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STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

In the matter of the Petition of: AMADOR REGIONAL SANITATION AUTHORITY FOR REVIEW OF ACTION BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, CENTRAL VALLEY, IN ISSUING CLEANUP AND ABATEMENT ORDER NO. R5-2017-0708	REQUEST FOR STAY AND PETITION FOR REVIEW OF ACTION BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, CENTRAL VALLEY, IN ISSUING CLEANUP AND ABATEMENT ORDER NO. R5-2017-0708 [Water Code §§ 13320(a) and 13321(a)]

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I.

INTRODUCTION

Amador Regional Sanitation Authority ("ARSA") respectfully seeks review by the State Water Resources Control Board ("State Board") of the California Regional Water Quality Control Board, Central Valley Region's ("Regional Board") issuance of Cleanup and Abatement Order R5-2017-0708 ("Order") on September 8, 2017. (Water Code, § 13320, subd. (a).) A copy of the Order is attached hereto as "**Exhibit A**."

In addition to State Board review of the Petition, ARSA seeks an immediate stay of the Order pursuant to Water Code section 13321, subdivision (a) and title 23, section 2053 of the California Code of Regulations, or, in the alternative, an expedited hearing regarding ARSA's request for a stay. The Declaration of Gary Ghio supporting ARSA's request for an immediate stay is filed with the Petition.

The legal and factual grounds for the Petition are set forth herein, in the accompanying Memorandum of Points and Authorities, and in the Declaration of Gary Ghio. This Petition presents three legal and factual grounds for rescinding the Order. First, the Order is factually unsupported. Second, ARSA does not threaten an illegal discharge. And third, ARSA does not threaten a condition of nuisance.

II.

BACKGROUND

ARSA is a joint powers agency which operates the Amador County Regional Outfall System ("System"). ARSA's System is regulated under Regional Board, Water Reclamation Requirements, Order No. 93-240 ("WRR"). The System accepts treated effluent from the City of Sutter Creek wastewater treatment plant and conveys it through a series of reservoirs, the last of which is Preston Reservoir. ARSA discharges effluent to a group of ranchers, to the city of Ione treatment plant, and to other permitted locations.

During the winter of 2016-2017, multiple atmospheric river storm systems struck California, bringing massive amounts of rainfall, and inundating lakes, rivers and streams, causing them to reach capacity and flood. The inundation of storm water during the winter of

2016-2017 exceeded the 100-year return frequency. (Dec. ¶ 7.) As an example, while the area generally receives 31 inches in annual precipitation, it received 57.82 inches this winter. (Dec. ¶ 7.) This unprecedented deluge severely strained the System. All told, more than 100 million gallons of stormwater entered the System during this time, which threatened to overtop Preston Reservoir.

With permission from the Department of Water Resources, Division of Safety of Dams, ARSA placed sandbags across the spillway at Preston Reservoir to raise the reservoir by 3 feet and transferred 92 acre feet of effluent to a reservoir at the California Department of Corrections and Rehabilitation property pursuant to a letter agreement dated March 29, 2017. In return for accepting ARSA's effluent, ARSA agreed to increase the amount of CDCR's permitted discharge into Preston Reservoir by an amount equal to the amount of effluent transferred to CDCR.

These measures prevented Preston Reservoir from overflowing, breaching, spilling, or otherwise discharging into surface waters or surface water drainage courses, despite a declared emergency due to the massive amounts of rain. By May 1, 2017, the freeboard levels as Preston Reservoir returned below the 2-foot mark. (Order, ¶ 17.)

Despite ARSA's appropriate response to emergency conditions caused by catastrophic rain event and not by any action or inaction of ARSA and despite ARSA's appropriate actions to prevent an illegal discharge, the Regional Board issued a formal enforcement action, directing ARSA to clean up and abate a threatened discharge and threatened nuisance.

Issuance of the Order is legally and factually erroneous and must be reversed. First the Order is not supported by facts and does not accurately describe any threatened violation. Second, the Order does not identify any threat of discharge. And third, the Order does not identify any threat of nuisance or pollution.

For these and the other reasons expressed in this Petition and accompanying documents, ARSA asks the State Board to issue a stay and grant its Petition to rescind the Order.

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III.

NAME AND ADDRESS OF PETITIONER

The names and contact information for ARSA are as follows:

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IV.

THE ACTION OR INACTION OF THE REGIONAL WATER BOARD BEING PETITIONED

ARSA seeks review of the Regional Board's actions in issuing a cleanup and abatement order, Order No. R5-2017-0708. In addition, ARSA seeks an immediate stay of the Order.

V.

DATE THE REGIONAL BOARD ACTED

The Regional Board issued the Order on September 8, 2017.

VI.

STATEMENT OF THE REASONS THE ACTION WAS IMPROPER

The Regional Board exceeded its legal authority, abused its discretion, and imposed improper procedural requirements on ARSA when issuing the Order. Specifically, the Regional Board took the following actions contrary to the law and facts:

1. The Regional Board exceeded its legal authority by issuing an Order that is not supported by the facts. First, the order alleges:

> "Because 70% of the total storage is already in use there will not be enough storage capacity available for the 2017/2018 wet season." (Order, ¶ 26.)

The WRRs, however, do not prohibit the System from using 70% of its total storage; and the water balance does not support a conclusion that use of 70% of total capacity means there will be insufficient capacity for the 2017/2018 wet season. To the contrary, the water balance shows that the System will function as designed in the upcoming season.

2. The Order alleges:

> "[T]he City of Ione … would not be accepting any additional flows from [ARSA] starting on 21 July 2017 … [and] ceased accepting [ARSA's] wastewater." (Order, ¶ 28-29.)

ARSA, however, has an enforceable contract with the city of Ione for the disposal of 650 acre feet per year. The WRRs authorize but do not require ARSA to dispose of effluent using the city of Ione's plant. Even if the city of Ione breaches its contract and refuses to accept ARSA's effluent, Ione's breach does not constitute a violation of ARSA's WRRs.

3. The Order alleges:

> In the two days between a meeting with the Regional Board on July 24, 2017 and an inspection on July 26, 2017, "24 acres on each ranch (48 acres total) for which [ARSA] holds the disposal easement for were not in use and were not being developed. No additional sprayfields had been added. No additional disposal … had been added." (Order, ¶¶ 30-32.)

ARSA, however, was not required by its WRR or any other order to develop additional methods of disposal in the two days that transpired between meeting with Regional Board staff on July 24 and the inspection on July 26. Further, even if the Regional Board had required ARSA to develop additional effluent disposal methods by July 24, 2017, two days' notice would have been unreasonable, arbitrary, and capricious. Finally, the Order appears to disregard or make light of ARSA's successful efforts to prevent a discharge and to secure additional disposal options. In the end, the hastily issued Order does not account for the disposal methods that ARSA has been in the process of developing as a result of its early efforts, including expansion of spray fields at Hoskins and Bowers Ranches. In effect, the presumptions by Board staff were incorrect and

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misstated. Further, the efforts and later demands required make assumptions that sprayfields can be developed at a moment's notice. This is absurd and ridiculous to even state.

4. The Regional Board staff exceeded its legal authority by issuing an Order that does not identify an urgent, immediate or even inevitable threat of discharge. To the contrary, ARSA has managed its System in the face of massive amounts of rainfall in a manner that prevented and continues to prevent unpermitted discharges. In fact, given a 100+ year storm, ARSA was able to manage the additional water. This included working diligently with CDCR to temporarily accept 92 acre feet and requesting and obtaining Department of Water Resources, Division of Safety of Dams' approval for placing sandbags across the spillway at Preston Reservoir while constantly updating and informing Regional Board staff of developments.

5. The Regional Board exceeded its legal authority by issuing an Order that does not identify a urgent, immediate or even inevitable threat of nuisance. Each action which the Order alleges threatens a nuisance, including use of 70% of total capacity, is expressly permitted and does not constitute or threaten a nuisance or condition of pollution.

VII.

HOW PETITIONER IS AGGRIEVED

ARSA is aggrieved by issuance of a formal enforcement action that is not supported by facts or the law. The Order may form the basis for escalated enforcement actions in the future, and requires ARSA to manage the System contrary to Water Code Section 13360, which prohibits the Regional Board from specifying the manner of compliance.

VIII.

ACTIONS PETITIONER REQUESTS THE STATE WATER BOARD TO TAKE

ARSA respectfully requests that the State Board find the Order improper and inappropriate pursuant to Water Code section 13320 and rescind the Order. ARSA also requests that the State Board grant an immediate stay of the Order pending its decision on the Petition.

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IX.

MEMORANDUM OF POINTS AND AUTHORITIES IN SUPPORT OF PETITION

A Memorandum of Points and Authorities is filed with this Petition and is incorporated herein by reference.

X.

STATEMENT OF COPIES FURNISHED

In accordance with the requirements of Title 23, section 2050(a)(8) of the California Code of Regulations, a copy of this Petition has been sent to the California Regional Water Quality Control Board, Central Valley Region.

XI.

STATEMENT OF ISSUES RAISED

The Regional Board delegated its enforcement authority to the Executive Officer pursuant to Resolution No. R5-2006-0023. ARSA staff met, discussed options and plans, provide Regional Board staff a tour of the System, participated in conference calls informing Board staff of plans. met with Regional Board staff prior to issuance of the Order; however, the Order was issued by the Executive Officer without any opportunity for ARSA to participate in its issuance.

XII.

CONCLUSION

For the reasons set forth in this Petition and in the related documents filed herewith, ARSA respectfully requests that the State Board find that the Order is improper and inappropriate, rescind the Order and take any other actions that the State Board deems necessary and appropriate to address ARSA's claims. Pending the State Board's decision on this Petition, ARSA respectfully requests that the State Board stay the Permit.

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Dated: October 9, 2017

BEST BEST & KRIEGER LLP

By: Rebecca Andrews

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I.

INTRODUCTION

Amador Regional Sanitation Authority ("ARSA") respectfully seeks review by the State Water Resources Control Board ("State Board") of the California Regional Water Quality Control Board, Central Valley Region's ("Regional Board") issuance of Cleanup and Abatement Order R5-2017-0708 ("Order") on September 8, 2017. This Request for Stay and Petition requests that the State Board immediately stay the Order, review the Regional Water Quality Control Board, Central Valley Region's ("Regional Board") issuance of the Order, and grant ARSA's Petition to rescind the Order on three (3) grounds: (1) the Order is factually unsupported; (2) ARSA does not threaten an illegal discharge; and (3) ARSA does not threaten a condition of nuisance.

II.

BACKGROUND

A. ARSA'S SYSTEM

ARSA is a joint powers authority which operates the Amador County Regional Outfall System ("System"). (Declaration of Gary Ghio ("Dec."), ¶ 2.) ARSA's System is regulated under Regional Board, Water Reclamation Requirements, Order No. 93-240 ("WRR"). The System accepts treated effluent from the City of Sutter Creek wastewater treatment plant and conveys it through a pipeline to Henderson Reservoir. Another pipeline conveys treated effluent from Henderson Reservoir to Preston Forebay, then to Preston Reservoir. Henderson Reservoir has a usable storage volume that varies from 0 acre-feet to approximately 393 acre feet with two feet of freeboard. (Order, ¶ 5; Dec. ¶ 4.) Preston Reservoir has a usable storage volume that varies from 0 acre feet to approximately 235 acre feet with two feet of freeboard. (Order, ¶ 5; Dec. ¶ 4.) Preston Forebay has a maximum capacity of approximately 30 acre feet with two feet of freeboard. (Order, ¶ 5.)

ARSA discharges effluent from the reservoirs to a group of ranches known as the Amador County Reclaimed Wastewater Users and to the Preston School of Industry in Ione as well as the Castle Oaks Golf Course, California Youth Authority, Preston School of Industry, and the City of

Ione reclamation plant. (WRR, Findings 2-6.) Two of the ranches accepting reclaimed wastewater are known as the Hoskins and Bowers Ranches. (Dec., ¶ 13.)

In accordance with the WRR, the System's treatment facilities are "designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency." (Order, ¶ E.2; Dec. ¶ 6.) The WRR also prohibits the discharge of wastes to surface waters or surface water drainage courses and the bypass or overflow of untreated or partially treated waste. (WRR, C.1, C.2.) The WRR does not contain a requirement relating to minimum pool amounts at the end of each dry season. Instead, the WRR requires a 2.0-foot freeboard at all treatment and storage ponds unless an operation plan shows why a 2.0 foot freeboard is not needed to prevent overtopping of the berms. (WRR, D.6.)

B. STORM EVENT

During the winter of 2016-2017, multiple "atmospheric river storm systems struck California, bringing massive amounts of rainfall." (State of California, Executive Department, Proclamation of a State of Emergency, Feb. 12, 2017.) The rainfall inundated lakes, rivers and streams, causing them to reach capacity and flood. (*Ibid*.) More than 100 million gallons of stormwater entered the System between October 1, 2016 and July 1, 2017. (Order, ¶ 14.) The inundation of storm water during the winter of 2016-2017 exceeded the 100-year return frequency. (Dec. ¶ 7.) As an example, while the area generally receives 31 inches in annual precipitation, it received 57.82 inches this winter. (Dec. ¶ 7.)

During these heavy storm events, ARSA actively monitored the freeboard levels in the System and remained in communications with the Regional Board regarding the decreasing freeboard levels at Preston Reservoir. (Order, ¶ 15.) ARSA informed the Regional Board of the risk of Preston Reservoir overtopping and spilling. (Dec. ¶ 8.) If Preston Reservoir overtopped and spilled, ARSA would have been unable to control the discharge, and the water may have reached a water of the United States. (Dec. ¶ 8.)

Preston Reservoir has an emergency release valve that releases water into an existing spray field located on the California Department of Corrections and Rehabilitation property ("CDCR") property. (Dec. ¶ 9.) ARSA staff informed the Regional Board that, if overtopping was

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inevitable, it would open the emergency release valve and facilitate a controlled release into the spray fields rather than allow Preston Reservoir to spill into a water of the United States. (Dec. ¶9.) Regional Board staff urged ARSA to investigate options for disposing of effluent that would not violate the discharge prohibitions of the WRR. (Order, ¶ 15.)

With permission from the Department of Water Resources, Division of Safety of Dams, ARSA placed sandbags across the spillway at Preston Reservoir to raise the reservoir by 3 feet and transferred 92 acre feet of effluent to a reservoir at the California Department of Corrections and Rehabilitation property pursuant to a letter agreement dated March 29, 2017. (Order, ¶ 16; Dec. ¶¶ 10-11.) In return for accepting ARSA's effluent, ARSA agreed to increase the amount of CDCR's permitted discharge into Preston Reservoir by an amount equal to the amount of effluent transferred to CDCR. (Dec. ¶ 11.)

These measures prevented Preston Reservoir from overflowing, breaching, spilling, or otherwise discharging into surface waters or surface water drainage courses, despite a declared emergency due to the massive amounts of rain. (Dec., ¶ 12.) By May 1, 2017, the freeboard levels as Preston Reservoir returned below the 2-foot mark. (Order, ¶ 17.)

C. ALLEGATIONS AND REQUIREMENTS IN ORDER

The Order includes 21 paragraphs under a heading entitled, "Violations of the WRRS." (Order, ¶¶ 20-40.) No paragraph in the Order contains any facts demonstrating a violation of Discharge Prohibition C.1 of the WRRs, which prohibits discharge of wastes to surface waters or surface water drainage courses. (Order, ¶ 20.) No paragraph contains any facts demonstrating a violation of Discharge Prohibition C.2 of the WRRs, which prohibits the by-pass of overflow of untreated or partially treated waste. (Order, ¶ 21.) Similarly, no paragraph contains any facts demonstrating a violation of Discharge Prohibition D.1 of the WRRs, which prohibits the "treatment and discharge from causing a nuisance or condition of pollution[.]" (Order, ¶ 22.) In the end, despite listing three separate Discharge Prohibition Violations, the Order does not contain any facts identifying an actual discharge in violation of the WRRs.

Instead, the Order describes how ARSA's System encroached on the freeboard requirements after the massive storm events. (Order, ¶¶ 23-25.) The freeboard encroachment,

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however, took place in conjunction with ARSA adding sandbags to create three additional feet of freeboard – thereby preventing a discharge violation in spite of storm water inundation that exceeded the 100-year return event. (*Ibid.*; see also Dec., ¶¶ 6-7, 12.)

The Order further alleges that ARSA violated the WRRs by threatening "to cause or permit waste to be discharged or deposited where it is or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance" based on the following allegations (Order, ¶ 33):

(1) "Because 70% of the total storage is already in use there will not be enough storage capacity available for the 2017/2018 wet season." (Order, ¶ 26.)

(2) "[T]he City of Ione … would not be accepting any additional flows from [ARSA] starting on 21 July 2017 … [and] ceased accepting [ARSA's] wastewater." (Order, ¶ 28-29.)

(3) In the two days between a meeting with the Regional Board on July 24, 2017 and an inspection on July 26, 2017, "24 acres on each ranch (48 acres total) for which [ARSA] holds the disposal easement for were not in use and were not being developed. No additional sprayfields had been added. No additional disposal … had been added." (Order, ¶¶ 30-32.)[1]

Based on these allegations, the Order requires ARSA to take the following measures:

(1) submit weekly email reports of the daily effluent flows from the Sutter Creek WWTP, the freeboard levels and total wastewater volume in Henderson and Preston Reservoirs, and Preston Forebay; the volume of applied wastewater and acres irrigated for every land application area used during the week; and all previously reported data for the above parameters (Order, Measure 1);

(2) develop and submit a plan to eliminate the threat of violation of Discharge Prohibitions C.1 and C.2 (Order, Measure 2); and

[1] The Order also alleges that water sent from Preston Reservoir to the City of Ione Water Reclamation Plant was "black, septic and contains hydrogen sulfide due to the anaerobic conditions." (Order, ¶ 19.) However, this allegation is contradicted by correspondence from Regional Board staff. (Dec., ¶ 16.)

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(3) submit a report certifying that: (1) all wastewater stored at CDCR's reservoir has been returned to Preston Reservoir; and (2) the combined volume of wastewater stored in Henderson and Preston Reservoirs and Preston Forebay is at or below 25 acre feet (Order, Measure 3).

In addition to these measures, ARSA is voluntarily expanding sprayfields at Hoskins and Bowers ranches to facilitate increased permitted discharges of treated effluent and has conducted a water balance that demonstrates the System's performance as the winter season approaches. (Dec., ¶¶ 13-14.)

III.

ARGUMENT

The Regional Board's issuance of the Order is improper pursuant to Water Code sections 13304 and 13320. The Order relies on findings that are not supported by evidence and describes circumstances that are not violations of the WRRs and do not constitute a threat of discharge or threat of nuisance or pollution under the Water Code or Civil Code. The freeboard encroachment described in the Order was the result of rainfall that exceeded the System's design capacity and was a measure that protected the public and environment from an unpermitted discharge. For these reasons, this Board should grant ARSA's petition and rescind the Order.

A. LEGAL STANDARDS

The Regional Board issued the Order pursuant to Water Code section 13304. Section 13304 authorizes issuance of a cleanup and abatement order, in part, to a person who actually discharges waste into the waters of this state in violation of any waste discharge requirement or other order, to a person who threatens to cause or permit a discharge of waste into the waters of the state, and to a person who "creates, or threatens to create, a condition of pollution or nuisance." (Water Code, § 13304, subd. (a).) The Order is not based on an actual discharge violation. The Order is based on an alleged (a) *threatened* discharge, and (2) *threatened* nuisance. (Order, ¶ 33.)

For purposes of Section 13304, "threaten" means "a condition creating a substantial probability of harm, when the probability and potential extent of harm make it reasonably

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necessary to take immediate action to prevent, reduce, or mitigate damages to persons, property, or natural resources." (Water Code, § 13304, subd. (e).) Inherent in the concept and definition of "threaten" is urgency, immediacy and even inevitability of the alleged harm. (Water Code, § 13304, subd. (e); *Santa Teresa Citizen Action Group v. City of San Jose* (2003) 114 Cal.App.4th 689, 708 [nuisance claim unripe absent "urgency and definiteness"].) Without these elements, there is no "threat," no nuisance, and no grounds for taking an enforcement action.

Further, nothing that is done or maintained under the express authority of a statute can be deemed a nuisance. (Civ. Code, § 3482.) In adopting Water Code section 13304, the Legislature "did not intend to depart from the law of nuisance, but also explicitly relied on it in the Porter-Cologne Act." (*City of Modesto Redevelopment Agency v. Superior Court* (2004) 119 Cal.App.4th 28, 38.) Thus, Section 13304 must "be read in light of the common law principles of nuisance." (*Santa Clara Valley Water Dist. v. Olin Corp*. (N.D. Cal. 2009) 655 F.Supp.2d 1048, 1064.)

The State Board determines whether an action or inaction of the Regional Board was inappropriate or improper pursuant to Water Code section 13320. The Regional Board's issuance of the Order was improper because it is not supported by the evidence and ARSA's system does not present a substantial probability of an unpermitted discharge or nuisance.

B. THE ORDER IS NOT SUPPORTED BY FACTS AND DOES NOT ACCURATELY DESCRIBE ANY THREATENED VIOLATION

The allegations in the Order are not supported by evidence. First, the WRRs do not prohibit the System from using 70% of its total storage; and the water balance does not support a conclusion that use of 70% of total capacity means there will be insufficient capacity for the 2017/2018 wet season. (See Order, ¶ 26.) To the contrary, the water balance shows that the System will function as designed in the upcoming season. (Dec., ¶ 14.)

Second, ARSA has an enforceable contract with the city of Ione for the disposal of 650 acre feet per year. (Dec., ¶ 5.) The WRRs authorize but do not require ARSA to dispose of effluent using the city of Ione's plant. (See WRR, ¶¶ 6-8.) Even if the city of Ione breaches its

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contract and refuses to accept ARSA's effluent, Ione's breach does not constitute a violation of ARSA's WRRs.

Third, ARSA was not required by its WRR or any other order to develop additional methods of disposal in the two days that transpired between meeting with Regional Board staff on July 24 and the inspection on July 26. Further, even if the Regional Board had required ARSA to develop additional effluent disposal methods by July 24, 2017, two days' notice would have been unreasonable, arbitrary, and capricious. Finally, the Order appears to disregard or make light of ARSA's successful efforts to prevent a discharge and to secure additional disposal options. In the end, the hastily issued Order does not account for the disposal methods that ARSA is developing as a result of its early efforts, including expansion of sprayfields at Hoskins and Bowers ranches. (Dec., ¶ 13.)

The Order is thus based on factually inaccurate findings and is improper.

C. ARSA DOES NOT THREATEN AN ILLEGAL DISCHARGE

The Order does not identify a threat of discharge. ARSA's System does not present a substantial probability of harm that makes it reasonably necessary to take immediate action to prevent, reduce, or mitigate damages to persons, property, or natural resources. To the contrary, ARSA has managed its System in the face of massive amounts of rainfall in a manner that prevented and continues to prevent unpermitted discharges.

During the winter of 2017, ARSA operated the System to prevent it from spilling or overtopping in the face of rain events that exceeded the 100-year return event and System's design capacity. The Order contains no allegations that ARSA's failure to maintain the System or any other violation of the WRRs resulted in an encroachment of the freeboard. Instead, the massive amount of rain, and no action or inaction by ARSA, resulted in Preston Reservoir holding more water than usual and encroaching on the freeboard. (Order, ¶ 12 ["Heavy rains during the 2016/17 wet season reduced the freeboard"].)

Use of 70% of total storage is not a violation of the WRRs, and the System's water balance demonstrates that the System is functioning and will continue function as designed and permitted, presenting no immediate threat of harm from a discharge. (Cf. Order, ¶ 26, with Dec.,

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¶ 14.) Without presenting imminent and inevitable harm, there is no "threat" under Water Code section 13304. (Water Code, § 13304, subd. (e).) Further, although ARSA is not required by its WRR or any other order to develop additional methods of disposal, ARSA has voluntarily expanded sprayfields at Hoskins and Bowers ranches to facilitate increased permitted discharges of treated effluent. (Dec., ¶ 13.)

It is inappropriate and improper for the Regional Board to issue a cleanup and abatement order to ARSA in light of ARSA's prevention of an unpermitted discharge during massive rain events. Not only did ARSA's actions prevent an unpermitted discharge, and therefore protect the public health and the environment, ARSA's actions to increase the freeboard and develop additional disposal methods since the rain events demonstrate continued compliance with the design, operation and maintenance requirements in the WRR. Far from being a threat of a discharge, WRR's actions have been directed entirely at preventing an unpermitted discharge.

D. ARSA DOES NOT THREATEN A CONDITION OF NUISANCE

The Order does not identify a threat of nuisance or pollution. (Civ. Code, § 3482.) ARSA operates its System under the express authority of the WRRs. The only alleged violation of the WRRs that may be associated with a threatened nuisance is the freeboard encroachment. (Order, ¶¶ 23-25.) As noted above, massive amounts of rain and no improper action or inaction by ARSA caused the freeboard encroachment. (See Order ¶12.) Rather than threaten a nuisance, the freeboard encroachment actually prevented an unpermitted discharge and prevented a condition of pollution or nuisance. (Dec. ¶ 12.) Since May 1, 2017, Moreover, this encroachment was expressly authorized by the Division of the Safety of Dams under its statutory authority to impose emergency remedial measures. (See Water Code, §§ 6110, 6111.) As such, it cannot be the basis for a violation or determination of threatened nuisance.

ARSA has remedied the freeboard encroachment, developed additional disposal means, and operates its System in accordance with the requirements of the WRR. (Order, ¶ 25; Dec., ¶ 14.) Each of these actions, including use of 70% of total capacity, are expressly permitted and do not constitute or threaten a nuisance or condition of pollution. (Civ. Code, § 3482; *Modesto, supra*, 119 Cal.App.4th at 38; *Santa Clara Valley Water Dist., supra*, 655 F.Supp.2d at 1064.)

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The Regional Board improperly issued the Order on the basis of a threatened nuisance. The allegations and facts do not support any urgency, immediacy and even inevitability of discharge, pollution or nuisance. For this reason, the Order should be rescinded.

IV.
THE ORDER SHOULD BE STAYED PENDING RESOLUTION OF THE PETITION

The State Board may issue a stay, in whole or in part, of an action taken by a Regional Board. (Water Code, § 13321, subd. (a).) A stay may be granted if the petitioner alleges facts and produces proof of the following: (1) substantial harm to petitioner or to the public interest if a stay is not granted; (2) a lack of substantial harm to other interested persons and to the public interest if a stay is granted; and (3) substantial questions of fact or law regarding the disputed action. (23 Cal. Code Regs., § 2053, subd. (a)(1) through (3).) A petition for stay must be supported by a declaration under penalty of perjury of a person or persons having knowledge of the facts alleged. (23 Cal. Code Regs. § 2053, subd. (a)(3).)

For the reasons expressed in the Declaration of Gary Ghio, in this Memorandum of Points and Authorities and in the Petition, the State Board should grant a stay of the Permit pending a decision on the Petition.

A. THERE WILL BE SUBSTANTIAL HARM TO ARSA AND THE PUBLIC INTEREST IF A STAY IS NOT GRANTED

ARSA and the public interest will be substantially harmed if a stay is not granted. First, as noted above, the Order is based on factually and legally flawed grounds. If the Order is not rescinded, it will provide grounds to escalate any future enforcement action. (See, State Water Resources Control Board, Water Quality Enforcement Order, VI.A, Step 4, Violator's Conduct Factors.) It is inappropriate to leave the Order in place when it is based on factually and legally flawed grounds and may penalize ARSA in the future based on an unsupported Order.

Second, the Order violates Water Code section 13360, subdivision (a), which prohibits the Regional Board from specifying the particular manner in which compliance with any order may be had. (Water Code, § 13360, subd. (a).) Contrary to Section 13360, the Order requires ARSA, by November 1, 2017, to accept "all wastewater that was pumped to CDCR's reservoir"

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and to reduce the "combined volume of wastewater stored in Henderson Reservoir, Preston Forebay, and Preston Reservoir … [to] at or below 25 acre feet." (Order, Measure 3.) The agreement between CDCR and ARSA does not require ARSA to accept all wastewater back by November 1, 2017. (Dec., ¶ 11.) It is improper for the Regional Board to interfere in an agreement between ARSA and CDCR by way of the Order.

Likewise, it is improper for the Regional Board to dictate ARSA's manner of complying with the WRR by requiring ARSA to reduce the total capacity in use below 25 acre feet by November 1, 2017. (Order, Measure 3; Water Code, § 13360.) The WRRs do not require such a reduction in pooled wastewater. ARSA's System does not, and likely cannot, reduce its total pooled wastewater to below 25 acre feet in advance of the wet season. (Dec., ¶ 15.) ARSA's System does not need to reduce pooled wastewater to below 25 acre feet in order to meet the requirements of the WRR. (Dec., ¶ 14.) It is improper for the Regional Board to require ARSA to reduce pooled wastewater to levels not required by the WRRs and not indicated by any facts to be necessary to comply with the WRRs.

The Order is not in the public interest, is based on factually and legally flawed grounds, and harms ARSA by interfering with an agreement between CDCR and ARSA and dictating ARSA's manner of complying with the WRRs. The Order should be stayed pending resolution of this Petition.

B. NO HARM TO OTHER INTERESTED PERSONS AND TO THE PUBLIC INTEREST WILL OCCUR IF A STAY IS GRANTED

If a stay is granted, ARSA will continue to operate the System pursuant to the requirements of the WRR. The freeboard encroachment was remedied before the Order was issued and has not recurred. (Order, ¶ 17.) Any threat of discharge associated with the freeboard encroachment has been remedied and ongoing compliance with the WRRs will protect interested persons and the public interest during the pendency of the stay. (Dec. ¶¶ 12, 14.)

C. THERE ARE SUBSTANTIAL QUESTIONS OF FACT AND LAW REGARDING THE PERMIT

The Order raised substantial questions of fact and law regarding appropriateness of the Order in light of the lack of any actual discharge and any threatened discharge or nuisance.

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A stay should be granted because ARSA has met the requirements for obtaining a stay. (23 Cal. Code Regs. § 2053, subd. (a)(1)-(3).)

V.

CONCLUSION

For the reasons expressed in the Petition and this Memorandum of Points and Authorities, the ARSA's Petition should be granted.

Dated: October 9, 2017

BEST BEST & KRIEGER LLP

By: Rebecca Andrews

HARRIET STEINER
JOSHUA NELSON
REBECCA J. ANDREWS
BEST BEST & KRIEGER LLP
Attorneys for Petitioners
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STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

In the matter of the Petition of: AMADOR REGIONAL SANITATION AUTHORITY FOR REVIEW OF ACTION BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, CENTRAL VALLEY, IN ISSUING CLEANUP AND ABATEMENT ORDER NO. R5-2017-0708	DECLARATION OF GARY GHIO IN SUPPORT OF REQUEST FOR STAY AND PETITION FOR REVIEW OF ACTION BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, CENTRAL VALLEY, IN ISSUING CLEANUP AND ABATEMENT ORDER NO. R5-2017-0708 [Water Code §§ 13320(a) and 13321(a)]

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Attorneys for Petitioner:
Amador Regional Sanitation Authority

DECLARATION OF GARY GHIO

I, Gary Ghio, declare as follows:

1. I am currently and have been at all relevant times the Engineer for the Amador Regional Sanitation Authority ("ARSA"). I am a licensed engineer with experience in managing wastewater disposal systems. As the Engineer, I am responsible for working with ARSA staff to manage and operate its wastewater disposal system.

2. ARSA is a is a joint power agency formed between the County of Amador and the cities of Sutter Creek and Amador City which operates the Amador County Regional Outfall System ("System").

3. In my role as Engineer, I have responsibility for overseeing ARSA's compliance with Central Valley Regional Water Quality Control Board Order No, 93-240 ("WRRs").

4. The System accepts treated effluent from the City of Sutter Creek wastewater treatment plant and conveys it through a pipeline to Henderson Reservoir. Another pipeline conveys treated effluent from Henderson Reservoir to Preston Forebay, then to Preston Reservoir. Henderson Reservoir has a usable storage volume that varies from 0 acre-feet to approximately 393 acre feet with two feet of freeboard. Preston Reservoir has a usable storage volume that varies from 0 acre feet to approximately 235 acre feet with two feet of freeboard. Preston Forebay has a maximum capacity of approximately 30 acre feet with two feet of freeboard.

5. ARSA has a contract with the city of Ione for the disposal of 650 acre feet per year. Attached to this Declaration as **Exhibit A** is a true and correct copy of the agreement between ARSA and the city of Ione.

6. The System is designed to prevent inundation or washout due to floods with a 100-year return frequency. Attached to this Declaration as **Exhibit B** is a true and correct copy of the System's As-Builts.

7. According to DWR Fiddletown Station, rainfall during the winter of 2016-2017 exceeded the 100-year return storm event. Moreover, these records underestimated the actual rainfall experienced as Fiddletown is located at a higher elevation. ARSA normally uses CIMIS data out of Plymouth for its actual rainfall data but that data was compromised last winter most

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likely due to the heavy rains. Actual measurements from the Sutter Creek wastewater treatment plant indicated much higher rainfall amounts. As an example, while the area generally receives 31 inches in annual precipitation, it received 57.82 inches this winter. Attached to this Declaration as **Exhibit C** are true and correct copies of the rainfall records.

8. During the storm events of 2016-2017, ARSA informed the Regional Board of the risk of Preston Reservoir overtopping and spilling. If Preston Reservoir overtopped and spilled, ARSA would have been unable to control the discharge, and the water may have reached a water of the United States.

9. Preston Reservoir has an emergency release valve that releases water into an existing spray field located on the California Department of Corrections and Rehabilitation property ("CDCR") property. ARSA staff informed the Regional Board that, in the event overtopping was inevitable, it would open the emergency release valve and facilitate a controlled release into the spray fields rather than allow Preston Reservoir to spill into a water of the United States.

10. The Department of Water Resources, Division of Safety of Dams authorized ARSA to place sandbags across the spillway at Preston Reservoir to raise the reservoir by 3 feet.

11. Pursuant to a letter agreement dated March 29, 2017 (that initially contemplated 75 acre feet but was expanded by the parties), ARSA transferred 92 acre feet of effluent to a reservoir at the California Department of Corrections and Rehabilitation property. Attached to this Declaration as **Exhibit D** is a true and correct copy of the March 29, 2017 letter. In return for accepting ARSA's effluent, ARSA agreed to increase the amount of CDCR's permitted discharge into Preston Reservoir in 2017 by an amount equal to the amount of effluent transferred to CDCR.

12. These measures prevented Preston Reservoir from overflowing, breaching, spilling, or otherwise discharging into surface waters or surface water drainage courses

13. ARSA is in the process of expanding the existing spray fields at the Bowers' and Hoskins' ranches to enable the discharge of an additional 60 acre-feet of water during the months of September and October 2017.

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14. ARSA has calculated the amount of inflow and discharge volumes ahead of the 2017-2018 winter season and does not believe it will overtop its reservoirs in the upcoming season. This belief is based on the assumption that the area will not experience rainfall approaching a 100-year storm season. Attached to this Declaration as **Exhibit E** is a true and correct copy of ARSA's projected volumes going into the winter months. Also attached as **Exhibit F** is a true and correct copy of the water balance for the System.

15. ARSA's System does not routinely, and likely cannot, reduce its total pooled wastewater to below 25 acre feet in advance of the upcoming wet season.

16. Attached as **Exhibit G** is a true and correct copy of email correspondence from Regional Board staff regarding discharge of effluent from Preston Reservoir to the city of Ione.

I declare under penalty of perjury under the laws of the state of California that the foregoing is true and correct.

Executed this 9TH day of October, 2017, at SAN ANDREAS, California.

GARY GHIO

LAW OFFICES OF
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EXHIBIT A

1/2023

AGREEMENT TO REGULATE USE OF HENDERSON/PRESTON WASTEWATER DISPOSAL SYSTEM

This agreement is made this 18th day of September 2007, by and between the California Department of Corrections and Rehabilitation, a California State Agency ("CDCR"), the City of Ione, a municipality formed pursuant to the laws of the State of California ("Ione"), and the Amador Regional Sanitation Authority, a joint powers agency formed pursuant to the laws of the State of California ("ARSA") (collectively, CDCR, Ione, and ARSA, shall be referred to as the "Parties"). The Parties hereby agree as follows:

WHEREAS, as settlement of past litigation, Ione and ARSA entered into an agreement and grant of easement entitled "Preston Farmlands Wastewater Disposal Contract and Grant of Easement" dated July 30, 1990 ("1990 Settlement Agreement"); and,

WHEREAS, the 1990 Settlement Agreement has been amended or assigned by the parties to the 1990 Settlement Agreement; and,

WHEREAS, this agreement will reallocate and govern the wastewater disposal rights and obligations among the Parties, but will not alter the 1990 Settlement Agreement, any and all amendments thereto, and any agreements implementing the 1990 Settlement Agreement, as those agreements govern the relationship and obligations between Ione or ARSA and any developer of the Preston Farmlands, as referred to in the agreements and amendments, and their successors and assigns and except as those agreements govern the relationship and obligations between Ione or ARSA and the present and future owners, operators, and lessees of the Castle Oaks Golf Course and their successors and assigns; and,

WHEREAS, pursuant to the 1990 Settlement Agreement, as amended, Ione was required to pay ARSA an annual payment (currently $20,000.00), which payment Ione in turn imposed on Castle Oaks Golf Course. The Parties intend to eliminate such fee for Ione and for Castle Oaks Golf Course by not including it herein as part of this agreement; and,

WHEREAS, this agreement does not extend to, or otherwise affect, Portlock International, Ltd.'s obligation to pay for operation of the Ione Tertiary Plant, which obligation ends December 31, 2013 and is governed by other agreements; and,

WHEREAS, CDCR owns a series of pipelines and reservoirs, including Henderson Reservoir, Preston Forebay and Preston Reservoir, each of which is interconnected so as to allow the transport of water and or wastewater from a point of diversion along Sutter Creek to the Preston Reservoir, in Ione, California ("Henderson/Preston System") (described in Exhibit 1); and,

WHEREAS, CDCR and ARSA have in place a lease agreement whereby ARSA has the right to use the Henderson/Preston System, subject to the terms and conditions contained therein, which lease expires in July 2008 ("ARSA/CDCR Lease"); currently ARSA uses the Henderson/Preston System to transport ARSA's secondary-treated wastewater to Preston Reservoir and then to Ione for treatment, disposal and use; and,

WHEREAS, ARSA and CDCR intend to execute a new lease or extend the existing ARSA/CDCR lease governing the use of the Henderson/Preston System. The new or extended lease will be for thirty (30) years. With regard to the lower system (as hereinafter described), the lease will contain a five (5) year cancellation clause that can be invoked by either party, subject to ARSA's continuing obligations to supply secondary treated wastewater to the CDCR's Preston Youth Correctional Facility and to maintain CDCR's water right from Sutter Creek, which obligations shall remain in effect unaffected by any such cancellation as will their rights to usage to the extent necessary to carry out those obligations; and,

WHEREAS, this agreement will govern the relationship and respective rights between the Parties with regard to the Henderson/Preston System; and,

WHEREAS, the upper Henderson/Preston System as referred to in this agreement includes the parts of the Henderson/Preston System from the outfall of the Sutter Creek Treatment Plant to Preston Youth Correctional Facility, including all pipelines, rights of way, reservoirs, water rights, etc; and,

WHEREAS, the lower Henderson/Preston System as referred to in this agreement includes the components of the Henderson/Preston System from below Preston Forebay to the outfall of the pipeline where it enters Castle Oaks property, including Preston Reservoir; and,

WHEREAS, ARSA will continue to deliver effluent to the Ione tertiary plant subject to the five-year termination clause provided herein in sections 8a and 8b; and,

WHEREAS, CDCR operates Mule Creek State Prison ("MCSP") and the Preston Youth Correctional Facility, both located within Ione City limits, and which two facilities along with the California Department of Forestry utilize the wastewater treatment plant at MCSP for their wastewater disposal; and,

WHEREAS, Ione operates two wastewater treatment plants, a portion of one treatment plant is located within the boundaries of Ione providing secondary level treatment of wastewater, and the other located in Amador County providing tertiary treatment of wastewater; and,

WHEREAS, each of the Parties' wastewater disposal systems are interrelated and interconnected; and,

WHEREAS, all of the Parties wish to work together to achieve a solution that addresses their respective wastewater needs; and,

WHEREAS, a water balance study was conducted by Lee and Ro, Inc. and completed on April 11, 2007 to determine the amount, if any, of surplus disposal capacity that currently exists in the Henderson/Preston System; and

WHEREAS, the water balance study resulted in an estimated surplus capacity that is allocated pursuant to this agreement.

IT IS AGREED by and among the parties hereto as follows:

1. Pursuant to the water balance and on the effective date of this agreement, the surplus capacity described above is allocated and each party's total allowable discharge to Preston Reservoir is as follows:

	Total Allowable Discharge to Henderson/Preston System
ARSA	650 acre-feet (af)
CDCR	350 af (counted against ARSA's 650 af disposal amount)
Ione	150 af (this amount is essentially a negative capacity amount to the extent that it relieves Ione of the obligation to take this amount from the other Parties)

2. Ione shall be obligated annually to accept from ARSA/CDCR a combined total of 650 af of secondarily treated wastewater for disposal. The method and location of disposal shall be the concern and obligation of Ione.

3. CDCR may dispose of up to 350 af (increased from its current allowance of 130 af) of treated wastewater into Preston Reservoir annually. CDCR's 350 af allowance shall be counted against ARSA's 650 af disposal right.

4. The effluent discharged to Preston Reservoir must be in compliance with the Waste Discharge Requirements established by the Regional Water Quality Control Board for the discharging party, and shall not contain constituents that cause the Ione tertiary plant to violate its Waste Discharge Requirements. Each party agrees to share all non-privileged wastewater effluent quality data with the other parties including monthly, quarterly, and annual reports submitted to the Central Valley Regional Water Quality Control Board. This information shall be furnished in a timely fashion to permit the City of Ione tertiary plant staff to evaluate potential impacts to operation of the plant. If requested, data shall be transmitted by facsimile or email. Such requests shall include all public information and shall not be limited to monitoring data that the party is required to provide pursuant to its Waste Discharge Requirements.

5. Unless otherwise agreed upon by the parties, discharges from Preston Reservoir to Ione, on a monthly basis, shall be as follows:

a. October 1 through March 31st: discharges shall be limited to 10 af per month;

b. April 1 through September 31st: discharges shall be limited to 95 af per month; and

c. The above limitations may be waived by agreement of the parties in the event of an emergency and where necessary for the prevention of environmental damage or civil liabilities attendant to wastewater violations, and in such event and prior to any deviation from these limits the parties agree to meet and confer and attempt to reach mutual agreement regarding the exceedance amounts necessary to accomplish the prevention or mitigation of the emergency.

6. Subject to five-year termination clauses in sections 8a and 8b, in any year, ARSA and CDCR will continue to provide effluent from Preston Reservoir to the Ione tertiary plant for use on the Castle Oaks Golf Course, if such effluent is available. As provided for in the 1990 Agreement, as amended. Castle Oaks Golf Course will continue to utilize wastewater treated at the Ione tertiary plant prior to using water from any other source until December 31, 2013.

7. From the effective date of this agreement, ARSA agrees to eliminate all flows to Ione's secondary treatment ponds within four years. ARSA holds existing deeded disposal rights, transmittal rights, and rights of way and easements, to dispose of 1300 acre feet of treated effluent on the former Noble Ranch (County Assessor parcel numbers: 011330001501; 011330002501; and 011330003501) comprising approximately 850 acres of arable ranch land. A golf course resort has been entitled to be constructed on the property to be known as "Gold Rush Golf, LLC." A mitigated negative declaration for this project, including effluent disposal options, was adopted February 18, 2003, under City of Sutter Creek Resolution Number 02-03-27. Portions of the project have been constructed (e.g. conduit construction under the Highway 49 Bypass) and the remainder will be completed prior to the four-year deadline described in this section. The completion of the effluent disposal options are independent of the construction of the golf course resort project.

8. This agreement will be in effect for thirty (30) years from the time of its enactment, subject to the following:

a. With regard to the lower Henderson/Preston System, ARSA agrees to eliminate all flows to the lower Henderson/Preston System within five years of receiving a written request to this effect from Ione, CDCR, or MCSP. Such written notice may only be given after Ione and CDCR have resolved how to provide adequate reclaimed water for both Castle Oaks Golf Course and Preston Youth Correctional Facility. Such resolution may include completing any necessary environmental review pursuant to CEQA for the new source of water; a contract between the new provider of water, MCSP, Ione, the golf course operator; and any necessary permits of modifications to existing permits pursuant to the Porter-Cologne Water Quality Control Act (Cal. Water Code, §§ 13000 et. seq.).

b. ARSA shall have a right to cancel all discharges to the lower Henderson/Preston System five (5)years after it gives written notice to Ione and CDCR of its intent. ARSA agrees to work with the Parties to

attempt to coincide its withdrawal with the other parties' ability to find an alternate water source.

9. Beginning January 1, 2015, each party whose wastewater is being treated at the Ione Tertiary Plant agrees to pay a proportionate share of the tertiary plant operation and maintenance costs based on the amount of flows the party contributes to the tertiary plant. If any of the parties has withdrawn flows prior to 2014, that party will have no such operation and maintenance obligation. Each party's "proportionate share" will be defined by the JPA proposed herein, if it is formed. If the JPA is not formed, "proportionate share" will be defined by joint agreement of the Parties. To the extent that additional treatment, beyond what the discharging party is required to perform, is necessary to allow recycled water use of water treated at the Ione Tertiary Plant, that party will not be required to pay for such additional treatment, unless required under this agreement. Where the tertiary treated water from the Ione Tertiary Plant is sold to a recycled water user, the revenue generated from the sale will be distributed to the Parties in proportion to the amount of water the each party contributed to the tertiary plant.

10. MCSP shall endeavor to reduce its wastewater disposal into Preston Reservoir as soon as possible by implementing projects, which may include some or all of the following:

a. Installing flushometers on toilets located in cells at MCSP; and

b. Installing shower timers, as able, at MCSP.

In addition, CDCR shall conduct a preliminary feasibility study to determine the cost and feasibility for CDCR to increase the Preston Reservoir Dam height by sixteen (16) inches, increasing the capacity of the reservoir thereby.

11. To implement the provisions of this agreement, the Parties may prepare implementation memoranda, as opposed to amendments to this agreement, unless all Parties agree an amendment is necessary. Such implementation agreements may be executed by authorized representatives of the Parties.

