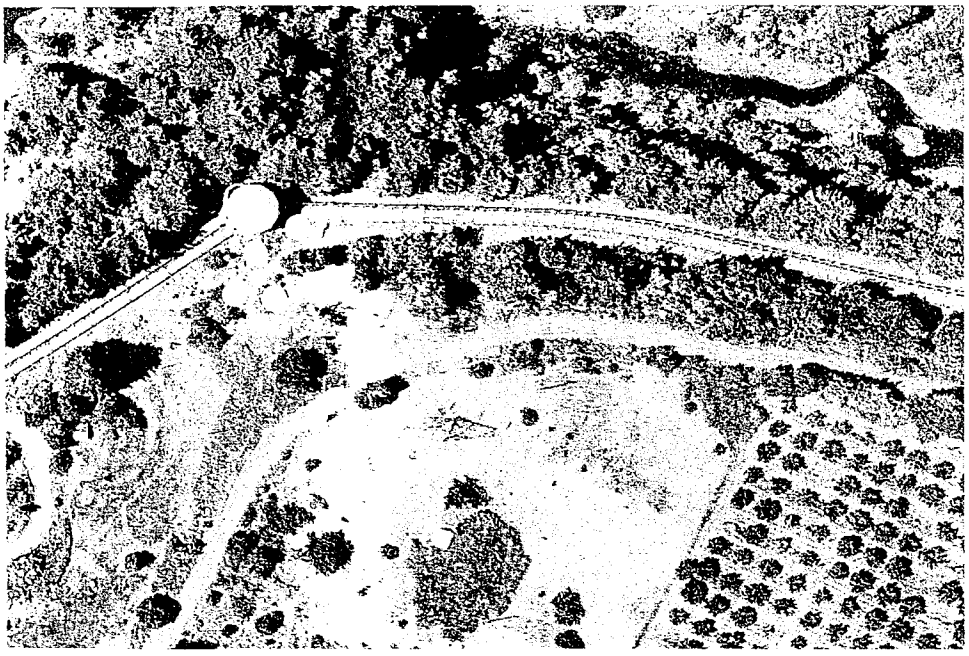


Photo 12: AR-7 – Powerhouse Road to Flowline (Lower)

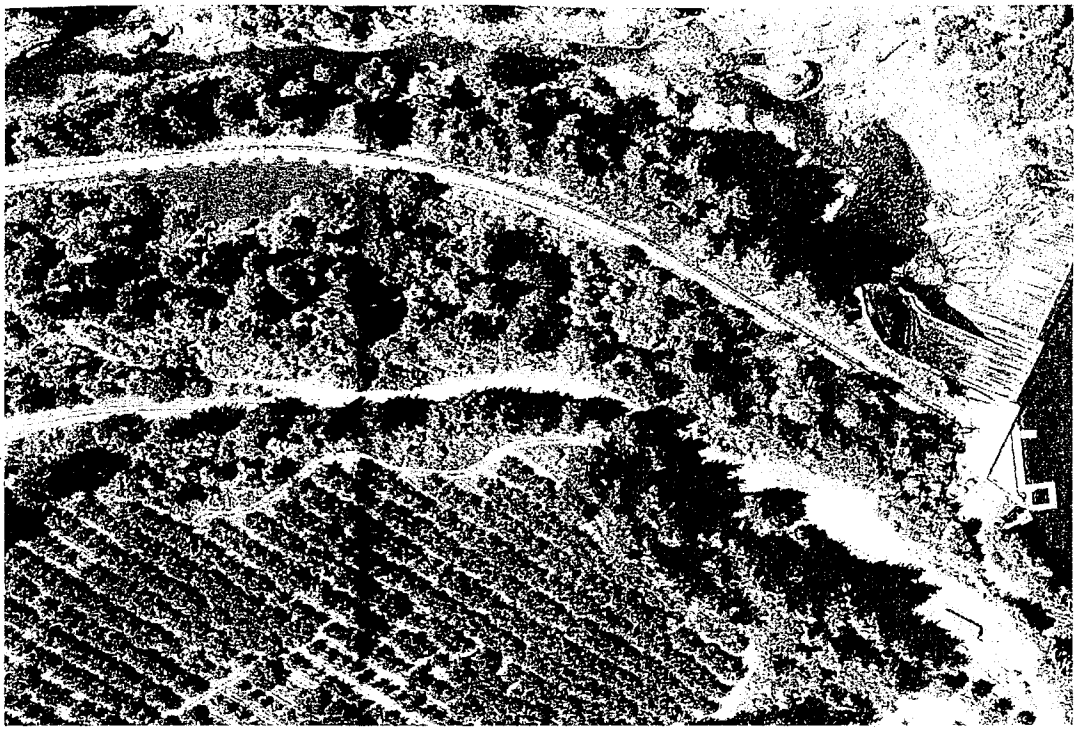


Photo 13: SA-4 – Staging Area for Flowline (Upper)



Photo 14: WA-3 – Penstock Removal

Corps No. 200400523
Figure 19

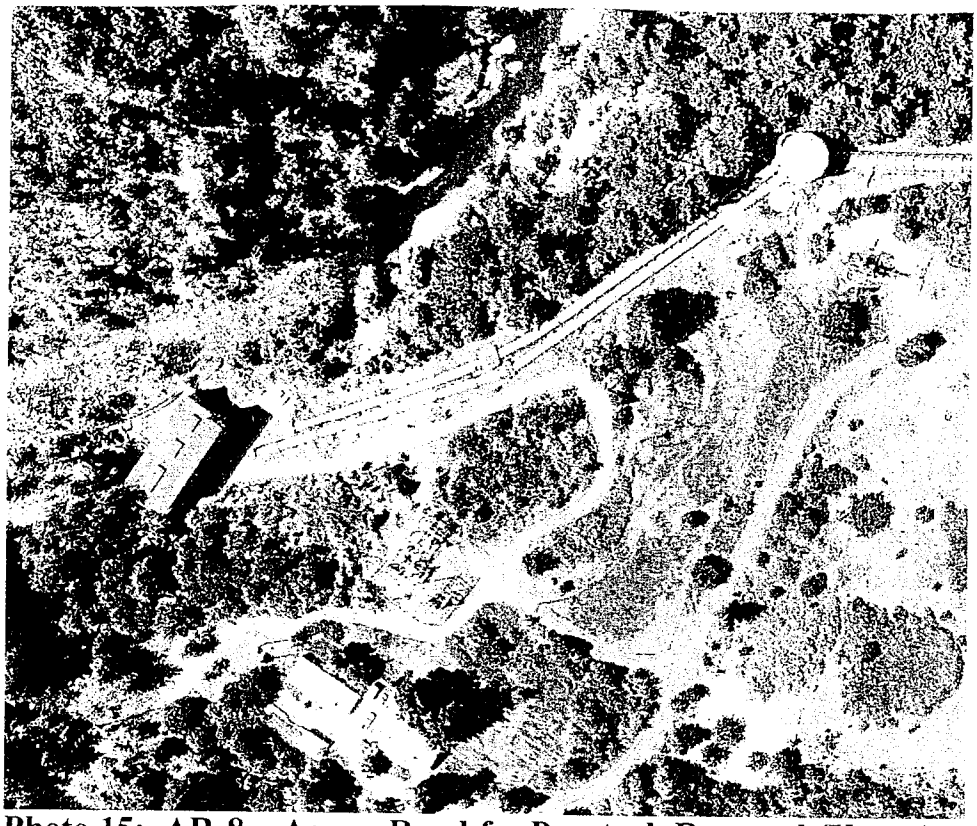


Photo 15: AR-8 – Access Road for Penstock Removal (Upper)



Photo 16: AR-9 – Access Road for Penstock Removal (Lower)

