Draft Plans and Specifications

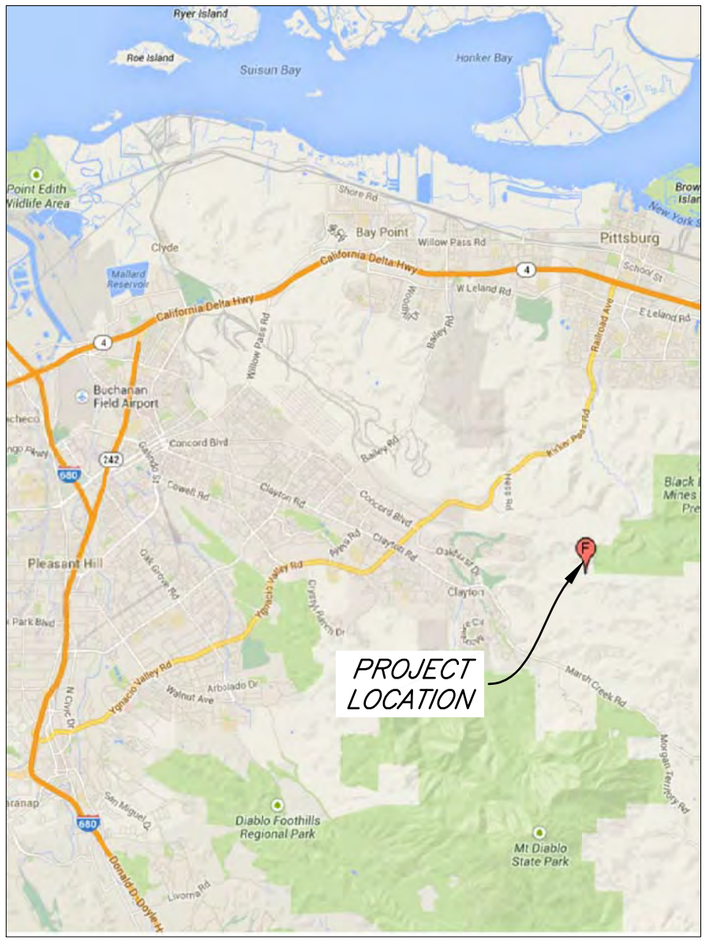
PLANS FOR CONSTRUCTION OF

ANG POND RESTORATION

PREPARED BY

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

SCHEDULE OF DRAWINGS



VICINITY MAP — Concord, CA Not To Scale

PROJECT LOCATION MAP Not To Scale

GENERAL NOTES

1. All construction shall be in accordance with these drawings, practice requirements and attached specifications. No changes are to be made in the drawings or specifications without written approval of NRCS.
2. Landowner shall be responsible for obtaining any needed permits, easements, and/or right-of-ways.
3. Landowner shall be responsible for locating and protecting all utilities. Special safety precautions are to be taken when working in the vicinity of gas, oil or electrical lines. Call underground Service Alert (USA) at 800-227-2600 prior to construction.
4. Cal-OSHA safety requirements shall be in effect during all construction.
5. All lines and grades shown on these drawings are approximate. The proposed structure location, excavation limits, and fill limits will be staked in the field by the engineer.
6. Contact the Natural Resources Conservation Service at least 7 days prior to construction.
7. Benchmark is a 2"X2" hub Coordinates N=5000, E=5000, Elev.=1000 located approximately 230 ft East of existing dam.

JOB CODES: POND (378), LINED WATERWAY (468)	
ENGINEERING JOB CLASS:	III
DRAINAGE AREA	16 acres
STORAGE	0.25 acre-feet
EFF. HEIGHT OF DAM	3 feet
STORAGE X EFF. HT OF DAM	0.75 acre-feet^2

Date 6/14
Designed D.T.
Drawn D.T. 6/14
Recommended
Approved

VICINITY MAP AND SCHEDULE OF DRAWINGS
ANG POND
Contra Costa County, CA

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

File No.

Drawing No.
Ang-14

Sheet 1 of 4

Exist. Road

Construction Limits

18'

33'

2 Spoil area

6 Wet Zone Limits

Exist. Drainage

Articulated Concrete Mat
See Sheet 4 for Details

Exist. Spring Box.
Protect In-Place

5 Exist. Top of
Embankment
Elev. 933.0'

Proposed Edge of Pond,
Cut daylight.

B

A

20'

1.75:1

Remove Sediment and Cattails

2+70

2+00

10'

2:1

8'

20'

34'

Exist. Spring Box.
Protect In-Place

Exist. Tree
Protect In-Place

C/L

1+00

Loose Rock Spillway
Crest Elev. 931.5'
See Sht. 3 for Profile

Exist. Top of
Embankment
Elev. 933.0'

Exist. Road

Construction Limits

890 900 910 920 930 940 950 960

CONSTRUCTION NOTES:

1. Remove a 4 inch dia. pipe in the exisitng pond as directed by NRCS engineer.

2. Spoil area with maximum height of 4 ft. will be staked by the engineer approximately 200 ft. north of the pond.

3. An exclusion fence will be contructed along the construction limits and the spoil area after the project is completed. Fence location shall be staked in the field by the NRCS engineer.

4. All disturbed areas will be mulched and seeded according to 342 practice standard.

5. Existing embankment shall be graded to the required elevation. Side slopes shall be field fitted so that they are minimum 2 horizontal to 1 vertical.

6. No work shall occur within the designated wet zone limits without NRCS approval

PLAN

20 0 20 40

Scale in Feet

		Date
Designed	D.T., C.V., J.H.	6/14
Drawn	D.T.	6/14
Checked	J.H., G.N.	6/14
Approved	N.V.	6/14

SITE PLAN ANG POND

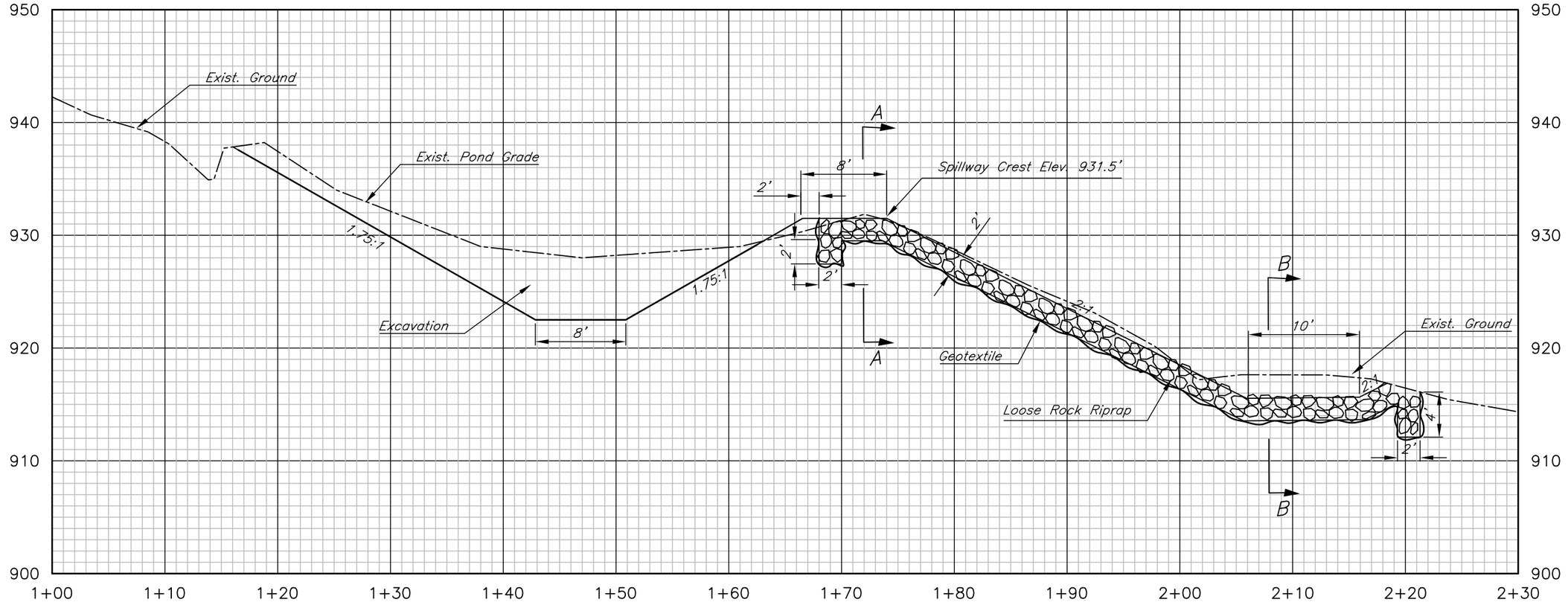
Contra Costa County, CA.