12. The Parties to this agreement agree to explore and work towards creating a Joint Powers Authority to develop a sub-regional wastewater master plan for the Ione Valley. This plan may involve the following elements:

a. Developing a permanent source of reclaimed water for the Castle Oaks Golf Course, Preston Youth Correctional Facility and other potential reclaimed water users within the Ione area.

b. Developing a master plan and joint projects to improve the treatment and disposal capabilities of the MCSP and Ione wastewater facilities.

c. ARSA's participation in the JPA will end when ARSA's discharges to the lower Henderson/Preston System end pursuant to sections 8a and 8b of this agreement.

13. Each of the Parties shall work to obtain all necessary permits, approvals, and authorizations to carry out this agreement in compliance with all pertinent Federal, State, and local laws and regulations.

14. In the event of a breach or default of this agreement, the aggrieved party will give written notice to the other parties within ten (10) days. After receiving such written notice, the Parties will meet and confer in an attempt to bring the violating party into compliance with this agreement. If, after meeting and conferring, the Parties fail to agree upon a plan to bring the violating party into compliance, the Parties may pursue meditation or other means agreed upon by the parties, including other remedies available by law.

15. Such non-performance provisions shall not apply if the nature of the breach or default is the result of a force majeure occurrence or is otherwise of a nature such that it cannot be fully cured within thirty (30) days, the party in default shall have such additional time as is reasonably necessary to cure the default so long as the party in default is proceeding diligently to complete the necessary cure after service of written notice by a non-defaulting party.

16. Each party retains any and all remedies it may have at law or in equity against each and every party hereto for breach of any duty established by this agreement.

17. Invalidation of any of the provisions contained in this agreement, or of the application thereof to any party by judgment or court order, shall in no way affect any of the other provisions hereof or the application thereof to any other party and said agreement shall remain in full force and effect except for the invalidated provision.

18. This agreement may be amended only by written instrument signed by all the parties.

19. Any notice to any party shall be in writing and by fax or email and given by delivering the notice to such party in person or by sending the notice by registered or certified mail, return receipt requested with postage prepaid, to the party's mailing address. The respective mailing addresses of the parties are:

City:
City Manager
City of Ione
Post Office Box 398
Ione, CA 95640

ARSA:
Rob Duke
General Manager
18 Main Street
Sutter Creek, CA 95685

CDCR: Warden
Mule Creek State Prison
4001 Highway 104
Ione, CA 95640

Either party may change its mailing address at any time by giving written notice of such change to the other parties in the manner provided herein at least ten (10) days prior to the date such change is effected. All notices shall be deemed given, received, made or communicated on the delivery date or attempted delivery date shown on the return receipt.

20. Nothing contained in this agreement shall act as a prohibition on the formation of additional contracts and agreements by and between the Parties to further implement the intentions of the Parties.

21. Failure of a party to insist upon the strict performance of any of the provisions of this agreement by any other party, irrespective of the length of time for which such failure continues, shall not constitute a waiver of such party's right to demand strict compliance by the other party in the future No waiver by a party of an act constituting breach or default shall be effective or binding upon such party unless the waiver is made in writing by such party, and no such waiver shall be implied from any omission by a party to take any action with respect to such breach or default under any provision of this agreement.

22. This agreement may be signed in counterparts, and shall have the same force and effect as if all signatures existed on the same document.

CITY OF IONE

Dated: 9-20-07

By: _____
Jerry Sherman
Mayor, City of Ione

Approved as to form:

STOEL RIVES LLP

Dated: 9-26-07

By: _____
Timothy M. Taylor
Attorneys for the City of Ione

ARSA

Dated: 9-18-07 By: _____
Rob Duke
General Manager

Approved as to form:

MCDONOUGH HOLLAND & ALLEN

Dated: 9/04/07 By: _____
Harriet Steiner
Attorneys for ARSA

Dated: _____ CDCR

By: _____
Deborah Hysen
Chief Deputy Secretary
Facility Planning, Construction, and Management

Approved as to form:

CALIFORNIA DEPARTMENT OF CORRECTIONS AND REHABILITATION, OFFICE OF LEGAL AFFAIRS

Dated: _____ By: _____
Chris Swanberg
Senior Staff Counsel
Attorneys for CDCR

ARSA

Dated: _____ By: _____
Rob Duke
General Manager

Approved as to form:

MCDONOUGH HOLLAND & ALLEN

Dated: _____ By: _____
Harriet Steiner
Attorneys for ARSA

Dated: _____ CDCR

By: _____
Deborah Hysen
Chief Deputy Secretary
Facility Planning, Construction, and Management

Approved as to form:

CALIFORNIA DEPARTMENT OF CORRECTIONS AND REHABILITATION, OFFICE OF LEGAL AFFAIRS

Dated: _____ By: _____
Chris Swanberg
Senior Staff Counsel
Attorneys for CDCR

EXHIBIT B

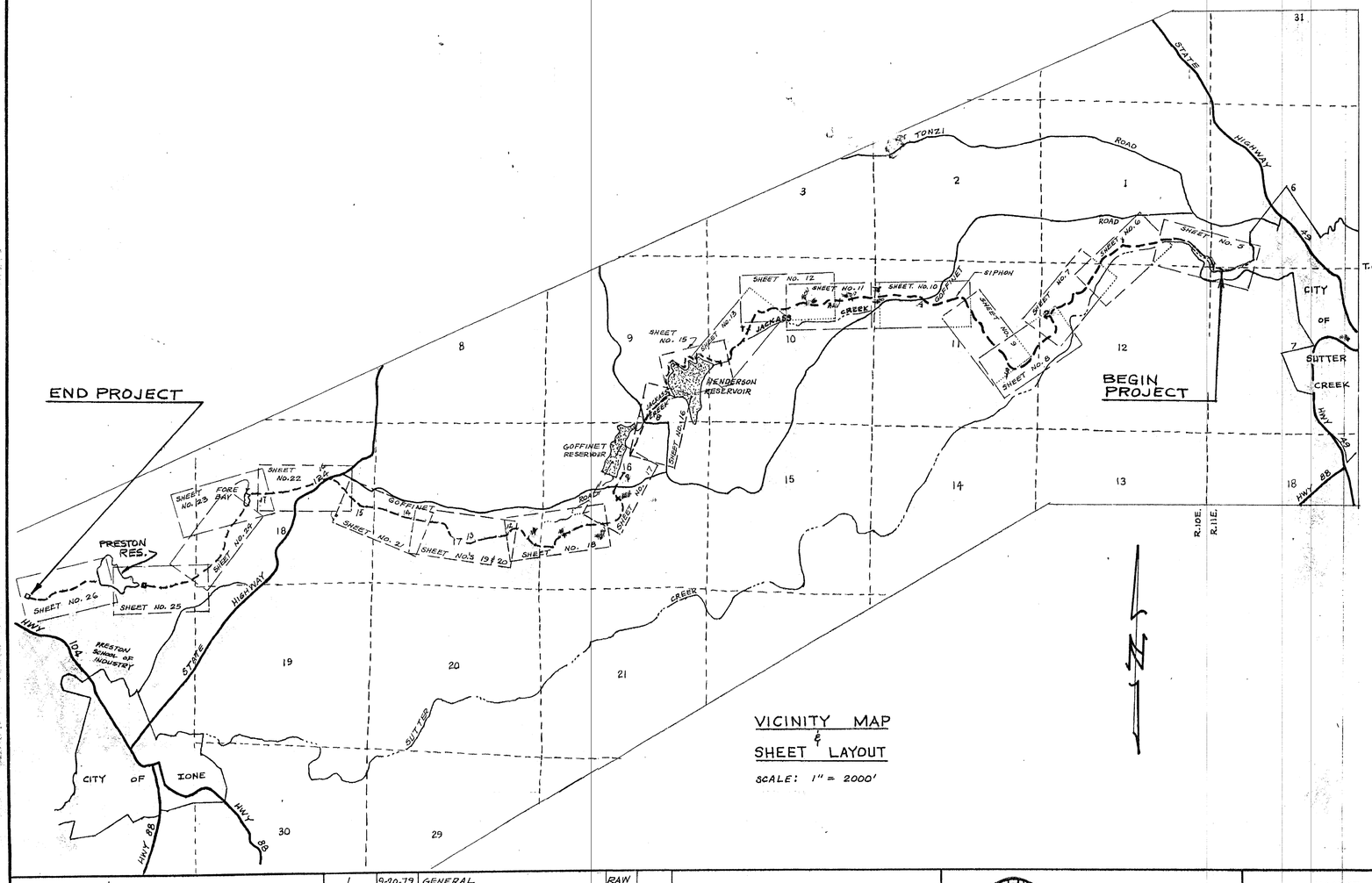
AMADOR COUNTY REGIONAL OUTFALL

PROJECT NO. 0995

AMADOR COUNTY CALIFORNIA

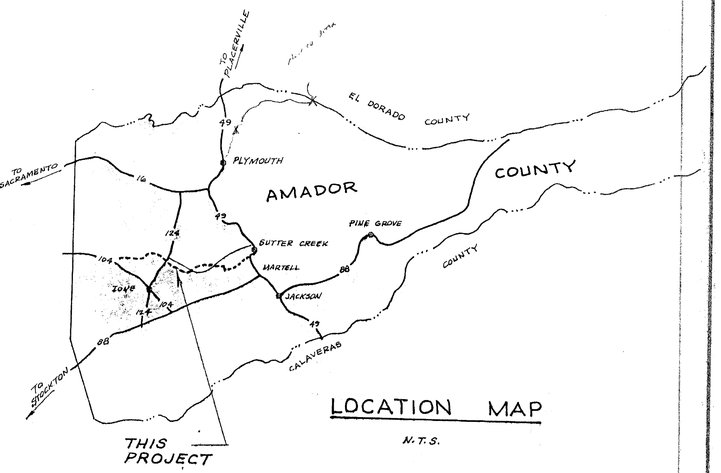
SHEET INDEX

SHEET NO.	DESCRIPTION
2	BOX CULVERT PLAN & DETAILS
3	HENDERSON RESERVOIR DETAILS
4	STANDARD DETAILS — SUTTER CREEK TO HENDERSON RESERVOIR
5-13	PLAN-PROFILE — SUTTER CREEK TO HENDERSON RESERVOIR
14	PLAN — HENDERSON RESERVOIR IMPROVEMENTS
15	PLAN-PROFILE — HENDERSON RESERVOIR
16-22	PLAN-PROFILE — HENDERSON RESERVOIR TO PRESTON FOREBAY
23	PLAN-PROFILE — FARMLAND IRRIGATION LINE
24	PLAN-PROFILE — EMERGENCY BY-PASS, PRESTON FOREBAY
25	PLAN-PROFILE — CHLORINATION HOUSE TO PRESTON RES.
26	PLAN-PROFILE - PRESTON FOREBAY TO CHLORINATION HOUSE
27-29	MISCELLANEOUS DETAILS — HENDERSON RESERVOIR TO PRESTON RESERVOIR
30	ELECTRICAL & INSTRUMENTATION DETAILS



VICINITY MAP & SHEET LAYOUT

SCALE: 1" = 2000'



LOCATION MAP

N.T.S.

Chairman, Amador Regional Sanitation Authority — 10/1/79 DATE

Roderick E. Schuler Acting — 10/1/79
Director of Public Works of Amador County — DATE

Eugene A. Weatherby — No. 5624 — 9/27/1979
Project Engineer — DATE

"AS BUILT"

REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-20-79	GENERAL	RAW	
2	8-15-80	ASBUILTS	MPA	

DRAWN BY: A. Sween & JW CHECKED

SUBMITTED BY C. E. NO.

GRETZINGER AND WEATHERBY CIVIL ENGINEERS
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

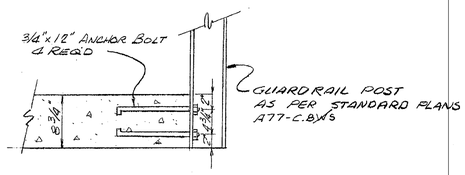
AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

COVER SHEET

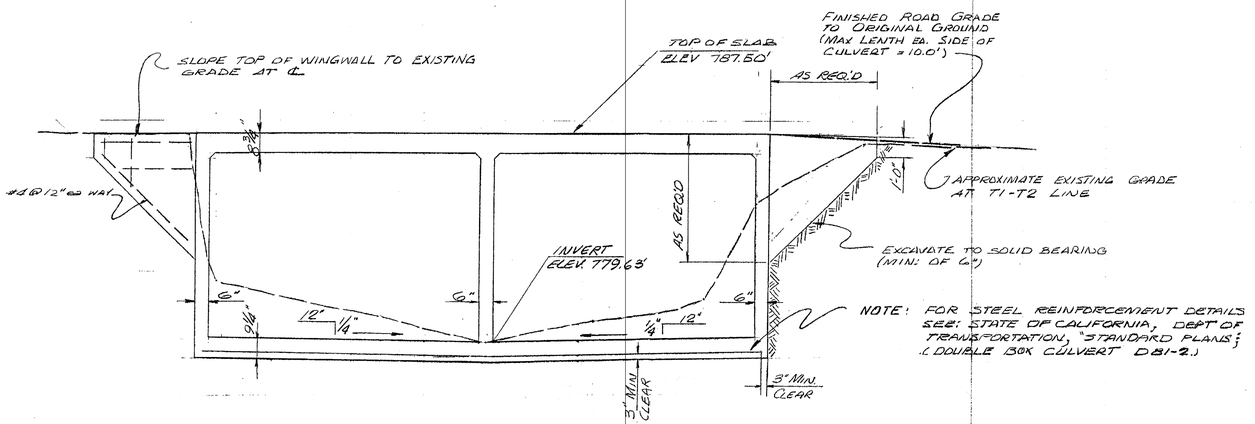
SUTTER CREEK TO HENDERSON RESERVOIR

DATE 7-16-79
SCALE: NOTED
SHEET 1 OF 30
FILE NO. D2849

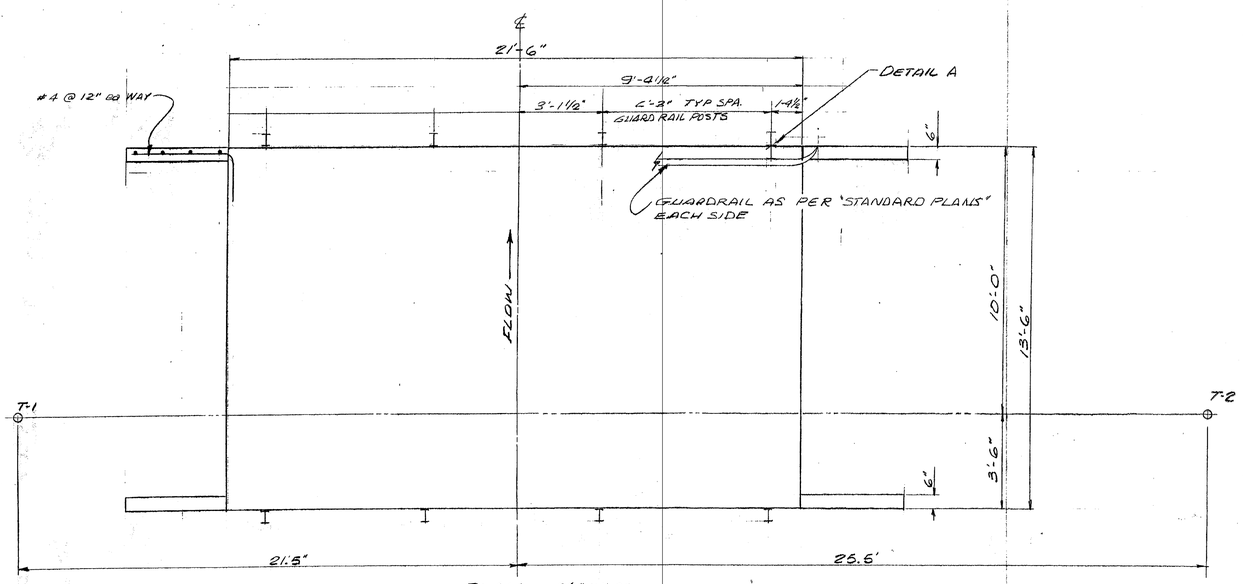
JOB NO. 750101



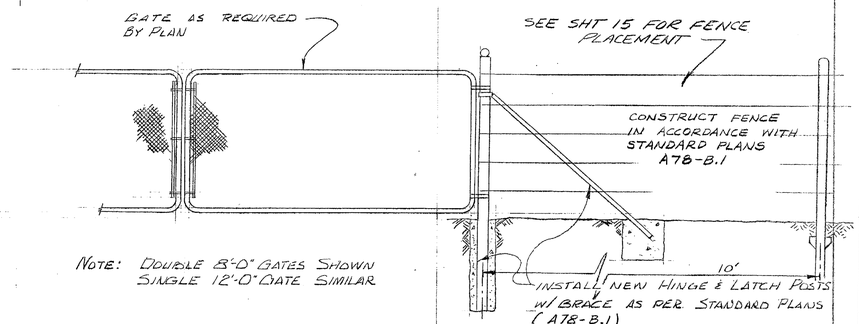
DETAIL A
1"=1'-0"



SECTION AT T-1, T-2 LINE
3/8" = 1'-0"



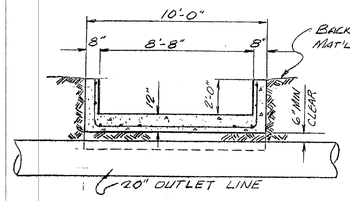
PLAN 3/8" = 1'-0"

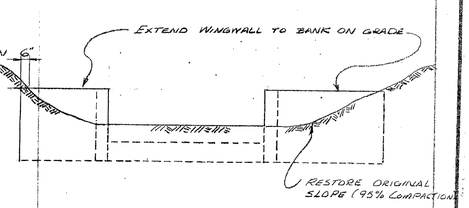


NOTE: DOUBLE 8'-0" GATES SHOWN
SINGLE 12'-0" GATE SIMILAR

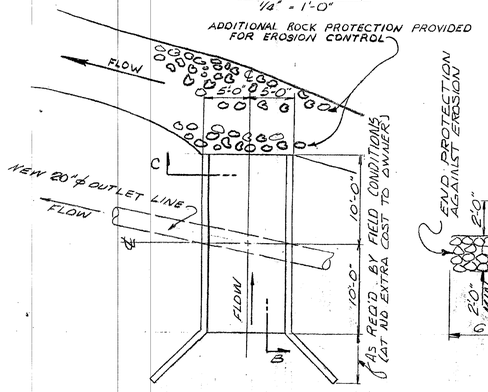
GATE & FENCE DETAIL
N.T.S.

GATE PLACEMENT SCHEDULE:-
DOUBLE 8' GATE - SEE SHEET 14
SINGLE 12' GATE - SEE SHEET 6
SINGLE 12' GATE - SEE SHEET 8



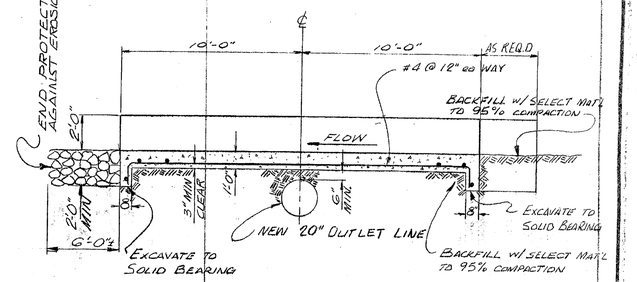


SECTION C-C
1/4" = 1'-0"



PLAN 1/8" = 1'-0"

UPSTREAM ELEVATION
1/4" = 1'-0"



SECTION B-B
1/4" = 1'-0"

"AS BUILT"

SPILLWAY OVER OUTLET
BELOW HENDERSON DAM STA 3+00±
SEE SHEET No. 14 & 15

REVISION	DATE	DESCRIPTION	BY	APP'D.
1	9-20-79	GENERAL	RAW	
2	8-15-80	ASBUILTS	MDA	

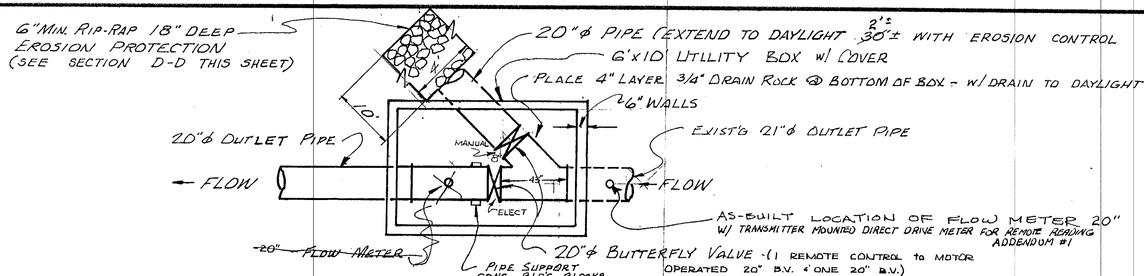
DRAWN BY: W CHECKED
SUBMITTED BY C. E. NO.

GRENTZINGER AND WEATHERBY CIVIL ENGINEERS
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY - REGIONAL OUTFALL PROJECT NO. 0995

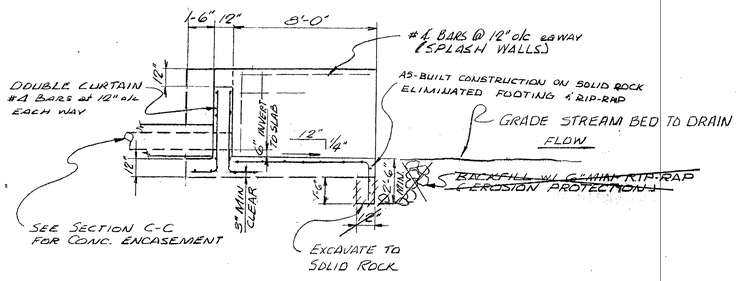
BOX CULVERT PLAN & DETAILS

DATE 7-10-79
SCALE: As Noted
SHEET 2 OF 30
FILE NO. D2849
JOB NO. 790101

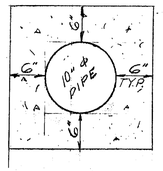


OUTLET CONNECTION
N.T.S. STA 0+00 OUTFALL LINE

HENDERSON RES.

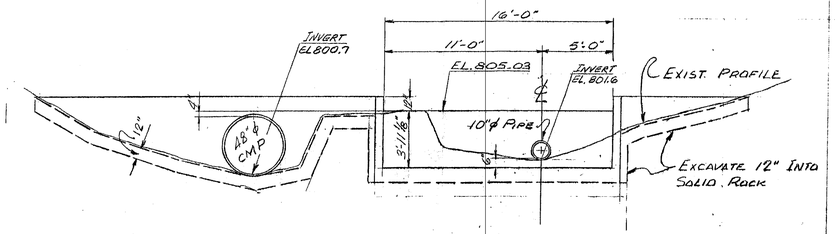


SECTION B-B
1/4" = 1'-0"

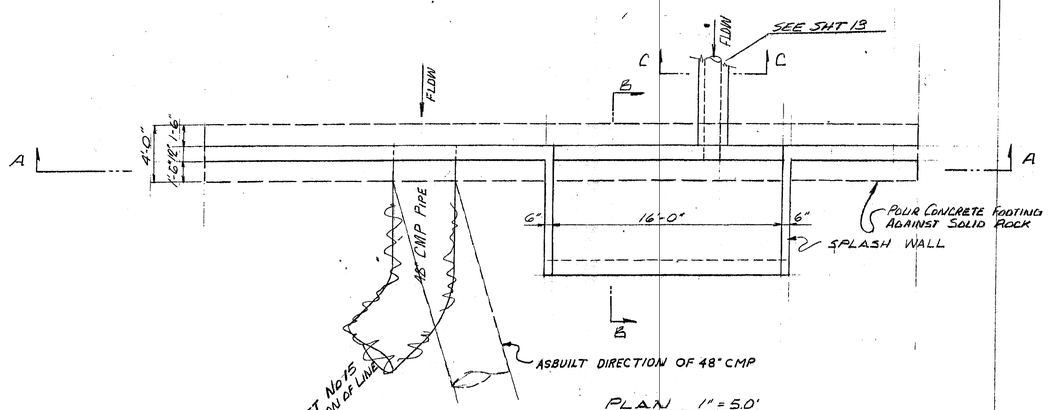


SECTION C-C
N.T.S.

CONCRETE ENCASE PIPE WHERE PIPE HAS LESS THAN 12" OF COVER

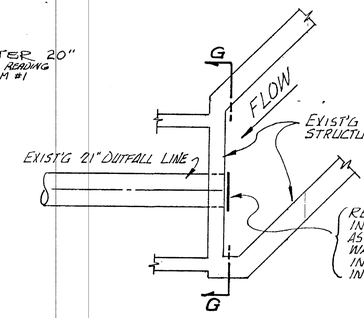


SECTION A-A
1" = 5.0'

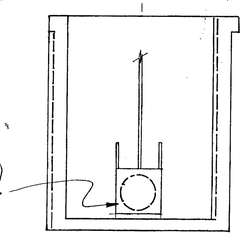


PLAN 1" = 5.0'

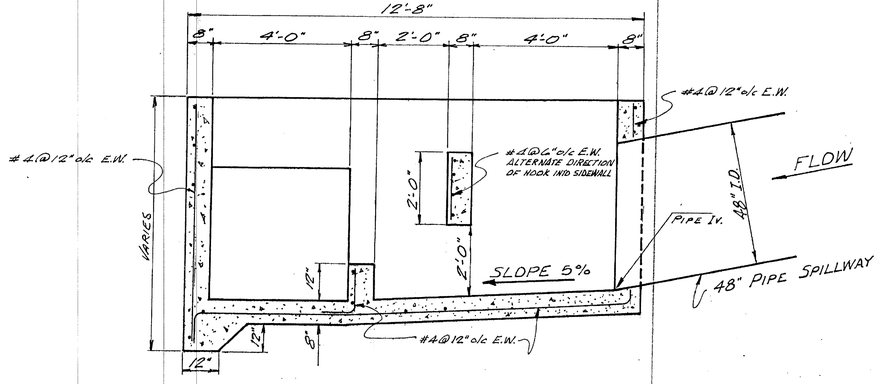
DIVERSION DETAILS ABOVE HENDERSON DAM
STA 82+50 BK = STA 236+79 AHD



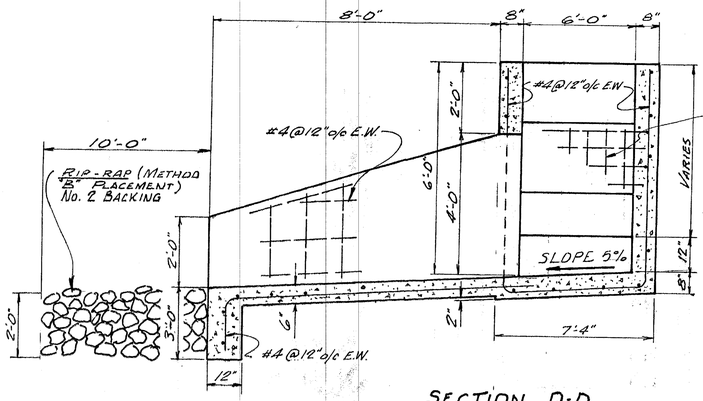
SLUICE GATE DETAIL
N.T.S. SEE SHEET No. 14



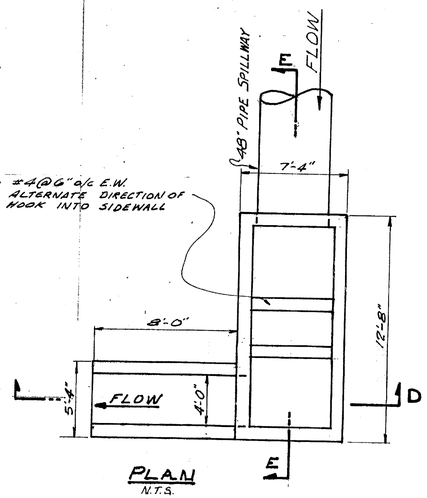
SECTION G-G
N.T.S.



SECTION E-E
N.T.S.



SECTION D-D
N.T.S.



PLAN
N.T.S.

(HENDERSON)
ENERGY DISSIPATOR
STA 46+00 - SPILLWAY (SEE SHT 15)

"AS BUILT"

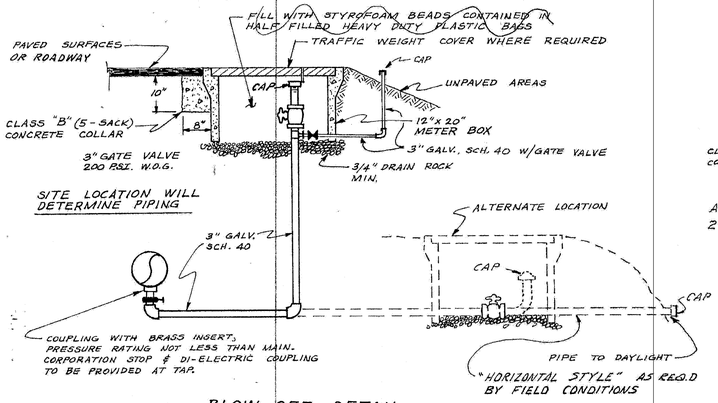
REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-20-79	GENERAL	RAW	
2	8-15-80	ASBUILTS	MCH	

DRAWN BY: JW CHECKED
SUBMITTED BY C. E. NO.

GREENINGER AND WEATHERBY CIVIL ENGINEERS
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0361

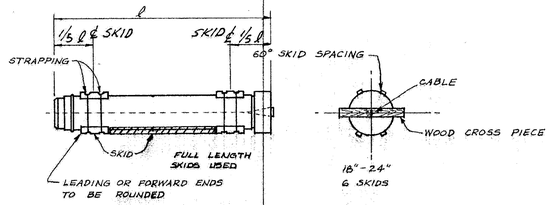
AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995
HENDERSON RESERVOIR DETAILS
SUTTER CREEK TO HENDERSON RESERVOIR

DATE 7-14-79
SCALE: As Noted
SHEET 3 OF 30
FILE NO. D2849
JOB NO. 79010



BLOW-OFF DETAIL

N. T. S.

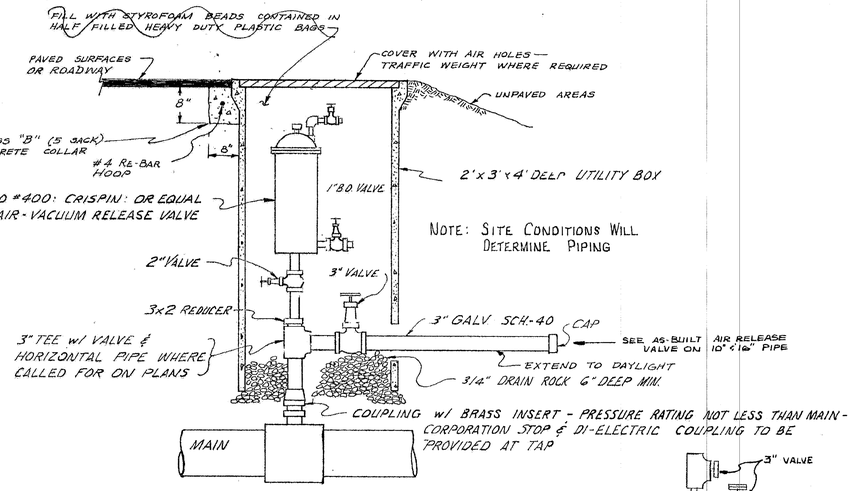


SKID DETAIL FOR ACP ONLY

SEE SHEET NO. 10

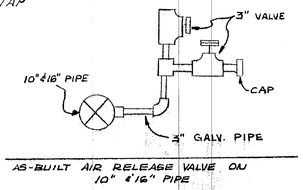
FOR OTHER TYPE PIPE INSTALL ACCORDING TO MANUFACTURERS RECOMMENDATIONS

N. T. S.

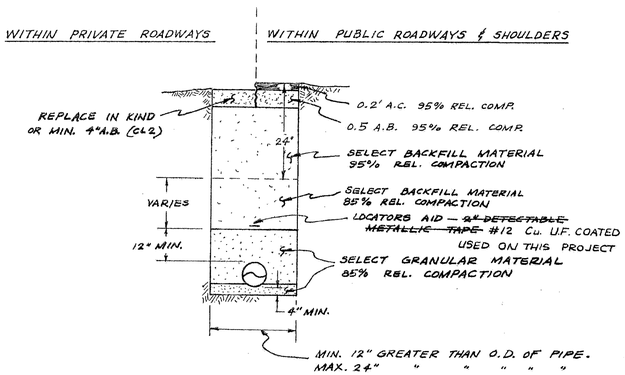


AIR RELEASE VALVE DETAIL

N. T. S.

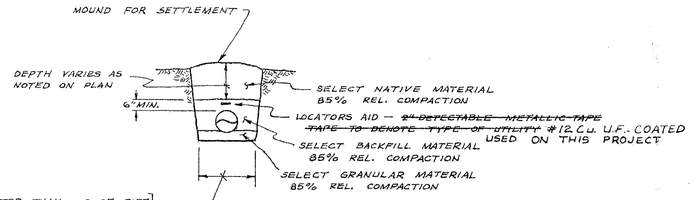


AS-BUILT AIR RELEASE VALVE ON 10" & 16" PIPE



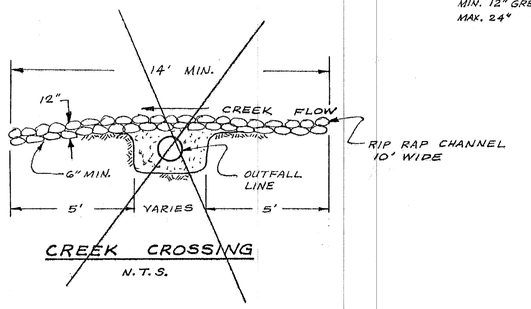
CLASS 'A' TRENCH DETAIL

N. T. S.



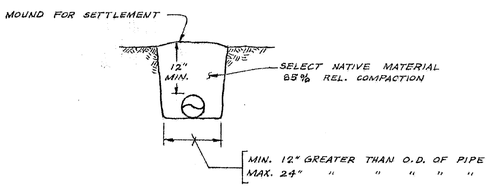
CLASS 'B' TRENCH DETAIL

N. T. S.



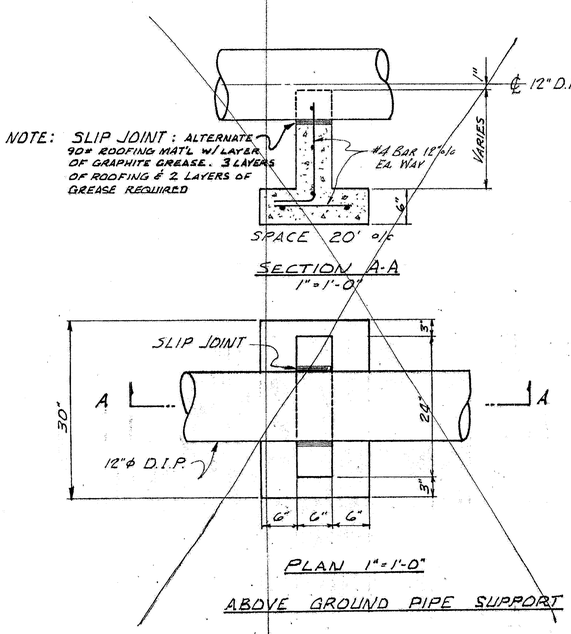
CREEK CROSSING

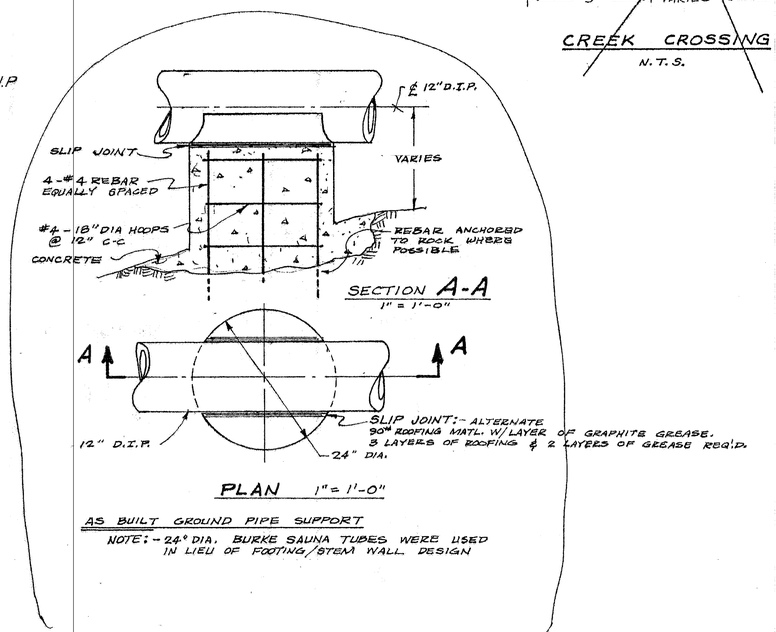
N. T. S.

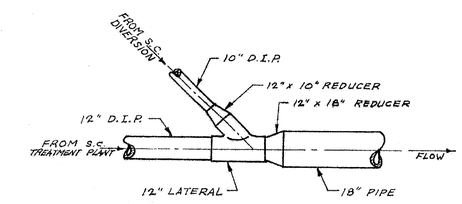


CLASS 'C' TRENCH DETAIL

N. T. S.







CONNECTOR DETAIL 'A'

N. T. S.

(SEE SHEET 6)

"AS BUILT"

REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-20-79	GENERAL	RAW	
2	8-15-80	ASBUILTS	MDK	

DRAWN BY: Sween CHECKED

SUBMITTED BY C. E. NO.

GREENINGER AND WEATHERBY CIVIL ENGINEERS
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

STANDARD DETAILS

SUTTER CREEK TO HENDERSON RESERVOIR

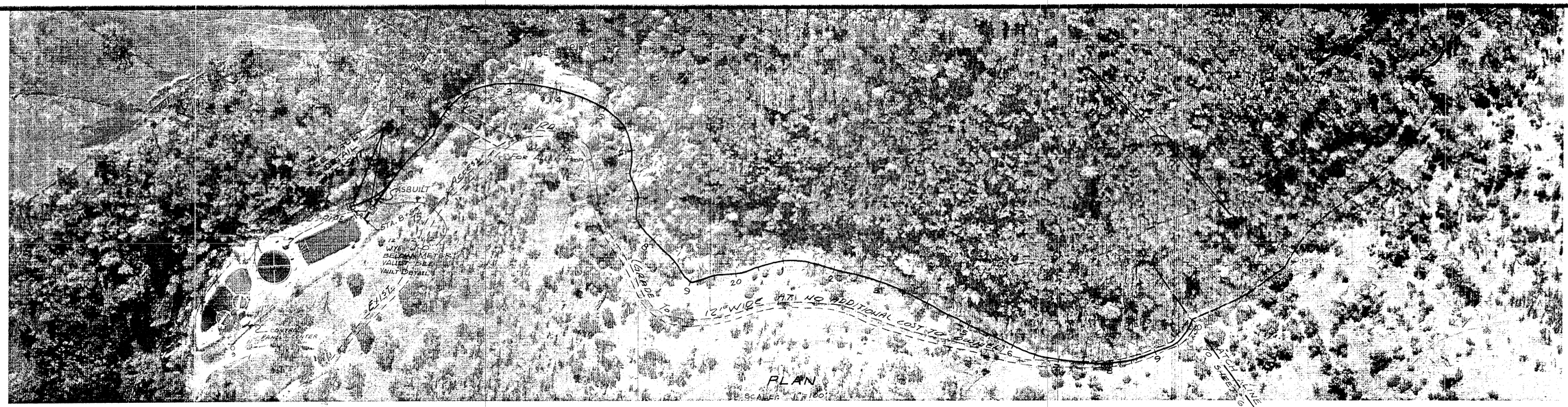
DATE 7-16-79

SCALE: NOTED

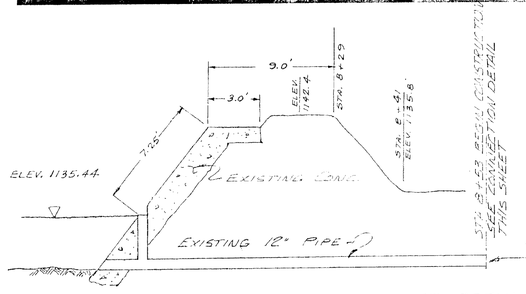
SHEET 4 OF 30

FILE NO. D2849

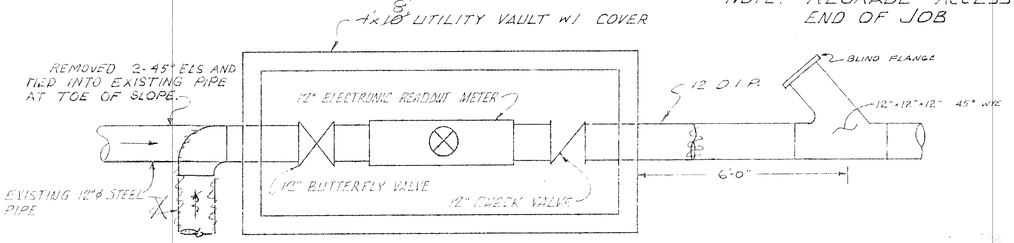
JOB NO. 790101



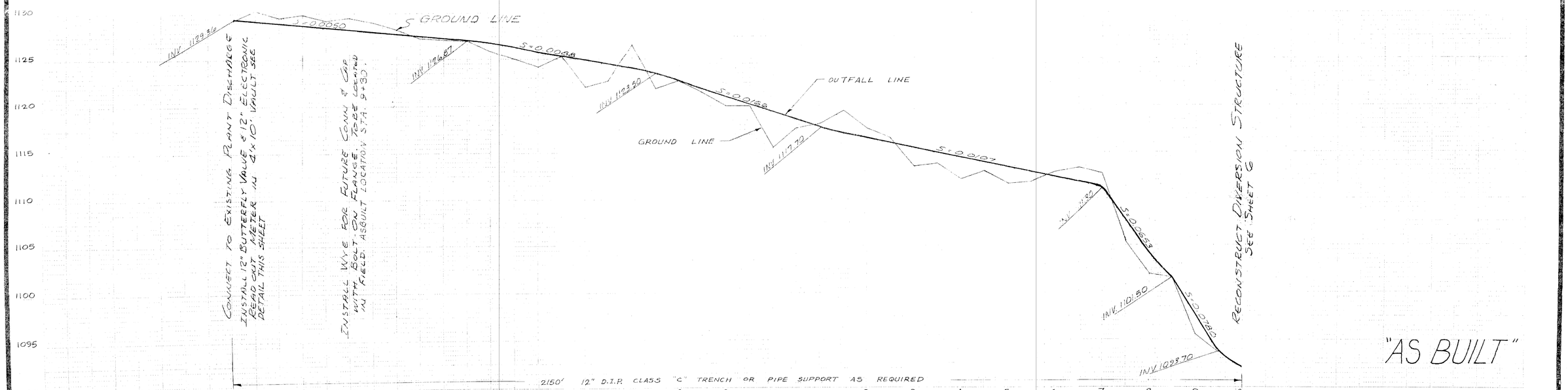
NOTE: REGRADE ACCESS ROAD AT END OF JOB



SETTLING POND OUTLET DETAIL
N. T. S.



VAULT DETAIL STA 8+53
N. T. S.



"AS BUILT"

PREPARED BY:

DRAWN BY: SWEEN / JW CHECKED

SUBMITTED BY C. E. NO.

