CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
1385 8th STREET, SUITE 130
ARCATA, CA 95521
VOICE (707) 826-8950
FAX (707) 826-8960

Th8.1a

CDP Amendment No. 1-10-032-A10

(Humboldt County Resource Conservation District)

July 13, 2023

EXHIBITS

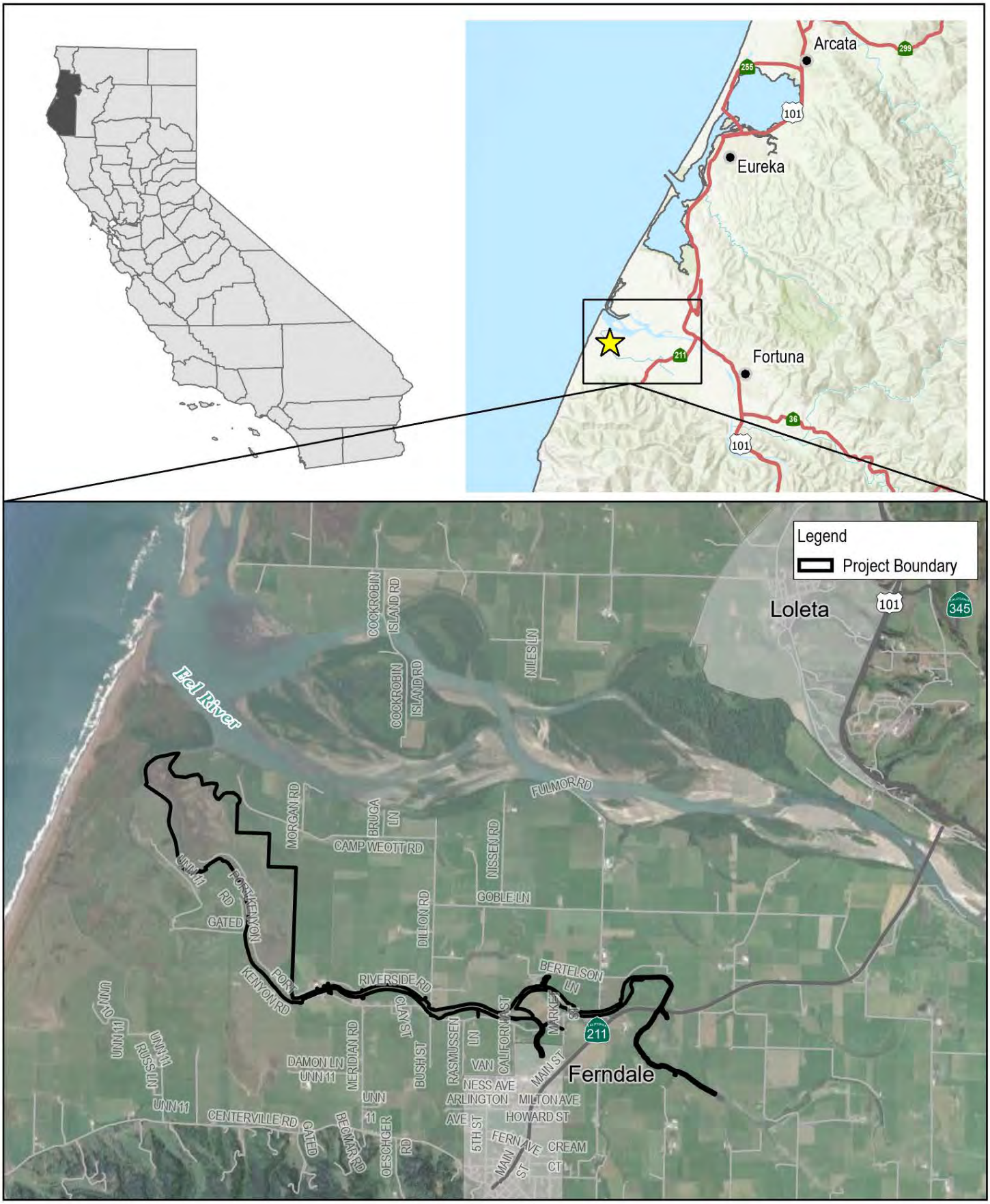
Exhibit 1 – Vicinity Map

Exhibit 2 – Overview Map Showing Project Construction to Date

Exhibit 3 – Preliminary Plans

Exhibit 4 – Unutilized Fill Areas

Exhibit 5 – Riverside Ranch Hydraulic Assessment (excerpts)



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Map Projection: Lambert Conformal Conic
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Humboldt County Resource Conservation District
Salt River Riverside Ranch EIR Addendum

Project No. **12563417**
Revision No. **-**
Date **Oct 2022**

Vicinity Map

FIGURE 1

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Data source: Tiled service layer: © OpenStreetMap (and) contributors, CC-BY-SA; World Topographic Map - labelless: California State Parks, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA; World Hillshade: Esri, NASA, NGA, USGS, FEMA; World Hillshade: Esri, CGIAR, USGS. Created by: jlopez4

Salt River Ecosystem Restoration Project
Permitted Project Area & Implementation Status

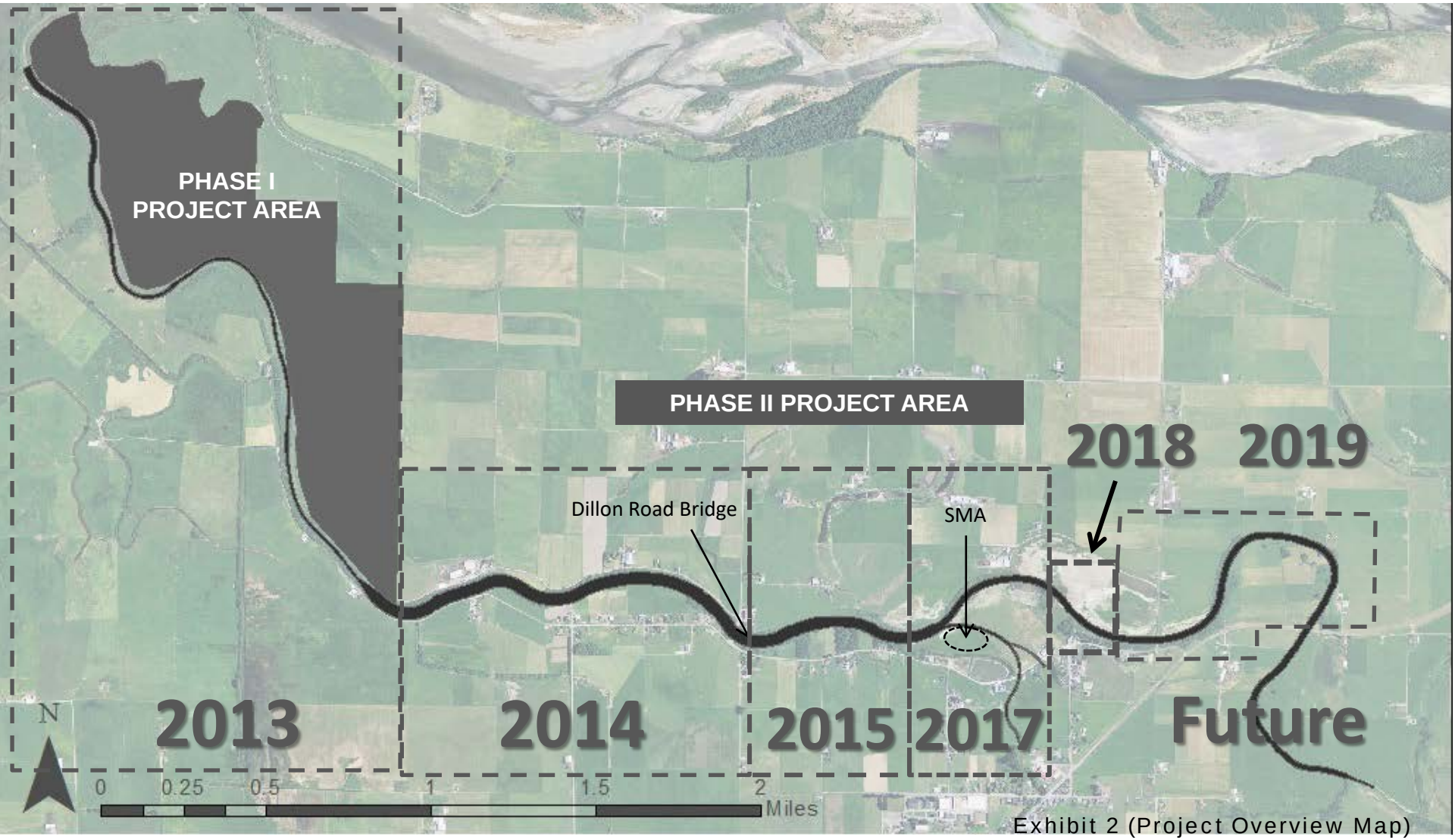
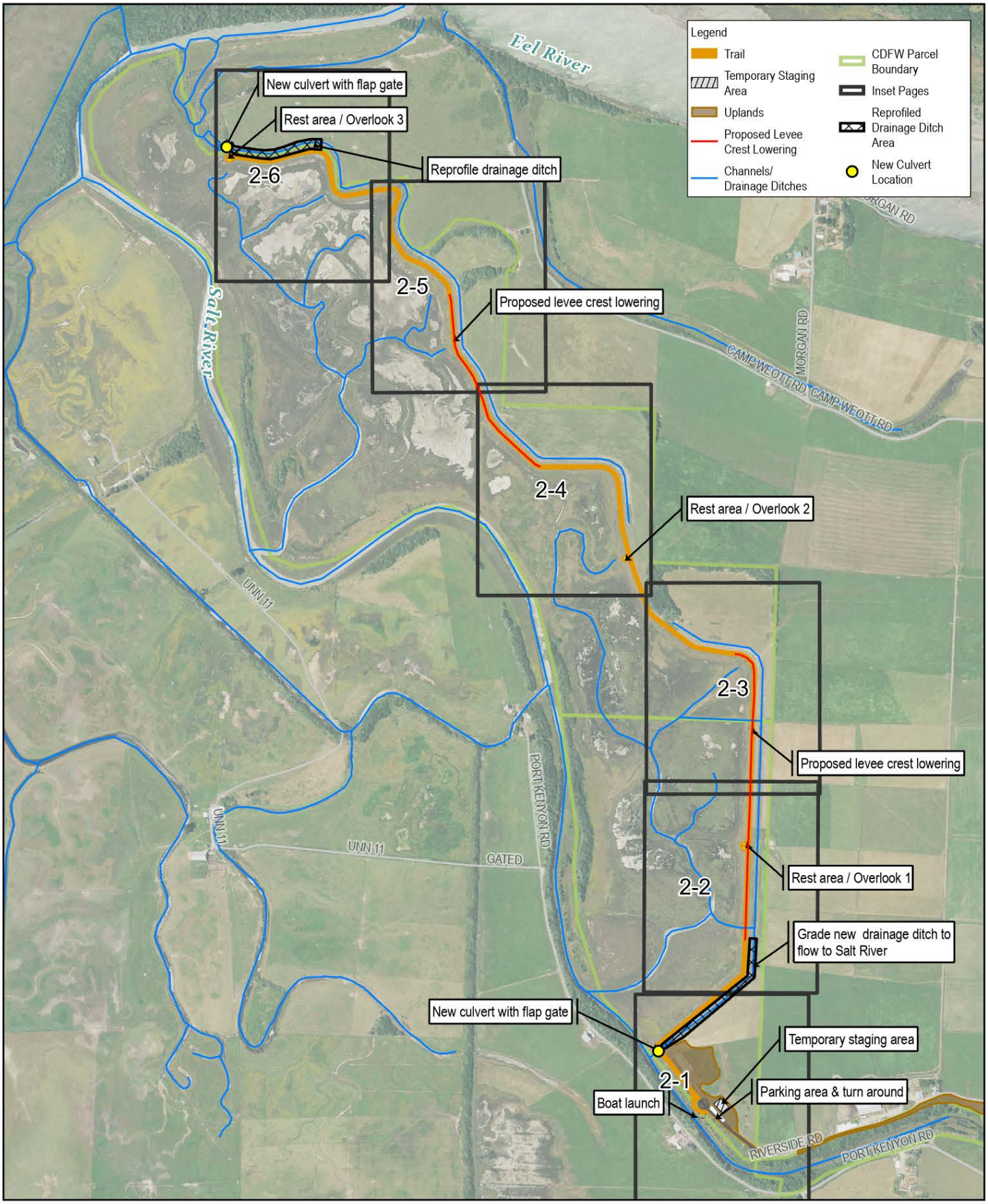


Exhibit 2 (Project Overview Map)



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Humboldt County Resource Conservation District
Salt River Riverside Ranch EIR Addendum

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Revision No. **-**
Date **Oct 2022**

Project Components Overview

FIGURE 2

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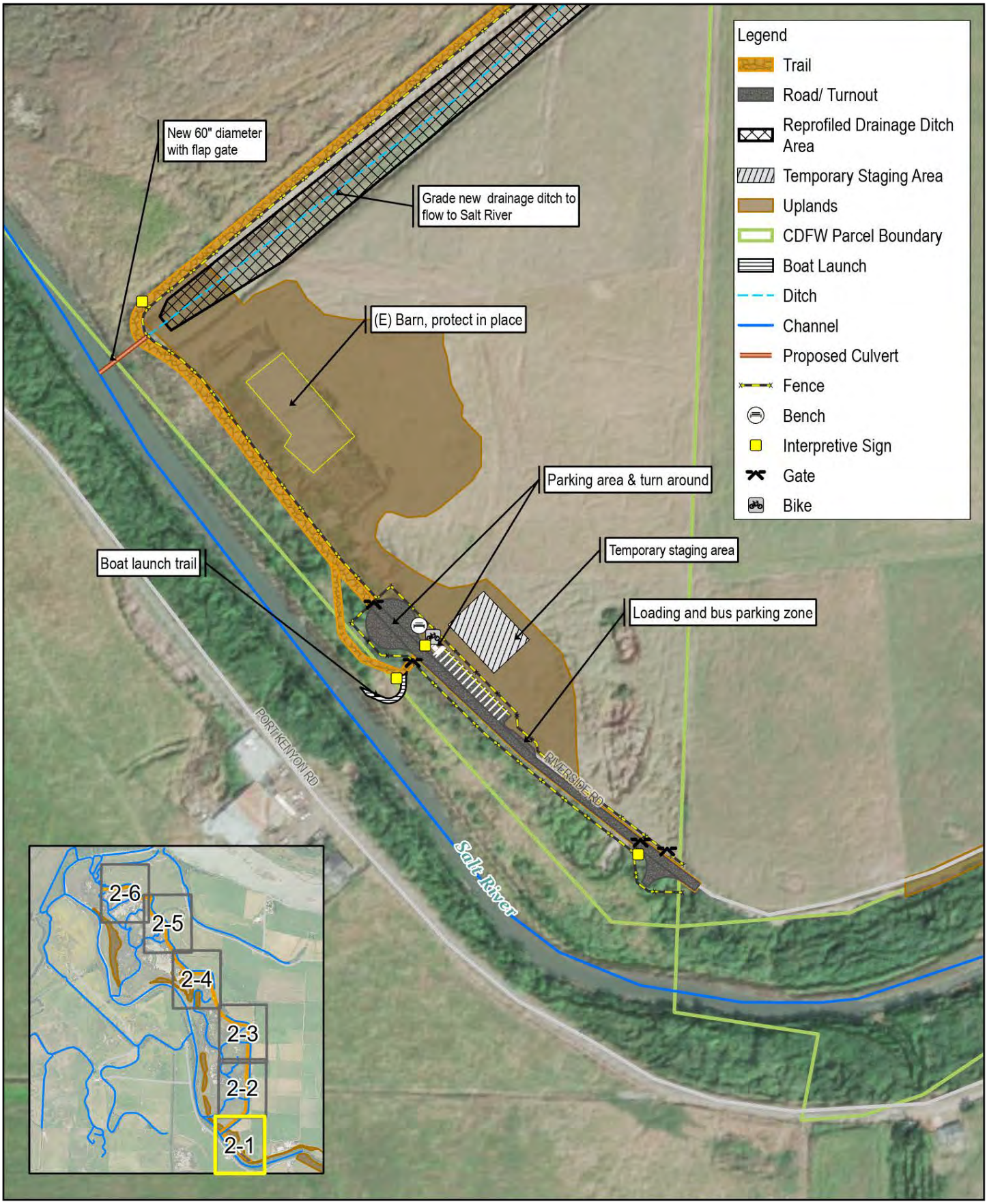

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Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Humboldt County Resource Conservation District
Salt River Riverside Ranch EIR Addendum

Project No. **12563417**
Revision No. **-**
Date **Oct 2022**

Project Components Map Series

FIGURE 2-1

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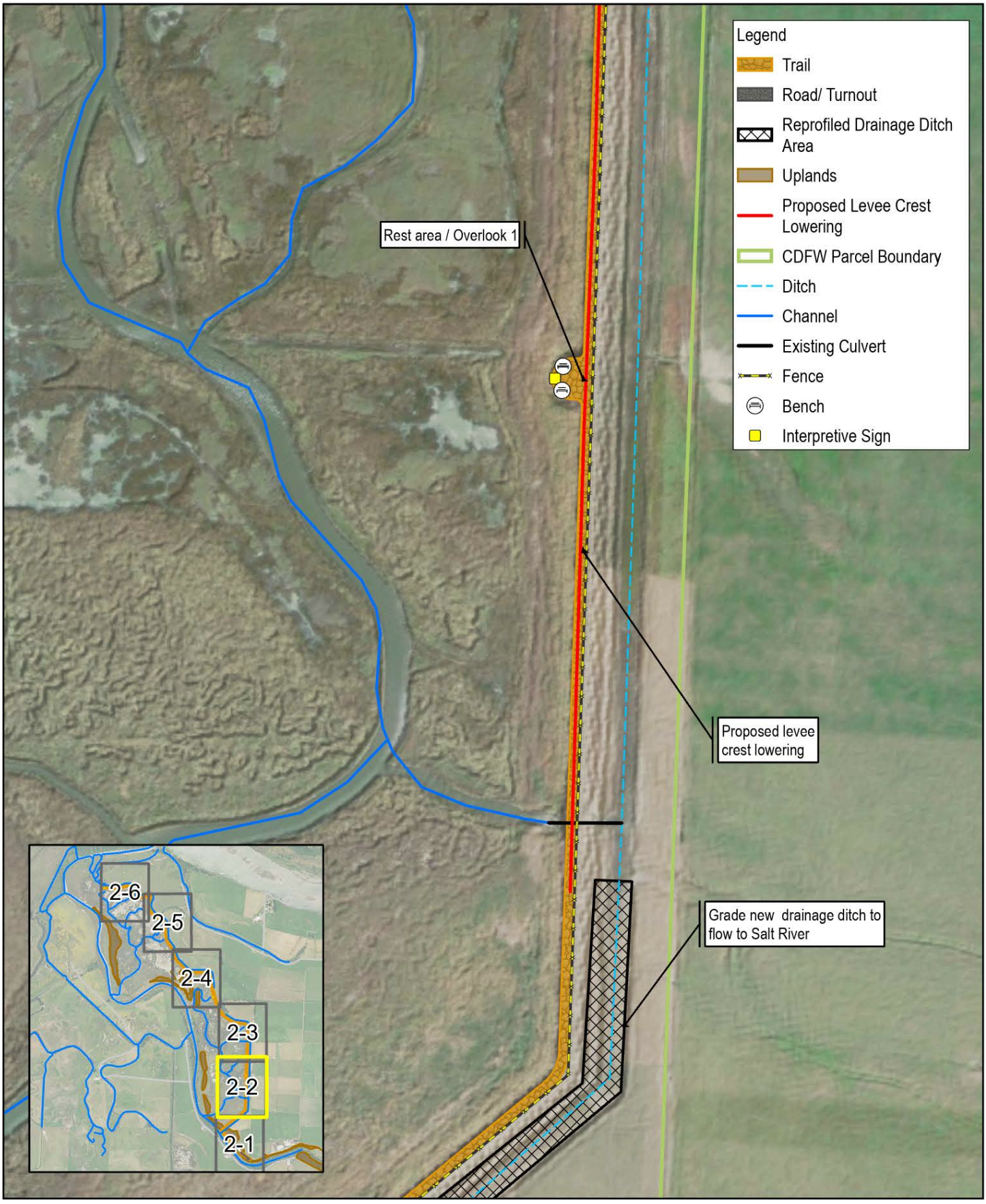

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Humboldt County Resource Conservation District
Salt River Riverside Ranch EIR Addendum

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Date **Oct 2022**

Project Components Map Series

FIGURE 2-2

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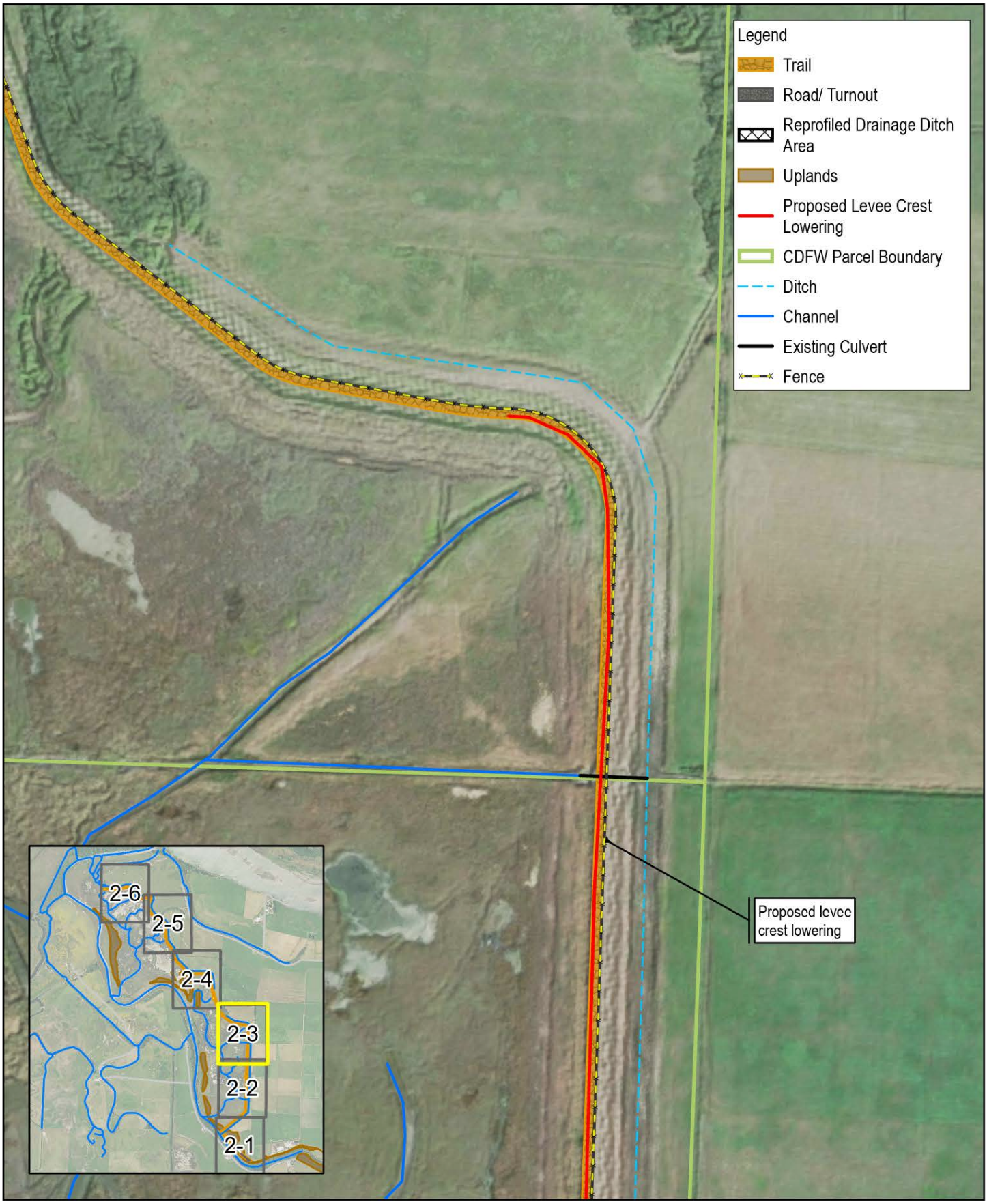

