

## Lake County Planning Commission

Sheridan, Kursten@Wildlife <Kursten.Sheridan@wildlife.ca.gov>

Wed 7/7/2021 9:49 AM

To: Tom Armstrong <tom@sourzfarm.com>; elli hagoel <ellihagoel@gmail.com>

To Whom it may concern,

The California Department of Fish and Game (CDFW) received a complaint regarding grading over streams at 11650 High Valley Road in Clearlake Oaks (Originally permitted by CDFW as a Notification Not Required/EPIMS-LAK-17051). Rose Sanchez and Michael Shun from my staff conducted a site visit to verify the complaint. During the site visit they documented violations of Fish and Game Code (FGC) 1602 and deviations to the site plan.

1602 violations included trenching into the bed bank and channel of tributaries to Schindler Creek, grading and deep ripping of the cultivation site up to the edge of tributaries to Schindler Creek, and creating dirt roads over tributaries to Schindler Creek. The cannabis cultivation site plan delineated a minimum 50-foot setback from unnamed tributaries surrounding the cultivation area. Grading and deep ripping occurred into the 50-foot setback, sometimes right up to the edges of the unnamed tributaries.

CDFW scheduled another site visit with staff from the California Department of Food and Agriculture and the Central Valley Regional Water Quality Control Board so those agencies could document the issues at the High Valley Road site.

After walking and driving the site, we met with Tom Armstrong and the other members of the Sourz Farms team to discuss a path forward that would remediate the site and allow for cultivation. Tom and his team recognized the deviations to the site plan and had already made plans to reestablish the appropriate setback for the cultivation, compact the ground between the tributaries and install erosion control measures. Proactively, Tom's team had already flagged the unapproved stream crossings and were planning to remove sediment and restore the channel to its existing condition.

During our meeting with CDFA and the Waterboards, CDFW described the steps necessary to remediate the 1602 violations and allow for cultivation to occur within the existing site plan. Tom's and his Team accepted our suggestions and committed to submitting a Lake and Streambed Notification that included remediation of all 1602 violations, and ways to route the water away from the cultivation area.

As of July 7<sup>th</sup>, Sourz Farms has submitted the requested Notification and paid the appropriate fees. A follow-up site visit has been scheduled for July 14<sup>th</sup> where CDFW will bring their Conservation Engineering members to review the revised grading plan. We expect a final Lake and Streambed Alteration Agreement will be finalized shortly after this meeting.

CDFW is confident that Tom and the Sourz Farms group are committed to remediating the issues we brought forward and have already shown considerable effort in fulfilling their obligations. We do not have any objections to the project and look forward to working with Tom and his Team on future cultivation projects.

Please feel free to reach out to me if you have any questions.

Sincerely,  
Kursten

Kursten Sheridan  
Senior Environmental Scientist, Supervisor  
California Department of Fish & Wildlife  
North Central Region  
Habitat Conservation – Cannabis Program

7/7/2021

Mail - Tom Armstrong - Outlook

1701 Nimbus Rd.  
Rancho Cordova, CA 95670  
cell (916) 817-0419  
[kursten.sheridan@wildlife.ca.gov](mailto:kursten.sheridan@wildlife.ca.gov)



## Katherine Schaefers

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**From:** Tracy Cline  
**Sent:** Tuesday, July 20, 2021 12:42 PM  
**To:** Tom Armstrong; Katherine Schaefers; Tod Elliott  
**Cc:** David Boesch  
**Subject:** Sourz Grading Violation  
**Attachments:** receipt for grading violation fee - 7-20-21.pdf; Sourz - Stamped Grading Permit Violation Clearance - 7-2-21.pdf

Hi Tom,

Attached is the Stamped Grading Permit and your receipt for payment. Please keep these documents for your files. As I mentioned previously, Tod and I will do intermittent grading inspections. Please have all erosion control materials in place immediately, but also ensure they are in good condition and functional prior to October 15<sup>th</sup>, the end of the Grading Season and beginning of the wet season.

Thank you for your cooperation in remedying this violation quickly. The attached Grading permit applies only to the noted violation (grading into the watercourse setbacks).

Please share any new engineering plans for rerouting the flow out of the cultivation area. This work may require a Grading Permit, which would be a separate permit, review and fee.

Thank you,

Tracy Cline



**Tracy Cline**  
**Associate Resource Planner**  
Department of Community Development  
255 N. Forbes St.  
Lakeport, CA 95453  
Phone: (707) 263-2221 x 37119  
Fax: (707) 262-2225  
Email: [Tracy.Cline@lakecountyca.gov](mailto:Tracy.Cline@lakecountyca.gov)  
**STAY CONNECTED:**



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**From:** Tom Armstrong [<mailto:tom@sourzfarms.com>]  
**Sent:** Friday, July 16, 2021 12:30 PM  
**To:** Tracy Cline <[Tracy.Cline@lakecountyca.gov](mailto:Tracy.Cline@lakecountyca.gov)>; Katherine Schaefers <[Katherine.Schaefers@lakecountyca.gov](mailto:Katherine.Schaefers@lakecountyca.gov)>; Tod Elliott <[Tod.Elliott@lakecountyca.gov](mailto:Tod.Elliott@lakecountyca.gov)>  
**Subject:** [EXTERNAL] Re: Revised Memos

Hi Tracy,

Great, thank you. Here is the WDID number WDID: 5S17CC429205.

**COUNTY OF LAKE**

Community Development Department  
255 N. Forbes St.  
Lakeport, CA 95453  
(707) 263-2382

Receipt No.: **59650**

Receipt Date: **07/20/2021**

# RECEIPT

**RECORD & PAYER INFORMATION**

Record ID: GR21-20  
Record Type: Planning Entitlement  
Property Address: 11650 HIGH VALLEY RD, CLEARLAKE OAKS 95423  
Parcel Number: 006-004-07  
Description of Work: UP21-10 Sourz - large cannabis cultivation project. Ag lands. Exempt grading was done to prepare the site for planting. Tilling was done legally, but the contractor did not observe the water course setbacks. Violation was issued on July 14, 2021. CDFW also issued a Notice of Violation. Applicant has remedied the issue and re-established all setbacks.  
Job Value: \$0.00  
Payer: Elli Hagoel  
Applicant: Aviona LLC  
, CA  
Owner: AVIONA LLC

**PAYMENT DETAIL**

Date	Payment Method	Reference	Cashier	Comments	Amount
07/20/2021	Other	6579903141	COUNTER	cashier's check to pay for grading violation clearance.	\$1,600.40

**FEE DETAIL**

Fee Description	Account	Fee Amount	Current Paid
Cannabis Grading Permit - Initial Fee	109-2602-422.21-20	\$1,520.00	\$1,520.00
General Plan Maintenance	001-2702-461.66-21	\$50.00	\$50.00
Technology Recovery 2% Cost	001-2702-461.66-19	\$30.40	\$30.40
		<hr/> \$1,600.40	<hr/> \$1,600.40





COUNTY OF LAKE COMMUNITY DEVELOPMENT DEPARTMENT  
Courthouse - 255 N. Forbes Street  
Lakeport, California 95453 • FAX (707) 263-2225  
Building & Safety Division (707) 263-2382  
Planning Division (707) 263-2221

Grading Permit #	GR21-20 (Violation)
Grading Permit Fee	\$1,520
Subtotal	\$1,520
Technology Recovery 2% of Subtotal	\$30.40
General Plan Maintenance	\$50
Total	\$1,600.40

GRADING VIOLATION CLEARANCE

**PROJECT IDENTIFICATION**

PROJECT ADDRESS: 11650 High Valley Rd.

CITY: Clearlake Oaks

CROSS STREET: Highway 20

ASSOCIATED PLANNING FILES: UP21-10 , EA21-10, IS21-10

DESCRIPTION OF PROJECT: Cannabis cultivation ranch

**OWNER OF RECORD**

NAME: Aviona LLC

E-MAIL: tom@sourzfarm.com

PHONE: 908-304-4918

ASSESSOR'S PARCEL #: 006 - 004 - 070

PARCEL/LOT SIZE: 649.28

ZONING DISTRICT: split, RL-WW-SC, A-WW-SC

SOIL TYPE: \_\_\_\_\_

EROSION HAZARD RATING: \_\_\_\_\_

FLOOD ZONE: \_\_\_\_\_

LEGAL LOT? ☒ Y ☐ N

CNDDB

MAILING ADDRESS: 13280 E. Highway 20 PO Box 95423

CITY: Clearlake Oaks

STATE: CA

ZIP: 95423

**SCOPE OF WORK**

VEGETATION TO BE CLEARED: # OF ACRES: \_\_\_\_\_ TYPE OF VEGETATION: \_\_\_\_\_

ESTIMATED VOLUME OF FILL: \_\_\_\_\_ CUBIC YARDS

ESTIMATED VOLUME OF EXCAVATION: \_\_\_\_\_ CUBIC YARDS

ESTIMATED VOLUME OF IMPORT/EXPORT: \_\_\_\_\_ CUBIC YARDS

SOURCE OF IMPORT: \_\_\_\_\_

DESTINATION OF EXPORT: \_\_\_\_\_

IS FILL PROPOSED TO SUPPORT A BUILDING OR STRUCTURE? ☐ YES / ☒ NO

IF YES, PLEASE DESCRIBE BUILDING OR STRUCTURE TO BE SUPPORTED: \_\_\_\_\_

*I hereby authorize this application and authorize the County of Lake or authorized representative(s) to make inspections at any reasonable time as deemed necessary for the purpose of reviewing and processing this application.*

APPLICANT'S SIGNATURE Elli Hagood DATE \_\_\_\_\_

**ENGINEER/ARCHITECT INFORMATION**

BUSINESS: Vanderwall Engineering

CONTACT: Bill Vanderwall

ADDRESS: 3745 Main Street Unit A PO Box 431

CITY: Kelseyville

STATE: CA

ZIP: 95451

PHONE: ( )

E-MAIL: bill@vdwengr.com

**CONTRACTOR INFORMATION**

BUSINESS: \_\_\_\_\_

CONTACT: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_

STATE: \_\_\_\_\_

ZIP: \_\_\_\_\_

PHONE: ( )

E-MAIL: \_\_\_\_\_

**LICENSED CONTRACTOR DECLARATION:** I HEREBY AFFIRM UNDER PENALTY OF PERJURY that I am licensed under provisions of Chapter 9 of Division 3 of the State of California Business and Professions Code, commencing with Sec.7000, and my license is in full force and effect.

CONTRACTOR SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

**OWNER-BUILDER DECLARATION** – I HEREBY AFFIRM UNDER PENALTY OF PERJURY that I am exempt from the Contractor's State License Law for one of the following reasons:

☐ I, as owner of the property, will contract with a contractor(s) or subcontractor(s) licensed pursuant to the Contractor's State License Law to complete the project (complete Contractor Information and signature block above).

☐ I as owner of the property, or my employees with wages as their sole compensation, will do the work (complete Workers' Compensation Declaration below).

**WORKERS' COMPENSATION DECLARATION** – I HEREBY AFFIRM UNDER PENALTY OF PERJURY one of the following declarations:

*This section need not be completed if the permit is for one hundred dollars (\$100) or less*

☐ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the workers' compensation laws of California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

☐ I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued.

☐ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:

CARRIER: \_\_\_\_\_ POLICY NUMBER: \_\_\_\_\_

**WARNING:** Failure to secure workers' compensation coverage is unlawful, and shall subject an employer to criminal penalties and civil fines up to one hundred thousand dollars (\$100,000.00), in addition to the cost of compensation, damages as provided for in Section 3706 of the Labor Code, interest and attorney's fees.

OWNER'S SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

FOR OFFICIAL USE ONLY

APPROVALS	DATE	INITIALS
1. PLANS SUBMITTED	7/15/21	TLC
2. C.E.Q.A. REVIEW	1/1/UP21-10	KS
3. CGP/SWPPP REQUIRED? <input checked="" type="checkbox"/> YES / <input type="checkbox"/> NO		TLC
4. RWQCB WDID#	7/15/21	TLC
5. ZONING CLEARANCE	1/1/UP21-10	KS
6. DEPT. OF PUB. WORKS	1/1/NIA	TLC
ENCROACHMENT PERMIT REQUIRED? <input type="checkbox"/> YES / <input checked="" type="checkbox"/> NO / PERMIT #:		
7. FINAL C.B.O. APPROVAL	7/16/21	TLC



WDID# 5 S17CC429 205

The Applicant has read and understands the following:

- ☒ This application shall be accompanied by grading and erosion control plans with details including but not limited to:
  - o Parcel details including owner information; north arrow; parcel location; and existing and proposed driveways/roads, water features, large trees, wells, septic systems;
  - o Location of proposed grading with existing and proposed land contours (with cross-sections as appropriate);
  - o Temporary and permanent Best Management Practices (BMPs).
  - o For projects that disturb more than one acre, a Construction General Permit and Stormwater Pollution Prevention Plan shall be administered by the California Regional Water Quality Control Board.
  - o For projects within an NOA area, an Asbestos Dust Mitigation Plan shall be approved by Lake County Air Quality Management District.
- ☒ A grading permit does not abridge or supersede the regulatory powers or permit requirements of any federal, state, local agency, special district or department which may retain a regulatory or advisory function as specified by statute or ordinance. The applicant shall obtain permits as may be required from each agency.
- ☒ The grading permitted shall substantially conform to the project as described.
- ☒ Disturbance of the soil shall not occur between October 15 and April 15 unless authorized by the Community Development Director. The permit holder shall monitor the site during all rain events and the rainy season, including post-installation; and shall apply BMPs, conduct erosion control maintenance, and make improvements as needed. The permit holder shall contact the Building Division for an erosion control inspection prior to October 15 every year until the project is complete.
- ☒ The Grading Permit shall expire two years from the date of grading permit issuance and may be revoked pursuant to Chapter 21 of the Lake County Code if its terms and conditions are violated. Conditions of Approval may be extended for a period of up to one year pursuant to §30-33 of the Lake County Grading Ordinance. The permit holder shall pay a yearly mitigation monitoring fee until all mitigations are complete.
- ☒ The permit holder shall permit the County of Lake or representatives or designee to make periodic inspections at any reasonable time deemed necessary in order to assure that the activity being performed under authority of this permit is in accordance with the terms and conditions prescribed herein. The permit holder shall request a final grading inspection after the project is complete.

At-Cost Project Reimbursement

I, Elli Hagoel, the undersigned, hereby authorize the County of Lake to process the above referenced permit request in accordance with the County of Lake Code. I am paying an initial fee of \$ 1800.40 as an estimated cost for County staff review, coordination and processing costs related to my permit. In making this initial fee, I acknowledge and understand that the initial fee may only cover a portion of the total processing costs. Actual costs for staff time are based on hourly rates adopted by the Board of Supervisors in the most current County fee schedule. I also understand and agree that I am responsible for paying these costs even if the application is withdrawn or not approved.