Corps No. 200400523
Figure 20



Photo 17: WA-4 – Work Area for Surge Tank Removal

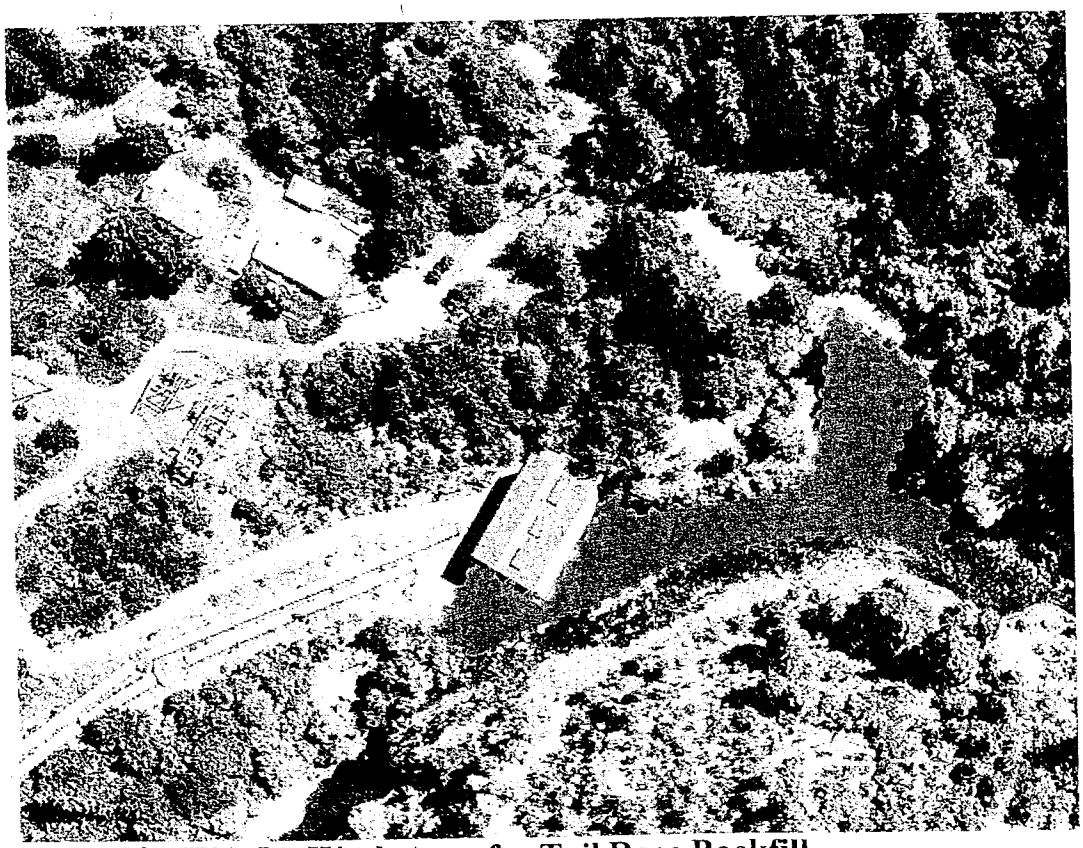


Photo 18: WA-5 – Work Area for Tail Race Backfill

Corps No. 200400523
Figure 21



Photo 19: AR-10 – Access Road for Tail Race Backfill



Photo 20: AR-11 – Access Road for Tail Race Grading

Corps No. 200400523
Figure 22

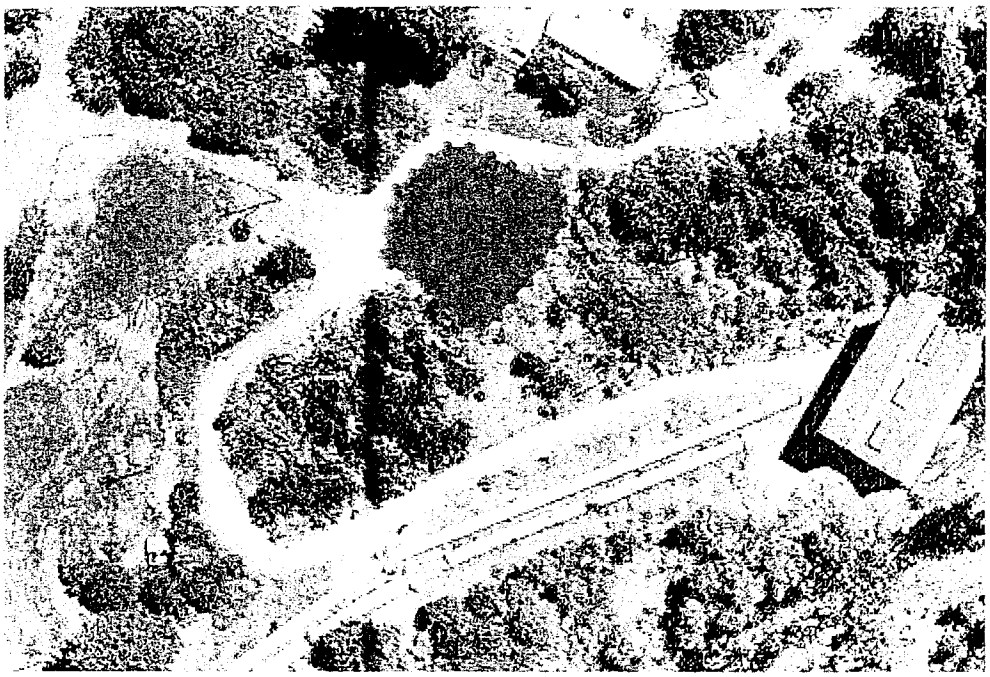


Photo 21: WA-6 – Work Area for Substation Removal

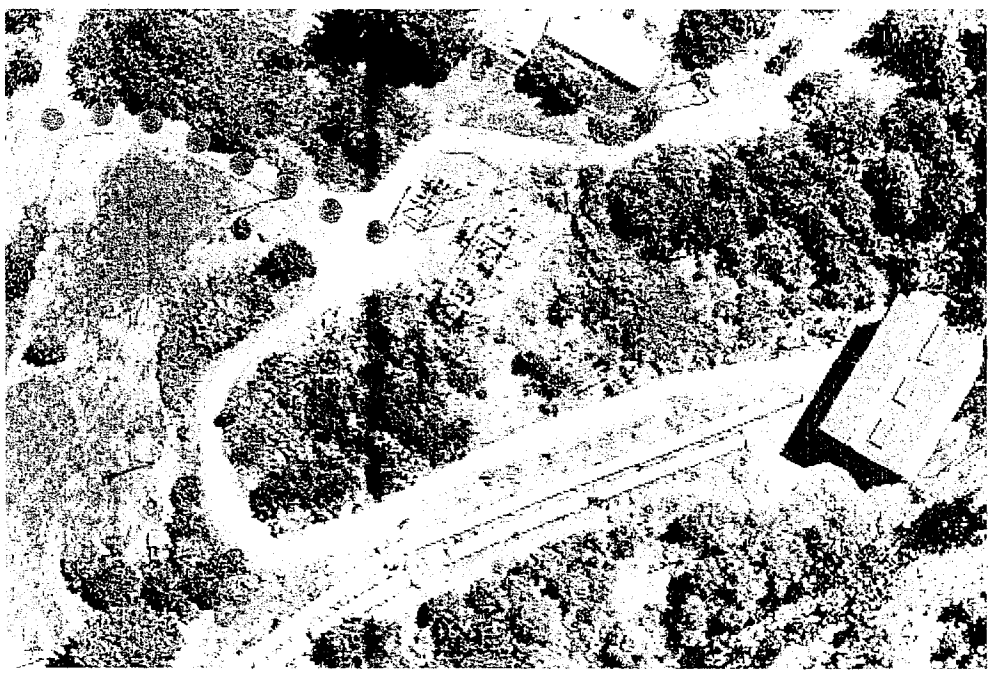


Photo 22: AR-12 – Access Road for Substation Removal

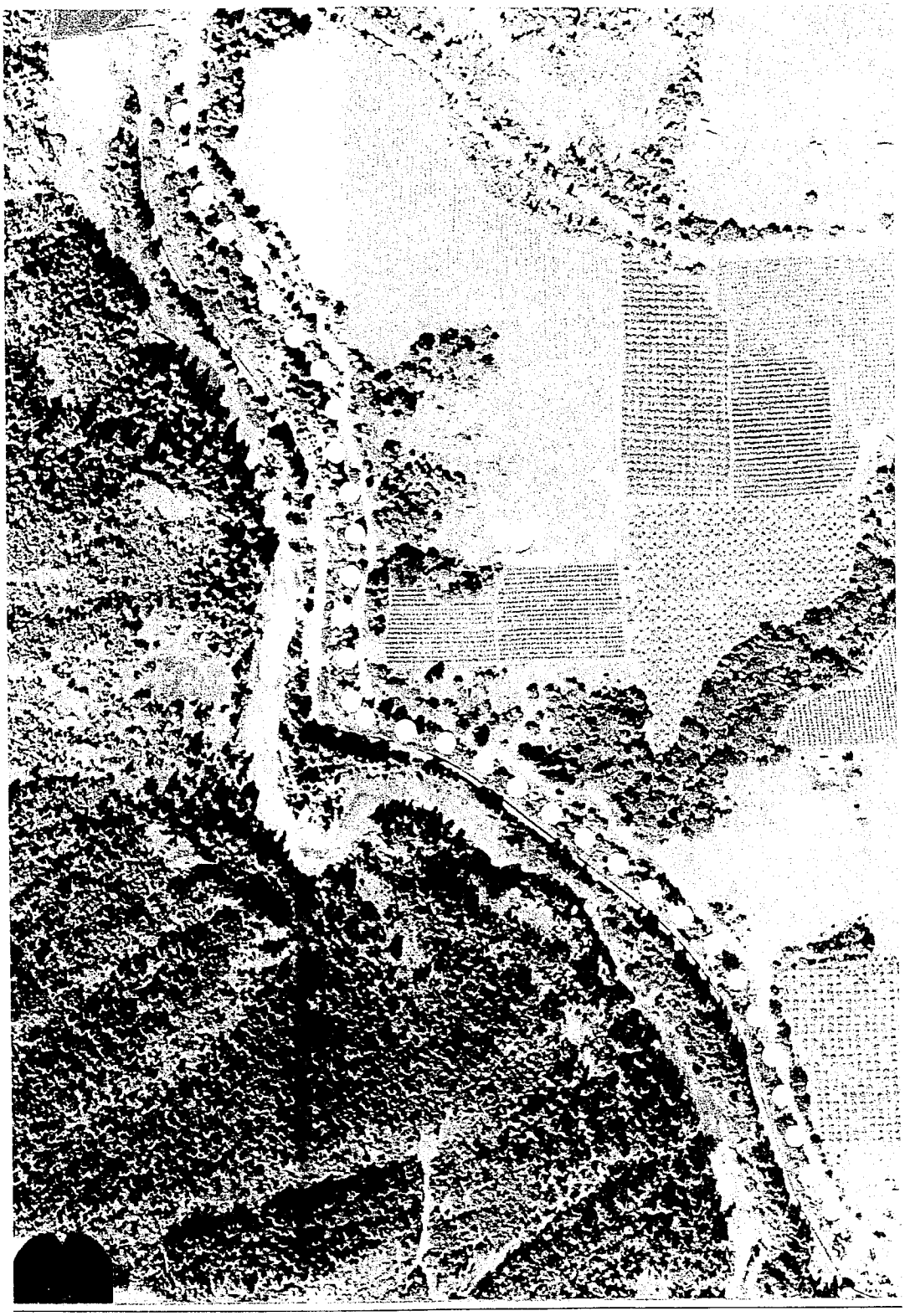


