

BRADFORD RECLAMATION DISTRICT 2059

P.O. BOX 1059 OAKLEY, CA 94561

DESIGN-BUILD REQUEST FOR BIDS (RFB)

PROJECT NAME:

BRADFORD ISLAND TRACT 19 MITIGATION SITE REHABILITATION

PROJECT Number: 23-010

ISSUED: February 02, 2024

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SECTION 00 - IMPORTANT DATES

1.	Issue Request For Bids (RFB)	February 02, 2024
2.	Mandatory Job Walk	February 15, 2024
3.	Written/Email Questions Due from Proposers 2:00 PM,	February 27, 2024
4.	Date Responses Due from District	March 4, 2024
5.	Proposals Due 2:00	PM, March 8, 2024
6.	Interviews (if necessary)	March 21, 2024
7.	Announce Selected Design-Build Entity	March 25, 2024
8.	Bradford Reclamation District 2059 Contract Approval	March 26, 2024
9.	Start Design/Permitting	March 27, 2024
10.	Construction of Restoration Summer/Fall 2024 to	o October 15, 2025
11.	All other Construction Completion	June 15, 2026
12.	Monitoring and Mitigation Site Maintenance Completion	June 30, 2027
All dat	tes are subject to change at Bradford Reclamation District 2059's disc	retion.

SECTION 01 – INTRODUCTION

A. INTRODUCTION

Bradford Reclamation District 2059 was formed in 1921 under the laws of the State of California and is governed by Division 15 of the California Water Code. The District is a public agency and is governed by applicable provisions of the California Government Code.

The District operates and maintains approximately 7.5 miles of levee, 6 miles of drainage canal, one pump station, and a 50-acre mitigation site. The island is approximately 2,200 acres located in Contra Costa County. Access to Bradford Island is provided by a ferry operated by the Delta Ferry Authority. The island is located along the San Joaquin River (north and west sides), False River (south side) and Fisherman's Cut (east side).

The District is looking for a design-Build team for the rehabilitation of the Bradford Island Tract 19 Mitigation Site located on Bradford Island.

This mitigation site is approximately 50 acres and was constructed in the mid 2000's. A variety of trees (11.64 acres of mixed riparian forest, 13.61 acres of cottonwood/willow forest) and shrubs (3.77 acres of high dune scrub, 12.92 acres of riparian scrub) were planted along with a small wetland (2.96 acres) located in the northwestern corner of the property. The District was required by the State of California Department of Water Resources to mitigate for habitat loss from past, ongoing, and future levee maintenance and improvement works on Bradford Island.

In August 2021, a significant fire on Bradford Island destroyed a majority of this mitigation site.

Planning, construction documents, and monitoring reports from the original mitigation site improvements are included in this RFB. The District and State agencies involved with this previous project were very pleased with the outcome of the project.

CONTRACTOR'S LICENSE CLASSIFICATION: In accordance with the Provisions of the California Public Contract Code Section 3300 and Section 10164, bidders shall be properly licensed to perform the Work from contract award through contract acceptance and shall possess a CLASS A license or equivalent combination of Classes required by the categories and type of Work included in the Contract Documents and Plans.

BUSINESS LICENSE: The Contractor must obtain and comply with all of the requirements of the City Business Ordinance, where applicable, before beginning work and through Contract Acceptance.

NONDISCRIMINATION: This Contract is subject to State and contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990 and shall be constructed and interpreted in compliance with said provisions. The City of Placerville hereby notifies all Bidders that it will affirmatively ensure that in any Contract entered into pursuant to this advertisement, disadvantaged business enterprise will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for the award.

WAGE RATE REQUIREMENTS AND DEPARTMENT OF INDUSTRIAL RELATIONS: In accordance with the provisions of California Labor Code Sections 1770, 1773, 1773.1, 1773.2, 1773.6, and 1773.7, the general prevailing rate of wages in the County which the Work is to be done has been determined by the Director of the California Department of Industrial Relations. These wage rates appear in the California Department of Transportation publication entitled General Prevailing Wage Rates. Interested parties can obtain the current wage information by submitting their requests to the Department of Industrial Relations, Division of Labor Statistics and Research, PO Box 603, San Francisco, CA 94101, Phone (415) 972-8620. The rates at the time of the bid advertisement date of a project will remain in effect for the life of the project is accordance with the California Code of Regulation, as modified and effective January 27, 1997. Each Contractor must comply with the Federal wage requirements of the Davis-Bacon Act. The higher of the two rates (State and Federal) must be paid to each person working on the project.

Copies of the general prevailing rate of wages in the County in which the Work is to be done are also on file at the California Department of Transportation's principal office, and shall be made available upon request, or at the Internet address http://www.dir.ca.gov. The federal minimum wage rates for the project as predetermined by the United States Secretary of Labor are **not** included in the Proposal and Contract. The contractor is responsible to check current wage rates at <u>http://www.wdol.gov/dba.aspx</u>.

Per SB 854, this project is subject to compliance monitoring and enforcement by the DIR. No contractor or subcontractor may be listed on a bid proposal for a public works project submitted on or after March 1, 2015 unless registered with the DIR pursuant to Labor Code Sections 1771.1(a)(1), 1725.5, and 1771.1(a). No subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the DIR pursuant to Labor Code 1725.5, see Labor Code 1771.1(b).

BID SECURITY: A bid security shall be provided with each bid. Bid security shall be in an amount of not less than ten percent (10%) of the total amount of the Bid and shall be cash, a certified check or cashier's check drawn for the order of the Bradford Reclamation District 2059 or a Bidder's Bond executed by a surety satisfactory to Bradford Reclamation District 2059. The Bidder to whom award is made shall provide Certificates of Insurance, and shall complete and submit the

Performance Bond and Payment Bond in and amount of one hundred percent (100%) of the total Contract price plus change orders, to hold good for a period of one year after the completion and acceptance of the work, to protect the District against the results of defective materials, quality of work, and equipment during that time. The bond forms are contained within the Contract Documents.

B. PROJECT APPROACH

The District will conduct a mandatory job walk on the date and time set forth in Section 00, above. All design-build entities must attend the entire job walk or will be disqualified from selection. Each design-build entity will need to review the Project criteria, the available record drawing documents provided by the District, and all other documentation provided in the RFB or referred to in the RFB. It is the intention of the District for all design-build entities to fully understand the Project scope of work and the existing conditions of the Project site and existing conditions. The District is providing these resources to assist the design-build entities to prepare a complete submission to this RFB.

Based on this information, the design-build entities will develop an efficient approach to the Project and provide a fixed price for fee, general conditions, and design costs. The selection process is further described herein.

Once the successful design-build entity has been selected, the District will enter into a Not to Exceed (NTE) contract with a fixed price component for fee, general conditions, and design costs. After the contract is issued, a Notice to Proceed (NTP) will be issued for the Project.

The design-build entity will be required to complete the Construction Documents and obtain all necessary permits and satisfy all permitting requirements. The District will pay the fees for necessary permits.

C. PROJECT COMPLETION

The design-build entity is responsible for achieving substantial completion and final completion for each element of work. The design-build entity is also responsible for obtaining all required approvals and meeting all warranty/guarantee requirements.

SECTION 02 - PROJECT SCOPE OF WORK

A. PROJECT DESCRIPTION

See SECTION 09 for description of work/project.

B. PROJECT BUDGET AND SCHEDULE

The Project budget for the design and construction of the Project is estimated to be \$2,000,000. The District reserves the right to change the Project cost or budget prior to contract award through addenda and after contract award in accordance with the design-build contract. The design/build portion of the Project shall be completed by October 15, 2025. All other construction work shall be

completed by June 15, 2026. Performance monitoring and maintenance shall be completed by June 30, 2027.

C. SCOPE OF WORK

The scope of work consists of designing and constructing the Project in accordance with all applicable laws and regulations. The Scope of Work shall include the requirements set forth in SECTION 09.

SECTION 03 – RFB SUBMISSION GENERAL REQUIREMENTS

A. GENERAL INFORMATION

1. District Point of Contact:

Blake Johnson, PE, District Engineer Bradford Reclamation District 2059 P.O. Box 1059 Oakley, CA 94561 <u>Blake_rd2059@att.net</u> 916-204-6869

All communications relating to this RFB must be directed to the District contact person named above. All communications between Proposers and other District staff members or any member of the District's governing Board concerning this RFB are strictly prohibited. Failure to comply with these requirements may result in proposal disqualification.

2. Examination of Documents

By submitting a bid, the Proposer represents that it has thoroughly examined and become familiar with the work required under this RFB, the scope of work, and it is capable of performing quality work to achieve the District's objectives consistent with industry and professional standards.

Should a Proposer require clarification of this RFB, the Proposer shall notify the District in writing. Written questions are due from Proposers by the date set forth in Section 00. The District will issue a written addendum clarifying the matter which will be posted on the District's website.

The District reserves the right to waive minor irregularities and omissions in the information contained in any proposal, the RFB process, and to make all final determinations. The District further reserves its right to reject any or all proposals.

3. Addenda

The District reserves the right to revise or amend the RFB. Such changes, if any, will be announced by addenda to this RFB via the District's website. Only questions answered by formal written addenda will

be binding. Oral and other interpretations or clarifications will be without legal effect.

4. Interested Parties

The General/ Prime Contractor/ Lead Entity and the Landscape Architect of Record will not be allowed to participate in the RFB process in any capacity as a design-build team member to more than one design-build entity. For the purposes of interpreting and applying the requirements of this paragraph, branch offices of a General/ Prime Contractor/ Lead Entity and Landscape Architect of Record that is an individual, corporation, partnership, or other legal entity, where such branch offices are owned and/or managed, in whole or in substantial part, by such individual, corporation, partnership, or other legal entity, shall be deemed identical to such General/ Prime Contractor/ Lead Entity and Architect of Record. Consultants or sub-consultants to the District who are participants or advisors to the District with respect to the Project and its requirements shall not be allowed to participate as a design-build team member or as a subcontractor or sub-consultant (of any tier) to a design-build entity.

5. Funds for Design and Construction

The design-build cost estimated for the Project is: two Million Dollars (\$2,000,000). This cost limitation is referred to as the NTE Amount and includes both the fixed price component, which is comprised of fee, general conditions, and design costs, as well as the amount available for the subcontractor trade package buyout, which is the difference between the NTE Amount and fixed price component. The District seeks to procure the highest quality facilities meeting or exceeding the requirements and criteria established in the RFB with the funds available. The District may not be able to make an award if the proposed prices exceed the available funds for this Project. Still, interested parties are authorized to submit bid higher than the NTE Amount for the District's consideration.

B. RFB PROVISIONS

The following information is provided to Proposers for submission of the price proposal. The information provided is subject to change. Proposing firms will bear all costs of this RFB.

1. The Proposer shall submit all requested information specified in this RFB.

Proposals must set forth full, accurate, and complete information as required by this solicitation, including attachments.

- 2. The District intends to award a contract to the responsible design-build entity whose proposal is determined to meet the solicitation and offers the best overall value to the District.
- 3. The District reserves the right to change the Project cost prior to contract award through addenda and after contract award in accordance with the design-build contract.
- 4. All proposals will remain subject to acceptance for 60 days after the day of the proposal opening. The District may, at its sole discretion, release any proposal prior to that date.
- 5. In addition to, and without limitation upon any other requirements of this RFB, the District shall have the right to disqualify any design-build entity and reject any proposal should it determine that any information submitted by any Proposer during the RFQ or RFB process is untrue or misleading as determined by the District.

C. WRITTEN DOCUMENTS

Submit three (3) bound copies of the final proposal. Provide $8\frac{1}{2}$ " x 11" format using 11 point or larger font size for written materials unless otherwise allowed in each individual section. Within the proposal, provide a title page identifying the proposing entity's name, address, telephone number, a designated contact person with their phone number and email address, a full table of contents and tabs for each major category of the RFB. Each page within the document shall be numbered, excluding divider tabs.

D. ELECTRONIC FORMAT

Provide a final copy of the proposal on a flash drive or thumb drive using Adobe Acrobat PDF format files. The electronic copy of the proposal shall be contained in one comprehensive PDF file. In no event shall the electronic file contain more than one PDF file.

E. SUBMISSION OF PROPOSAL

Proposers may mail or hand-deliver the required number of submittals in a sealed envelope or box, clearly marked "BRADFORD ISLAND TRACT 19 MITIGATION SITE REHABILITATION" and addressed as follows:

Mail to: Bradford Reclamation District 2059 Blake Johnson, PE, District Engineer PO Box 1059 Oakley, CA 94561 Hand Deliver to: Bradford Reclamation District 2059 Blake Johnson, PE, District Engineer 6329 Bethel Island Rd. Ste A Bethel Island, CA Oakley, CA 94511

Only hard copy submissions will be accepted. Submittals will be time and date stamped upon receipt. Submittals received after the time and date indicated may not be accepted. Proposers are solely responsible for ensuring all proposals are timely received by the District. The District shall not be responsible for any delivery issues including, but not limited to, mis-directed mail, mailing delays, etc.

F. **RFB EVALUATION CRITERIA**

The RFB is valued at **a maximum** of 100 points. The individual scoring criteria is listed below.

The points assigned to the Price Proposal will be based on a straight line scale ratio. The lowest price proposal will receive the maximum 20 points. The points assigned to the next lowest price proposal will be based on a straight line scaled ratio. See example below.

Lowest Proposed Price = **20** points

Example:	
Lowest Proposed Price is awarded:	20 Points
Second Lowest Proposed Price is awarded:	17 Points
Third Lowest Proposed Price is awarded:	14 Points
Fourth Lowest Proposed Price is awarded:	11 Points

The Price Proposal will be opened after scoring of the non-price elements of the proposal is complete.

The points assigned to the Design Build will be based on a straight line scale ratio. The highest ranked proposed design will receive the maximum 25 points. The points assigned to the next highest proposed design will be based on a straight line scaled ratio. See example below.

Highest Ranked Proposed Design Build Concept = 25 points

Example:

Highest Ranked Proposed Design Build:	25 Points
Next Highest Ranked Proposed Design Build:	22 Points
Next Highest Ranked Proposed Design Build:	19 Points
Next Highest Ranked Proposed Design Build:	16 Points

When the evaluation is complete, the responsive Proposers shall be ranked by the District based on a determination of best value provided. The District is not required to rank more than the top three Proposers. The District, in its sole discretion, may conduct negotiations with one or more of the responsive

Proposers as set forth Section 08.

RFB SCORING MATRIX

CAT	CATEGORY POINTS			
Α	Cover Letter Information			
	1	Identification of Bidder	Y	
	2	Acknowledgement of Addenda	Y	
	3	Legal Structure of Company	Y	
	4	Contact Person	Y	
	5	Proposal shall remain valid for a period of not less than 90 days	Y	
В	Pric	e Proposal	20	
	1	Fee		
	2	General Conditions		
	3	Design Costs		
С	Tec	nnical Expertise		
	1	Organization Chart	5	
	2	Design-Build Project Manager Resume	10	
	3	Restoration Project Manager Resume	10	
	4	Schedule	15	
D	Des	ign Build Experience	25	
Е	Acceptable Safety Record		5	
F	Additional Requirements			
	1	Termination/Claims/Litigation History	5	
	2	Local Business Participation	5	
G	Inte	view (if necessary)		
	тот	AL POINTS - RFB	100	

SECTION 04 – RFB SUBMISSION SPECIFIC REQUIREMENTS

A. COVER LETTER

The General / Prime Contractor / Lead Entity will provide a maximum two-page cover letter. The cover letter may provide optional information about the design-build entity and must, at a minimum, contain the following:

- 1. Complete contact information, including e-mail address for the person authorized to contractually bind the design-build entity.
- 2. Proposed working relationship between General/ Prime Contractor and subcontractors.
- 3. Name, title, e-mail address and telephone number of contact person during the period of proposal evaluation.
- 4. Acknowledgment of receipt of all RFB addenda, if any. List Addendum number and date issued.
- 5. A statement to the effect that the proposal shall remain valid for a period of not less than 60 days from the due date of submittal.
- 6. Signature of person(s) authorized to bind design-build entity to the terms of the proposal.

B. PRICE PROPOSAL

Please submit the price proposal in a sealed envelope separate from the nonprice proposal Sections C through G below. The price proposal shall consist of the following:

- 1. Design and Permitting Costs (excluding the cost of permits for government agencies).
- 2. Construction Costs.
- 3. 1.5-year Maintenance and Monitoring Costs.

The price proposal shall include the total of the above three items and an acknowledgment of all RFB addenda, if any, is included in the price.

C. TECHNICAL EXPERTISE

1. Team Organization Chart

Provide a Project organization chart which clearly delineates communication/reporting relationships among the design-build team key personnel, including key sub-consultants, sub-contractors, and proposed quality control group.

2. Design-Build Project Manager Resume

This is the premier role on the design-build team and will act as the first point of contact between the design-build team and the District's team. The position requires a minimum of five years' experience in design or construction management. Demonstrate satisfactory experience to lead, manage and control both design and construction. The design-build project manager must be solely assigned to this Project.

3. Restoration Project Manager Resume

A licensed professional Landscape Architect with a minimum of five years' experience in facilities of similar size and scope.

List recent relevant experience - The District will rate project experience most favorably if it contains a combination of both restoration and design build projects.

4. Schedule

Provide a narrative of how your team will manage the requirements of the Project scope.

- a. Design-build entities must demonstrate their ability to meet the completion date. The District is requesting a conceptual milestone schedule that will demonstrate the design-build entity's overall understanding of the Project scope and schedule requirements.
- b. Describe how the design-build entity will monitor all scheduling and milestone requirements and what steps it will take should the Project fall behind the approved schedule.
- c. Describe how the design-build entity will minimize delays at all phases of the Project.

Evaluation Criteria: The District will provide favorable evaluations for submission requirements that are well thought out given all the information that is being provided in the RFB and through additional sources listed in Section 05 District Provided Information. Solutions that are cost effective, feasible, safe and efficient will be rated favorable.

- 5. Stakeholder Involvement Describe for District how stakeholder involvement will be managed throughout the Project. Stakeholders include e: Department of Water Resources, Department of Fish and Wildlife, Delta Ferry Authority,
 - a. Describe how the design-build entity will coordinate with the stakeholders during the life of the Project.
 - b. Describe how stakeholder comments will be received, addressed,

and managed during the design and construction phases of the Project.

Evaluation Criteria: Plans that demonstrate the ability to work with stakeholders effectively for schedule, and review comments.

D. DESIGN BUILD

This section outlines the design criteria for the scope of work and construction. Provide details as to how the Design-Build entity will meet schedule with design, permitting, and construction.

E. ACCEPTABLE SAFETY RECORD

Provide information as to the Design-Build entity's safety record.

Submission Requirements: Submit a document that indicates compliance with the above-mentioned safety record or partnership.

F. ADDITIONAL REQUIREMENTS

- 1. Claims/Litigation/Termination History. Provide specific information on any termination for default, termination for convenience, claims filed by or against the proposed Prime Contractor/General/Contractor/Lead Entity and the Landscape Architect in connection with any public works projects, litigation settled or judgments entered within the last seven (7) years.
- 2. Local Business Participation

The District encourages design-build entities to use and local businesses for this Project. Please provide any information on the design-build team's plan or commitment to use local businesses for this Project.

G. INTERVIEWS

At the District's discretion and to further assist in evaluation, all short-listed design-build entities will be requested to participate in an oral interview. The interview will be used as another opportunity to clarify any issues within a given proposal and explore the approaches that may be used to satisfy all requirements for the District.

SECTION 05 – DISTRICT PROVIDED INFORMATION

In addition to this RFB, the District reserves the right to provide additional information regarding the Project on its website <u>https://bradfordisland.com</u>. Therefore, interested parties are solely responsible for periodically reviewing the District's website for additional information regarding the Project. Further, the District will provide responses to any written questions it receives regarding the Project via an addenda which will be posted on the District's website. Any questions must be submitted to the District Contact before the timeline set forth in Section 00.

SECTION 06 – PLANS AND SPECIFICATIONS

As part of this Design-build RFB, the District will provide copies of the plans and specifications for the previously designed and constructed mitigation site. The selected Design Build entity is required to provide new plans and specifications for the mitigation site.

SECTION 07 - CONTRACT AND GENERAL CONDITIONS

The District will provide a standard contract and general conditions for the Project to the selected proposer entity based on this RFB, the RFB response, and the information provided by the selected proposer during the interview. Proposers may provide sample contracts and/or general conditions for the District's consideration which the District, at its sole discretion, may revise or reject and provide its own documents. Proposals shall not contain or be conditioned upon acceptance of any specific contract or general condition provisions. Statements contained in any proposal to the effect that a price is based on certain assumptions that are not part of the specific requirements of the RFB documents shall be deemed an improper qualification in violation of the requirements of this paragraph.

SECTION 08 - NEGOTIATIONS

The District, in its sole discretion, may elect to request proposal revisions and hold discussions and negotiations with responsive Proposers as follows to ensure that any discussions or negotiations are conducted in good faith.

a. During negotiations, the design-build entity shall be represented by a person or persons who are familiar with all aspects of the designbuild entity's proposal. At least one person on behalf of the designbuild entity shall have the power to speak with authority on behalf of the design-build entity, and to contractually bind the design-build entity and all members of the design-build team without further authorization of persons not present. No design- build entity shall be represented and no person shall be present that is not directly interested and involved in the outcome of the RFB process- observers will not be permitted.

- b. The date, time, and place for negotiations shall be scheduled by the District. Written notice shall be given separately to the design-build entity or design-build entities selected to engage in negotiations.
- c. The length of negotiations shall be dictated by the subject matters discussed. Negotiations may be held, at the discretion of the District, in one or multiple rounds.
- d. There shall be no disclosure of competing design-build entities during negotiations or prices or pricing information contained in competing proposals or of technical information that is appropriately designated as "Proprietary Information" by the design-build entity.
- e. The District shall have the right to disclose and discuss with any or all design-build entities technical information contained in any proposal that is not appropriately designated as "Proprietary Information".
- f. Negotiations may in a fair and impartial manner include bargaining, which includes offers and counter-offers, etc., and may apply to price, schedule, technical requirements, Contract terms or other factors or issues the District determines are relevant.

SECTION 09 – DESCRIPTION OF WORK/PROJECT

The following items represent in general terms the scope and scale of the Design-Build components that Bradford Reclamation District 2059 is requesting for the Bradford Island Tract 19 Mitigation Site Rehabilitation Project.

This mitigation site is approximately 50 acres and was constructed in the mid 2000's. A variety of trees and shrubs were planted along with a small wetland located in the northwestern corner of the property. The District was required by the State of California Department of Water Resources to mitigate for habitat loss from past, ongoing, and future levee maintenance and improvement works on Bradford Island. A fire in August 2021 destroyed a large portion of this mitigation site.

The scope of the work is to be performed from February 2024 through June 2027. Work is to be performed from 9:00 AM to 5:00 PM Monday through Friday. Work on Saturday and Sunday shall be approved by the District. Construction and related work must absolutely be completed no later than June 15, 2026.

The Design-Build entity shall work with the District and the Delta Ferry Authority for access to the ferry during normal working hours (9am – 5pm, M-F) and hours outside of this time.

The primary scope of this Design-Build Project consists of but not limited to the following items:

- A. Developing a new design/plan for restoration of mitigation site.
- B. Provide all necessary permits (District will pay permit fees).
- C. Clear dead shrub/standing or fallen trees. Avoid live trees/shrubs as identified by District.
- D. Remove/control invasive weeds (blackberry, star thistle, etc.).
- E. Provide all vegetation/trees as shown on new construction/design plans.
- F. Grading site as necessary.
- G. Establish necessary irrigation (there is an existing well casing on-site). District will develop well.
- H. Provide fencing around perimeter of site. Provide 2 access gates to mitigation site.
- I. Provide maintenance access roads around the perimeter and within site.
- J. Maintain site for 1.5 years once construction has been approved by District and State.

ATTACHMENT A

CONTRACT, CONTRACT DOCUMENTS, GENERAL CONDITIONS

DRAFT CONSTRUCTION CONTRACT

THIS CONTRACT made on ______ by and between Bradford Reclamation District 2059 ("District"), and ______, hereinafter "Contractor". The District and Contractor may be collectively referred to as the "parties".

The parties have mutually covenanted and agreed as follows:

1. THE CONTRACT DOCUMENTS:

The complete Contract consists of the following documents ("Contract Documents"):

Invitation to Bid (See Part 1) Accepted Bid (and all accompanying documents) Addenda Nos. ______, as issued Designation of Subcontractors, (See Part 1) Construction Contract (See Part 2) Payment Bond to accompany Contract (See Part 2) Performance Bond to accompany Contract (See Part 2) Contractor's Certification Regarding Workers' Compensation (See Part 2) General Conditions (See Part 3) Supplemental Conditions (Special Provisions) (See Part 4) Drawings Technical Specifications (See Part 4) Change Orders State of California Department of Transportation (Caltrans) Standard Specifications 2015

THE WORK:

The Contractor agrees to furnish all tools, equipment, apparatus, facilities, labor, transportation, and material necessary to perform and complete in a good and workmanlike manner, the [DESCRIPTION OF PROJECT] "Project" as called for, and in the manner designated in, and in strict conformity with, the Contract Documents. It is understood and agreed that the tools, equipment, apparatus, facilities, labor, transportation, and material shall be furnished and the work performed and completed as required in the Drawings and Specifications under the sole direction and control of the Contractor, and subject to inspection and approval of the District, or its representatives. The District hereby designates as its representative for the purpose of this Contract the following named person: [NAME].

CONTRACT PRICE:

The District agrees to pay and the Contractor agrees to accept, in full payment for the work above agreed to be done, the sum of [WRITTEN NUMBER] [(NUMBER)] for the Project subject to additions and deductions as provided in the Contract Documents.

COMPLETION DATE:

The Project shall be commenced on the date specified in the Notice to Proceed. The total project will be completed within [WRITTEN NUMBER] [(NUMBER)] working days, as defined in the General Conditions, after the date stated in the Notice to Proceed.

NOTICE AND SERVICE THEREOF:

Any notice from one party to the other under the Contract shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative of such party. Any such notice shall not be effective for any purpose whatsoever unless served in the following manner, namely:

(a) If the notice is given to the District, by personal delivery thereof to the General Manager, or by depositing the same in the United States mail, enclosed in a sealed envelope, postage prepaid, and certified; addressed to the District at:

Bradford Reclamation District 2059 Blake Johnson, PE, District Engineer PO Box 1059 Oakley, CA 94561

(b) If the notice is given to the Contractor, by personal delivery thereof to said Contractor or to its duly authorized representative at the site of the project, or by depositing the same in the United States mail, enclosed in a sealed envelope, postage prepaid, and certified; addressed to the Contractor at:

Business	
Attention	
Street Address	
City, State, Zip Code	

(c) If the notice is given to the surety or any other person, by personal delivery to such surety or other person, or by depositing the same in the United States mail, enclosed in a sealed envelope, addressed to such surety or other person, as the case may be, at the address of such surety or person last communicated by it to the party giving the notice, postage prepaid and certified.

LIQUIDATED DAMAGES:

Liquidated damages as provided for in the General Conditions of the Contract shall be in the sum of One Thousand Dollars (\$1,000.00) for each and every day as defined therein for each different scope of work as defined by the Base Bid and each change order except as otherwise specified in the Supplemental Conditions.

PREVAILING WAGE:

Copies of the prevailing rate of per diem wages as determined by the Director of the Department of Industrial Relations in accordance with Labor Code section 1773.2 are on file at the District, and copies are available for inspection at that office to any interested party on request. Bidders shall be responsible for verifying with the Director of the Department of Industrial Relations that all such copies of the prevailing rate provided by the District are current and accurate. The requirement to pay the wage rate so specified is further detailed in the General Conditions.

CONTRACTOR REGISTRATION

By the execution of this Contract, Contractor hereby certifies that it is registered with the California Department of Industrial Relations as required pursuant to Labor Code section 1725.5 (Contractor registration).

IN WITNESS WHEREOF, four (4) identical counterparts of this Contract, each of which shall for all purposes be deemed an original, have been duly executed by the above-named parties, on the date noted on the first page of this Contract.

Date	Contractor
Date	Robert Davies, President Bradford Reclamation District 2059
Approved as to form:	
Raquel Hatfield, Attorney	
Attest:	

Angelia Tant, Secretary

PERFORMANCE BOND

The RECLAMATION DISTRICT 900, hereinafter "District," entered into a Contract dated ______, 20____ with ______ hereinafter "Contractor," for the work described as follows:

BRADFORD ISLAND TRACT 19 MITIGATION SITE REHABILITATION

WHEREAS, said Contractor is required under terms of said Contract to furnish a bond for the faithful performance of said Contract; and

WHEREAS, the Contract is by reference made a part hereof.

NOW, THEREFORE, we, _____, the undersigned Contractor, as Principal, and ______ (corporate surety), a corporation organized and existing under the laws of the State of ______, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the District in the penal sum of [WRITTEN NUMBER] [(NUMBER)], lawful money of the United States, said sum being not less than one hundred percent (100%) of the total Contract amount, for the payment of which sum be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT, if the above-bounded Contractor, its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and perform the covenants, conditions, and agreements in said Contract and any alterations thereof made as therein provided, on its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the District, its officers and agents, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and virtue.

As a condition precedent to the satisfactory completion of said Contract, the above obligation in said amount shall hold good for a period of one (1) year after the completion and Acceptance of said work, during which time if the above-bounded Contractor, its heirs, executors, administrators, successors or assigns shall fail to make full, complete, and satisfactory repair and replacements or totally protect the District from loss or damage made evident during said period of one (1) year from the date of Acceptance of said work, and resulting from or caused by defective materials or faulty workmanship in the prosecution of the work done, the above obligation in said sum shall remain in full force and effect. However, anything in this paragraph to the contrary notwithstanding, the obligation of the Surety hereunder shall continue so long as any obligation of the Contractor remains.

And the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or the specifications accompanying the same shall, in any way, affect its obligations on this bond and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to the work or the specifications. Said Surety hereby waives the provisions of Sections 2819 and 2845 of the Civil Code of the State of California.

In the event suit is brought upon this bond by the District and judgment is recovered, the Surety shall pay all costs incurred by the District in such suit, including reasonable attorneys' fees to be fixed by the Court.

IN WITNE	ESS WHEREOF, we I	have hereunto set o	our hands and seals this
	_day of	, 20	D
	-		
			(Contractor as Principal)
(Seal)		Ву	
(Seal)		Ву	

NOTE: If Contractor is a Partnership, all parties must execute the Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in California.

PAYMENT BOND

The RECLAMATION DISTRICT 900, hereinafter "District," has awarded to , hereinafter "Contractor," a Contract for the work described as follows:

BRADFORD ISLAND TRACT 19 MITIGATION SITE REHABILITATION

WHEREAS, the Contractor is required by the Contract and by the provisions of Third Division, Part 4, Title 15, Chapter 7 of the Civil Code to furnish a bond in connection with the Contract, as hereinafter set forth.

NOW, THEREFORE, we, ______, the undersigned Contractor, as Principal, and ______, a corporation organized and existing under the laws of the State of duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the ______ in the sum of [WRITTEN NUMBER] [(NUMBER)], said sum being not less than one hundred (100) percent of the total Contract amount payable by the District, under the terms of the Contract, for which payment well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT, if the Contractor, its heirs, executors, administrators, successors, and assigns or Subcontractors shall fail to pay for any materials, provisions, provender or other supplies or teams, implements or machinery used in, upon, for or about the performance of the work contracted to be done, or shall fail to pay for any work or labor thereon of any kind, or shall fail to pay any persons named in Civil Code section 9100, or shall fail to pay for amounts due under the Unemployment Insurance Code with respect to such work or labor thereon of any kind, or shall fail to pay for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Contractor and Subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work or labor, and provided that the claimant shall have complied with the provisions of that code, the Surety or Sureties hereon will pay for the same in an amount not exceeding the sum specified in the Contract; otherwise, the above obligation shall be void. In case suit is brought upon this bond, the Surety will pay reasonable attorneys' fees to the prevailing party to be fixed by the court.

This bond shall insure to the benefit of any and all persons, companies and corporations entitled to file claims under Section 9100 of the Civil Code, so as to give a right of action to them or to their assigns in any suit brought upon this bond.

It is further stipulated that the Surety of this bond shall not be exonerated or released from the obligation of the bond by any change, extension of time for performance, addition, alteration, or modification in, to, or of any contract, plans, specifications, or agreement pertaining or relating to any scheme or work of improvement described above or pertaining or relating to the furnishing of labor, materials, or equipment therefor, nor by any change or modification of any terms of payment or extension of the time for any payment pertaining or relating to any scheme or work of improvement described above, nor by any rescission or attempted rescission of the Contract, agreement, or bond, nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond, and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given, and under no circumstances shall Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between the District and original Contractor or on the party of the obligee named in such bond, but the sole

conditions of recovery shall be that claimant is a person described in Section 8400 and 8402 of the California Civil Code and has not been paid the full amount of its claim and that Surety does hereby waive notice of any such change, extension of time, addition, alteration, or modification.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20___.

(Contractor as Principal)

(Seal)

(Seal) By _____

NOTE: If Contractor is a Partnership, all partners should execute Bond.

By

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in California.

CONTRACTOR'S CERTIFICATE REGARDING WORKER'S COMPENSATION

TO: Blake Johnson, PE, District Engineer Bradford Reclamation District 2059 PO Box 1059 Oakley, CA 94561

I am aware of the provisions of Section 3700 of the Labor Code of the State of California which require every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract.

(Contractor)

Ву _____

(Business Address)

(Place of Residence)

GENERAL CONDITIONS

GENERAL CONDITIONS

DEFINITIONS AND TERMS

GENERAL

Wherever the following abbreviations and terms, or pronouns in place of them, are used in these Conditions and other Contract Documents of which these Conditions are a part, the intent and meaning shall be interpreted as provided below.

ABBREVIATIONS

The following abbreviations may be used in the Contract Documents:

AA AASHTO ABMA ACI AFBMA AGA AGC AGMA AI AIA AIA AISC AISI ANSI APA API APWA ARA ARA AREA ASCE	Aluminum Association American Association of State Highway/Transportation Officials American Boiler Manufacturer's Association American Concrete Institute Anti-Friction Bearing Manufacturers Association American Gas Association Associated General Contractors American Gear Manufacturer's Association The Asphalt Institute American Institute of Architects American Institute of Electrical Engineers American Institute of Steel Construction American Institute of Steel Institute American National Standards Institute, Inc. American Plywood Association American Petroleum Institute American Railway Association American Railway Engineering Association American Society Civil Engineers
ASHRAE ASME ASTM AWG AWPA AWS AWWA	American Society of Heating, Refrigeration and Air Conditioning Engineers American Society of Mechanical Engineers American Society for Testing and Materials American Wire Gage American Wood Preservers' Association American Welding Society American Water Works Association
BHMA CCMTC CRSI ETL FS ICBO IEEE IES IPCEA JICS MBMA	Builders Hardware Manufacturers Association California Concrete Masonry Technical Committee Concrete Reinforcement Steel Institute Electrical Testing Laboratory Federal Specification International Conference of Building Officials The Institute of Electrical and Electronics Engineers Illuminating Engineering Society Insulated Power Cable Engineers Association Joint Industry Conference Standards Metal Building Manufacturer's Association

MSS	Manufacturers Standardization Society of the Valve and Fitting Industry Standards
NBFU	National Board of Fire Underwriters
NBS	National Building Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Act of 1970
PCA	Portland Cement Association
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
UBC	Uniform Building Code
UL	Underwriter's Laboratory
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
USAS	The United States of America Standard Institute
USBR	United States Bureau of Reclamation
USPHS	United States Public Health Service
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California

DEFINITIONS

The intent and meaning of the following, wherever they appear in the Contract Documents, shall be interpreted as follows:

Acceptance - The formal Acceptance by the Engineer of the entire Contract, which has been completed in all respects in accordance with the Specifications and any, approved modifications.

Addenda - Any written change, clarification or supplement to documents issued for bidding, issued by the District or its Engineer prior to bid.

As Approved - The words "as approved", unless otherwise qualified, shall be understood to be followed by the words "by the Engineer".

As Shown, and As Indicated - The words "as shown" and "as indicated" shall be understood to be followed by the words "on the Plans".

Award - The decision of the District's Board of Trustees to accept the proposal of the highest scoring responsible Bidder for the Work, subject to the execution and approval of a satisfactory contract therefore and bond to secure the performance thereof and to such other conditions as may be specified or required by law.

Bid - The offer of the Bidder for the Work when made out and submitted on the prescribed Bid form, properly signed and guaranteed. A Bid is also known as a Proposal.

Bid Security - The cash, cashier's check, certified check, or bidder's bond accompanying the Bid submitted by the bidder, as a guarantee that the Bidder will enter into a Contract with the District for the performance of Work herein described.

Bidder - Any individual, firm, partnership or corporation submitting a Bid for the Work contemplated and acting directly or through a duly authorized representative.

Board of Trustees - Board of Trustees for Bradford Reclamation District 2059

Bureau - United States Bureau of Reclamation.

Calendar Day - Each day shown on the calendar.

Change Order - Written order issued by the Engineer to the Contractor covering changes in the Contract and establishing the bases of compensation and time adjustments for work affected by the changes.

Claim - A separate demand by the Contractor for (i) a time extension, (ii) payment of money or damages arising from work done by or on behalf of the Contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (iii) an amount the payment of which is disputed by the City.

Contract - The written agreement covering the performance of the work and the furnishing of labor, materials, tools and equipment in the construction of the Work. The Contract shall include all Contract Documents and supplemental agreements amending or extending the work contemplated which may be required to complete the Work in a substantial and acceptable manner. Supplemental agreements are written agreements covering alterations, amendments, or extensions to the contract and include Addenda and change orders.

Contract Documents - Contract Documents is the collective term for all of the following documents and any other document incorporated therein by reference: Invitation to Bid, Accepted Bid (and all accompanying documents), Designation of Subcontractors, Construction Contract, Payment Bond to Accompany Contract, Performance Bond to Accompany Contract, General Conditions, Supplementary and Special Conditions, (if any), Drawings (and Specifications), Addenda, Change Orders, City of West Sacramento Standard Specifications, State of California Department of Transportation (Caltrans) Standard Specifications 2015, Contractor's Certification Regarding Workers' Compensation.

Contractor - The person or persons, firm, partnership or corporation or other entity who has entered into the Contract with the District to perform the Work.

County - County of Contra Costa, California.

Date of Completion - Date of filing of the Notice of Completion with the Contra Costa County Clerk-Recorder's Office.

Date of Execution of the Contract - The date on which the Contract is signed by the District's authorized representative.

Datum - The Figures given in the Specifications or upon the drawings after the word "Elevation" or an abbreviation of it, shall mean U.S.G.S. datum, unless otherwise noted.

Days - Unless otherwise designated, days as used in the Contract Documents shall mean calendar days.

District – Bradford Reclamation District 2059

Elevation - The figures given on the Plans or in the other Contract Documents after the word "elevation" or abbreviation of it shall mean the distance in feet above the standard datum used by the City or District.

Engineer - The District, or the person designated by the District as its engineering representative during the course of construction, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them.

Extra Work - Work other than that required either expressly or implied by the Contract in its executed form.

Notice of Completion - notice of completion is the recorded project completion document filed with the Contra Costa County Clerk.

Or Equal - The term "or equal" shall be understood to indicate that the "equal" product be the equivalent or better than the product named in function, performance, reliability, quality, and general configuration. Determination of equality in reference to the project design requirements will be made by the Engineer.

Plans or Specification Drawings - The term "Plans" or "Specification Drawings" refers to the official plans, profiles, cross sections, elevations, details, and other Working Drawings and supplementary drawings, or reproductions thereof, signed by the Engineer, which show the location, character, dimensions, and details of the work to be performed. Plans may either be bound in the same book as the balance of the Contract Documents or bound in separate sets. Regardless of the method of binding, Plans shall be part of the Contract Documents.

Plant - All physical, resources, facilities, machinery, equipment, staging, tools, work and storage space other than provided by the Contract, together with subsidiary essentials and necessary maintenance for proper construction and acceptable completion of the project.

Project - The entire Work to be completed under the Contract.

Project Manager - The person designated by the District as its project management representative during the course of construction, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them. The Project Manager will be the District unless the District designates a separate Project Manager. When a Project Manager is used for a project, the Project Manager has full authority to act as the District's Engineer unless the designation specifically states otherwise.

Shop Drawings - Drawings prepared by the fabricator or supplier showing the layout and details of components fabricated in a shop for inclusion in the permanent facility (e.g., structural steel, reinforcing steel, railings).

Site - The area upon or in which the Contractor's operations are carried on and such other areas adjacent thereto as may be designated by the Engineer.

Specifications - The term "specifications" refers to the terms, provisions, and requirements contained herein. Where reference specifications, such as those of "ASTM", "AASHTO", etc. have been referred to, the applicable portions of such standard specifications shall become a part of these Contract Documents.

State - State of California.

State Standard Specifications - Standard Specifications issued by the State of California Department of Transportation, dated 2015, and as amended Bid in the supplemental conditions.

Subcontractor - The term "Subcontractor", as employed herein, includes only those having a direct contract with the Contractor and it includes one who furnishes material worked to a

special design according to the plans or specifications of this work, but does not include one who merely furnishes material not so worked and would be considered a supplier only.

Supplementary & Special Conditions Provisions - Additions, revisions, special directions, and requirements peculiar to a project and not otherwise thoroughly set forth in General and/or Specifications.

Time Limits - All time limits stated in the Contract Documents are of the essence of the Contract.

Work - All the work specified, indicated, shown or contemplated in the Contract Documents to construct the improvements, including all alterations, amendments or extensions thereto made by Change Order or other written orders of the Engineer.

Working Days - A Working day is defined as any day, except Saturdays, Sundays and legal holidays of the District.

Working Drawings - Drawings furnished by the Contractor showing the layout and details of temporary construction procedures and methods of construction, and data for construction equipment which are to be employed in the construction of the permanent facility (e.g., form drawings, erection drawings, load test pile procedures, pile hammer data, etc.).

Written Notice - "Written Notice" shall be deemed to have been duly served when delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by certified U.S. mail to the last business address known to the party who gives the notice as specified in the Contract.

Whenever in the Specifications or upon the drawings the words "directed", "required", "permitted", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation or prescription of the Engineer is intended, and similarly the words "approved", "acceptable", "satisfactory", or words of like import, shall mean approved or acceptable to, or satisfactory to the Engineer, unless otherwise expressly stated.

SCOPE OF WORK

INTENT OF CONTRACT DOCUMENTS

The intent of the Contract Documents is to prescribe the details for the construction and completion of the Work, which the Contractor undertakes to perform in accordance with the terms of the Contract. These General Conditions are meant to replace Division I of the State Standard Specifications for all District contracts which incorporate these General Conditions by reference.

Where the Specifications and Plans describe portions of the Work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment and incidentals and do all the Work involved in performing the Contract in a satisfactory and workmanlike manner.

The technical provisions are presented in sections for convenience. However, this presentation does not necessarily delineate trades or limits of responsibility. All sections of the Specifications and Plans are interdependent and applicable to the Project as a whole.

The Contract Documents are complementary, and what is called for in any one shall be as binding as if called for in all. Anything shown on the Drawings and not mentioned in the Specifications or mentioned in the Specifications and not shown on the Drawings shall have the same effect as if shown or mentioned respectively in both. Any work shown on one Drawing shall be construed to be shown in all Drawings and the Contractor will coordinate the Work and the Drawings.

If any portion of the Contract Documents shall be in conflict with any other portion, the various documents comprising the Contract Documents shall govern in the following order of precedence: Change Orders; Addenda; Shop Drawings, Drawings, Supplementary and Special Conditions; Designation of Subcontractors; Construction Contract; General Conditions; State of California Department of Transportation (Caltrans) Standard Specifications 2015.

Detail Drawings take precedence over General Drawings. As between schedules and other information given on Drawings, the Schedules shall govern. If an item is shown on any Drawing and not specifically included in Technical Specifications specific to this project, the Drawing shall govern. Any conflict or inconsistency between or in the drawings shall be submitted to the Engineer for clarification as soon as the Contractor becomes aware of such inconsistency.

CONTRACTOR'S UNDERSTANDING

It is understood and agreed that the Contractor has, by careful examination, satisfied itself as to the nature and location of the Work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, the general and local conditions, and all other matters which can in any way affect the Work under this Contract. No verbal agreement or conversation with any officer, agent or employee of the District, either before or after the execution of this Contract, shall affect or modify any of the terms or obligations contained herein.

CHANGES IN THE WORK

The District may, at any time, by written order, make changes in the Work as deemed necessary by the Engineer. Such changes include, but are not limited to:

In the Specifications or Plans;

In the sequence, method or manner of performance of the Work;

In the owner-furnished facilities, equipment, materials, services or site; and

Directing acceleration of the Work.

If such changes cause an increase or decrease in the Contractor's cost of, or time required for, performance of the Contract, an equitable adjustment will be made and the Contract modified in writing accordingly.

Change Orders

A change pursuant to this section will be in the form of a Change Order, which will set forth the work to be done or the method by which the change and cost adjustment, if any, will be determined, and the time of completion of the work.

Upon receipt of a Change Order, the Contractor shall proceed with the ordered work. If ordered in writing by the Engineer, the Contractor shall proceed with the work so ordered prior to actual receipt of a Change Order. A Change Order executed by the Contractor and approved by the Engineer is an executed Change Order as that term is used throughout this section.

Change Order Protests

A Change Order may be issued to the Contractor at any time. Should the Contractor disagree with any terms or conditions set forth in a Change Order, which he has not executed, he shall submit a written protest to the Engineer within fifteen (15) days after the receipt of such Change Order. The protest shall state the points of disagreement and, if possible, the quantities and cost involved.

If a written protest is not submitted, payment will be made as set forth in the Change Order. Such payment shall constitute full compensation for all work included therein or required thereby. Such unprotested Change Orders shall be considered as executed Change Orders.