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Date **Oct 2022**

Project Components Map Series

FIGURE 2-3

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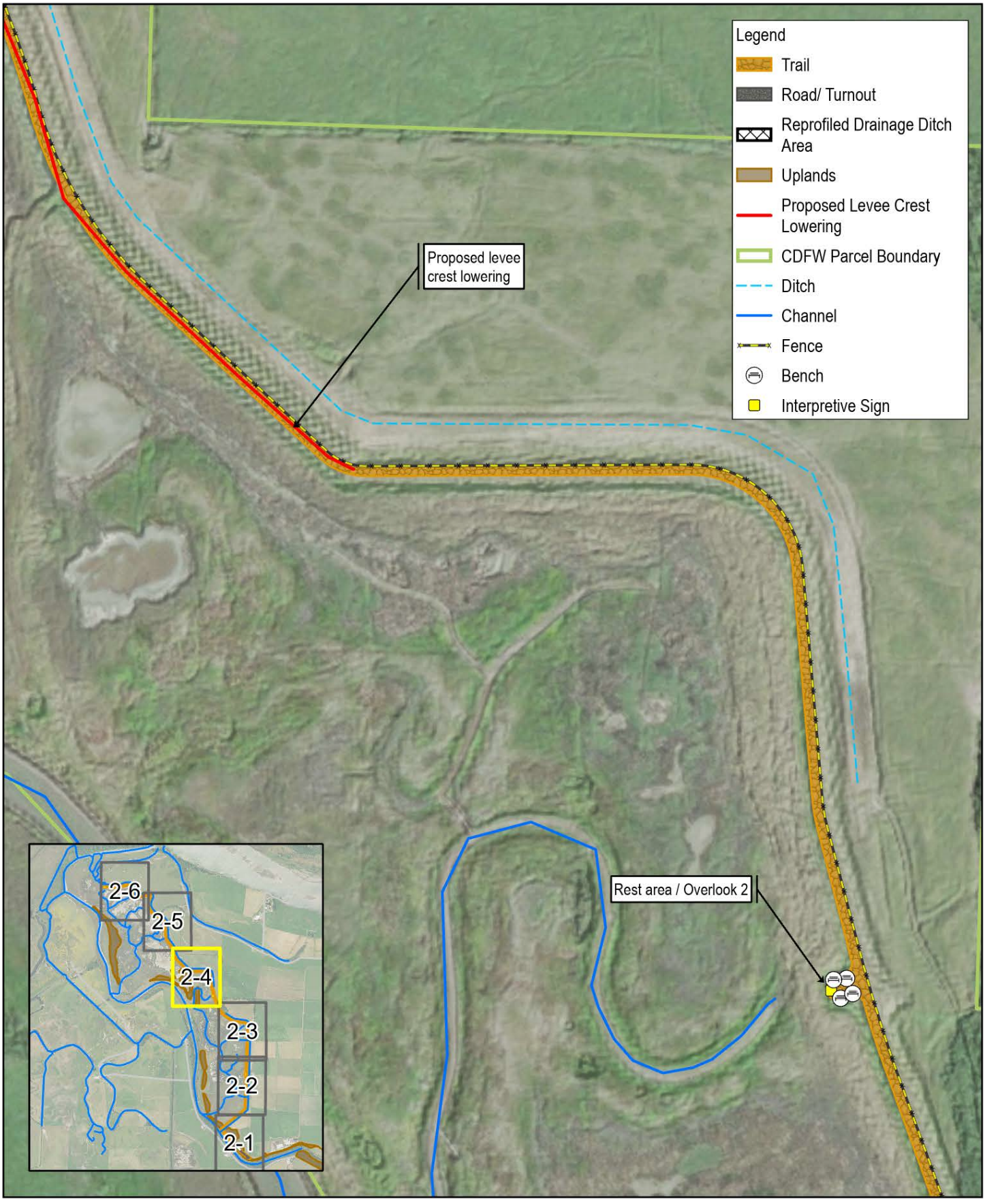

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Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Humboldt County Resource Conservation District
Salt River Riverside Ranch EIR Addendum

Project No. **12563417**
Revision No. **-**
Date **Oct 2022**

Project Components Map Series

FIGURE 2-4

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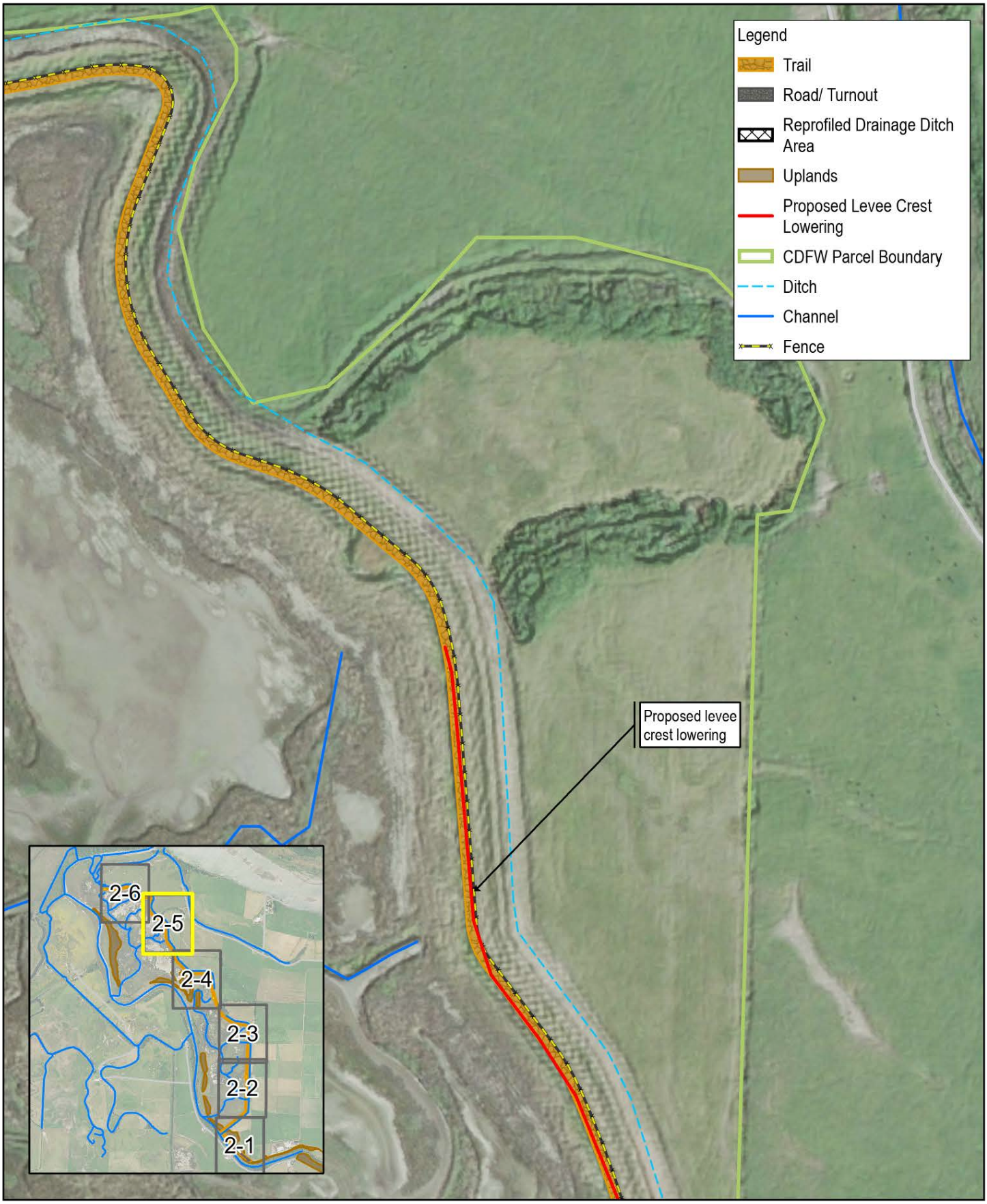

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Map Projection: Lambert Conformal Conic
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Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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Salt River Riverside Ranch EIR Addendum

Project No. **12563417**
Revision No. **-**
Date **Oct 2022**

Project Components Map Series

FIGURE 2-5

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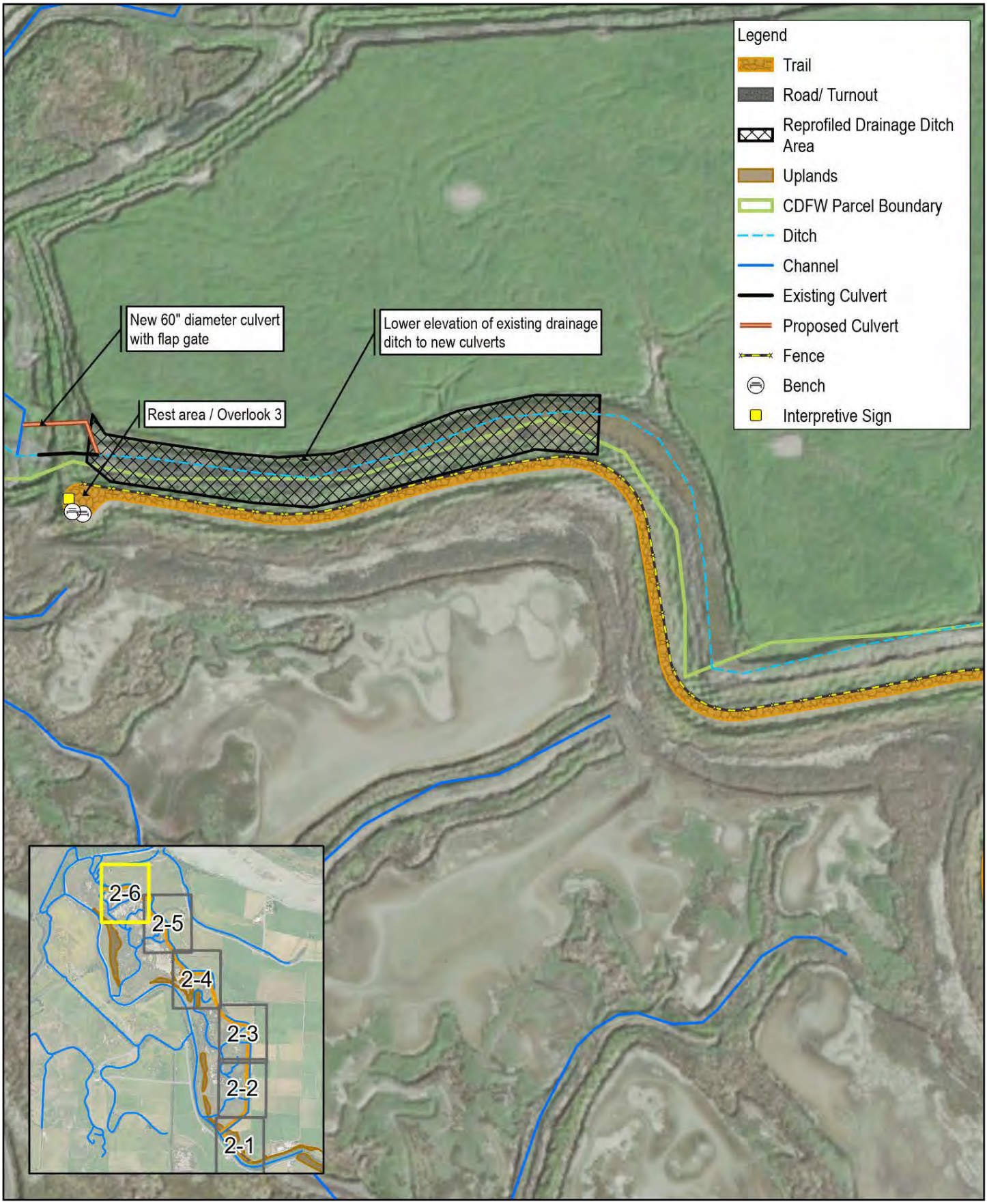

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Map Projection: Lambert Conformal Conic
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Humboldt County Resource Conservation District
Salt River Riverside Ranch EIR Addendum

Project No. **12563417**
Revision No. **-**
Date **Oct 2022**

Project Components Map Series

FIGURE 2-6

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Print date: 24 Oct 2022 - 10:43

Data source: World Imagery (Wayback 2022-05-18): NAIP_ortho_Ca023_2020. Created by: jlopez4

EXHIBIT 4

HUMBOLDT COUNTY
RESOURCE CONSERVATION DISTRICT

SALT RIVER ECOSYSTEM RESTORATION PROJECT
RIVERSIDE RANCH
PUBLIC ACCESS DESIGN
October, 2022

AREA MAP

LOCATION MAP

SHEET INDEX

SHEET NO.	DRAWING DESIGNATION	DESCRIPTION
GENERAL		
1	G001	COVER SHEET
2	G002	GENERAL NOTES, SYMBOLS &ABBREVIATIONS
3	G002A	SITE LANDSCAPE NOTES
PUBLIC ACCESS PLANS		
4	L-01	OVERALL SITE PLAN AND TRAIL ALIGNMENT
5	L-02	CONSTRUCTION ACCESS AND STAGING
6	L-03	PARKING AREA
7	L-04	BOAT LAUNCH
8	511	AMENITY AND FURNISHING DETAILS
9	512	FENCE AND TRAIL CONSTRUCTION DETAILS

PRELIMINARY

No.	Issue	Checked	Approved	Date
Author	L.Piper	Drafting Check	B.Vivyan	Project Manager	A.Hilton
Designer	L.Piper	Design Check	J.Svehla	Project Director	J.Svehla

Bar is one inch on original size sheet (0 — 1")

LICENSED LANDSCAPE ARCHITECT — STATE OF CALIFORNIA

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Eureka California 95501 USA
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www.ghd.com

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Client: Humboldt County Resource Conservation District
Project: Riverside Ranch Public Access Design
Title: Cover Sheet
Size: ARCH D

Project No.	Date	Scale	Sheet No.
12563417	October, 2022	As Shown	G001

Pro-Date:5 October 2022 - 5:43 PM Plotted By: Lucas Piper Filename: N:\GIS\Eureka\Projects\561\12563417\Digital_Design\CAD\Sheets\12563417_Public Access Plan.dwg

GENERAL NOTES

1. PROJECT REQUIRES A CLASS A GENERA. CONTRACTOR'S LICENSE IN THE STATE OF CALIFORNIA.
2. THE CONTRACTOR SHALL COMPLY WITHALL APPLICABLE STATE, COUNTY AND LOCAL CODES, PROJECT PERMITS, AND STANDARDS USED FOR TRAIL ADA COMPLANCE - *2013 US ACCESS BOARD ABA) ACCESSIBILITY GUIDELINESFOR OUTDOOR DEVELOPED AREAS, 36 CFR PART 1191.* CONTRACTOR WILL TIMELY AND ACCURATELY COMPLETE, SIGN, AND SUIMIT ALL NECESSARY DOCUMENTATION OF COMPLIANCE.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING SITE CONDITIONS PRIOR TO THE COMMENCEMENT OF WIRK AND REPORT ANY DISCREPAWCIES TO THE HCRCD. SHOULI EXISTING CONDITIONS DIFFER IROM THOSE SHOWN OR INDICATED, OR IF IT APPEARS THAT THESE PLANS DO NOT ADEQUATELY DETAIL THE WORK TO BE DONE, CONTRACTOR SHALL NOTIFY THE HCRCD PRIOR TO CONTINUING WITH ANY RELATED WORK. NO ILLOWANCE WILL BE MADE ON CONTRACTOR'S BEHALF FOR AN' EXTRA EXPENSE RESULTING FIOM FAILURE OR NEGLECT IN DE'ERMINING THE CONDITIONS UNDER WHICH WORK IS TO BE PERFORMED. NOTED DIMENSIONS TAKE PRECEDENCE OVER SCALE.
4. QUANTITIES OF ITEMS, LENGTH OF PROJECT, AND SITE CONDITIONS SHOWN IN THE PLANS ARE APPROXIMITE. ALL MATERIALS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR UNLESS OTHERWISE NOTED.
5. CONTRICTOR AGREES TO ASSUME SOL.' AND COMPLETE RESPONSIBILITY FOR THE JOB SITE DURING THECOURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOLSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HWLD THE HCRCD, GHD, AND THEIR REPRESENTATIVES IRMLESS IROM ANY AND ALL LIABILTY, REAL AND/OR ALLEGED, IN CONJUNCTION WITH THE PERFORMANCE OF THIS PROJECT.
6. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY AND ALL DAMAGES TO EXISTING STRUCTURES, ROADS, AND UTILITIES DURING CONSTRUCTION. ALL DAMAGE SHALL BE RESTORED TO EQUA, OR BETTER CONDITION AT THE 'ONTRACTOR'S EXPENSE.
7. A SET 9F SIGNED WORKING DRAWINGS 'ILL BE KEPT AT ALL TIMES AT THE JOB SITE ON WHICH ALL CHANIES OR VARIATIONS IN THE WORK ARE TO BE RECORIED AND/OR CORRECTED DAILY IY THE CONTRACTOR AND SUBMITTED TO THE HCRCD WHEN THE 'ORK TO BE DONE IS COMPLETE3.
8. CONTRICTOR SHALL NOTIFY THE HCRCI AT LEAST 72 HOURS IN ADVANCE OF COMMENCEMENT OF ANY PART OF THE WORK AND SHALL CCORDINATE CONSTIUCTION SCHEDULE ACCORDINGLY.
9. THE DESIGN FEATURES SHOWN ON THE IE DESIGN PLANS SHALL NOT BE ALTERED OR MODIFIED IN ANY WAY DURING CONSTRUCTION WITHOUT THE EXPRESSED, WRITTEN DIRECTION AND APPROVAL OF THE HCRCD.
10. ANY INIORMATION DERIVED FROM THE IMAPS, PLANS, SPECIFICATIONS, PROFILES, DRAWINGS OR FROM THE HCRCD WILL NOT RELIEVE THE CONTRACTOR FROM ANY RISK OR FROM FULFILLING THE TERMS OF THE CONTRACT.
11. NO WORK SHALL BE PERFORMED OUTSIDE OF THE DESIGNATED AREAS WITHOUT THE APPROVAL OF THE HCRCD.
12. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ADDITIONAL STAGING AREAS WITH THE HCRCD BEYOND WHAT IS SHOWN ON THE PLANS.
13. UPON COMPLETION OF THE CONSTRUCTION PROJECT, THE CONTRACTOR SHALL LEAVE THE PROJECT AREA FREE OF DEBRIS AND UNUSED MATERIAL UNLESS NOTED OTHERWISE.
14. THE CONTRACTOR SHALL PROTECT EXISTING SURVEY MONUMENTS WITHIN WORK LIMITS. ANY MONUMENT DAMAGED BY THE CONTRACTOR SHALL BE RESET IN ACCORDANCE WITH THE CALIFORNIA PROFESSIONAL LAND SURVEYORS ACT.
15. HOURS OF WORK: THE CONTRACTOR SHALL CONDUCT ALL WORK BETWEEN THE HOURS OF 7:00 A.M. AND `:00 P.M., MONDAY THROUGH FRIDAY. SATURDAY 7:00 A.M. TO 6:00 P.M. AND SUNDAY 9:00 A.M. TO 6:00 P.M. WEEKEND WORK WILL ONLY BE CONDUCTED AFTER PRIOR AUTHORIZATION FROM THE HCRCD. EQUIPMENT DELIVERY SHALL BE DURING HOURS OF WORK.
16. NO SHUTDOWN OF THE PROJECT SITE IS ANTICIPATED HOWEVER, ANY GRADING, EXCAVATION AND OTHER EARTH-MOVING ACTIVITIES SHALL CEASE UPON THE ONSET OF PRECIPITATION AT THE PROJECT SITE AND SHALL NOT COMMENCE UNTIL THE PREDICTED CHANCE OF RAIN IS LESS THAN 50 PERCENT IN THE FERNDALE AREA. THE WORK SITE SHALL BE WINTERIZED BETWEEN WORK CESSATION PERIODS BY INSTALLING STORMWATER RUNOFF AND EROSION CONTROL BARRIERS AROUND THE PERIMETER OF EACH DISTURBED SITE TO PREVENT THE ENTRAINMENT OF SEDIMENT INTO COASTAL WATERS. AGGREGATE STOCK OF STORMWATER RUNOFF AND EROSION CONTROL BARRIER MATERIALS SHALL BE KEPT ONSITE AND MADE AVAILABLE FOR IMMEDIATE USE. SUSPEND CONSTRUCTION ACTIVITIES FOR SAFETY AND ENVIRONMENTAL REASONS AT NO COST TO THE HCRCD OR THEIR REPRESENTATIVES.
17. CONTRACTOR SHALL MAINTAIN FREQUENT COMMUNICATIONS WITH THE HCRCD TO DISCUSS DETAILS OF IMPLEMENTATION, ORDER OF WORK, METHODS OF MINIMIZING ENVIRONMENTAL IMPACTS AND OTHER RELEVANT COMPONENTS OF CONSTRUCTION. CONTRACTOR AND HCRCD SHALL MEET WEEKLY ON-SITE TO DISCUSS PROJECT DETAILS.
18. ANY MODIFICATIONS FROM PLANS NEED TO BE COMPLETED AND/OR APPROVED BY THE HCRCD PRIOR TO IMPLEMENTATION.

ORDER OF WORK

1. THE CONTRACTOR SHALL STAKE THE LIMIT OF WORK BOUNDARY, THE TRAIL ALIGNMENT, AND ALIGNMENT OF THE NON-MOTORIZED BOAT LAUNCH.
2. THE HCRCD WILL CONDUCT SENSITIVE SPECIES CLEARANCE SURVEYS WITHIN THE PROJECT AREA.
3. THE FIRST ORDER OF WORK WILL BE FOR THE CONTRACTOR TO PROVIDE A SPILL RESPONSE PLAN AND PREPARE AND SUBMIT A WORK PLAN, PROGRESS SCHEDULE, NOTICE OF MATERIALS (INDICATING THE NAMES AND ADDRESSES OF SUPPLIERS) TO BE USED ON THE PROJECT, FOR REVIEW AND ACCEPTANCE BY HCRCD

   THE CONTRACTOR SHALL ALLOW TWO (2) WORKING DAYS FOR THE HCRCD'S REVIEW OF THE ABOVE SUBMITTAL.

   THE ABOVE ITEMS SHALL CLEARLY DISCLOSE THE CONTRACTOR'S PROPOSED PROCEDURES AND METHODS OF OPERATION. THE PROGRESS SCHEDULE WILL BE REVIEWED FOR ACCURACY WEEKLY. ANY MODIFICATIONS TO THE PROGRESS SCHEDULE SHALL BE SUBMITTED TO THE HCRCD IN WRITING. MODIFICATIONS TO THE PROGRESS SCHEDULE WILL NOT CONSTITUTE APPROVAL FOR A WORK SCHEDULE EXTENSION.

   PRIOR TO COMMENCEMENT THE CONTRACTOR SHALL SUBMIT A PROJECT SCHEDULE WITH DAILY ACTIVITIES, WHICH SHALL CLEARLY SHOW WHERE AND AT WHAT TIME THE CONTRACTOR ANTICIPATES WORKING.

   NO WORK MAY BEGIN UNDER THE CONTRACT UNTIL THE WORK PLAN, PROGRESS SCHEDULE, AND LIST OF MATERIALS HAVE BEEN APPROVED BY THE HCRCD. TIME REQUIRED FOR REVIEW AND APPROVAL OF THESE ITEMS SHALL NOT CONSTITUTE A BASIS FOR CONTRACT TIME EXTENSION.
4. THE SECOND ORDER OF WORK, PRIOR TO COMMENCING WORK, SHALL INCLUDE CONTACTING USA PER UTILITY NOTES.
5. THE THRD ORDER OF WORK SHALL INCIUDE THE INSTALLATION OF WATER POLLUTION CONTROL BMP'S.
6. THE FOURTH ORDER OF WORK SHALL INCLUDE INSTALLING PROJECT IMPROVEMENTS.
7. THE FIFTH ORDER OF WORK SHALL INCLUDE DISPOSAL OF MATERIALS OFF SITE.
8. THE SIXTH ORDER OF WORK SHALL INCLUDE SITE CLEAN UP.