I understand and agree to the following terms and conditions of this Reimbursement Agreement:

1. Time spent by County of Lake staff in processing my application and any direct costs will be billed against the available initial fee. "Staff time" includes, but is not limited to, time spent reviewing application materials, site visits, responding by phone or correspondence to inquiries from the applicant, the applicant's representatives, neighbors and/or interested parties, attendance and participation at meetings and public hearings, preparation of staff reports and other correspondence, processing of any appeals, responding to public records act requests or responding to any legal challenges related to the application. "Staff" includes any employee of the Community Development Department.
2. If processing costs exceed the available initial fee, I will receive invoices payable within 30 days of billing.
3. Being the owner of the project location, I hereby authorize the application and authorize the County of Lake or authorized representative(s) to make inspections at any reasonable time as deemed necessary for the purpose of review and processing this application.
4. If I fail to pay any invoices within 30 days, the County may either stop processing my permit application, or after conducting a hearing, deny my permit application. All invoices must be paid in full prior to issuance of the applied for permit.
5. If the County determines that any study submitted by the applicant requires a County-contracted consultant peer review, I will pay the actual cost of the consultant review. This cost may vary depending on the complexity of the analysis. Selection of any consultant for a peer review shall be at the sole discretion of the Community Development Director or his designee.
6. I agree to pay the actual cost of any public notices for the project as required by State Law or the Lake County Zoning Ordinance.
7. I may, in writing, request a further breakdown or itemization of invoices, but such a request does not alter my obligation to pay any invoices in accordance with the terms of this agreement.
8. I agree to pay all costs related to permit condition compliance as specified in any conditions of approval for my permit/entitlement including compliance monitoring.
9. I agree not to alter the physical condition of the property during the processing of this application by removing trees, demolishing structures, altering streams, and/or grading or filling. I understand that such alteration of the property may result in the imposition of criminal, civil or administrative fines or penalties, or delay or denial of the project.
10. Applicant shall defend, indemnify and hold harmless the County and its agents, including consultants, officers and employees from any claim, action or proceeding against the County or its agents, including consultants, officers or employees to attack, set aside, void, or annul the approval of this application or adoption of the environmental document which accompanies it. This indemnification obligation shall include, but not be limited to, damages, costs, expenses, attorney's fees, or expert witness costs that may be asserted by any person or entity, including the applicant, arising out of or in connection with the approval of this application, including any claim for private attorney general fees claimed by or awarded to any party against the County, and shall also include the County's costs incurred in preparing the administrative record which are not paid by the petitioner. The County shall promptly notify the applicant of any claim, action or proceeding. Notwithstanding the foregoing, the County shall control the defense of any such claim, action or proceeding unless the settlement is approved by the applicant and that the applicant may act in its own stead as the real party in interest in any such claim, action or proceeding.
11. I have checked the current Hazardous Waste and Substances Sites List pursuant to Government Code Section 65962.5(f). [www.envirostor.dtsc.ca.gov/public/](http://www.envirostor.dtsc.ca.gov/public/) The proposed project site is or is not included on the most recent list.
12. I hereby agree that any drainage studies and/or drainage models that are provided to the County as part of the technical studies for this entitlement process will be provided with a license or other satisfactory release allowing the County to duplicate, distribute, and/or publish the studies and models to the general public without restriction. I understand that failure to provide such license or release to the satisfaction of the County may result in comment that the study and or model is inadequate to support the entitlement request.

The signature(s) below signifies legal authority and consent to file an application in accordance with the information above. The signature also signifies that the submitted information and accompanying documents are true and accurate, and that the items initialed above have been read and agreed to.

Note: This agreement does not include other agency review fees or the County Clerk Environmental Document filing fees.

APPLICATIONS WILL NOT BE ACCEPTED WITHOUT SIGNATURE(S) OF LEGAL PROPERTY OWNERSHIP OR OFFICIAL AGENT/AUTHORITY TO FILE (circle one)

OwnershipContract to Purchase\* Letter of Authorization\* Power of Attorney\* \*Must Attach Evidence

Name of Property Owner or Corporate Principal Responsible or Appointed Designee for Payment of all At-Cost Project Reimbursement Fees:

Aviona LLC , Elli Hagoel (Please Print)

Name of Company or Corporation (if applicable): (Please Print)

Mailing Address of the Property Owner or Corporation/Company responsible for paying processing fees: (If a Corporation, please attach a list of the names and titles of Corporate officers authorized to act on behalf of the Corporation)

Name:\* Elli Hagoel Date: 7/15/21

Email address: elli@sourzfarm.com Phone Number: 707 413 4070

Signature of Owners/Agent\* Name Date

Elli Hagoel 7/15/21

Signature of Applicant Date

## Katherine Schaefer

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**From:** Sheridan, Kursten@Wildlife <Kursten.Sheridan@wildlife.ca.gov>  
**Sent:** Tuesday, July 20, 2021 9:16 AM  
**To:** Katherine Schaefer; Tracy Cline  
**Subject:** [EXTERNAL] FW: EPIMS-LAK-21213-R2 - Transmittal - Final Agreement  
**Attachments:** EPIMS Concurrence Page.pdf; EPIMS-LAK-21213-R2\_Final\_Agreement\_Cover\_Letter.pdf

Hi Tracy and Katherine,

Attached is the final Agreement and Cover letter for the SourzHVR site. We are still waiting for Law Enforcement to sign the NOV and will forward that as soon as it is signed.

Please let me know if you have any questions.

Thanks,  
Kursten

Kursten Sheridan  
Senior Environmental Scientist, Supervisor  
California Department of Fish & Wildlife  
North Central Region  
Habitat Conservation – Cannabis Program  
1701 Nimbus Rd.  
Rancho Cordova, CA 95670  
cell (916) 817-0419  
[kursten.sheridan@wildlife.ca.gov](mailto:kursten.sheridan@wildlife.ca.gov)

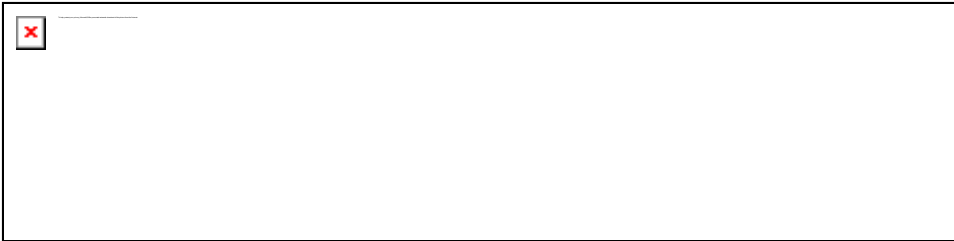


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**From:** [epims.support@wildlife.ca.gov](mailto:epims.support@wildlife.ca.gov) <[epims.support@wildlife.ca.gov](mailto:epims.support@wildlife.ca.gov)>  
**Sent:** Monday, July 19, 2021 3:27 PM  
**To:** [ellihagoel@gmail.com](mailto:ellihagoel@gmail.com)  
**Cc:** Wildlife R2 Cannabis <[R2Cannabis@wildlife.ca.gov](mailto:R2Cannabis@wildlife.ca.gov)>; Sanchez, Rose@Wildlife <[Rose.Sanchez@Wildlife.ca.gov](mailto:Rose.Sanchez@Wildlife.ca.gov)>; Shun, Michael@Wildlife <[Michael.Shun@Wildlife.ca.gov](mailto:Michael.Shun@Wildlife.ca.gov)>  
**Subject:** EPIMS-LAK-21213-R2 - Transmittal - Final Agreement

\*\*\*\* Do Not Respond to This Email \*\*\*\*





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This e-mail was generated by an automated mail handling system.  
Please **do not** reply to the address listed in the "From" field.  
Please read the CUSTOMER SERVICE section below if you have questions.

\*\*\*\*\*

Dear Elli Hagoel,

The California Department of Fish and Wildlife (CDFW) has reviewed your Lake or Streambed Alteration (LSA) application submitted to the Environmental Permit Information Management System (EPIMS) identified below:

**EPIMS Number:** EPIMS-LAK-21213-R2  
**Project Name:** SourzHVR  
**CDFW Region:** Region 2

Final documents are ready for printing. Complete the following steps to access and print your Final Standard Agreement documents:

1. Log into EPIMS at the link below.
2. From the Main Menu, select Permit Tracking.
3. Select the project associated with the permit number listed in this email.
4. From the Permit Components list, click on the Final Agreement form.
5. Click Print at the top of the page to print the Concurrence page.
6. Under the Standard Agreement section, click on the blue hyperlink to open the Final Standard Agreement and print it.

A printout of the Concurrence page containing the permittee and CDFW electronic signatures must be attached to the Final Standard Agreement to be valid. Once the Final Standard Agreement and Concurrence pages are printed, you may begin the project, provided you have obtained all necessary local, State, and federal permits or authorizations.

Log into the EPIMS at: <https://EPIMS.wildlife.ca.gov>

NOTE: For more information see LSA Questions and Answers at: <https://www.wildlife.ca.gov/Conservation/LSA/Q-and-A>. Questions regarding this correspondence, or about the status of your EPIMS self-certification, notification, agreement, status report, or fees should be directed to the CDFW Regional Office where the project is located.

\*\*\*\*\*

#### **CUSTOMER SERVICE**

[Forgot User ID?](#)  
[Forgot Password?](#)

**Need EPIMS Help?** Call (833) 303-7467 **OR** send an email to [EPIMSHelp@wildlife.ca.gov](mailto:EPIMSHelp@wildlife.ca.gov)  
**Project Specific Questions?** [CDFW Regional Offices](#)



California Department of  
**Fish and Wildlife**

## Permit Details

### Permit: EPIMS-LAK-21213-R2 - SourzHVR - 2021

**Status:** Underway  
**Region:** Region 2  
**Permittee Organization:**  
**CDFW Contact:** Rose Sanchez

## Standard Agreement

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This Standard Agreement is being issued to:

Elli Hagoel

**Final Standard Agreement:** EPIMS-LAK-21213-R2\_Final\_Agreement\_Cover\_Letter.pdf  
Open and print the attached PDF file.

## Exhibits

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## Concurrence

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**Final Agreement Effective Date:** 07/19/2021  
**Permittee Electronic Signature:** Elli Hagoel  
First and Last Name  
**Date Signed:** 07/19/2021

---

Department of Fish and Wildlife

**CDFW Electronic Signature:** Jennifer Garcia  
**CDFW Representative Title:** Environmental Program Manager  
**Date Signed:** 07/19/2021  
**Acting for:**



GENERAL NOTES

1. ALL MATERIAL WORKMANSHIP AND CONSTRUCTION SHALL CONFORM TO THE COUNTY OF LAKE STANDARD SPECIFICATIONS AND STANDARD PLANS, THE STATE OF CALIFORNIA STANDARD PLANS AND SPECIFICATIONS, AND THE COUNTY OF LAKE GRADING ORDINANCE ARTICLE IV.

2. THE CONTRACTOR SHALL GIVE THE COUNTY OF LAKE 72 HOURS NOTICE BEFORE STARTING WORK.

3. WORK HOURS ARE LIMITED TO MONDAY THROUGH FRIDAY, 7:00 AM TO 7:00 PM.

4. ANY DISCREPANCY DISCOVERED BY THE CONTRACTOR IN THESE PLANS OR ANY FIELD CONDITIONS DISCOVERED BY THE CONTRACTOR THAT MAY DELAY OR OBSTRUCT THE PROPER COMPLETION OF THE WORK PER THESE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER OF RECORD, THE COUNTY OF LAKE COMMUNITY DEVELOPMENT DEPARTMENT OR THE OWNER IMMEDIATELY UPON DISCOVERY. NOTIFICATION SHALL BE IN WRITING.

5 THE CONTRACTOR SHALL MAINTAIN A NEAT APPEARANCE TO THE WORK. IN ANY AREA VISIBLE TO THE PUBLIC, THE FOLLOWING SHALL APPLY: WHEN PRACTICAL, BROKEN CONCRETE AND DEBRIS DEVELOPED DURING CLEARING AND GRUBBING SHALL BE DISPOSED OF CONCURRENTLY WITH ITS REMOVAL. IF STOCKPILING IS NECESSARY, THE MATERIAL SHALL BE REMOVED OR DISPOSED OF WEEKLY. THE CONTRACTOR SHALL FURNISH TRASH BINS FOR ALL DEBRIS FROM STRUCTURE CONSTRUCTION. ALL DEBRIS SHALL BE PLACED IN TRASH BINS DAILY.

6. THE CONTRACTOR SHALL PROVIDE COMPACTION, GRADATION, SAND EQUIVALENT AND ALL OTHER TESTS AS REQUIRED BY THE COUNTY OF LAKE.

7. THE CONTRACTOR SHALL PROVIDE THE ENGINEER OF RECORD OR THE COUNTY OF LAKE THE RESULTS OF ANY COMPACTION, GRADATION, SAND EQUIVALENT, ETC., AND ALL OTHER TESTS AS REQUIRED BY THE COUNTY OF LAKE OR THESE PLANS.

Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
VOLUME	1.000	1.15	23800 Sq. Ft.	441 Cu. Yd.	441 Cu. Yd.	0 Cu. Yd.<Fill>

CONTRACTOR IS RESPONSIBLE FOR CALCULATING QUANTITIES. EXCESS MATERIAL SHALL BE DISKED IN PASTURE ON-SITE.

NOTIFICATION FOR INSPECTIONS

APPROVAL OF ALL WORK SHALL BE NECESSARY AT THE COMPLETION OF EACH OF THE FOLLOWING STAGES OF WORK AND SUCH APPROVAL MUST BE OBTAINED BEFORE SUBSEQUENT STAGES OF WORK MAY BE COMMENCED. ADDITIONALLY, THE INSPECTOR SHALL BE NOTIFIED AT LEAST 72 HOURS IN ADVANCE OF ANY OF THE FOLLOWING STAGES OF WORK. ANY CONSTRUCTION OR EXCAVATION REQUIRING INSPECTION THAT IS UNDERTAKEN WITHOUT INSPECTION IS SUBJECT TO RECONSTRUCTION AND RE-EXCAVATION AT THE CONTRACTOR'S EXPENSE.

INSPECTION MUST BE SCHEDULED FOR THE FOLLOWING ITEMS OF WORK:

1. REMOVE ALL WEAK SOIL IN FILL SLOPE AREAS.
2. COMPACT SUBGRADE.
3. PLACING AND COMPACTING OF MATERIAL
4. FINAL CLEAN-UP, AND BMP INSTALLATION.

PRESERVATION OF SURVEY MONUMENTS

1. CONTRACTOR IS RESPONSIBLE FOR PRESERVATION AND/OR PERPETUATION OF ALL EXISTING MONUMENTS WHICH CONTROL SUBDIVISIONS, TRACTS, BOUNDARIES, STREETS, HIGHWAYS, OR OTHER RIGHT-OF-WAY, EASEMENTS, OR PROVIDE SURVEY CONTROL WHICH WILL BE DISTURBED OR REMOVED DUE TO CONTRACTOR'S WORK. CONTRACTOR SHALL PROVIDE A MINIMUM OF 10 WORKING DAYS NOTICE TO CIVIL ENGINEER OR SURVEYOR IN RESPONSIBLE CHARGE OF THE WORK PRIOR TO DISTURBANCE OR REMOVAL OF EXISTING MONUMENTS. CIVIL ENGINEER OR SURVEYOR IN RESPONSIBLE CHARGE OF THE WORK SHALL COORDINATE WITH CONTRACTOR TO RESET MONUMENTS OR PROVIDE PERMANENT WITNESS MONUMENTS AND FILE THE REQUIRED DOCUMENTATION WITH THE COUNTY SURVEYOR PURSUANT TO BUSINESS AND PROFESSIONS CODE SECTION 8771.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COST TO RESET ANY SURVEY MONUMENTS DAMAGED BY CONTRACTOR'S PERSONNEL.