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

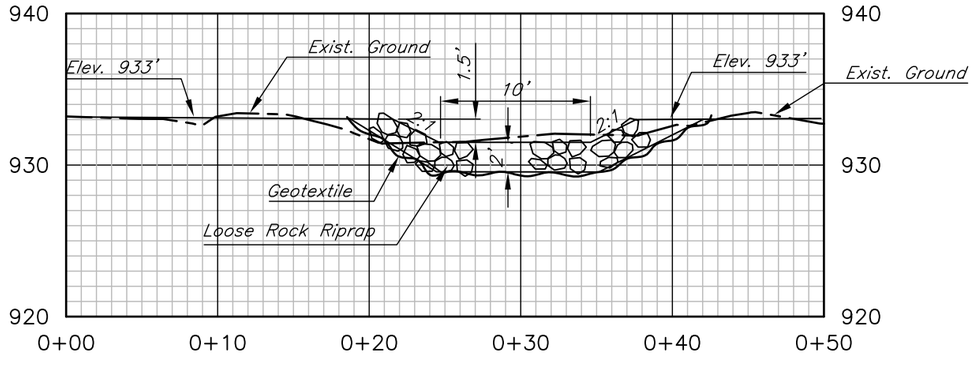
File No.

Drawing No.
Ang-14

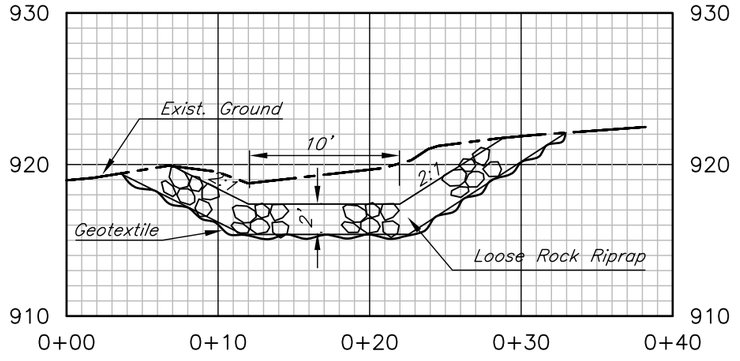
Sheet 2 of 4



PROFILE AT CENTERLINE OF POND AND SPILLWAY



SEC A–A



SEC B–B

10 0 10 20

Scale in Feet

		Date
Designed	D.T., C.V., J.H.	6/14
Drawn	D.T.	6/14
Checked	J.H., G.N.	6/14
Approved	N.V.	6/14

PROFILE AND CROSS SECTIONS
ANG POND

Contra Costa County, CA.

PROFILE

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

File No.

Drawing No.
Ang–14

Sheet 3 of 4

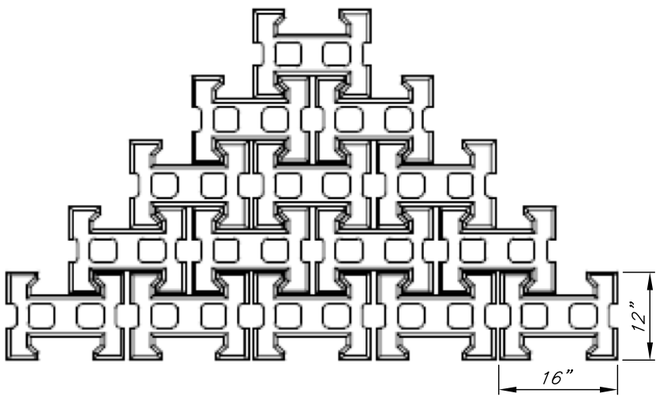
CONSTRUCTION NOTES:

1. Rock riprap shall meet the gradation requirements shown on the Practice Requirements Sheet, or meet CalTrans Facing rock gradation.

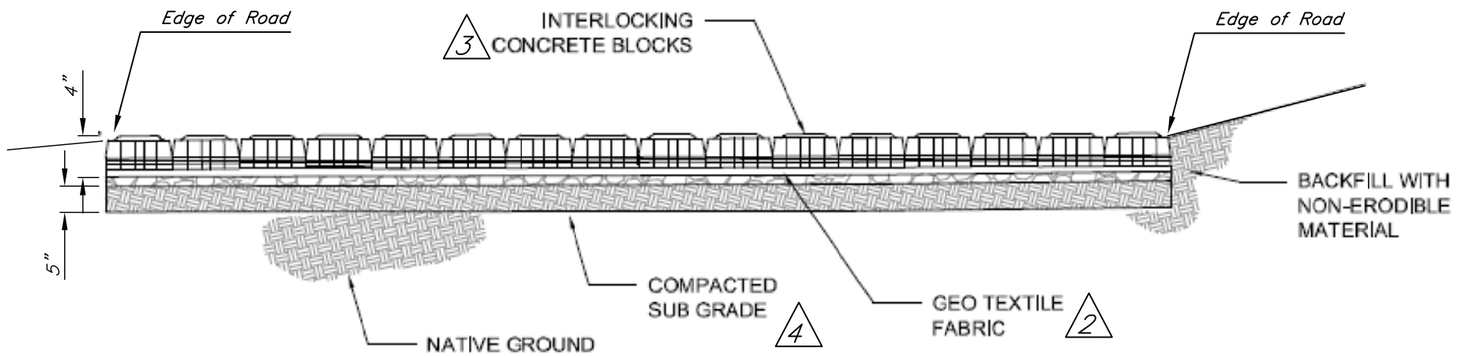
2. Geotextile fabric shall be placed beneath all rock and Articulated Concrete Mat according to manufacturer's requirements.

3. Articulated Concrete Mat shall be Armotec or approved equivalent, and shall be installed according to manufacturer's requirements. Exact limits of concrete mat shall be determined and staked by in the field by NRCS.

4. All subgrades shall be approved by NRCS prior to placement of rock or concrete block.



BLOCK DETAIL



TYPICAL ROAD SECTION

ARTICULATED CONCRETE MAT

NOT TO SCALE

		Date
Designed	D.T., C.V., J.H.	6/14
Drawn	D.T.	6/14
Checked	J.H., G.N.	6/14
Approved	N.V.	6/14

CONCRETE MAT DETAIL
ANG POND

Contra Costa County, CA

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

File No.

Drawing No.
Ang–14

Sheet 4 of 4

DRAWINGS AND SPECIFICATIONS

Brody Sanders (Ang Pond)

Job Code: Pond (378),
Lined Waterway or Outlet (468)

Engineering Job Class: III, IV

in cooperation with:

Contra Costa Resource Conservation District

Prepared by:
Concord Field Office

CALIFORNIA

NATURAL RESOURCES CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

TABLE OF CONTENTS

Landowner: Brody Sanders
Project: Pond & Lined Waterways
Job Code: Pond (378), Lined Waterway or Outlet
Engineering Class: III, IV

DESIGN REPORT

June 2014

LANDOWNER: Brody Sanders
PRACTICES: Pond (378); Lined Waterway (468)
LOCATION: Black Diamond Mine, California.
COUNTY: Contra Costa
RESOURCE CONS. DISTRICT: Contra Costa County
RCD NRCS FIELD OFFICE: Concord FO

SUMMARY

The proposed project will construct a small pond which collects and stores water from a spring. Excess water from the spring will outlet from the pond into a rock channel, which then conveys the flow to a stable location which is non-erosive. In addition, a road that is located just downstream from the rock channel will be protected in 2 locations to prevent erosion due to surface flow. It is estimated that the pond will store 0.25 acre-feet of water.