UTILITY NOTES

1. THE LOKATION FOR UTILITIES ON THESE PLANS IS APPROXIMATE ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY LOCATION, DEPTH AND HEIGHT. THEIR VERIFICATION SHALLBE COORDINATED BY THE CONTRACTOR WITH THE APPROPRIATE UTILITY COMPANY, FORTY-EIGHT HOURS BEFORE BEGINNING WORK IN AN AREA. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT NORTH (USA), AT 1-800-227-2600, TO DETERMINE LOCATIONS OF EXISTING UTILITIES. THE CONTRACTOR SHALL COOPERATE WITH UTILITY OWNERS TO EXPEDITE THE RELOKATION OR ADJUSTMENT OF THEIR UTILITIES TO MINIMIZ INTERRUPTION OF SERVICE AND DUPLICATION OF WORK. THE CONTRACTOR SHALL EXERCISE CAUTION WHEN WORKING NEAR EXISTING UTILITIES AND SHALL BE RESPONSIBLE FOR ALL DAMAGE, BREAKS AND/OR LEAKS. IF DAMAGE OCCURS, THE CONTRACTOR SHALL REPAIR UTILITY AT NO ADDITIONAL EXPENSE TO THE HCRCD.

REGULATORY COMPLIANCE NOTES

1. CONTRACTOR SHALL COMPLY WITH ALL PROJECT PERMITS. PERMIT CONDITIONS HAVE BEEN PROVIDED IN THE CONTRACT DOCUMENTS AND IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW AND UNDERSTAND THE CONDITIONS RELEVANT TO PUBLIC ACCESS CONSTRUCTION ACTIVITIES AS WELL AS ALL OTHER PERMIT REQUIREMENTS.
2. PROJECT PERMITS SHALL REMAIN ON SITE AT ALL TIMES.
3. THE CONTRACTOR SHALL DEVELOP AN EMERGENCY SPILL RESPONSE PLAN FOR REVIEW AND APPROVAL BY THE HCRCD PRIOR TO THE START OF WORK. THE PLAN SHALL IDENTIFY THE MATERIALS TO BE USED AND THE ACTIONS THAT WILL BE TAKEN IN THE EVENT OF SPILL OF PETROLEUM PRODUCTS OR ANY OTHER MATERIAL HARMFUL TO AQUATIC OR PLANT LIFE. THE EMERGENCY RESPONSE MATERIALS SHALL BE KEPT AT THE SITE TO ALLOW THE RAPID CONTAINMENT AND CLEAN-UP OF ANY SPILLED MATERIAL. EMERGENCY CLEAN UP OF ALL SPILLS SHALL BE DONE IMMEDIATELY. DURING OR SHORTLY AFTER THE INITIAL CLEAN UP IS POSSIBLE, THE HCRCD SHALL BE NOTIFIED THAT A SPILL HAS OCCURRED.
4. PRIOR TO COMMENCEMENT, CONTRACTOR SHALL PARTICIPATE IN ENVIRONMENTAL AWARENESS TRAINING PROVIDED BY THE HCRCD.
5. ALL EQUIPMENT FUELING SHALL BE CONDUCTED A MINIMUM OF 100-FEET FROM WATERWAYS.
6. ALL EQUIPMENT MAINTENANCE AND CLEANING SHALL OCCUR WITHIN THE STAGING AREA.
7. ANY VEHICLES OR EQUIPMENT SHALL BE CHECKED AND MAINTAINED DAILY TO PREVENT LEAKS OF MATERIALS.
8. CONTRACTOR SHALL MINIMIZE IDLING TIME TO FIVE (5) MINUTES FOR ALL TRUCKS AND MAINTAIN PROPERLY TUNED EQUIPMENT WITH FACTORY-EQUIPPED MUFFLERS.
9. CONTRACTOR EQUIPMENT AND PERSONNEL SHALL NOT ENTER WATERWAYS SUCH AS FIELD DEPRESSIONS, SLOUGHS AND DITCHES THAT CONTAIN WATER.
10. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO MINIMIZE EROSION AND PREVENT THE TRANSPORT OF SEDIMENT TO SENSITIVE AREAS, AND RUTTING OF THE EXISTING PASTURES.
11. AT A MINIMUM, THE CONTRACTOR SHALL EMPLOY THE FOLLOWING BEST MANAGEMENT PRACTICES (BMPS) AS DESCRIBED IN THE CURRENT CALIFORNIA STORMWATER BMP HANDBOOK FOR CONSTRUCTION:

    EC-1 SCHEDULING
    NS-9 VEHICLE EQUIPMENT AND FUELING
    WM-1 MATERIALS DELIVERY AND STORAGE
    WM-2 MATERIAL USE
    WM-4 SPILL PREVENTION AND CONTROL
    WM-9 SANITARY/SEPTIC WASTE MANAGEMENT
12. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIX ANY DEFICIENCIES INDICATED BY THE HCRCD TO PREVENT EROSION AND CONTROL SEDIMENT.
13. THE CONTRACTOR SHALL BE AWARE OF THE WET WEATHER TIMING, SOFT AND SATURATED SOIL CONDITIONS THAT WILL BE ENCOUNTERED. IT SHALL BE THE DISCRETION OF THE HCRCD TO HALT ACTIVITIES BASED ON WEATHER AND FIELD CONDITIONS.
14. CONTRACTOR SHALL MINIMIZE EQUIPMENT TRAVEL TO AND FROM THE PROJECT SITE DURING THE LIFE OF THE PROJECT. CONTRACTOR SHALL REHABILITATE THE PASTURE TO EQUAL OR BETTER CONDITION.
15. CONTRACTOR SHALL PREVENT RUTTING AND EROSION, AND SHALL UTILIZE LIGHT-WEIGHT, RUBBER-TRACKED/TIRED EQUIPMENT AND MATS AS NEEDED. IF GROUND DISTURBANCE DOES OCCUR, CONTRACTOR SHALL IMMEDIATELY IMPLEMENT EROSION/SEDIMENT CONTROL BMPS AS DIRECTED BY THE HCRCD TO PREVENT SOIL EROSION. IF STRAW MULCH IS USED, IT SHALL BE WEED-FREE STERILE RICE STRAW AND PLACED TO PROVIDE COMPLETE COVER OVER DISTURBED AREAS. THE CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING AND ADHERING TO A STORM WATER POLLUTION PREVENTION PLAN (SWPPP).
16. DURING CONSTRUCTION ACTIVITIES, CONTRACTOR SHALL PREVENT ANY DEBRIS FROM ENTERING ANY WATERWAYS INCLUDING BUT NOT LIMITED TO THE SALT RIVER, SLOUGHS, POOLED WATER DEPRESSIONS, AND DITCHES. CONTRACTOR SHALL MODIFY TECHNIQUE AS NECESSARY TO ENSURE DEBRIS DOES NOT ENTER THESE WATERS.
17. NO DEBRIS, SOIL, SILT, SAND, BARK, SLASH, SAWDUST, RUBBISH, OIL OR PETROLEUM PRODUCTS, OTHER ORGANIC MATERIAL OR EARTHEN MATERIAL FROM ANY CONSTRUCTION RELATED ACTIVITY SHALL BE ALLOWED TO ENTER INTO OR BE PLACED WHERE IT MAY BE WASHED BY RAINFALL INTO WATERWAYS.
18. IF, AT ANY TIME, AN UNAUTHORIZED DISCHARGE OF DEBRIS TO SURFACE WATER OCCURS, OR ANY WATER QUALITY PROBLEM ARISES, i.e. INCREASED TURBIDITY, CHANGES TO pH RESULTING IN >9 OR <6, THE ASSOCIATED PROJECT ACTIVITIES SHALL CEASE IMMEDIATELY UNTIL ADEQUATE BMPS ARE IMPLEMENTED, INCLUDING STOPPING WORK. THE REGIONAL WATER BOARD WILL BE NOTIFIED BY THE HCRCD PROMPTLY AND IN NO CASE MORE THAN 24 HOURS AFTER THE UNAUTHORIZED DISCHARGE OR WATER QUALITY PROBLEM ARISES.
19. FENCE LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY FENCE LOCATIONS WITHIN WORK AREA. FENCES SHALL NOT BE REMOVED OR ALTERED UNLESS AUTHORIZED BY HCRCD.
20. CONTRACTOR'S USE OF THE PREMISES SHALL BE LIMITED TO WITHIN THE LIMITS OF WORK. ACCESS ROUTES AND THE STAGING AREAS AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL NOT ENTER INTO ANY OTHER AREAS FOR ANY REASON WITHOUT PRIOR AUTHORIZATION FROM THE HCRCD.
21. PRIOR TO MOBILIZATION THE HCRCD WILL CONDUCT CLEARANCE SURVEYS WITHIN THE PROJECT AREA TO CLEAR ALL SENSITIVE SPECIES. DEPENDING UPON PRESENCE OF SPECIES, OPERATING MACHINERY EXCLUSION ZONES COULD RANGE FROM 100 TO 500' AND ALTERNATIVE MEANS AND METHODS MAY BE REQUIRED TO COMPLETE THE WORK WITHIN THE SPECIFIED SCHEDULE AND SUBJECT TO HCRCD APPROVAL. IF SENSITIVE SPECIES ARE DETECTED, CONSTRUCTION MAY BE DELAYED UNTIL SPECIES HAVE BEEN RELOCATED OR FLEDGED.

SITE ACCESS AND STAGING NOTES

1. ALL EQUIPMENT AND PERSONNEL SHALL ACCESS THE SITE VIA THE PRIMARY ACCESS ROAD ENTRANCE AT RIVERSIDE ROAD.
2. CONTRACTOR SHALL BE AWARE OF THE PRIVATE DAIRY AND GRAZING OPERATIONS ONSITE AND SHALL NOT IMPEDE THE ABILITY OF THE PRIVATE OWNER(S) OPERATIONS.
3. VEHICLES LEAVING THE PROJECT AREA SHALL HAVE TIRES FREE OF SEDIMENT TO PREVENT/MINIMIZE SEDIMENT FROM BEING TRACKED ONTO PUBLIC ROADWAYS.
4. THE PROJECT SITE IS SURROUNDED BY WORKING DAIRIES CONTAINING FREE-ROAM COWS AND BULLS. ALL GATES, IF PRESENT, SHOULD BE CLOSED UPON ENTERING AND EXITING ANY PART OF THE SITE, REGARDLESS OF CONDITION UPON ARRIVAL, UNLESS OTHERWISE DIRECTED BY THE HCRCD.

LEGEND:

BOUNDARY &/OR TOPOGRAPHIC:

NEW	DESCRIPTION	EXISTING	DESCRIPTION
X	FENCE (NEW)		CDFW PARCEL BOUNDARY
	CONCRETE PAVING		ADJACENT PROPERTY BOUNDARIES
90+00	TRAIL ITATIONS		CHANNEL
	NEW TRAIL / ROAD		MAPPED UPLAND AREAS
	ENHANCED TRAIL / ROAD	X	FENCE (EXISTING)
	BOAT AUNCH TRAIL	12.00	TOPOGRAPHIC CONTOURS

REFERENCE NOTES SCHEDULE

SYMBOL	DESCRIPTION	DETAIL
1	PROJECT BOUNDARY - CDFW PARCEL BOUNDARY	
2	PARCEL LINES - ADJACENT PROPERTY BOUNDARIES	
3	UPLANDS - MAPPED UPLAND AREAS	
4	ENHANCED TRAIL & ROAD - TRAIL AROUND MARSH PERIMETER TO FOLLOW EXISTING BERM ALIGNMENT.	3/LS02
5	BOAT LAUNCH TRAIL - RIVER ACCESS FOR NON-MOTORIZED WATERCRAFTS	5/LS02
6	NEW TRAIL & ROAD - PER PLAN AND DETAIL	4/LS02
7	TURN AROUND - FOR PUBLIC AND EMERGENCY VEHICLE USE	
8	PULL OUT - LOADING / UNLOADING AND BUS PARKING ZONE	
9	PARKING AREA - PARKING FOR 15 VEHICLES (ONE ADA SPACE)	
10	TRAILHEAD INFORMATION KIOSK SIGN - SIGN CONTENT BY OTHERS	6/LS01
11	INTERPERTIVE / WAYFINDING SIGN - SIGN CONTENT BY OTHERS	5/LS01
12	ACCESS RULES & REGULATION SIGN - SIGN CONTENT BY OTHERS	5/LS01
13	BENCH - PER PLAN AND DETAIL	4/LS01
14	PICNIC TABLE - PER PLAN AND DETAIL	2/LS01
15	BIKE RACKS - PER PLAN AND DETAIL	1/LS01
16	ACCESS GATE - 16-FOOT WIDE DOUBLE SWING GATE MAINTANED AND CONTROLED BY CDFW PER PLAN AND DETAIL	8/LS02
17	TRAIL ACCESS GATE - 8-FOOT WIDE SINGLE SWING GATE MAINTAINED AND CONTROLED BY CDFW PER PLAN AND DETAIL	7/LS02
18	CONCRETE PAVING - OUTDOOR RECREATION ACCESS ROUTE CONNECTING ADA PARKING TO TRAILHEAD AND PICNIC FACILITES	1/LS02
19	WHEEL STOP - CONCRETE PER DETAIL	2/LS02
20	PARKING STALL DELINEATION - RECYCLED FIRE HOSE TACKED IN PLACE	
21	ADA PARKING STALL - ADA PARKING SPACE SHALL BE STRIPED AND FULLY COMPLIANT W/ SECTION 11B-02 OF THE CBC	
22	FENCE (N) - NEW FENCE PER PLAN AND DETAIL	6/LS02
23	FENCE (E) - PROTECT IN PLACE	
24	GRAZING ACCESS GATE - MAINTAINED AND CONTROLLED BY LEASEE FOR GRAZING OPERATIONS.	8/LS02

PRELIMINARY

No.	Issue	Checked	Approved	Date
Author	L.Piper	Drafting Check	B.Vivyan	Project Manager	A.Hilton
Designer	L.Piper	Design Check	J.Svehla	Project Director	J.Svehla

Bar is one inch on original size sheet (0 — 1")

LICENSED LANDSCAPE ARCHITECT — LUCAS B. PIPER — STATE OF CALIFORNIA

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Client: Humboldt County Resource Conservation District
Project: Riverside Ranch Public Access Design
Title: General Notes, Symbols, & Abbreviations
Size: ARCH D

Project No. 12563417 | Date October, 2022 | Scale As Shown | Sheet No. G002

Pro Date:5 October 2022 - 5:43 PM | Plotted By: Lucas Piper | Filename: N:\US\Eureka\Projects\561\12563417\Digital_Design\CAD\Sheets\12563417_Public Access Plan.dwg

SITE LANDSCAPE NOTES:

1. ALL DISTURBED AREAS TO BE SEECED WITH ORGANIC NATIVE OR PASTURE MIX AND RATE APPROVED BY THE HCRCD.
2. ALL SEED SHALL BE PROVIDED BY THE CONTRACTOR AT THE PROPORTIONS PRESENTED IN THE FOLLOWING TABLES:

FRESHWATER SEED MIX		
Scientific Name	Common Name	Pounds of Pure Live Seed/Acre
Bromus carinatus	California brome	6.0
Deschampsia cespitosa ssp. cespitosa	tufted hairgrass	2.0
Elymus glaucus	blue wild rye	8.0
Elymus X Triticum	regreen hybrid wheatgrass	15.0
Festuca rubra	red fescue	10.0
Hordeum brachyantherum	meadow barley	10.0
Scirpus microcarpus	panicled bulrush	2.0
TOTAL		53.0

ORGANIC PASTURE SEED MIX		
Scientific Name	Common Name	Pounds of Pure Live Seed/Acre
Lolium perenne1	tetraploid perennial ryegrass	8.0
Trifolium alexandrinum	Berseem clover	5.0
Lotus corniculatus	Birdsfeet trefoil	3.0
Trifolium pratense	Barduro red clover	5.0
Trifolium repens	white clover (ladino type)	3.0
Trifolium fragiferum	Salina clover	2.0
Lolium perenne multiflorum1	Italian ryegrass	4.0
Lolium multiflorum1	Tetraploid annual ryegrass	3.0
TOTAL		33.0

1The Jepson Manual, 2nd edition (Baldwin et al. 2012) recognizes Festuca perennis, however many seed suppliers use the names Lolium perenne and L. multiflorum as synonyms.

3. THE ORGANIC PASTURE MIX SHALL BE APPLIED TO THE STAGING AREA EAST OF THE ACCESS ROAD. ALL OTHER DISTURBED AREAS ASSOCIATED WITH THE TRAIL SHALL RECEIVE THE FRESHWATER MIX.
4. PASTURE SEED
   a. ALL PASTURE SEED SHALL BE ORGANIC, IN THE EVENT THAT SPECIES IN THE SPECIFIED PASTURE MIX ARE NOT ALL COMMERCIALLY AVAILABLE AS CERTIFIED ORGANIC SEED, CONTRACTOR SHALL PROVIDE WRITTEN CERTIFICATION FROM SEED SUPPLIER STATING SUCH OR PROVIDE ALTERNATIVE ORGANIC SEED MIX FOR REVIEW AND APPROVAL.
   b. SEED SHALL BE ENDOPHYTE-FREE.
   c. SEED SHALL BE NON-GMO.
5. INOCULUM SOURCES SHALL BE SPECIES-SPECIFIC AND SHALL BE APPLIED AT A RATE OF TWO (2) POUNDS OF INOCULUM PER ONE HUNDRED (100) POUNDS OF SEEDS.
   d. LEGUME SEED SHALL BE SOWN WITHIN NINETY (90) CALENDAR DAYS AFTER INOCULATION OR SHALL BE RE-INOCULATED PRIOR TO SOWING.
   e. INOCULATED LEGUME SEED SHALL HAVE A CALCIUM CARBONATE COATING.
6. SEEDS SHALL BE OBTAINED FROM REGIONALLY APPROPRIATE SOURCES. SEED COLLECTED FROM WITHIN COASTAL HUMBOLDT COUNTY IS PREFERABLE AND SEED FROM ALTERNATIVE COASTAL SOURCES BETWEEN SAN FRANCISCO BAY AND COOS BAY WILL BE SUBJECT TO HCRCD'S APPROVAL. CONTRACTOR SHALL COORDINATE WITH THE HCRCD THIRTY (30) WORKING DAYS PRIOR TO SEEDING TO OBTAIN THESE APPROVALS. SEED MAY BE AVAILABLE FROM PACIFIC COAST SEED, 533 HAWTHORN PLACE, LIVERMORE, CA (925) 373-4417; HEDGEROW FARMS, 21740 COUNTY ROAD 88, WINTERS, CA(530) 662- 6847; S & S SEEDS, P.C. BOX 1275 CARPINTERIA, CA (805) 684-0436; LARNER SEEDS, 235 GROVE RD, BOLINAS, CA (415) 868-9407; SUNMARK SEEDS, 18032 NE AIRPORT WAY, PORTLAND, OR (888) 214-7333; OR APPROVED EQUAL.

SEED APPLICATION NOTES

BROADCAST SEEDING

A. GENERAL
1. CONTRACTOR MAY PROPOSE HYDROSEEDING APPLICATION AS AN ALTERNATIVE TO BROADCAST SEEDING. AREAS [illegible] SHALL BE SUBMITTED TO AND ARE SUBJECT TO HCRCD APPROVAL.
2. CONTRACTOR MAY PROPOSE DRILL SEED APPLICATION AS AN ALTERNATIVE TO BROADCAST SEEDING. AREAS AND [illegible] SHALL BE SUBMITTED TO AND ARE SUBJECT TO HCRCD APPROVAL.

B. TIMING
1. SEEDING SHALL OCCUR UPON COMPLETION OF SOIL PREPARATION WORK AND UPON REQUEST AND RECEIPT OF APPROVAL BY [illegible].
2. SEED SHALL BE APPLIED BEFORE THE ONSET OF WINTER RAINS.
3. SEEDING SHALL BE COMPLETED BY 15 OCTOBER, UNLESS OTHERWISE APPROVED BY THE HCRCD.
4. CONTRACTOR SHALL COORDINATE WITH THE HCRCD FOR PICK-UP AND DELIVERY OF HCRCD-SUPPLIED SEED AND SHALL REQUEST CONTRACTOR-PROVIDED SEED DELIVERY FROM SUPPLIER NO LESS THAN FIVE (5) WORKING DAYS PRIOR TO APPLICATION. CONTRACTOR SHALL STORE ALL SEED IN A COOL, DRY, SHADED PLACE UNTIL UTILIZED.
5. CONTRACTOR SHALL COORDINATE WITH THE HCRCD NO LESS THAN FIVE (5) WORKING DAYS PRIOR TO SEEDING SO THAT THE HCRCD CAN BE PRESENT DURING SEED APPLICATION.
6. WORK SHALL BE PERFORMED ONLY AT TIMES WHEN WEATHER CONDITIONS AT PROJECT SITE ARE FAVORABLE. NO WORK SHALL BE PERFORMED WHEN WIND CONDITIONS PROHIBIT UNIFORM DISTRIBUTION OF SEED UNLESS APPROVED BY THE HCRCD. NO WORK SHALL BE PERFORMED AND NO EQUIPMENT SHALL BE OPERATED WHEN SOILS ARE SATURATED.

C. LAYOUT
1. SEED SHALL BE APPLIED IN ACCORDANCE TO THE AREAS SHOWN ON PLANS AND ANY ADDITIONAL AREAS IMPACTED BY CONSTRUCTION, INCLUDING UNPAVED ACCESS, STAGING, STOCKPILING, AND HAUL ROUTES NECESSARY TO ACCESS TO SEDIMENT APPLICATION AREAS.
2. CONTRACTOR SHALL FLAG ALL SEEDING AREAS AND THE HCRCD SHALL APPROVE ALL AREAS TO BE SEEDED PRIOR TO SEEDING.
3. CONTRACTOR SHALL LIMIT FOOT AND EQUIPMENT TRAFFIC AND STORAGE OF SUPPLIES IN SEEDED AREAS.

D. PREPARATION OF SEEDING AREAS
1. SOIL PREPARATION WITHIN SEEDING AREAS SHALL OCCUR PRIOR TO BROADCAST SEEDING PER SUB-SECTION SOIL PREPARATION.
2. CLEAR ALL AREAS TO BE SEEDED OF SUBSTANTIAL DEBRIS AND ANY OTHER IMPEDIMENTS TO SEED-SOIL CONTACT

E. SEED APPLICATION
1. SEED SHALL BE DELIVERED TO THE PROJECT SITE IN UNOPENED SEPARATE CONTAINERS WITH THE SEED TAG ATTACHED. CONTAINERS WITHOUT A SEED TAG ATTACHED WILL NOT BE ACCEPTED.
2. LIMIT FOOT TRAFFIC OR STORAGE OF SUPPLIES IN SEEDED AREAS.
3. APPLY THE SEED MIX EVENLY AND AT THE RATES SPECIFIED IN THE TABLES IN SUB-SECTION SEED.
4. ANY REMAINING SEED SHALL BE APPLIED EVENLY TO THE AREAS SHOWN ON THE PLANS.
5. CONTRACTOR SHALL USE APPROPRIATE EQUIPMENT SUCH AS A RAKE OR LIGHT HARROW IMMEDIATELY AFTER APPLICATION TO LIGHTLY TO COVER SEED WITH 1/8-INCH TO ¼-INCH LAYER OF SOIL. SEED COVER SHALL NOT EXCEED ¼ INCH.
6. AFTER THE SITE HAS BEEN SEEDED, STRAW SHALL BE APPLIED PER SUB-SECTION STRAW AND TACKIFIER APPLICATION.