Where the protest concerning a Change Order relates to compensation, the compensation payable for all work specified or required by said Change Order to which such protest relates will be determined in the same manner as provided in Section 0 of this section. The Contractor shall keep full and complete records of the cost of such work and shall permit the Engineer to have such access thereto as may be necessary to assist in the determination of the compensation payable for such work. Where the protest concerning a Change Order relates to the adjustment of time and for completion of the Work, the time to be allowed therefor will be determined as provided in this section.

The consent of the Contractor's sureties shall not be required as to any change or Extra Work, and the liability of the Contractor's Bonds shall be increased or decreased accordingly without notice to the sureties.

PROCEDURES AND ALLOWABLE COSTS ON CHANGES AND ADDITIONS TO WORK

Forms of Payment

If the change in, or addition to, the Work will result in an increase in the contract sum, the District shall have the right to require the performance thereof. The compensation to be paid for any such work shall, in the District's sole discretion, be determined in one or more of the following ways:

By extension of agreed unit prices, if unit prices are required by the District's Bid form and provided with Contractor 's bid;

By revision of unit prices;

By proposal and Acceptance of an agreed upon lump sum; and

On a force account basis.

Until one of the above methods is agreed on, or if the Work is to be paid for on a time and materials basis, the Contractor shall keep full and complete records of the cost of such work in the form and manner prescribed by the Engineer and shall permit the Engineer to have access to such records as may be necessary to assist in the determination of the compensation payable for such work.

Lump Sum Payment

The District, in its sole and absolute discretion, may request a lump sum proposal by Contractor to perform the change in, or addition to, the Work performed. Such lump sum proposal shall be submitted by the Contractor within ten (10) days of the District's request therefor. Request for a lump sum proposal by District shall not be deemed an election by District to have the Work performed on a lump sum basis. Costs of preparing the proposal shall not be compensable.

Contents of Lump Sum Proposal

The Contractor's proposal shall be itemized and segregated by labor and materials for the various components of the change (no aggregate labor total will be acceptable). The proposal shall be accompanied by signed proposals of any Subcontractors, which will perform any portion of the change, and of any persons who will furnish materials or equipment for incorporation therein. The proposal shall also include the Contractor's estimate of the time required to perform said changes or additional work.

Computation of Labor Costs

The portion of the proposal relating to labor, whether by the Contractor's forces or the forces of any of its Subcontractors, may include the projected wages of the reasonably anticipated Site labor, including foremen, who will be directly involved in the change in the Work. These projected wages shall not include charges for assistant superintendents, superintendents, office personnel, timekeepers and maintenance mechanics.

Labor costs may also include Contractor's overhead and profit which shall be computed by adding to the labor costs either up to fifteen percent (15%) of the projected wages, but not payroll costs, or the labor surcharge set forth in the California Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the Work is accomplished and which is a part of the Contract. The method of computing the overhead and profit shall be solely within the discretion of the District.

The labor surcharge, if used, shall constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to, or on behalf of, the workmen, other than actual wages as defined above. No time or charges will be allowed except when the workers are actually engaged in the proper, efficient and diligent performance or completion of the extra work as authorized. Overtime shall not be worked without prior approval of the Engineer.

Computation of Equipment and Materials Costs

The portion of the proposal relating to materials may include the reasonably anticipated direct costs to the Contractor or to any of its Subcontractors of materials to be purchased for incorporation in the change in the Work. This portion of the proposal may also include transportation and applicable sales or use taxes. Up to fifteen percent (15%) of these direct costs may be included as overhead and profit for the Contractor or any such Subcontractor (such overhead and profit to include all small tools).

This portion of the proposal may further include the Contractor's and any of its Subcontractors' reasonably anticipated costs for the rental and operation of prime construction and automotive equipment furnished and used in connection with the change in the Work. The equipment rental and operation rates used shall be the latest edition of the Department of Transportation, Division of Construction, Equipment Rental Rates. These costs shall not include charges for listed equipment or major tools with a new cost of five hundred dollars (\$500.00) or less. No time charges shall be allowed except for equipment actually used for the proper and efficient performance or completion of the authorized change in the Work.

Subcontractors

The lump sum proposal may include up to five percent (5%) of the amount, which the Contractor will pay to any of its Subcontractors for the change in the Work as allowable overhead and profit to the Contractor.

Failure to Submit Lump Sum Proposal

In the event that the Contractor fails to submit its proposal within the designated period, the Engineer may direct the Contractor to proceed with the change or addition to the Work and the Contractor shall so proceed. The Engineer shall unilaterally determine the reasonable costs and time to perform the work in question, which determination shall be final and binding upon the Contractor.

Failure to Agree on Lump Sum Amount

In the event that the parties are unable to agree as to the reasonable costs and time to perform the change in or addition to the Work based upon the Contractor's proposal and the Engineer and District do not elect to have the change in the Work performed on a time and material basis, the Engineer and District shall make a unilateral determination of the reasonable cost and time to perform the change in the Work, based upon their own estimates, the Contractor's submission or combination thereof. In such instances, a Change Order shall be issued for the amount of costs and time determined by the Engineer and the District and shall become binding upon the Contractor unless the Contractor submits its protest in writing to the District within thirty (30) days of the issuance of the Change Order. The District has the right to direct the Contractor in writing to perform the change in the Work, which is the subject of the Change Order. Failure of the parties to reach agreement regarding the costs and time of

performing the change in the Work and/or any pending protest shall not relieve the Contractor from performing the change in the Work promptly and expeditiously.

Payment by Unit Prices

If any of the items included in the lump sum proposal are covered by unit prices contained in the contract document, the District may, if it requires the change in the Work to be performed on a lump sum basis, elect to use these unit prices in lieu of the similar items included in the lump sum proposal in which event an appropriate deduction will be made in the lump sum amount prior to the application of any allowed overhead and profit percentages. No overhead and profit shall be applied to any unit prices.

Payment on a Force Account Basis

If the District elects to have the change or addition to the Work performed on a force account basis, the Work shall be performed, whether by the Contractor's forces or the forces of any of its Subcontractors or Sub-Subcontractors, and payment shall be made subject to the following provision. The Contractor will be paid the direct costs of the labor, equipment and materials used in performing the force account work determined as hereinafter provided.

For labor, the Contractor will be paid the cost of labor for the workers (including foremen when authorized by the Engineer or Project Manager) used in the actual and direct performance of the work. The cost of labor, whether the employer is the Contractor or any or any Subcontractor of any tier, shall be actual wages, including basic hourly wage, health and welfare payments and pension payments incurred in performing the force account work, plus any travel and subsistence payments for the workers performing such work and made necessary thereby. To the actual wages shall be added a labor surcharge as set forth in the State Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates", as in effect on the date the work is performed. The labor surcharge shall be deemed to encompass the District's entire liability to reimburse the Contractor for workers compensation insurance payments, social security payments, Medicare payments, federal unemployment insurance payments, state unemployment insurance payments and state training taxes, made necessary by the force account work.

For equipment, the Contractor will be paid for the use of equipment at the rental rates listed for that equipment in the State Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates", which is in effect on the date the work is performed, regardless of ownership or any rental agreement entered into by Contractor for such equipment. The rental rate paid in accord with said publication shall be deemed to include the cost of fuel, oil, lubrication, supplies, small tools, attachments, repairs and maintenance, depreciation, storage and insurance for said equipment. Rental time will not be paid when equipment is inoperable due to breakdowns, repairs or maintenance. Payment for loading, transporting and unloading time will be in accordance with the State Standard Specifications applicable to loading, transporting and unloading equipment for force account work, as applicable as of the date the equipment is loaded, transported or unloaded.

For materials used in the work, the District will pay for materials furnished by the Contractor and necessarily used in the force account work. Prior to markups as set forth below, the amount paid shall be the price paid by the actual purchaser to the actual supplier plus any necessary actual costs of handling the materials.

Contractor may add fifteen percent (15%) to the total labor, equipment and material charges as the total overhead and profit to the entity or entities actually performing the force account work. If the entity or entities actually performing the work are Subcontractors or Sub-Subcontractors, the Contractor shall be allowed five percent (5%) of the total charge of the

performing entity or entities (including mark- up) as Contractor's mark-up. No other mark-ups shall be allowed hereunder.

The Contractor shall submit to the District daily work and material tickets, to include the identification number assigned to the change in the Work, the location and description of the change in the Work, the classification of labor employed (and names and social security numbers), hours expended, the material used, the equipment rented (not tools) and such other evidence of cost as the District may require. The District may require authentication of all time and material tickets and invoices by persons designated by the District for such purpose. The failure of the Contractor to secure any required authentication shall, if the District elects to treat it as such, constitute a waiver by the Contractor of any claim for the cost of that portion of the Change in the Work covered by a non-authenticated ticket or invoice; provided, however, that the authentication of any such ticket or invoice by the District shall not constitute an acknowledgment by the District that the items thereon were reasonably required for the Change in the Work.

Limitations on Changes

The Contractor shall not be entitled to any amount for indirect costs, damages or expenses of any nature, including, but not limited to, so-called "impact" costs, labor inefficiency, wage, material or other escalations beyond the prices upon which the proposal is based and to which the parties have agreed pursuant to the provisions of this section, and which the Contractor, its Subcontractors and Sub-Subcontractors or any other person may incur as a result of delays, interferences, suspensions, changes in sequence or the like, for whatever cause, whether reasonable or unreasonable, foreseeable or unforeseeable, or avoidable or unavoidable, arising from the performance of any and all changes in the work performed pursuant to this section. It is understood and agreed that the Contractor's sole and exclusive remedy in such event shall be recovery of its direct costs as compensable hereunder and an extension of the time of the Contract, but only in accordance with the provisions of the Contract Documents.

It is expressly agreed that Contractor shall not be entitled to claim damages for anticipated profits on any portion of the Work that may be deleted.

The amount of any adjustment for work deleted shall be estimated at the time deletion of work is ordered and the estimated adjustment will be deducted for the subsequent monthly pay estimates. The District reserves its rights under Section 0 to audit Contractor's as-Bid profit in connection with any deductive change, to arrive at a final adjustment. Contractor's as-Bid profit shall be reduced pro rata according to the proportion of the original contract value less as-Bid profit, represented by the work deleted.

The District reserves the right to contract with any person or firm other than the Contractor for any or all Extra Work.

UNILATERAL CHANGE IN OR ADDITION TO THE WORK

Notwithstanding the above, the District, directly or through the Engineer, may direct the Contractor in writing to perform changes in or additions to the scope of the Contract. The Contractor shall perform such work and the parties shall proceed pursuant to the provisions of Section 0.

DIFFERING SITE CONDITIONS

The Contractor shall promptly, and before the following conditions are disturbed, notify the District in writing of any:

Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25110.02 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law; or

Subsurface or latent physical conditions at the Site differing from those indicated in the Contract Documents; or

Unknown conditions at the Site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

The Engineer shall thereupon promptly investigate the conditions. If the Engineer finds that they do involve hazardous waste, or do materially differ and cause an decrease or increase in the Contractor's cost or time of performance, the Engineer will issue a change order as appropriate. Any increase or decrease of cost resulting from such changes shall be adjusted in the manner provided in Section 0 for adjustments as to extra and/or additional work and changes. In the event that a dispute arises between the District and the Contractor, whether the conditions materially differ, or involve hazardous waste, or cause and decrease or increase the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any scheduled completion date provided by the Contract, but shall proceed with all work to be performed under the Contract, the procedures applicable to claims for extra costs shall then apply.

CLAIMS FOR EXTRA COSTS

Notice of Potential Claims

It is hereby mutually agreed that the Contractor shall not be entitled to the payment of any additional compensation for any cause, including any act, or failure to act, by the Engineer, or the happening of any event, thing or occurrence, unless the Contractor provides the Engineer with written notice of the potential claims as hereinafter specified. Compliance with this section, however, shall not be a prerequisite as to matters within the scope of the protest provisions in Section 0.

The written notice of potential claims shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential claim. The notice as above required shall be given to the Engineer prior to the time that the Contractor commences performance of the Work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Engineer, or in all other cases within ten (10) days after the happening of the event, thing or occurrence giving rise to the potential claim.

Construction Dispute

The Contractor may submit a dispute to the Engineer concerning any matter for which a protest under Section 0, or a notice of potential claim, is filed. Such disputes, or potential claims, shall be submitted to the Engineer within sixty (60) days following the submission of said protest or notice, unless, due to the nature of the dispute or the uncompleted state of the Work, it is impracticable to determine the amount or the extent of the claim within such period. In such cases, disputes shall be submitted at the earliest practicable time in which such a determination can be made. In any event, all disputes shall be filed on or before the date of the final release by the Contractor as provided for in Section 0.

All disputes shall be in writing and shall set forth clearly and in detail, for each item of additional compensation requested, the reasons for the dispute, reference to applicable

provisions of the Specifications, the nature and the amount of the cost involved, the computations used in determining such costs, all pertinent factual data and all the documents necessary to substantiate the dispute. The Contractor shall maintain complete and accurate records of the cost or any portion of the Work for which additional compensation is claimed, and shall provide the Engineer with copies thereof, as required. The Engineer shall provide a written decision to the dispute or potential claim as soon as practicable but not later than 30 days following receipt thereof.

Resolution of Construction Claims

To the extent that the Contractor disputes the Engineer's Written Decision issued pursuant to Section 4.07(b)(2), or to the extent the Engineer fails to issue a timely written decision, the Contractor may file a written claim, as defined by Public Contract Code section 9204(c)(1), with the District including reasonable documentation to support the claim. Upon receipt of the claim, the District shall conduct a reasonable review of the claim, and within a period not to exceed 45 days, the District shall provide the Contractor with a written statement identifying what portion of the claim is disputed and what portion is undisputed. The time in which the District must provide a written statement may be extended by mutual agreement of the parties as specified by Public Contract Code section 9204(d)(1)(C). The District shall pay any undisputed portion of the claim within 60 days after issuance of its written statement.

Claims submitted by the Contractor shall be accompanied by a notarized certificate containing the following language:

Under the penalty of law for perjury or falsification and with specific reference to the California False Claims Act, Government Code section 12650, et. seq., the undersigned,

(Name)

(Title

(Company

hereby certifies that the claim for the additional compensation and time, if any, made herein for the work on this contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the contract between parties.

Dated:	_
/s/	-
Subscribed and sworn before me this	day
of	_
	_
Notary Public	
My commission expires	_

Failure to submit the notarized certificate will be sufficient cause for denying the

claim.

Any claim for overhead type expenses or costs, in addition to being certified as stated above, shall be supported by an audit report of any independent Certified Public Accountant. Any such overhead claim shall also be subject to audit by the District at its discretion.

Any costs or expenses incurred by the District in reviewing or auditing any claims that are not supported by the Contractor's cost accounting or other records shall be deemed to be damages incurred by the District within the meaning of the California False Claims Act.

Meet And Confer Regarding Unresolved Claims. If the Contractor disputes the City's written statement issued pursuant to Section 4.07(c)(1) or if the District fails to issue a timely written response, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the District shall schedule a meet and confer conference within 30 days for settlement of the dispute. The meet and confer conference shall be attended by senior executives of the parties who have authority to settle the controversy. Within 10 business days following the conclusion of the meet and confer conference, the District shall provide the Contractor with a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. The District shall pay any undisputed portion of the claim within 60 days after it issues its written statement.

Mediation. If the Contractor disputes, in writing, any portion of the District's written statement as issued under Section 4.07(c)(3), the disputed items shall be submitted to nonbinding mediation according to the provisions of Public Contract Code section 9204(d)(2), and any costs of mediation shall be allocated as set forth in that section. Upon receipt of a claim, the District and the Contractor may agree to waive, in writing, mediation.

Failure to Respond or Pay. If the District fails to timely respond to a claim from the Contractor or otherwise fails to meet the time requirements of Public Contract Code section 9204, the claim shall be deemed rejected in its entirety. Additionally, amounts not timely paid in the manner required by Public Contract Code section 9204 shall bear interest at 7 percent per annum.

Subcontractor Claims. If a Subcontractor or a lower tier Subcontractor lacks legal standing to assert a claim against the District because privity of contract does not exist, the Contractor may present to the District a claim on behalf of the Subcontractor or lower tier Subcontractor pursuant to Public Contract Code section 9204(d)(5).

CIVIL ACTION PROCEDURES

Alternative Dispute Resolution of Claims of \$375,000.00 or Less.

Claims Less Than \$375,000.00. Notwithstanding any other provision herein but after compliance with the provisions of Public Contract Code section 9204 as set forth in Section 4.07, claims of \$375,000.00 or less shall be resolved pursuant to the alternative dispute resolution procedures set forth in Public Contract Code section 20104 *et seq.* "Claim" for this purpose means a separate demand by the Contractor for a time extension, payment of money or damages arising from work done by or on behalf of the Contractor pursuant to the Contract, for which payment is expressly provided, or the Contractor is otherwise entitled to, or an amount the payment of which is disputed by the District.

Submission of Claims Less than \$375,000.00. The Contractor shall submit its claim of \$375,000.00 or less to the District in writing, within the time frames established under paragraph 4.07, but no later than before the final payment is made. The District shall respond within the time provided by statute. If the Contractor disagrees with the response or the District fails to respond within the time permitted, the Contractor shall notify the District of the disagreement in writing within fifteen (15) days from the date of the response or expiration of the time permitted to respond and demand a meet-and-confer conference. The District shall schedule a meet-and-confer conference within thirty (30) days of the demand. The meet and confer conference shall be attended by senior executives of the parties who have authority to settle the controversy. If not resolved at the meet-and-confer conference, the Contractor may initiate a civil action as set forth in Public Contract Code section 20104 *et seq.*, including but not limited to compliance with applicable Government Code provisions.

Time Limits Not Extended. Nothing in subdivision (a) of Public Contract Code section 20104.2 shall extend the time limit or supersede the notice requirements provided in this Contract for filing claims by the Contractor.

Alternative Dispute Resolution of Claims in Excess of \$375,000.00.

As a condition precedent to the initiation of litigation, disputes in excess of a total value of \$375,000.00 shall first be submitted to the claims procedures set forth in Sections 4.06 and 4.07.

GUARANTEE

In addition to warranties, representations and guarantees stated elsewhere in the Contract Documents, the Contractor unconditionally guarantees all materials and workmanship furnished hereunder, and agrees to replace the same at its sole cost and expense, and to the satisfaction of the Engineer, any and all materials which may be defective or improperly installed.

The Contractor shall repair or replace to the satisfaction of the Engineer any or all such work that may prove defective in workmanship or materials, ordinary wear and tear excepted, together with any other work, which may be damaged or displaced in so doing.

In the event of failure to comply with the above stated conditions within a reasonable time, the District is authorized to have the defect repaired and made good at the expense of the Contractor who will pay the costs and charges therefore immediately upon demand, including any reasonable management and administrative costs, and engineering, legal and other consultant fees incurred to enforce this section.

The signing of the Contract by the Contractor shall constitute execution of the above guarantees. Except as otherwise provided in this Contract, the guarantees and warranties shall remain in effect for a period of one (1) year after final Acceptance of the Work by the District.

CONTROL OF WORK

AUTHORITY OF ENGINEER

The Engineer is the representative of the District and has full authority to interpret the Contract Documents, to conduct the construction review and inspection of the Contractor's performance, and to decide questions, which arise during the course of the Work and the Engineer's decisions on these matters, shall be final and conclusive. The Engineer has the authority to reject all work and materials, which do not conform to the Contract Documents, and has the authority to stop the Work whenever such stoppage may be necessary to insure the proper execution of the Contract. The Engineer's failure to stop the Work shall not obligate the District to accept defective or otherwise unacceptable work or otherwise affect the Engineer's or District's authority to reject work for any reason set forth in the Contract Documents.

If at any time the Contractor's work force, tools, plant or equipment appear to the Engineer to be insufficient or inappropriate to secure the required quality of work or the proper rate of progress, the Engineer may order the Contractor to increase their efficiency, improve their character, to augment their number or to substitute other personnel, new or additional tools, plant or equipment, as the case may be, and the Contractor shall comply with such order. Neither the failure of the Engineer to demand such increase of efficiency, number, or improvement, nor the compliance by the Contractor with the demand, shall relieve the Contractor of its obligation to provide quality work at the rate of progress necessary to complete the Work within the specified time.

The Engineer may authorize minor variations in the work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Time. These may be accomplished by a Field Order. Contractor shall comply promptly with all Field Orders. If the Engineer and Contractor are unable to agree on entitlement or on the amount or extent, if any, of any adjustment in the Contract Price or Contract time, or cost, as a result of a Field Order, a claim may be made therefor pursuant to the State of California Department of Transportation.

Any order given by the Engineer, not otherwise required by the Contract Documents to be in writing shall, on request of the Contractor, be given or confirmed by the Engineer in writing.

Whenever work, methods of procedure, or any other matters are made subject to direction or approval, such direction or approval will be given by the Engineer.

DRAWINGS

Drawings furnished herewith are for bidding purposes. The Engineer will furnish the Contractor, free of charge, copies of full size Drawings which are reasonably necessary for the execution of the Work. The Contractor shall have no claim for excusable delay on account of the failure of the Engineer to deliver such Drawings, unless the Engineer shall have failed to deliver the same within two weeks after receipt of written demand therefore from the Contractor. The Contractor shall keep one copy of said Drawings, in good order, available to the Engineer and the Engineer's representatives, and convenient to the working site.

If the Contractor, in the course of the Work, finds any discrepancy between the Drawings and the physical condition of the locality, or any errors or omissions in the Drawings, or in the layout as given by points and instructions, it shall be the Contractor's duty to inform the Engineer in writing, and the Engineer will promptly verify the same.

Any work done after such discovery, until authorized, will be done at the Contractor's risk. All Drawings, Specifications, and copies thereof furnished by the Engineer are the property of the Engineer and shall not be reused on other work and, with the exception of the signed Contract sets, are to be returned to the Engineer, on request, at the completion of the Work. All models are the property of the District.

The Drawings shall be supplemented by such Shop Drawings prepared by the fabricator and/or supplier and Working Drawings prepared by the Contractor as are necessary to adequately control the Work. No changes shall be made by the Contractor in any Shop or Working Drawings after they have been reviewed by the Engineer, if the Engineer deems that no further submittals are necessary. The Contractor shall not commence the layout, purchase, fabrication, or construction of any work for which Shop or Working Drawings are required until Engineer has reviewed the specifications and drawings and has indicated in writing no further submittals are required for compliance with the Contract Documents.

Shop and Working Drawings for any structure shall include, but not be limited to, detail design calculations, fabrication and installation drawings, lists, graphs, operating instructions, etc., which shall be reviewed and accepted by the Engineer before any such work is performed.

Shop and Working Drawings will be required for cribs, cofferdams, falsework, centering and form work and for other temporary work and methods of construction the Contractor proposes to use. Such Drawings shall be subject to the review and Acceptance of the Engineer insofar as the details affect the character of the finished work, but details of design will be left to the Contractor who shall be responsible for the successful construction of the Work.

Contractor agrees that Shop and/or Working Drawings processed by the Engineer are not Change Orders; that the purpose of these Drawings submitted by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that the Contractor demonstrates its understanding by indicating which equipment and material the Contractor intends to furnish and by detailing the fabrication methods it intends to use. It is expressly understood, however, that favorable review of the Contractor's Shop and Working Drawings shall not relieve the Contractor of any responsibility for accuracy of dimensions and details, or for mutual agreements of dimensions and details. It is mutually agreed that the Contractor shall be responsible for agreement and conformity of its Drawings with the Specifications. Contractor further agrees that if deviations, discrepancies or conflicts between Shop and/or Working Drawings and Specifications are discovered either prior to or after the Drawings are processed by the Engineer, the Specifications shall control and shall be followed.

Unless otherwise stated, the Engineer shall have thirty (30) days from the date of receipt of Shop and/or Working Drawings for review.

Full compensation for furnishing all Shop and/or Working Drawings shall be considered as included in the prices paid for the Contract items of work to which such drawings relate and no additional compensation will be allowed therefore. Any cost related to the Engineer's review of any particular set of Shop and/or Working Drawings more than twice, due to incompleteness or unacceptability, shall be borne by the Contractor, and the District reserves the right to withhold such costs from payments due the Contractor.

All reasonable effort has been made to locate and delineate all known structures and facilities on the plans. Except as otherwise provided herein, the District shall assume no responsibility for the completeness or accuracy of its delineation of underground utilities nor the

existence of other buried objects which may be encountered, or which are not shown on the plans.

The Contractor shall keep and maintain a clean set of plans for the project and shall record in red ink all changes, revisions, etc. made during the course of construction. These plans shall include all changes, revisions, etc. from the original plan complete with the exact sizes, locations, dimensions, elevations, etc. These plans shall be kept and maintained in a neat, clean and legible condition and shall be available for inspection at all times by the Engineer. The Contractor shall deliver these completed plans to the Engineer and the Engineer shall approve these plans prior to final Acceptance of the project by the District.

CONSTRUCTION STAKING AND SURVEYS

The District will provide one set of construction stakes and benchmarks as it deems necessary to establish lines and grades required for the completion of the site work specified in the Contract. The Contractor shall notify the Engineer a minimum of seven (7) days in advance of the time work is to begin on any portion of the project that may require construction staking to be provided by the District. The Contractor shall make all other surveys necessary for the completion of the Work.

Alternatively, the Engineer may provide the Contractor with drawings showing benchmarks and reference points as it deems necessary to establish lines and grades required for the completion of the site work specified in the Contract Documents. The Contractor shall make or furnish all surveys and set all construction stakes necessary for the completion of the work.

Stakes and marks set by the District or Engineer shall be carefully preserved by the Contractor. The Contractor shall be charged for the cost of replacing or restoring the stakes and marks, which are destroyed or damaged by Contractor's operation. This charge will be deducted from any monies due or to become due to the Contractor under the Contract.

PERMITS AND REGULATIONS

Permits and licenses, of a temporary nature, necessary for the prosecution of the Work shall be secured and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the District unless otherwise specified.

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as shown on the plans and described in the Specifications. Contractor shall promptly notify the Engineer in writing of any specification at variance therewith. In such instances, any necessary changes shall be adjusted as provided in the Contract for changes in the Work. If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules, and regulations and without such notice to the Engineer, Contractor shall bear all costs arising therefrom.

CONFORMITY WITH CONTRACT DOCUMENTS AND ALLOWABLE DEVIATIONS

Work and materials shall conform to the lines, grades, cross sections, dimensions and material requirements, including tolerances, shown on Contract Documents. Although measurement, sampling, and testing may be considered evidence as to such conformity, the Engineer shall be the sole judge as to whether the Work or materials deviate from the Contract Documents. The Engineer's decision as to any allowable deviations therefrom shall be final and conclusive.

COORDINATION AND INTERPRETATION OF CONTRACT DOCUMENTS

Should it appear that the Work to be done or any of the matters relative thereto are not sufficiently detailed or explained in the Specifications and Plans, the Contractor shall apply to the Engineer for such further explanations as may be necessary and shall conform to them as part of the Contract. In the event of any doubt or question arising respecting the true meaning of the Specifications and Plans, reference shall be made to the Engineer, whose decision thereon shall be final and conclusive.

Any reference made in the Specifications and Plans to any specification, standard, method, or publication of any scientific or technical society or other organization shall, in the absence of a specific designation to the contrary, be understood to refer to the specification, standard, method, or publication in effect as of the date that the Work is advertised for Bids.

SUBCONTRACTORS

The attention of the Contractor is directed to the provisions of California Public Contract Code sections 4100-4113 regarding subcontracting and said provisions are by this reference incorporated herein and made a part hereof.

Each subcontract shall contain a suitable provision for the suspension or termination thereof should the Work be suspended or terminated or should the Subcontractor neglect or fail to conform to every provision of the Contract Documents insofar as such provisions are relevant. The Contractor shall be fully responsible to the District for the acts or omissions of the Contractor's Subcontractors and of the persons either directly or indirectly employed by the Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the District. If a legal action, including arbitration and litigation, against the District is initiated by a Subcontractor or Supplier, the Contractor shall reimburse the District for the amount of legal, engineering and all other expenses incurred by the District in defending itself in said action.

The District and the Engineer reserve the right to approve all Subcontractors.

Such approval shall be a consideration to the awarding of the Contract and unless notification to the contrary is given to the Contractor prior to the signing of the Contract, the list of Subcontractors which is submitted with the Contractor's proposal will be deemed to be acceptable. Contractor shall not, without the written consent of the District, subcontract the whole of the Work.

COOPERATION OF CONTRACTORS

Should construction be under way by other forces or by other contractors within or adjacent to the limits of the Work specified or should work of any other nature be under way by other forces within or adjacent to said limits, the Contractor shall cooperate with all such other contractors or other forces to the end that any delay or hindrance to their work will be avoided. The right is reserve d to perform other or additional work at or near the site (including material sources) at any time, by the use of other forces.

When two or more contractors are employed on related or adjacent work, each shall conduct its operation in such a manner as not to cause any unnecessary delay or hindrance to the other. Each Contractor shall be responsible to the other for all damage to work, to persons or property caused to the other by its operations, and for loss caused the other due to unnecessary delays or failure to finish the work within the time specified for completion.

SUPERINTENDENCE

The Contractor shall designate in writing, before starting work, an individual as authorized representative who shall have the authority to represent and act for the Contractor. This authorized representative shall be present at the Site of the Work at all times while work is actually in progress on the Contract. When the Work is not in progress and during periods when the Work is suspended, arrangements acceptable to the Engineer shall be made for any emergency work, which may be required.

The Contractor is solely responsible, at all times, for the superintendence of the Work and for its safety and progress.

Whenever the Contractor or its authorized representative is not present on any particular part of the Work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which the orders are given.

Any order given by the Engineer, not otherwise required by the Specifications to be in writing, will on request of the Contractor, be given or confirmed by the Engineer in writing.

INSPECTION OF WORK

Unless otherwise provided, all equipment, materials, and work shall be subject to inspection and testing by the Engineer. The Engineer will observe the progress and quality of the Work and determine, in general, if the Work is proceeding in accordance with the intent of the Contract Documents. The Engineer shall not be required to make comprehensive or continuous inspections to check the quality of the Work. The Engineer shall not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work. Visits and observations made by the Engineer shall not relieve the Contractor of Contractor's obligation to conduct comprehensive inspections of the Work and to furnish proper materials, labor, equipment and tools, and perform acceptable work, and to provide adequate safety precautions, in conformance with the intent of the Contract.

Whenever the Contractor varies the period during which work is carried on each day, the Contractor shall give due notice to the Engineer so that proper inspection may be provided. Any work done in the absence of the Engineer shall be subject to rejection. Proper facilities for safe access for inspection to all parts of the Work shall at all times be maintained for the necessary use of the Engineer and other agents of the District, and agents of the federal, state, or local governments at all reasonable hours for inspection by such agencies to ascertain compliance with laws and regulations.

One or more inspectors may be assigned to observe the Work by the Engineer and to act in matters of construction under this Contract. It is understood that inspectors shall have the power to issue instructions and make decisions within the limitations of the authority of the Engineer. Such inspection shall not relieve the Contractor of the Contractor's obligation to conduct comprehensive inspections of the Work, to furnish proper materials, labor, equipment and tools, and perform acceptable work, and to provide adequate safety precautions in conformance with the intent of the Contract.

The Engineer and the Engineer's representatives shall at all times have access to the Work wherever it is in preparation or progress, and the Contractor shall provide safe and convenient facilities for such access and for inspection. If the Specifications, the Engineer's instructions, laws, ordinances, or any public authority require any material, equipment or work to be specifically tested or approved, the Contractor shall give the Engineer timely notice of its readiness for inspection, and if the inspection is by an authority other than the District, of the

time fixed for inspection. Inspections by the Engineer will be made promptly and, where practicable, at the source of supply.

Work performed without inspection may be required to be removed and replaced under proper inspection. In such instances, the entire cost of removal and replacing, including the cost of District-furnished materials used in the Work, shall be borne by the Contractor, regardless of whether or not the Work exposed is found to be defective. Examination of questioned work, other than that installed without inspection, may be ordered by the Engineer and, if so ordered, the Work must be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the District will pay the cost of re-examination and replacement. If such work is found to be not in accordance with the Contract Documents, the Contractor shall pay such cost, unless the Contractor can show that the defect in the Work was caused by another Contractor, and in that event the District will pay such costs.

The inspection of the Work shall not relieve the Contractor of the Contractor's obligation to fulfill the Contract as herein prescribed, or in any way alter the standard of performance provided by the Contractor, and defective work shall be made good and unusable materials may be rejected, notwithstanding that such work and materials have been previously overlooked by the Engineer and accepted or estimated for payment. If the Work or any part thereof shall be found defective, the Contractor shall, within ten (10) calendar days, make good such defect in a manner satisfactory to the Engineer. If the Contractor fails to make ordered repairs of defective work or to remove the condemned materials from the Work within ten (10) calendar days after written direction by the Engineer, the District may make the ordered repairs, or remove the condemned materials, and deduct the cost thereof from any monies due the Contractor.

The Contractor shall furnish promptly, without additional charge, all facilities, labor and materials reasonably needed by the Engineer for performing all inspection and tests. Contractor shall be charged with any additional cost of inspection when material and workmanship are not ready at the time specified by the Contractor for its inspection.

Where any part of the Work is being done under an encroachment permit or building permit, or is subject to federal, state, county or District codes, laws, ordinances, rules or regulations, representatives of the government agency shall have full access to the Work and shall be allowed to make any inspection or tests in accordance with such permits, codes, laws, ordinances, rules, or regulations. If advance notice of the readiness of the Work for inspection by the governing agency is required, the Contractor shall furnish such notice to the appropriate agency.

The Engineer may inspect the production of material, or the manufacture of products at the source of supply. Plant inspection, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of both the Contractor and the material producer. The Engineer or the Engineer's authorized representative shall have free entry at all times to such parts of the plant as concerns the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. The District assumes no obligation to inspect materials at the source of supply.

TESTS

The Contractor shall perform, at the Contractor's own expense, all tests specified or required by the Specifications. The Engineer may perform such tests as the Engineer deems necessary to determine the quality of work or compliance with Contract Documents. The Contractor shall furnish promptly without additional charge all facilities, labor, and material reasonably required for performing safe and convenient tests as may be required by the Engineer will be performed in such a manner as will not unnecessarily delay the Work. The Contractor shall not be required to reimburse the District for tests

performed by the District or Engineer. If samples of materials are submitted which fail to pass the specified tests, the Contractor shall pay for all subsequent tests.

REMOVAL OF REJECTED AND UNAUTHORIZED WORK AND MATERIALS

All work or materials which have been rejected, shall be remedied, or removed and replaced by the Contractor in an acceptable manner and no compensation shall be allowed the Contractor for such removal, replacement, or remedial work.

Any work done beyond the lines and grades shown on the plans or established by the Engineer or any Extra Work done without written authority will be considered as unauthorized work and will not be paid for. Upon order of the Engineer, unauthorized work shall be remedied, removed, or replaced at the Contractor's expense.

Upon failure of the Contractor to comply with any order of the Engineer made under this section, the District may cause rejected or unauthorized work to be remedied, removed, or replaced, and may deduct the costs therefore from any monies due or to become due the Contractor.

DEDUCTIONS FOR UNCORRECTED WORK

If the Engineer deems it inexpedient to correct work damaged or not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefore, and such sum may be withheld by the District from Contractor's payment.

EQUIPMENT AND PLANTS

Only equipment and plants suitable to produce the quality of work and materials required will be permitted to operate on the Project.

Plants will be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to insure the production of sufficient material to carry the Work to completion within the time limit.

The Contractor shall provide adequate and suitable equipment and plants to meet the above requirements, and when ordered by the Engineer, shall remove unsuitable equipment from the Work and discontinue the operation of unsatisfactory plants. Contractor shall, upon request of the Engineer, submit one or more lists identifying, by make, model number, Contractor 's identification number and empty gross weight, each piece of operable equipment used for the Work. Contractor shall, upon request of the Engineer, submit documentation establishing that any measuring device used for the Work has been tested and properly approved under California Test 109.

In the case of termination of this Contract before its completion for any cause whatsoever, the Contractor, if notified to do so by the District, shall promptly remove any part or all of its equipment and supplies from the property of the District. If the Contractor fails to do so, the District shall have the right to remove such equipment and supplies at the expense of the Contractor.

CHARACTER OF WORKER

If any Subcontractor, or person employed by the Contractor or any Subcontractor fails or refuses to carry out the directions of the Engineer or appears to the Engineer to be incompetent or to act in a disorderly or improper manner, said person shall be removed from the Project immediately on the requisition of the Engineer. That person shall not again be employed on the

Work. Such discharge shall not be the basis for any claim for compensation or damages against the District, or any of its officers or agents.

SEPARATE CONTRACTS

The District reserves the right to let other contracts in connection with this Work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate Contractor's work with the other Contractor 's work.

If any part of the Contractor's work depends on proper execution or results upon the Work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results. The Contractor's failure to inspect and report shall constitute an Acceptance of the other Contractor 's work as fit and proper for the reception of the Contractor's work, except as to defects which may develop in the other Contractor 's work after the execution of the Contractor's work.

To insure the proper execution of Contractor's subsequent work, the Contractor shall measure work already in place and shall at once report to the Engineer any discrepancy between the executed work and the Drawings.

ASSIGNMENT

The Contractor shall not assign the Contract or sublet it as a whole or in part without the written consent of the District, nor shall the Contractor assign any monies due, or to become due to the Contractor hereafter without the prior written consent of the District.

USE OF COMPLETED PORTIONS, RIGHT TO OPERATE UNSATISFACTORY EQUIPMENT OR FACILITIES

The District may, at any time, and from time to time, during the performance of the Work, enter the Work Site for the purpose of installing any necessary work by District labor or other contracts, and for other purpose in connection with the installation of facilities. In doing so, the District shall endeavor not to interfere with the Contractor and the Contractor shall not interfere with other work being done by or on behalf of the District.

If, prior to completion and final Acceptance of all the Work, the District takes possession of any structure or facility (whether completed or otherwise) comprising a portion of the Work with the intent to retain possession thereof (as distinguished from temporary possession contemplating the return to the Contractor), then, while the District is in possession of the same, the Contractor shall be relieved of liability for loss or damage to such structure other than that resulting from the Contractor's fault or negligence. Such taking of possession by the District shall not relieve the Contractor from any provisions of this Contract regarding such structure, other than to the extent specified in the preceding sentence, nor shall such taking constitute a final Acceptance of such structure or facility.

If, following installation of any equipment or facilities furnished by the Contractor, defects requiring correction by the Contractor are found, the District shall have the right to operate such unsatisfactory equipment or facilities and make reasonable use thereof until the equipment or facilities can be shut down for correction of defects without injury to the District.

LANDS FOR WORK, RIGHT-OF-WAY CONSTRUCTION ROADS

The District will provide the lands, easements, right-of-way, and/or encroachment permits necessary or other rights to enter and work on lands necessary for the performance of

the Work. Other permits and licenses are addressed by Section 0. Should the Contractor find it advantageous to use any additional land for any purpose whatever, the Contractor shall provide for the use of such land at its expense. The Engineer shall be furnished with a copy of written agreements or otherwise be notified in writing of additional working space which is acquired. Nothing herein contained and nothing marked on the Plans shall be interpreted as giving the Contractor exclusive occupancy of the territory provided by the District. When two or more contracts are being executed at one time on the same or adjacent land in such a manner that work on one contract may interfere with that on another, the Engineer shall decide which Contractor shall cease work, and which shall continue, or whether the work on both contracts shall progress at the same time and in what manner, and the decision of the Engineer shall be final and binding. When the territory of one contract is the necessary or convenient means of access for the performance of another contract, such privilege of access or any other reasonable privilege may be granted by the Engineer to the Contractor so desiring, to the extent, amount, in the manner, and at the time permitted. No such decision as to the method or time of conducting the Work or the use of territory shall be the basis of any claim for delay or damage.

Lands, easements or rights-of-way to be furnished by the District for construction operations will be specifically shown on the Plans.

The Contractor shall construct and maintain all roads necessary to reach the various parts of the Work and for the transportation thereto of construction material and personnel. The cost of constructing and maintaining such roads shall be borne by the Contractor.

DISTRICT'S RIGHT TO AUDIT AND PRESERVATION OF RECORDS

The Contractor shall maintain books, records and accounts of all costs in accordance with generally accepted accounting principles and practices. The District and its authorized representatives shall have the right to audit the books, records and accounts of the Contractor under any of the following conditions:

The Contract is terminated for any reason in accordance with the provisions of the Contract Documents in order to arrive at equitable termination costs;

In the event of a disagreement between the Contractor and the District over the amount due the Contractor under the terms of the Contract;

To check or substantiate any amounts invoiced or paid which are required to reflect the costs of the Contractor, or the Contractor's efficiency or effectiveness under this Contract or in connection with extras, changes, claims, additions, backcharges, or others, as may be provided for in this Contract;

If it becomes necessary to determine the District's rights and the Contractor's obligations under the Contract or to ascertain facts relative to any claim against the Contractor which may result in a charge against the District;

To determine any difference in cost occasioned by a permissible substitution;

And/or for any other reason in the District's sole judgment.

Contractor shall provide the District (or its representatives), unlimited, reasonable access during working hours to the Contractor's books and records. The District's audit rights shall be liberally construed in the District's favor.

The Contractor, from the effective date of final payment or termination hereunder, shall preserve and make available to the District for a period of three (3) years thereafter, at all reasonable times at the office of the Contractor (but without any charge to the District), all its books, records, documents, photographs, micro-photographs, and other evidence bearing on the costs and expenses of the Contractor under this Contract and relating to the Work hereunder.

The District will make all payments required of it under this Contract subject to audit, under circumstances stated above, which audit may be performed at the District's option, either during the Contract time period or during the record retention time period. Regardless of authorization, approval or acceptance, signatures or letters which are given by the District and are part of the District's control systems or are requested by the Contractor, the payments made under this Contract shall not constitute a waiver or agreement by the District that it accepts as correct the billings, invoices or other charges on which the payments are based. If the District's audit produces a claim against the Contractor, the District may pursue all its legal remedies even though it has made all or part of the payments required by this Contract.

If any audit by the District or its representative discloses an underpayment by the District pursuant to the terms of the Contract Documents, the District shall have the duty to pay any amount found by the audit to be owed to the Contractor. If such audit discloses an overpayment, the Contractor shall have the obligation to reimburse the District for the amount of the overpayment. The District's right to claim reimbursement from the Contractor of any overpayment shall not be terminated or waived until three years after the completion of the District's audit or upon the termination of audit rights under subparagraph 0(f), whichever date is later. The obligation of the Contractor to make reimbursements hereunder shall not terminate except as provided by law.

The District's right to audit and the preservation of records shall terminate at the end of three (3) years after the date final payment is made or termination of the Contract. The Contractor shall include this "Right to Audit and Preservation of Records" clause in all subcontracts issued by it and it shall require the same to be inserted by all lower tier Subcontractors in their subcontracts, for any portion of the work. Should Contractor fail to include this clause in any such contract or lower tier contract, or otherwise fail to insure the District's rights hereunder, Contractor shall be liable to the District for all costs, expenses and attorney's fees which the District may have to incur obtaining or attempting to obtain an audit or inspection of or the restoration of records which otherwise would have been available to the District from said persons under this clause. Such audit may be conducted by the District or its authorized representative.

CONTROL OF MATERIALS

MATERIALS

Unless otherwise specifically stated in the Specifications, the Contractor shall furnish all materials necessary for the execution and completion of the Work. Unless otherwise specified, all materials shall be new and shall be manufactured, handled, and installed in a workmanlike manner to insure completion of the Work in accordance with the Contract Documents. The Contractor shall, upon request of the Engineer, furnish satisfactory evidence as to the kind and quality of materials.

Where materials are to be furnished by the District, the type, size, quantity and location at which they are available will be stated in the Contract Documents.

Manufacturers' warranties, guarantees, instruction sheets and parts listed, which are furnished with certain articles or materials incorporated in the Work, shall be delivered to the Engineer before Acceptance of the Contract.

STORAGE OF MATERIALS

Articles or materials to be incorporated in the Work shall be stored in such a manner as to insure the preservation of their quality and fitness for the Work, and to facilitate inspection.

TRADE NAMES AND ALTERNATIVES

Whenever a material, article, system or sub-system is specified or described by using the name and/or model of a proprietary product or trademark or the name of the manufacturer or vendor, the specified item shall establish the type, function, and quality required. It shall be understood that the words "or approved equivalent" are implied whether or not they follow the proprietary enumeration.

The District reserves the right to determine when proprietary items have no equivalency, and when uniformity of operations, interchangeability of parts, standard parts inventory, etc., are in the District's best interest.

Requests for review of equivalency will be considered upon submission of sufficient information as described herein, to allow complete review. Such requests shall not be accepted from anyone other than the Contractor. Such submission must be made prior to purchase, fabrication, manufacture or use of the equivalent items under consideration.

Contractor's Risk. If the Contractor includes in its Bid or later proposes any material, product or equipment that the Contractor considers equivalent to that specified, the Contractor assumes all risk of any sort associated with Acceptance or rejection of proposed equivalent items. The Contractor shall have no right to make claim based upon Contractor's Bid that includes a proposed equivalent item(s) of work which resulted in a lower Bid amount for said item(s) or lower total bid.

Submission Requirements. Each submission for equivalency review shall include:

Justification for use of the proposed equivalent item(s), including evidence, as applicable, that Contract specified material, product or equipment is unobtainable or unobtainable within an acceptable time for contract completion;

A description of the difference between specified item(s) and proposed equivalent item(s) and the comparative advantages and disadvantages of each;

All relevant data addressing each specified parameter to show equivalency;

A prediction of any effects the proposed change will have on operation and maintenance costs where applicable.

Equivalency. An item will be considered equivalent to the item specified if it is equal to or better in:

Design and strength in all sub-parts, quality, reliability and durability, operation, maintenance and serviceability, as applicable; and

Specified parameters in performance in all respects for the specific function(s) indicated in the contract.

Supplemental Requirements. Any tests required by the District to establish quality and performance standards shall be promptly conducted by or through the Contractor at no additional cost to the District. In addition, the Contractor shall:

Submit any additional data requested by the Engineer for the equivalency review;

and

Satisfactorily accomplish all changes, including any Engineering associated with use of equivalent items, at no additional cost to the District.