SPECIFIC GRADING NOTES

PREPARATION FOR FILL:

AREAS TO BE GRADED SHALL BE STRIPPED OF THE UPPER FEW INCHES OF SOIL CONTAINING ORGANIC MATTER. SOIL CONTAINING MORE THAN 2% BY WEIGHT OF ORGANIC MATTER SHOULD BE CONSIDERED ORGANIC. THE STRIPPINGS SHALL BE REMOVED FROM THE SITE, OR IF SUITABLE, STOCKPILED FOR RE-USE AS TOPSOIL. WEAK POROUS SURFACE SOILS SHALL BE OVEREXCAVATED TO A MINIMUM DEPTH OF 2 FEET. THE AMOUNT OF OVEREXCAVATION SHOULD BE DETERMINED IN THE FIELD BY THE SOILS ENGINEER OR FIELD TECHNICIAN AT THE TIME OF CONSTRUCTION. THE OVEREXCAVATED MATERIALS WITH AN ORGANIC CONTENT OF 3 PERCENT OR LESS SHALL BE RECOMPACTED AS ENGINEERED FILL.

SUBGRADE PREPARATION

AFTER THE SITE HAS BEEN PROPERLY CLEARED AND STRIPPED AND ANY NECESSARY EXCAVATIONS HAVE BEEN MADE, THE EXPOSED SOILS TO RECEIVE FILL SHOULD BE SCARIFIED TO A DEPTH 12 INCHES, MOISTURE CONDITIONED TO SLIGHTLY ABOVE OPTIMUM WATER CONTENT AND COMPACTED TO THE REQUIREMENTS FOR STRUCTURAL FILL.

FILL MATERIAL:

SELECT ENGINEERED FILL SHOULD CONSIST OF PREDOMINANTLY GRANULAR, NON-EXPANSIVE, SOILS WITH AS PLASTICITY INDEX OF 15 PERCENT OR LESS AND AN R-VALUE OF 10 OR GREATER. THE SELECT FILL SHOULD BE FREE OF PERISHABLE MATTER AND ROCKS OR LUMPS OVER 6 INCHES IN THE GREATEST DIMENSION WITH NOT MORE THAN 15% LARGER THAN 2.5 INCHES. THE SOILS ENGINEER SHOULD APPROVE IMPORTED MATERIALS PRIOR TO USE AS SELECT ENGINEERED FILL.

COMPACTION:

ALL ENGINEERED FILL LESS THAN 5 FEET THICK SHOULD BE COMPACTED TO AT LEAST 90% RELATIVE COMPACTION. ENGINEERED FILL GREATER THAN 5 FEET HIGH, SHOULD BE COMPACTED TO AT LEAST 95% RELATIVE COMPACTION. FILL MATERIAL SHOULD MOISTURE CONDITIONED TO 3% ABOVE OPTIMUM MOISTURE AND SPREAD AND COMPACTED IN LIFTS OF NOT MORE THAN 8" IN UNCOMPACTED THICKNESS. IF CONSTRUCTION PROCEED DURING OR IMMEDIATELY FOLLOWING WET WINTER MONTHS, IT MAY REQUIRE TIME TO DRY THE ON-SITE SOILS TO BE USED AS FILL.

GRADING NOTES

1. CONTRACTOR SHALL COMPLY WITH ANY AND ALL GRADING PERMIT REQUIREMENTS ADMINISTERED BY THE COUNTY OF LAKE PLANNING AND BUILDING SERVICES DEPARTMENT.

2. AS A MINIMUM, ALL GRADED AREAS AND EXPOSED SOIL WITHIN THIS PROJECT SHALL BE SEEDED FOR EROSION CONTROL BY THE CONTRACTOR. SEED AND MULCH WILL BE APPLIED BY OCTOBER 1ST TO ALL CUT AND FILL SLOPES WITHIN OR ADJACENT TO PROJECT ROADS. SEED AND FERTILIZER WILL BE APPLIED HYDRAULICALLY OR BY HAND AT THE RATES SPECIFIED BELOW. ON SLOPES, STRAW WILL BE APPLIED BY BLOWER OR BY HAND AND ANCHORED IN PLACE BY PUNCHING. ALL CRITICAL EARTHWORK OPERATIONS SHALL BE PERFORMED DURING THE DRY WEATHER SEASON, FROM APRIL 15TH TO OCTOBER 1ST OR AS OTHERWISE APPROVED BY THE COUNTY OF LAKE. THE CLEARING OF EXISTING VEGETATION SHALL BE CONFINED WITHIN THE LIMITS OF ACTUAL EARTHWORK. STAGING OF THE WORK SHALL BE REQUIRED TO ENSURE THAT THE AMOUNT OF LAND CLEARED AT ANY TIME IS LIMITED TO THE AREA THAT CAN BE DEVELOPED DURING THE CONSTRUCTION PERIOD. STORM WATER SHALL NOT BE ALLOWED TO FLOW DIRECTLY DOWN UNPROTECTED SLOPES. ENERGY DISSIPATING STRUCTURES AND EROSION CONTROL DEVICES SHALL BE PLACED AT ALL DRAINAGE OUTLETS WHICH DISCHARGE TO NATURAL CHANNELS AS SHOWN ON THESE PLANS. ALL SEDIMENT TRAPS SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL SUCH TIME THAT THE COUNTY ACCEPTS MAINTENANCE RESPONSIBILITY.

ITEM	POUNDS PER ACRE
"BLANDO BROME" .....	.30
ANNUAL RYE GRASS.....	.20
FERTILIZER (16-20-0 & 15% SULPHUR).....	.500
STRAW MULCH.....	4000 OR 3500 LB. OF WOOD CELLULOSE

3. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE DUST CONTROL MEASURES FOR THE ENTIRE CONSTRUCTION PERIOD OF THIS PROJECT TO THE SATISFACTION OF THE CITY OF CLEARLAKE.

4. PROJECTS GREATER THAN OR EQUAL TO 1-ACRE IN SIZE WILL REQUIRE A CONSTRUCTION GENERAL PERMIT AND STORM WATER POLLUTION PREVENTION PLAN (SWPPP) THROUGH THE APPROPRIATE REGIONAL WATER QUALITY CONTROL BOARD. SUBMIT COPIES TO COUNTY OF LAKE.

5. INSTALL JUTE NETTING ON ALL CUT SLOPES STEEPER THAN 3:1 PER SS-7 OF CALTRANS CONSTRUCTION SITE BMP'S MANUAL.

6. INSTALL FIBER ROLLS ON ALL CUT-SLOPES AND DISTURBED AREAS AS DIRECTED BY ENGINEER OF RECORD PER SC-5 OF CALTRANS CONSTRUCTION SITE BMP'S MANUAL.

# GRADING PLAN

## APN: 006-004-07

### 11650 HIGH VALLEY RD

### CLEARLAKE OAKS, CA

LAND OWNER

Aviona LLC  
Elli  
11315 Treyburn Way  
San Diego, CA 92109  
(707) 413-4070

PROJECT MANAGER

Tom Armstrong  
11650 High Valley RD  
Clearlake Oaks, CA  
tom@sourzfarms.com  
Phone: (908) 304-4918

ABBREVIATIONS

DW	DRIVEWAY
(E)	EXISTING
EP	ELEVATION
FL	FLOWLINE
HORZ	HORIZONTAL
INV	INVERT ELEVATION
LF	LINEAL FEET
P/L	PROPERTY LINE
(P)	PROPOSED
T.B.R.	TO BE REMOVED
T.R.	TO REMAIN
TYP	TYPICAL
VERT	VERTICAL

COMPACTION TESTING

Yale Bertolucci, CQE  
Construction Quality Enterprises  
149 N. Main Street, Suite 250  
P.O. Box 627  
Lakeport, CA 95453  
Toll Free: 877-813-9181  
Phone: 707-281-6427  
Email: yalebertolucci@ybcge.com

DISTURBED SOIL

0.55 ACRES

SCOPE OF WORK

THESE PLANS ARE FOR AN ON-SITE GRADING PLAN TO DIVERT DRAINAGE AWAY FROM THE PROPOSED CULTIVATION FARMS. FOR THE DIVERSION WILL ADD WATER TO ANOTHER DRAINAGE COURSE THAT DISSIPATES INTO A NEIGHBORING POND. THE DESIGN OF THE DIVERSION DITCHES AND STORMWATER PIPE IS SUPPORTED BY HYDROLOGY REPORT PREPARED BY VANDERWALL ENGINEERING JULY 2021.

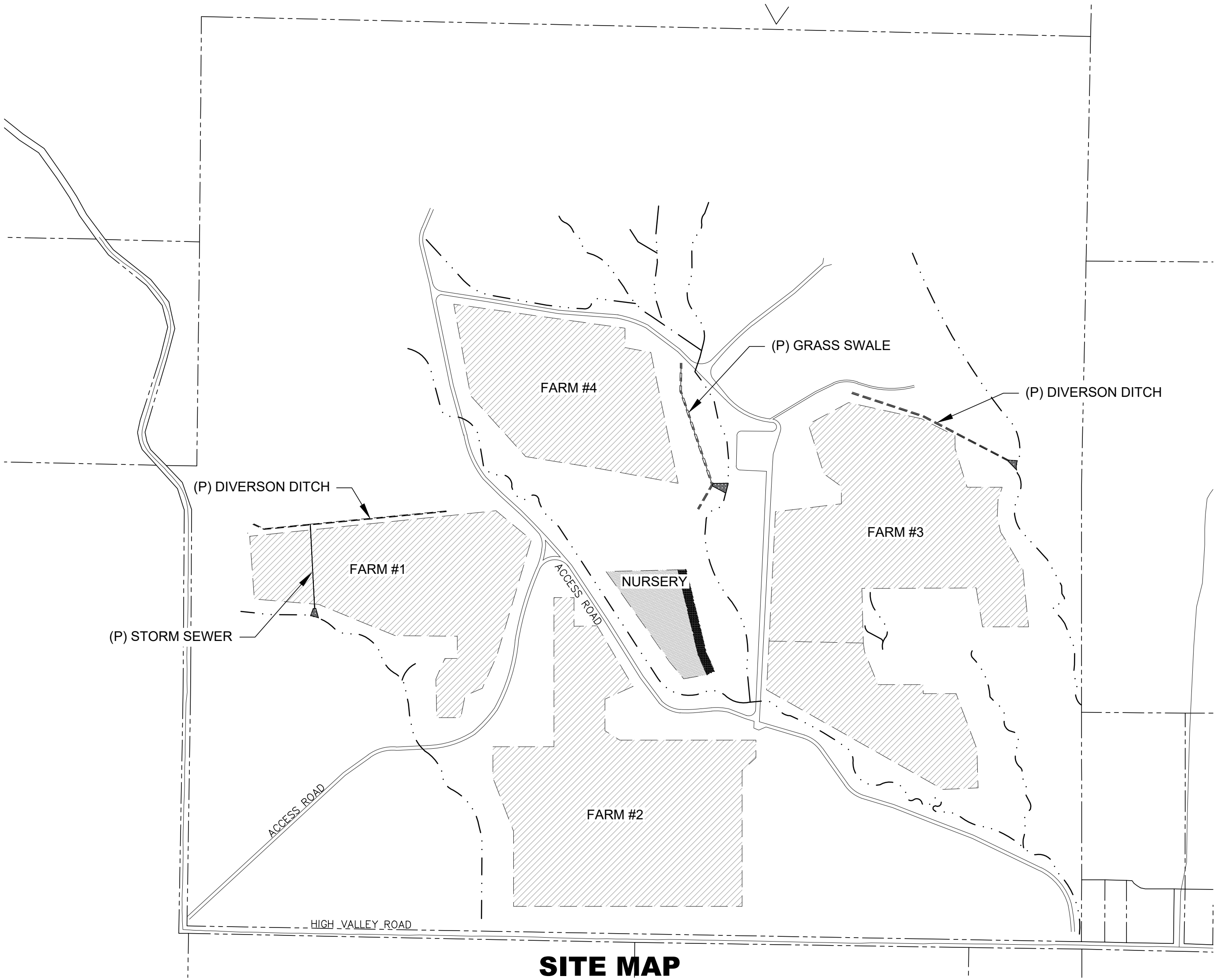
SURVEY DATA

THESE PLANS ARE BASED ON A TOPOGRAPHIC MAPS PREPARED BY VANDERWALL ENGINEERING. FIELD DATA WAS COLLECTED JULY 2021. DATUM IS RANDOM. NO SURFACE UTILITIES WERE FOUND IN TOPOGRAPHIC AREA SHOWN.

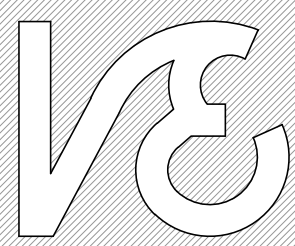
THIS IS NOT A BOUNDARY SURVEY.

## Sheet Index

SHEET 1	COVER SHEET
SHEET 2	FARM 1
SHEET 3	FARM 2
SHEET 4	FARM 3
SHEET 5	STORM WATER PROFILE
SHEET 6	DETAIL DRAWING



COVER SHEET  
HIGH VALLEY RANCH  
APN: 006-004-07  
11650 HIGH VALLEY ROAD  
CLEARLAKE OAKS, CALIFORNIA



VanDerWall  
Engineering

PO BOX 431  
Kelseyville, CA 95451  
(707) 279-4887 P  
www.vdwngr.com

Date: JULY 2021

Scale: n/a

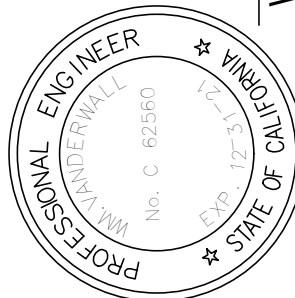
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Job: 21-35