Photo 23: WA-7 – Work Area for Powerline Removal

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Figure 24



Photo 24: AR-13 – Access Road from Powerhouse to SA-5



Photo 25: SA-5 – Staging Area at Becker Site

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Figure 25

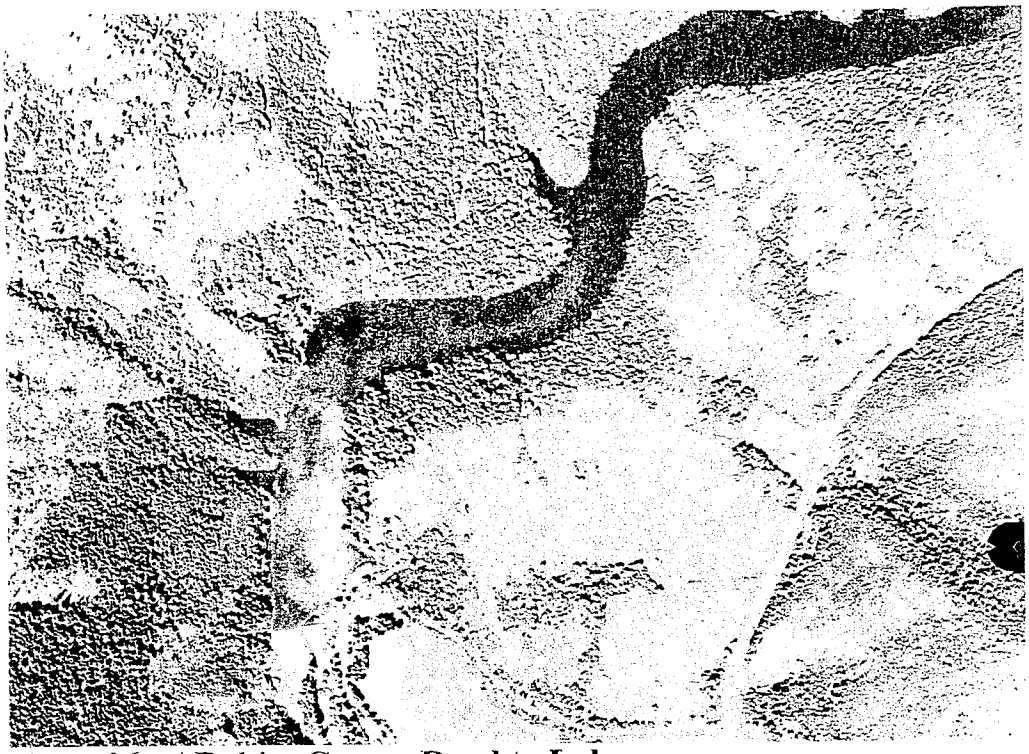


Photo 26: AR-14 – Graves Road to Lake



Photo 27: AR-15 – Cabin Road to Lower Lake

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Figure 26

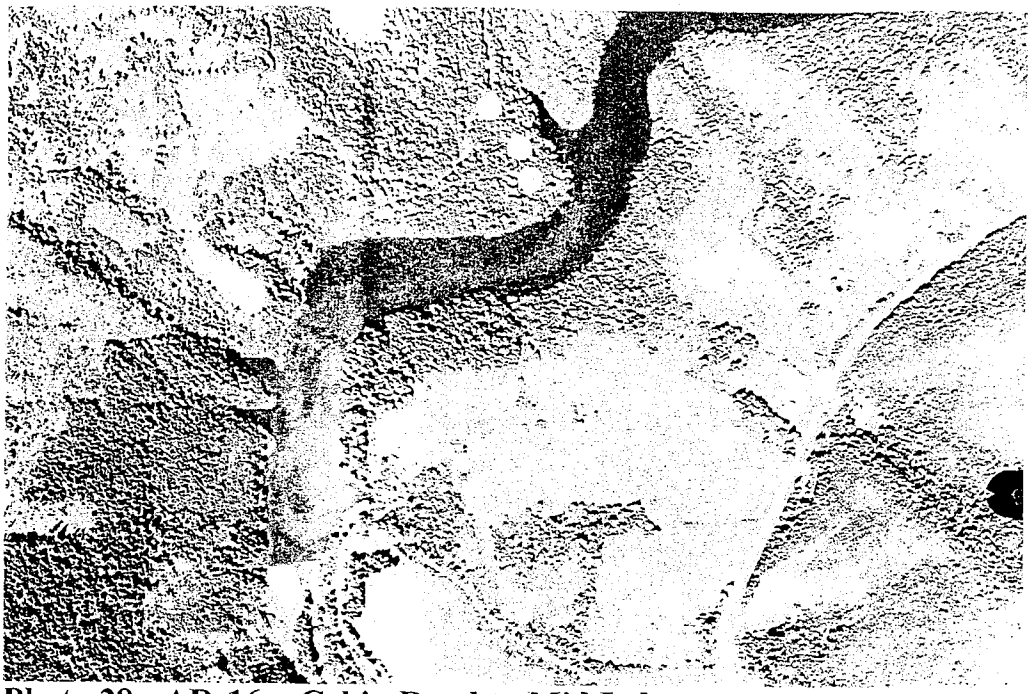
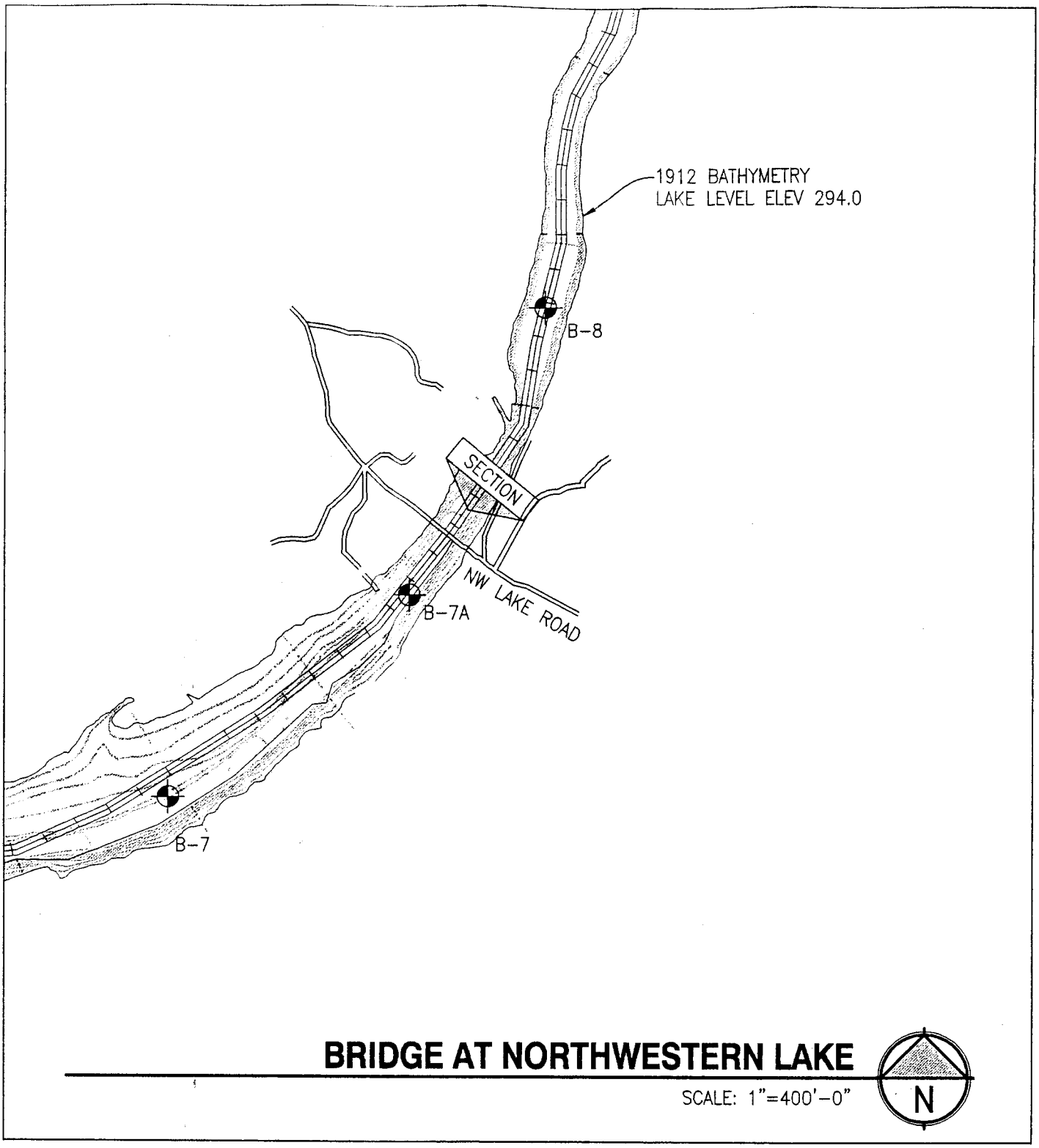