PRELIMINARY

No.	Issue	Checked	Approved	Date
Author	L.Piper	Drafting Check	B.Vivyan	Project Manager	A.Hilton
Designer	L.Piper	Design Check	J.Svehla	Project Director	J.Svehla

Plot Date/Time: October 2022 - 5:43 PM Plotted By: Lucas Piper Filename: N:\02\Eureka\Projects\561\12563417\Digital_Design\CAD\Sheets\12563417_Public Access Plan.dwg

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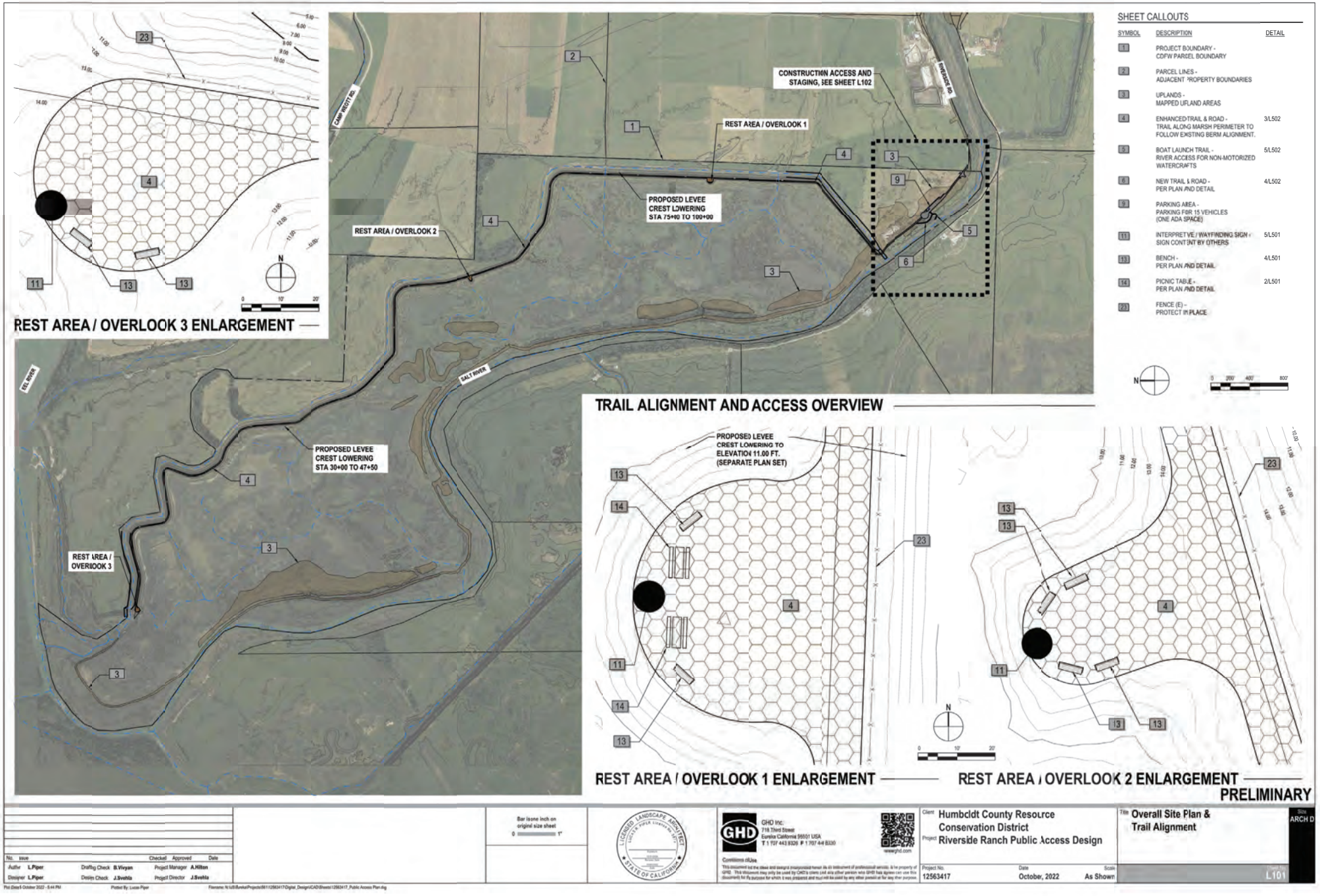
Client: Humboldt County Resource Conservation District
Project: Riverside Ranch Public Access Design

Title: Site Landscape Notes

Size: ARCH D

Project No.: 12563417
Date: October, 2022
Scale: As Shown
Sheet No.: 3002A


SHEET CALLOUTS
SYMBOL
DESCRIPTION
DETAIL
1 PROJECT BOUNDARY - CDFW PARCEL BOUNDARY
2 PARCEL LINES - ADJACENT PROPERTY BOUNDARIES
3 UPLANDS - MAPPED UPLAND AREAS
4 ENHANCED TRAIL & ROAD - TRAIL ALONG MARSH PERIMETER TO FOLLOW EXISTING BERM ALIGNMENT. 3/L502
5 BOAT LAUNCH TRAIL - RIVER ACCESS FOR NON-MOTORIZED WATERCRAFTS 5/L502
6 NEW TRAIL & ROAD - PER PLAN AND DETAIL 4/L502
9 PARKING AREA - PARKING FOR 15 VEHICLES (ONE ADA SPACE)
11 INTERPRETIVE / WAYFINDING SIGN - SIGN CONTENT BY OTHERS 5/L501
13 BENCH - PER PLAN AND DETAIL 4/L501
14 PICNIC TABLE - PER PLAN AND DETAIL 2/L501
23 FENCE (E) - PROTECT IN PLACE
CONSTRUCTION ACCESS AND STAGING, SEE SHEET L102
REST AREA / OVERLOOK 1
PROPOSED LEVEE CREST LOWERING STA 75+00 TO 100+00
REST AREA / OVERLOOK 2
REST AREA / OVERLOOK 3 ENLARGEMENT
TRAIL ALIGNMENT AND ACCESS OVERVIEW
PROPOSED LEVEE CREST LOWERING STA 30+00 TO 47+50
REST AREA / OVERLOOK 3
PROPOSED LEVEE CREST LOWERING TO ELEVATION 11.00 FT. (SEPARATE PLAN SET)
REST AREA / OVERLOOK 1 ENLARGEMENT
REST AREA / OVERLOOK 2 ENLARGEMENT
PRELIMINARY
SALT RIVER
CAMP REGIS RD
RIVERSIDE DR
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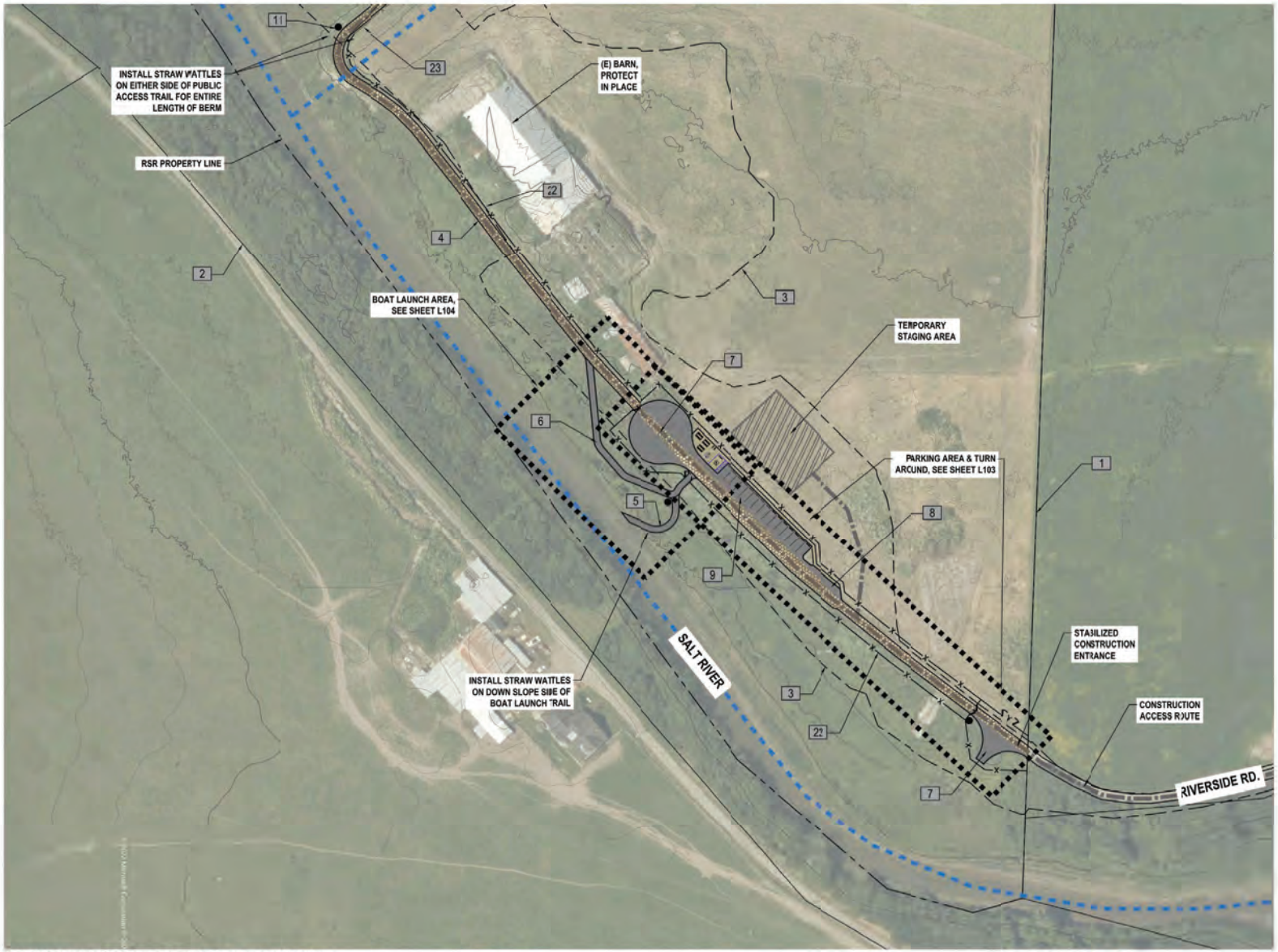
Humboldt County Resource Conservation District
Riverside Ranch Public Access Design
Overall Site Plan & Trail Alignment
Project No. 12563417
Date October, 2022
Scale As Shown
Size ARCH D
L101



SHEET CALLOUTS

SYMBOL	DESCRIPTION	DETAIL
1	PROJECT BOUNDARY - CDFW PARCEL BOUNDARY	
2	PARCEL LINES - ADJACENT PROPERTY BOUNDARIES	
3	UPLANDS - MAPPED UPLAND AREAS	
4	ENHANCED TRAIL & ROAD - TRAIL AROUND MARSH PERIMETER TO FOLLOW EXISTING BERM ALIGNMENT.	3/L502
5	BOAT LAUNCH TRAIL - RIVER ACCESS FOR NON-MOTORIZED WATERCRAFTS	5/L502
6	NEW TRAIL & ROAD - PER PLAN AND DETAIL	4/L502
7	TURN AROUND - FOR PUBLIC AND EMERGENCY VEHICLE USE	
8	PULL OUT - LOADING AND UNLOADING ZONE AND BUS PARKING ZONE	
9	PARKING AREA - PARKING FOR 15 VEHICLES (ONE ADA SPACE)	
11	INTERPRETIVE / WAYFINDING SIGN - SIGN CONTENT BY OTHERS	5/L501
22	FENCE (N) - NEW FENCE PER PLAN AND DETAIL	6/L502
23	FENCE (E) - PROTECT IN PLACE	

N

0 60' 120'

CONSTRUCTION ACCESS AND STAGING

PRELIMINARY

No.	Issue	Checked	Approved	Date
Author	L.Piper	Drafting Check	B.Vivyan	Project Manager	A.Hilton
Designer	L.Piper	Details Check	J.Svehla	Project Director	J.Svehla

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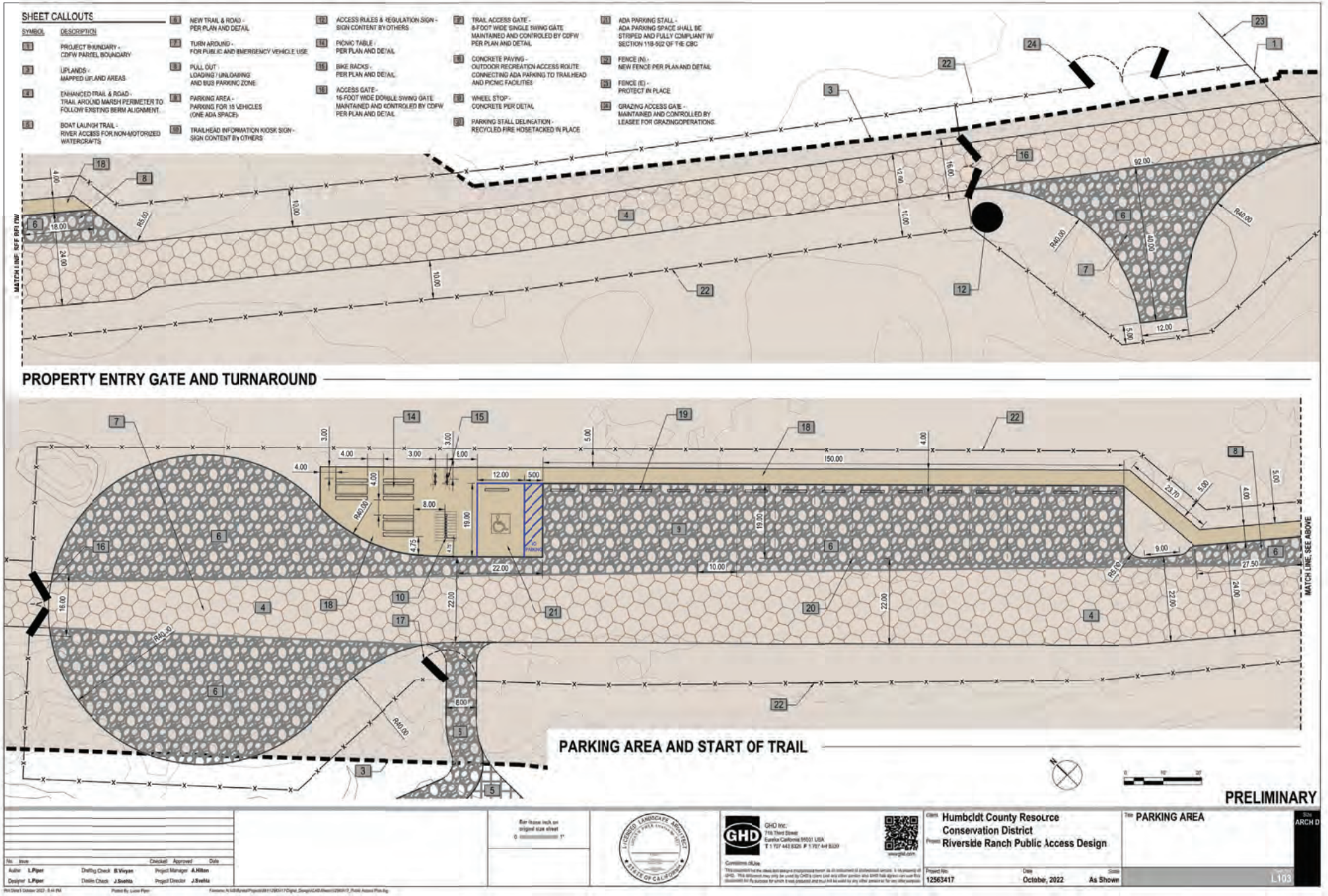
Client: Humboldt County Resource Conservation District
Project: Riverside Ranch Public Access Design
Title: Construction Access, Staging & Erosion Control
Size: ARCH D
Project No.: 12563417
Date: October, 2022
Scale: As Shown
Sheet No.: L102


SHEET CALLOUTS
SYMBOL
DESCRIPTION
1 PROJECT BOUNDARY - CDFW PARCEL BOUNDARY
3 UPLANDS - MAPPED UP LAND AREAS
4 ENHANCED TRAIL & ROAD - TRAIL AROUND MARSH PERIMETER TO FOLLOW EXISTING BERM ALIGNMENT.
5 BOAT LAUNCH TRAIL - RIVER ACCESS FOR NON-MOTORIZED WATERCRAFTS
6 NEW TRAIL & ROAD - PER PLAN AND DETAIL
7 TURN AROUND - FOR PUBLIC AND EMERGENCY VEHICLE USE
8 PULL OUT - LOADING / UNLOADING AND BUS PARKING ZONE
9 PARKING AREA - PARKING FOR 15 VEHICLES (ONE ADA SPACE)
10 TRAILHEAD INFORMATION KIOSK SIGN - SIGN CONTENT BY OTHERS
12 ACCESS RULES & REGULATION SIGN - SIGN CONTENT BY OTHERS
14 PICNIC TABLE - PER PLAN AND DETAIL
15 BIKE RACKS - PER PLAN AND DETAIL
16 ACCESS GATE - 16-FOOT WIDE DOUBLE SWING GATE MAINTAINED AND CONTROLED BY CDFW PER PLAN AND DETAIL
17 TRAIL ACCESS GATE - 8-FOOT WIDE SINGLE SWING GATE MAINTAINED AND CONTROLED BY CDFW PER PLAN AND DETAIL
18 CONCRETE PAVING - OUTDOOR RECREATION ACCESS ROUTE CONNECTING ADA PARKING TO TRAILHEAD AND PICNIC FACILITIES
19 WHEEL STOP - CONCRETE PER DETAIL
20 PARKING STALL DELINEATION - RECYCLED FIRE HOSETACKED IN PLACE
21 ADA PARKING STALL - ADA PARKING SPACE SHALL BE STRIPED AND FULLY COMPLIANT W/ SECTION 11B-502 OF THE CBC
22 FENCE (N) - NEW FENCE PER PLAN AND DETAIL
23 FENCE (E) - PROTECT IN PLACE
24 GRAZING ACCESS GATE - MAINTAINED AND CONTROLLED BY LEASEE FOR GRAZING OPERATIONS.
MATCH LINE SEE RPI NW
PROPERTY ENTRY GATE AND TURNAROUND
PARKING AREA AND START OF TRAIL
MATCH LINE, SEE ABOVE
PRELIMINARY
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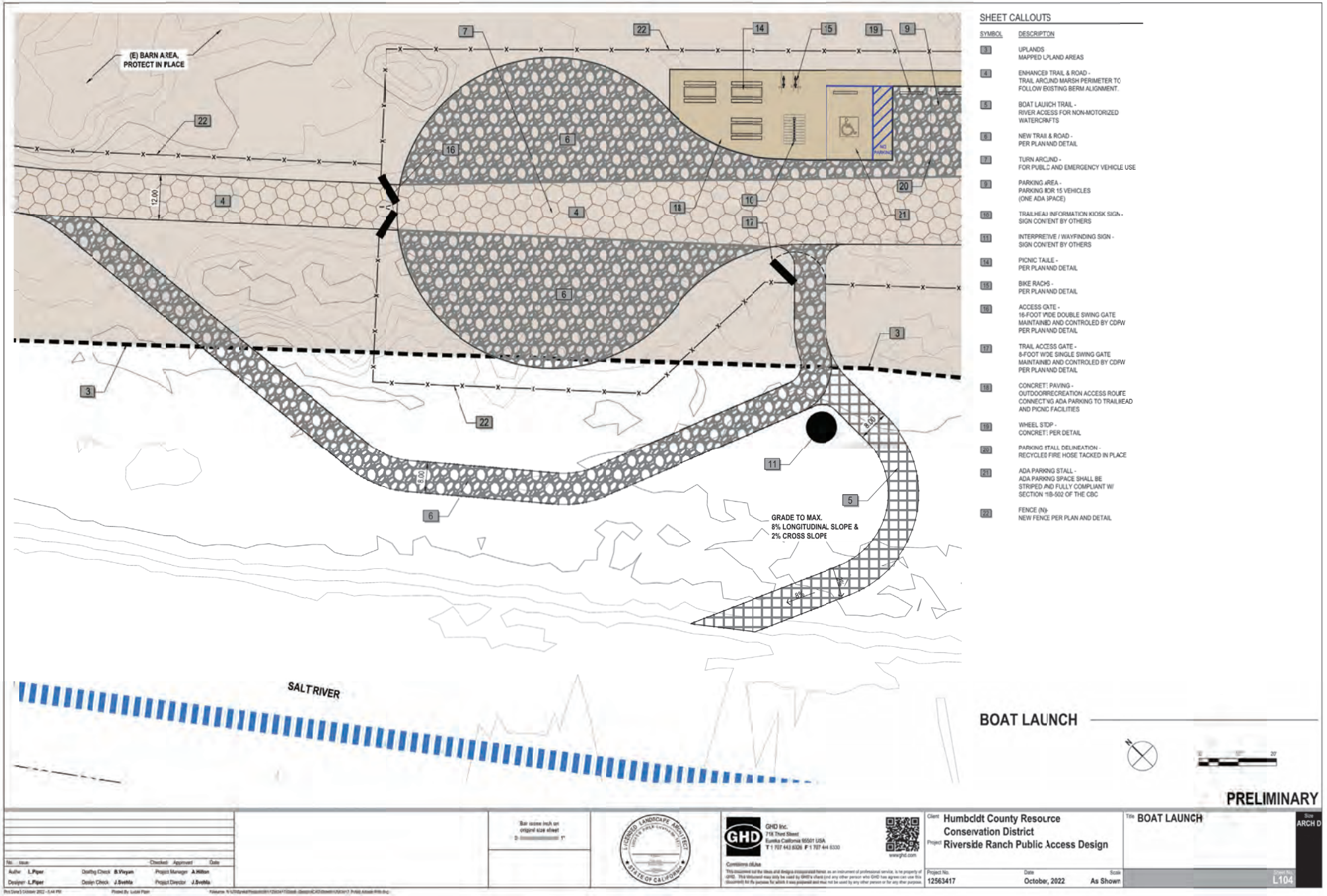
T 1 707 443 8326 F 1 707 44 8329
Humbcldt County Resolrce Conservation District
Riverside Ranch Public Access Design
PARKING AREA
Project No. 12563417
Date October, 2022
Scale As Shown
ARCH D
L103


(E) BARN AREA, PROTECT IN PLACE
SALT RIVER
GRADE TO MAX. 8% LONGITUDINAL SLOPE & 2% CROSS SLOPE
SHEET CALLOUTS
SYMBOL DESCRIPTION
3 UPLANDS MAPPED UPLAND AREAS
4 ENHANCED TRAIL & ROAD - TRAIL AROUND MARSH PERIMETER TO FOLLOW EXISTING BERM ALIGNMENT.
5 BOAT LAUNCH TRAIL - RIVER ACCESS FOR NON-MOTORIZED WATERCRAFTS
6 NEW TRAIL & ROAD - PER PLAN AND DETAIL
7 TURN AROUND - FOR PUBLIC AND EMERGENCY VEHICLE USE
9 PARKING AREA - PARKING FOR 15 VEHICLES (ONE ADA SPACE)
10 TRAILHEAD INFORMATION KIOSK SIGN - SIGN CONTENT BY OTHERS
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20 PARKING STALL DELINEATION - RECYCLED FIRE HOSE TACKED IN PLACE
21 ADA PARKING STALL - ADA PARKING SPACE SHALL BE STRIPED AND FULLY COMPLIANT W/ SECTION 11B-502 OF THE CBC
22 FENCE (N) - NEW FENCE PER PLAN AND DETAIL
BOAT LAUNCH
PRELIMINARY
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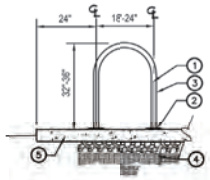
Client Humboldt County Resource Conservation District
Project Riverside Ranch Public Access Design
Title BOAT LAUNCH
Project No. 12563417
Date October, 2022
Scale As Shown
Size ARCH D
L104

LEGEND:
1. INVERTED U BIKE RACK, 2-INCH (MIN.) DIA. HOT DIPPED GALVANIZED STEEL PIPE.
2. SURFACE MOUNT VIA (2) 6" DIA. ANCHOR FLANGE WITH THREE MOUNTING HOLES EACH. SECURE TO CONCRETE WITH ANCHOR BOLTS. SPACE BETWEEN MULTIPLE BIKE RACKS SHALL BE 36" O.C.
3. ELECTROSTATICALLY APPLIED POLYESTER POWDER COAT - BLACK COLOR.
4. 90% COMPACTED SUBGRADE.
5. 4" CONCRETE PAD / SIDEWALK OVER 4" BASE ROCK. SEE PLAN FOR LAYOUT.

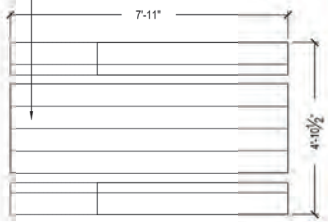


145-1438 BIKE DOCK

"LOOP BIKE DOCK", #145-1438, AVAILABLE FROM thepwkcatalog.com, OR APPROVED EQUAL.

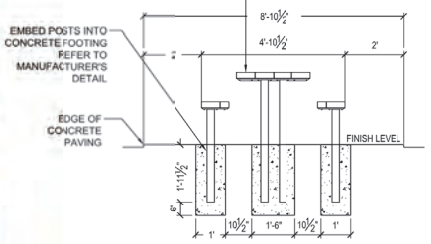
1 LOOP BIKE RACK
1/2" = 1'-0"

DUMOR 75 SERIES TABLE MODEL NO. 75-68 (8' PICNIC TABLE) MODEL NO. 75-68-1(8' ADA PICNIC TABLE) ALL TABLES SHALL BE DOUGLAS FIR.



2 PICNIC TABLE PLAN
1" = 1'-0"

DUMOR 75 SERIES TABLE MODEL NO. 75-68 8' PICNIC TABLE) & MODEL NO. 75-68-1 (8' ADA PICNIC TABLE) ALL PICNIC TABLES SHALL BE DOUGLAS FR WOOD.