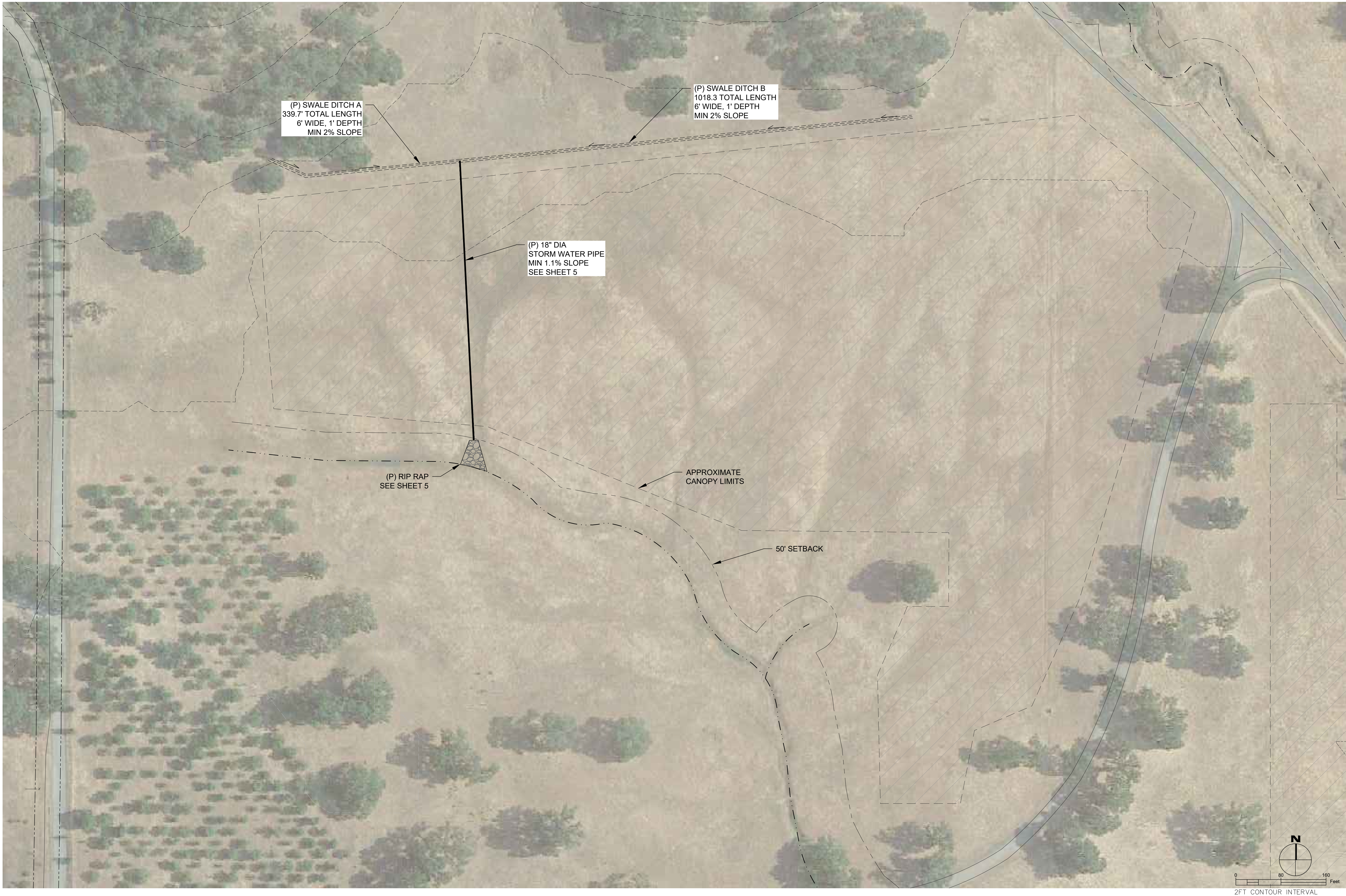
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1 of 6

Wm. Vanderwall, P.E.

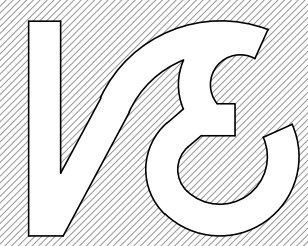






FARM 1 PLAN VIEW

HIGH VALLEY RANCH  
APN: 006-004-07  
11650 HIGH VALLEY ROAD  
CLEARLAKE OAKS, CALIFORNIA



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Date: JULY 2021

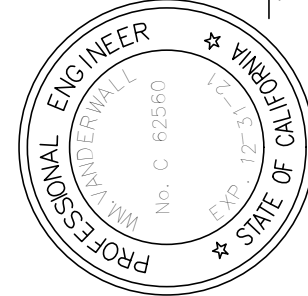
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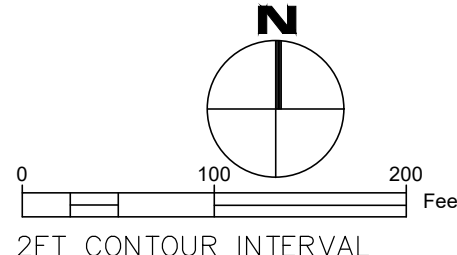
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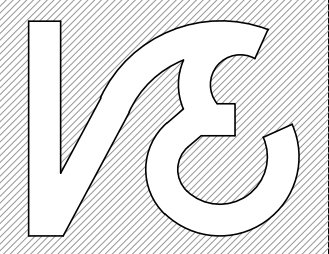


Wm. Vanderwall, P.E.





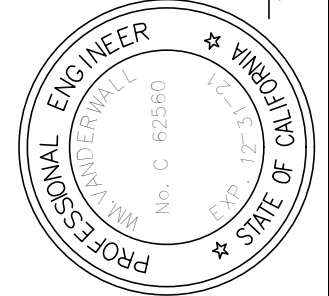
**FARM 3 PLAN VIEW**  
HIGH VALLEY RANCH  
APN: 006-004-07  
11650 HIGH VALLEY ROAD  
CLEARLAKE OAKS, CALIFORNIA



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Engineering**  
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Date: JULY 2021  
Scale: n/a  
Drawn: WJV  
Job: 21-35  
Sheet:

**3 of 6**

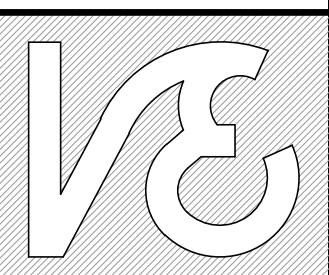


Wm. Vanderwall, P.E.



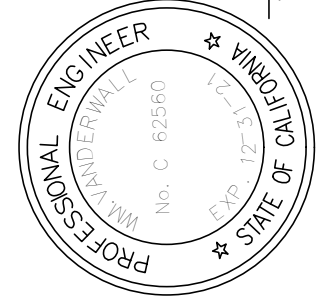


**FARM 3 PLAN VIEW**  
HIGH VALLEY RANCH  
APN: 006-004-07  
11650 HIGH VALLEY ROAD  
CLEARLAKE OAKS, CALIFORNIA



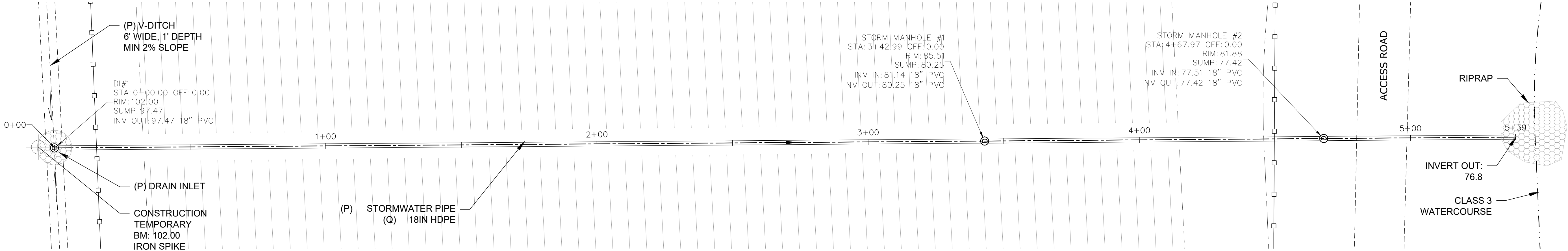
**VanDerWall Engineering**  
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Date: JULY 2021  
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Drawn: WJV  
Job: 21-35  
Sheet:



Wm. Vanderwall, P.E.





STORMWATER STRUCTURE SCHEDULE:

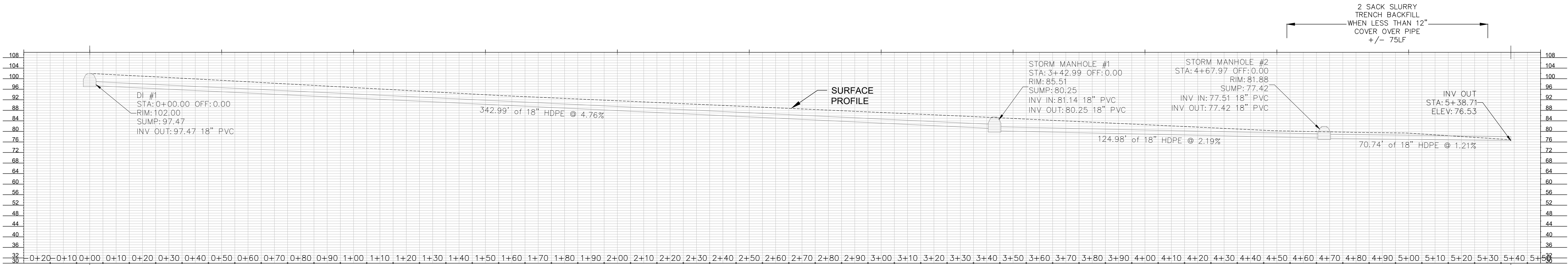
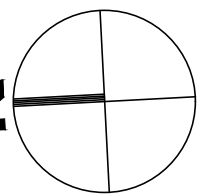
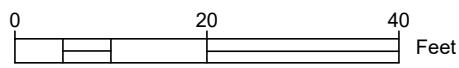
- DI #1

36X36 DROP INLET PER LAKE CO. STD 305  
REDWOOD COVER, V-DITCH NOTCH ON ALL FOUR SIDES.  
ARMOR 10' AROUND INLET W/6" ANGULAR RIP RAP.
- SMH #1

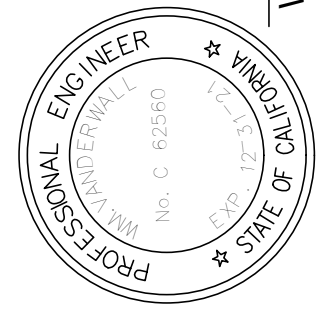
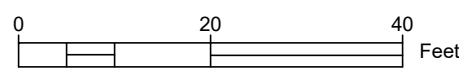
36X36 DROP INLET PER LAKE CO. STD 305  
REDWOOD COVER, NO V-DITCH NOTCH.
- SMH #2

36X36 DROP INLET PER LAKE CO. STD 305  
REDWOOD COVER, NO V-DITCH NOTCH.

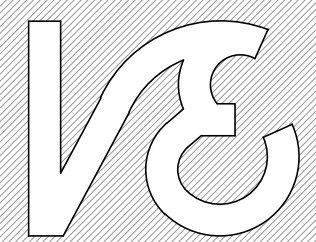
PLAN VIEW



PROFILE VIEW



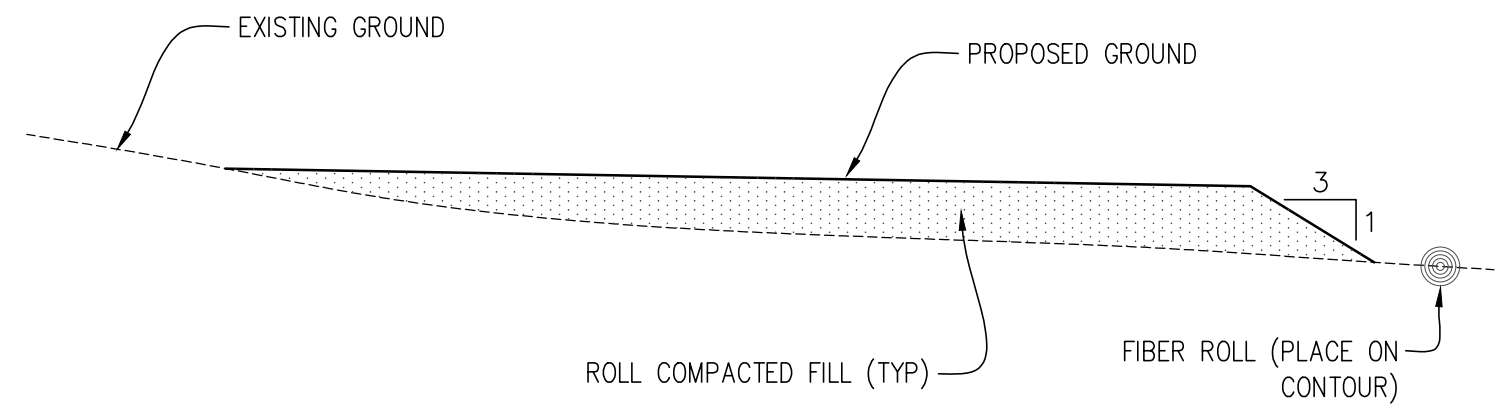
STORM SEWER  
HIGH VALLEY RANCH  
APN: 006-004-07  
11650 HIGH VALLEY ROAD  
CLEARLAKE OAKS, CALIFORNIA



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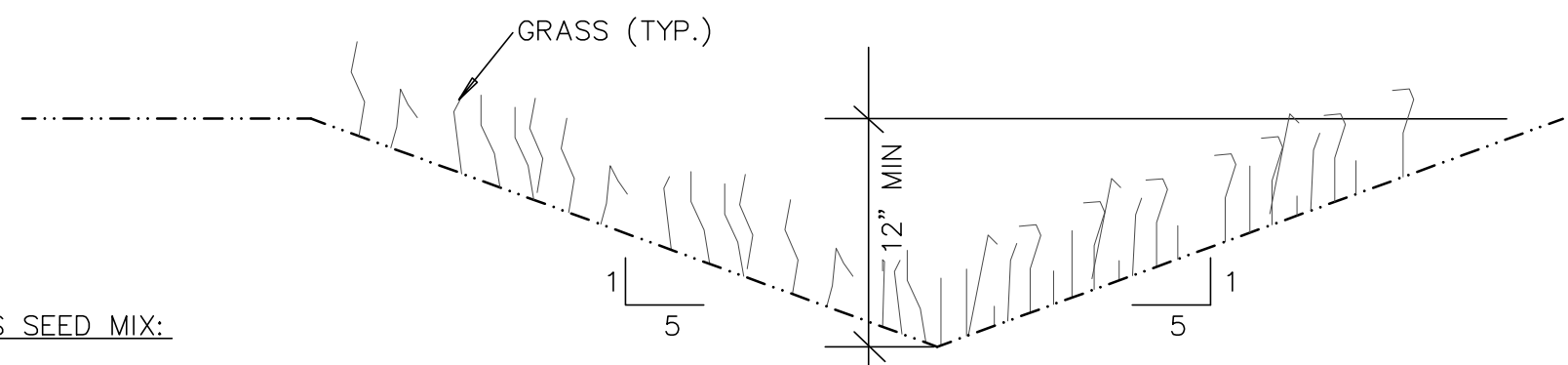
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Job: 21-35  
Sheet:



6  
A

**SPOIL FILL DETAIL**

NTS



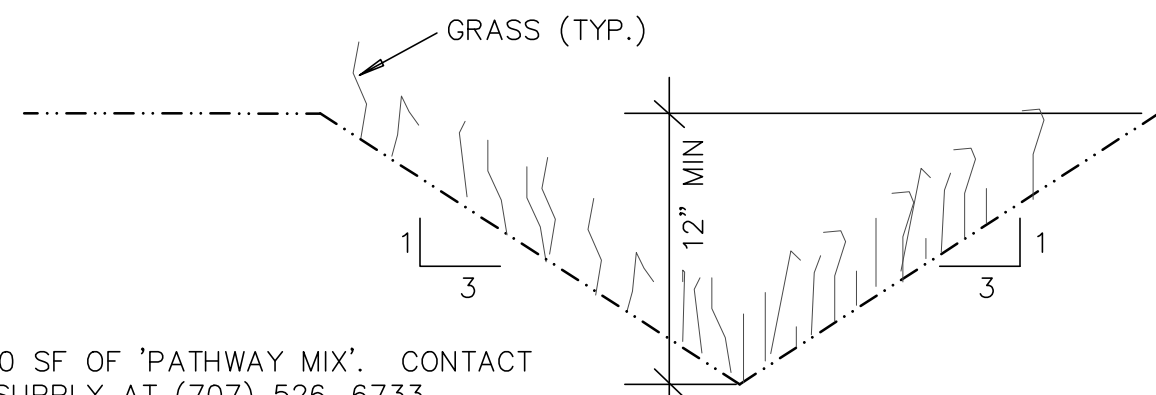
GRASS SEED MIX:

APPLY 1/2 LBS PER 100 SF OF 'PATHWAY MIX'. CONTACT LA BALISTERS SEED SUPPLY AT (707) 526-6733. PATHWAY SEED MIX CONTAINS 50% OF CREEPING RED FESCUE, 30% OF PERENNIAL RYE, AND 20% OF HARD FESCUE.