REVISION	DATE	DESCRIPTION	BY	APPD
1	9-20-79	GENERAL	RAW	

GRETZINGER AND WEATHERBY CIVIL ENGINEERS
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

PLAN – PROFILE STA. 8 + 53 TO 30 + 00

SUTTER CREEK TO HENDERSON RESERVOIR

SURVEY
PLAN
PROFILE

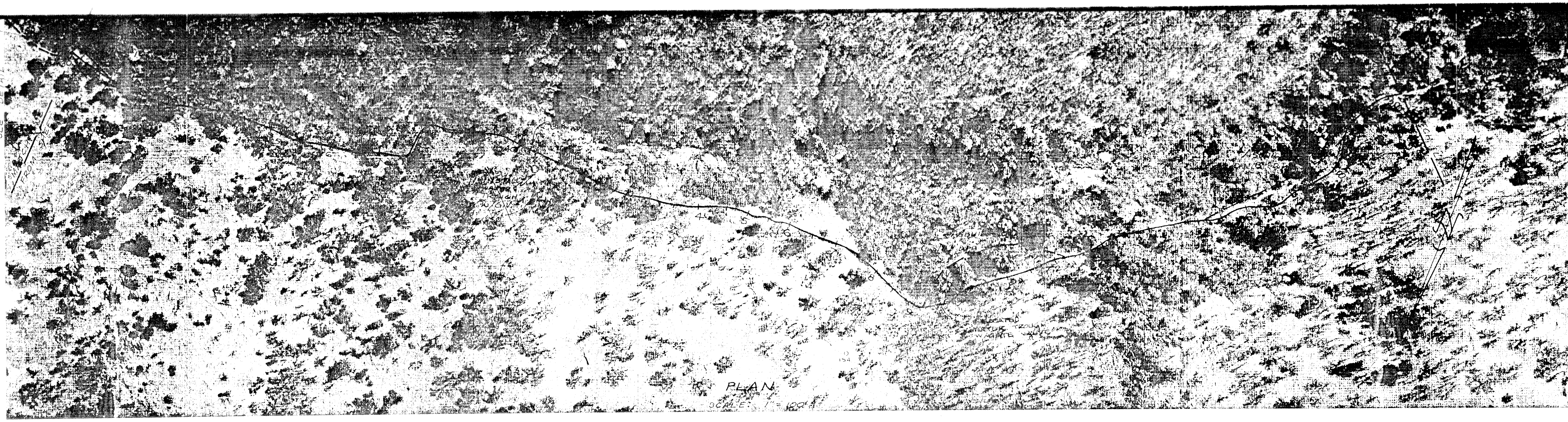
DATE 7-16-79

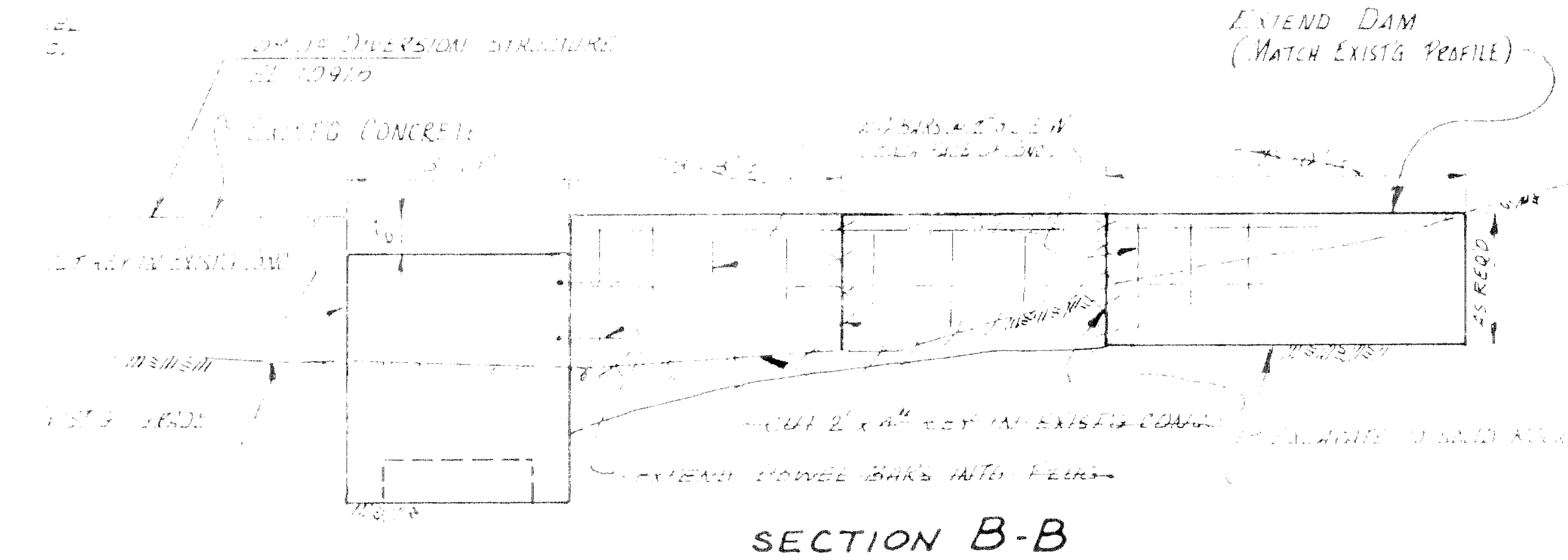
SCALE
HORIZONTAL 1" = 100'
VERTICAL 1" = 5'

FILE NO. D2849

SHEET 5 OF 30

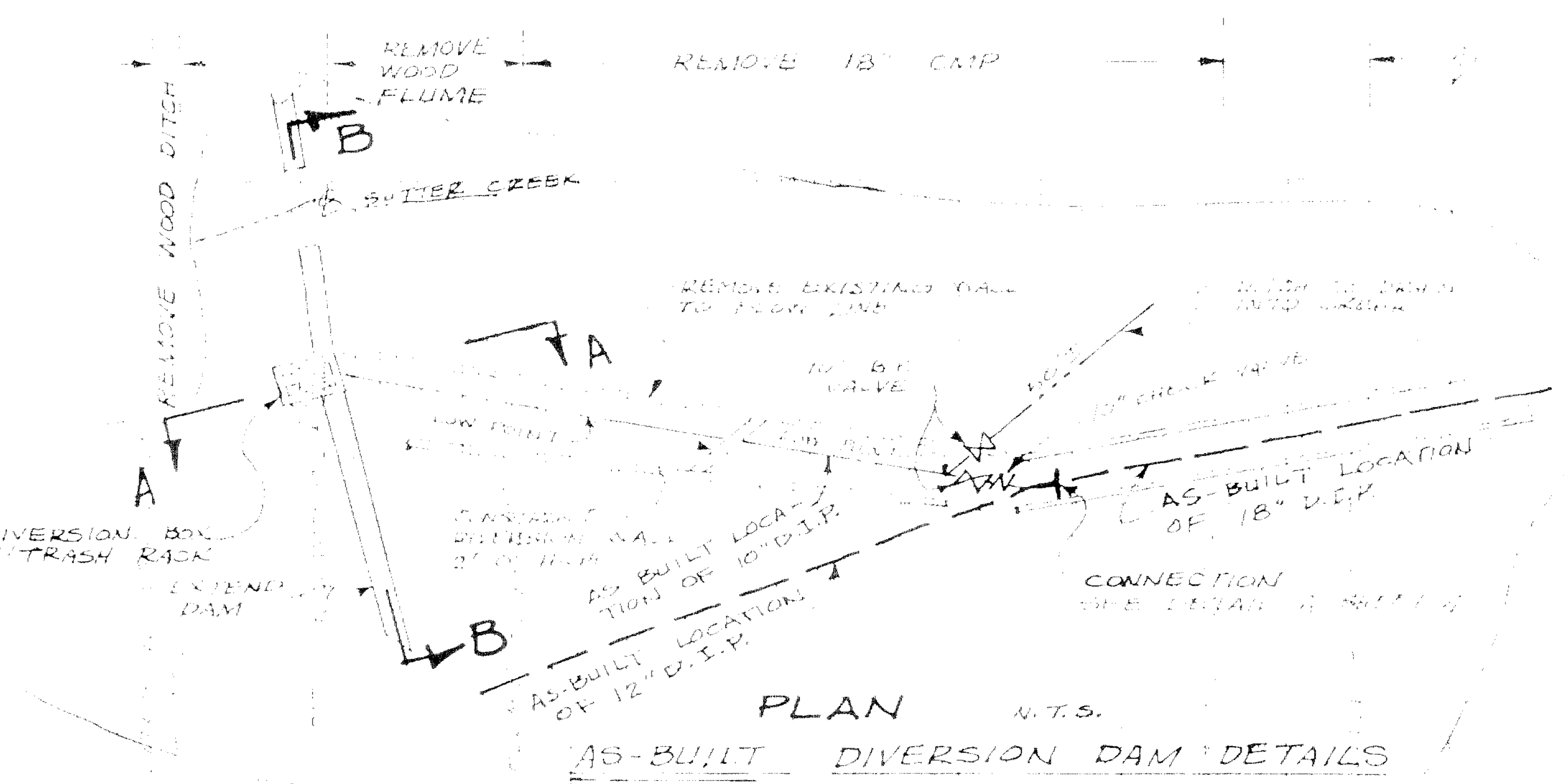
JOB NO. 780101





SECTION B-B

UPSTREAM ELEVATION N.T.S.



PLAN N.T.S.

AS-BUILT DIVERSION DAM DETAILS

"AS BUILT"

PREPARED BY		
DRAWN BY	CHECKED	
SUBMITTED BY	C.E. NO.	
REVISION DATE	DESCRIPTION	BY APPD

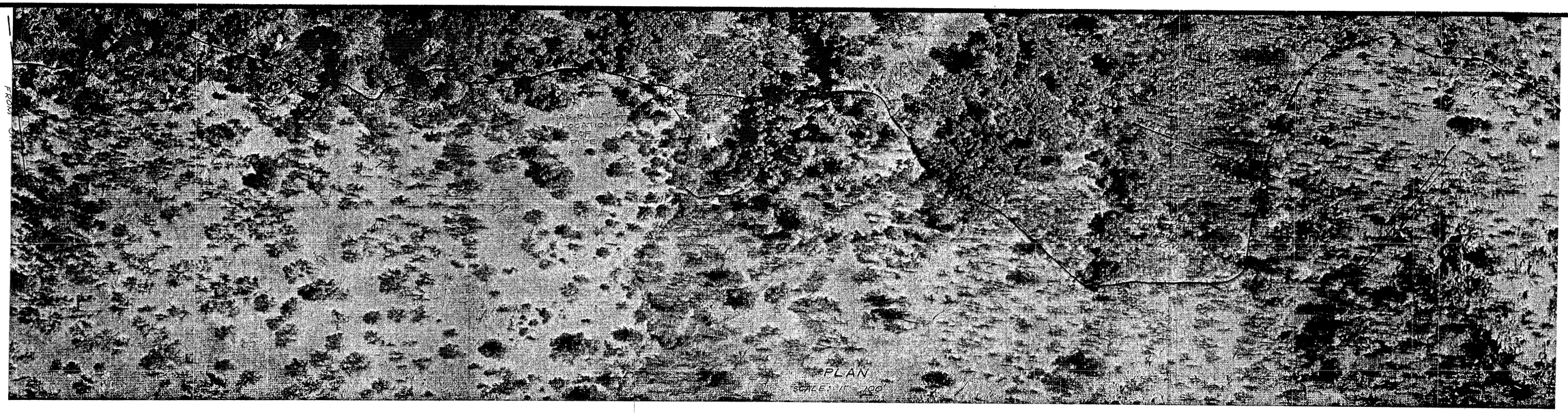
GRETZINGER AND WEATHERBY CIVIL ENGINEERS

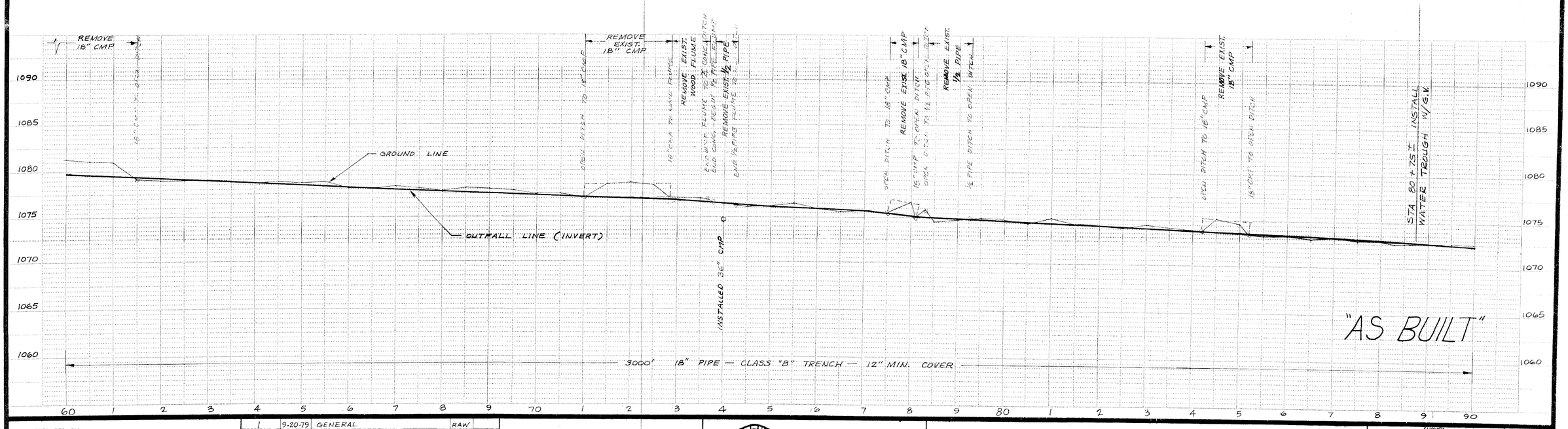
UNTY REGIONAL OUTFALL PROJECT NO. 0995

FILE STA. 30+00 TO 60+00

CREEK TO HENDERSON RESERVOIR

SURVEY		DATE
PLAN		
PROFILE		
SCALE		SHEET 6 OF 30
HORIZONTAL	1" = 100'	
VERTICAL	1" = 5'	
FILE NO	D28-49	





"AS BUILT"

PREPARED BY:

DRAWN BY: SWEEN & JW CHECKED

SUBMITTED BY C. E. NO.

REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-20-79	GENERAL	RAW	
2	8-15-80	AS BUILT	AS	

GRETZINGER AND WEATHERBY
CIVIL ENGINEERS

8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

PLAN - PROFILE STA. 60+00 TO 90+00

SUTTER CREEK TO HENDERSON RESERVOIR

SURVEY:
PLAN
PROFILE

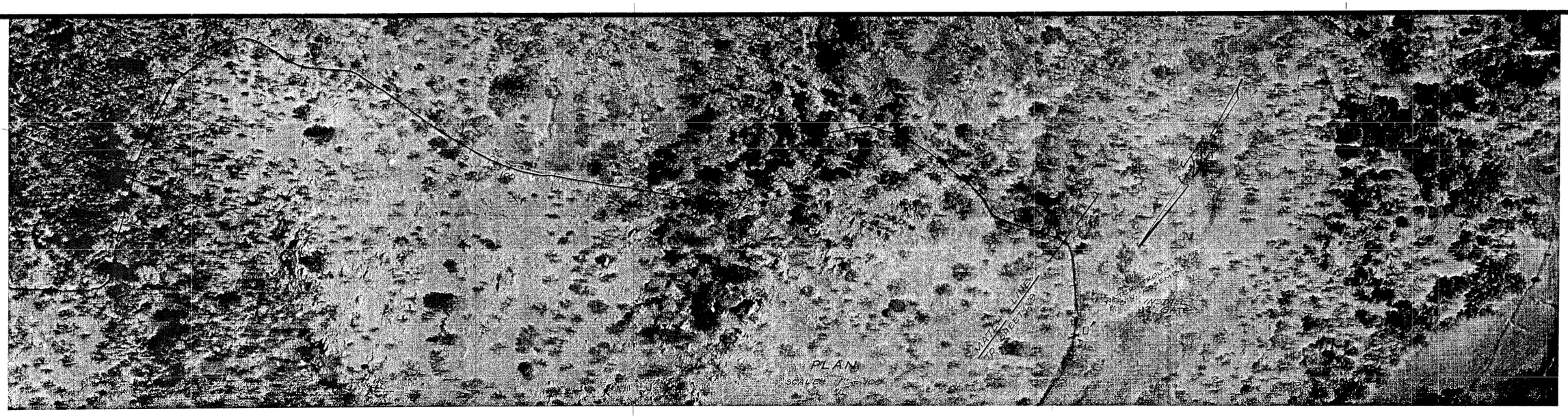
DATE 7-16-79

SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 5'

SHEET 7 OF 30

FILE NO. D2849

JOB NO. 79016



PREPARED BY:

DRAWN BY: Sween & Jw CHECKED

SUBMITTED BY: C. E. NO.

REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-20-79	GENERAL	RAW	
2	8-15-80	AS-BUILT	AS	

GREENFIELDER AND WEATHERBY CIVIL ENGINEERS

8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

PLAN - PROFILE STA. 90+00 TO 113+00

SUTTER CREEK TO HENDERSON RESERVOIR

SURVEY:
PLAN
PROFILE

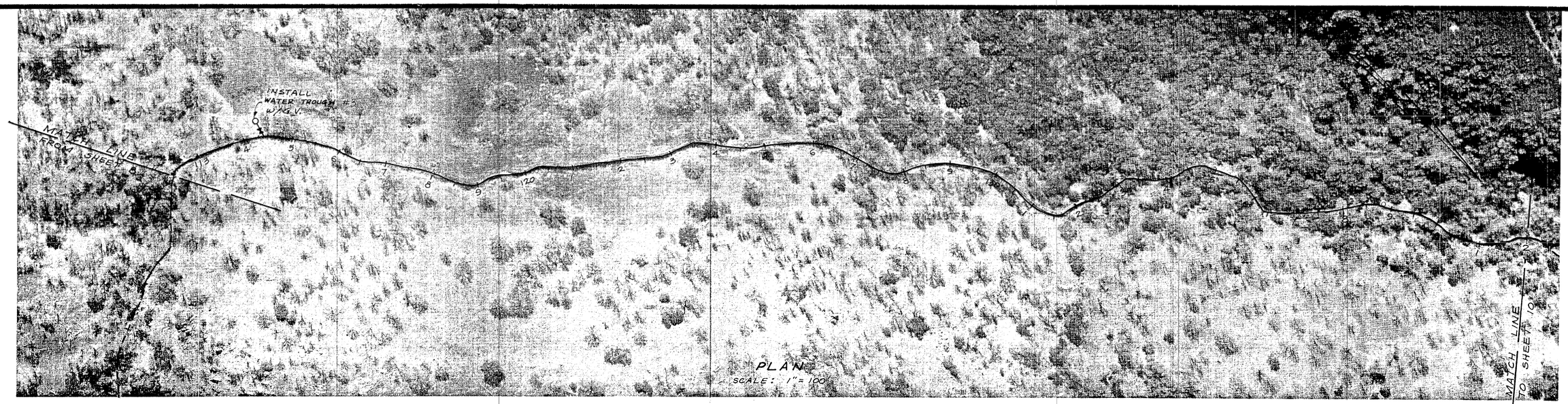
DATE 7-16-79

SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 5'

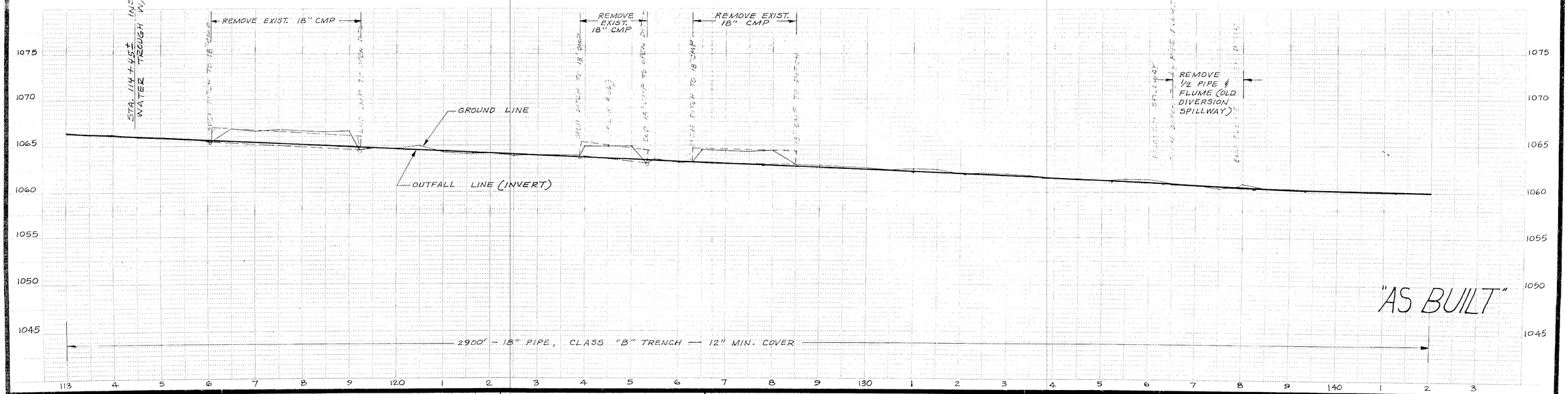
FILE NO. D2849

SHEET 8 OF 30

JOB NO. 790101



PLAN
SCALE: 1" = 100'



"AS BUILT"

PREPARED BY:

DRAWN BY: SWEEN & JGJ CHECKED

SUBMITTED BY C. E. NO.

REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-20-79	GENERAL	RAW	

GRIEWANGER AND WEATHERBY CIVIL ENGINEERS
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

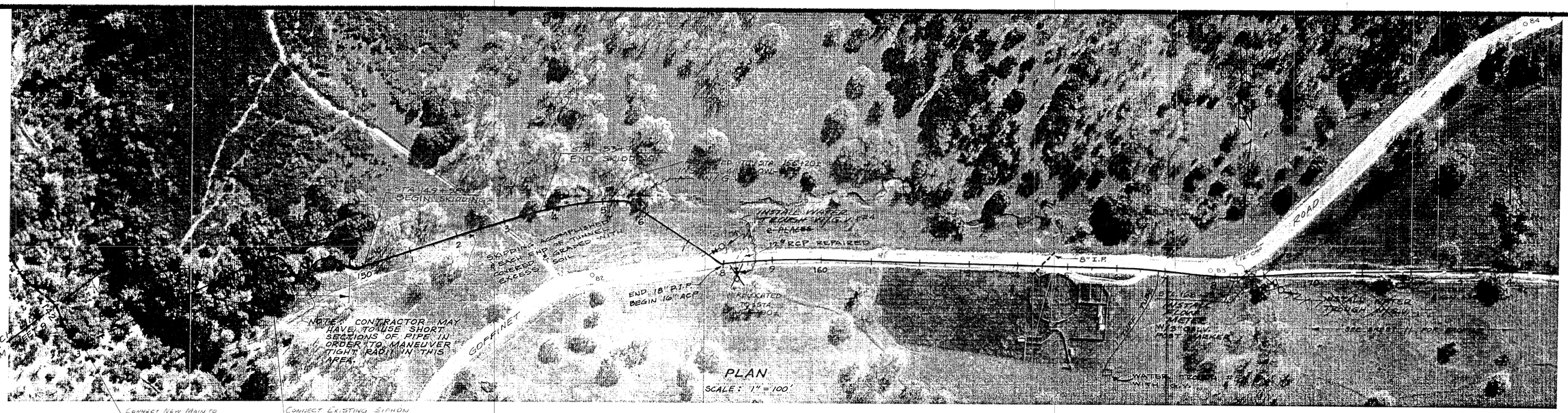
AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

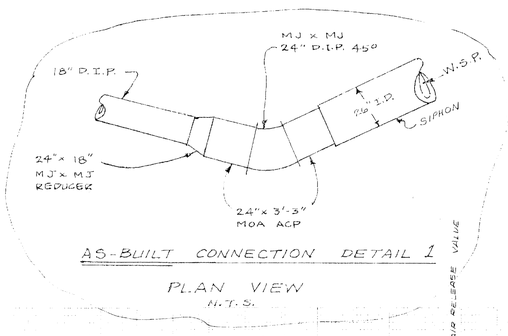
PLAN - PROFILE STA. 113+00 TO 142+00

SUTTER CREEK TO HENDERSON RESERVOIR

SURVEY:
PLAN
PROFILE
DATE 7-16-79
SCALE: HORIZONTAL 1" = 100' VERTICAL 1" = 10'
SHEET 9 OF 30
FILE NO. D2849

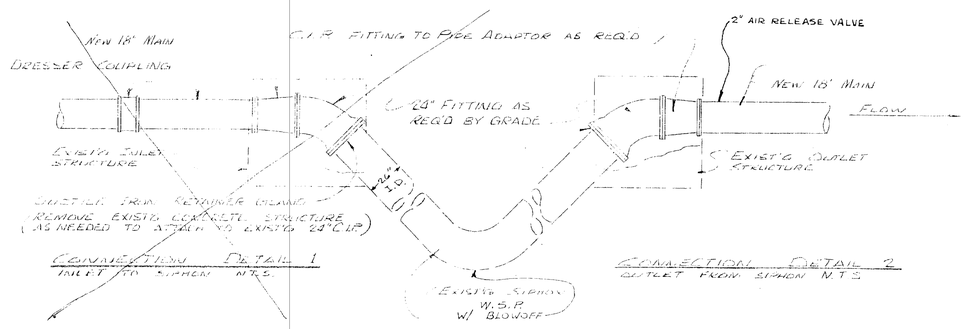
JOB NO. 790101





AS-BUILT CONNECTION DETAIL 1

PLAN VIEW
N.T.S.



CONNECTION DETAIL 1
INLET TO SIPHON N.T.S.

CONNECTION DETAIL 2
OUTLET FROM SIPHON N.T.S.

PREPARED BY:			
DRAWN BY: SWEEN & JBO	CHECKED		
SUBMITTED BY	C. E. NO.		

REVISION	DATE	DESCRIPTION	BY APPD.
1	9-20-79	GENERAL	RAW
2	8-15-80	AS BUILT	AS

GREENINGER LANE WEATHERBY CIVIL ENGINEERS

8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

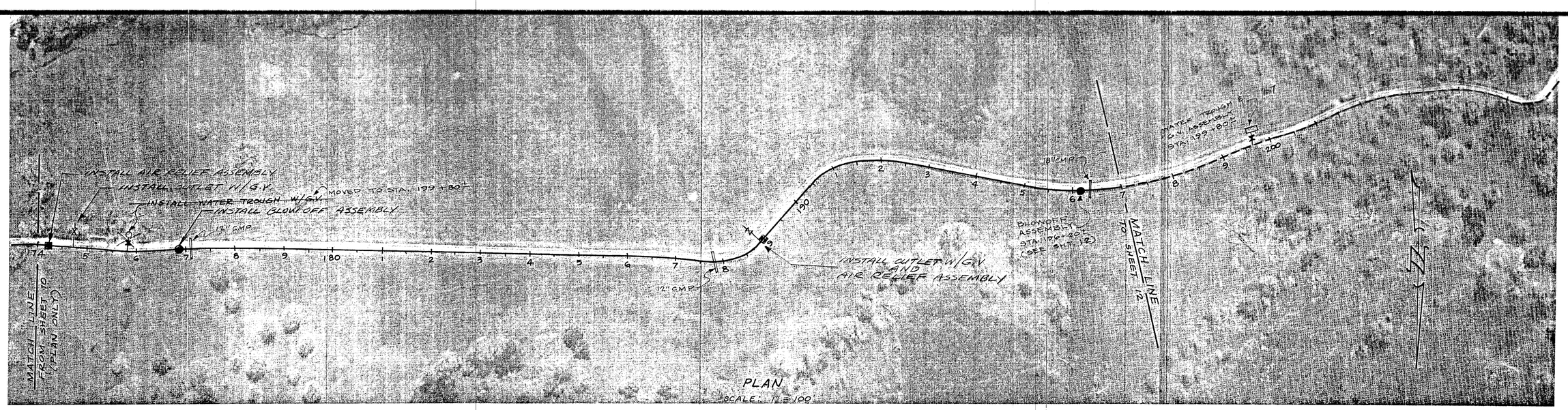
AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

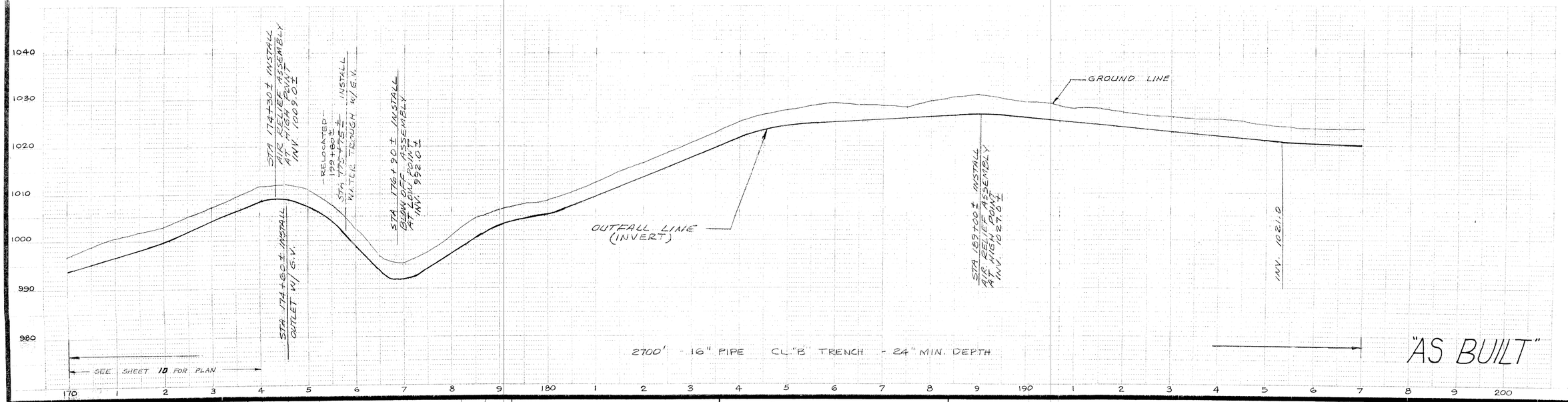
PLAN - PROFILE STA. 142+00 TO 170+00

SUTTER CREEK TO HENDERSON RESERVOIR

SURVEY:
PLAN
PROFILE
DATE 7-16-79
SCALE: HORIZONTAL 1" = 100' VERTICAL 1" = 10'
SHEET 10 OF 30
FILE NO. D2849

JOB NO. 790101





PREPARED BY:

DRAWN BY: JW & SWEEN CHECKED

SUBMITTED BY C. E. NO.

REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-20-79	GENERAL	RAW	
2	8-15-80	AS BUILT	A.S.	

GREYNIGER AND WEATHERBY CIVIL ENGINEERS

8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

PLAN — PROFILE STA. 170+00 TO 197+00

SUTTER CREEK TO HENDERSON RESERVOIR

SURVEY:
PLAN
PROFILE

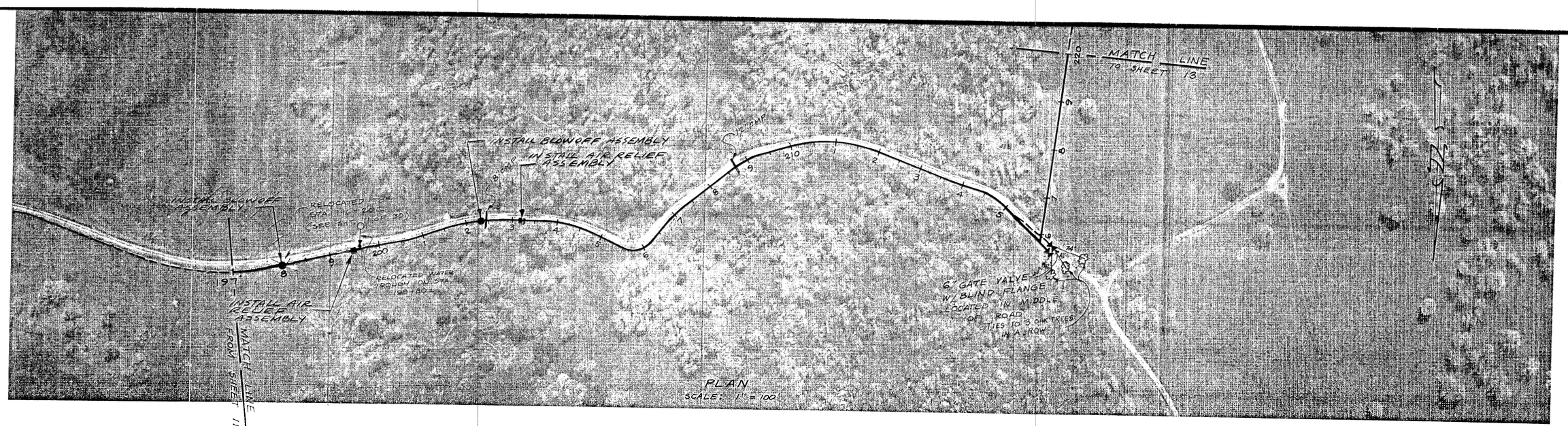
SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 10'

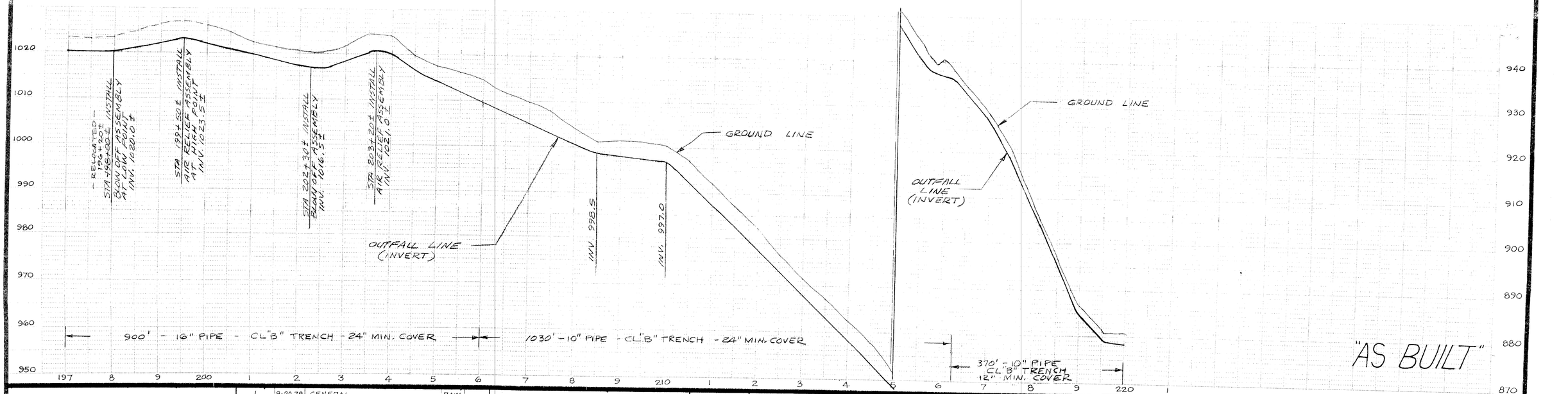
FILE NO. D2849

DATE 7-16-79

SHEET 11 OF 30

JOB NO. 790101





REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-20-79	GENERAL	RAW	
2	8-15-80	AS BUILT	A.S.	

PREPARED BY:

DRAWN BY: SWEEN CHECKED

SUBMITTED BY C. E. NO.

GRETZINGER AND WEATHERBY CIVIL ENGINEERS

8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

PLAN – PROFILE STA. 197+00 TO 220+00

SUTTER CREEK TO HENDERSON RESERVOIR

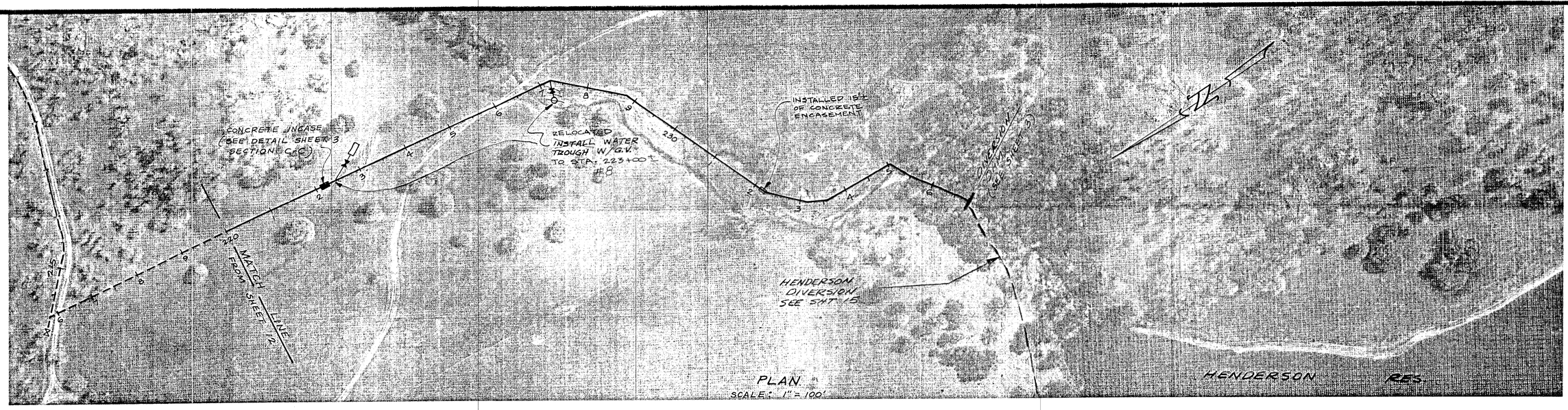
SURVEY:
PLAN
PROFILE

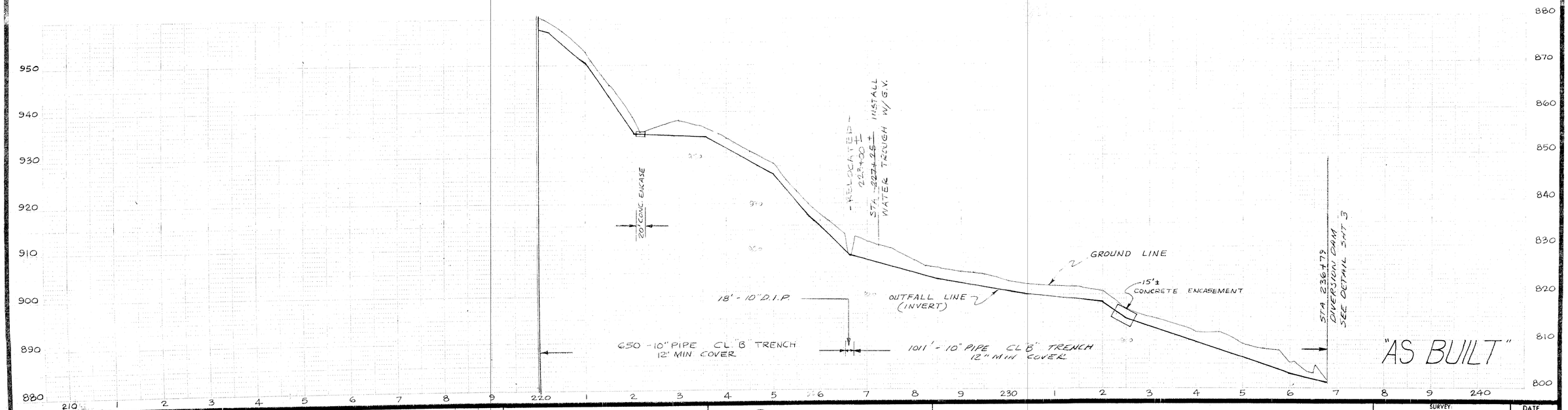
DATE 7-16-79

SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 10'

FILE NO D2849

SHEET 12 OF 30





PREPARED BY:

DRAWN BY: SWEEN CHECKED

SUBMITTED BY C. E. NO.

REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-20-79	GENERAL	RAW	A.S.
2	8-15-80	AS BUILT		

GRAY-SINGER-WEATHERBY CIVIL ENGINEERS

8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

PLAN — PROFILE STA. 220+00 TO 236+79

SUTTER CREEK TO HENDERSON RESERVOIR

SURVEY:
PLAN
PROFILE

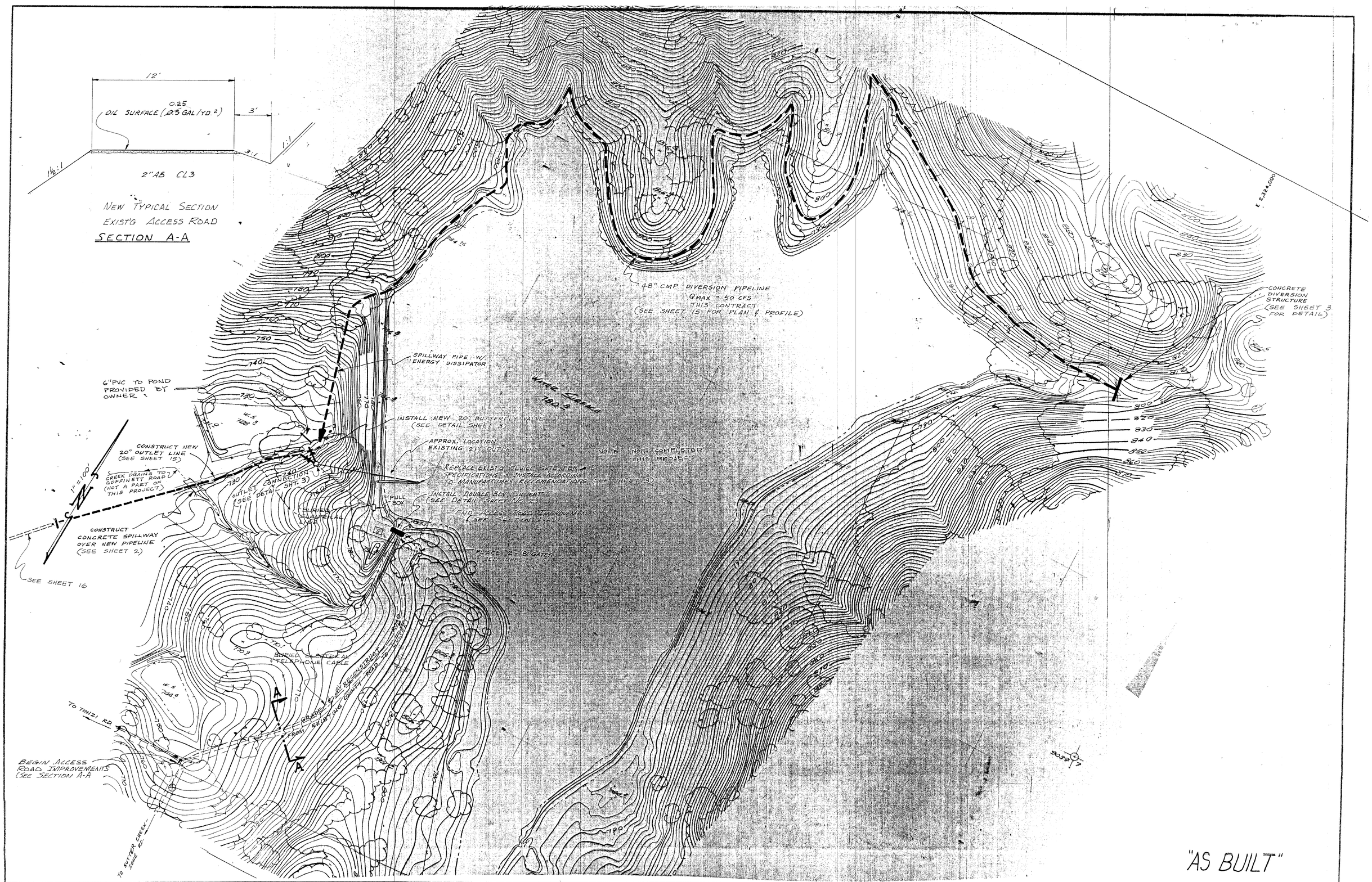
DATE 7-16-79

SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 10'

SHEET 13 OF 30

FILE NO. D2849

JOB NO. 790101



REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-24-79	GENERAL	RAW	
2	8-15-80	AS BUILT	A.S.	

DRAWN BY: Sween & J.W. CHECKED

SUBMITTED BY C. E. NO.

ERLENGER AND WEAVER CIVIL ENGINEERS
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995

HENDERSON RESERVOIR IMPROVEMENTS

SUTTER CREEK TO HENDERSON RESERVOIR

DATE 7-16-79

SCALE: 1" = 100'

SHEET 14 OF 30

FILE NO. D2849

JOB NO. 78010

END OUTLET LINE
(SEE SHEET 16 FOR CONTINUATION OF PROJECT)
(SEE SHEET 27 FOR CONNECTION DETAIL)

CONSTRUCT PIPE PROTECTION (SEE DETAIL THIS SHEET)

MANHOLE (SEE DETAIL THIS SHEET)

18" CMP LOCATED UNDER 48" PIPE TO PROVIDE DRAINAGE

RELOCATED MANHOLE

END PIPE SPILLWAY
BEGIN DIVERSION PIPELINE

DELETE THIS MANHOLE

MAINTAIN A MINIMUM OF 10.0' BETWEEN TOE OF DAM & DIVERSION PIPE

48" PIPE SPILLWAY

STA 7+19 BK = STA 5+80 AHD

ENERGY DISSIPATOR STA. 46+00 (SEE DETAIL SHT. 3)

OUTFALL LINE

OUTLET CONNECTION STA 0+00 SEE SHEET 3

CONSTRUCT CONCRETE SPILLWAY OVER PIPE (SEE DETAIL SHT. 2)

NOTE:
X ═══ X DENOTES NEW FENCE TO BE INSTALLED (SEE FENCE DETAIL SHT. 2)

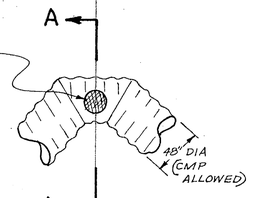
FLIGHT CROSS EL. 787.32'

CONSTRUCT 48" DIVERSION PIPELINE (CMP ALLOWED)

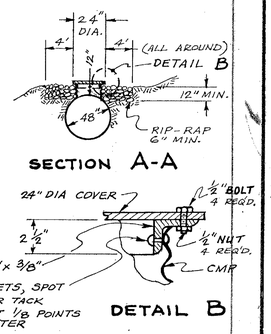
HENDERSON RESERVOIR

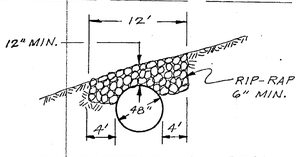
R = 100'
Δ = 90°

STA. 82+50 BK = STA. 236+79 AHD
CONCRETE DIVERSION STRUCTURE (SEE SHT. 3)

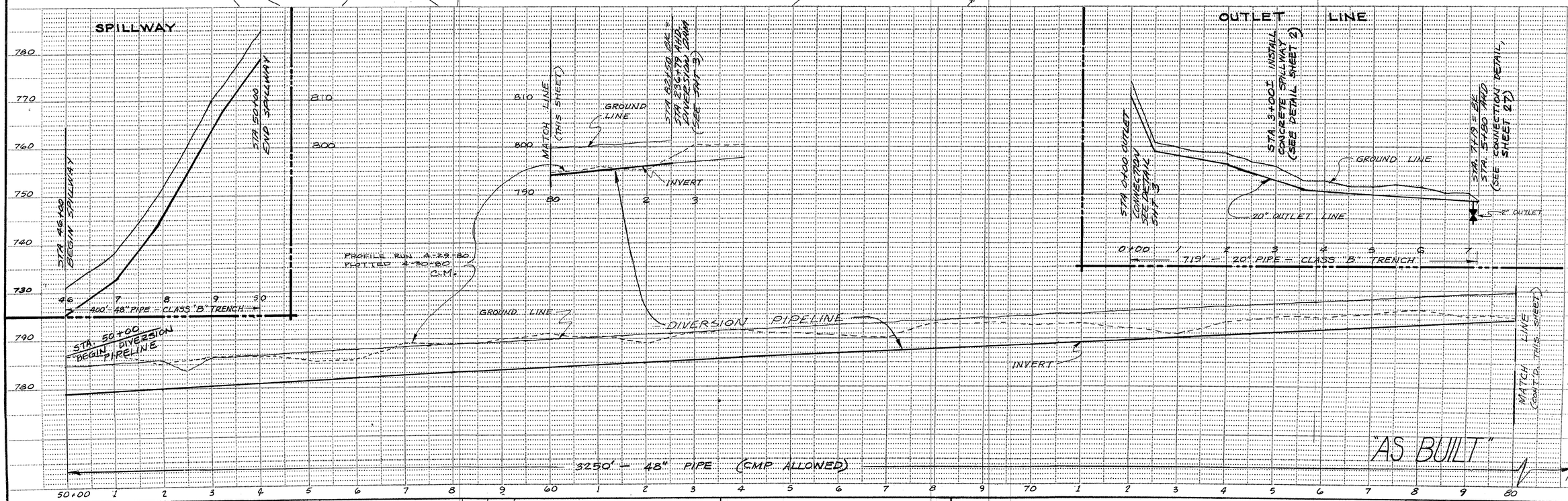


MANHOLE DETAILS
N.T.S.





PIPE PROTECTION DETAIL
STA. 55+10± & STA. 55+40±
DIVERSION PIPELINE
N.T.S.