Equivalency Determinations. The Engineer shall be the sole judge as to equivalency determinations. The Engineer's decision shall be final. The Contractor shall have no right of appeal to any decision rejecting the equivalency of any item.

Procedure.

Data substantiating a request for a substitution of "an equal" item shall be submitted prior to the Award of the Contract pursuant to Section 3400 of the latest edition of the Public Contract Code.

After the Bid opening, the apparent three low bidders shall have seven (7) calendar days to provide complete substantiating data for all product, material or system substitution requests. After this seven (7)-day period, the District may award the Contract to the apparent low bidder. In no event will product, material or system substitution requests submitted after the Award of Contract be considered. Failure to submit such substantiating data will result in the automatic rejection of the proposed substitution requests. For each additional five (5) product, material or system substitution requests over and above the initial ten (10), the District will have ten (10) additional days to review the proposed substitution requests.

Each substitution request may include one alternate substitution. All alternate substitutions shall be submitted concurrently with substitution requests. Upon review by the District, proposed substitutions shall be returned to the Bidder marked either "accepted" or "rejected". The District shall only review alternative substitution requests if the primary substitution request is rejected. If a substitution request, and its alternative, is returned "rejected", no further substitution requests for that product, material or system will be allowed and the Bidder will provide the specified product, material or system.

If, after all substitution requests have been processed, substitution requests by the apparent low Bidder are rejected by the District, the apparent low Bidder may elect not to execute the Contract. Under no circumstances, will bidders be allowed to alter their Bid Price as originally submitted. This election shall be made in writing no later than five (5) days following the receipt of the reviewed substitution requests. An election by the Bidder not to execute the Contract will result in the forfeiture of the bidder's Bid bond. If the apparent low Bidder elects not to continue, and the second low Bidder is awarded the Contract, the second low Bidder may then elect not to execute the Contract for the contract price shown on its Bid Form. Subsequent bidders shall have five (5) days following the receipt of the reviewed substitution requests and the Notice of Award in which to make their election. This process shall continue until one Bidder decides to continue with the Award of Contract process.

The District may award the Contract at any time after the time for submitting substitution requests expires pursuant to subpart (2), above. In the event the Contract is awarded prior to acceptance/rejection of substitution requests, all outstanding substitution requests shall be reviewed by the District as provided above. If the apparent low Bidder elects not to execute the Contract, the Award of Contract to the apparent low Bidder shall be rescinded and the Contract awarded to the next apparent low bidder. All bidders electing not to execute the Contract expressly agree that the District shall incur no liability for such rescissions. As provided herein, "apparent low bidder" means the lowest responsive and responsible bidder.

CERTIFICATES OF COMPLIANCE

A Certificate of Compliance shall be furnished prior to the use of any materials for which the Technical Specifications require that such a certificate be furnished. In addition, when so authorized in the Specifications, the Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The Certificate of Compliance shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the Contract. A Certificate of Compliance shall be furnished with each lot of material delivered to the Work and the lot so certified shall be clearly identified in the Certificate.

All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Contract Documents and any such material not conforming to such requirements will be subject to rejection whether in place or not.

The District reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

The form of the Certificate of Compliance and its disposition shall be as directed by the Engineer.

LEGAL RELATIONS AND RESPONSIBILITY

COMPLIANCE WITH LAWS – PERMITS, REGULATIONS, TAXES

The Contractor is an independent Contractor and shall, at the Contractor's sole cost and expense, comply with all laws, rules, ordinances and regulations of all governing bodies having jurisdiction over the Work, obtain all necessary permits and licenses therefore, pay all manufacturers' taxes, sales taxes, use taxes, processing taxes, and all federal and state taxes, insurance and contributions for social security and unemployment which are measured by wages, salaries or any remuneration paid to Contractor's employees, whether levied under existing or subsequently enacted laws, rules or regulations. The Contractor shall also pay all property tax assessments on materials or equipment used until Acceptance by the District. If any discrepancy or inconsistency is discovered in the Plans or Specifications, or in this Contract in relation to any such law, rule, ordinance, regulation, order or decree, the Contractor shall forthwith report the same to the Engineer in writing. The Contractor shall also protect, defend and indemnify the District, the Engineer, and all of the District's officers, agents, and servants against any claim or liability arising from or based upon the violation of any such law, rule, ordinance, regulation, order or its employees. Particular attention is called to the following:

Without limitation, materials furnished and performance by Contractor hereunder shall comply with Safety Orders of the Division of Industrial Safety, State of California, Federal Safety regulations of the Bureau of Labor, Department of Labor; and any other applicable Federal regulations.

The Contractor, upon request shall furnish evidence satisfactory to the District and Engineer that any or all of the foregoing obligations have been or are being fulfilled. The Contractor warrants to the District that it is licensed by all applicable governmental bodies to perform this Contract and will remain so licensed throughout the progress of the Work, and that Contractor has, and will have, throughout the progress of the Work, the necessary experience, skill and financial resources to enable the Contractor to perform this Contract.

Contractor is required to insure that material safety data sheets (MSDSs) for any material requiring a material safety data sheet pursuant to any federal or state law are available in a readily accessible place on the Project premises. Contractor is also required to insure:

The proper labeling of any substance brought onto the Project premise by Contractor or any Subcontractors and

That the person(s) working with the material, or within the general area of the material, are appropriately informed about the hazards of the substance and follow proper handling and protection procedures.

Contractor is required to comply with the provisions of California Health and Safety Code section 25249.5, *et seq.* (Prop. 65), which requires the posting and giving of notice to persons who may be exposed to any chemical known to the State of California to cause cancer.

PREVAILING WAGE

The Contractor shall forfeit as penalty to the District the amount specified by law for each calendar day or portion thereof for each worker (whether employed by the Contractor or any Subcontractor) paid less than the stipulated prevailing rates for any work done under the

Contract in violation of the provisions of the Labor Code and in particular, Section 1775 which is incorporated herein by reference. Copies of the current schedules for prevailing wages are on file in the District's office, and the contents of those schedules are included herein as if set forth in full.

The District will not recognize any claims for additional compensation because of the payment of the wages set forth in these General Conditions. The possibility of wage increases is one of the elements to be considered by the Contractor in determining its proposal, and will not under any circumstances, other than delays caused by the District, the Engineer, or the District's agents, be considered as the basis of a claim against the District.

The Contractor agrees to follow the instructions of the District's labor compliance officer until notified otherwise in writing by the District.

The Director of the Department of Industrial Relations of the State of California has determined the general prevailing rate of wages of per diem wages in the locality in which the work is to be performed for each craft or type of worker needed to execute the Contract. Copies of the applicable prevailing wage rate determinations are made available to the Contractor and Subcontractor at the Pre-Job Conference Meeting. The Contractor shall post a copy of this document at the prevailing wages at each job site, along with a CMU work place poster, printed on 8 1/2" X 11" paper or larger, in accordance with California Code of Regulations, Title 8, section 16451(d).

PREVAILING WAGE RECORDS

The Work is subject to monitoring and enforcement of prevailing wage requirements by the Department of Industrial Relations ("DIR") and the following provisions will apply:

Contractor and Subcontractors shall maintain and furnish to the DIR, a certified copy of each weekly payroll (but no less often than monthly), with a statement of compliance signed under penalty of perjury. Such certified payroll reports in PDF form shall be transmitted electronically to the DIR after first registering at http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html. The provisions of Labor Code section 1776 are incorporated herein by reference.

The DISTRICT and the DIR shall review, including by way of job site inspections, and, if appropriate, audit payroll records to verify compliance with the public works requirements of the Labor Code. The DIR will notify the Contractor or Subcontractor(s), as appropriate) of any noncompliance, in order for all such Contractor or Subcontractor(s) to correct the noncompliance.

The District shall withhold payments when payroll records are delinquent or inadequate.

The District shall withhold payments equal to the amount of underpayment and applicable penalties when, after investigation, it is established that underpayment has occurred.

The District shall cooperate with the DIR and DLSE in any investigation of suspected violations of prevailing wage requirements.

As directed by the Labor Commissioner, the District shall withhold Contract payments equal to the payments due or estimated to be due to the Contractor or Subcontractors whose payroll records are delinquent or inadequate, plus any additional amount that the Labor Commissioner has reasonable cause to believe may be needed to cover a back wage and penalty assessment against such Contractor or Subcontractors. The Contractor shall be required to withhold payments to a Subcontractor whose payroll records are delinquent or inadequate until the Labor Commissioner provides notice that the Subcontractor has cured such delinquency or deficiency.

These payroll records shall be made available to the District's representatives. These records shall be maintained during the course of the Work. The Contractor and all Subcontractors shall make the certified payroll records available for inspection by District representatives upon request and shall permit such representatives to interview employees during the work hours on the job site.

The Contractor shall be held entirely responsible for the prompt resolution of all non-compliances with the prevailing wage laws, including those pertaining to all Subcontractors and any lower tier Subcontractors.

The Project will not be accepted as complete by the District nor final payment made until all items of non-compliance are corrected or until appropriate provision is made by depository agreement to assure the ultimate resolution and payment of any back wages that may be found due.

A pre-construction conference shall be conducted before commencement of the Work with the Contractor and Subcontractors at which time the prevailing wage requirements will be reviewed and agreed to by all parties.

LABOR DISCRIMINATION

Attention is directed to Section 1735 of the Labor Code, which reads as follows: "A Contractor shall not discriminate in the employment of persons upon public works on any basis listed in subdivision (a) of Section 12940 of the Government Code, as those bases are defined in Sections 12926 and 12926.1 of the Government Code, except as otherwise provided in Section 12940 of the Government Code. Every Contractor for public works who violates this section is subject to all the penalties imposed for a violation of this chapter."

EIGHT-HOUR DAY LIMITATION

In accordance with the provisions of the Labor Code, and in particular, Sections 1810 to 1815 thereof, inclusive, eight hours labor shall constitute a day's work, and no worker, in the employ of said Contractor, or any Subcontractor, doing or contracting to do any part of the work contemplated by this Contract, shall be required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of those provisions; provided that subject to Labor Code section 1815, a worker may perform work in excess of either eight (8) hours per day or forty (40) hours during any one week upon compensation for all hours worked in excess of eight (8) hours per day or forty (40) hours any one week at not less than one and one-half times the basic rate of pay.

The Contractor and each Subcontractor shall also keep an accurate record showing the names and actual hours worked of all workers employed by them in connection with the Work. This record shall be open at all reasonable hours to the inspection of the District, State and Federal officers and agents. It is hereby further agreed that, the Contractor shall forfeit as a penalty to the District the sum of twenty-five dollars (\$25.00) for each worker employed in the performance of this Contract by the Contractor or by any of its Subcontractors for each calendar day during which such worker is required or permitted to labor more than eight (8) hours in and one calendar day and forty (40) hours in any one calendar week in violation of Sections 1810 through 1815.

COMPLIANCE WITH STATE REQUIREMENTS FOR EMPLOYMENT OF APPRENTICES

The Contractor's attention is directed to Section 1777.5 of the Labor Code. Provisions of said section pertaining to employment of registered apprentices are hereby incorporated by reference into these Specifications. As applicable, the Contractor or any Subcontractor employed by the Contractor in the performance of the Work shall take such actions as necessary to comply with the provisions of Section 1777.5.

UNDERGROUND UTILITIES

In accordance with Government Code section 4215, the Contractor shall be compensated for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, and removing or relocating existing main or trunkline utility facilities which are not indicated in the Contract Plans and Specifications with reasonable accuracy, and for the equipment on the Project necessarily idled during such work, provided that the Contractor shall first notify the Engineer before commencing work on locating, repairing damage to, removing or relocating such utilities. Contractor shall not be assessed liquidated damages for delays in completing the Work when such delays are due to the failure of either the District or the owner of the utility to provide for removal or relocation of such utility facilities.

The Contractor shall take all precautions necessary to protect the existing utilities within the project area. Any utilities damaged due to the Contractor's negligence shall be repaired or restored to their original condition at the Contractor's sole expense. Existing utilities shall be kept in service during the life of the Contract unless relocation, reconstruction, abandonment, or outage is specifically authorized by the Engineer.

The Contractor shall provide and maintain such temporary supports as may be necessary to preserve the functions of the various utility systems. No wires, conduits and/or pipes shall be removed until all services therein have been made inoperable.

The Contractor shall notify the Engineer and appropriate Regional Notification Center for operators of subsurface installations at least two (2) working days, but not more than fourteen (14) calendar days, prior to performing excavation or other work close to any underground pipeline, conduit, duct, wire and other structures. The Contractor shall provide updated information to the Notification Center as required and on a periodic basis. The Regional Notification Center includes but is not limited to the Underground Service Alert-Northern California (USA) at 1-800-642-2444.

The Contractor is advised that the State of California does not participate in USA. The Contractor is required to notify Caltrans Permits Branch (916) 322-1297 for the location of State facilities.

The Contractor shall not proceed with work until utility facilities involved have been located, disconnected, or otherwise adjusted by utility representatives.

The City Utility Maintenance Division will make repairs to all water service laterals and water mains damaged by the Contractor during the course of construction unless directed otherwise by the Engineer. Except as otherwise provided in this section, the Contractor shall be required to pay all labor, material and equipment costs incurred by the City Utilities Maintenance Division for the repairs made to damaged water service laterals and water mains. The City will bill the Contractor for the repairs and the bills will be paid by the Contractor prior to either the next monthly progress payment or prior to the final payment, whichever comes first. The Contractor shall provide to the Engineer proof of payment of the repair bills prior to the issuance of either the monthly progress payment or final payment. The current labor and equipment rates for the City Utility Maintenance Division will be made available to the Contractor at the preconstruction conference. The City shall have the right to deduct the total amount of any unpaid City repair bill from the money due or to become due the Contractor.

WATER POLLUTION

The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, and canals from pollution with fuels, oils, bitumens, calcium chloride, and other harmful materials and shall conduct and schedule Contractor's operations so as to avoid or minimize muddying and silting of said streams, lakes, reservoirs, and canals. Care shall be exercised to preserve vegetation beyond the limits of construction. The Contractor shall comply with Section 5650 of the California Fish and Game Code and all other applicable statutes and regulations relating to the prevention and abatement of water pollution.

PAYMENT OF TAXES

The Contract prices paid for the Work shall include full compensation for all taxes, which the Contractor is required to pay, whether imposed by federal, state, or local governments.

PERMITS AND LICENSES

The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the lawful prosecution of the work. All permits and licenses shall be obtained in sufficient time to prevent delays to the Work. The Contractor shall, at a minimum, possess and maintain the licenses and permits set forth in the Contract Provisions.

PATENTS

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated into the Work, and agrees to indemnify, defend and save harmless the District, the Engineer, and their duly authorized representatives, from all suits at law, or actions of every nature for, or on account of, the use of any patented materials, equipment, devices, or processes.

PUBLIC CONVENIENCE

This section defines the Contractor's responsibility with regard to convenience of the public and public traffic in connection with its operations.

The Contractor shall so conduct its operations as to offer the least possible obstruction and inconvenience to the public. The Contractor shall have under construction no greater length or amount of work than can be properly prosecuted with due regard to the rights of the public.

Unless otherwise provided in the Contract Documents, all public traffic shall be permitted to pass through the Work with as little inconvenience and delay as possible. In order to expedite the passage of public traffic through or around the work, the Contractor shall install as appropriate signs, lights, flares, barricades, and other facilities for the sole convenience and direction of public traffic. Also, where directed by the Engineer, the Contractor shall provide and station competent flagpersons whose sole duties shall consist of directing the movement of public traffic through or around the Work. The cost of furnishing and installing such signs, lights, flares, barricades, and other facilities, and the cost of providing and stationing such flagpersons, all for the convenience and direction of public traffic, will be considered as included in the Contract price and no additional compensation will be allowed.

Spillage resulting from hauling operations along or across any publicly traveled way shall be removed immediately by the Contractor at its expense.

Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners.

Convenient access to driveways, houses and buildings along the line of the work shall be maintained and temporary approaches to crossings or intersecting highways shall be provided and kept in good condition. When the abutting property owner's access across the right-of-way line is to be eliminated, or to be replaced under the Contract by other access facilities, the existing access shall not be closed until the replacement access facilities are usable.

Water shall be supplied if ordered by the Engineer for the alleviation or prevention of dust nuisance as provided in the Contract Documents. Any water obtained from a fire hydrant within the City of West Sacramento shall be subject to a fire hydrant permit issued by the Engineering Division of the City of West Sacramento.

Flagpersons and guards, while assigned to traffic control, shall perform their duties and shall be provided with the necessary equipment in accordance with the current "Instructions to Flagmen" of the California Department of Transportation. The equipment shall be furnished and kept clean and in good repair by the Contractor at its expense.

All traffic control shall be in accordance with California Manual on Uniform Traffic Control Devices (California MUTCD), Part 6 and this Section 0.

Traffic Control Plans. Traffic Control Plans shall be developed for the project to assure that adequate consideration is given to the safety and convenience of motorists, pedestrians, and workers during construction. The Traffic Control Plans shall include, but not be limited to, signing, pavement markings, construction scheduling, permanent barricades, methods and devices for delineation and channelization, placement and maintenance of devices, roadway lighting, traffic regulations, surveillance and inspection. The Traffic Control Plans shall be approved by the Engineer a minimum of two (2) working days prior to start of any work. Non-compliance with any stipulation of this section will be justification for the District to stop work.

Traffic Control Devices and Procedures. Traffic control devices and procedures shall conform to the California Manual on Uniform Traffic Control Devices (California MUTCD), Part 6 and this Section 0. Non-compliance with any stipulation of this section will be justification for the District to stop work.

Elimination of On-Street Parking. The Contractor shall place notification for the elimination of on-street parking, if required, at least forty-eight (48) hours, but not more than seventy-two (72) hours prior to the start of work. The notification shall include the Contractor's phone number, the City of West Sacramento Community Development Department phone number (916) 617-4645, and the phrase "VEHICLES WILL BE TOWED PURSUANT TO CVC SECTION 22651 (L)". This notice shall be affixed to a Type II barricade that is placed in the lane of the road (max. 200 ft. spacing) used for on-street parking. No other location or method of placement is acceptable. The notification shall be in a form approved by the Engineer. Non-compliance with any stipulation of this section will be justification for the City to stop work.

Lane Closures. All lane closures shall be included in the Traffic Control Plans, and shall both conform to Section 000 above, and be approved by the Engineer. Total road closures will not be allowed for the Project.

Measurement and Payment. Unless specifically shown as an item of work on the proposal form, all traffic control shall be considered included in other items of work and no additional compensation will be made for labor, materials or equipment needed.

CONTINUOUS OPERABILITY OF FACILITIES

Absent written permission by the Engineer, the continuous operation of all existing facilities is required and shall in no way be affected by the Work.

SAFETY

General

The Contractor shall be solely and completely responsible for the conditions of the job Site, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to all applicable federal, state, and local laws, ordinances, and codes, and to the rules and regulations established by the California Division of Industrial Safety, and to other rules of law applicable to the Work.

The services of the Engineer in conducting construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's work methods, equipment, bracing or scaffolding or safety measures, in, on, or near the construction site, and shall not be construed as supervision of the actual construction nor make the Engineer or the District responsible for providing a safe place for the performance of work by the Contractor, Subcontractors, or suppliers; or for access, visits, use work, travel or occupancy by any person.

The Contractor shall carefully instruct all personnel working in potentially hazardous work areas as to potential dangers and shall provide such necessary safety equipment and instruction as is necessary to prevent injury to personnel and damage to property. Special care shall be exercised relative to electrical work, work involving excavation and in sump pump work.

All work and materials shall be in strict accordance with all applicable State, Federal and local laws, rules, regulations, and codes.

Nothing in this Contract is to be construed to permit work not conforming to governing law. When Contract Documents differ from governing law, the Contractor shall furnish and install the higher standards called for without extra charge. All equipment furnished shall be grounded and provided with guards and protection as required by safety codes. Where vapor-tight or explosion-proof electrical installation is required by law, this shall be provided.

The Contractor shall submit a safety plan and/or narrative description to the Engineer prior to commencement of the Work. This safety plan and/or narrative description shall describe all first aid, safety clothing, etc. to be used at the Project Site.

Shoring and Trench Safety Plan

Attention is directed to Section 832 of the Civil Code of the State of California relating to lateral and subjacent support, and the Contractor shall comply with this law.

In accordance with Section 6705 of the State Labor Code, the Contractor shall submit to the District specific plans to show details of provisions for worker protection from caving ground. Not less than thirty (30) days before beginning excavation for any trench or trenches five feet or more in depth required under this Contract, the Contractor shall furnish to the Engineer Working Drawings of its trench safety plan. The trench safety plan Working Drawings shall be detailed plans showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground. If such plan varies from the shoring system standards established by the Construction Safety Orders of the California Division of Industrial Safety or the Federal Safety and Health Regulations for

Construction of the Occupational Safety and Health Administration, Department of Labor, the plan shall be prepared by a registered civil or structural engineer. In no event shall the Contractor use a shoring, sloping, or protective system less effective than that required by said Construction Safety Orders, or less effective than that required by said Federal Safety Standards. Submission of this plan in no way relieves the Contractor from the requirement to maintain safety in all operations performed by the Contractor or its Subcontractors.

BLASTING

Except for exceptional circumstances, blasting shall be prohibited. Accordingly, Bids should be prepared on the basis that no blasting will be permitted. Should blasting be required and expressly approved by the District, the District will issue a Change Order for blasting work.

INTOXICATING LIQUORS AND NARCOTICS

The Contractor shall not sell, permit or suffer the introduction or use of intoxicating liquors or narcotics upon or about the Site.

PROTECTION OF PERSONS AND PROPERTY

The Contractor shall take whatever precautions are necessary to prevent damage to all existing improvements, including above ground and underground utilities, trees, shrubbery that is not specifically shown to be removed, fences, signs, mailboxes, survey markers and monuments, buildings, structures, the District's property, adjacent property, and any other improvements or facilities within or adjacent to the work. If such improvements or property are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored, at the Contractor's expense, to a condition at least as good as the condition they were in prior to the start of the Contractor's operations.

The Contractor shall adopt all practical means to minimize interference to traffic and public inconvenience, discomfort or damage. The Contractor shall protect against injury to any pipes, conduits or other structures crossing the trenching or encountered in the Work and shall be responsible for any injury done to such pipes or structures, or damage to property resulting therefrom. The Contractor shall support or replace any such structures without delay and without any additional compensation to the entire satisfaction of the Engineer. All obstructions to traffic shall be guarded by barriers illuminated at night. The Contractor shall be responsible for all damage to persons and property directly or indirectly caused by its operations and, under all circumstances, Contractor must comply with the laws and regulations of the State of California relative to safety of persons and property and the interruption of traffic and the convenience of the public within the respective jurisdictions.

The Contractor is cautioned that it must replace all improvements in rights-of- way and within the public streets to a condition at least equal to what existed prior to the Contractor's entry onto the job.

Type and time of construction required at any road subject to interference by the work will be determined by those authorities responsible for maintenance of said road. It shall be the responsibility of the Contractor to determine the nature and extent of all such requirements, including provision of temporary detours as required; however, the construction right-of-way obtained by the District at affected roadways will be adequate for provision of all required detours. As required at any road crossing, the Contractor shall provide all necessary flagpersons, guardrails, barricades, signals, warning signs and lighting to provide for the safety of existing roads and detours. Immediately after the need for temporary detours ceases, or when directed, the Contractor shall remove such detours and perform all necessary cleanup work, including replacement of fences, and removal of pavement. Included shall be all necessary replacement of existing roadway appurtenances, grading work, soil stabilization and dust control measures, as required and directed.

The Contractor shall examine all bridges, culverts, and other structures over which it will move its materials and equipment, and before using them, Contractor shall properly strengthen such structures where necessary. The Contractor shall be responsible for any and all injury or damage to such structures caused by reason of its operations.

RESPONSIBILITY FOR REPAIR OF FACILITIES

All public or private facilities, including but not limited to, gravel surfacing at existing canals, structures, telephone cables, roadways, curbs, gutters, parking lots, private drives, levees and embankments for creeks, ponds and reservoirs disturbed during construction of the work shall be repaired and/or replaced by the Contractor to match facilities existing prior to construction. In addition, the Contractor shall be responsible for any settlement damage to such facilities or adjoining areas for a period of one year after Acceptance of such required facilities.

DISTRICT'S REPAIR

In the event the Contractor refuses or neglects to make good any loss or damage for which it is responsible under this Contract, the District may itself or by the employment of others, make good any such loss or damage, and the cost and expense of doing so, including any reasonable engineering, legal and other consultant fees, and any costs of administrative and managerial services, shall be charged to the Contractor. Such costs and expenses may be deducted by the District from claims for payment made by the Contractor for work completed or remaining to be completed.

ANTITRUST CLAIM ASSIGNMENT

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to this contract, the Contractor and all Subcontractors shall offer and agree to assign to the District all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services or materials pursuant to the public works contract or subcontract. This assignment shall be made and become effective at the time the District tenders final payment to the Contractor, without further acknowledgement by the parties.

WAIVER OF RIGHT TO RESCIND FOR MATERIAL BREACH

The Contractor agrees that it can be adequately compensated by money damages for any breach of this Contract which may be committed by the District and hereby agrees that no default, act, or omission of the District or the Engineer, shall constitute a material breach of the Contract entitling the Contractor to cancel or rescind the provisions of this Contract or (unless the District shall so consent or direct in writing) to suspend or abandon performance of all or any part of the Work. The Contractor hereby waives any and all rights and remedies to which it might otherwise be or become entitled, save only its right to money damages.

CONTRACTOR'S LICENSE NOTICE

CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND REGULATED BY THE CONTRACTORS' STATE LICENSE BOARD. ANY QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO:

REGISTRAR CONTRACTORS' STATE LICENSE BOARD

9821 BUSINESS PARK DRIVE SACRAMENTO, CALIFORNIA 95827

MAILING ADDRESS: P.O. BOX 26000 SACRAMENTO, CALIFORNIA 95826

HISTORICAL, SCIENTIFIC AND ARCHEOLOGICAL DISCOVERIES

All articles of historical or scientific value, including but not limited to coins, fossils, and articles of antiquity which may be uncovered by the Contractor during the progress of work, shall become District property. Such findings shall be reported immediately to the Engineer who will determine the method of removal, where necessary, and the final disposition thereof.

INSURANCE

Contractor shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property, which may arise from or in connection with the performance of the Work hereunder by the Contractor, its agents, representatives, employees or Subcontractors. The cost of such insurance shall be included in the Contractor's bid.

Neither the Contractor nor any Subcontractors shall commence any work until all required insurance has been obtained at their own expense. Such insurance must have the approval of the District as to limit, form, and amount, and shall be placed with insurers with a current A. M. Best's rating of no less than A-VII.

Any insurance bearing on adequacy of performance shall be maintained after completion of the project for the full guarantee period.

Prior to execution of the Contract, the Contractor shall furnish the District with original endorsements effecting coverage for all policies required by the Contract. The endorsements shall be signed by a person authorized by the insurer to bind coverage on its behalf. The endorsements are to be on forms provided or approved by the District. The District may require the Contractor or any Subcontractor to furnish complete certified copies of all insurance policies affecting the coverage required by the Contract.

All of the Contractor's policies shall contain an endorsement providing that written notice shall be given to the District at least sixty (60) calendar days prior to termination, cancellation, or reduction of coverage in the policy.

Any policy or policies of insurance that the Contractor elects to carry as insurance against loss or damage to its construction equipment and tools shall include a provision therein providing a waiver of the insurer's right to subrogation against the District and the Engineer.

The requirements as to the types, limits, and the District's approval of insurance coverage to be maintained by the Contractor are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor under the Contract.

In addition to any other remedy the District may have, if the Contractor or any of the Subcontractors fails to maintain the insurance coverage as required in this section, the District may obtain such insurance coverage as is not being maintained, in form and amount substantially the same as required herein, and the District may deduct the cost of such insurance from any amounts due or which may become due the Contractor under this Contract.

The Contractor and all Subcontractors shall, at their expense, maintain in effect at all times during the performance of work under the Contract not less than the following coverage and limits of insurance, which shall be maintained with insurers and under forms of policy satisfactory to the District. The maintenance by the Contractor and all Subcontractors of the following coverage and limits of insurance is a material element of this Contract. The failure of the Contractor or any Subcontractor to maintain or renew coverage or to provide evidence of renewal may be treated by the District as a material breach of this contract.

Workers' Compensation and Employer's Liability Insurance

Workers' Compensation

The Contractor and all Subcontractors shall maintain insurance to protect the Contractor or Subcontractor from all claims under Workers' Compensation and Employer's Liability Acts, including Longshoremen's and Harbor Workers' Act. Such coverage shall be maintained, in type and amount, in strict compliance with all applicable State and Federal statutes and regulations. The Contractor shall execute a certificate in compliance with Labor Code section 1861, on the form provided in the Contract Documents.

Claims Against District

If an injury occurs to any employee of the Contractor or any of the Subcontractors for which the employee or its dependents, in the event of its death, may be entitled to compensation from the District under the provisions of the said Acts, or for which compensation is claimed from the District, there will be retained out of the sums due the Contractor under this Contract, an amount sufficient to cover such compensation as fixed by said Acts, until such compensation is paid or it is determined that no compensation is due. If the District is required to pay such compensation, the amount so paid will be deducted and retained from such sums due, or to become due, the Contractor.

Commercial General and Automobile Liability Insurance

The Contractor shall maintain in effect at all times during the performance of the work hereunder not less than the following coverage's and limits of Commercial General and Automobile Liability insurance:

Form and Amount

The insurance shall include, but shall not be limited to, protection against claims arising from death, bodily injury, personal injury, or damage to property resulting from actions, failures to act, operations or equipment of the insured, or by its employees, agents or consultants, or by anyone directly or indirectly employed by the insured. The amount of insurance coverage shall not be less than \$1,000,000.00 per occurrence with an aggregate no less than two (2) times the required per occurrence limit applying to bodily injury, personal injury, and property damage, or any combination of the three. Any deductibles must be declared to and approved by the District. At the option of the District, either: the insurer shall reduce or eliminate such deductibles as respects the entity, its officers, officials, employees and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration expenses, and defense expenses. The commercial general and automobile liability insurance coverage shall also include the following:

Additional Requirements

Provision or endorsement naming the District, the Engineer and its consultants, and each of their officers, employees, and agents, each as additional insured's with

respect to any potential liability arising out of the performance of any work under the Contract, and providing that such insurance is primary insurance as respects the interest of the District and Engineer, and its consultants, and each of their officers, employees, and agents and that any other insurance, risk pool membership, or other liability protection maintained by the District or maintained by the Engineer is excess to the insurance required hereunder, and will not be called upon to contribute to any loss unless and until all limits available under the Contractor's and Subcontractor's insurance policy/policies have been paid. The additional insured coverage under the Contractor's policy shall be "primary and non-contributory" and will not seek contribution from the District's insurance or self-insurance and shall be at least as broad as CG 20 01 04 13.

"Cross Liability" or "Severability of Interest" clause.

Broad Form Property Damage, Personal Injury, Contractual Liability, Protective Liability, and Completed Operations coverage's, and elimination of any exclusion regarding loss or damage to property caused by explosion or resulting from collapse of buildings or structures or damage to property underground, commonly referred to by insurers as the "XCU" hazards.

Provision or endorsement stating that such insurance, subject to all of its other terms and conditions, applies to the liability assumed by the Contractor under the Contract, including, without limitation, that set forth in Section 0, Indemnity and Litigation Costs.

Provision or endorsement stating that any failure to comply with reporting or other provisions of the policies, including breaches of warranties, shall not affect coverage provided to the District, its officers, officials, employees, or volunteers.

The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

Builder's Risk or Installation Floater "All-Risk" Insurance. Before commencement of the Work, the Contractor shall submit written evidence that it has obtained for the period of the Contract, Builder's Risk "All-Risk" Completed Value Insurance and/or Inland Marine "All-Risk" Installation Floater Insurance, as may be applicable, upon the entire project which is the subject of this Contract, including completed work and work in progress. The policy or policies of insurance shall name the Contractor, District, and Engineer as insured's as their respective interests may appear, and shall include an insurer's waiver of subrogation rights in favor of each. Such insurance may have a deductible clause, but the amount of the deductible shall be subject to the approval of the District, except that the deductible on earthquake coverage may be in accordance with the underwriter's requirements.

INDEMNITY AND LITIGATION COST

Promptly upon execution of the Contract, the Contractor specifically obligates itself and hereby agrees to protect, hold free and harmless, defend and indemnify the District, the Engineer and its consultants, and each of their officers, employees and agents, from any and all liability, penalties, costs, losses, damages, expenses, causes of action, claims or judgments, including attorney's fees, which arise out of or are in any way connected with the Contractor's, or its Subcontractors' or suppliers', performance of work under this Contract or failure to comply with any of the obligations contained in the Contract. This indemnity shall imply no reciprocal right of the Contractor in any action on the contract pursuant to California Civil Code section 1717 or section 1717.5. To the fullest extent legally permissible, this indemnity, defense and hold harmless agreement by the Contractor shall apply to any and all acts or omissions, whether active or passive, on the part of the Contractor or its agents, employees, representatives, or Subcontractor's agents, employees and representatives, resulting in claim or

liability, irrespective of whether or not any acts or omissions of the parties to be indemnified hereunder may also have been a contributing factor to the liability, except such loss or damage which was caused by the active negligence, the sole negligence, or the willful misconduct of the District. The Contractor's obligations under this Section shall apply to claims arising from the Contractor's mistake, error, or neglect in preparing its Bid for this project. The Contractor's mistake, error, or neglect in preparing from the Contractor's mistake, error, or neglect in preparing from the Contractor's mistake, error, or neglect is project.

In any and all claims against the District, the Engineer and each of their consultants, officers, employees and agents by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation under this section shall not be limited in way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under Workers' Compensation statutes, disability benefit statutes or other employee benefit statutes.

PROTECTION OF WORK

The Contractor shall be responsible for the care of all the Work until its completion and final acceptance. The Contractor shall, at its own expense, replace damaged or lost material and repair damaged parts of the Work or the same may be done at the Contractor's expense by the District and the Contractor and its sureties shall be liable therefor. The Contractor shall make its own provisions for properly storing and protecting all material and equipment against theft, injury, or damage from any and all causes. Damaged material and equipment shall not be used in the Work. The Contractor shall take all risks from floods and casualties except as provided by law, and shall make no charge for the restoration of such portions of the work as may be destroyed or damaged by flood or other casualties or because of danger from flood or other casualties or for delays from such causes. The Contractor may, however, be allowed a reasonable extension of time on account of such delays, subject to the conditions herein before specified. The Contractor shall not be responsible for the cost, in excess of 5% of the contracted amount, of repairing or restoring damage to the Work, if the damage was proximately caused by an earthquake in excess of a magnitude of 3.5 on the Richter Scale or by tidal wave' s; provided that the Work damaged was built in accordance with accepted and applicable building standards, and the plans and specifications of the District.

Contractor shall effectively secure and protect adjacent property and structures, livestock, crops and other vegetation. If applicable, the Contractor shall open fences on or crossing the right-of-way and install temporary gates of sound construction thereon so as to prevent the escape of livestock. Adjacent fence posts shall be adequately braced to prevent the sagging or slackening of the wire. Before such fences are opened, the Contractor shall notify the owner or tenant of the property and, where practicable, the opening of the fence shall be in accordance with the wishes of said owner or tenant. The Contractor shall be responsible that no loss or inconvenience shall accrue to the owner or tenant by virtue of their fences having been opened or the gate not having been either shut or attended at all times. Where special types of fences are encountered, the Contractor shall install temporary gates made of similar materials and of suitable quality to serve the purposes of the original fences. In all cases where the Contractor removes fences to obtain workroom, the Contractor shall provide and install temporary fencing as required, and on completion of construction shall restore the original fence to the satisfaction of the Engineer. All costs of providing, maintaining and restoring gates and fencing shall be home by the Contractor. The Contractor shall provide and maintain all passageways, guard fences, lights and other facilities for protection required by public authority or local conditions.

The Contractor shall use extreme care during construction to prevent damage from dust to crops and adjacent property. The Contractor, at its own expense, shall provide adequate dust control for the right-of-way and take other preventative measures as directed by the Engineer.

The Contractor shall be responsible for all damage to any property resulting from trespass by the Contractor or its employees in the course of their employment, whether such trespass was committed with or without the consent or knowledge of the Contractor.

The Contractor shall see that the Site is kept drained and free of all ground water and any other water, which may impede the progress or execution of the Work.

The Contractor shall be responsible for any damage caused by drainage or water runoff from construction areas and from construction plant areas.

In an emergency affecting the safety of life, the Work, or adjoining property, the Contractor, without special instruction or authorization from the Engineer, is hereby permitted to act at its discretion to prevent such threatened loss or injury, and the Contractor shall so act without appeal if so instructed or authorized. Any compensation claimed by the Contractor on account of emergency work shall be determined as specified In Section 0. Should the Engineer deem an emergency condition to exist, the Contractor shall immediately do those things and take those steps ordered by the Engineer. The decision of the Engineer in this respect shall be final and conclusive. Any claims for compensation made by the Contractor on account of emergency work shall be determined as specified in Section 0.

Except as provided by Government Code section 4215, the Contractor shall be responsible for the removal, relocation and protection of all public and private utilities, including irrigation facilities in the nature of utilities, located on the site of the construction project if and to the extent that the same are identified in the Contract Documents, and the Contractor shall not be entitled to any extension of time or claim for damages for extra compensation in connection therewith. If and to the extent that such utilities or facilities are not identified in the Contract Documents, as between the Contractor and the District, the District will be responsible for the cost of their removal, relocation or protection, as the case may be, but the Contractor shall perform any such work in conformance with applicable provisions of Sections 0 and 0, if so directed by the Engineer. In such situations the Contractor shall not be responsible for delay in completion of the project caused by the failure of the District or the owner of the utility to provide for such removal or relocation. If the Contractor, while performing the Contract, discovers utility or irrigation facilities not identified by the District in the Contract Documents, the Contractor shall immediately notify the Engineer in writing.

Subject to the provisions of this section, where the Work to be performed under the Contract crosses or otherwise interferes with existing streams, watercourses, canals, farm ditches, pipelines, drainage channels, or water supplies, the Contractor shall provide for such watercourse or pipelines and shall perform such construction during the progress of the Work so that no damage will result to either public or private interests, and the Contractor shall be liable for all damage that may result from failure to so provide during the progress of the Work.

ACCIDENTS

The Contractor shall provide and maintain, in accordance with Labor Code section 6708 and OSHA requirements, adequate emergency first-aid treatment for its employees and anyone else who may be injured in connection with the Work.

The Contractor shall promptly report in writing to the Engineer all accidents whatsoever arising out of or in connection with, the performance of the Work, whether on or adjacent to the site, which caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, if death or serious injury or serious damage are caused, the accident shall be reported immediately by telephone or messenger to the District and the Engineer.

If any claim is made by anyone against the Contractor or any Subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

NO PERSONAL LIABILITY

Neither the District, the Engineer, nor any of their other officers, agents, or employees shall be personally responsible for any liability arising under the Contract, except such obligations as are specifically set forth herein.

PROGRESS AND COMPLETION OF WORK

PROGRESS SCHEDULE

The Contractor shall submit within ten (10) days after execution of the Contract a detailed work schedule(s) which shall detail the actions of the Contractor and Subcontractors working at the Site. This schedule(s) shall both show the dates at which the Contractor will start and complete and conform to the completion time specified in the Contract. The controlling operation, defined as the least float path, if any, shall be identified.

The Contractor shall review, revise and resubmit the progress schedule at least once a month to reflect progress. In any event, Contractor shall submit, at any time during the contract period, a current schedule to the Engineer at the Engineer's request.

No progress payments will be made for any work performed until a satisfactory schedule has been submitted and approved by the Engineer. An updated schedule shall be required from the Contractor if the project falls ten (10) working days behind schedule.

If the Work falls behind the accepted schedule, the Contractor shall promptly take whatever actions are necessary to put the project back on schedule. For delays or portions of delays for which the Contractor is responsible, no payment will be made or time extension allowed for increase in work force, equipment, and working hours needed to put the project on schedule.

COMMENCEMENT AND PROGRESS OF THE WORK AND TIME OF COMPLETION

Commencement

The Contractor shall begin the Work after receiving a Notice to Proceed within the period of time set forth in the Contract Provisions. Thereafter, Contractor shall diligently prosecute the Work to completion as specified in the Contract Documents. The Engineer shall have the right to specify the locations where Contractor shall start and proceed with the Work.

A preconstruction conference will be convened after the Contractor has delivered the necessary bonds, insurance certificates and signed agreement in proper form as required in the invitation to bid, Bid proposal and general conditions of these specifications. Prior to any work, the Contractor shall provide the Engineer with a list of key personnel assigned to the project and the telephone numbers where they may be reached at any time. The list shall be made available in sufficient copies and presented at the preconstruction conference.

Notwithstanding any other provisions of the Contract, the District shall not be obligated to accept or pay for any work furnished by the Contractor prior to the issuance of the Notice to Proceed whether or not the District has knowledge of the furnishing of such work. The Contractor shall not commence with work on this project until its Contract bonds and evidence of insurance comply with all Contract requirements and a Notice to Proceed has been issued.

The Contractor shall notify the Engineer in writing two (2) working days (48 hours) prior to commencement of work on the Project or scheduling work for a Saturday, Sunday, or District Holiday. Failure to provide said notification will void the District's obligation to provide inspection. Any work done in the absence of the District's Inspector shall be subject to rejection.

Completion

All work under this Contract shall be completed within the period of time set forth in the Contract Provisions. The Contract shall be deemed completed when the Engineer has certified the completion of the Project as provided in Section 9.07 of these General Conditions.

SUSPENSION OF WORK

The Engineer may at any time, by notice in writing to the Contractor, suspend any part of the Work for such period of time as may be necessary to prevent improper execution of the Work on the project by the Contractor, its Subcontractors or agents, and the Contractor shall have no claim for damages or additional compensation on account of any such suspension.

The District may at any time suspend any part or all of the Work upon ten (10) days written notice to the Contractor, who shall thereupon discontinue all work suspended except for all operations to prevent loss or damage to work already executed as may be directed by the Engineer. Work shall be resumed by the Contractor after such suspension on written notice from the District.

In the event of any suspension of the Work in whole or in part under subsection (B) above, the Contractor shall be entitled to an extension of time wherein to complete the Work to the extent of the delay caused to the Contractor thereby.

In the event the entire work shall be suspended by order of the District, as herein above provided, and shall remain so suspended for a period of sixty (60) consecutive days, through no fault of the Contractor, and notice to resume the Work shall not have been served on the Contractor as herein above provided, Contractor may, at its option, by written notice to the District, terminate the Contract in the same manner as if the termination had been initiated by the District, and the District shall have no claim for damages because of such termination of the Contract.

DELAY IN THE WORK – TIME EXTENSIONS

The Contractor shall at all times employ such force, plant, materials, and tools as will be sufficient, in the opinion of the Engineer, to prosecute the Work at not less than the rates fixed under the terms of the Contract and to complete the Work thereof within the time limits fixed therein. If the Contractor refuses or fails to prosecute the Work, or any separable part thereof, with such diligence as will ensure the completion within the time specified in the Contract, or any extension thereof, or fails to complete said work within such time, the District may exercise the termination provisions set forth in Section 0, below.

Excusable Delays. Excusable delays shall be delays in the controlling operation of the Contractor's work due to strikes, lockouts by others, fire, unusual delay in transportation, unavoidable casualties, adverse weather conditions which could not have been reasonably anticipated, or any other act(s) of God beyond the Contractor's control, or by delay authorized by the District, or by any cause which the District shall decide to justify the delay. Except as provided in Section 00, below, in the event of an excusable delay, the time of completion shall be extended for such reasonable time as the District may decide. The Contractor's right to an extension of time for an excusable delay is expressly subject to Contractor's giving written notice of such claim within ten (10) days following the date the Contractor knew or should have known of the delay. Failure to give such notice shall be construed as a waiver of such right. It is understood and agreed that extensions of time shall be the Contractor's sole and exclusive remedy for excusable delays.

Compensable delays. Compensable delays shall be delays in the controlling operating of the Contractor's work due to acts or neglect of the District, its employees or those under it by contract or otherwise, or by changes ordered in the work. In the event of a compensable delay,

the time of completion shall be extended for such reasonable time as the District may decide. In addition, the Contractor may recover its direct costs as provided in Section 0. The Contractor's remedies for compensable delays are expressly subject to Contractor's giving ten (10) days written notice of such claim from the date the Contractor knew or should have known of the delay. It is understood and agreed that the Contractor's sole and exclusive remedies for compensable delays shall be an extension of the time and recovery of its direct costs as compensable hereunder, but only in accordance with the provisions of the Contract Documents.

Contractor and District understand and agree that the Contract time for the completion of this project is a very important part of the contract. Extensions of time will only be granted as provided above when events actually cause the Contractor to be delayed in the performance of that schedule activity which is the controlling operation as of the time of the delay. When acts or omissions occur which could cause delay, Contractor will take all reasonable means in order to be able to continue to work as scheduled without any delay, or as short a delay as possible. Additionally, if inclement weather causes accumulation of standing water on the work site or other conditions which might cause delay, Contractor shall take all measures reasonably necessary to permit work to continue as quickly as possible.

If adverse weather conditions are the basis for a claim for additional time, such claim shall be documented by date substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the scheduled construction. Adverse weather conditions shall be considered only as those conditions that exceed the average annual number of rain days and rain quantities as established by the Annual Local Climatological Summary and NOAA National Technical Memorandum NWS WR-65 (Revised) as published by the United States Government, National Weather Service, National Climate Center, Asheville, North Carolina.

The Engineer shall be responsible for determining when adverse weather conditions result in non-workable days. It shall be the Contractor's duty to stay informed of such determinations by the Engineer. The Contractor may object to such adverse weather determinations by filing with the Engineer a written notice of objection. The notice of objection shall state the basis of the objection and provide supporting documentation, which substantiates that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the scheduled construction. All such notices of objection shall be filed within three (3) days of the day in dispute. It is hereby agreed that the Contractor's failure to submit a written notice of objection within three (3) days of the Engineer's adverse weather determination shall constitute a waiver by the Contractor of all its rights to further protest, judicial or otherwise.