ORIGIN OF REQUEST

Brody Sanders requested assistance through the 2008 Environmental Quality Incentives Program (EQIP). The NRCS Livermore Field Office will provide financial and technical assistance for the installation of practices as outlined in the EQIP contract.

DESCRIPTION OF PROBLEM

An existing pond has lost storage due to siltation. It does meet NRCS standards and is not functioning as planned. Also, itsupports non-native species such as bullfrogs which are predatory to native species also known to be present, such as western pond turtles and California red-legged frogs. The road downstream from the existing pond is eroding in areas that have high moisture due to poor drainage.

ALTERNATIVES AND SOLUTIONS

1. Re-build existing pond by removing sediment, improving embankment, and improving spillway to meet NRCS standards. Reduce erosion by installing rock channel and treat existing road surface in wet areas.
2. Do nothing.

To address the wildlife resource concerns, sediment removal is the least cost alternative considered. A pond with the proper depth will support the native species of concern. Alternative 1 was selected.

DESIGN CONSIDERATIONS

The proposed design is in accordance with NRCS Conservation Practice Standards 378-Pond and 468-Lined Waterway or Outlet, with the following considerations:

Hydrology

The average annual rainfall is approximately 15". The pond drains a 16acre ephemeral watershed. The pond is also fed by a perennial spring located just upstream. Using the Engineering Field Handbook, Chapter 2 method of computing peak discharge from small rural watersheds, it was found that the flow for a 50-year/24-hour event was approximately 36 cfs. A watershed map and hydrologic calculations are included in Appendix A.

Hydraulics

The lined rock channel which carries flow from the pond spillway to a safe location downstream was sized to carry the 50-year/24-hour storm of 36 cfs. Using Manning's Equation, the depth of flow within the rock

lined channel will be approximately 6-inches with a velocity of approximately 11 feet per second.

Soil Mechanics

The soils at the site are mapped in the Contra Costa County Soil Survey. The subsurface soil conditions of the site consist of clays, silty clay loans, (AcF). Altamont typically has weathered bedrock below 48-inches, and the Fontana has bedrock below 24 inches.

More than 75 percent of these soils pass the No. 200 sieve, and have a Plastic Index from 15 to 25. These soils generally have a very low permeability, but high shrink- swell behavior. When dry the pond floors may crack, and then leak upon re-wetting. This site is expected to be kept continuously wet by the spring. The soils are Lean Clays (CL) bordering on Fat Clays (CH) (Unified Soil Classification). The Standard Procter Unit Density is 95-105 lbs/ft3. These soils will be compacted using a method requirement outlined in the specifications.

The stability of the excavated slopes were checked as well using book values for the existing soil types. For the steepest proposed slope of 1.75 horizontal to 1 vertical, a Factor of Safety was calculated to be 1.5.

CONSTRUCTION

All construction shall adhere to the drawings and specifications. No changes will be allowed without approval of NRCS and any change shall maintain compliance with NRCS standards and specifications. The project is to be built using landowner's or contractor's forces. Layout and inspection will be provided by the NRCS. The landowner shall be responsible for obtaining any needed permits, easements, rights-of-way, locating utilities, or meeting any legal requirements. Cal-OSHA safety requirements shall be in effect during all construction.

OPERATION & MAINTENANCE

Project components require maintenance for satisfactory operation as planned. The landowner/operator shall be responsible for inspection and any necessary repair. See O&M plan dated May, 2014.

REFERENCES

USDA-NRCS. 1961. Soil Survey, Contra Costa County, California.

USDA-NRCS. 1986. Engineering Field Handbook, Chapter 2, "Estimating Runoff '.

USDA-NRCS. 1997. Plunge Pool Basin Design Spreadsheet (CaArea2-ENG-514). Version 1.0 *05197,* Based on, ASAE Vol. 37(4), 1167-1173, and Vol. 38(5), 1405-1411.

USDA-NRCS. 2007a. Field Office Technical Guide, Sections II and IV.

USDA-NRCS. 2007b. Part 628 National Engineering Handbook, Chapter 45 Filter Diaphragms. 210-VI-NEH, January 2007.

USDC-NOAA. 1973. Precipitation-Frequency Atlas of the Western United States, Volume XI-California.

APPROVAL

The controlling classification factors for Pond (378) are:

1. Hazard Class is "A".
2. Effective Height is 3 ft.
3. PGA<0.2
4. Not in a A-P Zone
5. Drainage Area is 16 acres.
6. Storage x Height is 0.6 ac-ft^2 •
7. Embankments over Active Faults are none.

Based on the above factors, the Job Class is Class III.

The controlling classification factors for Lined Waterway or Outlet (468) are:

8. Drainage Area is 16 acres. (Cl III)
9. Design Flow is 36 cfs. (Cl IV)

Based on the above factors, the project has an Engineering Class of IV.

Prepared by: _____ Date: _____

Reviewed by: _____ Date: _____

Approved by: _____ Date: _____

LANDOWNER'S/OPERA TORS ACKNOWLEDGMENT

The landowner/operator acknowledges that:

a. He/she has received a copy of the construction drawings, practice requirements, and pertinent specifications, and that he/she has an understanding of the contents and requirements.

b. He/she has obtained all the necessary permits.

c. No changes will be made in the installation of the job without prior concurrence of the NRCS technician.

d. Maintenance of the installed work is necessary for proper performance during the project life.

Accepted by: _____ Date: _____

CERTIFICATION

Pond CIN _____ Date _____

Lined Waterway or Outlet CIN _____ Date _____

Lined Waterway or Outlet CIN _____ Date _____

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

OPERATION AND MAINTENANCE

LANDOWNER: Brody Sanders
PRACTICES: Pond (378); Lined Waterway (468)
LOCATION: Black Diamond Mine, California.
COUNTY: Contra Costa
RESOURCE CONS. DIST.: Contra Costa County
RCD NRCS FIELD OFFICE: Concord LPO

These structures are an asset to your farm. The estimated life spans of these installations are at least 20 years. The life of a structure can be assured and usually increased by developing and carrying out a good operation and maintenance program.

These structures will require you to perform periodic operation to maintain for satisfactory performance. Here are some recommendations to help you develop a good operation and maintenance program.

GENERAL RECOMMENDATIONS

Pond:

- Annually inspect pond for damage from normal use. Inspect the spillways, inlets, and outlets for proper functioning for their ability to maintain the water level to design elevations.
- Immediately remove any blockage or obstructions and repair any damage.
- Inspect inlet, embankments and spillways after heavy rains for possible damage. Promptly repair any damage.
- Annually inspect the downstream toe of the dam. If there are wet areas or seeps, contact the local NRCS office for additional assistance.
- Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization, and application of herbicides when necessary. Periodic mowing may also be needed to control height.
- Fill rills and gullies that occur on the embankments and/or spillway and re-vegetate.
- Maintain a grass filter strip around the perimeter of the pond to trap sediment.
- Check downstream floodplain at least once every 5 years to assure life or property will not be threatened in the case of a dam failure.
- Iffences are installed, they shall be maintained to prevent unauthorized or livestock entry.
- Immediately repair any vandalism, vehicular, or livestock damage to any earthfills, spillways, or outlets.
- Removal of debris that may accumulate at the pond and immediately upstream or downstream from the basin.
- Inspect embankments for damage from rodents or burrowing animals. Repair any damage. Take appropriate proteective actions to alleviate further damage.
- Remove woody vegetation from embankments.
- Avoid excessive travel on any portion of the system that will harm or destroy the vegetative cover.