3 PICNIC TABLE SECTION
1/2" = 1'-0"

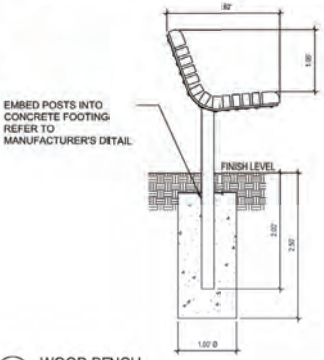
PRODUCT: WOOD BENCH
MODEL 39-600 WITH S-1 EMBEDMENT BY DUMOR, INC
WWW.DUMOR .COM | PHONE: 1-800-598-4018

SIZE: 71" LONG BY 23" WIDE

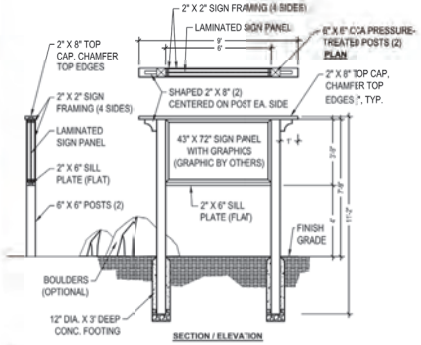
WOOD TYPE: 'C' OR BETTER DOUGLAS FIR KD 15% EE

MOUNTING: S-1 EMBEDMENT - INSTALL PER MANUFACTURE'S RECOMMENDATIONS.

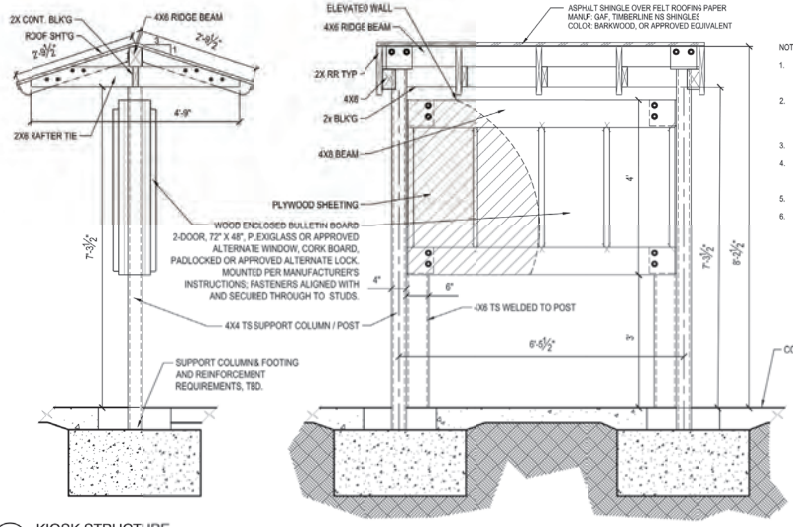
LOCATIONS: INSTALL AT LOCATIONS SHOWN ON PLANS.



4 WOOD BENCH
1" = 1'



5 SIGN STRUCTURE
NTS



NOTES:
1. CONTRACTOR OR MANUFACTURER SHALL PROVIDE STRUCTURAL ENGINEERED SHOP DRAWINGS AND CALCULATIONS.
2. ALL HARD SURFACES TO BE TREATED WITH VANDAL-RESISTANT COATINGS: SHERWIN-WILLIAMS ANTI-GRAFFITI COATING OR APPROVED EQUIVALENT.
3. ALL FASTENERS TO BE HOT-DIP GALVANIZED.
4. ALL WOOD MEMBERS TO BE PRIMED AND PAINTED BEFORE ASSEMBLY. ALL FLASHING TO BE PAINTED.
5. ALL LUMBER TO BE FIRE TREATED
6. ALL PAINT TO BE
   - SHERWIN-WILLIAMS PAINT
   - PRODUCT: DEEP RUSSET
   - PRODUCT NUMBER: MP 054632
   - OR APPROVED EQUIVALENT

6 KIOSK STRUCTURE
3/4" = 1'-0"

PRELIMINARY

No.	Issue	Checked	Approved	Date
Author	L.Piper	Drafting Check	B.Vivyan	Project Manager	A.Hilton
Designer	L.Piper	Design Check	J.Svehla	Project Director	J.Svehla

Bar is one inch on original size sheet

LICENSED LANDSCAPE ARCHITECT — LUCAS E. PIPER — STATE OF CALIFORNIA

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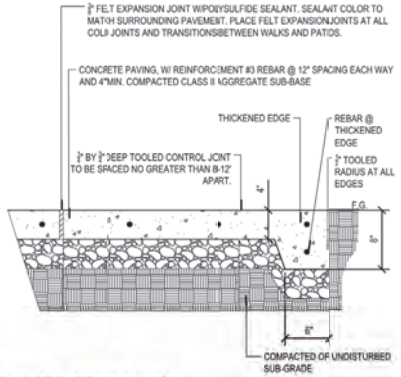
Client: Humboldt County Resource Conservation District
Project: Riverside Ranch Public Access Design

Title: AMENITY AND FURNISHING DETAILS

Size: ARCH D

Project No.	Date	Scale	Sheet No.
12563417	October, 2022	As Shown	L501

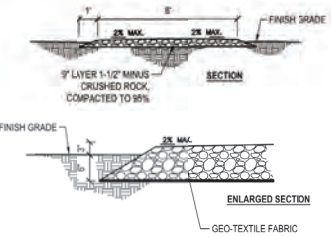
Plot Date: 5 October 2022 - 5:44 PM | Plotted By: Lucas Piper | Filename: N:\US\Eureka\Projects\561\12563417\Digital_Design\CAD\Sheets\12563417_Public Access Plan.dwg



1 CONCRETE PAVING

1-1/2" = 1'-0"

Running Slope of Trail Segment		Maximum Length of Segment
Steeper Than	But Not Steeper Than	
1:20 (5%)	1:12 (8.33%)	200 feet
1:12 (8.33%)	1:10 (10%)	30 feet
1:10 (10%)	1:8 (12%)	10 feet



5 BOAT LAUNCH TRAIL

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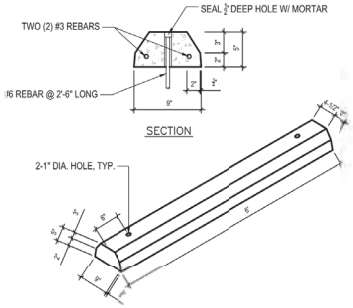

2 CONCRETE WHEEL STOP

1" = 1'-0" P-R02-98

Running Slope of Trail Segment		Maximum Length of Segment
Steeper Than	But Not Steeper Than	
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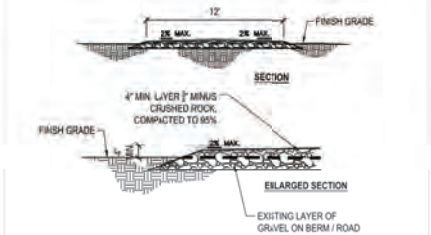
1:12 (8.33%)	1:10 (10%)	30 feet
1:10 (10%)	1:8 (12%)	10 feet



3 ENHANCED TRAIL / ROAD

1" = 1'-0" P-R02-96

Running Slope of Trail Segment		Maximum Length of Segment
Steeper Than	But Not Steeper Than	
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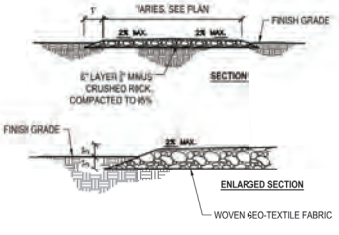
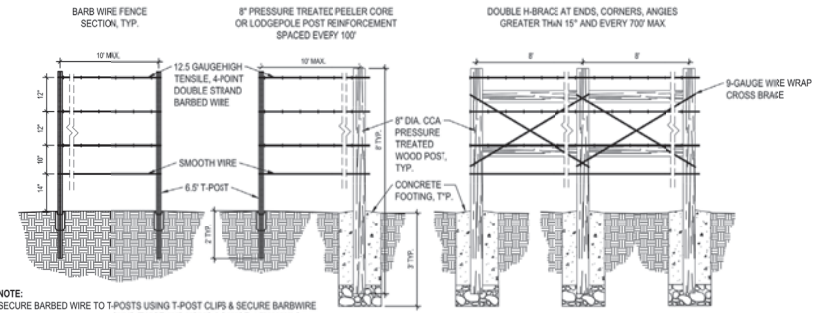
1:12 (8.33%)	1:10 (10%)	30 feet
1:10 (10%)	1:8 (12%)	10 feet



4 NEW TRAIL / ROAD

NTS P-R02-95



6 4-STRAND BARB WIRE FENCE

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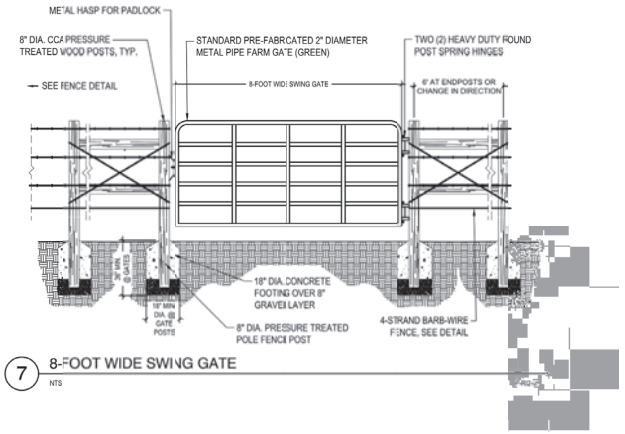
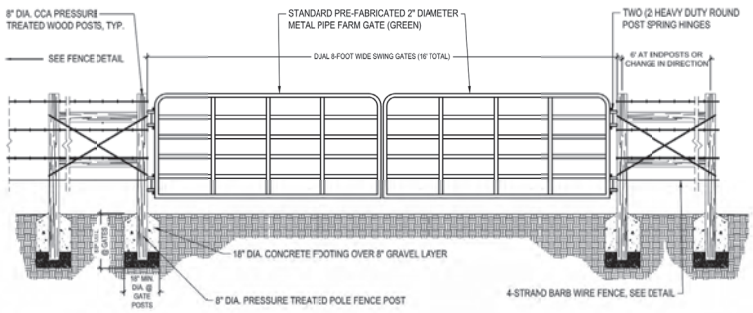


7 8-FOOT WIDE SWING GATE

NTS



8 16-FOOT WIDE DOUBLE SWING GATE

NTS P-R02-93

PRELIMINARY

No.	Issue	Checked	Approved	Date
Author	L.Piper	Drafting Check	B.Vivyan	Project Manager	A.Hilton
Designer	L.Piper	Design Check	J.Svehla	Project Director	J.Svehla

Bar is one inch on original size sheet (0 — 1")

LICENSED LANDSCAPE ARCHITECT — LUCAS R. PIPER — STATE OF CALIFORNIA

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Client: Humboldt County Resource Conservation District
Project: Riverside Ranch Public Access Design

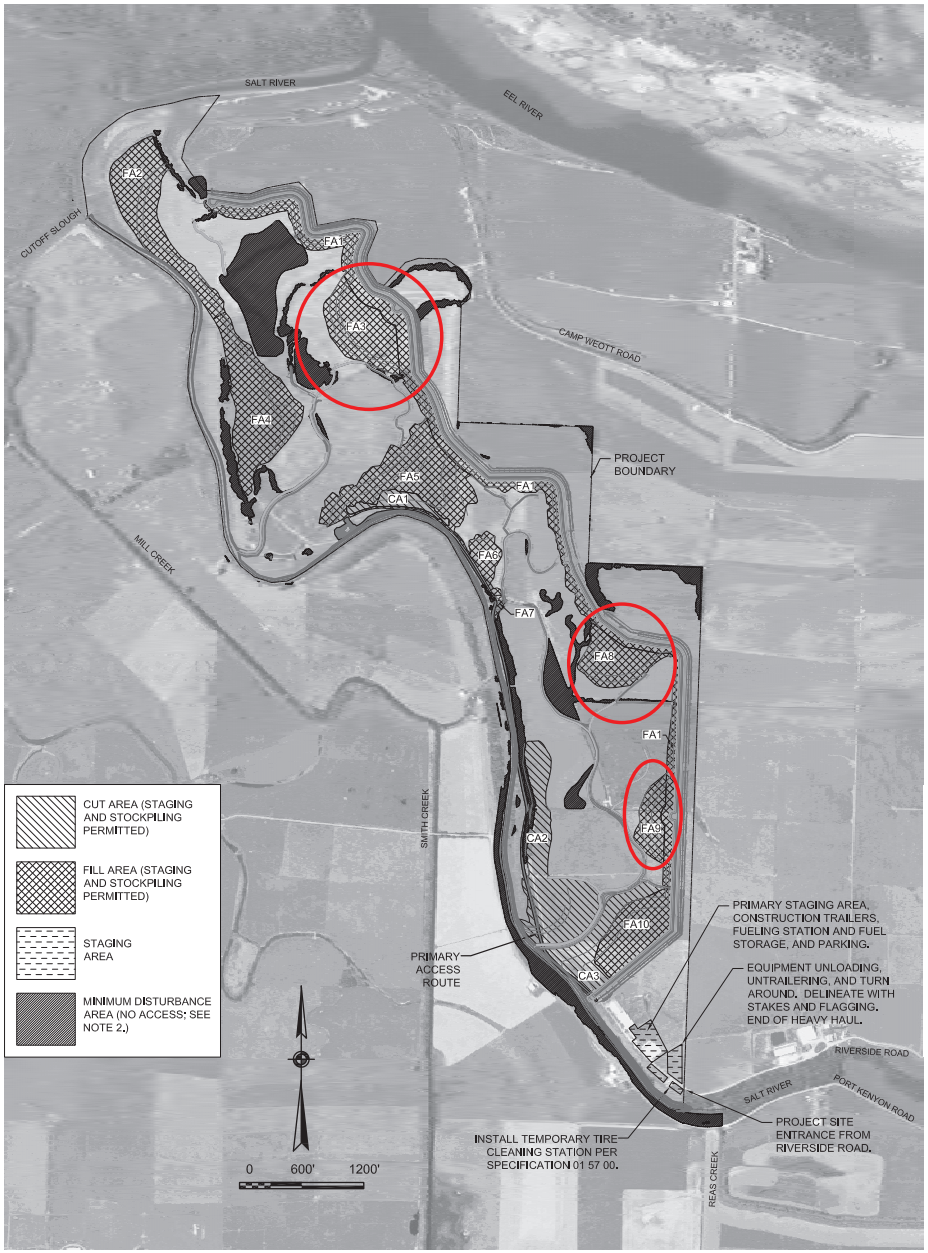
Title: FENCE AND TRAIL CONSTRUCTION DETAILS

Size: ARCH D

Project No.	Date	Scale	Sheet No.
12563417	October, 2022	As Shown	L502

Pro Date:5 October 2022 - 5:44 PM Plotted By: Lucas Piper Filename: N:\US\Eureka\Projects\561\12563417\Digital_Design\CAD\Sheets\12563417_Public Access Plan.dwg

EXHIBIT 4



SITE ACCESS AND STAGING NOTES:

1. ALL EQUIPMENT AND PERSONNEL SHALL ACCESS THE SITE VIA THE PRIMARY ACCESS ROUTE AND ENTRANCE AT RIVERSIDE RANCH ROAD.
2. NO ACCESS OR EARTHWORK WITHIN MINIMUM DISTURBANCE AREAS. VEGETATION TO BE RETAINED AND PROTECTED IN THESE AREAS. NO ACCESS WITHOUT PRIOR APPROVAL OF CONSTRUCTION MANAGER.
3. CONTRACTOR SHALL MAKE ANY MINOR IMPROVEMENTS TO THE ACCESS ROAD AS DIRECTED BY THE CONSTRUCTION MANAGER. PRIOR APPROVAL FROM THE CONSTRUCTION MANAGER REQUIRED IF CONTRACTOR WISHES TO IMPROVE ACCESS ROUTES OR STAGING AREAS. CONTRACTOR MAY LINE ACCESS ROUTES AND STAGING AREAS WITH GEOTEXTILE FABRIC AND FINISH WITH CRUSHED ROCK, PER DETAIL 2. ALL ACCESS ROADS AND STAGING AREA IMPROVEMENTS TO BE REMOVED BY CONTRACTOR UPON COMPLETION OF PROJECT AND AREAS DECOMPACTED AND RETURNED TO PRE-EXISTING CONDITIONS.
4. AT THE COMPLETION OF THE PROJECT, THE CONSTRUCTION MANAGER MAY REQUIRE THAT HEAVILY RUTTED SECTIONS OF ACCESS ROUTES ARE REPAIRED.
5. EQUIPMENT STAGING AND REFUELING PER SPECIFICATIONS.
6. LIVESTOCK AND GATE CONTROL: CONTRACTOR SHALL FOLLOW ALL CONSTRUCTION MANAGER'S INSTRUCTIONS ON GATE CLOSURE. CONTRACTOR LIABLE FOR ALL DAMAGES RESULTING FROM ANY AND ALL IMPROPER GATE CLOSURES.

STAGING AND STOCKPILING NOTES:

1. STAGING AND STOCKPILING OF SOIL, WOODY DEBRIS, AND OTHER DEBRIS IS PERMITTED ONLY IN FILL AREAS FA1 - FA10, CUT AREAS CA1 - CA3, AND DESIGNATED STAGING AREAS NEAR PROJECT ENTRANCE.
2. STOCKPILING OF DEBRIS, VEGETATION, AND WOOD CHIPS IS PERMITTED IN DESIGNATED AREAS.

TRAFFIC MANAGEMENT NOTES:

1. RIVERSIDE ROAD BETWEEN DILLON ROAD AND THE PROJECT SITE ENTRANCE VARIES IN WIDTH BETWEEN 10-15 FEET, WITH NO CENTERLINE STRIPE AND MINIMAL TURNOUTS. RIVERSIDE ROAD IS PRIMARILY USED FOR AGRICULTURAL AND RURAL RESIDENTIAL USE AND FREQUENTLY USED BY HAY AND MILK TRUCKS ASSOCIATED WITH AGRICULTURAL BUSINESS ALONG RIVERSIDE ROAD. TO THE BEST OF THEIR ABILITY, CONTRACTOR, SUBCONTRACTORS AND TRUCKERS SHALL YIELD TO ALL TRAFFIC AND NOT CAUSE TRAFFIC DELAYS ON RIVERSIDE RANCH ROAD.
2. PRIOR TO RECEIVING A NOTICE TO PROCEED, THE CONTRACTOR SHALL PROVIDE A TEMPORARY TRAFFIC MANAGEMENT PLAN FOR REVIEW AND APPROVAL BY THE CONSTRUCTION MANAGER AND THE COUNTY DEPARTMENT OF PUBLIC WORKS. THE TRAFFIC PLAN SHALL CONFORM TO THE PROVISIONS PRESENTED BELOW AND SHALL BE A LIVING DOCUMENT, SUBJECT TO MODIFICATION AND UPDATED AS PROJECT CONDITIONS CHANGE. IF CHANGES ARE MADE TO THE TRAFFIC PLAN, CONTRACTOR SHALL SUBMIT AND ALLOW 10 WORKING DAYS FOR PLAN REVIEW AND APPROVAL BY THE CONSTRUCTION MANAGER AND THE COUNTY.
3. THE TRAFFIC MANAGEMENT PLAN SHALL BE DEVELOPED AND IMPLEMENTED IN ACCORDANCE TO THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND ALL OTHER PERTINENT STATE AND LOCAL REQUIREMENTS. THE TRAFFIC MANAGEMENT PLAN SHALL INCLUDE, BUT IS NOT LIMITED TO, THE PROPOSED AVERAGE DAILY TRAFFIC (ADT), DURATION OF WORK, STAGING AREAS, SIGN PLACEMENT, AND FREQUENCY OF ON-SITE MEETINGS TO BE PERFORMED TO REVIEW AND UPDATE THE TRAFFIC MANAGEMENT PLAN.
4. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY PLACEMENT, MAINTENANCE AND REMOVAL OF TEMPORARY TRAFFIC CONTROL DEVICES AND SIGNS. IF SIGNS ARE PLACED IN THE COUNTY RIGHT-OF-WAY (ROW), THE CONTRACTOR SHALL BE RESPONSIBLE FOR APPLYING FOR AND SECURING THE NECESSARY ENCROACHMENT PERMIT(S). IF SIGNS ARE TO BE PLACED ON PRIVATE PROPERTY, THE CONTRACTOR SHALL RECEIVE PERMISSION FROM THE CONSTRUCTION MANAGER AND PROPERTY OWNER PRIOR TO PLACEMENT.
5. THE CONTRACTOR SHALL INSTALL A TEMPORARY ADVANCE WARNING NOTIFICATION SIGN(S) ON RIVERSIDE ROAD NEAR THE INTERSECTION WITH DILLON ROAD. A RECOMMENDED LOCATION IS PROVIDED ON MAP (THIS SHEET). THE TEMPORARY SIGN(S) LOCATION SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE COUNTY AND SHALL INCLUDE, BUT NOT LIMITED TO THE INFORMATION BELOW:

   A. ENTERING "NAME" PROJECT AREA
   B. CONSTRUCTION DATE X TO X
   C. END COUNTY ROAD 1- MILE AHEAD, NO TURNAROUND
   D. NARROW ROAD AHEAD
   E. OVERSIZED TRUCK TRAFFIC
   F. LOCAL TRAFFIC ONLY

6. THE CONTRACTOR SHALL INFORM THE CONSTRUCTION MANAGER A MINIMUM OF 72-HOURS IN ADVANCE OF THE ANTICIPATED DATE AND 4-HOUR WINDOW OF LARGE / OVERSIZED TRUCK-TRAILER CONSTRUCTION TRAFFIC ON RIVERSIDE ROAD. THE CONSTRUCTION MANAGER WILL BE RESPONSIBLE FOR NOTIFYING THE RESIDENCES ALONG RIVERSIDE ROAD. THE CONSTRUCTION MANAGER SHALL PROVIDE THE CONTRACTOR THE DATES AND TIMES OF LARGE / OVERSIZED VEHICLE USE ASSOCIATED WITH THE EXISTING AGRICULTURAL BUSINESSES ON RIVERSIDE ROAD.
7. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL TRAFFIC AND ENCROACHMENT PERMITS RELATED TO THE DELIVERY AND HAULING OF CONSTRUCTION EQUIPMENT AND MATERIALS, AND TRAFFIC CONTROL MEASURES AND DEVICES. THE CONTRACTOR MUST FOLLOW ALL PERTINENT STATE AND LOCAL REQUIREMENTS FOR TRANSPORTING LARGE VEHICLES AND EQUIPMENT TO THE PROJECT SITE.
8. THE CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR OF ANY DAMAGE TO RIVERSIDE ROAD RESULTING FROM THE CONSTRUCTION INGRESS / EGRESS ACTIVITY. THE POST-PROJECT CONDITION OF RIVERSIDE ROAD SHALL MEET OR EXCEED PRE-PROJECT CONDITIONS AND, IF NECESSARY, BE REPAIRED TO THE SATISFACTION OF THE CONSTRUCTION MANAGER AT CONTRACTOR'S EXPENSE.

Exhibit 4 (Unutilized Fill Areas)
CDP 1-10-032-A10

Kamman Hydrology & Engineering, Inc.

