SNC Reference Number

080139

Site Plan

STATE OF CALIFORNIA – THE RESOURCES AGENCY
ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

DEC 22 2005

Ms. Debbie Minor
Mosquito Volunteer Fire Department
2441 Mosquito Cutoff Road
Placerville, California 95667

Finnon Lake Dam, No. 4466
El Dorado County

Dear Ms. Minor:

Enclosed is your approved Application No. 4466, which was filed on June 14, 2000, for approval of plans and specifications for the repair of Finnon Lake Dam.

The approval of this application is subject to the following condition:

> "The entire area of the dam foundation shall be excavated to intensely weathered rock foundation as determined by the engineer and approved by the Division of Safety of Dams. Intensely weathered rock is available with minimum overexcavation, on the order of 4 to 6 feet, as indicated by the boring logs in the October 1973 report entitled "Finnon Lake and Reservoir Embankment Seismic Stability Study."

Please review the enclosed "Information Regarding Supervision of Construction of Dams and Reservoirs" and provide our Regional Engineer with the required timely notice of start of construction.

Sincerely,

Original signed by
David A. Gutierrez

David A. Gutierrez, Chief
Division of Safety of Dams

Enclosures
Certified Mail

cc: Mr. Mark Egbert, District Manager
El Dorado County and Georgetown
Divide Resource Conservation Districts
100 Forni Road, Suite A
Placerville, California 95667

J84-020-15-W DTG

Specifications for the
Reconstruction of
Finnon Lake Dam, No. 1466 (El Dorado)

~~ESD~~ 2/24 Files

GENERAL

Finnon Dam and Reservoir is located at Mosquito north of Placerville in El Dorado County and is presently under the direction of the Mosquito Volunteer Fire Department. The existing dam embankment material will be removed, dried, and stockpiled during the summer and the dam will be re-constructed during the summer the next year should the stockpiled material adequately dried.

The Job Corps has agreed to use this project as a training school for new equipment operators, requiring the extended period of time to complete the project.

There is approximately 100,000 cubic yards in the existing dam. This material will be removed and stockpiled in an area to the north and east of the dam below the normal water surface Elevation 2426. The reservoir is maintained at a low level and will be drained during construction.

The material from the existing dam will be used in the re-construction of the dam. No unsuitable material containing brush, roots, sod, lumber or timber greater than 2 inches in any dimension, or other perishable or unsuitable material shall be placed in the embankment. Unsuitable material will be disposed of as determined by the Engineer. Any additional material required to construct the embankment will be taken from below the normal water line. There are several possible borrow areas. The material from these areas shall be investigated and approved for suitable material by the Engineer and approval obtained from the Division of Safety of Dams.

The re-constructed dam will be 49 feet high from the downstream toe to the crest of the spillway. There will be 4 feet of freeboard above the spillway crest making a total height of 53 feet. There will be approximately 95,000 cubic yards in the dam.

Division of Safety of Dams will periodically inspect elements of the work during construction. The owner or the owner's representative shall give 48 hours notice of any inspection or review that is required to be witnessed by the Division.

CONTROL AND DIVERSION OF WATER

Dewatering shall be performed so that all construction may be performed free or water and that subsurface water removal be accomplished in a manner that assures stable slopes in the adjacent excavation.

CLEARING

Areas to be cleared consist of the stockpile area, borrow area, slopes of the

existing earth dam; and a zone 10 feet beyond the dam footprint, stockpile area and borrow area. Clearing shall consist of removal and disposal of all trees, brush, downed timber, and deleterious material.

GRUBBING

The entire slopes of the earth dam, stockpile area, and borrow area shall be grubbed. Grubbing shall consist of the removal of all stumps and roots 1 ½ inches or greater in diameter to a depth of 2 feet below natural ground surface.

EXCAVATION

Existing dam embankment shall be removed. Material removed from the existing dam embankment shall have all lumber or timber greater than 2 inches in any dimension removed and not placed in the stockpile

Excavation shall be carried to lines, grades, and dimensions as shown on the drawings or as directed by the Engineer.

Borrow areas have not been proven. Acceptability of the borrow area must be established by the Engineer. Laboratory testing of material from the borrow areas shall be approved by the Engineer and approved by the Division of Safety of Dams.