Outlet Rock Riprap Channel and Concrete Block Wet Crossings:

- Maintain widths of soil berms or banks.
- Immediately repair any vandalism, vehicular or livestock damage.
- Inspect for damage from rodents or burrowing animals. Repair any damage. Take appropriate corrective actions to alleviate further damage.

UTILITY CHECK SHEET

Reference Engr. Memo-73

Farm Name: Brody Sanders Location: _____

Utilities Involved and Location: Contact utility companies and call Dig Alert (1-800-227-2600).

Landowner or operator notified (who): Raegan Amerine (by whom): _

How: Verbal Date: Fall 2014

Work to be done: Excavation When: Fall 2014

Utility Company Notified (who): _____ (by whom): _____

How: _____ Date: _____

Request to locate utility: _____

Work to be done: _____ When: _____

Request for Company representative to be present: _____

Utility marked or staked: _____ Date: _____

Representative present during construction: _____

Contractor Notified (who): _____ (by whom): _____

How: _____ Date: _____

Type of utility: _____ Location: _____

Vertical location in relation to work: _____

Horizontal location in relation to work: _____

Contractor shown markings or stakes: _____

Utility location shown on plans: _____

Other remarks: _____

_____

Signature: _____ Date: _____

ENGINEER'S COST ESTIMATE

Landowner: Sanders (Ang)
Project: Pond, Lined Waterways

Item No.	Work or Material	Spec. No.	Estimated Quantity	Unit	Unit Price	Amount
1.	Excavation	378	600	C.Y.	$ 7.00	$4,200.00
2.	Compacted Earthfill	378	100	C.Y.	12.00	$1,200.00
3.	Rock Riprap	907	80	Ton	120.00	9,600.00
4.	Geotextile Fileter Fabric	905	210	S.Y.	5.00	1,050.00
5.	ArmorTec Block	468	1,200	S.F.	12.00	14,400.00
					Total =	$ 30,450.00

(6/13/14)

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

PRACTICE REQUIREMENTS

LANDOWNER: Brody Sanders
PRACTICES: Pond (378); Lined Waterway (468)
LOCATION: Black Diamond Mine, California.
COUNTY: Contra Costa
RESOURCE CONS. DIST.: Contra Costa County
RCD NRCS FIELD OFFICE: Concord FO

Installation shall be in accordance with following drawings, specifications and special requirements. NO CHANGES ARE TO BE MADE IN THE DRAWINGS OR SPECIFICATIONS WITHOUT PRIOR APPROVAL OF THE NRCS TECHNICIAN.

It shall be the responsibility of the owner to obtain all necessary permits and/or rights, and comply with all ordinances and laws pertaining to this installation.

1. Drawings, No.: Ang-14 Pages.: 1-4

2. Practice Specifications: 378,468,905,907

3. Special Requirements:

Specification 378 – Pond

a. Any excavated material deemed unsuitable for earthfill by NRCS shall be spread in uniform lifts within the spoil area, approximately 200 feet north of the existing pond. The spoil area's limits will be staked in the field by NRCS.
b. All material used for fill shall be taken from project site. No import or export material is allowed without NRCS approval. NRCS shall approve all fill material prior to placement.
c. In section VI Compaction, any method listed is allowed.
d. Top 4-inches areas to receive fill or area to be excavated, shall be stripped and stockpiled. This material which contains plant material shall be placed uniformly on all finished slopes.

Specification 468- Lined Waterway or Outlet

a. Lining material placed on road shall be 3.5-inch Armortec concrete block or approved equal. Install according to manufacturer recommendations, including foundation preparation, subgrade material, filter fabric and the block.

Specification 905- Geotextile Fabric

a. Fabric shall be placed non-woven with a minimum weight of 5 ounces per square yard.

Specification 907- Rock Riprap

a. Rock riprap shall be placed as shown on the drawings. Rock gradation in specification 907 shall not apply. Gradation shall be as follows:

D100 15-inch
D50 9-inch
D15 6-inch

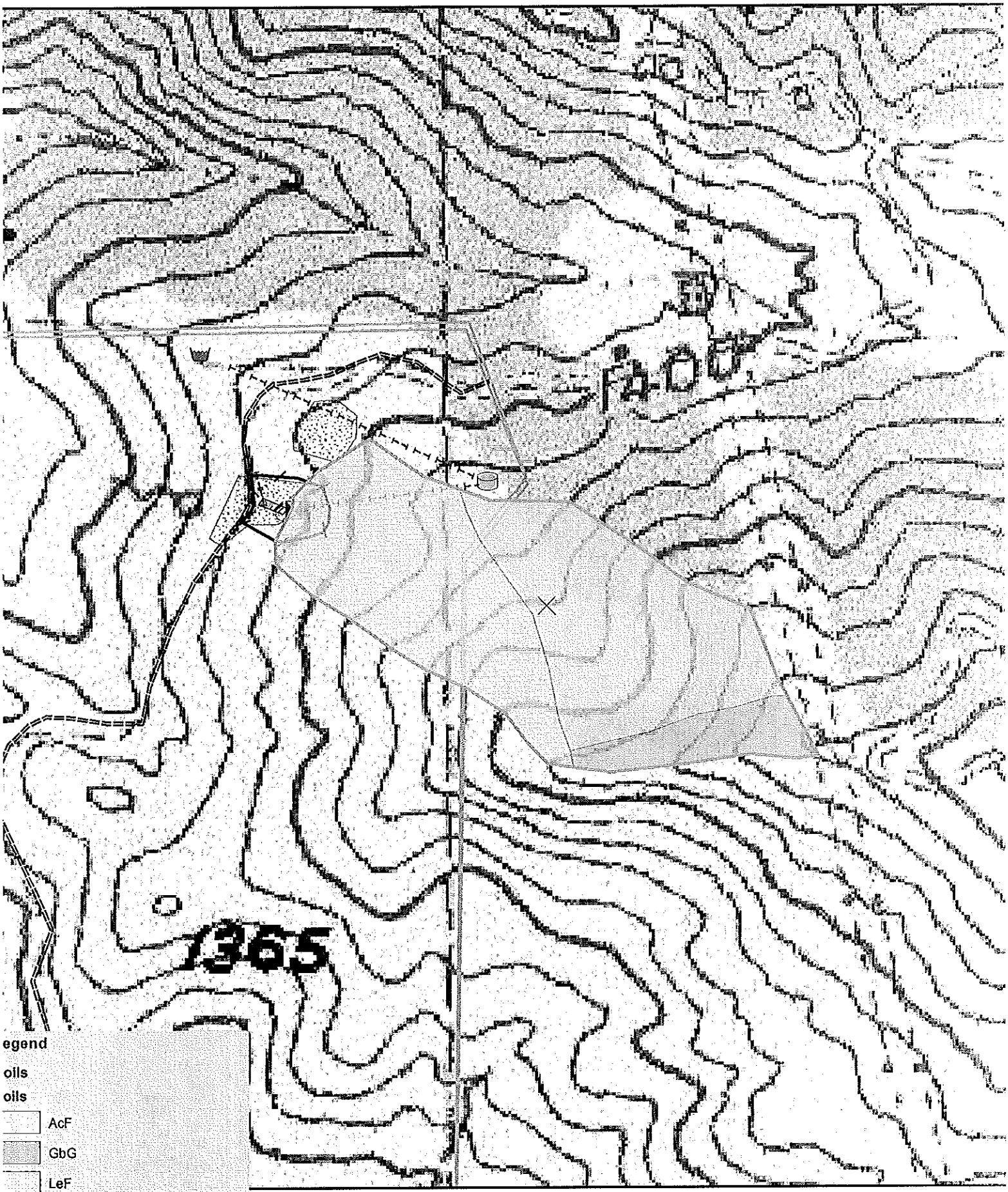
Using the CalTrans rock gradation classification, rock classified as "Facing" shall be considered acceptable.

b. All subgrade beneath rock shall be approved by NRCS prior to placement.