The Engineer will, within a reasonable period of time, issue a ruling on the Contractor's notice of objection. All such rulings by the Engineer shall be final, unless the Contractor files a written protest within fifteen (15) days of the Engineer's ruling. This protest shall clearly state the basis of the dispute. Such protest will be forwarded promptly to the District, which will issue a decision on each such protest. The District decision will be final. Pending the District decision, the Contractor shall proceed with its work in accordance with the Engineer's ruling and/or instructions. It is hereby agreed that the Contractor's failure to file a protest within fifteen days (15) of the Engineer's ruling shall constitute a waiver by the Contractor of all its rights to further protest, judicial or otherwise.

The number of days that are anticipated to be non-workable due to adverse weather conditions shall be as set forth in Section 4.0 of the Special Conditions. Days deemed non-workable by the Engineer in excess of such anticipated number shall be considered excusable delays.

Unexcused delays shall be delays in the Contractor's work due to acts or neglect of the Contractor, its employees, Subcontractors or those under it by contract or otherwise. In the event of an unexcused delay, the Contractor expressly agrees that it shall not be entitled to either an extension of time or recovery of its costs.

A request for an extension of time, or the granting of an extension of time, shall not constitute a basis for any claim against the District for additional compensation or damages unless caused by the District or another Contractor employed by the District.

DAMAGES FOR DELAY

In the event of compensable delay, the District shall only be liable for idle equipment, idle workers and the necessary costs of transporting equipment. The District shall be liable to the extent that the compensable delay is concurrent with excusable delays or Contractor caused delays to the controlling operation. The allowable costs shall be as for force account work under Section 0 with the following exceptions:

The Delay Factor in the Labor Surcharge and Equipment Rental Rules applies to each equipment rental rate;

The daily number of payable hours shall equal the normal working hours during the delay, not to exceed eight (8) hours per day; and

No markups will be added.

TERMINATION FOR CONVENIENCE

If at any time before completion of the Work, the District determines that it is either impossible or against the interests of the District to complete the Work, or if the Work is stopped by an injunction of a court of competent jurisdiction or by order of any competent authority, the District may, upon ten (10) days written notice to the Contractor, discontinue the Work and terminate the Contract. Upon service of such notice of termination, the Contractor shall discontinue the Work in such manner, sequence, and at such times as described below. The Contractor shall have no claim for damages for such discontinuance or termination, nor any claim for anticipated profits on the Work thus dispensed with, nor any other actually performed up to the time of discontinuance, including any Extra Work ordered by the Engineer to be done, nor for any claim for liquidated damages.

Termination of the Contract for convenience and the total compensation payable to the Contractor in the event of termination shall be governed by the following:

The Engineer will issue the Contractor a written notice signed by the Engineer, specifying that the Contract is to be terminated. Upon receipt of said written notice and, except as otherwise directed in writing by the Engineer, the Contractor shall:

Stop all Work under the Contract except that specifically directed to be completed prior to Acceptance.

Perform Work the Engineer deems necessary to secure the project for termination.

Remove equipment from the site of the Work.

Take such action as is necessary to protect materials from damage.

Notify all Subcontractors and suppliers that the Contract is being terminated and that their contracts or orders are not to be further performed unless otherwise authorized in writing by the Engineer.

Provide the Engineer with an inventory list of all material previously produced, purchased or ordered from suppliers for use in the Work and not yet used in the Work, including its storage location, and such other information as the Engineer may request.

Dispose of material not yet used in the Work as directed by the Engineer.

It shall be the Contractor's responsibility to provide the District with good title to all materials purchased by the District hereunder, including material for which partial payment has been made and with bills of sale or other documents of title for such materials.

Subject to the prior written approval of the Engineer, settle all outstanding liabilities and all claims arising out of subcontracts or orders for material terminated hereunder. To the extent directed by the Engineer, the Contractor shall assign to the District all the right, title and interest of the Contractor under subcontracts or orders for materials terminated hereunder.

Furnish the Engineer with the documentation required to be furnished by the Contractor under the provisions of the Contract including, on projects as to which Federal funds are involved, all documentation required under the Federal requirements included in the Contract.

Take such other actions as the Engineer may direct.

Termination of the Contract shall not relieve the Contractor of responsibility for damage to materials except as follows:

The Contractor's responsibility for damage to materials for which partial payment has been made and for materials furnished by the District for use in the Work and unused shall terminate when the Engineer certifies that such materials have been stored in the manner and at the locations he or she has directed.

The Contractor's responsibility for damage to materials purchased by the District subsequent to the issuance of the notice that the Contract is to be terminated shall terminate when title and delivery of such materials has been taken by the District.

When the Engineer determines that the Contractor has completed the Work under the Contract directed to be completed prior to termination and such other Work as may have been ordered to secure the project for termination, he or she will recommend that the Engineer formally accept the Contract, and immediately upon and after such Acceptance by the Engineer, the Contractor will not be required to perform any further Work thereon and shall be relieved of his or her Contractual responsibilities for injury to persons or damage to property which occurs after the formal Acceptance of the project by the Engineer.

The total compensation to be paid to the Contractor shall be determined by the Engineer on the basis of the following:

The reasonable cost to the Contractor, without profit, for all Work performed under the Contract, including mobilization, demobilization and Work done to secure the project for termination. Reasonable cost will include a reasonable allowance for project Overhead and general administrative Overhead not to exceed a total of seven (7%) percent of Direct Costs of such Work.

A reasonable allowance for profit on the cost of the Work performed as determined under Section 0 above, provided the Contractor establishes to the satisfaction of the Engineer that it is reasonably probable that he or she would have made a profit had the Contract been completed and provided further, that the profit allowed shall in no event exceed four (4%) percent of said cost.

The reasonable cost to the Contractor of handling material returned to the vendor, delivered to the District or otherwise disposed of as directed by the Engineer.

A reasonable allowance for the Contractor's administrative costs in determining the amount payable due to termination of the Contract.

All records of the Contractor and the Subcontractors, necessary to determine compensation in accordance with this section shall be open to inspection or audit by representatives of the District at all times after issuance of the notice that the Contract is to be terminated and for a period of three (3) years, and such records shall be retained for that period.

After Termination of the Work by the Engineer, the Engineer may make payments on the basis of interim estimates pending issuance of the Final Statement, when in his or her opinion the amount thus paid, together with all amounts previously paid or allowed, will not result in total compensation in excess of that to which the Contractor will be entitled.

All payments, including payment upon the Final Statement, shall be subject to deduction for prior payments and amounts, if any, to be kept or retained under the provisions of the Contract.

The provisions of this section shall be included in all subcontracts.

TERMINATION FOR DEFAULT

In the event of any default by the Contractor as described below, the District may, after giving ten (10) days' written notice to the Contractor, terminate the Contractor's right to proceed with the Work or any part of the Work in the District's sole discretion. Events of default include:

Failure or refusal to prosecute the Work, or any separable part thereof, with such diligence as will ensure the completion within the time specified in the Contract, or any extension thereof, or failure to complete said work within such time.

Filing of bankruptcy by the Contractor, or the making of a general assignment for the benefit of its creditors, or appointment of a receiver on account of Contractor's insolvency without discharge of the receiver within ten (10) days after its appointment.

Failure to make prompt payments to Subcontractors or suppliers.

Persistent disregard of laws, ordinances, or the instructions of the Engineer, or other substantial violation of any provision of the Contract.

In the event the right of the Contractor to proceed with the Work, or any portion thereof, has been terminated because of the default of the Contractor and the Contractor has been given ten (10) days' notice to cure such fault and has not done so, the District may take over the Work and prosecute the same to completion by contract or any other method the District deems expedient, and may take possession of and utilize in completing the Work such materials,

appliances, equipment and plant as may be on the site of the Work and necessary therefore. In such event, the Contractor and its sureties shall be liable for all damages including costs of managerial and administrative services, engineering, legal and other consultant fees, and liquidated damages sustained or incurred by the District.

Upon termination, the Contractor shall not be entitled to receive any further payment until the Work is finished. If upon completion of the Work the total cost to the District, including engineering, legal and other consultant fees, costs of managerial and administrative services, construction costs, and liquidated damages shall be less than the amount which would have been paid if the Work had been completed by the Contractor in accordance with the terms of the Contract, then the difference shall be paid to the Contractor in the same manner as the final payment under the Contract. If the total cost incurred by the District on account of termination of the Contract and subsequent completion of the Work by the District by whatever method the District may deem expedient shall exceed said amount which the Contractor would otherwise have been paid, the Contractor and its sureties shall be liable to the District for the full amount of such excess expense.

The rights and remedies of the District provided in this section are in addition to any of the rights and remedies provided by the law or under this Contract.

FAILURE TO TIMELY COMPLETE THE WORK – LIQUIDATED DAMAGES

Liquidated Damages

It is agreed by the parties to this Contract that time is of the essence. In the event all the Work is not completed before or upon the expiration of the time limit as set in the Bid, Contract and/or Progress Schedule, or within any time extensions that may have been granted, damage will be sustained by the District; and that it may be impracticable to determine the actual amount of damage by reason of such delay. Accordingly, it is agreed that the Contractor shall pay to the District as damages the amount set forth for each and every day's delay in finishing the Work in excess of the number of days specified. Liquidated damages shall be paid at a rate of one thousand dollars (\$1,000.00) per day unless otherwise stated in the Contract Documents. The parties expressly agree that the liquidated damage clause found in the Contract Documents is reasonable under the circumstances existing at the time the Contract was made. The District shall have the right to deduct the amount of liquidated damages from any money due or to become due the Contractor.

In addition, the District shall have the right to charge to the Contractor and to deduct from the final or progress payments for the Work the actual cost to the District of legal, engineering, inspection, superintendence, and other expenses, which are directly chargeable to the Contract and which accrue during the period of such delay, except that the cost of final inspection and preparation of the final estimate shall not be included in the charges.

Exclusions

Notwithstanding the provisions of Section 0, the Contractor shall not be liable for liquidated damages or delays caused by the removal or relocation of utilities when such removal or relocation is the responsibility of the District or the owner of the utility under Government Code section 4215.

CLEAN-UP

During the progress of the Work, the Contractor shall maintain the Site and related structures and equipment in a clean, orderly condition and free from unsightly accumulation of rubbish. All waste materials shall be removed daily from the Site and disposed of by the

Contractor by any proper means at its own expense unless designated otherwise on the plans. No waste materials shall be placed in the public street right-of-way. Unless otherwise specified, all existing piping, materials and/or equipment removed pursuant to this Contract shall become the Contractor's property.

Upon completion of the Work and before the final estimate is submitted, the Contractor shall, at its own cost and expense, remove from the vicinity of the Work all plants, buildings, rubbish, unused work materials, concrete forms, and temporary bridging and other like materials, belonging to the Contractor or used under the Contractor's direction during the construction, and in the event of the Contractor's failure to do so, the same may be removed by the District after ten (10) calendar days' notice to the Contractor. Such removal shall be at the expense of the Contractor.

The Contractor shall use care in the removal of materials and equipment so as not to cause damage to existing facilities and structures. Contractor shall assume liability for all such damage. Where the construction has crossed yards or driveways, restoration shall be by the Contractor to the complete satisfaction of the Engineer, at the Contractor's expense.

The Contractor shall make its own arrangements for the disposal of waste materials. If the Contractor elects to dispose of such materials on private property, Contractor shall obtain written permission from all property owners involved.

MEASUREMENT AND PAYMENT

MEASUREMENT OF QUANTITIES

Where the Contract provides for payment on a lump sum price basis, no measurement of quantity will be made. Where the Contract provides for payment on a unit price basis, the quantities of work performed will be computed by the Engineer on the basis of measurements taken by the Engineer, and these measurements shall be final and conclusive.

All quantities of work computed under the Contract shall be based upon measurements by the Engineer according to United States Measurements and Weights.

Methods of measurement are specified herein and in the Technical Specifications.

Mobilization shall be measured and payment issued according to Section 11 of the State Standard Specifications.

SCOPE OF PAYMENT

The Contractor shall accept the compensation provided in the Contract as full payment for furnishing all labor, materials, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced under the Contract; also for loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work until the Acceptance by the District and for all risks of every description connected with the prosecution of the Work, also for all expenses incurred in consequence of the suspension or discontinuance of the work as provided in the Contract; and for completing the Work according to the Specifications and Plans. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or material.

No compensation will be made in any case for loss of anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as provided in such agreements.

The Work includes the preparatory work and operations needed for mobilization and demobilization of the Project. The Work, however, does not include establishing the Engineer's field facility(s) of utility work and connections needed for these facilities.

PROGRESS ESTIMATE

For each calendar month of Contract work, the Engineer will prepare a progress estimate of all work performed under the Contract. Within the first ten (10) days of each succeeding calendar month, the Engineer will prepare in writing an estimate which in the Engineer's opinion is a fair approximation of the value of all work done under the Contract, including any amounts due the Contractor for Extra Work and Change Orders. In arriving at the value of the Work done, the Engineer will give consideration to the value of labor and materials which have been incorporated into the permanent work by the Contractor during the preceding month. Consideration will not be given to preparatory work done or for materials or equipment on hand.

In order to assist the Engineer, the Contractor shall furnish the Engineer with copies of invoices for all such items delivered to the job site.

PROGRESS PAYMENTS

The District will pay the Contractor ninety-five percent (95%) of the amount of each progress estimate within thirty (30) days after receipt of an undisputed and properly submitted progress estimate from the Contractor, unless the District has made a finding prebid pursuant to Public Contract Code section 7201(b)(4) justifying a larger retention. If the District fails to pay an undisputed progress estimate within the allotted thirty (30) days, the District shall pay interest to the Contractor equivalent to the legal rate set forth in subdivision (A) of section 685.010 of the Code of Civil Procedure. Five percent (5%) of the amount of each estimate shall be retained by the District until final completion and Acceptance of all work under the Contract.

Upon receipt of a payment request, the District shall act in accordance with both of the following:

Each payment request shall be reviewed by the District as soon as practicable after receipt for the purpose of determining that the progress estimate is a proper payment request.

Any payment request determined not to be a proper payment request suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven (7) days, after receipt. A request returned pursuant to this section shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.

The number of days available to the District to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the District exceeds the seven-day return requirement set forth in paragraph (2) of subdivision (b).

The Contractor may, in accordance with the provisions of Public Contracts Code section 22300, substitute securities for any monies which the District may withhold to insure performance under the Contract.

When, in the judgment of the Engineer, the Work is not proceeding in accordance with the provisions of the Contract, or when in the Engineer's judgment the total amount of the Work done since the last estimate amounts to less than one thousand dollars (\$1,000.00), no pay estimate will be prepared and no progress payment will be made.

No progress estimate or payment shall be considered to be an approval or Acceptance of any work, materials or equipment. Estimated amounts and values of work done and materials and equipment furnished will be conformed with actual amounts and values as they become available in subsequent progress estimates, progress payments and the final estimate and payment. All estimates and payments will be subject to correction in subsequent progress estimates and payments and the final estimate and payments and the final estimate and payments.

It is mutually agreed between the parties to the Contract that no payments made under the Contract, including progress payments and the final payment shall be evidence of the performance of the Contract, either wholly or in part, and no payment shall construed to be an Acceptance of any defective or incomplete work or improper materials.

PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

A prime Contractor or Subcontractor shall pay any Subcontractor not later than seven (7) days of receipt of each progress payment in accordance with the provisions in Section 7108.5 of the California Business and Professions Code concerning prompt payment to Subcontractors. The seven (7) days is applicable unless a longer period is agreed to in writing. Any delay or postponement of payment over 30

days may take place only for good cause and with the District's prior written approval. Any violation of Section 7108.5 shall subject the violating Contractor or Subcontractor to the penalties, sanctions and other remedies of that section. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or Subcontractor in the event of a dispute involving late payment or nonpayment by the prime Contractor , deficient subcontract performance, or noncompliance by a Subcontractor. This provision applies to both DBE and non-DBE Subcontractors.

LIENS AND STOP NOTICES

The Contractor agrees to keep the Work, the site of the Work and all monies held by the District free and clear of all liens and stop notices related to labor and materials furnished in connection with the Work, if permitted by law. Furthermore, the Contractor waives any right it may have to file any type of lien or stop notice in connection with the Work. Notwithstanding anything to the contrary contained in the Contract Documents, if any such lien or stop notice is filed or there is evidence to believe that lien or stop notice may be filed at any time during the progress of the Work or within the duration of this Contract, the District may refuse to make any payment otherwise due the Contractor or may withhold any payment due the Contractor a sum sufficient in the opinion of the District to pay all obligations and expenses necessary to satisfy such lien or stop notice. The District may withhold such payment unless or until the Contractor, within ten days after demand therefor by the District, shall furnish satisfactory evidence that the indebtedness and any lien or stop notice in respect thereof has been satisfied, discharged and released of record, or that the Contractor has legally caused such lien or stop notice to be released of record pending the resolution of any dispute between the Contractor and any person or persons filing such lien or stop notice. If the Contractor shall fail to furnish such satisfactory evidence within ten days of the demand therefor, the District may discharge such indebtedness and deduct the amount thereof, together with any and all losses, costs and damages suffered or incurred by the District from any sum payable to the Contractor under the Contract Documents, including but not limited to final payment and retained percentage. This section shall be specifically included in all Subcontracts and purchase orders entered into by the Contractor.

FINAL ACCEPTANCE AND DATE OF COMPLETION

Whenever the Contractor shall deem all Work under this Contract to have been completed in accordance therewith, the Contractor shall so notify the Engineer in writing, and the Engineer shall promptly ascertain whether the Work has been satisfactorily completed and, if not, shall advise the Contractor in detail and in writing of any additional work required. When all the provisions of the Contract have been fully complied with, to the satisfaction of the Engineer, the Engineer shall proceed with all reasonable diligence to determine accurately the total value of all Work performed by the Contractor at the prices set forth in the Contract or fixed by Change Orders, and the total value of all extra work, all in accordance with the Contract. The Engineer will then certify to said final estimate and to the completion of the Work, and will file copies thereof with the District and the Contractor, and shall cause of Notice of Completion to be filed with the Yolo County Clerk-Recorder. The date of completion shall be the date of filing of the Notice of Completion. All guarantees, warranties, and securities securing said guarantees and warranties, shall commence on said date.

RIGHT TO WITHHOLD PAYMENTS

In addition to all other rights and remedies of the District hereunder and by virtue of the law, the District may withhold or nullify the whole or any part of any partial or final payment to such extent as may reasonably be necessary to protect the District from loss on account of:

Defective work not remedied, irrespective of when any such work be found to be defective;

Claims or liens filed or reasonable evidence indicating probable filing of claims or liens including, but not limited to claims under Sections 1775, 1776, or 1777.7 of the Labor Code;

Failure of the Contractor to make payments properly for labor, materials, equipment, or other facilities, or to Subcontractors and/or suppliers;

A reasonable doubt that the Work can be completed for the balance then unearned;

A reasonable doubt that the Contractor will complete the Work within the agreed time limits;

Costs to the District resulting from failure of the Contractor to complete the Work within the proper time; or

Damage to work or property.

Whenever the District shall, in accordance herewith, withhold any monies otherwise due the Contractor, written notice of the amount withheld and the reasons therefor will be given the Contractor. After the Contractor has corrected the enumerated deficiencies, the District will promptly pay to the Contractor the amount so withheld. When monies are withheld to protect the District against claims or liens of mechanics, material men, Subcontractors, etc., the District may at its discretion permit the Contractor to deliver a surety bond in terms and amount satisfactory to the District, indemnifying the District against any loss or expense, and upon Acceptance thereof by the District, the District shall release to the Contractor monies so withheld.

FINAL PAYMENT

Within ten (10) days after the date of completion, the District will file in the Office of the County Recorder, a Notice of Completion of the Work herein agreed to be done by the Contractor. Within sixty (60) days of completion defined in Public Contract Code section 7107, the difference between said final estimate and all payments theretofore made to the Contractor shall be due and payable to the Contractor, subject to any requirements concerning the furnishings of a maintenance bond, and excepting only such sum or sums as may be withheld or deducted in accordance with the provisions of this Contract. All prior certifications upon which partial Payments may have been made, being merely estimates, shall be subject to correction in the final certificate.

FINAL RELEASE

Final payment to the Contractor in accordance with the final estimate is contingent upon the Contractor furnishing the District with a signed written release of all claims against the District arising by virtue of the Contract. Disputed Contract claims in stated amounts may be specifically excluded by the Contractor from the operation of the release. The release shall be in substantially the form specified in California Civil Code section 8138.

ATTACHMENT B

DESIGN BUILD SCHEDULE

ATTACHMENT B – DESIGN BUILD SCHEDULE

ACTIVITY	START DATE	COMPLETION DATE
1. Design/Permitting	March 27, 2024	May 1, 2025
2. Restoration Construction	Summer/Fall 2024	October 15, 2025
3. All other Construction (fencing, roads)	Summer/Fall 2024	June 15, 2026
4. Monitoring and Mitigation Site Maintenance	October 15, 2025	June 30, 2027

ATTACHMENT B

ATTACHMENT C

BID SCHEDULE

ATTACHMENT C – BID SCHEDULE

Bradford Reclamation District No. 2059

Tract 19 Mitigation Site Rehabilitation Contra Costa County

BID SCHEDULE					
Bid Item No.	Description of Item	Estimated Quantity	Unit	Unit Price (figures)	Total Price of Item
1	Project Management	1	Lump Sum		
2	Restoration Design (Construction Documents)	1	Lump Sum		
3	Permits (excluding fees)	1	Lump Sum		
4	Mobilization/Demobilization	1	Lump Sum		
5	Irrigation System (excluding well)	1	Lump Sum		
6	Site Prep (tree/shrub cleanup, weed control)	1	Lump Sum		
7	Revegetation (trees/shrubs)	1	Lump Sum		
8	Graded Access Construction Roads	1	Lump Sum		
9	Fencing	1	Lump Sum		
1.5-Y	ear Monitoring, Maintenance, an	d Reporting Peri	od		
10	Maintenance, Monitoring and Reporting	1.5	Year		
TOTAL AMOUNT OF BID FOR SCHEDULE (SUM OF ALL BID ITEMS 1-10): NOTE: Payment Bond in the amount of 100% of anticipated total contract price must be provided if total contract price is in excess of \$25,000.00					
DATED:	co	NTRACTOR:			

ATTACHMENT C

ATTACHMENT D

REVISED MITIGATION PLAN



EXHIBIT B Bradford Island Tract 19: Revised 50-Acre Mitigation Plan

FINAL

Prepared for Bradford Island Reclamation District (RD 2059) 311 East Main Street #504 Stockton, CA 95202

> Prepared by Stillwater Sciences 2855 Telegraph Ave., Ste. 400 Berkeley, CA 94705

> > January 24, 2006



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1 INTRODUCTION

1.1 Background

The California Department of Fish and Game (DFG), Delta Levee Habitat Improvement Program is responsible for assessing impacts to certain general habitat types resulting from levee maintenance and improvements in the Sacramento-San Joaquin Delta (Delta) under the Delta Flood Protection Act (SB 34, superceded by Assembly Bill 360). DFG is responsible for ensuring that there is "net long-term habitat improvement" as a result of expenditures made by the California Department of Water Resources (DWR) to Reclamation Districts, which participate in the programs previously mentioned. DFG conducts a habitat assessment of each proposed levee maintenance/improvement project (described in more detail in Section 1.2). Based on this assessment, the total acreage of habitat impacted by the project is determined, and appropriate mitigation is agreed upon between DFG and the responsible Reclamation District.

As part of these AB360 requirements, the Bradford Island Reclamation District No. 2059 (District) is required to develop or purchase 50 acres to mitigate for habitat losses from past, ongoing, and future levee maintenance and improvement works on Bradford Island. The goal of the mitigation is to restore Delta riparian and wetland habitat lost due to levee construction and maintenance, including foraging and nesting habitat for riparian dependent birds and mammals. DFG and DWR completed an environmental assessment on Bradford Island in April 2000. Based on this assessment it was determined that a portion of the 149-acre Tract 19, located on the western side of Bradford Island (Figures 1 and 2), would satisfy DFG mitigation requirements. A 50-acre portion of Tract 19 has been designated as the Mitigation Parcel (Parcel) (Figure 2). The District currently owns fee title and has dedicated the property to DFG as a conservation easement.

The following documents are required by DFG to complete the Mitigation Package for this Parcel:

- Fish and Wildlife Habitat Mitigation Agreement by and between Bradford Reclamation District No. 2059 and California Department of Fish and Game
- Deed of Conservation Easement for the Mitigation Parcel and Declaration of Restrictions (Exhibit A), including the following:
 - Legal Description of Tract 19 (Attachment 1)
 - Map Depicting Bradford Island Tract 19 and Mitigation Parcel (Attachment 2)
 - Legal Description of the Mitigation Parcel (Attachment 3)
- Mitigation Plan for Bradford Island Tract 19 (this document, Exhibit B)

This Mitigation Plan was developed to guide the restoration and management of that portion of Tract 19 under a conservation easement.

1.2 Habitat Impact Determination and Required Mitigation under AB360

After reviewing and understanding a levee project description, the steps toward impact determination include: (1) a field survey of existing habitat (habitat assessment); (2) observation and description of existing maintenance practices that affect the habitat; and (3) the description of the "net habitat" that continues to exist after maintenance practices are carried out. AB360

habitat assessments consist of mapping four different habitat types within the levee project footprint: freshwater marsh, scrub shrub (woody species < 20 ft in height), riparian forest (woody species > 20 ft in height), and shaded riverine aquatic cover.

Levee rehabilitation and maintenance activities are performed pursuant to the provisions of the California Water Code sections 12300 et seq. Levee maintenance project impacts under the AB360 program for Bradford Island are described in Attachment 3 of Exhibit A, and are depicted in Attachment 2 of Exhibit A. Levee maintenance and improvement activities on Bradford Island include impacts to freshwater marsh habitat, scrub-shrub habitat, riparian forest habitat, and various other habitats that are or were on or adjacent to local non-project levees in the Sacramento-San Joaquin Delta (Table 1). These habitat losses are long-term in nature, and occurred or may occur in conjunction with the rehabilitation and maintenance of the levees that surround Bradford Island from the base of the landside levee toe out to a distance of 100 ft from the landside levee toe, as delineated by DFG in an April 2000 habitat assessment. The area of impact also includes planned removal of some riparian forest vegetation, totaling 0.23 acres, from designated borrow sites on Bradford Island.

In order to meet the requirements of no net loss of aquatic and riparian habitat under the AB360 program, DFG believes that establishment and preservation of 2.95 acres of freshwater emergent marsh habitat, 22.06 acres of scrub shrub habitat, and 24.99 acres of riparian forest habitat (total of 50.00 acres) would mitigate for the above specified impacts, and is feasible on Tract 19 (Table 1). The 24.99 acres of riparian forest mitigation include 0.68 acre of mitigation for the planned removal of trees from designated borrow sites on Bradford Island. The 50-Acre Mitigation Parcel shall be established, developed, and maintained as a single habitat mitigation parcel, and the Endowment Account established by Work Agreements BR-03-1.0 and BR-01-1.3 shall be available to meet all of the approved costs and expenses associated with it.

AB360 Habitat Type	Area of Impact (acres)	Mitigation Required (acres)
Freshwater Marsh	1.66	2.95
Scrub Shrub	6.90	22.06
Riparian Forest	8.11	24.99
Other habitat	4.52	*
Totals	21.19	50.00

Table 1. Area of impact for each AB3	60 habitat type affected by levee maintenance projects on
<u>Bradford Island, and</u>	corresponding mitigation requirements.

Mitigation for "other" habitat was included in the above AB360 habitat types.

The remaining portion of Tract 19, consisting of approximately 99 acres (the remainder) shall be managed in accordance with the terms and provisions of a separate Land Management Plan. It is not part of the mitigation program and will remain in cattle grazing until needed for other purposes in accordance with the Land Management Plan.

1.3 Mitigation Parcel Location and Characterization

Tract 19 is located on Bradford Island in Contra Costa County (Figure 1). Twitchell Island is to the north of Bradford Island; Webb Tract is to the east and Jersey Island is to the south. The San Joaquin River flows along the north and west sides of the island. Tract 19 consists of one rectangular shaped parcel in one section, T2N, R3E, M.D.B. and M (Attachment 2 of Exhibit A) and involves one landowner, the District. The Contra Costa County Assessor's Parcel Number is

26-020-002. The tract is 149 acres total in size. The location of Tract 19 on Bradford Island, and the layout of the 50-acre Mitigation Parcel within Tract 19 are shown in Figure 2.

1.3.1 Historical Land Use

Historically, Tract 19 has been used for agriculture, grazing and sand mining. A large commercial sand mining company owned and occupied the site until the property was sold in 1974. Robert C. Benson and Jean M. Benson as Trustees of the Benson Family Trust (Benson) owned Tract 19 from 1974 to 2003. Tract 19 was sold to the District in January 2003.

The northwest corner of Tract 19 was historically used for growing corn row crops. According to the previous landowner, corn was last grown on the property in 1985. Since the purchase of the property from the sand-mining operator in 1974, grazing has been the primary use of the site.

1.3.2 Adjacent Properties and Current Land Use

The San Joaquin River and four other properties surround Tract 19. The adjacent property to the north is used for grazing. A storage building, a storage container, old farm equipment, and a pile of tires are north of the property line. An underground gas pipeline runs east/west near the north property line. It crosses the island main drain canal that runs north/south the length of the island and then continues across the San Joaquin River.

The San Joaquin River borders Tract 19 to the west. The property to the east of Tract 19 is also used for grazing and is separated from Tract 19 by the north/south main drain canal. A house is on the southeast corner of the property. The property owner indicated that he sold a one-acre parcel in the southwest corner where a house is now located.

The property to the south includes a lake owned by a duck club and used for duck hunting. DWR photos taken in 1983 show flooding on Bradford Island after high water caused a levee breach approximately 700 ft south of Tract 19. The floodwater scoured out a depression that created the large lake that remains today. A dense riparian forest has grown up around the lake and is adjacent to the southern boundary of the Tract 19. Several duck blinds around the lake are visible from the levee road.

1.3.3 Existing Topography, Geology, and Soils

Tract 19 contains a series of sand hills, the tops of which are approximately 6–8 ft above sea level (all elevations reported are relative to the National Geodetic Vertical Datum [NGVD]). The entire tract is below the San Joaquin River 100-year flood elevation. The majority of the Mitigation Parcel is below sea level, but ranges in elevation from 8 ft at the top of the hills in the northeastern portion of the Parcel, to -14 ft in the northwestern and southeastern portions of the Parcel (Figure 3).

DWR staff reviewed the U.S. Department of Agriculture soil survey of Contra Costa County, Jersey Island Quadrangle. According to the map, Tract 19 has alluvium and intertidal deposits formed in the late Pleistocene and Holocene of the Quaternary Epoch. Two soils were identified from two different soil associations: Piper Fine Sandy Loam and Rindge Muck (Figure 4).

Piper Fine Sandy Loam is part of the Piper series, which is mapped throughout Tract 19 as well as throughout Bradford Island. The soils of this series are poorly drained and formed on low aeolian mounds and ridges that have become prominent with subsidence of the surrounding organic soils. Elevation of this soil type ranges from 5–15 ft below sea level. Where these soils are not drained, they are saturated within a depth of 20 to 40 inches throughout the year and are

saturated within a depth of 20 inches for 4 to 12 months each year. In a representative profile the surface layer is moderately alkaline fine sandy loam about 10 inches thick. It is very dark gray in the upper part and light gray in the lower part. The subsoil is mottled, light-gray, moderately alkaline, weakly cemented fine sandy loam about 28 inches thick. The substratum is mottled, pale-brown, moderately alkaline fine sand that extends to a depth of more than 60 inches. The Piper Fine Sandy Loam soil generally has slopes of 2–5 percent, but a few areas are nearly level. Runoff is slow to medium. Permeability is slow in about 80 percent of the area and moderate in 20 percent depending on the amount of cementation. Roots can penetrate to a depth of 20 to 36 inches. The available water capacity is 2 to 4 inches. Agricultural uses on this soil type are primarily for dryland pastureland, small grain, and volunteer hay.

Rindge Muck is part of the Rindge Series, which consists of very poorly drained organic soils that are formed in the Delta. The Rindge series is mapped throughout Bradford Island, as well as on other islands in the Delta. The Delta islands are the only occurrence of this soil type in Contra Costa County. Elevation of this soil type ranges between 5–15 ft below sea level. In a representative profile the surface layer is very dark brown, strongly acidic muck about 14 inches thick. The next layer is very dark gray, strongly acidic muck about 10 inches thick. Below this, to a depth of 60 inches, is black, very acidic to strongly acidic muck. The soils in this series are level or nearly level (0–2 percent slopes). Runoff is very slow. Permeability is rapid and the available water capacity is 10 inches or more. The water table ranges from a depth of about 50 inches in the summer to 12 inches or less in the winter. This soil is subject to peat fires during summer. When allowed to dry, this soil shrinks irreversibly. It will repel water when allowed to air dry. Agricultural uses on this soil type are mainly for row crops, especially corn. Some small areas are in permanent pasture. Other small areas are flooded during part of the year to provide wildlife habitat.

1.3.4 Groundwater

Five piezometers were installed on a portion of Tract 19 in early September 2003 as part of earlier mitigation planning efforts (TP-1 to TP-5, as shown in Figure 5). The depth to groundwater was measured in these piezometers on September 3, September 11, and September 23, 2003. Four additional piezometers were installed within the boundaries of the current 50-acre Mitigation Parcel in November 2005, and the depth to groundwater was measured on November 15 and November 30, 2005 (TP-6 to TP-9, shown in Figure 5). Three of the original piezometers installed in 2003 remained intact and were also re-measured in 2005.

The measured groundwater levels ranged from 3.1 to 13.7 ft below the ground surface in September 2003 (-8.0 ft to -18.4 ft elevation), and 0.1 to 8.8 ft below the ground surface in November 2005 (-7.4 ft to -17.8 ft elevation). Groundwater levels were highest in piezometers closer to the levee (western boundary of Tract 19) and then declined in a fairly linear manner landward (east). It should be noted that TP-1 may be located on fill resulting from the sandmining operations prior to 1973, and may potentially be reflecting a perched water table rather than the actual groundwater table.

Mean September groundwater elevation for TP-1 through TP-5, and predicted September groundwater elevation for TP-6 through TP-9 (based on rate of decline relationships among the three wells that were measured both in 2003 and 2005) were used in a GIS to interpolate groundwater elevations across Tract 19, as an estimate of late-summer groundwater conditions. The mean or predicted September groundwater elevation at each of the monitoring wells and the interpolated groundwater elevation surface across Tract 19 are shown in Figure 5. It should be

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noted that because of the limited number of data points used, this should be considered only a rough approximation of the late-summer groundwater conditions at the tract.

The groundwater elevation data were then overlayed with the surface topography to produce an estimated depth to late-summer groundwater across the Mitigation Parcel (Figure 6). Groundwater in the late summer is present within approximately 2 ft of the surface in the northwestern corner of the Mitigation Parcel and in smaller pockets in the eastern portion of the Parcel. Late-summer groundwater levels are furthest from the ground surface (> 18 ft) on the two hills in the northeastern portion of the Parcel.

1.3.5 Biological Characteristics

Tract 19 is heavily disturbed from historical land use activities. Moderate cattle grazing on Tract 19 continues to provide some disturbance. Non-native grasses and a few scattered native trees and shrubs characterize the vegetation on the Mitigation Parcel. Under recent management, seasonal application of 2-4-D and other selective herbicides was intended to keep the grasses dominant to provide maximum forage for grazing cattle.

The dominant plant species present are non-native grasses, especially those cultivated for forage, such as Bermuda grass (*Cynodon dactylon*), as well as annuals such as wild oat (*Avena fatua*), and several brome species (*Bromus* spp.). Native herbaceous species are present in small numbers in the higher elevation sandy soils, including silver bush lupine (*Lupinus albifrons*) and gilia (*Gilia capitata*). Woody vegetation is sparse, and includes a few scattered mature trees of California black walnut (*Juglans californica*), Valley oak (*Quercus lobata*), Goodding's black willow (*Salix gooddingii*), and Fremont cottonwood (*Populus fremontii*). Natural establishment of young trees appears limited, perhaps due to cattle browsing and other disturbances. Nonnative invasive plant species include yellow star thistle (*Centaurea solstitialis*), which is well established on the hills within the boundary of the Mitigation Parcel. Himalayan blackberry (*Rubus discolor*) appears to be limited to the existing stand of Goodding's black willow in the southern portion of the Mitigation Parcel, though it is extensive along the southern fence line of Tract 19.

Several bird species were observed on the Parcel, including Nuttall's Woodpecker (*Picoides nuttallii*), western tanager (*Piranga ludoviciana*), and a white-tailed kite (*Elanus leucurus*) (Stillwater Sciences 2003). Additional wildlife species observed outside of Tract 19 along the northern and eastern levees of Bradford Island are included in Table 2.

Common Name Scientific Name	
Birds	· · · · · · · · · · · · · · · · · · ·
American crow	Corvus brachyrhynchos
American goldfinch	Carduelis tristis
American kestrel	Falco sparverius
Barn swallow	Hirundo rustica
Brewer's blackbird	Euphagus cyanocephalus
Cliff swallow	Petrochelidon pyrrhonota
Great egret	Casmerodius albus
House finch	Carpodacus mexicanus
Killdeer	Charadrius vociferous
Mallard	Anas platyrhynchos
Mourning dove	Zenaida macroura

Table 2. Wildlife species observed from the northern and eastern levees of Bradford Island in May
2003 (Source: Stillwater Sciences 2003).

Common Name	Scientific Name	
Northern harrier	Circus cyaneus	
Northern mockingbird	Mimus polyglottos	
Red-winged blackbird	Agelaius phoeniceus	
Ring-necked pheasant	Phasianus colchicus	
Rufous-sided towhee (spotted towhee)	Pipilo erythrophthalmus	
Western meadowlark	Sturnella neglecta	
Western grebe	Aechmophorus occidentalis	
Western kingbird	Tyrannus verticalis	
White-tailed kite Elanus leucurus		
Reptiles and Amphibians		
Pacific tree-frog	Hyla regilla	
Western fence lizard	Sceloporus occidentalis	

A survey of existing habitat within the Mitigation Parcel was conducted by Todd Gardner (DFG) during a field visit on July 16, 2002 (DFG 2002). The Parcel was also visited by staff from DWR, DFG, the District, and Stillwater Sciences in preparation for development of this Mitigation Plan on October 28, 2005. No federally or state listed threatened or endangered species were observed during these two site visits. DWR will prepare a categorical exemption under the California Environmental Quality Act (CEQA) for this Mitigation Plan, including any necessary surveys for the presence of special-status species.

1.4 Project Goals and Objectives

This Mitigation Plan is intended to guide habitat development, mitigation/restoration efforts, and a three-year post implementation maintenance and monitoring period (three-year maintenance period) on the 50-acre Mitigation Parcel. The goal of the mitigation is to restore self-sustaining Delta riparian and wetland habitat lost to levee construction and maintenance on Bradford Island, in order to meet the requirements of the AB360 program (discussed in Sections 1.1 and 1.2).

The objectives are as follows:

- Restoration of the Parcel will meet acreage targets to mitigate the loss of AB360 habitat types, including scrub shrub, riparian forest, and freshwater marsh.
- The restoration design will work within the bounds of physical (e.g., soils, depth to groundwater) and biological (e.g., non-native invasive weeds, sources of seed for natural recruitment) constraints of the site, in order to maximize the likelihood for successful establishment and long-term persistence of native vegetation.
- The restoration design will take advantage of opportunities to enhance existing native vegetation on the Parcel.
- The habitat to be developed by this plan will include higher quality, less fragmented, and higher diversity habitat that is more indicative of historic vegetation for this geographic area. A portion of the Parcel is contiguous with existing high quality habitat at the scour lake to the south. Once the Parcel is restored it will provide a larger habitat area when combined with the lake. This will reduce edge effects as well as potential adverse impacts related to land-use activities on adjacent properties.
- After implementation and the three-year maintenance period of habitat establishment, maintenance, monitoring, and remedial planting (as necessary), the Parcel will attain the performance standards presented in Section 4.1.

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1.5 Project Opportunities and Constraints

The Mitigation Parcel has two distinct soil types: Rindge Muck organic (peat) soil and Piper Fine Sandy Loam mineral soil. The Rindge Muck occurs in lower elevation areas and has been subject to subsidence. This soil type presently supports emergent marsh, and riparian scrub and forest habitats on Bradford Island. It remains wet to near the surface even during late-summer (Figure 6), and is therefore likely to provide groundwater levels that will continue to support freshwater marsh and riparian species even after the three-year maintenance period. Bermuda grass is well established in these areas and will need to be monitored for regrowth after initial removal. Establishment of native overstory species is likely to significantly reduce the distribution of Bermuda grass through shading, although it may always be present to some extent in open patches.

Portions of the Mitigation Parcel contain Piper Fine Sandy Loam soil, which occurs on sand hills and ridges up to sea level. It presently supports an oak savannah-like habitat with Valley oak and Goodding's black willow trees, scattered bush lupine shrubs, and annual grasses. There is the opportunity to restore these hills to include a component of stabilized sand dune habitat similar to that currently found in the Antioch Dunes National Wildlife Refuge and Brannan Island State Recreation Area. This rare habitat type has limited opportunities to be restored elsewhere in the Delta. However, although the sand hills in the southern portion of Tract 19 support some native dune species (e.g., bush lupine and gilia), the sand hills in the Mitigation Parcel are more compacted and currently support a substantial population of yellow star thistle. Maintaining a portion of the sand hill with some open areas, as would be necessary to support persistence of dune species such as bush lupine, may provide conditions suitable for continued persistence of yellow star thistle at the site. Providing a more stabilized area with denser native herbaceous species might be necessary to compete with yellow star thistle, though this would constrain the ability to restore a native dune community within the boundary of the 50-acre Mitigation Parcel.

Both the Antioch site and the Brannan site support populations of the endangered Antioch Dunes evening primrose (*Oenothera deltoides* ssp. *howellii*). The Piper soil on Tract 19 appears to have the potential to support a population of the Antioch Dunes evening primrose in the future. Introduction of the federally listed Antioch Dunes evening primrose is not part of this Mitigation Plan, but if restoration of associated dune species is successful, introduction of this listed species might be considered in the future.

1.6 Agency Responsibilities

The District is responsible for (1) developing this Mitigation Plan; (2) implementation of the mitigation project; (3) three years of maintenance (including weed control and irrigation), monitoring, and reporting; and (4) implementation of remedial measures if the performance standards are not met at the end of the three-year maintenance period.

DWR is responsible for providing (1) development funding for implementation of this project and (2) an endowment account of a minimum of \$100,000 for long-term maintenance, as detailed below.

1) Development Phase Payment Terms

DWR shall provide \$1,375,000 to preserve, enhance, and maintain the 50-Acre Mitigation Parcel during the development phase using funds identified by Work Agreements BR-03-5.0 and BR-03-6.0 between the DWR and the District.

2) Long-term Operation and Maintenance

The District shall have the responsibility for all long-term operation and maintenance of the 50-Acre Mitigation Parcel to the extent that funds are available to the District from monies provided to DWR by the California Legislature, pursuant to California Water Code sections 12300 et seq., and earned as interest by the Endowment Account as established by Work Agreements BR-03-1.0 and BR-01-1.3 between the DWR and the District. Should outside funding for the 50-Acre Mitigation Parcel cease, the District will maintain the fences protecting the Parcel and periodically remove trash.

DFG is responsible for ensuring that the requirements of AB360 are met, including (1) approval of this Mitigation Plan and the entire Mitigation Package; (2) oversight of installation, maintenance, and monitoring of the 50-Acre Mitigation Parcel; and (3) ensuring that the final performance standards are met.

2 **RESTORATION PLANNING & IMPLEMENTATION**

The Mitigation Parcel will be selected for special management activities mitigation (as described in Work Agreements BR-99-01, BR 99-02, BR-03-2.0, and BR-03-4.0). The boundaries of the Mitigation Parcel have been identified by legal description (described in Attachment 3 of Exhibit A, and depicted in Attachment 2 of Exhibit A). In order to meet the AB360 program mitigation requirement of no net loss of aquatic and riparian habitat, the 50 acres of replacement habitat will be developed in proportion to the impacts on the affected types of habitats, as presented in Table 1. The planting design and conceptual layout are discussed in Section 2.1.

2.1 Planting Design

The planting design was based on the following: (1) existing physical (topography, soils, depth to groundwater) and biological (existing vegetation) opportunities and constraints on the Parcel; (2) consideration for the types and acreage of habitats impacted under the AB360 program; (3) discussions between DFG and DWR biologists and the District; and (4) general knowledge of natural, disturbed, and restored plant communities in the area. Five vegetation types are proposed for mitigation on the Parcel: Freshwater Marsh, Dune Scrub (includes high and low elevation areas), Riparian Scrub, Cottonwood/Willow, and Mixed Riparian Forest. Table 3 summarizes the acreage associated with each proposed vegetation type on the 50-acre Mitigation Parcel and how these acreages correspond to the mitigation requirements under AB360 (discussed in Section 1.2 and summarized in Table 1).

AB360 Habitat Type Affected	Required Mitigation Acreage	Proposed Vegetation Type for Mitigation	Approx. Acres	Subtotal
Freshwater Marsh	2.95	Freshwater Marsh	2.96	2.96
Scrub Shrub	22.06	Dune Scrub (high)	3.77	21.79
		Dune Scrub (low)	5.10	
		Riparian Scrub	12.92	
Riparian Forest	24.99	Cottonwood/Willow	13.61	25.25
Riparian Porest	24.77	Mixed Riparian Forest	11.64	20.20
Totals	50.00		50.00	50.00

Table 3. Relationship between AB360 mitigation requirements and the corresponding vegetation
type and acreage proposed for mitigation.