"AS BUILT"

REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-24-79	GENERAL	RAW	A.J.
2	8-15-80	AS BUILT		

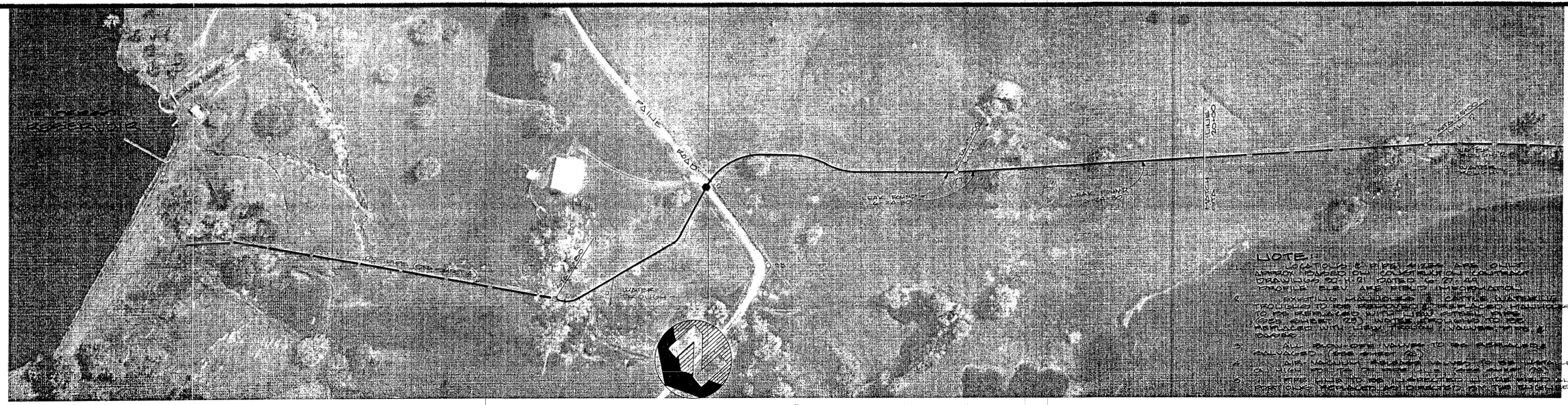
PREPARED BY:
DRAWN BY: NW CHECKED
SUBMITTED BY C. E. NO.

GRETZINGER AND WEATHERBEE CIVIL ENGINEERS
10 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

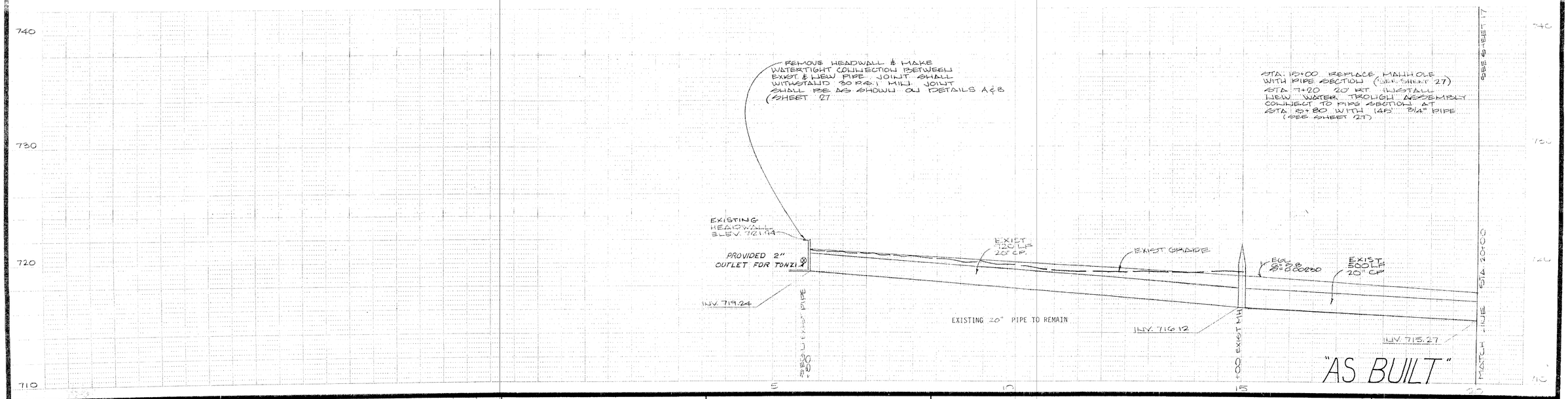
AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995
HENDERSON RESERVOIR DIVERSION
SUTTER CREEK TO HENDERSON RESERVOIR

SURVEY:
PLAN
PROFILE
DATE 7/14/79
SCALE: HORIZONTAL 1" = 100' VERTICAL 1" = 10'
SHEET 15/30 OF
FILE NO. D2849

JOB NO. 790101



● = BROKE INTO LINE FOR T.V. CREW



REVISION	DATE	DESCRIPTION	BY	APPD.
1	5-79	GENERAL (NO CHANGE)		
2	8-15-80	AS BUILT		

PREPARED BY:

DRAWN BY: HOWERTER CHECKED GERMAN

SUBMITTED BY: C. E. NO.

GRETZINGER AND WEATHERBY CIVIL ENGINEERS

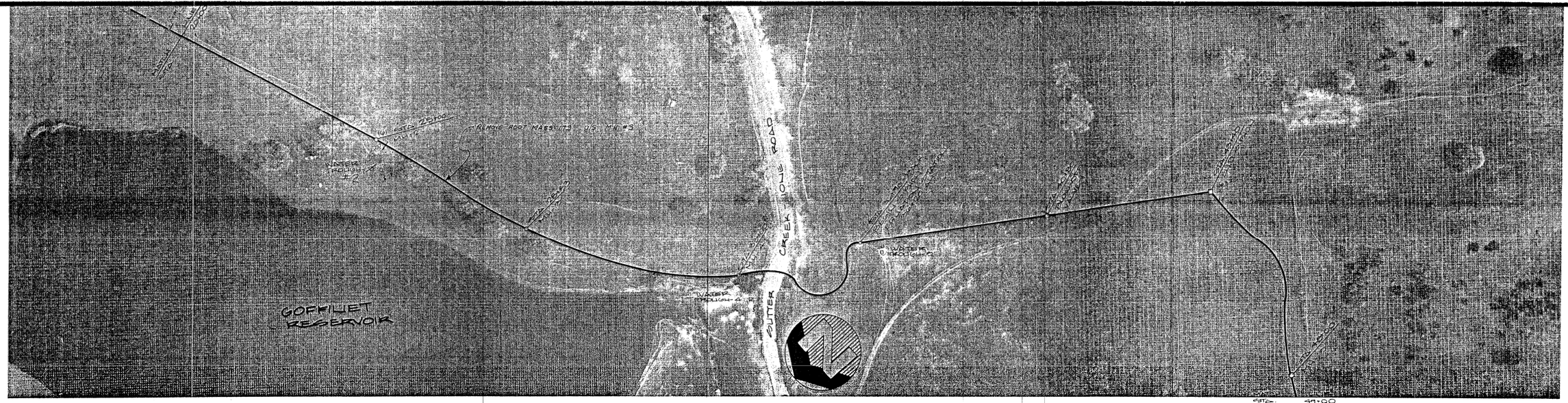
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

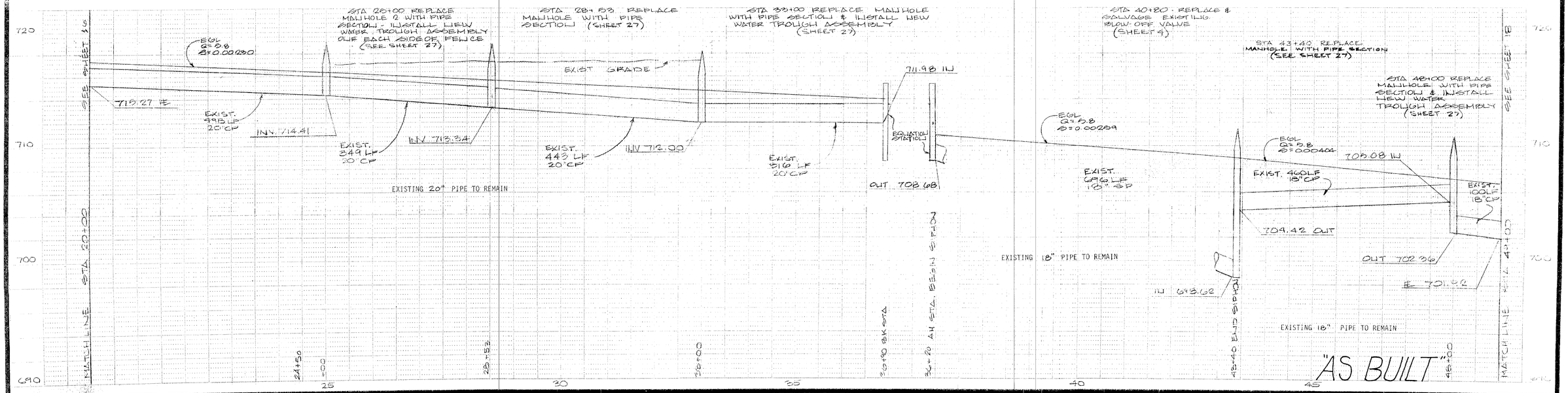
AMADOR COUNTY REGIONAL OUTFALL LINE

HENDERSON RESERVOIR TO PRESTON FOREBAY

SURVEY:
PLAN
PROFILE
SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 4'
FILE NO. (79004) D2849

DATE MAY 79
SHEET 16
OF 30





PREPARED BY:

DRAWN BY: HOWERTER CHECKED GERMAN

SUBMITTED BY: C. E. NO.

REVISION	DATE	DESCRIPTION	BY	APPD.

GREWENGER AND WEATHERBY CIVIL ENGINEERS

8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

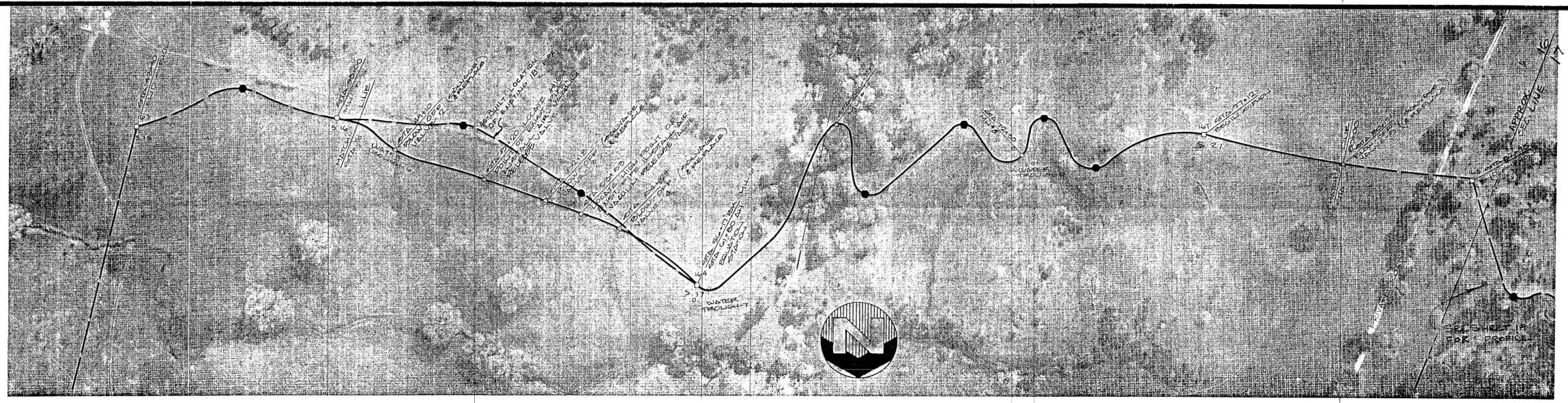
AMADOR COUNTY REGIONAL OUTFALL LINE

HENDERSON RESERVOIR TO PRESTON FOREBAY

SURVEY:
PLAN:
PROFILE:
SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 4'
FILE NO. (79204) D2849

DATE MAY 79

SHEET 17 OF 30



●=BROKE INTO LINE FOR T.V. CREW

PREPARED BY:

DRAWN BY: HOWERTER CHECKED GERMAN

SUBMITTED BY C. E. NO.

REVISION	DATE	DESCRIPTION	BY	APPD

GARTZINGER AND WEATHERBY CIVIL ENGINEERS

8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUT FALL LINE

HENDERSON TO PRESTON RESERVOIR FOREBAY

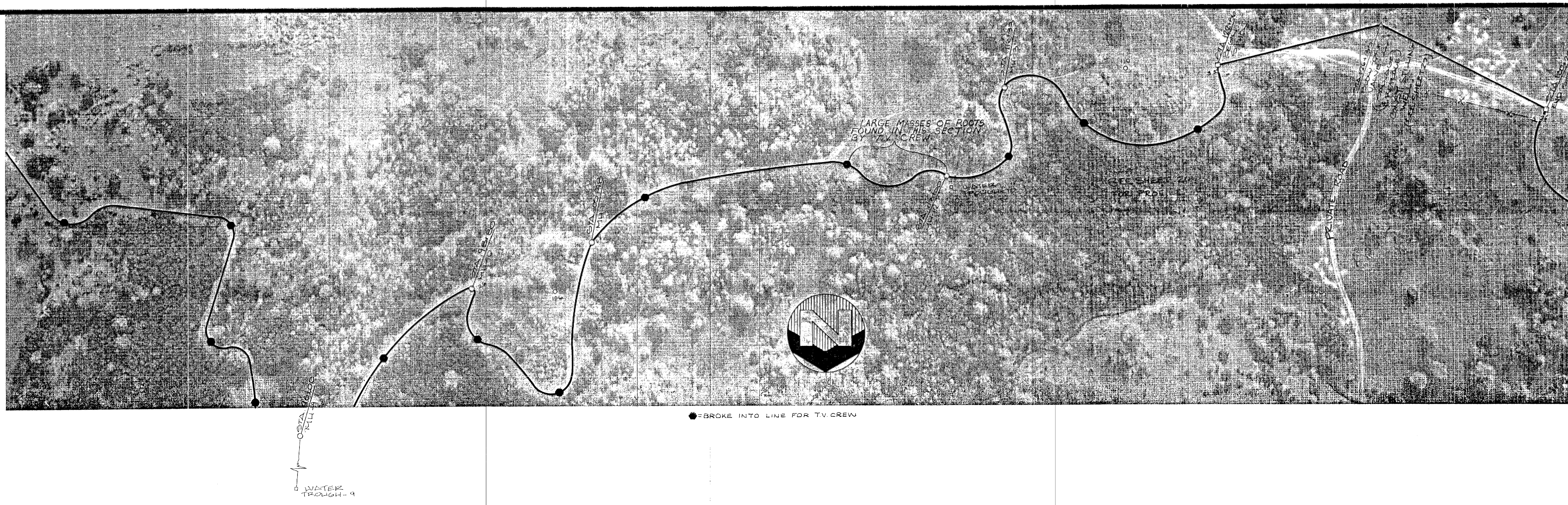
SURVEY:
PLAN
PROFILE

SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 4'

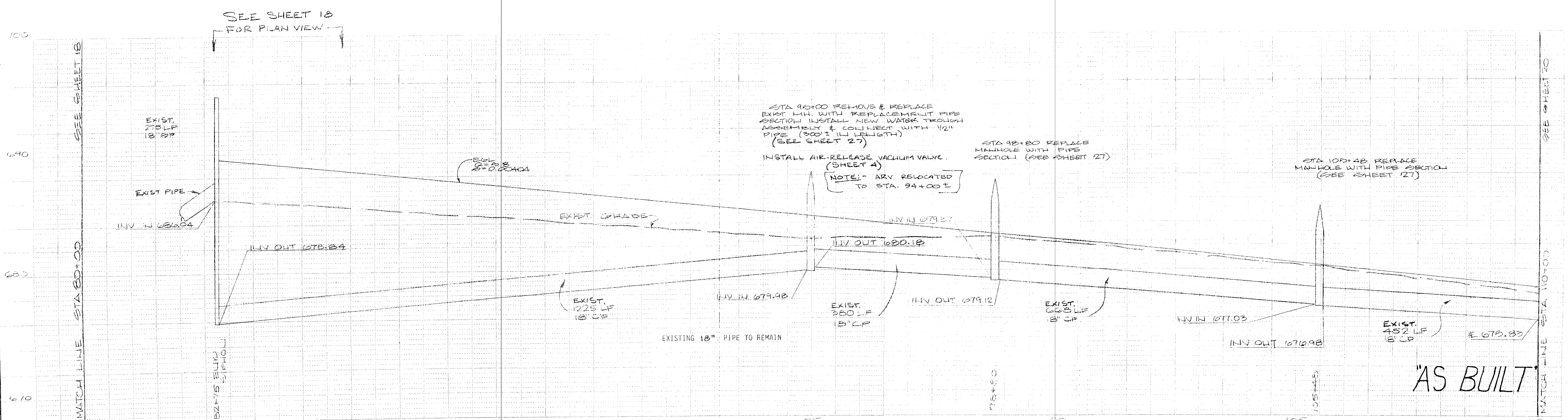
FILE NO. (79004) D2849

DATE MAY 79

SHEET 18 OF 30



●=BROKE INTO LINE FOR T.V. CREW



REVISION	DATE	DESCRIPTION	BY	APPD.
1	5-79	GENERAL (NO CHANGE)		
2	8-15-80	AS BUILT (A.S.)		

PREPARED BY:

DRAWN BY: HOWERTER CHECKED GERMAN

SUBMITTED BY ______ C. E. NO. ______

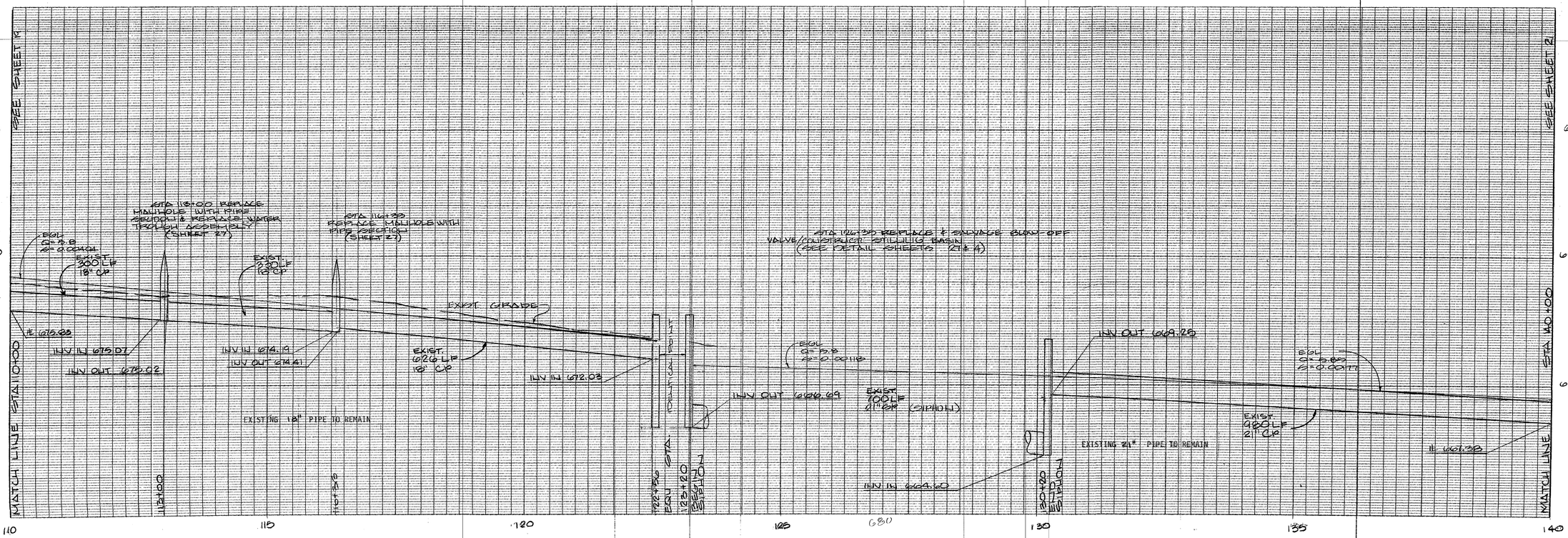
GRETZINGER AND WEATHERBY CIVIL ENGINEERS
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL LINE
HENDERSON RESERVOIR TO PRESTON FOREBAY

SURVEY: PLAN ______ PROFILE ______
SCALE: HORIZONTAL 1" = 100' VERTICAL 1" = 4'
FILE NO. (79004) D2849

DATE: MAY 79
SHEET 19 OF 30

PLAN VIEW. SEE SHEET 19 & 21



"AS BUILT"

BENCHMARK ELEV. _____

FIELD BOOK NO. _____ PG. _____

JTS ENGINEERING CONSULTANTS, INC.
811 J. STREET
SACRAMENTO, CALIFORNIA 95814 (916) 441-6708

DESIGNED LYEDA
DRAWN HOWERTER
CHECKED GERMAN
SUBMITTED _____ RCE _____

SCALE
H=1"=100'
V=1"=4'

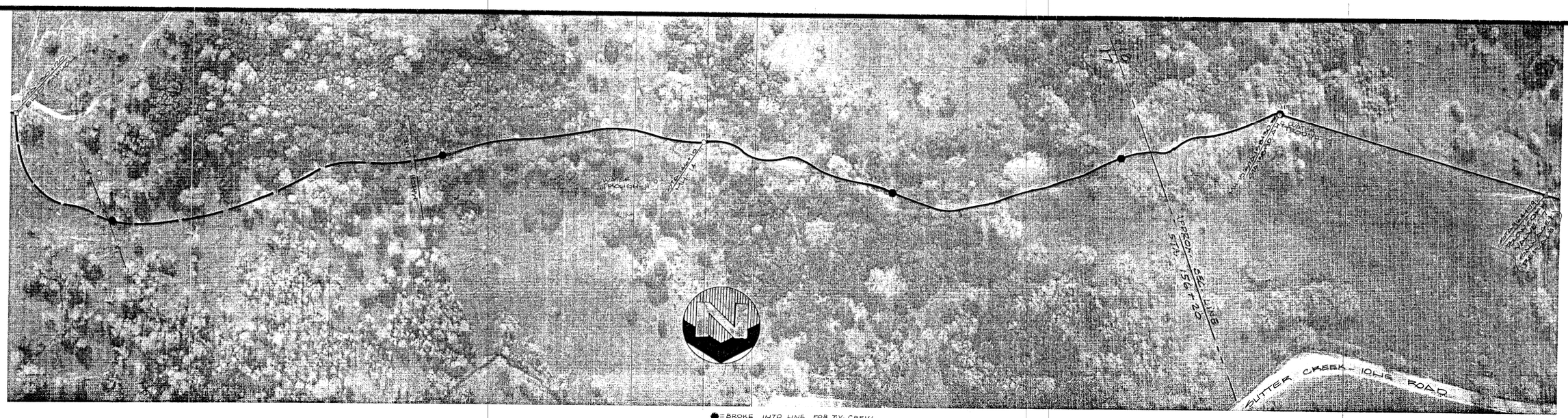
NO	DATE	REVISION	COUNTY APPROVAL	BY

AMADOR COUNTY REGIONAL OUTFALL LINE
HENDERSON RESERVOIR TO PRESTON FOREBAY

DATE MAY 79
SHEET 20 OF 30

JOB NO. (79004)
D2849

BRUNING 330235-1



●=BROKE INTO LINE FOR T.V. CREW

PREPARED BY:

DRAWN BY: HOWERTER CHECKED GERMAN

SUBMITTED BY C. E. NO.

REVISION	DATE	DESCRIPTION	BY	APPD.

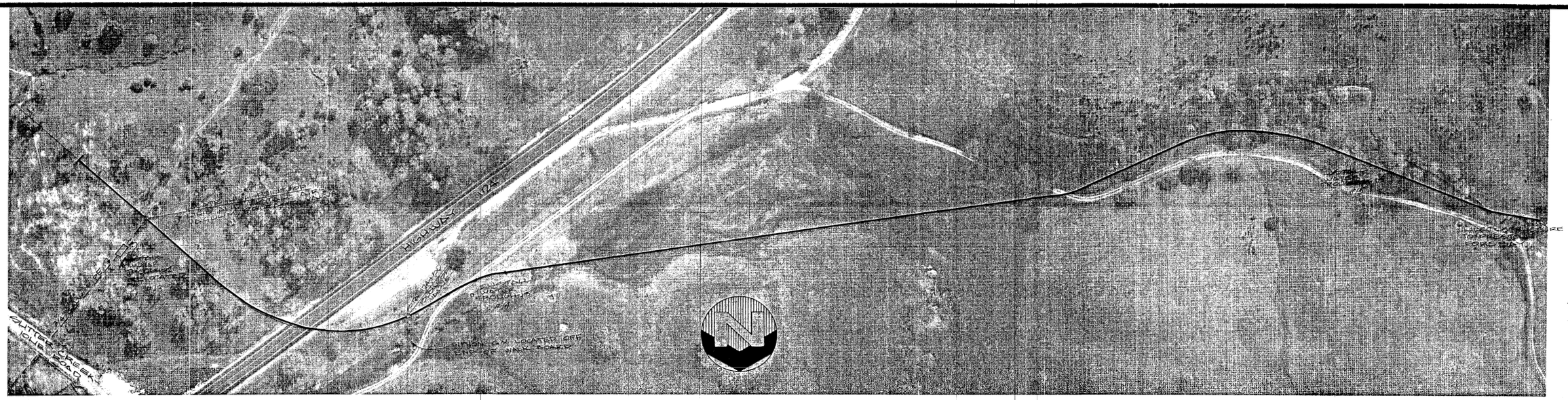
GRETZINGER, JANDL, WEATHERBY CIVIL ENGINEERS

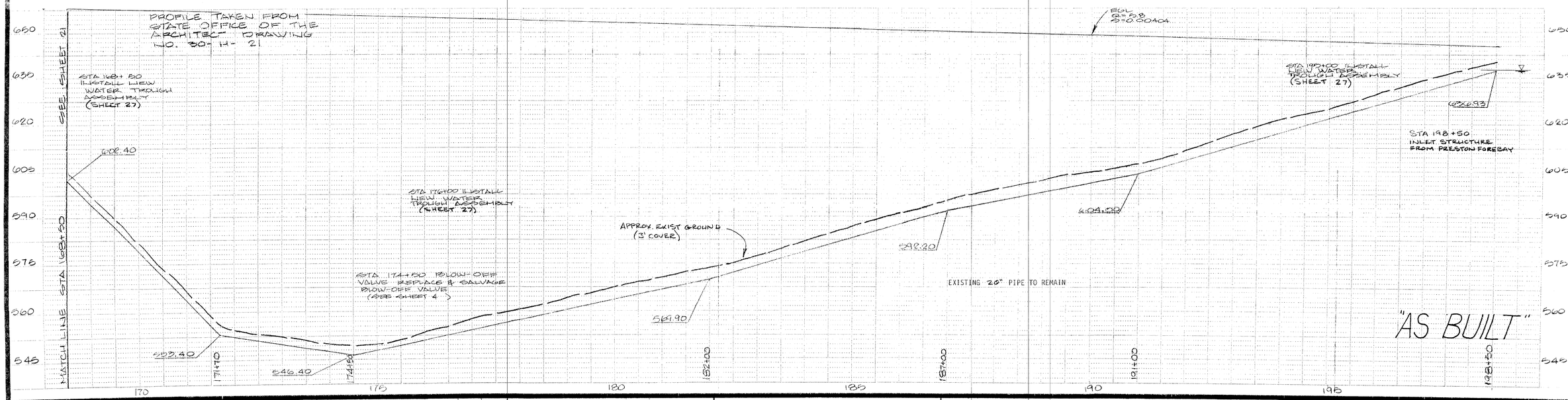
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL LINE
HENDERSON RESERVOIR TO PRESTON FOREBAY

SURVEY:
PLAN
PROFILE
SCALE: HORIZONTAL 1" = 100' VERTICAL 1" = NOTED
FILE NO. (79004) D2849

DATE MAY 79
SHEET 21 OF 30





PREPARED BY:

DRAWN BY: HOWERTER CHECKED GERMAN

SUBMITTED BY: C. E. NO.

REVISION	DATE	DESCRIPTION	BY	APPD.
1	9-79	GENERAL (NO CHANGE)		
2	8-15-80	AS-BUILT	A.S.	

GREENINGER AND WEATHERBY CIVIL ENGINEERS

8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL LINE

HENDERSON TO RESERVOIR PRESTON FOREBAY

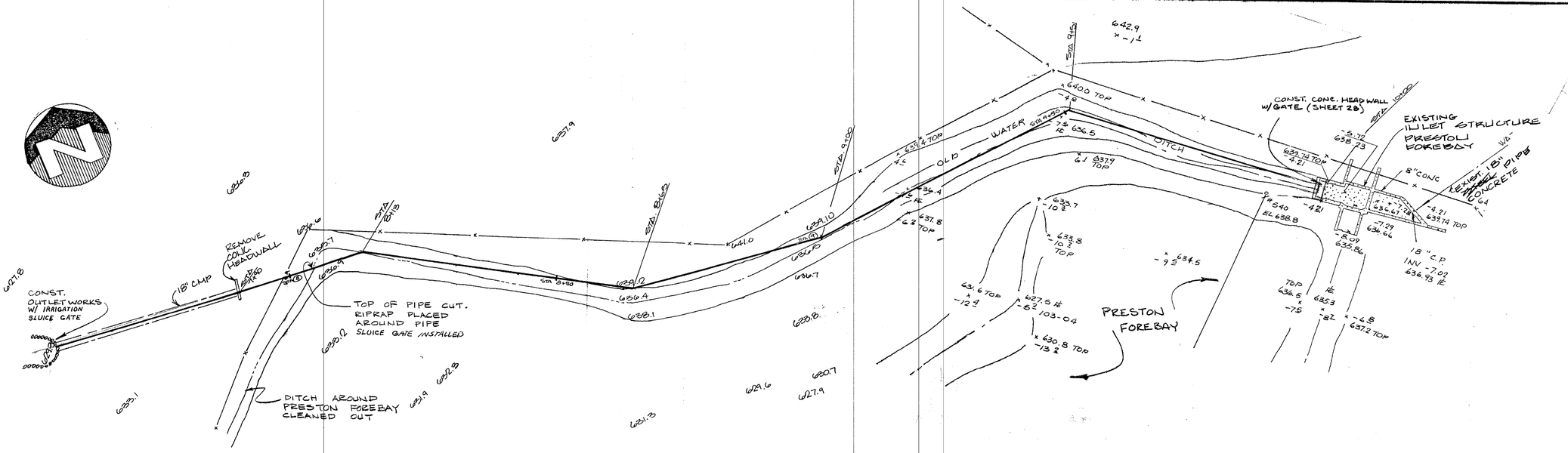
SURVEY:
PLAN
PROFILE

SCALE:
HORIZONTAL 1" = 100'
VERTICAL 1" = 15'

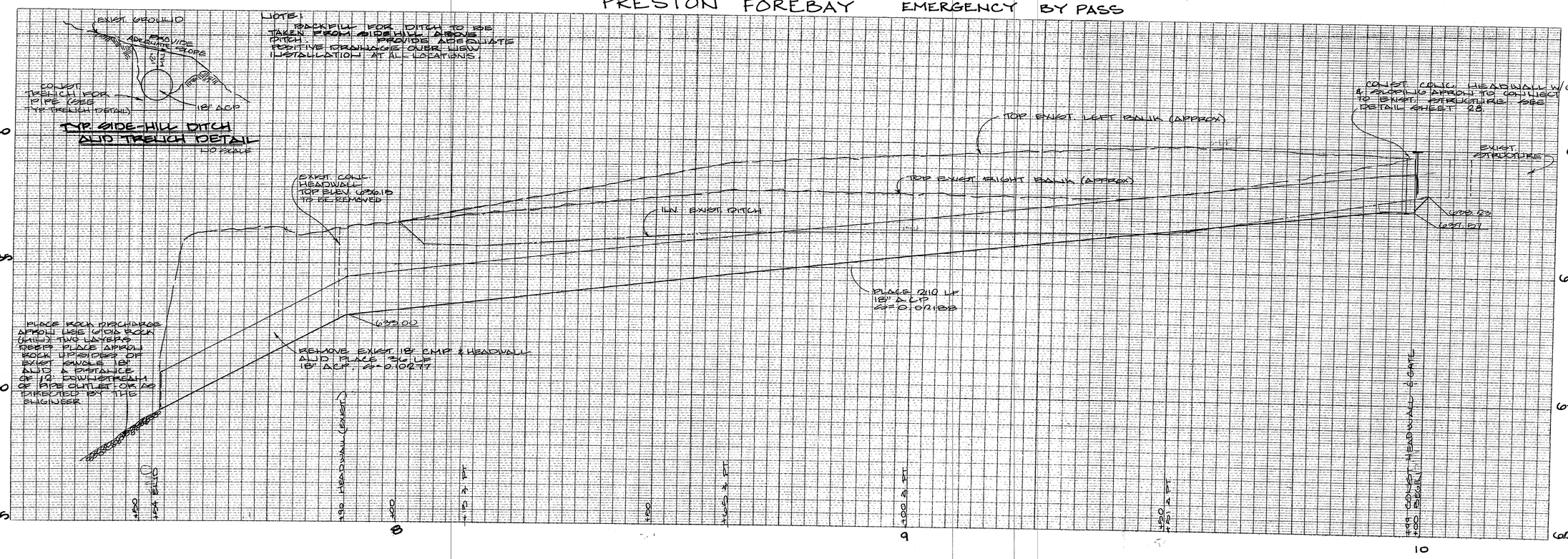
FILE NO. 79004

DATE MAY 79

SHEET 22 OF 30



PRESTON FOREBAY EMERGENCY BY PASS



"AS BUILT"

BENCHMARK ELEV.	
FIELD BOOK NO. / PG.	

JTS ENGINEERING CONSULTANTS, INC.
811 J. STREET
SACRAMENTO, CALIFORNIA 95814 (916) 441-6708

DESIGNED	UYEDA
DRAWN	HOWERTER
CHECKED	GERMAN
SUBMITTED	RCE

SCALE H = 1" = 10' V = 1" = 2'

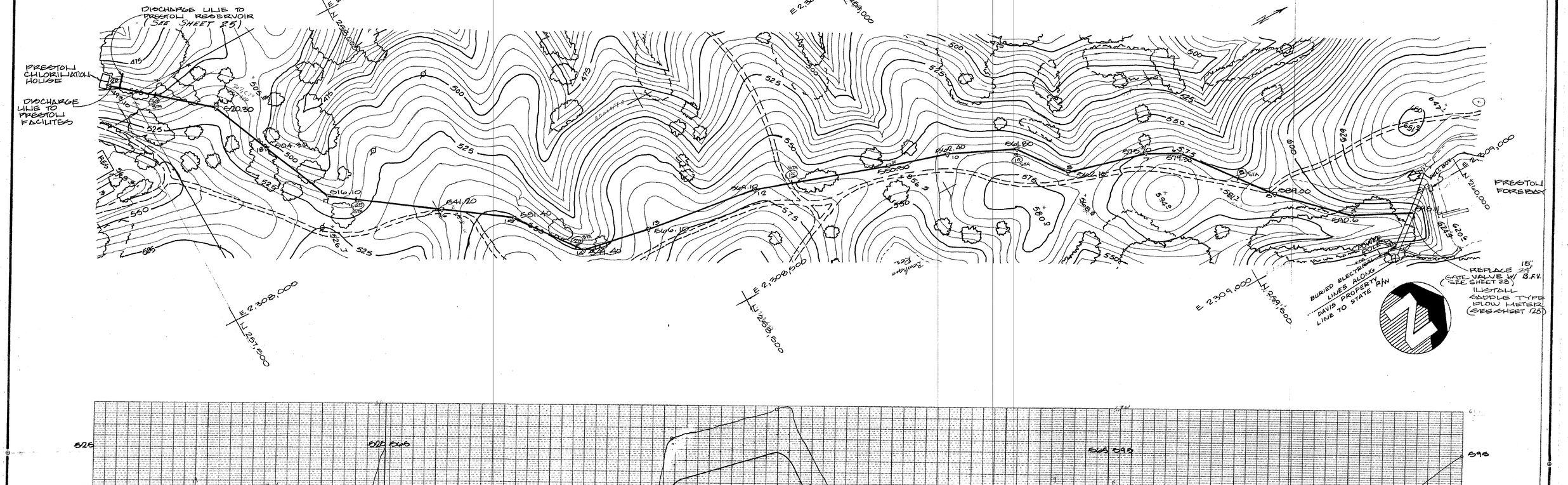
NO	DATE	REVISION	COUNTY APPROVAL	BY
1	9-79	GENERAL (NO CHANGE)		
2	8-15-80	AS-BUILT (A.S.)		

AMADOR COUNTY REGIONAL OUTFALL LINE
PRESTON FOREBAY
EMERGENCY BY-PASS
AMADOR COUNTY CALIFORNIA

DATE JULY 79
SHEET 23 OF 30

JOB NO. (79004)

BRUNING 33035-1



"AS BUILT"

BENCHMARK ELEV. _____

FIELD BOOK NO. _____ PG. _____

BRUNING 23035-1

JTS ENGINEERING CONSULTANTS, INC.
811 J. STREET
SACRAMENTO, CALIFORNIA 95814 (916) 441-6708

DESIGNED UYEDA
DRAWN HOWERTER
CHECKED GERMAN
SUBMITTED _____ RCE _____
SCALE H=1"=100' V=1"=5'

NO	DATE	REVISION	COUNTY APPROVAL	BY

OUTFALL LINE.

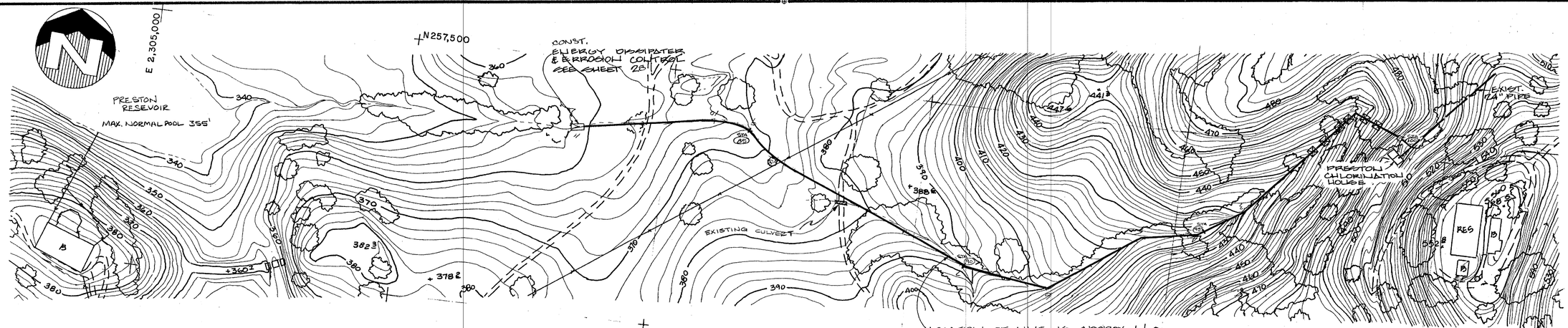
SUTTER CREEK

PRESTON FOREBAY - CHLORINATION HOUSE

AMADOR COUNTY, CALIFORNIA

DATE MAY 79
SHEET 24/30 OF

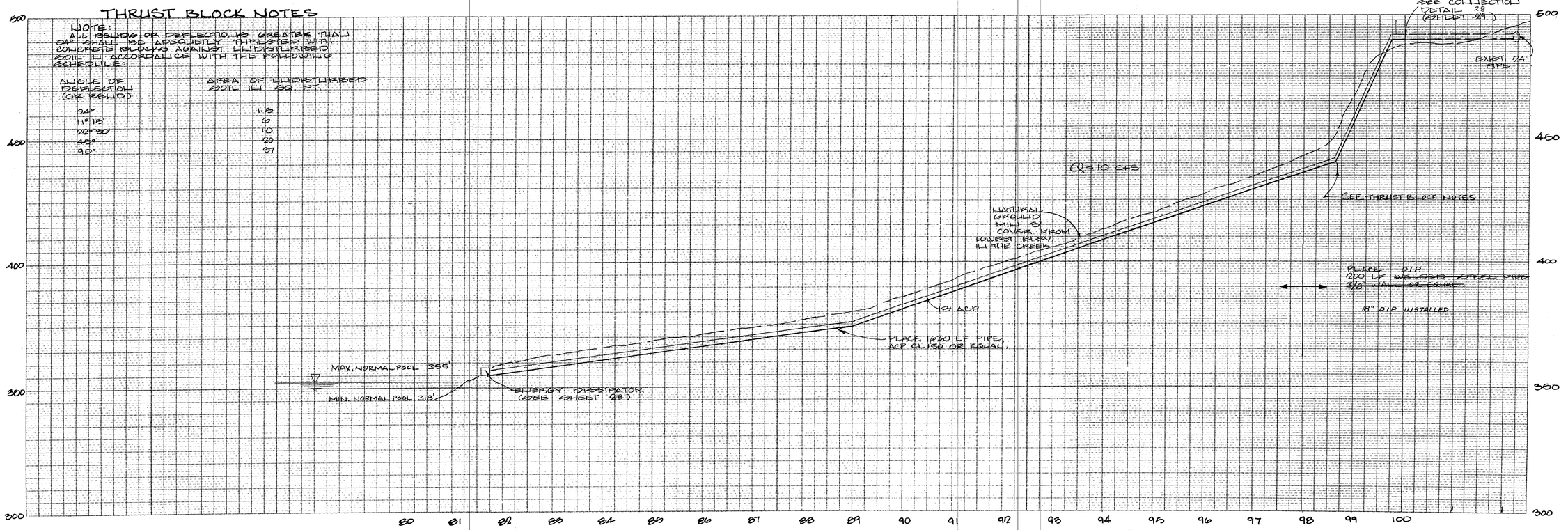
JOB NO. (79004)



THRUST BLOCK NOTES

NOTE:
ALL BENDS OR DEFLECTIONS GREATER THAN ONE SHALL BE ADEQUATELY THRUSTED WITH CONCRETE BLOCKS AGAINST UNDISTURBED SOIL IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:

ANGLE OF DEFLECTION (OR BEND)	AREA OF UNDISTURBED SOIL IN SQ. FT.
04°	1.5
11° 15'	6
22° 30'	10
45°	20
90°	37



"AS BUILT"

BENCHMARK ELEV. _____

FIELD BOOK NO. _____ PG. _____

BRUNING 33035-1

JTS ENGINEERING CONSULTANTS, INC.
811 J. STREET
SACRAMENTO, CALIFORNIA 95814 (916) 441-6708

DESIGNED LIVEDA
DRAWN BLINGE
CHECKED GERMAN
SUBMITTED _____ RCE _____
SCALE H=1"=100' V=1"=10'

NO	DATE	REVISION	COUNTY APPROVAL	BY
1	9-79	GENERAL (NO CHANGE)		
2	8-15-80	AS-BUILT (A.S.)		

OUTFALL LINE

SUTTER CREEK

CHLORINATION HOUSE TO PRESTON RES.

AMADOR COUNTY, CALIFORNIA

DATE MAY 79
SHEET 25 OF 30

JOB NO. (79004)
D2249

"AS BUILT"

BENCHMARK ELEV.	
FIELD BOOK NO.	PG.

JTS ENGINEERING CONSULTANTS, INC.
811 J. STREET
SACRAMENTO, CALIFORNIA 95814 (916) 441-6708

DESIGNED	UYEDA	SCALE H 1"= 100' V 1"= 4'
DRAWN	HOWERTER	
CHECKED	GERMAN	
SUBMITTED		RCE

NO	DATE	REVISION	COUNTY APPROVAL	BY
1	9-79	GENERAL (NO CHANGE)		
2	8-15-80	AS-BUILT (A.S.)		

FARMLAND IRRIGATION LINE

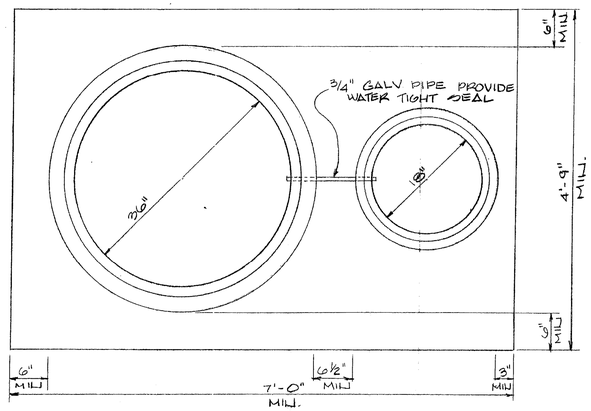
SUTTER CREEK

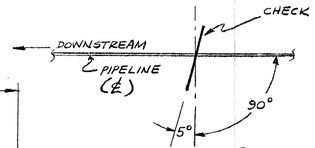
AMADOR COUNTY, CALIFORNIA

DATE JULY 79
SHEET 26 OF 30

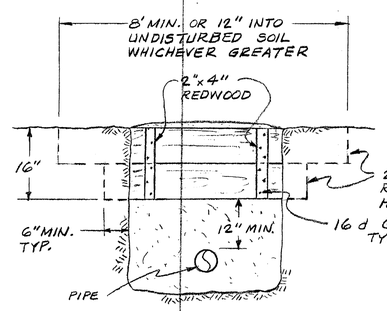
JOB NO. (79004)
D 2849

BRUNING 33035-1





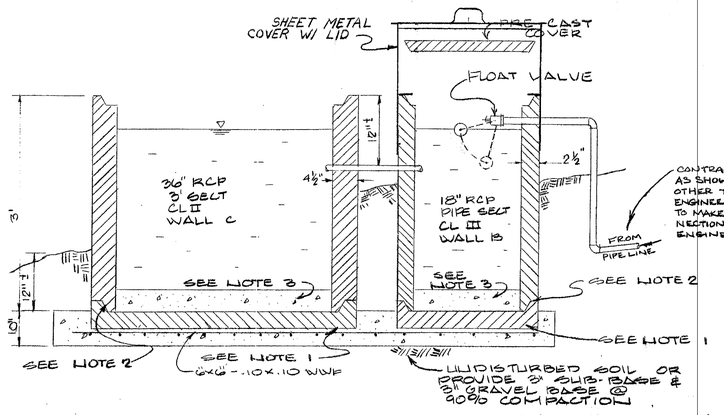
DETAIL (1)
N.T.S.



