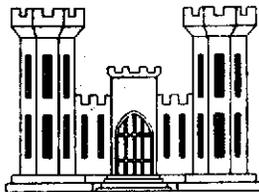


COPY 35

OPERATION AND MAINTENANCE MANUAL

KLAMATH RIVER AT AND IN THE VICINITY OF KLAMATH, CALIFORNIA

DEL NORTE COUNTY, CALIFORNIA



~~JUNE 1972~~

REVISED MARCH 1974

**U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA**

This is the complete manual

ROUTING AND TRANSMITTAL SLIP		ACTION
1 TO (Name, office symbol or location) EUREKA PROJECT OFFICE	INITIALS	CIRCULATE
	DATE	COORDINATION
2	INITIALS	FILE
	DATE	INFORMATION
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DATE

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GSA FPMR (41CFR) 100-11.206

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OPERATION AND MAINTENANCE MANUAL
KLAMATH RIVER AT AND IN THE VICINITY OF KLAMATH, CALIFORNIA
FLOOD CONTROL PROJECT
DEL NORTE COUNTY, CALIFORNIA

MARCH 1974

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FOREWARD

On 7 November 1966, the Congress approved construction by the Corps of Engineers of a flood control project on Klamath River, Del Norte County, California, situated generally in the river reach between the mouth and about 8.5 miles upstream. Actual construction effort was concentrated in the Klamath Townsite and Klamath Glen areas. Flood damage in flood plain areas not protected by structural measures will be controlled through flood plain management.

In 1970, the Congress modified the project to add protection of the north bank of the Klamath River for approximately two miles from Klamath Townsite to Larson's Quarry.

An Operation and Maintenance Manual, dated November 1969, was prepared by the U.S. Army Engineer District, Corps of Engineers, San Francisco, California, to acquaint responsible local interests with the requirements for maintaining the rip-rap protection and interior drainage features and enforcing the flood plain management requirements incorporated in the Klamath Townsite portion of the authorized project. The manual was revised in June 1972 to include the Klamath Glen portion of the project.

This revised manual, prepared upon completion of the Klamath River Bank Protection portion of the project, fully covers all features of the entire authorized project. Timely and effective maintenance in accordance with this manual is required to assure continuation of beneficial results from all portions of the project.

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OPERATION AND MAINTENANCE MANUAL
KLAMATH RIVER AT AND IN THE VICINITY OF KLAMATH, CALIFORNIA
FLOOD CONTROL PROJECT
DEL NORTE COUNTY, CALIFORNIA

INTRODUCTION

1. AUTHORITY

The Klamath River at and in the Vicinity of Klamath, California, Flood Control Project, Del Norte County, California, was authorized by the Flood Control Act of 1966, Public Law 89-789, 89th Congress, 2d Session, enacted 7 November 1966, which reads in part as follows:

"Section 203. The following works of improvement for the benefit of navigation and the control of destructive floodwaters and other purposes are hereby adopted and authorized to be prosecuted under the direction of the Secretary of the Army and the supervision of the Chief of Engineers in accordance with the plans in the respective reports hereinafter designated and subject to the conditions set forth therein:

* * * * *

The project for flood protection on the Klamath River at and in the vicinity of Klamath, California, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 478, Eighty-ninth Congress, at an estimated cost of \$2,460,000."

Section 215 of the Rivers and Harbors Act of 1970 reads in part as follows:

"The project for flood protection on the Klamath River at and in the vicinity of Klamath, California, authorized by the Flood Control Act of 1966 (80 Stat. 1205), is hereby modified to require the Secretary of the Army, acting through the Chief of Engineers, to provide, as an essential part of the project, bank protection works extending approximately two miles downstream from the project to protect the north bank of the river from erosion due to Klamath River flows.****"

2. LOCATION

a. The Klamath Townsite portion of the authorized project extends from approximately River Mile 2 to River Mile 3 on the Klamath River at Klamath Townsite, Del Norte County, California.

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b. The Klamath Glen portion of the authorized project extends from approximately River Mile 5.5 to River Mile 7.5.

c. The Klamath River Bank Protection portion of the project as authorized by the 1970 modification extended the protection on the right bank or north bank at the river from approximately River Mile 0.2 to 2.0.

3. DESCRIPTION OF THE PROJECT

a. Klamath Townsite Portion. The California Division of Highways and the San Francisco District, Corps of Engineers, through cooperative planning, developed an alternative plan to the plan authorized in House Document No. 478. The alternative plan combined highway construction and flood control features for the Town of Klamath. In order to provide flood protection as soon as possible for the Town of Klamath, the State of California advanced its program for construction of U.S. Highway 101 in the vicinity of the Town of Klamath by approximately ten years. The State of California constructed an embankment with riverward slope protection as part of U.S. Highway 101. The Corps of Engineers' portion of the project primarily entailed filling, to standard project flood elevation, the confined depression between the highway embankment and the steep canyon wall bordering the proposed townsite, and installing a gravity system of interior drainage. The fill area consists of a strip of land on the north side of the Klamath River, 100 feet to 700 feet wide and about 4,500 feet long, centered 2.5 miles upstream from the river mouth. This area of about 48 acres is the new Klamath Townsite.

b. Klamath Glen Portion. Approximately 8,900 feet of revetted levee, encircling Klamath Glen, is the primary feature of this portion of the authorized project. Interior runoff relief is provided by one 48-inch gravity flow culvert. A V-shaped channel on the landward side of the levee, from Station 84+00 to Station 22+00, will carry surface runoff and the seepage outflow of perforated pipe-subdrains to a 9-acre ponding area specially prepared within a 27-acre ponding easement. The prepared pond also serves as the forebay for the pumping plant, consisting of three pumps, diesel powered engines and controls. The total ponding area is sufficient to impound interior runoff from a standard project flood.

c. Bank Protection Portion. This portion consists of 7,300 feet of riprapped protection along the north bank of the Klamath River from the end of the existing riprap along U.S. Highway 101 to Larson's Campsite some 600 feet downstream of the Requa Inn where it ties into existing riprap along the bank. Tie backs extend approximately seventy five feet into Hunter and Salt Creeks.

4. PROTECTION PROVIDED

a. The Klamath Townsite portion of the project, as constructed, provides standard project flood protection for the 48-acre area adjacent to the portion of relocated Highway U.S. 101 which extends northward from the new Highway U.S. 101 Bridge across the Klamath River. The riprapped highway embankment was constructed to an elevation of two feet above standard project flood water surface.

b. The Klamath Glen portion of the project, as constructed, provides protection against a standard project flood to the community of Klamath Glen. The levee height provides a 5-foot freeboard above standard project flood water surface.

c. The Klamath River Bank Protection project protects the right or north bank of the extreme downstream end of the Klamath River from erosion damage during the standard project flood. No protection against inundation is intended.

5. CONSTRUCTION HISTORY

a. Construction of the Townsite portion of the project was initiated in April 1968 and completed in October 1968. A joint inspection was held on 24 October 1968 by the Corps of Engineers and officials from the Del Norte County Engineer's office. The project was officially transferred to Del Norte County for operation and maintenance on 14 November 1968.

b. Construction of the Klamath Glen portion was initiated in January 1971 and completed in November 1971. A joint inspection was held on 17 November 1971 attended by representatives of the Corps of Engineers and the Del Norte County Engineer's office. The project was officially transferred to Del Norte County for operation and maintenance on 7 February 1972.

c. Construction of the Klamath River Bank Protection portion was initiated in July 1972 with the intention that it be completed in 1973. Due to favorable conditions, work was completed in November 1972. A joint inspection was held on 20 November 1972 attended by representatives of the Corps of Engineers and the Del Norte County Engineer's office. The project was officially transferred to Del Norte County for operation and maintenance on 7 December 1972.

LOCAL COOPERATION REQUIREMENTS

6. ASSURANCES OF COOPERATION

By Resolution No. 67-43 dated 24 April 1967, the Del Norte County Board of Supervisors stated:

"FURTHER RESOLVED that in the event the United States Government adopts and authorizes the proposed plan of improvement, it is the declaration of this Board to cooperate with the U.S. Army Corps of Engineers in the accomplishment of the aforesaid project as follows:

"a. Provide without cost to the United States all lands, easements, and rights-of-way necessary for construction and functioning of the project;

"b. Hold and save the United States free from damages due to the construction works;

"c. Maintain and operate all the works after completion in accordance with regulations prescribed by the Secretary of the Army, and manage the historical flood plain within the eight-and-one-half mile reach above the mouth of the Klamath River in accordance with Paragraph 'f' below;

"d. Adjust all claims regarding water rights arising from construction of the project;

"e. Make any alterations to existing improvement which may be required because of the project, and

"f. Prevent any encroachment on the constructed works, ponding areas, and flood plain management areas which might interfere with the proper functioning of the project, lessen its beneficial effects, or reduce its design capacity; and, if ponding or flood plain management is impaired, provide promptly without cost to the United States substitute storage or equivalent pumping capacity and such flood-control works as required to protect the management areas.

Further, by Resolution No. 68-11 dated 13 February 1968, the Del Norte County Board of Supervisors stated:

"NOW THEREFORE, BE IT RESOLVED that this Board affirms and agrees to provide the local cooperation set forth in Resolution No. 67043 in connection with the present proposed project at Klamath and be it further resolved that WILLIAM W. SPEER, County Counsel and/or LAVERNE M. NELSON, County Road Commissioner, be, and each of them is hereby authorized to certify to the Army Corps of Engineers on behalf on this Board that it has obtained all lands, easements, and rights-of-way necessary for the performance of the proposed work at Klamath."

7. ENTRY PERMITS

Entry permits for the project were furnished by the Del Norte County Board of Supervisors acting through the Del Norte County Road Commissioner and County Engineer. Pertinent resolutions of the Board of Supervisors and correspondence granting lands, easements and rights-of-way for construction purposes are given in Exhibit B.

MAINTENANCE AND OPERATION

8. PURPOSE

The purpose of this manual is to assist the responsible local authorities in carrying out their obligations through provision of information and advice as to the operation and maintenance requirements of the project. The construction plans appended to this manual are included as an aid in proper maintenance and should be referred to. Maintenance of electrical and mechanical equipment should be performed according to instructions in manuals furnished by manufacturers. Particular attention should be given to the maintenance required in the manufacturer's warranty.

9. REGULATIONS

Section 208.10, Title 33 of the Code of Federal Regulations contains rules for the maintenance and operation of local flood protection works provided by the Secretary of the Army in accordance with authority contained in Section 3 of the Flood Control Act of 22 June 1936, as amended and supplemented. A copy of the complete regulations will be found in Exhibit A. Compliance with these regulations is one of the requirements of local cooperation. Applicable portions of the regulations are as follows:

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"General

"(1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits.

"(2) The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood control works in accordance with regulations prescribed by the Secretary of the Army, as required by law, shall appoint a permanent committee consisting of or headed by an official hereinafter called the 'Superintendent,' who shall be responsible for the development and maintenance of, and directly in charge of, an organization responsible for the efficient operation and maintenance of all of the structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States.

"(3) A reserve supply of materials needed during a flood emergency shall be kept on hand at all times.

"(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the rights-of-way for the protective facilities.

"(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project rights-of-way, nor shall any change be made in any feature of the works without prior determination by the District Engineer of the Department of the Army, or his authorized representative that such improvement, excavation, construction or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods

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of construction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished the District Engineer after completion of the work.

"(6) It shall be the duty of the superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance and operation of the protective works.

"(7) The District Engineer or his authorized representatives shall have access at all times to all portions of the protective works.

"(8) Maintenance measures or repairs which the District Engineer deems necessary shall be promptly taken or made.

"(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods.

"(10) The Department of the Army will furnish local interests with an Operation and Maintenance Manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under these regulations."

10. DUTIES OF SUPERINTENDENT

In line with the provisions covered by the regulations, the general duties of the Superintendent should include the following:

a. Training of key personnel. Key personnel should be trained in order that regular maintenance work may be performed efficiently and to insure that unexpected problems related to flood control may be handled in an expeditious and orderly manner. The Superintendent should have available the names, addresses and telephone numbers of all his key men and a reasonable number of substitutes. These key men should in turn have similar data on all of the men that will be necessary for assistance in the discharge of their duties. The organization of key men should include the following:

(1) An assistant to act in the place of the Superintendent in case of his absence or indisposition.

(2) Sector foremen in sufficient number of lead maintenance patrol work of the entire project during flood fights. High qualities of leadership and responsibility are necessary for these positions.

b. Streamflow stages. Permanent arrangements should be made by the Superintendent with the National Weather Service at Eureka, California, to secure forecasts of weather and potential flood conditions to plan adequate measures of protection.

c. Semiannual report. Attention is directed to paragraph 208.10 (a)(6) of the Flood Control Regulations (inclosed with this manual as Exhibit A) which states:

"(6) It shall be the duty of the superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works."

The report should be submitted within a ten-day period, prior to 1 June and 1 December of each year and should include dated copies of all reports of inspection made during the period of report. The report should also include the nature, date of construction and date of removal of all temporary repairs and dates of permanent repairs. In accordance with the regulations, inspections will be made prior to the beginning of the flood season and, otherwise, at intervals not to exceed 90 days. Immediate steps shall be taken to remedy any adverse conditions disclosed by such inspections. A form for this report is shown in Exhibit E, if space in form is insufficient, attach additional sheets.

d. Checklist. The checklist shown in Exhibit F should be used in each inspection to insure that no features of the protective system are overlooked.

e. Proposed improvements or alterations. Drawings or prints of proposed improvements or alterations to the existing Flood Control Works must be submitted for approval to the District Engineer, U.S. Army Engineer District, San Francisco, Corps of Engineers, San Francisco, California, sufficiently in advance of the proposed construction to permit adequate study and consideration of the work. The Del Norte County Road Commissioner and County Engineer shall review all proposed plans of improvement for appropriateness and assurance that the improvements are located on the plans with proper reference to project centerline station. This review will be accomplished prior to submittal to the District Engineer. Drawings or prints, in duplicate, showing any improvements or alterations as finally constructed should be furnished to the District Engineer, U.S. Army Engineer District, Corps of Engineers, after completion of the work.

11. RIPRAP

Inspection and maintenance of riprap shall be in accordance with paragraph 208.10 (b) of Exhibit A which states in part:

"The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Periodic inspections shall be made by the Superintendent to insure that maintenance measures are being effectively carried out and, further, to be certain that:

(vi) No revetment work or riprap has been displaced, washed out, or removed.

Such inspection shall be made immediately prior to the beginning of the flood season; immediately following each major high water period, and otherwise at intervals not exceeding 90 days. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections."

12. INTERIOR DRAINAGE FACILITIES - GENERAL

Inspection and maintenance of drainage structures shall be in accordance with paragraph 208.10 (a) General, (see paragraph 9 of this manual) and 208.10 (d) which states in part:

"Drainage structures

(1) Maintenance. Adequate measures shall be taken to insure that inlet and outlet channels are kept open and that trash, drift, or debris is not allowed to accumulate near drainage structures. Periodic inspections shall be made by the Superintendent to be certain that:

(a) Pipes, gates, operating mechanism, riprap, and headwalls are in good condition;

(b) Inlet and outlet channels are open;

(c) Care is being exercised to prevent the accumulation of trash and debris near the structures and that no fires are being built near bituminous coated pipes;

(d) Erosion is not occurring adjacent to the structure which might endanger its water tightness or stability."

General maintenance measures shall include keeping all ditches, inlet structures, culverts, manholes, subdrain outlets, etc., clear of trash, debris, and growth that may cause any obstruction to flow. These measures should also include any repairs necessary to restore the works to their original condition.

13. RELIEF WELLS - KLAMATH GLEN

a. Description. Thirty-four relief wells have been installed at the land side levee toe. Locations and details of relief well installations are as indicated hereinafter in tabular form.

b. Inspection. The relief wells shall be sounded annually to check for sanding. The inspection should include an examination of the cover plates, locks, tee outlets and other appurtenances, and of any indication of piping or slumping of the ground around or near wells. Relief wells shall be pump tested at 5-year intervals to obtain the specific yield of the well (gallons per minute per foot of well screen per foot of well drawdown). If this yield is less than 80 percent of the installed yield as hereinafter indicated, corrective treatment surging and flushing shall be made and the well pump tested again. The wells shall be checked for sanding before and after each pumping. Damage to relief wells and associated discharge systems shall be corrected as soon as practicable. During periods of high stream flow, the relief wells shall be checked for discharge to determine specific yield and possible sanding. Results of inspections shall be reported to the District Office, Engineering Division, ATTN: F & M Branch. Relief wells which do not function properly during periods of high stream flow shall be reported immediately to the above by telephone (area code 415 556-3309).

c. Maintenance. Prior to 15 October of each year the relief wells shall be sounded to determine the amount of sand that has accumulated in the bottom of the pipes. If there is more than 12 inches in the wells, they are to be flushed with a mixture of air and water until all the material has been removed from inside the pipes. In addition, any trash or debris which has accumulated in the outlets of collector pipes shall be removed. Damaged relief wells and associated discharge systems shall be corrected as soon as practicable. Wells which sand badly shall be filled with concrete and replacement wells installed.

RELIEF WELL DATA

KLAMATH GLEN, CALIFORNIA

RELIEF WELL SCHEDULE				YIELD		
WELL NO.	STATION	ELEVATION OF TOP OF RISER PIPE	DEPTH OF HOLE FROM TOP OF RISER PIPE	RATE GPM	DURATION HR	DRAWDOWN FT
1	ABANDONED	-	-	-	-	-
2	80+00	50.4'	62'	150	.1	8
3	77+00	48.1'	55'	50	.25	5.7
4	74+00	47.8'	52'	500	6	.9
5	72+25	48.4'	89'	600	4	0
6	70+90	52.2'	90.5'	500	6	1.0
7	69+90	49.0'	91'	700	6	0
8	68+85	48.5'	91'	500	6	4.5
9	67+82	47.5'	91'	500	6	0
10	66+71	47.4'	84'	860	6	0
11	66+05	48.8'	72'	425	6	.1
12	65+53	47.6'	72'	390	6	.3
13	65+01	46.6'	74'	400	6	0
14	64+50	46.6'	74'	400	6	0
15	63+98	46.7'	74'	360	6	0
16	63+48	47.8'	74'	360	6	0
17	62+96	48.0'	75'	400	6	0
18	62+43	46.9'	74.5'	410	6	0
19	61+92	46.7'	75.4'	510	6	0
20	61+41	46.7'	78'	400	6	.1
21	60+88	49.0'	8.0'	400	6	0
22	60+37	49.2'	81'	425	6	0
23	59+13	49.2'	72'	840	6	.8
24	57+14	49.2'	71.5'	820	6	0
25	55+14	49.2'	72.5'	830	6	0
26	52+65	49.9'	57.5'	630	6	2.4
27	49+67	50.7'	58.5'	630	6	1
28	46+66	49.9'	51'	500	6	3.0
29	43+66	46.7'	52'	400	6	0
30	40+66	46.7'	55'	500	6	0
31	20+00	-	80'	-	.02	54
32	16+80	29'	69'	-	.04	46
33	13+55	29'	59'	-	.04	40
34	10+90	39.7'	67'	75	6	0
35	7+35	41.7'	67'	200	6	0
36	ABANDONED	-	-	-	-	-

14. GRAVITY DRAINAGE SYSTEM - KLAMATH GLEN OUTLET STRUCTURE

a. Description. The outlet structure is located at Station 17+25. It consists of concrete inlet and outlet structures, a 48-inch C.M.P. with bituminous coating and paved invert, and a concrete gatewell structure with a 48-inch circular slidegate and a 48-inch flapgate on the discharge end. The purpose of the outlet structure is to drain the water from the ponding area by means of gravity flow.

b. Operating conditions - general.

(1) Normal operating conditions, slidegate open. Runoff from behind the levee will collect in the pond. As long as the water surface in the pond is higher than the water surface on the Terwer Creek side, water will flow through the outlet structure by gravity. When the water surface in Terwer Creek is higher than the pond, the flapgate at the outlet end of the structure will close and prevent water from entering the ponding area through the outlet pipe. After the level of Terwer Creek has subsided and is lower than the water level of the pond, the flapgate will open and gravity flow will again take place. Unless the flapgate fails to function, the slidegate should remain open.

(2) Abnormal operating conditions. The possibility exists that the flapgate at the outlet end of the pipe may fail to function and not close. If the water level of Terwer Creek rises above the water level of the pond, water will flow from Terwer Creek to the ponding areas. When this situation occurs, the slidegate should be lowered to a closed position to prevent any flow from Terwer Creek. As long as the water surface in the creek is higher than the pond, the slidegate should remain closed until the flapgate can be repaired.

(3) Monthly machinery tests. In order to provide a shallow pond for testing or exercising the pumping machinery, it may be necessary to close the slidegate. Immediately after making such tests, the slidegate should be opened to the fully opened position.

CAUTION: During such tests, the water level in the pond should not be permitted to rise above elevation 28.0. This is necessary to preclude the possibility of damaging the slidegate. Also, by keeping the pond at or below this level, valuable storage space in the pond will not be excessively filled should a flood suddenly occur.

c. Gates.

(1) Flapgate. The flapgate is mounted on the discharge end of the outlet pipe. It is Waterman Model F-55f, cast iron drainage gate (flatback, machined iron seats). It is manufactured by Waterman Industries Inc., 515 South G Street, Exeter, California 93221. Its operation is automatic and requires no special maintenance effort or lubrication.

(2) Slidegate. The gate is a 48" Waterman Model SC-50f cast iron slidegate (flatback). It is designed for a maximum seating head of 50 feet and a maximum unseating head of 10 feet. It is manufactured by Waterman Industries Inc., 515 South G Street, Exeter, California 93221. It requires no special maintenance effort or lubrication.

(3) Gate lift.

(a) Description. The lift is a Waterman Type 3EP-12:1 Lift. It is manufactured by Waterman Industries Inc., 515 South G Street, Exeter, California 93221. This unit features gear ratios of 4:1 on high speed and 12:1 on low speed. It has zerck type lubrication fittings. Any of the following commercial products can be used for lubrication:

Standard Oil Company of California: Marine
Lubriplate
Conoco Oil Company: All Purpose Super Lube
Texaco Inc.: Texaco Multifax Heavy Duty #2
Shell Oil Company: Shell Alvania

(b) Hand operation. The handle comes with a fitted hand grip and can be used with either gear ratios of 4:1 or 12:1. The handle is turned until the slidegate reaches the desired position.

(c) Power operation. A gasoline engine powered wrench is furnished for rapid, powered operation of the gate lift. This device is manufactured by Homelite, a division of Textron Inc. located at 2234 Auburn Boulevard, Sacramento, California. The single cylinder, two-stroke cycle, 4 horsepower engine operates on a fuel mixture of 1/2-pint Homelite engine oil in each gallon of regular gasoline. One-half pint of SAE 30 oil can be used in lieu of the Homelite oil. Homelite SAE 90 gear oil is used in the gears. The power wrench engages either of the 3/4-inch square shafts on the gate lift. The gate lift handle should be removed before the power wrench is used.

d. Inspection. After each storm, an inspection should be made to insure the following:

(1) That the interior drainage ditch, inlet structures, and pipe are all free of any deposition or debris which could hinder the normal operation of this system.

(2) That the inlet and outlet of the 48" pipe are free from any debris or deposition which would interfere with the free flow of water.

(3) That the flapgate is free from any debris or silt that could keep it from opening or closing freely.

(4) That the slidegate is in good operational condition.

(5) That the gatewell structure is free from any debris or deposition that would keep the slidegate from closing.

15. MECHANICAL DRAINAGE SYSTEM, KLAMATH GLEN

a. General.

(1) The mechanical drainage system consists of:

- (a) Three engine-driven pumps
- (b) Right angle gear drive
- (c) Drive shafts
- (d) Engines
- (e) Grating
- (f) Float switches
- (g) Engine control systems
- (h) Warning devices
- (i) Battery chargers
- (j) Commercial electric system
- (k) Fuel Tank
- (l) Discharge line
- (m) Building

It is designed to operate automatically during stormy periods and for this reason it is independent of commercial electric power.

(2) The mechanical drainage system is designed to discharge water from the ponding area over the top of the levee under the following conditions:

(a) A condition in which the gravity outlet cannot function because the water surface on the Terwer Creek side of the levee is higher than the water surface in the pond.

(b) A condition in which the gravity outlet is functioning but unable to remove water as fast as it ponds in the ponding area.

(c) A condition in which the gravity outlet is shut to provide a shallow pond for the purpose of testing or exercising the machinery. (See CAUTION statement in paragraph 14.)

(3) Pumps are controlled by float switches which operate when water reaches a predetermined level. The engines are normally stopped when the water falls to a lower predetermined level. The engines are protected by an automatic stopping mechanism which will operate to stop the engine under any one of the following conditions:

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- (a) Overspeeding
- (b) Overheating of coolant
- (c) Low oil pressure

A grating at the intake of the pump chamber protects the pump from large floating debris. Operation is completely automatic and requires no operator in attendance. Periodic maintenance however is required.

b. Pumps.

(1) Description. Three identical pumps are provided. They are of the mixed-flow type having an oil lubricated lineshaft and a 24-inch below the base discharge elbow. They fit through an opening in the deck of the pump station and are suspended over that opening by a 1-1/2-inch thick steel base plate. The pumps are manufactured by the Johnston Pump Company, 1775 East Allen Avenue, Glendora, California 91740. The stainless steel lineshaft is held in alignment by bronze sleeve bearings. Since the bearing immediately above the impeller is water lubricated, the pumps must not be run unless the pond water surface is at elevation 24.0 or higher.

(2) Operation. Proper performance of these pumps requires that they operate at 750 RPM and that the impeller be adjusted correctly. Pumps and engines should be operated together at least once a year prior to flood season to make sure they function correctly and to adjust pump RPM with a load on the engines.

(a) Pump RPM is controlled by adjusting the engine speed. To obtain a pump speed of 750 RPM, the engine must operate at 2250 RPM. Pump RPM can be measured with a hand held tachometer (not furnished) at the top of the pump shaft. The pump shaft extends through the right-angle gear drive and is accessible by removing the cover on the top of the right-angle gear drive. The RPM on the pump shaft is multiplied by 3 to obtain the engine RPM. The purpose of RPM measurements and adjustments is to ensure a pump speed of 750 RPM; because this speed gives the best efficiency for the mechanical drainage system. The engine tachometer will be set by authorized workmen to read 2250 RPM when the pump shaft turns at 750 RPM. The overspeed stopping mechanism will be set on the basis of 3 times the pump speed rather than the engine tachometer because the engine tachometer is less accurate.

(b) Impeller adjustment consists of moving the pump shaft and impeller vertically by rotating a large nut at the top of the shaft. To obtain access to the nut, remove the top cover of the right-angle gear drive. Adjustment instructions are contained in Johnston Vertical Pumps - Installation, Operation and Maintenance Manual. This operation is best handled by a qualified pump man.

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(3) Lubrication. Lubrication shall be in accordance with the lubrication chart, Installation, Operation and Maintenance Manual - Johnston Vertical Pumps. Note that oil drip rate must never be less than 5 drops per minute. Note also the recommended lubricant. The installation and operating portions of the Johnston manual should be studied insofar as they pertain to oil lubricated pumps. The oil reservoir on the solenoid oiler will be checked once each month and after each 50 hours of operation. Particular care must be taken that pumps are not run dry. Since the bearing immediately above the impeller bowls is water lubricated, there must be water to pump. Absence of such water will damage the pump if it is run.

(4) Maintenance. The pump intake should be periodically checked and debris removed. Precautions must be taken to prevent the engine from starting during this operation.

c. Right angle gear drive.

(1) Description. The right angle gear drive is a Randolph Model 20, vertical hollow shaft drive. It is mounted on the gear drive pedestal of each pump. Its weight is carried by the pump base plate. This is illustrated in Johnston drawing number H-4392-D in the Johnston Manual. It is manufactured by Randolph Manufacturing Company, Box 5306, Lubbock, Texas 79417. Manufacturer's literature may be found in the pump section of the manual. A certified dimension print, an illustrated parts list and operating and maintenance instructions are found at the back of the Johnston Manual. This drive serves three functions as follows:

(a) Supports the weight of all rotating pump parts by means of its hollow shaft through which the pump lineshaft runs. The pump lineshaft is supported at the top of this hollow shaft and a suitable radial bearing is provided in the right angle gear drive.

(b) Changes direction of the plane of rotation from horizontal to vertical.

(c) Provides a reduction in RPM in the ratio 3 turns on the horizontal shaft equals 1 turn on its vertical.

(2) Lubrication. The lubrication chart in the manufacturer's manual lists the proper lubricant as to type and grade. This particular installation requires oil changing at the end of each wet season. Periodic changes should be made every three months for the first year until a rate of water condensation can be determined. The oil capacity is 18 quarts per drive. The oil level is checked through a window. During operation, oil should cover the upper window on the right-angle gear drive.

(3) Cooling. There is no provision for liquid cooling. The drive is air cooled.

d. Drive shaft.

(1) Description. Three identical drive shafts are provided. Suitable adapters are provided to connect to the engine and to the right angle drive. The drive shafts are enclosed in a removable metal housing for safety purposes. Each drive shaft consists of a W-70 flange having a 2-3/4" bore, a W-70 flange having a 2-1/4" bore and a WVA-70 shaft. The WVA-70 shaft has a splined slip joint and two universal joints. The drive shafts are manufactured by H. S. Watson Company, 1316 - 67th Street, Emeryville, California 94608.

(2) Disconnection. When conducting monthly engine reliability and maintenance checks it may be necessary to run the engines without running the pumps. To do this, disconnect the drive shaft at the engine. Procedure:

(a) Disconnect batteries

(b) Remove guard

(c) Disconnect flanges at engine end by removing bolts

(d) Pull the shaft to rear to obtain clearance and place the driven end on suitable support. The slip joint should not be disassembled.

CAUTION: Drive shaft must be reconnected after engine tests. The pumping plant cannot provide emergency protection if drive shafts remain disconnected between engine tests.

(3) Connection proceeds in the reverse order.

(4) Disassembly and assembly. Disassembly and assembly are covered in the Installation Instructions, page 22 of "Watson Drive Shafts." Note that the yokes are to be in line.

(5) Lubrication. Lubrication is covered in Service Instructions, "Watson Drive Shafts." In view of the limited annual operating time, the shafts will be lubricated quarterly whenever the manufacturer's lubrication interval is longer.

e. Engine.

(1) General description. Three Caterpillar D334 diesel engines are provided, one for each pump. They are four stroke cycle diesel engines and described in the literature provided by the manufacturer, Caterpillar Tractor Company, 100 NE Adams Street, Peoria, Illinois 61602. To operate pumps at the required 750 RPM, the engines must operate at 2250 RPM, pump RPM being the more important factor. Engines must be started and the operating systems checked and maintained at least once every 30 days.

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(2) Cooling system features.

(a) The cooling system is independent of the water being pumped. The engine is cooled in much the same manner as a liquid cooled automobile, truck or tractor engine.

(b) A radiator is provided for the coolant.

(c) A fan and necessary belting is provided. This fan causes the air to flow from the fan through the radiator, opposite to automotive practice.

(d) Anti-freeze protection is provided to 0°F.

(e) A coolant heater is provided. This heater is powered from the commercial power source. It aids in easy starting by maintaining a minimum temperature of 60°F.

(3) Lubrication system. A crankcase oil heater is provided. This is powered by commercial electric power. Its purpose is to minimize engine wear on starting and to provide for easy starting.

(4) Starting system. The engine uses a direct electric starting system which operates under full engine compression. A 24-volt starter is used. Four 6-volt batteries, connected in series, provide a 24-volt 200 ampere-hour source of direct current power.

(5) Generating system. An alternator and rectifier are provided to recharge the battery during the engine operating period.

(6) Overcrank feature. Each engine is provided with an overcrank protective device. This protects engine and batteries from prolonged overcranking in the event it fails to start. At least five cranking attempts are made, with rest periods between crankings of about 1 minute duration. At the completion of cranking attempts, in the event the engine fails to start a red warning light is illuminated on control panel and a red flashing light is illuminated on the roof of the building. CAUTION - PREVENT INJURY: These engines may make more than 5 cranking attempts. Unless the overcrank light is illuminated on the particular cranking panel of the engine concerned, assume that another cranking attempt will be made and that the engine will run.

(7) Overspeed feature. The overspeed feature is an automatic shut-off in the event of overspeed. This is set on delivery and its adjustment in the field is not recommended unless the work is done by Caterpillar men. In the event of an overspeed shut-off, warning lights within and outside the building are energized.

(8) Low oil pressure safety shut-off. Excessively low oil pressure will stop the engine with the illumination of proper warning lights as described above.

(9) High coolant temperature shut-off. High coolant temperature will shut off the engine with the illumination of appropriate lights as described above. In the absence of coolant, the control is inoperative. It is possible, therefore, for the engine to lose all its water and keep running with consequent damage. It follows that the radiator must be periodically checked to make sure that the coolant is at the proper level.

(10) Glow plugs. Glow plugs are present but not hooked up. They are not used.

(11) Literature and instructions. Literature and instructions have not been provided for the engine as a separate unit. Pending the arrival of such literature (Caterpillar Form GEG 00294 D334), another publication dealing with a D334 Electric Set (Caterpillar Form GEG 00737) has been provided as a temporary guide. This guide covers the engine but also covers generators not applicable to this installation. The sections "Engine Operation," "Lubrication and Maintenance Chart" and "Lubrication and Maintenance Procedures" are of extreme importance and must be followed. Where instructions or information in this manual differs from what is contained in the manufacturer's manual, the manufacturer's manual shall apply.

(12) Testing of safety devices. Obviously the conditions which cause the safety devices to shut off the engine are conditions which would damage the engine. Duplicating such conditions to test the safety devices is equally damaging. Such devices are best tested by an authorized Caterpillar repairman who will set up temporary electric circuits which have the same effect electrically as the damaging condition. In this way the safety devices can be tested without risk.

f. Trash rack. A trash rack is provided at the inlet to the pump station to prevent any debris from entering the pumps and disrupting their operation. Debris should be cleaned from the trash rack with the rakes provided.

g. Engine control system.

(1) General description. Each engine control system is an electrical device powered by 24-volt direct current from batteries. Three separate but identical systems are provided, one for each engine. The systems were built by Republic Electric and Development Company, 85 Jackson Street, Hayward, California 94544.

Each engine has a crank panel mounted on the building wall. Each panel is numbered to correspond to the number of the engine for identification purposes. There are four red lights on each panel which, when illuminated, indicate the reason an engine is inoperative. The lights are identified on the panel face as overcrank, overspeed, low oil pressure and high coolant temperature. A reset switch is provided. There is a three position control switch with positions labeled auto, manual and off.

(2) Float switches. There are three float switches, one for each pump. They consist of a mounting pedestal, a float, and the necessary operational circuits to complete or break electrical connections. The switches give an electrical signal to the control system when it is in an automatic running position. The presence of such a signal from the float switches will start the engine. The absence of such a signal will stop it. The switch is a Floatrol switch, class 3100, manufactured by Autocon Industries, Inc., 995 University Avenue, St. Paul, Minnesota 55104. The operational procedures are covered in the technical data supplied by the manufacturer. The water surface elevation at which the engines and pumps begin to operate can be changed. The floats are adjustable. Inspection should insure that the stilling well is free of any debris or obstruction that would hinder the movement of the float. Float switches can be jammed open and fail to shut off the engines if debris accumulates in the pipe enclosing the floats. This could lead to the extremely damaging condition of running the pumps dry which will result in pump failure. The pumps will also be damaged by dry running if the water level in the ponding area falls below 24 feet since float switches are out of the control circuits when the control switch is in manual position.

(3) Operation.

(a) The only way the engine can be started is by the electric cranking motor. The only way the engine can be stopped is by shutting off the fuel. All elaboration of controls rests on these facts. The fuel is shut off by sufficient movement of a rack in the fuel injection pump. The means of moving the rack are immaterial, the result is the same. Normally the rack is moved by a solenoid controlled by the control system.

(b) The cranking panel selector switch is normally in the automatic position, marked "auto." It is important that this switch be kept in the "auto" position except when the equipment is being tested or when maintenance or repair work is being done. When in this position, an electric current from the float switch automatically starts the engine. If the engine is running, the absence of current from the float switch causes the engine to idle for about 2 minutes, then shut off. The cranking panel is more than its name implies. It is an electrical control for:

1. Starting the engine in the manual position.
2. Stopping the engine immediately. (The engine may also be stopped by an engine mounted device.)
3. Starting the engine automatically on an electric signal from the float switch.
4. Stopping the engine automatically with suitable idle time in the absence of an electrical signal from the float switch.
5. Stopping the engine automatically in the event of low oil pressure.
6. Stopping the engine automatically in the event of high coolant temperature.
7. Cranking timing and overcrank features.
8. Stopping the engine in the event of overspeeding.
9. Actuating signal lights on the roof of the building.
10. Permitting an operator to reset the electrical control circuits, after a cause of shutdown has been determined and corrected. (Manual protective devices on the engine must be reset as well.)
11. Dropping the battery charger out of the 24-volt circuit during cranking.

(c) The manual position of the automatic control switch allows the engine to be started for maintenance and test purposes. It is independent of any float control.

(d) The off position of the automatic control switch stops the engine without an idling delay.

(4) Trouble shooting. Under certain conditions the control system may stop or fail to start the engine.

(a) Engine fails to start without any electrical indication of trouble:

Check batteries and battery charger.

(b) Engine stops or fails to start, roof light flashing, indicator light on crank panel on.

1. Move selector switch to OFF.
2. Disconnect both cables from batteries as an additional safety measure.
3. Disconnect drive shaft at engine end, unless there is sufficient water for pump operation.
4. Locate and correct the fault as indicated by the appropriate indicator light.
5. Actuate the engine mounted reset button applicable to the fault and actuate the engine mounted safety lever. Consult Caterpillar Form GEG 00225, Engine Operation, pages 5-8 in this regard.
6. Manipulate the reset switch on the cranking panel.
7. Reconnect batteries.
8. Run the engine on manual control observing its operation.
9. Stop engine by turning control to stop.
10. Connect the drive shaft.
11. Set control switch to automatic.

The operation of the control system is not simple and it must be understood. A study of Caterpillar literature in the engine section, the Redco section, and wiring diagrams will enable an operator to understand it. These should be studied carefully.

(5) Manufacturer's manual, drawings and literature.

- (a) Redco Section of Manual: Four-light Cranking Panel.
- (b) Floatrol Section of Manual: Redco Automatic Starting Controls.
- (c) Wiring Section of Manual.

1. Peterson Tractor Interconnect Drawing - Redco four-light panel to D334 Engine, A 4804.

2. Republic Electric and Development Drawings.

a. Engine Control PA-23869

b. Outline PA-29290

c. Wiring DC PB-23868

d. Interconnect PB-29291

e. Schematic DC PB-23867

(6) Maintenance and service. The functioning of this control system should be checked out by an authorized Caterpillar repairman immediately before the season of probable use, and at six-month intervals.

h. Warning device.

(1) Description. Three warning lights are mounted on the roof of the pump house, one for each engine. They are red in color and have a revolving reflector giving a flashing effect.

(2) Operation. Any fault indicated by an engine control system will operate the light for that engine.

(3) Maintenance. Consult manufacturer's literature.

i. Battery charger.

(1) Description. Three La Marche Model A-11 Battery Chargers are provided, one for each engine. They are powered from commercial AC power sources. The chargers build up and maintain a charged condition in the storage batteries at all times except during the cranking of the engine concerned.

(2) Literature. A manufacturer's manual is supplied with each charger.

(3) Service. Adequately covered in the manufacturer's manual.

j. Electrical power.

(1) Commercial. 120/240 AC electrical power is supplied from a commercial source for:

- (a) Power and light in the pump station.
- (b) The coolant heaters for Diesel engines.
- (c) The lubrication oil heaters for the Diesel engines.
- (d) The battery chargers.

If the power is cut off, the pump station will continue to function. However, it should be restored as soon as possible particularly since the AC battery charger will be inoperative.

(2) Battery. Four 6-volt 200 ampere-hour batteries connected in series are furnished with each engine. These batteries are the source of 24-volt D.C. power for:

- (a) Starting the engine.
- (b) Transmitting signals from the float switch mechanism.
- (c) Operating the engine control system.

FAILURE OF THESE BATTERIES MEANS FAILURE OF THE ENGINE.

The specific gravity of the electrolyte (hydrometer reading) will be measured every 50 hours or weekly and a record kept of each cell reading. After the reading is taken, distilled water will be added as needed to bring the electrolyte to the proper level. The readings should be about 1300 to 1240. A prolonged period of low readings on the batteries of any one engine may be indicative of charger failure. A low reading on any one cell is indicative of battery failure.

k. Fuel storage tank. The two fuel storage tanks are fabricated from steel and each has a 1,000-gallon capacity. This is enough fuel for 50 hours of full speed operation. The level of fuel should be checked as a part of the periodic maintenance for the engines. The fuel in the tank should be drained and replaced with fresh fuel as often as recommended by the fuel supplier. A gravity drain for the entire fuel system is provided.

l. Water storage tank. The water stored in this tank is for use in the cooling system of the Diesel engines. It is not fit for human consumption. The water in the tank should be drained periodically. The roof strainer should be maintained free from any type of debris.

m. Pump discharge lines. Three 24-inch steel pipes, one for each pump, are provided. They should be examined for gasket failures and any exterior damage. The paint may require touch-up. The grill at the outlet end of each discharge pipe should be checked to insure that entry to the pipe is effectively prevented.

n. Grouted riprap. The strip of grouted riprap below the outfall from the pumps (Sta. 18+69) should be inspected each time the pump station is operated, to insure that the riprap has not been undermined, displaced, washed out or removed.

o. Engine building. The building that houses the engines is a prefabricated metal building. The building will require little or no maintenance. Proper precautions should be taken to insure that there are no obstructions to the flow of air through the building.

p. System stoppage. If one or more of the pumps is not discharging water properly and it is suspected that trash is fouling the pump, the following procedure can be used to flush water backwards through the pump to dislodge the trash.

(1) Observe the discharge and see which pump is not working properly.

(2) Set the selector switch on the appropriate cranking panel to "Manual."

(3) Reduce engine speed to 600 RPM as indicated on engine tachometer using the head throttle.

(4) Set the cranking panel selector switch to "OFF."

(5) After engine stops, allow pumps to backflow until flow stops. Look in the sump to verify that flow has stopped.

(6) Set cranking panel selector switch to "Manual" thus starting engine.

(7) Bring engine to operating RPM using head throttle.

(8) Set cranking panel selector to "Automatic."

q. Tools, lubricants and spare parts. Items such as the powered wrench, grease guns, lubricants, spare filter elements for the diesel engines and various flood fighting materials, should be securely stored on or in the immediate vicinity of the project. It is emphasized that this is necessary so that these items will be available if needed without reliance on their having to be transported to the project during a flood over possibly impassable roads.

r. Prompt repairs. Any defect which prevents the mechanical drainage system from operating at full capacity will be corrected within 24 hours of its discovery.

FLOOD PLAIN MANAGEMENT

16. GENERAL

The historical flood plain for the lower 8.5-mile reach of the Klamath River consists of approximately 2,200 acres. As a part of local cooperation the Del Norte County Board of Supervisors is required to manage the historical flood plain exclusive of the flood-free areas of Klamath and Klamath Glen in accordance with the standards prescribed by Del Norte County Board of Supervisors' Ordinances Number 66-4, 66-5 and 67-10 and supplemental criteria established and furnished by the U.S. Army Corps of Engineers. In accordance with Ordinance Number 67-10 dated 1 November 1969, local interests have established flood plain regulations as follows:

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"a. SECTION 3.1700 REGULATIONS FOR "FP-1" DISTRICTS

This district classification is intended to be applied to properties which lie within a primary flood zone which, for the purposes of this Ordinance, shall be construed to be a stream channel and the portions of the adjacent flood plain as are required to efficiently carry the floodflow of the stream, and on which properties special regulations are necessary for the minimum protection of regulations are necessary for the minimum protection of the public health and safety, and of property and improvements from hazards and damage resulting from flood waters.

The following regulations shall apply in all "FP-1" Districts, and shall be subject to the provisions of Chapters 4 and 5 of this Ordinance.

3.1701 Uses Permitted

(a) Public parks and recreation developments, boating facilities, campgrounds, and trailer parks operated on a seasonal basis between the months of May and November inclusive except as provided in Subsection (d) below. Rest rooms and utility facilities shall be located and constructed in accordance with Health Department requirements. Such buildings shall be designed to withstand inundation due to floods and shall be submitted to the Planning Commission for approval. Floating docks shall be sectional with no portion longer than 60 feet. Portable buildings and floating docks are to be removed from the zoned areas at the end of the season.

(b) Crop farming, truck gardening, livestock grazing, and other agricultural uses which are of the same or closely similar nature.

(c) Public utility wire and pipe lines for transmission and local distribution purposes.

(d) Travel trailers are permitted in trailer parks, and such trailer parks are permitted to operate to serve said travel trailers, between the months of December and April inclusive, providing that such travel trailer is maintained in a condition that will permit its removal from the flood plain without the need for a special towing vehicle or apparatus; that the access to such travel trailers, including but not limited to drives, roads, and

streets, be adequate to provide egress and ingress at any time under all weather conditions; that no cabanas, remadas, or structures shall be constructed, placed or attached to or adjacent such trailer; that each such travel trailer located in the "FP-1" District under the provisions of this subsection shall be limited to a period of stay not to exceed 7 consecutive calendar days.

3.1702 Uses Permitted with a Use Permit

The following uses, buildings, and structures when it is found by the Planning Commission that such buildings or structures will be so constructed or placed, or will be so protected by levees or other floodproofing that they will not be appreciably damaged, will offer a minimum obstruction to stream flow, and will resist floatation in the event of flooding. Dikes and other structures designed to protect properties from flooding shall be so constructed that they will not endanger life or restrict the flow or carrying capacity of the flood channels.

"(a) Single, non-expandable trailers not over 12 feet wide, maintained in a readily movable state, and having no auxiliary buildings attached thereto when they are occupied by the owner or caretaker of properties listed in 3.1701 (a).

(b) Commercial excavation of natural materials, filling of land areas, construction of levees, dikes, or other structures designed to protect property from natural flooding.

(c) Floating docks during off season.

(d) Private trailers on private parcels of ground used on a seasonal basis as in Section 3.1701 (a).

"b. SECTION 3.1800 REGULATIONS FOR "FP-2" DISTRICTS

This district classification is intended to be applied to properties which lie within areas where inundation is caused by overflow and back water which is relatively free of any current, excluding areas within the "FP-1" Districts, and so require regulations for the protections of such properties and their improvements from hazards and damage which may result from flood waters.

The following regulations shall apply in all "FP-2" Districts, and shall be subject to the provisions of Chapters 4 and 5 of this Ordinance.

3.1801 Uses Permitted

(a) Single family dwellings and accessory residential and agricultural structures located on agricultural properties, provided that the ground floor level of such buildings shall be above the flood profile level as shown on the zoning map of the particular area in question or provided that the building area is protected from flooding by dikes, levees or other safety measures.

(b) Public parks, recreation developments and trailer parks. Rest rooms and utility facilities shall be located and constructed in accordance with Health Department requirements. Such buildings shall be designed to withstand inundation due to floods.

3.1801 Uses Permitted with a Use Permit

(a) Single, non-expandable trailers not over 12 feet wide, maintained in a readily movable state, and having no auxiliary buildings attached thereto.

(b) Improvements to existing buildings, and accessory residential and agricultural structures whose floor level does not meet the requirements as set forth in Section 3.1801 (a).

(c) Occasional isolated commercial buildings, and industrial structures where such do not create congestion and whose design has been approved by the Planning Commission.

"c. SECTION 3.1900 REGULATIONS FOR "FP-3" DISTRICTS

This district classification is intended to be applied to properties which lie within a flood zone, but which have been protected by man-made dikes or levees constructed by local, State, or Federal agencies solely for the protection of the area so zoned.

The following regulations shall apply in all "FP-3" Districts, and shall be subject to the provisions of Chapters 4 and 5 of this Ordinance.

3.1901 Uses Permitted

- (a) All uses permitted in the various zoning classifications which may be applied thereto."

The limits of the three flood plain zones are delineated on Exhibit C, entitled "Flood Plain Zoning at Mouth of Klamath River." Exhibit D, entitled "Reference Elevations for Flood Plain Zones" shows the location and elevation of monuments from Corps of Engineers and California Division of Highways surveys. These monuments will be of assistance in checking compliance with elevation requirements of the flood plain regulations.

COMBATTING FLOOD CONDITIONS

17. SUGGESTED METHODS

As previously stated, the project provides standard flood protection, and normally no flood problems should be experienced. However, floods of unanticipated magnitude might conceivably occur, and hence it is considered prudent to include a discussion of methods used to combat flood conditions. Most of the methods described herein have been developed during years of experience with the various problems that often come up during periods of high water. They are not intended to restrict the Superintendent, or others concerned, to a rigid set of rules for every condition that may arise, but are set forth only as guides. If problems not covered by these suggestions arise and the Superintendent is in doubt as to the procedure to be taken, he will be expected to consult the District Engineer, U.S. Army Engineer District, Corps of Engineers, San Francisco, California, and follow standard engineering practices in meeting the situation. It should be noted that it is much better to be overprepared for a "flood fight" than to find at the last moment that preparations were incomplete or unsatisfactory. Confidence of the protected persons and firms is a valuable asset that should not be carelessly lost through inefficient operation of the protection system in time of emergency.

a. Security. Personnel of the Corps of Engineers, U.S. Army, whether military or civilian, are not vested with any civil police authority in the performance of their engineering duties, and they will not attempt to exercise any such authority. The responsibility for protecting flood control works against sabotage, acts of depredation, or other unlawful acts rests with the local interests through local and State governmental agencies. In the event local law enforcement agencies prove inadequate, local interests can request the aid of State forces, and if additional support becomes necessary, Federal troops can be requested as provided by law.

b. Inspection of flood control works. Immediately upon receipt of information that a high water is imminent, the Superintendent should

form a skeleton organization capable of quick expansion and assign individuals (Sector Foremen) to have charge of definite sections of the project. As his initial activity, each Sector Foreman should go over his entire sector and parts of adjacent sectors, making a detailed inspection, particularly with reference to the following matters:

(1) Sector limits ascertain that the dividing line between sectors is plainly determined and, if necessary, marked.

(2) Transportation facilities: roads and rail.

(3) Material supply: quantity, location and condition.

(4) Communications: locate and check all necessary telephone and two-way radio facilities in the sector.

c. Preliminary repair work. After the initial inspection has been made, each Sector Foreman should recruit a labor crew and provide it with tools such as shovels, axes, wheelbarrows, etc. In addition, bulldozers, scrapers, trucks, etc., should be located and made ready for use in case of emergency. Then immediate action should be taken to perform the following work:

(1) Repair and close all flapgates on culverts and see that they operate and are seated properly before they are covered with flood waters.

(2) Ascertain that all roads to and along the project are in a good state of repair. The Superintendent should contact the California Division of Highways concerning U.S. Highway 101 if the situation so dictates.

(3) Locate necessary tools and materials (sacks, sandbags, brush, lumber, lights, etc.) and distribute and store them at points where active maintenance is anticipated.

(4) Check and obtain repair of all telephone lines and radio communication equipment necessary for operation; obtain lists of all team forces, motorboats, motorcars, and truck transportation that can be made available.

(5) Make thorough arrangements with reliable citizens of the community for the supply, transportation, subsistence, and shelter for the necessary labor.