Photo 28: AR-16 – Cabin Road to Mid Lake

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Figure 27



BRIDGE AT NORTHWESTERN LAKE

SCALE: 1"=400'-0"

PROJECT NAME:	PROJECT NO:	BY:	DATE:
CONDIT DAM REMOVAL	04-31-006	TJV/REC	03-16-04

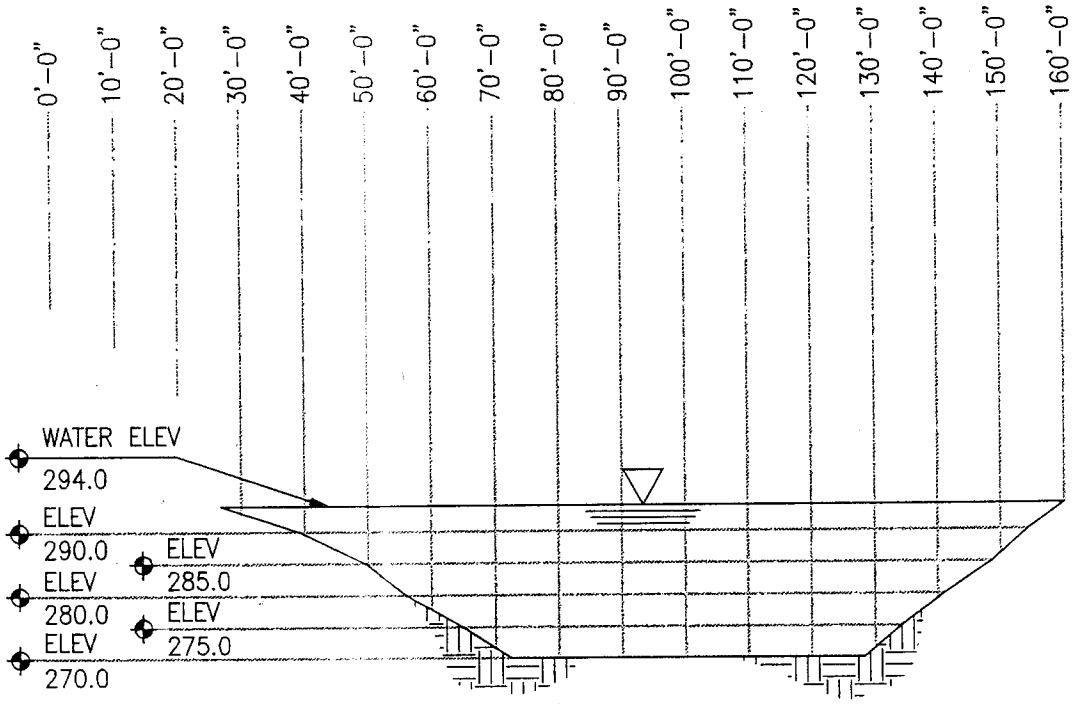
D'AMATO CONVERSANO INC.
400 SW 6TH AVENUE, SUITE 605
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SITE PLAN
FIGURE 2

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NORHTWESTERN LAKE (1912 BATHYMETRY)

1

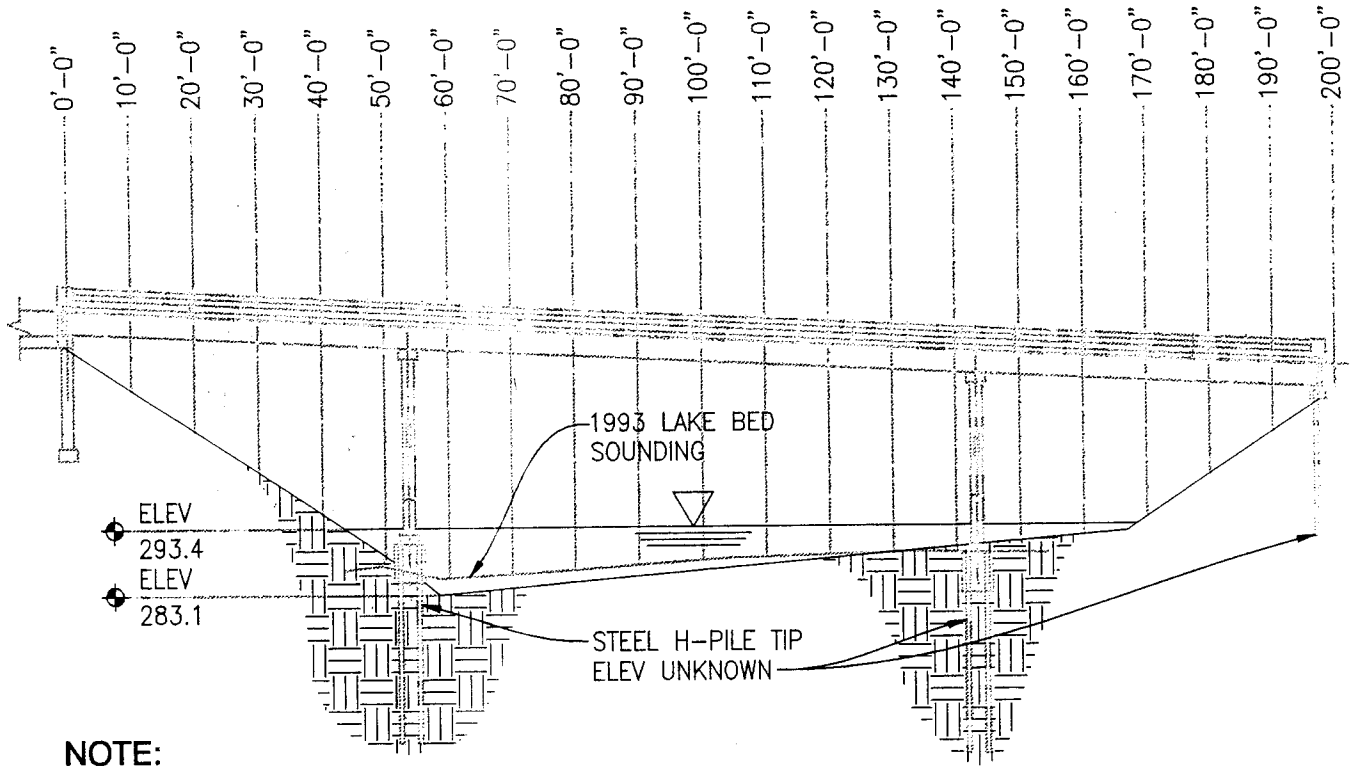
CHANNEL SECTION AT FUTURE (1958) BRIDGE ℄ SCALE: 1"=30'-0"