NOTE:
INSTALL CHECK DAMS AT 25' INTERVALS IN UNPAVED AREAS WITH SLOPES GREATER THAN 20%. WHEN IN EXISTING STREAM BED OR DRAIN COURSE, DAMS SHALL BE INSTALLED WHERE SLOPE EXCEEDS 5%. INSTALLATION TO BE SKEWED TO LINE OF SLOPE PER DETAIL (1)

REDWOOD CHECK DAM

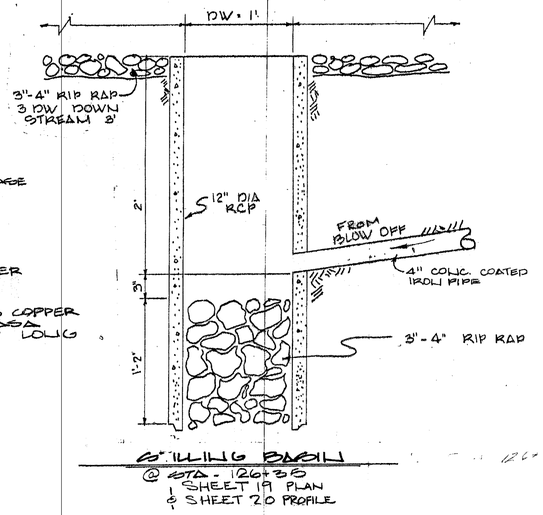
N.T.S.

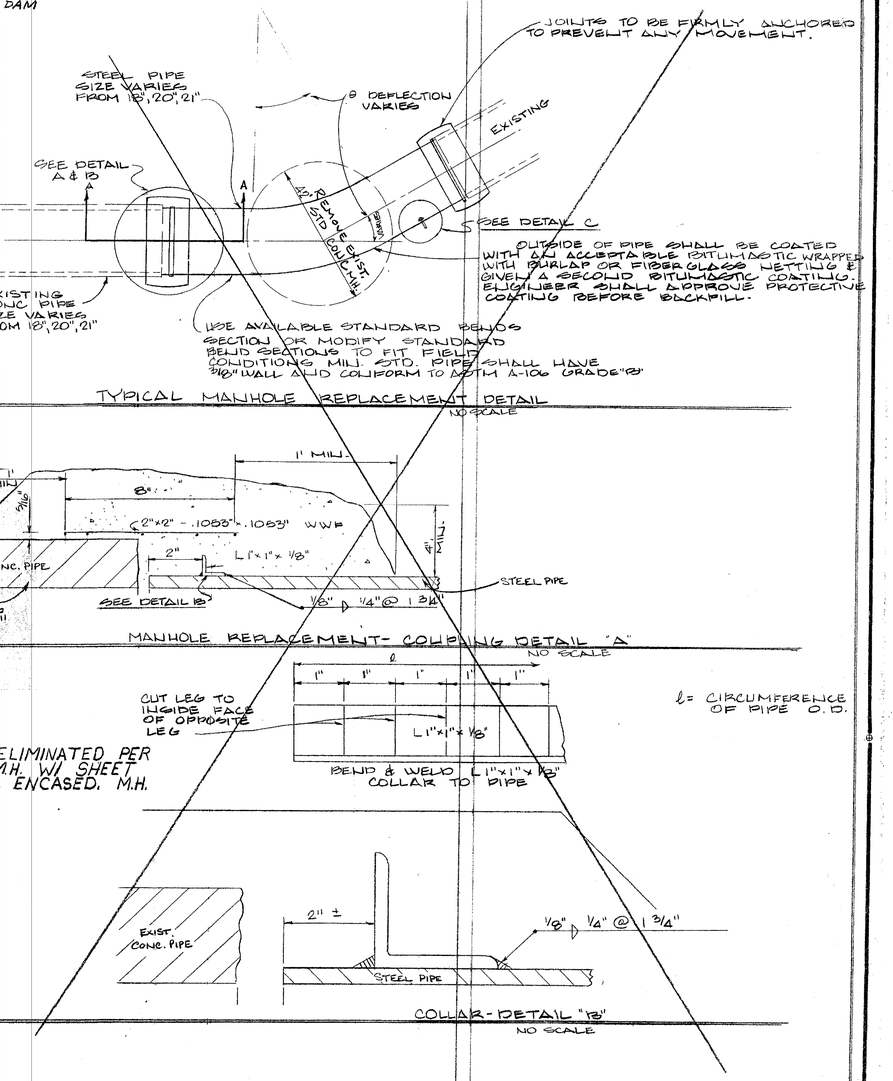


TYPICAL WATER TROUGH ASSEMBLY
SCALE 1"=1'-0"

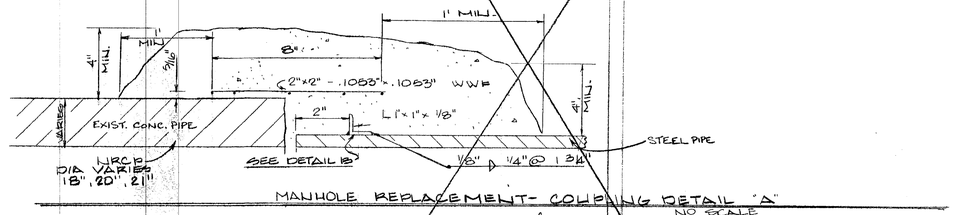
NOTES:

1. PRECAST CONCRETE BASE TO BE SET IN 10" CONCRETE FOUNDATION SLAB- FORMING WILL NOT BE REQUIRED
2. FLEXIBLE JOINT SEALANT TO BE PLACED BETWEEN THE BASE AND PIPE SECTIONS AND ALL JOINTS TO BE GROUTED TO FORM A WATER TIGHT SEAL
3. 4" OF CONCRETE TO BE PLACED IN PIPE AT BASE TO SEAL JOINT
4. CONCRETE PIPE TO BE GROUTED AT BASE
5. 3/4" GALVANIZED PIPE TO BE GROUTED TO FORM A WATER TIGHT CONNECTION
6. FLOAT CHAMBER MECHANISM TO BE ROBERT COMPANY CASA BALL COCK/6" LUGH SEAMLESS BALL/# 40-B COPPER ROD (8") ;OR BAKER HAMILTON & PACIFIC COMPANY # 24 CASA BALL COCK / # 20-6" COPPER BALL / # 430- 1/4" ROD-8" LONG 20 THREADS OR EQUIVALENT.
7. USE 6"x6" 10/10 WWF IN SLAB.
8. H_2O TROUGHS LOCATED ON ALLEN PROPERTY, SEE CCO #1.





TYPICAL MANHOLE REPLACEMENT DETAIL
NO SCALE

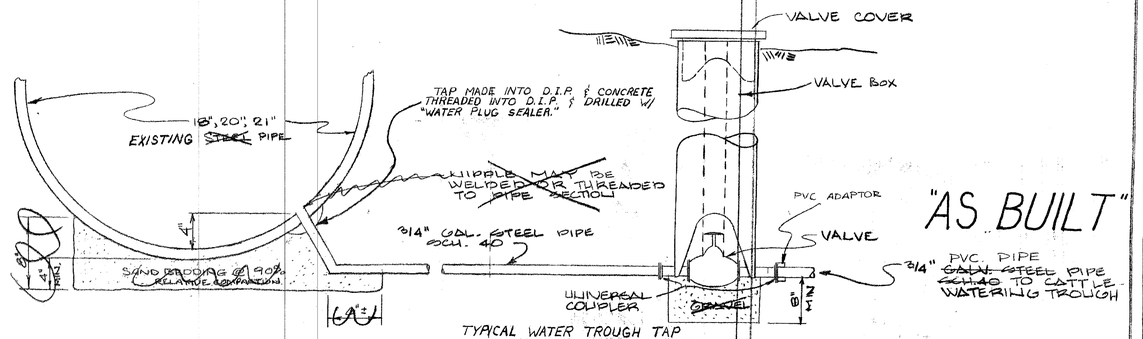


MANHOLE REPLACEMENT- COUPLING DETAIL "A"
NO SCALE

NOTE:
THESE DETAILS ELIMINATED PER CCO-02. REPLACED M.H. W/ SHEET METAL FLUME & CONC. ENCASED. M.H. LEFT IN PLACE.

ℓ = CIRCUMFERENCE OF PIPE O.D.

COLLAR- DETAIL "B"
NO SCALE



"AS BUILT"

TYPICAL WATER TROUGH TAP
MANHOLE REPLACEMENT- INLET DETAIL-"C"
APPLICABLE WHERE NOTED ON PLANS NO SCALE

BENCHMARK ELEV. _____

FIELD BOOK NO. _____ PG. _____

BRUNING 3-9035-1

JTS ENGINEERING CONSULTANTS, INC.
811 J. STREET
SACRAMENTO, CALIFORNIA 95814 (916) 441-6708

DESIGNED LIVEDA
DRAWN HOWERTER
CHECKED GERMALI
SUBMITTED _____ RCE _____
SCALE

NO	DATE	REVISION	COUNTY APPROVAL	BY

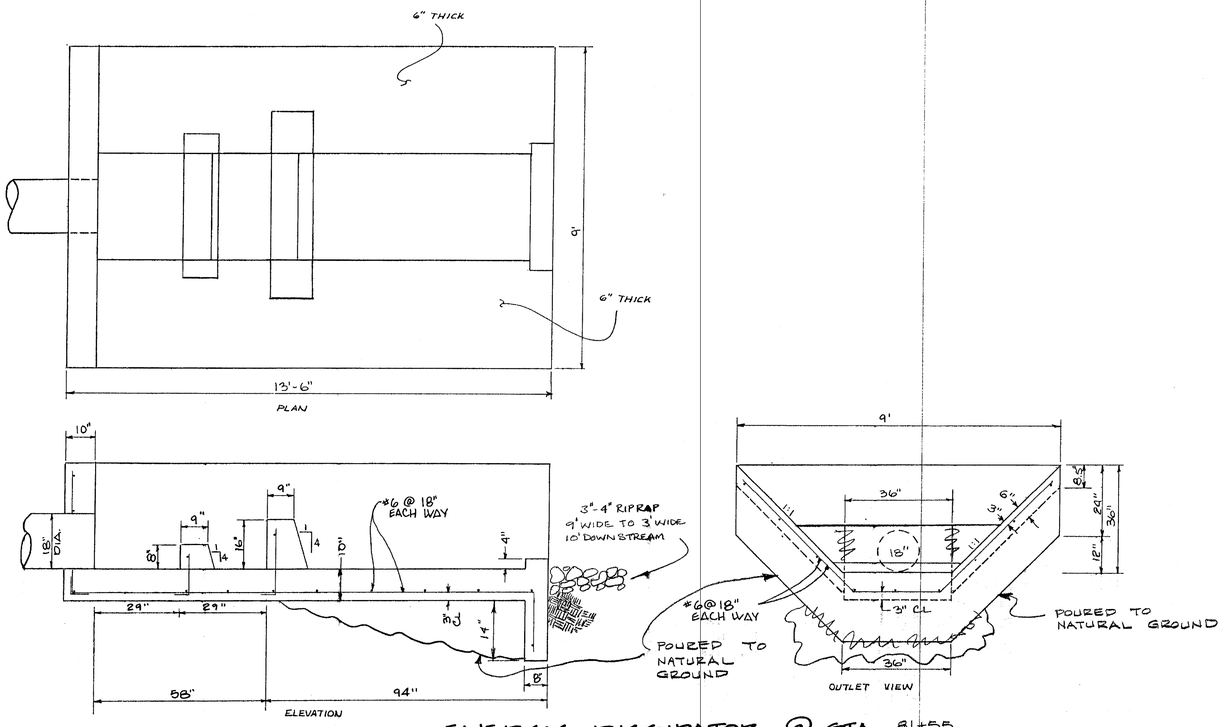
AMADOR COUNTY REGIONAL OUTFALL LINE

MISCELLANEOUS DETAILS

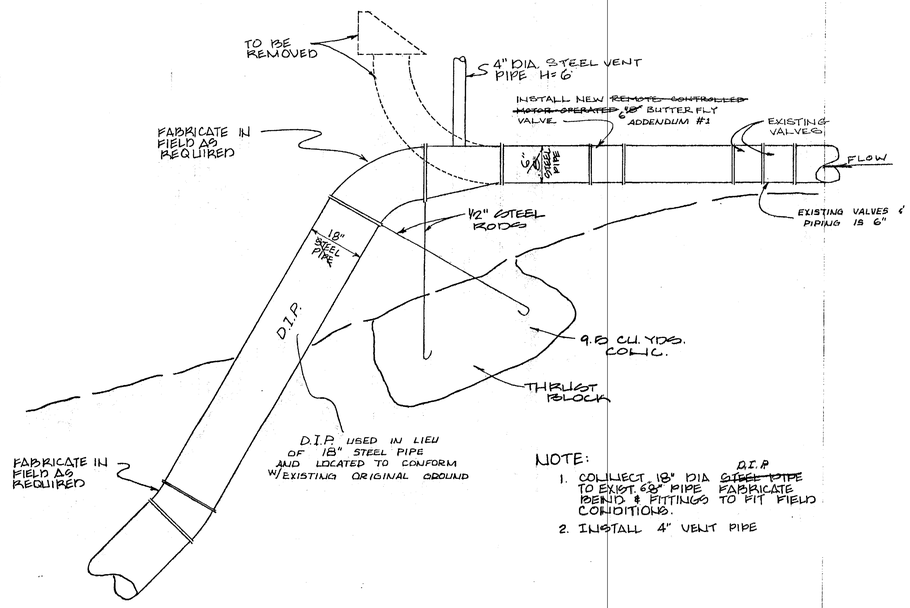
AMADOR COUNTY, CALIFORNIA

DATE JULY 79
SHEET 27 OF 30

JOB NO. (19004)



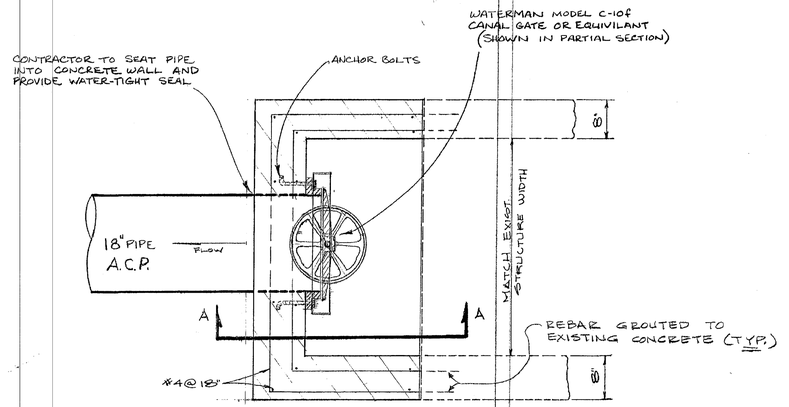
ENERGY DISSIPATOR @ STA. 81+55



NOTE:

1. COLLECT 18" DIA ~~STEEL PIPE~~ D.I.P TO EXIST. 68" PIPE FABRICATE BEND & FITTINGS TO FIT FIELD CONDITIONS.
2. INSTALL 4" VENT PIPE

OUTFALL LINE CONNECTOR @ CHLORINATION HOUSE STA. 100+00

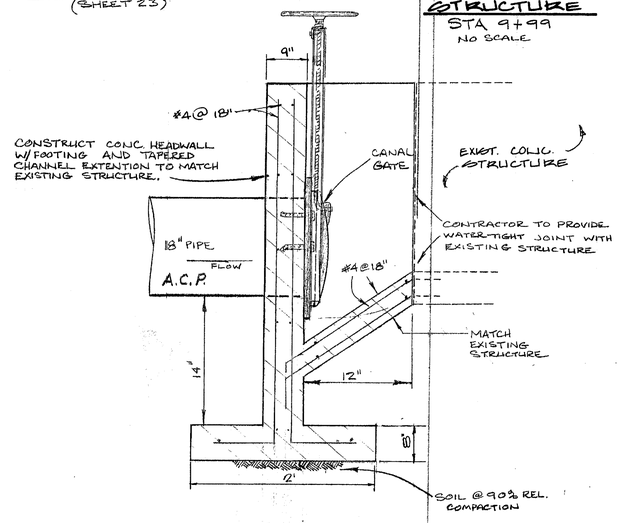


PRESTON FOREBAY EMERGENCY BY-PASS INLET STRUCTURE

(SHEET 23)

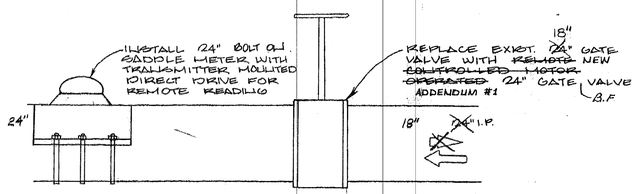
STA 9+99

NO SCALE



SECTION A-A

NO SCALE



24" GATE/VALVE BELOW PRESTON FOREBAY AND BOLT ON SADDLE METER

@ STA 1+00

NOTE: THE PIPE IN THIS AREA TAPERS FROM 18" TO 24"

"AS BUILT"

BENCHMARK ELEV. _____

FIELD BOOK NO. _____ PG. _____

BRUNING 33035-1

JTS ENGINEERING CONSULTANTS, INC.
811 J. STREET
SACRAMENTO, CALIFORNIA 95814 (916) 441-6708

DESIGNED	LVEDA
DRAWN	HOWERTER
CHECKED	GERMAN
SUBMITTED	RCE
SCALE	NONE

NO	DATE	REVISION	COUNTY APPROVAL	BY
1	9-79	GENERAL (NO CHANGE)		
2	8-1580	AS-BUILT (A-5)		

AMADOR COUNTY REGIONAL OUTFALL LINE

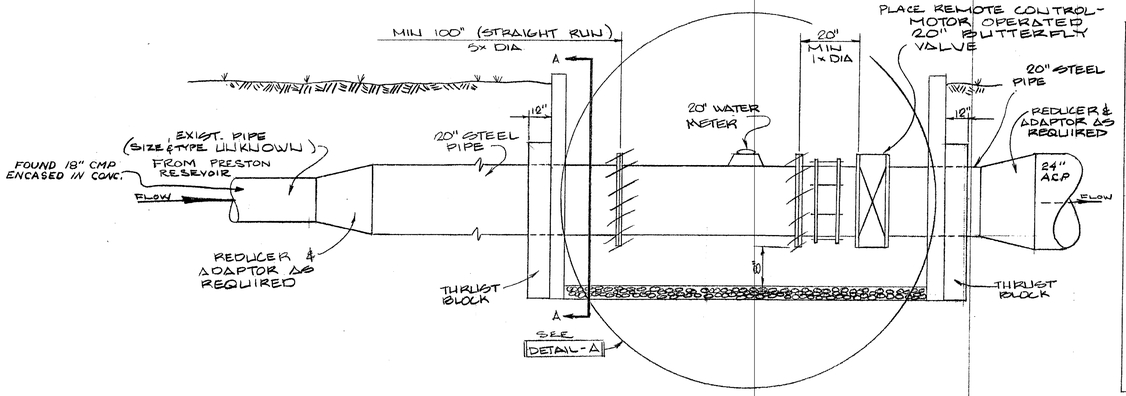
MISCELLANEOUS DETAILS

CITY OF IONE, AMADOR COUNTY, CALIFORNIA

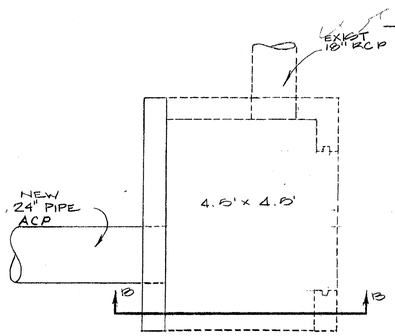
DATE JULY 79

SHEET 28 OF 30

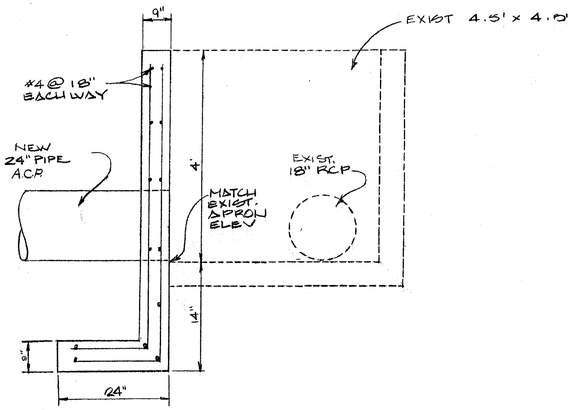
JOB NO. (79004) D2845



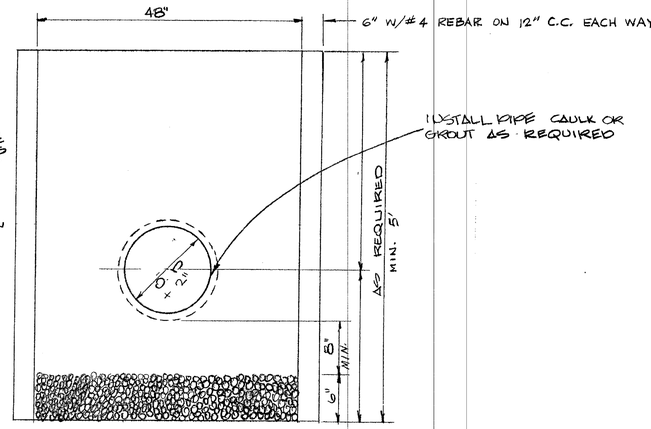
PRESTON RESEVOIR
FLOW METER VAULT
STA 1+00



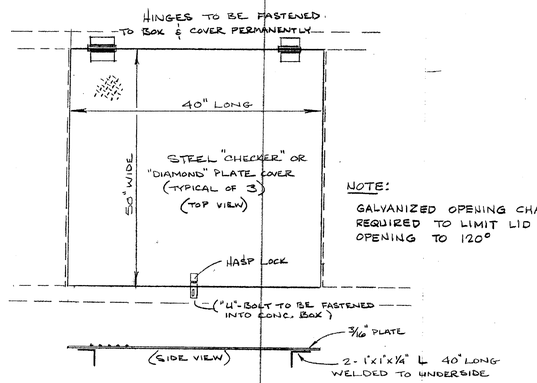
IRRIGATION OUTLET STRUCTURE
@ STA 24+30 NO SCALE



SECTION B-B
NO SCALE

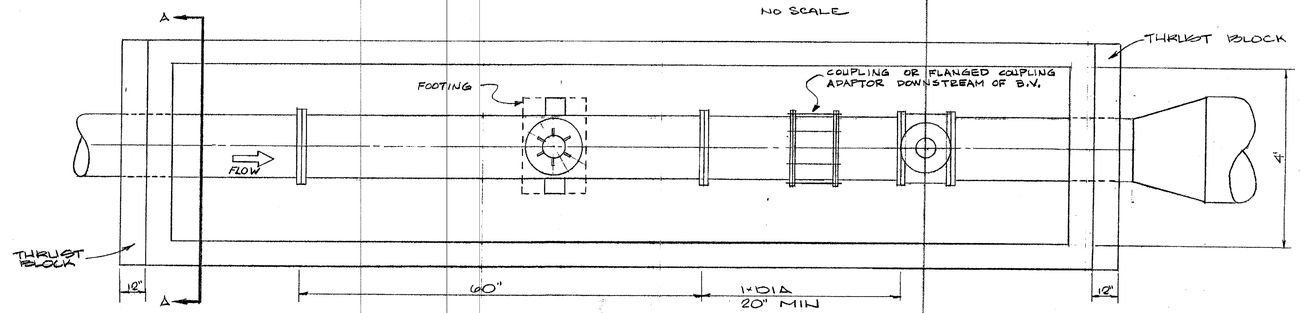


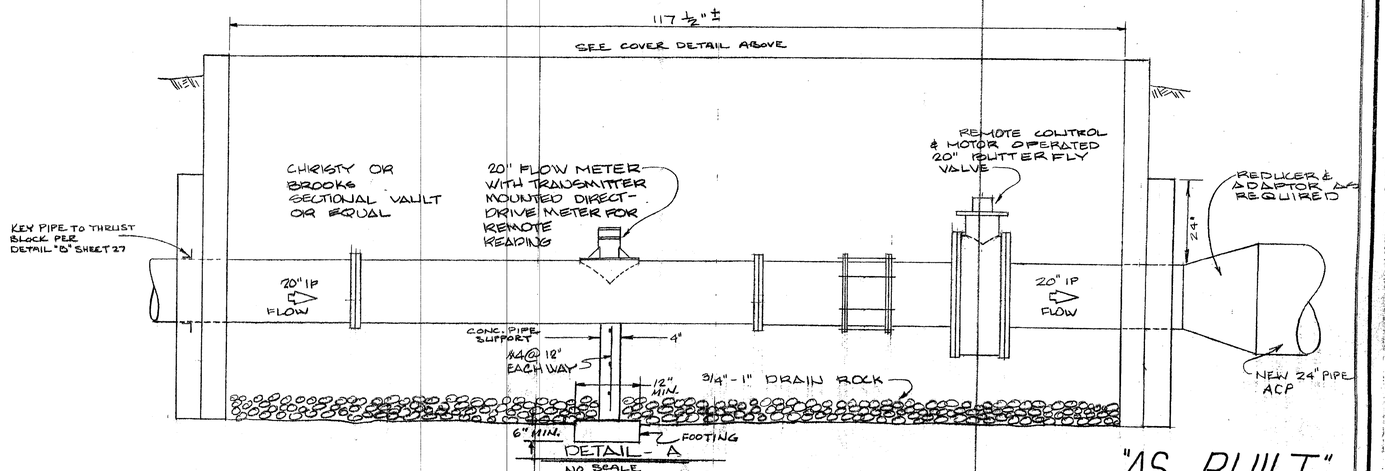
SECTION A-A
OF DETAIL "A"



NOTE:
GALVANIZED OPENING CHAIN REQUIRED TO LIMIT LID OPENING TO 120°

VAULT COVER DETAIL
NO SCALE





DETAIL - A
NO SCALE

"AS BUILT"

BENCHMARK ELEV. _____

FIELD BOOK NO. _____ PG. _____

JTS ENGINEERING CONSULTANTS, INC.
811 J. STREET
SACRAMENTO, CALIFORNIA 95814 (916) 441-6708

DESIGNED LYEDA	SCALE
DRAWN BLINGE	
CHECKED GERMAN	
SUBMITTED _____	RCE _____

NO	DATE	REVISION	COUNTY APPROVAL	BY
1	9-79	GENERAL (NO CHANGE)		
2	8-15-80	AS BUILT (A.S.)		

AMADOR COUNTY REGIONAL OUTFALL LINE

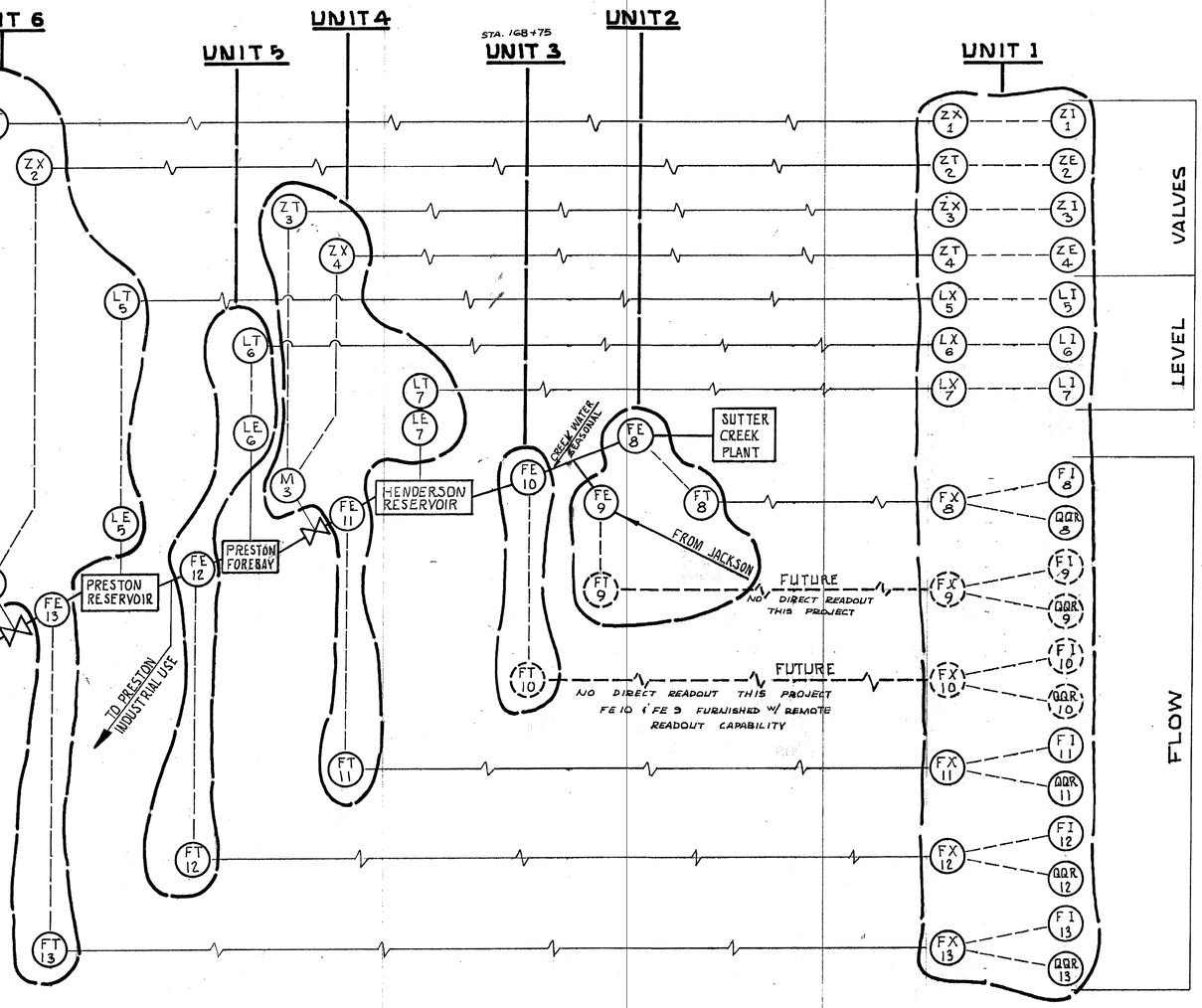
MISCELLANEOUS DETAILS

AMADOR COUNTY, CALIFORNIA

DATE JULY '79
SHEET 29 OF 30

JOB NO. (79004)

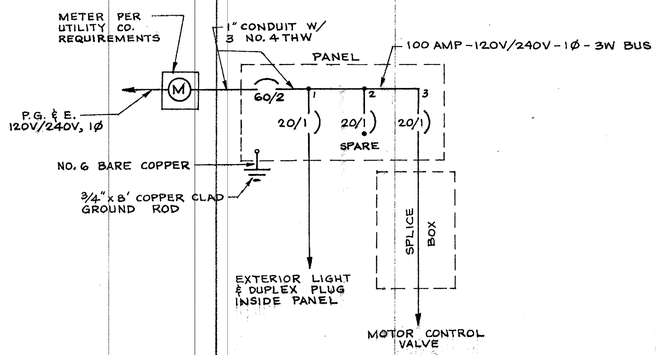
BRUNING 230351



SCHEMATIC DIAGRAM - INDICATING & CONTROL SYSTEM

CONTROL INSTRUMENTATION

SYMBOL		SYMBOL	
	LOOPS 1 & 3 VALVE POSITION INDICATION		LOOPS 5, 6 & 7 LEVEL MEASUREMENT
M	2 each - Electric Motor Valve Operators driven by 4-20 ma. input and with position indication producing 4-20 ma. output.	LE	3 each - Level Primary Elements Submersible Level Transducers with 4-20 ma. output.
ZT	2 each - Valve Position Transmitters Model D100-AN151 Pulse Frequency Telemetry Transmitter, 4-20 ma. in/FSK tone out. In controller housing, with Power Supply.	LT	3 each - Level Transmitters Same as ZT.
ZX	2 each - Valve Position Receivers Pulse Frequency Telemetry Receiver, FSK tone in/4-20 ma. out. In Controller housing, with Power Supply.	LX	3 each - Level Receivers. Same as ZX.
ZI	2 each - Valve Position Indicator Digital Readout with 4-20 ma. input.	LI	3 each - Level Indicators 3½ Digit level indication meters.
	LOOPS 2 & 4 VALVE POSITION CONTROL		LOOP 8 THRU 13 FLOW MEASUREMENTS
ZE	2 each - Valve Control Primary Elements Manual input Valve Controls with 4-20 ma. output.	FE	4 each - Flow Primary Elements Propeller, Flowmeters with 4-20 ma. output.
ZT	2 each - Valve Position Transmitters. Same as ZT above.	FT	4 each - Flow Transmitters Same as ZT.
ZX	2 each - Valve Position Receivers. Same as ZX above.	FX	4 each - Flow Receivers Same as ZX.
		FI	4 each - Flow Indicators 3½ Digit flow rate indication meters.
		QQR	4 each - Flow Quantity Totalizers Model D100-AN157 Current to pulse converter with Totalizer Counter (non-resettable) and chart recorder.



ELECTRICAL SCHEMATIC DIAGRAM

NOTE: CONTRACTOR TO CONTACT P.G. & E. IN JACKSON FOR POWER AND WILL BE RESPONSIBLE FOR ALL COSTS NECESSARY TO PROVIDE POWER AS SHOWN.

"AS BUILT"

DRAWN BY: _____ CHECKED _____
SUBMITTED BY _____ C. E. NO. _____

REVISION	DATE	DESCRIPTION	BY	APPD.

GRETZINGER AND WEATHERBY CIVIL ENGINEERS
8 COURT ST.
JACKSON, CALIFORNIA 95642
PHONE 209-223-0381

AMADOR COUNTY REGIONAL OUTFALL PROJECT NO. 0995
ELECTRICAL & INSTRUMENTATION DETAILS

DATE 7-16-79
SCALE: NONE
SHEET 30 / 30 OF
FILE NO. 02849

Job No. 790101

EXHIBIT C

Sutter Creek WWTP Rain Totals

August '16	
	0 "

September '16	
	0 "

October '16	
10/2/16	0.06 "
10/14/16	1.15 "
10/15/16	0.60 "
10/16/16	2.40 "
10/23/16	0.05 "
10/24/16	0.06 "
10/27/16	0.83 "
10/29/16	0.85 "
10/30/16	0.77 "
10/31/16	0.06 "
Total	6.83 "

November '16	
11/15/16	0.20 "
11/19/16	1.55 "
11/20/16	0.40 "
11/22/16	0.40 "
11/26/16	1.50 "
11/27/16	0.10 "
Total	4.15 "

December '16	
12/7/16	0.30 "
12/8/16	0.16 "
12/9/16	0.45 "
12/10/16	1.20 "
12/13/16	0.04 "
12/15/16	2.11 "
12/23/16	0.86 "
12/24/16	0.04 "
12/30/16	0.14 "
Total	5.30 "

January '17	
1/1/17	0.20 "
1/2/17	0.66 "
1/3/17	1.12 "
1/4/17	1.65 "
1/6/17	0.38 "
1/7/17	0.95 "
1/8/17	1.35 "
1/9/17	1.20 "
1/10/17	2.95 "
1/11/17	0.51 "
1/12/17	0.10 "
1/18/17	1.05 "
1/19/17	1.09 "
1/20/17	1.20 "
1/21/17	0.30 "
1/22/17	1.23 "
1/23/17	0.20 "
Total	16.14 "

February '17	
2/1/17	0.18 "
2/2/17	0.12 "
2/3/17	0.64 "
2/5/17	0.77 "
2/6/17	1.35 "
2/7/17	1.23 "
2/8/17	0.55 "
2/9/17	3.35 "
2/10/17	0.80 "
2/15/17	0.30 "
2/16/17	0.20 "
2/17/17	0.28 "
2/19/17	1.15 "
2/20/17	2.00 "
2/21/17	1.04
2/22/17	0.05
2/27/17	0.17
Total	14.18 "

Year to Date Total	57.82 "

March '17	
3/4/17	0.90 "
3/5/17	0.25 "
3/20/17	1.04 "
3/21/17	0.98 "
3/22/17	0.70 "
3/24/17	0.45 "
3/26/17	0.50 "
3/30/17	0.22 "
Total	5.04 "

April '17	
4/7/17	1.40 "
4/8/17	0.70 "
4/9/17	0.35 "
4/13/17	0.55 "
4/14/17	0.38 "
4/17/17	0.70 "
4/18/17	0.60 "
4/19/17	0.08 "
Total	4.76 "

May '17	
5/5/17	0.11 "
5/16/17	0.20 "
5/30/17	0.41 "
Total	0.72 "

June '17	
6/11/2017	0.70 "
Total	0.70 "

EXHIBIT D

STATE OF CALIFORNIA — DEPARTMENT OF CORRECTIONS AND REHABILITATION
EDMUND G. BROWN JR., GOVERNOR

FACILITY PLANNING, CONSTRUCTION AND MANAGEMENT

P.O. Box 942883
Sacramento, CA 94283-0001

March 29, 2017

Karl Drexel, SDA, General Manager
Amador Regional Sanitation Authority
18 Main St.
Sutter Creek CA 95685

Dear Mr. Drexel:

Thank you for your letter dated March 27, 2017 regarding the Preston Reservoir. The purpose of this response is to indicate that the California Department of Corrections and Rehabilitation (CDCR) disagrees with the conclusion of your letter; that the January 1, 2009 ground lease (Lease L-2070) between the Amador Regional Sanitation Authority (ARSA) and CDCR authorizes the use of the Preston Reservoir dump valve for release of effluent onto CDCR property without CDCR's approval.

The letter references a site visit conducted by Director Deborah Hysen. Our records indicate that Director Hysen did not participate in a site visit that occurred on or about March 9, 2017. CDCR staff indicates that the site visit included review of the Preston Reservoir, spillway, dump valve, and general discussion of the impacts of releases of effluent from either the spillway or the dump valve. Participation by CDCR in this discussion does not constitute consent or concurrence with ARSA's intent to use the dump valve as indicated in your March 27, 2017 letter.

CDCR has not completed an analysis of whether or not the dump valve is a component of the "premises" referenced in the ground lease between ARSA and CDCR. Even if we assume, for purposes of this letter only, that the dump valve is a component of the "premises", the remainder of the ground lease does not authorize the use of the dump valve to release effluent from Preston Reservoir upon CDCR premises. The lease specifically requires ARSA to operate the premises in a manner that does not interfere with the orderly operation of the prison. (Lease Sections 3b and 12). A release of effluent from the dump valve would interfere with the orderly operation of the prison.

The ground lease further obligates ARSA to keep the premises operational and in compliance with all applicable federal, state and local laws (Lease Section 14a) and strictly comply with "any and all rules and regulations by governing agencies to include EPA, Department of Health or local water quality board." (Lease Section 28b). The use of the dump valve to release effluent is contrary to these lease obligations.

CDCR previously requested a copy of the variance received from the Department of Safety of Dams (DSOD) to allow for sandbags on the Preston Reservoir spillway. I have seen pictures indicating this activity has already occurred. Please provide a copy of this variance. Additionally, and as stated in the lease, prior to making any future improvements to the premises ARSA must submit all plans, specifications, and/or drawings in writing to CDCR, and must receive CDCR approval prior to implementing such improvements. (Lease Section 14c.)

CDCR does not agree that the use of the dump valve to release effluent onto CDCR land is contemplated as a permitted activity pursuant to the ground lease, and does not provide consent for this activity.

In an effort to assist with ARSA's effluent storage capacity issues, Mule Creek State Prison (MCSP) staff has developed a plan to utilize a pump and piping to connect the CDCR force main to Preston Reservoir to pump ARSA effluent into the Mule Creek Reservoir. CDCR authorizes ARSA to perform the construction necessary to utilize the CDCR force main as described above. Please ensure that this construction is coordinated with Ron Hess and Christofer Hudgens of MCSP.

CDCR agrees to accept a total of up to 75 acre feet of ARSA effluent into Mule Creek Reservoir. In return for agreeing to accept ARSA effluent under these emergency conditions, CDCR requests that ARSA agrees to increase CDCR's permitted 350 acre feet discharge into Preston Reservoir in 2017 by an amount equal to the amount of effluent transferred to CDCR. Your concurrence with this proposal is necessary before CDCR will begin accepting ARSA effluent.

Thank you for your letter and for the continuing dialogue between our two agencies.

Sincerely,

Dean Lee Borg

DEAN L. BORG
Director (A)
Facility Planning, Construction and Management

cc: Deborah Hysen, Director, Facility Planning, Construction and Management
Joe Lizarraga, Warden, MCSP
Mike Williams, Associate Warden-Business Services, MCSP
Ron Hess, Correctional Plant Manager, MCSP
Christofer Hudgens, Correctional Plant Supervisor, MCSP
Jon Hanken, City Manager, City of Ione

EXHIBIT E

ARSA RESERVOIRS and IRRIGATION									
Sep-17	Sutter Creek Effluent Flow (gals)	Bowers Irrigation (gals)	Henderson Reservoir Freeboard (ft)	Henderson Reservoir Volume (ac ft)	Hoskins Irrigation (gals)	Preston Forebay FT	Preston Forebay Volume (ac ft)	Preston Reservoir FT	Preston Reservoir Volume (ac ft)
9/1/2017	303,600	303,600	13'10"	125.5	252,000	6'11"	23.1	7'6"	142.5
9/2/2017	267,400	267,400	13'11"	124.4	252,000	6'10"	23.2	7'6"	142.5
9/3/2017	249,800	249,800	14'0"	123.4	252,000	6'9"	23.3	7'6"	142.5
9/4/2017	276,600	276,600	14'0"	123.4	252,000	6'8"	23.3	7'6"	142.5
9/5/2017	248,800	248,800	14'1"	122.3	252,000	6'8"	23.3	7'6"	142.5
9/6/2017	269,000	269,000	14'2"	121.2	432,000	8'2"	21.8	7'5"	143.5
9/7/2017	300,200	300,200	14'3"	120.2	432,000	9'2"	20.8	7'4"	144.6
9/8/2017	278,800	278,800	14'4"	119.1	432,000	8'2"	21.8	7'4"	144.6
9/9/2017	279,000	279,000	14'5"	118.0	432,000	8'2"	21.8	7'4"	144.6
9/10/2017	266,000	266,000	14'6"	116.9	432,000	7'10"	22.2	7'4"	144.6
9/11/2017	307,200	307,200	14'6"	116.9	432,000	7'6"	22.5	7'3"	145.7
9/12/2017	279,400	279,400	14'7"	115.8	432,000	7'0"	23.0	7'3"	145.7
9/13/2017	300,400	300,400	14'8	114.7	432,000	6'0"	24.0	7'2"	146.8
9/14/2017	294,200	294,200	14'10"	113.7	432,000	6'0"	24.0	7'2"	146.8
9/15/2017	288,600	288,600	15'0"	108.4	432,000	5'7"	24.4	7'1"	147.9
9/16/2017	236,400	236,400	15'2"	107.4	432,000	5'4"	24.7	7'1"	147.9
9/17/2017	235,200	235,200	15'4"	106.3	432,000	5'2"	24.8	7'1"	147.9
9/18/2017	291,000	291,000	15'6"	105.2	432,000	5'0"	25.0	7'0"	149.0
9/19/2017	279,200	279,200	15'8"	104.1	432,000	6'0"	24.0	6'11"	150.1
9/20/2017	284,000	284,000	15'9"	103.0	432,000	7'0"	23.0	6'10"	151.2
9/21/2017	268,200	268,200	15'9"	102.0	432,000	8'4"	21.7	6'10"	151.2
9/22/2017	300,600	300,600	15'10"	100.9	432,000	9'0"	21.0	6'10"	151.2
9/23/2017	313,000	313,000	15'10"	99.8	432,000	9'0"	21.0	6'10"	151.2
9/24/2017	289,000	289,000	15'11"	98.7	432,000	9'0"	21.0	6'10"	151.2
9/25/2017	314,000	314,000	15'11"	97.6	432,000	8'10	21.2	6'10"	151.2
9/26/2017	289,400	289,400	16'0"	94.32	432,000	8'9"	21.3	6'10"	151.2
9/27/2017	304,600	304,600	16'1"	93.2	432,000	8'8"	21.3	6'10"	151.2
9/28/2017		0							
9/29/2017		0							
9/30/2017		0							
	Sutter Creek Total Flow								
Total	7,613,600	7,613,600			10,764,000				
Maximum	314,000								
Minimum	235,200								
Average Daily	281,985								

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possiblity of fine and imprisonment.