STOCKPILE

The stockpile area designated by the Engineer shall be cleared of all plant growth and any other unsuitable material before any fill material is placed on it. Also any humps or hollows shall be leveled off to a uniform grade to drain before placement of fill material.

The existing dam shall be cleared and grubbed as determined by the Engineer.

Material removed from the existing dam embankment shall have all lumber or timber greater than 2 inches in any dimension removed and not placed in the stockpile.

The existing dam embankment will be disced to facilitate drying, removed, and placed in the designated stockpile area. Material placed in the stockpile will be allowed to dry out as much as possible. The stockpile shall be disced to facilitate the drying out process. Completed stockpile shall be surface compacted and graded to drain.

FOUNDATION TREATMENT

The entire area to be occupied by the embankment shall be stripped or excavated to a sufficient depth to remove all materials not suitable for foundation. The entire area to be occupied by the foundation of the dam shall be stripped to moderately weathered rock foundation as determined by the Engineer and approved by the Division

of Safety of Dams. Foundation shall be de-watered to remove excess moisture and water.

CORE TRENCH

An artificial barrier or cutoff trench under the base of the dam shall be constructed as shown on the drawings. The cutoff trench shall have a bottom width of twenty-four feet and shall be excavated to the approximate depth and at the location shown on the drawings. The exact depth will be determined by the nature of the materials encountered. The foundation of the cutoff trench shall consist of firm, impermeable, in-place, moderately weathered rock. The cutoff trench shall be backfilled with selected impervious material, properly compacted as described in the section Embankment. The backfill material shall be taken from the stockpile area or the borrow area and shall be soil with the highest clay content possible. No material shall be placed in the cutoff trench until it is inspected and determined adequate by the Engineer and approved by the Division of Safety of Dams.

EMBANKMENT

No brush, roots, sod, lumber or timber greater than 2 inches in any dimension, or other perishable or unsuitable material shall be placed in the embankment. The Engineer shall determine the adequacy of the foundation and obtain the approval of the Division of Safety of Dams. The foundation and abutment areas shall be scarified to provide a loose bonding surface between the foundation and the embankment. This loose bonding surface shall contain adequate moisture for proper compaction when fill material is placed on it.

No stones having an average diameter of more than six inches shall be placed in the embankment. Any such stones hauled onto the embankment shall be removed before rolling. A vibrating tamper or sheepsfoot tamper will be used to compact the fill. If a sheepsfoot tamper is used, it shall weight 4,000 pounds per foot, be 5 or 5.5 feet in diameter, and have 7 to 9 square inch knobs with 9 inch protrusion.

The first course of fill material shall be spread over the foundation in a thin layer such that the combined thickness of this layer and the scarified surface of the foundation shall be less than eight inches. Each layer shall be placed in lifts not exceeding 8 inches in loose thickness then compacted with at least eight (8) passes of a sheepsfoot roller. The moisture content of the fill material before compaction shall be kept within -1 and +3 percent of the optimum moisture content. The embankment shall be compacted to an average relative compaction of at least 93% as determined by ASTM D-1557 based on the previous five tests, minimum of 92%.

For the embankment material placement, at least one sand cone density test (ASTM D-1556) shall be performed for each 2000 cubic yards placed, a minimum of one test per day, and at least one per each four compacted lifts.

A definite moisture content shall be established for the fill material on the stockpile prior to the start of construction, and no fill shall be placed in the embankment that does not have the proper moisture content. Moisture may be added by sprinkling on the embankment in such a manner that uniform distribution is obtained. Any material or surfaces that contain more moisture than required shall either be removed or allowed to dry to an acceptable moisture content. The application of water to the material should be done in the stockpile area or the borrow pits if possible. Each layer of material shall be compacted with the tamper.

If lifts of fill do not meet compaction requirements, the lifts shall be removed, dried or moisture conditioned to meet the proper moisture content, replaced, and recompacted as specified, and retested.

SPILLWAY

The existing spillway will be used for the reconstructed dam and shall not be disturbed. If the spillway is damaged, it will be reconstructed to its original dimensions with reinforced concrete as directed by the Engineer and approved by the Division of Safety of Dams.

If construction has to be halted due to winter weather with the dam partially built, then a temporary spillway will be constructed, 4 feet deep and 12 feet wide lined with plastic as directed by the Engineer and approved by the Division of Safety of Dams.