(6) Investigate all drainage ditches and open these drains when obstructions exist.

d. Disaster relief. It is the responsibility of local, State and municipal authorities supported by and/or working in connection with the American Red Cross to adopt measures for the relief of flood disaster

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victims. Relief measures can be undertaken by the Department of the Army through its Army Area Commander under existing Army Regulations, but such measures will be undertaken only as a last resort, in extreme cases and under compelling circumstances where local resources are clearly inadequate to cope with the situation.

e. Checklist. The inspection list in Exhibit E is furnished for reproduction and use by the local interests as a checklist for inspections and, also, for use in making the required semi-annual reports. This list should be used in each inspection to insure that no feature of the protective system is overlooked. Items requiring repairs should be noted thereon; if items are satisfactory, they should be indicated as such.

f. Flood fight. After the above preliminary organization and precautions have been completed, the "flood fight" itself commences. The methods of combatting flood high water levels as described in the following paragraphs have been proven effective during many years of use by the Department of the Army.

(1) Sack topping. Sack topping may be used to raise the elevation of grade about three feet. The sacks should generally be laid stretcherwise for the first layer, crosswise for the second layer, and so on. Sacks should be lapped at least one-fourth either way and well mauled into place. When properly sacked and tamped, one sack will give about three to four inches of topping (see Exhibit G, Plate 4).

(2) Lumber and sack topping. This is the most commonly used method of raising low reaches in emergencies. In putting on this topping, as well as other topping, a careful line of levels should be run and grade stakes set in advance. Two-inch by 4-inch by 6-foot long stakes should then be driven six feet apart, and 1-inch by 12-inch boards nailed to the landside of the stakes. This wall, backed with a single tier of sacks, will hold out at least one foot of water. If an additional foot is necessary, the layers of sacks will have to be increased in number and reinforced. In extreme cases, the stakes should be driven three feet into the ground and a 3-foot topping properly braced with sacks and earth should be utilized. In some instances, it may be practicable to back up the planking with tamped earth obtained in the vicinity, in lieu of the sacks down in the drawing (see Exhibit G, Plate 5).

g. Liaison with District Engineer and use of Government plant. During periods of emergency, close liaison will be maintained with the Corps of Engineers, whose objective of maintaining the integrity of the flood control works will be attained by supporting local interests in their efforts or by assuming full charge of the flood fight when the problem is beyond the capacities of local interests. The District Engineer, U.S. Army Engineer District, San Francisco, is authorized to use or loan Government property and plant in cases of emergency where life is in danger and there is no opportunity to secure prior authority for such use. The authority also extends to saving of property where no suitable private equipment is available, provided that such use is without detriment to the Government.

h. Flood Emergency Manual. The most recent "Flood Emergency Manual" published by the U.S. Army Engineer District, San Francisco, should be used to supplement the information furnished in this Operation and Maintenance Manual.

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Title 33—Navigation and Navigable Waters

Chapter II—Corps of Engineers

Part 208—Flood Control Regulations

Sec.

208.10 Local flood protection works; maintenance and operation of structures and facilities.

§ 208.10 *Local flood protection works; maintenance and operation of structures and facilities*—(a) *General*. (1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits.

(2) The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood control works in accordance with regulations prescribed by the Secretary of the Army, as required by law, shall appoint a permanent committee consisting of or headed by an official hereinafter called the "Superintendent," who shall be responsible for the development and maintenance of, and directly in charge of, an organization responsible for the efficient operation and maintenance of all of the structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States.

(3) A reserve supply of materials needed during a flood emergency shall be kept on hand at all times.

(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the right-of-way for the protective facilities.

(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in any feature of the works without prior determination by the District Engineer of the Department of the Army or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished the District Engineer after completion of the work.

(6) It shall be the duty of the superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works.

(7) The District Engineer or his authorized representatives shall have access at all times to all portions of the protective works.

(8) Maintenance measures or repairs which the District Engineer deems necessary shall be promptly taken or made.

(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods.

(10) The Department of the Army will furnish local interests with an Operation and Maintenance Manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under this part.

(b) *Levees*—(1) *Maintenance*. The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Measures shall be taken to promote the growth of sod; exterminate burrowing animals, and to provide for routine mowing of the grass and weeds, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. Where practicable, measures shall be taken to retard bank erosion by planting of willows or other suitable growth on areas riverward of the levees. Periodic inspections shall be made by the Superintendent to insure that the above maintenance measures are being effectively carried out and, further, to be certain that:

(i) No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;

(ii) No caving has occurred on either the land side or the river side of the levee which might affect the stability of the levee section;

(iii) No seepage, saturated areas, or sand boils are occurring;

(iv) Toe drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged;

(v) Drains through the levees and gates on said drains are in good working condition;

(vi) No revetment work or riprap has been displaced, washed out, or removed;

(vii) No action is being taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sod;

(viii) Access roads to and on the levee are being properly maintained;

(ix) Cattle guards and gates are in good condition;

(x) Crown of levee is shaped so as to drain readily, and roadway thereon, if any, is well shaped and maintained;

(xi) There is no unauthorized grazing or vehicular traffic on the levees;

(xii) Encroachments are not being made on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency.

Such inspections shall be made immediately prior to the beginning of the flood season; immediately following each major high water period, and otherwise at intervals not exceeding 90 days, and such intermediate times as may be necessary to insure the best possible care of the levee. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance

repair measures shall be accomplished during the appropriate season as scheduled by the Superintendent.

(2) *Operation*. During flood periods the levee shall be patrolled continuously to locate possible sand boils or unusual wetness of the landward slope and to be certain that:

(i) There are no indications of slides or sloughs developing;

(ii) Wave wash or scouring action is not occurring;

(iii) No low reaches of levee exist which may be overtopped;

(iv) No other conditions exist which might endanger the structure.

Appropriate advance measures will be taken to insure the availability of adequate labor and materials to meet all contingencies. Immediate steps will be taken to control any condition which endangers the levee and to repair the damaged section.

(c) *Flood walls*—(1) *Maintenance*. Periodic inspections shall be made by the Superintendent to be certain that:

(i) No seepage, saturated areas, or sand boils are occurring;

(ii) No undue settlement has occurred which affects the stability of the wall or its water tightness;

(iii) No trees exist, the roots of which might extend under the wall and offer accelerated seepage paths;

(iv) The concrete has not undergone cracking, chipping, or breaking to an extent which might affect the stability of the wall or its water tightness;

(v) There are no encroachments upon the right-of-way which might endanger the structure or hinder its functioning in time of flood;

(vi) Care is being exercised to prevent accumulation of trash and debris adjacent to walls, and to insure that no fires are being built near them;

(vii) No bank caving conditions exist riverward of the wall which might endanger its stability;

(viii) Toe drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged.

Such inspections shall be made immediately prior to the beginning of the flood season, immediately following each major high water period, and otherwise at intervals not exceeding 90 days. Measures to eliminate encroachments and effect repairs found necessary by such inspections shall be undertaken immediately. All repairs shall be accomplished by methods acceptable in standard engineering practice.

(2) *Operation*. Continuous patrol of the wall shall be maintained during flood periods to locate possible leakage at monolith joints or seepage underneath the wall. Floating plant or boats will not be allowed to lie against or tie up to the wall. Should it become necessary during a flood emergency to pass anchor cables over the wall, adequate measures shall be taken to protect the concrete and construction joints. Immediate steps shall be taken to correct any condition which endangers the stability of the wall.

(d) *Drainage structures*—(1) *Maintenance*. Adequate measures shall be taken to insure that inlet and outlet channels

are kept open and that trash, drift, or debris is not allowed to accumulate near drainage structures. Flap gates and manually operated gates and valves on drainage structures shall be examined, oiled, and trial operated at least once every 90 days. Where drainage structures are provided with stop log or other emergency closures, the condition of the equipment and its housing shall be inspected regularly and a trial installation of the emergency closure shall be made at least once each year. Periodic inspections shall be made by the Superintendent to be certain that:

(i) Pipes, gates, operating mechanism, riprap, and headwalls are in good condition;

(ii) Inlet and outlet channels are open;

(iii) Care is being exercised to prevent the accumulation of trash and debris near the structures and that no fires are being built near bituminous coated pipes;

(iv) Erosion is not occurring adjacent to the structure which might endanger its water tightness or stability.

Immediate steps will be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections.

(2) *Operation.* Whenever high water conditions impend, all gates will be inspected a short time before water reaches the invert of the pipe and any object which might prevent closure of the gate shall be removed. Automatic gates shall be closely observed until it has been ascertained that they are securely closed. Manually operated gates and valves shall be closed as necessary to prevent inflow of flood water. All drainage structures in levees shall be inspected frequently during floods to ascertain whether seepage is taking place along the lines of their contact with the embankment. Immediate steps shall be taken to correct any adverse condition.

(e) *Closure structures*—(1) *Maintenance.* Closure structures for traffic openings shall be inspected by the superintendent every 90 days to be certain that:

(i) No parts are missing;

(ii) Metal parts are adequately covered with paint;

(iii) All movable parts are in satisfactory working order;

(iv) Proper closure can be made promptly when necessary;

(v) Sufficient materials are on hand for the erection of sand bag closures and that the location of such materials will be readily accessible in times of emergency.

Tools and parts shall not be removed for other use. Trial erections of one or more closure structures shall be made once each year, alternating the structures chosen so that each gate will be erected at least once in each 3-year period. Trial erection of all closure structures shall be made whenever a change is made in key operating personnel. Where railroad operation makes trial erection of a closure structure infeasible, rigorous inspection and drill of operating personnel may be substituted therefor. Trial erection of sand bag closures is not required. Closure materials will be carefully checked prior to and following flood periods, and damaged or missing parts shall be repaired or replaced immediately.

(2) *Operation.* Erection of each movable closure shall be started in sufficient

time to permit completion before flood waters reach the top of the structure sill. Information regarding the proper method of erecting each individual closure structure, together with an estimate of the time required by an experienced crew to complete its erection will be given in the *Operation and Maintenance Manual* which will be furnished local interests upon completion of the project. Closure structures will be inspected frequently during flood periods to ascertain that no undue leakage is occurring and that drains provided to care for ordinary leakage are functioning properly. Boats or floating plant shall not be allowed to tie up to closure structures or to discharge passengers or cargo over them.

(f) *Pumping plants*—(1) *Maintenance.* Pumping plants shall be inspected by the Superintendent at intervals not to exceed 30 days during flood seasons and 90 days during off-flood seasons to insure that all equipment is in order for instant use. At regular intervals, proper measures shall be taken to provide for cleaning plant, buildings, and equipment, repainting as necessary, and lubricating all machinery. Adequate supplies of lubricants for all types of machines, fuel for gasoline or diesel powered equipment, and flash lights or lanterns for emergency lighting shall be kept on hand at all times. Telephone service shall be maintained at pumping plants. All equipment, including switch gear, transformers, motors, pumps, valves, and gates shall be trial operated and checked at least once every 90 days. Megger tests of all insulation shall be made whenever wiring has been subjected to undue dampness and otherwise at intervals not to exceed one year. A record shall be kept showing the results of such tests. Wiring disclosed to be in an unsatisfactory condition by such tests shall be brought to a satisfactory condition or shall be promptly replaced. Diesel and gasoline engines shall be started at such intervals and allowed to run for such length of time as may be necessary to insure their serviceability in times of emergency. Only skilled electricians and mechanics shall be employed on tests and repairs. Operating personnel for the plant shall be present during tests. Any equipment removed from the station for repair or replacement shall be returned or replaced as soon as practicable and shall be trial operated after reinstallation. Repairs requiring removal of equipment from the plant shall be made during off-flood seasons insofar as practicable.

(2) *Operation.* Competent operators shall be on duty at pumping plants whenever it appears that necessity for pump operation is imminent. The operator shall thoroughly inspect, trial operate, and place in readiness all plant equipment. The operator shall be familiar with the equipment manufacturers' instructions and drawings and with the "Operating Instructions" for each station. The equipment shall be operated in accordance with the above-mentioned "Operating Instructions" and care shall be exercised that proper lubrication is being supplied all equipment, and that no overheating, undue vibration or noise is occurring. Immediately upon final recession of flood waters, the pumping station shall be thoroughly cleaned, pump house sumps flushed, and equipment thoroughly inspected, oiled and greased. A record or log of pumping plant operation shall be kept for each station, a copy of which shall be furnished the District Engineer following each flood.

(g) *Channels and floodways*—(1) *Maintenance.* Periodic inspections of improved channels and floodways shall be made by the Superintendent to be certain that:

(i) The channel or floodway is clear of debris, weeds, and wild growth;

(ii) The channel or floodway is not being restricted by the depositing of waste materials, building of unauthorized structures or other encroachments;

(iii) The capacity of the channel or floodway is not being reduced by the formation of shoals;

(iv) Banks are not being damaged by rain or wave wash, and that no sloughing of banks has occurred;

(v) Riprap sections and deflection dikes and walls are in good condition;

(vi) Approach and egress channels adjacent to the improved channel or floodway are sufficiently clear of obstructions and debris to permit proper functioning of the project works.

Such inspections shall be made prior to the beginning of the flood season and otherwise at intervals not to exceed 90 days. Immediate steps will be taken to remedy any adverse conditions disclosed by such inspections. Measures will be taken by the Superintendent to promote the growth of grass on bank slopes and earth deflection dikes. The Superintendent shall provide for periodic repair and cleaning of debris basins, check dams, and related structures as may be necessary.

(2) *Operation.* Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or by wave wash. Appropriate measures shall be taken to prevent the formation of jams of ice or debris. Large objects which become lodged against the bank shall be removed. The improved channel or floodway shall be thoroughly inspected immediately following each major high water period. As soon as practicable thereafter, all snags and other debris shall be removed and all damage to banks, riprap, deflection dikes and walls, drainage outlets, or other flood control structures repaired.

(h) *Miscellaneous facilities*—(1) *Maintenance.* Miscellaneous structures and facilities constructed as a part of the protective works and other structures and facilities which function as a part of, or affect the efficient functioning of the protective works, shall be periodically inspected by the Superintendent and appropriate maintenance measures taken. Damaged or unserviceable parts shall be repaired or replaced without delay. Areas used for ponding in connection with pumping plants or for temporary storage of interior run-off during flood periods shall not be allowed to become filled with silt, debris, or dumped material. The Superintendent shall take proper steps to prevent restriction of bridge openings and, where practicable, shall provide for temporary raising during floods of bridges which restrict channel capacities during high flows.

(2) *Operation.* Miscellaneous facilities shall be operated to prevent or reduce flooding during periods of high water. Those facilities constructed as a part of the protective works shall not be used for purposes other than flood protection without approval of the District Engineer unless designed therefor.

(Sec. 3, 49 Stat. 1571, as amended; 33 U. S. C. 701c) [9 P. R. 9999, 10203]

BOARD OF SUPERVISORS
COUNTY OF DEL NORTE
STATE OF CALIFORNIA

RESOLUTION NO. 67- 43

RESOLUTION OF COOPERATION OF COUNTY OF DEL NORTE
WITH THE UNITED STATES GOVERNMENT IN FLOOD CONTROL
PROJECT ON LOWER KLAMATH RIVER AND RESCINDING COUNTY
RESOLUTION 65-80.

WHEREAS, the District Engineer, San Francisco District, U.S. Army Corps of Engineers, is now preparing a survey report which will give consideration to adoption of a project for flood control on the lower Klamath River in the County of Del Norte, State of California, and

WHEREAS, it is understood the District Engineer's report will recommend construction of levees together with necessary interior drainage structures and facilities for protection of flood-free areas at Klamath and Klamath Glen, and contribute to the cost of the necessary flowage easements to assure proper management of remaining flood plain, and

WHEREAS, it is estimated that the cost of the aforesaid project will be about \$4,100,000, of which \$440,000 will be local non-Federal costs for land easements and rights-of-way, together with an estimated annual cost of \$16,000 for maintenance and operation of the proposed improvements, and

WHEREAS, County Resolution 65-80 as adopted by this Board of Supervisors does not agree completely with H.D. 478,

NOW, THEREFORE, BE IT RESOLVED by the Board of Supervisors of the County of Del Norte, State of California, that County Resolution 65-80 is herewith rescinded.

FURTHER RESOLVED that in the event the United States Government adopts and authorizes the proposed plan of improvement, it is the declaration of this Board to cooperate with the U.S. Army Corps of Engineers in the accomplishment of the aforesaid project as follows:

a. Provide without cost to the United States all lands, easements, and rights-of-way necessary for construction and functioning of the project;

b. Hold and save the United States free from damages due to the construction works;

c. Maintain and operate all the works after completion in accordance with regulations prescribed by the Secretary of the Army, and manage the historical flood plain within the eight-and-one-half mile reach above the mouth of the Klamath River in accordance with Paragraph "f" below;

d. Adjust all claims regarding water rights arising from construction of the project;

e. Make any alterations to existing improvements which may be required because of the project; and

f. Prevent any encroachment on the constructed works, ponding areas, and flood plain management areas which might interfere with the proper functioning of the project, lessen its beneficial effects, or reduce its design capacity; and, if ponding or flood plain management is impaired, provide promptly without cost to the United States substitute storage or equivalent pumping capacity and such flood-control works as required to protect the management areas.

9. The County of Del Norte will annually notify local interests of the degree of protection which will be provided by the project.

PASSED AND ADOPTED by the Board of Supervisors of the County of Del Norte the 24th day of April, 1967, by the following vote:

AYES: Supervisors McNamara, Mellon, Hight, Del Ponte, Chairman
McClendon.

NOES: None

ABSENT: None

/s/ Bernard McClendon
Chairman, Board of Supervisors

ATTEST:

/s/ Dorothy Sinclair (SEAL)
County Clerk

The foregoing is a correct copy of the original on file in this office.

Dated: April 24, 1967

ATTEST:

DOROTHY SINCLAIR
County Clerk and ex-officio Clerk of the Board of Supervisors, County of Del Norte, State of California.

By Virginia Ferguson
Deputy

BOARD OF SUPERVISORS
COUNTY OF DEL NORTE

RESOLUTION NO. 68-11

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF DEL NORTE
STATE OF CALIFORNIA

WHEREAS, the Flood Control Act of 1966 (Public Law 89-789, approved November 7, 1966) authorized a Federal project for flood protection on the Klamath River substantially in accordance with the recommendations of the Chief of Engineers in House Document No. 478, 89th Congress, 2d Session; and

WHEREAS, by Resolution No. 67-43 dated April 24, 1967, this Board agreed to provide the required local cooperation as set forth therein in connection with the project for flood control at Klamath and Klamath Glen, and

WHEREAS, the present proposed plans of the Government for that portion of the project at Klamath would provide for filling approximately 40 acres adjacent and contiguous to the highway embankment being constructed by the State on Highway 101 in the vicinity of Klamath in lieu of the levee work proposed in the House Document.

NOW, THEREFORE, BE IT RESOLVED that this Board affirms and agrees to provide the local cooperation set forth in Resolution No. 67-43 in connection with the present proposed project at Klamath and be it further resolved that WILLIAM W. SPER, County Counsel, and/or LAVERNE M. NELSON, County Road Commissioner, be, and each of them is hereby authorized to certify to the Army Corps of Engineers on behalf of this Board that it has obtained all lands, easements, and rights-of-way necessary for the performance of the proposed work at Klamath.

PASSED AND ADOPTED by the Board of Supervisors of the
County of Del Norte the 13th day of February, 1968, by the fol-
lowing vote:

AYES : Supervisors McNamara, Mellon, Hight, Del Ponte, Chairman
McClendon,

NOES : None.

ABSENT: None.

Bernard McClendon
CHAIRMAN OF THE BOARD

ATTEST:

Dorothy Sinclair (SEAL)
CLERK OF THE BOARD

The foregoing is a correct copy of
the original on file in this office.
Dated: February 13, 1968

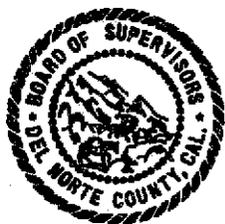
ATTEST:

DOROTHY SINCLAIR
County Clerk and ex-officio Clerk of
the Board of Supervisors, County of
Del Norte, State of California.

By Virginia Ferguson
Deputy

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DEL NORTE COUNTY

Road Commissioner & County Engineer

COURTHOUSE

Crescent City, California 95531

LaVERNE M. NELSON
Road Commissioner
Tel. IN 4-3621
P. O. Box 716
County Engineer
Tel. IN 4-2323
Courthouse

April 16, 1968

Colonel F.C. Boerger
U.S. Army Engineers District
100 McAllister Street
San Francisco, California 94102

SUBJECT: Klamath Townsite Relocation, Del Norte County, California.

Dear Colonel Boerger:

This is to inform your staff that all lands, easements, and rights of way for the proposed Klamath townsite are available for construction purposes.

The county has also secured a dredging permit from the State Lands Commission for the excavation of up to 1,200,000 cubic yards of earthen materials from Taylor Island on the south bank of the Klamath River.

This should provide you with the necessary right of way clearance and fill material to develop the townsite.

We sincerely hope you will make every effort to accomplish the townsite fill this calendar year.

Sincerely yours,

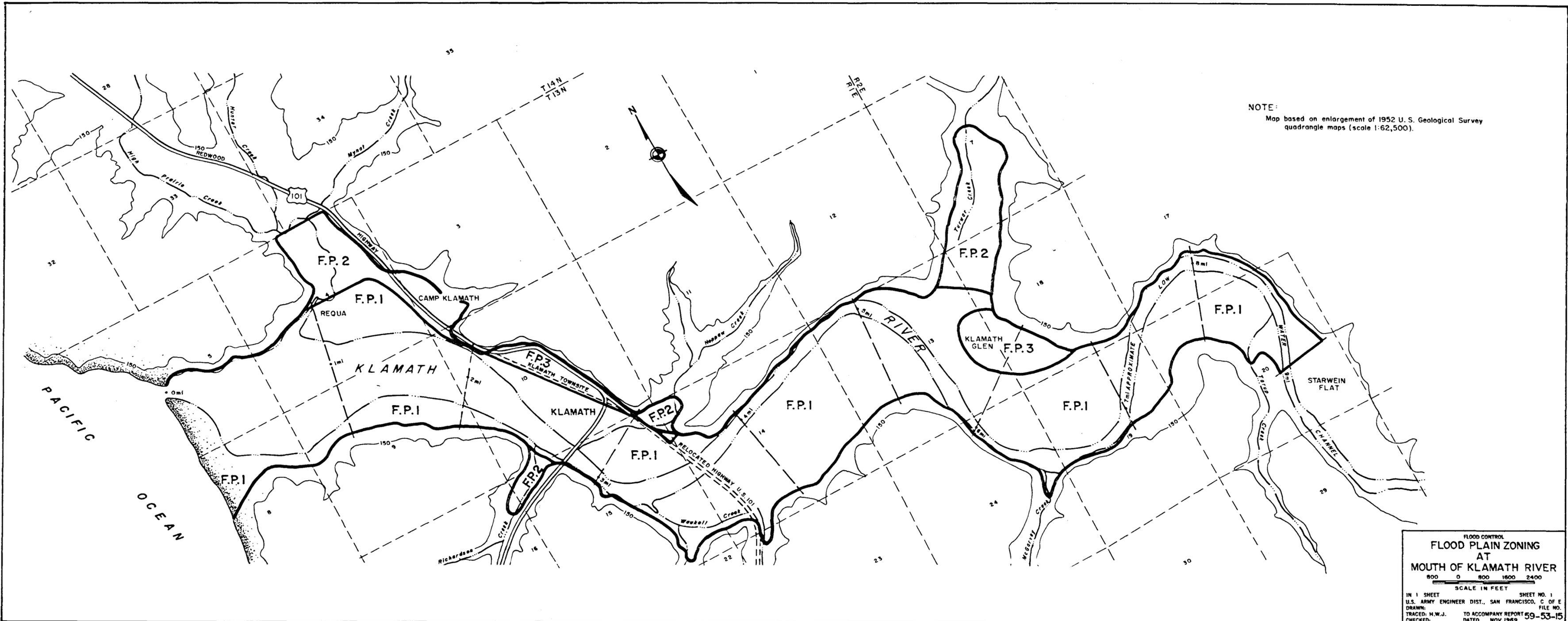
LaVerne M. Nelson
Road Commissioner
& County Engineer

Enclosures: 1

CC: Board of Supervisors, Del Norte County
Klamath Community Services District

LMN:rs

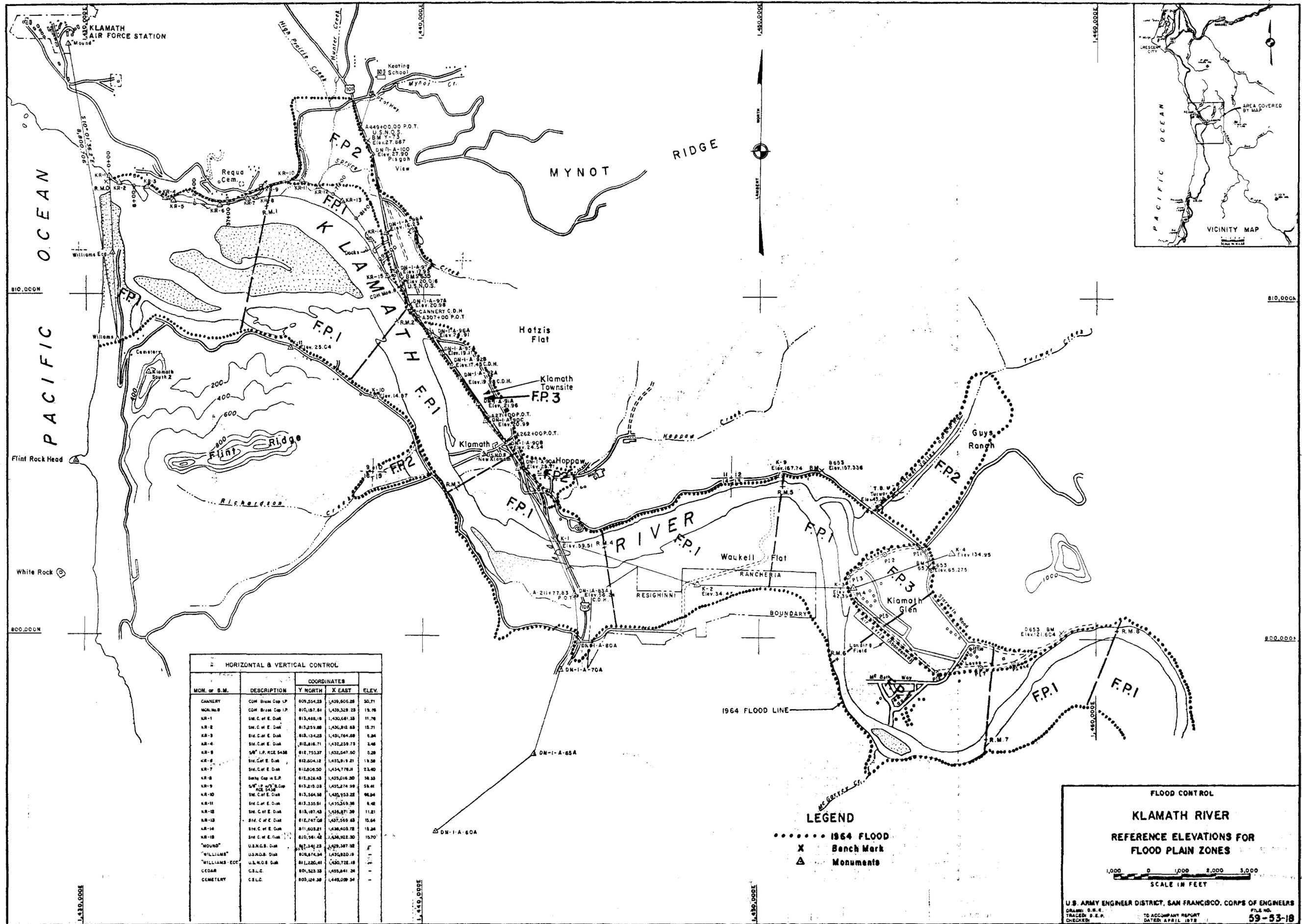
KLAMATH-1000



NOTE:
 Map based on enlargement of 1952 U. S. Geological Survey
 quadrangle maps (scale 1:62,500).

FLOOD CONTROL
FLOOD PLAIN ZONING
 AT
MOUTH OF KLAMATH RIVER
 800 0 800 1600 2400
 SCALE IN FEET
 IN 1 SHEET SHEET NO. 1
 U.S. ARMY ENGINEER DIST., SAN FRANCISCO, CALIF. OF E.
 DRAWN: TO ACCOMPANY REPORT 59-53-15
 CHECKED: DATED NOV 1969

EXHIBIT C



HORIZONTAL & VERTICAL CONTROL

MON. OR B.M.	DESCRIPTION	COORDINATES		
		Y NORTH	X EAST	ELEV.
CANNERY	CDM Break Cap I.P.	809,554.23	1,439,606.28	30.71
MOLINE	CDM Break Cap I.P.	810,187.81	1,439,329.29	19.78
KR-1	Stk. C of E. Disk	813,498.18	1,430,681.33	11.78
KR-2	Stk. C of E. Disk	815,259.88	1,430,812.43	15.71
KR-3	Stk. C of E. Disk	818,134.25	1,431,764.08	0.84
KR-4	Stk. C of E. Disk	812,818.71	1,432,259.73	3.48
KR-5	Stk. I.P. R.C.E. 5458	812,753.37	1,432,547.00	0.28
KR-6	Stk. C of E. Disk	812,604.12	1,433,919.21	19.58
KR-7	Stk. C of E. Disk	812,008.50	1,434,778.31	23.40
KR-8	Stk. Cap in E.P.	812,928.43	1,435,016.30	38.33
KR-9	Stk. I.P. in E.P. Cap	813,210.03	1,435,274.99	58.41
KR-10	Stk. C of E. Disk	813,564.58	1,435,153.28	68.94
KR-11	Stk. C of E. Disk	813,335.51	1,435,369.38	4.42
KR-12	Stk. C of E. Disk	813,187.43	1,435,871.39	11.21
KR-13	Stk. C of E. Disk	812,747.08	1,437,559.43	10.54
KR-14	Stk. C of E. Disk	811,603.21	1,438,405.72	14.24
KR-15	Stk. C of E. Disk	810,561.48	1,438,922.30	15.70
"MOUND"	U.S.A.G.S. Disk	807,341.23	1,439,387.92	-
"WILLIAMS"	U.S.A.G.S. Disk	808,874.34	1,439,820.19	-
"WILLIAMS-ECO"	U.S.A.G.S. Disk	811,280.41	1,430,728.18	-
CEDAR	C.S.L.C.	809,323.33	1,438,841.24	-
CEMETERY	C.S.L.C.	809,124.39	1,448,099.34	-

LEGEND
 1964 FLOOD
 X Bench Mark
 Δ Monuments

FLOOD CONTROL
KLAMATH RIVER
REFERENCE ELEVATIONS FOR
FLOOD PLAIN ZONES

1,000 0 1,000 2,000 3,000
 SCALE IN FEET

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO, CORPS OF ENGINEERS
 DRAWN: O.S.R. FILE NO. 59-53-18
 CHECKED: TO ACCOMPANY REPORT DATED: APRIL 1978

SEMI-ANNUAL REPORT
FOR
INSPECTION, MAINTENANCE AND OPERATION OF
KLAMATH PORTION
OF

KLAMATH RIVER AT AND IN THE VICINITY OF KLAMATH, CALIFORNIA
FLOOD CONTROL PROJECT
DEL NORTE COUNTY, CALIFORNIA

Period from _____ Submitted by _____
to _____ Date _____

INSPECTION CHECKLIST

ITEM: NO.:	FEATURE	: LOCATION AND EXTENT OF : MAINTENANCE REQUIRED
1	Riprap condition	
2	Drainage ditches condition	
3	Drainage culverts condition	
4	Weeds or undesirable vegetation	
5	Accumulations of drift, trash or debris	
6	Unauthorized excavation and loose backfill	
7	Unauthorized encroachment on rights-of-way	
8	Gravity drainage system:	
	a. Relief wells	
	b. Outlet culvert	
	c. Slidegate	
	d. Flapgate	

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INSPECTION CHECKLIST
(Continued)

ITEM: NO.:	FEATURE	: LOCATION AND EXTENT OF : MAINTENANCE REQUIRED
9	: Mechanical drainage system:	:
	: a. Engines	:
	: b. Pumps	:
	: c. Engine controls	:
	: d. Batteries and electrical : equipment	:
	: e. Other maintenance	:
10	: Non-compliance with flood plain : usage regulations:	:
	: a. Zone FP-1	:
	: b. Zone FP-2	:
	: c. Zone FP-3	:

MAINTENANCE CHECKLIST
SEE MANUFACTURERS LITERATURE FOR PROPER MAINTENANCE PROCEDURES
(HOURS MEANS SERVICE HOURS)

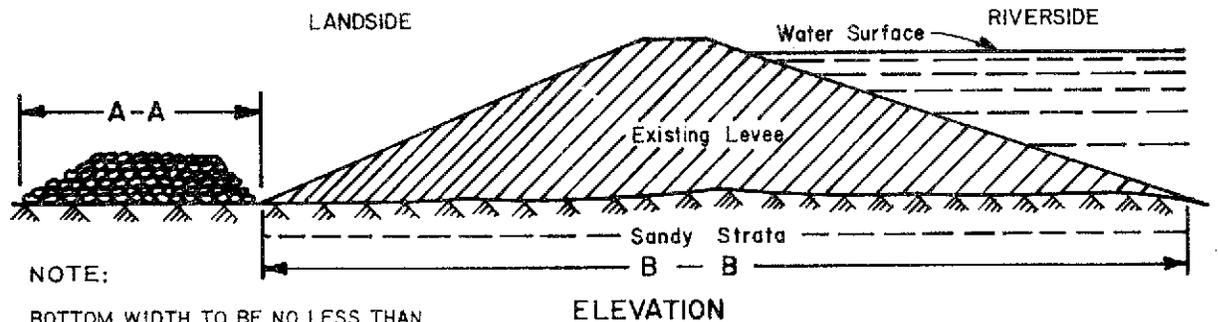
	AS NEEDED	FREQUENTLY DURING OPERATION	10 HOURS OR DAILY	AFTER EACH STORM	50 HOURS OR WEEKLY	250 HOURS OR MONTHLY	500 HOURS OR QUARTERLY	1000 HOURS OR SEMI-ANNUALLY	2000 HOURS OR ANNUALLY
Gravity Drainage System									
Check for free movement of flapgate		X	X	X		X			
Check for debris in ditches		X	X	X		X			
Check for debris in inlet structure				X		X			
Check for debris in outlet pipe				X		X			
Check for debris that would prevent closing slidegate				X		X			
Check operation of slidegate				X		X			
Lubricate gate lift								X	
Check relief wells									X
Check power wrench	X								
Mechanical Drainage System									
Pumps									
Check lubricator oil level			X	X		X			
Check oil drip rate			X	X		X			
Remove debris from pump bell				X		X			
Right Angle Gear Drive									
Check oil level			X			X			
Change oil							X		
Drive Shaft									
Engine									
Start, run and stop (disconnect driveshaft as needed)						X			
Check crankcase lube oil pressure		X							
Check crankcase lube oil level			X						
Check crankcase lube system - change oil & filters						X			
Check fuel pressure gauge		X							
Check fuel level			X	X					
Check fuel tank - drain water and sediment								X	
Check fuel priming pump and priming fuel system	X								
Clean primary fuel filter element	X								
Replace final fuel filter element	X								
Check day tank			X						
Drain fuel tank and replace fuel	X								
Check anti-freeze reading							X		
Drain and replace anti-freeze									X
Check cooling water temperature		X							
Check cooling water level			X						

K101111

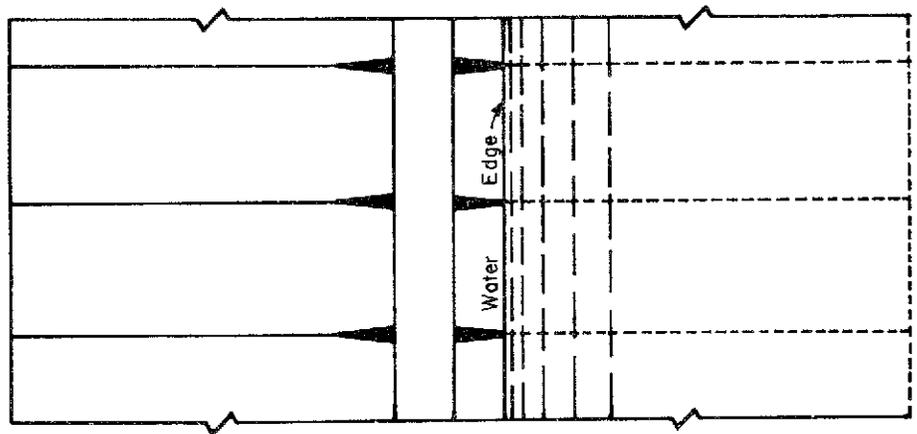
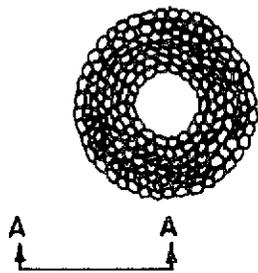
CONTINUANCE OF MAINTENANCE CHECKLIST

	AS NEEDED	FREQUENTLY DURING OPERATION	10 HOURS OR DAILY	AFTER EACH STORM	50 HOURS OR WEEKLY	250 HOURS OR MONTHLY	500 HOURS OR QUARTERLY	1000 HOURS OR SEMI-ANNUALLY	2000 HOURS OR ANNUALLY
Engine (continuation)									
Radiator fan belt - check wear and adjust						X			
Radiator fan belt - lubricate							X		
Engine jacket water system - check for leaks	X								
Check battery charging rate	X	X							
Check battery fluid level					X				
Alternator belt - inspect and adjust	X					X			
Batteries - check installation and general condition	X								
Clean crankcase breather						X			
Air cleaner service indicator - check and service			X						
Empty two stage air cleaner dust cup					X				
Air cleaner element - install replacement element						X			
Air cleaner - install new filter element									X
Single stage air cleaner - install replacement element	X								
Two stage air cleaner - install replacement element	X								
Clean used air filter elements	X								
Service air cleaner pre-cleaner	X								
Service tachometer drive								X	
Safety shut-off control - check operation								X	
Intake and exhaust valves - check adjustment									X
Intake and exhaust valves - adjust	X								
Valve rotators - check									X
Other									
Float switches - check for binding in well	X		X	X		X			
Trashrack - removed debris	X	X		X		X			
Discharge pipes - inspect						X			

KAMAH 1-9-3



NOTE:
 BOTTOM WIDTH TO BE NO LESS THAN
 $1\frac{1}{2}$ TIMES HEIGHT.
 BE SURE TO CLEAR SAND DISCHARGE.
 TIE INTO LEVEE IF BOIL IS NEAR TOE.



PLAN B-B

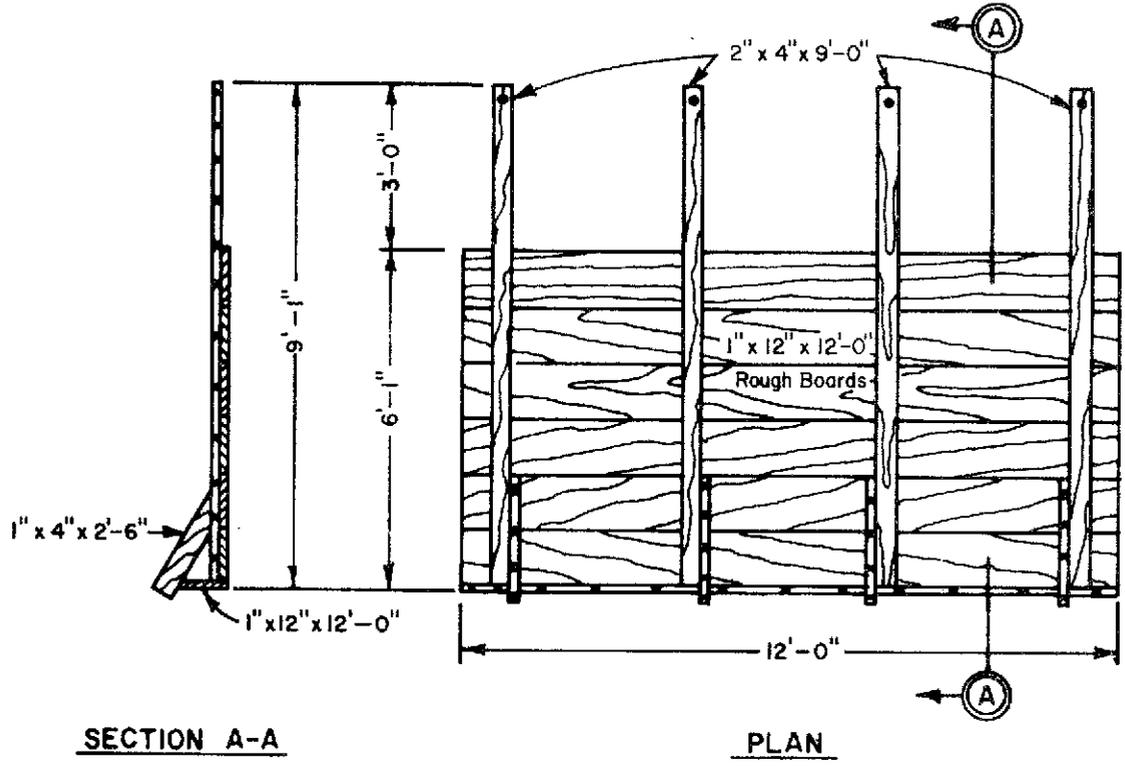
NOTE:
 DO NOT SACK BOIL WHICH DOES NOT PUT OUT
 MATERIAL.
 HEIGHT OF SACK LOOP OR RING SHOULD BE ONLY
 SUFFICIENT TO CREATE ENOUGH HEAD TO SLOW DOWN
 FLOW THROUGH BOIL SO THAT NO MORE MATERIAL IS
 DISPLACED AND BOIL RUNS CLEAR.
 NEVER ATTEMPT TO COMPLETELY STOP FLOW THROUGH
 BOIL.

**SUGGESTED METHODS
 OF EMERGENCY PROTECTION
 CONTROL OF SAND BOILS**

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
 DRAWN:
 TRACED:
 CHECKED:

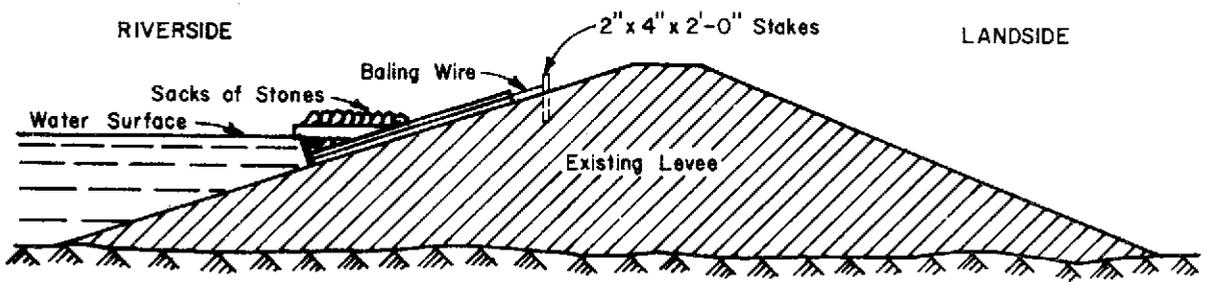
DATED JUNE 1972 99-20-274

KLAMATH 1917



SECTION A-A

PLAN

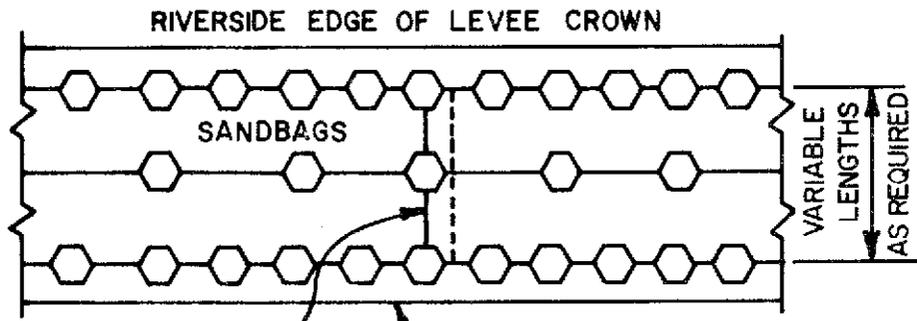


SECTION

Bill of Material For 100 Feet	
LUMBER	
56 pieces	1" x 12" x 12'-0"
32 pieces	1" x 4" x 2'-6"
32 pieces	2" x 4" x 9'-0"
* 32 pieces	2" x 4" x 2'-0"
* (Sharpened)	
WIRE	
200' Baling Wire	
NAILS	
4 1/2 lbs - 8d Nails	

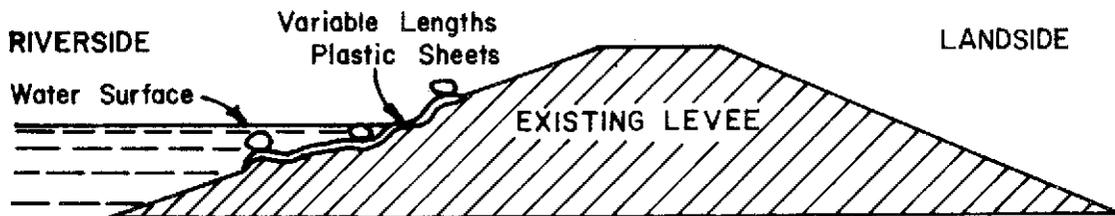
**SUGGESTED METHODS
OF EMERGENCY PROTECTION
MOVABLE
WAVE WASH PROTECTION**

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, CALIF. OF E
DRAWN: FILE NO.
TRACED:
CHECKED: DATED JUNE 1972 99-20-274



ALLOW APPROXIMATELY 1' LAP FOR EACH PLASTIC SHEET

PLAN



SECTION

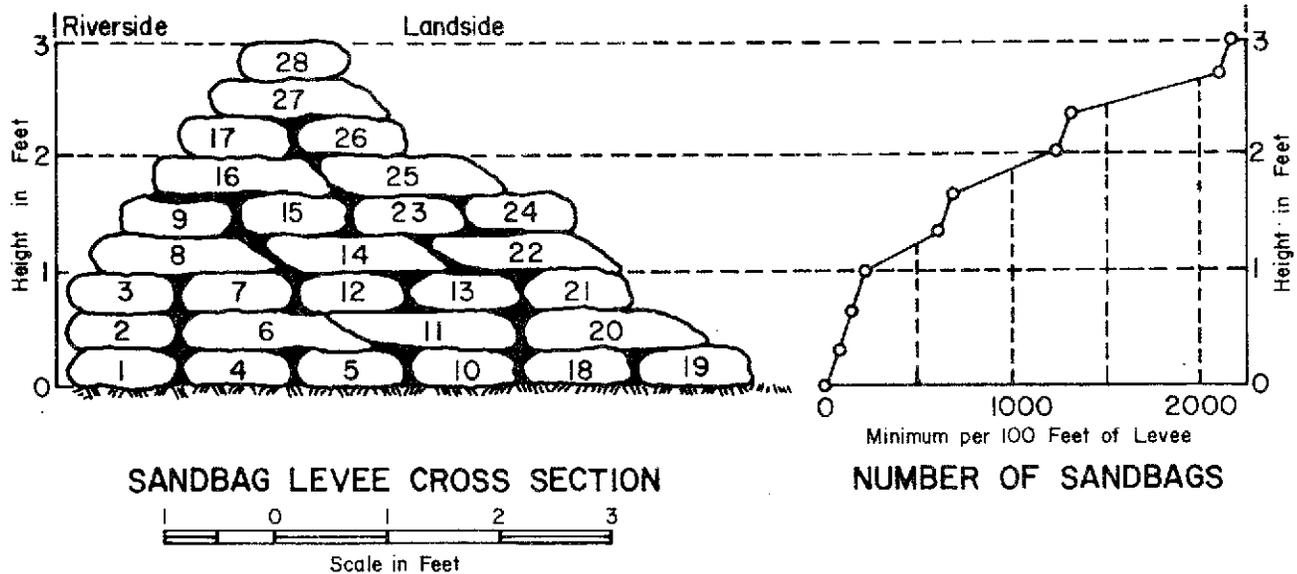
NOTE:

LAY LENGTHS AS REQUIRED OF PLASTIC SHEETS APPROXIMATELY PARALLEL WITH LEVEE SLOPE AND ACROSS DAMAGED SECTION. WEIGHT TOP AND EDGES OF PLASTIC SHEETS WITH FILLED SANDBAGS AS SHOWN ABOVE.