9-28-17

EXHIBIT F

1 in 100 Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Reservoir		Henderson Reservoir	Preston Reservoir	Total
Volume	(ac-ft)	393	235	628
Surface Area	(ac)	29	18	47

Amount of disposal during average year scenario

Annual Disposal		Henderson Reservoir	Bowers Ranch	Hoskins Ranch	Total
Area	(ac)	varies	24	24	48
Year 1	(ac-ft/yr)	64	100	50	214

			Henderson Reservoir			Preston Reservoir	
Total Inflow	Active Starting Volume	WWTP Effluent	Storage Accumulated (to Preston)	Max Storage	Approximate Available Capacity	Max Storage	Approximate Available Capacity
	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
System	0	512	-490	351	42	62	173

Period			WWTP Effluent					Historic Weather Data			Bowers	Henderson Reservoir									Hoskins	Preston Reservoir							
Years	Month	Days	Monthly Flow	Monthly Flow	ADWF (Jun-Sep)	ADWF (Jun-Sep)	Estimated Inflow & Infiltration	% of Total	Precip	Pan Evap	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Subtotal Disposal	Wastewater sent to Preston Reservoir	Change in Storage Volume	Estimated Storage Volume	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Water sent to Ione	Change in Storage Volume	Estimated Storage Volume
	(mo)	(days)	(mgd)	(ac-ft)	(mgd)	(ac-ft)	(ac-ft)	(%mo)	(in/mo)	(in/mo)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
Year 1	Oct	31	0.414	39.4	0.263	25.0	14.4	6.03	3.09	3.14	13.8	25.6	1.2	7.3	-1.3	0.0	7.3	-10.0	22.9	22.9	10.0	0.3	8.8	4.8	2.4	0.01	10.0	-3.2	0.0
	Nov	30	0.540	49.7	0.263	24.2	25.5	12.66	6.49	1.12	0.0	49.7	3.8	14.2	-0.7	0.0	17.3	-10.0	57.0	79.9	0.0	10.8	14.4	10.1	0.8	0.01	10.0	14.4	14.4
	Dec	31	0.646	61.4	0.263	25.0	36.4	18.27	9.37	0.91	0.0	61.4	9.5	16.4	-0.9	0.0	25.0	-10.0	76.4	156.3	0.0	11.4	23.4	13.2	0.7	0.01	10.0	24.1	38.5
	Jan	31	0.644	61.3	0.263	25.0	36.2	18.17	9.32	0.92	0.0	61.3	14.0	11.8	-1.4	0.0	24.4	-10.0	75.6	232.0	0.0	11.2	20.4	11.0	0.7	0.01	10.0	20.9	59.4
	Feb	28	0.592	50.9	0.263	22.6	28.3	15.45	7.92	1.00	0.0	50.9	14.9	7.0	-1.9	0.0	20.0	-10.0	60.9	292.9	0.0	10.6	10.7	7.6	0.8	0.01	10.0	10.5	69.9
	Mar	31	0.554	52.7	0.263	25.0	27.7	13.44	6.89	1.63	0.0	52.7	14.6	4.4	-3.5	0.0	15.6	-10.0	58.3	351.1	0.0	10.4	9.1	5.4	1.2	0.01	10.0	8.2	78.1
	Apr	30	0.483	44.5	0.263	24.2	20.2	9.66	4.96	3.18	0.0	44.5	11.4	2.3	-7.3	0.0	6.4	-80.0	-29.1	322.0	0.0	80.8	17.2	3.0	2.4	0.01	97.0	-1.4	76.7
	May	31	0.371	35.3	0.263	25.0	10.3	3.74	1.92	4.67	0.0	35.3	4.3	1.1	-10.4	0.0	-5.1	-80.0	-49.8	272.2	0.0	79.9	5.5	1.0	3.5	0.01	97.0	-15.1	61.6
	Jun	30	0.322	29.6	0.263	24.2	5.4	1.13	0.58	6.23	8.9	20.8	1.2	0.4	-12.8	0.0	-11.2	-80.0	-70.4	201.8	6.6	160.3	0.1	0.3	4.7	0.01	99.0	56.8	118.4
	Jul	31	0.301	28.6	0.263	25.0	3.6	0.04	0.02	7.53	28.6	0.0	0.0	0.0	-13.1	0.0	-13.1	-80.0	-93.0	108.8	16.3	150.5	0.0	0.0	5.6	0.01	99.0	45.9	164.3
	Aug	31	0.309	29.4	0.263	25.0	4.4	0.42	0.22	6.76	29.4	0.0	0.3	0.3	-8.2	0.0	-7.6	-80.0	-87.6	21.2	9.9	157.0	0.0	0.3	5.1	0.01	99.0	52.9	217.2
	Sep	30	0.320	29.5	0.263	24.2	5.2	0.99	0.51	5.30	19.2	10.3	0.3	1.1	-3.0	0.0	-1.6	-30.0	-21.2	0.0	6.6	110.4	0.0	0.8	4.0	0.01	99.0	7.4	224.6
	Total	365		512.2		294.6	217.6	100.0	51.3	42.40	99.9	412.3	75.5	66.4	-64.3	-0.1	77.4	-490.0	0.0		49.5	793.7	109.6	57.4	31.8	0.12	650.0		

Copy (paste special, values) appropriate data into input columns above (Average, RP10, RP100, etc.)

Precipitation Table (Ref'd "Precip" Sheet)

Month	Percent / month	Average Precipitation	RP 100 YR	2015-2016 Actual precip.
Units	(%/mo)	(in/mo)	(in/mo)	(in/mo)
October	6.03	1.71	3.09	1.59
November	12.66	3.59	6.49	3.82
December	18.27	5.18	9.37	6.59
January	18.17	5.15	9.32	7.59
February	15.45	4.38	7.92	1.27
March	13.44	3.81	6.89	7.62
April	9.66	2.74	4.96	3.02
May	3.74	1.06	1.92	0.66
June	1.13	0.32	0.58	0.00
July	0.04	0.01	0.02	0.00
August	0.42	0.12	0.22	0.14
September	0.99	0.28	0.51	0.00
TOTAL	100.00	28.35	51.29	32.30

Pan Evaporation Table (Ref'd from "Evap" Sheet)

MONTH	Pan Evaporation	Effective Lake Evap	100-YR Effecitve Evap
Units	(in/mo)	(in/mo)	(in/mo)
October	3.93	3.14	3.14
November	1.87	1.50	1.12
December	1.51	1.21	0.91
January	1.53	1.22	0.92
February	1.67	1.34	1.00
March	2.72	2.18	1.63
April	3.98	3.18	3.18
May	5.84	4.67	4.67
June	7.79	6.23	6.23
July	9.41	7.53	7.53
August	8.45	6.76	6.76
September	6.62	5.30	5.30
TOTAL	55.32	44.26	42.40

Average Year Flows

	0.263
	ADF (mgd)
Month	
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265
Average:	0.332

RP100 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320
	0.458

Actual 2016/2017 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	0.279
August	---
September	----
	0.513

Actual 2015/2016 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.252
November	0.280
December	0.432
January	0.613
February	0.382
March	0.571
April	0.357
May	0.300
June	0.277
July	0.290
August	0.297
September	0.277
	0.361

1 in 100 Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Henderson Reservoir**

RESERVOIR

	Volume Storage (ac-ft)	Area (ac)	
Minimum	0	0.0	
Maximum	393	28.9	Enter small number (0.01 ac) instead of 0.0 ac.
Active Starting Volume	0		Minimum starting volume = minimum (dead) storage
Watershed Area	4.3	(ac)	
Runoff Coefficient, C	1		
Percolation Rate	0.12	(ac-ft/yr)	

Resevoir Equation "y=Ax^2 + Bx +C"

Coefficient A	-0.0001
Coefficient B	0.0999
Constant C	4.8166

Resevoir Height Equation "y=Ax + B

Coefficient A	0.9706
Coefficient B	-2.8011

Month	FLOW				STORAGE INPUTS				STORAGE OUTPUTS							
Units	Days	WWTP Monthly Flow (ac-ft)	Bowers Disposal (ac-ft)	Beginning Reservoir Volume (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	Watershed Runoff (indirect) (ac-ft)	**Subtotal Influent/Precipitation** (ac-ft)	Evaporation (water surface) (ac-ft)	Percolation (direct) (ac-ft)	Wastewater sent to Preston Reservoir (ac-ft)	**Subtotal Disposal** (ac-ft)	**NET OUT** (ac-ft)	Beginning Storage Volume (ac-ft)	Change in Storage Volume (ac-ft)	**Estimated End of Month Storage Volume (ac-ft)**
October	31	39.4	13.8	0.0	25.6	1.2	7.3	34.1	-1.3	-0.01	-10.0	-11.3	22.9	0.0	22.9	**22.9**
November	30	49.7	0.0	22.9	49.7	3.8	14.2	67.7	-0.7	-0.01	-10.0	-10.7	57.0	22.9	57.0	**79.9**
December	31	61.4	0.0	79.9	61.4	9.5	16.4	87.4	-0.9	-0.01	-10.0	-10.9	76.4	79.9	76.4	**156.3**
January	31	61.3	0.0	156.3	61.3	14.0	11.8	87.0	-1.4	-0.01	-10.0	-11.4	75.6	156.3	75.6	**232.0**
February	28	50.9	0.0	232.0	50.9	14.9	7.0	72.8	-1.9	-0.01	-10.0	-11.9	60.9	232.0	60.9	**292.9**
March	31	52.7	0.0	292.9	52.7	14.6	4.4	71.8	-3.5	-0.01	-10.0	-13.5	58.3	292.9	58.3	**351.1**
April	30	44.5	0.0	351.1	44.5	11.4	2.3	58.2	-7.3	-0.01	-80.0	-87.3	-29.1	351.1	-29.1	**322.0**
May	31	35.3	0.0	322.0	35.3	4.3	1.1	40.6	-10.4	-0.01	-80.0	-90.4	-49.8	322.0	-49.8	**272.2**
June	30	29.6	8.9	272.2	20.8	1.2	0.4	22.4	-12.8	-0.01	-80.0	-92.8	-70.4	272.2	-70.4	**201.8**
July	31	28.6	28.6	201.8	0.0	0.0	0.0	0.1	-13.1	-0.01	-80.0	-93.1	-93.0	201.8	-93.0	**108.8**
August	31	29.4	29.4	108.8	0.0	0.3	0.3	0.6	-8.2	-0.01	-80.0	-88.2	-87.6	108.8	-87.6	**21.2**
September	30	29.5	19.2	21.2	10.3	0.3	1.1	11.7	-3.0	-0.01	-30.0	-33.0	-21.4	21.2	-21.2	**0.0**
Total		512.2	99.9		412.3	75.5	66.4	554.3	-64.3	-0.12	-490.0	-554.5	-0.2		0.0	

RP100 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320

1 in 100 Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Preston Reservoir Average Water Balance

Assumptions:

Bowers Ranch has 24 Acres in use and 40 Acres in total available.
Hoskins Ranch has 24 Acres in use and 60 Acres in total available.
The Preston Forebay has 2 Acres of Surface Area.
Preston Reservoir ranges from 0 Acres when empty to 18 when full with 14 acres of watershed area and Capacity of 235 ac-ft.
The assumed Percolation rate is 100 Gallons per Day or 0.01 Acre-Feet per Month.

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Average Year	In	1.20	2.57	3.45	3.97	3.58	3.35	1.86	0.85	0.26	0.04	0.06	0.29	21.48
Rainfall 100 Year	In	3.32	5.40	8.79	7.65	4.00	3.40	6.47	2.05	0.04	0.00	0.00	0.00	41.11
Pan Evaporation	In	3.14	1.12	0.91	0.92	1.00	1.63	3.18	4.67	6.23	7.53	6.76	5.30	42.40

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Henderson Reservoir														
Effluent	AF	10	10	10	10	10	10	80	80	80	80	80	30	490
Hoskins Ranch														
Hoskins Ranch Available Disposal	AF	10	0	0	0	0	0	0	0	7	16	10	7	50
Preston Forebay														
Preston Forebay Influent	AF	0	10	10	10	10	10	80	80	73	64	70	23	440
Precipitation	AF	1	1	1	1	1	1	1	0	0	0	0	0	7
Evaporation	AF	0	0	0	0	0	0	0	0	1	1	1	0	4
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Preston Forebay Effluent	AF	0	11	11	11	11	10	81	80	73	63	69	23	444
CDCR														
CDCR Effluent to Preston Reservoir	AF	0	0	0	0	0	0	0	0	88	88	88	88	350
Preston Reservoir														
Preston Reservoir Maximum Available Storage	AF	235	235	235	235	235	235	235	235	235	235	235	235	
Water in Storage at Beginning of Month	AF	0	0	14	38	59	70	78	77	62	118	164	217	
Influent	AF	0	11	11	11	11	10	81	80	160	151	157	110	794
Precipitation	AF	9	14	23	20	11	9	17	5	0	0	0	0	110
Evaporation	AF	2	1	1	1	1	1	2	4	5	6	5	4	32
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Water sent to Ione	AF	10	10	10	10	10	10	97	97	99	99	99	99	650
Water Applied(+)/Removed(-) from Storage	AF	-3	14	24	21	10	8	-1	-15	57	46	53	7	
Estimated End of Month Storage	**AF**	**0**	**14**	**38**	**59**	**70**	**78**	**77**	**62**	**118**	**164**	**217**	**225**	

1 in 100 Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Conversions		
MG to AF	0.325851	= 1 AF

Logical Value for SCWWTP Options	0
Logical Value for CDCR Options	1
Logical value for removed henderson and thngys	FALSE
Logical Value for Rainfall	4
Logical Value for Perc	1
Logical value for remove preston	FALSE

Preston Reservoir			
Elevation	Area (AC)	Capacity (AC-FT)	Elevation
325	0	0	325
330	3	5	330
335	6	25	335
340	8	60	340
345	12	110	345
350	16	175	350
353	18	235	353
355	20	270	355

Misc Assumptions

Preston Reservoir	0.00	18.00	235.00
Percolation	100.00	0.01	
Preston Forebay	2.00		
Storage Pond 5	4.35	52.17	
Storage Pond 6	3.45	27.62	0.80
Storage Pond 7	4.38	30.69	0.46
Additional Storage	0.00		
Preston Watershed Area	14.00		
Watershed Runnoff Coef.	0.70		
Bowers Ranch	24.00	40.00	
Hoskins Ranch	24.00	60.00	

Precip. into both Preston Forebay and Preston Reservoir is assumed with full reservoir in all cases due to lack of mapping for determination of depth/area curves.

1 in 100 Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Bowers Ranch**

Storage	(ac-ft)	(ac)	
Minimum	**0**	**0**	
Maximum	**0.00000001**	**0.00000001**	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	**24**	(ac)
Runoff Coefficient, C	**0.1**	

Month		**FLOW**	**INPUTS**		
Units	Days	WWTP Monthly Flow (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	Total Disposal (ac-ft)
October	31	39.4	13.8	0.6	14.4
November	30	49.7	0.0	1.3	1.3
December	31	61.4	0.0	1.9	1.9
January	31	61.3	0.0	1.9	1.9
February	28	50.9	0.0	1.6	1.6
March	31	52.7	0.0	1.4	1.4
April	30	44.5	0.0	1.0	1.0
May	31	35.3	0.0	0.4	0.4
June	30	29.6	8.9	0.1	9.0
July	31	28.6	28.6	0.0	28.6
August	31	29.4	29.4	0.0	29.4
September	30	29.5	19.2	0.1	19.3
Total			99.9	10.3	110.1

Historic Disposal Data:

Year	Disposal Amount mg	ac-ft
2011/2012	23.1	70.9
2012/2013	31.1	95.4
2013/2014	36.3	111.4
2014/2015	32.5	99.7
2015/2016	31.8	97.8

1 in 100 Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Hoskins Ranch**

RESERVOIR

Storage	Volume (ac-ft)	Area (ac)	
Minimum	**0**	**0**	
Maximum	**0.00000001**	**0.00000001**	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	**24**	(ac)
Runoff Coefficient, C	**0.1**	

Month		**FLOW**	**INPUTS**		
		WWTP Monthly Flow	Facility Influent Flow	Precipitation (direct)	**Subtotal**
Units	Days	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
October	31	39.4	10.0	0.6	10.6
November	30	49.7	0.0	1.3	1.3
December	31	61.4	0.0	1.9	1.9
January	31	61.3	0.0	1.9	1.9
February	28	50.9	0.0	1.6	1.6
March	31	52.7	0.0	1.4	1.4
April	30	44.5	0.0	1.0	1.0
May	31	35.3	0.0	0.4	0.4
June	30	29.6	6.6	0.1	6.7
July	31	28.6	16.3	0.0	16.4
August	31	29.4	9.9	0.0	10.0
September	30	29.5	6.6	0.1	6.7
Total			49.5	10.3	59.8

Historic Disposal Data:

Year	Disposal Amount mg	ac-ft
2011/2012	26.1	80.1
2012/2013	21.9	67.2
2013/2014	22.4	68.7
2014/2015	55.5	170.3
2015/2016	18.7	57.3

1 in 100 Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

PRECIPITATION and DISTRIBUTION of RAIN

Used average rainfall to distribute 100-year

SUTTER HILL CDF, CALIFORNIA (048713)

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
	6.03	12.66	18.27	18.17	15.45	13.44	9.66	3.74	1.13	0.04	0.42	0.99	100
Avg Precip	1.71	3.59	5.18	5.15	4.38	3.81	2.74	1.06	0.32	0.01	0.12	0.28	28.35
10-YR	2.41	5.05	7.29	7.25	6.16	5.36	3.86	1.49	0.45	0.01	0.17	0.39	39.89
100-YR	3.09	6.49	9.37	9.32	7.92	6.89	4.96	1.92	0.58	0.02	0.22	0.51	51.29
												100-YR Return Ratio	**1.81**
Lat	3837											**10-YR Return Ratio**	**1.41**
Long	12080												
Elevation ft	1586												

http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca8713

Period of Record : 10/01/1943 to 06/10/2016

IONE, CALIFORNIA (048230)

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
Avg Precip	1.20	2.57	3.45	3.97	3.58	3.35	1.86	0.85	0.26	0.04	0.06	0.29	21.48
100-YR	3.32	5.40	8.79	7.65	4.00	3.40	6.47	2.05	0.04	0.00	0.00	0.00	41.11

1 in 100 Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

EVAPORATION

Standard daily pan evaporation is measured using the four-foot diameter Class A Evaporation pan. The pan water level reading is adjusted when precipitation is measured to obtain the actual evaporation. Most Class A pans are installed aboveground, allowing effects such as radiation on the side walls and heat exchanges with the pan material. These effects tend to increase the evaporation totals. The amounts can then be adjusted by multiplying the totals by 0.70 or 0.80 to more closely estimate the evaporation from naturally existing surfaces such as a shallow lake, wet soil, or other moist natural surfaces.

Source: Western Regional Climate Center, Desert Research Institute www.wrcc.dri.edu
Training Handbook for Disposal of Non-Designated Waste to Land Systems: Design, Operation, and Monitoring , Dated June 2004

Pan Coefficient (C_p) = **0.8** **Average between 0.7 and 0.8 as described above**

Weather Correction Factor (k) [d] **25%** From Training Handbook: "The reduction in evaporation during a wet year in the wet season only can be in the 20 to 30 percent range

Zone 10

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
Pan Evaporation	3.93	1.87	1.51	1.53	1.67	2.72	3.98	5.84	7.79	9.41	8.45	6.62	55.32
Effective Lake Evap	3.14	1.50	1.21	1.22	1.34	2.18	3.18	4.67	6.23	7.53	6.76	5.30	44.26
100-YR Effecitve Evap	3.14	**1.12**	**0.91**	**0.92**	**1.00**	**1.63**	3.18	4.67	6.23	7.53	6.76	5.30	42.40

100-YR Correction Factor Included

http://www.wrcc.dri.edu/htmlfiles/westevap.final.html

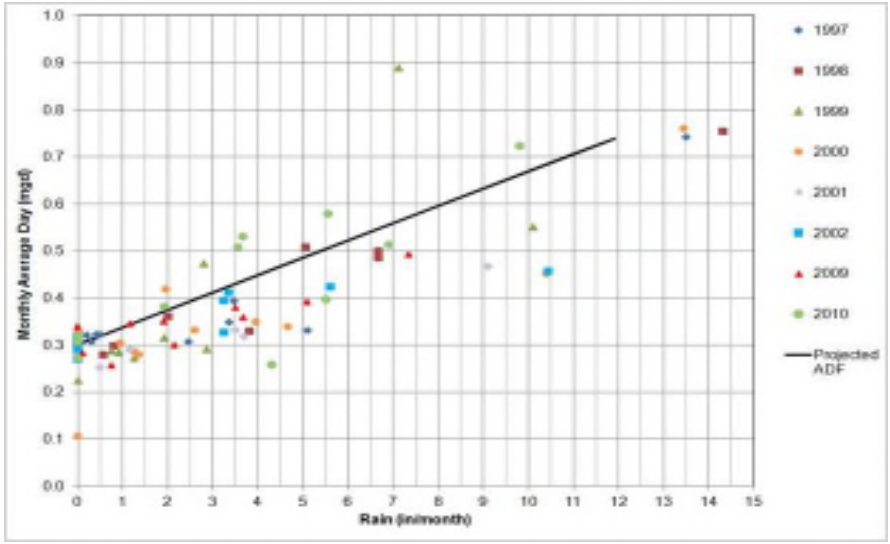
Pan evaporation locations in the project vicinity were limited. The closest being Placerville IFG and Camp Pardee. Placerville IFG is used because the rate is slightly more conservative and there is more complete data available.

1 in 100 Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Using historic rainfall data and CSC WWTP flows, the relationships between monthly rainfall depths and monthly average and peak flows at the WWTP were used to project the collection systems response to monthly rainfall in the form of response curves which were developed as part of the 2017 update of the City of Sutter Creek and ARSA Wastewater Master Plan.

Using the monthly average response curve, we determined the average monthly flows that correlated to the 100-year rainfall values for each month. The equation of the trendline is: y = 0.0368x + 0.3008.

WWTP Monthly Average Day Flow Projected by Monthly Rainfall Depth



Resulting average and 1 in 100 year flows and comparison to actual 2016/2017 flows:

Average Year Flows	
Month	Flow (mgd)
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265

RP100 WWTP Flows	
Month	Flow (mgd)
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320

Actual 2016/2017 WWTP Flows	
Month	Flow (mgd)
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	0.279
August	---
September	----

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows NO IONE- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Reservoir		Henderson Reservoir	Preston Reservoir	Total
Volume	(ac-ft)	393	235	628
Surface Area	(ac)	29	18	47

Amount of disposal during average year scenario

Annual Disposal		Henderson Reservoir	Bowers Ranch	Hoskins Ranch	Total
Area	(ac)	varies	24	24	48
Year 1	(ac-ft/yr)	68	103	50	221

			Henderson Reservoir			Preston Reservoir	
Total Inflow	Active Starting Volume	WWTP Effluent	Storage Accumulated (to Preston)	Max Storage	Approximate Available Capacity	Max Storage	Approximate Available Capacity
	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
System	0	529	-500	378	15	312	-77

Period			WWTP Effluent					Historic Weather Data			Bowers	Henderson Reservoir									Hoskins	Preston Reservoir								
Years	Month	Days	Monthly Flow	Monthly Flow	ADWF (Jun-Sep)	ADWF (Jun-Sep)	Estimated Inflow & Infiltration	% of Total	Precip	Pan Evap	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Subtotal Disposal	Wastewater sent to Preston Reservoir	Change in Storage Volume	Estimated Storage Volume	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Water sent to Ione	Change in Storage Volume	Estimated Storage Volume
	(mo)	(days)	(mgd)	(ac-ft)	(mgd)	(ac-ft)	(ac-ft)	(%mo)	(in/mo)	(in/mo)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
Year 1	Oct	31	0.355	33.8	0.263	25.0	8.7	6.03	3.09	3.14	13.8	20.0	1.2	7.3	-1.3	0.0	7.3	-10.0	17.2	17.2	10.0	0.3	8.8	4.8	2.4	0.0	0.0	6.8	6.8
	Nov	30	0.373	34.3	0.263	24.2	10.1	12.66	6.49	1.12	0.0	34.3	3.5	14.4	-0.6	0.0	17.4	-10.0	41.7	58.9	0.0	10.8	14.4	10.1	0.8	0.0	0.0	24.4	31.1
	Dec	31	0.532	50.6	0.263	25.0	25.6	18.27	9.37	0.91	0.0	50.6	8.1	17.8	-0.8	0.0	25.1	-10.0	65.7	124.7	0.0	11.4	23.4	13.2	0.7	0.0	0.0	34.1	65.2
	Jan	31	0.997	94.8	0.263	25.0	69.8	18.17	9.32	0.92	0.0	94.8	12.2	13.6	-1.2	0.0	24.6	-10.0	109.4	234.1	0.0	11.2	20.4	11.0	0.7	0.0	0.0	30.9	96.1
	Feb	28	0.946	81.3	0.263	22.6	58.7	15.45	7.92	1.00	0.0	81.3	15.0	6.9	-1.9	0.0	20.0	-10.0	91.3	325.4	0.0	10.6	10.7	7.6	0.8	0.0	0.0	20.5	116.6
	Mar	31	0.500	47.6	0.263	25.0	22.5	13.44	6.89	1.63	0.0	47.6	15.4	3.7	-3.6	0.0	15.4	-10.0	53.0	378.4	0.0	10.4	9.1	5.4	1.2	0.0	0.0	18.2	134.9
	Apr	30	0.537	49.4	0.263	24.2	25.2	9.66	4.96	3.18	0.0	49.4	11.7	2.0	-7.5	0.0	6.2	-80.0	-24.4	354.0	0.0	80.8	17.2	3.0	2.4	0.0	0.0	95.6	230.5
	May	31	0.310	29.5	0.263	25.0	4.5	3.74	1.92	4.67	0.0	29.5	4.4	0.9	-10.8	0.0	-5.5	-80.0	-56.0	298.0	0.0	79.9	5.5	1.0	3.5	0.0	0.0	81.9	312.4
	Jun	30	0.297	27.3	0.263	24.2	3.1	1.13	0.58	6.23	8.9	18.5	1.2	0.4	-13.4	0.0	-11.8	-80.0	-73.3	224.7	6.6	72.8	0.1	0.3	4.7	0.0	0.0	68.3	380.7
	Jul	31	0.279	26.5	0.263	25.0	1.5	0.04	0.02	7.53	26.5	0.0	0.0	0.0	-13.9	0.0	-13.9	-80.0	-93.9	130.8	16.3	63.0	0.0	0.0	5.6	0.0	0.0	57.4	438.0
	Aug	31	0.297	28.3	0.263	25.0	3.2	0.42	0.22	6.76	28.3	0.0	0.3	0.3	-9.1	0.0	-8.5	-80.0	-88.6	42.3	9.9	69.5	0.0	0.3	5.1	0.0	0.0	64.4	502.4
	Sep	30	0.277	25.5	0.263	24.2	1.3	0.99	0.51	5.30	25.5	0.0	0.4	1.0	-3.9	0.0	-2.5	-40.0	-42.3	0.0	6.6	32.9	0.0	0.8	4.0	0.0	0.0	28.9	531.4
	Total	365		528.9		294.6	234.3	100.0	51.3	42.40	103.0	425.9	73.5	68.4	-68.0	-0.1	73.8	-500.0	0.0		49.5	453.7	109.6	57.4	31.8	0.1	0.0		

Copy (paste special, values) appropriate data into Input columns above (Average, RP10, RP100, etc.)

Precipitation Table (Ref'd "Precip" Sheet)

Month	Percent / month	Average Precipitation	RP 100 YR	2015-2016 Actual precip.
Units	(%/mo)	(in/mo)	(in/mo)	(in/mo)
October	6.03	1.71	3.09	1.59
November	12.66	3.59	6.49	3.82
December	18.27	5.18	9.37	6.59
January	18.17	5.15	9.32	7.59
February	15.45	4.38	7.92	1.27
March	13.44	3.81	6.89	7.62
April	9.66	2.74	4.96	3.02
May	3.74	1.06	1.92	0.66
June	1.13	0.32	0.58	0.00
July	0.04	0.01	0.02	0.00
August	0.42	0.12	0.22	0.14
September	0.99	0.28	0.51	0.00
TOTAL	100.00	28.35	51.29	32.30

Pan Evaporation Table (Ref'd from "Evap" Sheet)

MONTH	Pan Evaporation	Effective Lake Evap	100-YR Effecitve Evap
Units	(in/mo)	(in/mo)	(in/mo)
October	3.93	3.14	3.14
November	1.87	1.50	1.12
December	1.51	1.21	0.91
January	1.53	1.22	0.92
February	1.67	1.34	1.00
March	2.72	2.18	1.63
April	3.98	3.18	3.18
May	5.84	4.67	4.67
June	7.79	6.23	6.23
July	9.41	7.53	7.53
August	8.45	6.76	6.76
September	6.62	5.30	5.30
TOTAL	55.32	44.26	42.40

Average Year Flows

	0.263
	ADF (mgd)
Month	
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265
Average:	0.332

RP100 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320
	0.458

Actual 2016/2017 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	0.279
August	0.297
September	0.277
	0.475

Actual 2015/2016 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.252
November	0.280
December	0.432
January	0.613
February	0.382
March	0.571
April	0.357
May	0.300
June	0.277
July	0.290
August	0.297
September	0.277
	0.361

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows NO IONE- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Henderson Reservoir**

RESERVOIR

Storage	Volume (ac-ft)	Area (ac)	
Minimum	0	0.0	
Maximum	393	28.9	Enter small number (0.01 ac) instead of 0.0 ac.
Active Starting Volume	0		Minimum starting volume = minimum (dead) storage
Watershed Area	4.3	(ac)	
Runoff Coefficient, C	1		
Percolation Rate	0.12	(ac-ft/yr)	

Resevoir Equation "y=Ax^2 + Bx +C"	
Coefficient A	-0.0001
Coefficient B	0.0999
Constant C	4.8166

Resevoir Height Equation "y=Ax + B	
Coefficient A	0.9706
Coefficient B	-2.8011

Month	FLOW			STORAGE INPUTS				STORAGE OUTPUTS							
Units	Days	WWTP Monthly Flow (ac-ft)	Bowers Disposal (ac-ft)	Beginning Reservoir Volume (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	Watershed Runoff (indirect) (ac-ft)	**Subtotal Influent/Precipitation** (ac-ft)	Evaporation (water surface) (ac-ft)	Percolation (direct) (ac-ft)	Wastewater sent to Preston Reservoir (ac-ft)	**Subtotal Disposal** (ac-ft)	NET OUT (ac-ft)	Beginning Storage Volume (ac-ft)	Change in Storage Volume (ac-ft)	**Estimated End of Month Storage Volume (ac-ft)**
October	31	33.8	13.8	0.0	20.0	1.2	7.3	28.5	-1.3	-0.01	-10.0	-11.3	17.2	0.0	17.2	**17.2**
November	30	34.3	0.0	17.2	34.3	3.5	14.4	52.3	-0.6	-0.01	-10.0	-10.6	41.7	17.2	41.7	**58.9**
December	31	50.6	0.0	58.9	50.6	8.1	17.8	76.5	-0.8	-0.01	-10.0	-10.8	65.7	58.9	65.7	**124.7**
January	31	94.8	0.0	124.7	94.8	12.2	13.6	120.6	-1.2	-0.01	-10.0	-11.2	109.4	124.7	109.4	**234.1**
February	28	81.3	0.0	234.1	81.3	15.0	6.9	103.2	-1.9	-0.01	-10.0	-11.9	91.3	234.1	91.3	**325.4**
March	31	47.6	0.0	325.4	47.6	15.4	3.7	66.6	-3.6	-0.01	-10.0	-13.6	53.0	325.4	53.0	**378.4**
April	30	49.4	0.0	378.4	49.4	11.7	2.0	63.1	-7.5	-0.01	-80.0	-87.5	-24.4	378.4	-24.4	**354.0**
May	31	29.5	0.0	354.0	29.5	4.4	0.9	34.8	-10.8	-0.01	-80.0	-90.8	-56.0	354.0	-56.0	**298.0**
June	30	27.3	8.9	298.0	18.5	1.2	0.4	20.1	-13.4	-0.01	-80.0	-93.4	-73.3	298.0	-73.3	**224.7**
July	31	26.5	26.5	224.7	0.0	0.0	0.0	0.1	-13.9	-0.01	-80.0	-93.9	-93.9	224.7	-93.9	**130.8**
August	31	28.3	28.3	130.8	0.0	0.3	0.3	0.6	-9.1	-0.01	-80.0	-89.1	-88.6	130.8	-88.6	**42.3**
September	30	25.5	25.5	42.3	0.0	0.4	1.0	1.4	-3.9	-0.01	-40.0	-43.9	-42.5	42.3	-42.3	**0.0**
Total		528.9	103.0		425.9	73.5	68.4	567.8	-68.0	-0.12	-500.0	-568.1	-0.2		0.0	

Actual 2016/2017 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	0.279
August	0.297
September	0.277

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows NO IONE- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Preston Reservoir Average Water Balance

Assumptions:

Bowers Ranch has 24 Acres in use and 40 Acres in total available.
Hoskins Ranch has 24 Acres in use and 60 Acres in total available.
The Preston Forebay has 2 Acres of Surface Area.
Preston Reservoir ranges from 0 Acres when empty to 18 when full with 14 acres of watershed area and Capacity of 235 ac-ft.
The assumed Percolation rate is 100 Gallons per Day or 0.01 Acre-Feet per Month.

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Average Year	In	1.20	2.57	3.45	3.97	3.58	3.35	1.86	0.85	0.26	0.04	0.06	0.29	21.48
Rainfall 100 Year	In	3.32	5.40	8.79	7.65	4.00	3.40	6.47	2.05	0.04	0.00	0.00	0.00	41.11
Pan Evaporation	In	3.14	1.12	0.91	0.92	1.00	1.63	3.18	4.67	6.23	7.53	6.76	5.30	42.40

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Henderson Reservoir														
Effluent	AF	10	10	10	10	10	10	80	80	80	80	80	40	500
Hoskins Ranch														
Hoskins Ranch Available Disposal	AF	10	0	0	0	0	0	0	0	7	16	10	7	50
Preston Forebay														
Preston Forebay Influent	AF	0	10	10	10	10	10	80	80	73	64	70	33	450
Precipitation	AF	1	1	1	1	1	1	1	0	0	0	0	0	7
Evaporation	AF	0	0	0	0	0	0	0	0	1	1	1	0	4
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Preston Forebay Effluent	AF	0	11	11	11	11	10	81	80	73	63	69	33	454
CDCR														
CDCR Effluent to Preston Reservoir	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Preston Reservoir														
Preston Reservoir Maximum Available Storage	AF	235	235	235	235	235	235	235	235	235	235	235	235	
Water in Storage at Beginning of Month	AF	0	7	31	65	96	117	135	231	312	381	438	502	
Influent	AF	0	11	11	11	11	10	81	80	73	63	69	33	454
Precipitation	AF	9	14	23	20	11	9	17	5	0	0	0	0	110
Evaporation	AF	2	1	1	1	1	1	2	4	5	6	5	4	32
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Water sent to Ione	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Applied(+)/Removed(-) from Storage	AF	7	24	34	31	20	18	96	82	68	57	64	29	
Estimated End of Month Storage	**AF**	**7**	**31**	**65**	**96**	**117**	**135**	**231**	**312**	**381**	**438**	**502**	**531**	

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows NO IONE- Sutter Creek Facilities (Bowers Ranch, Henderson, F

Conversions		
MG to AF	0.325851	= 1 AF

Logical Value for SCWWTP Options	0
Logical Value for CDCR Options	1
Logical value for removed henderson and thngys	FALSE
Logical Value for Rainfall	4
Logical Value for Perc	1
Logical value for remove preston	FALSE

Misc Assumptions

Preston Reservoir	0.00	18.00	235.00
Percolation	100.00	0.01	
Preston Forebay	2.00		
Storage Pond 5	4.35	52.17	
Storage Pond 6	3.45	27.62	0.80
Storage Pond 7	4.38	30.69	0.46
Additional Storage	0.00		
Preston Watershed Area	14.00		
Watershed Runnoff Coef.	0.70		
Bowers Ranch	24.00	40.00	
Hoskins Ranch	24.00	60.00	

Precip. into both Preston Forebay and Preston Reservoir is assumed with full reservoir in all cases due to lack of mapping for determination of depth/area curves.

Preston Reservoir			
Elevation	Area (AC)	Capacity (AC-FT)	Elevation
325	0	0	325
330	3	5	330
335	6	25	335
340	8	60	340
345	12	110	345
350	16	175	350
353	18	235	353
355	20	270	355

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows NO IONE- Sutter Creek Facilities (Bowers Ranch, Henderson, Prest

Facility Name: **Bowers Ranch**

Storage	(ac-ft)	(ac)	
Minimum	**0**	**0**	
Maximum	**0.00000001**	**0.00000001**	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	**24**	(ac)
Runoff Coefficient, C	**0.1**	

Month		**FLOW**	**INPUTS**		
		WWTP Monthly Flow	Facility Influent Flow	Precipitation (direct)	Total Disposal
Units	Days	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
October	31	33.8	13.8	0.6	14.4
November	30	34.3	0.0	1.3	1.3
December	31	50.6	0.0	1.9	1.9
January	31	94.8	0.0	1.9	1.9
February	28	81.3	0.0	1.6	1.6
March	31	47.6	0.0	1.4	1.4
April	30	49.4	0.0	1.0	1.0
May	31	29.5	0.0	0.4	0.4
June	30	27.3	8.9	0.1	9.0
July	31	26.5	26.5	0.0	26.5
August	31	28.3	28.3	0.0	28.3
September	30	25.5	25.5	0.1	25.6
Total			103.0	10.3	113.2

Historic Disposal Data:

Year	Disposal Amount	
	mg	ac-ft
2011/2012	23.1	70.9
2012/2013	31.1	95.4
2013/2014	36.3	111.4
2014/2015	32.5	99.7
2015/2016	31.8	97.8

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows NO IONE- Sutter Creek Facilities (Bowers Ranch, Henderson, Pre

Facility Name: **Hoskins Ranch**

RESERVOIR

Storage	Volume (ac-ft)	Area (ac)	
Minimum	0	0	
Maximum	0.00000001	0.00000001	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	24	(ac)
Runoff Coefficient, C	0.1	

Month		**FLOW**	**INPUTS**		
		WWTP Monthly Flow	Facility Influent Flow	Precipitation (direct)	**Subtotal**
Units	Days	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
October	31	33.8	10.0	0.6	10.6
November	30	34.3	0.0	1.3	1.3
December	31	50.6	0.0	1.9	1.9
January	31	94.8	0.0	1.9	1.9
February	28	81.3	0.0	1.6	1.6
March	31	47.6	0.0	1.4	1.4
April	30	49.4	0.0	1.0	1.0
May	31	29.5	0.0	0.4	0.4
June	30	27.3	6.6	0.1	6.7
July	31	26.5	16.3	0.0	16.4
August	31	28.3	9.9	0.0	10.0
September	30	25.5	6.6	0.1	6.7
Total			49.5	10.3	59.8

Historic Disposal Data:

Year	Disposal Amount mg	ac-ft
2011/2012	26.1	80.1
2012/2013	21.9	67.2
2013/2014	22.4	68.7
2014/2015	55.5	170.3
2015/2016	18.7	57.3

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows NO IONE- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Rar

PRECIPITATION and DISTRIBUTION of RAIN

Used average rainfall to distribute 100-year

SUTTER HILL CDF, CALIFORNIA (048713)

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
	6.03	12.66	18.27	18.17	15.45	13.44	9.66	3.74	1.13	0.04	0.42	0.99	100
Avg Precip	1.71	3.59	5.18	5.15	4.38	3.81	2.74	1.06	0.32	0.01	0.12	0.28	28.35
10-YR	2.41	5.05	7.29	7.25	6.16	5.36	3.86	1.49	0.45	0.01	0.17	0.39	39.89
100-YR	3.09	6.49	9.37	9.32	7.92	6.89	4.96	1.92	0.58	0.02	0.22	0.51	51.29
											100-YR Return Ratio		**1.81**
Lat	3837										**10-YR Return Ratio**		**1.41**
Long	12080												
Elevation ft	1586												

http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca8713

Period of Record : 10/01/1943 to 06/10/2016

IONE, CALIFORNIA (048230)

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
Avg Precip	1.20	2.57	3.45	3.97	3.58	3.35	1.86	0.85	0.26	0.04	0.06	0.29	21.48
100-YR	3.32	5.40	8.79	7.65	4.00	3.40	6.47	2.05	0.04	0.00	0.00	0.00	41.11

ıch)

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows NO IONE- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

EVAPORATION

Standard daily pan evaporation is measured using the four-foot diameter Class A Evaporation pan. The pan water level reading is adjusted when precipitation is measured to obtain the actual evaporation. Most Class A pans are installed aboveground, allowing effects such as radiation on the side walls and heat exchanges with the pan material. These effects tend to increase the evaporation totals. The amounts can then be adjusted by multiplying the totals by 0.70 or 0.80 to more closely estimate the evaporation from naturally existing surfaces such as a shallow lake, wet soil, or other moist natural surfaces.

Source: Western Regional Climate Center, Desert Research Institute www.wrcc.dri.edu
Training Handbook for Disposal of Non-Designated Waste to Land Systems: Design, Operation, and Monitoring , Dated June 2004

Pan Coefficient (C_p) = **0.8** **Average between 0.7 and 0.8 as described above**

Weather Correction Factor (k) [d] **25%** From Training Handbook: "The reduction in evaporation during a wet year in the wet season only can be in the 20 to 30 percent range

Zone 10

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
Pan Evaporation	3.93	1.87	1.51	1.53	1.67	2.72	3.98	5.84	7.79	9.41	8.45	6.62	55.32
Effective Lake Evap	3.14	1.50	1.21	1.22	1.34	2.18	3.18	4.67	6.23	7.53	6.76	5.30	44.26
100-YR Effecitve Evap	3.14	**1.12**	**0.91**	**0.92**	**1.00**	**1.63**	3.18	4.67	6.23	7.53	6.76	5.30	42.40

100-YR Correction Factor included

http://www.wrcc.dri.edu/htmlfiles/westevap.final.html

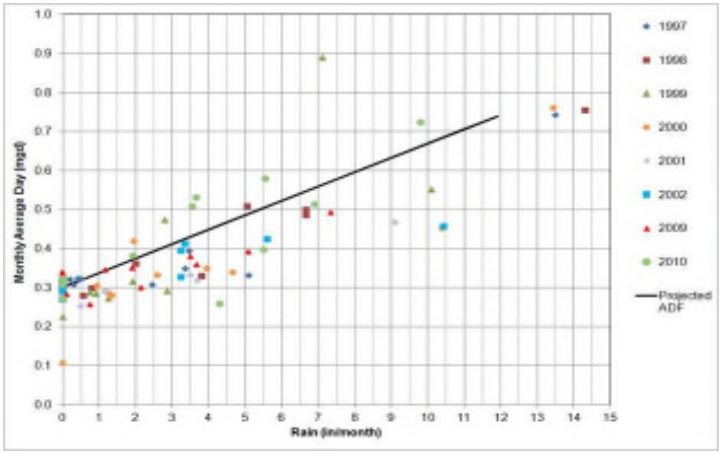
Pan evaporation locations in the project vicinity were limited. The closest being Placerville IFG and Camp Pardee. Placerville IFG is used because the rate is slightly more conservative and there is more complete data available.

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows NO IONE- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Using historic rainfall data and CSC WWTP flows, the relationships between monthly rainfall depths and monthly average and peak flows at the WWTP were used to project the collection systems response to monthly rainfall in the form of response curves which were developed as part of the 2017 update of the City of Sutter Creek and ARSA Wastewater Master Plan.

Using the monthly average response curve, we determined the average monthly flows that correlated to the 100-year rainfall values for each month. The equation of the trendline is: y = 0.0368x + 0.3008.

WWTP Monthly Average Day Flow Projected by Monthly Rainfall Depth



Resulting average and 1 in 100 year flows and comparison to actual 2016/2017 flows:

Average Year Flows	
Month	Flow (mgd)
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265

RP100 WWTP Flows	
Month	Flow (mgd)
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320

Actual 2016/2017 WWTP Flows	
Month	Flow (mgd)
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	0.279
August	---
September	----

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Reservoir		Henderson Reservoir	Preston Reservoir	Total
Volume	(ac-ft)	393	235	628
Surface Area	(ac)	29	18	47

Amount of disposal during average year scenario

Annual Disposal		Henderson Reservoir	Bowers Ranch	Hoskins Ranch	Total
Area	(ac)	varies	24	24	48
Year 1	(ac-ft/yr)	68	103	50	221

			Henderson Reservoir			Preston Reservoir	
Total Inflow	Active Starting Volume	WWTP Effluent	Storage Accumulated (to Preston)	Max Storage	Approximate Available Capacity	Max Storage	Approximate Available Capacity
	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
System	0	529	-500	378	15	62	173

Period			WWTP Effluent					Historic Weather Data			Bowers	Henderson Reservoir									Hoskins	Preston Reservoir								
Years	Month	Days	Monthly Flow	Monthly Flow	ADWF (Jun-Sep)	ADWF (Jun-Sep)	Estimated Inflow & Infiltration	% of Total	Precip	Pan Evap	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Subtotal Disposal	Wastewater sent to Preston Reservoir	Change in Storage Volume	Estimated Storage Volume	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Water sent to Ione	Change in Storage Volume	Estimated Storage Volume
	(mo)	(days)	(mgd)	(ac-ft)	(mgd)	(ac-ft)	(ac-ft)	(%mo)	(in/mo)	(in/mo)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
Year 1	Oct	31	0.355	33.8	0.263	25.0	8.7	6.03	3.09	3.14	13.8	20.0	1.2	7.3	-1.3	0.0	7.3	-10.0	17.2	17.2	10.0	0.3	8.8	4.8	2.4	0.0	10.0	-3.2	0.0
	Nov	30	0.373	34.3	0.263	24.2	10.1	12.66	6.49	1.12	0.0	34.3	3.5	14.4	-0.6	0.0	17.4	-10.0	41.7	58.9	0.0	10.8	14.4	10.1	0.8	0.0	10.0	14.4	14.4
	Dec	31	0.532	50.6	0.263	25.0	25.6	18.27	9.37	0.91	0.0	50.6	8.1	17.8	-0.8	0.0	25.1	-10.0	65.7	124.7	0.0	11.4	23.4	13.2	0.7	0.0	10.0	24.1	38.5
	Jan	31	0.997	94.8	0.263	25.0	69.8	18.17	9.32	0.92	0.0	94.8	12.2	13.6	-1.2	0.0	24.6	-10.0	109.4	234.1	0.0	11.2	20.4	11.0	0.7	0.0	10.0	20.9	59.4
	Feb	28	0.946	81.3	0.263	22.6	58.7	15.45	7.92	1.00	0.0	81.3	15.0	6.9	-1.9	0.0	20.0	-10.0	91.3	325.4	0.0	10.6	10.7	7.6	0.8	0.0	10.0	10.5	69.9
	Mar	31	0.500	47.6	0.263	25.0	22.5	13.44	6.89	1.63	0.0	47.6	15.4	3.7	-3.6	0.0	15.4	-10.0	53.0	378.4	0.0	10.4	9.1	5.4	1.2	0.0	10.0	8.2	78.1
	Apr	30	0.537	49.4	0.263	24.2	25.2	9.66	4.96	3.18	0.0	49.4	11.7	2.0	-7.5	0.0	6.2	-80.0	-24.4	354.0	0.0	80.8	17.2	3.0	2.4	0.0	97.0	-1.4	76.7
	May	31	0.310	29.5	0.263	25.0	4.5	3.74	1.92	4.67	0.0	29.5	4.4	0.9	-10.8	0.0	-5.5	-80.0	-56.0	298.0	0.0	79.9	5.5	1.0	3.5	0.0	97.0	-15.1	61.6
	Jun	30	0.297	27.3	0.263	24.2	3.1	1.13	0.58	6.23	8.9	18.5	1.2	0.4	-13.4	0.0	-11.8	-80.0	-73.3	224.7	6.6	160.3	0.1	0.3	4.7	0.0	99.0	56.8	118.4
	Jul	31	0.279	26.5	0.263	25.0	1.5	0.04	0.02	7.53	26.5	0.0	0.0	0.0	-13.9	0.0	-13.9	-80.0	-93.9	130.8	16.3	150.5	0.0	0.0	5.6	0.0	99.0	45.9	164.3
	Aug	31	0.297	28.3	0.263	25.0	3.2	0.42	0.22	6.76	28.3	0.0	0.3	0.3	-9.1	0.0	-8.5	-80.0	-88.6	42.3	9.9	157.0	0.0	0.3	5.1	0.0	99.0	52.9	217.2
	Sep	30	0.277	25.5	0.263	24.2	1.3	0.99	0.51	5.30	25.5	0.0	0.4	1.0	-3.9	0.0	-2.5	-40.0	-42.3	0.0	6.6	120.4	0.0	0.8	4.0	0.0	99.0	17.4	234.6
	Total	365		528.9		294.6	234.3	100.0	51.3	42.40	103.0	425.9	73.5	68.4	-68.0	-0.1	73.8	-500.0	0.0		49.5	803.7	109.6	57.4	31.8	0.1	650.0		

Copy (paste special, values) appropriate data into Input columns above (Average, RP10, RP100, etc.)