6  
B

**5:1 GRASS-LINED DITCH SECTION**

NTS



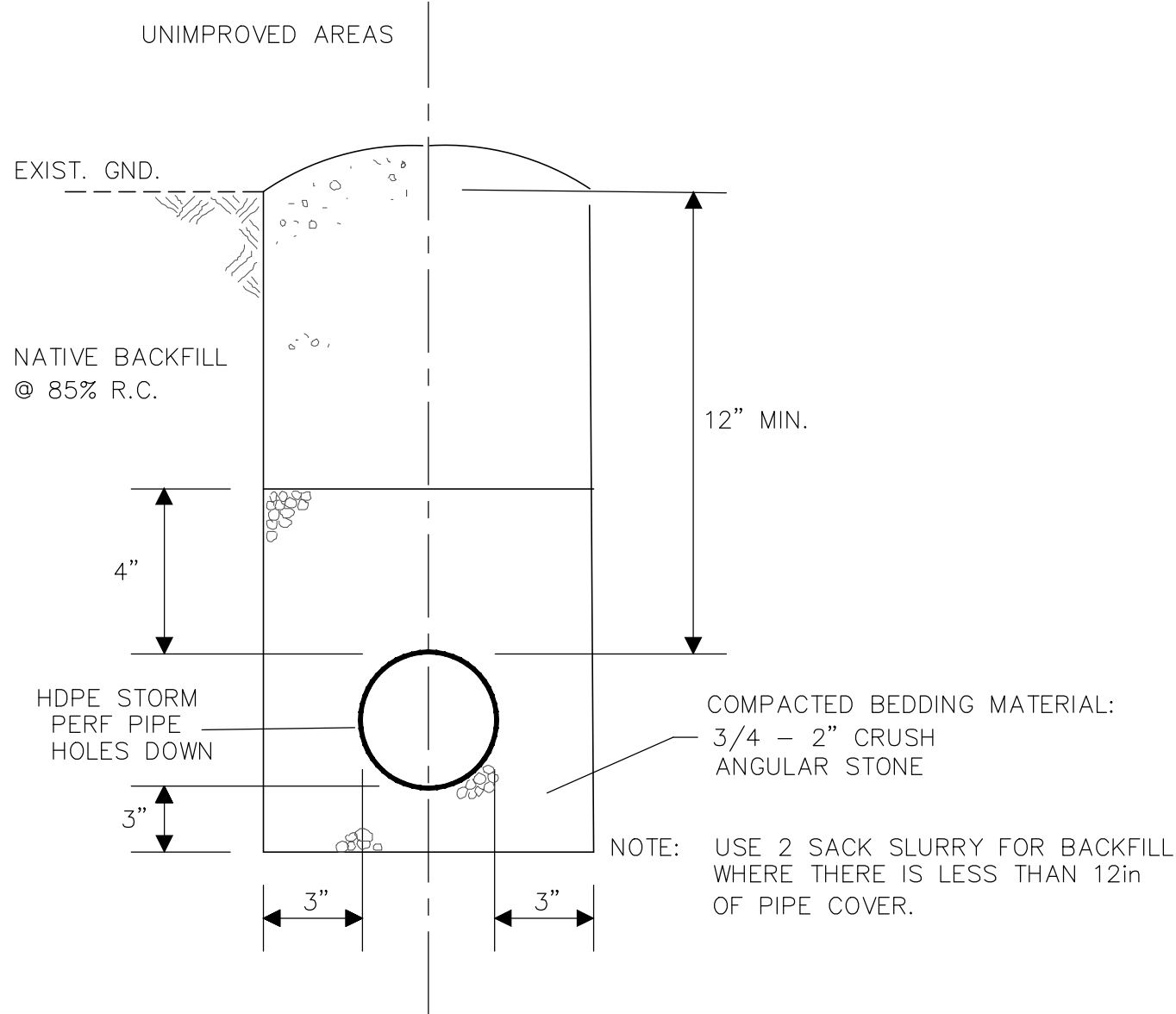
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6  
C

**3:1 GRASS-LINED DITCH SECTION**

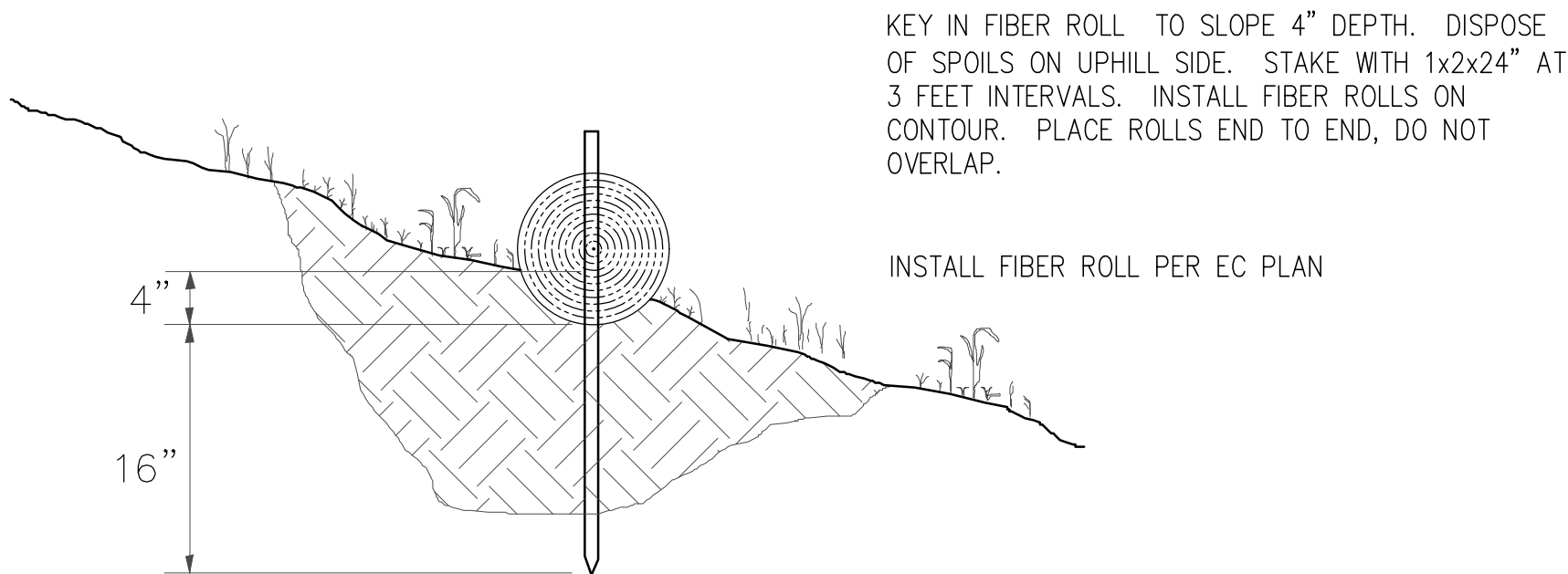
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6  
D

**STORM DRAIN TRENCH**

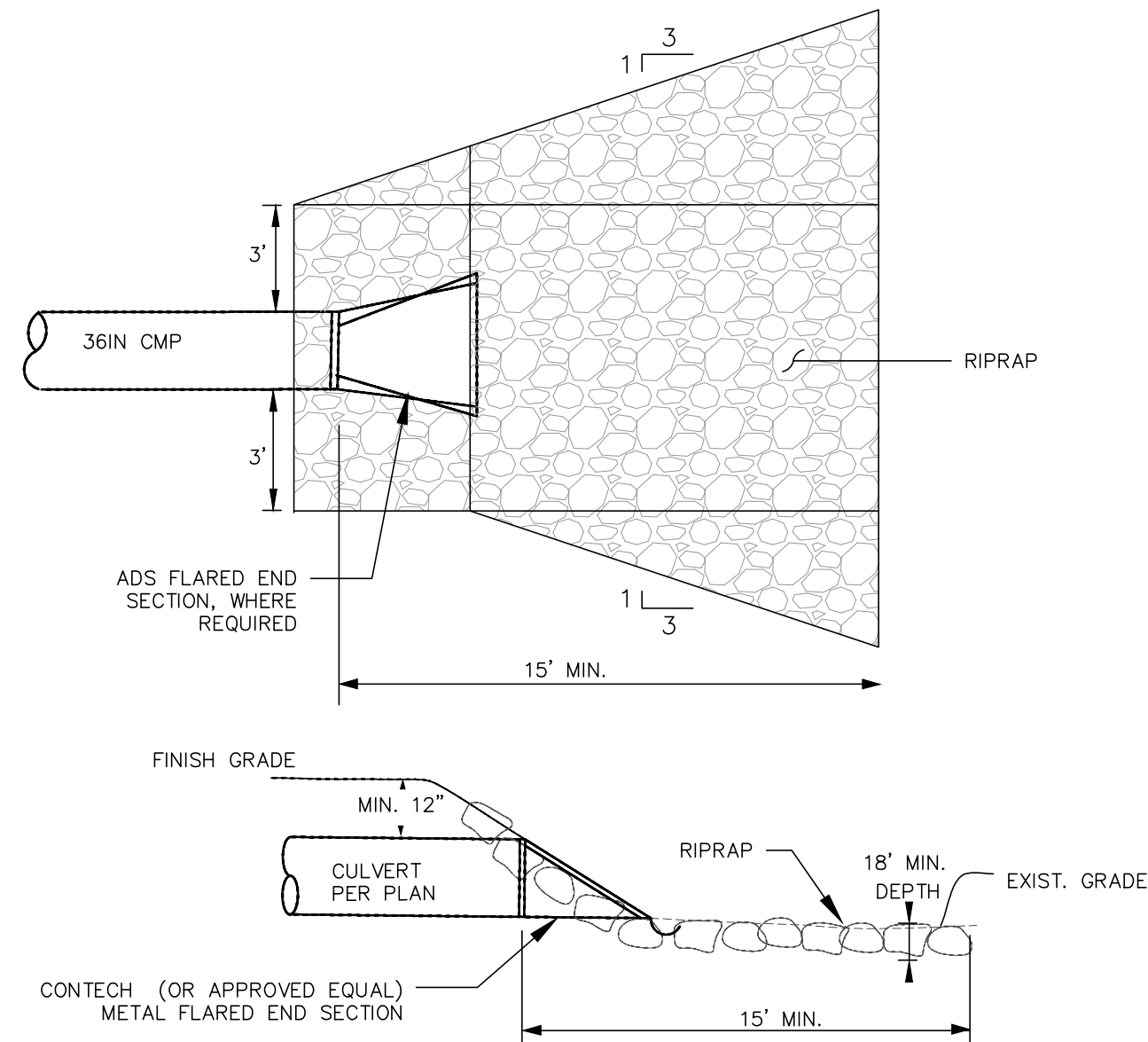
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6  
E

**FIBER ROLL INSTALLATION**

NTS

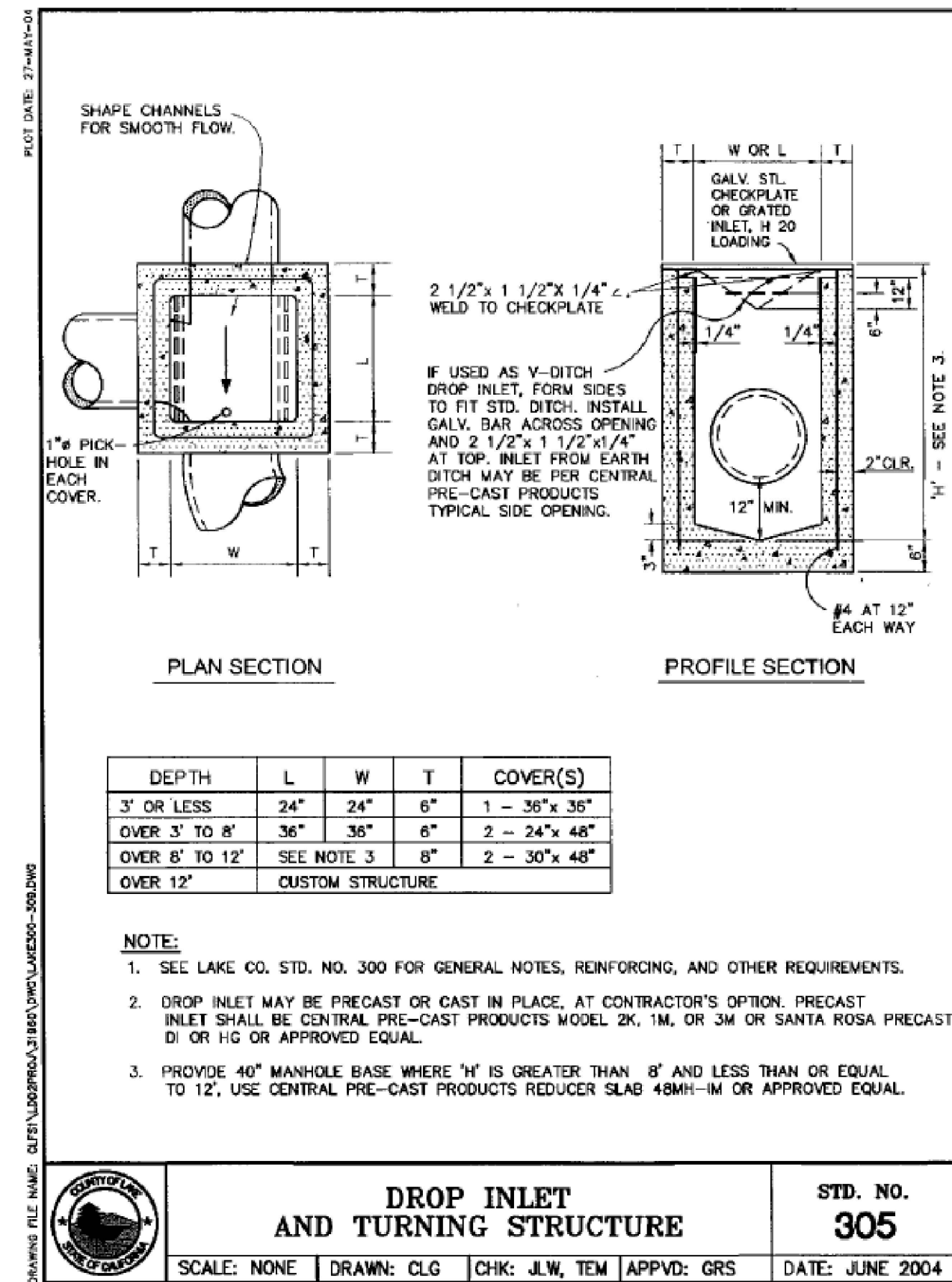


NOTE: INLET PER PLAN VIEW, SAME RIPRAP SPECIFICATION

6  
F

**CULVERT OUTLET**

NTS



DEPTH	L	W	T	COVER(S)
3' OR LESS	24"	24"	6"	1 - 36"x 36"
OVER 3' TO 8'	36"	36"	6"	2 - 24"x 48"
OVER 8' TO 12'	SEE NOTE 3	8"	8"	2 - 30"x 48"
OVER 12'	CUSTOM STRUCTURE			

- NOTE:
- SEE LAKE CO. STD. NO. 300 FOR GENERAL NOTES, REINFORCING, AND OTHER REQUIREMENTS.
  - DROP INLET MAY BE PRECAST OR CAST IN PLACE, AT CONTRACTOR'S OPTION. PRECAST INLET SHALL BE CENTRAL PRE-CAST PRODUCTS MODEL 2K, 1M, OR 3M OR SANTA ROSA PRECAST DI OR HG OR APPROVED EQUAL.
  - PROVIDE 40" MANHOLE BASE WHERE 'H' IS GREATER THAN 8' AND LESS THAN OR EQUAL TO 12'. USE CENTRAL PRE-CAST PRODUCTS REDUCER SLAB 48MH-1M OR APPROVED EQUAL.