MATERIAL REQUIRED FOR 100 LINEAR FEET OF LEVEE
SANDBAGS
120 Sandbags and Plastic Sheets as Required (Polyethelene 6Mil Thickness)

SUGGESTED METHODS
OF EMERGENCY PROTECTION
MOVABLE
WAVE WASH PROTECTION

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
DRAWN: FILE NO.
TRACED:
CHECKED: DATED JUNE 1972 99-20-274

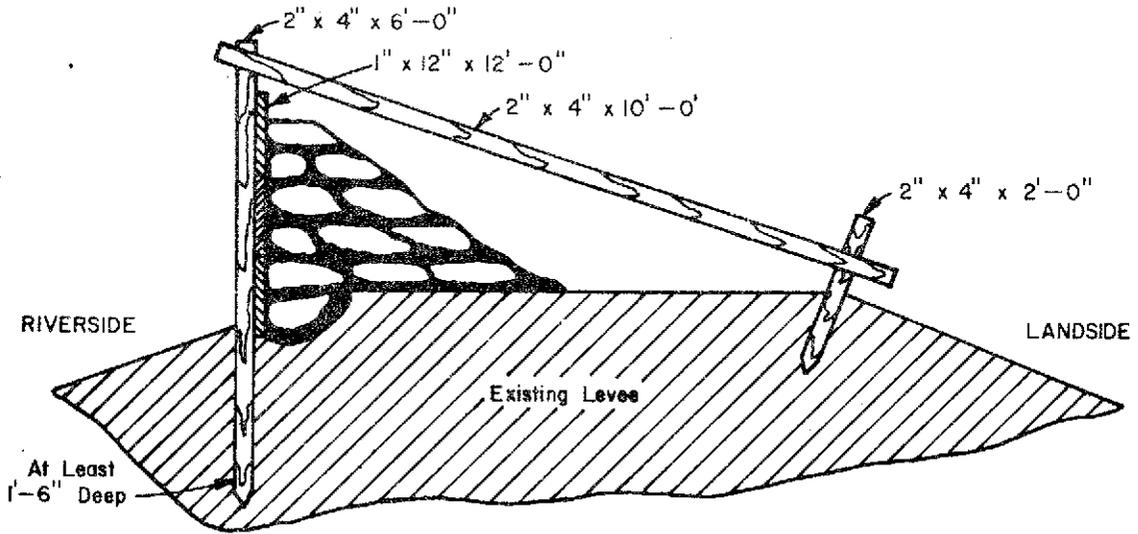


NOTE:

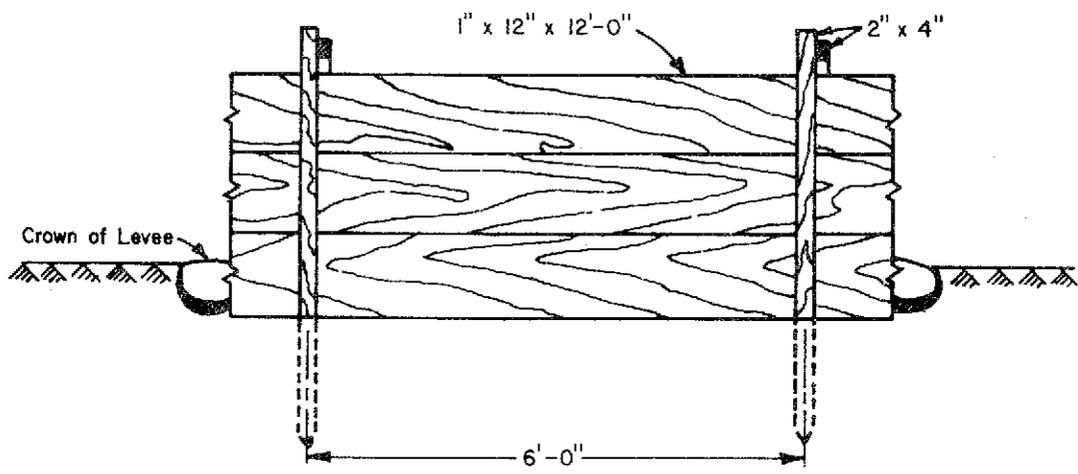
1. ENTIRE BASE TO BE CLEARED AND SCARIFIED.
2. BEST MATERIAL FOR FILLING SANDBAGS IS A FINE SAND OF COURSE SILT. AVOID, AS MUCH AS POSSIBLE, THE USE OF COURSE GRAVEL AND HEAVY CLAYS.
3. FILL SANDBAGS 1/2 TO 2/3 FULL, 50 TO 60 POUNDS, AND LEAVE ENOUGH FLAP TO TURN UNDER. DO NOT TIE.
4. NUMBERS SHOWN ON THE SANDBAGS ARE FOR THE GENERAL ORDER OF PLACING THE SANDBAGS TO GIVE THE HIGHEST PROTECTION WITH THE MINIMUM NUMBER OF SANDBAGS.
5. WHEN BAGS ARE PLACED, FLATTEN OUT AND FILL VOIDS BY MASHING BAGS WITH FEET AND VIGOROUSLY TRAMPING EACH COURSE OF THE LEVEE SECTION. PROVIDE A LEVEE SECTION AS IMPERVIOUS TO WATER AS POSSIBLE. ALTERNATE DIRECTION OF SACKS AND STAGGER JOINTS WHEREVER PRACTICAL.
6. THE ABOVE SECTION IS BASED UPON AN AVERAGE IN PLACE SANDBAG SECTION OF 4" X 12" X 18".

**SUGGESTED METHODS
OF EMERGENCY PROTECTION
SACK TOPPING**

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
 DRAWN: FILE NO.
 TRACED:
 CHECKED: DATED JUNE 1972 99-20-274



SECTION



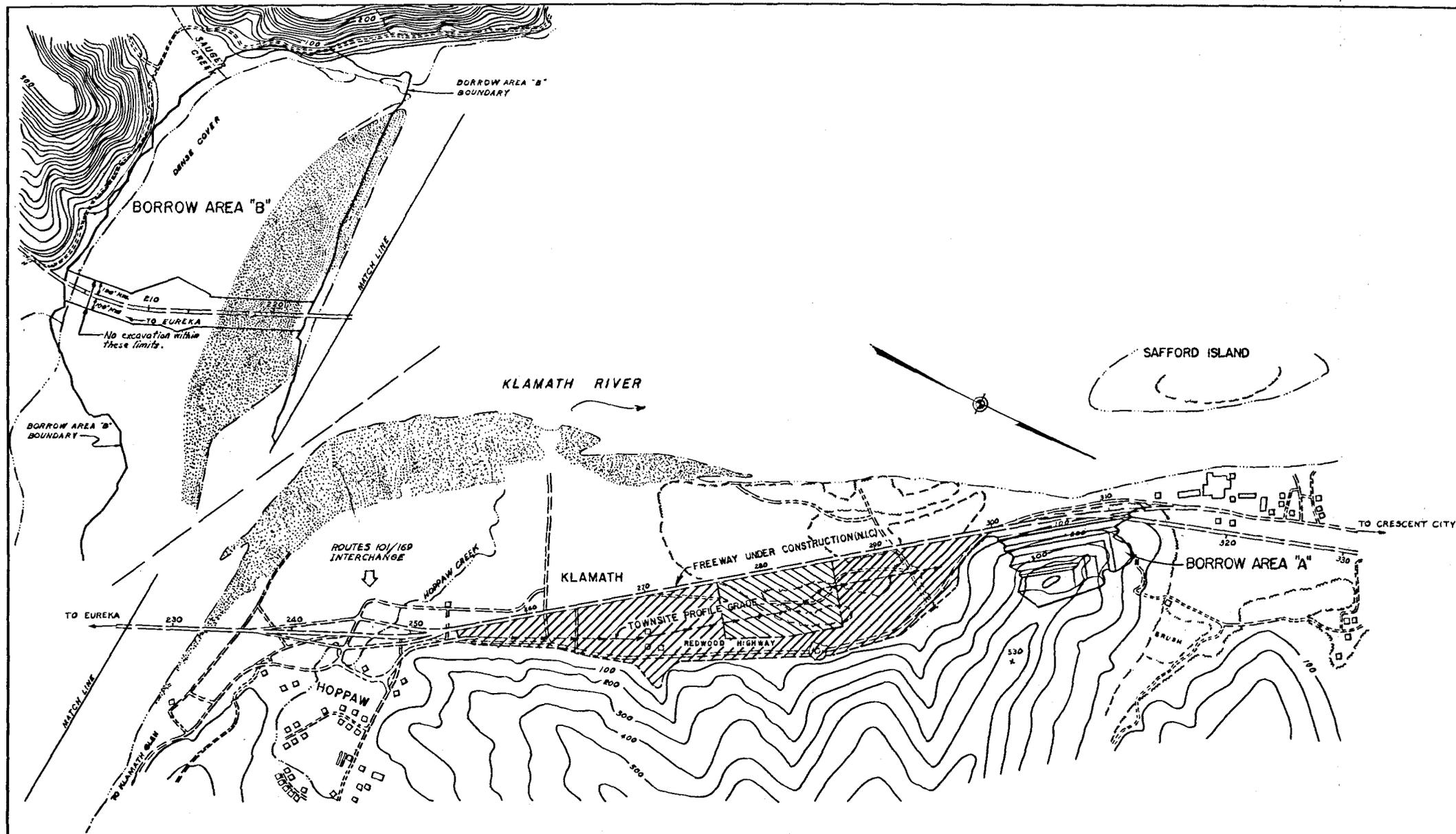
FRONT ELEVATION

Bill of Material For 100 Linear Feet of Levee	
LUMBER	
25 pieces	1" x 12" x 12' - 0"
17 pieces	2" x 4" x 10' - 0"
* 17 pieces	2" x 4" x 6' - 0"
* 17 pieces	2" x 4" x 2' - 0"
* (Sharpened)	
NAILS	
1 lb 8d nails	
2 lb 16d nails	
SANDBAGS	
1100 bags	

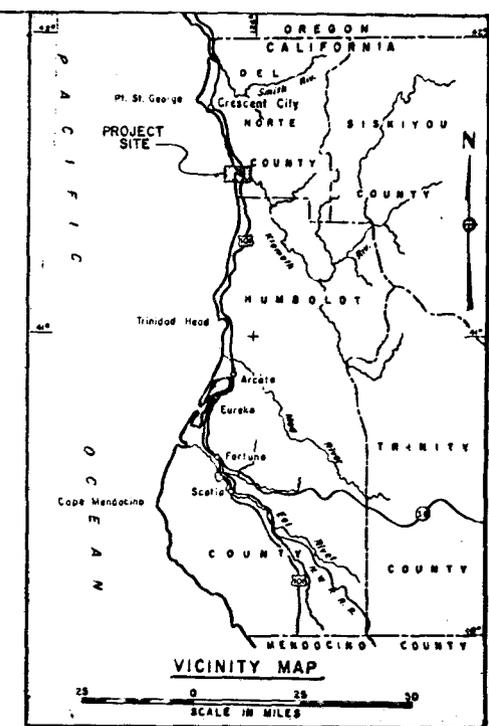
**SUGGESTED METHODS
OF EMERGENCY PROTECTION
LUMBER AND SACK TOPPING**

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
DRAWN: FILE NO.
TRACED:
CHECKED: DATED JUNE 1972 99-20-274

UNCLASSIFIED



PLAN
SCALE: 1" = 400'



LEGEND
 PROJECT SITE
 BY OTHERS

SCHEDULE OF DRAWINGS	
DRAWING NO. SHEET	TITLE OF DRAWINGS
50-39-28	1 VICINITY MAP, LOCATION PLAN AND SCHEDULE OF DWGS
	2 PLAN & PROFILE STA 254+00 TO STA 263+00
	3 PLAN & PROFILE STA 263+00 TO STA 283+00
	4 PLAN & PROFILE STA 283+00 TO STA 312+00
	5 CROSS SECTIONS STA 254+00 TO STA 282+00
	6 CROSS SECTIONS STA 285+00 TO STA 300+00
	7 TYPICAL SECTIONS AND DETAILS
	8 INLET STRUCTURE DETAILS
	9 JUNCTION & MANHOLE STRUCTURE DETAILS

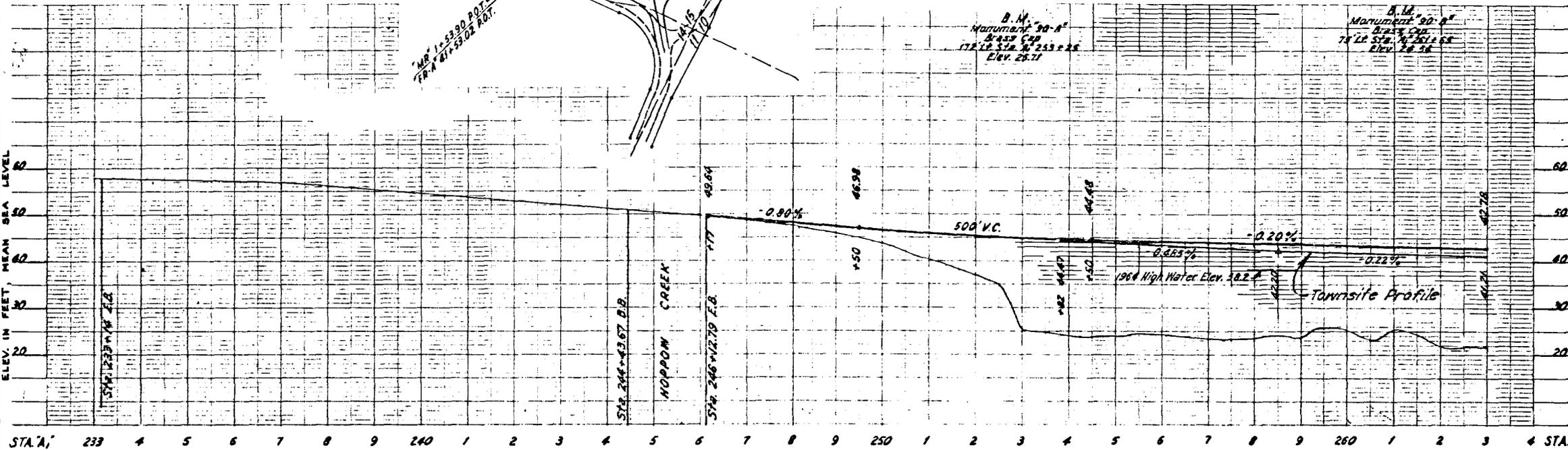
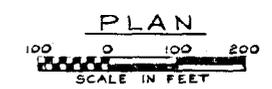
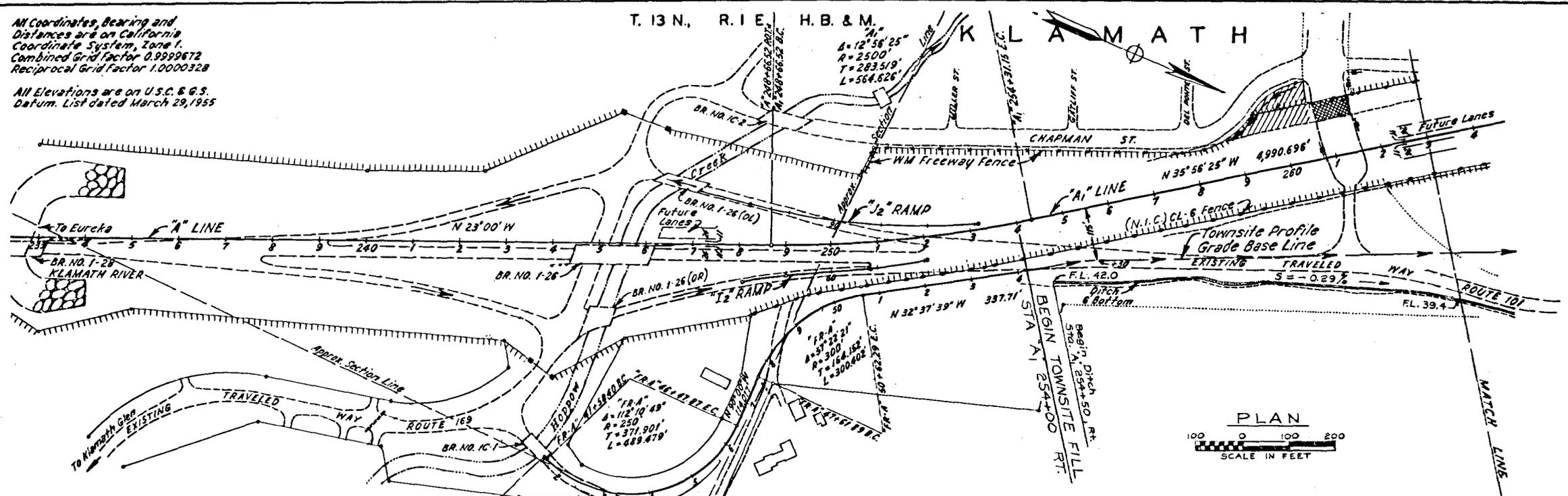
	AS CONSTRUCTED - NO CHANGES MADE.	10	08 SEP 57	MS
	REVISED BORROW AREA "B"	11	1 APR 68	RL
	REVISED BORROW AREAS & SCH. OF DWGS	12	1 APR 68	RL
SYMBOL	DESCRIPTION	DATE	APPROVAL	
REVISIONS				
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA				
DRAWN BY L.M.F.		DEL NORTE COUNTY CALIFORNIA		
TRACED BY L.M.F.		FLOOD PROTECTION		
CHECKED BY		KLAMATH RIVER AT KLAMATH		
		VICINITY MAP, LOCATION PLAN AND SCHEDULE OF DRAWINGS		
APPROVED BY <i>Frank C. Doerflinger</i>		APPROVAL REQUIREMENT		DATE 28 FEB 1968
COLONEL, C.E., DISTRICT ENGINEER		SCALE: 1" = 400'		JOB NO.
		DRAWING NUMBER		
		T-52		39 29



All Coordinates, Bearing and Distances are on California Coordinate System, Zone 1. Combined Grid Factor 0.9999672. Reciprocal Grid Factor 1.0000328.

All Elevations are on U.S.C. & G.S. Datum. List dated March 29, 1955.

T. 13 N., R. 1 E., H. B. & M. K L A M A T H



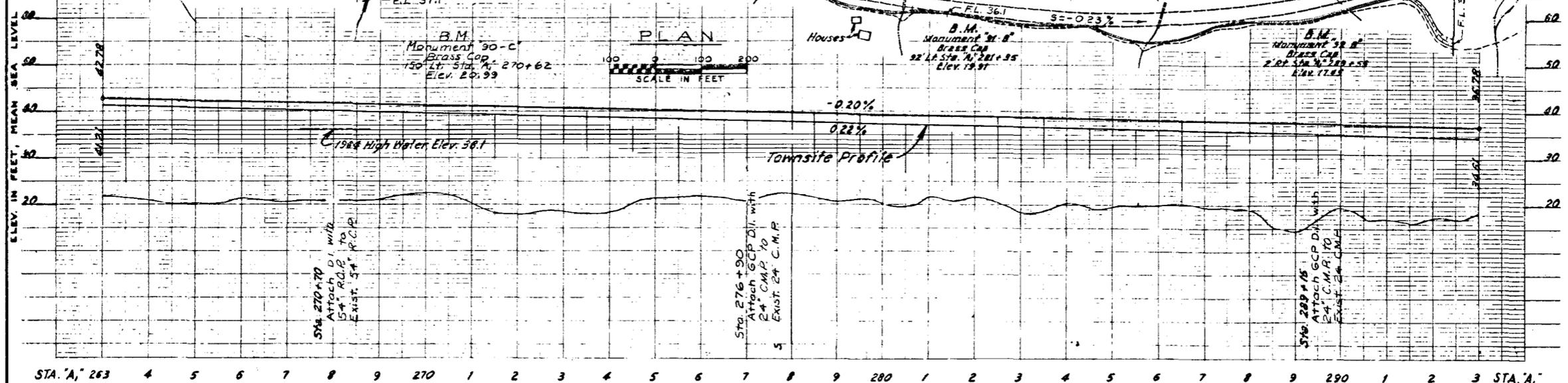
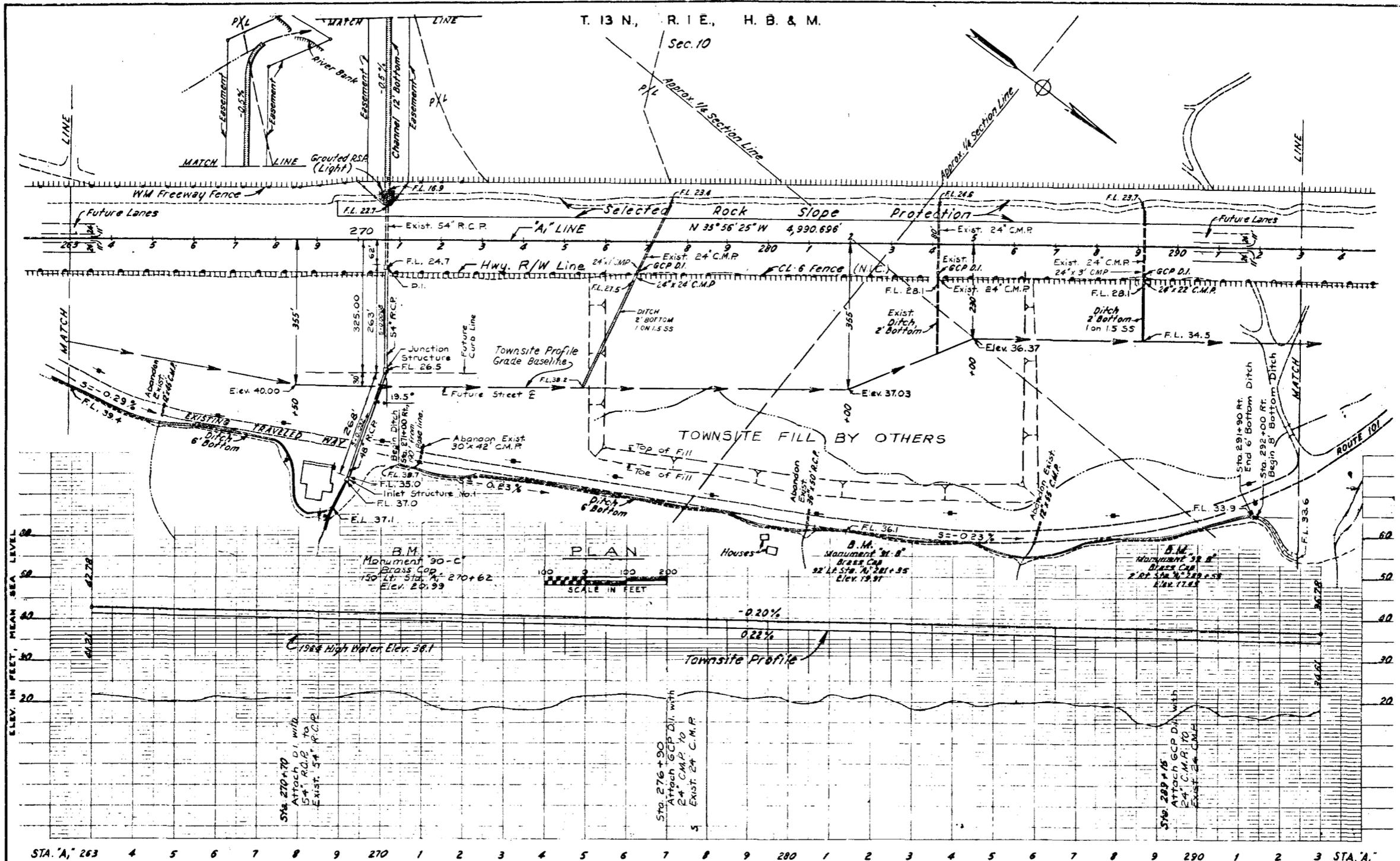
LEGEND:
 F.L. — Flow Line
 S — Slope

NOTE:
 1. For Typical Sections and Details See Sheet 7

AS CONSTRUCTED - NO CHANGES MADE.		DATE	APPROVAL
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY:	DEL NORTE COUNTY	CALIFORNIA	
V.O.:	FLOOD PROTECTION		
TRACED BY:	KLAMATH RIVER AT KLAMATH		
CHECKED BY:	PLAN AND PROFILE		
SUBMITTED BY:	STA. 254+00 TO STA. 263+00		
APPROVAL RECOMMENDED:	DATE		
	28 FEB 1968		
PREPARED UNDER THE DIRECTION OF FRANK C. BOERGER COLONEL, C.E. DISTRICT ENGINEER		SHEET	JOB NO.
		2	59 39 23

T. 13 N., R. 1 E., H. B. & M.

Sec. 10

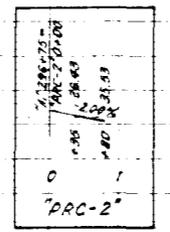
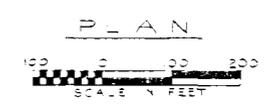
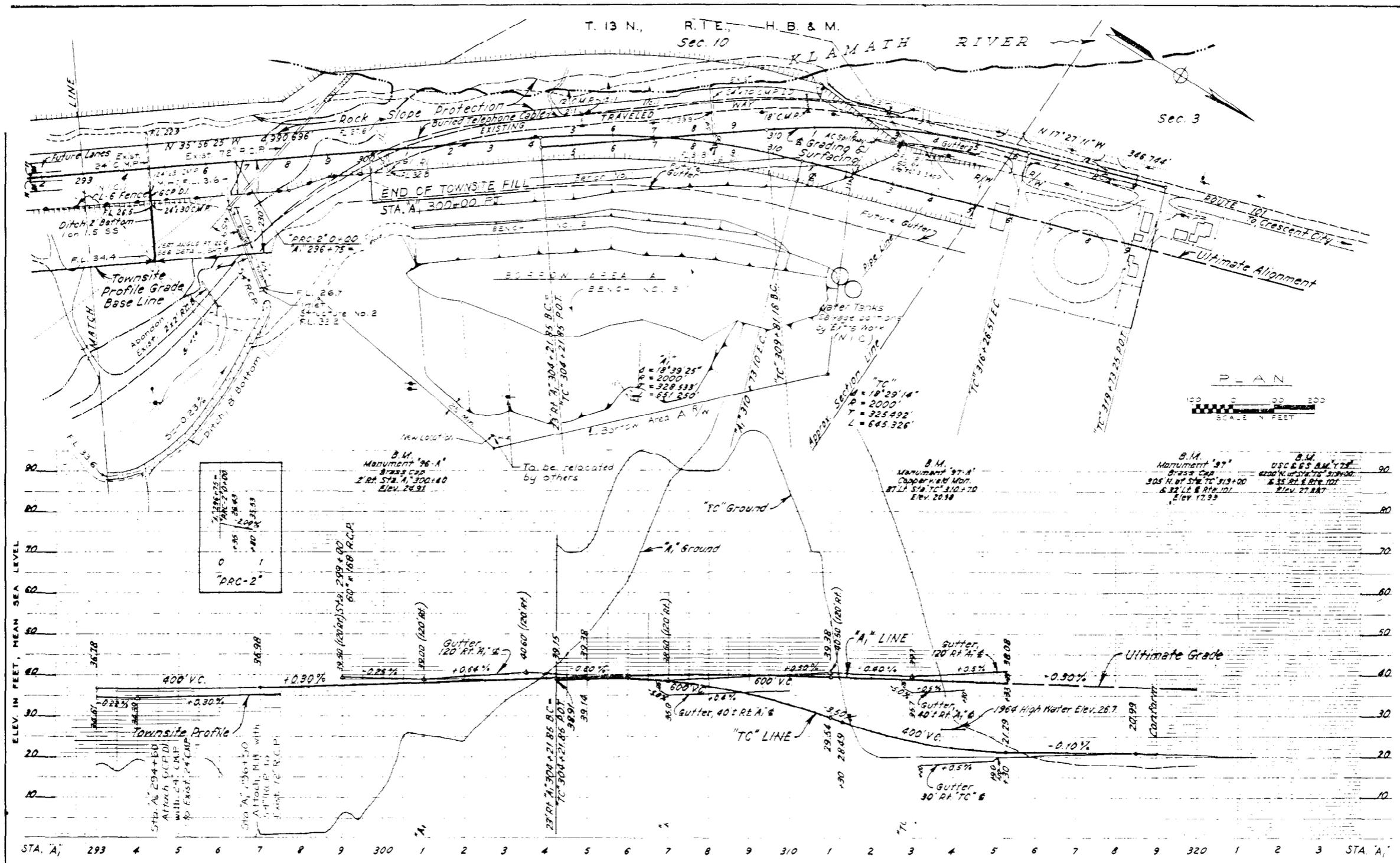


LEGEND
 FL - Flow Line
 S - Slope

Note:
 1. For Typical Sections and Details
 See Sheet 7

REVISIONS		DATE	APPROVAL
AS CONSTRUCTED - CHANGES MADE		27 SEP 25	JLS
REVISED PROFILE NOTES AND PLAN STA 276+00 AND STA 289+15		1 APR 68	PER

U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA	
DRAWN BY: V.O.	DEL NORTE COUNTY CALIFORNIA
TRACED BY:	FLOOD PROTECTION
CHECKED BY:	KLAMATH RIVER AT KLAMATH
SUBMITTED:	PLAN AND PROFILE
APPROVAL RECOMMENDED BY:	STA. 263+00 TO STA. 293+00
APPROVED:	DATE: 28 FEB 1968
PREPARED UNDER THE DIRECTION OF FRANK C. BOERGER COLONEL, CE, DISTRICT ENGINEER	
SCALE: AS SHOWN	JOB NO. DRAWING NUMBER
SHEET 3	59 39 23



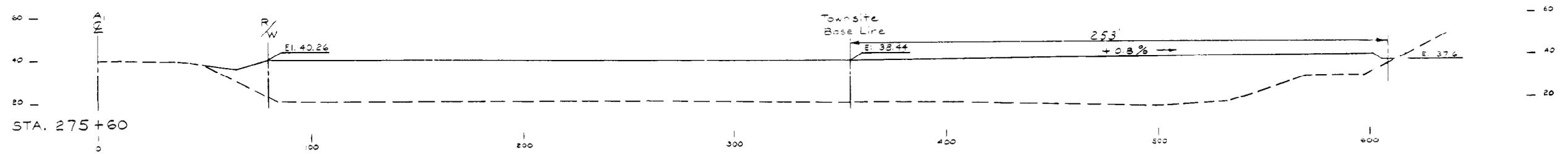
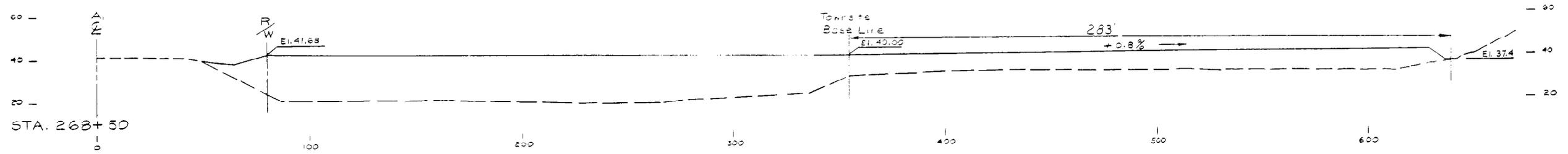
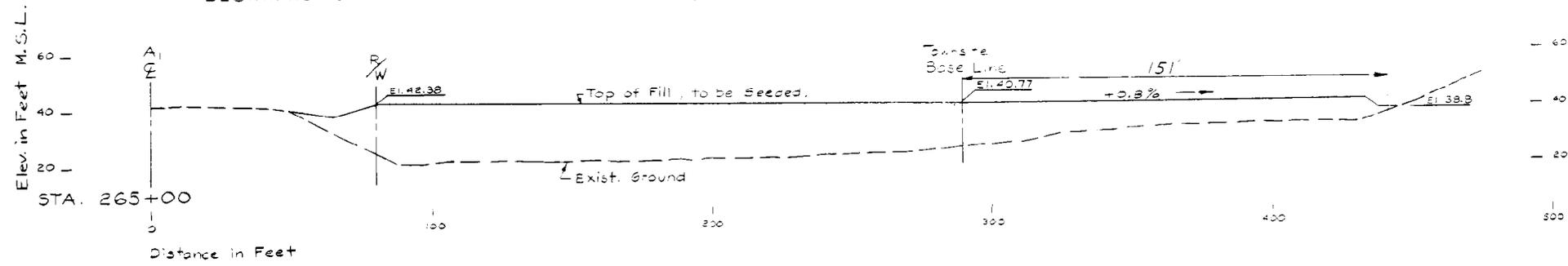
LEGEND

1/2" = 1' 0" (CL)	1/4" = 1' 0" (CL)	1/8" = 1' 0" (CL)	1/16" = 1' 0" (CL)
1/2" = 1' 0" (CL)	1/4" = 1' 0" (CL)	1/8" = 1' 0" (CL)	1/16" = 1' 0" (CL)

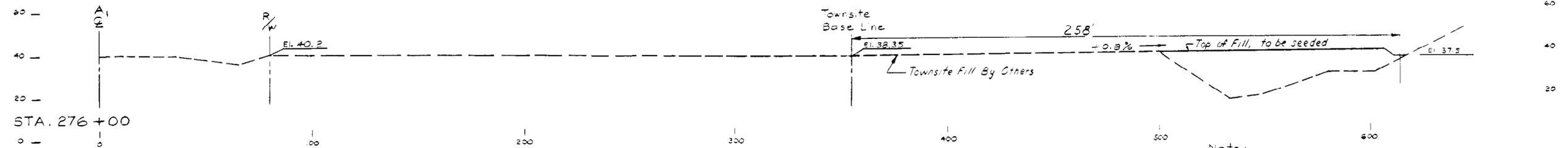
Notes:
For T.O.C. Sections and Data
See Sheet 7

NO CONSTRUCTION CHANGES MADE		JUN 69 SERGE 75
REVISED BORRAN AREA A, BORRAN AREA B, BORRAN AREA C		MAY 68 KIC
REVISED PLAN AT STA 293+00 AND BORRAN AREA A, B, C		APR 68 P.P.
SYMBOL	DESCRIPTION	DATE APPROVAL
REVISIONS		
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA		
DRAWN BY	DEL. NORTH COUNTY	CALIFORNIA
TRACED BY	FLOOD PROTECTION KLAMATH RIVER AT KLAMATH PLAN AND PROFILE STA. 293+00 TO STA. 312+00	
CHECKED BY		
APPROVED		
APPROVAL RECOMMENDATIONS	APPROVED	DATE: 28 FEB 1968
PREPARED UNDER THE DIRECTION OF FRANK C. BORRER COLONEL, DISTRICT ENGINEER		SCALE: AS SHOWN JOB NO.: DRAWING NUMBER: SHEET 4 59 39 23

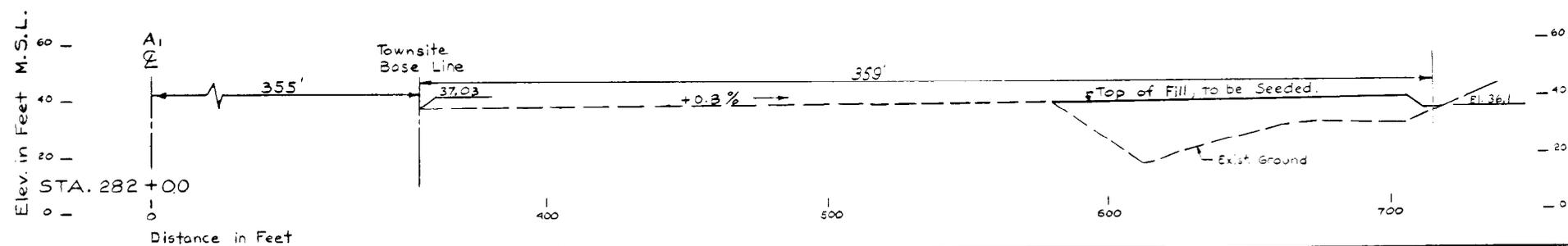
BEGINNING OF TOWNSITE FILL STA. "A₁" 254+00



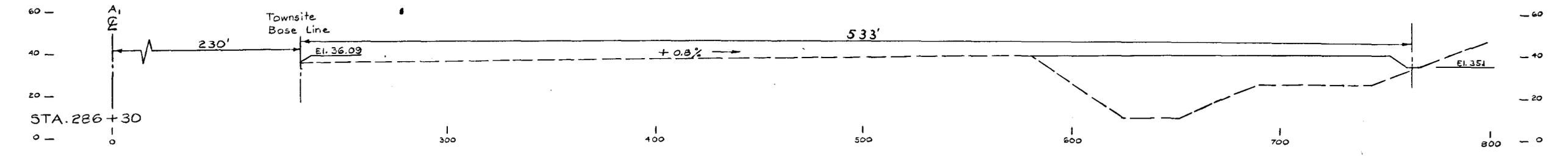
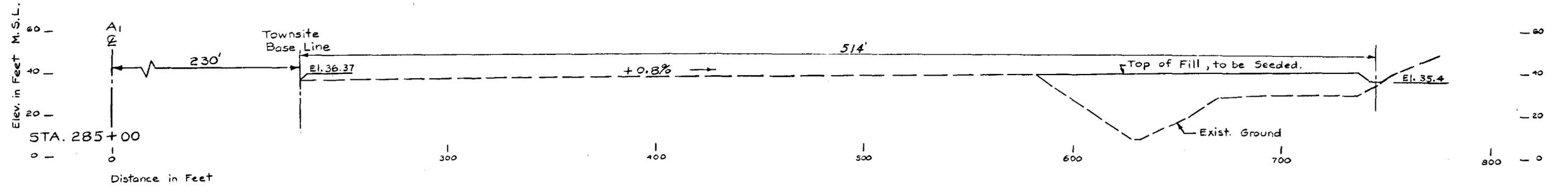
STA. "A₁" 275+60 TO STA. "A₁" 276+00, TRANSITION SECTION



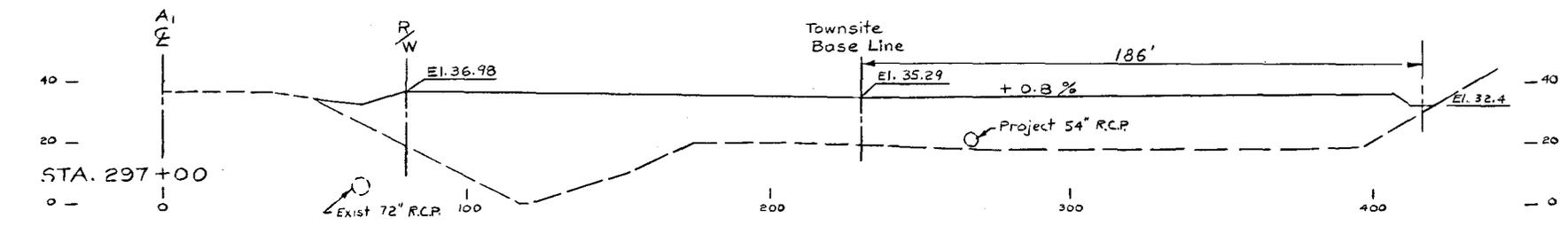
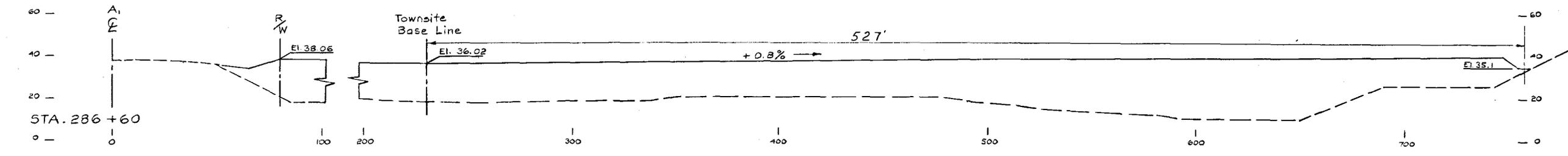
Note: Cross-sections are taken normal to "A₁" Line (Highway Center Line).



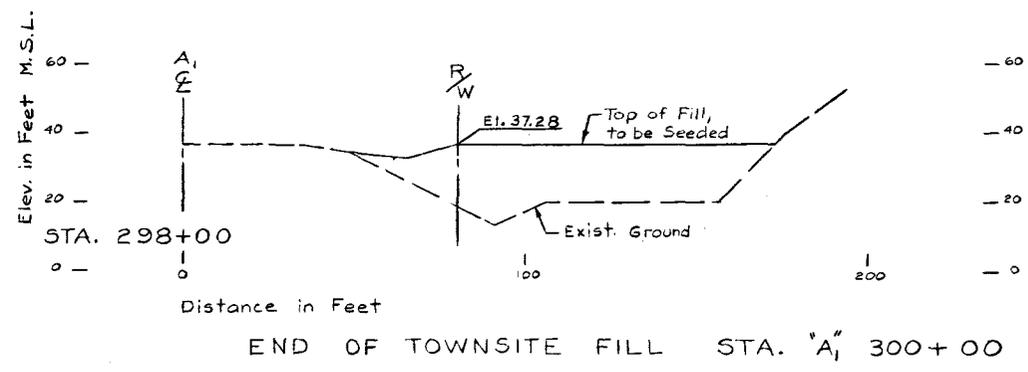
AS CONSTRUCTED - NO CHANGES MADE	VW	6/25/68	MS
ADDED DIMENSIONS AND REVISED STATIONS	MS	1/16/68	RJR
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY: V.O.	DEL NORTE COUNTY CALIFORNIA		
TRACED BY:	FLOOD PROTECTION		
CHECKED BY:	KLAMATH RIVER AT KLAMATH		
SUBMITTED BY: J. J. Jensen	CROSS SECTIONS		
DATE: 28 Feb. 1968	STA. 254+00 TO STA. 282+00		
APPROVED BY: [Signature]	SCALE: 1" = 20'	DATE:	JOB NO.:
PREPARED UNDER THE DIRECTION OF FRANK C. BOERGER COLONEL, C.E. DISTRICT ENGINEER	DRAWING NUMBER		SHEET 5 59 39 23



STA. "A," 286+30 TO STA. "A," 286+60 TRANSITION SECTION



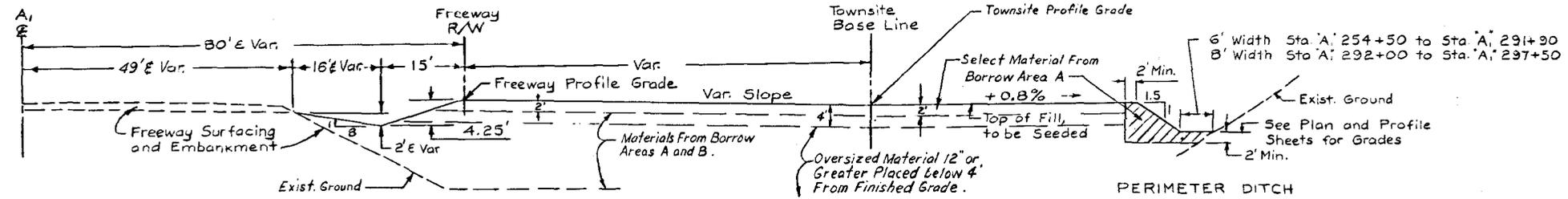
Note:
Cross-sections are taken normal to "A" Line
(Highway Center Line).



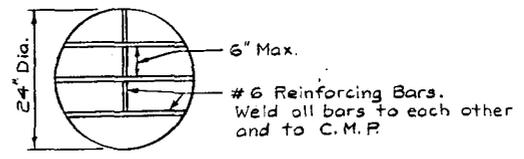
END OF TOWNSITE FILL STA. "A," 300+00

AS CONSTRUCTED - NO CHANGES MADE.		VW	69-SEP-25	75
ADDED DIMENSIONS		2s	1 APR 68	10/1
REVISIONS				
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO COMPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA				
DRAWN BY:	DEL NORTE COUNTY		CALIFORNIA	
TRACED BY:	FLOOD PROTECTION			
CHECKED BY:	KLAMATH RIVER AT KLAMATH			
SUBMITTED:	CROSS SECTIONS			
APPROVAL RECOMMENDED:	STA. 285+00 TO STA. 300+00			
DATE:	28 Feb. 1968			
PREPARED UNDER THE DIRECTION OF FRANK C. BOERGER COLONEL, C.E., DISTRICT ENGINEER		SCALE: 1" = 20'	JOB NO.	
DRAWING NUMBER		SHEET 6 59 39 23		

KLA-MATH RIVER

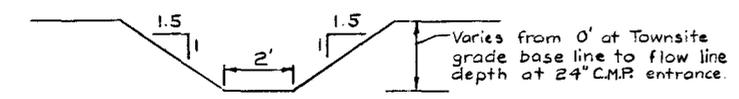


TOWNSITE GRADING
 STA. 'A' 254+00 TO STA. 'A' 300+00
 No Scale

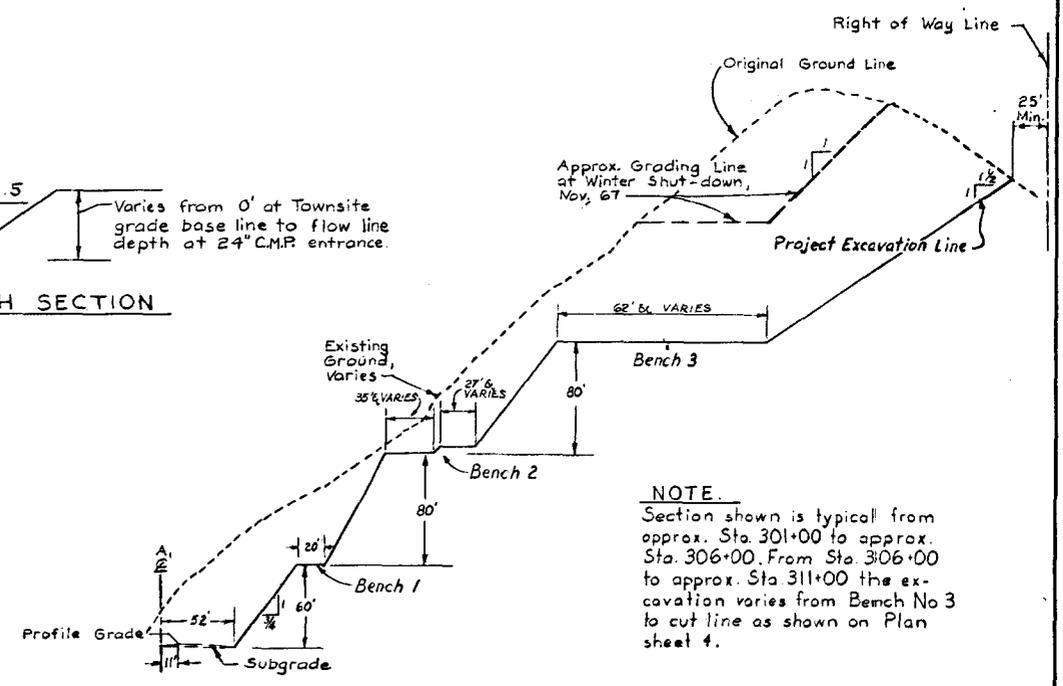


24" C.M.P. INLET SECURITY BARRIER
 Scale: 1" = 1'

Install security barriers at upstream ends of C.M.P. opposite Sta 277+15±, Sta. 299+15± and Sta 294+60±.



24" C.M.P. INLET DITCH SECTION
 No Scale



SECTION OF BORROW AREA 'A'
 Scale: 1" = 50'

NOTE.
 Section shown is typical from approx. Sta. 301+00 to approx. Sta. 306+00. From Sta. 306+00 to approx. Sta. 311+00 the excavation varies from Bench No 3 to cut line as shown on Plan sheet 4.

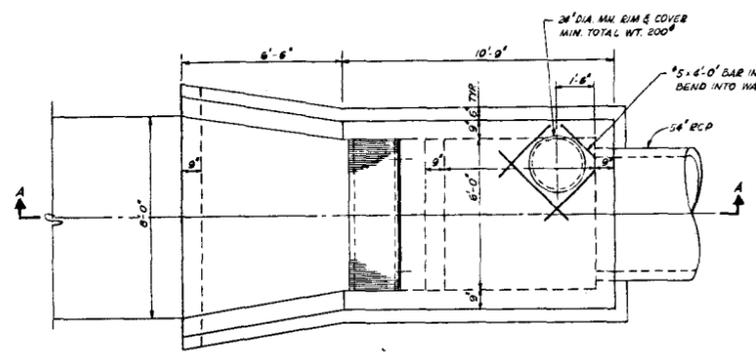
LEGEND:
 C.M.P. — Corrugated Metal Pipe

AS CONSTRUCTED - CHANGES MADE	VM	09 SEP 68	MS
DELETED PERCENT COMPACTION	MS	04 APR 68	MS
REVISED DETAILS FOR TOWNSITE GRADING, TYPICAL SECTION OF BORROW AREA A, AND SECURITY BARRIER.	MS	1 APR 68	MS
SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY: V.O.	DEL NORTE COUNTY	CALIFORNIA	
TRACED BY:	FLOOD PROTECTION KLAMATH RIVER AT KLAMATH		
CHECKED BY:	TYPICAL SECTIONS AND DETAILS		
SUBMITTED BY:			
APPROVAL RECOMMENDED BY:	APPROVER:	DATE:	
		28 Feb 1968	
PREPARED UNDER THE DIRECTION OF FRANK C. BOERGER COLONEL, C.E., DISTRICT ENGINEER		AS SHOWN	JOB NO.
		DRAWING NUMBER	
		SHEET 7	59 39 23

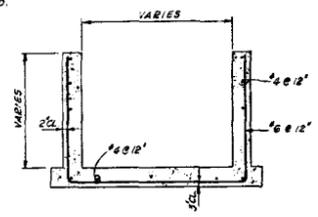
RECORD DRAWING

K LAMATH RIVER

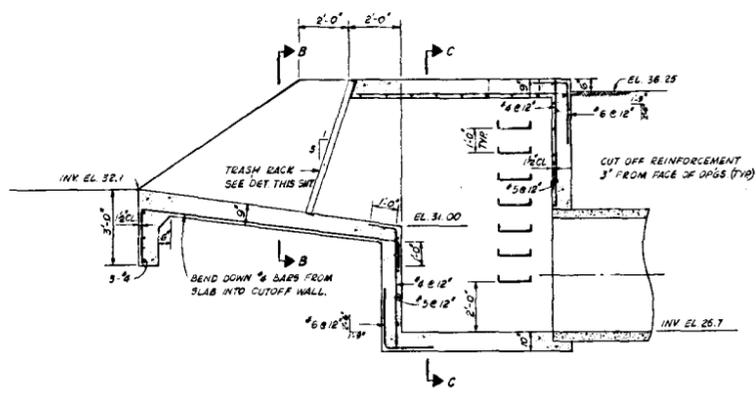
GENERAL NOTES



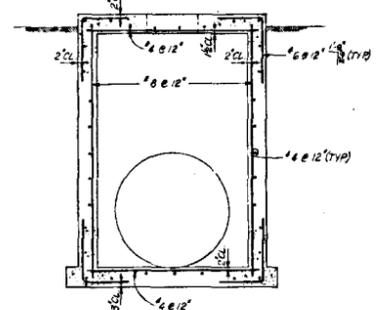
PLAN



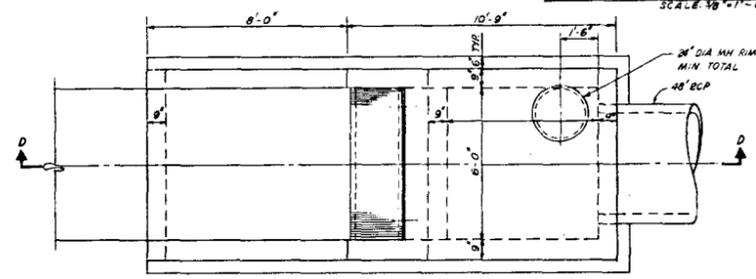
SECTION B-B



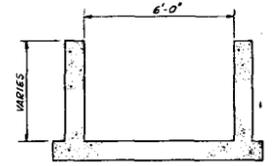
SECTION A-A



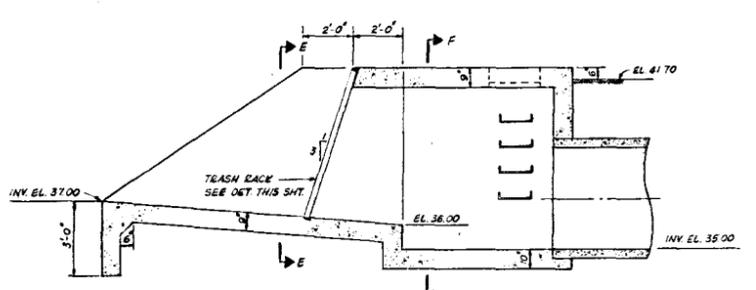
SECTION C-C



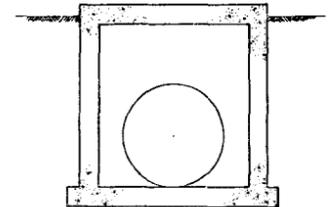
PLAN



SECTION E-E



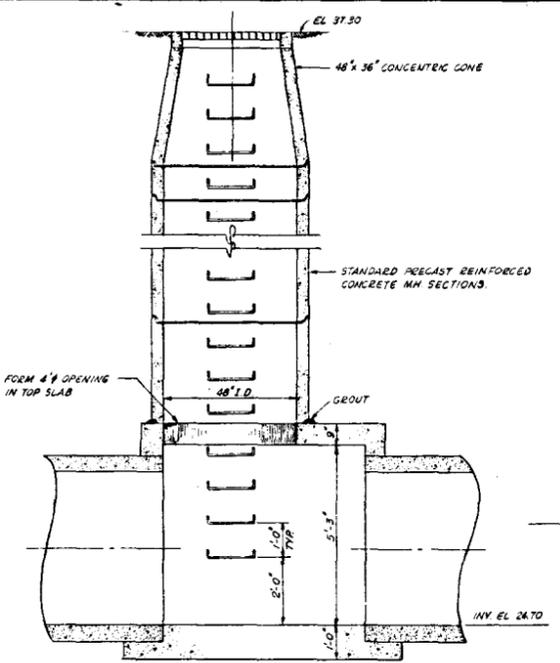
SECTION D-D



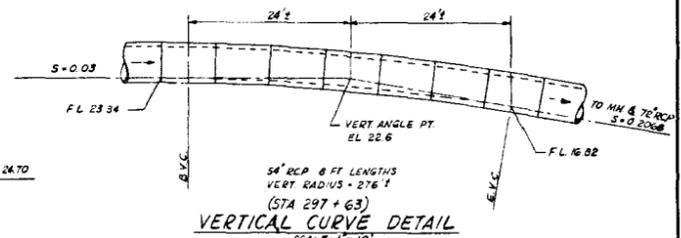
SECTION F-F

INLET STRUCTURE STA 270+70.1
SCALE: 3/8"=1'-0"

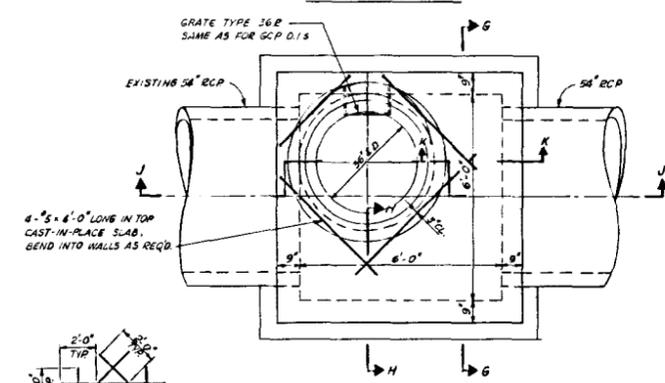
NOTE:
REINFORCEMENT SIMILAR TO
INLET STRUCTURE AT STA 297+63



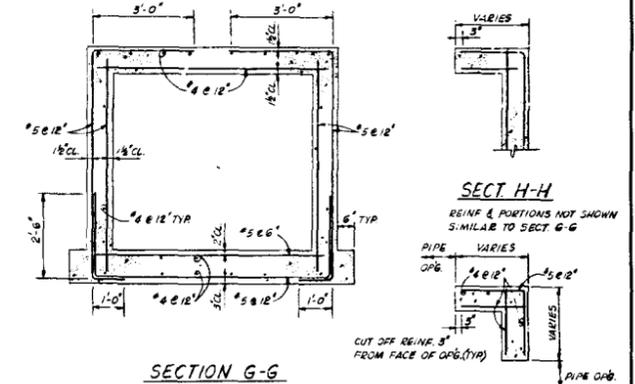
SECTION J-J



VERTICAL CURVE DETAIL
SCALE: 1"=10'

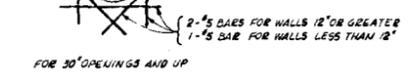


PLAN



SECTION G-G

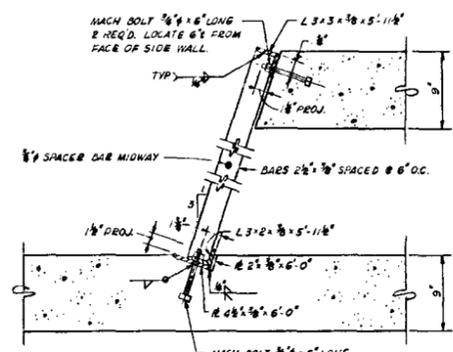
SECTION H-H



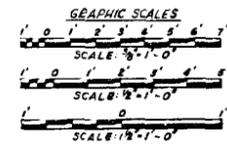
TYP REINFORCING @ PIPE OPENINGS
NO SCALE

DROP INLET STA 270+70.1
SCALE: 1/2"=1'-0"

SECTION K-K
TYP CORNER SECTION AT
PIPE OPENINGS.