Precipitation Table (Ref'd "Precip" Sheet)

Month	Percent / month	Average Precipitation	RP 100 YR	2015-2016 Actual precip.
Units	(%/mo)	(in/mo)	(in/mo)	(in/mo)
October	6.03	1.71	3.09	1.59
November	12.66	3.59	6.49	3.82
December	18.27	5.18	9.37	6.59
January	18.17	5.15	9.32	7.59
February	15.45	4.38	7.92	1.27
March	13.44	3.81	6.89	7.62
April	9.66	2.74	4.96	3.02
May	3.74	1.06	1.92	0.66
June	1.13	0.32	0.58	0.00
July	0.04	0.01	0.02	0.00
August	0.42	0.12	0.22	0.14
September	0.99	0.28	0.51	0.00
TOTAL	100.00	28.35	51.29	32.30

Pan Evaporation Table (Ref'd from "Evap" Sheet)

MONTH	Pan Evaporation	Effective Lake Evap	100-YR Effecitve Evap
Units	(in/mo)	(in/mo)	(in/mo)
October	3.93	3.14	3.14
November	1.87	1.50	1.12
December	1.51	1.21	0.91
January	1.53	1.22	0.92
February	1.67	1.34	1.00
March	2.72	2.18	1.63
April	3.98	3.18	3.18
May	5.84	4.67	4.67
June	7.79	6.23	6.23
July	9.41	7.53	7.53
August	8.45	6.76	6.76
September	6.62	5.30	5.30
TOTAL	55.32	44.26	42.40

Average Year Flows

	0.263
	ADF (mgd)
Month	
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265
Average:	0.332

RP100 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320
	0.458

Actual 2016/2017 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	0.279
August	0.297
September	0.277
	0.475

Actual 2015/2016 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.252
November	0.280
December	0.432
January	0.613
February	0.382
March	0.571
April	0.357
May	0.300
June	0.277
July	0.290
August	0.297
September	0.277
	0.361

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Henderson Reservoir**

RESERVOIR

	Volume (ac-ft)	Area (ac)	
Minimum	0	0.0	
Maximum	393	28.9	Enter small number (0.01 ac) instead of 0.0 ac.
Active Starting Volume	0		Minimum starting volume = minimum (dead) storage
Watershed Area	4.3	(ac)	
Runoff Coefficient, C	1		
Percolation Rate	0.12	(ac-ft/yr)	

Resevoir Equation "y=Ax^2 + Bx +C"	
Coefficient A	-0.0001
Coefficient B	0.0999
Constant C	4.8166

Resevoir Height Equation "y=Ax + B	
Coefficient A	0.9706
Coefficient B	-2.8011

Month	FLOW			STORAGE INPUTS				STORAGE OUTPUTS							
Units	Days	WWTP Monthly Flow (ac-ft)	Bowers Disposal (ac-ft)	Beginning Reservoir Volume (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	Watershed Runoff (indirect) (ac-ft)	**Subtotal Influent/Precipitation** (ac-ft)	Evaporation (water surface) (ac-ft)	Percolation (direct) (ac-ft)	Wastewater sent to Preston Reservoir (ac-ft)	**Subtotal Disposal** (ac-ft)	NET OUT (ac-ft)	Beginning Storage Volume (ac-ft)	Change in Storage Volume (ac-ft)	**Estimated End of Month Storage Volume (ac-ft)**
October	31	33.8	13.8	0.0	20.0	1.2	7.3	28.5	-1.3	-0.01	-10.0	-11.3	17.2	0.0	17.2	**17.2**
November	30	34.3	0.0	17.2	34.3	3.5	14.4	52.3	-0.6	-0.01	-10.0	-10.6	41.7	17.2	41.7	**58.9**
December	31	50.6	0.0	58.9	50.6	8.1	17.8	76.5	-0.8	-0.01	-10.0	-10.8	65.7	58.9	65.7	**124.7**
January	31	94.8	0.0	124.7	94.8	12.2	13.6	120.6	-1.2	-0.01	-10.0	-11.2	109.4	124.7	109.4	**234.1**
February	28	81.3	0.0	234.1	81.3	15.0	6.9	103.2	-1.9	-0.01	-10.0	-11.9	91.3	234.1	91.3	**325.4**
March	31	47.6	0.0	325.4	47.6	15.4	3.7	66.6	-3.6	-0.01	-10.0	-13.6	53.0	325.4	53.0	**378.4**
April	30	49.4	0.0	378.4	49.4	11.7	2.0	63.1	-7.5	-0.01	-80.0	-87.5	-24.4	378.4	-24.4	**354.0**
May	31	29.5	0.0	354.0	29.5	4.4	0.9	34.8	-10.8	-0.01	-80.0	-90.8	-56.0	354.0	-56.0	**298.0**
June	30	27.3	8.9	298.0	18.5	1.2	0.4	20.1	-13.4	-0.01	-80.0	-93.4	-73.3	298.0	-73.3	**224.7**
July	31	26.5	26.5	224.7	0.0	0.0	0.0	0.1	-13.9	-0.01	-80.0	-93.9	-93.9	224.7	-93.9	**130.8**
August	31	28.3	28.3	130.8	0.0	0.3	0.3	0.6	-9.1	-0.01	-80.0	-89.1	-88.6	130.8	-88.6	**42.3**
September	30	25.5	25.5	42.3	0.0	0.4	1.0	1.4	-3.9	-0.01	-40.0	-43.9	-42.5	42.3	-42.3	**0.0**
Total		528.9	103.0		425.9	73.5	68.4	567.8	-68.0	-0.12	-500.0	-568.1	-0.2		0.0	

Actual 2016/2017 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	0.279
August	0.297
September	0.277

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Preston Reservoir Average Water Balance

Assumptions:

Bowers Ranch has 24 Acres in use and 40 Acres in total available.
Hoskins Ranch has 24 Acres in use and 60 Acres in total available.
The Preston Forebay has 2 Acres of Surface Area.
Preston Reservoir ranges from 0 Acres when empty to 18 when full with 14 acres of watershed area and Capacity of 235 ac-ft.
The assumed Percolation rate is 100 Gallons per Day or 0.01 Acre-Feet per Month.

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Average Year	In	1.20	2.57	3.45	3.97	3.58	3.35	1.86	0.85	0.26	0.04	0.06	0.29	21.48
Rainfall 100 Year	In	3.32	5.40	8.79	7.65	4.00	3.40	6.47	2.05	0.04	0.00	0.00	0.00	41.11
Pan Evaporation	In	3.14	1.12	0.91	0.92	1.00	1.63	3.18	4.67	6.23	7.53	6.76	5.30	42.40

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Henderson Reservoir														
Effluent	AF	10	10	10	10	10	10	80	80	80	80	80	40	500
Hoskins Ranch														
Hoskins Ranch Available Disposal	AF	10	0	0	0	0	0	0	0	7	16	10	7	50
Preston Forebay														
Preston Forebay Influent	AF	0	10	10	10	10	10	80	80	73	64	70	33	450
Precipitation	AF	1	1	1	1	1	1	1	0	0	0	0	0	7
Evaporation	AF	0	0	0	0	0	0	0	0	1	1	1	0	4
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Preston Forebay Effluent	AF	0	11	11	11	11	10	81	80	73	63	69	33	454
CDCR														
CDCR Effluent to Preston Reservoir	AF	0	0	0	0	0	0	0	0	88	88	88	88	350
Preston Reservoir														
Preston Reservoir Maximum Available Storage	AF	235	235	235	235	235	235	235	235	235	235	235	235	
Water in Storage at Beginning of Month	AF	0	0	14	38	59	70	78	77	62	118	164	217	
Influent	AF	0	11	11	11	11	10	81	80	160	151	157	120	804
Precipitation	AF	9	14	23	20	11	9	17	5	0	0	0	0	110
Evaporation	AF	2	1	1	1	1	1	2	4	5	6	5	4	32
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Water sent to Ione	AF	10	10	10	10	10	10	97	97	99	99	99	99	650
Water Applied(+)/Removed(-) from Storage	AF	-3	14	24	21	10	8	-1	-15	57	46	53	17	
Estimated End of Month Storage	**AF**	**0**	**14**	**38**	**59**	**70**	**78**	**77**	**62**	**118**	**164**	**217**	**235**	

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston an

Conversions		
MG to AF	0.325851	= 1 AF

Logical Value for SCWWTP Options	0
Logical Value for CDCR Options	1
Logical value for removed henderson and thngys	FALSE
Logical Value for Rainfall	4
Logical Value for Perc	1
Logical value for remove preston	FALSE

Misc Assumptions

Preston Reservoir	0.00	18.00	235.00
Percolation	100.00	0.01	
Preston Forebay	2.00		
Storage Pond 5	4.35	52.17	
Storage Pond 6	3.45	27.62	0.80
Storage Pond 7	4.38	30.69	0.46
Additional Storage	0.00		
Preston Watershed Area	14.00		
Watershed Runnoff Coef.	0.70		
Bowers Ranch	24.00	40.00	
Hoskins Ranch	24.00	60.00	

Precip. into both Preston Forebay and Preston Reservoir is assumed with full reservoir in all cases due to lack of mapping for determination of depth/area curves.

Preston Reservoir			
Elevation	Area (AC)	Capacity (AC-FT)	Elevation
325	0	0	325
330	3	5	330
335	6	25	335
340	8	60	340
345	12	110	345
350	16	175	350
353	18	235	353
355	20	270	355

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and

Facility Name: **Bowers Ranch**

Storage	(ac-ft)	(ac)	
Minimum	0	0	
Maximum	0.00000001	0.00000001	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	24	(ac)
Runoff Coefficient, C	0.1	

Month		FLOW	INPUTS		
		WWTP Monthly Flow	Facility Influent Flow	Precipitation (direct)	Total Disposal
Units	Days	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
October	31	33.8	13.8	0.6	14.4
November	30	34.3	0.0	1.3	1.3
December	31	50.6	0.0	1.9	1.9
January	31	94.8	0.0	1.9	1.9
February	28	81.3	0.0	1.6	1.6
March	31	47.6	0.0	1.4	1.4
April	30	49.4	0.0	1.0	1.0
May	31	29.5	0.0	0.4	0.4
June	30	27.3	8.9	0.1	9.0
July	31	26.5	26.5	0.0	26.5
August	31	28.3	28.3	0.0	28.3
September	30	25.5	25.5	0.1	25.6
Total			103.0	10.3	113.2

Historic Disposal Data:

Year	Disposal Amount	
	mg	ac-ft
2011/2012	23.1	70.9
2012/2013	31.1	95.4
2013/2014	36.3	111.4
2014/2015	32.5	99.7
2015/2016	31.8	97.8

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and

Facility Name: **Hoskins Ranch**

RESERVOIR

Storage	Volume (ac-ft)	Area (ac)	
Minimum	**0**	**0**	
Maximum	**0.00000001**	**0.00000001**	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	**24**	(ac)
Runoff Coefficient, C	**0.1**	

Month		**FLOW**	**INPUTS**		
		WWTP Monthly Flow	Facility Influent Flow	Precipitation (direct)	**Subtotal**
Units	Days	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
October	31	33.8	10.0	0.6	10.6
November	30	34.3	0.0	1.3	1.3
December	31	50.6	0.0	1.9	1.9
January	31	94.8	0.0	1.9	1.9
February	28	81.3	0.0	1.6	1.6
March	31	47.6	0.0	1.4	1.4
April	30	49.4	0.0	1.0	1.0
May	31	29.5	0.0	0.4	0.4
June	30	27.3	6.6	0.1	6.7
July	31	26.5	16.3	0.0	16.4
August	31	28.3	9.9	0.0	10.0
September	30	25.5	6.6	0.1	6.7
Total			49.5	10.3	59.8

Historic Disposal Data:

Year	Disposal Amount mg	ac-ft
2011/2012	26.1	80.1
2012/2013	21.9	67.2
2013/2014	22.4	68.7
2014/2015	55.5	170.3
2015/2016	18.7	57.3

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

PRECIPITATION and DISTRIBUTION of RAIN

Used average rainfall to distribute 100-year

SUTTER HILL CDF, CALIFORNIA (048713)

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
	6.03	12.66	18.27	18.17	15.45	13.44	9.66	3.74	1.13	0.04	0.42	0.99	100
Avg Precip	1.71	3.59	5.18	5.15	4.38	3.81	2.74	1.06	0.32	0.01	0.12	0.28	28.35
10-YR	2.41	5.05	7.29	7.25	6.16	5.36	3.86	1.49	0.45	0.01	0.17	0.39	39.89
100-YR	3.09	6.49	9.37	9.32	7.92	6.89	4.96	1.92	0.58	0.02	0.22	0.51	51.29
											100-YR Return Ratio		**1.81**
Lat	3837										**10-YR Return Ratio**		**1.41**
Long	12080												
Elevation ft	1586												

http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca8713

Period of Record : 10/01/1943 to 06/10/2016

IONE, CALIFORNIA (048230)

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
Avg Precip	1.20	2.57	3.45	3.97	3.58	3.35	1.86	0.85	0.26	0.04	0.06	0.29	21.48
100-YR	3.32	5.40	8.79	7.65	4.00	3.40	6.47	2.05	0.04	0.00	0.00	0.00	41.11

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

EVAPORATION

Standard daily pan evaporation is measured using the four-foot diameter Class A Evaporation pan. The pan water level reading is adjusted when precipitation is measured to obtain the actual evaporation. Most Class A pans are installed aboveground, allowing effects such as radiation on the side walls and heat exchanges with the pan material. These effects tend to increase the evaporation totals. The amounts can then be adjusted by multiplying the totals by 0.70 or 0.80 to more closely estimate the evaporation from naturally existing surfaces such as a shallow lake, wet soil, or other moist natural surfaces.

Source: Western Regional Climate Center, Desert Research Institute www.wrcc.dri.edu
Training Handbook for Disposal of Non-Designated Waste to Land Systems: Design, Operation, and Monitoring , Dated June 2004

Pan Coefficient (C_p) = **0.8** **Average between 0.7 and 0.8 as described above**

Weather Correction Factor (k) [d] **25%** From Training Handbook: "The reduction in evaporation during a wet year in the wet season only can be in the 20 to 30 percent range

Zone 10

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
Pan Evaporation	3.93	1.87	1.51	1.53	1.67	2.72	3.98	5.84	7.79	9.41	8.45	6.62	55.32
Effective Lake Evap	3.14	1.50	1.21	1.22	1.34	2.18	3.18	4.67	6.23	7.53	6.76	5.30	44.26
100-YR Effecitve Evap	3.14	**1.12**	**0.91**	**0.92**	**1.00**	**1.63**	3.18	4.67	6.23	7.53	6.76	5.30	42.40

100-YR Correction Factor included

http://www.wrcc.dri.edu/htmlfiles/westevap.final.html

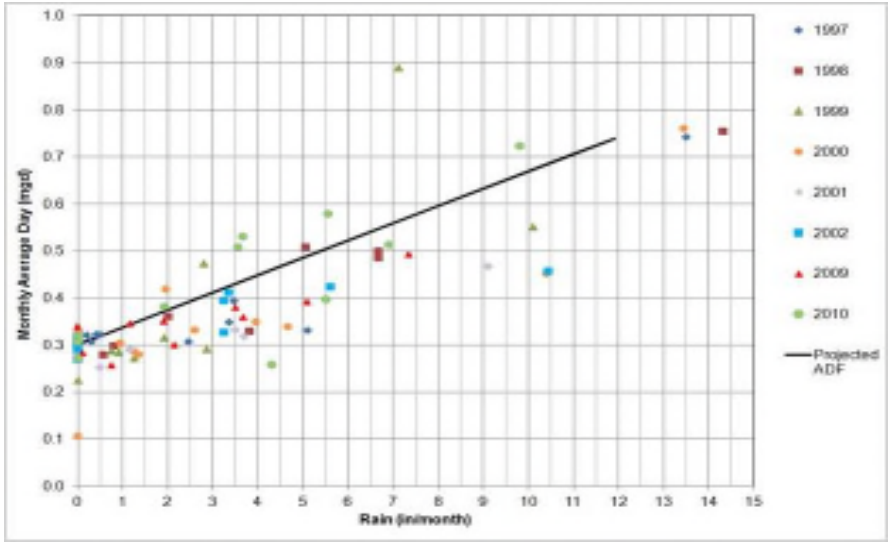
Pan evaporation locations in the project vicinity were limited. The closest being Placerville IFG and Camp Pardee. Placerville IFG is used because the rate is slightly more conservative and there is more complete data available.

1 in 100 Year Water Balance w/ 2016/2017 CSC WWTP Acutal flows- Sutter Creek Facilities (Bowers Ranch, Henderson, Preston a

Using historic rainfall data and CSC WWTP flows, the relationships between monthly rainfall depths and monthly average and peak flows at the WWTP were used to project the collection systems response to monthly rainfall in the form of response curves which were developed as part of the 2017 update of the City of Sutter Creek and ARSA Wastewater Master Plan.

Using the monthly average response curve, we determined the average monthly flows that correlated to the 100-year rainfall values for each month. The equation of the trendline is: y = 0.0368x + 0.3008.

WWTP Monthly Average Day Flow Projected by Monthly Rainfall Depth



Resulting average and 1 in 100 year flows and comparison to actual 2016/2017 flows:

Average Year Flows	
Month	Flow (mgd)
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265

RP100 WWTP Flows	
Month	Flow (mgd)
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320

Actual 2016/2017 WWTP Flows	
Month	Flow (mgd)
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	0.279
August	---
September	----

2015/2016 Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

2015 - 2016 MONITORING DATA

		SUTTER CREEK WWTP FLOWS			BOWERS DISPOSAL FLOWS			HENDERSON RESERVOIR						
DATE	PRECIPITATION (IN)	DATE	INFLOW (MG)	INFLOW (AC-FT)	DATE	OUTFLOW (MG)	OUTFLOW (AC-FT)	DATE	FREEBOARD (FT)	STORAGE VOLUME (MG)	STORAGE VOLUME (AC-FT)	DATE	OUTFLOW (MG)	OUTFLOW (AC-FT)
								9/30/2015	19.6	16.4	50.5			
Oct 2015	1.59	Oct 2015	7.8	23.9	Oct 2015	4.5	13.8	10/31/2015	24.1	3.9	12.1	Oct 2015	19.7	60.4
Nov 2015	3.82	Nov 2015	8.4	25.8	Nov 2015	0.0	0.0	11/30/2015	21.1	11.7	35.9	Nov 2015	3.9	12.1
Dec 2015	6.59	Dec 2015	13.4	41.1	Dec 2015	0.0	0.0	12/31/2015	17.2	25.6	78.5	Dec 2015	9.8	30.1
Jan 2016	7.59	Jan 2016	19.0	58.2	Jan 2016	0.0	0.0	1/31/2016	12.1	50.3	154.4	Jan 2016	12.4	38.0
Feb 2016	1.27	Feb 2016	10.7	32.8	Feb 2016	0.0	0.0	2/29/2016	10.9	57.4	176.2	Feb 2016	17.8	54.6
Mar 2016	7.62	Mar 2016	17.7	54.2	Mar 2016	0.0	0.0	3/31/2016	8.7	72.0	221.0	Mar 2016	15.1	46.3
Apr 2016	3.02	Apr 2016	10.7	32.8	Apr 2016	0.0	0.0	4/30/2016	8.5	73.4	225.3	Apr 2016	13.7	42.0
May 2016	0.66	May 2016	9.3	28.5	May 2016	0.0	0.0	5/31/2016	9.9	63.8	195.8	May 2016	23.0	70.7
Jun 2016	0.00	Jun 2016	8.3	25.3	Jun 2016	2.9	8.9	6/30/2016	14.4	38.2	117.3	Jun 2016	32.2	98.9
Jul 2016	0.00	Jul 2016	9.0	27.6	Jul 2016	9.0	27.6	7/31/2016	20.1	14.7	45.2	Jul 2016	25.4	78.0
Aug 2016	0.14	Aug 2016	9.2	28.2	Aug 2016	9.2	28.2	8/31/2016	22.3	8.1	25.0	Aug 2016	8.7	26.6
Sep 2016	0.00	Sep 2016	8.3	25.5	Sep 2016	6.3	19.2	9/30/2016	25.8	0.8	2.5	Sep 2016	10.8	33.2
TOTAL:	**32.3**		**131.7**	**404.1**		**31.8**	**97.7**						**192.6**	**591.0**

			PRESTON RESERVOIR									
HOSKINS DISPOSAL FLOWS							M. CREEK FLOWS INTO PRESTON			TOTAL FLOWS TO IONE TERTIARY WWTP		
DATE	OUTFLOW (MG)	OUTFLOW (AC-FT)	DATE	FREEBOARD (FT)	STORAGE VOLUME (MG)	STORAGE VOLUME (AC-FT)	DATE	INFLOW (MG)	INFLOW (AC-FT)	DATE	OUTFLOW (MG)	OUTFLOW (AC-FT)
			9/30/2015	8.9	40.5	124.3						
Oct 2015	5.8	17.8	10/31/2015	10.9	32.9	101.0	Oct 2015	0.0	0.0	Oct 2015	13.0	40.0
Nov 2015	0.0	0.0	11/30/2015	14.6	20.9	64.0	Nov 2015	0.0	0.0	Nov 2015	10.9	33.4
Dec 2015	0.0	0.0	12/31/2015	14.0	22.8	70.0	Dec 2015	0.0	0.0	Dec 2015	6.6	20.2
Jan 2016	0.0	0.0	1/31/2016	11.4	31.3	96.0	Jan 2016	0.0	0.0	Jan 2016	3.9	12.1
Feb 2016	0.0	0.0	2/29/2016	8.7	41.4	126.9	Feb 2016	0.0	0.0	Feb 2016	4.0	12.4
Mar 2016	0.0	0.0	3/31/2016	5.5	54.9	168.5	Mar 2016	0.0	0.0	Mar 2016	3.4	10.3
Apr 2016	0.0	0.0	4/30/2016	5.6	54.5	167.2	Apr 2016	0.0	0.0	Apr 2016	9.1	27.8
May 2016	0.0	0.0	5/31/2016	7.7	45.6	139.9	May 2016	0.0	0.0	May 2016	27.3	83.8
Jun 2016	2.2	6.6	6/30/2016	9.8	36.7	112.6	Jun 2016	0.0	0.0	Jun 2016	36.0	110.4
Jul 2016	5.3	16.3	7/31/2016	7.6	46.0	141.2	Jul 2016	35.9	110.2	Jul 2016	40.9	125.6
Aug 2016	3.2	9.9	8/31/2016	8.3	43.1	132.1	Aug 2016	32.9	101.0	Aug 2016	44.1	135.4
Sep 2016	2.2	6.6	9/30/2016	13.2	25.4	78.0	Sep 2016	10.3	31.6	Sep 2016	37.5	115.1
TOTALS:	**18.7**	**57.3**						**79.2**	**242.9**		**236.7**	**726.4**

2015/2016 Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Reservoir		Henderson Reservoir	Preston Reservoir	Total
Volume	(ac-ft)	393	235	628
Surface Area	(ac)	29	18	47

Amount of disposal during 2015/2016

Annual Disposal		Henderson Reservoir	Bowers Ranch	Hoskins Ranch	Total
Area	(ac)	varies	24	24	48
	(ac-ft/yr)	54	98	57	209

			Henderson Reservoir			Preston Reservoir	
Total Inflow	Active Starting Volume	WWTP Effluent	Storage Accumulated (to Preston)	Max Storage	Approximate Available Capacity	Max Storage	Approximate Available Capacity
	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
System	51	405	-390	225.3	168	179.6	55

Period			WWTP Effluent					Historic Weather Data				Bowers	Henderson Reservoir									Hoskins	Preston Reservoir								
Years	Month	Days	Monthly Flow	Monthly Flow	ADWF (Jun-Sep)	ADWF (Jun-Sep)	Estimated Inflow & Infiltration	% of Total	Precip	Pan Evap	Eto	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Subtotal Disposal	Wastewater sent to Preston Reservoir	Change in Storage Volume	Estimated Storage Volume	Actual Storage Volume	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Water sent to Ione	Change in Storage Volume	Estimated Storage Volume	Actual Storage Volume
	(mo)	(days)	(mgd)	(ac-ft)	(mgd)	(ac-ft)	(ac-ft)	(%mo)	(in/mo)	(in/mo)	(in/mo)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
Year 1	Oct	31	0.252	24.0	0.263	25.0	0.0	6.03	1.59	3.14	0.00	13.8	10.2	1.3	3.1	-2.5	0.0	1.9	-50.4	-38.4	12.1	12.1	17.8	32.6	4.24	4.8	2.36	0.01	40.0	-5.5	118.8	101.0
	Nov	30	0.280	25.8	0.263	24.2	1.6	12.66	3.82	1.50	0.00	0.0	25.8	1.9	8.7	-0.8	0.0	9.8	-11.8	23.8	35.9	35.9	0.0	12.3	10.19	10.1	1.12	0.01	33.4	-12.0	106.7	64.0
	Dec	31	0.432	41.1	0.263	25.0	16.1	18.27	6.59	1.21	0.00	0.0	41.1	4.5	13.7	-0.8	0.0	17.4	-15.9	42.6	78.5	78.5	0.0	17.2	17.57	13.2	0.91	0.01	20.2	13.7	120.4	70.0
	Jan	31	0.613	58.3	0.263	25.0	33.3	18.17	7.59	1.22	0.00	0.0	58.3	7.6	13.4	-1.2	0.0	19.8	-2.2	75.9	154.4	154.4	0.0	3.4	20.24	11.0	0.92	0.01	12.1	10.6	131.0	96.0
	Feb	28	0.382	32.8	0.263	22.6	10.2	15.45	1.27	1.34	0.00	0.0	32.8	1.9	1.6	-2.0	0.0	1.5	-12.5	21.8	176.2	176.2	0.0	12.6	3.39	7.6	1.00	0.01	12.4	2.6	133.6	126.9
	Mar	31	0.571	54.3	0.263	25.0	29.3	13.44	7.62	2.18	0.00	0.0	54.3	12.3	8.8	-3.5	0.0	17.6	-27.1	44.8	221.0	221.0	0.0	28.5	20.32	5.4	1.63	0.01	10.3	36.8	170.4	168.5
	Apr	30	0.357	32.9	0.263	24.2	8.6	9.66	3.02	3.18	0.00	0.0	32.9	5.5	2.8	-5.8	0.0	2.5	-31.0	4.4	225.3	225.3	0.0	31.3	8.05	3.0	2.39	0.01	27.8	9.2	179.6	167.2
	May	31	0.300	28.5	0.263	25.0	3.5	3.74	0.66	4.67	0.00	0.0	28.5	1.2	0.6	-8.7	0.0	-6.8	-51.2	-29.5	195.8	195.8	0.0	50.9	1.76	1.0	3.50	0.01	83.8	-34.7	144.9	139.9
	Jun	30	0.277	25.5	0.263	24.2	1.3	1.13	0.00	6.23	0.00	8.9	16.6	0.0	0.0	-10.7	0.0	-10.7	-84.5	-78.6	117.3	117.3	6.6	77.3	0.00	0.3	4.67	0.01	110.4	-37.8	107.2	112.6
	Jul	31	0.290	27.6	0.263	25.0	2.6	0.04	0.00	7.53	0.00	27.6	0.0	0.0	0.0	-9.5	0.0	-9.5	-62.6	-72.1	45.2	45.2	16.3	155.8	0.00	0.0	5.65	0.01	125.6	24.6	131.8	141.2
	Aug	31	0.297	28.3	0.263	25.0	3.2	0.42	0.14	6.76	0.00	28.3	0.0	0.1	0.3	-5.1	0.0	-4.8	-15.3	-20.1	25.1	25.0	9.9	105.8	0.37	0.3	5.07	0.01	135.4	-34.3	97.5	132.1
	Sep	30	0.277	25.5	0.263	24.2	1.3	0.99	0.00	5.30	0.00	19.2	6.3	0.0	0.0	-3.2	0.0	-3.2	-25.6	-22.5	2.6	2.5	6.6	50.1	0.00	0.8	3.97	0.01	115.1	-69.0	28.5	78.0
	Total	365		404.5				100.0	32.3	44.27	0.00	97.8	306.8	36.4	53.0	-53.9	-0.1	35.4	-390.1				57.3	577.8	86.13	57.4	33.19	0.12	726.41			

Copy (paste special, values) appropriate data into input columns above (Average, RP10, RP100, etc.)

Precipitation Table (Ref'd "Precip" Sheet)

Month	Percent / month	Average Precipitation	RP 100 YR	2015-2016 Actual precip.
Units	(%/mo)	(in/mo)	(in/mo)	(in/mo)
October	6.03	1.71	3.09	1.59
November	12.66	3.59	6.49	3.82
December	18.27	5.18	9.37	6.59
January	18.17	5.15	9.32	7.59
February	15.45	4.38	7.92	1.27
March	13.44	3.81	6.89	7.62
April	9.66	2.74	4.96	3.02
May	3.74	1.06	1.92	0.66
June	1.13	0.32	0.58	0.00
July	0.04	0.01	0.02	0.00
August	0.42	0.12	0.22	0.14
September	0.99	0.28	0.51	0.00
TOTAL	100.00	28.35	51.29	32.30

Pan Evaporation Table (Ref'd from "Evap" Sheet)

MONTH	Pan Evaporation	Effective Lake Evap	100-YR Effecitve Evap
Units	(in/mo)	(in/mo)	(in/mo)
October	3.93	3.14	3.14
November	1.87	1.50	1.12
December	1.51	1.21	0.91
January	1.53	1.22	0.92
February	1.67	1.34	1.00
March	2.72	2.18	1.63
April	3.98	3.18	3.18
May	5.84	4.67	4.67
June	7.79	6.23	6.23
July	9.41	7.53	7.53
August	8.45	6.76	6.76
September	6.62	5.30	5.30
TOTAL	55.32	44.26	42.40

Average Year Flows

	0.263
	ADF (mgd)
Month	
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265
Average:	0.332

RP100 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320
	0.458

Actual 2016/2017 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	---
August	---
September	----
	0.539

Actual 2015/2016 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.252
November	0.280
December	0.432
January	0.613
February	0.382
March	0.571
April	0.357
May	0.300
June	0.277
July	0.290
August	0.297
September	0.277
	0.361

2015/2016 Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Henderson Reservoir**

RESERVOIR

Storage	Volume (ac-ft)	Area (ac)	
Minimum	0	0.0	
Maximum	393	28.9	Enter small number (0.01 ac) instead of 0.0 ac.
Active Starting Volume	50.5	Sept. 30, 2015	Minimum starting volume = minimum (dead) storage
Watershed Area	4.3	(ac)	
Runoff Coefficient, C	1		
Percolation Rate	0.12	(ac-ft/yr)	

Resevoir Equation "y=Ax^2 + Bx +C"	
Coefficient A	-0.0001
Coefficient B	0.0999
Constant C	4.8166

Resevoir Height Equation "y=Ax + B	
Coefficient A	0.9706
Coefficient B	-2.8011

Month	FLOW				STORAGE INPUTS				STORAGE OUTPUTS								
Units	Days	WWTP Monthly Flow (ac-ft)	Bowers Disposal (ac-ft)	Beginning Reservoir Volume (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	Watershed Runoff (indirect) (ac-ft)	**Subtotal Influent/Precipitation** (ac-ft)	Evaporation (water surface) (ac-ft)	Percolation (direct) (ac-ft)	Wastewater sent to Preston Reservoir (ac-ft)	**Subtotal Disposal** (ac-ft)	NET OUT (ac-ft)	Beginning Storage Volume (ac-ft)	Change in Storage Volume (ac-ft)	**Estimated End of Month Storage Volume (ac-ft)**	**Actual End of Month Storage Volume (ac-ft)**
October	31	24.0	13.8	50.5	10.2	1.3	3.1	14.6	-2.5	-0.01	-50.4	-52.9	-38.4	50.5	-38.4	12.1	12.1
November	30	25.8	0.0	12.1	25.8	1.9	8.7	36.3	-0.8	-0.01	-11.8	-12.6	23.8	12.1	23.8	35.9	35.9
December	31	41.1	0.0	35.9	41.1	4.5	13.7	59.3	-0.8	-0.01	-15.9	-16.7	42.6	35.9	42.6	78.5	78.5
January	31	58.3	0.0	78.5	58.3	7.6	13.4	79.3	-1.2	-0.01	-2.2	-3.4	75.9	78.5	75.9	154.4	154.4
February	28	32.8	0.0	154.4	32.8	1.9	1.6	36.3	-2.0	-0.01	-12.5	-14.5	21.8	154.4	21.8	176.2	176.2
March	31	54.3	0.0	176.2	54.3	12.3	8.8	75.4	-3.5	-0.01	-27.1	-30.6	44.8	176.2	44.8	221.0	221.0
April	30	32.9	0.0	221.0	32.9	5.5	2.8	41.2	-5.8	-0.01	-31.0	-36.8	4.4	221.0	4.4	225.3	225.3
May	31	28.5	0.0	225.3	28.5	1.2	0.6	30.4	-8.7	-0.01	-51.2	-59.9	-29.5	225.3	-29.5	195.8	195.8
June	30	25.5	8.9	195.8	16.6	0.0	0.0	16.6	-10.7	-0.01	-84.5	-95.2	-78.6	195.8	-78.6	117.3	117.3
July	31	27.6	27.6	117.3	0.0	0.0	0.0	0.0	-9.5	-0.01	-62.6	-72.1	-72.1	117.3	-72.1	45.2	45.2
August	31	28.3	28.3	45.2	0.0	0.1	0.3	0.3	-5.1	-0.01	-15.3	-20.5	-20.1	45.2	-20.1	25.1	25.0
September	30	25.5	19.2	25.1	6.3	0.0	0.0	6.3	-3.2	-0.01	-25.6	-28.8	-22.5	25.1	-22.5	2.6	2.5
Total		404.5	97.8		306.8	36.4	53.0	396.1	-53.9	-0.12	-390.1	-444.1					

Actual 2015/2016 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.252
November	0.280
December	0.432
January	0.613
February	0.382
March	0.571
April	0.357
May	0.300
June	0.277
July	0.290
August	0.297
September	0.277

2015/2016 Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Preston Reservoir Average Water Balance

Assumptions:

Bowers Ranch has 24 Acres in use and 40 Acres in total available.
Hoskins Ranch has 24 Acres in use and 60 Acres in total available.
The Preston Forebay has 2 Acres of Surface Area.
Preston Reservoir ranges from 0 Acres when empty to 18 when full with 14 acres of watershed area and Capacity of 235 ac-ft.
The assumed Percolation rate is 100 Gallons per Day or 0.01 Acre-Feet per Month.

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall 2015-2016 (CIMIS Plymouth)	In	1.59	3.82	6.59	7.59	1.27	7.62	3.02	0.66	0.00	0.00	0.14	0.00	32.30
Rainfall 100 Year	In	3.09	6.49	9.37	9.32	7.92	6.89	4.96	1.92	0.58	0.02	0.22	0.51	51.29
Pan Evaporation	In	3.14	1.50	1.21	1.22	1.34	2.18	3.18	4.67	6.23	7.53	6.76	5.30	44.26

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Henderson Reservoir														
Effluent	AF	50	12	16	2	13	27	31	51	85	63	15	26	390
Hoskins Ranch														
Hoskins Ranch Available Disposal	AF	18	0	0	0	0	0	0	0	7	16	10	7	57
Preston Forebay														
Preston Forebay Influent	AF	33	12	16	2	13	27	31	51	78	46	5	19	333
Precipitation	AF	0	1	1	1	0	1	1	0	0	0	0	0	5
Evaporation	AF	0	0	0	0	0	0	0	0	1	1	1	0	4
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Preston Forebay Effluent	AF	33	12	17	3	13	28	31	51	77	46	5	19	334
CDCR														
CDCR Effluent to Preston Reservoir	AF	0	0	0	0	0	0	0	0	0	110	101	32	244
Preston Reservoir														
Preston Reservoir Maximum Available Storage	AF	235	235	235	235	235	235	235	235	235	235	235	235	
Water in Storage at Beginning of Month	AF	124	119	107	120	131	134	170	180	145	107	132	97	
Influent	AF	33	12	17	3	13	28	31	51	77	156	106	50	578
Precipitation	AF	4	10	18	20	3	20	8	2	0	0	0	0	86
Evaporation	AF	2	1	1	1	1	2	2	4	5	6	5	4	33
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Water sent to Ione	AF	40	33	20	12	12	10	28	84	110	126	135	115	726
Water Applied(+)/Removed(-) from Storage	AF	-6	-12	14	11	3	37	9	-35	-38	25	-34	-69	
Estimated End of Month Storage	**AF**	**119**	**107**	**120**	**131**	**134**	**170**	**180**	**145**	**107**	**132**	**97**	**29**	
Actual Storage	**AF**	**101**	**64**	**70**	**96**	**127**	**169**	**167**	**140**	**113**	**141**	**132**	**78**	

2015/2016 Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Conversions		
MG to AF	0.325851	= 1 AF

Logical Value for SCWWTP Options	0
Logical Value for CDCR Options	1
Logical value for removed henderson and thngys	FALSE
Logical Value for Rainfall	4
Logical Value for Perc	1
Logical value for remove preston	FALSE

Misc Assumptions

Preston Reservoir	0.00	18.00	235.00
Percolation	100.00	0.01	
Preston Forebay	2.00		
Storage Pond 5	4.35	52.17	
Storage Pond 6	3.45	27.62	0.80
Storage Pond 7	4.38	30.69	0.46
Additional Storage	0.00		
Preston Watershed Area	14.00		
Watershed Runnoff Coef.	0.70		
Bowers Ranch	24.00	40.00	
Hoskins Ranch	24.00	60.00	

Precip. into both Preston Forebay and Preston Reservoir is assumed with full reservoir in all cases due to lack of mapping for determination of depth/area curves.

Preston Reservoir			
Elevation	Area (AC)	Capacity (AC-FT)	Elevation
325	0	0	325
330	3	5	330
335	6	25	335
340	8	60	340
345	12	110	345
350	16	175	350
353	18	235	353
355	20	270	355

2015/2016 Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Bowers Ranch**

Storage	(ac-ft)	(ac)	
Minimum	0	0	
Maximum	0.00000001	0.00000001	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	24	(ac)
Runoff Coefficient, C	0.1	

Month		**FLOW**	**INPUTS**		
Units	Days	WWTP Monthly Flow (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	Total Disposal (ac-ft)
October	31	24.0	13.8	0.3	14.1
November	30	25.8	0.0	0.8	0.8
December	31	41.1	0.0	1.3	1.3
January	31	58.3	0.0	1.5	1.5
February	28	32.8	0.0	0.3	0.3
March	31	54.3	0.0	1.5	1.5
April	30	32.9	0.0	0.6	0.6
May	31	28.5	0.0	0.1	0.1
June	30	25.5	8.9	0.0	8.9
July	31	27.6	27.6	0.0	27.6
August	31	28.3	28.3	0.0	28.3
September	30	25.5	19.2	0.0	19.2
Total			97.8	6.5	104.2

2015/2016 Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Hoskins Ranch**

RESERVOIR

Storage	Volume (ac-ft)	Area (ac)	
Minimum	**0**	**0**	
Maximum	**0.00000001**	**0.00000001**	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	**24**	(ac)
Runoff Coefficient, C	**0.1**	

Month		**FLOW**	**INPUTS**		
Units	Days	WWTP Monthly Flow (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	**Subtotal** (ac-ft)
October	31	24.0	17.8	0.3	18.1
November	30	25.8	0.0	0.8	0.8
December	31	41.1	0.0	1.3	1.3
January	31	58.3	0.0	1.5	1.5
February	28	32.8	0.0	0.3	0.3
March	31	54.3	0.0	1.5	1.5
April	30	32.9	0.0	0.6	0.6
May	31	28.5	0.0	0.1	0.1
June	30	25.5	6.6	0.0	6.6
July	31	27.6	16.3	0.0	16.3
August	31	28.3	9.9	0.0	10.0
September	30	25.5	6.6	0.0	6.6
Total			57.3	6.5	63.8

2015/2016 Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

PRECIPITATION and DISTRIBUTION of RAIN

Used average rainfall to distribute 100-year

SUTTER HILL CDF, CALIFORNIA (048713)

MONTH	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**TOTAL**
	6.03	12.66	18.27	18.17	15.45	13.44	9.66	3.74	1.13	0.04	0.42	0.99	100
Avg Precip	1.71	3.59	5.18	5.15	4.38	3.81	2.74	1.06	0.32	0.01	0.12	0.28	28.35
10-YR	2.41	5.05	7.29	7.25	6.16	5.36	3.86	1.49	0.45	0.01	0.17	0.39	39.89
100-YR	3.09	6.49	9.37	9.32	7.92	6.89	4.96	1.92	0.58	0.02	0.22	0.51	51.29
											100-YR Return Ratio		**1.81**
Lat	3837										**10-YR Return Ratio**		**1.41**
Long	12080												
Elevation ft	1586												

http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca8713

Period of Record : 10/01/1943 to 06/10/2016

2015/2016 Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

EVAPORATION

Standard daily pan evaporation is measured using the four-foot diameter Class A Evaporation pan. The pan water level reading is adjusted when precipitation is measured to obtain the actual evaporation. Most Class A pans are installed aboveground, allowing effects such as radiation on the side walls and heat exchanges with the pan material. These effects tend to increase the evaporation totals. The amounts can then be adjusted by multiplying the totals by 0.70 or 0.80 to more closely estimate the evaporation from naturally existing surfaces such as a shallow lake, wet soil, or other moist natural surfaces.

Source: Western Regional Climate Center, Desert Research Institute www.wrcc.dri.edu
Training Handbook for Disposal of Non-Designated Waste to Land Systems: Design, Operation, and Monitoring , Dated June 2004

Pan Coefficient (C_p) = **0.8** **Average between 0.7 and 0.8 as described above**

Weather Correction Factor (k) [d] **25%** From Training Handbook: "The reduction in evaporation during a wet year in the wet season only can be in the 20 to 30 percent range

Zone 10

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
Pan Evaporation	3.93	1.87	1.51	1.53	1.67	2.72	3.98	5.84	7.79	9.41	8.45	6.62	55.32
Effective Lake Evap	3.14	1.50	1.21	1.22	1.34	2.18	3.18	4.67	6.23	7.53	6.76	5.30	44.26
100-YR Effecitve Evap	3.14	**1.12**	**0.91**	**0.92**	**1.00**	**1.63**	3.18	4.67	6.23	7.53	6.76	5.30	42.40

100-YR Correction Factor Included

http://www.wrcc.dri.edu/htmlfiles/westevap.final.html

Pan evaporation locations in the project vicinity were limited. The closest being Placerville IFG and Camp Pardee. Placerville IFG is used because the rate is slightly more conservative and there is more complete data available.