OUTLET

The outlet conduit alignment shown on the drawings is only approximately. The final alignment is to be determined in the field by the Engineer. The conduit shall be constructed in a trench. The bottom of the trench shall be located on native, undisturbed, competent material, moderately weathered bedrock, as determined by the Engineer and approved by the Division of Safety of Dams. All loose rock fragments, dirt, gravel, standing or running water, and other objectionable material shall be removed from the base of the trench, to the extent determined by the Engineer. If the characteristics of the foundation, at any point, are unsuitable for a foundation, then the unsatisfactory materials shall be removed to such depth as may be directed by the Engineer. The unsuitable material shall be replaced with backfill concrete.

The pipe shall be 16 inches in diameter ductile iron, steel, or PVC encased in reinforced concrete as shown on the drawings. Ductile iron pipe and fittings shall conform to ANSI A21.51 and A21.53 or equivalent. Steel pipe shall conform to the requirements of AWWA C-200 and shall be 0.135 inch in thickness. Steel shall be ASTM A-36. PVC pressure pipe shall conform to a minimum of PVC, schedule 80 (ASTM D-1784) or equivalent. Joints shall conform to ASTM D-2672 or equivalent.

Conduit shall not bridge the cutoff trench. If bridging of the cutoff trench is unavoidable, the conduit shall be supported on backfill concrete to foundation

determined adequate by the Engineer and approved by the Division of Safety of Dams.

Concrete shall be placed immediately after the foundation has been approved by the Engineer and the Division of Safety of Dams. The outlet pipe shall be weighted down by anchorage to prevent floating. The concrete shall be placed initially only on one side of the outlet pipe until it is even with the spring line on the other side to reduce void formation under the pipe. Expansion joints shall be placed at 30-foot intervals.

The existing slide gate, stem and vent pipe shall be salvaged and if possible will be used on the new dam. Condition of the gate, stem, and vent pipe shall be determined by the Engineer and approved for reuse by Division of Safety of Dams. Should the slide gate, stem, and accessories have to be replaced, they shall meet the requirements of AWWA Specifications C-501. They shall be the product of one manufacturer regularly engaged in the manufacture of gates and accessories, such as Waterman Industries. The gate, lifts, and accessories shall operate properly for the use intended, with a practical degree of water-tightness and have seating heads equal to, or in excess of, the heads shown on the drawings. The gate shall have a flat-back design, and bronze seats, galvanized assembly bolts, galvanized anchor bolts, and galvanized frame.

Trashrack shall consist of galvanized steel members, fabricated and installed in accordance with the details shown on the drawings. All structural steel shall conform to ASTM A-36.

Reinforced concrete work shall conform to the Building Code requirements ACI 318. Portland cement shall conform to ASTM C-150, Type II, low alkali. Reinforcing bars shall conform to ASTM A 615, Grade 40.

CONCRETE

Concrete shall meet the requirements of ASTM C-94 specifications.

Cement used for all concrete structures shall be ASTM C-150, Portland Cement Type II.

All concrete aggregate shall be from proven sources of materials not reactive to alkali or sulfates, with maximum size particles passing 1 1/2-inch square opening. Aggregates shall conform to ASTM C-33.

Concrete shall be concrete with 470 pounds of cement per cubic yard and 4-inch slump maximum per CalTrans Section 90 of the State Standard Specifications. The minimum 28-day test strength shall be 3,000-pound-per-square-inch compression.

Concrete forms shall be constructed to the lines shown on the drawings and shall be mortar tight. Forms shall be sufficiently rigid to prevent bulging and deformation

under load. No forms shall be removed within four days of placing concrete, and all removal shall be accomplished in a manner that will prevent damage to the concrete.

Sprinkle foundation sufficiently ahead of placement of the concrete.

Concrete shall be transported from the mixer to the placement as rapidly as possible by methods that will prevent segregation and loss of ingredients. Any concrete which, during transportation, has become too stiff for effective placement or consolidations shall be wasted. In no case shall concrete be used which has been retained in truck mixers for more than 90 minutes after the introduction of mixing water to the batch. Concrete retained in truck mixers for more than 45 minutes shall be continuously agitated. Concrete shall be deposited as nearly as possible in its final position. Drop chutes and elephant trunks shall be used to drops greater than 5 feet. Concrete shall be placed at such a rate that all concrete in the same lift shall be deposited on plastic concrete. If previous placed concrete has harden, the concrete lift shall be roughen, cleaned, 1/2-inch of grout placed, and the concrete placed.