The conceptual layout of each vegetation type across the parcel is shown in Figure 7, and this conceptual planting plan relative to physical site characteristics (i.e., depth to estimated late-summer groundwater, existing site topography, soil type) is shown in Figure 8. The physical characteristics found across each vegetation type are also summarized in Table 4, with vegetation types listed from highest to lowest elevation.

Table 4.	Physical	characteristics	across	each	vegetation	type.

Vegetation Type	Elevation Range (ft)	Late-summer Groundwater Depth (ft)	Soil Type
High Dune Scrub	>2	18 to 22	Piper Fine Sandy Loam
Low Dune Scrub	-4 to +2	12.1 to 18	Piper Fine Sandy Loam (with some portions in Rindge Muck)

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Vegetation Type	Elevation Range (ft)	Late-summer Groundwater Depth (ft)	Soil Type
Mixed Riparian Forest	-10 to -4 (north portion of parcel) -12 to -4 (south portion of parcel)	4.1 to 12	Rindge Muck, transitioning to Piper Fine Sandy Loam at upper elevations
Cottonwood/Willow	-14 to -10 (north) -14 to -12 (south)	2 to 6	Rindge Muck
Riparian Scrub	-14 to -12	0 to 4 (mostly 0 to 2)	Rindge Muck
Freshwater Marsh	-14 to -12	0 to 2	Rindge Muck

In order to understand the type of plant community that corresponds to each of the five proposed vegetation types, Table 5 relates the mitigation plan vegetation types to the vegetation classification system and nomenclature used by the California Natural Diversity Database (CNDDB 2002). CNDDB (2002) is based on the series (= alliance) level classification described by Sawyer and Keeler-Wolf (1995), but is structured to be compatible with the earlier Holland (1986, 1990) vegetation classification system.

Table 5.	Relation of the n	nitigation plan	vegetation t	types to the C	NDDB (2002)	vegetation
class	ification system.	Parentheses i	ndicate simil	lar or associat	ed vegetation	types.

	Mitigation	CNDDB	CNDDB (2002) Classification(s)
AB360 Habitat Type	Plan	Code(s)	
19 B.	Vegetation		
1 mm	Туре		
			Dominant:
		52.102.00	Bulrush – Cattail Wetland
II-SI			Smaller patches with possible elements of the
We			following:
Freshwater Marsh	Freshwater	52.104.00	Bur-reed Wetland
wal	Marsh	52.105.00	Duckweed Wetland
shu		45.110.00	Sedge
Pre		45.560.00	Rush Riparian Grassland
		41.060.00	Grasslands with Common Reed
		41.061.00	Alkali Common Reed
		32.060.03	Coyote Brush/Creeping Ryegrass
4		32.060.10	Coyote Brush/Purple Needlegrass
Lu	Dune Scrub	71.040.06	Valley Oak - Coast Live Oak/Grass
6 5		(22.200.00)	(Antioch Dunes Unique Stands)
Scrub Shrub		(32.081.01)	(Silver Bush Lupine Scrub)
Sc	Riparian	63.100.00	Scrub Willow
	Scrub	63.140.00	Great Valley Willow
1		61.130.01	Great Valley Cottonwood Riparian
res	Cottonwood/	(61.130.06)	(Fremont Cottonwood)
Fo	Willow	(61.202.00)	(Black Willow Riparian Forest and Woodland)
		(61.211.00)	(Goodding's Willow Woodland)
Riparian Forest	Mixed	71.040.07	Great Valley Valley Oak Riparian
dig	Riparian		
	Forest		

The plant palette and planting densities were determined by:

- (1) Comparison of other restoration projects in the Delta:
 - Decker Island (Reclamation District No. 2026, 2000; D. Showers, pers. comm., 2005),
 - Sherman Island (T. Gardner and D. Showers, unpublished data; site visit November 2005),
- (2) Comparison of other restoration projects within the Sacramento-San Joaquin valley:
 - Tuolumne River (River Partners 2004),
 - Merced River (DWR and DFG 2003),
 - Lower Clear Creek (McBain and Trush et. al 1999),
 - Sacramento River (Alpert et. al 1999; Griggs and Golet 2002; Efseaff et al. 2003)
- (3) Review of the limited data available on species composition and density within natural reference systems:
 - Sacramento River (Wood 2003, Strahan 1984, Vaghti 2003),
 - Cosumnes River (Tu 2000),
 - Antioch Dunes National Wildlife Refuge (USFWS 2002; site visit in September 2003),
 - Brannan Island State Recreation Area (site visit in October 2003 and October 2005).
- (4) Input from DFG and DWR biologists.

The Dune Scrub vegetation type is intended to correspond with the "scrub shrub" habitat type identified by DFG under the AB360 program (see Table 3). Although the species composition of Dune Scrub is not directly "in-kind" mitigation, it includes higher quality, less fragmented, and higher diversity habitat that is more indicative of historic vegetation types found in this geographic area (Vaghti 2003). The species proposed for planting in the Dune Scrub area are more likely to successfully establish and continue to be self-sustaining given the physical constraints (e.g., soils, depth to groundwater) of this particular area on the Mitigation Parcel. Additionally, it takes advantage of the opportunity to enhance the unique sand dune features currently found on the higher elevation hilltops, establishing a small area of dune habitat that is found only in very limited areas of the Delta.

Riparian Scrub areas will be more reflective of habitat that was removed as part of levee maintenance work, and are therefore considered to be "in-kind" mitigation for the "scrub shrub" component, although the planting pallet is much more diverse and includes native understory species. The Mixed Riparian Forest and Cottonwood/Willow Forest will provide a much more diverse and higher quality area than the "riparian forest" habitat type that was lost, as will the Freshwater Marsh area.

The following sections briefly describe mitigation goals for each vegetation type and list the dominant and associated plant species, estimated planting densities for containers/plugs, and estimated number of container/plug plants (\pm 20 percent) to be installed by vegetation type for the Mitigation Parcel on Bradford Island. Vegetation types are listed in order from highest to lowest elevation.

2.1.1 Dune Scrub

<u>Goal</u>: Replace the non-native yellow star thistle and annual grassland species with native shrubs and grasses to create and maintain a native plant community on the drier, moderately high elevation hills (generally -4 to +2 ft NGVD) with sandy soils (Piper Fine Sandy Loam). A

secondary goal is to expand the existing (sparse) Valley oak population in the lower elevational zone of this community (Figure 7).

The Dune Scrub vegetation type meets the criteria for "scrub shrub" because of the dominance of toyon (*Heteromeles arbutifolia*) and coyote brush (*Baccharis pilularis*). Control of existing nonnative weeds (especially Bermuda grass and yellow star thistle) will be an important management issue. Oaks will be planted in the lower relative elevation zones (depth to late-summer groundwater ≤ 12 ft [Figure 8]) in order to minimize water stress, although a few experimental trees will be scattered at higher elevations.

Some of the potential associated species, such as bush lupine, California croton (*Croton californicus*), and deerweed (*Lotus scoparius*), are native dune scrub species common to the Antioch Dunes National Wildlife Refuge (USFWS 2002) that could serve to expand the existing bush lupine population on Tract 19 and create and maintain a native dune scrub community on the highest elevation sites (generally > 2 ft NGVD) with sandy soils (Piper Fine Sandy Loam). Removal of existing non-native weeds and periodic ground disturbance will likely be required to maintain and enhance these native species, but may conflict with efforts to control yellow star thistle on the sand hills in the Mitigation Parcel.

Oaks and shrubs will be planted in clusters (generally 5–10 trees/shrubs), rather than in a uniform grid spacing. In the higher elevation zone (3.77 acres), coyote brush and toyon will be planted in clusters, on 10 foot centers, for a total density of 100 container plants/acre for a total of 378 plants. Woody species in the lower elevation zone (5.10 acres) will include planting of oak species, and will be planted in clusters at a total density of 150 plants/acre for a total of 766 plants. Grass plugs will be planted in random clusters over approximately 1/3 of the lower elevation zone, for a total of approximately 1,650 plugs/acre on the low zone (8,415 plugs total). A seed mix of herbaceous species, containing both dominant and associated species, will be seeded across the Dune Scrub area.

Table 6 presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting methods for Dune Scrub areas.

Common Name Scientific Name <i>Dominant species – high elevation dune scrub (3.77 acres)</i> Covote brush						
Dominant species – high eleve Covote brush	Scientific Name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plants/ acre)	Total Needed
	ation dune scrub (3.77 acres)					
	Baccharis pilularis	woody/shrub	Container	10	50	189
Toyon	Heteromeles arbutifolia	woody	Container	10	50	189
TOTAL woody and woody/shrub pl	hrub plants				100	378
Dominant species – low elevation dune scrub (5.10 acres)	tion dune scrub (5.10 acres)					
Coyote brush	Baccharis pitularis	woody/shrub	Container	10	50	255
Toyon	Heteromeles arbutifolia	woody	Container	10	50	255
Valley oak	Quercus lobata	woody	Container	10	25	128
Coast live oak	Quercus agrifolia	woody	Container	10	25	128
TOTAL woody and woody/shrub plants	chrub plants				150	766
Mugwort	Artemisia douglasiana	herbaceous	Plugs ¹ and seed	3	550	2,805
Creeping wildrye	Leymus triticoides	herbaceous	Plugs ¹ and seed	3	550	2,805
Needlegrass	Nasella pulchra	herbaceous	Plugs ¹ and seed	3	550	2,805
TOTAL herbaceous plugs (n	TOTAL herbaceous plugs (note that dominant herbs will also be included in a seed mix)	also be include	ed in a seed mix)		1,650	8,415
Associated species (for both h	Associated species (for both higher and lower elevational areas)	eas)	N1 1 1 1 1			
Bush lupine L	Lupinus albifrons	woody/shrub	Container/Seed	A minimum o	A minimum of 3 associated species shall be included	es shall be included
Yarrow	Achillea millefolium	herbaceous	Seed	in the planting	in the planting mix, including at least 2 herbaceous	east 2 herbaceous
Elegant clarkia	Clarkia ungiculata	herbaceous	Seed		species.	
California croton	Croton californicus	herbaceous	Seed			
Tufted hairgrass	Deschampsia cespitosa	herbaceous	Seed			
Blue wildrye	Elymus glancus	herbaceous	Seed			
California poppy E	Eschscholtzia californica	herbaceous	Seed			
Gilia	Gilia capitata	herbaceous	Seed			
Gumplant	Grindelia spp.	herbaceous	Seed			
Telegraph weed	Heterotheca grandiflora	herbaceous	Seed			
Deerweed	Lotus scoparius	herbaceous	Seed			
Dove lupine	Lupinus bicolor	herbaceous	Seed			

Table 6. Dominant and associated species to be planted in Dune Scrub areas (8.87 acres).

²⁴ January 2006 F (243 00 Bradford Hand Mingation Plans/2000 Revised Sire Mingation Plan/2200 Revised Mingation Plan Report/FINAL/Revised Mingation Plan_FINAL doc

Common Name	Scientific Name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plants/ acre)	Total Needed
lupine	Lupinus succulentus	herbaceous	Seed			
Aan-root (wild cucumber)	Marah fabaceous	vine	Seed			
dented in almost an autor						

I Plugs planted in clusters on only 1/3 of lower elevation areas.

24 Ianuary 2006 F V243 00 Bradford Island Mitugation Plans/7000 Revised Site Miligation Plan/7200 Revised Mitugation Plan_FINAL doc 16

2.1.2 Mixed Riparian Forest

<u>Goal</u>: Enhance existing and create additional stands of mixed riparian forest at moderate- to lowelevation areas of Rindge Muck soils, transitioning into Piper Fine Sandy Loam soils at upper elevations. This vegetation type generally occurs in areas 4 to 12 ft above late summer groundwater levels, at approximately -10 to -4 ft NGVD in the north portion of the Parcel, and -12 to -4 in the southern portion of the Parcel.

Fremont cottonwood would dominate the lower elevation areas in the transition down to Cottonwood/Willow Forest, and Valley oak would dominate the upper elevation areas (approximately 8–12 ft above groundwater [Figure 8]) in the transition to Piper Fine Sandy Loam soils and the low elevation Dune Scrub community.

The target density for woody species in the Mixed Riparian Forest is 250 plants/acre, across 11.64 acres, for a total of 2,910 woody plants. Again, woody species will be planted in denser clusters with the interstices planted with associated shrubs, vines, and herbaceous species.

Table 7 presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting method for the Mixed Riparian Forest areas.

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ton nameScientific nameClassPlantinglesmethodmethodmethodlesmoodyMethodmethodvoodMethodmoodyCuttingswoodMethodmoodyCuttingswoodMethodmoodyCuttingswoodMethodmoodyCuttingswoodMethodmoodyCuttingswoodMethodMoodyCuttingswoodMethodmoodyCuttingswoodMethodmoodyContainerlesMethodmoody ² ContainerriaMethodmoody ² ContainerlesMethodmoody ² Containerring black walnutMethodshrub/vineContainerMethodMethodshrub/vineContainerMethodMethodshrub/vineContainerMethodRubus ursinusshrub/vineContainerMethodRubus ursinusshrub/vineContainerMethodRubus ursinusshrub/vineContainerMethodRubus ursinusshrub/vineContainerMethodRubus ursinusshrub/vineContainerMethodRubus ursinusshrub/vineContainerMethodRubus ursinusshrub/vineContainerMethodRubus ursinusshrub/vineContainerMethodRubus ursinusherbaceousplugs/seed ³ MethodLeynus glancusherbaceousplugs/seed ³	Scientific name Class Planting Method Populus fremontin woody Cuttings Saltz gooddingii woody Cuttings Saltz gooddingi woody Cuttings Saltz gooddingi woody Cuttings Saltz gooddingi woody Cuttings Saltz gooddingi woody Container Acer negundo woody ³ Container Arer negundo woody ³ Container Arer negundo woody ³ Container Aristolochia californica shrub/vine Seed Rubus ursinus shrub/vine Container Artemisia douglasiana herbaceous Plugs/seed ³ Artemisia douglasiana herbaceous Plugs/seed ³ Hordeum brachyantherum ssp. herbaceous Plugs/seed ³ Hordeum brachyantherum ssp. herbaceous Plugs/seed ³ Kubus triticoides herbaceous Plugs/seed ³ Hordeum brachyantherum ssp. herbaceous Plugs/seed ³ Loymus triticoides herbaceous Plu	Table 7.	Table 7. Dominant and associated species to be planted in Mixed Riparian Forest areas (11.64 acres).	to be planted	in Mixed Riparian	Forest areas (11.	64 acres).	
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edgeCarex barbaraeherbaceousPlugs/seed ³ Elymus glaucusherbaceousPlugs/seed ³ Hordeum brachyantherum ssp.herbaceousPlugs/seed ³ eLeymus triticoidesherbaceousPlugs/seed ³ assNasella pulchraherbaceousPlugs/seed ³	Carex barbaraeherbaccousPlugs/seed ³ Elymus glaucusherbaccousPlugs/seed ³ Hordeum brachyantherum ssp.herbaccousPlugs/seed ³ Leymus triticoidesherbaccousPlugs/seed ³ Nasella pulchraherbaccousPlugs/seed ³ the assumption that no woody species will be chosen from the associated list.*	Igwort	Artemisia douglasiana	herbaceous	Container/seed ³	up to 15% of the	e total Dominant w	voody plants, with
Elymus glaucusElymus glaucusPlugs/seed³Hordeum brachyantherum ssp.herbaceousPlugs/seed³californicumherbaceousPlugs/seed³teLeymus triticoidesherbaceousPlugs/seed³assNasella pulchraherbaceousPlugs/seed³	Elymus glaucusherbaceousPlugs/seed³Hordeum brachyantherum ssp.herbaceousPlugs/seed³Leymus triticoidesherbaceousPlugs/seed³Nasella pulchraherbaceousPlugs/seed³the assumption that no woody species will be chosen from the associated list.the the the the the the the the the the	nta Barbara sedge	Carex barbarae	herbaceous	Plugs/seed ³	a proportional re	eduction across ea	ch of Dominant
Hordeum brachyantherum ssp.herbaceousPlugs/seed³californicumLeymus triticoidesherbaceousPlugs/seed³assNasella pulchraherbaceousPlugs/seed³	Hordenum brachyantherum ssp.herbaceousPlugs/seed³californicumherbaceousPlugs/seed³Leymus triticoidesherbaceousPlugs/seed³Nasella pulchraherbaceousPlugs/seed³the assumption that no woody species will be chosen from the associated list.second as specified in the table	ue wildrye	Elymus glaucus	herbaceous	Plugs/seed ³	species, except f	for oaks. Oaks car	nnot be replaced.
Leymus triticoidesherbaceousPlugs/seed ³ Nasella pulchraherbaceousPlugs/seed ³	Leymus triticoides herbaceous Plugs/seed ³ Nasella pulchra herbaceous Plugs/seed ³ the assumption that no woody species will be chosen from the associated list. associated list.	adow barley	Hordeum brachyantherum ssp. californicum	herbaceous	Plugs/seed ³	Additional specified of the specifi	ies recommendatio	ons can be made
Nasella pulchra herbaceous	Nasella pu the assumption that associated list then	ceping wildrye	Leymus triticoides	herbaceous	Plugs/seed ³			biotection of the control of
	the assumption that associated list then	rple needlegrass	Nasella pulchra	herbaceous	Plugs/seed ³			

²⁴ January 2006 F 1243 00 Bradford Island Mitigation Plans/2000 Revised Site Mitigation Plan7200 Revised Mitigation Plan Report/FINAL Revised Mitigation Plan_FINAL doc 1 8

2.1.3 Cottonwood/Willow Forest

<u>Goal</u>: Enhance existing and create additional stands of Cottonwood/Willow Forest at low elevations (generally 2 to 6 ft above late summer groundwater levels, approximately -14 to -10 ft NGVD in northern portions of the Parcel and -14 to -12 in the southern portions) areas of Rindge Muck soils. This community type is a transition between the lower elevation Riparian Scrub and Freshwater Marsh, and the higher elevation Mixed Riparian Forest.

The density for woody species for Cottonwood/Willow Forest is 250 plants/acre, across 13.61 acres, for a total of 3,402 plants. Again, woody plants will be planted in denser clusters with the interstices planted with associated shrubs, vines, and herbaceous species.

Table 8 presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting method for the Cottonwood/Willow areas.

	Table 8. Dominant and associate	ed species to be	e planted in Cott	inant and associated species to be planted in Cottonwood/Willow areas (13.61 acres).	eas (13.61 acres).	
Common name	Scientific name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plants/ acre)	Total Needed ¹
Dominant species						
Fremont cottonwood	Populus fremontii	woody	Cutting	8-10	100	1,361
Goodding's black willow	Salix gooddingii	woody	Cutting	8-10	100	1,361
Box elder	Acer negundo	woody	Container	8-10	25	340
Oregon ash	Fraximus latifolia	woody	Container	8-10	25	340
TOTAL woody plants					250	3,402
Associated species						
Arroyo willow	Salix lasiolepis	woody ²	Cutting	• A minimum of 5	A minimum of 5 associated species shall be included	shall be included
Dutchman's pipevine	Aristolochia californica	shrub/vine	Seed	in the initial pla	in the initial planting mix. This shall include a	ll include a
California rose	Rosa californica	shrub/vine	Container	- 3 herbs		
California blackberry	Rubus ursinus	shrub/vine	Container	- 1 shrub/vine		
California wild grape	Vitis californica	shrub/vine	Container	-		
Dogbane	Apocynum cannabinum	herbaceous	Plugs/Seed	 If a woody speci- to 15% of the to 	 If a woody species is/are chosen, it/they can replace up to 15% of the total Dominant woody plants with a 	hey can replace up v nlants with a
Mugwort	Artemisia douglasiana	herbaceous	Plugs/Seed	proportional red	proportional reduction across each Dominant species.	Dominant species.
Santa Barbara sedge	Carex barbarae	herbaceous	Plugs/Seed			-
Blue wildrye	Elymus glaucus	herbaceous	Plugs/Seed	Additional specie	Additional species recommendations can be made	s can be made
Meadow barley	Hordeum brachyantherum ssp. californicum	herbaceous	Plugs/Seed	(collan +:B.a)	(כיני ווכניטא טמו אווו ווככם וט טכ מטארטענם טא שרט.	roved by DFU.
Creeping wildrye	Leynus triticoides	herbaceous	Plugs/Seed			
Purple needlegrass	Nasella putchra	herbaceous	Plugs/Seed			
1 The "total needed" column is bas	1 The "total needed" column is based on the assumption that no woody species will be chosen from the associated list	will be chosen fror	n the associated list	:		
2 II WOODY SPECIES are selected iro	2.11 Woody species are selected from the associated list then the total dominant species needed will be reduced as specified in the table.	species needed will	I be reduced as specifi	ed in the table.		

will be reduced as specified in the table.

²⁴ January 2006 F V243 nm Bradford Island Mitugation Plans/7000 Revised Site Mitugation Plan/200 Revised Mitugation Plan FINAL doc 20

2.1.4 Riparian Scrub

Goal: Enhance existing and create additional stands of Riparian Scrub at lower elevations (generally 0 to 2 ft above late summer groundwater levels, approximately -14 to -12 ft NGVD) in areas of Rindge Muck soils. This community grades down to the Freshwater Marsh area in the northern portion of the Parcel, and into the higher elevation Cottonwood/Willow zone at the upper edge of its elevation range.

The target density for woody species is 300 plants/acre, across 12.92 acres, for a total of 3,876 plants, with a mixture of willows, buttonbush., and mule fat dominating. Again, woody species will be planted in denser clusters with the interstices planted with associated herbaceous species.

Table 9 presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting methods for the Riparian Scrub areas.

	1 able 9. Dominant and associated species to be planted in Kiparian Scrub areas (12.92 acres).	ciated species	to be planted in	Kiparian Scrub are	as (12.92 acres).	
Common name	Scientific name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plants/ acre)	Total Needed
Dominant species						
Arroyo willow	Salix lasiolepis	woody	Cutting	6-10	105	1.357
Shining willow or red willow	Salix lucida ssp. lasiandra or S. laevigata	woody	Cutting	6-10	105	1,357
Buttonbush	Cephalanthus occidentalis	woody	Container	6-10	45	581
Mule fat	Baccharis salicifolia	woody	Container	6-10	45	581
TOTAL woody plants					300	3,876
Associated species						
Aster	Aster chilensis/A. lentus	herbaceous	Plugs/seed	• A minimum of 2	• A minimum of 2 associated species will be included in	ill be included in
Santa Barbara sedge	Carex barbarae	herbaceous	Plugs/seed	the initial planting mix.	g mix.	
Saltgrass	Distichlis spicata	herbaceous	Plugs/seed	 Additional snecie 	 Additional species recommendations can be made 	can he made
Western goldenrod	Euthamia occidentalis	herbaceous	Plugs/seed	(e.g., herbs) but v	(e.g., herbs) but will need to be approved by DFG.	ved by DFG.
Sneezeweed	Helenium bigelovii	herbaceous	Plugs/seed			
Yellow monkeyflower	Mimulus guttatus	herbaceous	Plugs/seed			

d . 01 -14 m 14 inter. Ę -Table 9 Domina

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2.1.5 Freshwater Marsh

Goal: Create a seasonally inundated wetland area, located in the northern portion of the Mitigation Parcel in peaty, muck soils (Rindge Muck). Currently the surface elevation ranges from -14 to -12 ft NGVD. The marsh will be excavated to create topographic variation that ranges from approximately -16 to -14 ft NGVD, which will allow for ponding of water during the winter months, and will retain soil saturation at or near the surface during summer months.

The marsh will be planted with clusters of plugs on 3 ft centers, for a target density of 3,500 plugs/acre. Across 2.96 acres, the estimated total number of plugs would be 10,365. The interstices between plug clusters would be broadcast seeded with associated species. The tule/bulrush and common reed will be planted at lower relative elevations in the marsh, and the sedge and rush species will be planted at higher relative elevations. Cattails are not included in the initial planting mix even though this species was removed as part of the levee maintenance work, because it is assumed that this species will quickly colonize on its own (as noted on Sherman Island Parcel 11 and other Delta islands).

Table 10 presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting methods for the Freshwater Marsh area.

	Table 10. Dominant and associated species to be planted in freshwater marsh areas (2.96 acres).	iated species to	be planted in	freshwater ma	irsh areas (2.96	ó acres).
Common name	Scientific name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plugs/acre)	Total Needed
Dominant species						
Tule/bulrush	Scirpus acutus/S. californicus	herbaceous	Plugs	e	887	2,626
Common reed	Phragmites australis	herbaceous	Plugs	e	887	2,626
Sedge	Carex spp. ¹	herbaceous	Plugs	3	887	2,626
Bog rush	Juncus effusus	herbaceous	Plugs	e	280	829
Baltic rush	Juncus balticus	herbaceous	Plugs	m	280	829
Iris-leaved rush	Juncus xiphiodes	herbaceous	Plugs	m	280	829
TOTAL herbaceous plan	ants	:			3.500	10.365
Associated species		10.00				
Hedge bindweed	Calystegia sepium ssp. limnophila	herbaceous	Seed	• A minimum be included i	• A minimum of 2 associated species shall be included in the initial planting mix.	species shall ting mix.
Button celery	Eryngium aristulatum	herbaceous	Seed			0
Western goldenrod	Euthamia occidentalis	herbaceous	Seed	Additional sp	• Additional species recommendations can	indations can
Sneezeweed	Helenium bigelovii	herbaceous	Seed	approved by DFG.	ve mave (e.g., neros) out will need to be approved by DFG.	
Leather-root	Hoita macrostachya	herbaceous	Seed		, ,	
California loosestrife	Lythrum californicum	herbaceous	Seed			
Yellow monkeyflower	Atimulus guttatus	herbaceous	Seed			-
Water parsley	Oenamhe sarmentosa	herbaceous	Seed			
Hedgenettle	Stachys albens	herbaceous	Seed			
I Must be local native species,						

, 90 C 4 -Table 10. Dominant and associated species to be planted in freshv

²⁴ January 2006 F 0243 00 Bradford Juland Mirigation Plans/7000 Revised Site Miligation Plan7200 Revised Miligation Plan FINAL doc 24

2.2 Implementation

2.2.1 Pre-construction Activities

Until mitigation activities commence, the entire Tract 19, including the Mitigation Parcel, will continue to be grazed by cattle in accordance with the existing grazing lease agreements. Grazing may continue within the Mitigation Parcel to control introduced weedy plants such as ripgut brome (*Bromus diandrus*) until construction activities commence.

2.2.2 Initial Weed Removal

An initial weed maintenance effort will occur prior to revegetation efforts on the Mitigation Parcel, and will focus on elimination of Bermuda grass, yellow star thistle, and Himalayan blackberry. Ongoing weed maintenance will occur throughout the three-year maintenance period (Section 3.2) in order to achieve the performance standards discussed in Section 4.1. If herbicides are used, they will be selected and applied by a licensed applicator in accordance with current regulations. DFG will review and approve any herbicides used on the property.

Bermuda grass is a perennial species that spreads vegetatively through rhizomes and stolons. Bermuda grass will likely be treated with an herbicide (initial spraying typically will occur in Spring), with a follow up application (e.g., in Fall) if regrowth occurs. The dead mat layer may be left for weed suppression. The Freshwater Marsh area may be treated prior to excavation of the marsh. DFG recommends use of the herbicide Roundup Pro, applied using a hose-gun sprayer or backpack sprayer in areas where there is existing native vegetation to minimize impacts to nontarget species. The herbicide should be applied to each plant, but not to the soil surrounding each plant.

Yellow star thistle is well established in the drier portions of the Mitigation Parcel. DFG recommends the use of the herbicide Transline (active ingredient = cloyralid) on yellow star thistle, once in the Spring prior to revegetation, with follow-up applications annually as necessary. Transline is most effective when applied to actively growing or germinating plants. In areas with existing broadleaf vegetation, Transline is typically applied using a hose-gun sprayer or backpack sprayer to minimize damage to existing native vegetation. Besides yellow star thistle, Transline affects only species in the families *Asteraceae, Fabaceae, Solanaceae*, and *Polygonaceae*, and will not affect grass species (DFG 2003). DFG recommends that the herbicide mix should be applied to each plant, including the soil surrounding each plant.

The non-native, invasive Himalayan blackberry is present under the existing Goodding's black willow stand in the southeastern portion of the Parcel and will be treated/removed as necessary to prevent the species from spreading into the newly restored Cottonwood/Willow or Mixed Riparian forests. Himalayan blackberry is also dense and widespread along the ditch/fence line that forms the southern boundary of Tract 19. The District will maintain a right of way corridor between the fence line and the Mitigation Parcel (approximately 30 ft), keeping it clear for vehicle access; therefore, Himalayan blackberry will be kept from encroaching into the Mitigation Parcel.

2.2.3 Grading and Contouring

The planting plan has been designed to minimize the necessity for earth moving activities on the Parcel. The only area that will require considerable excavation and grading is the Freshwater Marsh. The marsh will be excavated to allow for seasonal inundation necessary to support a variety of wetland plant species (e.g., tules, cattails, sedges and rushes). During the summer, the

soil will remain saturated at or near the surface. The marsh will be excavated and contoured to slope gradually up to the surrounding Riparian Scrub and Cottonwood/Willow areas. The estimated amount of material to be excavated for the wetland is about 15,000 cubic yards. The marsh will not be excavated with a uniform perimeter, but will instead be lobed to increase habitat complexity. Excavated material will be moved off-site.

Minor grading may occur in other areas of the Mitigation Parcel (e.g., to smooth out rough edges or provide access for contractors). Outside of the Freshwater Marsh, other areas may be scraped (up to 6 inches) with a blade or disced to aid in removal of non-native seed banks, and to promote native seed germination and establishment from broadcast seeding, but will not require any significant grading or contouring.

2.2.4 Plant and Material Procurement

As much as possible, local plant stock collected from within the legal Delta (see Appendix A for map of legal Delta boundaries), growing under similar ecological conditions (e.g., soils, depth to groundwater) will be used to revegetate the Mitigation Parcel. Container stock, plugs, and herbaceous seed mixes identified in Section 2.1 above will be acquired from a contracted native plant nursery, as will slow-release fertilizer. The contracted nursery will collect material during the appropriate time of year or provide existing in-stock material already collected from within the legal Delta.

Cuttings for Goodding's black willow and arroyo willow may be taken from the Port of Stockton site south of the duck club property, where willows are abundant. Cuttings may also be obtained from other levee areas along Bradford Island or from another suitable location within the legal Delta. Cuttings will be collected during the dormant period for these species, kept moist, and installed on the Parcel within one week of collection. Collection during late fall/early winter will coincide with the species dormancy period and the revegetation schedule.

Potential sources of cuttings within the collection area of the legal Delta will be identified for Fremont cottonwood, mule fat, California blackberry, and shining/red willow. The cuttings may be substituted for the container stock requirements identified in Section 2.1 for each species if it is determined to be more cost-effective.

2.2.5 Plant Installation

Plant installation will occur during late fall/early winter, after the onset of the first winter rains, in order to maximize success of plant establishment (typically during plant dormancy) and minimize initial irrigation demands.

The location, quantity, and spacing of plants will be installed as specified in Section 2.1 and Figure 7, but may be adjusted by the contractor as necessary to accommodate field conditions.

Planting will follow guidelines developed by the California Department of Conservation (Newton and Claassen 2003), as discussed below.

Container stock will be planted to minimize disturbance of the root system and avoid air pockets in the planting hole. This will generally include the following steps:

- A hole will be excavated to approximately twice the size of the plant's root ball.
- The planting hole will be partially filled with loose, amended soil (including slow-release fertilizer as necessary).

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- The plant will be carefully removed from the container, leaving the rootball completely intact.
- Any plants not exhibiting a healthy root system will be discarded
- The plant will be placed into the planting hole and the soil firmed around the plant to bring the soil to slightly above the root crown at finished grade. Weed-stop mats or mulch may be placed around the base of certain plants.
- The plants will be placed in soil depressions or collection basin to increase the amount of precipitation intercepted by the plant and "watered-in" at the time of planting. On slopes, a four-inch high, hand-compacted earth berm will be constructed along the forward edge of the planting terrace for a watering basin.
- Immediately after installation, the plant will be irrigated to settle the soil around the plant. If the root becomes exposed, additional soil will be placed around the root crown.

Cuttings will be procured and planted during dormancy, and will be planted in the correct orientation according to the following basic steps:

- Cuttings will be taken from vigorous-growing, healthy shrubs and trees.
- Willow and cottonwood poles should be approximately 3 to 4 ft long and at least 0.5 inches in diameter at the base, but no larger than approximately 6 inches in diameter. Some shorter cuttings (minimum of 18 inches) can be installed in the Riparian Scrub or Cottonwood/Willow zones where late-summer groundwater levels are 3–4 ft below the ground surface.
- On woody cuttings, the base (end to be planted in the ground) will be cut at a 45 degree angle, and the top will be cut at a 90 degree angle.
- Cuttings will be bundled in lots of 25 to 50, with all basal ends oriented in the same direction to aid in proper installation.
- Most auxiliary branches and leaves will be removed before planting; for grasses and grass-like species, the overall length should be trimmed to about 1/2 their normal height.
- Unless placed in cold storage, cuttings will be planted within two-weeks of procurement.
- Cuttings will be kept moist, will not be left in the sun, and will be transported in covered vehicles to protect them from desiccation.
- Cuttings will be planted in pre-drilled holes so that approximately 4-6 inches of the cutting remains above the ground.
- The hole will be closed with loose soil and firmed around the plant with the heel of the boot to close the hole completely. No airspace will be left.
- The cuttings will be watered immediately after planting to settle the soil and eliminate air pockets. If the base becomes exposed, additional soil will be placed around the cutting.

Plugs for grasses, rushes, and sedges obtained from a native plant nursery will be planted per the nurseries specifications/recommendations, but will follow similar guidelines described above for container stock and cuttings. Seeds for herbaceous species will be broadcast seeded or drill seeded (or another more cost effective and efficient method, as specified by the planting contractor) in the interstices between plantings.

Plant-protectors will not be initially installed. There are no large native mammals on Bradford Island, cattle will be fenced out permanently from the Parcel, and small rodents are uncommon due to large flooding events in the past. Voles do exist on the island but have not posed a problem to local farmers. Beavers are also present, but given the quantity of available forage just south of the Parcel, and the distance from the levee that beavers would need to travel, significant impact is unlikely. Monitoring for herbivory damage will occur at least annually, and if damage

is found to be impacting seedling success to the extent that performance standards (e.g., survival) may not be attained, plant protectors will be installed.

3 MAINTENANCE & FOLLOW-UP RESTORATION

Following implementation of grading and revegetation, the District will continue to maintain the perimeter fence and irrigation system, and will implement an irrigation and weed maintenance program to meet the schedule and performance standards described in Section 4.

3.1 Irrigation

Plants installed on the Mitigation Parcel will receive watering, as needed, for three years following implementation, as part of site maintenance activities. The District or its designated contractor will monitor all irrigated plants and provide the appropriate amount and frequency of water as site-specific conditions require.

The District has installed a water well in the southwest corner of Tract 19 that will be used to irrigate the Mitigation Parcel. The District will develop an irrigation system appropriate for the Parcel. For example, the higher elevation areas will likely be irrigated with a pressure system that draws water from the well and feeds into a drip system with some sprayers installed as necessary. Lower elevation areas may be flooded (e.g., Freshwater Marsh) or hand watered to recharge soil moisture if necessary. The irrigation system will be adjustable so water flow can be increased or decreased as needed for different areas and during different seasons. The system will be checked and maintained regularly to ensure that it is working properly.

3.2 Post-implementation Weed Maintenance

A three-year period of weed maintenance will include spot use of herbicides, hand removal, and mechanical methods that do not disturb the ground to control invasive weeds as necessary in order to meet performance standards for percent cover.

3.3 Remedial Actions

Should the performance standards (described in Section 4.2 below) not be met at the end of the three year monitoring period, negotiations with DFG will determine any required remedial planting/seeding and additional monitoring. Remedial plantings will be installed in the same manner and schedule as described in Section 2.2.5 (Plant Installation). The District may choose to develop interim performance standards to be met at the end of each year following initial installation, in order to space remedial actions over the three-year period and increase the likelihood for achieving the final performance standards.

4 MONITORING PROGRAM

Management and restoration activities on the Mitigation Parcel will be monitored by the District (or its designated agent) for a period of three years following implementation to determine if the habitat restoration goals (Section 1.5) and performance standards (Section 4.1) for the Parcel are being met. Yearly monitoring of vegetation establishment will provide guidance to the District and DFG to determine if remedial actions are needed. Other projects in the Delta suggest that natural recruitment will supplement the plantings and contribute to meeting the performance standards. If monitoring reveals that performance standards are not met, remedial activities will be implemented as described in Section 3.3 above.

Funding for the monitoring required by this plan shall be provided from DWR's account established for habitat mitigation under California Water Code sections 12300 et seq, as described in Section 1.6 (Agency Responsibility).

4.1 Performance Standards

DFG and the District have agreed to performance standards for the Mitigation Parcel, which are summarized in Table 11. These performance standards are based on the desire that the site be on a self-sustaining trajectory by the end of the required three-year maintenance period. Requirements were modified from typical DFG mitigation targets (e.g., percent survival of woody species) used on other Delta mitigation projects, and on professional judgment. DFG and the District may, through consensus negotiations, choose to modify these standards based on sitespecific conditions and the results of yearly maintenance and monitoring at the site.

The District shall achieve the following performance standards on the Parcel after three years:

- Survival of native woody species: At least 80 percent survival of the total planted density of native woody species (total shall include both surviving planted stock and natural recruitment of native woody species). Survival will be measured separately (i.e., stratified) for scrub-shrub types (Dune Scrub and Riparian Scrub), and riparian forest types (Mixed Riparian and Cottonwood/Willow). This performance standard excludes planted oaks in the Mixed Riparian and low Dune Scrub areas, and bush lupine (if planted as an associate species in the Dune Scrub area). Woody species are defined in the "class" category of Tables 6 through 10. The 80 percent survival requirement will extend to include California rose and California blackberry if planted as associate species in any of the vegetation types.
- Vigor of native woody species: The surviving woody species would also need to show signs of health and vigor, meaning at least 80 percent of the surviving woody species (as defined above) have a vigor rating of "4" (defined in Section 4.2.2.2 as having 81 percent or more healthy foliage). The vigor requirement excludes planted oaks and bush lupine, but would include California rose and California blackberry if planted as associate species.
- Survival of planted oaks: Establishment of oak species on the Parcel is largely experimental, given the depth to groundwater at the higher elevation portions of the Parcel (Figure 8), and no oaks were removed as a result of the District's levee maintenance activities for which this Parcel constitutes mitigation; therefore, the performance standard for oaks will be 50 percent survival of planted oaks across the entire Parcel (i.e., in both the low elevation Dune Scrub area and Mixed Riparian Forest area combined).

Percent cover of invasive weeds: Percent cover will be used to evaluate the success of weed control activities on the Parcel. The focus of weed control will be on particularly invasive, non-native species that create serious problems in California's native ecosystems, as defined by the California Invasive Plant Council (Cal-IPC). Cal-IPC has produced an Invasive Plant Inventory of non-native species that pose serious problems in California wildlands, and rates these species based on criteria such as severity of ecological impacts on ecosystems, dispersal and establishment characteristics, and current distribution (Warner et al. 2003). The list is "based on information submitted by land managers, botanists, and researchers throughout the state, and on published sources" (Cal-IPC 2006). The original list was published in 1999 and is in the process of being updated (Cal-IPC 2006). For the purposes of these performance standards, an "invasive weed" is defined as any plant with an "A" or "B" rating on the 1999 Cal-IPC list (Cal-IPC 1999). The 1999 list is provided for reference as an appendix to this report (Appendix B). The performance standard will be: (1) 90% free of yellow star thistle by the end of year 3, measured separately (i.e., stratified) for each vegetation type; (2) 75% free of bermuda grass by the end of year 3, measured separately (i.e., stratified) for each vegetation type; and (3) 80% free of all other invasive weeds (defined above) by the end of year three, measured separately (i.e., stratified) for each vegetation type. The percent cover values are based on relative percent cover, which is defined in more detail in the discussion of monitoring methods in Section 4.2.2.3.

Vegetation Type	Native woody ¹ species survival	Native woody ¹ species vigor (of surviving stems)	Percent cover free of yellow star thistle	Percent cover free of bermuda grass	Percent cover free of other invasive weeds ²
Freshwater Marsh	NA	NA	90%	75%	80%
Dune Scrub	80% planted	80%	90%	75%	80%
Riparian Scrub	density ³	Category 4 ⁴	90%	75%	80%
Cottonwood/Willow	80% planted	80%	90%	75%	80%
Mixed Riparian	density ³	Category 4 ⁴	90%	75%	80%

Table 11. Summary of performance standards by vegetation type.

¹ This includes species defined as woody in the "class" category of Tables 6 through 10, and California rose and California blackberry, if these species were planted.

For the purposes of this project, invasive weeds are those defined as category "A" or "B" by the California Invasive Plant Council's 1999 List of Exotic Pest Plants of Greatest Ecological Concern in California (Cal-IPC 1999, Appendix B)

¹ Does not include oak species or bush lupine (if planted as associate species). Performance standard for oaks is 50% survival of planted density across the Dune Scrub and Mixed Riparian areas combined

⁴ Category 4 Vigor Rating defined in Section 4.2.2.2. Vigor performance standard does not include oak species or bush lupine (if planted as associate species). This is 80 percent of the surviving stems.

4.2 Monitoring Methods

4.2.1 Photo Monitoring and Incidental Observations

Photo monitoring from fixed stations in each vegetation type, or from a vantage point (i.e., levee road or hill tops) where multiple vegetation types can be photographed with a panoramic view, will be established to monitor changes over time. Because of the limited amount of excavation likely to occur on the Mitigation Parcel, photo monitoring will begin prior to installation (i.e., pre-construction = baseline). Photographs will be taken at least once each year in the summer after leaf out has occurred. To ensure consistency, the fixed station locations will be recorded using a handheld GPS receiver, the height of the camera stand measured (if used), and a compass bearing of the direction the camera is facing will be taken (or the compass bearing for the start of a panoramic series of photographs) in case the permanent stand/marker is damaged or overgrown

with vegetation. Photographs of other notable features or incidental observations will also be taken during each monitoring period.

Qualitative observations on plant stress and likely cause (e.g., herbivory, water stress, pathogens), and distribution and abundance of weeds will be made during routine maintenance activities as well as during yearly quantitative monitoring efforts.

4.2.2 Performance Standards Monitoring

Monitoring of progress toward achieving the project performance standards (discussed in Section 4.1) will occur annually for three years following installation, and at approximately the same time each year. Typically one monitoring event will occur during late spring/early summer during flowering periods of most herbaceous species, to aid in species identification and accurate assessments of percent herbaceous cover. A second monitoring event will occur toward the end of the growing season (e.g., September), in order to assess woody species survival and vigor after the summer.

Although percent survival/density and vigor of woody species, and percent cover of invasive weed species are the only parameters tied to performance standards, other measurements, such as percent cover of all herbaceous species and species richness, will aid in the overall assessment of site conditions and will provide valuable data for future restoration/mitigation efforts in the Delta.

4.2.2.1 Density of woody species

In order to monitor success of planted woody species and account for natural recruitment, the density of woody species (stems per unit area) will be monitored using sampling of permanent plots stratified (i.e., measured separately) by vegetation type and placement of plantings (i.e., woody species will be planted in clusters, especially in the Dune Scrub areas, so plots will be established only within the clustered areas, and not within interstitial herbaceous areas). All woody species will be monitored, regardless of whether the species was planted as part of the original installation (e.g., if sandbar willow [*Salix exigua*] establishes on the Parcel, it will be counted in the overall density of native woody species present).

Permanent plots will be established following initial planting, the baseline density within each fixed plot will be determined, and the mean density of plots, combined by vegetation types as shown in Table 11 (i.e., plots within the Riparian Scrub and Dune Scrub areas will be combined, and plots within the Cottonwood/Willow and Mixed Riparian Forest areas will be combined) will be used as the baseline density value.

Although woody stems will be identified, monitored, and reported by species, the total of all woody species will be used to meet the performance standard. The total of all woody stems in each plot will be calculated, and a mean value among plots will be compared to the mean baseline value, in order to meet the performance standard.

Since no woody species will be planted in the Freshwater Marsh area, density will not be monitored in this area.

4.2.2.2 Vigor of woody species

Vigor will be monitored simultaneously with measurement of woody species density through a visual estimate of foliage, using the following qualitative categories. Healthy foliage is defined as showing no signs of herbivory, nutrient or water stress, or pathogens on stems or foliage.

- 4 = 81 percent (or greater) of foliage appears to be healthy
- 3 = 51 to 80 percent of foliage appears to be healthy
- 2 = 25 to 50 percent of foliage appears to be healthy
- 1 = less than 25 percent of foliage appears to be healthy

Although vigor will be monitored and reported by species, the vigor ratings for all woody species combined will be used to meet the performance standard.

4.2.2.3 Percent cover of herbaceous species and weeds

A line-intercept method will be used to visually estimate percent cover, or a similar standard methodology appropriate to the species assemblages planted (e.g., Daubenmire plots, step-point method, releves; see Elzinga et al. 1998, USDA and USDI 1996, Sawyer and Keeler-Wolf 1995, CNPS 2003), if mutually agreed upon by DFG and the District. Transects will be randomly located in each vegetation type, and may be permanently established depending on the methodology used. For each transect, absolute cover by species will be visually estimated and recorded, as will bare ground and organic litter/debris (e.g., dead plant material such as leaf litter or thatch). Because absolute cover can potentially include canopy overlap among species (Barbour et al. 1998), the absolute cover values will be transformed to a relative percent cover amount, including bare ground and organic litter/debris, which will total 100 percent. Mean percent relative cover values for each vegetation type will be used to meet the performance standards. For example, if three transects were sampled in the Cottonwood/Willow areas, then the mean of these three transects for relative cover of yellow star thistle would need to be less than 10 percent in order to meet the performance standard (Table 11).

Percent cover by species will be estimated for each species to provide appropriate data necessary for adaptive management decisions. A visual estimate of percent cover of overstory strata (shrubs and trees) may be made, as necessary, to account for possible effects of overstory shading on herbaceous species. Percent cover by life-form groupings (e.g., grasses, perennial herbs, annual herbs, etc) or by species may also be included in reporting to allow for more specific analysis of the herbaceous understory and an understanding of the success of certain planting methods and species assemblages.