APPENDIX A
CALCULATIONS

Program EQIP Rangeland
Year: 2013

Engineer: Neftali J. Vel
Office: Concord FO
Map: Plan



NOAA Atlas 14, Volume 6, Version 2
Location name: Pittsburg, California, US*
Coordinates: 37.9450, -121.8960
Elevation: 1527ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval(years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.135 (0.119-0.154)	0.167 (0.147-0.192)	0.211 (0.185-0.243)	0.249 (0.216-0.290)	0.302 (0.250-0.368)	0.345 (0.278-0.432)	0.390 (0.304-0.505)	0.438 (0.329-0.590)	0.508 (0.361-0.723)	0.565 (0.384-0.841)
10-min	0.193 (0.170-0.221)	0.239 (0.211-0.275)	0.303 (0.266-0.349)	0.357 (0.309-0.415)	0.433 (0.359-0.527)	0.494 (0.398-0.619)	0.559 (0.435-0.724)	0.629 (0.472-0.846)	0.728 (0.518-1.04)	0.811 (0.550-1.21)
15-min	0.233 (0.206-0.267)	0.290 (0.255-0.332)	0.366 (0.321-0.422)	0.431 (0.374-0.502)	0.523 (0.434-0.638)	0.597 (0.481-0.749)	0.676 (0.526-0.876)	0.760 (0.571-1.02)	0.881 (0.626-1.25)	0.980 (0.666-1.46)
30-min	0.319 (0.281-0.365)	0.396 (0.349-0.454)	0.501 (0.439-0.576)	0.589 (0.512-0.686)	0.715 (0.593-0.872)	0.816 (0.658-1.02)	0.923 (0.720-1.20)	1.04 (0.780-1.40)	1.20 (0.856-1.71)	1.34 (0.910-1.99)
60-min	0.452 (0.399-0.517)	0.561 (0.494-0.644)	0.710 (0.623-0.817)	0.836 (0.725-0.973)	1.01 (0.840-1.24)	1.16 (0.932-1.45)	1.31 (1.02-1.70)	1.47 (1.11-1.98)	1.71 (1.21-2.43)	1.90 (1.29-2.83)
2-hr	0.661 (0.584-0.757)	0.818 (0.720-0.938)	1.03 (0.904-1.19)	1.21 (1.05-1.41)	1.47 (1.21-1.79)	1.67 (1.35-2.10)	1.89 (1.47-2.45)	2.12 (1.59-2.86)	2.46 (1.75-3.50)	2.74 (1.86-4.08)
3-hr	0.831 (0.733-0.951)	1.03 (0.904-1.18)	1.29 (1.13-1.49)	1.52 (1.32-1.77)	1.84 (1.52-2.24)	2.09 (1.69-2.62)	2.36 (1.84-3.06)	2.66 (1.99-3.58)	3.08 (2.19-4.38)	3.43 (2.33-5.10)
6-hr	1.17 (1.04-1.34)	1.46 (1.28-1.67)	1.84 (1.61-2.12)	2.16 (1.87-2.51)	2.61 (2.16-3.18)	2.97 (2.40-3.73)	3.36 (2.62-4.35)	3.77 (2.83-5.07)	4.35 (3.09-6.19)	4.84 (3.28-7.19)
12-hr	1.55 (1.37-1.77)	1.94 (1.71-2.23)	2.47 (2.17-2.84)	2.91 (2.53-3.39)	3.53 (2.92-4.30)	4.01 (3.23-5.03)	4.53 (3.53-5.87)	5.07 (3.81-6.82)	5.84 (4.15-8.30)	6.47 (4.39-9.62)
24-hr	2.10 (1.93-2.33)	2.67 (2.45-2.97)	3.43 (3.14-3.83)	4.06 (3.69-4.56)	4.93 (4.35-5.70)	5.61 (4.86-6.61)	6.31 (5.35-7.59)	7.04 (5.83-8.69)	8.06 (6.43-10.3)	8.87 (6.86-11.7)
2-day	2.65 (2.43-2.95)	3.43 (3.14-3.82)	4.45 (4.07-4.96)	5.28 (4.80-5.93)	6.41 (5.66-7.42)	7.29 (6.31-8.58)	8.17 (6.93-9.84)	9.09 (7.52-11.2)	10.3 (8.25-13.2)	11.3 (8.76-14.9)
3-day	3.00 (2.75-3.33)	3.91 (3.59-4.36)	5.10 (4.66-5.69)	6.06 (5.50-6.81)	7.36 (6.49-8.51)	8.35 (7.23-9.83)	9.36 (7.93-11.3)	10.4 (8.59-12.8)	11.8 (9.40-15.1)	12.9 (9.96-17.0)
4-day	3.34 (3.07-3.72)	4.36 (4.00-4.85)	5.67 (5.19-6.33)	6.73 (6.11-7.56)	8.15 (7.19-9.43)	9.24 (8.00-10.9)	10.3 (8.76-12.4)	11.5 (9.47-14.1)	13.0 (10.3-16.6)	14.1 (10.9-18.6)
7-day	4.16 (3.82-4.63)	5.37 (4.92-5.97)	6.90 (6.31-7.70)	8.13 (7.38-9.13)	9.76 (8.61-11.3)	11.0 (9.52-12.9)	12.2 (10.4-14.7)	13.5 (11.1-16.6)	15.1 (12.1-19.4)	16.4 (12.7-21.7)
10-day	4.65 (4.27-5.17)	5.96 (5.47-6.64)	7.62 (6.97-8.50)	8.92 (8.11-10.0)	10.6 (9.39-12.3)	11.9 (10.3-14.1)	13.2 (11.2-15.9)	14.5 (12.0-17.9)	16.2 (12.9-20.7)	17.5 (13.5-23.1)
20-day	6.09 (5.59-6.77)	7.78 (7.13-8.65)	9.84 (9.01-11.0)	11.4 (10.4-12.8)	13.5 (11.9-15.6)	14.9 (12.9-17.6)	16.4 (13.9-19.7)	17.8 (14.7-21.9)	19.6 (15.6-25.0)	20.9 (16.2-27.6)
30-day	7.35 (6.75-8.18)	9.39 (8.61-10.4)	11.8 (10.8-13.2)	13.7 (12.4-15.3)	16.0 (14.1-18.4)	17.6 (15.2-20.7)	19.1 (16.2-23.0)	20.6 (17.1-25.4)	22.5 (18.0-28.8)	23.9 (18.5-31.5)
45-day	9.06 (8.32-10.1)	11.5 (10.6-12.8)	14.4 (13.2-16.1)	16.6 (15.1-18.6)	19.2 (16.9-22.2)	20.9 (18.1-24.7)	22.6 (19.2-27.2)	24.2 (20.0-29.9)	26.2 (20.9-33.5)	27.6 (21.3-36.4)
60-day	10.7 (9.83-11.9)	13.6 (12.5-15.1)	16.9 (15.5-18.9)	19.3 (17.5-21.7)	22.2 (19.6-25.7)	24.2 (20.9-28.5)	26.0 (22.0-31.2)	27.6 (22.9-34.1)	29.7 (23.7-38.0)	31.2 (24.1-41.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE CA		PROJECT Ang Pond - Brody Sanders		
BY JMH	DATE 5-20-14	CHECKED BY	DATE	JOB NO.
SUBJECT Rock Overflow downstm of Spring				SHEET 1 OF

Field engineer determined 16 acres of D.A. to this location in swale, and calculated 16 cfs for 50 YR event.