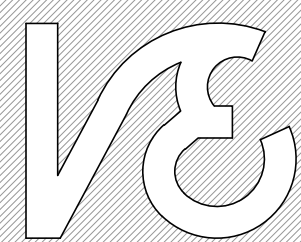
**DROP INLET  
AND TURNING STRUCTURE**

**STD. NO.  
305**

SCALE: NONE | DRAWN: CLG | CHK: J.W. TEM | APPVD: GRS | DATE: JUNE 2004

DETAILS

HIGH VALLEY RANCH  
APN: 006-004-070  
11650 HIGH VALLEY ROAD  
CLEARLAKE OAKS, CALIFORNIA



**VanDerWall  
Engineering**

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Date: JULY 2021

Scale: n/a

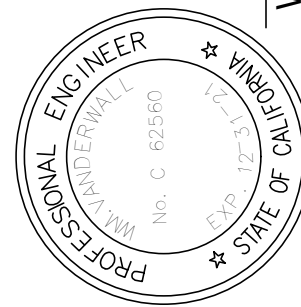
Drawn: WJV

Job: 21-35

Sheet:

6 of 6

Wm. Vanderwall, P.E.



# ***Design Hydrology Calculations***

for

11650 High Valley Road  
Clearlake Oaks, CA

Submitted to:

**California Department of Fish and Wildlife**

Prepared by:

Wm. VanDerWall, RCE  
Vanderwall Engineering

**Date Submitted: JULY 2021**

## **Project Scope**

The owner, Aviona LLC, proposes to develop the property for a commercial cannabis cultivation project.

This report addresses the construction of two grass swales and installation of one stormwater pipe on the property. The main purpose is to provide a design for stormwater mitigation. In addition, recommend riprap protection for the inlets and outlets for proper energy dissipaters are also part of this design report.

## **Design Rational**

The 100-year storm water event is analyzed in this report for sizing stormwater infrastructure such as culverts and drain inlets.

The rainfall duration intensity is based on local data. This rainfall duration intensity requires a 'K' factor which is based on the Average Precipitation in Lake County. The 'K' factor is used to adjust for variations in rainfall intensities throughout the County. "K" is determined by obtaining the mean annual precipitation for the drainage basin from Figure 3 and dividing it by 35 inches per year.

$$K = 28/35 = 0.8$$

The rainfall intensity is based on the minimum time of concentration of 10 minutes plus time of concentration for each tributary. The Tributary Map depicts the Length of travel and slopes that were used to calculate the time of concentration. Figure 2: Overland Flow Velocities from the Lake County Road and Construction Standards, was used to calculate the time of concentration of each tributary.

The Values of C, runoff coefficient is based on ASCE Design and Construction of Urban Stormwater Management Systems

## Calculate 100 Year flows For Each Tributary

$$Q = CIAK$$

Where;

C= runoff coefficient

K = 0.8

A = Tributary (acres)

$I_{100}$  = Rainfall intensity for 100-year design storm

$I_{100} = 5.71(T_c)^{-0.415}$

$T_c$  = 10 minutes + travel time.

Table 1: Tabulation of Tributary, C, L,  $T_c$ , I, A, K, and 100-yr flows.

	Tributary	C	Length	$T_c$ (min.)	$I_{100}$ (in/hr)	Area (Sf)	Area (acres)	k	Q100 (cfs)
Post	A	0.45	1060	15	1.84	251906	5.8	0.8	3.8
	B	0.45	1060	15	1.84	500216	11.5	0.8	7.6
	C	0.33		10	2.20	250717	5.8	0.8	3.3
	D	0.31	1391	22	1.60	476769	10.9	0.8	4.3

Swale Ditch A: Trib A = 3.8 cfs

Swale Ditch B: Trib B = 7.6 cfs

Swale Ditch C: Trib C = 3.3 cfs

Swale Ditch D: Trib D = 4.3 cfs

Drainpipe Inlet: Trib A + B = 11.4 cfs

---

Hydroflow Express Calculators were used in determining the minimum size storm drainpipe and the size and shape of each swale. A n-value of 0.020 was used for both HDPE storm drainpipe and swales based on SCWA "FMDM". Summary of the drainpipe and each swale calculation is as follows:

Table 2: Tabulation of pipe diameter, velocity and critical depth.

ID	Min Dia/ TYPE	Velocity (fps)	Critical Depth (ft)	Q100 (cfs)
Drainpipe	18"/HDPE	7.99	1.29	11.43

**Determine if proposed grass lined ditch A to drainpipe inlet at field 1, is adequate.**

**Given:** Q100= 3.80 cfs (trib. A)  
Side slope = 3:1  
Depth = 12in  
n = 0.020  
S = 2.0

**Solution:** Per Hydroflow Express Channel Report (see appendix)

---

**Determine if proposed grass lined ditch B to drainpipe inlet at field 1, is adequate.**

**Given:** Q100= 7.60 cfs (trib. B)  
Side slope = 3:1  
Depth = 12in  
n = 0.020  
S = 2.0

**Solution:** per Hydroflow Express Channel Report (see appendix)

---

**Determine if proposed grass lined ditch C to watercourse east of field 4, is adequate.**

**Given:** Q100= 3.30 cfs (trib. C)  
Side slope = 5:1  
Depth = 12in  
n = 0.020  
S = 2.0

**Solution:** per Hydroflow Express Channel Report (see appendix)

---

**Determine if proposed grass lined ditch D to watercourse north of field 3, is adequate.**

**Given:** Q100= 4.30 cfs (trib. D)  
Side slope = 3:1  
Depth = 12in  
n = 0.020  
S = 2.0

**Solution:** per Hydroflow Express Channel Report (see appendix)

---

## Riprap Design:

### Riprap Rock Size Equation

$$D_{50} = 0.2D \times [(Q/(g^{0.5} \times D^{2.5}))^{(4/3)} \times [D/TW]$$

Where;

$D_{50}$  = Riprap size (ft)

Q = Design Discharge (cfs)

D = culvert diameter (ft)

TW = Tailwater, (ft) use 0.4D when depth is unknown)

G = gravity acceleration 32.2 ft/s

Assume rock specific gravity is 2.65

Calculations and design procedure are from the FHWA Hydraulic Design of Energy Dissipaters for Culverts and Channels Hydraulic Engineering Circular Number 14, 3<sup>rd</sup> Edition.

Riprap Classes and Apron Dimension			
Class	$D_{50}$	Apron Length	Apron Depth
1	5	4D	$3.5D_{50}$
2	6	4D	$3.3D_{50}$
3	10	5D	$2.4D_{50}$
4	14	6D	$2.2D_{50}$
5	20	7D	$2.0D_{50}$
6	22	8D	$2.0D_{50}$

Calculated D50, Apron Length, and Apron Depth						
POC ID	Q	Dia (ft)	D_50 (ft)	D_50 (in)	Apron Length (ft)	Apron Depth (in)
Pipe	11.4	1.5	0.5	6	2.0	19

\*use min 6" riprap, with minimum 2 ft apron length, and minimum 9" depth.

\*\* inlet should be armored with identical riprap size and depth as calculated for outlet.



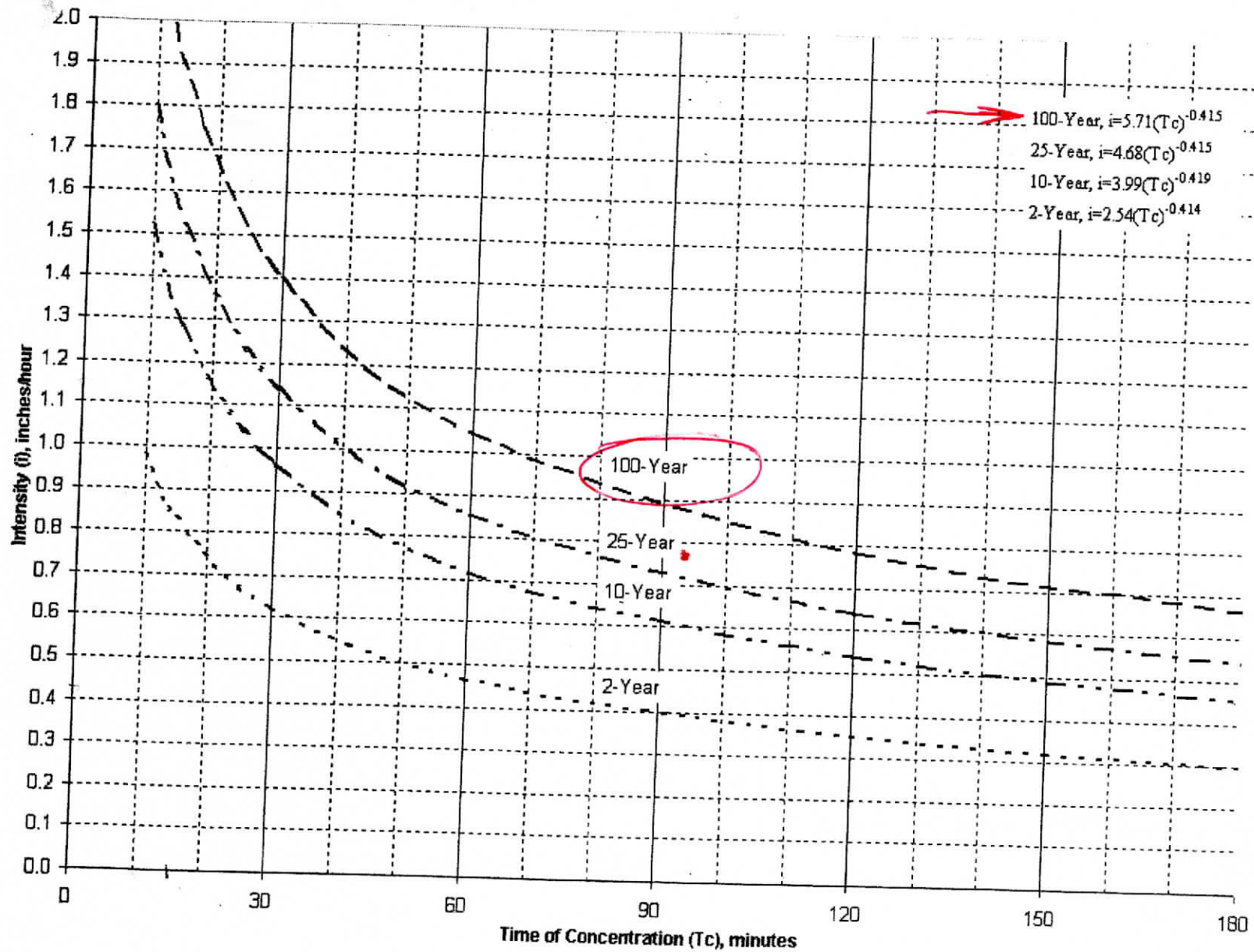
# **APPENDIX**

**Rainfall Duration-Intensity Curves**

**Average Annual Precipitation for Lake County**

**Values of C runoff Coefficient**

**CHANNEL REPORTS**



"Figure 1: Rainfall Duration-Intensity Curves"

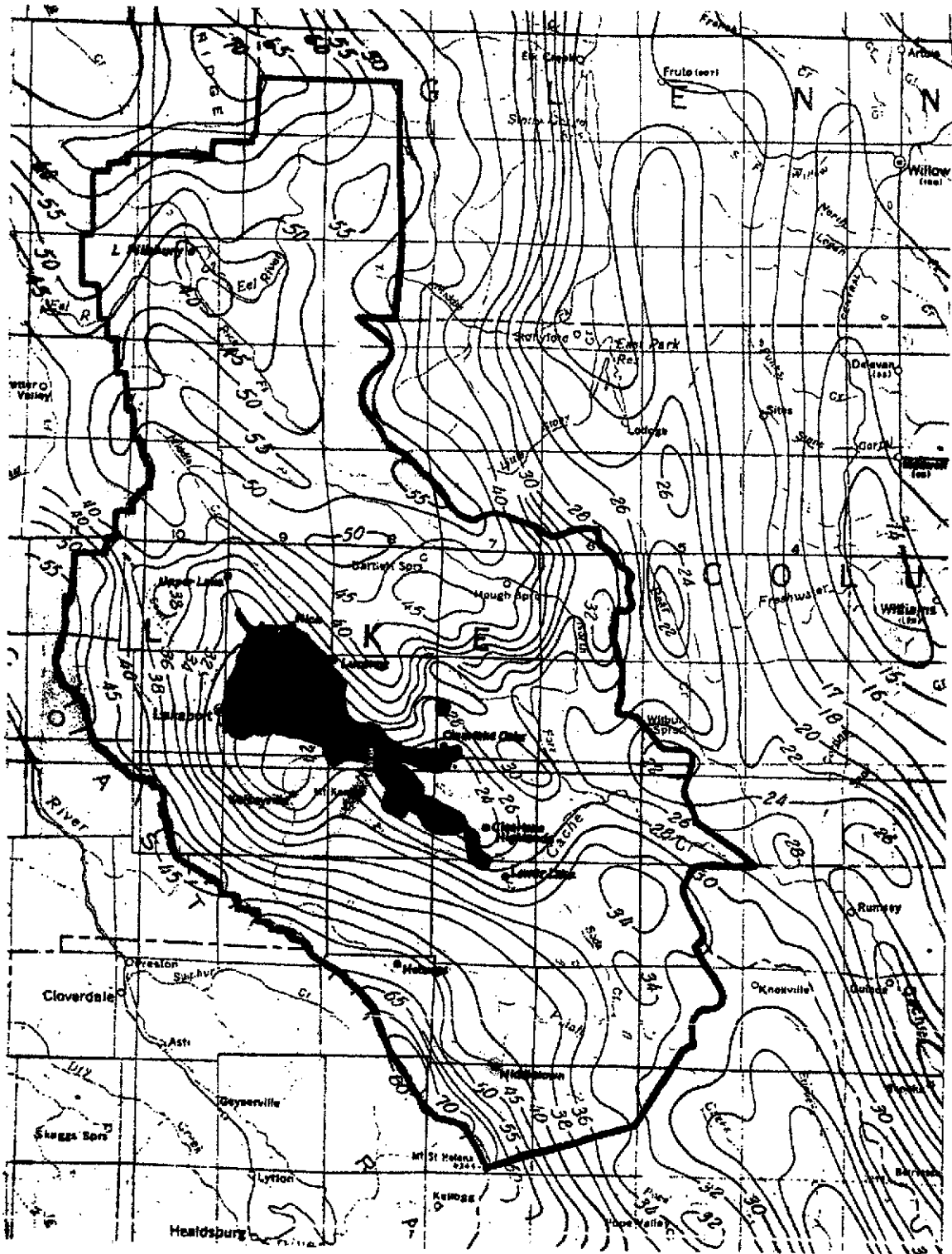


Figure 3: Average Annual Precipitation for Lake County

From: Calif. Department of Water Resources, Lines of Average Yearly Precipitation in the Central Valley, April 1966