STAMP

BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ADJUST SCALES ACCORDINGLY

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MARK	DATE	DESCRIPTION
		ISSUE

HUMBOLDT COUNTY
RESOURCECONSERVATION DISTRICT
RIVERSIDE RANCH AND SALT RIVER
ECOSYSTEM RESTORATION PROJECT

SITE ACCESS, STAGING, STOCKPILING, AND TRAFFIC MANAGEMENT

PROJ. NO.: 3042
DRWN: SGL | CHKD: GRK

G4

SHEET 4 OF 24

EXHIBIT 5

Michael Love & Associates

Hydrologic Solutions

Riverside Ranch

Hydraulic Assessment

Humboldt County Resource Conservation District

18 November 2021

EXP 09/30/23

GHD Inc 380
718 Third Street
Eureka, CA 95501 USA
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Michael Love & Associates
Hydrologic Solutions
PO Box 4477 • Arcata, CA 95518 • (707) 822 -2411

Printed date	11/18/2021 3:36:00 PM
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File name	RiversideRanchReport.pdf
Author	Brett Vivyan PE (GHD), Jeremy Svehla PE (GHD), Michael Love PE (MLS), Travis James PE (MLA)
Project manager	Brett Vivyan PE
Client name	Humboldt County Resource Conservation District
Project name	HCRCD-RIVERSIDE RANCH ALT. ANALYSIS
Document title	Riverside Ranch | Hydraulic Assessment
Revision version	Rev 1
Project number	11220084

Document status

Status Code	Author	Reviewer	Approved for issue	
		Name	Name	Date
Final	Brett Vivyan PE	Michael Love PE (MLA) Conor Shea PhD, PE (USFWS) Jeremy Svehla PE (GHD) Doreen Hansen (HRCD) Shawn Fresz (CDFW)	Brett Vivyan PE	11/19/2021

Executive Summary

Overview

The Humboldt County Resource Conservation District (HCRCD) is a Special District established in the County of Humboldt by popular vote in 1987. The District's function is to assist private landowners in voluntary planning, design, and in the implementation of natural resource conservation practices in Humboldt County. The HCRCD is the lead agency for multiple habitat restoration projects across coastal Humboldt County, including the Salt River Ecosystem Restoration Project (SEREP). The SRERP is a large restoration project consisting of excavating and restoring 7 miles of the Salt River channel and enhancing over 300 acres of a tidal estuary located in the lower Eel River Delta. Construction of the tidal estuary component of the SRERP, known as Riverside Ranch, was completed in 2013. This report presents results of a hydraulic evaluation of project elements built to accommodate the restoration project within the agricultural landscape setting of the lower Eel River Delta. Specifically, evaluation of a two-mile levee (Riverside Ranch levee) and associated ditch that was constructed along the perimeter of the estuary project within Riverside Ranch, which is owned and maintained by the California Department of Fish and Wildlife (CDFW).

Background

The HCRCD obtained a Wildlife Conservation Board (WCB) grant to retain Professional Hydraulic Engineering services to support USFWS and HCRCD. GHD and Michael Love & Associates' services were retained to work directly with USFWS who provided direction and oversight of the technical analyses in accordance to the scope of services outlined in the HCRCD solicitation. This study focuses on the following project objectives:

– Assess if the Riverside Ranch levee is causing notable flood impacts to the surrounding agricultural areas;
– Identify drainage patterns on adjoining agricultural lands;
– Develop alternatives for potential modifications to the levee/ditch system, or surrounding area to alleviate identified flood impacts

Alternative Selection

The alternative development process utilized the findings of each previous modeled alternative to improve upon the benefits. Lowering of two sections of the levee to elevation 11 feet, as shown in Alternative G1 exhibited the following benefits, listed below and quantified in Table A1:

- Minimized the difference between agricultural and estuary water levels during the peak of the Extreme Flood event by allowing flood flow on the agricultural fields to overtop the Riverside Ranch levee and flow to the estuary
- Greatest reduction in peak water levels on the agricultural fields during the Extreme Flood Level event while preventing the estuary from overtopping the Riverside Ranch levee during the Action and Flood Level events
- Reduced floodplain flow velocities and re-directed floodplain flow away from the residence adjacent to Morgan Slough during the Extreme Flood Level event

In addition to the benefits of Alternative G1, Alternative G1-G exhibited the following benefits:

- Greatest reduction in duration of flooding during the Extreme Flood Level event by 35 hours in the northern agricultural fields
- Reduced duration of flooding during the Extreme Flood Level event by 11 hours in the southern agricultural fields
- Greatest reduction in minimum water levels between precipitation events in northern agricultural fields
- Greatest reduction in maximum water levels between precipitation events in southern agricultural fields

Table A1. Selected Alternative G1-G Summary of Benefits

Metric	Northern Agricultural	Southern Agricultural
Flood Level Event: Difference in Peak Water Level	No Change	No Change
Extreme Flood Level Event: Difference in Peak Water Level	Reduced by 0.1 feet	Reduced by 1.1 feet
Extreme Flood Level Event: Change in Flood Duration	Reduced by 35 hours	Reduced by 11 hours
Precipitation Events: Maximum Water Level	Reduced by 0.1 feet	Reduced by 0.5 feet
Precipitation Events: Minimum Water Level	Reduced by 1.6 feet	Reduced by 0.1 feet

Concept Design

A conceptual design and description of components are presented below.

Simulation Concept

Description

Levee Lowering

Location	Crest Elev. (NAVD)	Length
South	11.0 ft	2,550 ft
North	11.0 ft	1,800 ft

Existing Gated Culverts

Location	Flow Line Elev. (NAVD)	Size
1	2.2 ft	60-inch dia.
2	3.7 ft	60-inch dia.
3	2.8 ft	60-inch dia.

New Gated Culverts

Location	Flow Line Elev. (NAVD)	Size
A	1.6 ft	60-inch dia.
E	1.0 ft	60-inch dia.

New and Reprofiled Drainage Ditches

Location	Flow Line Elev. (NAVD)	Length
i (new)	Min 1.6 ft	1,500 feet
Ii (reprofiled)	Min 1.0 ft	800 feet

3.7 Existing Condition Model Findings

The model results showed that different flood patterns occur across the floodplain depending on the severity of flooding. Key findings regarding the floodplain flow and water levels for each of the four events are presented below. Figures presented in this section identify location of monitored water levels and show modeled water levels and inundation extent.

3.7.1 Action Level

During the Action Level event, peak water levels at Salt River Slough propagate over the Salt River Slough levee and into the northern agricultural fields (Figure 20 and Figure 16a). Local rainfall from the 191-acre drainage area contributing to the northern drainage ditch also contributes to the flooding. The Riverside Ranch levee prevents flow from the northern estuary to the northern agricultural fields. As water levels in the Eel River and estuary begin to recede, floodwaters on the agricultural side of the levee drain over the Salt River Slough levee and through the single 60-inch diameter gated culvert into the Salt River Slough. When water levels on the agricultural side of the levee fall below approximately 7.5 feet, the 60-inch diameter culvert is the only drainage outlet for remaining flood waters. The rate of drain off from the agricultural lands is dependent on Salt River Slough water levels and volume of flood water stored on the agricultural lands. Substantially more volume is stored per foot of water level between elevation 6 feet and 7.5 feet than below 6 feet.

Modeled water levels on the southern agricultural fields are lower than the northern agricultural fields during this event, suggesting limited hydrologic connectivity between the northern and southern agricultural fields at these flood levels (Figure 20 and Figure 16b). In the Action Level event, flooding of the southern agricultural fields and southern drainage ditch appears to be sourced from rainfall-runoff from the 635-acre drainage area to the east. The Riverside Ranch levee prevents water levels in the southern estuary from flowing onto the agricultural lands.

Following the storm event, receding water levels in the Salt River, near the access road, are consistently lower than the southern estuary. This is due to the lower topography in the Salt River channel compared to the tidal channels in the southern estuary.

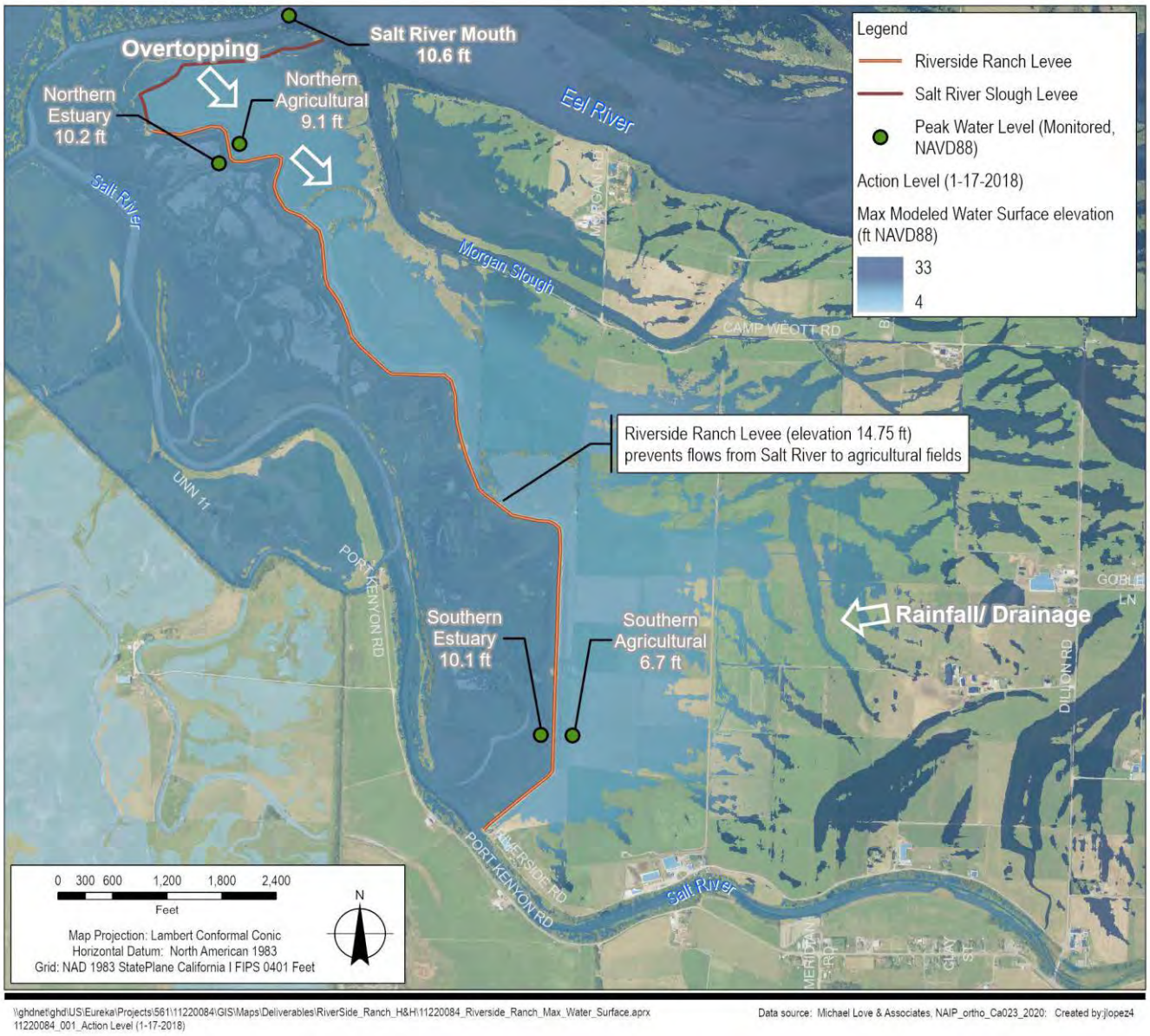


Figure 20 Peak water surface elevations (recorded and modeled) and floodplain flow patterns during Action Level event

3.7.2 Flood Level

Similar to the Action Level event, during the Flood Level event peak water levels in the Salt River Slough propagate over the Salt River Slough levee and flow southeasterly over the agricultural lands (Figure 21 and Figure 17a). Local rainfall from the 191-acre drainage area contributing to the northern drainage ditch and limited overtopping of the southern Eel River bank further upriver also contribute to the flooding. Peak water levels in the northern estuary and agricultural lands are similar, with the Riverside Ranch levee crest several feet above the peak water levels. As water levels in the estuary begin to recede, flood water on the agricultural lands drain over the Salt River Slough levee and through the single 60-inch diameter culvert. When water levels on northern agricultural lands recede to below approximately 7.5 feet, the 60-inch diameter culvert is the only drainage outlet. The rate of drain off on the agricultural lands is dependent on water levels in the receiving estuary and Salt River Slough and culvert capacity. Multiple tidal cycles are required to drain flood waters from the agricultural lands.

A portion of the modeled flood waters from the overtopping of the Salt River Slough levee propagate east to the southern drainage ditch and agricultural fields. Peak water levels on the southern agricultural fields are lower than the northern agricultural fields (Figure 21 and Figure 17b). The increased rainfall-runoff from the 635 acre drainage area to the east, and inflows from limited overtopping of the southern bank of the Eel River from further upriver

contribute to peak water levels on the southern agricultural fields. The Riverside Ranch levee prevents peak water levels in the southern estuary from flowing onto the adjacent agricultural lands.

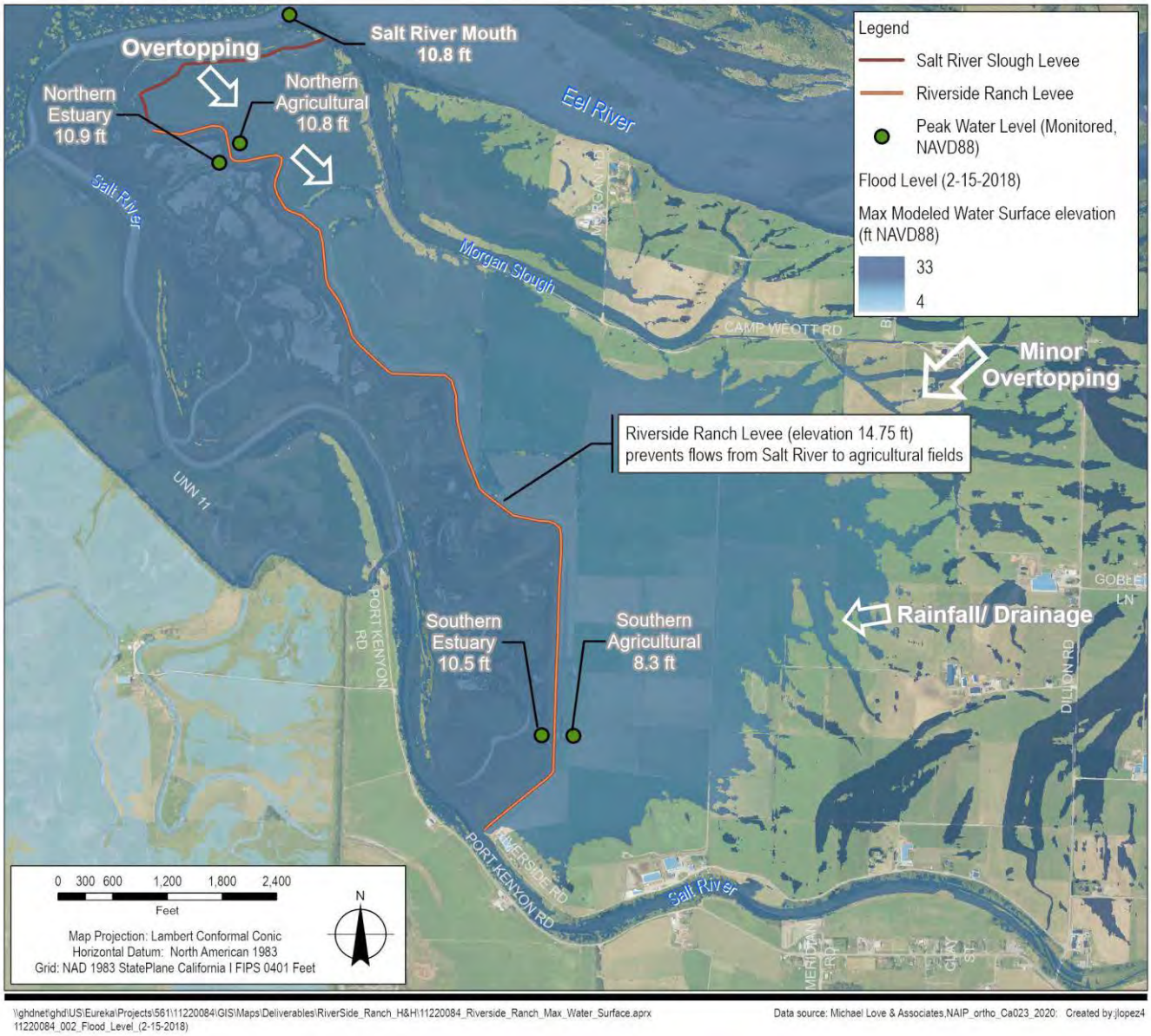


Figure 21 Peak water surface elevations (monitored and modeled) and floodplain flow patterns during Flood Level event

3.7.3 Extreme Flood Level

The Extreme Flood event results in different floodplain patterns compared to the Action and Flood Level events (Figure 22 and Figure 18). The Extreme Flood event results in substantial overtopping of the southern Eel River bank upriver from Morgan Slough and Morgan Road, which results in greater peak water levels on the agricultural lands compared to the estuary. This leads to overtopping of the Riverside Ranch and Salt River Slough levees, conveying flow from the agricultural lands to the estuary. At the onset of the flood event, as flood waters rise in the Eel and Salt Rivers, similar patterns as the Action and Flood Level events occur. As flood water in the Eel continues to rise and overtop the southern bank into the Study Area, floodwaters are routed westward across the broad floodplain and water levels on the agricultural lands rapidly rise, with water levels exceeding those in the estuary. The highest water levels occur on the southern agricultural fields.

Floodplain flows from the Eel River flow east to west and encounter the Riverside Ranch levee, where flow is directed south and north along the eastern side of the levee. Based on site topography and flow paths across the agricultural fields to the east, prior to construction of the Riverside Ranch levee, these floodplain flows would have

continued in a more westerly direction to lower elevation ground and encountered what is now the historical Salt River levee. Under analyzed conditions, floodplain flows traveling north along the levee pass through a topographic constriction between Morgan Slough and the Riverside Ranch levee, where floodplain velocities increase from those in other areas of the agricultural lands and floodplain. After flowing through this topographic constriction, the floodwaters continue northerly, overtopping the Salt River Slough levee and flowing to Salt River Slough and the Eel River.

As water levels on the southern agricultural fields rise above 11 to 12 feet, some of the floodplain flows are conveyed to the south, overtopping of the levee access road at Riverside Road and flow into the Salt River. At water levels above 14.75 feet, overtopping of the Riverside Ranch levee from the agricultural lands to the estuary occurs. A small portion of the overall drainage occurs through the three 60-inch diameter culverts, as water levels are higher on the agricultural lands, however this is an insignificant fraction of the total drainage. As Eel River levels recede, water levels on the agricultural fields remain higher than in the estuary for several days due to the large volume of floodwaters stored on the agricultural lands, limited drainage pathways, and the gradual recession of water levels in the estuary.

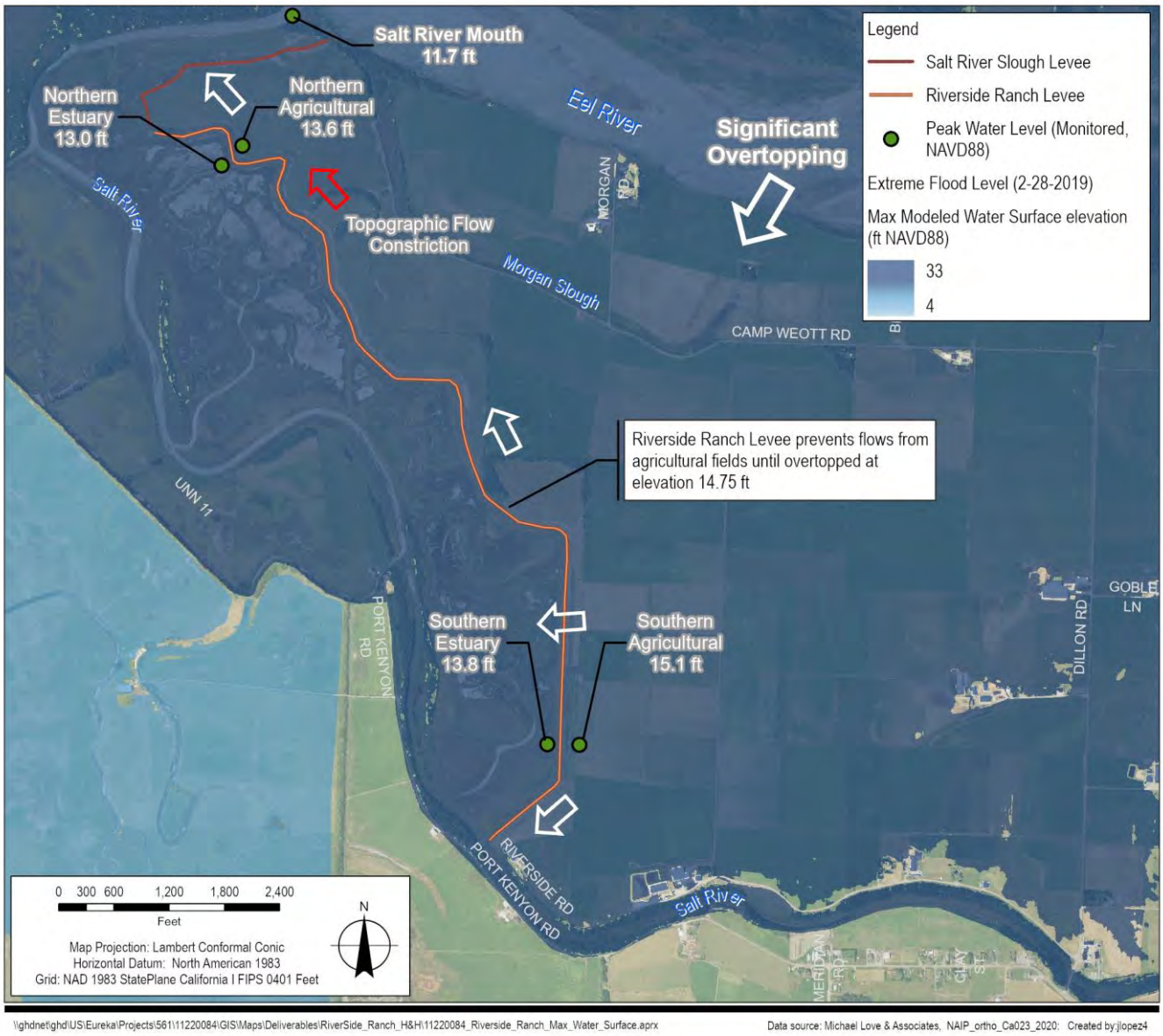


Figure 22 Peak water surface elevations and floodplain flow patterns during Extreme Flood Level event

3.7.4 Precipitation Event

During the Precipitation event, water levels within the southern drainage ditch and southern agricultural fields can only drop to the lowest water levels and elevations of the tidal channels in the southern estuary. Floodplain drainage ponds in the lower agricultural elevations adjacent to the Riverside Ranch levee (Figure 23). Water levels reach peaks of approximately 6 feet (NAVD) during the precipitation events and 4 feet between events (Figure 19). Following the low tide, water levels within the southern ditch increase with floodplain runoff. The lowest water levels in the northern ditch are limited by the existing culvert flow line. Water levels within the northern estuary drainage channel drop to below elevation 2 feet, but the lowest water levels in the northern drainage ditch and agricultural fields do not drop below elevation 3 feet. Maximum water levels in the northern agricultural fields are similar to the southern, reaching approximately 6 feet (NAVD).