TRASH RACK DETAIL
SCALE: 1/2"=1'-0"



R.C.P. BEDDING DETAIL

PLACE SELECTED MATERIAL UNDER LOWER ONE-THIRD SECTOR OF ALL REINFORCED CONCRETE PIPE AS SHOWN.

BY	DESCRIPTION	DATE	APPROVAL
AS CONSTRUCTED	CHANGES MADE	13 SEP 68	KS
REVISED D	OPENING @ STA 270+70.1	13 APR 68	PC
REVISED	REINFORCING DETAILS	13 APR 68	PC

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

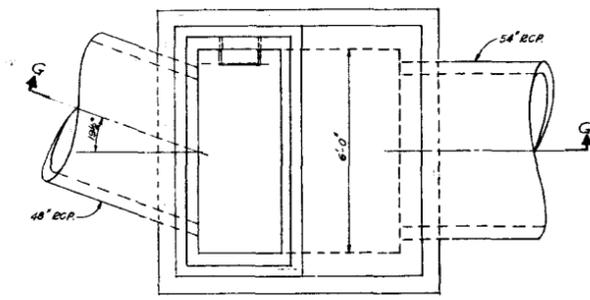
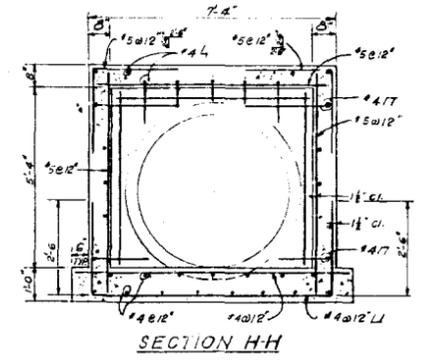
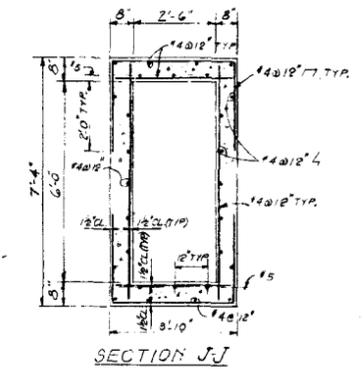
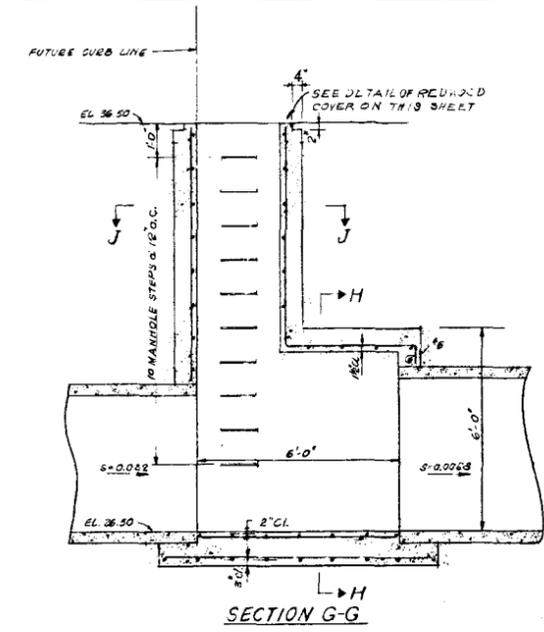
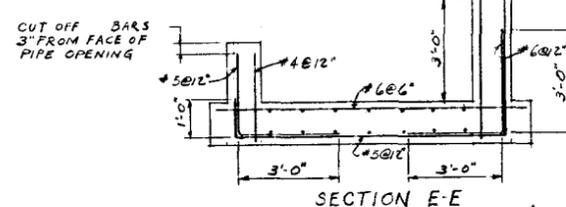
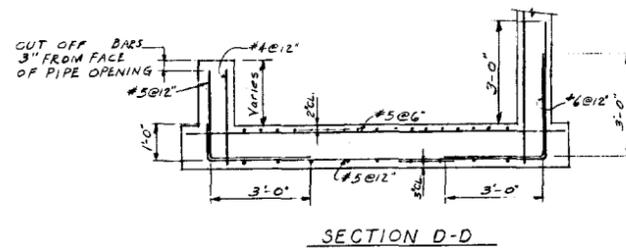
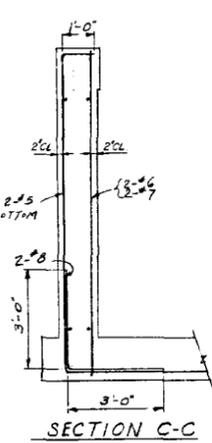
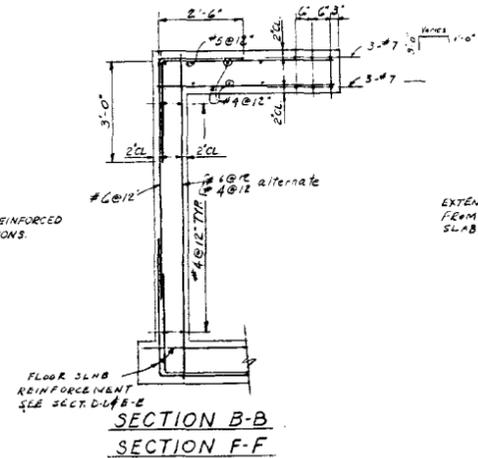
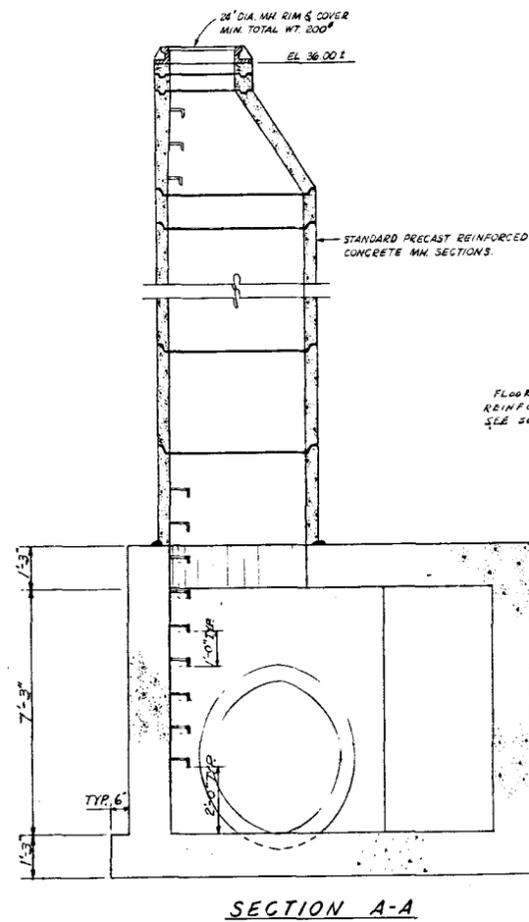
DEL NORTE COUNTY CALIFORNIA
**FLOOD PROTECTION
KLAMATH RIVER AT KLAMATH
INLET STRUCTURE DETAILS**

DRAWN BY: TSK
CHECKED BY:
SUBMITTED BY: [Signature]
APPROVAL RECOMMENDED BY: [Signature]
DATE: 28 Feb. 1968

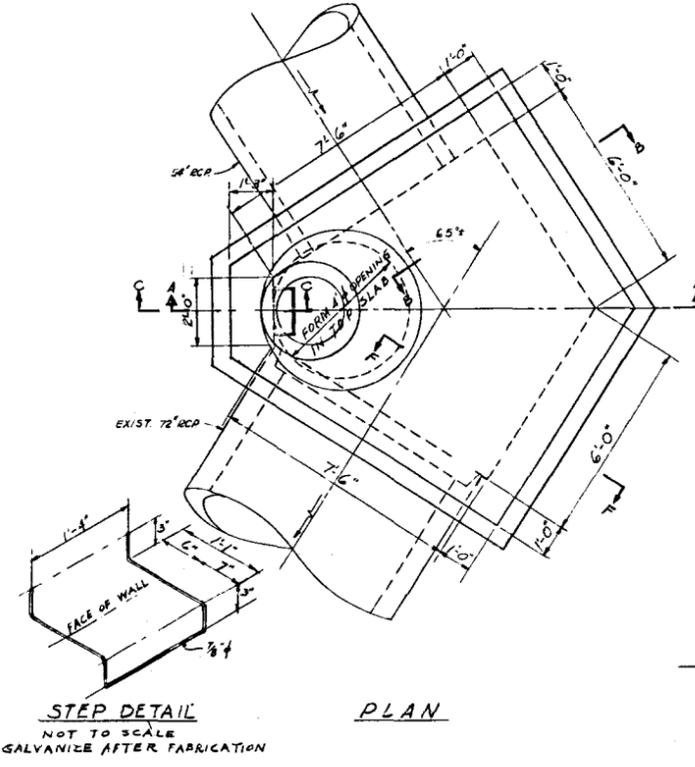
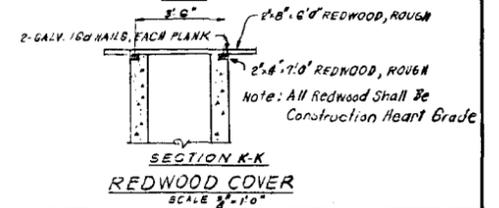
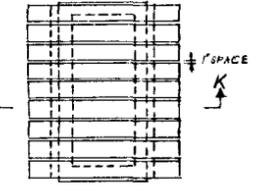
PREPARED UNDER THE DIRECTION OF
FRANK C. DOERGER
COLONEL, C.E., DISTRICT ENGINEER

SCALE: AS SHOWN
JOB NO.:
DRAWING NUMBER:
SHEET 8 59 39 23

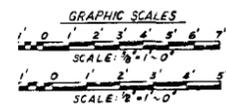
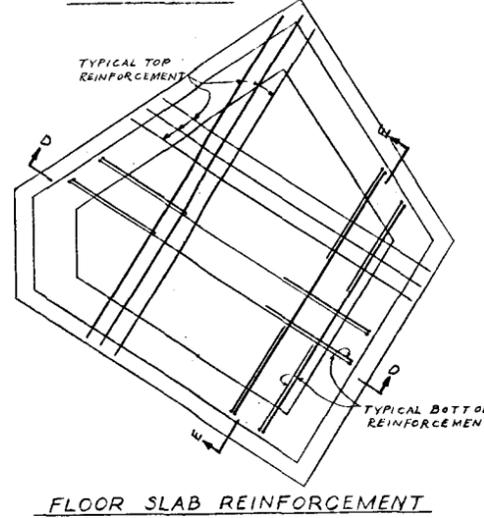
K
L
A
M
A
T
H



JUNCTION STRUCTURE STATION 270+70
SCALE 1/2"=1'-0"



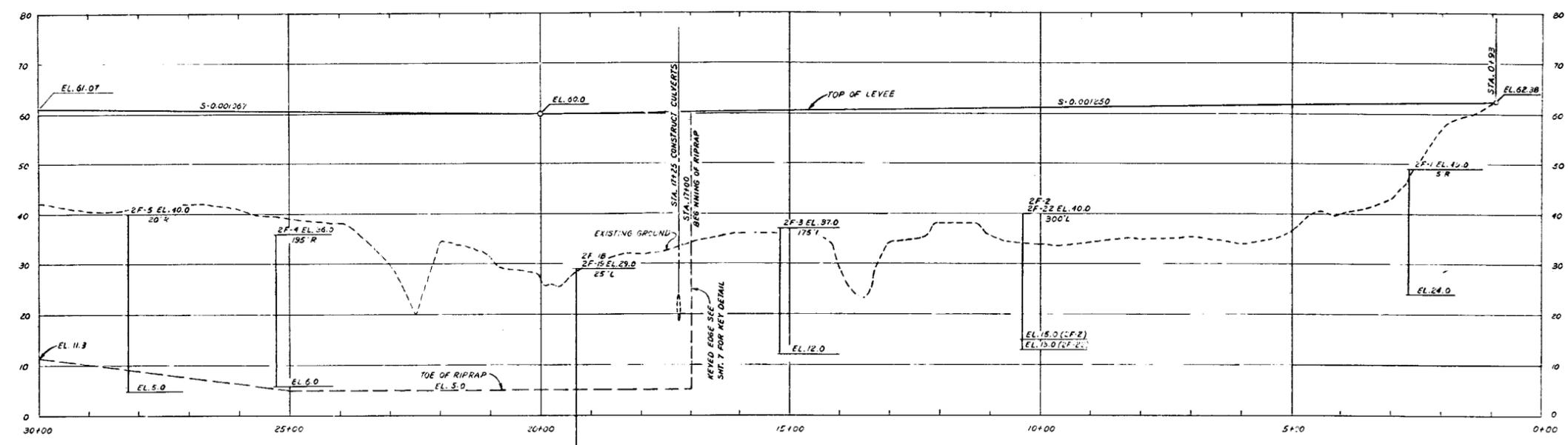
MANHOLE STATION 297+63
SCALE 1/2"=1'-0"



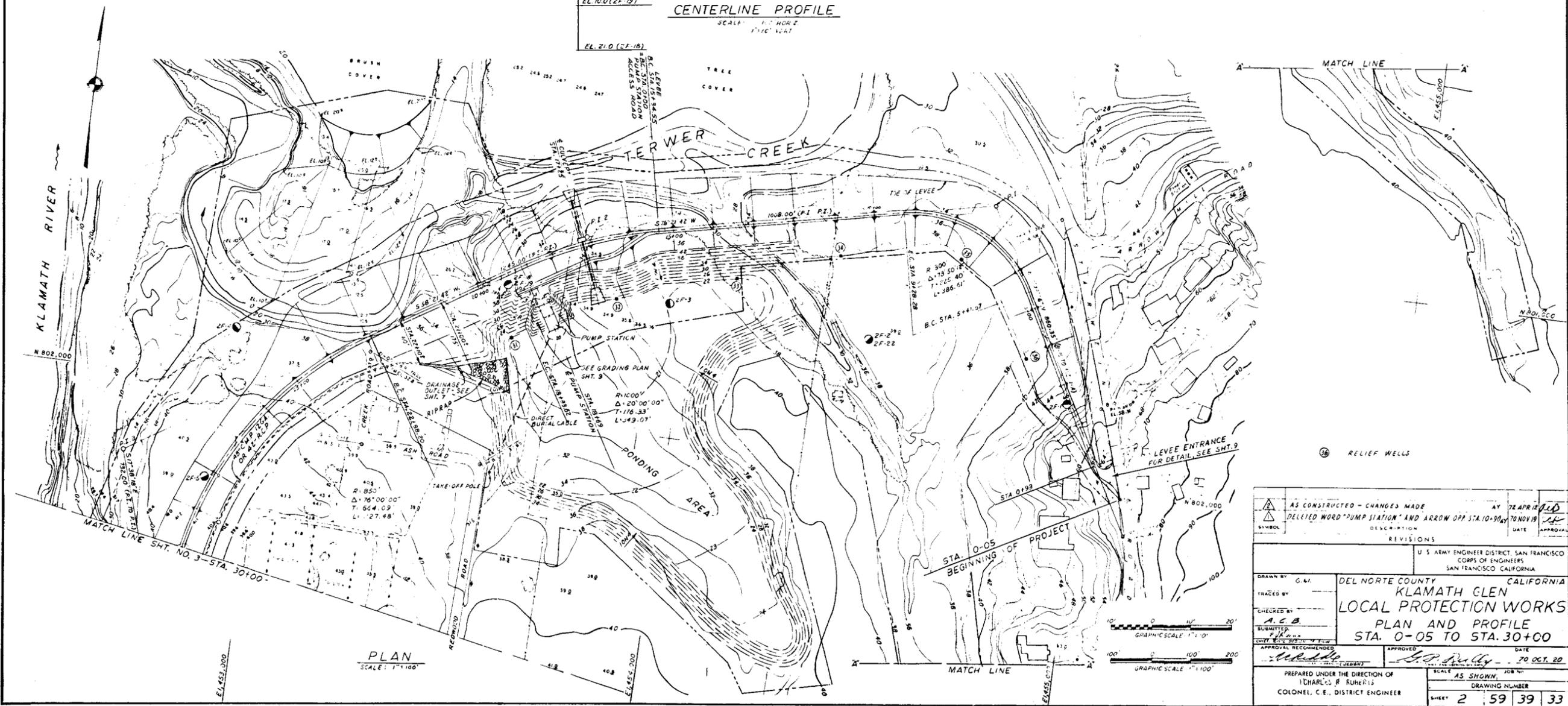
AS CONSTRUCTED - NO CHANGES MADE.	IN	APPROVED	BY
REVISED REINFORCING DETAILS	1.0	1 APR 68	PER
SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY: T.K.	DEL NORTE COUNTY	CALIFORNIA	
TRACED BY:	FLOOD CONTROL		
CHECKED BY:	KLAMATH RIVER AT KLAMATH		
SUBMITTED:	JUNCTION & MANHOLE		
APPROVAL RECOMMENDED:	STRUCTURE DETAILS		
APPROVED:	DATE:	28 Feb. 1968	
PREPARED UNDER THE DIRECTION OF FRANK C. BOERGER COLONEL, C.E., DISTRICT ENGINEER		SCALE:	JOB NO.
		AS SHOWN	DRAWING NUMBER
		SHEET	9 59 39 23

UNCLASSIFIED

ELEVATION IN FEET - M.S.L.



CENTERLINE PROFILE
 SCALE: 1" = 10' HORZ
 1" = 10' VERT

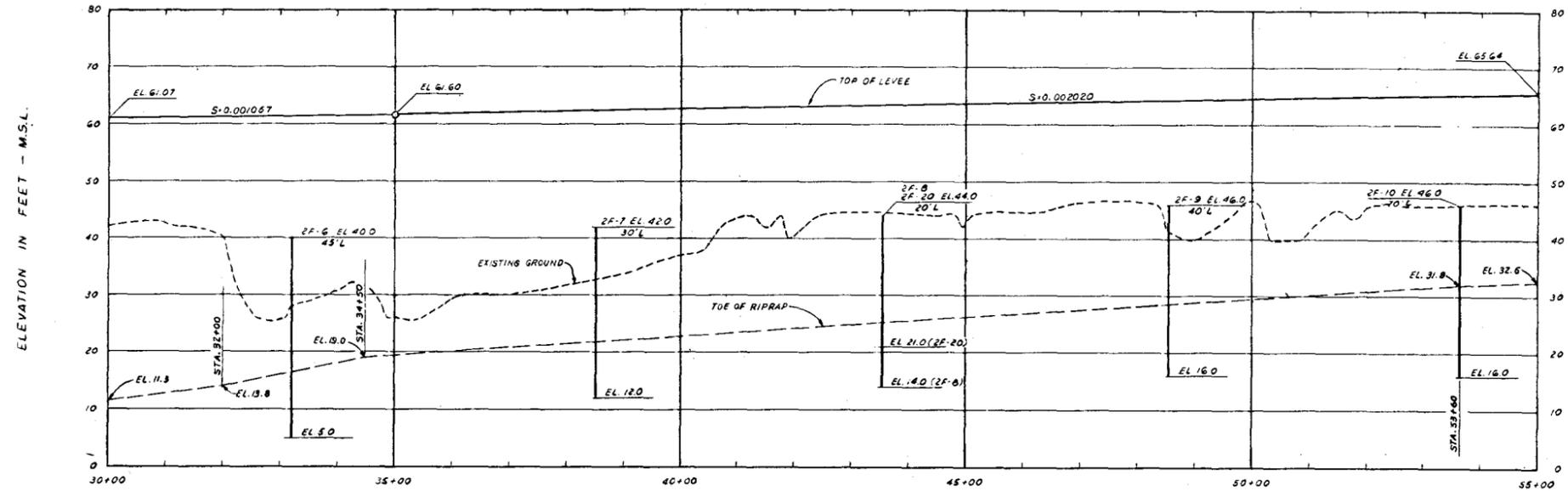


PLAN
 SCALE: 1" = 100'

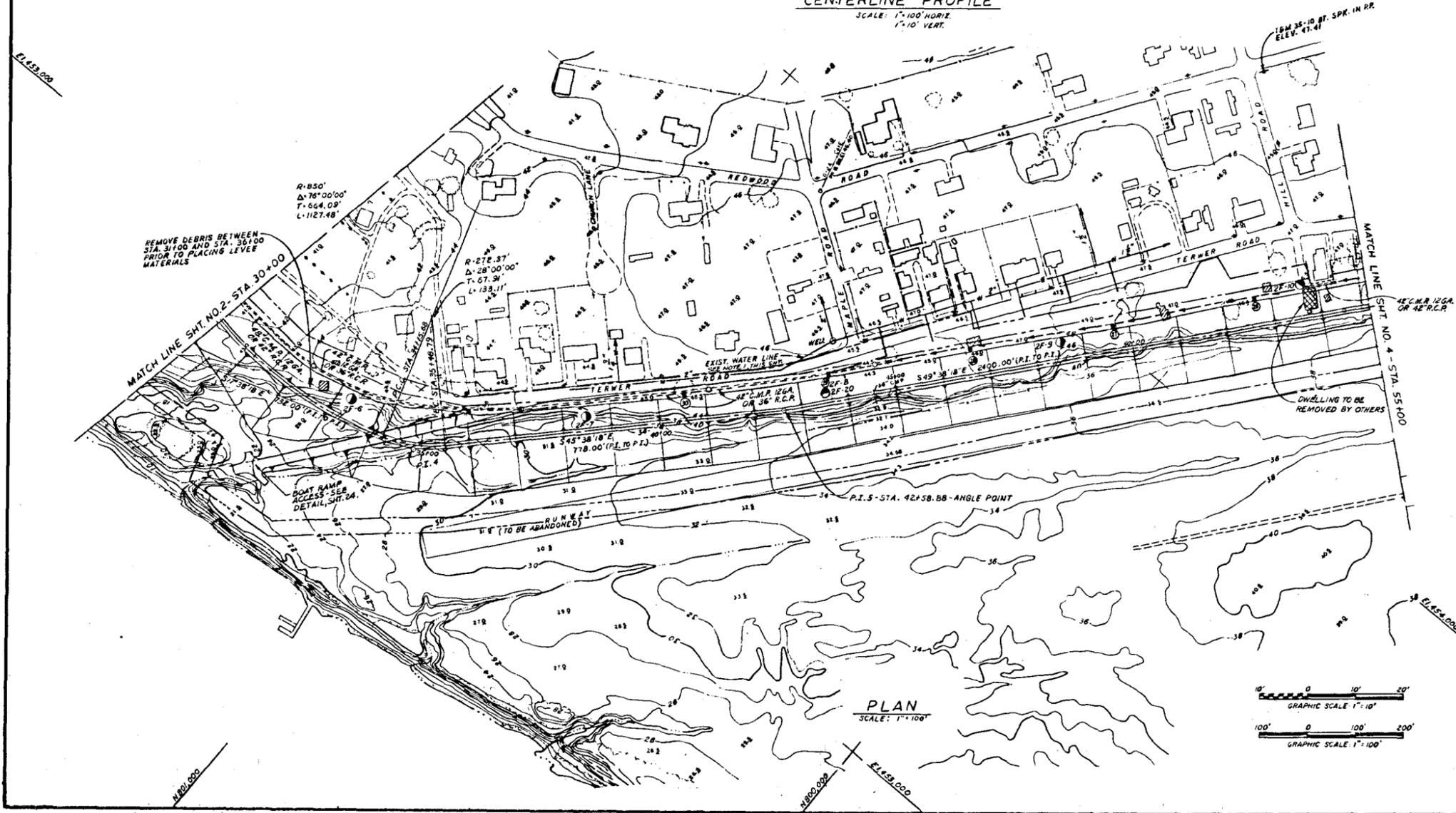
AS CONSTRUCTED - CHANGES MADE		DATE	BY
DELETED WORD "PUMP STATION" AND ARROW OFF STA. 10+90		7 APR 22	W.D.
DESCRIPTION		DATE	APPROVAL
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY	DEL NORTE COUNTY CALIFORNIA		
TRACED BY	KLAMATH GLEN		
CHECKED BY	LOCAL PROTECTION WORKS		
SUBMITTED	PLAN AND PROFILE		
APPROVAL RECOMMENDED	STA. 0-05 TO STA. 30+00		
APPROVED	DATE		
	70 OCT. 20		
PREPARED UNDER THE DIRECTION OF		SCALE	JOB NO.
CHARLES R. RUMBLE		AS SHOWN	
COLONEL, C.E., DISTRICT ENGINEER		DRAWING NUMBER	
		SHEET	2 59 39 33

RECORD DRAWING

KAMATH GLEN



CENTERLINE PROFILE
SCALE: 1"=100' HORIZ.
1"=10' VERT.



NOTE
1. REMOVE AND CAP EXISTING WATER LINE AT RIGHT OF WAY LINE.

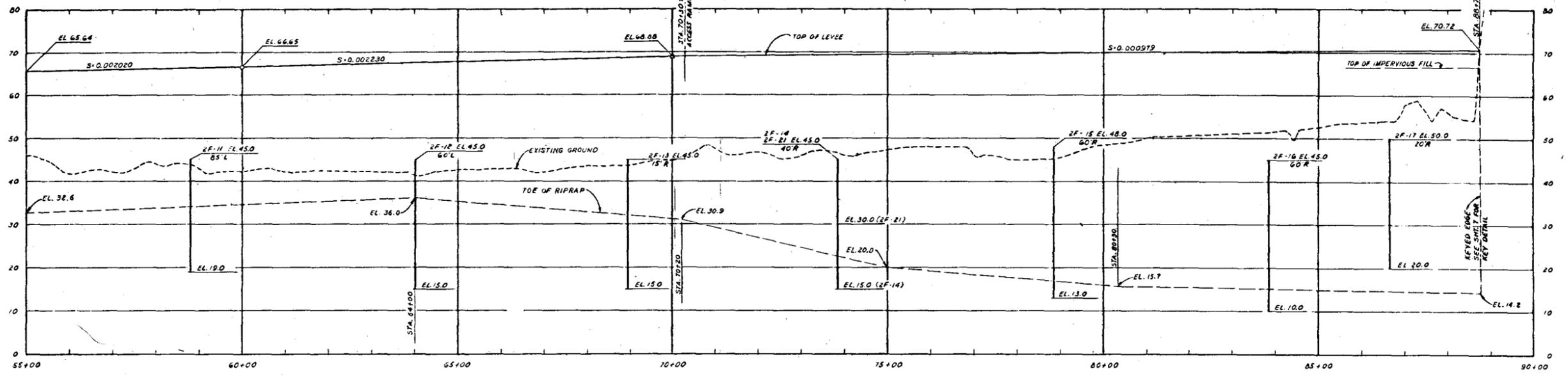
⊕ RELIEF WELLS

AS CONSTRUCTED - CHANGES MADE		BY	DATE	APPROVAL
REVISIONS				
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA				
DRAWN BY	DEL NORTE COUNTY CALIFORNIA			
TRACED BY	KLAMATH GLEN			
CHECKED BY	LOCAL PROTECTION WORKS			
SUBMITTED		PLAN AND PROFILE		
APPROVAL RECOMMENDATIONS		STA. 30+00 TO STA. 55+00		
APPROVED		DATE	70 OCT. 20	
PREPARED UNDER THE DIRECTION OF		SCALE AS SHOWN	DRAWING NUMBER	
[CHARLES R. ROBERTS]		3 59 39 33		
COLONEL, C.E. DISTRICT ENGINEER		SHEET		

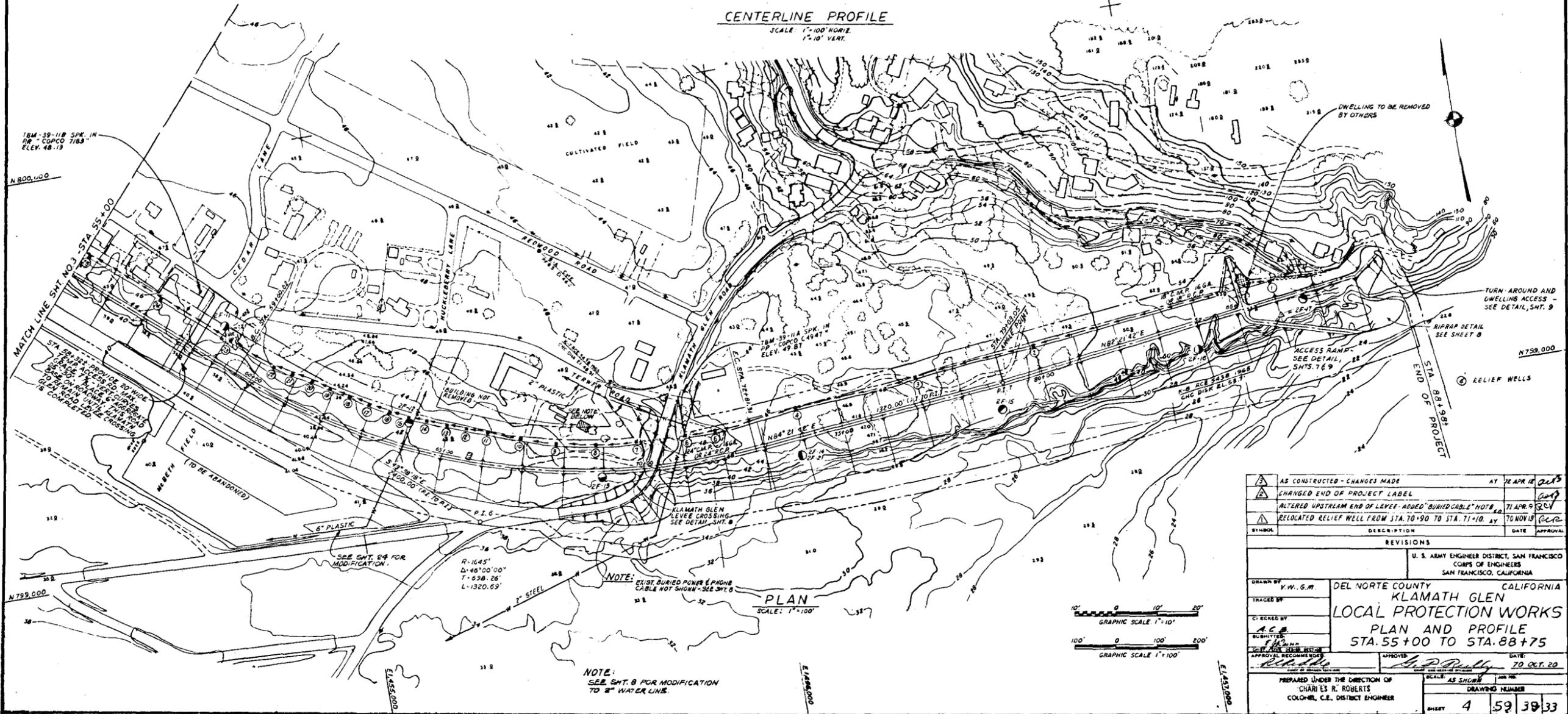
RECORD DRAWING

KAMATH GLEN

ELEVATION IN FEET - M.S.L.



CENTERLINE PROFILE
SCALE: 1"=100' HORIZ.
1"=10' VERT.

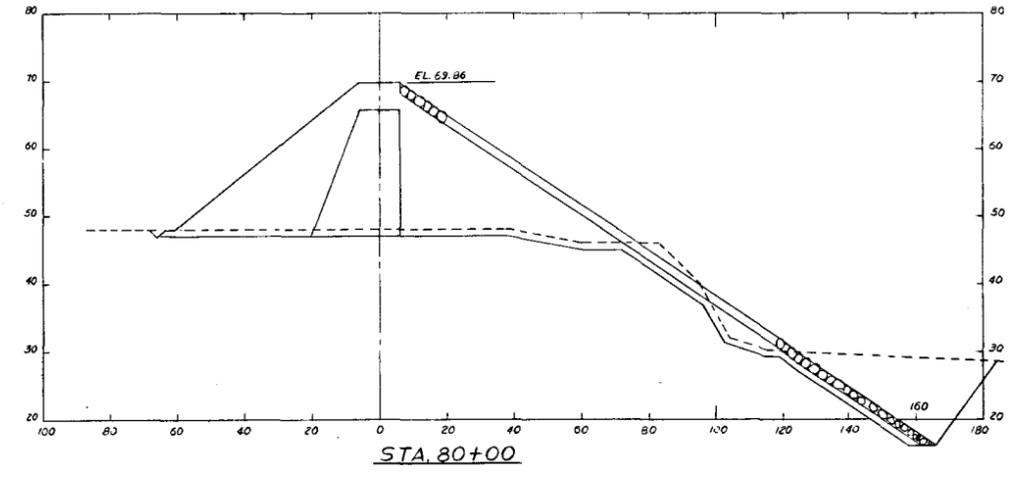
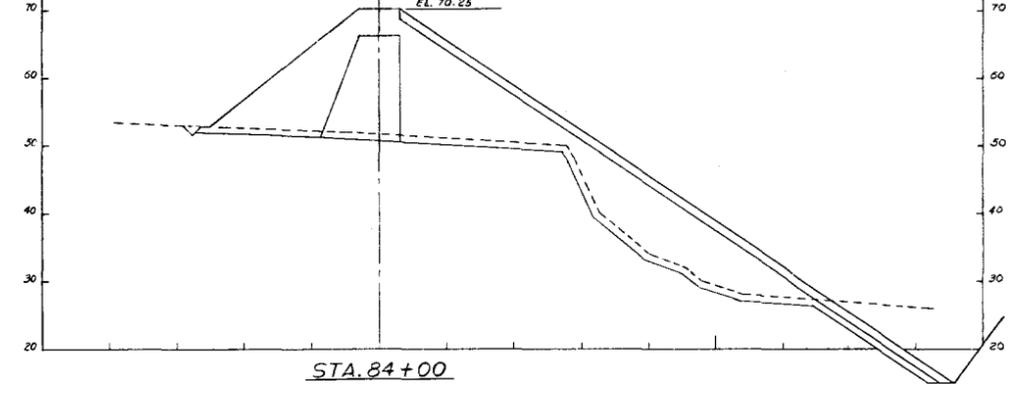
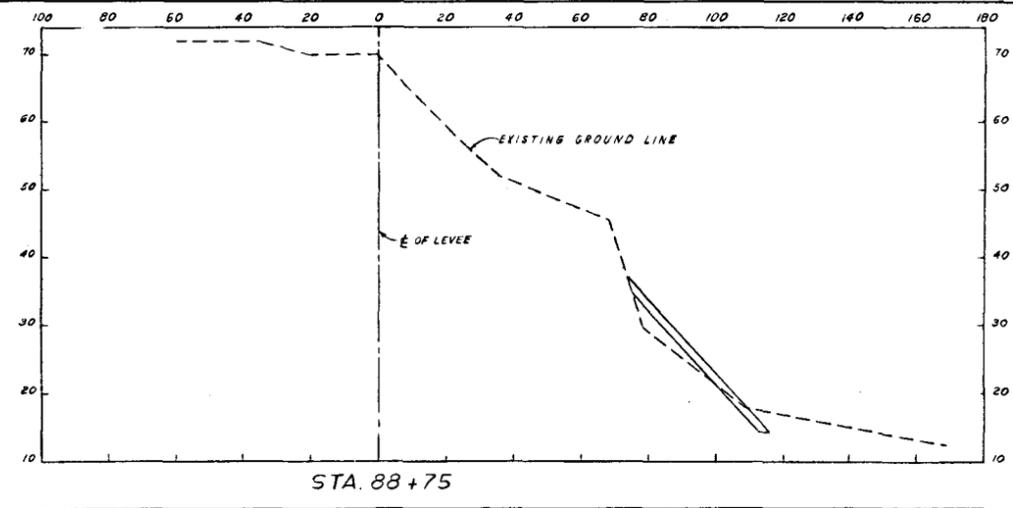
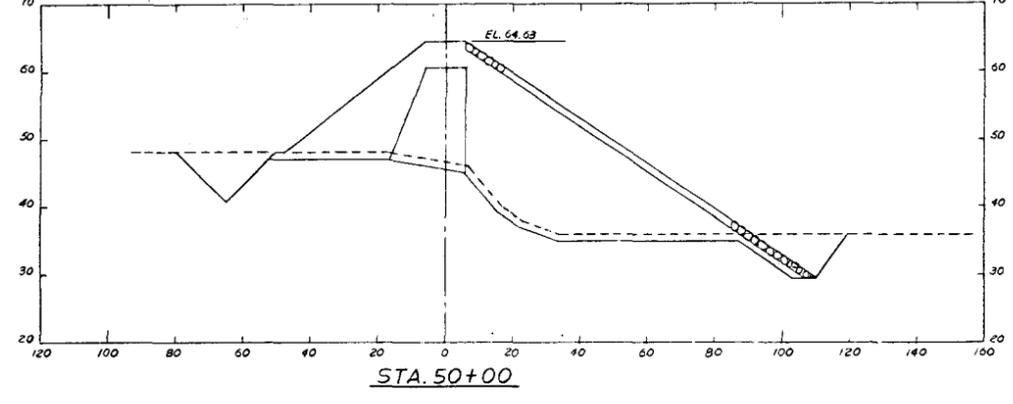
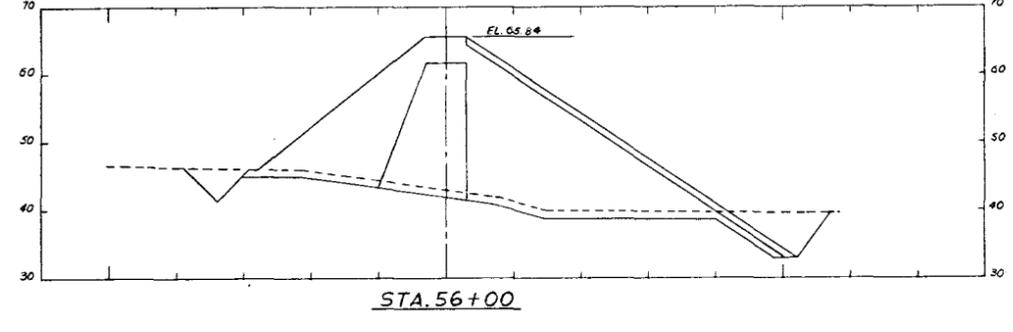
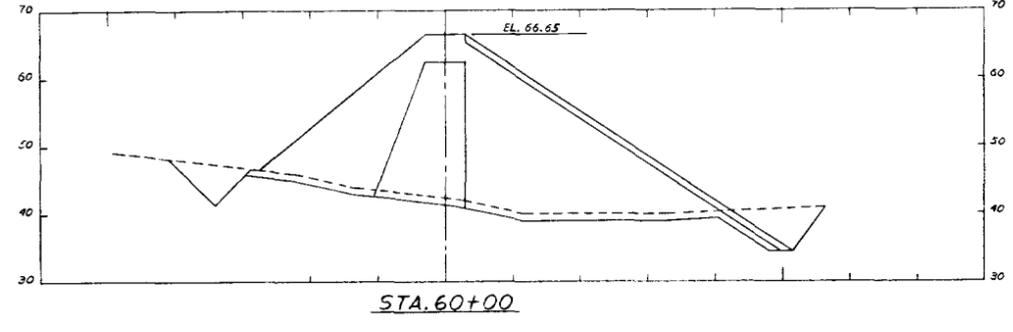
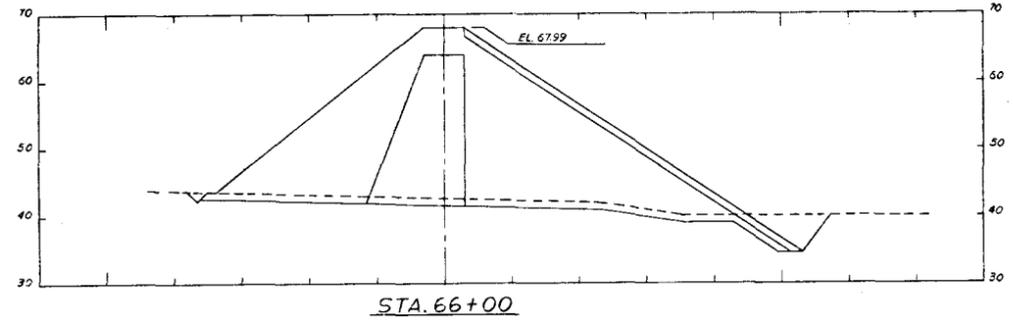
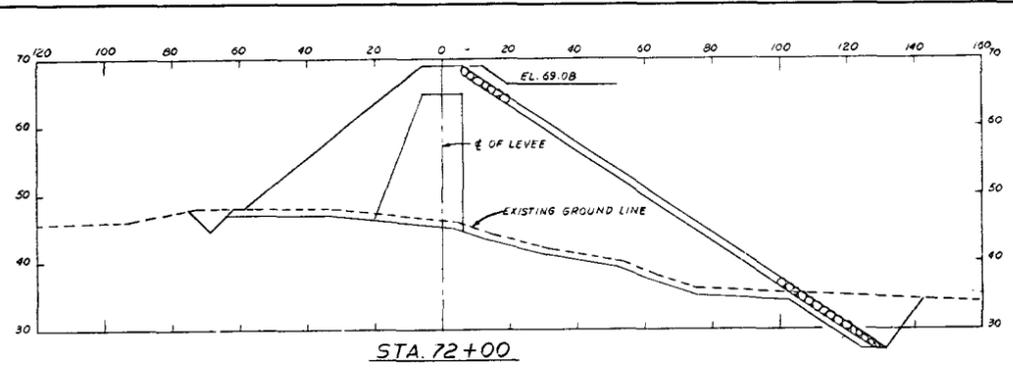


SYMBOL	DESCRIPTION	DATE	APPROVAL
△	AS CONSTRUCTED - CHANGES MADE	AT 12 APR 12	del
△	CHANGED END OF PROJECT LABEL	27 APR 9	del
△	ALTERED UPSTREAM END OF LEVEE - ADDED "BURIED CABLE" NOTE	27 APR 9	del
△	RELOCATED RELIEF WELL FROM STA. 70+90 TO STA. 71+10	17 NOV 19	del

REVISIONS	
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA	
DRAWN BY: V.W.G.M.	DEL NORTE COUNTY CALIFORNIA
TRACED BY:	KLAMATH GLEN
CHECKED BY: A.E.	LOCAL PROTECTION WORKS
APPROVED BY: [Signature]	PLAN AND PROFILE
	STA. 55+00 TO STA. 88+75
DATE: 20 OCT. 20	
PREPARED UNDER THE DIRECTION OF: CHARLES R. ROBERTS	DRAWING NUMBER
COLONEL, C.E. DISTRICT ENGINEER	4 59 39 33

RECORD DRAWING

KLA-MATH GLEN

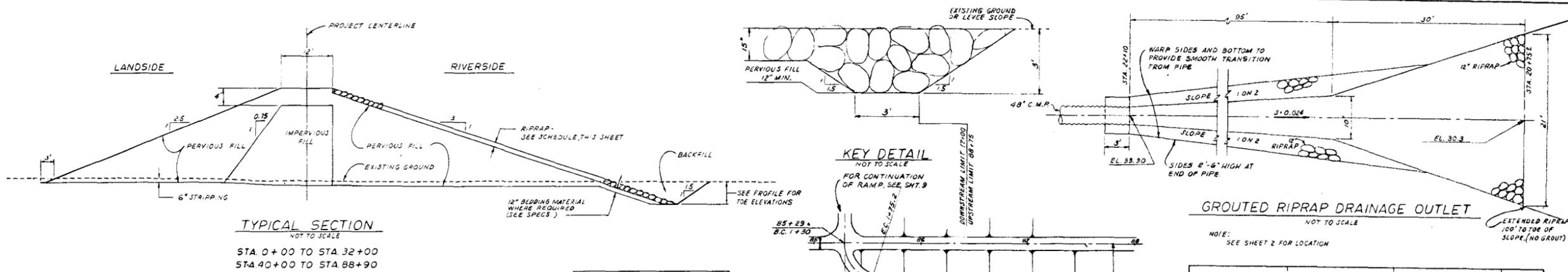


NOTE:
SECTIONS DRAWN WITH RIVERSIDE
OF LEVEE ON THE RIGHT.
SEE SHEET 7 FOR TOE DRAIN DETAILS.