Try 10 foot wide crest. Neglect side slopes because keeping flow shallow. Very rough rock surface, so use "C" of Cult'k as 2.0 instead of 3.

$$H = \left(\frac{Q}{C\,L}\right)^{2/3} = \left(\frac{36}{2(10)}\right)^{2/3} = 1.5 \text{ feet.}$$ ✓

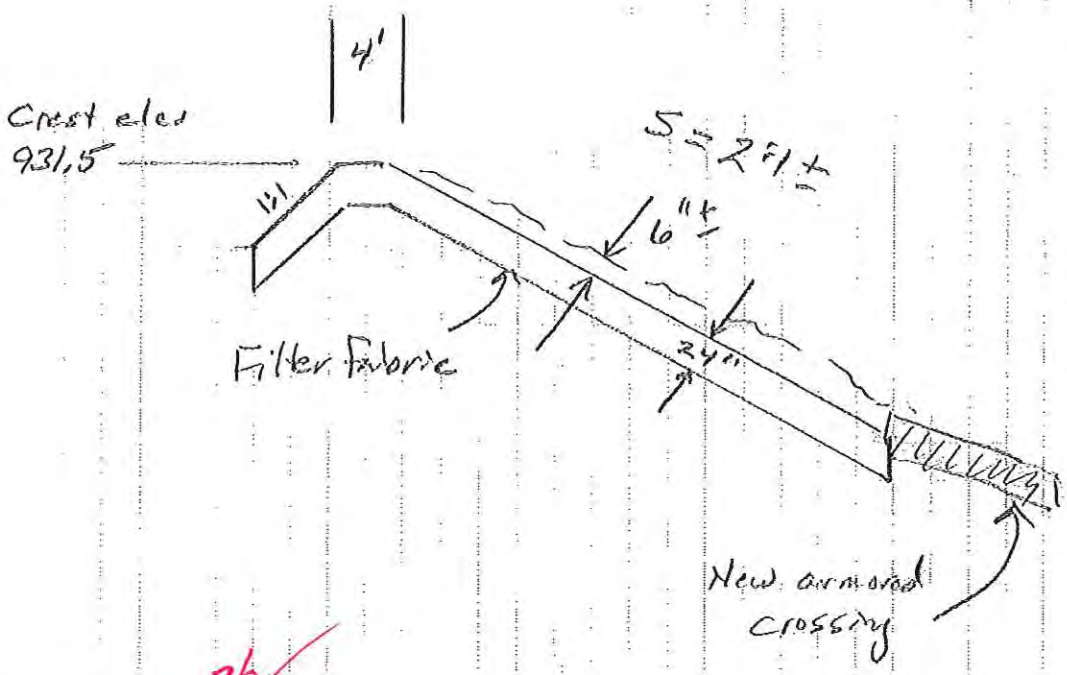
So water will build to about 1.5 foot on weir crest for 50 year flow.

Client desires some open water in pool, therefore needs to be greater than 3-feet deep. Surveys of site show low elevation at approx. 931.5 feet. Set weir (new) at 931.5, and excavate small upstream spring storage to 922.5

For downstream slope protection from weir crest to new water crossing,

STATE ~~III~~ CA		PROJECT Ang Pond		
BY JH	DATE 5/14	CHECKED BY NV, GN	DATE	JOB NO.
SUBJECT Ang Pond - Lined Waterway				SHEET 2 OF

depress rock protection about 6 inches below existing grade.



If Q = ~~36~~ 36 cfs, and with almost 3:1 downstm slope, water flow will be quite turbulent. y_n if flowed smooth =

$$V = \frac{1.486}{n} R^{\frac{2}{3}} (S)^{\frac{1}{2}}$$

if n = 0.04, S = 0.5

y	A	$R^{\frac{2}{3}}$	V	Q
0.3	3.2	.43	11.3	36 cfs
~~0.35~~	~~3.9~~	~~.49~~	~~10.5~~	~~41~~

$y_n \geq 0.3$ Feet

STATE CA		PROJECT Ang		
BY JH	DATE	CHECKED BY NV GN	DATE	JOB NO.
SUBJECT				SHEET 3 OF

Size Rock Diameter

V = 11 fps.

Reality check - estimate force on one 8" rock, flow 4" deep.

Assume rock deflects ½ water jet force

$$F = \rho (V)^2 y \left(\frac{1}{2}\right)$$

$$F = 1.94 (11)^2 (.33) \left(\frac{1}{2}\right) = 39 \text{ pounds}$$

8-inch rock weighs $(\frac{4}{3}\pi r^3)(62.4)(2.5) = 71$ pounds

8-inch max rock size, angular, interlock - OK

Gradation

	% PASSING
12"	100
8"	50
4"	<20

See Sheet 5 for comparison.

STATE CA		PROJECT Ang		
BY JH	DATE	CHECKED BY NV, GN	DATE	JOB NO.
SUBJECT				SHEET 4 OF

Check Rock Size against PS. 468

Rock size 0.5 slope Check -

P.S, 468 Rock design criteria

$$D_{50} = \left[\frac{q\,(s)^{0.58}}{4.75(10)^{-2}} \right]^{0.53}$$

If $S = 0.5$
$Z = 0.30$ ft
$n = 0.04$
$q = \frac{36}{10} = 3.6$ ✓

D_s

$$D_{50} = \left[\frac{3.6(0.5)^{.58}}{4.75(10)^{-2}} \right]^{0.53}$$

$D_{50} = 8.9$ inches

Use $D_{50} = 9$" ✓

15" 100% passing
9" 50% passing
6" 15% passing

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE CA		PROJECT Any		
BY JH	DATE	CHECKED BY NV, GN	DATE	JOB NO.
SUBJECT				SHEET 5 OF

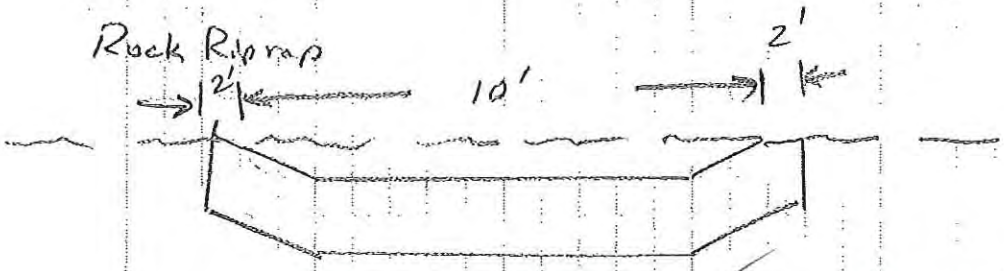
Thickness of Rock Section

2 times larger rock sizes

Use 9"-12" ⇒ use 24" thick section ✓

Quantity

Rock Riprap



$\frac{2' \times 14' \times (L = 48')}{27} = 50\,CY \times 1.6 = 80\ TON$ ✓

~~70 TONS~~

Filter Fabric - non-woven

$14' \times \cancel{40'}\ 50' =$

~~700~~ 560 SQFT

≃ 80 SY

Computation Sheet

NRCS–ENG-523A Rev. 6-2002

U.S. Department of Agriculture
Natural Resources Conservation Service

State	Project		
CA.	Ang Pond		
By: DT	Date: 6/14	Checked by:	Date:
Subject: Quantity Calculation.		Job No.	Sheet 5 of

Excavation.

Excavated pond (from Civil 3D)

~ 500 yd^3

Rock lined spillway.

2' (depth) x 14' (width) x 50' (length)

= 1,400 ft^3 = 52 yd^3.

concrete mat.

0.33' (4" depth) x [(20x30) + (18x30)]

= 1380 ft^3 = 14 yd^3

Total Excavation = 570 CY.

use 600 C.Y.

Concrete Mat.

(20x30) + (18x30) = 1,140 ft^2.

use 1,200 ft^2 Concrete Mat.