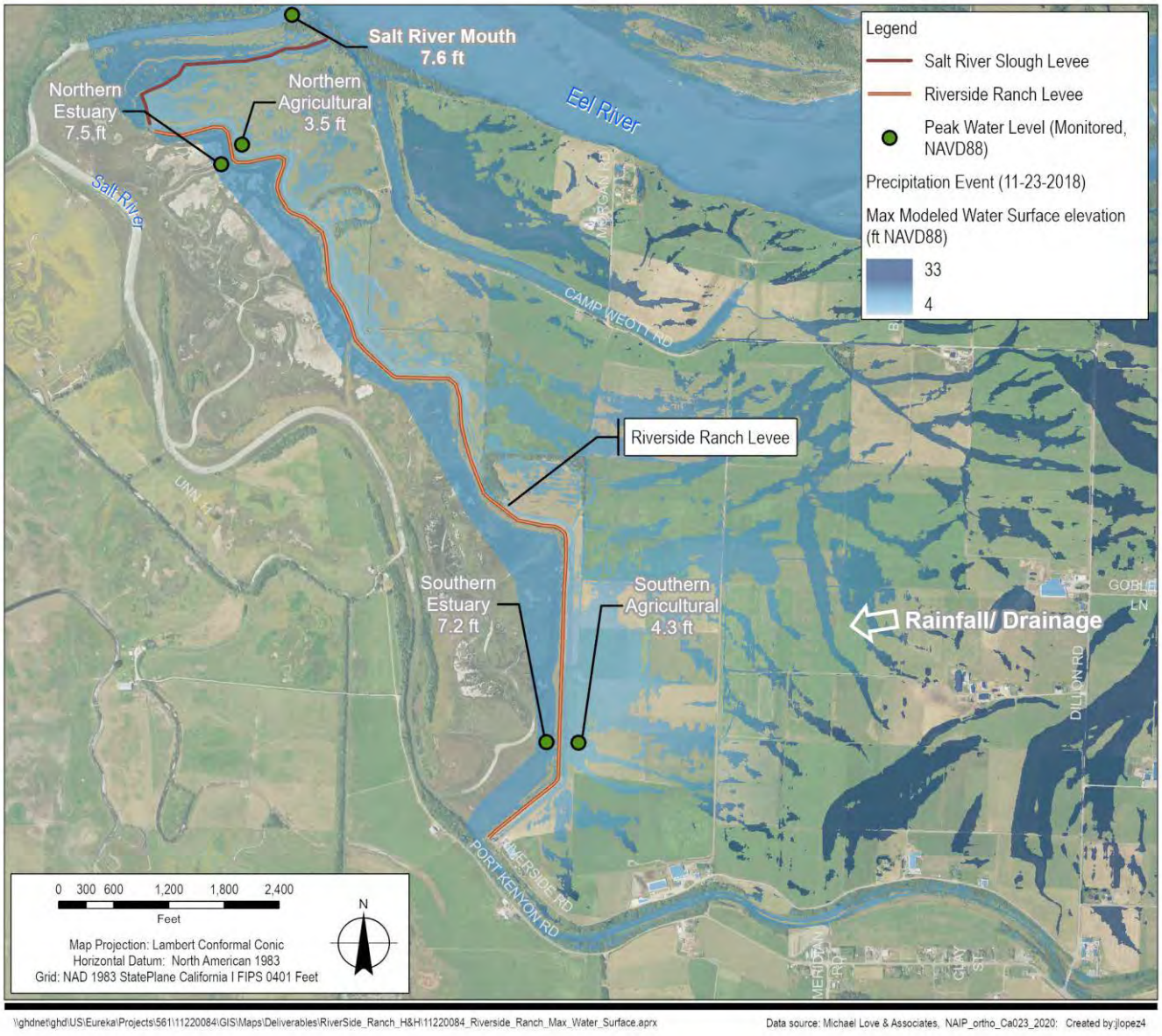


Figure 23 Peak water surface elevations and floodplain flow patterns during precipitation event.

3.8 Summary of Key Findings

The following summary of key findings is based on the analysis of water level monitoring data and existing conditions model results for the four water level simulations.

1. **Peak Water Levels During Extreme Flood Level**

   Floodplain flows originating from the overtopping of the southern bank of the Eel River exceed the drainage capacity of the northern and southern ditches and three 60-inch culverts. The overtopping rate results in higher peak water levels on the agricultural lands than in the estuary. Peak water levels are highest on the southern agricultural fields and overtop the levee and levee access road. The elevation of the Riverside Ranch levee does not allow for the utilization of available flood storage in the estuary when water levels on the agricultural lands exceed at approximately 11 feet.

2. **Flood Pattern During Extreme Flood Level (Past and Present)**

   Floodplain flows from the Eel River flow east to west, towards the southern half of Riverside Ranch. Based on site topography and flow paths across the agricultural fields to the east, prior to construction of the Riverside Ranch levee, these floodplain flows would have continued in a more westerly direction through Riverside Ranch before encountering what is now the historical levee, thus providing floodwater storage within the historical Riverside Ranch and overtopping of the lower-elevation levee system.

   Under current conditions the floodplain flows from the Eel River encounter the southern portion of the Riverside Ranch levee, where flow is directed south and north along the eastern side of the levee. Floodplain flow to the north passes through a topographic constriction, between the levee running along Morgan Slough and the Riverside Ranch levee, where floodplain velocities increase from those in other areas of the agricultural lands. Floodplain flows continue northerly and overtop the Salt River Slough levee. Floodplain flows that are directed south, upon encountering the levee, overtop the levee access road at Riverside Road and eventually overtop the Riverside Ranch levee from the agricultural lands to the estuary.

3. **Peak Water Levels During Action and Flood Level**

   The Riverside Ranch levee prevents peak water levels from flowing onto the agricultural lands. Flooding of the southern agricultural lands is largely due to rainfall-runoff from the 635-acre drainage area to the east. Peak water levels are more than 2 feet lower than on the northern agricultural lands.

   Water levels overtopping the Salt River Slough levee, which has lower top elevations than the Riverside Ranch levee, result in the largest contribution to peak water levels on the northern agricultural lands. The Riverside Ranch levee provides the northern agricultural lands with some flood protection from the estuary at the Action Level event, but peak water levels are nearly the same on both sides of the levee during the Flood Level event.

   The Action and Flood Level events occurred during high tides between 8 feet and 9 feet. The combination of these high tides and high flows on the Eel River resulted in peak estuary water levels between 10.1 feet and 10.9 feet.

4. **Drainage of Agricultural Lands**

   Drainage of the agricultural lands is dependent on water levels, hydraulic gradient between the estuary and agricultural lands, the volume of water stored on the agricultural lands, and the capacity and flow line elevation of the drainage infrastructure. When water levels on the agricultural fields are below levee elevations (7.5 to 14.75 ft), the drainage infrastructure serves as the only means to convey flows from the agricultural lands to the estuary. If water levels in the estuary are greater than water levels on the agricultural lands, tide gates prevent flows from being conveyed to the agricultural lands and all water on the agricultural lands is stored. As estuary water levels recede below the agricultural water levels and/or the water level on the agricultural side rise above the estuary water level, tide gates open and drainage is conveyed from the agricultural lands to the estuary. The northern and southern drainage systems were designed to convey the

10-year storm recurrence interval (KHE, 2019). When water levels on the agricultural fields are greater than approximately 7 feet, flows spread out onto the fields creating a large storage volume. This volume of water exceeds the capacity of the drainage system and multiple tidal cycles are required to drain the agricultural lands. As inboard water levels decrease below 7 feet water becomes concentrated into the existing drainage ditches. At this point the volume of water stored becomes substantially less and the drainage system is capable of draining water levels in the ditch down to the low tide elevation in a single tidal cycle. The lowest water levels are governed by the culvert flowline elevations and elevation of tidal channels in the estuary.

3.9 Hydraulic Design Objectives

Based on the key findings of the water level monitoring data and the existing conditions hydraulic model, the following hydraulic objectives were identified:

– Reduce peak water levels on adjacent agricultural lands during Eel River Extreme Flood Level
– Improve rate of drain-off between storm events from the levee ditches and agricultural fields (northern and southern)

3.10 Design Alternatives

Design alternatives were developed to evaluate potential improvements in drainage patterns associated with various modifications to the existing Riverside Ranch levee and potential addition/replacement of gated drainage culverts and associated drainage ditches. The development of design alternatives was iterative, first focusing on lowering discrete sections of the Riverside Ranch levee to better understand the effect on floodplain flow patterns and peak water levels during the Extreme Flood event, and the effect on flood protection from the Salt River Estuary during the Flood and Action Level events. The alternative development process utilized a proposed conditions hydraulic model, adapted from the existing conditions hydraulic model, to evaluate performance based on the following metrics:

– Reduction in peak water levels on agricultural lands
– Reduction in duration of flooding of agricultural lands
– Reduction in peak floodplain velocities at the topographic constriction
– Minimization of erosion potential associated with levee overtopping
– Reduction in peak water levels and duration of inundation on agricultural fields during local precipitation driven events.

Each alternative built on the information gained from previous alternatives, progressing towards an optimal alternative with respect to the project objectives, with consideration given to avoiding modifications that would not provide additional benefit.

Following the identification of an optimal alternative for the lowering of the Riverside Ranch levee, alternatives that focused on the addition of gated culverts and modifications to drainage channels were developed. These alternatives explored multiple configurations of culverts to increase drainage conveyance and decrease water levels on agricultural lands.

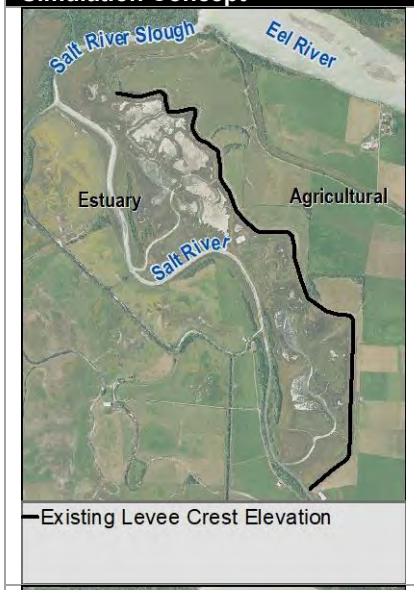
4. Evaluation of Design Alternatives (Concept Design)

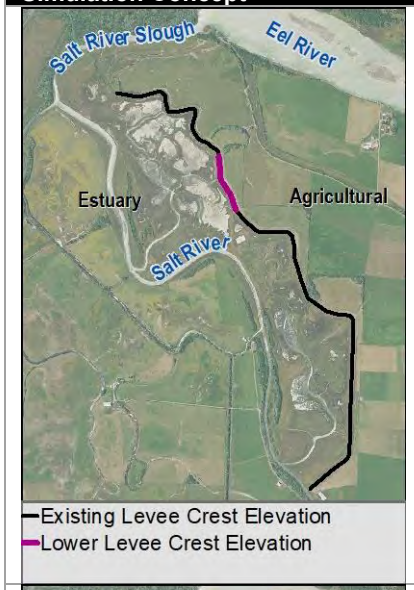
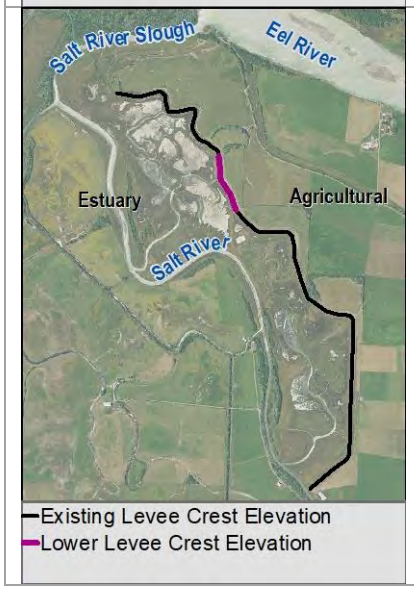
Each alternative was developed using the existing conditions model with modifications to the existing Riverside Ranch levee, addition/modification of gated drainage culverts through the levee, and geometry of the drainage ditch. Discrete lengths of the Riverside Ranch levee were lowered to between elevation 10 and 11.5 feet to assess changes in peak water levels and flow patterns during the Flood Level and Extreme Flood Level events. Culvert structures were added and dimensions and invert elevations assigned. The various configurations are described below.

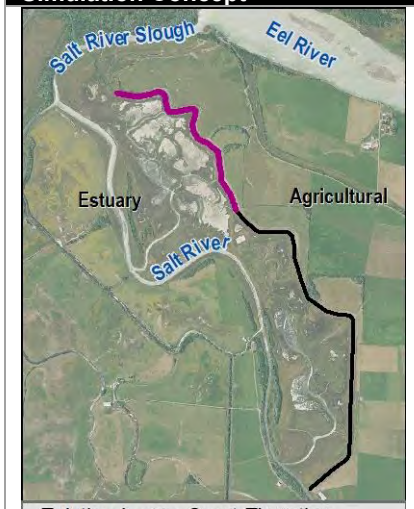
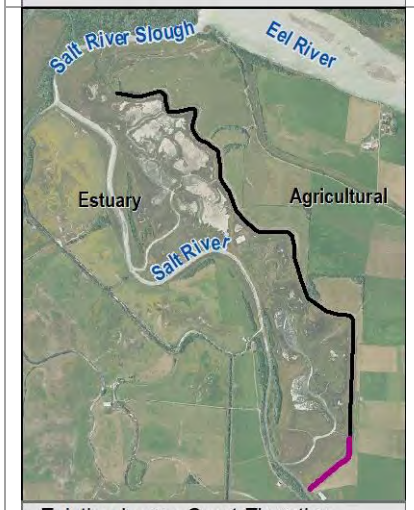
4.1.1 Simulations and Results

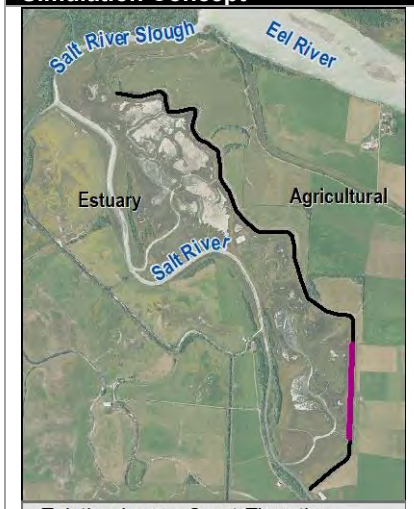
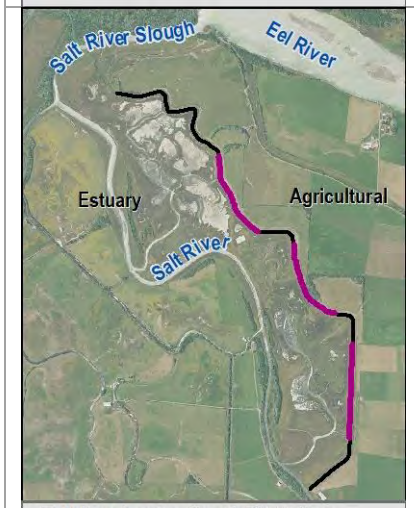
Seven alternatives representing section(s) of lowered levee crest elevations and seven alternatives representing different culvert configurations were developed and simulated. A description of each alternative and resulting hydraulic performance related to the design objectives are described in Table 4 and Table 5. The simulations presented in Table 4 focus on peak water levels and floodplain flow patterns associated with lowering sections of the Riverside Ranch levee. Simulation in Table 5 focus on efficiency of drainage following peak water levels and drain-off between storm events associated with adding culverts and drainage ditch modifications. Detailed hydrographs of each modeled alternative are shown in Appendix A.

Table 4 Simulation summary

Simulation Concept	Description	Modeled Water Level Findings	Modeled Flood Pattern Findings
	**Existing Conditions** Present conditions with typical levee crest elevation of 14.75 feet (NAVD)	**Flood Level** ***Northern Agricultural Fields*** Peak 10.4 feet (Monitored 10.4 ft) ***Southern Agricultural Fields*** Peak 8.4 feet (Monitored 10.1 ft) **Extreme Flood Level** ***Northern Agricultural Fields*** Peak 13.3 feet (Monitored 13.7 ft) ***Southern Agricultural Fields*** Peak 14.8 feet (Monitored 15.1 ft)	**Flood Level** Levee prevents overtopping of flow from estuary to agricultural fields. Flow travels north and south along levee **Extreme Flood Level** Floodplain velocity at residence between Morgan Slough and Riverside Ranch, 1 ft/sec. Flow travels north and south along levee. Higher peak water levels on agricultural lands than estuary.
	**Alternative A** Lower 11,500 linear feet of levee crest to 10 feet (NAVD).	**Flood Level** ***Northern Agricultural Fields*** Increased peak by 0.1 feet ***Southern Agricultural Fields*** Increased peak by 0.4 ft **Extreme Flood Level** ***Northern Agricultural Fields*** No change in peak water levels. Minor reduction in water levels leading up to and following peak. ***Southern Agricultural Fields*** Reduced peak by 1.1 feet. Equal water levels on both sides of levee above 10 feet. Agricultural water levels below or equal to estuary through peak and following peak. Slightly lower than existing after peak and below 10 feet.	**Flood Level** Overtopping of lowered levee areas resulting in flow from estuary to agricultural fields. **Extreme Flood Level** Reduced velocity by 27% between Morgan Slough and Riverside Ranch levee. Flow change from northwesterly to westerly.

Simulation Concept	Description	Modeled Water Level Findings	Modeled Flood Pattern Findings
	**Alternative B1** Lower 1,200 linear feet of levee crest elevation to 11.5 feet (NAVD).	**Flood Level** ***Northern Agricultural Fields*** No change in peak ***Southern Agricultural Fields*** No change in peak **Extreme Flood Level** ***Northern Agricultural Fields*** Reduction of peak water levels by 0.1 feet. Similar water levels throughout storm event. ***Southern Agricultural Fields*** Reduced peak by 0.1 feet. Similar water levels as existing with agricultural above estuary.	**Flood Level** No significant changes **Extreme Flood Level** Increased velocity by 7% between Morgan Slough and Riverside Ranch levee.
	**Alternative B2** Lower 1,200 linear feet of levee crest elevation to 10.0 feet (NAVD).	**Flood Level** ***Northern Agricultural Fields*** Increased peak by 0.1 feet ***Southern Agricultural Fields*** Increased peak by 0.1 feet **Extreme Flood Level** ***Northern Agricultural Fields*** Reduced peak by 0.1 feet. Minor reduction in water levels above 10 feet. ***Southern Agricultural Fields*** Reduced peak by 0.1 feet. Similar water levels as existing with agricultural above estuary.	**Flood Level** Overtopping of lowered levee areas resulting in flow from estuary to agricultural fields. **Extreme Flood Level** Increased velocity by 12% between Morgan Slough and Riverside Ranch levee.

Simulation Concept	Description	Modeled Water Level Findings	Modeled Flood Pattern Findings
	**Alternative C** Lower 4,200 linear feet of levee crest elevation to 11.5 feet (NAVD).	**Flood Level** ***Northern Agricultural Fields*** No change in peak ***Southern Agricultural Fields*** No change in peak **Extreme Flood Level** ***Northern Agricultural Fields*** Reduction of peak water levels by 0.1 feet. Minor reduction in water levels above 12 feet. ***Southern Agricultural Fields*** Reduced peak by 0.1 feet. Similar water levels as existing with agricultural above estuary	**Flood Level** No significant changes **Extreme Flood Level** Increased velocity by 18% between Morgan Slough and Riverside Ranch levee.
	**Alternative D** Lower 1,400 linear feet of levee crest elevation to 10.0 feet (NAVD).	**Flood Level** ***Northern Agricultural Fields:*** No change in peak ***Southern Agricultural Fields*** Increased peak by 0.2 feet **Extreme Flood Level** ***Northern Agricultural Fields*** No change in peak water levels. Minor reduction in water levels above 9 feet, after peak. ***Southern Agricultural Fields*** Reduced peak by 0.9 feet. Difference between estuary and agricultural water levels reduced. Agricultural water levels higher than estuary above water level 10-11 feet.	**Flood Level** Overtopping of lowered levee areas resulting in flow from estuary to agricultural fields. **Extreme Flood Level** Reduced velocity by 14% between Morgan Slough and Riverside Ranch levee. Increased floodplain flow direction toward existing barn and access road.

Simulation Concept	Description	Modeled Water Level Findings	Modeled Flood Pattern Findings
	**Alternative E** Lower 1,900 linear feet of levee crest elevation to 11.0 feet (NAVD).	**Flood Level** ***Northern Agricultural Fields*** No change in peak ***Southern Agricultural Fields*** No change in peak **Extreme Flood Level** ***Northern Agricultural Fields*** Reduction of peak water levels by 0.1 feet. Minor reduction in water levels above 10 feet, after peak. ***Southern Agricultural Fields*** Reduced peak by 1.1 feet. Difference between estuary and agricultural water levels reduced. Agricultural water levels approximately equal to estuary above elevation 10 feet.	**Flood Level** No changes **Extreme Flood Level** Reduced velocity by 23% between Morgan Slough and Riverside Ranch levee.
	**Alternative F** Lower three sections of levee crest elevations totaling 5,400 linear feet, to 11.0 feet (NAVD).	**Flood Level** ***Northern Agricultural Fields*** No change in peak ***Southern Agricultural Fields*** No change in peak **Extreme Flood Level** ***Northern Agricultural Fields*** Reduction of peak water levels by 0.1 feet. Minor reduction in water levels above 10 feet. ***Southern Agricultural Fields*** Reduced peak by 1.0 feet. Difference between estuary and agricultural water levels reduced. Agricultural water levels approximately equal to estuary above elevation 10 feet.	**Flood Level** No changes **Extreme Flood Level** Reduced velocity by 28% between Morgan Slough and Riverside Ranch levee.

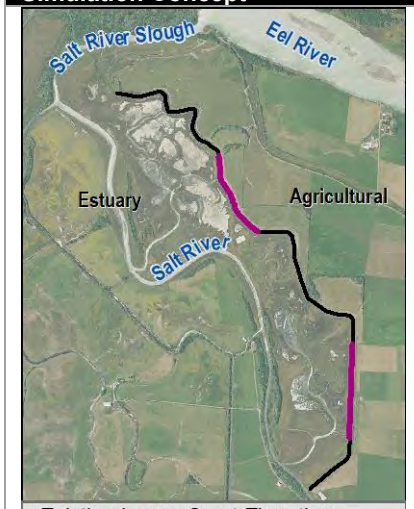
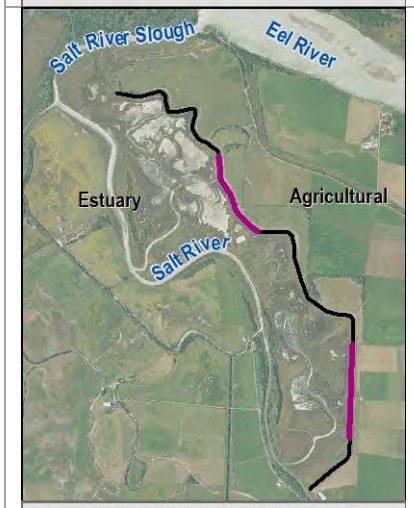
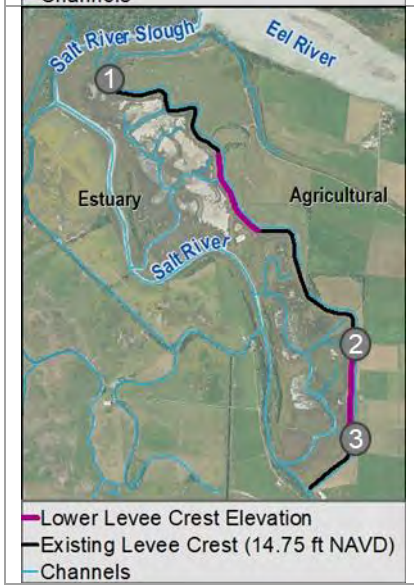
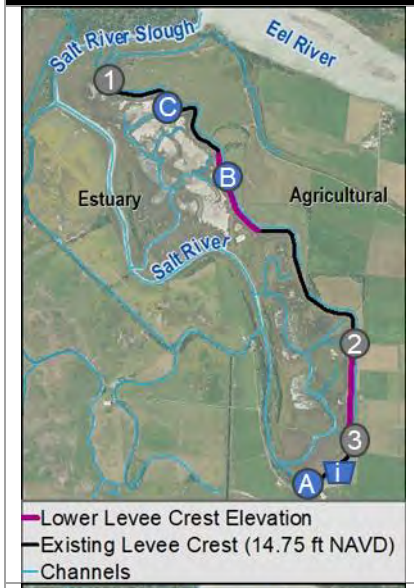
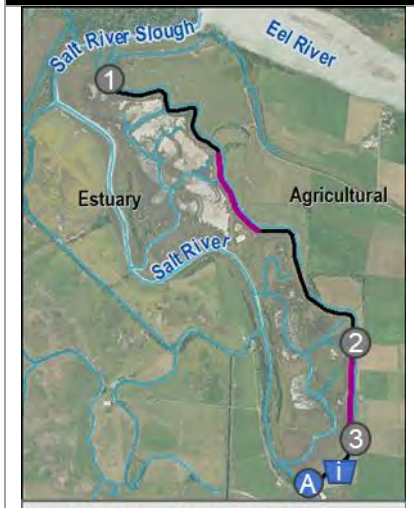
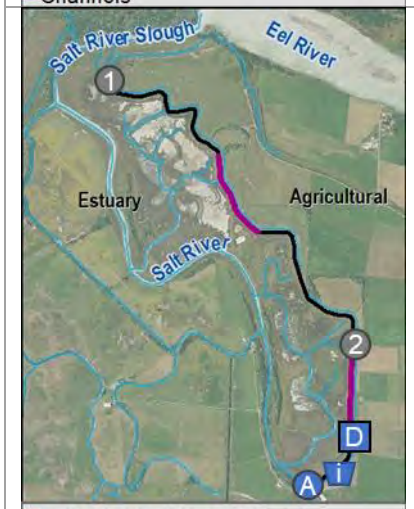
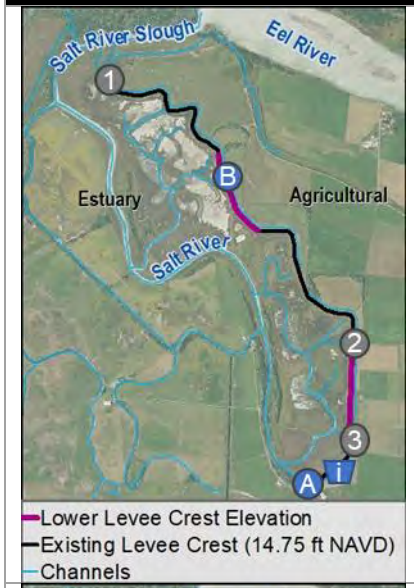
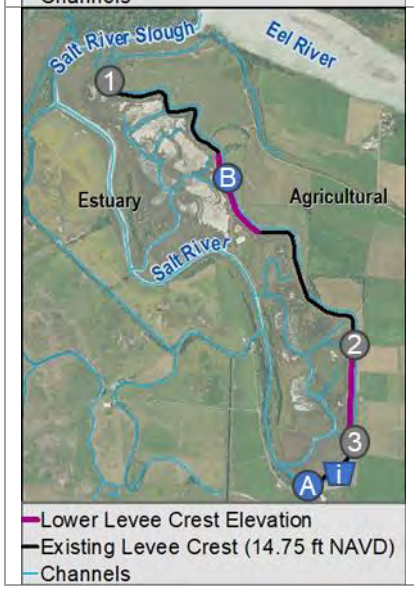
Simulation Concept	Description	Modeled Water Level Findings	Modeled Flood Pattern Findings
	**Alternative G1** Lower two sections of levee crest elevations totaling 4,300 linear feet, to 11.0 feet (NAVD).	**Flood Level** ***Northern Agricultural Fields*** No change in peak ***Southern Agricultural Fields*** No change in peak **Extreme Flood Level** ***Northern Agricultural Fields*** Reduction of peak water levels by 0.1 feet. ***Southern Agricultural Fields*** Reduced peak by 1.1 feet. Difference between estuary and agricultural water levels reduced. Agricultural water levels approximately equal to estuary above elevation 10 feet.	**Flood Level** No changes **Extreme Flood Level** Reduced velocity by 25% between Morgan Slough and Riverside Ranch levee.
	**Alternative G2** Lower two sections of levee crest elevations totaling 4,300 linear feet, to 10.0 feet (NAVD).	**Flood Level** ***Northern Agricultural Fields:*** Increased peak by 0.1 feet ***Southern Agricultural Fields:*** Increased peak by 0.3 ft **Extreme Flood Level** ***Northern Agricultural Fields:*** Reduced peak water levels by 0.1 feet. Minor reduction in water levels above 10 feet. ***Southern Agricultural Fields*** Reduced peak by 1.1 feet. Difference between estuary and agricultural water levels reduced. Agricultural water levels approximately equal to estuary above elevation 10 feet.	**Flood Level** Overtopping of lowered levee areas resulting in flow from estuary to agricultural fields. **Extreme Flood Level** Reduced velocity by 23% between Morgan Slough and Riverside Ranch levee.