AS CONSTRUCTED - NO CHANGES MADE	DATE: 22 APR 12	APPROVAL: [Signature]	
ALTERED SECTION AT STA. 88+75	DATE: 7 APR 9	APPROVAL: [Signature]	
SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			
DRAWN BY: G.M.		U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA	
TRACED BY:		DEL NORTE COUNTY KLA-MATH GLEN CALIFORNIA	
CHECKED BY: A.C.B.		LOCAL PROTECTION WORKS	
SUBMITTED BY:		CROSS SECTIONS	
CHIEF, CIVIL DESIGN SECT.		APPROVAL: [Signature]	
APPROVAL RECOMMENDATION:		DATE: 20 OCT 20	
PREPARED UNDER THE DIRECTION OF CHARLES R. ROBERTS COLONEL, C.E. DISTRICT ENGINEER		SCALE: AS SHOWN	
DRAWING NUMBER		JOB NO.	
SHEET 6		59.39.33	

RECORD DRAWING

KRAM-H-1000

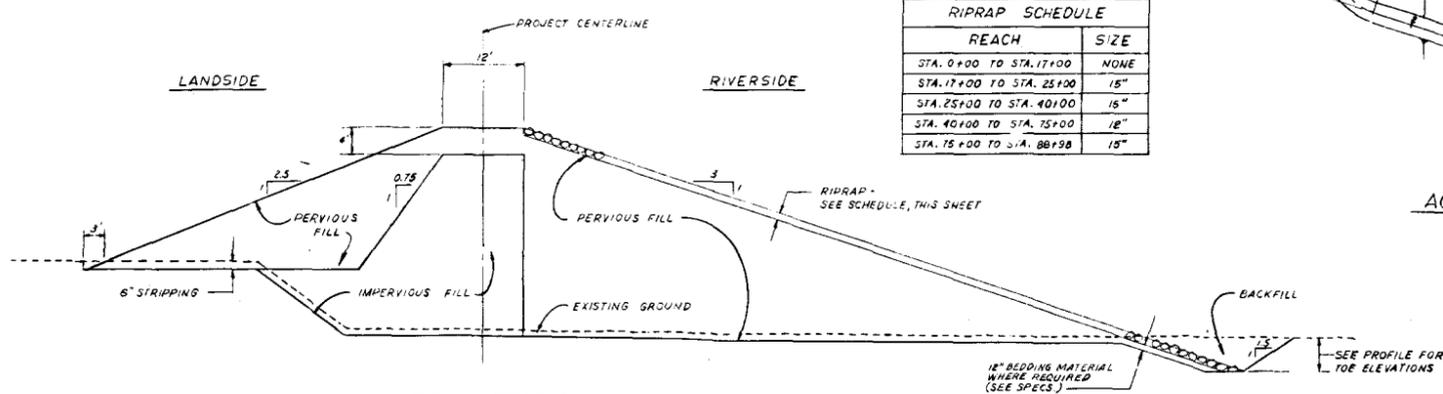


TYPICAL SECTION
NOT TO SCALE
STA. 0+00 TO STA. 32+00
STA. 40+00 TO STA. 88+90

KEY DETAIL
NOT TO SCALE
FOR CONTINUATION OF RAMP, SEE SHT. 9

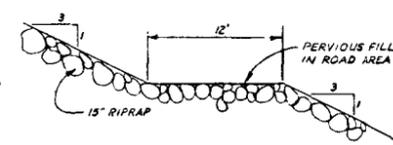
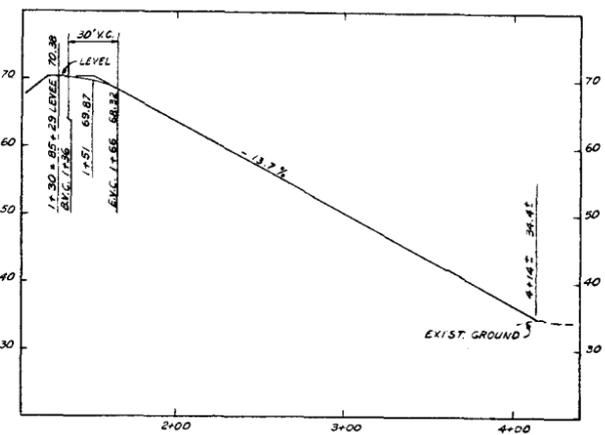
GROUTED RIPRAP DRAINAGE OUTLET
NOT TO SCALE

RIPRAP SCHEDULE	
REACH	SIZE
STA. 0+00 TO STA. 17+00	NONE
STA. 17+00 TO STA. 25+00	15"
STA. 25+00 TO STA. 40+00	15"
STA. 40+00 TO STA. 75+00	18"
STA. 75+00 TO STA. 88+90	15"



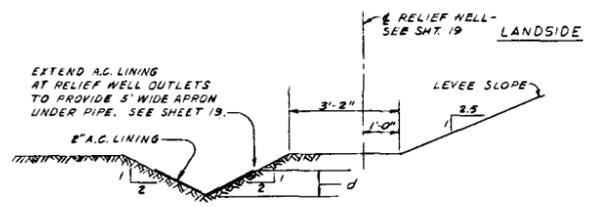
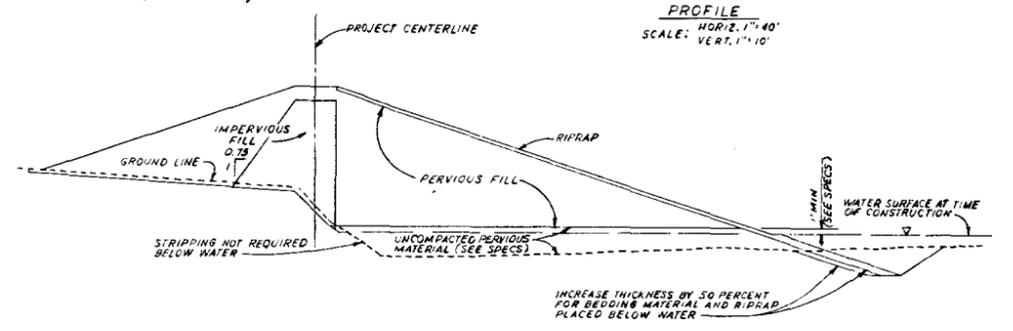
TYPICAL SECTION
NOT TO SCALE
STA. 32+00 TO STA. 40+00

ACCESS RAMP - STA. 85+29
PLAN
SCALE: 1"=40'

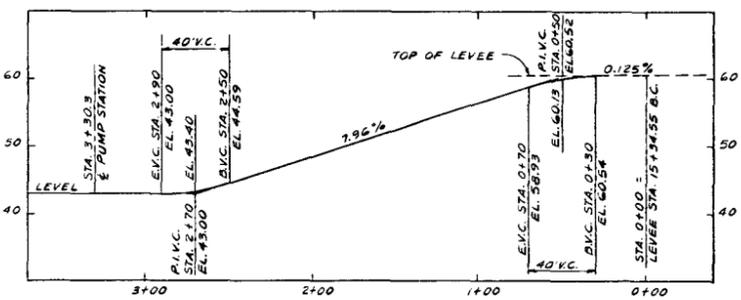


SECTION A-A
(NOT TO SCALE)

ACCESS RAMP - STA. 85+29
PROFILE
SCALE: HORIZ. 1"=40'
VERT. 1"=10'



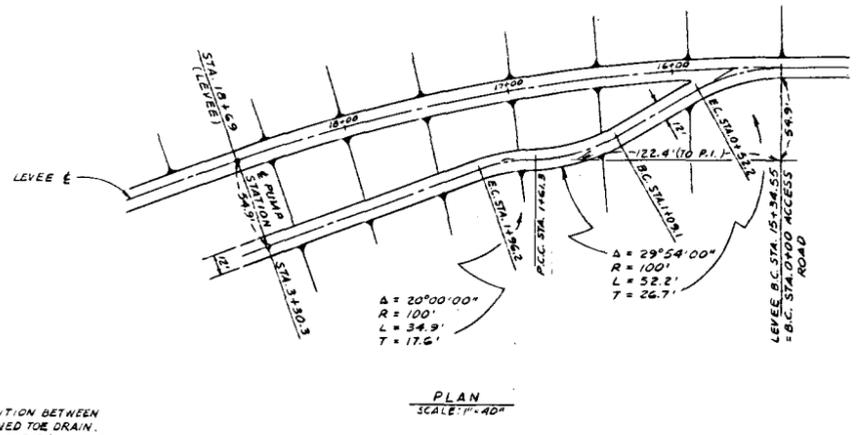
LINED TOE DRAIN DETAIL
NOT TO SCALE



CENTERLINE PROFILE
SCALE: HORIZ. 1"=40'
VERT. 1"=10'

TOE DRAIN DATA			
STATION	INVERT ELEV.	DEPTH	REMARKS
88+40	87.6	1.0'	BEGIN DITCH
86+81	#	1.0'	END DITCH, BEGIN 18" C.M.P.
85+95	#	1.0'	END 18" C.M.P., BEGIN DITCH
85+72	#	1.0'	END DITCH, BEGIN 18" C.M.P.
84+83	#	1.0'	END 18" C.M.P., BEGIN DITCH
83+80	51.0	1.0'	POINT OF GRADE CHANGE
80+30	47.1	1.0'	POINT OF GRADE CHANGE
77+60	45.0	1.5'	BEGIN 1.5' DEPTH
71+08	44.59	1.5'	END DITCH, BEGIN 24" C.M.P.
69+75	44.51	1.25'	END 24" C.M.P., BEGIN DITCH @ 7.25' DEPTH
64+30	42.0	2.0'	BEGIN 2.0' DEPTH
54+40	41.4	2.0'	END DITCH, BEGIN 42" C.M.P.
53+80	41.07	2.0'	END 42" C.M.P., BEGIN DITCH
45+00	39.99	20'	END DITCH, BEGIN 42" C.M.P.
41+08	38.85	-	4" DROP INLET
37+5	37.70	-	4" DROP INLET
32+13	36.23	-	4" DROP INLET, BEGIN 48" C.M.P.
27+11	34.77	-	4" DROP INLET
22+10	33.30	-	END 48" C.M.P., BEGIN OUTLET

NOTE:
1. ALLOW 15' FOR TRANSITION BETWEEN VARYING DEPTHS OF LINED TOE DRAIN.
2. AT JUNCTION OF LINED TOE DRAIN AND PIPE, WARP DITCH TO PIPE WITHIN A DISTANCE OF 6 PIPE DIAMETERS.



ACCESS ROAD TO PUMP STATION
SCALE: 1"=40'

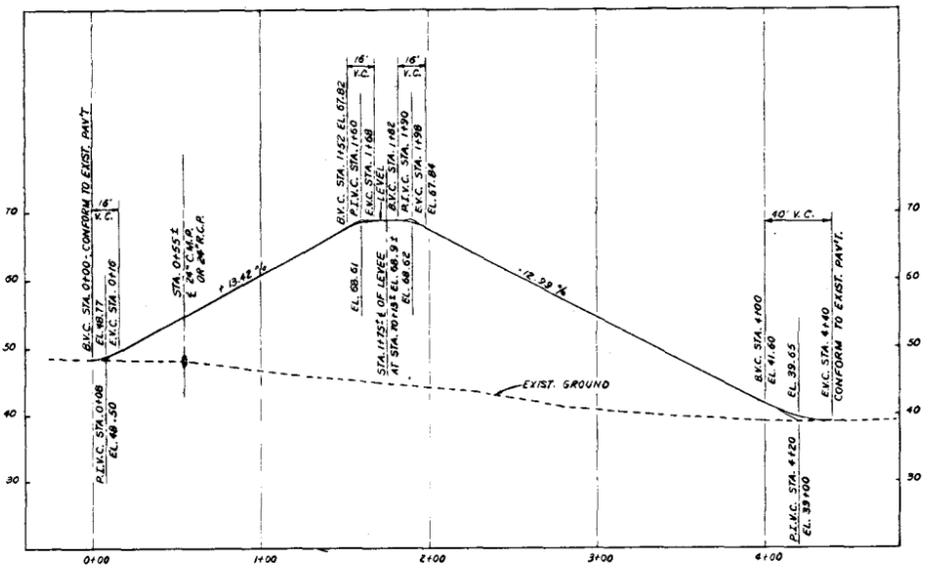
TYPICAL SECTION FOR EMBANKMENT CONSTRUCTION BELOW WATER
NOT TO SCALE

NOTE: SEE OTHER TYPICAL SECTIONS FOR DIMENSIONS AND DETAILS NOT SHOWN

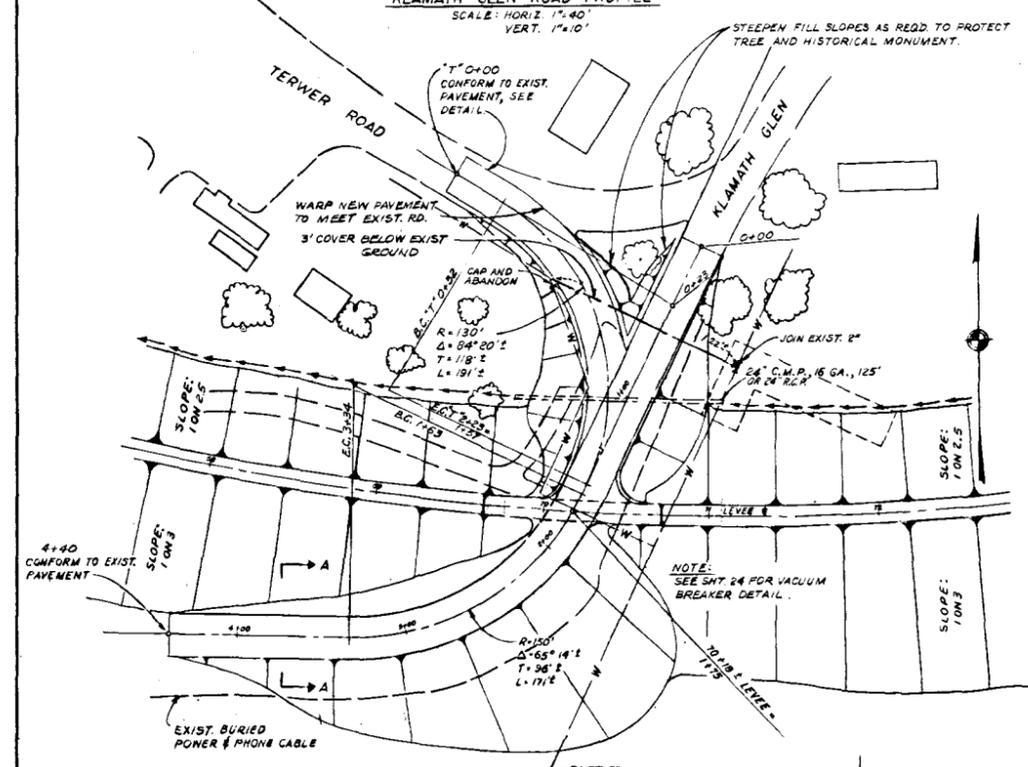
AS CONSTRUCTED - CHANGES MADE	DATE	APPROVAL
REVISIONS		
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA		
DRAWN BY: ELL, G. M.	DEL NORTE COUNTY	CALIFORNIA
TRACED BY:	KLAMATH GLEN	
CHECKED BY: A.C.B.	LOCAL PROTECTION WORKS	
SUBMITTED BY: T.H.A.	DETAILS AND TYPICAL SECTIONS	
APPROVAL RECOMMENDED: [Signature]	APPROVED: [Signature]	DATE: 70 OCT 20
PREPARED UNDER THE DIRECTION OF [CHARLES H. ROBERTS] COLONEL, C.E., DISTRICT ENGINEER		
SCALE: AS SHOWN	JOB No.	DRAWING NUMBER
SHEET 7	59	39 33

RECORD DRAWING

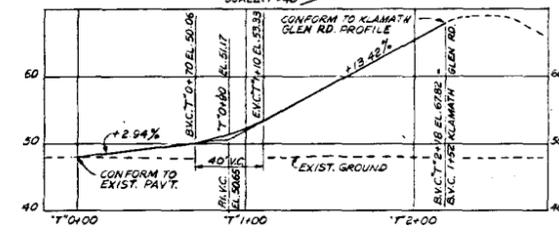
KRAMATH GLEN



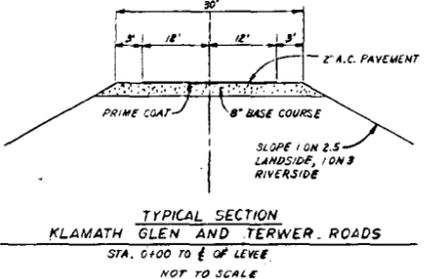
KLAMATH GLEN ROAD PROFILE
SCALE: HORIZ. 1"=40'
VERT. 1"=10'



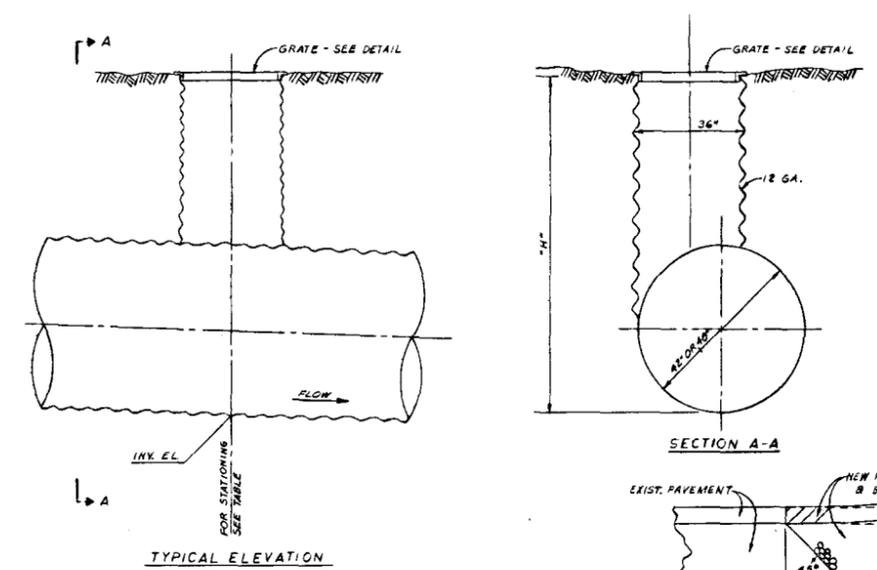
KLAMATH GLEN ROAD LEVEE CROSSING
SCALE: 1"=40'



TERWER ROAD PROFILE
SCALE: HORIZ. 1"=40'
VERT. 1"=10'



TYPICAL SECTION KLAMATH GLEN AND TERWER ROADS
STA. 0+00 TO E. OF LEVEE
NOT TO SCALE

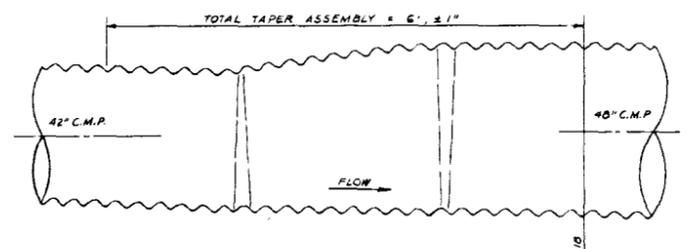


TYPICAL ELEVATION

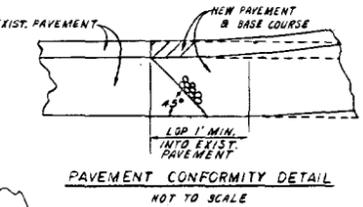
SECTION A-A

DROP INLET DATA			
STATION	PIPE SIZE	"H"*	INVERT ELEVATION
44+70	42"	6.4	39.89
41+08	42"	6.4	38.88
37+15	42"	6.4	37.70
32+13	48"	7.8	36.23
29+00	48"	7.8	35.20

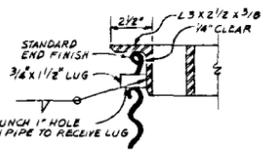
* VERIFY "H" IN FIELD.
SEE ALSO "DRAIN DATA", SHEET 7.
NOTE: FOR RCP ALTERNATE, SEE SHEET 25



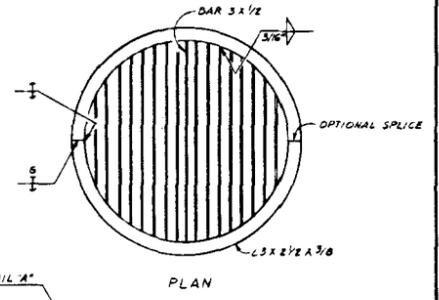
42" TO 48" CORRUGATED ECCENTRIC TAPER (12 GAGE)



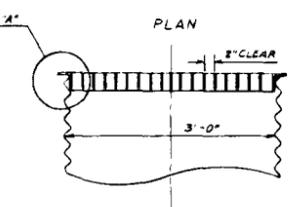
PAVEMENT CONFORMITY DETAIL
NOT TO SCALE



DETAIL A'
SCALE: 3"=1'-0"

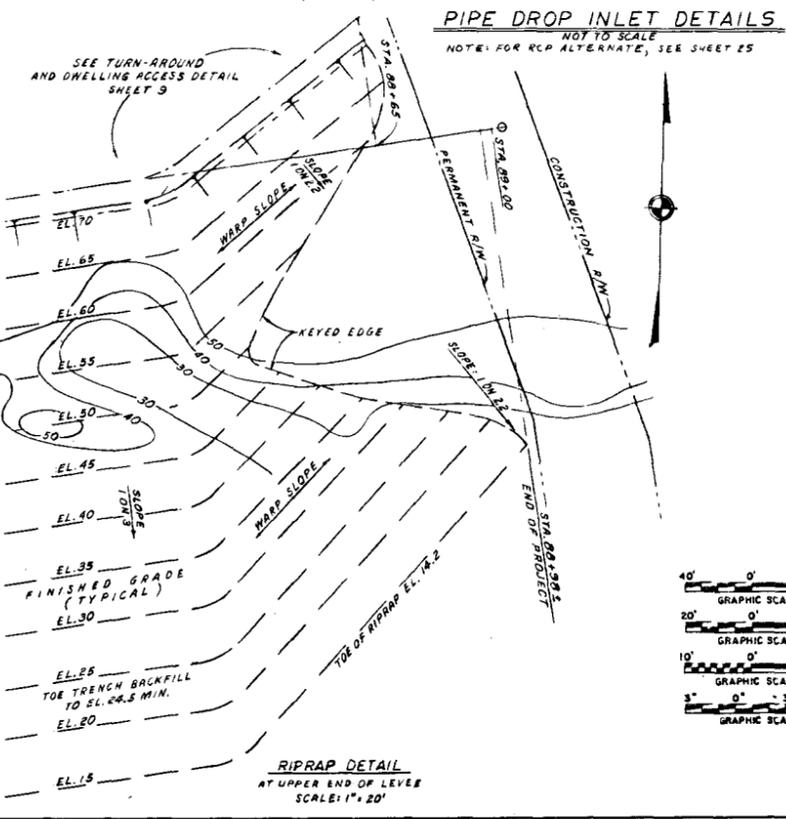


PLAN



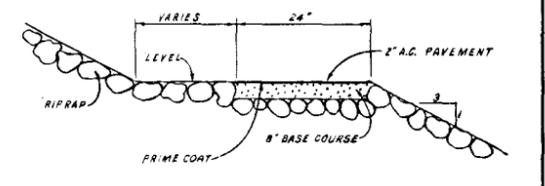
SECTION

GRATE DETAIL
NOT TO SCALE

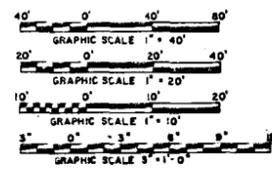


PIPE DROP INLET DETAILS
NOT TO SCALE

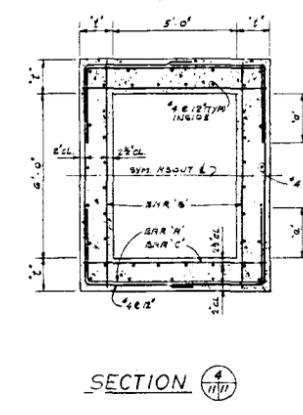
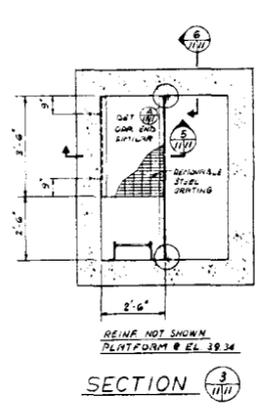
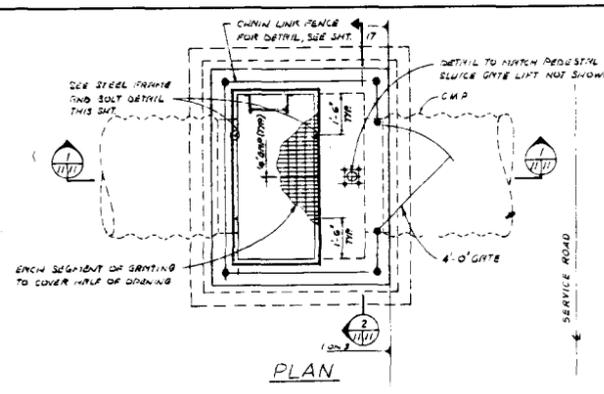
NOTE: FOR RCP ALTERNATE, SEE SHEET 25



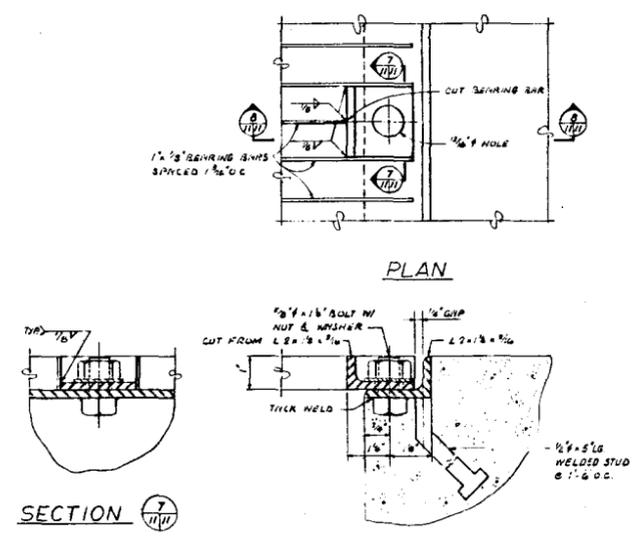
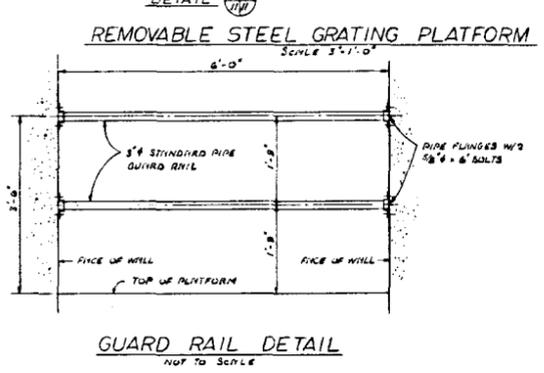
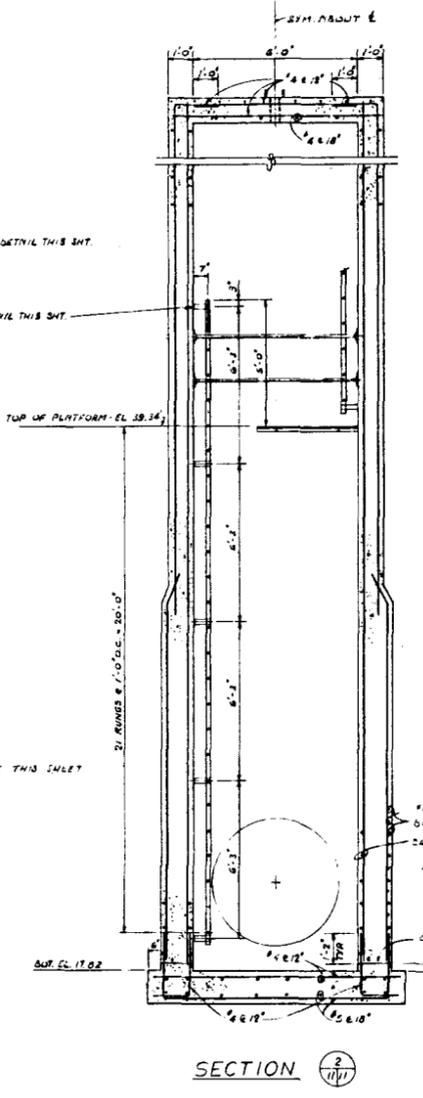
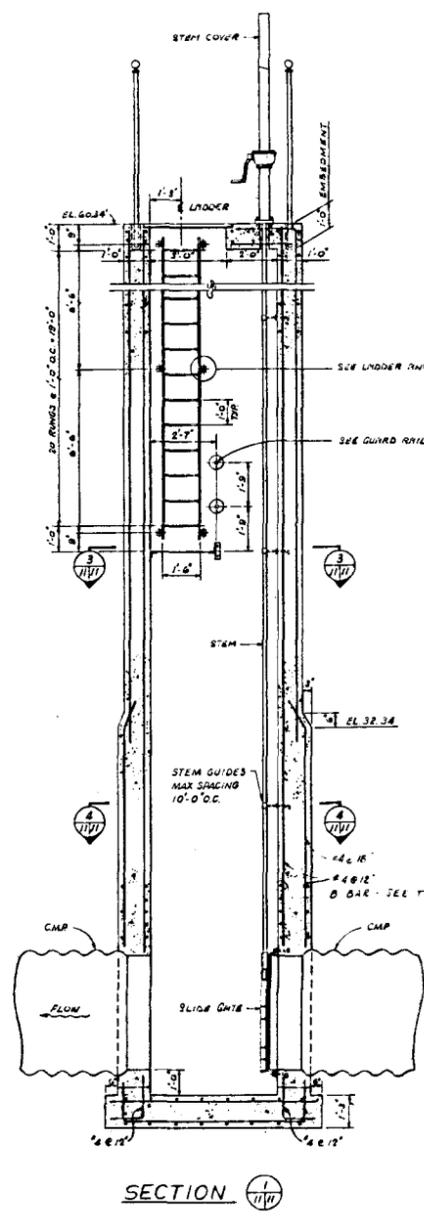
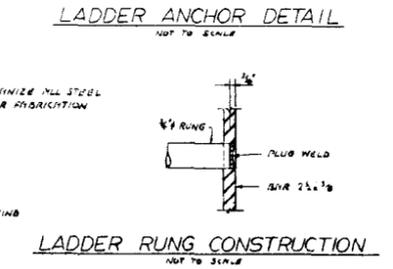
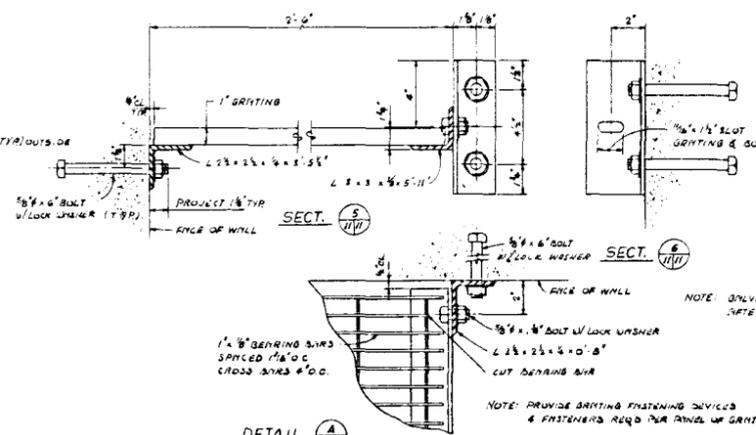
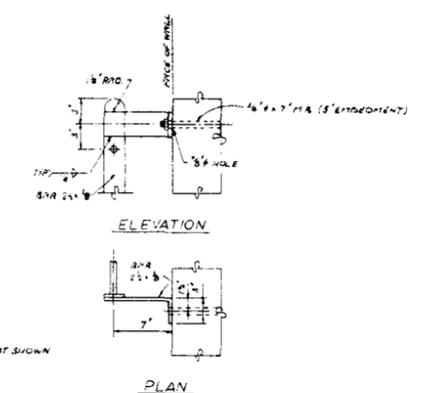
SECTION A-A
NOT TO SCALE



AS CONSTRUCTED - CHANGES MADE	DATE	APPROVAL
ADDED RIPRAP DETAIL	22 APR 12	[Signature]
ADDED EXIST. BURIED POWER & PHONE CABLE	27 APR 09	[Signature]
REVISIONS		
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA		
DRAWN BY: G.M. WAT	DEL NORTE COUNTY, CALIFORNIA	
KLAMATH GLEN LOCAL PROTECTION WORKS		
DETAILS-PIPE DROP INLET AND LEVEE CROSSING		
CHECKED BY: A.C.B.	DATE: 20 OCT. 20	
APPROVAL RECOMMENDED: [Signature]		
PREPARED UNDER THE DIRECTION OF: [Signature]		
[Signature] COLONEL, C.E. DISTRICT ENGINEER		
SCALE: AS SHOWN	JOB NO.	DRAWING NUMBER
		59 39 33
SHEET 8		

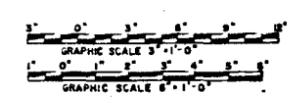


GATEWELL REINFORCEMENT						
DEPTH BELOW TOP OF W.E.L.	FROM	TO	THICKNESS OF WALL	BAR 'A'	BAR 'B'	BAR 'C'
TOP	10'-0"	18'-0"	1'-0"	NONE	4 #8 @ 12"	4 #8 @ 12"
10'-0"	18'-0"	26'-0"	1'-0"	2'-0"	4 #8 @ 12"	4 #8 @ 12"
18'-0"	26'-0"	28'-0"	1'-0"	2'-0"	4 #8 @ 12"	4 #8 @ 12"
26'-0"	BOTTOM	28'-0"	1'-0"	2'-0"	4 #8 @ 12"	4 #8 @ 12"



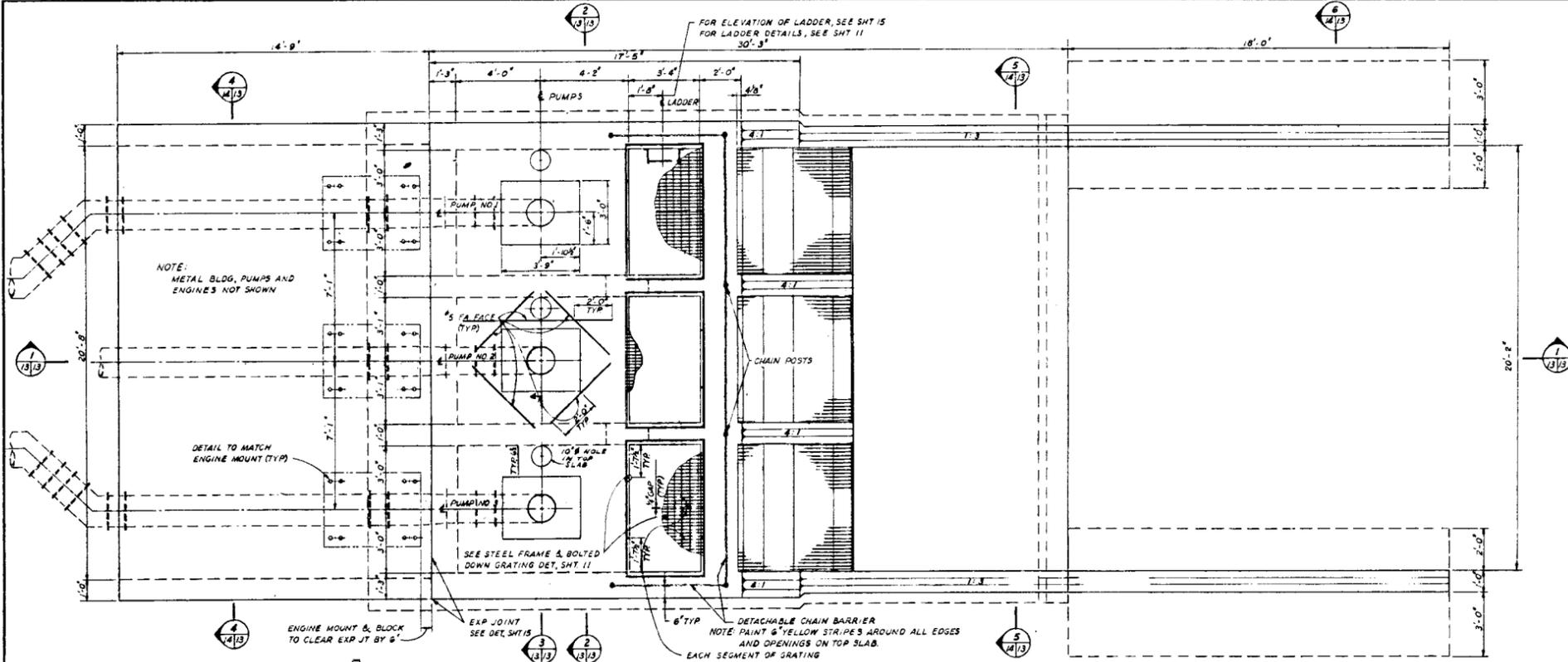
GATEWELL DETAILS NO SCALE

STEEL FRAME & BOLTED DOWN GRATING DETAIL SCALE 6"=1'-0" GALVANIZE ALL STEEL AFTER FABRICATION

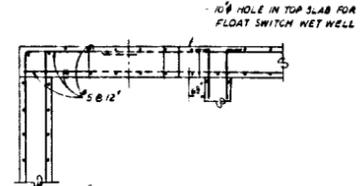
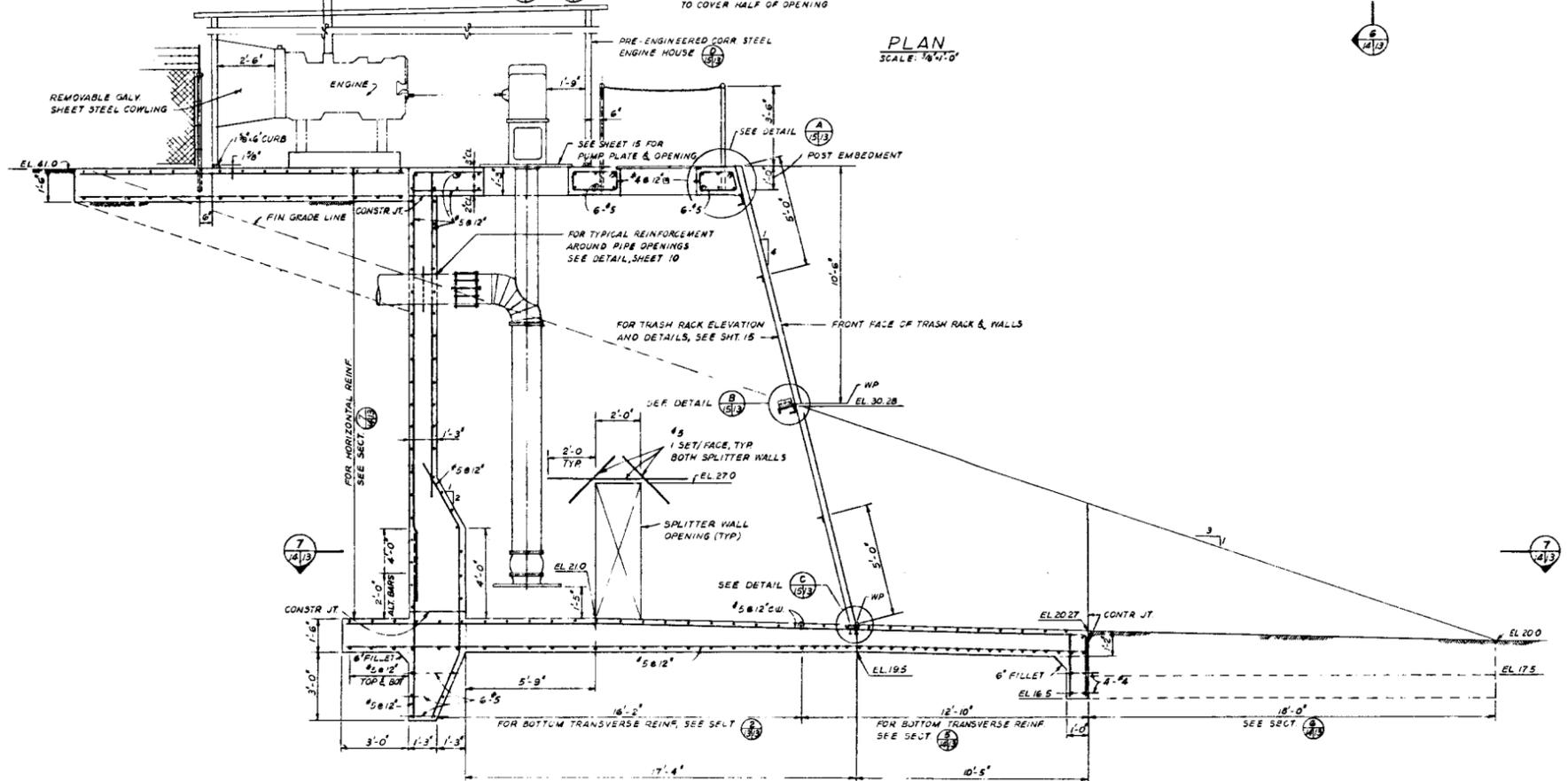
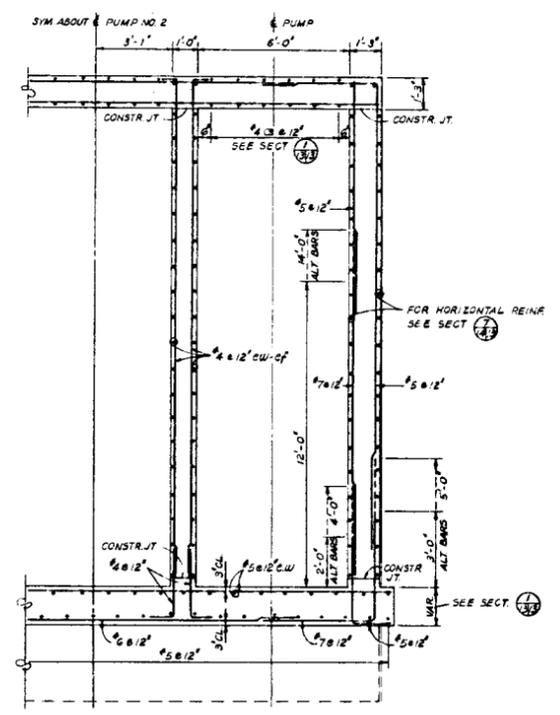


AS CONSTRUCTED - NO CHANGES MADE		AT	7E APR 12	REP
BY	DESCRIPTION	DATE	APPROVAL	
REVISIONS				
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA				
DRAWN BY:	TSK	DEL NORTE COUNTY CALIFORNIA		
TRACED BY:		KLAMATH GLEN		
CHECKED BY:	SH, FFP	LOCAL PROTECTION WORKS		
SUBMITTED:		GATE WELLS		
APPROVAL RECOMMENDED:		STRUCTURAL PLAN SECTIONS & DETAILS		
APPROVED:		DATE:	70 OCT 20	
PREPARED UNDER THE DIRECTION OF		SCALE:	JOB NO.	
CHARLES B. ROBERTS		25	5508	
COLONEL, CE, DISTRICT ENGINEER		DRAWING NUMBER	DRAWING NUMBER	
		SHEET	11 59 39 33	

K L A M A T H



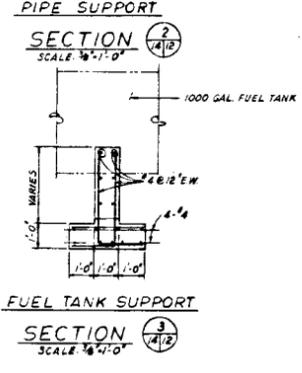
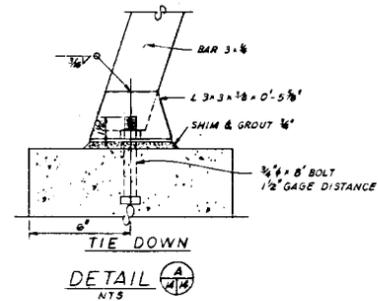
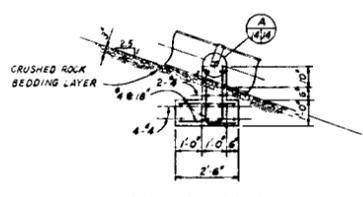
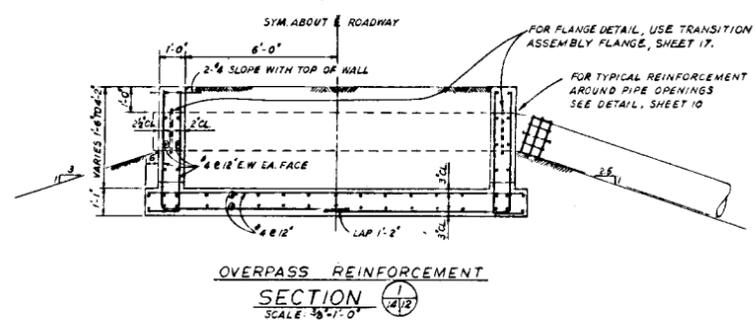
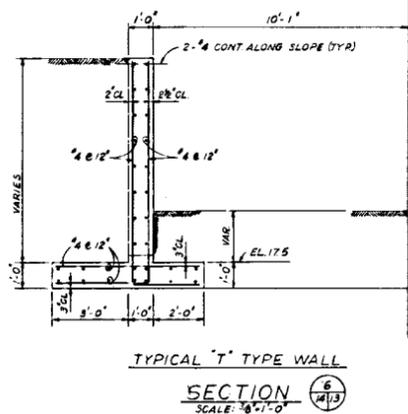
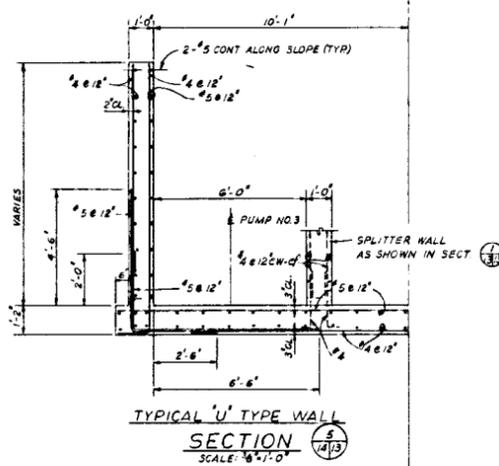
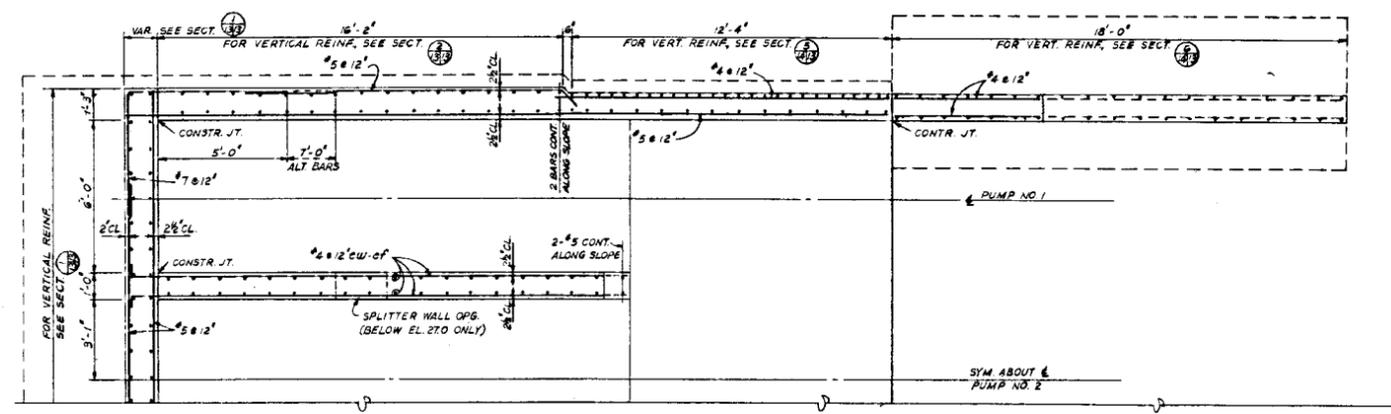
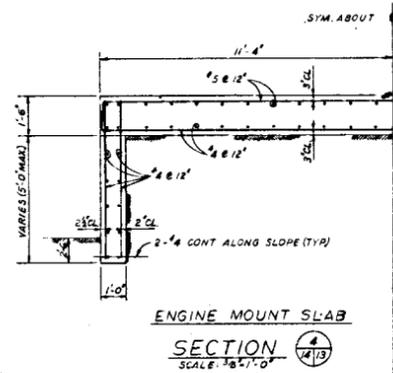
PLAN
SCALE: 3/8" = 1'-0"



AS CONSTRUCTED - NO CHANGES MADE	DATE: 27 APR 12	BY: [Signature]
REVISED PUMPING STA. PLAN AND SECTIONS	DATE: 71 MAY 17	BY: [Signature]
REVISIONS		
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA		
DRAWN BY: TSK	DEL NORTE COUNTY CALIFORNIA	
TRACED BY:	KLAMATH GLEN	
CHECKED BY: D.A. - E	LOCAL PROTECTION WORKS	
SUBMITTED: [Signature]	PUMPING STATION	
APPROVAL RECOMMENDED: [Signature]	STRUCTURAL PLAN & SECTIONS	
APPROVED: [Signature]	DATE: 70 OCT 20	
PREPARED UNDER THE DIRECTION OF CHARLES M. ROBERTS COLONEL, C.E., DISTRICT ENGINEER		
SCALE: AS SHOWN	JOB NO.	DRAWING NUMBER
SHEET 13	59	39 33



RECORD DRAWING



BAR NO	RECOMMENDED HOOKS					MINIMUM LAP LENGTH
	90° HOOKS		180° HOOKS			
	HOOK A	HOOK J	HOOK A	J	APPROX. H	
#4	7 1/2"	8 1/2"	6"	4"	4 1/2"	1'-2"
#5	9"	10 1/2"	7"	5"	5"	1'-6"
#6	10 1/2"	1'-0 1/2"	8"	6"	6"	1'-10"
#7	1'-0 1/2"	1'-2 1/2"	10"	7"	7"	2'-1"
#8	1'-2 1/2"	1'-5"	1'-1"	10"	9"	2'-6"
#9	1'-4 1/2"	1'-7"	1'-3"	11 1/2"	10 1/2"	3'-3"
#10	1'-6 1/2"	1'-11"	1'-7 1/2"	1'-3 1/2"	1'-0 1/2"	4'-1"
#11	1'-8 1/2"	2'-1 1/2"	1'-9 1/2"	1'-5"	1'-2"	5'-0"

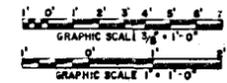
DETAILING DIMENSION, HOOK A	DETAILING DIMENSION, HOOK J	LAP SPLICING
RECOMMENDED BENDING D = 6d FOR #4 THROUGH #7 D = 8d FOR #8 AND #9 D = 10d FOR #10 AND #11	RECOMMENDED BENDING D = 6d FOR #4 THROUGH #7 D = 8d FOR #8 AND #9 D = 10d FOR #10 AND #11	LAP SPLICING

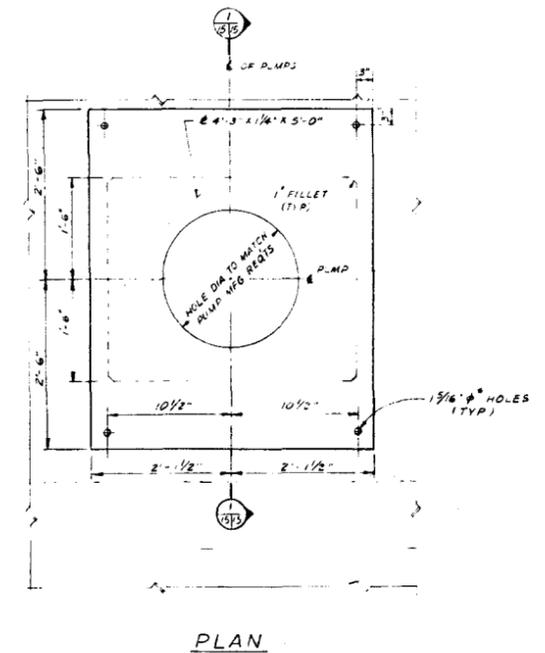
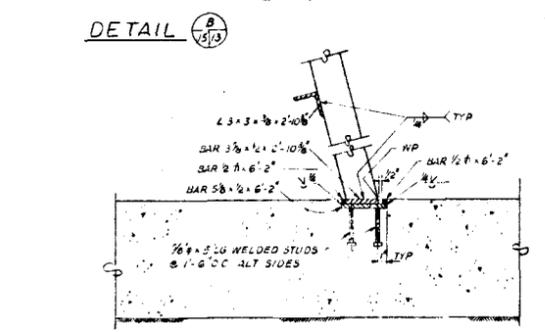
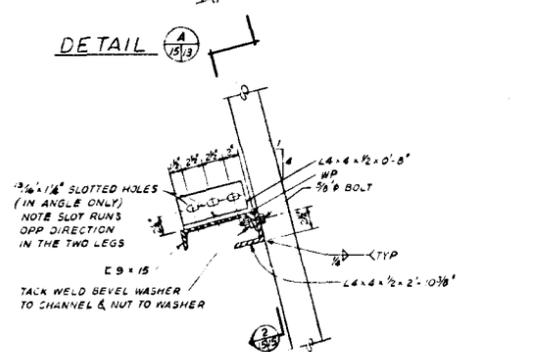
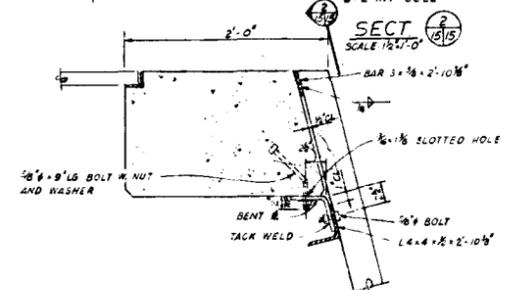
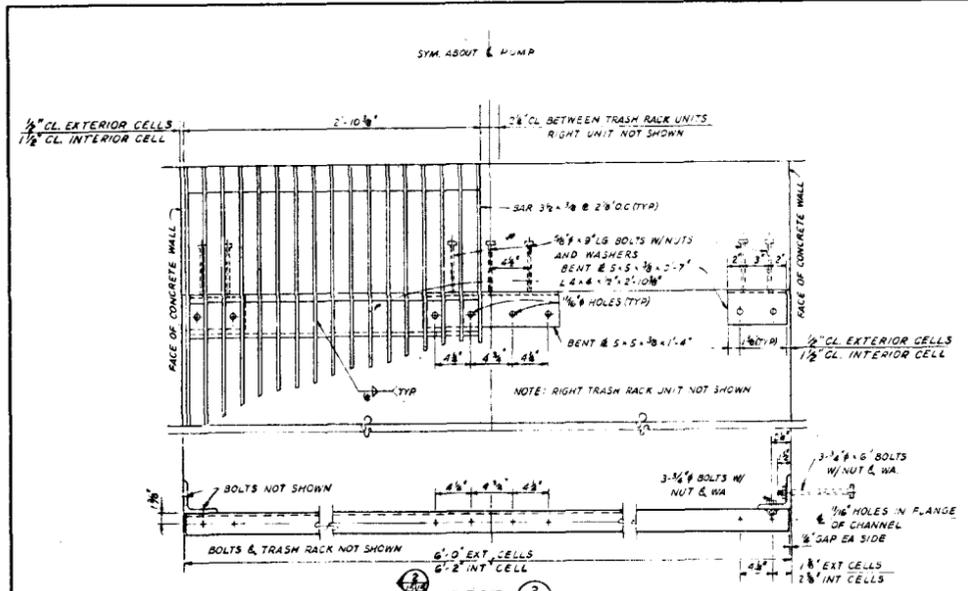
ALL OTHER BENDS SHALL BE IN ACCORDANCE WITH SECTION 501 OF THE ACI BUILDING CODE (ACI 318-63)