Geotextile

Rock lined spillway

14' (width) x 50' (length) = 700 ft^2 = 78 SY.

Concrete Mat.

1,140 ft^2 = 127 SY

Total Geotextile = 205 SY

use 210 SY

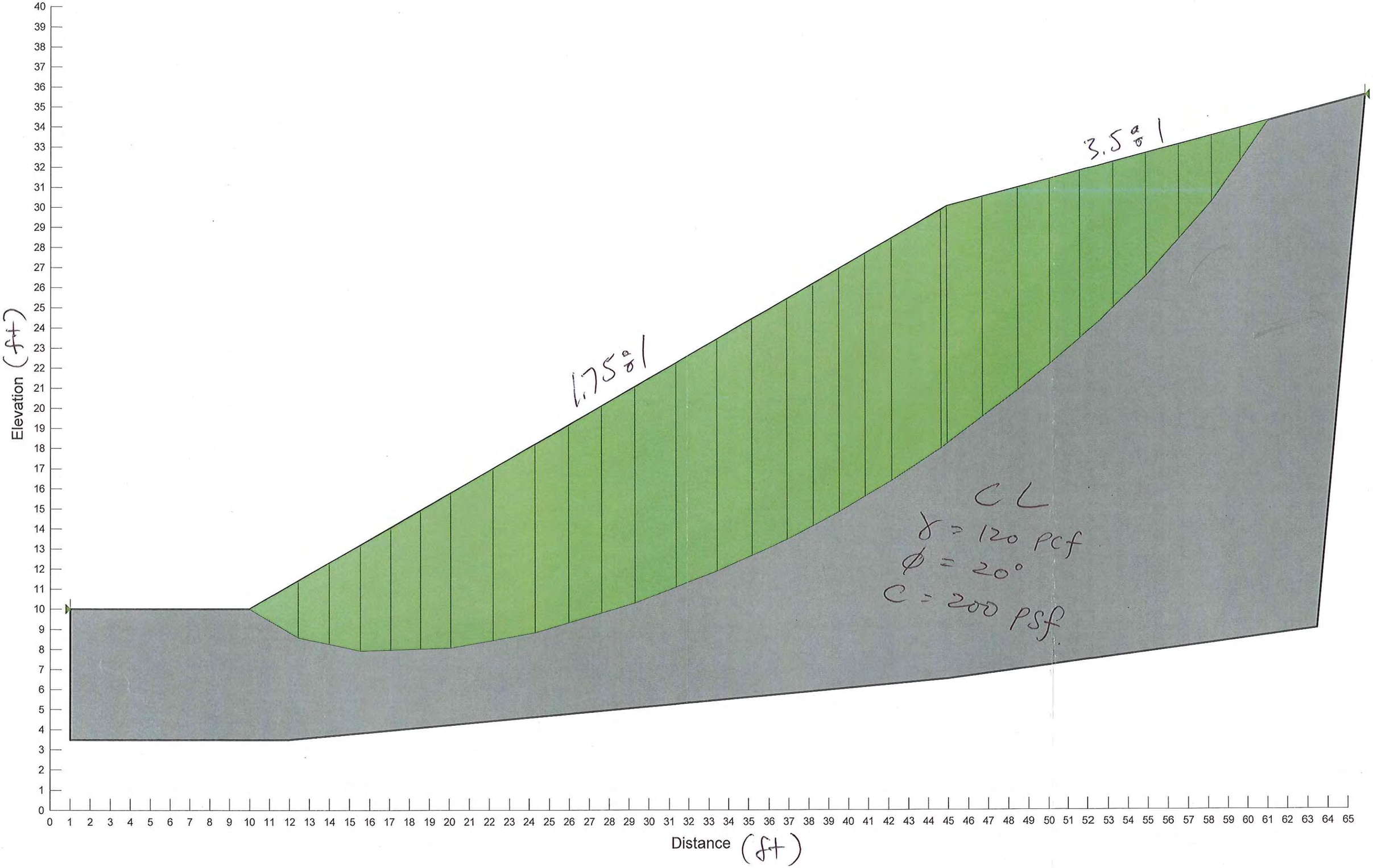
Slope Adjustment

Area	15.57 acres
Longitud	-121.90
Latitud	37.95
50 yr/ 24 hr	5.61 in
	36 cfs
Watershed L	1,640 ft

Contour	Lenth
1760	20
1720	260
1680	495
1640	745
1600	780
1560	740
1520	710
1480	730
1440	515
1400	350
1360	245
∑	5,590

Slope Ave (Y%)	33 %

1.464


3.5 to 1
1.75 to 1
CL
γ = 120 pcf
ϕ = 20°
C = 200 psf
Elevation (ft)
Distance (ft)

1.603

3.5:1

2:1

CL

$\gamma = 120$ pcf

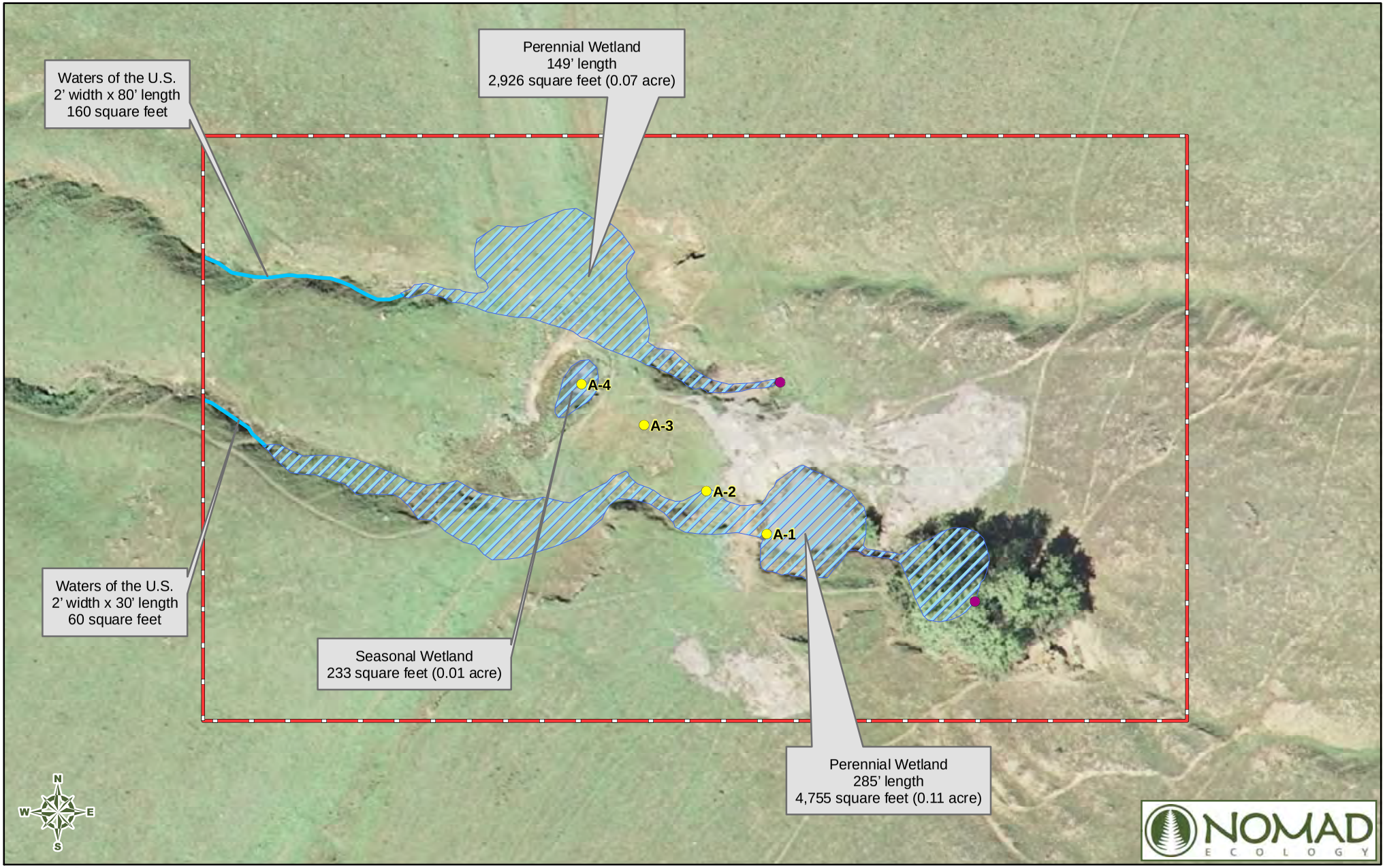
$\phi = 20°$

$C = 200$ psf.