Concrete shall be placed by use of approved immersion-type vibrator equipment, supplemented by hand spading, rodding, and tamping, as necessary. Duration of vibration shall be limited to the minimum required to produce satisfactory consolidation without causing segregation. Vibrators shall not be used to promote horizontal movement of concrete.

The temperature of the placed concrete shall be 50° F. minimum and 85° F. maximum.

Concrete will be sampled and two test cylinders will be taken for each 50 cubic yards of concrete placed or for each separate placement. Half of the cylinders will be broken at 7 days and the remainder at 28 days after placement.

Defective concrete and concrete containing voids or rock pockets shall be removed and repaired as directed by the Engineer. Repair shall not have feather edges. All permanently exposed concrete shall have a wood trowel finish.

Protect concrete by keeping the surface moist for a minimum curing period of seven days after placing.

All fresh concrete shall be adequately protected from damage by construction equipment.

Backfill concrete shall meet the requirements of Section 19-3.062, State Standard Specifications, for slurry cement backfill (made with 198 pounds of cement per cubic yard).

STEEL REINFORCEMENT

Steel reinforcement shall consist of intermediate grade deformed bars, conforming to ASTM A-615, Grade 40. Reinforcing steel shall be clean and free from heavy rust, scale, or coating of any kind and shall be held in place and tied at splices, corners, and intersections with 16-gauge annealed wire.

The spacing of bars, measured center to center, shall be as shown on the drawings or as directed by the Engineer.

All reinforcing bar splices shall provide an overlap of 40-bar-diameters or as shown on the drawings.

COMPACTION TESTS

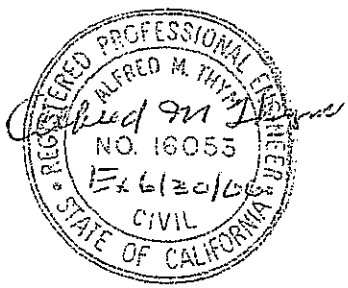
Signet Testing Labs, 3121 Diablo Avenue, Hayward, California will perform the compaction tests and they will provide an inspector for the job.

EROSION CONTROL

Work will be done on this dam during the summer months so it is not anticipated that storms will occur during construction. However, if unseasonable rains occur hay bales will be placed at strategic locations to control erosion on disturbed areas. The disturbed areas will be at the location of the dam itself, the disposal area and stockpile area. Hay bales will be placed on the lower side of each area to collect any soil displaced by the runoff.

After construction is finished, all the exposed disturbed areas and the dam slopes will be seeded with a mixture of 12 pounds Blondo Brome and 9 pounds of Rose Clover with 300 .400 pounds of ammonium phosphate per acre. These areas will also be covered with straw at the rate of two tons per acre to reduce erosion until the grass and clover become established.

There will be a water truck on the job to add moisture to fill. This truck will be used to control any dust that might become a problem.