Species richness will be calculated based on the line intercept method used to calculate percent cover. The total number of species intersecting the transects will be recorded. If a belt-transect or plot-based sampling method is used, species richness will be determined based on the total number of species per unit area observed across all plots.

4.3 Reporting

The District, or its designated agent, will be responsible for annual reporting to summarize yearly maintenance activities, monitoring results, and recommendations for remedial action. The reports will include the following sections:

- o Introduction
- o Maintenance Activities Performed
- o Monitoring Methods
- Monitoring Results (qualitative and quantitative results compared to baseline information from the original planting, or compared to previous year(s) results)
- o Achievement of Performance Standards (and interim guidelines if developed)
- Recommendations for adaptive management and/or remedial planting

4.4 Schedule

Year 1 post-implementation

- 1. The District will maintain the perimeter fence and irrigation system.
- 2. The District will continue watering within the planted area on a schedule to be determined by weather and local site conditions (typically Spring through Fall).
- 3. The District will continue necessary weed control measures that may include hand removal, mechanical and/or chemical control (typically Spring through Fall).
- 4. If the District determines through monitoring that its interim success criteria are not being met, the District will conduct additional plantings of woody plants and herbs (Winter).
- 5. The District will prepare an interim monitoring report summarizing the results of monitoring and describing the maintenance and/or remedial activities that took place, for submittal to DFG (Winter of Year 1).

Year 2 and 3 post-implementation

- 1. The District, DWR, and DFG will review the results of previous monitoring to determine if further routine management of the habitat will be necessary. If it is found that the plants are sufficiently large to be self-sustaining, further watering will be curtailed (Spring).
- 2. If weeding in previous years has been successful, the District will only spot treat small infestations as necessary (Spring through Fall).
- 3. If the District determines through monitoring that its interim success criteria are not being met, the District will conduct additional plantings of woody plants and herbs (Winter of Year 2).
- 4. The District will prepare an interim monitoring report summarizing the results of monitoring and describing the maintenance and/or remedial activities that took place (Winter of Year 2).
- 5. If at the end of Year 3, monitoring determines that the growth and spread of the plantings has not achieved the performance standards described in Section 4.2, the District may, based on negotiations with DFG, initiate remedial planting activities and extend the monitoring of the new plantings for another year (Winter of Year 3).
- 6. The District will prepare a final monitoring report (Winter of Year 3) or it will be considered a yearly interim report, if remedial plantings are required during Winter of Year 3, and a final report will be prepared the following year (Winter of Year 4).

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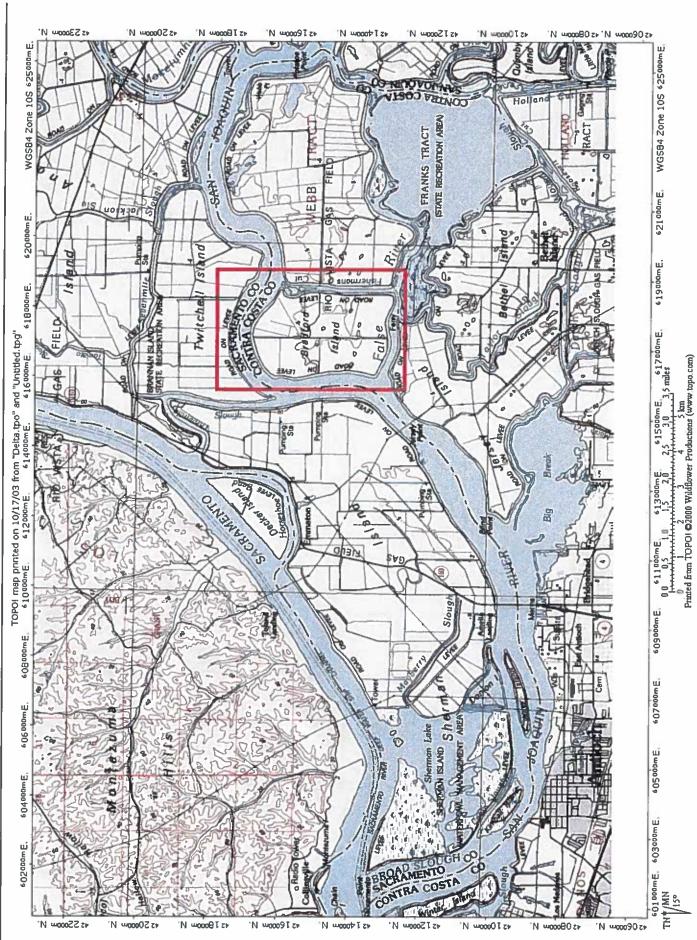
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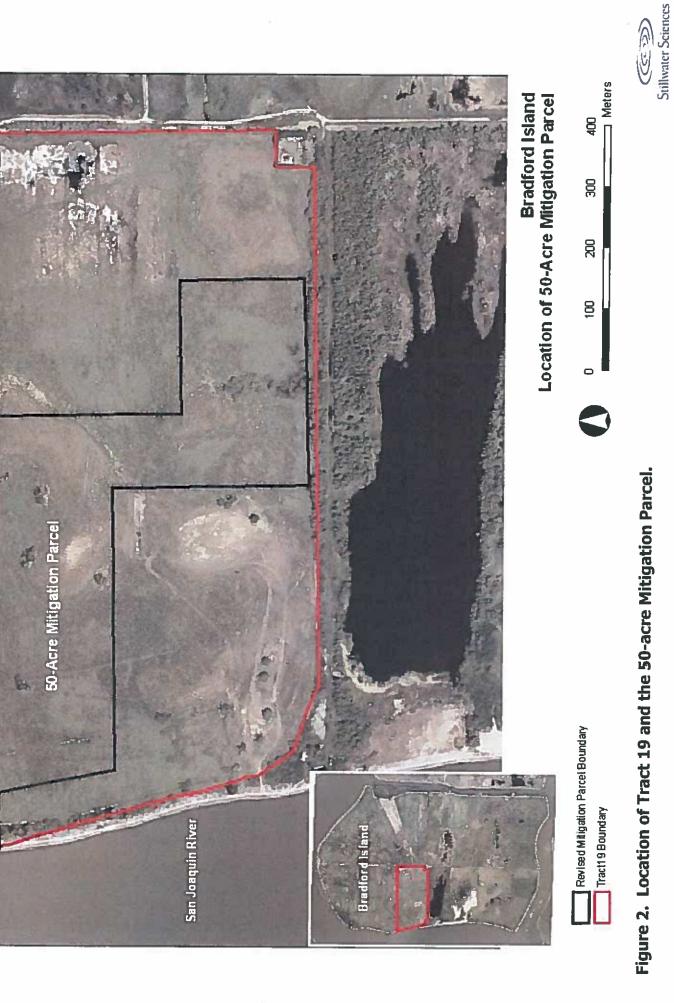
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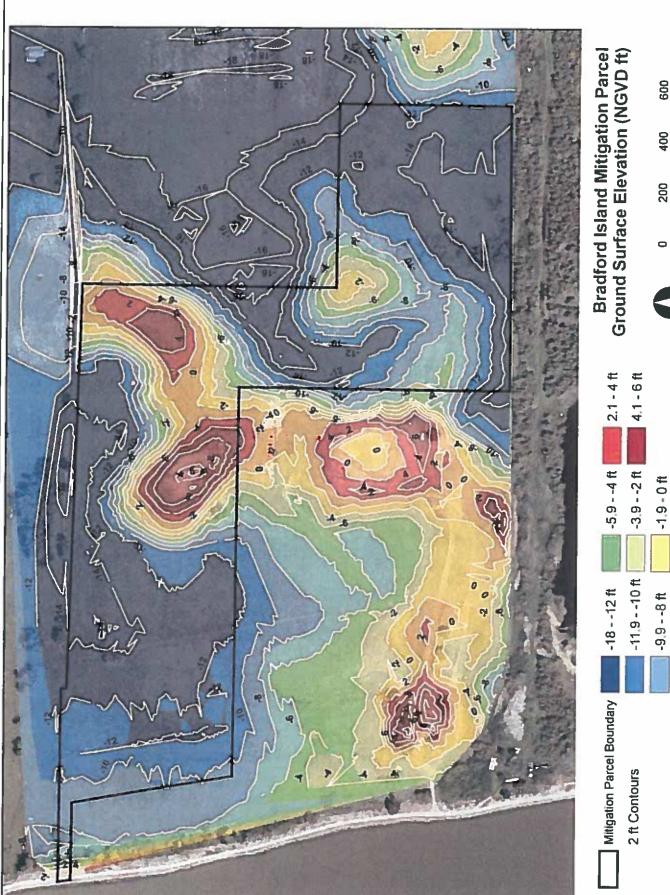
FIGURES



Bradford Island Tract 19



Bradford Island Tract 19



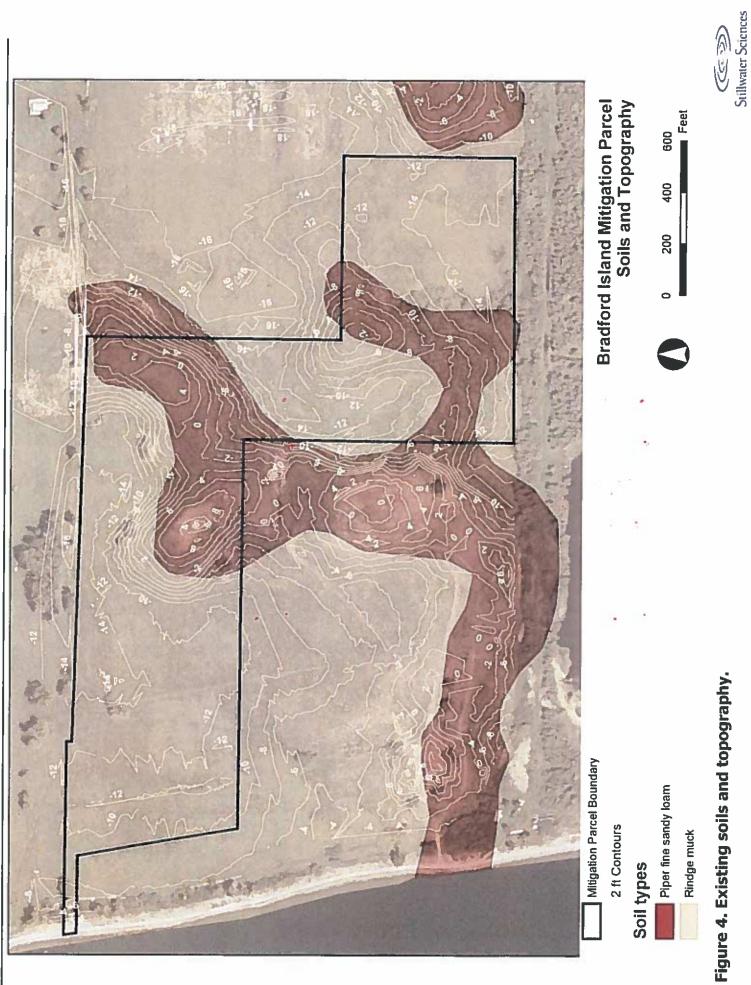
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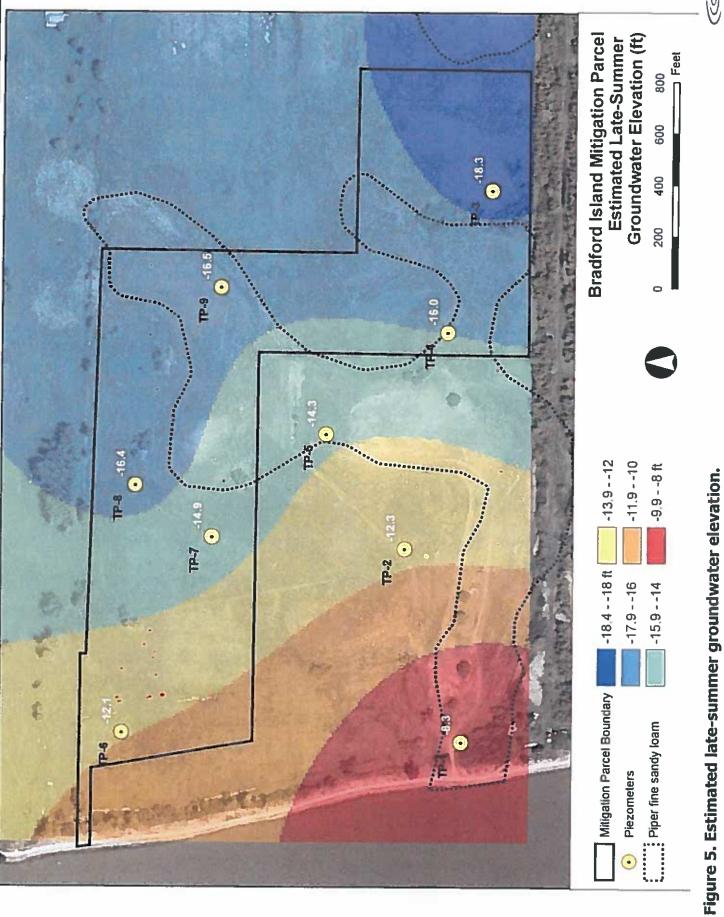
Figure 3. Existing ground surface elevation of the Mitigation Parcel.

0.1 - 2 ft

-7.9 - -6 ft

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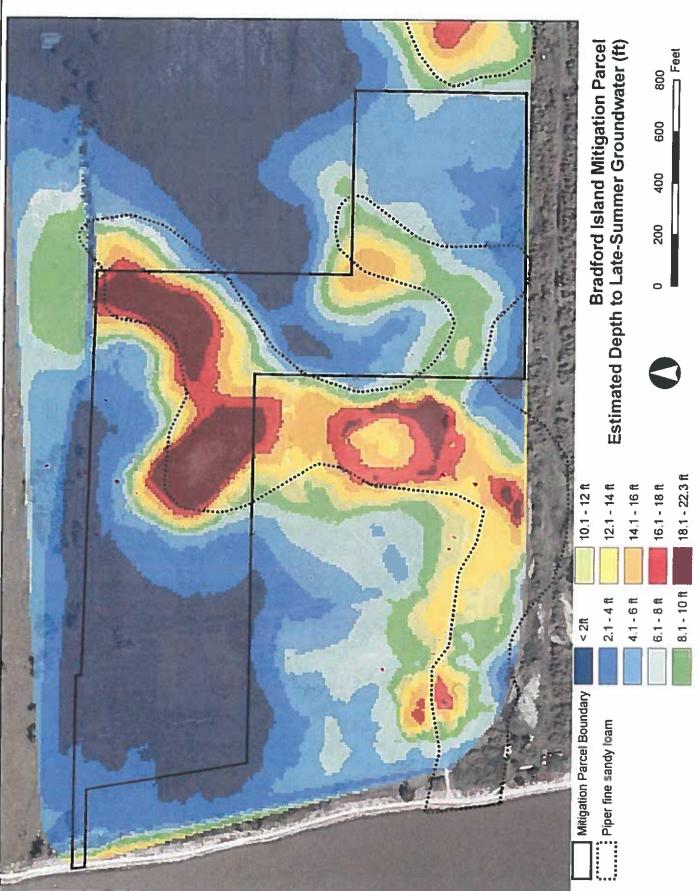
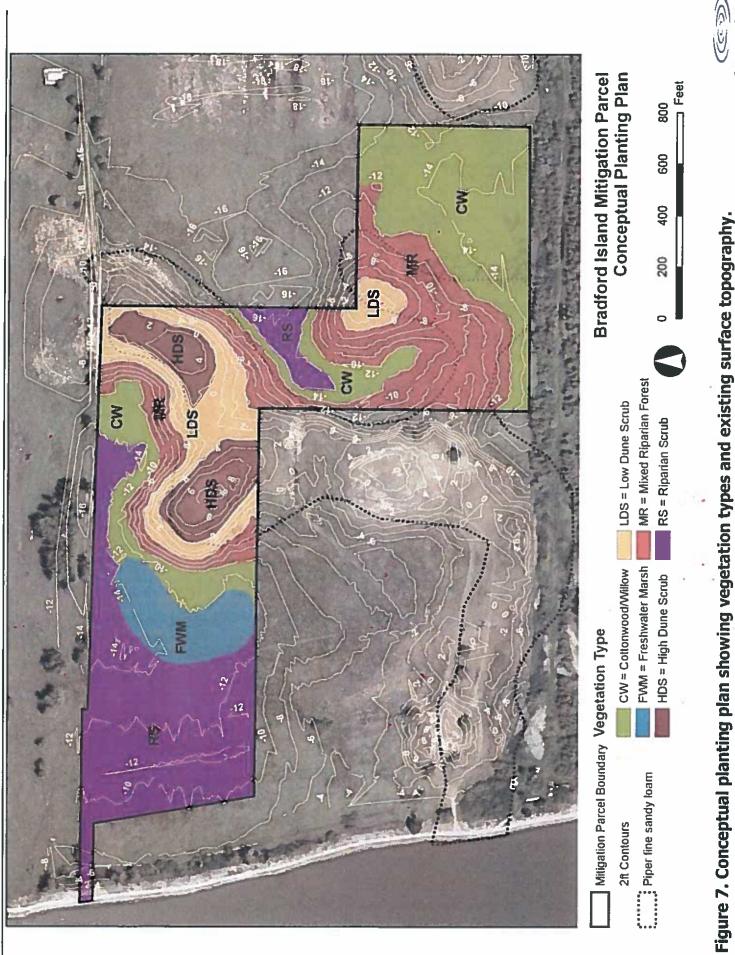


Figure 6. Approximate depth to late-summer groundwater.

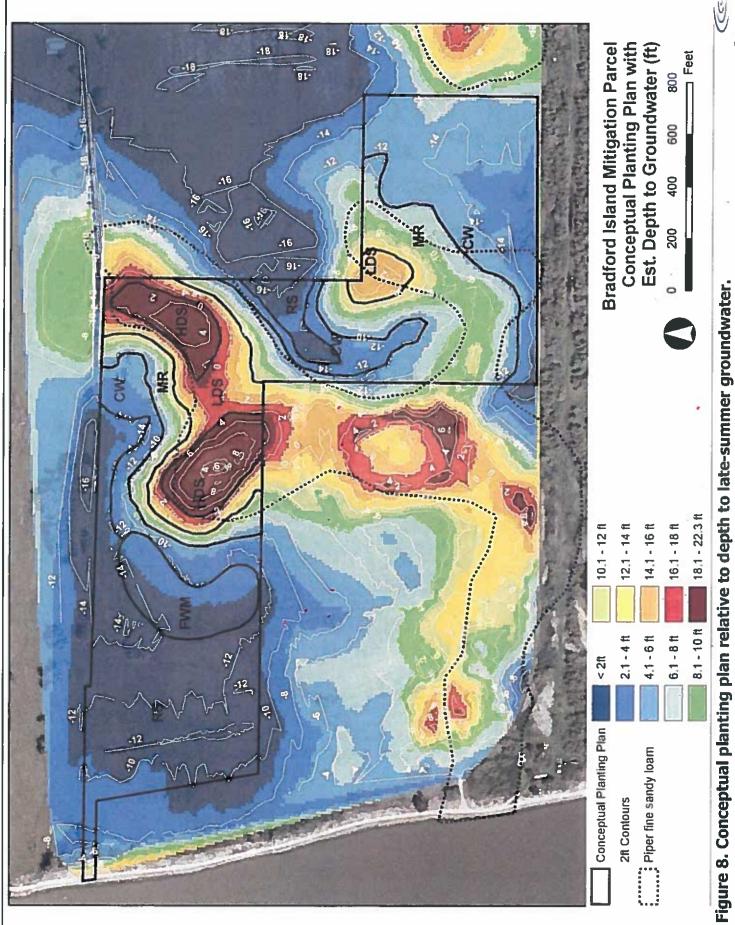
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APPENDIX A

Map of legal Delta

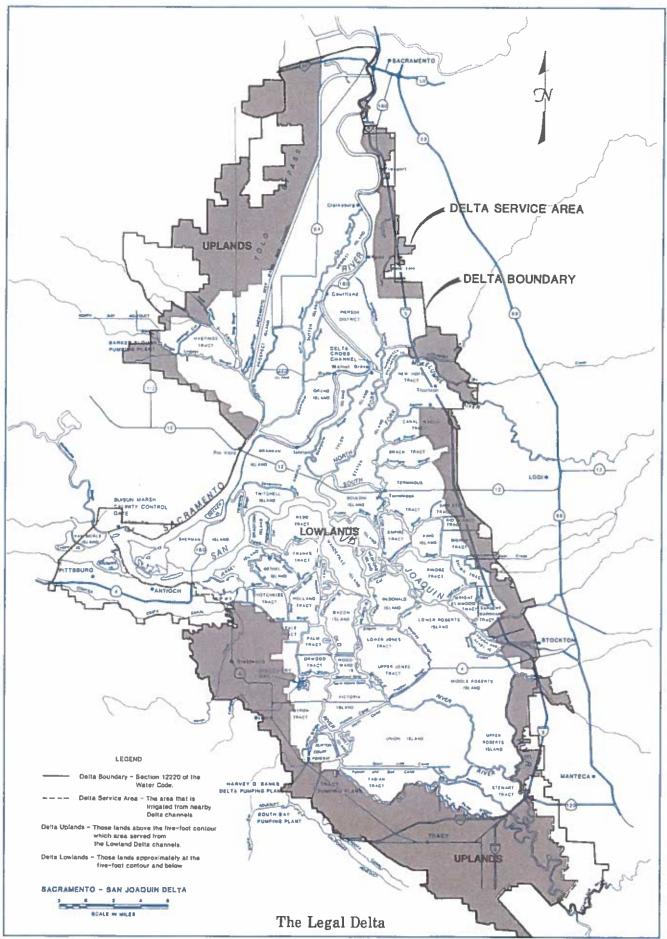
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Source:

DWR (Department of Water Resources). 1995. Sacramento-San Joaquin Delta Atlas. Available online at <u>http://baydeltaoffice.water.ca.gov/DeltaAtlas/index.cfm</u>. DWR, Sacramento, California.

24 January 2006



Sacramento-San Joaquin Delta Atlas

Department of Water Resources

APPENDIX B

California Invasive Plant Council's 1999 List of Exotic Pest Plants of Greatest Ecological Concern in California

Source:

Cal-IPC (California Invasive Plant Council). 1999. Exotic Pest Plants of Greatest Ecological Concern in California, October, 1999. Available online at <u>http://www.cal-ipc.org/1999_cal-ipc_list/</u>.

24 January 2006

Stillwater Sciences

The CalEPPC List: Exotic Pest Plants of Greatest Ecological Concern in California

October, 1999

The CalEPPC list is based on information submitted by our members and by land managers, botanists and researchers throughout the state, and on published sources. The list highlights non-native plants that are serious problems **in wildlands** (natural areas that support native ecosystems, including national, state and local parks, ecological reserves, wildlife areas, national forests, BLM lands, etc.).

List categories include:

List A: Most Invasive Wildland Pest Plants; documented as aggressive invaders that displace natives and disrupt natural habitats. Includes two sub-lists; List A-1: Widespread pests that are invasive in more than 3 Jepson regions (see page 3), and List A-2: Regional pests invasive in 3 or fewer Jepson regions.

List B: Wildland Pest Plants of Lesser Invasiveness; invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption; may be wide-spread or regional.

Red Alert: Pest plants with potential to spread explosively; infestations currently small or localized. If found, alert CalEPPC, County Agricultural Commissioner or California Department of Food and Agriculture.

Need More Information: Plants for which current information does not adequately describe nature of threat to wildlands, distribution or invasiveness. Further information is requested from knowledgeable observers.

Annual Grasses: New in this edition; a preliminary list of annual grasses, abundant and widespread in California, that pose significant threats to wildlands. Information is requested to support further definition of this category in next List edition.

Considered But Not Listed: Plants that, after review of status, do not appear to pose a significant threat to wildlands.

Plants that fall into the following categories are not included in the List:

- Plants found mainly or solely in disturbed areas, such as roadsides and agricultural fields.
- Plants that are established only sparingly, with minimal impact on natural habitats.



1999 List Review Committee:

Dr. Lars W.J. Anderson, Research Leader U.S. Dept of Agriculture-ARS Aquatic Weed Research Lab.

Dr. Joe DiTomaso, Extension Weed Ecologist Weed Science Program Department of Vegetable Crops University of California, Davis

Dr. G. Fred Hrusa, Senior Plant Systematist Plant Pest Diagnostics Center California Department of Food & Agriculture

Dr. Marcel Rejmánek, Professor of Plant Ecology Section of Evolution and Ecology University of California, Davis

CalEPPC List Committee:

Ann Howald, Instructor Santa Rosa Junior College

Dr. John Randall, Invasive Weed Specialist The Nature Conservancy

Jake Sigg, President California Native Plant Society

Ellie Wagner, Botanist California Dept. of Transportation

Peter Warner, Restoration Coordinator Golden Gate National Parks Association

The CalEPPC list is updated regularly. Please use the form provided to send comments, suggestions or new information to: **Peter Warner, 555 Magnolia Avenue, Petaluma, CA, 94952-2080**, or via email at **peterjwarner@earthlink.net**

Thanks to all those who submitted comments for the 1999 list.

The California Exotic Pest Plant Council

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Ammophila arenaria	European beach grass	Coastal dunes	SCo,CCo,NCo
Arundo donax	giant reed, arundo	Riparian areas	cSNF,CCo,SCo,SnGb,D,GV
Bromus tectorum	cheat grass, downy brome	Sagebrush, pinyon-juniper, other desert communities; increases fire frequency	GB,D
Carpobrotus edulis	iceplant, sea fig	Many coastal communities, esp. dunes	SCo,CCo,NCo,SnFrB
Centaurea solstitialis ^C	yellow starthistle	Grasslands	CA-FP (uncommon in SoCal
Cortaderia jubata	Andean pampas grass, jubatagrass	Horticultural; many coastal habitats, esp. disturbed or exposed sites incl. logged areas	NCo,NCoRO,SnFrB, CCo,WTR,SCo
Cortaderia selloana	pampas grass	Horticultural; coastal dunes, coastal scrub, Monterey pine forest, riparian, grasslands; wetlands in ScV_i also on serpentine	SnFrB,SCo,CCo,ScV
Cynara cardunculus ^B	artichoke thistle	Coastal grasslands	CA-FP, esp. CCo,SCo
Cytisus scoparius ^C	Scotch broom	Horticultural; coastal scrub, oak woodlands. Sierra foothills	NW, CaRF, SNF, GV, SCo, CW
Eucalyptus globulus	Tasmanian blue gum	Riparian areas, grasslands, moist slopes	NCoRO, GV, SnFrB, CCo, SCoRO, SCo, nChl
Foeniculum vulgare	wild fennel	Grasslands; esp. SoCal, Channel Is.; the cultivated garden herb is not invasive	CA FP
Genista monspessulana ^c	French broom	Horticultural; coastal scrub, oak woodlands, grasslands	NCoRO,NCoRI,SnFrB, CCo,SCoRO,sChI,WTR,PR
Lepidium latifolium ^B	perennial pepperweed. tall whitetop	Coastal, inland marshes, riparian areas, wetlands, grasslands; potential to invade montane wetlands	CA (except KR,D)
Myriophyllum spicatum	Eurasian watermilfoil	Horticultural; lakes, ponds, streams, aquaculture	SnFrB,SnJV,SNH(?); prob. C.
Pennisetum setaceum	fountain grass	Horticultural; grasslands, dunes, desert canyons; roadsides	Deltaic GV,CCo,SCo, SnFrB
Rubus discolor	Himalayan blackberry	Riparian areas, marshes, oak woodlands	CA-FP
Senecio mikanioides (=Delairea odorata)	Cape ivy, German ivy	Coastal, riparian areas, also SoCal (south side San Gabriel Mtns.)	SCo,CCo,NCo,SnFrB,SW
Taeniatherum caput-medusae ^c	medusa-head	Grasslands, particularly alkaline and poorly drained areas	NCoR,CaR,SNF,GV,SCo
Tamarix chinensis, T. gallica, T. parviflora & T. ramosissima	tamarisk, salt cedar	Desert washes, riparian areas, seeps and springs	SCo,D,SnFrB,GV,sNCoR, sSNF,Teh,SCoRI,SNE, WTR
Ulex europaeus ^B	gorse	North, central coastal scrub, grasslands	NCo,NCoRO,CaRF, n&cSNF,SnFrB,CCo

List A-1: Most Invasive Wildland Pest Plants; Widespread

¹Noxious Weed Ratings

- F: Federal Noxious Weed, as designated by the USDA; targeted for federally-funded prevention, eradication or containment efforts.
- A: CA Dept. of Food & Agriculture, on "A" list of Noxious Weeds; agency policies call for eradication, containment or entry refusal.
- B: CA Dept. of Food & Agriculture, on "B" list of Noxious Weeds; includes species that are more widespread, and therefore more difficult to contain, agency allows country Agricultural Commissioners to decide if local eradication or containment is warranted.
- C: CA Dept. of Food & Agriculture, on "C" list of Noxious Weeds; includes weeds that are so widespread that the agency does not endorse state or county-funded eradication or containment efforts except in nurseries or seed lots.
- Q: CA Dept. of Food & Agriculture's designation for temporary "A" rating pending determination of a permanent rating.

For most species nomenclature follows The Jepson Manual: Higher Plants of California (Hickman, J., Ed., 1993).

Exotic Pest Plants of Greatest Ecological Concern in California

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Allanthus altissima	tree of heaven	Riparian areas, grasslands, oak woodlands, esp. GV, SCo	CA-FP
Atriplex semibaccata	Australian saltbush	SoCal, coastal grasslands, scrub, "high marsh" of coastal salt marshes	CA (except CaR,c&sSN)
Brassica tournefortii	Moroccan or African mustard	Washes, alkaline flats, disturbed areas in Sonoran Desert	SW,D
Bromus madritensis sp. rubens	red brome	Widespread; contributing to SoCal scrub, desert scrub type conversions; increases fire frequency	CA
Cardaria draba ^B	white-top, hoary cress	"Riparian areas, marshes of central coast; also ag. lands, disturbed areas	Problem only in CCo
Conicosia pugioniformis	narrow-leaved iceplant, roundleaf iceplant	Coastal dunes, sandy soils near coast; best documented in San Luis Obispo and Santa Barbara cos.	CCo
Cotoneaster pannosus. C. lacteus	cotoneaster	Horticultural; many coastal communities; esp. North Coast, Big Sur; related species also invasive	CCo,SnFrB,NW
Cytisus striatus	striated broom	Often confused with C. scoparius; coastal scrub, grassland	SnFrB,CCo,SCo,PR
geria densa	Brazilian waterweed	Streams, ponds, sloughs, lakes: Sacramento-San Joaquin Delta	n&sSNF,SnJV,SnFrB, SnJt,SNE
hrharta calycina	veldt grass	Sandy soils, esp. dunes; rapidly spreading on central coast	CCo,SCoRO,WTR
ichhornia crassipes	water hyacinth	Horticultural; established in natural waterways, esp. troublesome in Sacramento-San Joaquin Delta	GV,SnFrB,SCo,PR
laeagnus angustifolia	Russian olive	Horticultural; interior riparian areas	SnJV,SnFrB,SNE,DMoj
uphorbia esula	leafy spurge	Rangelands in far no. CA, also reported from Los Angeles Co.	eKR,NCo.CaR,MP,SCo
icus carica	edible fig	Horticultural; Central Valley, foothill, South Coast and Channel Is. riparian woodlands	nSNF,GV,SnFrB,SCo
upinus arboreus	bush lupine	Native to SCo, CCo; invasive only in North Coast dunes	SCo,CCo,NCo
lentha pulegium	pennyroyal	Santa Rosa Plain (Sonoma Co.) and Central Valley vernal pools; wetlands elsewhere	NW,GV,CWSCo
lyoporum laetum	myoporum	Horticultural, coastal riparian areas in SCo	SCo,CCo
aponarla o∬icinalis	bouncing bet	Horticultural; meadows, riparian habitat in SNE, esp. Mono Basin	NW,CaRH,nSNF,SnFrB, SCoRO,SCo,PR,MP,SNE GV
Spartina alterniflora	Atlantic or smooth cordgrass	S.F. Bay salt marshes; populations in Humboldt Bay believed extirpated	CCo(shores of S.F. Bay)

List A-2: Most Invasive Wildland Pest Plants; Regional

²Distribution by geographic subdivisions per the Jepson Manual

CA=California CA-FP=California Floristic Province CaR=Cascade Ranges CaRF=Cascade Range Foothills CCo=Central Coast ChI=Channel Islands CW=Central Western CA D=Deserts DMoj=Mojave Desert DSon=Sonoran Desert GB=Great Basin

- GV=Great Valley KR=Klamath Ranges MP=Modoc Plateau NCo=North Coast NCoRI=Inner NCo Ranges NCoRO=Outer NCo Ranges NW=Northwestern CA PR=Peninsular Ranges SCo=South Coast SCoRI=Inner SCo Ranges SCoRO=Outer SCo Ranges
- ScV=Sacramento Valley SnJV=San Joaquin Valley SN=Sierra Nevada SNE=East of SN SNF=SN Foothills SNH=High SN SnFrB=San Francisco Bay Area SnGb=San Gabriel Mtns SW=Southwestern CA Teh=Tehachapi Mtns WTR=Western Transverse Ranges

The California Exotic Pest Plant Council

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Ageratina adenophora ^r	eupatory	Horticultural; coastal canyons, coastal scrub, slopes, Marin to San Diego Co; San Gabriel Mtns.	CCo,SnFrB,SCo,SCoRO
Bassia hyssopifolia	bassia	Alkaline habitats	CA (except NW,SNH)
Bellardia trixago	bellardia	Grasslands, on serpentine, where a threat to rare natives	NCoRO,CCo,SnFrB
Brassica nigra	black mustard	Coastal communities, esp. fog-belt grasslands; disturbed areas	CA-FP
Cardaria chalepensis ⁸	lens-podded white-top	Wetlands of Central Valley	CA
Carduus pycnocephalus ^c	Italian thistle	Grasslands, shrublands, oak woodlands	sNCo,sNCoR,SNF,CW, SCo,ScV
Centaurea calcitrapa ⁸	purple starthistle	Grasslands	NW,sCaRF,SNF,GV,CW,S
Centaurea melitensis	tocalote, Malta starthistle	Widespread; sometimes misidentified as C. solstitialis; perhaps a more serious invader than currently recognized	CA-FP,D
Cirsium arvense ⁸	Canada thistle	Especially troublesome in riparian areas	CA-FP
Cirsium vulgare	bull thistle	Riparian areas, marshes, meadows	CA-FP,GB
Conium maculatum	poison hemlock	Mainly disturbed areas but may invade wildlands; known to poison wildlife; early expanding stage in many areas, esp. San Diego Co. riparian, oak understory	CA·FP
Crataegus monogyna	hawthom	Horticultural; recent invader, colonizing healthy native forest around Crystal Springs reservoir on S.F. peninsula	SnFrB,CCo,NCo,NCoR
Ehrharta erecta	veldt grass	Wetlands, moist wildlands; common in urban areas; potential to spread rapidly in coastal, riparian, grassland habitats	SnFrB,CCo,SCo
Erechtites glomerata, E. minima	Australian fireweed	Coastal woodlands, scrub, NW forests, esp. redwoods	NCo,NCoRO,CCo,SnFrB SCoRO
Festuca arundinacea	tall fessue	Horticultural (turf grass); coastal scrub, grasslands in NCo, CCo	CA-FP
Hedera helix	English ivy	Horticultural; invasive in coastal forests, riparian areas	CA-FP
Holcus lanatus	velvet grass	Coastal grasslands, wetlands in No. CA	CA exc. DSon
Hypericum perforatum ^c	Klamathweed, St. John's wort	Redwood forests, meadows, woodlands; invasion may occur due to lag in control by established biocontrol agents	NW,CaRH,n&cSN,ScV, CCo,SnFrB,PR
llex aquifolium	English holly	Horticultural; coastal forests, riparian areas	NCoRO,SnFrB,CCo
ris pseudacorus	yellow water Iris, yellow flag	Horticultural; riparian, wetland areas, esp. San Diego, Los Angeles cos.	SnFrB,CCo,sSnJV,SCo
Leucanthemum vulgare	ox-eye daisy	Horticultural; invades grassland, coastal scrub	KR,NCoRO,n&cSNH, SnFrB,WTR,PR
Mesembryanthemum crystallinum	crystalline iceplant	Coastal bluffs, dunes, scrub, grasslands; concentrates salt in soil	NCo,CCo.SCo,Chl
Myriophyllum aquaticum	parrot's feather	Horticultural: streams, lakes, ponds	NCo,CaRF,CW,SCo
Olea europaea	olive	Horticultural and agricultural; reported as invasive in riparian habitats in Santa Barbara, San Diego	NCoR,NCoRO,CCo, SnFrB,SCoRO,SCo
Phalaris aquatica	Harding grass	Coastal sites, esp. moist soils	NW,cSNF,CCo,SCo
Potamogeton crispus	curlyleaf pondweed	Scattered distribution in ponds, lakes, streams	NCoR,GV,CCo,SnFrB, SCo,ChI,SnGb,SnBr,DMo
Ricinus communis	castor bean	SoCal coastal riparian habitats	GV,SCo,CCo
Robinia pseudoacacia	black locust	Horticultural; riparian areas, canyons; native to eastern U.S.	CA-FP,GB
Schinus molle	Peruvian pepper tree	Horticultural; invasive in riparian habitats in San Diego, Santa Cruz Is.	SNF,GV,CW,SW,Teh

List B: Wildland Pest Plants of Lesser Invasiveness

Exotic Pest Plants of Greatest Ecological Concern in California

List B: Continued

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Schinus terebinthifolius	Brazilian pepper	Horticultural; riparian areas	sSCo
Senecio jacobaea [®]	tansy ragwort	Grasslands; biocontrol agents established	NCo,wKR,s&wCaR, nSNF, nScV,SW
Spartium junceum	Spanish broom	Coastal scrub, grassland, wetlands, oak woodland. NW forests, esp. redwoods; also roadcuts	NCoRO,ScV,SnFrB, SCoRO,SCo,sChI,WTR
Verbascum thapsus	woolly or common mullein	SNE meadows, sagebrush, pinyon juniper woodlands; shores of Boggs Lake (Lake Co.)	CA
Vinca major	periwinkle	Horticultural; riparian, oak woodland, other coastal habitats	NCoRO,SnFrB, CCo. sSCoRO,SCo

Red Alert: Species with potential to spread explosively; infestations currently restricted

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Alhagi pseudalhagi ⁿ	camel thorn	Noxious weed of arid areas; most infestations in California have been eradicated	GV,sSNE,D
Arctotheca calenduld ^A	Capeweed	Seed producing types are the problem; most are vegetative only	NCo,SnFrB,CCo
Centaurea maculosa ^a	spotted knapweed	Riparian, grassland, wet meadows, forest habitats; contact CA Food & Ag if new occurrences found	CaR,SN,nScV,nCW,MP, nSNE,sPR,NW
Crupina vulgaris ^{F.A}	bearded creeper, common crupina	Aggressively moving into wildlands, esp. grassland habitats	NCoR (Sonoma Co.),MP
Halogeton glomeratus ^A	halogeton	Noxious weed of Great Basin rangelands; report locations to CA Food & Ag; goal is exclusion from CA	GB
Helichrysum petiolare	licorice plant	North coastal scrub; one population on Mt. Tamalpais, w. Marin Co.	Not in Jepson
Hydrilla verticillata ^{FA}	hydrilla	Noxious water weed; report locations to CA Food & Ag; eradication program in place; found in Clear Lake (Lake Co.) in 1994	NCoRI,n&cSNF,ScV.SCo,I
Lythrum salicaria ^B	purple loosestrife	Horticultural; noxious weed of wetlands, riparian areas	sNCo,NCoRO,nSNF,ScV, SnFrB,nwMP
Ononis alopecuroides ^o	foxtail restharrow	Eradication efforts underway in San Luis Obispo Co.; to be looked for elsewhere in CA	CCo; not in Jepson
Retama monosperma	bridal broom	First noted at Fallbrook Naval Weapons Station, San Diego Co; could rival other invasive brooms	San Diego Co.; not in Jepson
Salvinia molesta ^F	giant waterfern	Ponds, lakes, reservoirs, canals	Napa, Sonoma cos., lower Colorado River; not in Jepson
Sapium sebiferum	Chinese tallow tree	Horticultural; riparian, wetland habitats, open areas and understory	ScV,SnFrB; not in Jepson
Sesbania punicea	scarlet wisteria tree	Horticultural; riparian areas; American River Parkway, Sacramento Co., Suisun Marsh, San Joaquin River Parkway	ScV,SnJV; not in Jepson
Spartina anglica	cord grass	Scattered in S.F. Bay	Not in Jepson
Spartina densi/lora	dense-flowered cord grass	Scattered in S.F. Bay, Humboldt Bay salt marshes	CCo,NCo
Spartina patens	salt-meadow cord grass	One site in S.F. Bay, also Siuslaw Estuary, OR and Puget Sound, WA	CCo

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The California Exotic Pest Plant Council

Need More Information

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Acacia dealbata	silver wattle	Aggressive in natural areas?	SnFRB,SCoRO,SCoRI,C
Acacia decurrens	green wattle	Sometimes confused with A. dealbata; aggressive in natural areas?	Unknown
Acacia melanoxylon	blackwood acacia	Reported from S.F. Bay area, central coast, Santa Cruz Is.; spreads slowly; other areas?	SnFrB,SCoRO,SCo,CCo
Aeschynomene rudis ^B	rough jointvetch	Princeton area, Colusa Co.; pest of rice crops; potential threat to riparian, wetland habitats?	ScV
Agrostis avenacea	Pacific bentgrass	Invading vernal pools in San Diego area; attempts at manual eradication unsuccessful so far; problem in other areas?	sNCo,sNCoR,SNF, GV,CW,nSCo
Aptenia cordifolia	red apple	Habitats where invasive?	CCo,SCo,sChl
Asphodelus fistulosus 🛛	asphodel	Common in SCo highway rights-of-way, other disturbed sites; threats to wildlands?	sSnJV,SCo
Carduus acanthoides ^A	giant plumeless thistle	Threatens wildlands?	NCoRI,nSN,SnFrB, nSCoRO,MP
Cistus ladanifer	gum cistus	Horticultural; invades coastal sage scrub, chaparral: areas where problematic?	sCCo,SnGb
Cordyline australis	New Zealand cabbage	Infestation at Salt Point State Park; bird-dispersed; other problem areas?	Not in Jepson
Cotoneaster spp. 'exc. C. pannosus, C. lacteus)	cotoneaster	Horticultural; bird-distributed: which species are problems in wildlands?	Unknown
Cupressus macrocarpa	Monterey cypress	Native only to Monterey Peninsula; planted and naturalized CCo, NCo; threat to wildlands?	CCo
Descurainia sophia	flixweed, tansy mustard	Entering Mojave wildlands through washes; threat to wildlands?	CA
Dimorphotheca sinuata -	African daisy, Cape marigold	Horticultural; reported as invasive in w. Riverside Co., Ventura Co.; problem elsewhere?	SnJV,SCoRO.SCo,PR
Echium candicans, E. pininana	pride of Madeira, pride of Teneriffe	Horticultural; riparian, grassland, coastal scrub communities; spreads by seed	CCo,SnFrB,SCo,sNCo
Ehrharta longlflora	veldt grass	Reported from San Diego	Not in Jepson
Erica lusitanica	heath	Threat to wildlands?	NCo (Humboldt Co.)
Euphorbia lathyris	caper spurge, gopher plant	Invades coastal scrub, marshes, dunes; Sonoma, Marin cos.; threat to wildlands?	NCo,CCo,GV,SCo
Gazania linearis	gazania	Horticultural; invades grassland in S.F., coastal scrub?	CCo,SCo
Glyceria declinata		Although reported from Central Valley vernal pools, genetic research is needed to confirm identity; plants that have been called G. declinata key in Jepson to native G. occidentalis	Uncertain; not in Jepson
ledera canariensis	Algerian ivy	Horticultural; invasive in riparian areas in SoCal?	Not in Jepson
lirschfeldia incana	Mediterranean or short-pod mustard	Increasing in western, southern Mojave; threat to wildlands?	NCo,SNF,GV,CW,SCo, DMoj
Hypericum canariense	Canary Island hypericum	Reported in San Diego area, coastal sage scrub, grassland; threat to wildlands?	SCo
Hypochaeris radicata	rough cat's-ear	Widespread in coastal grasslands, wetlands; threat to wildlands?	NW,CaRF,nSNF,ScV, CW,SCo
satis tinctoria ^B	dyers' woad	Well-known invader in Utah; threat to wildlands?	KR,CaR,nSNH,MP
Ligustrum lucidum	glossy privet	Horticultural; spreading rapidly on Mendocino coast; problem in other areas?	NCo; not in Jepson
.imonium ramosissimum sp. provinciale	sea lavender	Reported spreading in Carpinteria Salt Marsh; problem in other areas?	Not in Jepson

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Exotic Pest Plants of Greatest Ecological Concern in California

Need More Information: Continued

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Ludwigia uruguayensis (= L. hexapetala)	water primrose	Invasive in aquatic habitats; non-native status questioned?	NCo,sNCoRO,CCo, SnFrB,SCo
Malephora crocea	ice plant	Invades margins of wetlands, bluffs along SCo	CCo,SCo,sChl
Maytenus boaria	mayten	Horticultural; scattered in riparian forests, ScV; east SnFrB	ScV,SnFrB
Mesembryanthemum nodiflorum	slender-leaved iceplant	Abundant on Channel Islands; invades wetlands; habitats where problematic?	SnFrB,SCo,ChI
Nicotlana glauca	tree tobacco	Disturbed places; not very competitive with natives in coastal scrub, chaparral; spreading along Putah Creek (Yolo Co.); problems elsewhere?	NCoRI,c&sSNF, GV,CW,SW,D
Oxalis pes-caprae	Bermuda buttercup	Invades disturbed sites; invasive in undisturbed habitats?	NCo,NCoRO,CCo, SnFrB,SCoRO,SCo
Parentucellia viscosa		Threat to NCo (Humboldt Co.) dune swales?	NCo,NCoRO,CCo,SCo
Passi/lora caerulea		Horticultural; reported from SoCal; threat to wildlands?	SCo; not in Jepson
Pennisetum clandestinum ^{EC}	Kikuyu grass	Disturbed sites, roadsides; threat to wildlands?	NCo.CCo,SnFrB,SCo, Santa Cruz Is.
Phyla nodiflora	mat lippia	Most varieties in CA are native; taxonomy unclear; status of plants in vernal pools, wetlands?	NW(except KR,NCoRH), GV,CCo,SnFrB,SCo, PR,DSon
Pinus radiata cultivars	Monterey pine	Cultivars invading native Monterey, Cambria forests, where spread of pine pitch canker is a concern	CCo
Piptatherum miliaceum	smilo grass	Aggressive in SoCal creeks, canyons: threats to wildlands?	NCo,GV,CW,SCo
Pistacia chinensis	Chinese pistache	Horticultural: invades riparian areas and woodlands in \ensuremath{ScV}	ScV
Prunus cerasifera	cherry plum	Oak woodland, riparian areas; esp. Marin, Sonoma cos.; bird-distributed; problems elsewhere?	SnFrB,CCo
Pyracantha angustifolia	pyracantha	Horticultural; spreads from seed in S.F. Bay area; bird-distributed; problem elsewhere?	sNCoRO,CCo,SnFrB, SC
Saisola soda	glasswort	Threat to salt marshes?	nCCo,SnFrB
Salsola tragus [:]	Russian thistle, tumbleweed	Abundant in dry open areas in w. Mojave Desert, Great Basin; not limited to disturbed sites; threats?	СА
Salvia aethiopis ⁸	Mediterranean sage	Creates monocultures in E. Oregon grasslands; threat to CA wildlands?	MP
Stipa capensis		Distribution and threats?	Not in Jepson
Tamarix aphylla	athel	Spreading in Salton Sea area; threats to wildlands?	nSnJV,nSCo,D
Tanacetum vulgare	common tansy	Jepson reports as uncommon, escape from cultivation in urban areas; problem in wildlands?	NCo,NCoRO,CaRH, SCoRO
	tall vervain	Horticultural; invades riparian forests, wetlands; extensive	ScV.nSnJV.nSnFrB,CCo



The California Exotic Pest Plant Council

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Aegilops triuncialis ^B	barbed goatgrass	Serpentine soils, grasslands	sNCoR,CaRF, n&cSNF. ScV,nCW
Avena barbata	slender wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub, disturbed sites	CA-FP,MP,DMoj
Avena fatua	wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub on deeper soil, disturbed sites	CA-FP,MP,DMoj
Brachypodium distachyon	false brome	Expanding in SoCal; common in Orange Co.	sNCoR,sCaRF, SNF,GV,CWSCo,sChl
Bromus diandrus	ripgut brome	Coastal dunes, coastal sage scrub, grasslands	CA
Lolium multiflorum	Italian ryegrass	Wetland areas, esp. ver nal pools in San Diego Co.; common in disturbed sites	CA-FP
Schismus arabicus 🐾	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV,CW,sChI,D
Schismus barbatus	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV,SW,D

Annual Grasses

Considered, but not listed

Latin Name'	Common Name	Habitats of Concern and Other Comments
Albizia lophantha	plume acacia	Not invasive
Anthoxanthum odoratum	sweet vernal grass	Disturbed sites on coast; Marin, Sonoma, Mendocino cos.
Carpobrotus chilensis	sea fig	Native status in question; not a threat to wildlands
Centranthus ruber	red valerian	Horticultural; roadcuts in Marin Co.; not a threat to wildlands
Convoluulus arvensis [©]	field bindweed	Disturbed sites: ag lands
Coprosma repens	mirror plant	No evidence of wildland threat
Crocosmia x crocosmii/lora		Generally in disturbed coastal, urban areas, roadsides
Digitalis purpurea	foxglove	Horticultural; scattered in prairies, meadows, disturbed sites; not a major wildland threat
Dipsacus sativus, D. fullonum	wild teasel, Fuller's teasel	Roadsides, disturbed sites
Fumaria officinalis, F. parviflora	fumitory	S.F. Bay area, Monterey Bay salt marshes, sandy disturbed sites
Medicago polymorpha	California bur clover	Grasslands, moist sites; mainly restricted to disturbed sites
Melilotus officinalis	yellow sweet clover	Restricted to disturbed sites in CA
Nerium oleander	oleander	Horticultural; not invasive, although reported from riparian areas in Central Valley, San Bernardino Mtns.
Picris echloides	bristly ox-tongue	Disturbed areas
Silybum marianum	milk thistle	Disturbed areas, especially overgrazed moist pasturelands; may inter fere with restoration
Xanthium spinosum	spiny cocklebur	Identified as native in <i>The Jepson Manual</i> (Hickman, 1993) and <i>A California Flora</i> (Munz and Keck, 1968); restricted to disturbed areas
Zantedeschia aethiopica	calla lily	Horticultural: mainly a garden escape in wet coastal areas
Zoysia cultivars	Amazoy and others	Horticultural; no evidence of wildland threat

The California Exotic Pest Plant Council

Who We Are:

hroughout California, natural wildlands and parks are under attack from invasive pest plants. As natural habitat is replaced by exotic plants, we also lose many of the state's native birds, insects, fish and other wildlife species. People concerned with the protection, management and enjoyment of our natural areas have become increasingly alarmed about the spread of invasive exotic vegetation. Since its formation in 1992, CalEPPC has been dedicated to finding solutions to problems caused by non-native pest plant invasions of the state's natural areas. The objectives of CalEPPC are to:

- provide a focus for issues and concerns regarding exotic pest plants in California;
- facilitate communication and the exchange of information regarding all aspects of exotic pest plant control and management;
- provide a forum where all interested parties may participate in meetings and share in the benefits from the information generated by this council;
- promote public understanding regarding exotic pest plants and their control;
- serve as an advisory council regarding funding, research, management and control of exotic pest plants;

- facilitate action campaigns to monitor and control exotic pest plants in California; and
- review incipient and potential pest plant management problems and activities and provide relevant information to interested parties.