0431006BASE.dwg 17 Mar 2004 - 4:21 pm mseiser

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Figure 29



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NORTHWESTERN LAKE BRIDGE (3-3-2004)

4

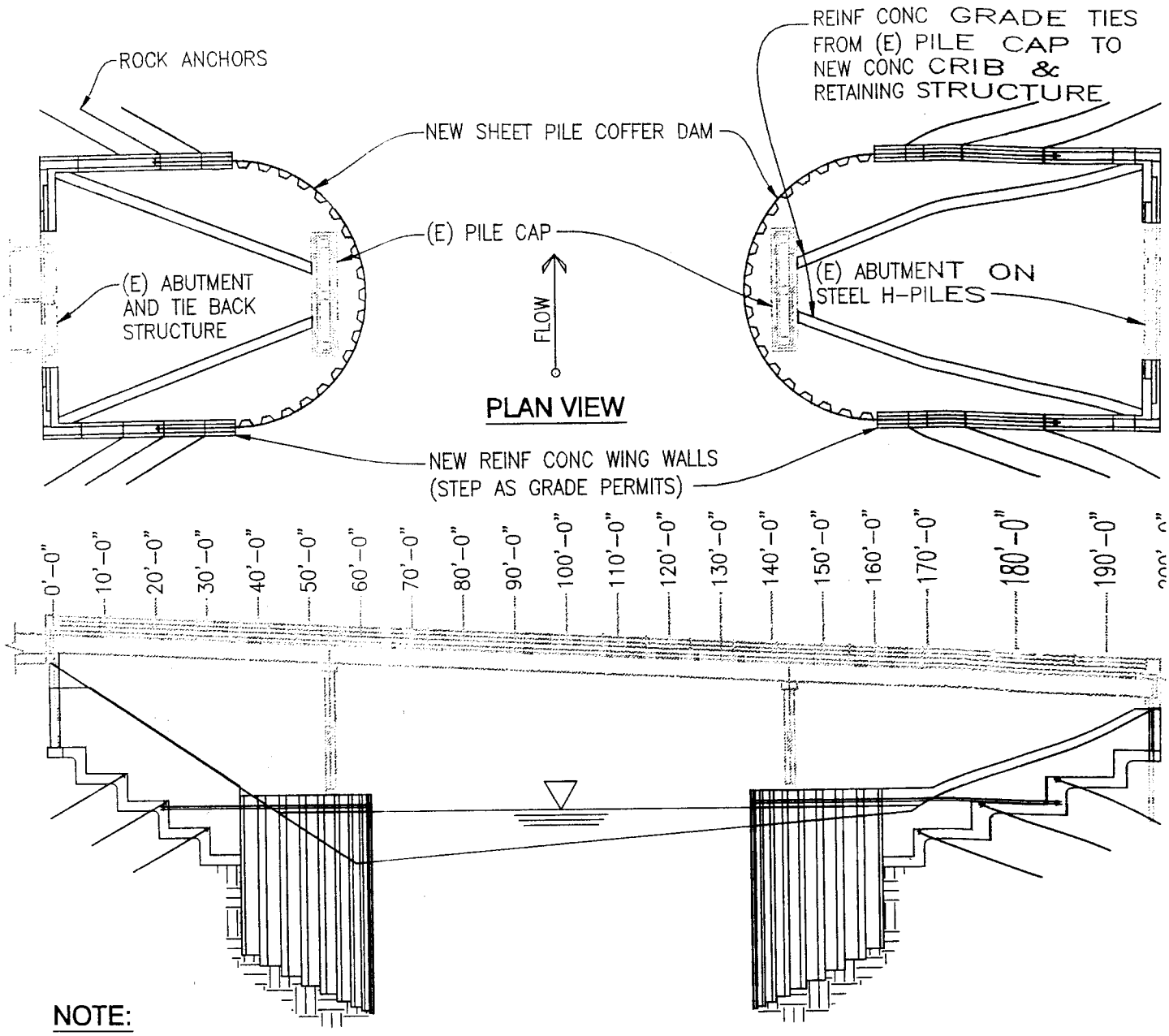
SCALE: 1"=30'-0"

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Figure 30



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NORTHWESTERN LAKE BRIDGE

PRE-DAM REMOVAL

SCALE: 1"=30'-0"

5

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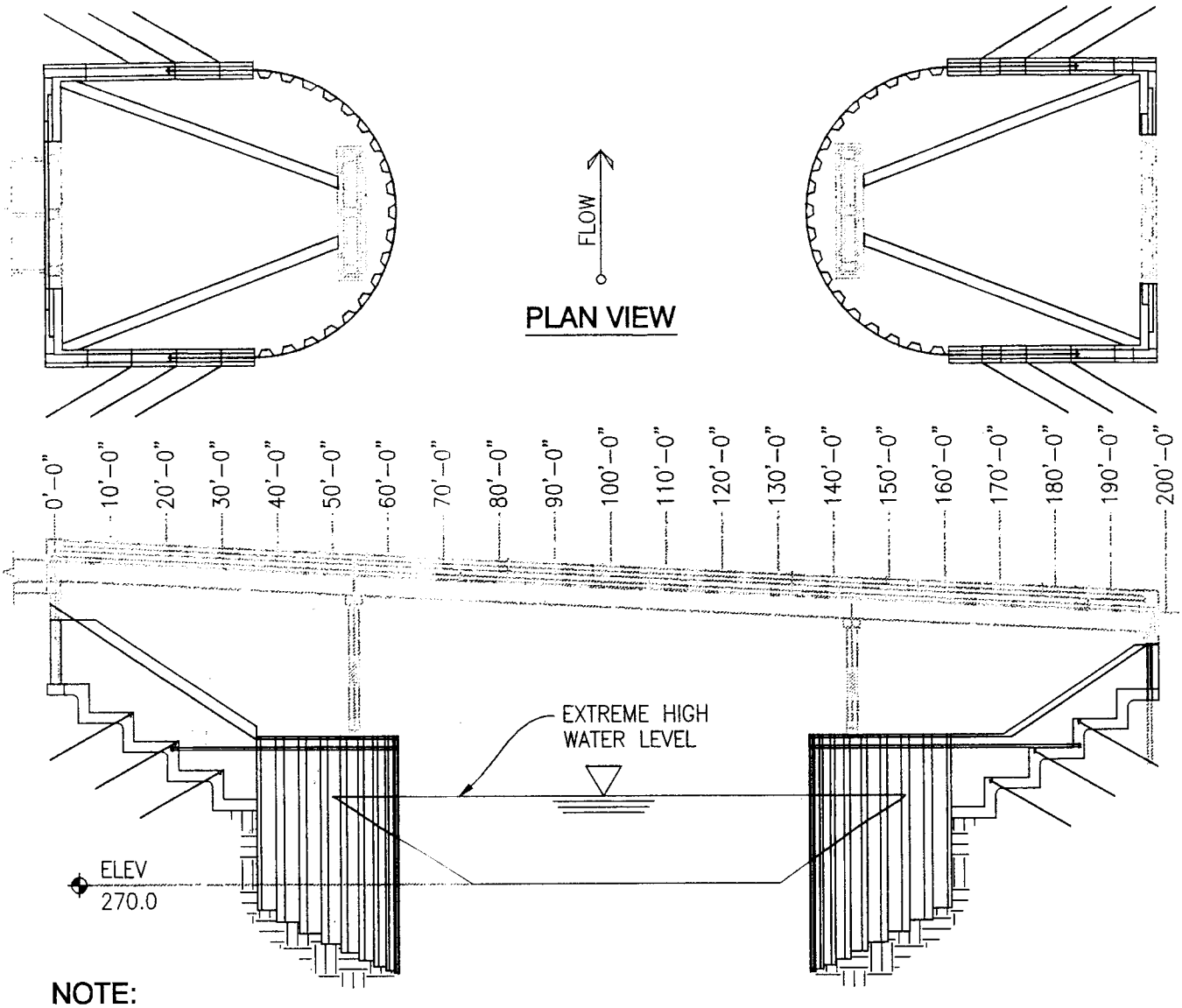
PROJECT NAME:	PROJECT NO:	BY:	DATE:
CONDIT DAM REMOVAL	04-31-006	TJV/REC	03-16-04