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Calculations for Figure 3

spillway @ 2415

Area Calculations

(A) 290 × 5 = 1450

210 × 5 = 1050

80 × 5 = 400

2900 SQ Ft.

(B) 360 × 5 = 1800

220 × 5 = 1100

70 × 5 = 350

3250 SQ Ft.

(C) 390 × 5 = 1950

150 × 5 = 750

2700 SQ Ft.

(D) 350 × 5 = 1750

100 × 3 = 300

2050

(E) 220 × 4 = 880

(F) 100 × 2 = 200

G 0 = 0

Volume Calculations

A-B $\frac{2900 + 3250}{2} \times 100$

307,500

B-C $\frac{3250 + 2700}{2}$

D-E $\frac{2050 + 880}{2} \times$

E-F $\frac{880 + 200}{2} \times 100$

F-G $\frac{200}{2} \times 100$

Total cu. ft vol. = 1,653,000

43,560

24.7 Acre Feet

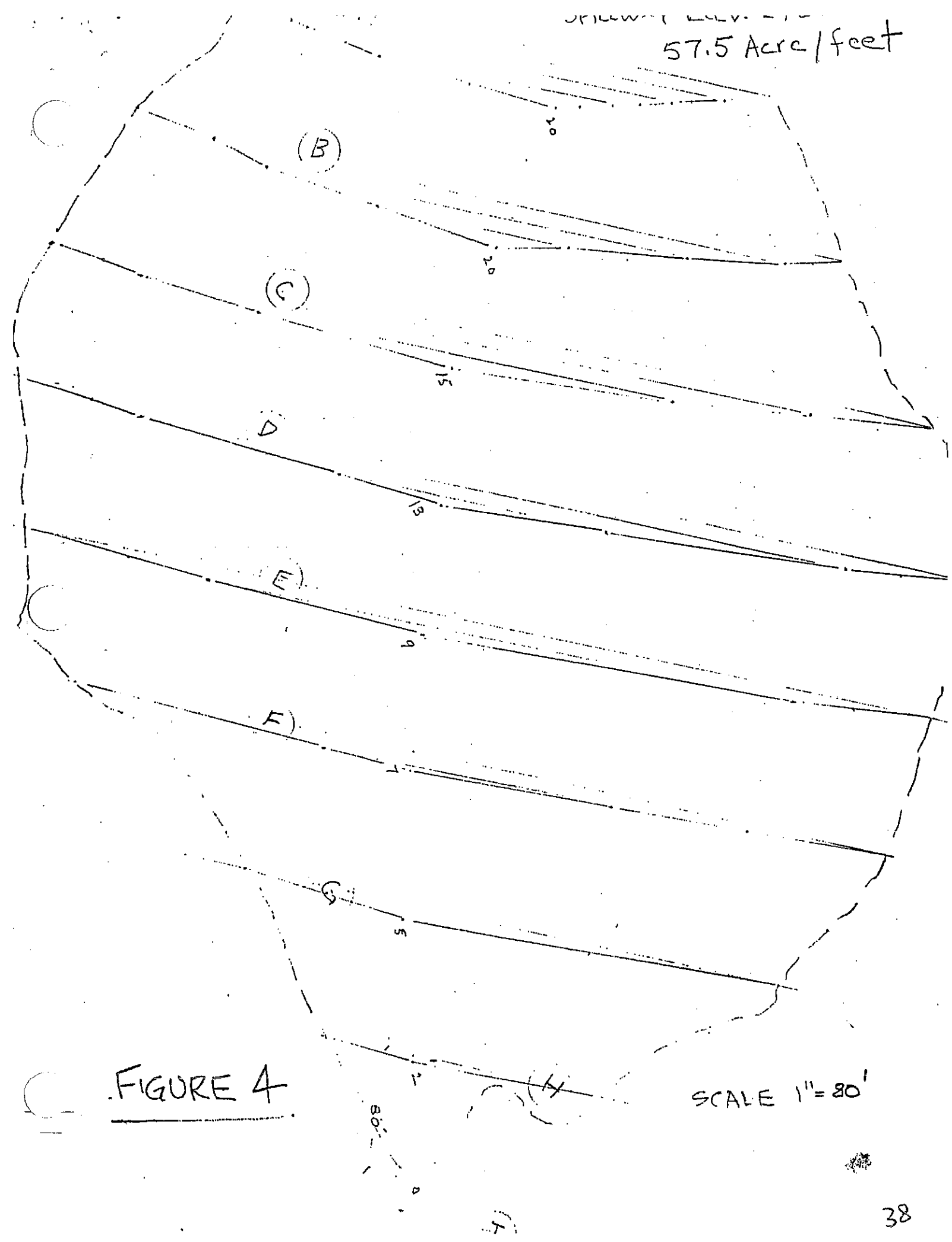


FIGURE 4

SCALE 1" = 80'

Calculations for Figure 7
Spillway elevation @ 2420'

	Section Area Calculations	Volume Calculations
A	350×5 1750	A-B
	290×5 = 1450	$\frac{4650+5500}{2}\times 100 = 507{,}500$
	210×5 = 1050	
	80×5 = 400	
	4650	
B	450×5 2250	B-C
	360×5 = 1800	$\frac{5500+5450}{2}\times 100 = 547{,}500$
	220×5 = 1100	
	70×5 = 350	
	5500	
C	550×5 = 2750	C-D
	390×5 = 1950	$\frac{5450+5000}{2}\times 100 = 522{,}500$
	150×5 = 750	
	5450	
D	580×5 = 2950	D-E
	350×5 = 1750	$\frac{5000+3480}{2}\times 100 = 424{,}000$
	100×5 = 500	
	5000	
E	520×5 2600	E-F
	220×4 = 880	$\frac{3480+2150}{2}\times 100 = 281{,}500$
	3480	
F	390×5 1950	F-G $\frac{2150+950}{2}\times 100 = 155{,}000$
	100×2 = 200	
	2150	G-H $\frac{950+200}{2}\times 100 = 57{,}500$
G	190×5 = 950	H-I $\frac{200}{2}\times 80$ 8,000
H	100×2 = 200	Total Cub. Ft. = 2,503,500
I	0×80 = 80	43560
		57.5 Acre Ft.