Elevation (ft)

Distance (ft)

Draft Wetland Delineation



September 2012

Legend

Study Area

Data Point Locations

Sulfur Springs

Wetlands and Waters of the U.S.

Waters

Permanent Wetlands

Ang-3 (Repair of Road)

Preliminary Jurisidictional Determination

Ang Property Repair Projects

East Contra Costa County Habitat Conservancy

1:600

0 25 50

Feet

Sources: Contra Costa County

Contra Costa County, California

Project Location Photographs (Taken 08/08/2012)

Ang-3

Southern sulfur spring under canopy of coast live oak.

Pond below southern sulfur spring (south).

Pond and drainage below southern sulfur spring (east)

Downstream of southern sulfur spring (south).

Northern sulfur spring (north).

Drainage below northern sulfur spring (north).

Downstream of northern sulfur spring (northwest).

Unvegetated barren on slope (east).

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Ang-3 Sulfur Springs Wetland | City/County: Contra Costa County | Sampling Date: 8/10/12

Applicant/Owner: East Contra Costa Habitat Conservancy | State: CA | Sampling Point: A-1

Investigator(s): E. McDermott, H. Bartosh | Section, Township, Range: Section 7, T1N, R1E

Landform (hillslope, terrace, etc.): hillslope terrace | Local relief (concave, convex, none): concave | Slope (%): 2

Subregion (LRR): C - Mediterranean California | Lat: 4200316 Northing | Long: 596753 Easting | Datum: UTMNAD83

Soil Map Unit Name: Altamont-Fontana Complex 30-50% slopes | NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Wetland Hydrology Present?	Yes (●)	No ( )	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Polypogon monspeliensis*	5	No	FACW
2. *Thypha angustifolia*	95	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	95	x 1 =	95
FACW species	5	x 2 =	10
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	100 (A)		105 (B)

Prevalence Index = B/A = 1.05

Hydrophytic Vegetation Indicators:

- [x] Dominance Test is >50%
- [x] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks: Location is at margin of pond.

SOIL

Sampling Point: A-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	10YR3/2						loamy muck	
	Gley 2 5/5PB							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☒ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks: Soils are dark with gleying at the soil surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ◉ No ○ Depth (inches): 3

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ◉ No ○ Depth (inches): 12

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Areas of standing water are present and soils are saturated.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Ang-3 Sulfur Springs Wetland | City/County: Contra Costa County | Sampling Date: 8/10/12

Applicant/Owner: East Contra Costa Habitat Conservancy | State: CA | Sampling Point: A-2

Investigator(s): E. McDermott, H. Bartosh | Section, Township, Range: Section 7, T1N, R1E

Landform (hillslope, terrace, etc.): hillslope | Local relief (concave, convex, none): concave | Slope (%): 10

Subregion (LRR): C - Mediterranean California | Lat: 4200321 Northing | Long: 596746 Easting | Datum: UTMNAD83

Soil Map Unit Name: Altamont-Fontana Complex 30-50% slopes | NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Wetland Hydrology Present?	Yes (●)	No ( )	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Polypogon monspeliensis*	65	Yes	FACW
2. *Juncus xiphioides*	1	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	66 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 34 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	65	x 2 =	130
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	66 (A)		131 (B)

Prevalence Index = B/A = 1.98

Hydrophytic Vegetation Indicators:

- [x] Dominance Test is >50%
- [x] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks: Location is on margin of drainage below the pond. Area is dominated by Polypogon monspeliensis. Surrounding grasslands are dominated by upland grasses.

SOIL

Sampling Point: A-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	10YR3/2	80	7.5YR5/6	20	C	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks: Bright, obvious mottles are present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☒ Water Marks (B1) (**Nonriverine**)
- ☒ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☒ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Site obviously ponds as evidenced by deep cattle hoofprints and other surface soil indicators. Water is flowing nearby.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Ang-3 Sulfur Springs Wetland | City/County: Contra Costa County | Sampling Date: 8/10/12

Applicant/Owner: East Contra Costa Habitat Conservancy | State: CA | Sampling Point: A-3

Investigator(s): E. McDermott, H. Bartosh | Section, Township, Range: Section 7, T1N, R1E

Landform (hillslope, terrace, etc.): hillslope | Local relief (concave, convex, none): convex | Slope (%): 10

Subregion (LRR): C - Mediterranean California | Lat: 4200329 Northing | Long: 596739 Easting | Datum: UTMNAD83

Soil Map Unit Name: Altamont-Fontana Complex 30-50% slopes | NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ( )	No (●)	
Hydric Soil Present?	Yes ( )	No (●)	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Wetland Hydrology Present?	Yes ( )	No (●)	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Bromus diandrus*	79	Yes	Not Listed
2. *Bromus hordeaceous*	10	No	FACU
3. *Centaurea solstitialis*	1	No	Not Listed
4. *Festuca perenne (Lolium perenne)*	10	No	FAC
5.			
6.			
7.			
8.			
Total Cover:	100 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	10	x 3 =	30
FACU species	10	x 4 =	40
UPL species	80	x 5 =	400
Column Totals:	100 (A)		470 (B)

Prevalence Index = B/A = 4.70

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks: Vegetation at this location is typical of upland grassland in the vicinity.

SOIL

Sampling Point: A-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	10YR3/2						clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks: No evidence of hydric soils are present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☒ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches): _____

Water Table Present? Yes ○ No ◉ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches): _____

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Site is slightly elevated and does not appear to carry water or pond water.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Ang-3 Sulfur Springs Wetland | City/County: Contra Costa County | Sampling Date: 8/10/12

Applicant/Owner: East Contra Costa Habitat Conservancy | State: CA | Sampling Point: A-4

Investigator(s): E. McDermott, H. Bartosh | Section, Township, Range: Section 7, T1N, R1E

Landform (hillslope, terrace, etc.): depression on hillslope | Local relief (concave, convex, none): concave | Slope (%): 2

Subregion (LRR): C - Mediterranean California | Lat: 4200334 Northing | Long: 596732 Easting | Datum: UTMNAD83

Soil Map Unit Name: Altamont-Fontana Complex 30-50% slopes | NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Wetland Hydrology Present?	Yes (●)	No ( )	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Polypogon monspeliensis*	20	Yes	FACW
2. *Thypha angustifolia*	5	Yes	OBL
3. *Polypogon viridis*	5	Yes	FACW
4.			
5.			
6.			
7.			
8.			
Total Cover:	30 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum: 70 % | % Cover of Biotic Crust: %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	25	x 2 =	50
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	30 (A)		55 (B)

Prevalence Index = B/A = 1.83

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [X] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks: Location is in a depression that has a pipe leading to it. Bare dirt is present at this location due to cattle trampling.

SOIL

Sampling Point: A-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	10YR3/2	85	7.5YR5/6	15	C	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☒ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks: Bright mottles are present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☒ Water Marks (B1) (**Nonriverine**)
- ☒ Sediment Deposits (B2) (**Nonriverine**)
- ☒ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☒ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Location is in a depressional feature that has a pipe leading to it. Ponding in this location is visible on aerial imagery servered by Google Earth, dated 2012.