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FIGURE 7

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FUTURE WHITE SALMON RIVER (FORMERLY NORHTWESTERN LAKE)

AFTER DAM REMOVAL AND SEDIMENT TRASPORT

SCALE: 1"=30'-0"

6

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PROJECT NAME:	PROJECT NO:	BY:	DATE:
CONDIT DAM REMOVAL	04-31-006	TJV/REC	03-16-04

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FIGURE 8

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Figure 32

Table 2. Size Distribution of Reservoir Material

Volume of Reservoir Material - by Fractions[2]				
Material Description	Min size mm	Max. Size mm	Percentage of Material	Cubic Yards
Clay		.004	7.4 %	178,257
Silt	0.004	.0625	28.8 %	697,783
Very Fine Sand	0.0625	0.125	23.6%	571,936
Fine Sand	0.125	0.250	16.2%	392,217
Medium Sand	0.250	0.500	10.8%	260,805
Coarse Sand	0.500	1.000	7.6%	183,103
Very Coarse Sand	1.000	2.000	2.3 %	56,695
Very Fine Gravel	2.000	4.000	1.1 %	25,938
Gravel and Larger	4.000		2.3 %	54,805

[2] Based on 1997 topography by Raliegh and Associates and composite of sediment sampling data from 1991 through 1997.