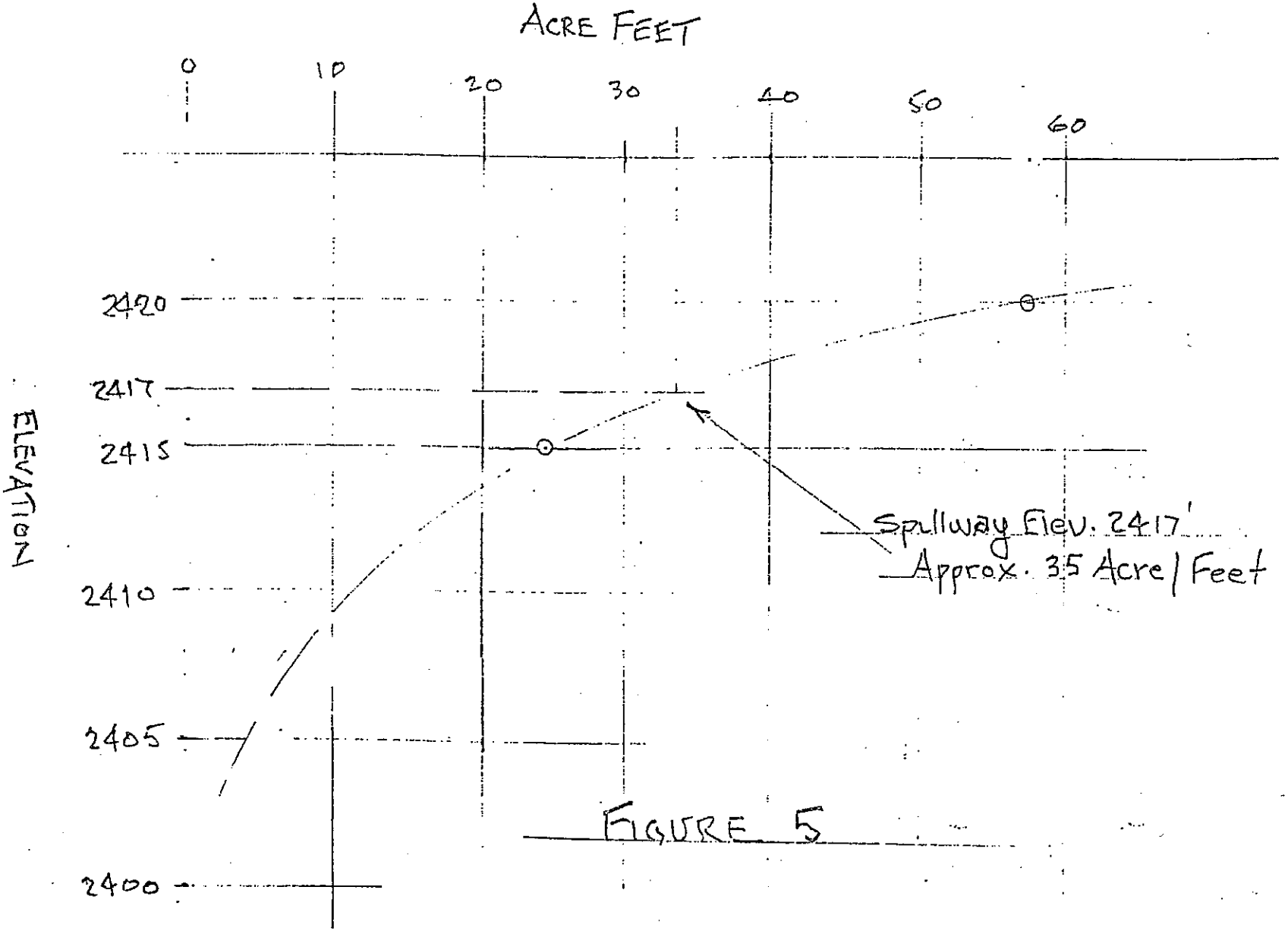
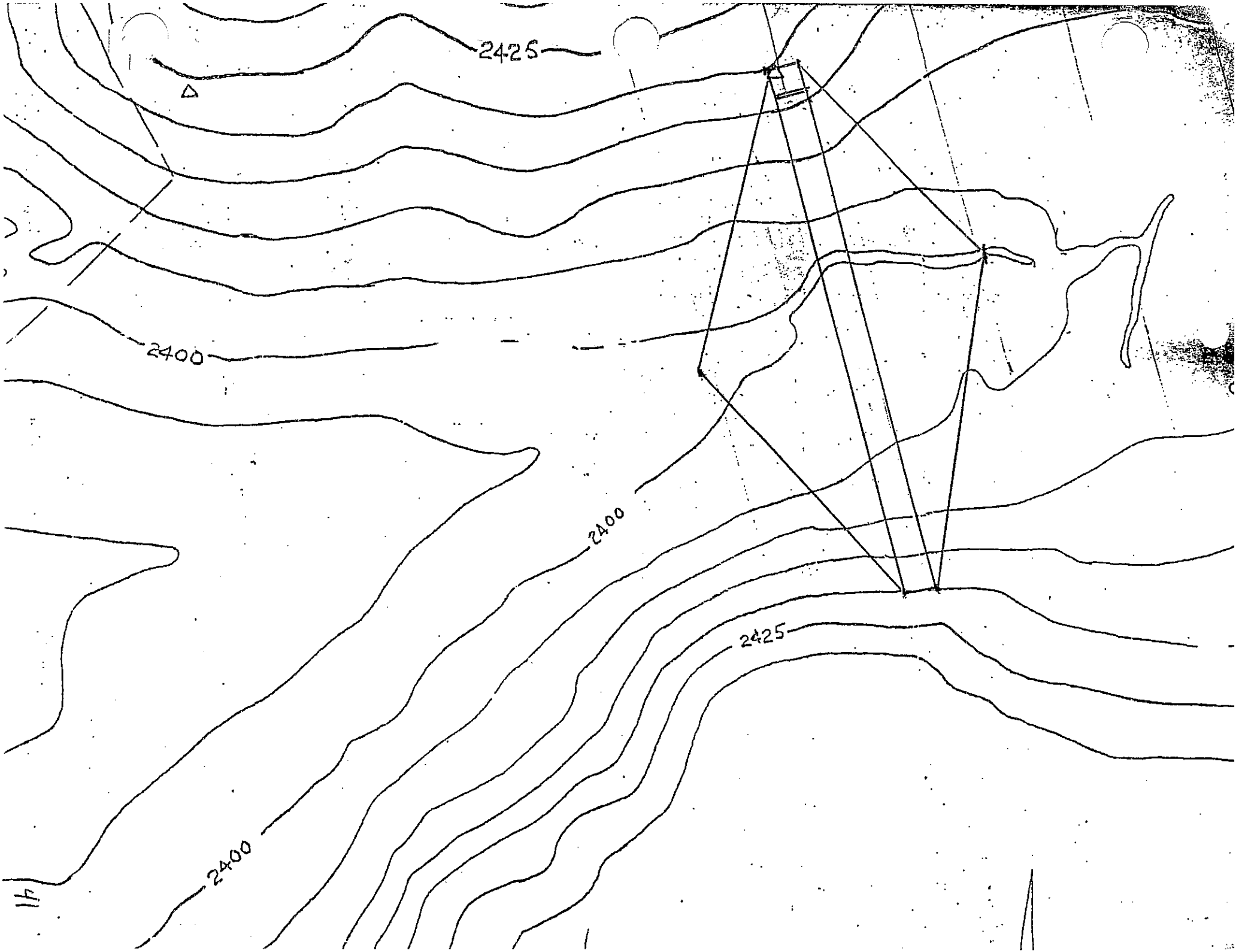

ACRE FEET
0
10
20
30
40
50
60
ELEVATION
2420
2417
2415
2410
2405
2400
Spillway Elev. 2417'
Approx. 35 Acre/Feet

FIGURE 5


2425
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