**Table 1: Runoff Coefficients For Undeveloped Areas**

	Watershed Types			
	Extreme	High	Normal	Low
<b>Relief</b>	0.28-0.35 Steep Rugged terrain with average slopes above 30%	0.20-0.28 Hilly, with average slopes of 10 to 30%	0.14-0.20 Rolling with average slopes of 5 to 10%	0.08-0.14 Relatively flat land, with average slopes of 0 to 5%
<b>Soil Infiltration</b>	0.12-0.16 No effective soil cover, either rock or thin soil mantle of negligible infiltration capacity	0.08-0.12 Slow to take up water, clay or shallow loam soils of low soil infiltration capacity, imperfectly or poorly drained	0.06-0.08 Normal, well drained light or medium textured soils, sandy loams, silt and silt loams	0.04-0.06 High, deep sand or other soil that takes up water readily, very light well drained soils
<b>Vegetal Cover</b>	0.12-0.16 No effective plant cover; bare or very sparse cover	0.08-0.12 Poor to fair; clean cultivation crops, or poor natural cover, less than 20% of drainage area over good cover	0.06-0.08 Fair to good; about 50% of area in good grassland or woodland, not more than 50% of area in cultivated crops	0.04-0.06 Good to excellent; about 90% of drainage area in good grassland, woodland or equivalent cover
<b>Surface Storage</b>	0.10-0.12	0.08-0.10	0.06-0.08	0.04-0.06
	Negligible surface storage, depressions few and shallow; drainageways steep and small, no marshes	Low; well defined system of small drainageways; no ponds or marshes	Normal; considerable surface depression storage; lakes and pond marshes	High; surface storage high; drainage system not sharply defined; large floodplain storage or large number of ponds and marshes
Given: An undeveloped watershed consisting of 1) rolling terrain with average slopes of 5%, 2) clay type soils, 3) good grassland area, and 4) normal surface depressions Find: The runoff coefficient, C, for the above watershed			Solution: Relief 0.14 Soil Infiltration 0.08 Vegetal Cover 0.04 Surface Storage 0.06 C = 0.32	

**Table 2: Typical Ranges of Impermeable Area**

Development Type	Low, %	High, %
Suburban Residential (SR)	5	15
Single-Family Residential (R1)	45	65
Two-Family Residential (R2)	50	70
Multi-Family Residential (R3)	50	75
Commercial	50	100

**Table 3: Typical Runoff Coefficients for Developed Areas**

Type of Drainage Area	Runoff Coefficient	Type of Drainage Area	Runoff Coefficient
<b>Business:</b>		<b>Residential</b>	
Downtown Areas	0.70-0.95	Single Family Areas	0.30-0.50
Neighborhood Areas	0.50-0.70	Multi-units, detached	0.40-0.60
<b>Industrial</b>		Multi-units, attached	0.60-0.75
Light industrial areas	0.50-0.80	Suburban	0.25-0.40
Heavy industrial areas	0.60-0.90	Apartment dwelling areas	0.50-0.70
Parks, cemeteries	0.10-0.25	Playgrounds	0.20-0.40

# Channel Report

## 18" HDPE

### Circular

Diameter (ft) = 1.50

Invert Elev (ft) = 100.00

Slope (%) = 1.20

N-Value = 0.012

### Highlighted

Depth (ft) = 1.13

Q (cfs) = 11.43

Area (sqft) = 1.43

Velocity (ft/s) = 7.99

Wetted Perim (ft) = 3.16

Crit Depth, Yc (ft) = 1.29

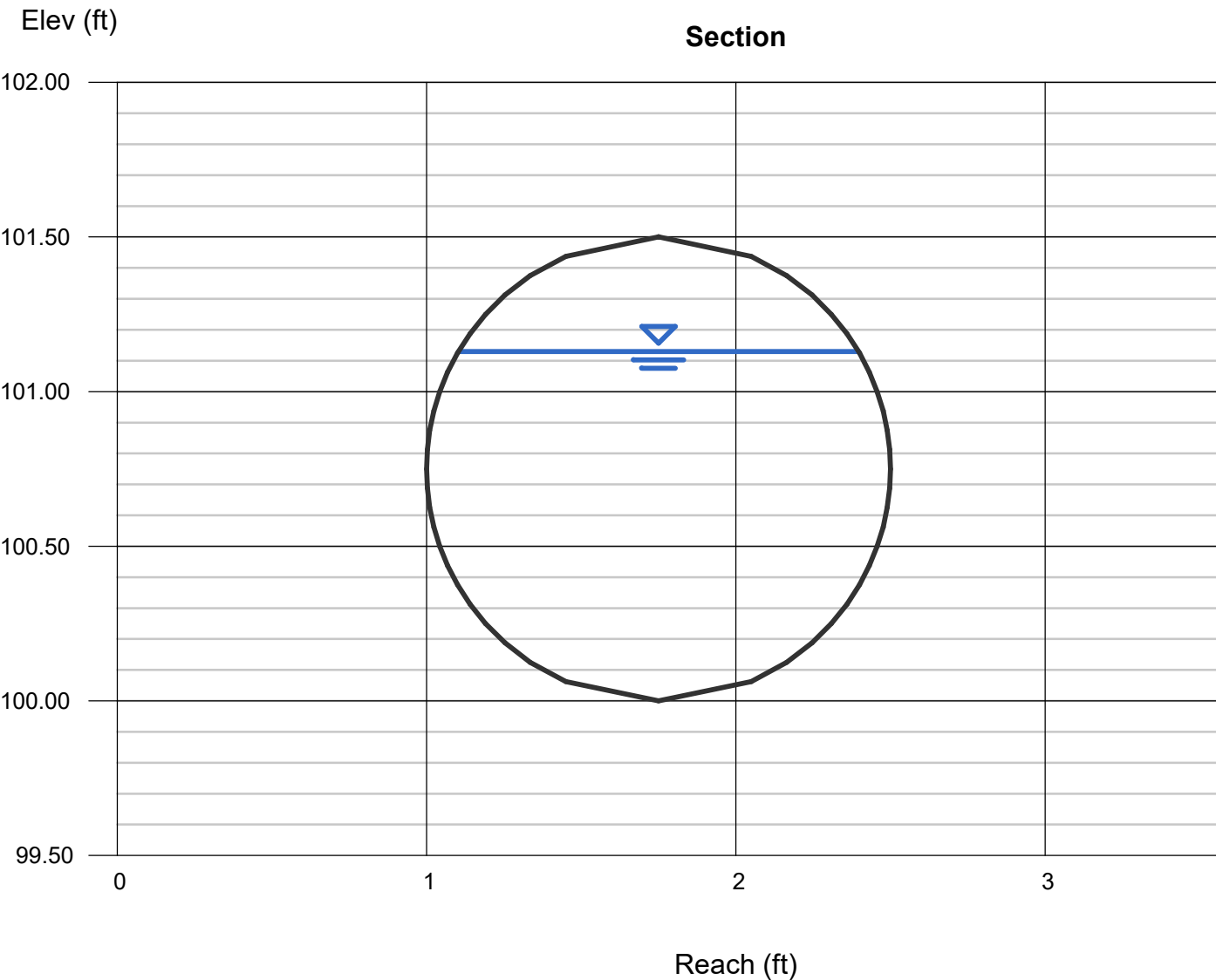
Top Width (ft) = 1.29

EGL (ft) = 2.12

### Calculations

Compute by: Known Q

Known Q (cfs) = 11.43



# Channel Report

## Swale Ditch A

### Triangular

Side Slopes (z:1) = 3.00, 3.00  
Total Depth (ft) = 1.00

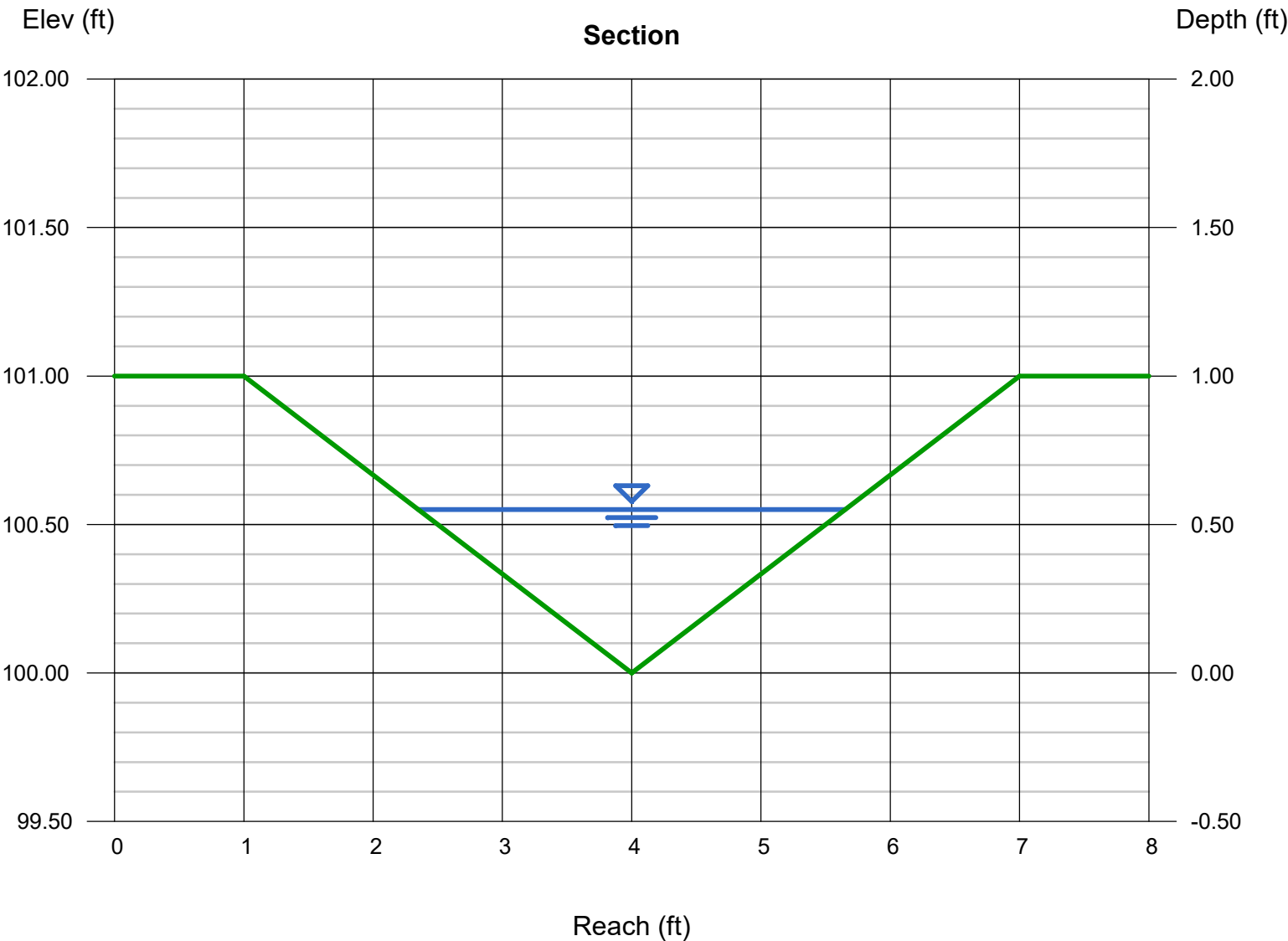
Invert Elev (ft) = 100.00  
Slope (%) = 2.00  
N-Value = 0.020

### Calculations

Compute by: Known Q  
Known Q (cfs) = 3.80

### Highlighted

Depth (ft) = 0.55  
Q (cfs) = 3.800  
Area (sqft) = 0.91  
Velocity (ft/s) = 4.19  
Wetted Perim (ft) = 3.48  
Crit Depth, Yc (ft) = 0.64  
Top Width (ft) = 3.30  
EGL (ft) = 0.82



# Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Wednesday, Jul 14 2021

## Swale Ditch B

### Triangular

Side Slopes (z:1) = 3.00, 3.00  
Total Depth (ft) = 1.00

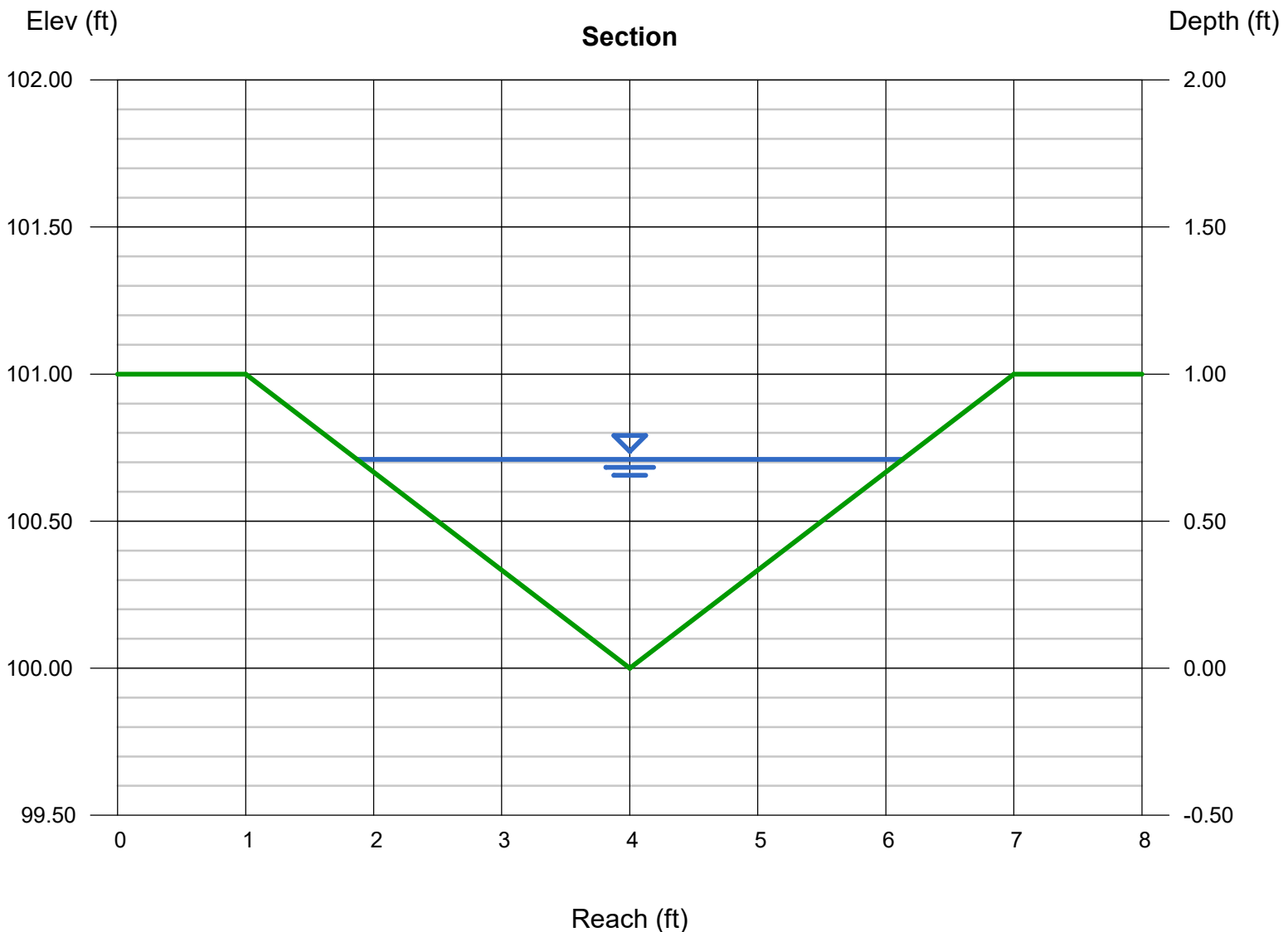
Invert Elev (ft) = 100.00  
Slope (%) = 2.00  
N-Value = 0.020