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Figure 33

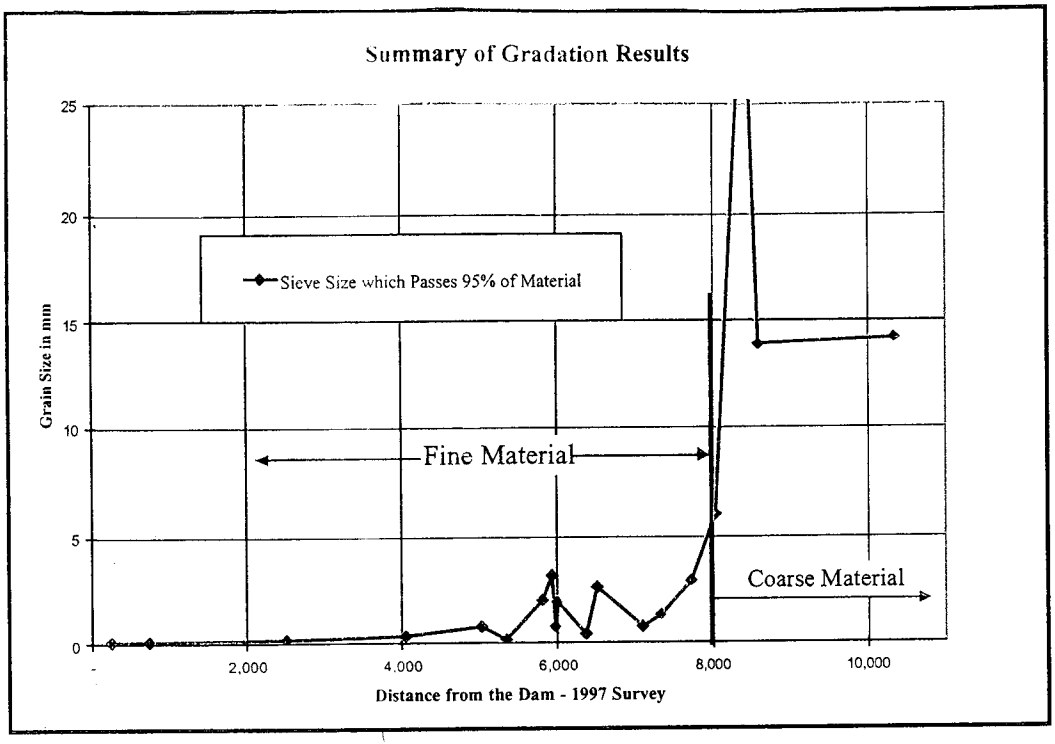


Figure 1. Sediment Gradations vs. Distance from Dam

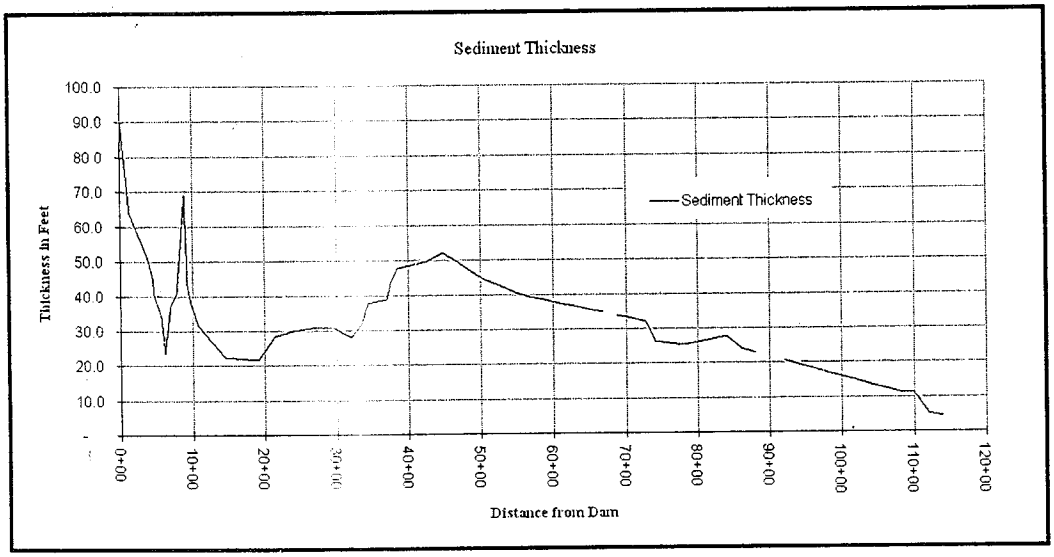


Figure 2. Reservoir Sediment Thickness

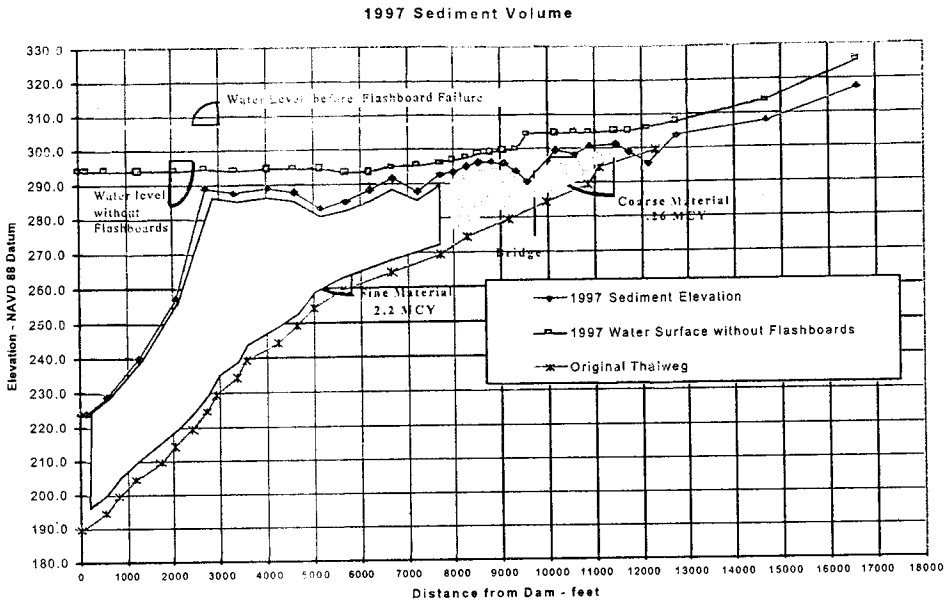


Figure 3. Sediment Location

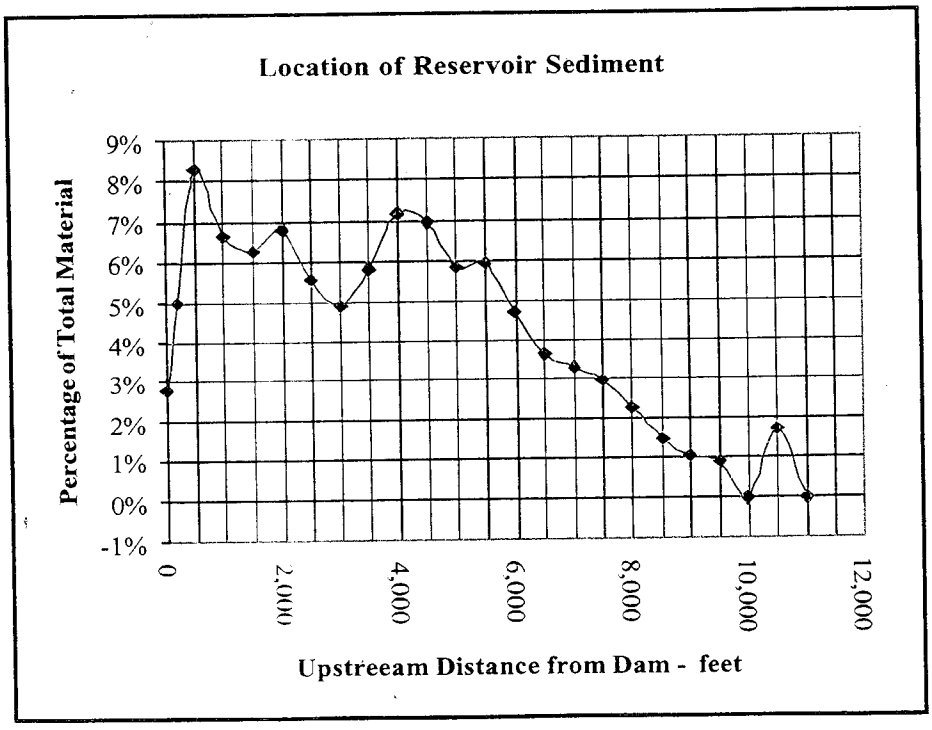


Figure 4. Location of Reservoir Sediment

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Figure 35

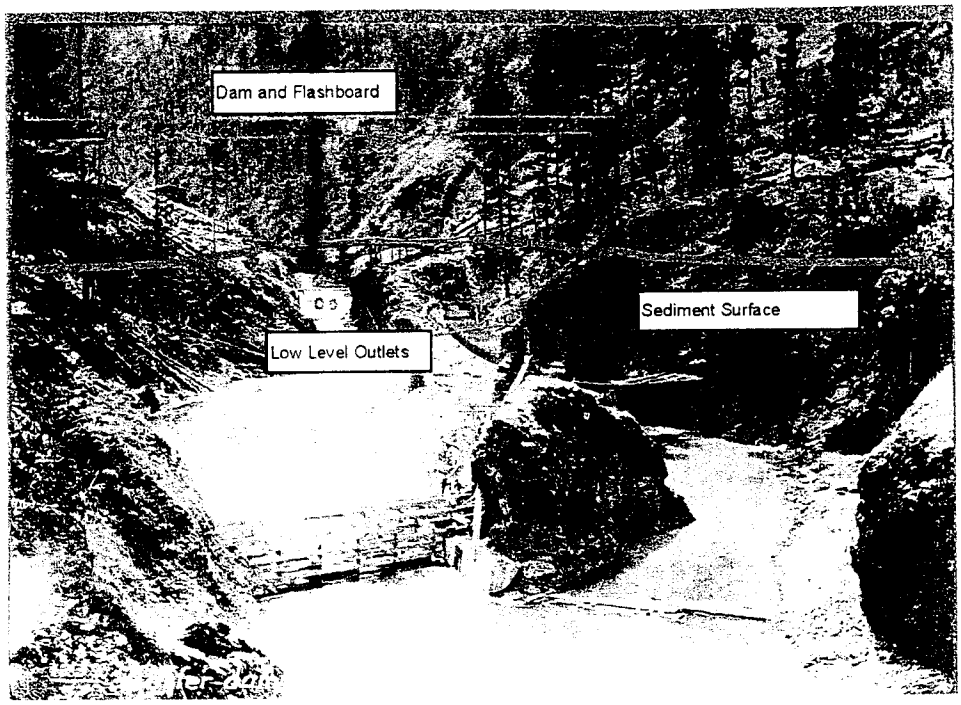


Figure 6. Looking Downstream at the Dam Site

Figure 7 through Figure 9 show the type of material in the reservoir by grain size superimposed on pre-dam topography. Figure 10 and Figure 11 show the pre-dam topography of the reservoirs.