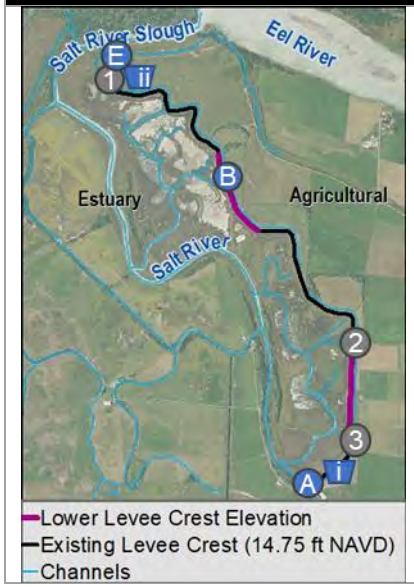
Table 5 Summary of Culvert Alternatives

Simulation Concept	Description	**Extreme Flood Level** Drainage time from peak water level to elevation 6 feet (within drainage ditch)	**Multiple Rain Events** Maximum and minimum water level at culverts between rain events
	**Existing Conditions** Flow Line Elev. Location (feet NAVD) Size 1 2.2 60-inch dia. 2 3.7 60-inch dia. 3 2.8 60-inch dia.	***Northern Agricultural Fields:*** 82 hours ***Southern Agricultural Fields:*** 61 hours	***Northern Agricultural Fields*** Max: 3.5 ft Min: 3.1 ft ***Southern Agricultural Fields*** Max: 4.3 ft Min: 3.2 ft
	**Alternative G1** This simulation utilized the two most effective lowered sections from Extreme Flood Level and Flood Level simulations. Both sections of levee crest elevations along these were reduced to 11.0 feet. Common to all drainage alternatives. *Existing Culverts* Flow Line Elev. Location (feet NAVD) Size 1 2.2 60-inch dia. 2 3.7 60-inch dia. 3 2.8 60-inch dia.	***Northern Agricultural Fields:*** No reduction in drainage time ***Southern Agricultural Fields:*** No reduction in drainage time	***Northern Agricultural Fields*** Max: no reduction Min: no reduction ***Southern Agricultural Fields*** Max: no reduction Min: no reduction

Simulation Concept	Description	**Extreme Flood Level** Drainage time from peak water level to elevation 6 feet (within drainage ditch)	**Multiple Rain Events** Maximum and minimum water level at culverts between rain events
	**Alternative G1-A** *Existing Culverts* Location / Flow Line Elev. (feet NAVD) / Size 1 — 2.2 — 60-inch dia. 2 — 3.7 — 60-inch dia. 3 — 2.8 — 60-inch dia. *New Culverts* Location / Flow Line Elev. (feet NAVD) / Description A — 1.6 — 60-inch dia. B — 4 — 60-inch dia. C — 3 — 60-inch dia. *New Drainage Channels* Location / Flow Line Elev. (feet NAVD) / Description i — Min 1.6 — Channel	***Northern Agricultural Fields*:** Drainage time reduced by 34 hours ***Southern Agricultural Fields:*** Drainage time reduced by 11 hours	***Northern Agricultural Fields*** Max: reduced by 0.1 ft Min: no reduction ***Southern Agricultural Fields*** Max: reduced by 0.5 ft Min: reduced by 0.1 ft
	**Alternative G1-B** *Existing Culverts* Location / Flow Line Elev. (feet NAVD) / Size 1 — 2.2 — 60-inch dia. 2 — 3.7 — 60-inch dia. 3 — 2.8 — 60-inch dia. *New Culverts* Location / Flow Line Elev. (feet NAVD) / Description A — 1.6 — 60-inch dia. C — 3 — 60-inch dia. *New Drainage Channels* Location / Flow Line Elev. (feet NAVD) / Description i — Min 1.6 — Channel	***Northern Agricultural Fields*:** Drainage time reduced by 32 hours ***Southern Agricultural Fields:*** Drainage time reduced by 11 hours	***Northern Agricultural Fields*** Not modeled ***Southern Agricultural Fields*** Not modeled

Simulation Concept	Description	**Extreme Flood Level** Drainage time from peak water level to elevation 6 feet (within drainage ditch)	**Multiple Rain Events** Maximum and minimum water level at culverts between rain events
	**Alternative G1-C** *Existing Culverts* Location / Flow Line Elev. (feet NAVD) / Size 1 — 2.2 — 60-inch dia. 2 — 3.7 — 60-inch dia. 3 — 2.8 — 60-inch dia. *New Culverts* Location / Flow Line Elev. (feet NAVD) / Description A — 1.6 — 60-inch dia. *New Drainage Channels* Location / Flow Line Elev. (feet NAVD) / Description i — Min 1.6 — Channel	*Not Modeled*	***Northern Agricultural Fields*** Max: reduced by 0.2 ft Min: no reduction ***Southern Agricultural Fields*** Max: reduced by 0.5 ft Min: reduced by 0.1 ft
	**Alternative G1-D** *Existing Culverts* Location / Flow Line Elev. (feet NAVD) / Size 1 — 2.2 — 60-inch dia. 2 — 3.7 — 60-inch dia. *New Culverts* Location / Flow Line Elev. (feet NAVD) / Description A — 1.6 — 60-inch dia. D — 0.2 — 10feet x 10ft *New Drainage Channels* Location / Flow Line Elev. (feet NAVD) / Description i — Min 1.6 — Channel	***Northern Agricultural Fields*:** Drainage time reduced by 14 hours ***Southern Agricultural Fields:*** Drainage time reduced by 13 hours	***Northern Agricultural Fields*** Max: no reduction Min: no reduction ***Southern Agricultural Fields*** Max: reduced by 0.5 ft Min: reduced by 0.2 ft

Simulation Concept	Description	**Extreme Flood Level** Drainage time from peak water level to elevation 6 feet (within drainage ditch)	**Multiple Rain Events** Maximum and minimum water level at culverts between rain events
	**Alternative G1-E** *Existing Culverts* Location / Flow Line Elev. (feet NAVD) / Size 1 — 2.2 — 60-inch dia. 2 — 3.7 — 60-inch dia. 3 — 2.8 — 60-inch dia. *New Culverts* Location / Flow Line Elev. (feet NAVD) / Description A — 1.6 — 60-inch dia. B — 4 — 60-inch dia. *New Drainage Channels* Location / Flow Line Elev. (feet NAVD) / Description i — Min 1.6 — Channel	***Northern Agricultural Fields*:** Drainage time reduced by 25 hours ***Southern Agricultural Fields:*** Drainage time reduced by 10 hours	***Northern Agricultural Fields*** Max: reduced by 0.1 ft Min: no reduction ***Southern Agricultural Fields*** Max: reduced by 0.5 ft Min: reduced by 0.1 ft
	**Alternative G1-F** *Existing Culverts* Location / Flow Line Elev. (feet NAVD) / Size 1 — 2.2 — 60-inch dia. 2 — 3.7 — 60-inch dia. 3 — 2.8 — 60-inch dia. *New Culverts* Location / Flow Line Elev. (feet NAVD) / Description A — 1.6 — 60-inch dia. B — 2 — 60-inch dia. *New Drainage Channels* Location / Flow Line Elev. (feet NAVD) / Description i — Min 1.6 — Channel	***Northern Agricultural Fields*:** Drainage time reduced by 26 hours ***Southern Agricultural Fields:*** Drainage time reduced by 11 hours	***Northern Agricultural Fields*** Max: reduced by 0.2 ft Min: reduced by 0.5 ft ***Southern Agricultural Fields*** Max: reduced by 0.5 ft Min: reduced by 0.1 ft

Simulation Concept	Description	**Extreme Flood Level** Drainage time from peak water level to elevation 6 feet (within drainage ditch)	**Multiple Rain Events** Maximum and minimum water level at culverts between rain events
	**Alternative G1-G** *Existing Culverts* Location / Flow Line Elev. (feet NAVD) / Size 1 — 2.2 — 60-inch dia. 2 — 3.7 — 60-inch dia. 3 — 2.8 — 60-inch dia. *New Culverts* Location / Flow Line Elev. (feet NAVD) / Description A — 1.6 — 60-inch dia. E — 1.0 — 60-inch dia. *New Drainage Channels* Location / Flow Line Elev. (feet NAVD) / Description i — Min 1.6 — Channel ii — Min 1.0 — Channel	***Northern Agricultural Fields*:** Drainage time reduced by 35 hours ***Southern Agricultural Fields:*** Drainage time reduced by 11 hours	***Northern Agricultural Fields*** Max: reduced by 0.2 ft Min: reduced by 1.6 ft ***Southern Agricultural Fields*** Max: reduced by 0.5 ft Min: reduced by 0.1 ft

4.1.2 Levee Lowering Findings

Modeling of the seven levee lowering design alternatives resulted in the following key findings, relevant to the design objectives:

Flood Elevation Riverside Ranch vs Agricultural Lands (Peak and Duration)

During the Extreme Flood Level event, under existing conditions, when significant overtopping of the levees along the Eel River inundates the northern and southern agricultural fields, water levels on the agricultural fields rise and exceed water levels in the estuary. Reducing Riverside Ranch levee elevations allows flood water on the agricultural fields to flow over the levee and into the estuary, reducing the magnitude and duration of difference between water levels, and utilizing available storage in the estuary. Alternatives A, E, F and G1 and G2 all minimize the difference in water levels by allowing flood waters on the agricultural land to flow over the levee to the estuary. Minimization of differences and duration is achieved by lowering as little as 1,900 linear feet of levee crest to 10 feet or 11 feet (NAVD).

During the Flood Level event, limited overtopping of the Eel River onto the floodplain occurs and estuary water levels are typically greater than agricultural water levels. Agricultural water levels are greater than estuary water levels after the peaks, when drainage to the estuary is limited to stormdrain infrastructure.

Agricultural Lands Peak Flood Elevation

During the Extreme Flood Level event, peak water levels on the agricultural fields can be reduced by lowering levee crest elevations and utilizing available storage in the estuary. Alternatives E, G1 and G2 exhibit the greatest reduction in peak flood elevations on both the northern and southern agricultural fields. Peak water levels are reduced by 1.1 feet on the southern agricultural fields and 0.1 feet on the northern agricultural fields. This reduction is achieved by lowering as little as 1,900 linear feet of levee crest to 10 feet or 11 feet (NAVD). Additional lowering of the levee along the northern agricultural lands does not further reduce peak water levels on agricultural lands.

Levee Overtopping from Estuary Side

During the Flood Level event, peak water levels on agricultural fields increase when levee crest elevations are lowered to 10.0 feet due to overtopping from the estuary to the agricultural lands. Lowering levee crest elevations to 11.0 feet prevent Flood Event estuary water levels from overtopping into the agricultural fields.

Flood Frequency (Action, Flood, Extreme Flood) and Extent of Inundation on Ag lands

Under existing conditions, peak water levels in the estuary reach elevation 10.1 to 10.2 feet during the Action Level event, and elevation 10.5 to 10.9 feet during the Flood Level event. Lowering levee crest elevations below 11 feet result in overtopping of the levee from the estuary side, increasing the flood frequency and extent of inundation on agricultural lands. Alternatives proposing levee crest elevations of 11 feet maintain a similar flood frequency due to overtopping of the Eel River bank during the Extreme Flood Level event prior to estuary water levels reaching elevation 11 feet.

Floodplain Velocity

On the floodplain, increased velocities occur through constrictions, where cross-section area of the available flow path is reduced. Increased velocities were noted under the existing conditions Extreme Flood Level event in the area between the Riverside Ranch levee and the levee along the western side of Morgan Slough, where a residential home is located. Velocities near the residence were reduced by lowering levee crest elevations south of the constriction. Alternatives A, F, G1 and G2 resulted in most significant reduction in velocity and change of flow path away from the residence.

Erosion Potential from Levee Overtopping

Levee overtopping can result in erosion of the crest and slope of the levee. At the time of overtopping, differential in water levels on either side of the levee is correlated with the erosion potential. Minimizing the difference

between water levels at the time of overtopping reduces the erosion potential. All alternatives, except for Alternatives B and C, result in a water level difference less than 1 foot at the time of overtopping.

4.1.3 Culvert Findings

Using Alternative G1 for levee lowering, which best meets all of the design objectives for lowering peak water levels and floodplain velocities, seven culvert/drainage ditch configuration alternatives were modeled. Hydraulic modeling resulted in the following key findings:

Flood Duration

The duration of flooding was evaluated based on the number of hours required for water levels to fall below elevation 6 feet, the typical ground elevation of adjacent agricultural fields following the peak of the Extreme Flood Level event. Lowering of levee crest elevation does not reduce the duration of flooding, both existing conditions and Alternative G1 required 82 hours for the northern agricultural lands to drain and 61 hours for the southern agricultural lands.

Lowering of the existing northern drainage channel and installation of a new 60-inch diameter culvert, set at an elevation of 1.0 feet (NAVD) discharging to the northern estuary reduces the duration of flooding on the northern agricultural fields by 35 hours. Adding additional 60-inch diameter culverts discharging to the northern estuary do not show additional reductions in duration of flooding.

Excavation of a new drainage channel that conveys drainage to the south, and 60-inch diameter culvert, set at an elevation of 1.6 feet (NAVD) discharging directly to the Salt River at the levee access road reduces the duration of flooding on the southern agricultural fields by 11 hours. Replacing the existing southern culvert with a 10feet x 10feet flood gate reduces the duration by an additional 2 hours.

Peak and Minimum Water Levels between Precipitation Events.

Local drainage improvements were analyzed using results from the precipitation event scenario. Between the precipitation events, water levels within the northern drainage channel fall to elevation 3.1 feet and rise to 3.5 feet. In the southern drainage channel, water levels fall to elevation 3.2 feet and rise to 4.3 feet.

Lowering of the existing northern drainage ditch and adding a second 60-inch diameter gated culvert, set at an elevation of 1.0 feet (NAVD) discharging to the Salt River Slough reduces the higher water level by 0.1 feet and the lower water level by 1.6 feet. Adding additional 60-inch diameter gated culverts, discharging to the northern estuary do not show additional reductions in water levels.

Excavation of a new drainage channel that conveys drainage to the south, and 60-inch diameter gated culvert, set at an elevation of 1.6 feet (NAVD) discharging directly to the Salt River at the levee access road reduces the higher water level by 0.5 feet and the lower water level by 0.1 feet. Replacing the existing southern culvert with a 10feet x 10feet flood gate does not affect the higher water level and reduces the lower water level by an additional 0.1 feet.

5. Alternative Selection

The alternative development process utilized the findings of each previous modeled alternative to improve upon the benefits. Lowering of two sections of the levee to elevation 11 feet, as shown in Alternative G1 exhibited the following benefits, listed below and quantified in Table 6:

- Minimized the difference between agricultural and estuary water levels during the peak of the Extreme Flood event by allowing flood flow on the agricultural fields to overtop the Riverside Ranch levee and flow to the estuary
- Greatest reduction in peak water levels on the agricultural fields during the Extreme Flood Level event while preventing the estuary from overtopping the Riverside Ranch levee during the Action and Flood Level events

- Reduced floodplain flow velocities and re-directed floodplain flow away from the residence adjacent to Morgan Slough during the Extreme Flood Level event

In addition to the benefits of Alternative G1, Alternative G1-G exhibited the following benefits:

- Greatest reduction in duration of flooding during the Extreme Flood Level event by 35 hours in the northern agricultural fields
- Reduced duration of flooding during the Extreme Flood Level event by 11 hours in the southern agricultural fields
- Greatest reduction in minimum water levels between precipitation events in northern agricultural fields
- Greatest reduction in maximum water levels between precipitation events in southern agricultural fields

Table 6 Selected Alternative G1-G Summary of Benefits

Metric	Northern Agricultural	Southern Agricultural
Flood Level Event: Difference in Peak Water Level	No Change	No Change
Extreme Flood Level Event: Difference in Peak Water Level	Reduced by 0.1 feet	Reduced by 1.1 feet
Extreme Flood Level Event: Change in Flood Duration	Reduced by 35 hours	Reduced by 11 hours
Precipitation Events: Maximum Water Level	Reduced by 0.1 feet	Reduced by 0.5 feet
Precipitation Events: Minimum Water Level	Reduced by 1.6 feet	Reduced by 0.1 feet

Alternative G1-F, the addition of a 10feet x 10feet flood gate, exhibited improvements to the reduction in flood duration by an additional 2 hours during the Extreme Flood Level event and reduction of 0.1 feet in minimum water levels between precipitation events. Alternative G1-F was not selected due to the expected increase in cost and negligible drainage improvements.

6. Concept Design

6.1 Selected Alternative

Alternative G1-G best meets the design objectives. Following selection of the design alternative, the extent of levee lowering was refined and modeled to improve hydraulics, removing the presence of erosive circulating flow patterns near the levee crest during overtopping. A conceptual design and components are presented in Table 7 and further detailed in Appendix B.

Table 7 Concept Design of Selected Alternative G1-G

Simulation Concept	Description
	***Levee Lowering*** Location / Crest Elev.(NAVD) / Length South / 11.0 ft / 2,550 ft North / 11.0 ft / 1,800 ft ***Existing Gated Culverts*** Location / Flow Line Elev. (NAVD) / Size 1 / 2.2 ft / 60-inch dia. 2 / 3.7 ft / 60-inch dia. 3 / 2.8 ft / 60-inch dia. ***New Gated Culverts*** Location / Flow Line Elev. (NAVD) / Size A / 1.6 ft / 60-inch dia. E / 1.0 ft / 60-inch dia. ***New and Reprofiled Drainage Ditches*** Location / Flow Line Elev. (NAVD) / Length i (new) / Min 1.6 ft / 1,500 feet ii (reprofiled) / Min 1.0 ft / 800 feet

6.2 Design, Permitting, Construction and Cost

The conceptual design and modeling is intended to demonstrate feasibility of the project to meet the project objectives. Additional modeling is recommended to inform final design and the development of construction documents. Design components include transition geometry from lowered levee sections to existing levee crest, extent and type of erosion control measures during overtopping events, geometry of new drainage ditches, geometry of lowered levee crest sections, culvert and tide gate structures, use or off-haul of excavated material. The final design is anticipated to incorporate reuse of excavated material for placement on the existing salt marsh plain and high marsh ecotone and to support eradication of invasive spartina. The excavated material would be placed in thin lifts above MHHW (6.5ft) while not exceeding elevation 9.0 feet such that estuarine wetland characteristics persist post-fill placement. Other sediment reuse options may exist such as placement on adjacent agricultural uplands.

6.2.1 Environmental Compliance Strategy

The project Final Environmental Impact Report (EIR) was completed in February 2011 (SCH # SD2007-05-6) and all necessary regulatory permits were issued prior to commencement of construction in 2013. The issued permits included a Humboldt County Conditional Use Permit (CUP), Humboldt County Grading Permit, California Department of Fish & Wildlife (CDFW) 1602 Streambed Alteration Agreement, Regional Water Quality Control Board 401 Water Quality Certification, California State Lands Commission Lease, California Coastal Commission Coastal Development Permit (CDP), U.S. Fish & Wildlife Biological Opinion (BO) for Tidewater Goby, NOAA-Fisheries Biological Opinion (BO) for Salmonids, and a U.S. Army Corps of Engineers 404 Individual Permit. The Humboldt County Resource Conservation District (RCD) is the CEQA lead agency and applicant for the project permits. The EIR and permits covered the entire Salt River Ecosystem Restoration Project (Project) inclusive of Phase 1 (Riverside Ranch completed in 2013) and Phase 2. The portions of the Project that have been constructed, including Phase 1, have remained consistent with the EIR and issued permits with one Material Amendment approved for the CDP on Phase 2 of the project. The EIR and issued permits were predicated on the Habitat Mitigation & Monitoring Plan (HMMP) which documented the pre- and post-project habitat types and wetland fill/creation acreages. For the project phases constructed to date, the habitat acreages restored have generally remained consistent with the planned acreages in the HMMP, as has the wetland fill and creation associated with excavation and filling.

To remain consistent with the HMMP, it is recommended that the final design result in a no-net change in habitat type acreages specified in the HMMP. Additionally, it is recommended to avoid placement of fill on wetlands that would result in a conversion to uplands. Based on the selected alternative, both can likely be achieved by placement of the excavated soils on the spartina dominated salt marsh plain between MHHW (elevation 6.5ft) and elevation 9.0 feet such that salt marsh habitat/coastal wetland will continue to persist.

An Adaptive Management Plan (AMP) was developed for the project which included specific post-construction monitoring methods, reporting and management actions. The purpose of the AMP is to monitor the physical and biological response of the constructed project to ensure the project remains on a trajectory to achieve the project goals, and if determined necessary through the monitoring results, take management actions. Given the geomorphically dynamic system, the AMP, inclusive of the management actions specified within, were included in the EIR analysis and issued regulatory permits, thus the anticipate management actions would not require additional on continuous regulatory approvals prior to each management action. The RCD has been completing the monitoring of the constructed project phases as specified in the AMP. Through the monitoring process outlined in the AMP and the analysis described in this report, the components identified in the selected alternative (levee lowering and addition of culverts/tide gates to improve drainage) are consistent with the management actions described in Table B-1 of the AMP. However, the quantity of excavated material and proposed placement on the salt marsh plain are not explicitly cover in the AMP. Therefore, as an initial phase of the final design it is recommended the RCD inquire with each regulatory agency to determine regulatory coverage under the AMP compared to a permit amendment. Given the delay in completion of Phase 2, it is also recommended the RCD request any necessary permit extensions (i.e. 5 to 10 years) to accommodate future project completion an ongoing adaptive management. An amendment to the existing EIR or development of a supplemental EIR is also anticipated for the selected alternative. The CEQA approach can also be confirmed in consultation with the agencies as the final design effort is initiated.