### Calculations

Compute by: Known Q  
Known Q (cfs) = 7.60

### Highlighted

Depth (ft) = 0.71  
Q (cfs) = 7.600  
Area (sqft) = 1.51  
Velocity (ft/s) = 5.03  
Wetted Perim (ft) = 4.49  
Crit Depth, Yc (ft) = 0.84  
Top Width (ft) = 4.26  
EGL (ft) = 1.10



# Channel Report

## Swale Ditch C

### Triangular

Side Slopes (z:1) = 5.00, 5.00  
Total Depth (ft) = 1.00

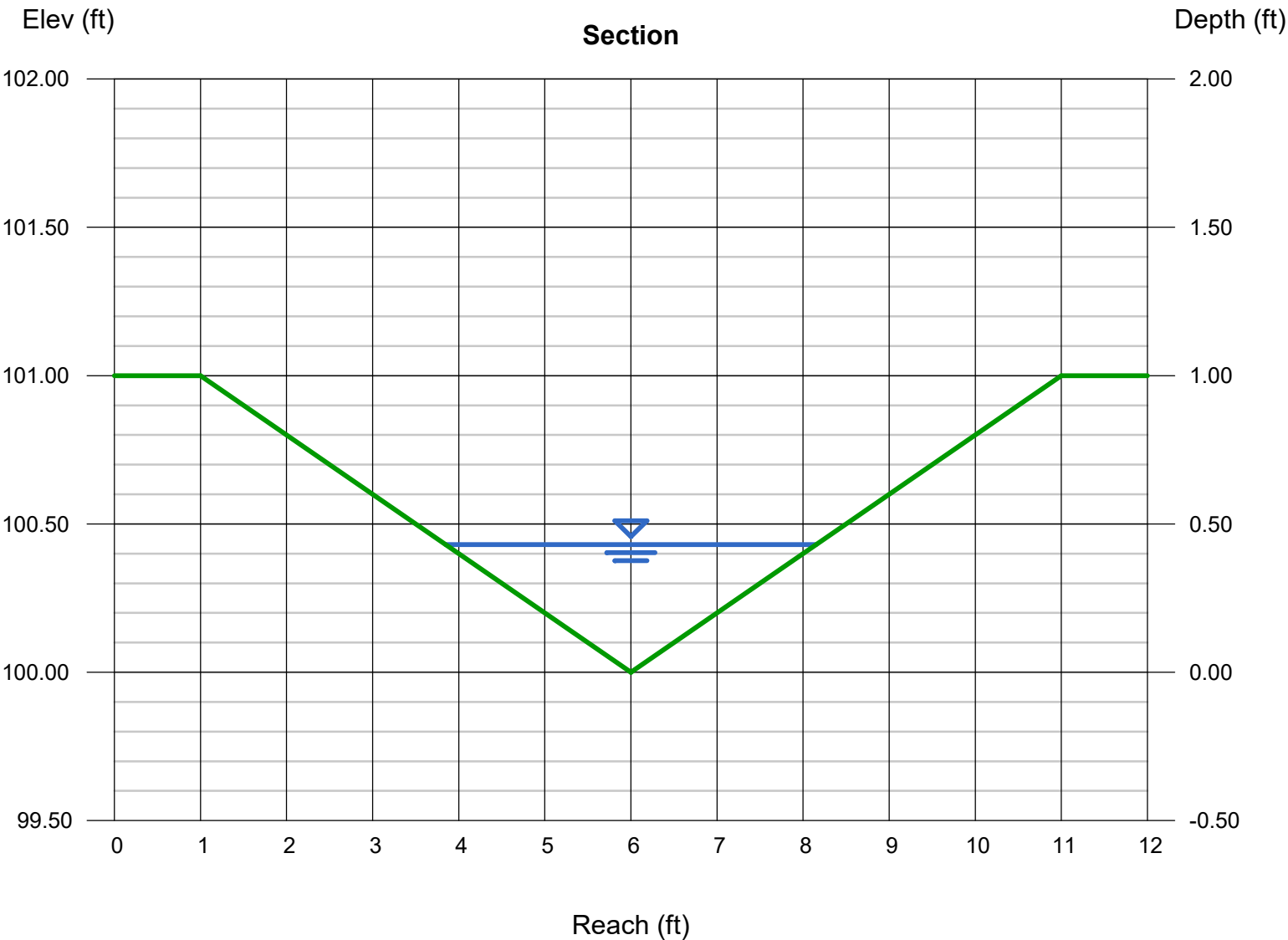
Invert Elev (ft) = 100.00  
Slope (%) = 2.00  
N-Value = 0.020

### Calculations

Compute by: Known Q  
Known Q (cfs) = 3.30

### Highlighted

Depth (ft) = 0.43  
Q (cfs) = 3.300  
Area (sqft) = 0.92  
Velocity (ft/s) = 3.57  
Wetted Perim (ft) = 4.39  
Crit Depth, Yc (ft) = 0.49  
Top Width (ft) = 4.30  
EGL (ft) = 0.63





# Channel Report

## Swale Ditch D

### Triangular

Side Slopes (z:1) = 3.00, 3.00  
Total Depth (ft) = 1.00

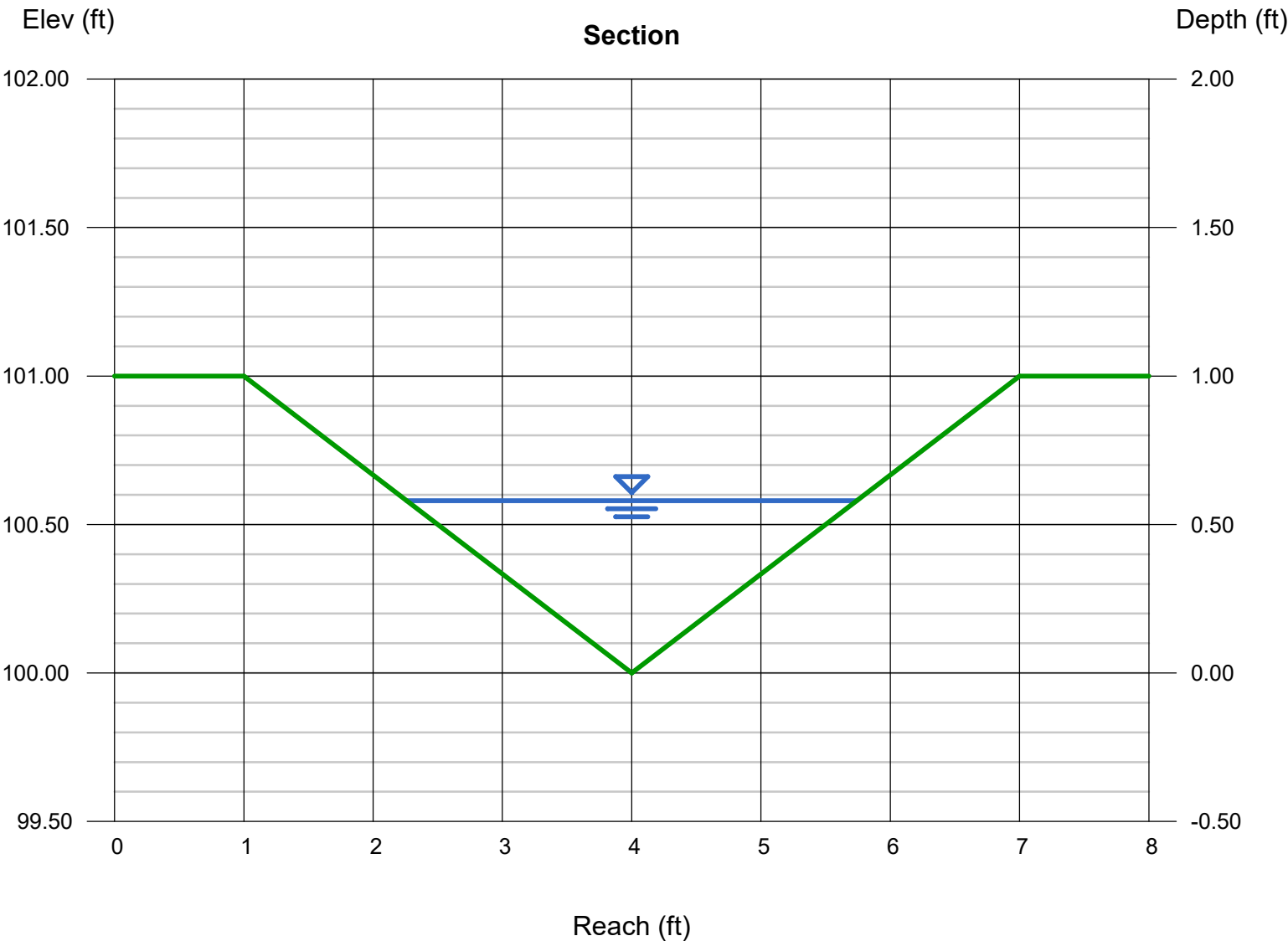
Invert Elev (ft) = 100.00  
Slope (%) = 2.00  
N-Value = 0.020

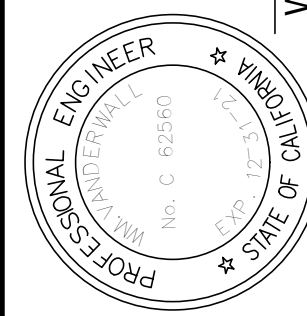
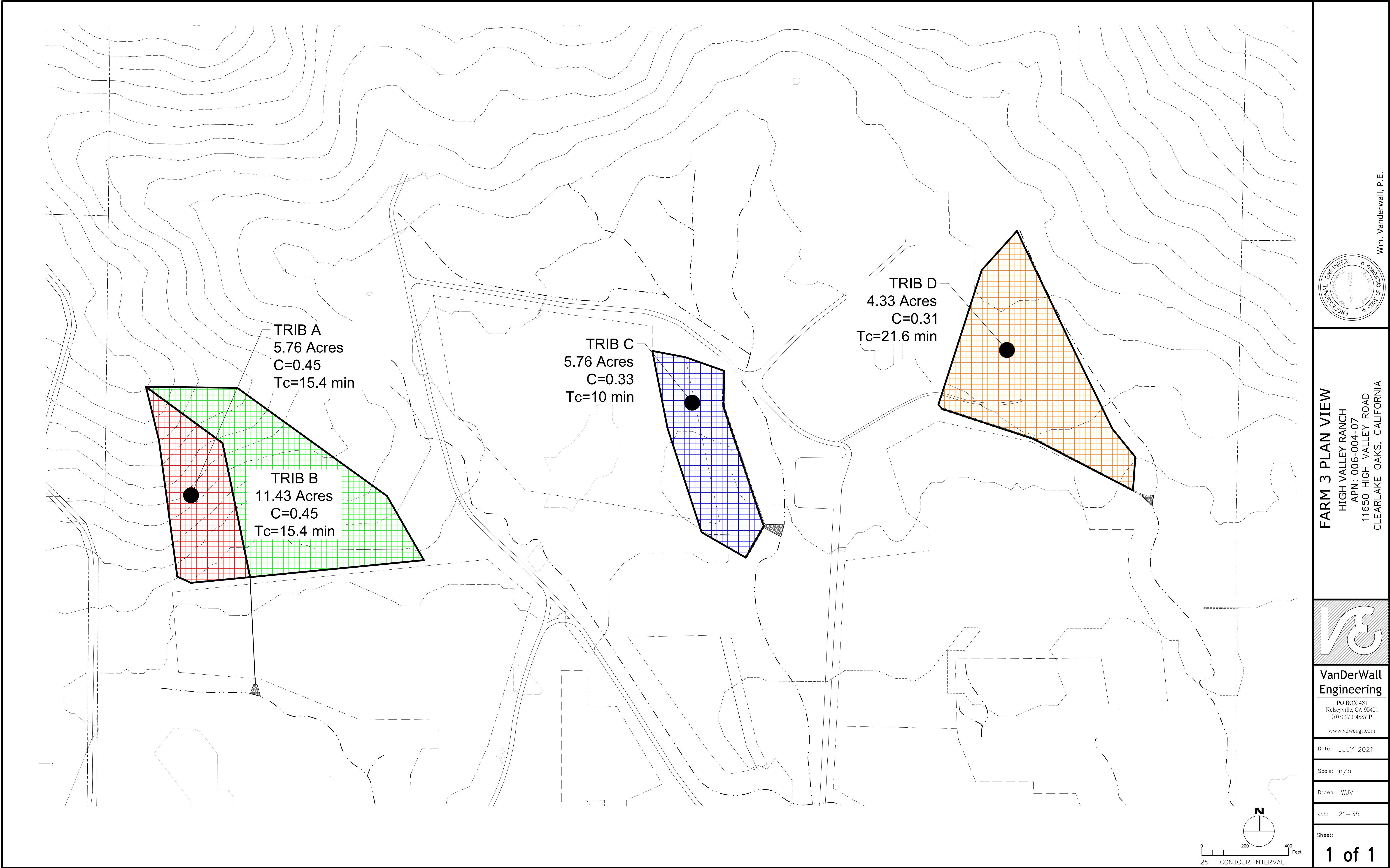
### Calculations

Compute by: Known Q  
Known Q (cfs) = 4.30

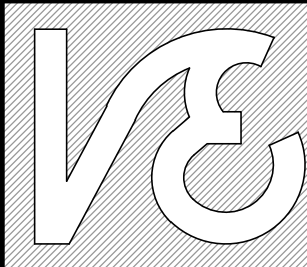
### Highlighted

Depth (ft) = 0.58  
Q (cfs) = 4.300  
Area (sqft) = 1.01  
Velocity (ft/s) = 4.26  
Wetted Perim (ft) = 3.67  
Crit Depth, Yc (ft) = 0.67  
Top Width (ft) = 3.48  
EGL (ft) = 0.86





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Drawn: WJV

Job: 21-35

Sheet:

**1 of 1**

Wm. Vanderwall, P.E.