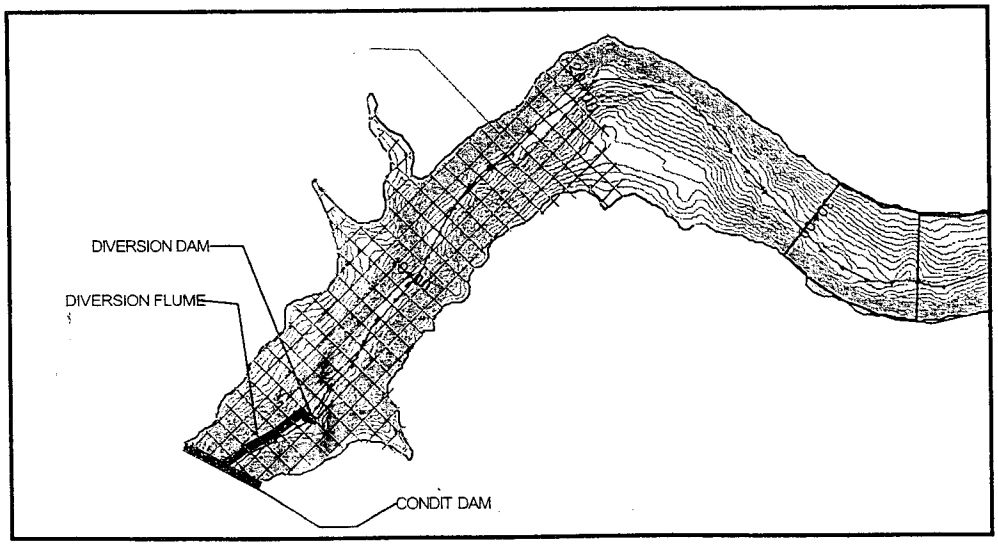


Figure 7. Silt and Clay Location

Corps No. 200400523
Figure 36

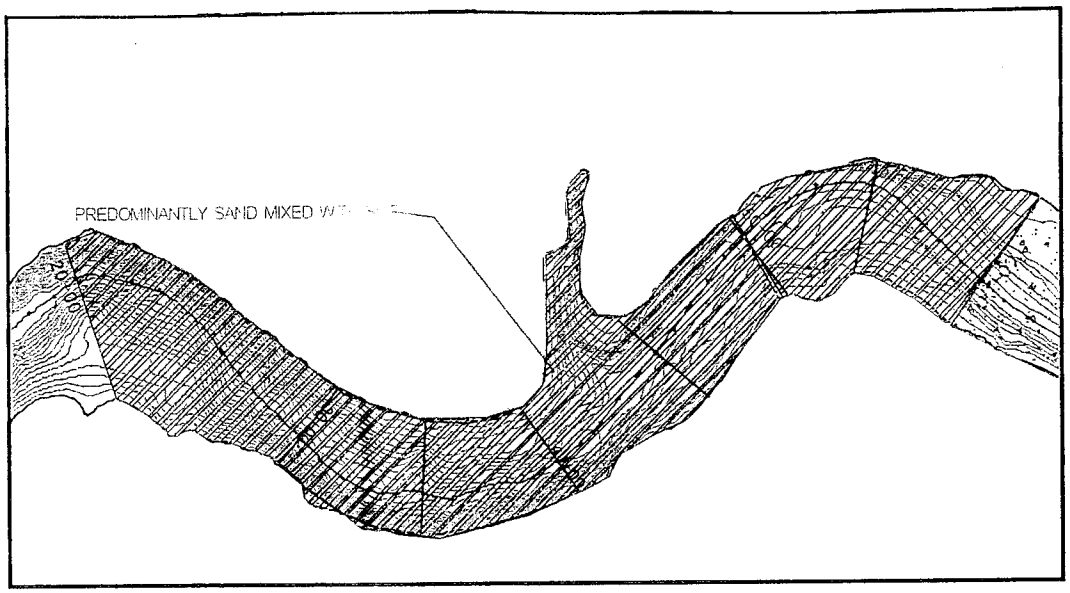


Figure 8. Silt and Sand Location

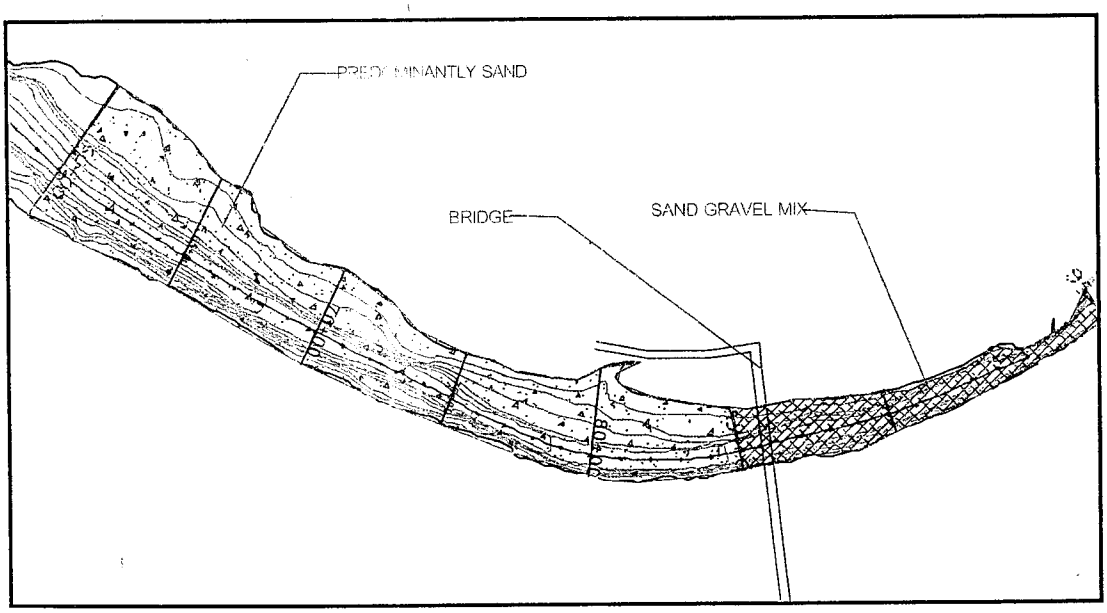


Figure 9. Predominantly Sand - Sand/Gravel Mixture

Corps No. 200400523
Figure 37

plume of high concentration water in the CR and the distance downstream before the plume is completely mixed in the CR water.

Several actions occur at the confluence of the two rivers. Medium sized sand particles that arrive at the In-lieu site after the pool is filled will move into the CR system. Most sand particles will settle near the confluence. Suspended sediment concentrations of WSR water entering the CR will be less than the concentrations in the river at the top of the In-lieu site due to settling in the In-lieu site. Silt particles will settle in the CR in the pool created by Bonneville Dam as discussed below. Most clay-sized particles will stay in suspension to the mouth of the CR.

Figure 28 shows the estimated length of the plume on average before the two rivers become completely mixed. The estimated distance is approximately 3 miles based on the angle of the mixing waters shown in Figure 29, which is an aerial photograph of the mouth of the WSR. The dark area in the upper right corner is the WSR, which was less turbid than the CR. Swirls in the mixing area have been photographically enhanced to show the angle of mixing. This angle is extended downstream to its interception on the Oregon side of the river where water from the WSR should be thoroughly mixed with CR water.

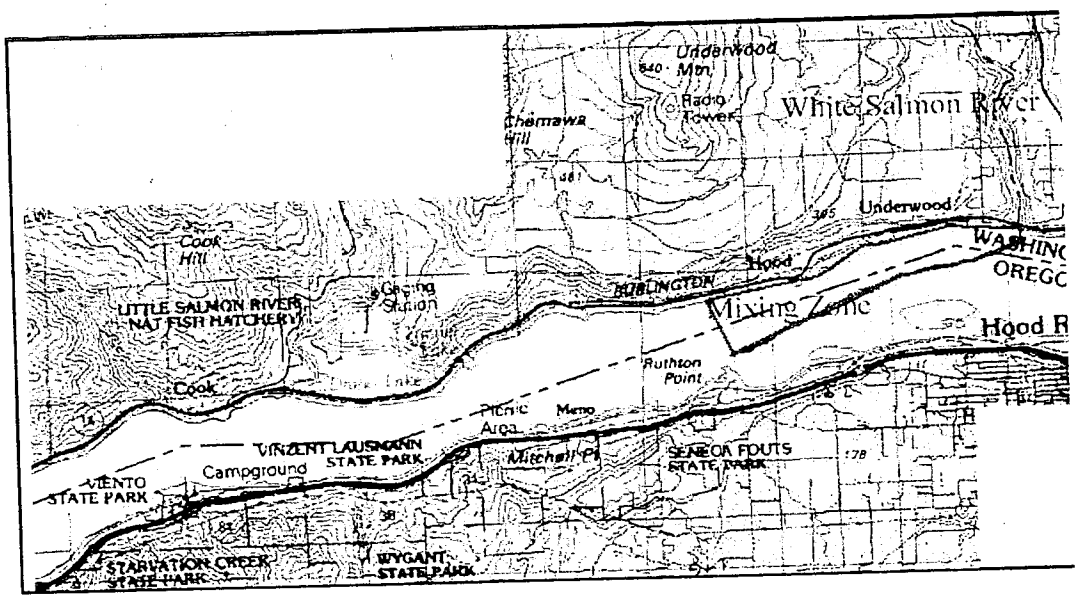


Figure 28. Columbia River Mixing Zone

Corps No. 200400523
Figure 38

TABLE 5
Summary of Wetland Areas, Classes, and Ratings

Wetland ID	Total Acreage	Acreage by Cowardin Class			Acreage by Hydrogeomorphic Class**			DOE Rating Category for Eastern Washington		WSDOT Functional Assessment	
		PEM	PFO	PSS	Lake Fringe	Riverine	Slope	Based on Functions	Based on Special Characteristics	Functional Assessment Description	Rating Category (H/M/L)***
Northwestern Lake											
2	1.6	1.0	0.6	--	**1.6**	-	-	III	N/A	Likely	High
3	1.3	0.8	0.5	-	**0.8**	-	0.5	III	N/A	Likely	High
5	0.4	0.4	0.0*	-	0.0*	**0.4**	-	II	N/A	Likely	High
6A	0.2	-	0.2	-	-	-	**0.2**	III	N/A	Not Likely	Low
6B	0.3	-	0.3	-	-	-	**0.3**	III	II	Likely	Moderate
7	0.1	0.1	-	-	**0.1**	-	-	IV	N/A	Not Likely	Moderate
8	0.1	0.0*	0.1	-	0.0*	**0.1**	-	II	II	Likely	High
9	0.8	0.8	-	-	**0.8**	-	-	IV	N/A	Not Likely	Moderate
10	0.1	0.0*	0.1	-	0.0*	**0.1**	-	II	II	Likely	High
11	0.2	0.2	-	-	**0.2**	-	-	IV	N/A	Not Likely	Moderate
12	0.4	0.1	0.3	-	0.1	**0.3**	-	III	N/A	Likely	High
17	0.0*	0.0*	-	-	**0.0***	-	-	IV	N/A	Likely	Moderate
18	0.0*	0.0*	-	-	**0.0***	-	-	IV	N/A	Not Likely	Moderate
19	0.2	0.2	-	-	**0.2**	-	-	IV	N/A	Not Likely	Moderate
20	0.0*	0.0*	-	-	**0.0***	-	-	IV	N/A	Not Likely	Moderate
21	0.0*	-	0.0*	-	-	-	**0.0***	III	N/A	Not Likely	Low
23	0.0*	0.0*	-	-	**0.0***	-	-	IV	N/A	Not Likely	Moderate
24	0.0*	0.0*	-	-	**0.0***	-	-	IV	N/A	Not Likely	Moderate
25	0.0*	0.0*	-	-	**0.0***	-	-	IV	N/A	Not Likely	Moderate
Total	*5.7*	*3.6*	*2.1*	*0*	*3.8*	*0.9*	*1.0*				
Downstream											
15	0.5	-	-	0.5	-	**0.5**	-	III	N/A	Likely	High
16	0.3	0.3	-	-	**0.3**	-	-	IV	N/A	Likely	Moderate
22	0.2	0.2	-	-	**0.2**	-	-	IV	N/A	Likely	Moderate
Total	*1.0*	*0.5*	-	*0.5*	*0.5*	*0.5*	-				

* 0.0 indicates where wetlands were delineated but represented less than 0.1 acre, and is therefore rounded to zero.
** Hydrogeomorphic class highlighted in bold used for DOE Rating.
*** Rating Category for WSDOT Functional Assessment added for clarification; defined by number of function categories provided: High = 11-14; Moderate = 6-10; Low = 0-5.

Corps No. 20040523
Figure 39

Corps No. 200400523
Figure 40

Corps No. 200400523
Figure 41