What We Do:

CalEPPC:

- Holds an annual statewide symposium;
- Co-sponsors regional workshops on control of problem wildland weeds:
- Publishes a quarterly newsletter with timely, practical information:
- Maintains an informative web site at www.caleppc.org
- Sponsors rigorous experiments on control methods for French broom, German ivy, pampas grass and other invasive pest plants;
- Advances public and professional awareness of wildland weed problems and solutions by sponsoring illustrated brochures and a soon-to-be published book on California's worst wildland weeds:
- Is recognized as an authoritative source of new information on all aspects of wildland weed management.

1999 CalEPPC Membership Form

f you would like to join CalEPPC, please remit your calendar dues using the form provided below. All members will receive the CalEPPC newsletter, be eligible to join CalEPPC working ${}^{\perp}$ groups, be invited to the annual symposium and participate in selecting future board members. Your personal involvement and financial support are the keys to success. Additional contributions by present members are welcomed!

Individual Institutional			Name		
S	ow Income/ Student*	\$15.00	N/A		Affiliation
🗅 F	legular amily	\$25.00 \$40.00	Regular Contributing	\$100.00 \$250.00	Address
ŭ S	ustaining	\$100.00	Patron Sustaining	\$500.00 \$1000.00	City/State/Zip
	I Lifetime \$1000.00 lease make an additional contribution in my		name to	Office Phone	
		ome members		s	Home Phone
Cape	lvy Bioconti	ol Fund:		s	Fax
Please make your check payable to CalEPPC and mail with this application form to:		ind mail	email		
	PPC Member ally Davis	ship			

32912 Calle del

* Students, please include current registration and/or class schedule

The California Exotic Pest Plant Council is a California 501(c)3 non-profit, public benefit corporation organized to provide a focus for issues and concerns regarding exotic pest plants in California, and is recognized under federal and state tax laws as a qualified donee for tax deducible charitable contributions.

The CalEPPC List: Exotic Pest Plants of Greatest Ecological Concern in California

October, 1999

Potential uses for this list:

- Informing the public
- · Targeting species for control efforts
- Alerting restorationists to potential problem species
- Aiding those who comment on environmental documents
- Soliciting additional information on exotic plants with unknown or changing status

NOT FOR RESALE

Arundo donax Illustration by Sally Davis

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ATTACHMENT E

MITIGATION SITE PLANS AND SPECIFICATIONS



Green Mountain Engineering

Surveying • Civil Engineering • Permitting • Estimating • Construction Consulting

CONSTRUCTION PLANS AND SPECIFICATIONS

BRADFORD ISLAND LEVEE MAINTENANCE DISTRICT

RECLAMATION DISTRICT 2059 CONTRA COSTA COUNTY, CA.

2006 TRACT 19 MITIGATION SITE 04April06

PREPARED BY:

GREEN MOUNTAIN ENGINEERING

HULTGREN-TILLIS ENGINEERS

Dominick Gulli PE, PLS

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1314 Paloma Avenue Stockton CA 95209

Office Address:

5665 Pershing Avenue Stockton CA 95207

PHONE 209-478- 6525 TELEFAX NUMBER: 209-478-6540 CELLULAR NUMBER: 209-649-4555

APRIL 2006

R. Kevin Tillis, Geotechnical Eng.

2221 Commerce Avenue Suite A-1 Concord CA 94520 (925) 685-6300 (925) 685-6768

NOTICE TO CONTRACTORS RECLAMATION DISTRICT NO. 2059 – BRADFORD ISLAND LEVEE CONTRA COSTA COUNTY, CALIFORNIA

Sealed bids for the following work:

2006 Tract 19 Mitigation Site

Will be received at the office of the District's Secretary, Al Warren Hoslett, Attorney at Law, 311 East Main Street Suite 504, Stockton CA 95202 on **Thursday April 27, 2006 @ 2:00 pm**, at which time they will be publicly opened and read.

The scope of work is as follows:

Prepare 50-acre site and remove weeds and non-native plants. Design and Install Irrigation system. Construct a 2.96 acre pond. Complete detailed planting plan, procure plant stock, and perform restoration planting. Maintain site for 3 years, including remedial planting as necessary.

No bid will be received unless it is made on proposal forms furnished by the District's Project Engineer.

BID BOND (BID GUARANTEE) IS REQUIRED. Each bid must be accompanied by a Bidder's Bond, or a certified cashier's check made payable to Reclamation District No. 2059, for an amount equal to at least 10 per cent (10%) of the amount of the bid. Failure to furnish such bid guarantee in the proper surety form, amount, and by the time set for bid opening, may be cause for rejection of the bid.

Prospective bidder's attention is directed to Section 2 of the General Specifications entitled "Bid Requirements and Conditions." Prior to commencement of contract performance, submittal of Performance and Payment Bonds equal to 100% of the contract price (or as set forth in Sections 3247-3252 of the Civil Code of the State of California) will be required.

All bids are to be compared on the basis of the Project Engineer's Estimate of the quantities of work to be done. Reclamation District No. 2059 – Bradford Island reserves the right to reject any and all bids. If an award is made, such award will be to the lowest responsible and responsive bidder.

Any bid submitted to the District by a Contractor who is not licensed in accordance with Section 7028.15 of the Business and Professions Code, State of California, shall be considered no responsive and shall be rejected by the District. Specialty contractors with a license classification C-27 may bid as a prime contractor.

Plans and specifications, forms of proposal, will be available on April 11, 2006 from the Project Engineer, GREEN MOUNTAIN ENGINEERING, Dominick Gulli, Mail: 1314 Paloma Ave. Stockton CA 95209. Office: 5665 North Pershing Avenue Stockton CA 95207 Phone 209-478-6525 fax 209-478-6540 cell 209 649-4555

A non-refundable charge of \$47.00 per set will be required for the plans and specifications.

Bidders requesting overnight delivery of plans will be required to furnish their shipping account number to cover the additional cost. GME accepts no responsibility for the processing or mail service of the plans and specs.

The estimated cost range of the work associated with this project: \$700,000 to \$800,000

A pre-bid job walk is scheduled for Thursday April 13, 2006 at 9:00 am. Interested parties must meet at the ferry landing for the Bradford/Webb Tract ferry. Tickets for the ferry must be purchased at the store located at the corner of Cypress Road and Highway 4. The island is limited to ferry access and ferry tickets shall be purchased here for \$5.50 per round trip. Depending on participation on the job walk, carpooling to the island may be required and each bidder shall be limited to 2 people for the job walk if space is restricted. The island is only available for access via the ferry on Monday- Friday 8:00 am to 5:00 pm (except noon). You must purchase ferry tickets at the above-mentioned store to board the ferry. To get to the Bradford ferry continue east on E Cypress Rd 0.5 miles to Jersey Island Rd and head north (left) along Jersey Island Rd about 1.6 miles to a bridge over the Dutch Slough; thence continue Northwesterly about 1.2 miles and turn right at the right angle turn in Jersey Island Rd; thence proceed along this Rd 0.3 miles to the levee rd and continue in a meandering Northeasterly direction, along the levee about 2.2 miles to the Bradford/Webb tract ferry. Wait on the left side of the rd for directions from the ferry operator.

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APPENDIX (supplemental documents)

- A Revised 50-Acre Mitigation Plan Prepared By Stillwater Sciences (24 Jan 2006)
- B Plant List Information
- C Contract for District furnished Oak trees
- D Map of Legal Delta
- E Well installation report
- F Contract Form

<u>PLANS</u>

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<u>DESCRIPTION</u> Title Sheet and Vicinity Map Site Plan Planting Plan Planting Plan	<u>SHEET NO.</u> T-1 S-1 P-1
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GENERAL SPECIFICATIONS ARTICLE I SECTION 1 - DEFINITIONS

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In these specifications the following definitions shall apply:

- 1.1 <u>Bidder</u> An individual, firm, partnership, corporation or combination thereof submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.
- 1.2 <u>Contract</u> The written agreement covering the performance of the work and the furnishing of labor, materials, tools, and equipment in the construction of the work. The contract shall include the notice to contractors, proposal, plans, specifications, special provisions and contract bonds; also, any and all supplemental agreements amending or extending the work contemplated and may be required to complete the work in a substantial and acceptable manner. Supplemental agreements are written agreements covering alterations, amendments, or extensions to the contract and include contract change orders.
- 1.3 <u>Contractor</u> The person or persons, firm, corporation or combination thereof, private or municipal who have entered into a contract with the Reclamation District No. 2059 as party or parties of the second part or his or their legal representatives.
- 1.4 <u>County</u> Whenever the word "County" is used it shall be understood to mean or refer to Contra Costa County, acting by or through its duly elected or appointed officers or officials or their authorized assistants.
- 1.5 <u>DWR</u>- The State Department of Water Resources.
- 1.6 <u>F&G or DFG-</u> California Department of Fish and Game.
- 1.7 <u>Encroachments</u> Items within the levee section that belong to private landowners. These items include but are not limited to; siphons, conduits, fences, pumps, electrical appurtenances, docks, ramps, stairways, personal property, houses, structures etc.
- 1.8 <u>Engineer</u> Green Mountain Engineering, Dominick Gulli, Civil Engineer, Hultgren-Tillis Engineers, Kevin Tillis, Geotechnical Engineer. Acting either directly or through properly authorized agents.
- 1.9 Owner or District The Reclamation District No. 2059 or its properly authorized agents.
- 1.10 <u>State</u> Whenever the word "State" is used it shall be understood to mean and refer to the State of California.
- 1.11 <u>Standard Specifications</u>- Most recent version (at time of Bid) of the The State of California Department of Transportation Standard Specifications.
- 1.12 <u>Mitigation Plan-</u> The Mitigation Plan prepared by Stillwater Sciences dated 24 January 2006 for the 50 acre and Mitigation Parcel (Appendix A).
- 1.13 <u>Woody Plants or Species.</u> Plants that generally have bark and grow in a vertical direction with a trunk and branches.

- 1.14 <u>Shrubs and vines</u> Plants that grow horizontally with many branches or bushy and produce berries or flowers.
- 1.15 <u>Herbaceous plants or species</u>. Low growing Non-woody plants.

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1.16 <u>Weeds</u> Invasive or non-native species, including but not limited to: Bermuda grass, Himalayan blackberry, yellow star thistle.

GENERAL SPECIFICATIONS ARTICLE I SECTION 2 - BID REQUIREMENTS AND CONDITIONS

2-1 <u>Sealed Bids</u> - All bids will be received at the office of the District's Secretary, Al Warren Hoslett, Attorney at Law, 311 East Main Street Suite 504, Stockton CA 95202 on April 27th 2006 at 2:00 pm, at which time they will be publicly opened and read for performing the following work:

Prepare site and remove weeds and non-native plants. Design and Install Irrigation system. Construct a 2.96 acre pond and levee access ramp. Complete detailed planting plan, procure plant stock, and perform restoration planting. Maintain site for 3 years, including remedial planting as necessary.

- 2-2 <u>Examination of Plans, Specifications, Special Provisions and Site Work</u> The bidder is required to examine carefully the site, proposal, plans, specifications, and contract form for the work contemplated, and it will be assumed that the bidder has investigated and is satisfied as to the conditions to be encountered, and to the character, quality, and quantity of work to be performed and materials to be furnished, and as to the requirements of the specifications, the special provisions, and the contract. It is mutually agreed that submission of a proposal shall be considered primae facie evidence that the bidder has made such examination.
- 2-3 <u>Bid Form</u> All bids must be made upon blank forms to be obtained from the Engineer with the bid package, Telephone No. (209) 478-6525, Fax: (209)-478-6540 Cell phone (209) 649-4555.

All proposals must give the prices proposed, in figures, and must be signed by the bidder, with his address. If the bid is made by an individual, his name and postal address must be shown. If made by a firm or partnership, the name and postal address of each member of the firm or partnership must be shown. If made by a corporation, the proposal must show the name and state under the laws of which the corporation was chartered and the names, titles, and business addresses of the president, secretary and treasurer.

Telefax bids will not be considered.

All contractors submitting proposals must sign the Bid Form and complete the appropriate information and statements therein. Any bid not containing the information requested may be considered non responsive and may be rejected by the District.

Proposals must be submitted on all individual items listed on the bid form; otherwise, the bids for this proposal will be considered non-responsive and will be rejected.

The total of the bid will be the sum of the total prices of all items in the Bid Form. The total price of the unit price items will be the product of the unit price and the estimated quantity of the item. In case of discrepancy between the unit price and the total price of an item, the unit price shall govern, provided, that if the unit price is ambiguous, unintelligible, or uncertain for any cause, or is omitted, it shall be the amount obtained by dividing the amount set forth at the total price by the estimated quantity of the item. Bids shall include for each

price item in the Bid Form, a unit price and total price, and for each lump sum price item, a total price, all in legible figures.

- 2-4 <u>Rejection of Proposals Containing Alterations, Erasures or Irregularities</u> Proposals may be rejected if they show any alterations of form, additions not called for, conditional or alternative bids, incomplete bids, erasures, or irregularities of any kind.
- 2-5 <u>Bidder's Guarantee</u> All bids shall be presented under sealed cover and shall be accompanied by cashier's check, or bidder's bond, made payable to Reclamation District No. 2029 for the amount equal to at least ten per cent (10%) of the amount of said bid, and no bid will be considered unless such cashier's check, certified check or bidder's bond is enclosed therewith.
- 2-6 <u>Award of Contract</u> All bids will be compared on the basis of the Engineer's Estimate of quantities of work to be done. Reclamation District No. 2059 reserves the right to reject any or all of the bids. If any awards are made, such awards will be to the lowest single responsible and responsive bidder.

The award, if made, will be made within 60 days after the opening of the bids. Contractor's bid shall remain valid for at least 60 days after the opening of the bids.

2-7 <u>Execution of Contract</u> - The contract shall be signed by the successful bidder and returned, together with the contract bonds within ten (10) days, not including Sundays, after the bidder has received notice that the contract has been awarded. No proposal shall be considered binding on the owner until the execution of the contract.

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Failure to execute a contract and file acceptable bonds as provided herein within ten (10) days, not including Sundays, after the bidder has received notice that the contract has been awarded shall be just cause for the annulment of the award and the forfeiture of the proposal guarantee.

- 2-8 <u>Return of Bidder's Guarantee</u> Within fifteen (15) days of the award of contract, the proposal guarantee accompanying such of the proposals, which are not to be considered in making the award, will be returned. All other proposal guaranties will be held until the contract has been finally executed, after which they will be returned to the respective bidders whose proposals they accompanied.
- 2-9 <u>Contract Bonds</u> The contractor shall furnish two good and sufficient bonds. One of said bonds shall be furnished in the amount of 100% of the total contract price and guarantee faithful performance of the said contract by the contractor; the other of the said bonds shall be furnished in the amount and as required by Sections 3247-3252, inclusive, of the Civil code of the State of California.

At the completion of phase 1 and the beginning of the maintenance periods the bonds can be replaced with bonds to equal the amount of work remaining on the contract.

Bonds with a duration of 1 year will be acceptable so long as they may be renewed on a yearly basis and no lapse in bonding is provided."

Whenever any surety or sureties on any such bonds, or on any bonds required by law for the protection of the claims of laborers and material men, become insufficient, or the owner has

cause to believe that such surety or sureties have become insufficient, a demand in writing may be made of the contractor for such further bond or bonds or additional surety, not exceeding that originally required, as is considered necessary, considering the extent of the work remaining to be done. Thereafter, no payment shall be made upon such contract to the contractor or any assignee of the contractor until such further bond or bonds or additional surety has been furnished.

- 2-10 <u>Stop Notices and Service of Notices</u> All stop notices shall comply with the requirements of Sections 3098, 3103, 3181, and 3183 of the Civil Code of the State of California.
- 2-11 <u>Subcontractors and Suppliers</u> All bids shall be accompanied by a list of subcontractors to be used on the work indicating the nature of work to be done by each and the percentage of the total project which each will perform.

Contractor shall comply with the Subletting and Subcontracting Fair Practices Act commencing Section 4100 of the Public Contract Code. Violations shall subject the Contractor to penalties described in the Act.

2-12 <u>Bid Items</u> - Items bid shall be for the complete operating project as shown on the plans and described in the specifications and shall include all materials, labor, tools, overhead, profit, and anything else necessary for a complete workmanlike job.

Payments shall be made on the basis of the bid items listed on the proposal and no additional claims for compensation will be allowed therefore.

GENERAL SPECIFICATIONS ARTICLE I SECTION 3 - SCOPE OF WORK

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- 3-1 Intent of Plans and Specifications The intent of the plans and specifications is to prescribe the details for the construction and completion of the work, which the Contractor undertakes to perform in accordance with the terms of the contract. Where the plans or specifications describe portions of the work in general terms, but not in complete detail, it is understood that only best general practice is to prevail and that only materials and workmanship of the first quality are to be used.
- 3-2 <u>Work To Be Done</u> The work to be done consists of furnishing all labor, methods and processes, implements, tools, machinery, and materials, except as otherwise specified, which are necessary and required to construct and put in complete order for use the work designated in the contract, and to leave the grounds in a neat condition.
- 3-3 <u>Alterations</u> The Owner reserves the right to increase or decrease the quantity of any item or portion of the work, or to omit portions of the work as may be deemed necessary or expedient by the Engineer; also to make alterations or deviations, increase or decrease, additions or omissions, in the plans and specifications, as may be determined during the progress of the work to be necessary and advisable.
- 3-4 <u>Extra Work</u> New and unforeseen work will be classed as extra work when such work cannot be covered by any of the various items or combination of items for which there is a bid price.

Extra work means the providing of materials and equipment and the performing of work not directly or by implication called for by the contract. Changes in quantity under a unit price contract or item shall not be considered as extra work. If the owner requires extra work he may (1) do it himself, (2) employ others to do it, (3) direct the Contractor to perform the extra work at a mutually agreed upon sum, or (4) direct the Contractor to do the work on a time and expense basis.

The Contractor shall do such extra work upon receipt of an approved Contract Change Order or other written order for the Engineer, and in the absence of such approved Contract Change Order or other written order of the Engineer he shall not be entitled to payment for such extra work.

- 3-5 <u>Removal of Obstructions</u> The Contractor shall remove and dispose of all structures, trees, debris, or other obstructions of any character to the construction of the project, if and as required by the Engineer.
- 3-6 <u>Final Cleaning Up</u> Before final inspection of the work, and as a condition of acceptance and final payment, the Contractor shall clean the project site, borrow pits, and all ground occupied by his temporary structures, and equipment; and all parts of the work shall be left in a neat and presentable condition.
- 3-7 <u>Variations in Estimated Quantities</u> When the quantity of a pay item in this Contract is an estimated quantity, and where the actual quantity of such pay item varies by more than twenty-five percent (25%) above or below the estimated quantity stated in this Contract, an equitable adjustment in the contract price shall be made upon demand of either party. The

equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above one hundred twenty-five percent (125%) or below seventy-five percent (75%) of the estimated quantity.

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If an item is eliminated in its entirety, payment will be as specified in Caltrans Standard Specification section 4-1.03(B)(3).

If the quantity variation is such as to cause an increase in the time necessary for completion, the Engineer shall, upon receipt of a written request for an extension of time, ascertain the facts and make such adjustment for extending the completion date as in his judgment the findings justify.

GENERAL SPECIFICATIONS ARTICLE I SECTION 4 - CONTROL OF THE WORK

4-1 <u>Authority of the Engineer</u> - The Engineer shall decide all questions which may arise as to the quality or acceptability of materials furnished and work performed, and as to the manner of performance and rate of progress of the work; all questions which may arise as to the interpretation of the plans and specifications; all questions as to the acceptable fulfillment of the Contract on the part of the Contractor; and all questions as to claims and compensation.

The Engineer's decision shall be final and he shall have executive authority to enforce and make effective such decisions and orders which the Contractor fails to carry out promptly.

4-2 <u>Plans</u> - All authorized alterations affecting the requirements and information given on the approved plans shall be in writing. No changes shall be made of any plan or the Engineer has approved drawing after the same, except by direction of the Engineer.

Working drawings or plans for any structures not included in the plans furnished by the Engineer shall be approved by the Engineer before any work involving these plans shall be performed, unless approval be waived in writing by the Engineer.

It is mutually agreed, however, that approval by the Engineer of the Contractor's working plans does not relieve the Contractor of any responsibility for accuracy of dimensions and details, and that the Contractor shall be responsible for agreement and conformity of his working plans with the approved plans and specifications.

- 4-3 <u>Conformity with Plans and Allowable Deviation</u> Finished surfaces in all cases shall conform with the lines, grades, cross sections, and dimensions shown on the approved plans. Deviations from the approved plans, as may be required by the exigencies of construction, will be determined in all cases by the Engineer and authorized in writing.
- 4-4 <u>Coordination of Contract, Special provisions, Plans and Specifications and supplementary</u> <u>documents</u> These specifications, the plans, special provisions and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary, to describe, and to provide for a complete work. The contract shall govern over the Special provisions, which governs over the plans, which governs over the specifications, which governs over the supplemental documents.
- 4-5 <u>Interpretation of Plans and Specifications</u> Should it appear that the work to be done, or any matter relative thereto, is not sufficiently detailed or explained in these specifications, plans and special provisions, the Contractor shall apply to the Engineer for such further explanations as may be necessary, and shall conform to such explanation or interpretation as part of the Contract, so far as may be consistent with the intent of the original specifications. In the event of doubt or question relative to the true meaning of the specifications, reference shall be made to the Engineer, whose decision thereon will be final.

In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.

4-6 Lines and Grades - All distances and measurements are given and will be made in

horizontal plane. Start and stop points for all designated work sites will be provided by reference stakes with flagging along the shoulder of the levee.

The Engineer will provide benchmark data and will establish control lines within the mitigation site.

The Engineer will provide construction stakes at boundaries shown on the plans.

The boundaries between stakes shall be determined from the elevation contour.

The Contractor is responsible for setting additional grade control and dimension stakes, and any other related construction staking and surveying, as may be required for construction activities.

4-7 <u>Flagging Color Code</u> - Where flagging is used on the work, it will conform to the following code:

LIGHT GREEN:	Important control or reference points, monuments, benchmarks, etc.
YELLOW:	Denotes even 1,000 foot stations.
ORANGE:	Property boundary.
PINK:	Habitat boundary.
BLUE:	Finish grade.
WHITE:	Obstructions to be removed.

4-8 <u>Removal of Defective and Unauthorized Work</u> - All work which is defective in its constructions or deficient in any of the requirements of these specifications shall be remedied, or removed and replaced by the Contractor in an acceptable manner, and no compensation shall be allowed for such corrections.

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Any work done beyond the lines and grades shown on the plans or established by the Engineer, or any extra work done without written authority, will be considered unauthorized and will not be paid for.

Upon failure on the part of the Contractor to comply forthwith with any order of the Engineer made under the provisions of this article, the Engineer shall have the authority to cause defective work to be remedied, removed and replaced, and unauthorized work to be removed, and to deduct the costs thereof from any money due or to become due to the Contractor.

4-9 <u>Superintendence</u> - The Contractor shall designate in writing before starting work an authorized representative who shall have the authority to represent and act for the Contractor. Said authorized representative shall be present at the site of the work at all times while work is actually in progress on the Contract. When work is not in progress and during periods when work is suspended, arrangements acceptable to the Engineer shall be made for any emergency work, which may be required.

Whenever the Contractor or his authorized representative is not present on any particular part of the work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which the orders are given.

4-10 <u>Inspection</u> - The Engineers, The District, The DWR and The DFG shall at all times have access to the work during construction, and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship, and character of materials used and employed in the work.

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Whenever the Contractor varies the period during which work is carried on each day, he shall give due notice to the Engineer, so that the proper inspection may be provided. Any work done in the absence of the Engineer shall be subject to rejection.

The inspection of work shall not relieve the Contractor of any of his obligation to fulfill the Contract as prescribed. Defective work shall be made good, and unsuitable materials may be rejected, not-withstanding the fact that such defective work and unsuitable materials have been previously overlooked by the Engineer and accepted or estimated for payment.

Projects financed in part or in whole with funds from other agencies shall be subject to inspection at all times by the agencies involved.

- 4-11 <u>Transportation</u> Bradford Island is serviced by "Delta Ferry Authority", which is affiliated through funding with The District. The reliability and insurance of transportation is the contractor's risk. In the event the Contractor uses Marine Access to get to the job he shall provide transportation to the Engineer, The District, The DWR and The DFG and affiliates as required.
- 4-12 <u>Final Inspection</u> Whenever the work provided and contemplated by the Contract shall have been satisfactorily completed and the final clean up performed, the Engineer and the District will make a final inspection.

If the work has been satisfactorily completed and accepted, the Contractor will be notified of acceptance.

If the Engineer and/or District determine that the work is not complete, the Contractor will be notified of the deficiencies. The Contractor shall initiate procedures to correct the deficiencies noted and another final inspection shall be made before complete acceptance of the project and final payment.

The cost of all work to be performed to correct any deficiencies shall be borne by the Contractor and shall include furnishing all labor, tools, transportation, supplies, equipment, appurtenances, fuel, and power.

If additional material is required to correct the deficiency, it will be paid at the contract unit price. If the work is under a lump sum item, no additional compensation will be made for corrections.

- 5-1 <u>General</u> All materials or equipment furnished by the Contractor shall conform to the requirements of these specifications; where the quality of materials or equipment is not specifically called out they shall be of the highest quality normally used.
- 5-2 <u>Contractor's Submittals</u> The Contractor shall submit to the Engineer for his approval, six copies of the catalog and descriptive literature on materials or equipment, which will be used in the work. Such submittal shall be made prior to beginning of work or as specified elsewhere in these specifications.

Before completion of the work the Contractor shall submit six copies of installation, maintenance, and operation manuals on all equipment, which he has installed.

5-3 <u>Samples and Tests</u> - At the option of the Engineer, the source of supply of each of the materials or equipment shall be approved by the Engineer before delivery is started and before such materials or equipment are used in the work. The Contractor shall furnish such samples of material or equipment as is requested by the Engineer, without charge. No equipment or material shall be used until the Engineer has approved it. Samples shall be secured and tested whenever necessary to determine the quality of the material or equipment.

All tests of materials or equipment furnished by the Contractor shall be made in accordance with commonly recognized standards of national testing organizations, and such special tests and methods as prescribed in these specifications.

Where compaction requirements are specified The Engineer may cause to have compaction tests performed as deemed necessary. In the event that compaction tests fail, additional testing and retesting shall be performed at a rate of 3 additional tests per failed test and the cost thereof borne by the contractor and withheld from subsequent monies due to the contractor.

The district engineer shall provide at least one compaction test for every 500 yards of fill placed.

5-4 <u>Defective Materials</u> - All materials or equipment not conforming to the requirements of these specifications shall be considered defective, and all such materials or equipment, whether in place or not, shall be rejected. They shall be removed immediately from the site of the work unless otherwise permitted by the Engineer. No rejected material or equipment, the defects of which have been subsequently corrected, shall be used until approved in writing by the Engineer.

Upon failure on the part of the Contractor to comply with any order of the Engineer made under the provisions of this article, the Engineer shall have the authority to remove and replace defective material or equipment and to deduct the cost of removal and replacement from any moneys due or to become due to the Contractor.

5-5 <u>Manufactured Equipment</u> - Manufactured equipment shall be all new, first line, current production models of manufacturers regularly engaged in the productions of such equipment

for at least five years.

5-6 <u>Trade Names and Alternatives</u> - For convenience in designation on the plans or in the specifications, certain articles of materials or equipment to be incorporated in the work may be designated under a trade name or the name of a manufacturer and his catalog information. The use of an alternative article or material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:

The burden of proof as to quality and suitability of alternatives shall be upon the Contractor and he shall furnish all information necessary as required by the Engineer. The Engineer shall be the sole judge as to the quality of and suitability of alternative articles or materials and his decision shall be final.

Whenever the specifications permit the substitution of a similar or equivalent material or article, no tests or action relating to the approval of such substitute material will be made until the request for substitution is made in writing by the Contractor accompanied by complete data as to the equality of the material or article proposed. Such request shall be made in ample time to permit approval without delaying the work.

Any additional costs incurred to allow the use of alternate material or equipment shall be borne by the Contractor, and shall not be the basis of any claim or claims for extra compensation. Any savings resulting from the use of alternate material or equipment shall be deducted from any monies due or that may become due to the Contractor under the Contract.

GENERAL SPECIFICATIONS ARTICLE I SECTION 6 - LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

- 6-1 <u>Laws to be Obeyed</u> The Contractor shall keep himself fully informed of all existing and future State and Federal laws and all municipal and county ordinances and regulations which in any manner affect those engaged or employed in the work, or the materials used in the work, or which in any way affect the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same.
- 6-2 <u>Hours of Labor</u> Eight hours labor constitutes a legal day's work. The Contractor shall forfeit, as a penalty to the Owner, twenty-five dollars (\$25.00) for each laborer, workman, or mechanic employed in the execution of the Contract by the Contractor or by any subcontractor under him, upon which any of the work herein mentioned, for each calendar day during which said laborer, workman or mechanic is required or permitted to labor more than eight (8) hours in violation of the provisions of the Labor Code, and in particular, Sections 1810 to 1815 thereof, inclusive.
- 6-3 <u>Labor Discrimination</u> No discrimination shall be made in the employment of persons upon public works because of the race, color or religion of such persons and every Contractor for public works violating this section is subject to all the penalties imposed for a violation of Chapter 1 of Part VII, in accordance with the provisions of Section 1735 of the Labor Code.
- 6-4 <u>Registration of Contractors</u> Before submitting bids, contractors shall be licensed in accordance with the provisions of Chapter 9 of Division 3 of the Business and Professions Code.
- 6-5 <u>Permits and Licenses</u> The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incidental to the due and lawful prosecution of the work.
- 6-6 <u>Patents</u> The Contractor shall assume all responsibilities arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work.
- 6-7 <u>Safety Provisions</u> The Contractor shall conform to the rules and regulations pertaining to safety established by the California Division of Industrial Safety.
- 6-8 <u>Public Convenience and Safety</u> The Contractor shall so conduct his operations as to offer the least possible obstruction and inconvenience to the public and he shall have under construction no greater amount of work than he can prosecute properly with due regard to the rights of the public.

Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners.

Whenever the Contractor's operations create a condition hazardous to traffic or the public, he shall furnish, erect, and maintain at his expense and without cost to the Owner, such fences, barricades, lights, signs, and other devices as are necessary to prevent accidents or

damage or injury to the public.

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Should the Contractor appear to be neglectful or negligent in furnishing warning and protective measures as above provided, the Engineer may direct attention to the existence of a hazard and the necessary warning and protective devices shall be furnished and installed by the Contractor at his expense.

Should the Engineer point out the inadequacy of warning and protective measures, such action on the part of the Engineer shall not relieve the Contractor from responsibility for public safety or abrogate his obligation to furnish and pay for these devices.

6-9 <u>Preservation of Property</u> - Trees, shrubs, and other plants that are not to be removed, and pole lines, fences, signs, markers and monuments, buildings and structures, conduits, pipe lines under or above ground, sewer and water lines, all highway facilities, and any other improvements or facilities shall be protected from injury or damage. If such objects are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored at the Contractor's expense. The facilities shall be replaced and restored to a condition as good as when the Contractor entered upon the work.

The fact that any underground facility is not shown upon the plans shall not relieve the Contractor of his responsibility under this Section. It shall be the Contractor's responsibility to ascertain the existence of any underground improvements or facilities, which may be subject to damage by reason of his operations.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in protecting and repairing property as specified in the Section shall be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefore.

6-10 <u>Responsibility for Damage</u> - The Owner, The Engineers, The RD Program Manager or the District board shall not be answerable or accountable in any manner for any loss or damage that may happen to the work or any part thereof; or for any material or equipment used in performing the work; or for injury or damage to any person or persons, either workmen or the public; for damage to adjoining property from any cause whatsoever during the progress of the work or at any time before final acceptance.

The Contractor shall indemnify and save harmless the Owner and the Engineer from any suits, claims, or actions brought by any person or persons for or on account of any injuries or damages sustained or arising in the construction of the work or in consequence thereof. The Owner may retain so much of the money due the Contractor as shall be considered necessary, until disposition has been made of such suits or claims for damages as aforesaid.

6-11 <u>Contractor's Responsibility for Work</u> - Except as provided above, until the formal acceptance of the work by the Owner, the Contractor shall have the charge and care thereof and shall bear the risk of injury or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by acts of the Federal Government or the public enemy.

- 6-12 <u>No Personal Liability</u> Neither the Owner, the Engineer, nor any other officer or authorized assistant or agent shall be personally responsible for any liability arising under the Contract.
- 6-13 <u>Responsibility of the Owner</u> The Owner shall not be held responsible for the care or protection of any materials or parts of work prior to final acceptance, except as expressly provided in these specifications.
- 6-14 <u>Workmen's Compensation</u> Pursuant to the requirements of Section 1860 of the Labor Code (Chapter 1000, Statutes of 1965), the Contractor will be required to secure the payment of workmen's compensation to his employees in accordance with the provisions of Section 3700 of the Labor Code and in accordance with the USLH workers compensation where applicable.

Prior to the commencement of work, the Contractor shall sign and file with the Engineer a certificate of Workmen's Compensation Insurance.

- 6-15 <u>Antitrust Claims</u> Sections 4551 through 4554 of the Government Code pertaining to the assignment of antitrust claims are incorporated herein in full by this reference.
- 6-16 <u>Other contractors</u>. Other contractors may be working on Bradford and within the contract areas during the time of this contract. The contractor shall cooperate and coordinate his activities as required to not impact other contractors and visa/versa. No additional compensation will allowed for any work associated with coordinating around other contractors.

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6-17 <u>Labor Compliance Program.-</u> Notice to Bidders- In accordance with the provisions of Sections 1770 and 1773 of the Labor Code, the Director of the Department of Industrial Relations has determined the general prevailing rate of wages applicable to the work to be done. These rates are set forth in a schedule located at the State Department of Industrial Relations, Director of Industrial Relations. This schedule is available to any interested party on request. Attention is directed to the provisions of Sections 1777.5 and 1777.6 of the Labor Code of the State of California concerning employment of apprentices by the contractor or a subcontractor. Each prime contractor and all subcontractors are responsible for compliance with the requirements of Sections 1777.5 and 1777.6.

This District operates a Labor Compliance Program pursuant to Labor Code sections 1771.5 and 1771.7. Therefore, a labor compliance pre-job conference shall be conducted with all contractors and subcontractors to discuss federal and state labor law requirements applicable to the project. The labor compliance pre-job conferences are in addition to the pre-construction conference and will be scheduled independently, either face-to-face, or by web conference. Project contractors and subcontractors shall be required to maintain and furnish to the District, at designated times, a certified copy of each weekly payroll containing a statement of compliance signed under penalty of perjury. The District or District Representative shall review and audit payroll records to verify compliance with applicable labor law. The District shall withhold contract payments when payroll records are delinquent or inadequate. The District shall withhold contract payments equal to the amount of underpayment, with penalties, when, after investigation, it has been established that underpayment has occurred.

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Copies of the Labor Compliance Program and the required rates are on file and available upon request. Contractor and subcontractors shall be required to submit payroll reports as prescribed by the District, which will require the Contractor and Subcontractor to submit certified payroll s on weekly basis. Follow up web conference training session may be required and should be planned by each Contractor and Subcontractor in advance of submitting certified payroll records.

- 6-18 <u>Job Start Meeting -</u> The District will conduct a labor compliance pre-job meeting ("Job Start Meeting") which is mandatory for all contractors and subcontractors. The District's LCP will be discussed with all in attendance. The Job Start Meeting will discuss the payment of prevailing wages, apprenticeship training, penalties, certified payroll records as well as non-discrimination in employment, kickbacks, acceptance of prohibited fees, proper licensing, unfair competition, and worker's compensation insurance. Follow up web conference training session may be required and should be planned by each Contractor and Subcontractor in advance of submitting certified payroll records.
- 6-19 <u>State Labor Provisions Construction Prevailing Wages -</u> In accordance with the provisions of section 1720 et seq. of the Labor Code, the Division of Labor Standards and Research has determined the general prevailing rates or wages and employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in section 1773.8.

It shall be mandatory upon the Contractor herein and upon any subcontractor to pay not less than the said specified rates to all laborers, workers, and mechanics employed by them in the execution of agreement.

In addition to said penalty and pursuant to said section 1775, the difference between each stipulated prevailing wage rates and the amount paid to each workman for each calendar day or portion thereof for which each workman was paid less than the stipulated prevailing wage shall be paid to each workman by the Contractor. Contractor may be responsible for paying subcontractor's employees prevailing wages if it does not comply with the provisions of Labor Code sections 1770 et seq.

- 6-20 <u>Non-discrimination in Employment</u> The Contractor will not discriminate against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, sex or sexual orientation, except as may be provided in Section 12940 of the Government Code of the State of California.
- 6-21 <u>Travel and Subsistence Payments -</u> The Contractor shall be required to make such travel and subsistence payments to each worker needed to execute the work, as such travel and subsistence payments are defined in the applicable collective bargaining agreement filed with the Department of Industrial Relations in accordance with Section 1773.1 of the Labor Code of the State of California.

- 6-22 <u>Penalty for Paying Less Than Prevailing Wage Rates -</u> In accordance with California Labor Code Section 1775 the Contractor shall, as penalty to the District, forfeit up to \$50.00 for each calendar day, or portion thereof, for each worker paid less than the minimum prevailing wages for such work or craft in which such worker is employed by the Contractor or by any subcontractor, as required in Subsection 14.1.
- 6-23 <u>Review of Certified Payroll Records -</u> The Contractor and each subcontractor shall keep or cause to be kept an accurate record showing the names and occupants of all laborers, workers and mechanics employed by it in connection with the execution of this Agreement or any subcontract there under, and showing also the actual per diem wage paid to each of such workers. Contractor must provide certified payroll records to the District or District's Representative on a weekly basis, in a format required by the District, and make them available to representatives of the Division of Labor Standards and Research.

The District or District Representative will request detailed information from the Contractor and each subcontractor reflecting the required Department of Industrial Relations Classification, Craft, Base/Straight Rate, OT Rate, and Benefit Breakdown and other pertinent information to be determined by the District, in addition to the breakdown of the same information to be paid by the Contractor and each subcontractor.

The contractor shall be responsible for the submittal of payroll records of all its subcontractors. All certified payroll records shall be accompanied by a statement of compliance signed by the contractor indicating that the payrolls records are correct and complete, that the wage rates contained therein are not less than those determined by the Director of the Department of Industrial Relations, and that the classifications set forth for each employee conform with the work performed.

- 6-25 <u>On Site Worker Interviews</u> The District or District Representative shall make periodic site visits to observe and interview workers regarding the payment of prevailing wages and proper work classifications. Contractor and each subcontractor shall cooperate and coordinate with the District and provide unaccompanied access to workers on the job site.
- 6-24 Employment of Registered Apprentices The provisions of Section 1777.5, of Section 1777.6, and of Section 1777.7 of the Labor Code of the State of California shall be applicable to the Contractor and each subcontractor involved in the construction of the work of improvement.

In the event a licensed Contractor willfully fails to comply with the provisions of Section 1777.5 of the Labor Code of the State of California, such Contractor shall be subject to the penalties set forth in Section 1777.7 of the Labor Code of the State of California, including the withholding from contract progress payments, due or to become due, the sum of \$50.00 per calendar day for noncompliance.

6-25 <u>Working Hours -</u> Eight hours labor constitutes a legal days work.

The time of service of any worker employed upon this work is limited and restricted to 8 hours during any one calendar day, and 40 hours during any one calendar week, except as hereinafter provided.

The Contractor and each subcontractor shall keep an accurate record, showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by him in connection with this work. The record shall be kept open at all reasonable hours to the inspection of the District and to the Division of Labor Law Enforcement of the State of California.