BENDS, HOOKS & SPLICE DETAILS

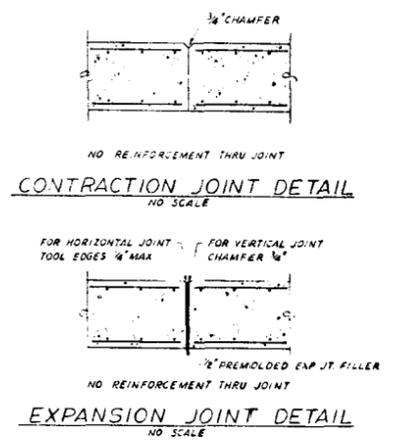
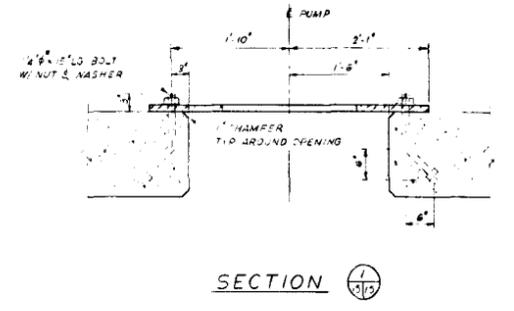
SYMBOL	DESCRIPTION	DATE	APPROVAL
△	AS CONSTRUCTED - NO CHANGES MADE	12 APR 12	TSK
△	CHANGES MADE AS NOTED	19 MAY 17	JE
△	ADDED IMBEDDED FLANGES TO RIVERWARD WALL OF CONC. OVERPASS	10 NOV 18	PLC

REVISIONS	
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA	
DRAWN BY: TSK	DEL NORTE COUNTY CALIFORNIA
TRACED BY:	KLAMATH GLEN
CHECKED BY: D.H. JE	LOCAL PROTECTION WORKS
SUBMITTED: <i>Paul Parrott</i>	PUMPING STATION
APPROVAL RECOMMENDED: <i>Paul Parrott</i>	STRUCTURAL SECTIONS
DATE: 10 OCT 20	
PREPARED UNDER THE DIRECTION OF: COLONEL, CE, DISTRICT ENGINEER	DRAWING NUMBER
SCALE: AS SHOWN	SHEET 14 59 39 33



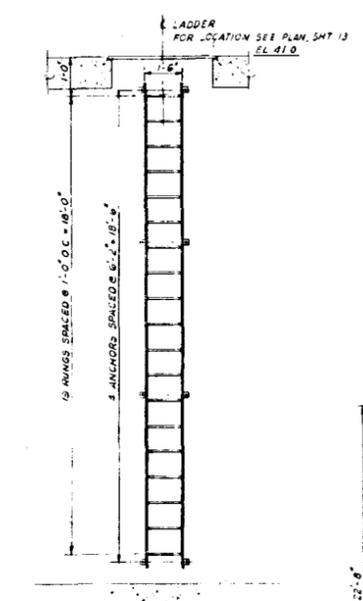


PUMP PLATE & OPENING DETAILS
SCALE: 1/2" = 1'-0"

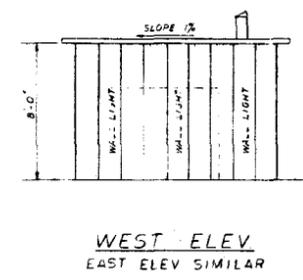


GENERAL NOTES

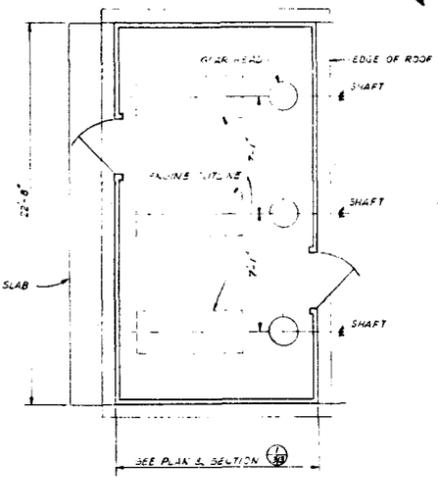
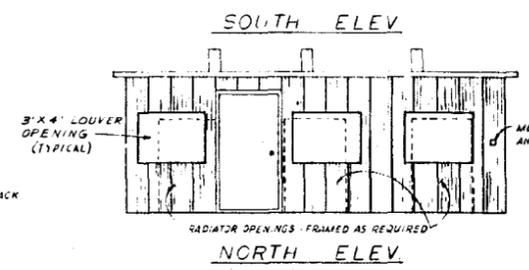
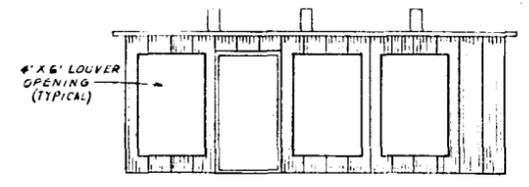
- 1 ALL EXPOSED EDGES SHALL BE CHAMFERED 1/8" UNLESS OTHERWISE NOTED
- 2 REINFORCEMENT CLEARANCES SHOWN ARE TYPICAL AND INDICATE CLEARANCE BETWEEN FACE OF CONCRETE AND OUTSIDE OF STEEL REINFORCEMENT.
- 3 ALL EXPOSED STRUCTURAL STEEL TO BE HOT DIP GALVANIZED AFTER FABRICATION AND PRIOR TO FIELD BOLTING



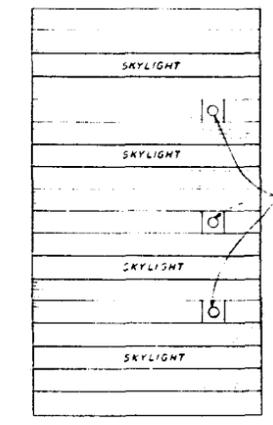
LADDER ELEVATION
NOTE: FOR STEEL FRAME AND BOLTED DOWN GRATING AND LADDER DETAILS SEE SHT 11



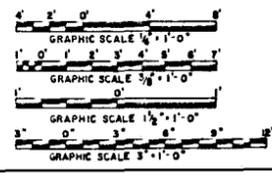
WEST ELEV.
EAST ELEV. SIMILAR



ENGINE HOUSE DETAILS
SCALE: 1/2" = 1'-0"

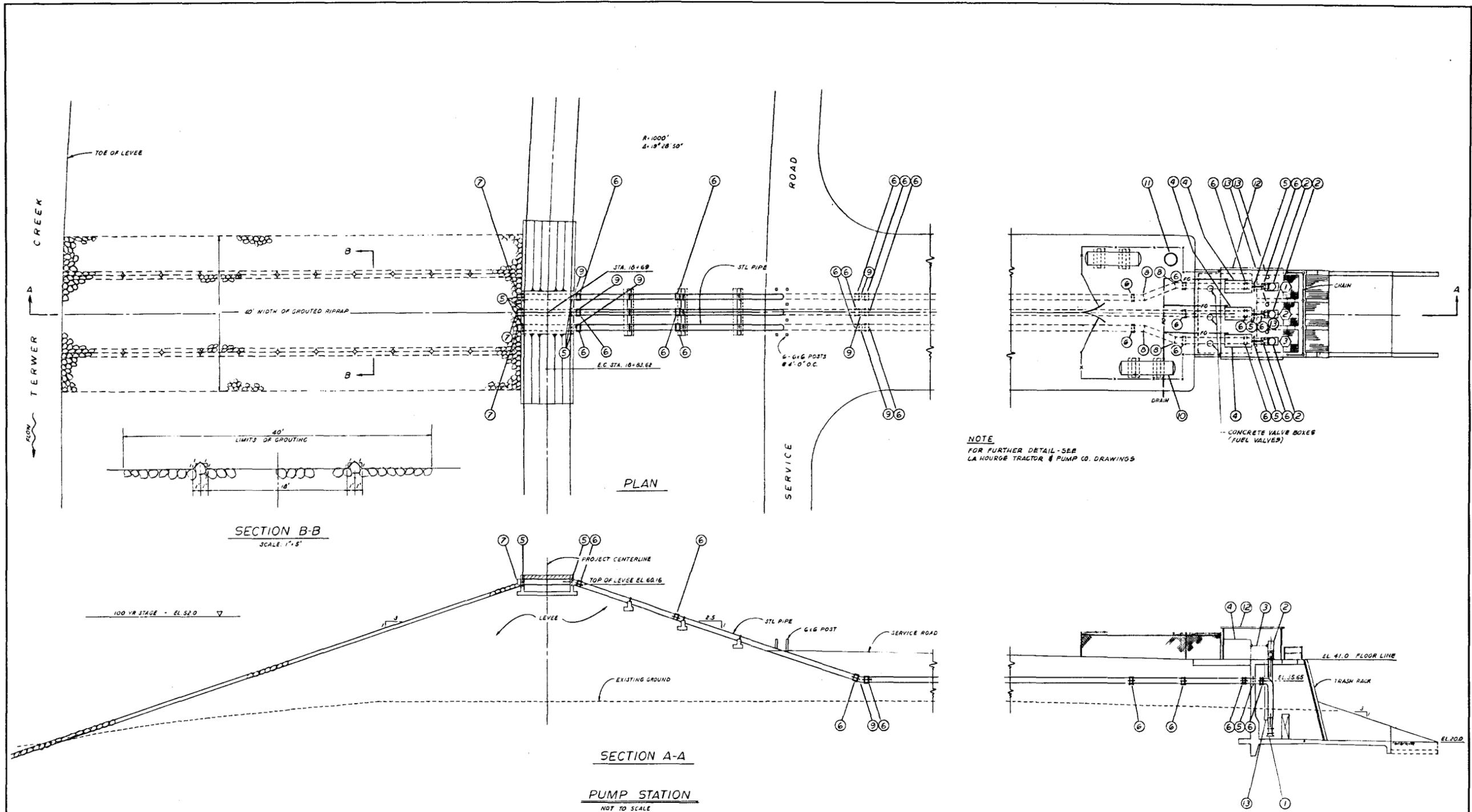


ROOF PLAN



AS CONSTRUCTED - CHANGES MADE		DATE: 12 APR 1978	BY: JRS
REVISED TRASH RACK AND LADDER DETAILS		DATE: 15 MAY 1978	BY: JRS
QUANTITY TAKE OFF		DATE: 15 MAY 1978	BY: JRS
REVISIONS			
SYMBOL	DESCRIPTION	DATE	APPROVAL
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY: TSK	DEL NORTE COUNTY CALIFORNIA		
TRACED BY:	KLAMATH GLEN		
CHECKED BY:	LOCAL PROTECTION WORKS		
SUBMITTED:	PUMPING STATION		
APPROVAL RECOMMENDED:	STRUCTURAL SECTIONS & DETAILS		
APPROVED:	DATE: 20 OCT 78	JOB NO.	
PREPARED UNDER THE DIRECTION OF CHARLES B. ROBERTS, COLONEL, C.E., DISTRICT ENGINEER		SCALE: AS SHOWN	DRAWING NUMBER
		SHEET	15 59 39 33

K LAMATH GLEN



NOTE
FOR FURTHER DETAIL - SEE
LA HOURS TRACTOR & PUMP CO. DRAWINGS

PUMP OPERATING SCHEDULE					
RISING LEVEL	START PUMP	PUMPS RUNNING	FALLING LEVEL	STOP PUMP	PUMPS RUNNING
25.5	(3)	(1)(2)(3)	25.0	(3)	(1)(2)
25.0	(2)	(1)(2)	24.5	(2)	(1)
24.5	(1)	(1)	24.0	(1)	

NOTE: TO EQUALIZE WEAR, SEQUENCE OF PUMPS MAY BE ALTERNATED BY ADJUSTING FLOATS.

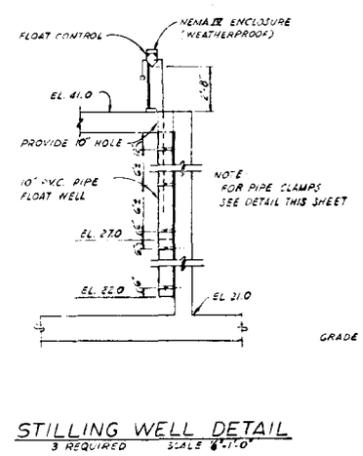
SCHEDULE OF MATERIALS		
NO.	DESCRIPTION	QTY.
(1)	MIXED FLOW PUMP	3
(2)	GEARED HEAD	3
(3)	DRIVE SHAFT	3
(4)	ENGINE, DIESEL	3
(5)	IMBEDDED FLANGE	9
(6)	FLEXIBLE COUPLING WITH TENSION BARS - MANDATORY LOCATION	26
(7)	OUTLET PIPE GUARD	3
(8)	ELBOW - 2" STL 90°	4
(9)	ELBOW - 2" STL ANGLE TO MATCH SLOPES	6
(10)	DIESEL FUEL TANK - 1000 GAL CAPACITY	1
(11)	WATER STORAGE TANK - 200 GAL CAPACITY	1
(12)	ENGINE HOUSE	1
(13)	STILLING WELL	3

CONSTRUCTION NOTES

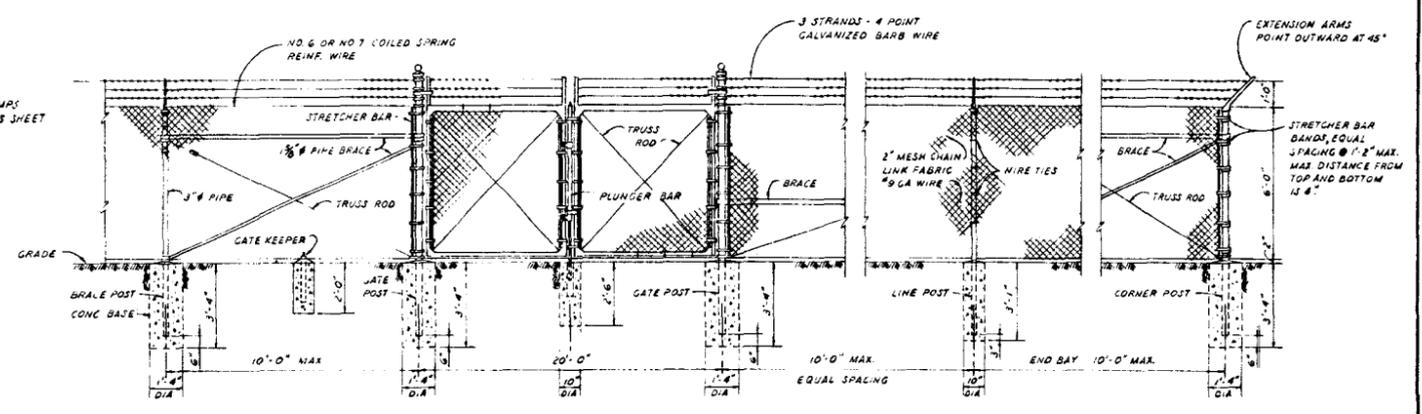
- DISCHARGE LINES SHOWN ARE TO BE 24" UNLESS AN INCREASE IS WARRANTED BY PUMP CHARACTERISTICS
- ALL BURIED STEEL DISCHARGE LINES TO BE LINED WITH COAL TAR ENAMEL INSIDE AND OUT AND WRAPPED WITH FELT.
- UNBURIED STEEL DISCHARGE LINES TO BE LINED WITH COAL TAR ENAMEL AND TO RECEIVE TWO PRIME COATS AND TWO FINISH COATS OF PAINT.
- FLEXIBLE COUPLINGS ON UNBURIED LINES WILL BE LIMITED TO LOCATIONS SHOWN.
- FLEXIBLE COUPLINGS WITH TENSION BARS MAY BE ADDED ON BURIED LINES TO ACCOMMODATE RANDOM PIPE LENGTHS.
- ALL FLEXIBLE COUPLINGS WILL HAVE TENSION BARS.

AS CONSTRUCTED - CHANGES MADE	DATE: 7 APR 68
CHANGES MADE AS NOTED	DATE: 17 MAY 68
ADDED IMBEDDED FLANGES TO RIVERWARD WALL	DATE: 17 NOV 68
REVISIONS	
SYMBOL	DESCRIPTION DATE APPROVAL
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA	
DRAWN BY: EL	DEL NORTE COUNTY CALIFORNIA
TRACED BY:	KLAMATH GLEN
CHECKED BY:	LOCAL PROTECTION WORKS
APPROVED:	PUMPING STATION
DATE: 20 OCT 20	MECHANICAL AND PIPING LAYOUT
PREPARED UNDER THE DIRECTION OF CHARLES R. ROBERTS, COLONEL, C.E., DISTRICT ENGINEER	SCALE: AS SHOWN JOB NO. DRAWING NUMBER
SHEET 16	59 39 33

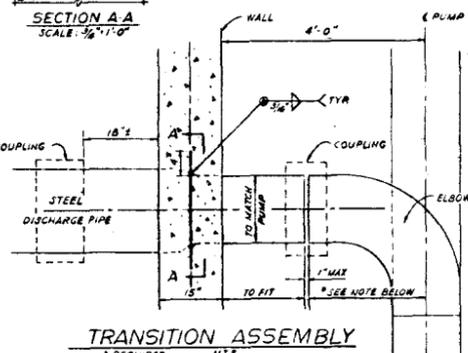
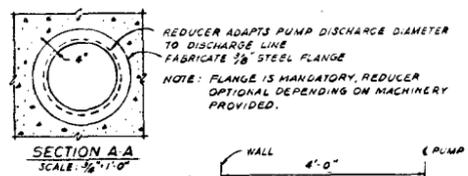
KRAMER ENGINE



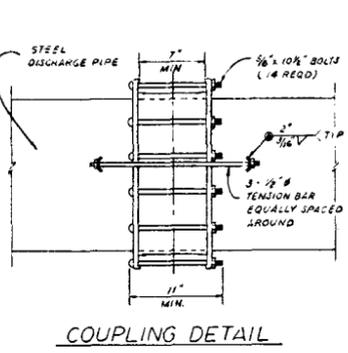
STILLING WELL DETAIL
3 REQUIRED SCALE 1/2"=1'-0"



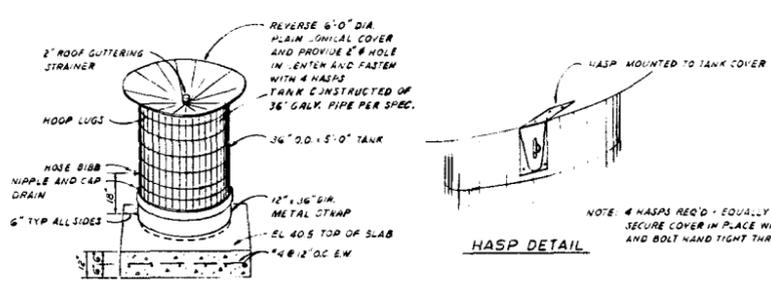
CHAIN LINK FABRIC FENCE
NOT TO SCALE
NOTE: FOR ACTUAL FENCE CONFIGURATION AND DIMENSIONS, SEE SHEETS 11 AND 12.



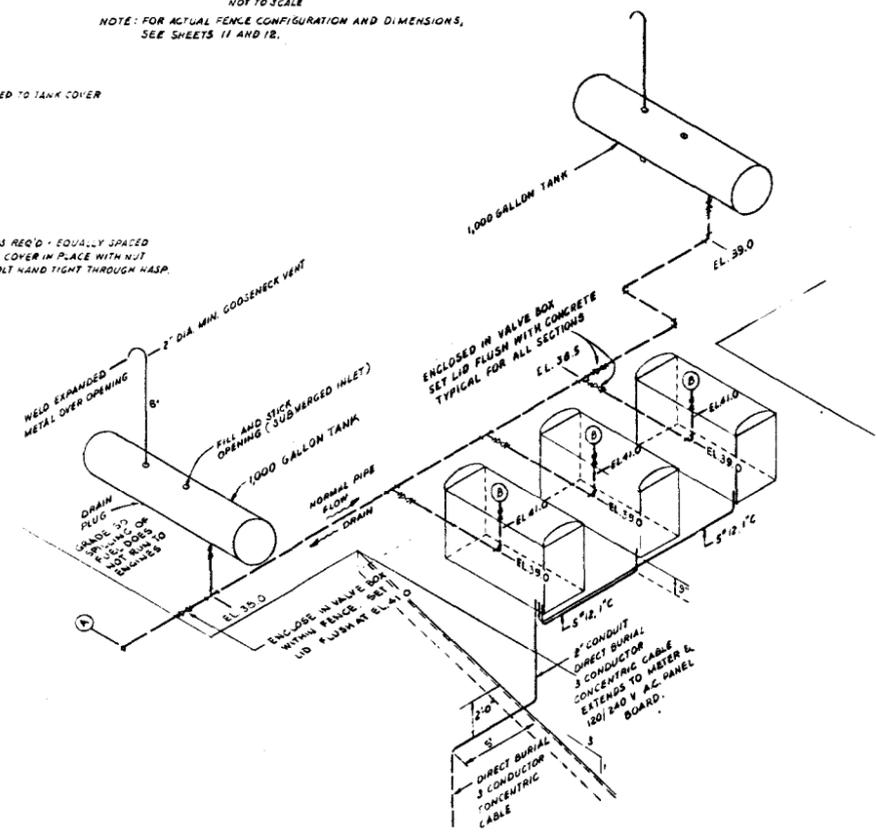
TRANSITION ASSEMBLY
3 REQUIRED NTS



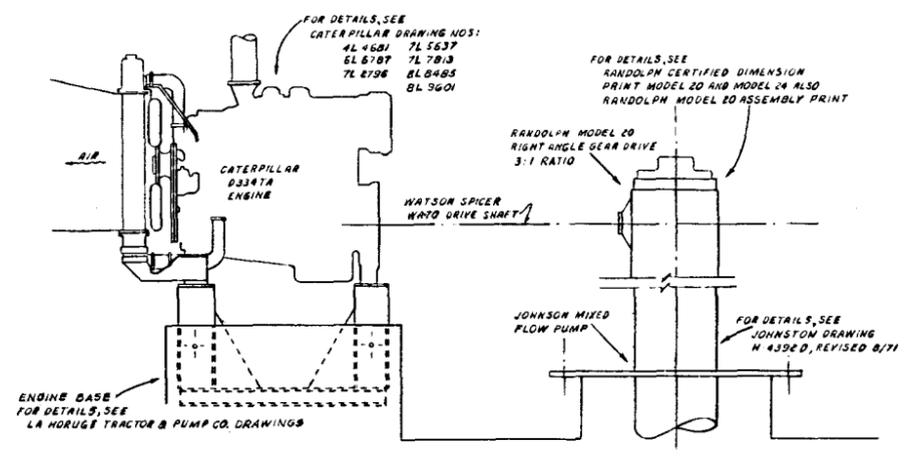
COUPLING DETAIL



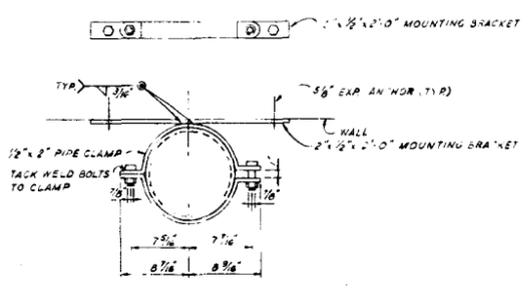
WATER STORAGE TANK DETAIL
1 REQUIRED NOT TO SCALE



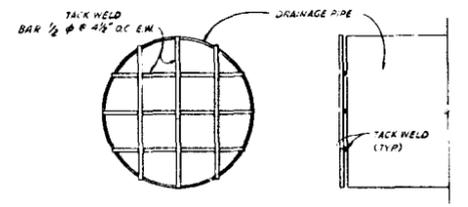
FUEL PIPING AND ELECTRICAL CONDUITS
NOT TO SCALE



PUMP, ENGINE AND DRIVE ASSEMBLY
3 REQUIRED NOT TO SCALE



STILLING WELL PIPE CLAMP DETAIL
15 REQUIRED SCALE 1/2"=1'-0"



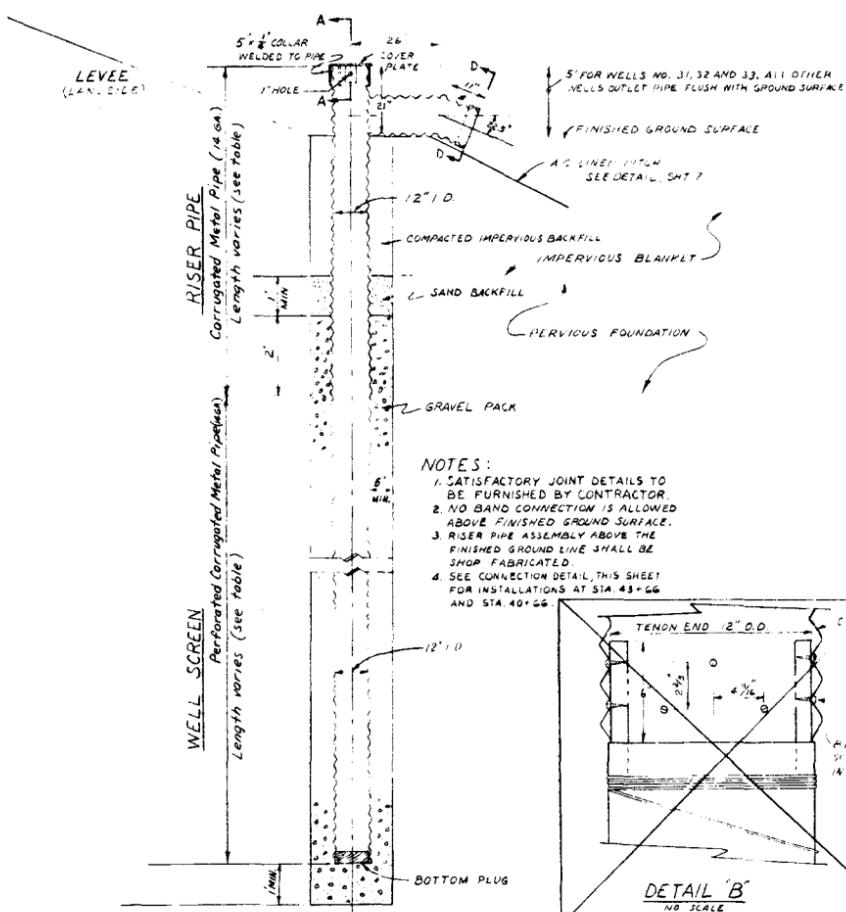
OUTLET PIPE GUARD DETAIL
3 REQUIRED SCALE 1/2"=1'-0"

- NOTES**
- ENTIRE SYSTEM DRAINS BY GRAVITY AT (A)
 - CONNECT TO ENGINE FUEL SYSTEM AT (B) WITH APPROVED FLEXIBLE CONNECTION.
 - ALL PIPING AND VALVES 1/2" NOMINAL SIZE UNLESS OTHERWISE NOTED.
 - A PARALLEL FUEL OIL RETURN LINE AND/OR AN ENGINE MOUNTED TANK WILL BE PROVIDED BY CONTRACTOR IF REQUIRED BY ENGINE SUPPLIER.
 - APPROVED CONDUIT (NOT SHOWN) WILL BE REQUIRED BETWEEN ENGINE AND SOLENOID LUBRICATOR ON CORRESPONDING PUMP.
 - ALL CONDUITS TO TERMINATE 1'-0" ABOVE FLOOR SLAB (MINIMUM).
 - ELECTRICAL EQUIPMENT TO BE 2'-0" ABOVE FLOOR SLAB (MINIMUM).

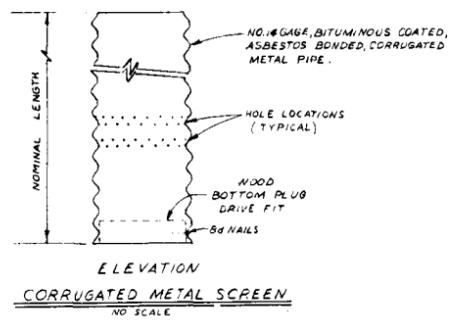
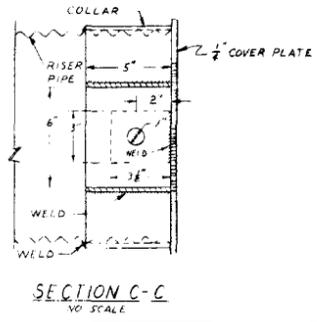
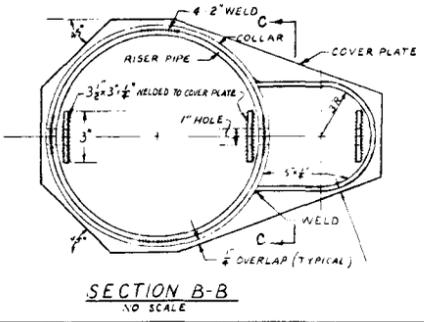
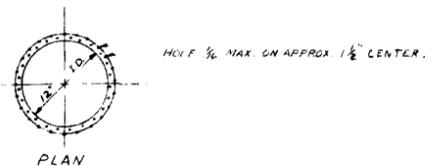
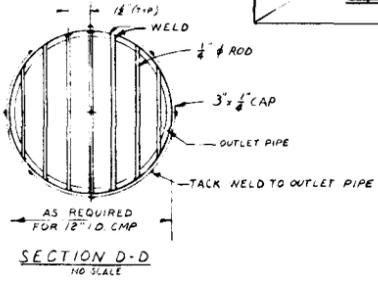
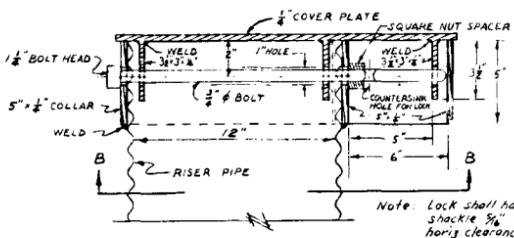
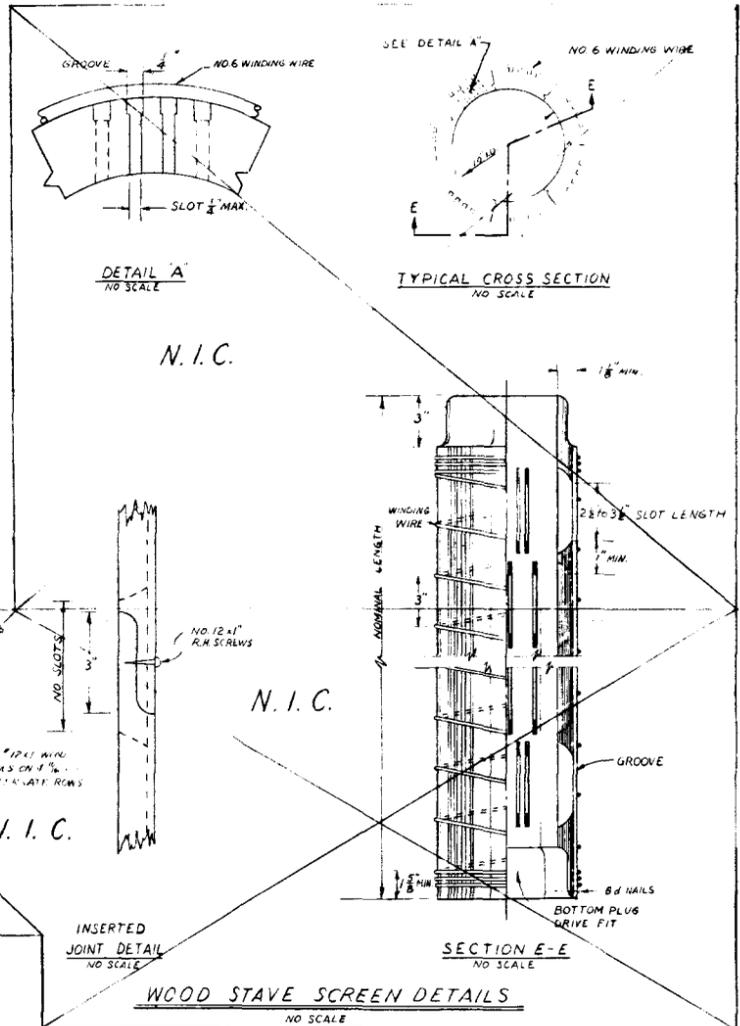
REVISIONS		DATE	BY
AS CONSTRUCTED - CHANGES MADE		78 APR 18	EL
CHANGES MADE AS NOTED		71 MAR 17	SW

U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA	DEL NORTE COUNTY CALIFORNIA KLAMATH GLEN LOCAL PROTECTION WORKS PUMPING STATION MECHANICAL MISC. DETAILS
DRAWN BY: EL	CHECKED BY: [Signature]
DATE: 70 OCT 20	APPROVED: [Signature]
PREPARED UNDER THE DIRECTION OF CHARLES R. BOBERTS COLONEL, C.E., DISTRICT ENGINEER	AS SHOWN DRAWING NUMBER SHEET 17 59 39 33

KRAMER ENGINEERING

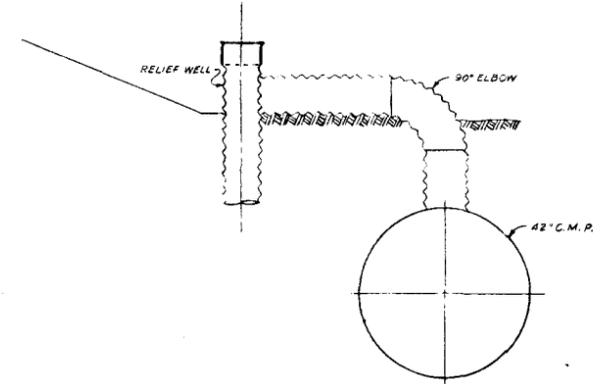


- NOTES:**
1. SATISFACTORY JOINT DETAILS TO BE FURNISHED BY CONTRACTOR.
 2. NO BAND CONNECTION IS ALLOWED ABOVE FINISHED GROUND SURFACE.
 3. RISER PIPE ASSEMBLY ABOVE THE FINISHED GROUND LINE SHALL BE SHOP FABRICATED.
 4. SEE CONNECTION DETAIL, THIS SHEET FOR INSTALLATIONS AT STA. 43+66 AND STA. 40+66.



RELIEF WELLS									
WELL NUMBER	PROJECT CENTERLINE STATION	PUMP TEST DISCHARGE RATE (GPM)	ELEVATION OF BOTTOM OF HOLE (ELEV.)	DEPTH OF HOLE (ELEV.)	LENGTH OF SCREEN (ELEV.)	LENGTH OF RISER (ELEV.)	INVERT OF WELL OUTLET AT RISER (ELEV.)	THICKNESS OF IMPERVIOUS BLANKET #	ABANDONED
1									
2	70+55	1.3	-12.5	67.0	72	39.8	48.0		
3	77+00	1.3	-8.0	55.0	22	24.1	46.0		
4	74+00	1.3	-6.0	52.0	24	28.8	46.0		
5	72+25	1.6	-41.3	89.0	62	26.4	45.7		
6	71+10	1.6	-41.0	90.0	70	22.2	48.0		
7	69+73	1.6	-41.8	91.0	70	19.8	47.2		
8	68+85	1.6	-42.3	91.0	70	19.6	46.7		
9	67+82	1.6	-40.1	91.0	72	17.4	45.9		
10	66+71	1.6	-37.5	84.0	70	14.7	45.5		
11	66+05	0.8	-26.3	72.0	50	17.9	45.7		
12	65+53	0.8	-27.1	72.0	56	17.8	44.9		
13	65+01	0.8	-27.2	74.0	60	13.0	44.8		
14	64+50	0.8	-27.5	74.0	60	13.0	*		
15	63+98	0.8	-25.9	74.0	60	12.0	44.9		
16	63+48	0.8	-27.5	74.0	60	13.0	*		
17	62+96	0.8	-28.0	75.0	60	4.2	*		
18	62+43	0.8	-29.0	74.5	60	15.3	*		
19	61+92	0.8	-29.5	75.4	60	16.2	*		
20	61+41	0.8	-30.0	76.0	60	18.7	*		
21	60+88	0.8	-30.5	80.0	60	21.2	*		
22	60+37	0.8	-31.0	81.0	60	21.7	*		
23	59+13	1.8	-24.5	72.0	52	21.2	*		
24	57+4	1.8	-24.5	71.5	52	20.2	*		
25	35+14	1.8	-24.5	72.5	52	21.7	*		
26	52+65	1.4	-9.0	67.5	36	22.2	*		
27	49+67	1.4	-8.5	68.5	36	23.2	*		
28	46+66	1.1	-3.5	51.0	28	23.7	*		
29	43+66	1.1	-5.0	62.0	24	28.7	*		
30	40+66	1.1	-8.5	55.0	24	31.7	*		
31	20+00	2.0	-49.5	80.0	16	86.0	24.0	65.0**	
32	16+80	2.0	-42.0	69.0	24	50.0	24.0	65.0**	
33	13+58	2.0	-32.5	59.0	44	18.0	24.0	65.0**	
34	10+90	1.5	-28.5	67.0	24	43.0	36.0	40.0**	
35	7+35	1.5	-16.5	67.0	24	43.0	36.5	40.0**	
36									ABANDONED

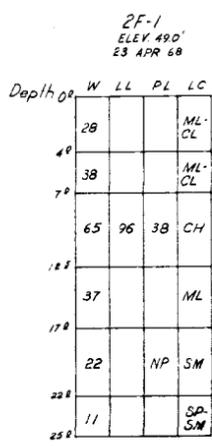
* INVERT OF OUTLET AT TOP OF DITCH.
 ** IF THE THICKNESS OF IMPERVIOUS BLANKET EXCEEDS THE THICKNESS SHOWN IN THE COLUMN DURING DRILLING, RELIEF WELL WILL BE ABANDONED.



CONNECTION DETAIL
 STA. 43+66 AND STA. 40+66
 NOT TO SCALE

AS CONSTRUCTED - CHANGES MADE		DATE	APPROVAL
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY: HD	DEL NORTE COUNTY CALIFORNIA		
TRACED BY:	KLAMATH GLEN		
CHECKED BY: RET	LOCAL PROTECTION WORKS		
SUBMITTER: [Signature]		RELIEF WELL DETAILS	
APPROVAL RECOMMENDED: [Signature]	APPROVED: [Signature]	DATE: 70 OCT 20	
PREPARED UNDER THE DIRECTION OF CHARLES R. ROBERTS COLONEL, C.E., DISTRICT ENGINEER			
SCALE: NO SCALE	JOB NO.	DRAWING NUMBER	
SHEET 19	59	39	33

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Silt, brown, moist, firm, some fine sand, some small gravel to 1/8" max. Many grass roots to 0².

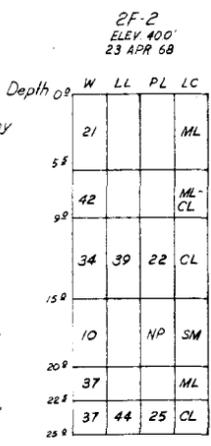
Clay, light tan (some brown mottling), moist, stiff, some lightly cemented nodules to 1/2" maximum.

Clay, mottled tan, moist, stiff, fat. Sa 1, Fi 99.

Silty Clay, mottled tan and light gray, moist, stiff.

Silty Sand, light brown, moist, dense, fine sand. Sa 60, Fi 40.

Gravelly Sand, gray and tan, moist, dense, sand mostly fine, rounded gravel to 1" max, more gravel with depth.



Sandy Silt, gray, moist, firm, fine sand, many grass roots to 0².

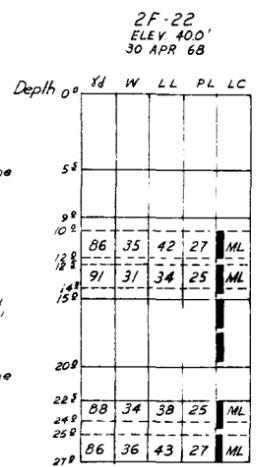
Silt, gray and brown, damp, some fine sand.

Silty Clay, dark tan, moist, stiff.

Sandy Silt, dark tan and gray, wet, soft, fine sand.

Silt, dark tan and gray, wet, firm, some fine sand.

Silty Clay, tan, moist, stiff.



Sandy Silt, gray, moist, firm, fine sand.

Silt, gray and tan, damp, firm, some fine sand.

Silty Clay, dark tan, moist, stiff. Sa 1, Fi 99, G 2.75.

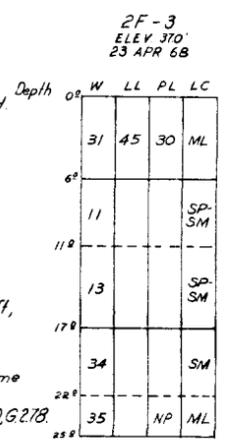
Sa 11, Fi 89, G 2.79.

Sandy Silt, dark tan with gray, wet, soft, fine sand.

Silt, dark tan and gray, wet, firm, some fine sand.

Silty Clay, tan, moist, stiff. Sa 10, Fi 90, G 2.78.

Sa 1, Fi 99, G 2.78.



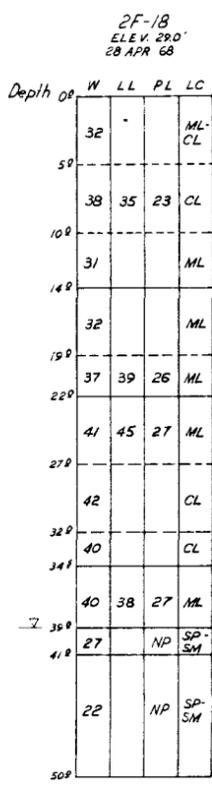
Silt, dark tan, moist, firm, some fine sand. Many grass roots to 0².

Silty Sand, dark grayish tan, moist, dense, fine, an occasional 1" lens of silt.

Becoming wet with depth.

Sandy Silt, tanish gray, wet, soft, fine sand.

Sa 42, Fi 58.



Silt, dark tan, moist, firm, some fine sand. Many grass roots to 0².

Wet below 5⁰.

Silt, dark tan, moist, firm.

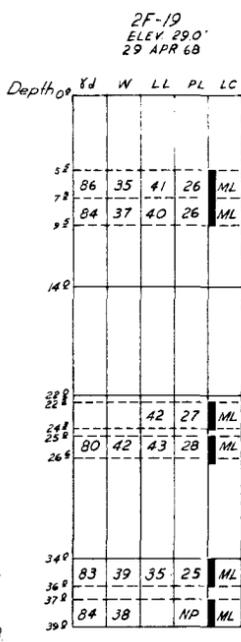
Thin streak of Silty Clay 17⁰ to 17².

Silty Clay, tan, moist, firm.

Silt, gray and tan, wet, soft, an occasional thin (2") sand lens. Free water @ 39⁰.

Silty Sand, brown, wet, dense. Sa 92, Fi 8.

Silty Gravelly Sand, brown, wet, dense, fine and coarse sand, gravel to 1" maximum. Gr 19, Sa 73, Fi 8.



Silt, dark tan, moist, firm, some fine sand.

Wet below 5⁰. Sa 10, Fi 90, G 2.76. Sa 1, Fi 99, G 2.77.

Silt, dark tan, moist, firm.

Silty Clay, tan, moist, firm. G 2.76. Sa 13, Fi 87, G 2.74.

Silt, gray and tan, wet, soft, occasional thin sand lenses. Sa 5, Fi 95, G 2.81. Sa 6, Fi 94, G 2.79.

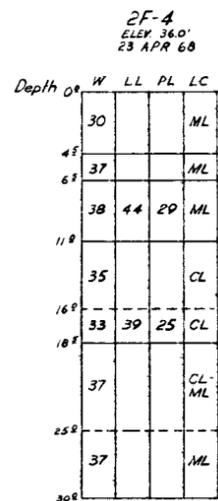
NOTES:

- Elevation indicates approximate ground surface at boring location. Elevations are based on the datum of Mean Sea Level.
- Soil classifications are in accordance with Military Standard 619B "Unified Soil Classification System" Revised 12 June 1968.
- Field visual classifications and descriptions as described by the inspector are shown to the right of the log.
- Soil symbols shown on the L.C. Column are based on laboratory visual classification with test data on selected samples.

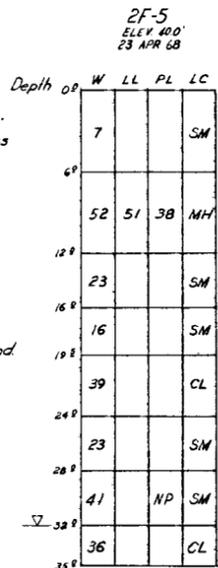
LEGEND

- W - Moisture content (%)
- LL - Liquid limit (%)
- NP - Nonplastic
- PL - Plastic limit (%)
- LC - Laboratory classification
- O - Organic content (% of dry weight)
- Gr 10 - 10 per cent gravel
- Sa 20 - 20 per cent sand
- Fi 70 - 70 per cent fines
- G - Specific gravity
- γ_d - Dry unit weight (Dry density)
- ▽ - Free water level at completion of hole.
- - Undisturbed push tube sample

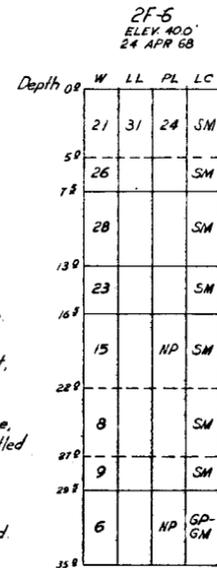
AS CONSTRUCTED - NO CHANGES MADE		AT 28 APR 68	DATE 20 APR 68
SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY: L.M.F.	DEL NORTE COUNTY CALIFORNIA		
TRACED BY:	KLAMATH GLEN		
CHECKED BY:	LOCAL PROTECTION WORKS		
SUBMITTED:	STATION-0105 TO STATION 21+00		
APPROVAL RECOMMENDED:	APPROVED:	DATE:	
		10 OCT 68	
PREPARED UNDER THE DIRECTION OF CHARLES R. ROBERTS COLONEL, C.E., DISTRICT ENGINEER		SCALE: NO SCALE	JOB NO. DRAWING NUMBER
SHEET 20		59	39 33



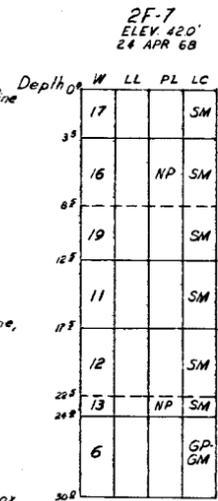
Sandy Silt, dark grayish tan, moist, firm, fine sand, some partially decayed roots and limbs, many grass roots to 0'.
Silt, gray, moist, firm.
Silt, dark tan, moist, firm. Sa. 3, Fi. 97.
Silty Clay, tan, moist, stiff. Thin (2") layers of silt, brownish tan, moist, firm.
Sa. 4, Fi. 96.
Sandy Silt, dark tan, wet, firm, fine sand.
Wetter with depth.
Sa. 33, Fi. 67.



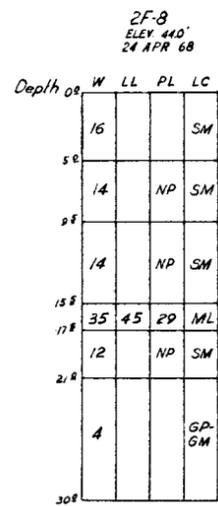
Silty Sand, gray, damp, dense, fine.
Sandy Silt, dark gray, wet, firm, fine sand, some partially decayed organics. Sa. 25, Fi. 75.
Silty Sand, grayish tan, moist, dense, fine.
Silty Sand, dark tan, moist, dense, fine.
Silty Clay, mottled tan and brown, wet, firm.
Silty Sand, dark tan, moist, dense, fine, thin (2") layers of Silty Clay, mottled tan.
Silt, tan, wet, firm, some fine sand. Sa. 53, Fi. 47.
Sandy Silt, tan, very wet, soft, fine sand. Free water @ 32%.



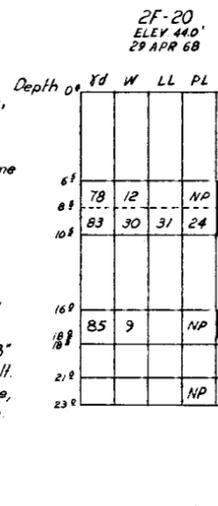
Sandy Silt, grayish tan, moist, firm, fine sand, some rounded gravel, some pieces of wood to 6" thickness. Gr. 20, Sa. 41, Fi. 39.
Very little wood or junk below 4'.
Sandy Silt, gray, wet, firm, fine sand. Many pieces of wood and junk. Fill ends @ 13'.
Sandy Silt, dark tan, moist, firm, fine sand.
Silty Sand, dark tan, moist, dense, fine, some small pieces of wood. Sa. 75, Fi. 25.
Silty Sandy Gravel, brown, moist, 3" max. Gr. 57, Sa. 34, Fi. 9.



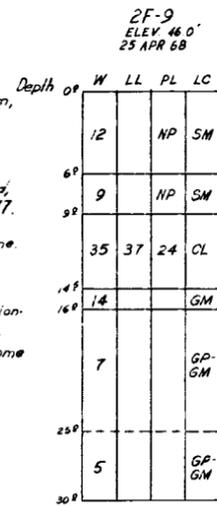
Sandy Silt, grayish tan, moist, firm, fine sand, many grass roots to 0'.
Sandy Silt, gray, moist, firm, fine sand. Sa. 56, Fi. 44.
Silty Sand, brown, moist, dense, fine, some gravel to 1" max, an occasional 2" streak of silt. Gravel to 3" below 14'.
Silty Sand, brown, moist, dense, fine. An occasional 2" streak of silt.
Sa. 73, Fi. 27.
Silty Sandy Gravel, brown, moist, dense, 3" max, an occasional cobble to 4" maximum.