2015/2016 Un-Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

2015 - 2016 MONITORING DATA

		SUTTER CREEK WWTP FLOWS			BOWERS DISPOSAL FLOWS			HENDERSON RESERVOIR						
DATE	PRECIPITATION (IN)	DATE	INFLOW (MG)	INFLOW (AC-FT)	DATE	OUTFLOW (MG)	OUTFLOW (AC-FT)	DATE	FREEBOARD (FT)	STORAGE VOLUME (MG)	STORAGE VOLUME (AC-FT)	DATE	OUTFLOW (MG)	OUTFLOW (AC-FT)
								9/30/2015	19.6	16.4	50.5			
Oct 2015	1.59	Oct 2015	7.8	23.9	Oct 2015	4.5	13.8	10/31/2015	24.1	3.9	12.1	Oct 2015	19.7	60.4
Nov 2015	3.82	Nov 2015	8.4	25.8	Nov 2015	0.0	0.0	11/30/2015	21.1	11.7	35.9	Nov 2015	3.9	12.1
Dec 2015	6.59	Dec 2015	13.4	41.1	Dec 2015	0.0	0.0	12/31/2015	17.2	25.6	78.5	Dec 2015	9.8	30.1
Jan 2016	7.59	Jan 2016	19.0	58.2	Jan 2016	0.0	0.0	1/31/2016	12.1	50.3	154.4	Jan 2016	12.4	38.0
Feb 2016	1.27	Feb 2016	10.7	32.8	Feb 2016	0.0	0.0	2/29/2016	10.9	57.4	176.2	Feb 2016	17.8	54.6
Mar 2016	7.62	Mar 2016	17.7	54.2	Mar 2016	0.0	0.0	3/31/2016	8.7	72.0	221.0	Mar 2016	15.1	46.3
Apr 2016	3.02	Apr 2016	10.7	32.8	Apr 2016	0.0	0.0	4/30/2016	8.5	73.4	225.3	Apr 2016	13.7	42.0
May 2016	0.66	May 2016	9.3	28.5	May 2016	0.0	0.0	5/31/2016	9.9	63.8	195.8	May 2016	23.0	70.7
Jun 2016	0.00	Jun 2016	8.3	25.3	Jun 2016	2.9	8.9	6/30/2016	14.4	38.2	117.3	Jun 2016	32.2	98.9
Jul 2016	0.00	Jul 2016	9.0	27.6	Jul 2016	9.0	27.6	7/31/2016	20.1	14.7	45.2	Jul 2016	25.4	78.0
Aug 2016	0.14	Aug 2016	9.2	28.2	Aug 2016	9.2	28.2	8/31/2016	22.3	8.1	25.0	Aug 2016	8.7	26.6
Sep 2016	0.00	Sep 2016	8.3	25.5	Sep 2016	6.3	19.2	9/30/2016	25.8	0.8	2.5	Sep 2016	10.8	33.2
TOTAL:	**32.3**		**131.7**	**404.1**		**31.8**	**97.7**						**192.6**	**591.0**

			PRESTON RESERVOIR									
HOSKINS DISPOSAL FLOWS							M. CREEK FLOWS INTO PRESTON			TOTAL FLOWS TO IONE TERTIARY WWTP		
DATE	OUTFLOW (MG)	OUTFLOW (AC-FT)	DATE	FREEBOARD (FT)	STORAGE VOLUME (MG)	STORAGE VOLUME (AC-FT)	DATE	INFLOW (MG)	INFLOW (AC-FT)	DATE	OUTFLOW (MG)	OUTFLOW (AC-FT)
			9/30/2015	8.9	40.5	124.3						
Oct 2015	5.8	17.8	10/31/2015	10.9	32.9	101.0	Oct 2015	0.0	0.0	Oct 2015	13.0	40.0
Nov 2015	0.0	0.0	11/30/2015	14.6	20.9	64.0	Nov 2015	0.0	0.0	Nov 2015	10.9	33.4
Dec 2015	0.0	0.0	12/31/2015	14.0	22.8	70.0	Dec 2015	0.0	0.0	Dec 2015	6.6	20.2
Jan 2016	0.0	0.0	1/31/2016	11.4	31.3	96.0	Jan 2016	0.0	0.0	Jan 2016	3.9	12.1
Feb 2016	0.0	0.0	2/29/2016	8.7	41.4	126.9	Feb 2016	0.0	0.0	Feb 2016	4.0	12.4
Mar 2016	0.0	0.0	3/31/2016	5.5	54.9	168.5	Mar 2016	0.0	0.0	Mar 2016	3.4	10.3
Apr 2016	0.0	0.0	4/30/2016	5.6	54.5	167.2	Apr 2016	0.0	0.0	Apr 2016	9.1	27.8
May 2016	0.0	0.0	5/31/2016	7.7	45.6	139.9	May 2016	0.0	0.0	May 2016	27.3	83.8
Jun 2016	2.2	6.6	6/30/2016	9.8	36.7	112.6	Jun 2016	0.0	0.0	Jun 2016	36.0	110.4
Jul 2016	5.3	16.3	7/31/2016	7.6	46.0	141.2	Jul 2016	35.9	110.2	Jul 2016	40.9	125.6
Aug 2016	3.2	9.9	8/31/2016	8.3	43.1	132.1	Aug 2016	32.9	101.0	Aug 2016	44.1	135.4
Sep 2016	2.2	6.6	9/30/2016	13.2	25.4	78.0	Sep 2016	10.3	31.6	Sep 2016	37.5	115.1
TOTALS:	**18.7**	**57.3**						**79.2**	**242.9**		**236.7**	**726.4**

2015/2016 Un-Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Reservoir		Henderson Reservoir	Preston Reservoir	Total
Volume	(ac-ft)	393	235	628
Surface Area	(ac)	29	18	47

Amount of disposal during average year scenario

Annual Disposal		Henderson Reservoir	Bowers Ranch	Hoskins Ranch	Total
Area	(ac)	varies	24	24	48
Year 1	(ac-ft/yr)	27	98	57	182

			Henderson Reservoir			Preston Reservoir	
Total Inflow	Active Starting Volume	WWTP Effluent	Storage Accumulated (to Preston)	Max Storage	Approximate Available Capacity	Max Storage	Approximate Available Capacity
	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
System	51	405	-591	73.6	319	346.1	-111

Period			WWTP Effluent					Historic Weather Data			Bowers	Henderson Reservoir										Hoskins	Preston Reservoir								
Years	Month	Days	Monthly Flow	Monthly Flow	ADWF (Jun-Sep)	ADWF (Jun-Sep)	Estimated Inflow & Infiltration	% of Total	Precip	Pan Evap	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Subtotal Disposal	Wastewater sent to Preston Reservoir	Change in Storage Volume	Estimated Storage Volume	Actual Storage Volume	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Water sent to Ione	Change in Storage Volume	Estimated Storage Volume	Actual Storage Volume
	(mo)	(days)	(mgd)	(ac-ft)	(mgd)	(ac-ft)	(ac-ft)	(%mo)	(in/mo)	(in/mo)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
Year 1	Oct	31	0.252	24.0	0.263	25.0	0.0	6.03	1.59	3.14	13.8	10.2	1.3	1.6	-2.5	0.0	0.3	-60.4	-50.0	0.5	12.1	17.8	42.6	4.24	4.8	2.36	0.01	40.0	4.5	128.8	101.0
	Nov	30	0.280	25.8	0.263	24.2	1.6	12.66	3.82	1.50	0.0	25.8	1.5	4.5	-0.6	0.0	5.4	-12.1	19.1	19.7	35.9	0.0	12.6	10.19	10.1	1.12	0.01	33.4	-11.8	117.1	64.0
	Dec	31	0.432	41.1	0.263	25.0	16.1	18.27	6.59	1.21	0.0	41.1	3.7	7.3	-0.7	0.0	10.3	-30.1	21.2	40.9	78.5	0.0	31.4	17.57	13.2	0.91	0.01	20.2	27.9	145.0	70.0
	Jan	31	0.613	58.3	0.263	25.0	33.3	18.17	7.59	1.22	0.0	58.3	5.5	7.7	-0.9	0.0	12.4	-38.0	32.7	73.6	154.4	0.0	39.1	20.24	11.0	0.92	0.01	12.1	46.3	191.3	96.0
	Feb	28	0.382	32.8	0.263	22.6	10.2	15.45	1.27	1.34	0.0	32.8	1.2	1.1	-1.3	0.0	1.1	-54.6	-20.8	52.9	176.2	0.0	54.7	3.39	7.6	1.00	0.01	12.4	44.7	236.0	126.9
	Mar	31	0.571	54.3	0.263	25.0	29.3	13.44	7.62	2.18	0.0	54.3	6.2	7.4	-1.8	0.0	11.9	-46.3	19.8	72.7	221.0	0.0	47.7	20.32	5.4	1.63	0.01	10.3	56.1	292.1	168.5
	Apr	30	0.357	32.9	0.263	24.2	8.6	9.66	3.02	3.18	0.0	32.9	2.9	2.7	-3.1	0.0	2.6	-42.0	-6.6	66.1	225.3	0.0	42.3	8.05	3.0	2.39	0.01	27.8	20.2	312.3	167.2
	May	31	0.300	28.5	0.263	25.0	3.5	3.74	0.66	4.67	0.0	28.5	0.6	0.6	-4.3	0.0	-3.1	-70.7	-45.2	20.9	195.8	0.0	70.4	1.76	1.0	3.50	0.01	83.8	-15.2	297.1	139.9
	Jun	30	0.277	25.5	0.263	24.2	1.3	1.13	0.00	6.23	8.9	16.6	0.0	0.0	-3.6	0.0	-3.6	-98.9	-20.9	0.0	117.3	6.6	91.8	0.00	0.3	4.67	0.01	110.4	9.0	306.1	112.6
	Jul	31	0.290	27.6	0.263	25.0	2.6	0.04	0.00	7.53	27.6	0.0	0.0	0.0	-3.0	0.0	-3.0	-78.0	0.0	0.0	45.2	16.3	171.2	0.00	0.0	5.65	0.01	125.6	40.0	346.1	141.2
	Aug	31	0.297	28.3	0.263	25.0	3.2	0.42	0.14	6.76	28.3	0.0	0.1	0.2	-2.7	0.0	-2.5	-26.6	0.0	0.0	25.0	9.9	117.1	0.37	0.3	5.07	0.01	135.4	-23.0	323.1	132.1
	Sep	30	0.277	25.5	0.263	24.2	1.3	0.99	0.00	5.30	19.2	6.3	0.0	0.0	-2.1	0.0	-2.1	-33.2	0.0	0.0	2.5	6.6	57.7	0.00	0.8	3.97	0.01	115.1	-61.3	261.8	78.0
	Total	365		404.5				100.0	32.3	44.27	97.8	306.8	23.1	33.1	-26.5	-0.1	29.6	-591.0				57.3	778.8	86.13	57.4	33.19	0.12	726.41			

Copy (paste special, values) appropriate data into Input columns above (Average, RP10, RP100, etc.)

Precipitation Table (Ref'd "Precip" Sheet)

Month	Percent / month	Average Precipitation	RP 100 YR	2015-2016 Actual precip.
Units	(%/mo)	(in/mo)	(in/mo)	(in/mo)
October	6.03	1.71	3.09	1.59
November	12.66	3.59	6.49	3.82
December	18.27	5.18	9.37	6.59
January	18.17	5.15	9.32	7.59
February	15.45	4.38	7.92	1.27
March	13.44	3.81	6.89	7.62
April	9.66	2.74	4.96	3.02
May	3.74	1.06	1.92	0.66
June	1.13	0.32	0.58	0.00
July	0.04	0.01	0.02	0.00
August	0.42	0.12	0.22	0.14
September	0.99	0.28	0.51	0.00
TOTAL	100.00	28.35	51.29	32.30

Pan Evaporation Table (Ref'd from "Evap" Sheet)

MONTH	Pan Evaporation	Effective Lake Evap	100-YR Effecitve Evap
Units	(in/mo)	(in/mo)	(in/mo)
October	3.93	3.14	3.14
November	1.87	1.50	1.12
December	1.51	1.21	0.91
January	1.53	1.22	0.92
February	1.67	1.34	1.00
March	2.72	2.18	1.63
April	3.98	3.18	3.18
May	5.84	4.67	4.67
June	7.79	6.23	6.23
July	9.41	7.53	7.53
August	8.45	6.76	6.76
September	6.62	5.30	5.30
TOTAL	55.32	44.26	42.40

Average Year Flows

	0.263
	ADF (mgd)
Month	
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265
Average:	0.332

RP100 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320
	0.458

Actual 2016/2017 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	---
August	---
September	----
	0.539

Actual 2015/2016 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.252
November	0.280
December	0.432
January	0.613
February	0.382
March	0.571
April	0.357
May	0.300
June	0.277
July	0.290
August	0.297
September	0.277
	0.361

2015/2016 Un-Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Henderson Reservoir**

RESERVOIR

Storage	Volume (ac-ft)	Area (ac)	
Minimum	0	0.0	
Maximum	393	28.9	Enter small number (0.01 ac) instead of 0.0 ac.
Active Starting Volume	50.5	Sept. 30, 2015	Minimum starting volume = minimum (dead) storage
Watershed Area	4.3	(ac)	
Runoff Coefficient, C	0.5		
Percolation Rate	0.12	(ac-ft/yr)	

Resevoir Equation "y=Ax^2 + Bx +C"	
Coefficient A	-0.0001
Coefficient B	0.0999
Constant C	4.8166

Resevoir Height Equation "y=Ax + B	
Coefficient A	0.9706
Coefficient B	-2.8011

Month	FLOW				STORAGE INPUTS				STORAGE OUTPUTS								
Units	Days	WWTP Monthly Flow (ac-ft)	Bowers Disposal (ac-ft)	Beginning Reservoir Volume (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	Watershed Runoff (indirect) (ac-ft)	**Subtotal Influent/Precipitation** (ac-ft)	Evaporation (water surface) (ac-ft)	Percolation (direct) (ac-ft)	Wastewater sent to Preston Reservoir (ac-ft)	**Subtotal Disposal** (ac-ft)	NET OUT (ac-ft)	Beginning Storage Volume (ac-ft)	Change in Storage Volume (ac-ft)	**Estimated End of Month Storage Volume (ac-ft)**	**Actual End of Month Storage Volume (ac-ft)**
October	31	24.0	13.8	50.5	10.2	1.3	1.6	13.0	-2.5	-0.01	-60.4	-63.0	-50.0	50.5	-50.0	**0.5**	**12.1**
November	30	25.8	0.0	0.5	25.8	1.5	4.5	31.8	-0.6	-0.01	-12.1	-12.7	19.1	0.5	19.1	**19.7**	**35.9**
December	31	41.1	0.0	19.7	41.1	3.7	7.3	52.1	-0.7	-0.01	-30.1	-30.8	21.2	19.7	21.2	**40.9**	**78.5**
January	31	58.3	0.0	40.9	58.3	5.5	7.7	71.6	-0.9	-0.01	-38.0	-38.9	32.7	40.9	32.7	**73.6**	**154.4**
February	28	32.8	0.0	73.6	32.8	1.2	1.1	35.2	-1.3	-0.01	-54.6	-55.9	-20.8	73.6	-20.8	**52.9**	**176.2**
March	31	54.3	0.0	52.9	54.3	6.2	7.4	68.0	-1.8	-0.01	-46.3	-48.1	19.8	52.9	19.8	**72.7**	**221.0**
April	30	32.9	0.0	72.7	32.9	2.9	2.7	38.5	-3.1	-0.01	-42.0	-45.1	-6.6	72.7	-6.6	**66.1**	**225.3**
May	31	28.5	0.0	66.1	28.5	0.6	0.6	29.8	-4.3	-0.01	-70.7	-75.0	-45.2	66.1	-45.2	**20.9**	**195.8**
June	30	25.5	8.9	20.9	16.6	0.0	0.0	16.6	-3.6	-0.01	-98.9	-102.5	-85.9	20.9	-20.9	**0.0**	**117.3**
July	31	27.6	27.6	0.0	0.0	0.0	0.0	0.0	-3.0	-0.01	-78.0	-81.1	-81.0	0.0	0.0	**0.0**	**45.2**
August	31	28.3	28.3	0.0	0.0	0.1	0.2	0.2	-2.7	-0.01	-26.6	-29.3	-29.2	0.0	0.0	**0.0**	**25.0**
September	30	25.5	19.2	0.0	6.3	0.0	0.0	6.3	-2.1	-0.01	-33.2	-35.3	-29.0	0.0	0.0	**0.0**	**2.5**
Total		404.5	97.8		306.8	23.1	33.1	363.0	-26.5	-0.12	-591.0	-617.7					

Actual 2015/2016 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.252
November	0.280
December	0.432
January	0.613
February	0.382
March	0.571
April	0.357
May	0.300
June	0.277
July	0.290
August	0.297
September	0.277

2015/2016 Un-Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Preston Reservoir Average Water Balance

Assumptions:

Bowers Ranch has 24 Acres in use and 40 Acres in total available.
Hoskins Ranch has 24 Acres in use and 60 Acres in total available.
The Preston Forebay has 2 Acres of Surface Area.
Preston Reservoir ranges from 0 Acres when empty to 18 when full with 14 acres of watershed area and Capacity of 235 ac-ft.
The assumed Percolation rate is 100 Gallons per Day or 0.01 Acre-Feet per Month.

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall 2015-2016	In	1.59	3.82	6.59	7.59	1.27	7.62	3.02	0.66	0.00	0.00	0.14	0.00	32.30
Rainfall 100 Year	In	3.09	6.49	9.37	9.32	7.92	6.89	4.96	1.92	0.58	0.02	0.22	0.51	51.29
Pan Evaporation	In	3.14	1.50	1.21	1.22	1.34	2.18	3.18	4.67	6.23	7.53	6.76	5.30	44.26

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Henderson Reservoir														
Effluent	AF	60	12	30	38	55	46	42	71	99	78	27	33	591
Hoskins Ranch														
Hoskins Ranch Available Disposal	AF	18	0	0	0	0	0	0	0	7	16	10	7	57
Preston Forebay														
Preston Forebay Influent	AF	43	12	30	38	55	46	42	71	92	62	17	27	534
Precipitation	AF	0	1	1	1	0	1	1	0	0	0	0	0	5
Evaporation	AF	0	0	0	0	0	0	0	0	1	1	1	0	4
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Preston Forebay Effluent	AF	43	13	31	39	55	47	42	70	92	61	16	26	535
CDCR														
CDCR Effluent to Preston Reservoir	AF	0	0	0	0	0	0	0	0	0	110	101	32	244
Preston Reservoir														
Preston Reservoir Maximum Available Storage	AF	235	235	235	235	235	235	235	235	235	235	235	235	
Water in Storage at Beginning of Month	AF	124	129	117	145	191	236	292	312	297	306	346	323	
Influent	AF	43	13	31	39	55	48	42	70	92	171	117	58	779
Precipitation	AF	4	10	18	20	3	20	8	2	0	0	0	0	86
Evaporation	AF	2	1	1	1	1	2	2	4	5	6	5	4	33
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Water sent to Ione	AF	40	33	20	12	12	10	28	84	110	126	135	115	726
Water Applied(+)/Removed(-) from Storage	AF	5	-12	28	46	45	56	20	-15	9	40	-23	-61	
Estimated End of Month Storage	**AF**	**129**	**117**	**145**	**191**	**236**	**292**	**312**	**297**	**306**	**346**	**323**	**262**	
Actual Storage	**AF**	**101**	**64**	**70**	**96**	**127**	**169**	**167**	**140**	**113**	**141**	**132**	**78**	

2015/2016 Un-Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Preston Reservoir			
Elevation	Area (AC)	Capacity (AC-FT)	Elevation
325	0	0	325
330	3	5	330
335	6	25	335
340	8	60	340
345	12	110	345
350	16	175	350
353	18	235	353
355	20	270	355

Misc Assumptions

Preston Reservoir	0.00	18.00	235.00
Percolation	100.00	0.01	
Preston Forebay	2.00		
Storage Pond 5	4.35	52.17	
Storage Pond 6	3.45	27.62	0.80
Storage Pond 7	4.38	30.69	0.46
Additional Storage	0.00		
Preston Watershed Area	14.00		
Watershed Runnoff Coef.	1.0 (assumes saturated conditions)		
Bowers Ranch	24.00	40.00	
Hoskins Ranch	24.00	60.00	

Precip. into both Preston Forebay and Preston Reservoir is assumed with full reservoir in all cases due to lack of mapping for determination of depth/area curves.

2015/2016 Un-Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Bowers Ranch**

Storage	(ac-ft)	(ac)	
Minimum	0	0	
Maximum	0.00000001	0.00000001	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	24	(ac)
Runoff Coefficient, C	0.1	

Month		**FLOW**	**INPUTS**		
Units	Days	WWTP Monthly Flow (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	Total Disposal (ac-ft)
October	31	24.0	13.8	0.3	14.1
November	30	25.8	0.0	0.8	0.8
December	31	41.1	0.0	1.3	1.3
January	31	58.3	0.0	1.5	1.5
February	28	32.8	0.0	0.3	0.3
March	31	54.3	0.0	1.5	1.5
April	30	32.9	0.0	0.6	0.6
May	31	28.5	0.0	0.1	0.1
June	30	25.5	8.9	0.0	8.9
July	31	27.6	27.6	0.0	27.6
August	31	28.3	28.3	0.0	28.3
September	30	25.5	19.2	0.0	19.2
Total			97.8	6.5	104.2

2015/2016 Un-Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Hoskins Ranch**

RESERVOIR

Storage	Volume (ac-ft)	Area (ac)	
Minimum	**0**	**0**	
Maximum	**0.00000001**	**0.00000001**	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	**24**	(ac)
Runoff Coefficient, C	**0.1**	

Month		**FLOW**	**INPUTS**		
Units	Days	WWTP Monthly Flow (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	**Subtotal** (ac-ft)
October	31	24.0	17.8	0.3	18.1
November	30	25.8	0.0	0.8	0.8
December	31	41.1	0.0	1.3	1.3
January	31	58.3	0.0	1.5	1.5
February	28	32.8	0.0	0.3	0.3
March	31	54.3	0.0	1.5	1.5
April	30	32.9	0.0	0.6	0.6
May	31	28.5	0.0	0.1	0.1
June	30	25.5	6.6	0.0	6.6
July	31	27.6	16.3	0.0	16.3
August	31	28.3	9.9	0.0	10.0
September	30	25.5	6.6	0.0	6.6
Total			57.3	6.5	63.8

2015/2016 Un-Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

PRECIPITATION and DISTRIBUTION of RAIN

Used average rainfall to distribute 100-year

SUTTER HILL CDF, CALIFORNIA (048713)

MONTH	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**TOTAL**
	6.03	12.66	18.27	18.17	15.45	13.44	9.66	3.74	1.13	0.04	0.42	0.99	100
Avg Precip	1.71	3.59	5.18	5.15	4.38	3.81	2.74	1.06	0.32	0.01	0.12	0.28	28.35
10-YR	2.41	5.05	7.29	7.25	6.16	5.36	3.86	1.49	0.45	0.01	0.17	0.39	39.89
100-YR	3.09	6.49	9.37	9.32	7.92	6.89	4.96	1.92	0.58	0.02	0.22	0.51	51.29
											100-YR Return Ratio		**1.81**
Lat	3837										**10-YR Return Ratio**		**1.41**
Long	12080												
Elevation ft	1586												

http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca8713

Period of Record : 10/01/1943 to 06/10/2016

2015/2016 Un-Calibrated Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

EVAPORATION

Standard daily pan evaporation is measured using the four-foot diameter Class A Evaporation pan. The pan water level reading is adjusted when precipitation is measured to obtain the actual evaporation. Most Class A pans are installed aboveground, allowing effects such as radiation on the side walls and heat exchanges with the pan material. These effects tend to increase the evaporation totals. The amounts can then be adjusted by multiplying the totals by 0.70 or 0.80 to more closely estimate the evaporation from naturally existing surfaces such as a shallow lake, wet soil, or other moist natural surfaces.

Source: Western Regional Climate Center, Desert Research Institute www.wrcc.dri.edu
Training Handbook for Disposal of Non-Designated Waste to Land Systems: Design, Operation, and Monitoring , Dated June 2004

Pan Coefficient (C_p) =	**0.8**	**Average between 0.7 and 0.8 as described above**
Weather Correction Factor (k) [d]	**25%**	From Training Handbook: "The reduction in evaporation during a wet year in the wet season only can be in the 20 to 30 percent range

Zone 10

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
Pan Evaporation	3.93	1.87	1.51	1.53	1.67	2.72	3.98	5.84	7.79	9.41	8.45	6.62	55.32
Effective Lake Evap	3.14	1.50	1.21	1.22	1.34	2.18	3.18	4.67	6.23	7.53	6.76	5.30	44.26
100-YR Effecitve Evap	3.14	**1.12**	**0.91**	**0.92**	**1.00**	**1.63**	3.18	4.67	6.23	7.53	6.76	5.30	42.40

100-YR Correction Factor Included

http://www.wrcc.dri.edu/htmlfiles/westevap.final.html

Pan evaporation locations in the project vicinity were limited. The closest being Placerville IFG and Camp Pardee. Placerville IFG is used because the rate is slightly more conservative and there is more complete data available.

Average Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Reservoir		Henderson Reservoir	Preston Reservoir	Total
Volume	(ac-ft)	393	235	628
Surface Area	(ac)	29	18	47

Amount of disposal during average year scenario

Annual Disposal		Henderson Reservoir	Bowers Ranch	Hoskins Ranch	Total
Area	(ac)	varies	24	24	48
	(ac-ft/yr)	42	92	50	184

			Henderson Reservoir			Preston Reservoir	
Total Inflow	Active Starting Volume	WWTP Effluent	Storage Accumulated (to Preston)	Max Storage	Approximate Available Capacity	Max Storage	Approximate Available Capacity
	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
System	0	372	-311	200.2	193	41.6	193

Period			WWTP Effluent					Historic Weather Data			Bowers	Henderson Reservoir									Hoskins	Preston Reservoir								
Years	Month	Days	Monthly Flow	Monthly Flow	ADWF (Jun-Sep)	ADWF (Jun-Sep)	Estimated Inflow & Infiltration	% of Total	Precip	Pan Evap	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Subtotal Disposal	Wastewater sent to Preston Reservoir	Change in Storage Volume	Estimated Storage Volume	Land Disposal	Facility Influent Flow	Precipitation (direct)	Watershed Runoff (indirect)	Evaporation (water surface)	Percolation (direct)	Water sent to Ione	Change in Storage Volume	Estimated Storage Volume
	(mo)	(days)	(mgd)	(ac-ft)	(mgd)	(ac-ft)	(ac-ft)	(%mo)	(in/mo)	(in/mo)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
Year 1	Oct	31	0.255	24.3	0.263	25.0	0.0	6.03	1.71	3.14	13.8	10.5	0.7	4.0	-1.3	0.0	3.5	-10.0	3.9	3.9	10.0	-0.1	3.20	4.8	2.36	0.01	10.0	-9.2	0.0
	Nov	30	0.276	25.5	0.263	24.2	1.2	12.66	3.59	1.50	0.0	25.5	1.6	8.4	-0.7	0.0	9.3	-10.0	24.7	28.7	0.0	10.3	6.85	10.1	1.12	0.01	10.0	6.0	6.0
	Dec	31	0.475	45.2	0.263	25.0	20.1	18.27	5.18	1.21	0.0	45.2	3.3	11.1	-0.8	0.0	13.6	-10.0	48.7	77.4	0.0	10.5	9.20	13.2	0.91	0.01	10.0	8.7	14.8
	Jan	31	0.462	43.9	0.263	25.0	18.9	18.17	5.15	1.22	0.0	43.9	5.1	9.1	-1.2	0.0	13.0	-10.0	46.9	124.3	0.0	10.5	10.59	11.0	0.92	0.01	10.0	10.2	25.0
	Feb	28	0.422	36.2	0.263	22.6	13.6	15.45	4.38	1.34	0.0	36.2	5.7	6.4	-1.8	0.0	10.4	-10.0	36.6	160.9	0.0	10.5	9.55	7.6	1.00	0.01	10.0	9.0	34.0
	Mar	31	0.442	42.1	0.263	25.0	17.0	13.44	3.81	2.18	0.0	42.1	5.8	4.7	-3.3	0.0	7.2	-10.0	39.3	200.2	0.0	10.4	8.93	5.4	1.63	0.01	10.0	7.7	41.6
	Apr	30	0.320	29.4	0.263	24.2	5.2	9.66	2.74	3.18	0.0	29.4	4.8	2.8	-5.5	0.0	2.0	-80.0	-48.5	151.7	0.0	80.0	4.96	3.0	2.39	0.01	97.0	-14.4	27.2
	May	31	0.282	26.8	0.263	25.0	1.8	3.74	1.06	4.67	0.0	26.8	1.6	1.4	-6.9	0.0	-4.0	-80.0	-57.2	94.5	0.0	79.7	2.27	1.0	3.50	0.01	97.0	-18.5	8.7
	Jun	30	0.257	23.6	0.263	24.2	0.0	1.13	0.32	6.23	8.9	14.8	0.4	0.5	-6.9	0.0	-6.1	-40.0	-31.3	63.2	6.6	120.4	0.69	0.3	4.67	0.01	99.0	17.4	26.1
	Jul	31	0.261	24.9	0.263	25.0	0.0	0.04	0.01	7.53	24.9	0.0	0.0	0.0	-6.7	0.0	-6.7	-30.0	-36.8	26.4	16.3	100.5	0.11	0.0	5.65	0.01	99.0	-4.0	22.1
	Aug	31	0.269	25.6	0.263	25.0	0.6	0.42	0.12	6.76	25.6	0.0	0.1	0.3	-4.2	0.0	-3.8	-11.0	-14.8	11.6	9.9	88.0	0.16	0.3	5.07	0.01	99.0	-15.9	6.2
	Sep	30	0.265	24.4	0.263	24.2	0.2	0.99	0.28	5.30	19.2	0.0	0.1	0.6	-2.6	0.0	-1.9	-10.0	-11.6	0.0	6.6	90.5	0.77	0.8	3.97	0.01	99.0	-11.7	0.0
	Total	365		371.8		294.6	77.2	100.0	28.4	44.27	92.4	274.3	29.1	49.4	-41.8	-0.1	36.5	-311.0	0.0		49.5	611.2	57.28	57.4	33.19	0.12	650.00		

Copy (paste special, values) appropriate data into input columns above (Average, RP10, RP100, etc.)

Precipitation Table (Ref'd "Precip" Sheet)

Month	Percent / month	Average Precipitation	RP 100 YR	2015-2016 Actual precip.
Units	(%/mo)	(in/mo)	(in/mo)	(in/mo)
October	6.03	1.71	3.09	1.59
November	12.66	3.59	6.49	3.82
December	18.27	5.18	9.37	6.59
January	18.17	5.15	9.32	7.59
February	15.45	4.38	7.92	1.27
March	13.44	3.81	6.89	7.62
April	9.66	2.74	4.96	3.02
May	3.74	1.06	1.92	0.66
June	1.13	0.32	0.58	0.00
July	0.04	0.01	0.02	0.00
August	0.42	0.12	0.22	0.14
September	0.99	0.28	0.51	0.00
TOTAL	100.00	28.35	51.29	32.30

Pan Evaporation Table (Ref'd from "Evap" Sheet)

MONTH	Pan Evaporation	Effective Lake Evap	100-YR Effecitve Evap
Units	(in/mo)	(in/mo)	(in/mo)
October	3.93	3.14	3.14
November	1.87	1.50	1.12
December	1.51	1.21	0.91
January	1.53	1.22	0.92
February	1.67	1.34	1.00
March	2.72	2.18	1.63
April	3.98	3.18	3.18
May	5.84	4.67	4.67
June	7.79	6.23	6.23
July	9.41	7.53	7.53
August	8.45	6.76	6.76
September	6.62	5.30	5.30
TOTAL	55.32	44.26	42.40

Average Year Flows

	0.263
	ADF (mgd)
Month	
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265
Average:	0.332

RP100 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320
	0.458

Actual 2016/2017 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	---
August	---
September	----
	0.539

Actual 2015/2016 WWTP Flows

	0.263
	ADF (mgd)
Month	
October	0.252
November	0.280
December	0.432
January	0.613
February	0.382
March	0.571
April	0.357
May	0.300
June	0.277
July	0.290
August	0.297
September	0.277
	0.361

Average Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Henderson Reservoir**

RESERVOIR

	Volume Storage (ac-ft)	Area (ac)	
Minimum	0	0.0	
Maximum	393	28.9	Enter small number (0.01 ac) instead of 0.0 ac.
Active Starting Volume	0		Minimum starting volume = minimum (dead) storage
Watershed Area	4.3	(ac)	
Runoff Coefficient, C	1		
Percolation Rate	0.12	(ac-ft/yr)	

Resevoir Equation "y=Ax^2 + Bx +C"

Coefficient A	-0.0001
Coefficient B	0.0999
Constant C	4.8166

Resevoir Height Equation "y=Ax + B

Coefficient A	0.9706
Coefficient B	-2.8011

Month		FLOW			STORAGE INPUTS				STORAGE OUTPUTS							
Units	Days	WWTP Monthly Flow (ac-ft)	Bowers Disposal (ac-ft)	Beginning Reservoir Volume (ac-ft)	Facility Influent Flow (ac-ft)	Precipitation (direct) (ac-ft)	Watershed Runoff (indirect) (ac-ft)	**Subtotal Influent/Precipitation** (ac-ft)	Evaporation (water surface) (ac-ft)	Percolation (direct) (ac-ft)	Wastewater sent to Preston Reservoir (ac-ft)	**Subtotal Disposal** (ac-ft)	**NET OUT** (ac-ft)	Beginning Storage Volume (ac-ft)	Change in Storage Volume (ac-ft)	**Estimated End of Month Storage Volume (ac-ft)**
October	31	24.3	13.8	0.0	10.5	0.7	4.0	15.2	-1.3	-0.01	-10.0	-11.3	3.9	0.0	3.9	**3.9**
November	30	25.5	0.0	3.9	25.5	1.6	8.4	35.4	-0.7	-0.01	-10.0	-10.7	24.7	3.9	24.7	**28.7**
December	31	45.2	0.0	28.7	45.2	3.3	11.1	59.5	-0.8	-0.01	-10.0	-10.8	48.7	28.7	48.7	**77.4**
January	31	43.9	0.0	77.4	43.9	5.1	9.1	58.2	-1.2	-0.01	-10.0	-11.2	46.9	77.4	46.9	**124.3**
February	28	36.2	0.0	124.3	36.2	5.7	6.4	48.4	-1.8	-0.01	-10.0	-11.8	36.6	124.3	36.6	**160.9**
March	31	42.1	0.0	160.9	42.1	5.8	4.7	52.6	-3.3	-0.01	-10.0	-13.3	39.3	160.9	39.3	**200.2**
April	30	29.4	0.0	200.2	29.4	4.8	2.8	37.0	-5.5	-0.01	-80.0	-85.5	-48.5	200.2	-48.5	**151.7**
May	31	26.8	0.0	151.7	26.8	1.6	1.4	29.7	-6.9	-0.01	-80.0	-86.9	-57.2	151.7	-57.2	**94.5**
June	30	23.6	8.9	94.5	14.8	0.4	0.5	15.6	-6.9	-0.01	-40.0	-46.9	-31.3	94.5	-31.3	**63.2**
July	31	24.9	24.9	63.2	0.0	0.0	0.0	0.0	-6.7	-0.01	-30.0	-36.7	-36.8	63.2	-36.8	**26.4**
August	31	25.6	25.6	26.4	0.0	0.1	0.3	0.4	-4.2	-0.01	-11.0	-15.2	-14.8	26.4	-14.8	**11.6**
September	30	24.4	24.4	11.6	0.0	0.1	0.6	0.8	-2.6	-0.01	-10.0	-12.6	-11.9	11.6	-11.6	**0.0**
Total		371.8	97.6		274.3	29.1	49.4	352.7	-41.8	-0.12	*	-353.0				

Average Year Flows

	0.263
	ADF (mgd)
Month	
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265

Average Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Preston Reservoir Average Water Balance

Assumptions:

Bowers Ranch has 24 Acres in use and 40 Acres in total available.
Hoskins Ranch has 24 Acres in use and 60 Acres in total available.
The Preston Forebay has 2 Acres of Surface Area.
Preston Reservoir ranges from 0 Acres when empty to 18 when full with 14 acres of watershed area and Capacity of 235 ac-ft.
The assumed Percolation rate is 100 Gallons per Day or 0.01 Acre-Feet per Month.

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Rainfall Average Year	In	1.20	2.57	3.45	3.97	3.58	3.35	1.86	0.85	0.26	0.04	0.06	0.29	21.48
Rainfall 100 Year	In	3.32	5.40	8.79	7.65	4.00	3.40	6.47	2.05	0.04	0.00	0.00	0.00	41.11
Pan Evaporation	In	3.14	1.50	1.21	1.22	1.34	2.18	3.18	4.67	6.23	7.53	6.76	5.30	44.26

Month		October	November	December	January	February	March	April	May	June	July	August	September	Total
Henderson Reservoir														
Effluent	AF	10	10	10	10	10	10	80	80	40	30	11	10	311
Hoskins Ranch														
Hoskins Ranch Available Disposal	AF	10	0	0	0	0	0	0	0	7	16	10	7	50
Preston Forebay														
Preston Forebay Influent	AF	0	10	10	10	10	10	80	80	33	14	1	3	261
Precipitation	AF	0	0	1	1	1	1	0	0	0	0	0	0	4
Evaporation	AF	0	0	0	0	0	0	0	0	1	1	1	0	4
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Preston Forebay Effluent	AF	0	10	10	11	10	10	80	80	33	13	0	3	261
CDCR														
CDCR Effluent to Preston Reservoir	AF	0	0	0	0	0	0	0	0	88	88	88	88	350
Preston Reservoir														
Preston Reservoir Maximum Available Storage	AF	235	235	235	235	235	235	235	235	235	235	235	235	
Water in Storage at Beginning of Month	AF	0	0	6	15	25	34	42	27	9	26	22	6	
Influent	AF	0	10	10	11	10	10	80	80	120	101	88	90	611
Precipitation	AF	3	7	9	11	10	9	5	2	1	0	0	1	57
Evaporation	AF	2	1	1	1	1	2	2	4	5	6	5	4	33
Percolation	AF	0	0	0	0	0	0	0	0	0	0	0	0	0
Water sent to Ione	AF	10	10	10	10	10	10	97	97	99	99	99	99	650
Water Applied(+)/Removed(-) from Storage	AF	-9	6	9	10	9	8	-14	-19	17	-4	-16	-12	
Estimated End of Month Storage	**AF**	**0**	**6**	**15**	**25**	**34**	**42**	**27**	**9**	**26**	**22**	**6**	**0**	

Average Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Conversions		
MG to AF	0.325851	= 1 AF

Logical Value for SCWWTP Options	0
Logical Value for CDCR Options	1
Logical value for removed henderson and thngys	FALSE
Logical Value for Rainfall	4
Logical Value for Perc	1
Logical value for remove preston	FALSE

Misc Assumptions

Preston Reservoir	0.00	18.00	235.00
Percolation	100.00	0.01	
Preston Forebay	2.00		
Storage Pond 5	4.35	52.17	
Storage Pond 6	3.45	27.62	0.80
Storage Pond 7	4.38	30.69	0.46
Additional Storage	0.00		
Preston Watershed Area	14.00		
Watershed Runnoff Coef.	0.70		
Bowers Ranch	24.00	40.00	
Hoskins Ranch	24.00	60.00	

Precip. into both Preston Forebay and Preston Reservoir is assumed with full reservoir in all cases due to lack of mapping for determination of depth/area curves.

Preston Reservoir			
Elevation	Area (AC)	Capacity (AC-FT)	Elevation
325	0	0	325
330	3	5	330
335	6	25	335
340	8	60	340
345	12	110	345
350	16	175	350
353	18	235	353
355	20	270	355

Average Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Bowers Ranch**

Storage	(ac-ft)	(ac)	
Minimum	**0**	**0**	
Maximum	**0.00000001**	**0.00000001**	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	**24**	(ac)
Runoff Coefficient, C	**0.1**	

Month		**FLOW**	**INPUTS**		
		WWTP Monthly Flow	Facility Influent Flow	Precipitation (direct)	Total Disposal
Units	Days	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
October	31	24.3	13.8	0.3	14.1
November	30	25.5	0.0	0.7	0.7
December	31	45.2	0.0	1.0	1.0
January	31	43.9	0.0	1.0	1.0
February	28	36.2	0.0	0.9	0.9
March	31	42.1	0.0	0.8	0.8
April	30	29.4	0.0	0.5	0.5
May	31	26.8	0.0	0.2	0.2
June	30	23.6	8.9	0.1	8.9
July	31	24.9	24.9	0.0	24.9
August	31	25.6	25.6	0.0	25.6
September	30	24.4	19.2	0.1	19.3
Total			92.4	5.7	98.0

Historic Disposal Data:

	Disposal Amount	
Year	mg	ac-ft
2011/2012	23.1	70.9
2012/2013	31.1	95.4
2013/2014	36.3	111.4
2014/2015	32.5	99.7
2015/2016	31.8	97.8

Average Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Facility Name: **Hoskins Ranch**

RESERVOIR

Storage	Volume (ac-ft)	Area (ac)	
Minimum	0	0	
Maximum	0.00000001	0.00000001	Enter small number (0.01 ac) instead of 0.0 ac.

Watershed Area	24	(ac)
Runoff Coefficient, C	0.1	

Month		**FLOW**	**INPUTS**		
		WWTP Monthly Flow	Facility Influent Flow	Precipitation (direct)	**Subtotal**
Units	Days	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
October	31	24.3	10.0	0.3	10.3
November	30	25.5	0.0	0.7	0.7
December	31	45.2	0.0	1.0	1.0
January	31	43.9	0.0	1.0	1.0
February	28	36.2	0.0	0.9	0.9
March	31	42.1	0.0	0.8	0.8
April	30	29.4	0.0	0.5	0.5
May	31	26.8	0.0	0.2	0.2
June	30	23.6	6.6	0.1	6.7
July	31	24.9	16.3	0.0	16.4
August	31	25.6	9.9	0.0	10.0
September	30	24.4	6.6	0.1	6.7
Total			49.5	5.7	55.2

Historic Disposal Data:

Year	Disposal Amount mg	ac-ft
2011/2012	26.1	80.1
2012/2013	21.9	67.2
2013/2014	22.4	68.7
2014/2015	55.5	170.3
2015/2016	18.7	57.3

Average Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

PRECIPITATION and DISTRIBUTION of RAIN

Used average rainfall to distribute 100-year

SUTTER HILL CDF, CALIFORNIA (048713)

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
	6.03	12.66	18.27	18.17	15.45	13.44	9.66	3.74	1.13	0.04	0.42	0.99	100
Avg Precip	1.71	3.59	5.18	5.15	4.38	3.81	2.74	1.06	0.32	0.01	0.12	0.28	28.35
10-YR	2.41	5.05	7.29	7.25	6.16	5.36	3.86	1.49	0.45	0.01	0.17	0.39	39.89
100-YR	3.09	6.49	9.37	9.32	7.92	6.89	4.96	1.92	0.58	0.02	0.22	0.51	51.29
											100-YR Return Ratio		**1.81**
Lat	3837										**10-YR Return Ratio**		**1.41**
Long	12080												
Elevation ft	1586												

http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca8713

Period of Record : 10/01/1943 to 06/10/2016

IONE, CALIFORNIA (048230)

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
Avg Precip	1.20	2.57	3.45	3.97	3.58	3.35	1.86	0.85	0.26	0.04	0.06	0.29	21.48
100-YR	3.32	5.40	8.79	7.65	4.00	3.40	6.47	2.05	0.04	0.00	0.00	0.00	41.11

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EVAPORATION

Standard daily pan evaporation is measured using the four-foot diameter Class A Evaporation pan. The pan water level reading is adjusted when precipitation is measured to obtain the actual evaporation. Most Class A pans are installed aboveground, allowing effects such as radiation on the side walls and heat exchanges with the pan material. These effects tend to increase the evaporation totals. The amounts can then be adjusted by multiplying the totals by 0.70 or 0.80 to more closely estimate the evaporation from naturally existing surfaces such as a shallow lake, wet soil, or other moist natural surfaces.

Source: Western Regional Climate Center, Desert Research Institute www.wrcc.dri.edu
Training Handbook for Disposal of Non-Designated Waste to Land Systems: Design, Operation, and Monitoring , Dated June 2004

Pan Coefficient (C_p) = **0.8** **Average between 0.7 and 0.8 as described above**

Weather Correction Factor (k) [d] **25%** From Training Handbook: "The reduction in evaporation during a wet year in the wet season only can be in the 20 to 30 percent range

Zone 10

MONTH	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
Pan Evaporation	3.93	1.87	1.51	1.53	1.67	2.72	3.98	5.84	7.79	9.41	8.45	6.62	55.32
Effective Lake Evap	3.14	1.50	1.21	1.22	1.34	2.18	3.18	4.67	6.23	7.53	6.76	5.30	44.26
100-YR Effecitve Evap	3.14	**1.12**	**0.91**	**0.92**	**1.00**	**1.63**	3.18	4.67	6.23	7.53	6.76	5.30	42.40

100-YR Correction Factor Included

http://www.wrcc.dri.edu/htmlfiles/westevap.final.html

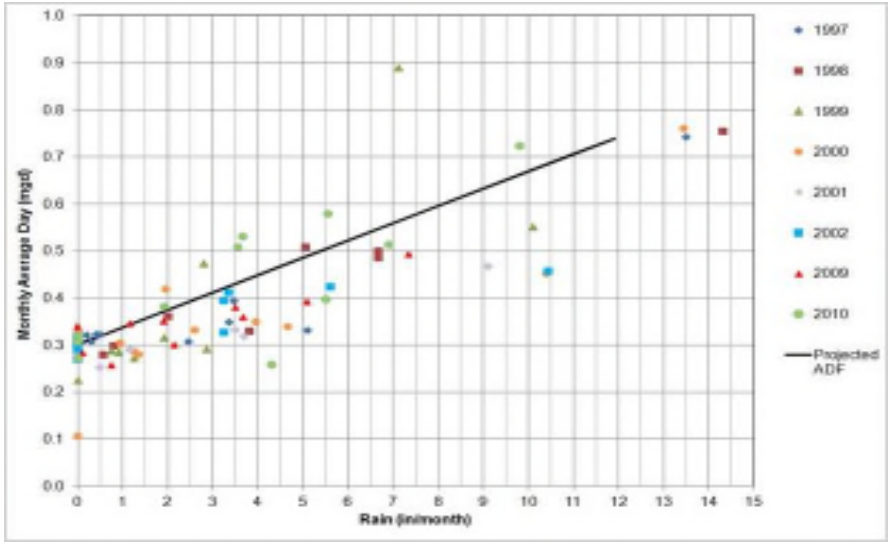
Pan evaporation locations in the project vicinity were limited. The closest being Placerville IFG and Camp Pardee. Placerville IFG is used because the rate is slightly more conservative and there is more complete data available.

Average Year Water Balance - Sutter Creek Facilities (Bowers Ranch, Henderson, Preston and Hoskins Ranch)

Using historic rainfall data and CSC WWTP flows, the relationships between monthly rainfall depths and monthly average and peak flows at the WWTP were used to project the collection systems response to monthly rainfall in the form of response curves which were developed as part of the 2017 update of the City of Sutter Creek and ARSA Wastewater Master Plan.

Using the monthly average response curve, we determined the average monthly flows that correlated to the 100-year rainfall values for each month. The equation of the trendline is: y = 0.0368x + 0.3008.

WWTP Monthly Average Day Flow Projected by Monthly Rainfall Depth



Resulting average and 1 in 100 year flows and comparison to actual 2016/2017 flows:

Average Year Flows	
Month	Flow (mgd)
October	0.255
November	0.276
December	0.475
January	0.462
February	0.422
March	0.442
April	0.320
May	0.282
June	0.257
July	0.261
August	0.269
September	0.265

RP100 WWTP Flows	
Month	Flow (mgd)
October	0.414
November	0.540
December	0.646
January	0.644
February	0.592
March	0.554
April	0.483
May	0.371
June	0.322
July	0.301
August	0.309
September	0.320

Actual 2016/2017 WWTP Flows	
Month	Flow (mgd)
October	0.355
November	0.373
December	0.532
January	0.997
February	0.946
March	0.500
April	0.537
May	0.310
June	0.297
July	0.279
August	---
September	----

EXHIBIT G

Subject: Preston Reservoir Treatment

From: Croyle, Kenny@Waterboards [mailto:Kenny.Croyle@Waterboards.ca.gov]
Sent: Thursday, August 10, 2017 9:48 AM
To: Jon Hanken <jhanken@ione-ca.com>; CastleOaks GolfPro <cogolfpro@gmail.com>; Amy Gedney <agedney@cityofsuttercreek.org>
Cc: Hold, Howard@Waterboards <Howard.Hold@waterboards.ca.gov>
Subject: Preston Reservoir Treatment

All,

Thank you for your efforts to reduce the odors related to your facilities. I have not received any additional complaints to date.

Some questions came up regarding the treatment of Preston Reservoir, and I wanted to clarify for all those responsible/named in the WDRs. Regarding Preston, there are no water quality limits in the 93-240 permit related to water contained in Preston or water coming out of Preston. However, there are effluent coming out of the Ione tertiary plant. Therefore the Regional Board cannot require any treatment of that reservoir, but can enforce on the limits of the plant effluent. Any additional treatment not described in the permit would need to be approved by the Regional Board first. If the Dischargers (the parties named in the permit) feel that some sort of treatment to Preston Reservoir is necessary to either meet those effluent limits and/or prevent odors, please contact us immediately to get a workplan approved. Let me know as soon as possible if that is the case.

Kenny Croyle
Water Resources Control Engineer
WDRs and Title 27 Compliance and Enforcement Unit
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670

1-916-464-4676 (direct)

Kenny.Croyle@waterboards.ca.gov