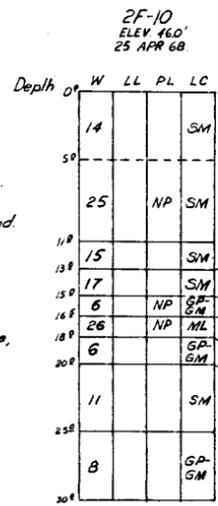
Sandy Silt, grayish tan, moist, firm, fine sand, some gravel, many grass roots to 0'.
Silty Sand, brown, moist, dense, fine, some gravel to 1/4" maximum. Sa. 69, Fi. 31.
Silty Sand, brown, moist, dense, fine.
Silt, tan, moist, firm, some fine sand, an occasional lens of silty sand to 2" thick. Sa. 9, Fi. 91.
Silty Sand, brown, fine, some gravel to 3" max, an occasional 3" lens of tan silt.
Silty Sandy Gravel, brown, moist, dense, 3" max, some cobbles to 6" maximum.



Sandy Silt, grayish tan, moist, firm, fine sand, some gravel.
Silty Sand, brown, moist, dense, fine sand, some gravel to 1/4" max. G. 277.
Silty Sand, brown, moist, dense, fine.
Sa. 66, Fi. 34.
Silt, tan, some fine sand, and an occasional lens of silty sand to 2" thick.
Silty Sand, brown, moist, dense, some gravel, an occasional 3" lens of silt.
Silty Sandy Gravel, brown, moist, dense, cobbles to 6" maximum. Gr. 68, Sa. 23, Fi. 9.



Sandy Silt, grayish tan, moist, firm, fine sand, many grass roots to 0'. Sa. 57, Fi. 43.
Large piece of concrete @ 6'.
Silty Sand, brown, moist, dense, fine. (Old fill).
Silt, brown, moist, firm, some fine sand. Sa. 22, Fi. 78.
Gravelly Silt, brown, wet, firm, gravel to 1/4" maximum.
Silty Sandy Gravel, brown, moist, dense, rounded 5" maximum.

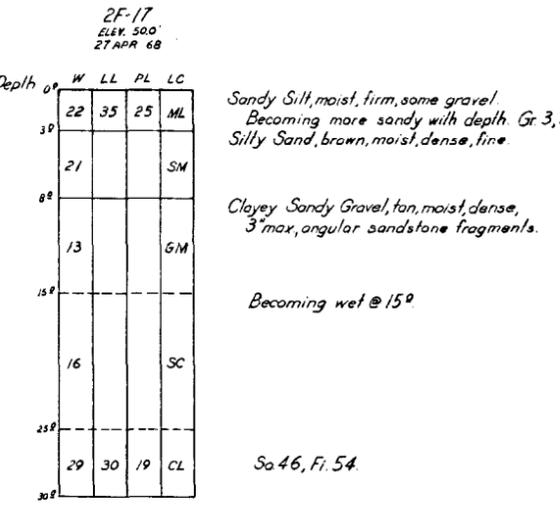
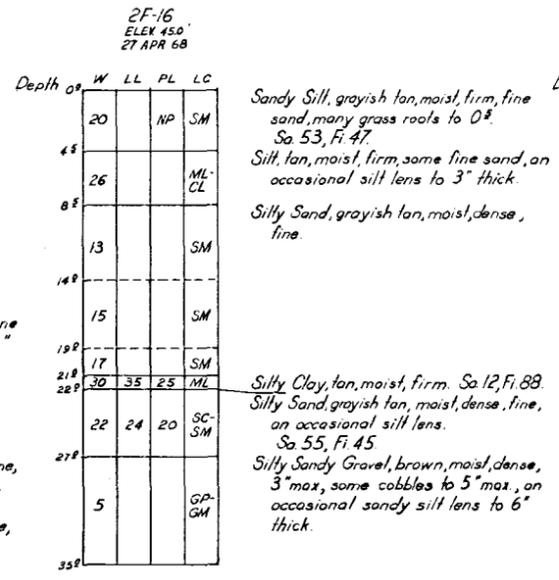
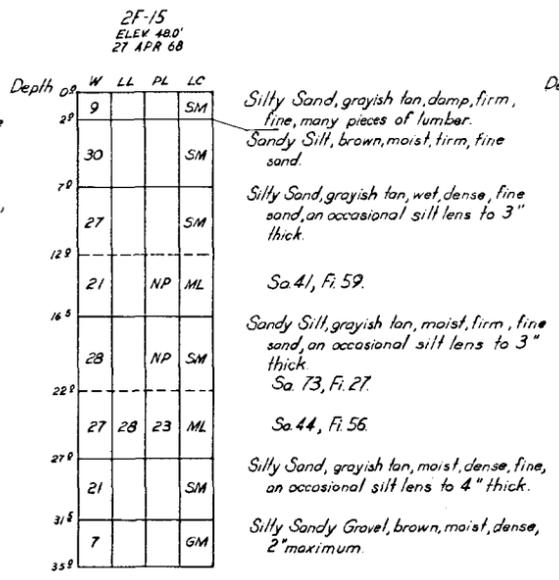
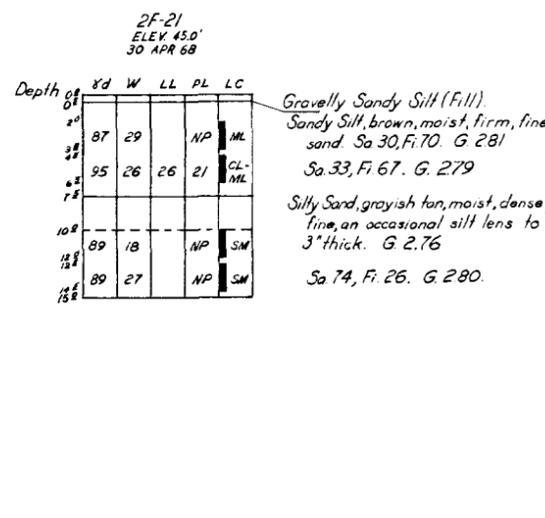
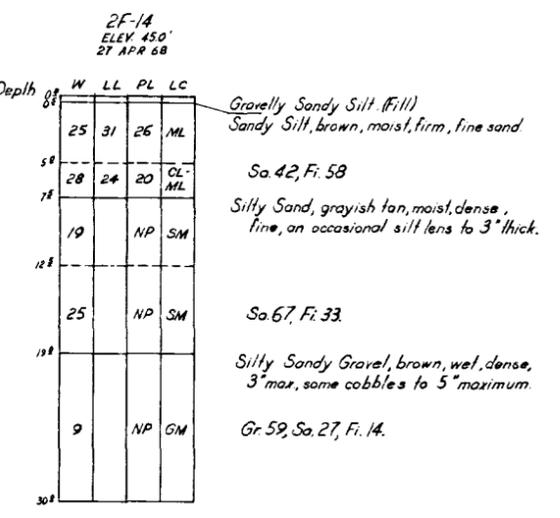
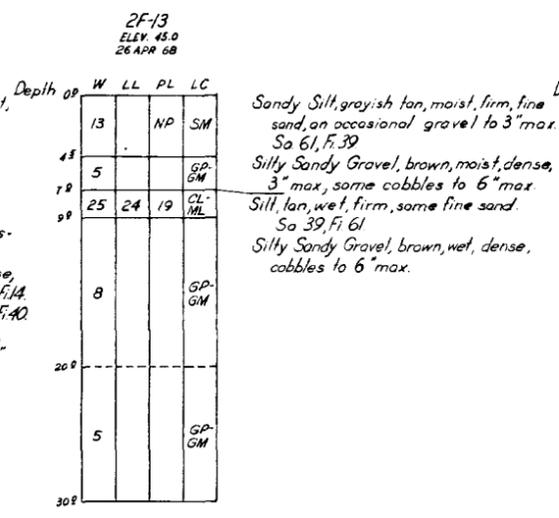
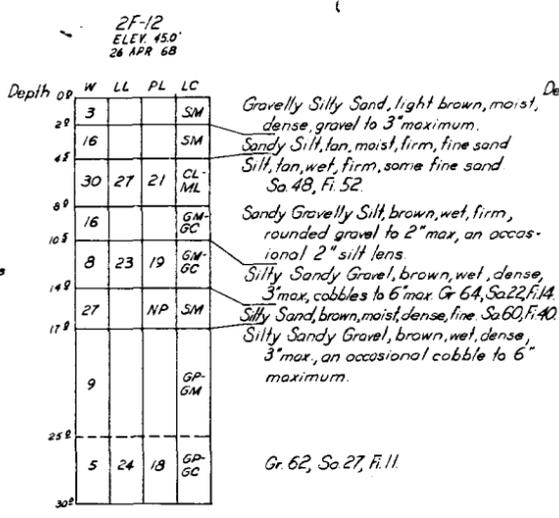
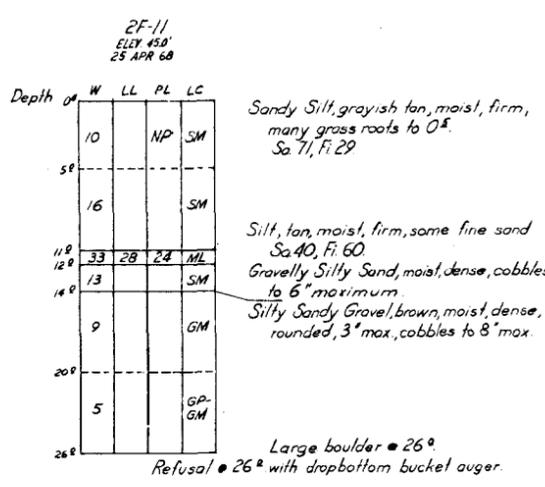


Sandy Silt, grayish tan, moist, firm, fine sand.
Sa. 51, Fi. 49.
Silty Sand, brown, moist, dense, fine.
Gravelly Silty Sand, brown, moist, firm, rounded gravel to 3" maximum.
Silty Sandy Gravel, brown, moist, dense, 5" max. Gr. 63, Sa. 28, Fi. 9.
Silt, tan, wet, firm, some fine sand, and gravel to 1" maximum. Sa. 44, Fi. 56.
Silty Sandy Gravel, brown, wet, dense, 5" max.
Silty Sand, tan, moist, dense, fine, some gravel, an occasional silt lens to 2" thick.
Silty Sandy Gravel, brown, moist, dense, to 4" maximum.

AS CONSTRUCTED - NO CHANGES MADE		DATE	APPROVAL
SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY:	DEL NORTE COUNTY CALIFORNIA		
TRACED BY:	KLAMATH GLEN		
CHECKED BY:	LOCAL PROTECTION WORKS		
SUBMITTED:	STATION 21+00 TO STATION 89+11		
APPROVED:	DATE	10 OCT 20	
PREPARED UNDER THE DIRECTION OF CHARLES R. ROBERTS COLONEL, C. E. DISTRICT ENGINEER			
SCALE/NO SCALE	JOB NO.	DRAWING NUMBER	
		SHEET 21 59 39 33	

NOTES AND LEGEND ARE SHOWN ON SHEET 20.

KAMATH GLEN

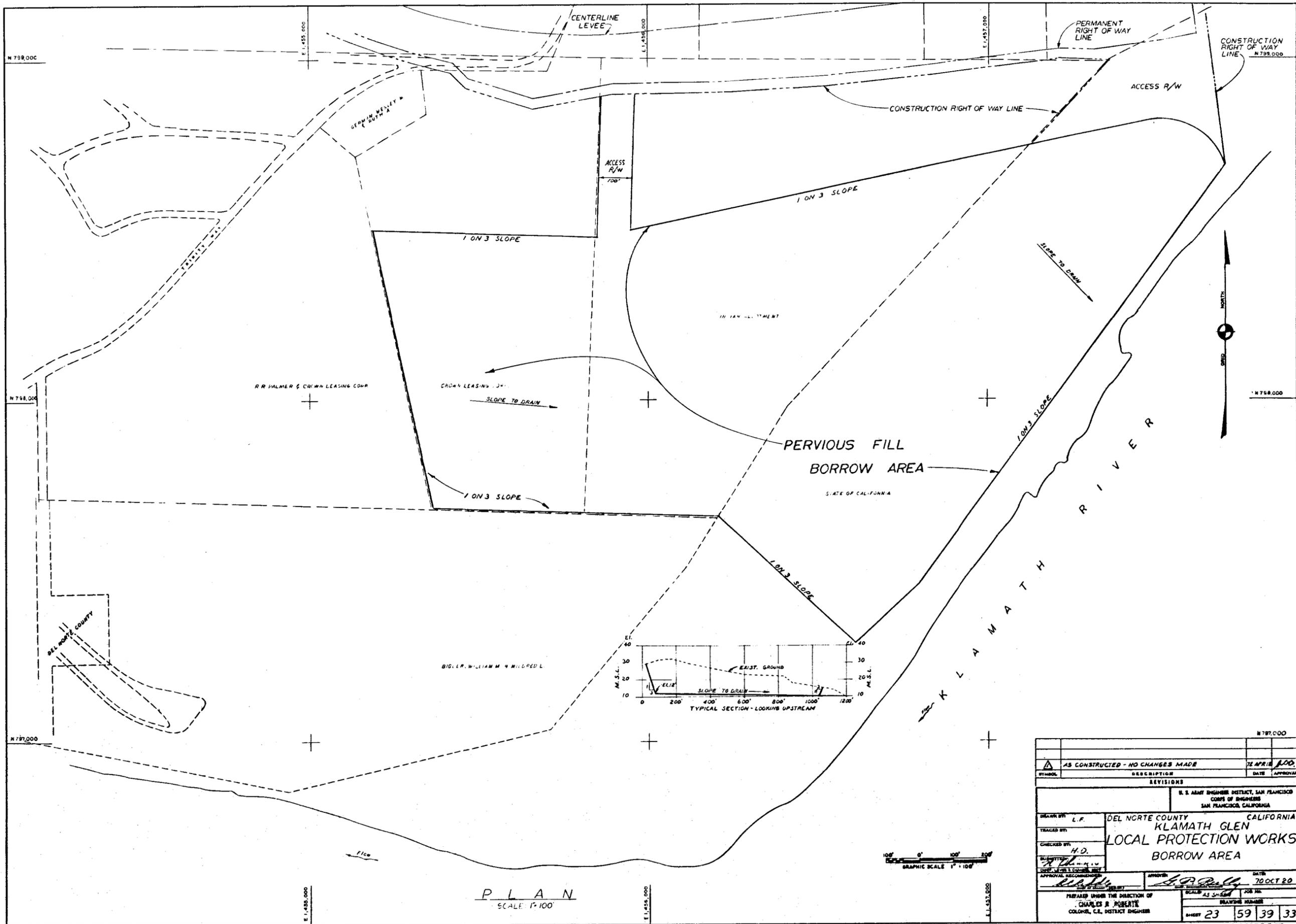


NOTES AND LEGEND ARE SHOWN ON SHEET 20

AS CONSTRUCTED - NO CHANGES MADE		DATE	APPROVAL
SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY	L.M.F.	DEL NORTE COUNTY CALIFORNIA	
TRACED BY		KLAMATH GLEN	
CHECKED BY	H.D.	LOCAL PROTECTION WORKS	
SUBMITTED BY		LOGS OF EXPLORATION HOLES	
DATE		STATION 55+00 TO STATION 88+75	
APPROVED	<i>[Signature]</i>	DATE	70 OCT 20
PREPARED UNDER THE DIRECTION OF		SCALE	JOB NO.
CHARLES R. ROBERTS		DRAWING NUMBER	
COLONEL, C.E., DISTRICT ENGINEER		SHEET	22 59 39 33

RECORD DRAWING

KLAMATH RIVER

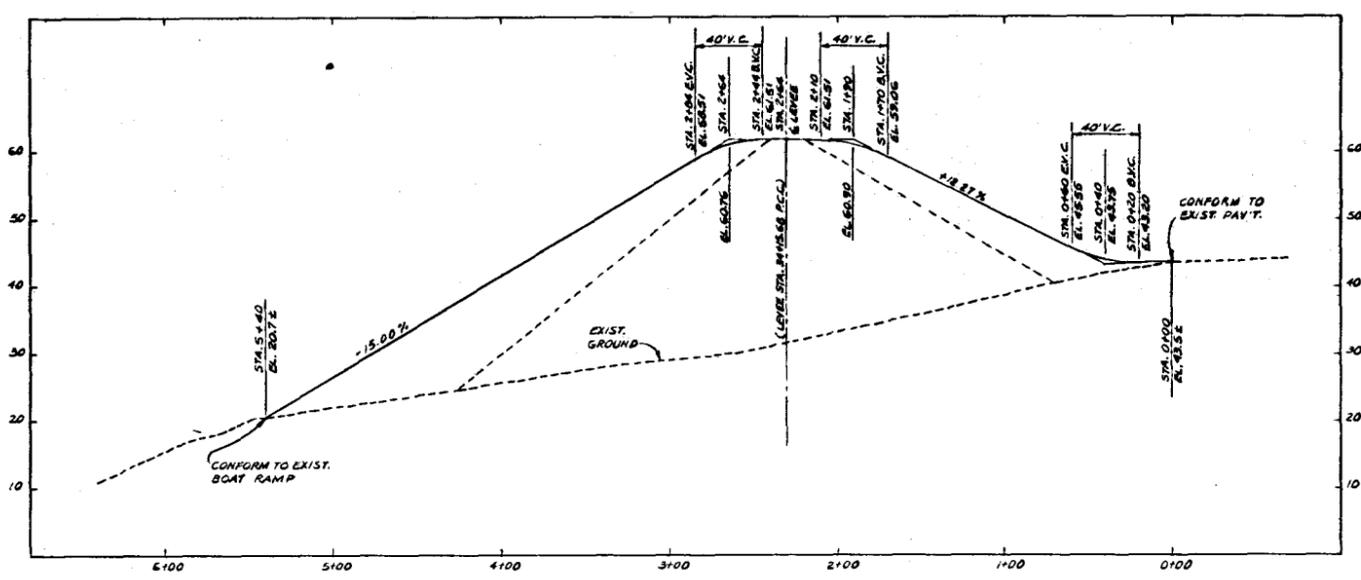


PLAN
SCALE 1"=100'

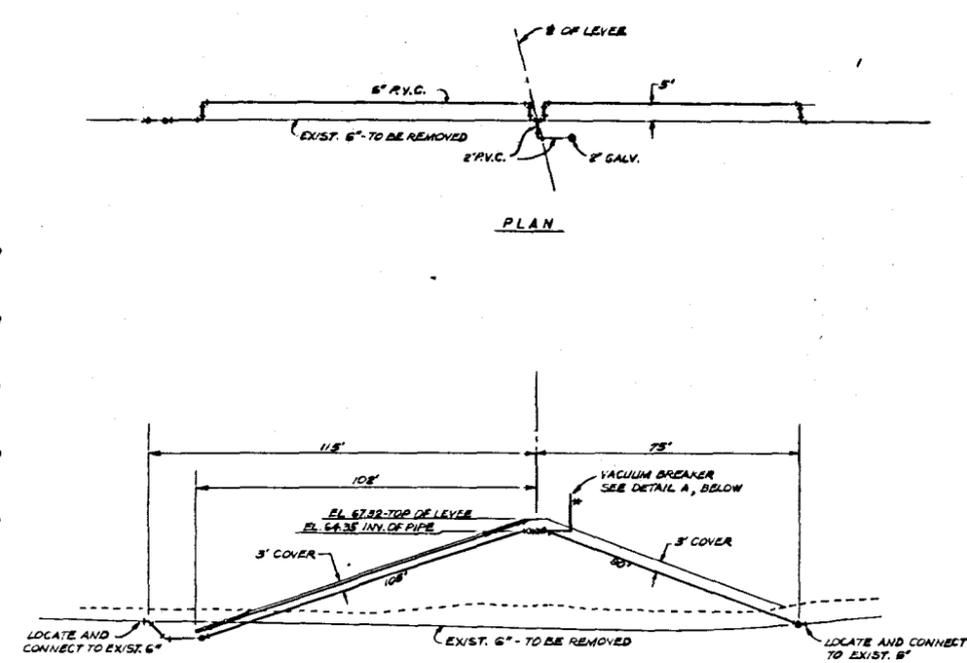


AS CONSTRUCTED - NO CHANGES MADE		72 APR 18 1900
SYMBOL	DESCRIPTION	DATE APPROVAL
REVISIONS		
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA		
DRAWN BY L.F.	DEL NORTE COUNTY CALIFORNIA	
TRACED BY	KLAMATH GLEN	
CHECKED BY H.D.	LOCAL PROTECTION WORKS	
QUANTITY	BORROW AREA	
DESIGNED BY	APPROVED	DATE
APPROVAL RECOMMENDED	<i>[Signature]</i>	70 OCT 20
PREPARED UNDER THE DIRECTION OF		
CHARLES R. ROBERTS		
COLONEL, C.E., DISTRICT ENGINEER		
SCALE	AS SHOWN	JOB NO.
DRAWING NUMBER		
SHEET	23	59 39 33

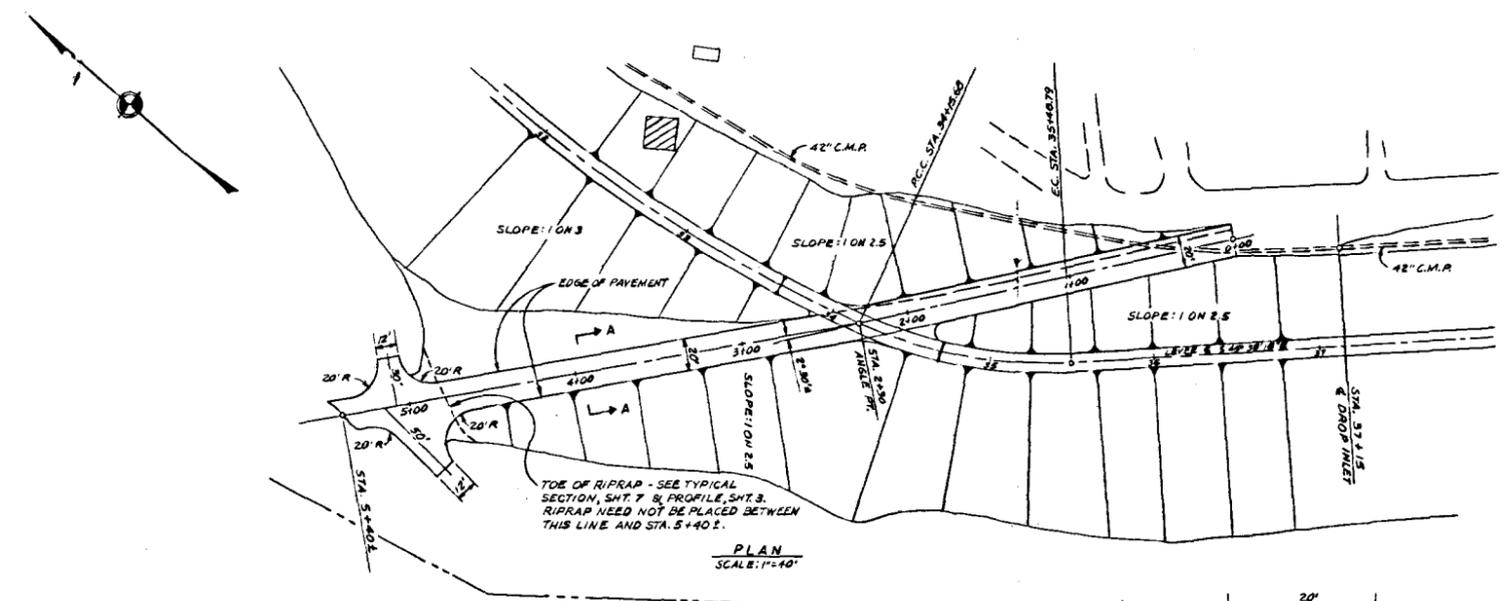
RECORD DRAWING



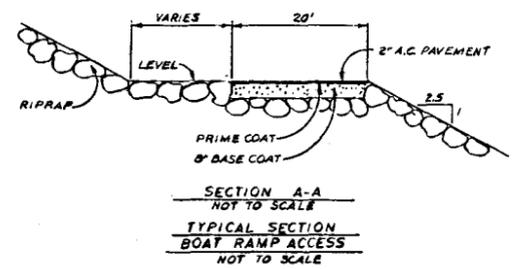
PROFILE
SCALE: HORIZ. 1"=40'
VERT. 1"=10'



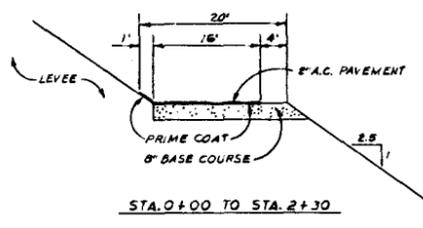
ELEVATION



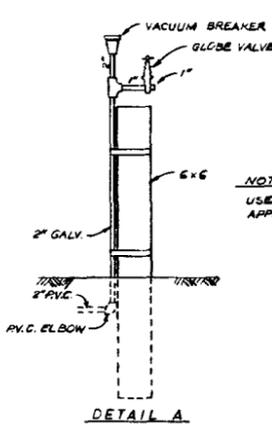
PLAN
SCALE: 1"=40'



BOAT RAMP ACCESS



STA. 0+00 TO STA. 2+30

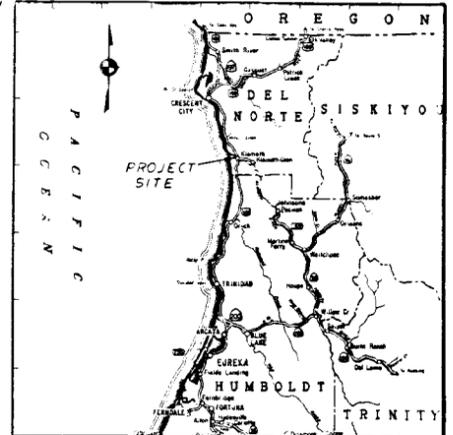
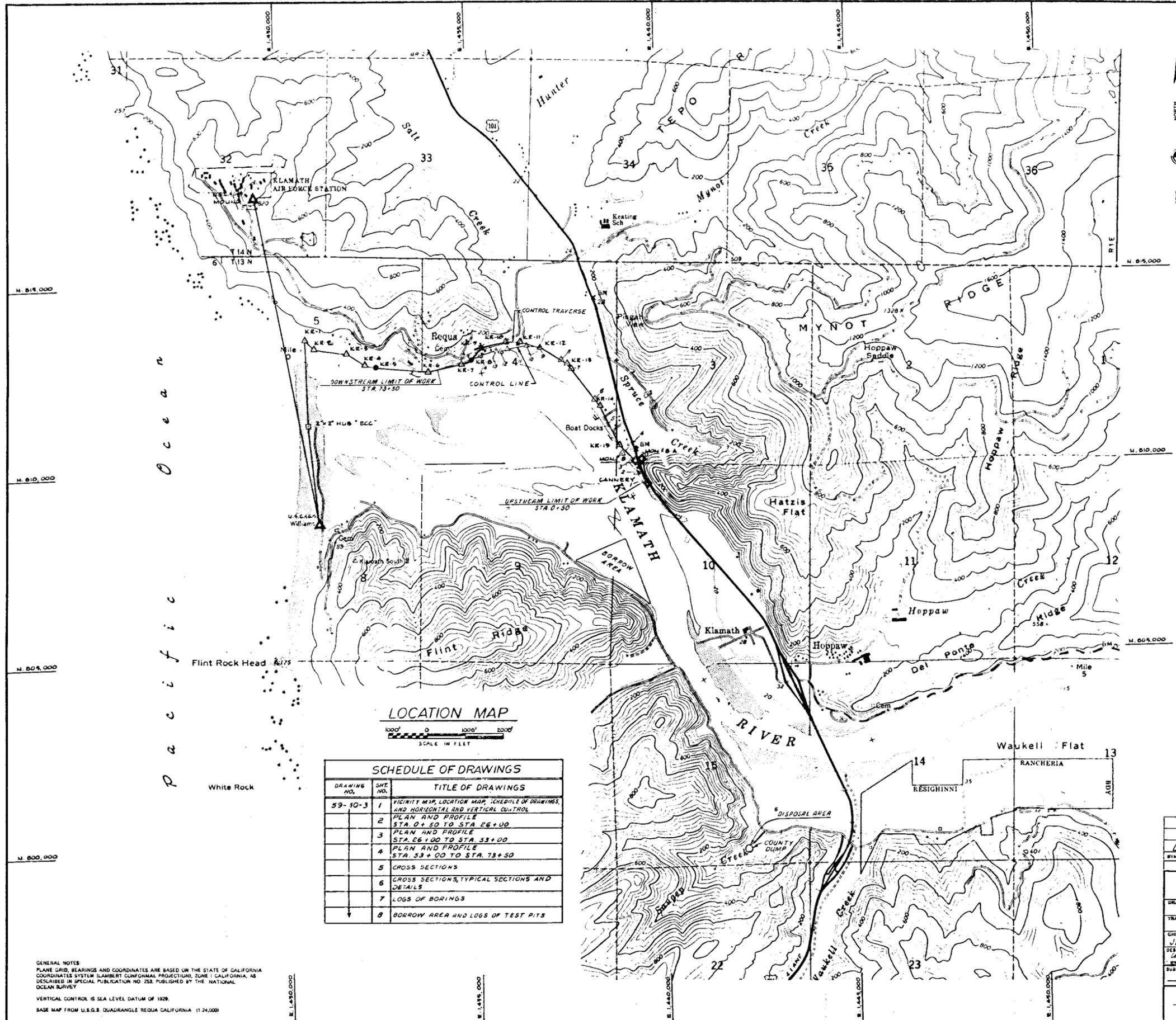


DETAIL A

PIPE REPLACEMENT DETAIL - STA. 64+00!
NOT TO SCALE

AS CONSTRUCTED - NO CHANGES MADE		78 APR 18	1905
SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY: R. W. W.	DEL NORTE COUNTY	CALIFORNIA	
TRACED BY:	KLAMATH GLEN LOCAL PROTECTION WORKS		
CHECKED BY: A.C.B./P	BOAT RAMP ACCESS & UTILITY MODIFICATIONS		
ELABORATED BY: R. W. W.	APPROVED BY: [Signature]	DATE:	70 OCT. 20
PREPARED UNDER THE DIRECTION OF CHARLES E. ROBERTS COLONEL, CE, DISTRICT ENGINEER	SCALE: AS SHOWN	DRAWING NUMBER	24 59 39 33

K L A M A T H



LEGEND

- ▲ U.S.C. 164 DISK
- △ CORPS OF ENGINEERS DISK
- BATHY PIN
- ⊠ 1/2" IRON PIPE WITH 5" BRASS CAP
- 2" x 2" HUB
- CONTROL TRAVERSE
- C.S.D.H. IRON PIPE WITH BRASS CAP
- × U.S.C. 164 B.M.

LOCATION MAP



SCHEDULE OF DRAWINGS

DRAWING NO.	SHT. NO.	TITLE OF DRAWINGS
59-10-3	1	VICINITY MAP, LOCATION MAP, SCHEDULE OF DRAWINGS, AND HORIZONTAL AND VERTICAL CONTROL
	2	PLAN AND PROFILE STA. 0+50 TO STA. 26+00
	3	PLAN AND PROFILE STA. 26+00 TO STA. 53+00
	4	PLAN AND PROFILE STA. 53+00 TO STA. 73+50
	5	CROSS SECTIONS
	6	CROSS SECTIONS, TYPICAL SECTIONS AND DETAILS
	7	LOGS OF BORINGS
	8	BORROW AREA AND LOGS OF TEST PITS

GENERAL NOTES:
 PLANE GRID, BEARINGS AND COORDINATES ARE BASED ON THE STATE OF CALIFORNIA COORDINATES SYSTEM (LAMBERT CONFORMAL PROJECTION), ZONE 1 CALIFORNIA, AS DESCRIBED IN SPECIAL PUBLICATION NO. 253, PUBLISHED BY THE NATIONAL OCEAN SURVEY.
 VERTICAL CONTROL IS SEA LEVEL DATUM OF 1929.
 BASE MAP FROM U.S.G.S. QUADRANGLE REGUA CALIFORNIA (174,000)

HORIZONTAL & VERTICAL CONTROL				
MON. OR B.M.	DESCRIPTION	Y NORTH	X EAST	ELEV.
CANNERY	C.S.D.H. Brass Cap I.P.	809,544.23	1,420,666.26	20.71
MON. #8	C.S.D.H. Brass Cap I.P.	810,157.81	1,420,229.23	15.78
MON. #8A	C.S.D.H.	810,165.06	1,420,425.30	-
KR-1	Std. C. of E. Disk	812,458.18	1,420,681.23	11.76
KR-2	Std. C. of E. Disk	812,258.88	1,420,812.80	15.71
KR-3	Std. C. of E. Disk	812,124.23	1,421,744.68	5.84
KR-4	Std. C. of E. Disk	812,816.21	1,421,240.73	2.48
KR-5	5/8" I.P. RICE 5/8"	812,552.37	1,422,641.80	5.28
KR-6	Std. C. of E. Disk	812,804.12	1,422,819.21	13.28
KR-7	Std. C. of E. Disk	812,808.50	1,424,78.11	22.60
KR-8	Bathy Cap in I.P.	812,826.43	1,420,616.50	28.23
KR-9	5/8" I.P. 1/2" R. Cap RICE 5/8"	812,510.00	1,420,274.28	26.41
KR-10	Std. C. of E. Disk	812,364.28	1,420,363.23	66.84
KR-11	Std. C. of E. Disk	812,226.81	1,420,268.98	8.82
KR-12	Std. C. of E. Disk	812,187.43	1,420,871.58	11.21
KR-13	Std. C. of E. Disk	812,741.28	1,427,540.83	15.88
KR-14	Std. C. of E. Disk	811,833.21	1,428,403.73	15.24
KR-15	Std. C. of E. Disk	812,641.42	1,428,222.28	19.20
"HOLLYWOOD"	USCGS Disk	817,241.23	1,428,287.85	-
"WILLIAM"	USCGS Disk	808,814.24	1,428,220.18	-
BM 2028	USCGS Disk	-	-	20.00
BM 72	USCGS	-	-	21.88

AS CONSTRUCTED - NO CHANGES MADE AL 15 JAN 17 75

REVISIONS

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
 CORPS OF ENGINEERS
 SAN FRANCISCO, CALIFORNIA

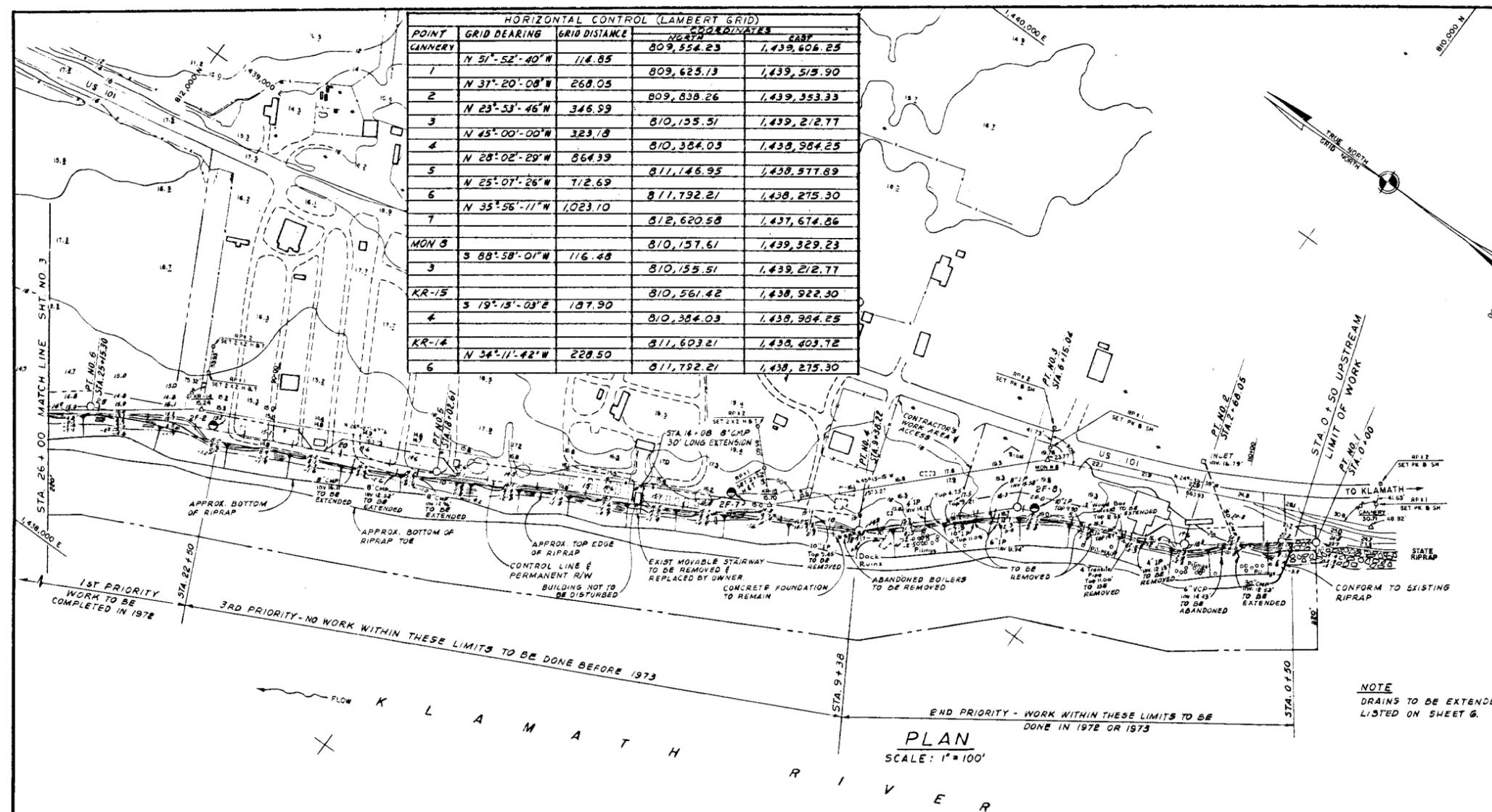
DRAWN BY: HD
 TRACED BY:
 CHECKED BY: JWE
 DESIGNED BY: W. E. Indrag
 SUBMITTED: 1972 MAY 17

APPROVAL RECOMMENDER: [Signature]
 DATE: 1972 MAY 17

APPROVED: [Signature]
 COLONEL, C.E., DISTRICT ENGINEER

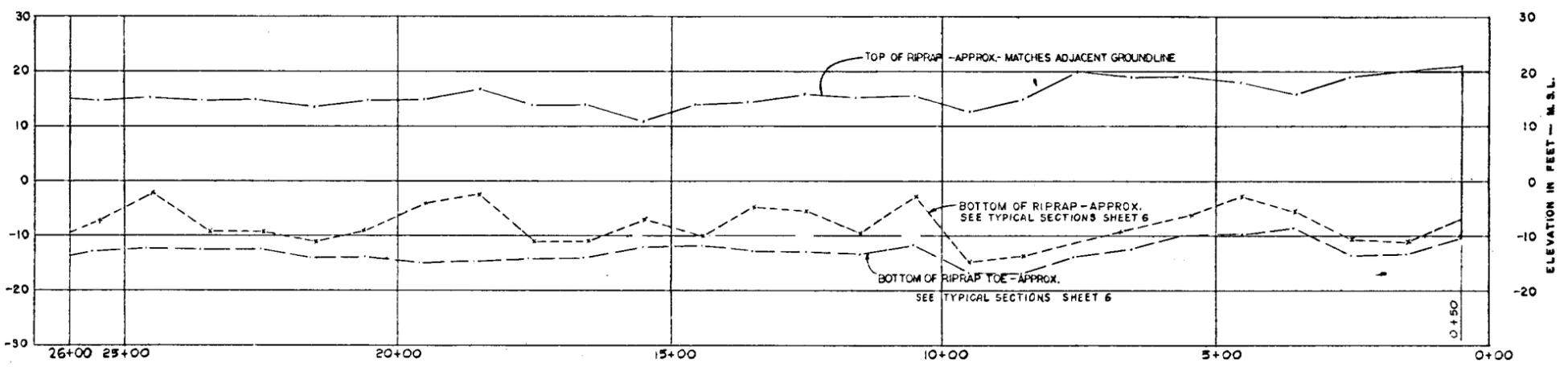
SCALE: AS SHOWN JOB NO. [Blank]
 DRAWING NUMBER: [Blank]
 SHEET: 1 59 40 3

KAMATH



HORIZONTAL CONTROL (LAMBERT GRID)				
POINT	GRID BEARING	GRID DISTANCE	EASTING	NORTHING
CANNERY			809,554.23	1,439,606.25
1	N 51°-52'-40"W	114.85	809,625.13	1,439,515.90
2	N 37°-20'-08"W	268.05	809,838.26	1,439,353.33
3	N 23°-53'-46"W	346.59	810,155.51	1,439,212.77
4	N 45°-00'-00"W	323.18	810,384.03	1,438,984.25
5	N 28°-02'-29"W	864.39	811,146.95	1,438,577.89
6	N 25°-07'-26"W	712.69	811,792.21	1,438,275.30
7	N 35°-56'-11"W	1,023.10	812,620.58	1,437,674.86
MON 8	S 88°-58'-01"W	116.48	810,157.61	1,439,329.23
3			810,155.51	1,439,212.77
KR-15	S 19°-15'-03"E	187.90	810,561.42	1,438,922.30
4			810,384.03	1,438,984.25
KR-14	N 34°-11'-42"W	228.50	811,603.21	1,438,403.72
6			811,792.21	1,438,275.30

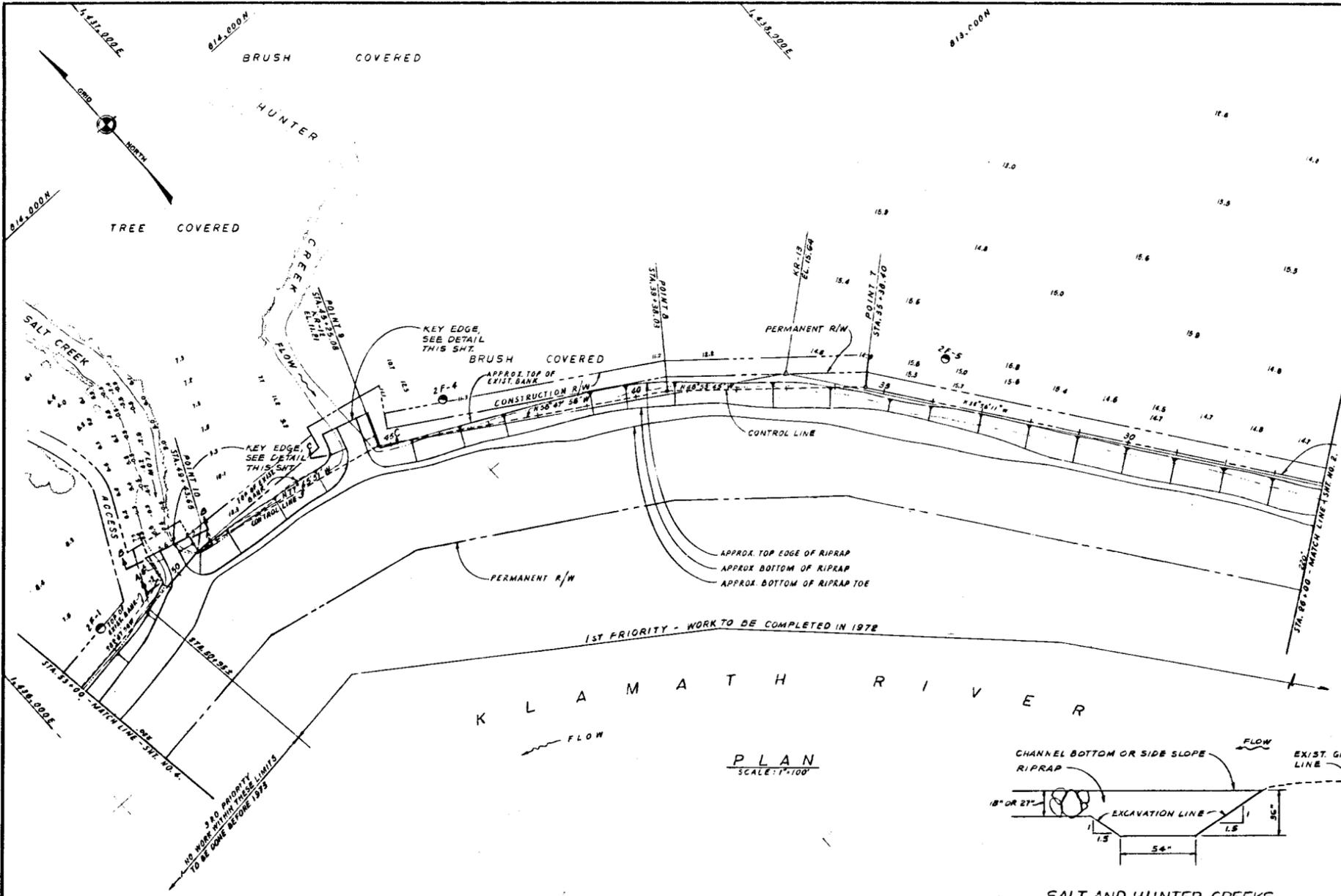
- LEGEND**
- BORING LOCATION
 - PERMANENT R/W
 - - - CONSTRUCTION R/W
 - △ NR 14 MONUMENTED CONTROL POINT
 - × BM 5525 BENCH MARK
 - ST-1233 TRAVERSE STATION (See Monument)
 - 16.7 (1st) SPOT ELEVATIONS (Decimal Point Indicates Division)
 - 23.2 (2nd) (Feet)
 - FIRST ST. PAVED ROAD
 - - - UNPAVED, PRIVATE OR UNIMPROVED ROAD
 - - - TRAIL
 - - - SIDEWALK (Small Scale Showing) RAILROADS (Drawn to Scale)
 - WALL - RETAINING WALL SEAWALL, ETC
 - FENCE
 - GUARD RAILING
 - BUILDINGS
 - FOUNDATIONS, SLABS, PARKING AREA, RUINS
 - CULVERT, BRIDGE
 - POWER LINE
 - POWER LINE (Lower Scale to Scale)
 - PIPE
 - PIPE LINE (Label Water, Oil, Gas, if known)
 - AREAS SUCH AS DUMPS, MUD FLATS, EXCAVATIONS, ETC
 - WATER SURFACE - STREAM, LAKE, POND
 - TANK
 - UTILITY POLE
 - STREET LIGHT
 - MANHOLE
 - FLAGPOLE, STANDPIPE, STACK, ETC
 - PRINCIPAL POINT
 - FIRE HYDRANT
 - CATCH BASIN
 - TREE OR BRUSH COVER
- NOTES**
- SURVEYED BY CHAMMILL FOR THE CORPS OF ENGINEERS MAR. 15-18, 1971 AND APR. 2-8, 1971
- BASE MAPS WERE COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY FLOWN MARCH 18, 1971
- PLANE GRID BEARINGS AND COORDINATES ARE BASED ON THE STATE OF CALIFORNIA COORDINATE SYSTEM (LAMBERT CONFORMAL PROJECTION), ZONE 1 CALIFORNIA, AS DESCRIBED IN U.S.N.O.S. SPECIAL PUBLICATION NO. 253
- ELEVATIONS ARE BASED ON M.D.S. SEA LEVEL DATUM
- REFERENCE BENCH MARK IS U.S.N.O.S. BRASS DISK IN A CONCRETE MONUMENT STAMPED "U.S.C. & G.S. 5525, 1942" SET IN STEEL FENCE CORNER 400' NORTH OF CANNERY ON EAST SIDE OF HWY 101 ELEVATION IS 2022 FEET M.S.L.
- CONTOUR INTERVAL IS 2 FEET



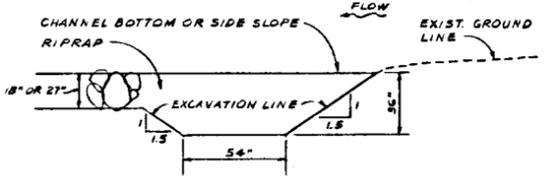
PROFILE
 SCALES: HORIZ. 1" = 100'
 VERT. 1" = 10'

AS CONSTRUCTED - CHANGES MADE	AL 25 JAN 77	JWS
SYMBOL	DESCRIPTION	DATE
REVISIONS		
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA		
DEL NORTE COUNTY KLAMATH RIVER CALIFORNIA		
BANK PROTECTION CAMP KLAMATH TO REQUA PLAN AND PROFILE STA. 0+50 TO STA. 26+00		
APPROVAL RECOMMENDED:	APPROVED:	DATE: 1972 MAY 17
PREPARED UNDER THE DIRECTION OF JAMES L. LAMMIE COLONEL, C.E., DISTRICT ENGINEER		
SCALE: AS SHOWN	DRAWING NUMBER	SHEET 2 59403

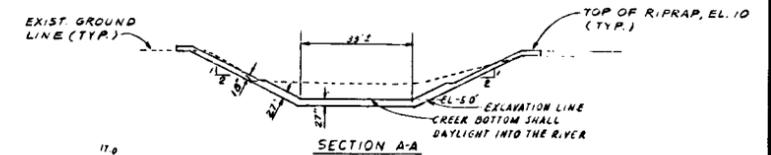
UNDO-H-1000



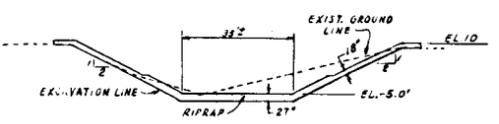
PLAN
SCALE: 1"=100'



SALT AND HUNTER CREEKS
KEY DETAIL
NOT TO SCALE

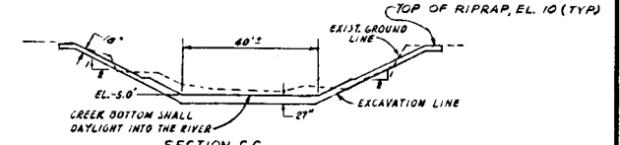


SECTION A-A



SECTION B-B

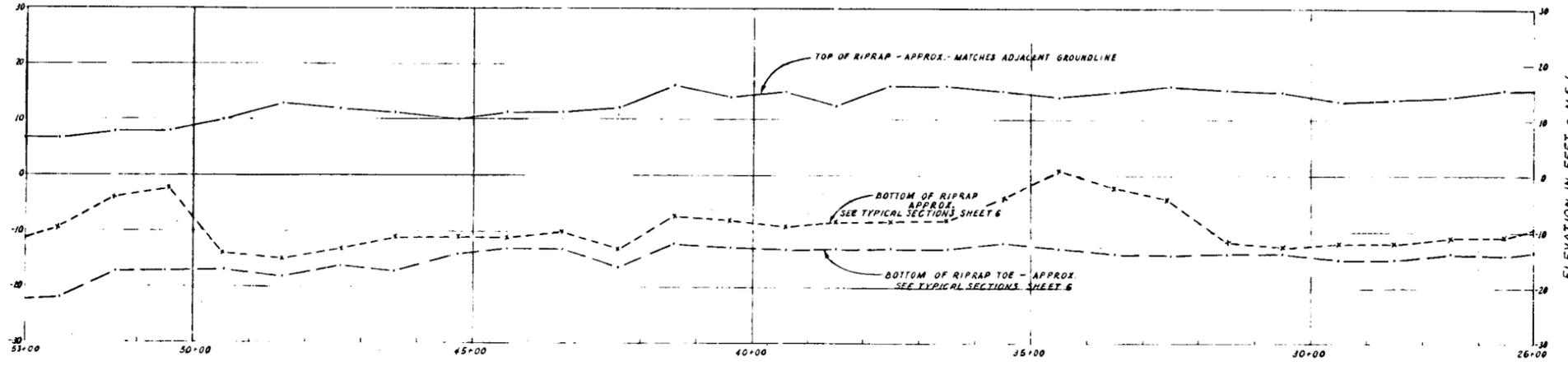
SALT CREEK
(LOOKING UPSTREAM)
SCALE: HORIZ. - 1"=20'
VERT. - 1"=20'



SECTION C-C

HUNTER CREEK
(LOOKING UPSTREAM)
SCALE: HORIZ. - 1"=20'
VERT. - 1"=20'

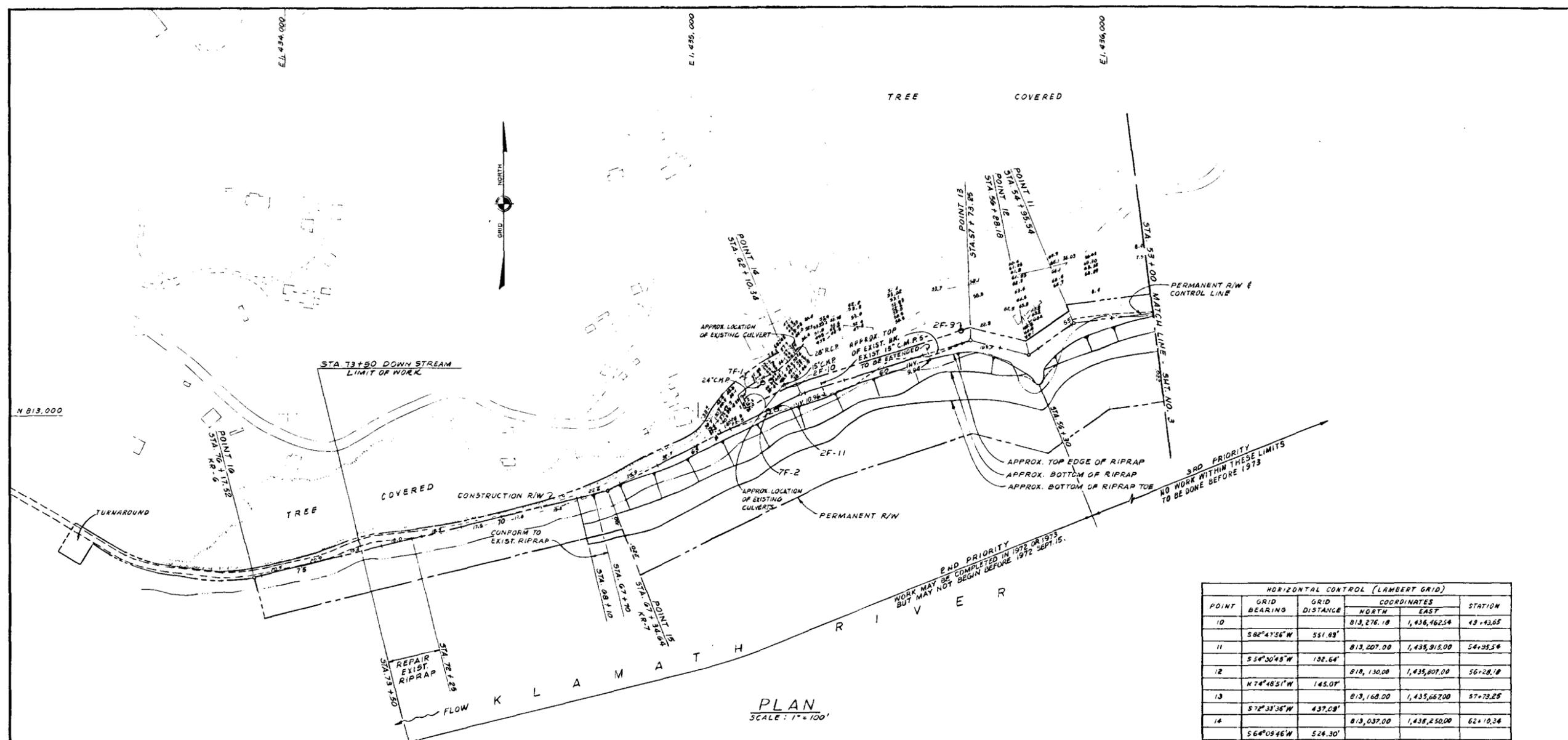
POINT	HORIZONTAL CONTROL (LAMBERT GRID)				
	GRID BEARING	GRID DISTANCE	COORDINATES NORTH	COORDINATES EAST	STATION
POINT 6			811,792.21	1,438,275.50	25+15.30
POINT 7	N30°56'11"W	1,023.10'	812,620.58	1,437,676.00	35+38.40
POINT 8	N48°53'45"W	308.63'	812,882.31	1,437,378.78	50+38.08
POINT 9	N58°47'56"W	607.05'	813,187.43	1,436,871.58	45+25.00
POINT 10	N77°48'31"W	418.57'	813,276.18	1,436,462.54	49+43.65
POINT 11	S08°47'56"W	551.88'	813,207.00	1,437,918.00	54+25.54
PT. KR-13	ELEV. 15.14		812,747.00	1,437,569.60	



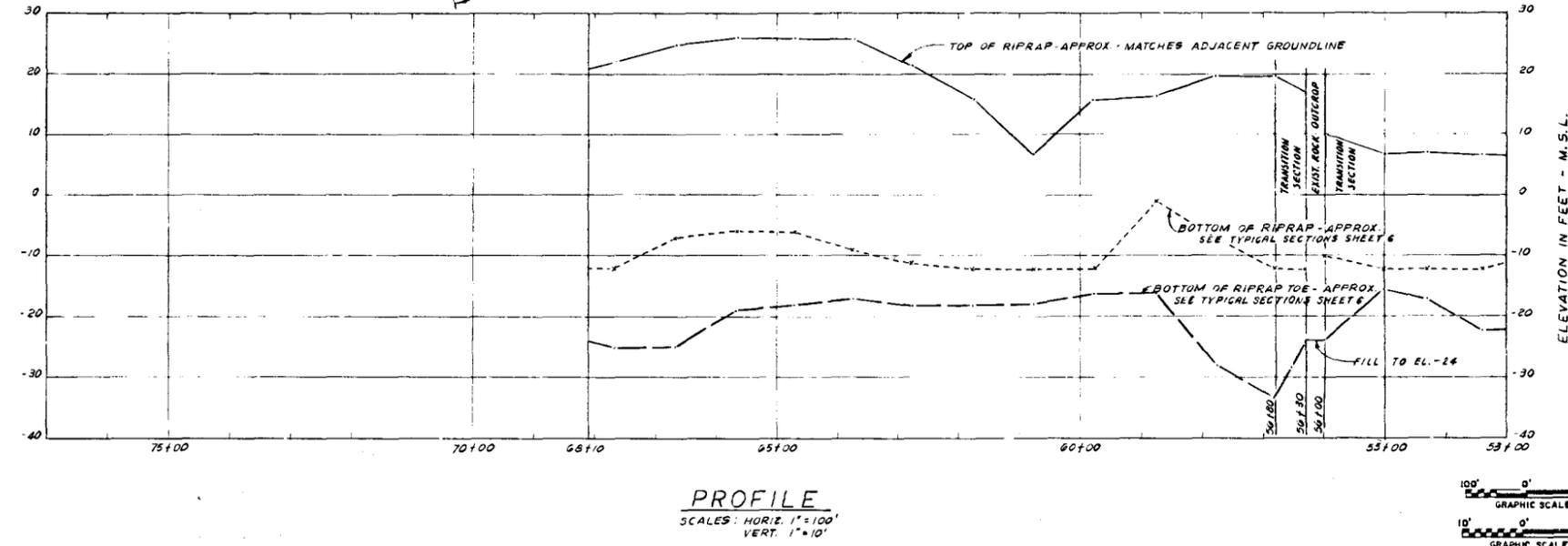
PROFILE
SCALE: HORIZ. - 1"=100'
VERT. - 1"=10'

AS CONSTRUCTED - CHANGES MADE		AL	25 JAN 17	775
SYMBOL	DESCRIPTION	DATE	APPROVAL	
REVISIONS				
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA				
DRAWN BY:	AY	DEL NORTE COUNTY	CALIFORNIA	
TRACED BY:		KLAMATH RIVER		
CHECKED BY:	JWE	BANK PROTECTION		
SUBMITTED BY:	W. C. Smith	CAMP KLAMATH TO REQUA		
APPROVAL RECOMMENDED:		PLAN AND PROFILE		
DATE:	1978 MAY 17	STA. 26+00 TO STA. 53+00		
PREPARED UNDER THE DIRECTION OF:	JAMES L. LAMMIE	SCALE: AS SHOWN	JOB NO.	
COLONEL, C.E. DISTRICT ENGINEER		DRAWING NUMBER		
		SHEET	3	59 40 3

Klamath River

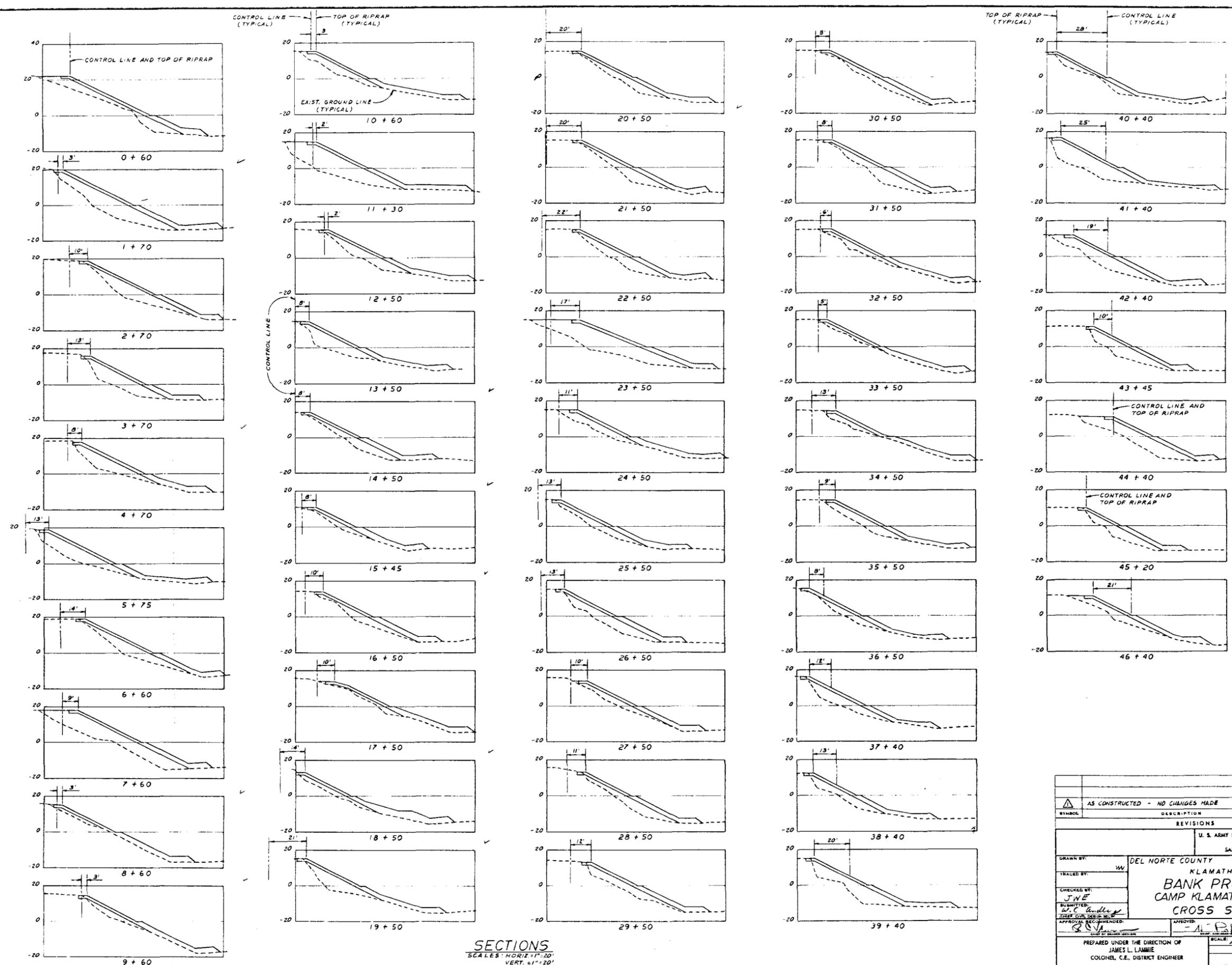


HORIZONTAL CONTROL (LAMBERT GRID)					
POINT	GRID BEARING	GRID DISTANCE	COORDINATES		STATION
			NORTH	EAST	
10	58°47'56"W	551.89'	813,276.18	1,436,462.54	43+43.65
11	55°30'48"W	132.64'	813,207.00	1,435,915.00	54+35.54
12	N74°48'51"W	145.00'	818,130.00	1,435,807.00	56+28.18
13	S72°33'38"W	437.08'	813,168.00	1,435,687.00	57+23.25
14	S64°09'46"W	526.30'	813,037.00	1,438,250.00	62+10.34
15 (K.R. 7)	S76°36'54"W	802.88'	812,808.50	1,434,778.11	67+34.68
16 (K.R. 6)			812,604.12	1,433,919.21	76+17.52



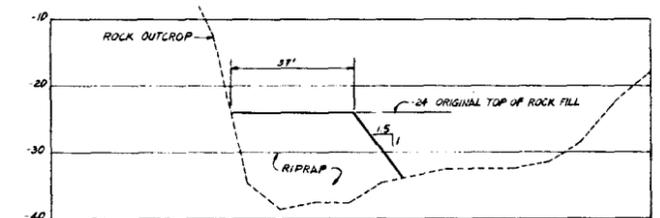
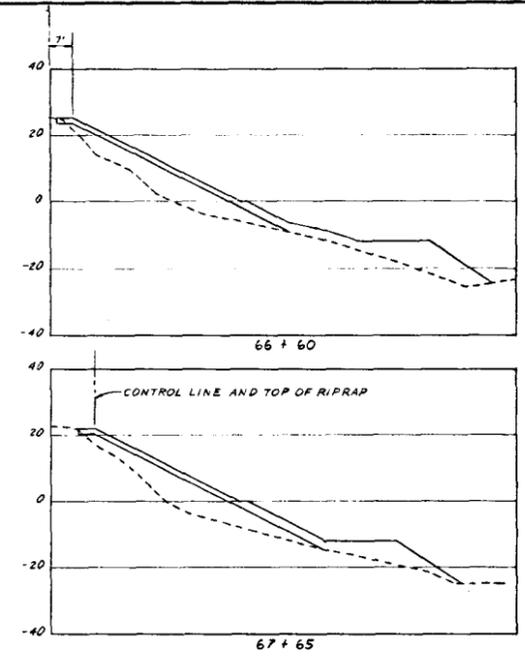
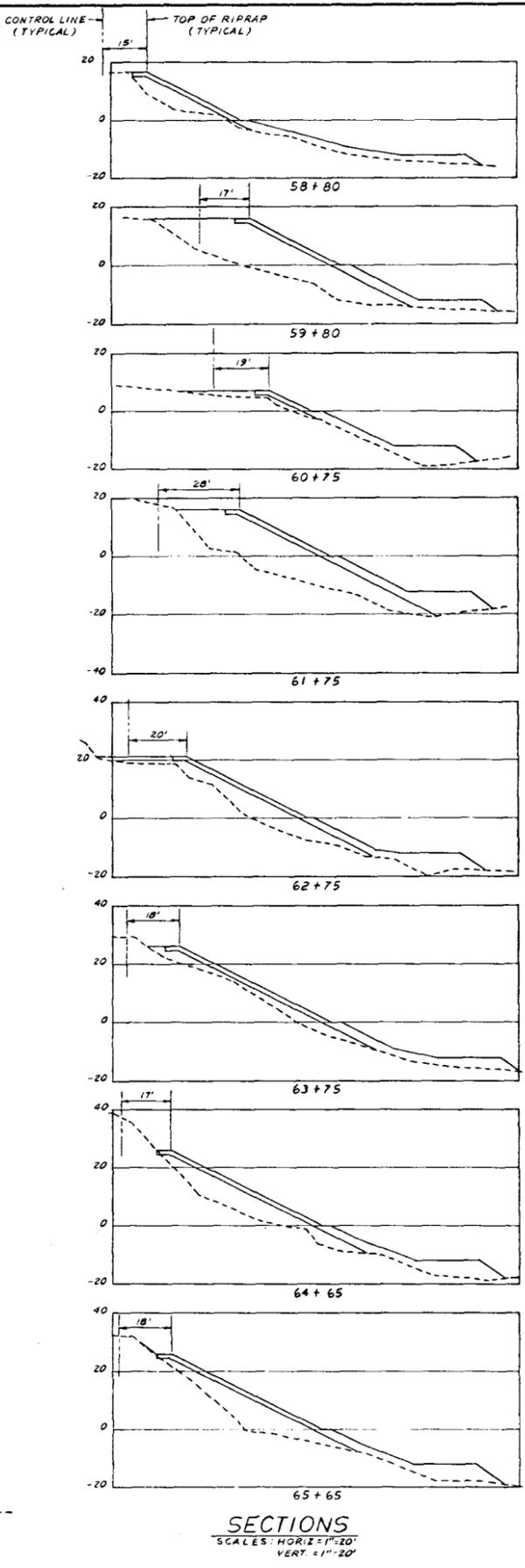
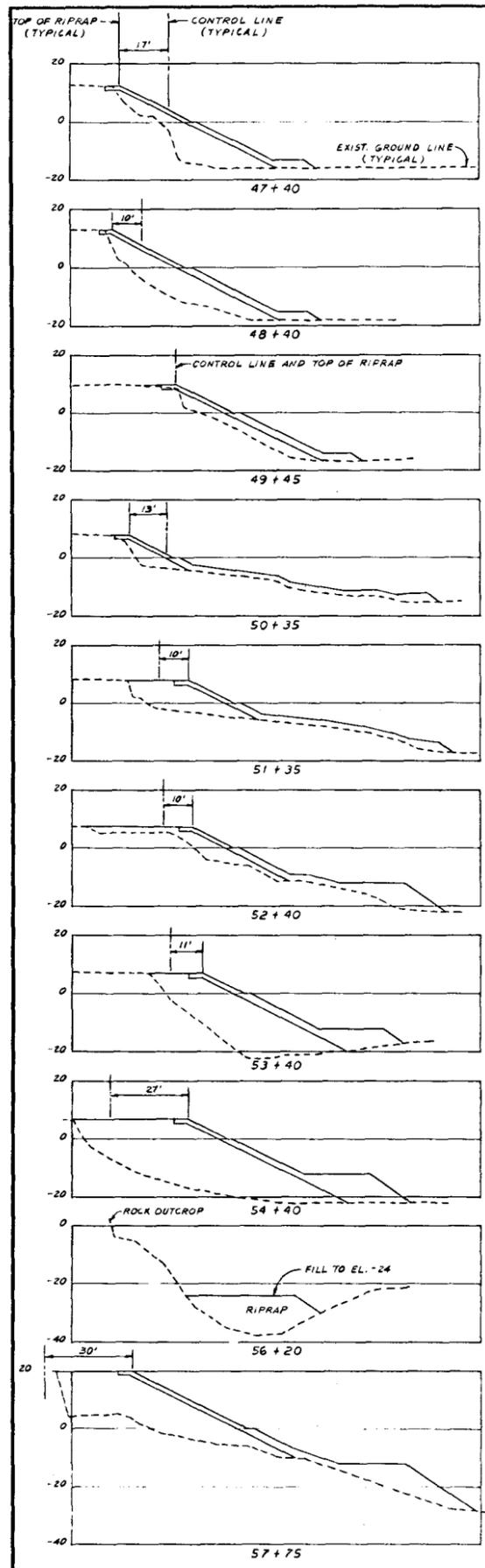
AS CONSTRUCTED - CHANGES MADE	ALL	25 JAN 17	75
REVISOR'S NOTATION ON PLAN. DELETED NOTATION ON PROFILE 22 JUN 18			
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY: C.S.	DEL NORTE COUNTY CALIFORNIA		
TRACED BY:	KLAMATH RIVER		
CHECKED BY: J.W.E.	BANK PROTECTION		
SUBMITTED: W.C. Bradley	CAMP KLAMATH TO REQUA		
APPROVAL RECOMMENDED:	PLAN AND PROFILE		
	STA 53+00 TO STA. 73 + 50		
	APPROVED:	DATE:	1972 MAY 17
PREPARED UNDER THE DIRECTION OF JAMES L. LAMIE COLONEL, C.E., DISTRICT ENGINEER		SCALE: AS SHOWN	DRAWING NUMBER
		SHEET	4 59 40 3

10000-11-1000



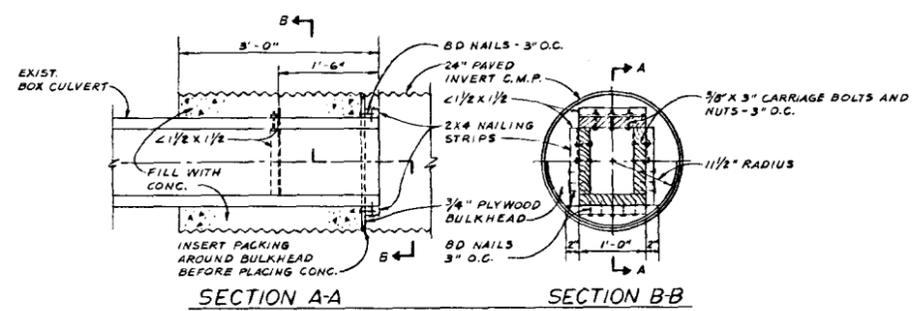
SECTIONS
 SCALE: HORIZ. 1"=20'
 VERT. 1"=20'

AS CONSTRUCTED - NO CHANGES MADE		AL	13 JAN 77	MS
SYMBOL	DESCRIPTION	DATE	APPROVAL	
REVISIONS				
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA				
DRAWN BY: <i>WV</i>		DEL NORTE COUNTY CALIFORNIA		
TRACED BY:		KLAMATH RIVER		
CHECKED BY: <i>JWE</i>		BANK PROTECTION CAMP KLAMATH TO REQUA CROSS SECTIONS		
SUBMITTED BY: <i>W. C. Gaudin</i>		DATE: 1972 MAY 17		
APPROVAL: <i>[Signature]</i>		DATE: 1972 MAY 17		
PREPARED UNDER THE DIRECTION OF JAMES L. LAMMIE COLONEL, C.E., DISTRICT ENGINEER		SCALE: AS SHOWN	JOB NO.	DRAWING NUMBER
				SHEET 5 59 40 3

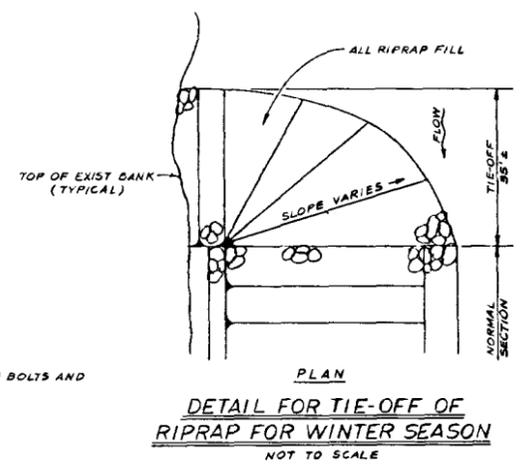
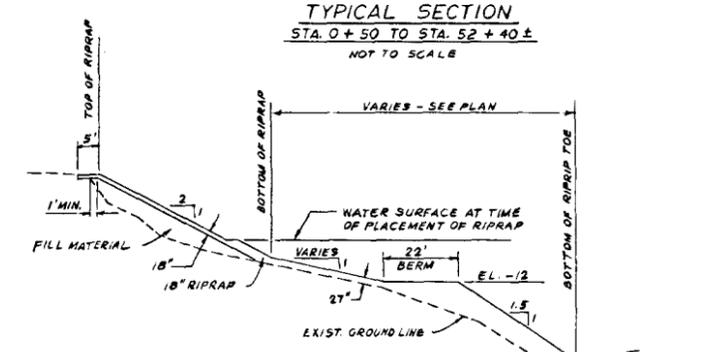
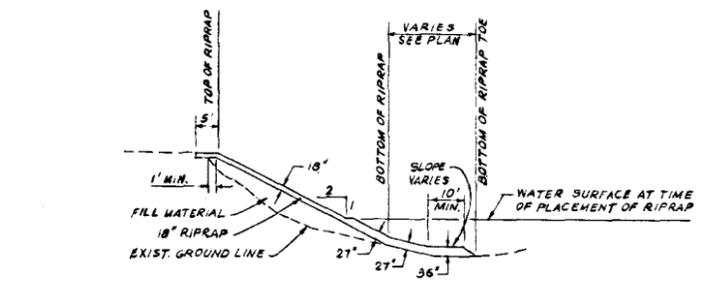


TYPICAL SECTION
STA. 56+00± TO STA. 56+30±
NOT TO SCALE

- NOTES
1. TRANSITION FROM STA. 55+00 TO STA. 56+00± WITH RIPRAP SLOPE DAY LIGHTING AGAINST ROCK OUTCROP.
 2. TRANSITION FROM STA. 56+30± TO STA. 56+80 WITH RIPRAP SLOPE DAY LIGHTING AGAINST ROCK OUTCROP.

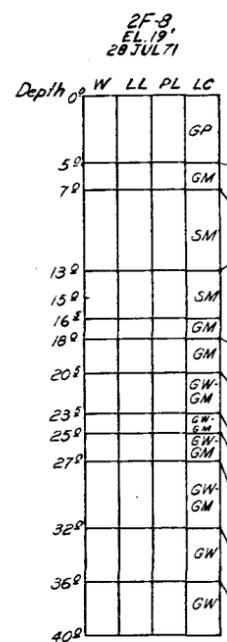


CULVERT EXTENSIONS					
STA.	EXISTING DRAIN	INVERT	EXTENSION	LENGTH	INVERT
1+60	30" C.M.P.	12.53	30" C.M.P.	16'	12.2
3+87	12" RECT. WOOD BOX	7.3	24" C.M.P. PAVED INV.	14'	7.1
18+40	8" C.M.P.	12.96	8" C.M.P.	8'	12.5
18+82	8" C.M.P.	12.52	8" C.M.P.	8'	12.3
19+70	8" C.M.P.	12.95	8" C.M.P.	8'	12.5
58+85	15" C.M.P.	9.94	15" C.M.P.	10'	9.8
61+55	15" C.M.P.	10.36	15" C.M.P.	8'	10.8
14+08			8" C.M.P.	30'	18.0

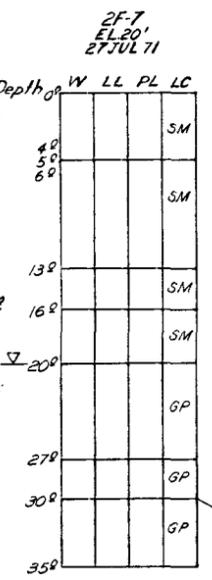


AS CONSTRUCTED - CHANGES MADE	ALL 13 JAN 17	JS
SYMBOL	DESCRIPTION	DATE
REVISIONS		
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA		
DRAWN BY: MW	DEL NORTE COUNTY	CALIFORNIA
TRACED BY:	KLAMATH RIVER	
CHECKED BY: JHE	BANK PROTECTION	
SUBMITTED: Mc C. [Signature]	CAMP KLAMATH TO REQUA	
APPROVAL RECOMMENDED: [Signature]	TYPICAL SECTIONS AND DETAILS	
APPROVED: [Signature]	DATE: 1972 MAY 17	
PREPARED UNDER THE DIRECTION OF JAMES L. LAMMIE COLONEL, C.E., DISTRICT ENGINEER		
SCALE: AS SHOWN	DRAWING NUMBER	SHEET
	6	59 40 3

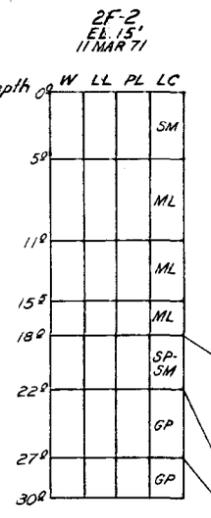
WOOD H-11-1000



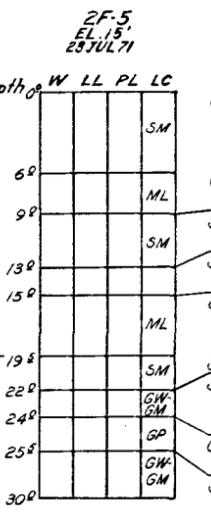
Clayey Sandy Gravel, gray & brown, dry (damp below 2') hard; generally 1/2" to 2 1/2" size; cobbles to 8" diam.
Clayey Sandy Gravel, gray, damp, dense, tight, generally 1/4" to 2" size; cobbles to 6" diam.
Clayey Silty Sand, brown, damp, loose, very fine.
Trace of gravel (1/2" to 1" size) below 15'.
Sandy Gravel, brown, loose, damp to moist; trace of clay.
Gravel, brown, wet, loose, generally 1/2" to 2" size; cobbles to 6" diam.; trace of sand & clay.
Gravel, gray, wet, loose, generally 1/2" to 2" size; some cobbles to 6" diam.; trace of sand.
Gravel, gray, wet, loose.
Gravel, gray, wet, loose, generally 5" to 6" size; some cobbles to 10" max. size.
Sandy Gravel, gray, wet, loose; sand is coarse.
Gravel, gray, wet, loose; occasional cobbles to 7" max. size.
Sandy Gravel, gray, wet, loose. Gr. 68, Sa. 32, Fi. 0.



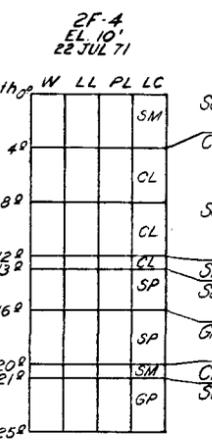
Silty Clayey Sand, brown, damp, soft, very fine.
Gray below 4'.
Silty Clayey Sand, brown, damp, soft, very fine; Iron scrap, tile and debris between 5' and 6'.
Silty Clayey Sand, brown, moist, soft, fine.
Silty Clayey Sand, gray, moist, soft, very fine.
Sandy Gravel, gray to brown, wet, loose 1/2" to 2"; occasional cobbles to 6" max. Gr. 75, Sa. 24, Fi. 1.
Gravel, gray, wet, loose, 1/2" to 2" size; occasional cobbles to 6" max.
Sandy Gravel, gray, wet, loose, 1/2" to 2" size.



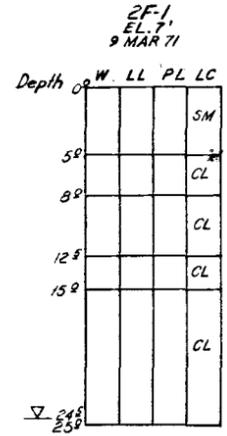
Clayey Sandy Silt, brown, damp, soft.
Clayey Sandy Silt, brown, moist to wet, very soft to friable. Sa. 41, Fi. 59.
Silty Clay, brown, wet, very soft to soft.
Clayey Silty Sand, gray with brown streaks, damp, soft, fine. Sa. 30, Fi. 70.
Sandy Gravel, grayish brown, rusty brown (8" to 18"), wet, loose, fine to medium, rounded, some clay. Gr. 36, Sa. 59, Fi. 5.
Sandy Gravel, gray, wet, loose, fine to medium.
Sandy Gravel, gray, wet, loose, medium to coarse; cobbles to 6" size. Gr. 58, Sa. 41, Fi. 1.



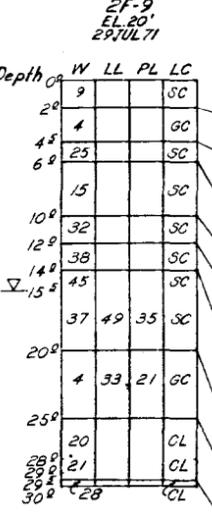
Silty Sand, brown, damp, loose, fine.
Clayey Silt, brown, damp, very soft.
Silty Sand, brown, damp, loose, fine.
Sandy Clayey Silt, brown, damp, soft.
Sandy Clayey Silt, gray with rust spots, damp, soft.
Sand, gray, wet, loose, fine.
Sandy Gravel, brown, wet, loose, 1/2" to 1 1/2" size; cobbles to 5" max. size.
Gravelly Sand, brownish gray, wet, loose.
Sandy Gravel, gray, wet, loose; some cobbles to 5" size.



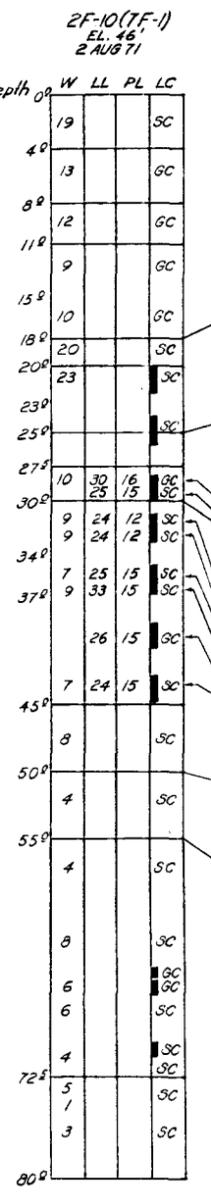
Sand, brown, slightly damp, loose, fine.
Clayey Silt, gray with brown rust spots, damp, soft; some scattered wood fragments.
Sandy Clayey Silt, gray with brown rust spots, moist, very soft, some wood fragments.
Silty Clay, gray, moist, soft.
Sandy Gravel, gray, wet, loose; sand is coarse. Gr. 39, Sa. 58, Fi. 3.
Gravel, gray & white, wet, loose, generally 1" to 2 1/2" size.
Clayey Silt, gray, wet, very soft.
Sandy Gravel, gray, wet, loose; occasional cobbles to 6" size.



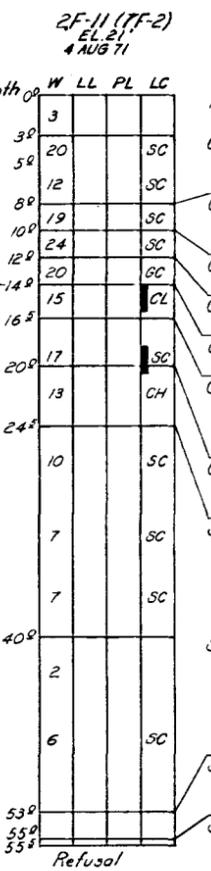
Gravelly Clayey Sand, (Fill), brown, damp, stiff, friable. Gr. 32, Sa. 43, Fi. 20.
Clayey Silt, gray, damp, very soft.
Clay, gray, moist, soft, fat.
Clay, gray, moist, very soft, fat.
Clayey Silt, gray, moist, very soft. Sa. 1, Fi. 99.



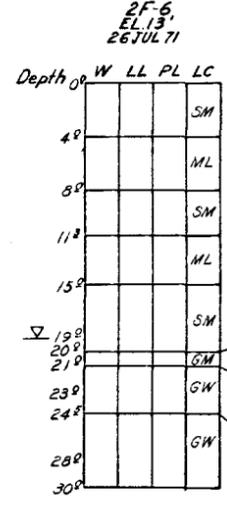
Gravelly Clay, (Fill), light brown, dry, hard.
Gravelly Clay, (Fill), light brown, damp, stiff to very stiff.
Silty Sandy Clay, (Fill), dark brown, damp, firm to stiff, some wood fragments.
Gravelly Clay, brown, damp, firm to stiff.
Clay, dark gray, damp, firm to stiff.
Gravelly Clayey Sand, dark gray & green, damp to moist, medium dense; some wood fragments.
Gravelly Sandy Clay, dark gray, (sand is green), moist to wet, fetid; some wood fragments.
Becomes wet & soft below 15'.
Sandy Gravelly Clay, dark gray, (sand is green), wet, very soft, fetid.
Sandy Clay, green, damp, stiff; some cobbles and boulders.
Sandy Gravelly Clay, dark gray, damp, stiff. (May be weathered sheared shale)



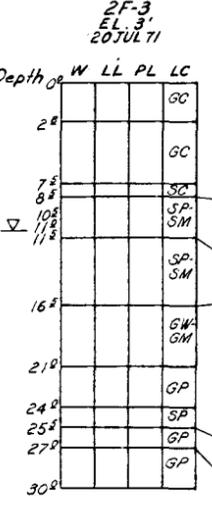
Gravelly Clay, (Fill), brown, damp, stiff.
Clayey Gravel, (Fill), brown, moist, stiff.
Gravel, (Fill), brown, damp, very dense; some boulders.
Clayey Gravel, (Fill), brown, wet, dense to very dense.
Small amount of dark sheared shale @ 15'.
Gravelly Clay, (Fill), brown-gray, moist, stiff; wood fragments.
Clay, tan, damp, very stiff, lean. Some boulders to 10" size @ 23'. $\gamma_d = 103$.
Gravelly Clay, tan, moist, stiff, lean.
Clay, (Sandy Shaly Gouge), dark gray, damp, stiff, lean; some pebbles. Gr. 32, Sa. 25, Fi. 43; G-2.75; $\gamma_d = 124$. Gr. 27, Sa. 43, Fi. 30; G-2.75.
Gravelly Sandy Clay (Sandy Shaly Gouge), dark gray, moist, stiff; some cobbles and boulders to 2.7'. Gr. 10, Sa. 46, Fi. 44; G-2.75; $\gamma_d = 128$. Gr. 13, Sa. 44, Fi. 43; G-2.76; $\gamma_d = 132$. Gr. 40, Sa. 42, Fi. 18; G-2.76; $\gamma_d = 131$. Gr. 22, Sa. 45, Fi. 33; G-2.77; $\gamma_d = 130$. Gr. 56, Sa. 31, Fi. 13; G-2.77. Gr. 24, Sa. 49, Fi. 27; G-2.75; $\gamma_d = 134$.
Gravelly Sandy Clay (Sandy Shaly Gouge), dark gray, damp, very stiff, some boulders.
Gravelly Sandy Clay, (Sandy Shaly Gouge), dark gray, damp to moist, very stiff to hard; occasional cobbles and boulders.
Gravelly Sandy Clay, (Sandy Shaly Gouge), dark gray, dry, hard, friable.
 $\gamma_d = 144$
Shale, dark gray to black, soft to moderately hard, sheared, gougey, some cobbles and occasional boulders of quartzite and siltstone.



Rock Fill, 2" to 8" size.
Clayey Sand (Fill), black, damp, loose, fine.
Trace of gravel @ 5'.
Clayey Sand, (Fill), brownish black, damp, loose, fine; some shell fragments.
Gravelly Clay, (Fill), light brown, damp to moist.
Clayey Gravel, (Fill), light brown, wet, loose.
Gravelly Clay, (Fill), light brown, wet, soft. Gr. 12, Sa. 31, Fi. 57; $\gamma_d = 119$.
Clay, gray with tan spots, damp, stiff to very stiff; scattered nodules, cobbles and occasional boulders. $\gamma_d = 117$.
Clay, dark gray, damp, stiff, fat; scattered nodules and cobbles, and occasional boulders.
Shale, sandy, gougey, dark gray to black, soft to very soft; scattered nodules and cobbles of very hard quartzite and siltstone. Gr. 17, Sa. 48, Fi. 35.
Shale, sandy, gougey, dark gray to black, soft to moderately hard; scattered nodules and cobbles; occasional boulders of very hard quartzite and siltstone. Gr. 18, Sa. 45, Fi. 37.
Sandstone and Shale; sandstone is gray, wet, hard; shale is black, wet, soft, sheared.
Sandstone, gray, hard, some veins of calcite.



Silty Sand, brown, damp, loose, fine.
Clayey Silt, gray with rust patches, damp, soft.
Clayey Silty Sand, brown, damp, very loose to loose, fine.
Silty Clay, gray, moist, very soft, sticky.
Clayey Silty Sand, gray, moist, very soft; scattered wood fragments.
Clayey Gravelly Sand, gray, wet, loose.
Sandy Gravel, red, wet, loose 1/2" to 1 1/2" size; cobbles to 6" max. Streak of coarse gravel @ 23'.
Sandy Gravel, gray, wet, loose, 1/2" to 2" size; occasional cobbles to 6" max.
Layer of Silty Clay (0.2') @ 28'. Gr. 39, Sa. 38, Fi. 3.



Clayey Gravel, (Fill), gray, cobbles and boulders (mainly 5" diam).
Silty Clayey Gravel, (Fill), brown & gray, moist; some cobbles.
Clayey Gravel, (Fill), brown, moist.
Gravelly Sand, gray, damp, fine, loose.
Same wood fragments @ 10'.
Sand, gray, wet, loose, fine; 40% wood fragments.
Sandy Gravel, gray, wet, loose; mainly 3/4" to 2" size.
Gravel, gray, white, green, black, wet, loose; 1" to 5" size.
Gravelly Sand, gray, wet, loose, generally 1" size.
Sandy Gravel, gray, wet, loose, pea gravel.
Sandy Gravel, gray, white, green, wet, loose, 1" to 4" size; some cobbles to 6" max. size.

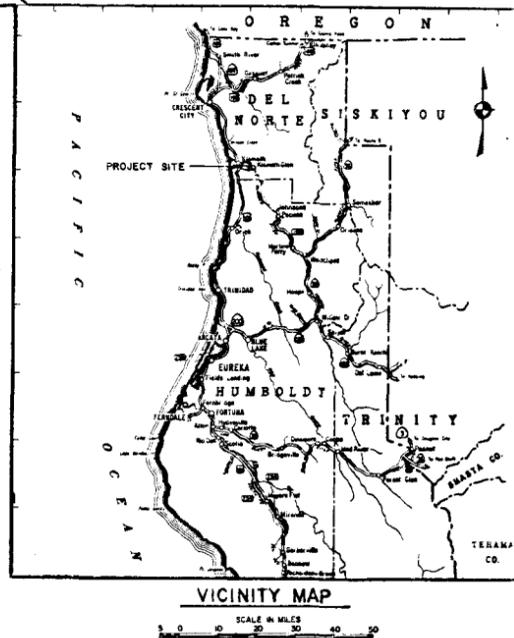
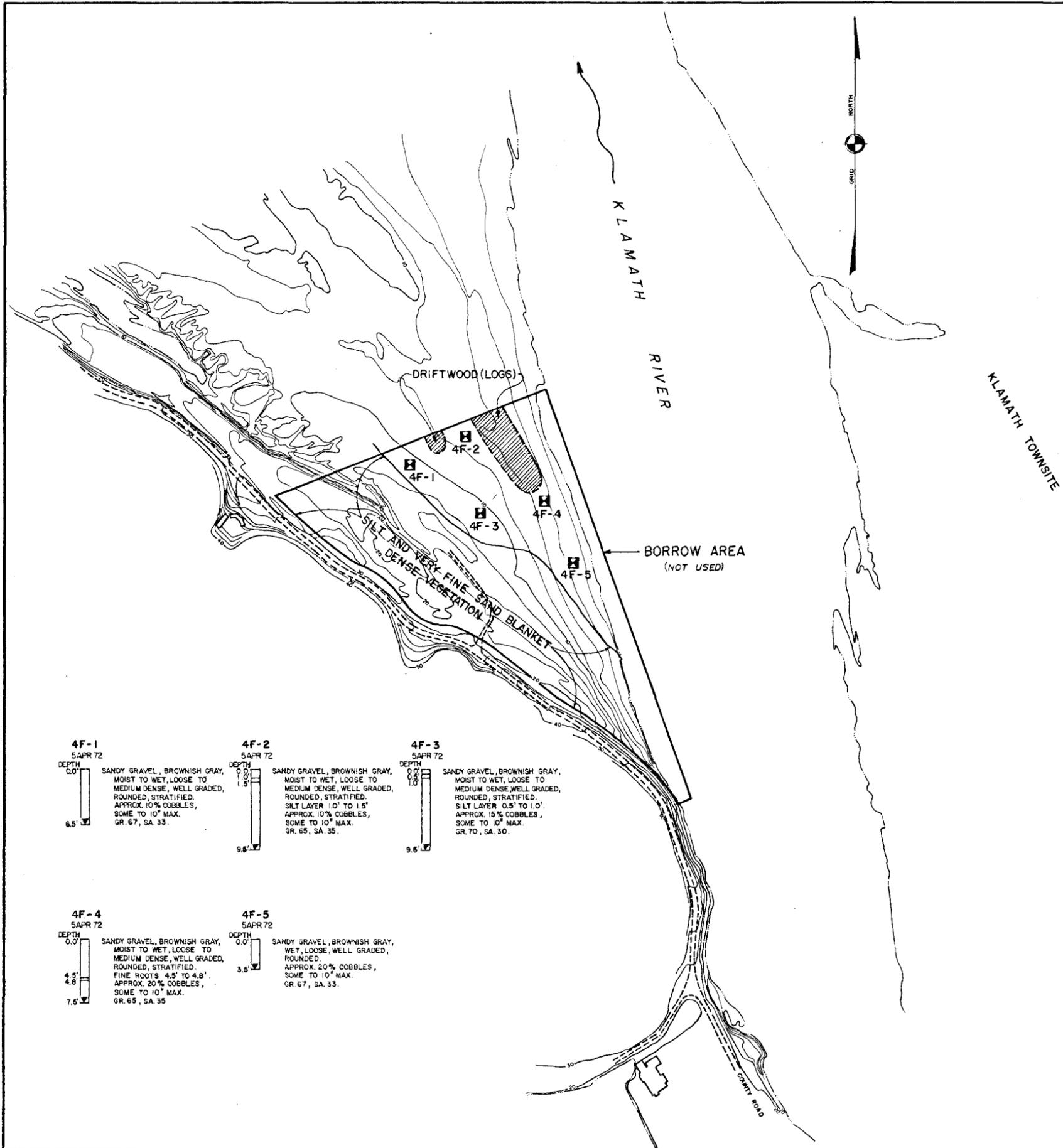
NOTE:
Exploration holes 2F-6 and 2F-3 are beyond the downstream limit of project.

- LEGEND**
- W = Moisture content (%)
 - LL = Liquid Limit (%)
 - PL = Plastic Limit (%)
 - LC = Laboratory classification
 - G = Specific Gravity
 - Gr. 10 = 10% gravel
 - Sa. 20 = 20% sand
 - Fi. 70 = 70% fines
 - Δ = Free water level at completion of hole.
 - = Undisturbed push tube sample.
 - (TF-) = Companion hole for undisturbed samples
 - γ_d = Dry weight, LB/CF.

- NOTES**
- Elevation indicates approximate ground surface of boring location. Elevations are based on the datum of Mean Sea Level.
 - Soil classifications are in accordance with Military Standard 619B, "Unified Soil Classification System" revised 12 June 1968.
 - Field visual classifications and descriptions as described by the inspector are shown to the right of the log.
 - Soil symbols shown on the LC column are based on laboratory visual classification with test data on selected samples.
 - Location of borings are shown on Sheets 2, 3 & 4.

AS CONSTRUCTED - NO CHANGES MADE	A.L.	13 JAN 71	J.S.
SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			
U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO CORPS OF ENGINEERS SAN FRANCISCO, CALIFORNIA			
DRAWN BY: LMF	DEL NORTE COUNTY	CALIFORNIA	
TRACED BY:	KLAMATH RIVER		
CHECKED BY: HD	BANK PROTECTION		
SUBMITTED BY: <i>[Signature]</i>	CAMP KLAMATH TO REQUA		
APPROVAL RECOMMENDED: <i>[Signature]</i>	LOGS OF BORINGS		
CHEF, FOUNDATION & EARTHWORK	APPROVED: <i>[Signature]</i>	DATE: 1972 MAY 17	
PREPARED UNDER THE DIRECTION OF			
JAMES L. LAMMIE			
COLONEL, CE, DISTRICT ENGINEER			
SCALE: AS SHOWN	DRAWING NUMBER	SHEET	7 59 40 3

K L A M A T H
R I V E R

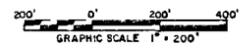
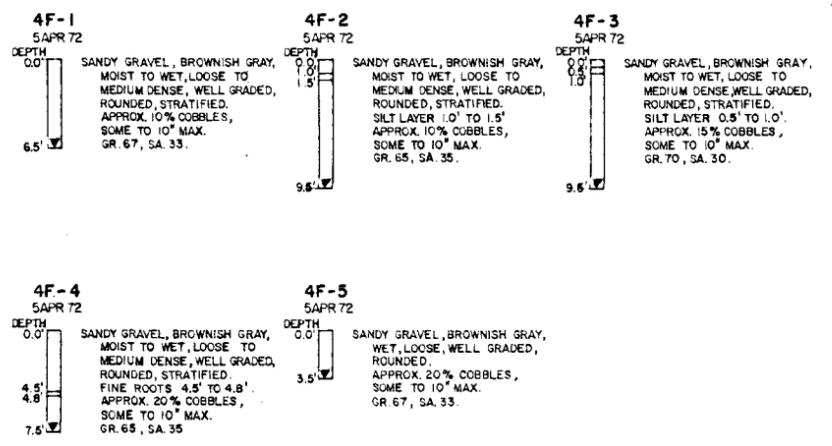


LEGEND

- BACKHOE TEST PIT.
- ▽ WATERLEVEL AT COMPLETION OF HOLE ON 5 APRIL 1972.
- GR. 67 = GRAVEL (%)
- SA. 33 = SAND (%)

NOTES

1. TOPOGRAPHY BASED ON AERIAL PHOTOS DATED 27 JULY 1965 (FROM STATE OF CALIFORNIA)
2. FIELD VISUAL CLASSIFICATIONS AND DESCRIPTIONS AS DESCRIBED BY THE INSPECTOR ARE SHOWN TO THE RIGHT OF THE LOG.
3. COBBLES IS PLUS 3" SIZE MATERIAL. GRAVEL IS MINUS 3" TO PLUS NO. 4 SIZE MATERIAL. SAND IS MINUS NO. 4 SIZE MATERIAL. INDICATED SANDY GRAVEL GRADATION DOES NOT INCLUDE COBBLE SIZES.



AS CONSTRUCTED - NO CHANGES MADE		ALL	13 JUN 72	MS
SYMBOL	DESCRIPTION	DATE	APPROVAL	
REVISIONS				
DRAWN BY: LMF		DEL NORTE COUNTY KLAMATH RIVER CALIFORNIA		
CHECKED BY: HD		BANK PROTECTION		
SUBMITTED BY: [Signature]		CAMP KLAMATH TO REQUA		
APPROVAL RECOMMENDED BY: [Signature]		BORROW AREA AND		
DATE: 1972 MAY 17		LOGS OF TEST PITS		
PREPARED UNDER THE DIRECTION OF COLONEL, CE, DISTRICT ENGINEER		SCALE: AS SHOWN	DRAWING NUMBER	
		8	59	40 3