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GENERAL SPECIFICATIONS ARTICLE 1 SECTION 7 - PROSECUTION AND PROGRESS

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7-1 <u>Subletting and Assignment</u> - The Contractor shall give his personal attention to the fulfillment of the Contract and shall keep the work under his control.

Subcontractors will not be recognized as such, and all persons engaged in the work of construction will be considered as employees of the Contractor. And their work shall be subject to the provisions of the Contract, Plans and Specifications.

Where a portion of the work sublet by the Contractor is not being prosecuted in a manner satisfactory to the Engineer, the Subcontractor shall be removed immediately on the requisition of the Engineer and shall not again be employed upon the work.

The Contract may be assigned only upon the written consent of the owner.

- 7-2 Progress of the Work and Time for Completion The Contractor shall begin work within ten (10) calendar days after receiving the Notice To Proceed and shall diligently prosecute the **Phase one work to completion, before 31January 2007.** Each subsequent phase will be completed within 365 calendar days. These durations allow for normal "adverse weather" days. Any extensions due to weather will only be allowed if the lost days which are beyond normal.
- 7-3 <u>Character of Workman</u> If any Subcontractor or person employed by the Contractor shall fail or refuse to carry out the directions of the Engineer or shall appear to the Engineer to be incompetent or to act in a disorderly or improper manner, he shall be discharged immediately on the requisition of the Engineer, and such person shall not be employed again on the work.
- 7-4 <u>Temporary Suspension of Work</u> The Engineer shall have the authority to suspend work wholly or in part, for such period as he may deem necessary, due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for such time as he may deem necessary, due to the failure on the part of the Contractor to carry out orders given, or to perform any provisions of the work. The Contractor shall immediately obey such order of the Engineer and shall not resume work until ordered in writing by the Engineer. No additional compensation will be allowed for such suspensions of work.
- 7-5 <u>Time of Completion and Liquidated Damages</u> It is agreed by the parties to the Contract that in case all of the work called for by the Contract is not completed before or upon the expiration of the time limit as set forth in these specifications, damage will be sustained by the Owner, and it will be impractical to determine the actual damage which the Owner will sustain by reason of such delay: and it is therefore agreed that the Contractor will pay the Owner the sum of **One thousand dollars (\$1,000.00)** per calendar day for each and every day's delay beyond the time prescribed, per each phase, to complete the work; and the Contractor agrees to pay such liquidated damages as herein provided, and in case the same are not paid, agrees that the Owner may deduct the amount thereof from any monies due or

that may become due the Contractor under the Contract.

7-6 It is further agreed that in case the work called for under the Contract is not finished and completed in all parts and requirements within the time specified, the Owner shall have the right to extend the time limit for completion of the Contract, it shall further have the right to charge the Contractor, his heirs, assigns, or sureties, and to deduct from the final payment for the work, all or part, as it may deem proper, of the actual cost of engineering, inspection, superintendence, and other overhead expenses which are directly chargeable to the Contract, and which accrue during the period of such extension, except that the cost of final surveys and preparation of final estimate shall not be included in such charges.

The Contractor will be granted an extension of time of completion and will not be assessed liquidated damages or the cost of engineering and inspection during any delay in the completion of the work caused by acts of God, or of the public enemy, acts of the Owner, fire, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or unusually severe weather, delays of subcontractors or suppliers arising from unforeseeable causes beyond their control, and without the fault or negligence of both the Contractor and Subcontractors or suppliers; provided that the Contractor the Engineer in writing of the cause of delay within ten (10) days from the beginning of any such delay. The Engineer shall ascertain the facts and the extent of delay, and his findings thereon shall be final and conclusive.

7-7 <u>Adjustment of Dispute</u> - All questions or controversies that may arise between the Contractor and the and the Owner, under or in reference to this Contract, shall be subject to the decision of some competent person to be agreed on by the Owner and the Contractor, and his decisions shall be final and conclusive upon both parties.

Pursuant to Public Contract Code, Section 22201, should the Owner and the Contractor be unable to agree upon such person, a board of three arbitrators shall be chosen, one by the Owner, one by the Contractor, and the third by the two so chosen, and the decision of any two of said arbitrators shall be final and binding upon the parties. If either party to the Contract neglects or fails for a period of ten days after notice from the other party to designate an arbitrator hereunder, the arbitrator designated by the other party shall have full power to decide the dispute in the same manner as though a board of three arbitrators had been selected.

The referee or arbitrators shall decide which party shall pay the cost of arbitration, and final payment to the Contractor shall not be made until the full decision of the referee or arbitrators has been rendered.

7-8 <u>Suspension of Contract</u> - If at any time in the opinion of the Owner, the Contractor has failed to supply an adequate working force, or material of proper quality, or has failed in any other respect to prosecute the with the diligence and force specified and intended in and by the terms of the Contract, notice thereof will be served on him and should he neglect or refuse to provide means for a satisfactory compliance with the Contract, as directed by the Engineer, within the time specified in such notice, the Owner in any case shall have the power to suspend the operation of the Contract. Upon receiving notice of such suspension, the Contractor shall discontinue said work, or such parts of it as the Owner may designate.

Upon such suspension, the Contractor's control shall terminate, and thereupon the Owner or his duly authorized representative may take possession of any and all or any part of the Contractor's materials, tools, equipment, and appliances upon the premises, and use the same for the purpose of completing said Contract, and hire such force or rent such additional machinery, tools, appliances and equipment, and buy such additional materials and supplies at the Contractor's expense as may be necessary for the proper conduct of the work and for the completion thereof; or may employ other parties to carry the Contract to completion, employ the necessary workmen, substitute other machinery or materials, and purchase the materials contracted for, in such manner as the Owner may deem proper; or the Owner may annul and relent the work or any part thereof. Any excess cost arising there from over and above the Contract price will be charged against the Contractor and his sureties, who will be liable therefore. In the event of such suspension, all monies due the Contractor or retained under the terms of the Contract shall be forfeited to the Owner but such forfeiture will not release the Contractor or his sureties from liability for failure to fulfill the Contract. The Contractor and his sureties will be credited with the amount of money so forfeited toward suspension of the operation of the Contract and the completion of the work by the Owner as above provided, and the contractor will be so credited with any surplus remaining after all just claims for such completion have been paid.

In the determination of the question whether there has been any such non-compliance with the contract as to warrant suspension or annulment thereof, the decision of the Owner shall be binding on all parties to the Contract.

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GENERAL SPECIFICATIONS ARTICLE 1 SECTION 8 - MEASUREMENT AND PAYMENT

8-1 <u>Extra and Force Account Work</u> - Extra work as hereinbefore defined, when ordered and accepted, shall be paid for under a written work order in accordance with the terms therein provided. Payment for extra work will be made at the unit price or lump sum previously agreed upon by the Contractor and the Engineer, or by force account.

If the work is done on force account in shall be performed and paid for in accordance with Caltrans Standard Specifications and labor and equipment rates in effect at the time of the bid.

All extra work and force account shall be adjusted daily upon receipt sheets, prepared by the Engineer, furnished to the Contractor and signed by both parties, which daily reports shall thereafter be considered the true record of extra work or force account work done.

8-2 <u>Change Orders</u> - The construction contract, plans and detailed specifications contained contain the provisions required for the construction of the project. No information obtained from any officer, agent, or employee of the District on any such matters shall in any way affect the risk or obligation assumed by the Contractor or relieve him from fulfilling any of the conditions of the Contract.

The Engineer may order changes, including revisions, to drawings and specifications, performance of extra work, increases or decreases in contracted items of work, and the elimination of work. Such orders will be in writing. Changes shall not affect the obligations of the sureties on the contract bonds nor require their consent. The Contractor shall promptly notify the Engineer whenever it appears that a change is necessary, and when so directed, shall stop work in the areas that may be affected. Contract time and compensation will be adjusted for changes, which materially increase or decrease the time for performance or cost.

When so directed, the Contractor shall proceed with changes before agreement is reached on contract adjustments to compensation or time of performance, and shall furnish to the Engineer at the end of each day, signed detailed hourly records for that day of labor, construction equipment and itemized records of materials, equipment and services used in performance of the changes. If the Contractor fails to provide such records, the Engineer's records will be used for the purpose of adjusting compensation or time of performance.

8-3 <u>Lump Sum Change Orders</u> - When applicable, changes in contract price resulting from extra work may be determined by a mutually agreed upon lump sum price. The Contractor's proposal for such changes shall include a detailed breakdown of labor and materials to be provided by his forces or by the forces of his subcontractor or material supplier. The breakdown shall be based on force account rates and markup.

The Engineer shall receive the Contractor's proposal for lump sum change orders within five (5) days following the issuance of the change order price request.

8-4 <u>Omitted Work</u> - The District may, by written order to the Contractor, omit work, equipment, and material to be provided under the Contract, and the value of the omitted work, equipment, and material will be deducted from the contract price in accordance with the bid schedule.

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8-5 <u>Progress Payments</u> - The Engineer will, after award of the Contract, establish a monthly closure date for the purpose of making monthly progress estimates. The Contractor may request in writing that such monthly closure date be changed. The Engineer may approve such request when it is compatible with the District's payment procedure.

Each month, the Engineer will make an approximate measurement of the work performed and materials delivered to the closure date, which will become the basis for making monthly progress estimates.

The Engineer for progress estimate payment purposes shall determine the value of the work completed.

From each progress payment, ten percent (10%) will be retained by the owner, and the remainder, less the amount of all previous payments, will be paid to the Contractor.

No progress payment made to the Contractor or its sureties will constitute a waiver of the liquidated damages under Section 7-5.

As provided for in Section 4590 of the California Government Code and Section 10263 of the California Public Contract Code, the Contractor may substitute securities for any monies withheld by the owner to ensure performance under the contract.

- 8-6 <u>Stop Payment Notices</u> The District, through the Engineer or other appropriate District's representatives, may at its option and at any time, withhold additional amounts due the Contractor sufficient to cover claims filed pursuant to Section 3179 et seq. of the Civil Code.
- 8-7 <u>Final Payment</u> The Engineer shall, after the completion and acceptance of the Contract, make a final estimate of the amount of work done there under, and the value of such work, and the District shall pay the entire sum so found to be due after deducting there from all previous payments and all amounts to be kept and all amounts to be retained under the provisions of the Contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. The final payment shall not be due and payable until the expiration of thirty (30) days from the date recorded on the Notice of Completion filed with the County, by the District.

Work will not be considered complete in areas where a certificate of approval from the County, State or other regulatory agency is required until said certificate is received by the District.

It is mutually agreed between the parties to the Contract that no certificates given or payments made under the Contract, except the final certificate or final payment, shall be

conclusive evidence of the performance of the Contract, either wholly or in part, against any claim of the party of the first part, and no payment shall be constructed to be an acceptance of any defective work or improper materials.

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The Contractor further agrees that the payment of the final amount due under the Contract, and the adjustment and payment for any work done in accordance with any alterations of the same, shall release the District and the Engineer from any and all claims or liability on account of work performed under the Contract or any alteration thereof.

GENERAL SPECIFICATIONS ARTICLE 1 SECTION 9 - SPECIAL PROVISIONS

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9-1 <u>Public Liability and Property Damage Insurance</u> - The Contractor shall take out and maintain during the life of the Contract, Public Liability and Property Damage Insurance, in which the Owner, The Engineers, The RD Program Manager, the District board members and The Port of Stockton shall be named as an additional assured, which will protect the Contractor, and or all Subcontractors, Owner or its agents or representatives, against any claim for personal injury, including accidental death as well as from the operation of the contractor, whether such operation shall have been performed by the Contractor, any Subcontractor, or by anyone employed either directly or indirectly by any of them.

The Public Liability and Property Damage Insurance shall be provided with the limits not less than the following:

- 1. Limit or liability for injury or accidental death, \$1,000,000 per occurrence.
- 2. Limit or Liability for Property Damage, \$1,000,000 per occurrence.

The Contractor shall furnish the Owner with satisfactory proof of the carrying of the required insurance by submitting certifications or policies of insurance to the Engineer, prior to commencement of work under the Contract. Any work performed prior to the submission of such certification or policies shall be considered as having been done by him at his own risk and as a volunteer.

- 9-2 <u>Guarantee</u> The completed project, including all work, materials, devices and equipment, shall be guaranteed by the Contractor against faulty workmanship and materials for a period of one year after final acceptance by the Owner. The Contractor shall be responsible for all repair and/or replacements to include all labor, materials, equipment, devices, plant and other items of work necessary. To secure this guarantee, the Contract bonds as specified in Section 2-9 shall continue in full force and effect for one year from the date of formal acceptance of the work by the Owner.
- 9-3 <u>Change Orders</u> The Construction Contract, Plans and the detailed Specifications contain the provisions required for the construction of the project. No information obtained from any officer, agent, or employee of the Owner on any such matters shall in any way affect the risk or obligations assumed by the Contractor or relieve him of from fulfilling any of the conditions of the Contract.
- 9-4 <u>Preservation of Property</u> Attention is directed to Article 1, General Conditions, Section 6-9 "Preservation of Property" and Section 6-10 "Responsibility for Damage".

The approximate location of known utilities, submarine cables, siphons, discharge pipes, etc., is shown on the plans for the information of the contractor. The Owner and Engineer assume no responsibility for the reliability or accuracy of the information. The contractor shall immediately repair, or replace, if necessary, any damaged facilities.

Trees, shrubs, and other plants that are not to be removed and pole lines, fences, signs, markers and monuments, buildings and structures, conduits, pipelines under or above ground, sewer and water lines, all highway facilities and any other improvements or facilities shall be protected from injury or damage and if ordered by the Engineer, the Contractor shall provide and install suitable safeguards, approved by the Engineer, to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operations, they shall replace or restored at the Contractor's expense. The facilities shall be replaced and restored in a condition as good as when the Contractor entered upon the work.

- 9-5 <u>Traffic Control</u> Contractor shall be responsible for all traffic control, including placing and maintaining warning signs and lights. Coordination with the proper agencies shall be the responsibility of the Contractor. A large 3x6 sign shall be maintained at the Ferry slip indicating when and where the road will be closed.
- 9-6 <u>Right-of-Way</u> The owner will furnish all of the right of way for the work.
- 9-7 <u>Completion</u> The Contractor, upon completion of all work, shall restore all Owner access roads to project sites to the condition existing prior to commencement of work.
- 9-8 <u>Water Pollution Control</u> The Contractor shall exercise every reasonable precaution to protect streams, waterways, and other bodies of water from pollution with fuels, oils, bitumen, calcium chloride, and other harmful materials and shall conduct and schedule his operations so as to avoid or minimize muddying and silting of said streams, lakes, reservoirs, bays and coastal waters. Care shall be exercised to preserve vegetation beyond the limits of construction.

Water pollution control work is intended to provide prevention, control and abatement of water pollution to streams, waterways, and other bodies of water. Nothing in the terms of the Contract shall relieve the Contractor of the responsibility for compliance with Sections 5650 and 12015 of the Fish & Game Code, or other applicable statutes relating to the prevention or abatement of water pollution.

9-9 Job Specific Submittals. -The following items shall be submitted with the contract bonds and insurance requirements of the contract.

1. <u>Safety Plan.</u>

2. <u>Initial baseline Schedule.</u> The schedule shall note the notice to proceed and contract duration. The procurement and gathering durations. The irrigation system installation, grading operations and the revegetation schedule.

- 9-10 <u>Preconstruction Conference</u> The Engineer will schedule a conference with the Contractor within ten (10) days after the Notice To Proceed has been sent to the Contractor. Contractor and subcontractor representatives shall attend.
- 9-11 <u>Initiation Of Work</u> The Contractor shall start work within ten (10) days after he receives the Notice To Proceed.

9-12 <u>Project Meetings</u> - Meetings will be held as often as is deemed necessary by the Engineer. Representatives of the Contractor shall attend.

The purpose of the meetings will be to discuss compliance with the Contract plans and specifications, progress, coordination, submittals, and job-related issues and changes.

9-13 <u>Security</u> - The Contractor shall at all times be responsible for the security of his plant and equipment. The Owner will not take any responsibility for missing or damaged equipment, tools, or personal belongings.

9-14 <u>Documentation and Access to Records</u> - The Contractor shall maintain books, records, documents and other evidence directly pertinent to performance on State grant work under this contract in accordance with generally accepted accounting principles and the financial information and data used by the Contractor in preparation or support of the cost submission for any negotiated contract or change order and a copy of the cost summary submitted to the District. The Department of Water Resources, the State Reclamation Board, the State Controller's Office, the District, or any of their authorized representatives shall have access to such books, records, documents, and other evidence for the purpose of inspection, audit, and copying. The Contractor will provide facilities for such access and inspection.

Records shall be maintained and made available during performance on work under this contract and until ten (10) years from the date of final payment for the project. In addition, those records which relate to any Dispute appeal under this contract, to litigation, to the settlement of claims arising out of such performance, or costs or items to which an audit exception had been taken, shall be maintained and made available until three (3) years after the date of resolution of such appeal, litigation, claim, or exception.

- 9-15 <u>Mobilization-</u> Mobilization shall be defined and paid as defined in Caltrans Standard Specifications.
- 9-17 <u>Order of work-</u> Initial weed control shall precede plant installation. Main line Irrigation shall be installed prior to plant installation.

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9-18 <u>Hours of Work</u> The District imposes no limitations on the hours of performing the work. In the event that work is being performed outside of the operation of the Delta Ferry Authority, the contractor shall provide transportation for the engineer and all affiliates as required.

GENERAL SPECIFICATIONS ARTICLE 1 SECTION 10 - DESCRIPTION OF WORK

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The work to be performed shall consist of furnishing all labor, materials, tools, transportation, supplies, equipment, appurtenances, fuel, and power, unless specifically excepted, necessary or required for the construction and adjustment of appurtenant facilities on the job site as shown on the plans as staked in the field.

The work will consist of: (1) clearing the site of weeds, non-native plants and debris; (2) site grading; (3) procuring and obtaining plantings; (4) installing plantings and irrigation;(5) installing fencing; (6) grading a pond and levee ramp; (7) maintaining the site for a subsequent three years; and (8) re-planting as necessary to meet Performance Criteria.

TECHNICAL SPECIFICATIONS ARTICLE II DIVISION I GENERAL SECTION 1.1 DEFINITIONS AND REQUIREMENTS

1.0 <u>General</u> - Unless the context otherwise requires, whenever in the plans and specifications, the following abbreviations and terms are used, the intent and meaning shall be interpreted as provided herein.

AB AC ANS! ASTM BC BFE BM BRK BS CB CF CL CO COE CP CY DIA DFG E A CC COE CP CY DIA DFG E EA EC EG EL/ELEV EP ESMT ETC EXC FS FT GA GAL GALV	Aggregate Base Asphalt Concrete American National Standards Institute American Society of Testing Materials Beginning of Curve Base Flood Elevation Bench Mark Break Backsight Catch Basin Cubic Foot Centerline County Corps Of Engineers Control Point Cubic Yard Diameter Dept of Water Resources Department of Fish and Game East Each End of Curve For Example Elevation Edge of Pavement Easement Et Cetera Excavation Foresight Feet Gauge Gallons Galvanized
FS	Foresight
GRND	Ground
GS HI	Ground Shot Height of Instrument
HP	Hinge Point
HWY ID	Highway Inside Diameter
IN, "	Inch
INV	Invert

LF	Linear Foot
L/S	Land Side Of Levee
MAX	Maximum
MAX	
MIN	Manhole
	Minimum
MPH	Miles Per Hour
N	North
NGVD	National Geodetic Vertical Datum
NO	Number
OD	Outside Diameter
PK	Concrete Nail
R	River
RCE	Registered Civil Engineer
R/S	River Side of Levee
R/W	Right-of-Way
S	South
SCH	Schedule
SL	Slough
ST	Street
STA	Station
STD	Standard
SQFT	Square Foot
SQYD	Square Yard
STATE STA	ANDARD SPECIFICATIONS: State of California Dept of Transportation Standard
Specificatio	
TP	Turning Point or Test Pit
TR	Top of Rock/Riprap
UL	Underwriter's Laboratories
USA	Underground Service Alert
USGS	U. S. Geologic Survey
W	West
WS	Water Side of Levee
X-SEC	Cross Section

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Where reference to ANSI, ASTM, State Standard Specifications, or similar standards or specifications is made, it shall be understood that reference is made to the latest revision of the particular specifications.

TECHNICAL SPECIFICATIONS ARTICLE II DIVISION 2 - SITE WORK SECTION 2.1 INITIAL WEED CONTROL/CLEARING AND ONGOING WEED MAINTENANCE

1.0 <u>General Requirements</u>

- 1.1 <u>Scope of Work</u> There are primarily three (3) types of non-native, invasive weed species to be removed from the site: Bermuda grass, yellow star thistle and Himalayan Blackberry. In addition, there are other non-native, invasive grasses that will also need to be managed. The work to be performed under this Section shall consist of furnishing all labor, materials, tools, transportation, supplies, equipment, appurtenances, fuel, and power, unless specifically excepted, necessary or required for the work as shown on the plans and described in these specifications.
- 1.2 <u>Description of Work</u> This work shall consist of 1) initial weed maintenance (i.e., kill or remove all invasive weeds) prior to planting to prepare the Site for plant installation, 2) cleaning the Site of any plant debris, trash, and fencing within the boundaries, and 3) ongoing weed control throughout the three-year maintenance period. Existing native species (e.g., willows) shall be protected from damage or removal.
- 1.3 <u>Submittals</u> The following submittal(s) shall be made within twenty (20) days of receiving the notice to proceed. The District will review the material and return to the Contractor within fifteen (15) days of receipt. Any required resubmitted time for revisions will not be counted toward the critical path of the construction schedule.
 - 1.3 A <u>Weed Control Plan</u>. As part of the Weed Control Plan, the Contractor shall submit, for each weed species, the method of control (mechanical, chemical, fire, etc.). the schedule for weed control, and the method(s) to protect existing or planted native plant species. If herbicides are to be used, the Contractor shall in addition specify the type of herbicides, including application rate, and the name of the licensed applicator(s) to perform the weed control. This Plan shall encompass initial weed control during Site preparation and clearing, as well as detailing the methods and schedule for weed maintenance for a period of 3 years following Site construction and revegetation.

2.0 <u>Construction</u>

- 2.1 <u>General</u> During the progress of the work, the Contractor shall keep the premises occupied by the Contractor in a clean and orderly condition, disposing of refuse in a manner satisfactory to the District. Further, the Contractor is responsible for knowing, and shall comply with, all applicable Federal, State, County and Local requirements regarding the disposal of refuse and vegetative material.
- 2.2 <u>Initial Weed Removal</u> An initial weed maintenance effort shall occur prior to revegetation efforts on the Site. The initial weed maintenance shall focus on, but not be limited to, elimination of Bermuda grass, yellow star thistle and Himalaya blackberry. Initial weed removal shall occur across the entire site to kill the non-

native, invasive plant species that will inhibit re-establishment of native species on the site or will hinder achievement of the Performance Standards. Care shall be taken to ensure that the existing native plants and trees are not impacted.

The Contractor shall state the method(s) and timing of weed control, by species, as part of the Contractor's Weed Control Plan (Section 1.3 A above). In addition, The contractor shall determine whether the dead weed mat layer shall be left for weed suppression or should be disrupted or removed. DFG recommendations for treatment of specific weeds is discussed in the Mitigation Plan (Appendix A).

- 2.3 <u>Debris Removal</u>- The Contractor shall remove all existing plant debris and trash at the site prior to planting operations; this will include the existing fence and all miscellaneous steel and debris. The fence along the south boundary shall remain.
- 2.4 <u>Removal and Disposal of Material</u> All materials removed shall be disposed of in a manner that meets with the approval of the District. No items to be removed shall be donated or sold to any person on the Island. Grubbings will be stockpiled and either chipped, burned or buried at mutually agreeable (i.e., between the Contractor and the District) stockpile areas. All burning permits and air quality requirements are the Contractor's responsibility. No burning shall be performed within fifty (50) feet of peat soil deposits.
- 2.5 <u>Post-implementation Weed Maintenance.</u> A 3-year period of weed maintenance, including spot use of herbicides, hand removal, and/or mechanical scraping, will be used to control invasive weeds as necessary in order to control non-native vegetation and to meet Performance Standards for percent cover. The Contractor shall specify the methods and schedule as part of the Contractor's Weed Control Plan (Section 1.3A above). The formal weed maintenance period shall begin February 1,2007, upon completion of planting and continue for 36 months ending on January 31, 2010.
- 2.6 <u>Related Requirements</u> In areas where excessive dust is a nuisance to property owners, the Contractor shall wet down the area and otherwise control dust during construction.

3.0 Measurement and Payment

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- 3.1 <u>Measurement</u> Measurement for weed control will be based on percent complete as determined between the Contractor and the District.
- 3.2 <u>Payment</u> Full compensation for all costs incurred and the work covered in this Section shall be included in the unit price paid for Bid Item 2 – <u>Weed control and</u> <u>clearing</u> and Bid Items A1, A2 and A3 – Maintenance <u>periods</u> as set forth in the Contractor's Bid, and no additional or separate compensation will be made therefore. Progress payments for Bid Item No 2 will be made no more than monthly. Progress payments for Maintenance periods will be made on a guarterly basis.

TECHNICAL SPECIFICATIONS ARTICLE II DIVISION 2 - SITE WORK SECTION 2.2 – RESTORATION PLANTING

1.0 <u>General Requirements</u>

- 1.1 <u>Scope of Work</u> The work performed under this Section shall consist of furnishing all labor, materials, tools, transportation, supplies, equipment, appurtenances, fuel and power, unless specifically excepted, necessary or required to perform plant and material procurement for local plant stock, and plant installation, as shown on the Plans and described in these Specifications.
- 1.2 <u>Description of Work</u> Develop a detailed planting plan and schedule, procure, install and maintain the mitigation plantings. The work shall be performed in accordance with these specifications. The Contractor is responsible for installing the plants in a manner that will guarantee their performance for the duration of the maintenance period, as defined by the Performance Standards.
- 1.3 <u>Submittals</u> The following submittal(s) shall be made within twenty (20) days of receiving the notice to proceed. The District will review the material and return to the Contractor within fifteen (15) days of receipt. Any required resubmitted time for revisions will not be counted toward the critical path of the construction schedule.

1.3 A Detailed Planting Plan and Schedule - Using the tables in Appendix B of plant species to be planted in each vegetation/habitat type and the information provided in section 2.0 (Planting Zones), the Contractor shall submit a detailed list of the species to be provided for each vegetation type, including acreages described, and the layout and spacing of plantings in each vegetation type. The Contractor shall identify the Dominant species and the Associated species to be used in each vegetation type. The list shall include the common name, scientific name, source, quantity of each species, density of each species, and type of planting method of the species. The date that each species will be ready for planting shall also be included; along with the dates that each species will be planted shall be included in the plan. Seed mixtures shall be specified designating pounds per acre per species and percent live seed as well as any additive mixtures such as inoculants and fertilizer. The method of seeding herbaceous species shall be included in the plan. The list and schedule will be reviewed by the District within twenty (20) days of receipt. The approved planting plan will be used for inspection and measurement as well as approval of planting operations.

1.3 B <u>Commercial Nursery Identification</u>. The Contractor shall submit the name and location of the nursery to be used to procure the plantings identified in Appendix B. Include the species to be provided, the time frame for beginning the growth and the expected duration until established for planting.

1.3 C <u>Access Plan.</u> As detailed in Article II, Division 2 (Site Work), Section 2.3 (Irrigation System). Part 1.3B, the Contractor shall submit a site map showing proposed access roads and foot paths within the Site. The access roads shall be placed to minimize disturbance to plants and plant density. The Access Plan shall provide information about types of vehicles and equipment that will be used onsite during restoration planting (Article II, Division 2, Section 2.2), grading (Article II,

Division 2, Section 2.4), and maintenance (Article II, Division 2, Section 2.5). The Access Plan shall provide information on protecting irrigation installation (Article II, Division 2, Section 2.3).

2.0 <u>Planting Zones</u>

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Attached in Appendix B is a planting list showing the quantities of Dominant species to be installed for each vegetation type. The Contractor shall supplement this list with the Associated species of the Contractor's choice as outlined in Appendix B. The Contractor shall ensure that only native species are planted on the Site.

For Dominant species where the method is listed as "plugs/seeding", Both plugs and seeding shall be employed. This only occurs in the Low Dune Scrub planting zone. In the Low Dune Scrub zone, it is required to plant both plugs and seed of the Dominant herbaceous species, as discussed in Section 2.1 below and according to the specifications in Section 4.5 below.

2.1 <u>Dune Scrub (approximately 8.87 acres)</u> – There are two elevation zones within this vegetation type, a high (3.77 acres) and a low (5.10 acres) zone. Table 2 in Appendix B presents the Dominant and Associated species for these zones.

The goal of the Dune Scrub planting zone is to replace the non-native yellow star thistle and annual grassland species with native shrubs and grasses to create and maintain a native plant community on the drier, moderately high elevation hills (generally -4 to +2 ft NGVD) with sandy soils (Piper Fine Sandy Loam). A secondary goal is to expand the existing (sparse) Valley oak population in the lower elevational zone of this community.

Control of existing non-native weeds (especially Bermuda grass and yellow star thistle) will be an important management issue. Oaks will be planted in the lower relative elevation zones (depth to late-summer groundwater \leq 12 ft) in order to minimize water stress, although a few experimental trees shall be scattered at higher elevations.

Table 2 in Appendix B presents the Dominant and Associated species, target species composition for the initial planting mix, and suggested planting method for the Dune scrub areas. Oaks and shrubs shall be planted in clusters (generally 5–10 trees/shrubs), rather than in a uniform grid spacing. In the higher elevation zone (3.77 acres), coyote brush and toyon shall be planted in clusters, on 10 foot centers, for a total density of 100 container plants/acre for a total of 378 plants. Woody species in the lower elevation zone (5.10 acres) shall include planting of oak species, and shall be planted in clusters at a total density of 150 plants/acre for a total of 766 plants. Grass plugs shall be planted in random clusters over approximately 1/3 of the lower elevation zone, for a total of approximately 1,650 plugs/acre on the low zone (8,415 plugs total). A seed mix of herbaceous species, containing both dominant and associated species, shall be seeded across the Dune Scrub area.

A minimum of three (3) Associated species shall be included in the planting mix, including at least two (2) herbaceous species. The Contractor shall determine the best method of seeding (e.g., hydroseeding, drilling, broadcast seeding), and shall

provide seeding rates for herbaceous species planted, to be specified in the Detailed Planting Plan, as discussed in Section 1.3A above.

The Contractor can make additional species recommendations (e.g., herbs), and recommendations on planting methods for Associated species, subject to District approval. Container stock for oak species has already been set-aside by the District. See discussion of District Furnished Stock Material (Section 3.1 below) and Appendix C.

2.2 Mixed Riparian Forest (MF) (approximately 11.64 acres).

The goal of the Mixed Riparian Forest is to enhance existing and create additional stands of mixed riparian forest at moderate- to low-elevation areas of Rindge Muck soils, transitioning into Piper Fine Sandy Loam soils at upper elevations. This vegetation type generally occurs in areas 4 to 12 ft above late summer groundwater levels, at approximately -10 to -4 ft NGVD in the north portion of the Parcel, and -12 to -4 in the southern portion of the Parcel.

Fremont cottonwood shall dominate the lower elevation areas in the transition down to Cottonwood/Willow Forest, and Valley oak shall dominate the upper elevation areas (approximately 8–12 ft above groundwater) in the transition to Piper Fine Sandy Loam soils and the low elevation Dune Scrub community.

Table 3 in Appendix B presents the Dominant and Associated species, target species composition for the initial planting mix, and suggested planting method for the Mixed Riparian Forest areas. The target density for woody species in the Mixed Riparian Forest is 250 plants/acre, across 11.64 acres, for a total of 2,910 woody plants. Again, woody species shall be planted in denser clusters with the interstices planted with associated shrubs, vines, and herbaceous species.

A minimum of four (4) Associated species shall be included in the initial planting mix. This shall include a minimum of:

- 2 herbaceous species
- 1 shrub/vine species

If a woody Associated species is/are chosen, it/they can replace up to 15 percent of the total Dominant woody plants, with a proportional reduction across each of the Dominant species, except for oaks. Oaks cannot be replaced by woody Associated species, and shall be planted in the amounts provided in Table 3, Appendix B. The Contractor shall determine the best method of seeding (e.g., hydroseeding, drilling, broadcast seeding), and shall provide seeding rates for Associated herbaceous species planted, to be specified in the Detailed Planting Plan, as discussed in Section 1.3A above.

The Contractor can make additional species recommendations (e.g., herbs), and recommendations on planting methods for Associated species, subject to District approval. Container stock for oak species has already been set-aside by the District. See discussion of District Furnished Stock Material (Section 3.1 below) and Appendix C.

2.3 <u>Cottonwood Willow (CW) (approximately 13.61 acres).</u>

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The goal of the Cottonwood/Willow planting zone is to enhance the existing vegetation and create additional stands of Cottonwood/Willow Forest at low elevations (generally 2 to 6 ft above late summer groundwater levels, approximately 14 to -10 ft NGVD in northern portions of the Parcel and -14 to -12 in the southern portions) areas of Rindge Muck soils. This community type is a transition between the lower elevation Riparian Scrub and Freshwater Marsh, and the higher elevation Mixed Riparian Forest.

Table 4 in Appendix B presents the Dominant and Associated species for this zone. The density for woody species for Cottonwood/Willow Forest is 250 plants/acre, across 13.61 acres, for a total of 3,402 plants. Again, woody plants shall be planted in denser clusters with the interstices planted with associated shrubs, vines, and herbaceous species.

A minimum of five (5) Associated species shall be included in the initial planting mix. This shall include a minimum of:

- 3 herbaceous species
- 1 shrub/vine species

If a woody Associated species is/are chosen, it/they can replace up to 15 percent of the total Dominant woody plants, with a proportional reduction across each of the Dominant species, except for oaks. Oaks cannot be replaced by woody Associated species, and shall be planted in the amounts provided in Table 4, Appendix B. The Contractor shall determine the best method of seeding (e.g., hydroseeding, drilling, broadcast seeding), and shall provide seeding rates for Associated herbaceous species planted, to be specified in the Detailed Planting Plan, as discussed in Section 1.3A above.

The Contractor can make additional species recommendations (e.g., herbs), and recommendations on planting methods for Associated species, subject to District approval.

2.4 <u>Riparian Scrub (RS) (approximately 12.92 acres)</u>

The goal of the Mixed Riparian Scrub zone is to enhance existing and create additional stands of Riparian Scrub at lower elevations (generally 0 to 2 ft above late summer groundwater levels, approximately -14 to -12 ft NGVD) in areas of Rindge Muck soils. This community grades down to the Freshwater Marsh area in the northern portion of the Parcel, and into the higher elevation Cottonwood/Willow zone at the upper edge of its elevation range.

Table 5 in Appendix B presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting methods for the Riparian Scrub areas. The target density for woody species is 300 plants/acre, across 12.92 acres, for a total of 3,876 plants, with a mixture of willows, buttonbush., and mule fat dominating. Again, woody species shall be planted in denser clusters with the interstices planted with associated herbaceous species.

A minimum of two (2) Associated species shall be included in the initial planting mix.

The Contractor shall determine the best method of seeding (e.g., hydroseeding, drilling, broadcast seeding), and shall provide seeding rates for Associated

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herbaceous species planted, to be specified in the Detailed Planting Plan, as discussed in Section 1.3A above.

The Contractor can make additional species recommendations (e.g., herbs), and recommendations on planting methods for Associated species, subject to District approval.

2.5 Freshwater Marsh (FWM) – (approximately 2.96 acres).

The goal of the Freshwater Marsh planting zone is to create a seasonally inundated wetland area, located in the northern portion of the Mitigation Parcel in peaty, muck soils (Rindge Muck). Currently the surface elevation ranges from -14 to -12 ft NGVD. The marsh will be excavated to create topographic variation that ranges from approximately -16 to -14 ft NGVD, which will allow for ponding of water during the winter months, and will retain soil saturation at or near the surface during summer months.

Table 6 in Appendix B presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting methods for the Freshwater Marsh area. The marsh shall be planted with clusters of plugs on 3 ft centers, for a target density of 3,500 plugs/acre. Across 2.96 acres, the estimated total number of plugs would be 10,365. The interstices between plug clusters shall be seeded with associated species. The tule/bulrush and common reed shall be planted at lower relative elevations in the marsh, and the sedge and rush species shall be planted at higher relative elevations.

A minimum of two (2) Associated species shall be included in the initial planting mix.

The Contractor shall determine the best method of seeding (e.g., hydroseeding, drilling, broadcast seeding), and shall provide seeding rates for Associated herbaceous species planted, to be specified in the Detailed Planting Plan, as discussed in Section 1.3A above.

The Contractor can make additional species recommendations (e.g., herbs), and recommendations on planting methods for Associated species, subject to District approval.

2.6 <u>Planting Requirements</u> – Each planting zone has Dominant species and Associated species. See Appendix B for the descriptions and spacing. The Contractor shall tabulate all of the species and identify which Associated species will be used. For all seeded type species to be used, the Contractor shall designate the pounds per acre, percent live seed proposed to be seeded, and the proposed method of seeding (e.g., hydroseed, drilling, broadcast). For all plug and container species the contractor shall designate, the spacing and density to be planted, to be consistent with the Mitigation Plan (Appendix A).

3.0 <u>Materials</u>

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3.1 <u>District Furnished Stock Material (Oaks)</u> – The District contracted with Hartland Nursery, Walnut Grove, in fall 2004 to procure and grow all the oak trees. The existing contract between Hartland Nursery and the District does not cover transportation of the oak stock to the project Site. The Contractor shall coordinate with Hartland Nursery and make all necessary arrangements for transportation of the oak trees to the Site at the appropriate time (see Appendix B Tables 2 and 3 for planting zones and distribution of oaks, and Appendix C for Hartland contract information).

- 3.2 <u>Nursery Stock Material</u> The Contractor shall procure the other plantings and seed as described above and in Appendix B with the following specifications. The Contractor shall make all reasonable efforts to identify and utilize local plant stock collected from within the Legal Delta (see Appendix D - Map of Legal Delta), growing under similar ecological conditions, to revegatate the Site. If a particular species cannot be found within the limits of the Legal Delta, the Contractor shall specify its point of origin and obtain approval from the District. Nursery stock material shall come from established commercial nursery(s) with similar climatic conditions to those in the locality of the Site and that are familiar with growing native type plantings. The Contractor shall be responsible for ensuring that stock material is collected during the appropriate time of year or that the nursery provides existing instock material already collected from within the Legal Delta.
- 3.3 <u>Cuttings Material</u> The Contractor shall identify source areas for cuttings in the Detailed Planting Plan, as discussed in Section 1.3A above. The District has access to the Port of Stockton parcel on the island, which is an option for gathering of cuttings for Goodding's black willow and arroyo willow. Some mature Fremont cottonwoods are also found onsite. The Contractor shall have access to review this site prior to bid to determine the adequacy of the stock on site for use on the project. It is the Contractor's responsibility to verify whether or not these species are consistent with the species defined in the Mitigation Plan and to determine if adequate cuttings can be developed from the site as defined in Appendix B. Use of cuttings from the Port of Stockton site is optional. The Contractor may also obtain cuttings from other levee areas along Bradford Island or from another suitable location within the Legal Delta (Appendix D Map of Legal Delta), as long as the source is identified in the Detailed Planting Plan.

The Contractor shall identify potential sources of cuttings within the collection area of the legal Delta for Fremont cottonwood, California blackberry, and shining or red willow. The cuttings may be substituted for the container stock requirements identified in Appendix B for each species if it is determined to be more cost-effective, subject to the District's approval.

Cuttings shall be collected during the dormant period for these species, kept moist, and installed on the Site preferably within one week of collection. Unless placed in cold storage, cuttings shall be planted within two-weeks of procurement. Collection during late fall/early winter 2005 (October 1, 2006 through January 31, 2007) will coincide with the dormancy period and the revegetation schedule.

- 3.4 <u>Inspection</u> Plant materials are subject to inspection by the District or the District's representatives at the commercial nursery(s) and on site. The acceptance of plant stock by the District does not waive the responsibility of the Contractor for performance of the material throughout the maintenance periods.
- 3.5 <u>Delivery</u> Plants shall be delivered in a manner that will prevent damage to the branches, roots and shape. Plants shall be covered during transportation. Root balls shall be kept moist. The Contractor is responsible for coordinating delivery to

the Site.

- 3.6 <u>Storage</u> Plants not installed on the day of delivery shall be stored in such a manner that no damage shall occur. Root balls shall be kept moist. Plants shall be covered if a threat of damage from sun, wind, frost, rain or other causes is possible.
- 3.7 <u>Growing Conditions</u> Plants shall be grown in various size containers that accentuate long root growth. Minimum sizes include the following:
 - 2 x 2 x 5 inch tree bands
 - 2.5 x 2.5 x 9 inch tree bands
 - 9 inch Dee pots
 - 8 inch leach tubes
 - 1 gallon-sized containers

Plant material shall be grown for several months but not more than two (2) years to ensure that they meet the quality characteristics defined below.

- 3.8 <u>Quality</u> Plant and seed quality shall be of good quality per the guidelines and requirements outlined below.
 - 3.8 A Plants shall show vigorous growth and health characteristics. Vigorous health and root development is more important than height and spread. Plants shall be free of insects, disease, disfiguring knots, sun-salt injuries, abrasions and other objectionable defects.
 - 3.8 B Roots shall be well distributed throughout the entire soil ball and fully developed without restriction. Plants shall not be root bound nor have bent roots. Five (5) percent of plants shall be inspected for conformance with these criteria by the District.
 - 3.8 C Seed mixtures shall be reviewed on site by comparing the amount of seed installed in the mix to the acreage covered. All seed shall come in weighed bags stating the contents, weight, percent live seed, and any seed treatment such as inoculation. Seed mixtures prepared offsite shall have a certificate of compliance stating the quantities used to make the mixture.
- 3.9 <u>Extra Stock</u> It is the Contractor's responsibility to order enough stock such that plants rejected for reason of damage or quality shall not impact the design quantities established. It is the responsibility of Hartland Nursery to provide healthy oak stock material in the quantities requested.
- 4.0 <u>Construction</u>
 - 4.1 <u>Weed Control and Ground Preparation</u> All areas to be planted shall be free weeds and cleared as described in Division 2, Section 2.1 "Weed Control and Clearing".
 - 4.2 <u>Timing</u> Installation shall occur between October 1, 2006 and January 31, 2007, after the onset of the first winter rains, in order to maximize success of plant establishment (typically during plant dormancy) and minimize initial irrigation demands. The contractor shall provide a schedule stating when each species shall

be planted, per Section 1.3A above.

- 4.3 <u>Container Plants</u> Plantings obtained from the nursery shall be planted to minimize disturbance of the root system and avoid air pockets in the planting hole. This shall generally include the following steps:
 - Clear a three (3) foot square area of weeds, weed debris, herbaceous groundcover, and other materials to reduce competition from weeds and non-native plants.
 - For sloping terraces dig a twelve (12) to eighteen (18) inches wide terrace that slopes slightly back to the bank.
 - A hole shall be excavated to approximately twice the size of the plant's root ball and two (2) to four (4) times the width of the root ball. For gallon containers this shall be twelve (12) to eighteen (18) inches deep and across, and for nine (9) inch D-pots this shall be approximately twelve (12) to eighteen (18) inches deep and ten (10) to twelve (12) inches across.
 - The sides of the hole shall be roughened if necessary and partially filled with loose, amended soil.
 - Each container planting for trees and shrubs shall be fertilized using slowrelease fertilizer (approximately one quarter of an ounce) or slow-release fertilizer tablets. Tablets will be tightly compressed, long lasting and slowrelease weighing approximately twenty-one (21) grams and having a P/N/K ratio of approximately 20:10:5. Fertilizer shall be placed in the root zone of the plant before backfill.
 - The plant shall be carefully removed from the container, leaving the root ball completely intact.
 - Any plants not exhibiting a healthy root system shall be discarded.
 - The plant shall be placed into the planting hole and the soil firmed around the plant to bring the soil to slightly above the root crown at finished grade (i.e., 1/2-inch above the soil).
 - The plants shall be placed in soil depressions or collection basin to increase the amount of precipitation intercepted by the plant and "watered-in" at the time of planting. On slopes, a three four (3–4) inch high, hand-compacted earth berm shall be constructed along the forward edge of the planting terrace for a watering basin.
 - Immediately after installation, the plant shall be irrigated to settle the soil around the plant. If the root becomes exposed, additional soil shall be placed around the root crown.
- 4.4 <u>Cuttings</u> Plant materials that are to be obtained by cutting shall be procured and planted during dormancy, as specified in Section 3.3 above. The Contractor shall plant the cuttings using the best planting technique (e.g., treating the base or basal

ends with root hormones or fungicide where appropriate) and shall plant cuttings in the correct orientation according to the following basic steps:

- Cuttings shall be taken from vigorous-growing, healthy shrubs and trees.
- Willow and cottonwood poles shall be approximately three (3) to four (4) feet long and at least one-half (1/2) inch in diameter at the base, but no larger than approximately six (6) inches in diameter. Some shorter cuttings (minimum of 18 inches) can be installed in the Cottonwood/Willow zones where late-summer groundwater levels are three (3) to four (4) feet below the ground surface. Cuttings of cottonwood and willow species shall be obtained during plant dormancy.
- On woody cuttings, the base of the cutting (end to be planted in the ground) shall be indicated by cutting it at a forty-five (45) degree angle, and the top will be cut at a ninety (90) degree angle.
- Before bundling, most auxiliary branches and leaves shall be removed; for grasses and grass-like species, the overall length should be trimmed to about one half (1/2) their normal height.
- Cuttings shall be bundled in lots of twenty-five (25) to fifty (50), with all basal ends oriented in the same direction to aid in proper installation.
- Unless placed in cold storage, cuttings shall be planted within two-weeks of procurement.
- Cuttings shall be kept moist, shall not be left in the sun or wind, and shall be transported in covered vehicles to protect them from desiccation.
- Cuttings shall be planted in pre-drilled holes so that approximately four (4) to six (6) inches of the cutting remains above the ground.
- The hole shall be closed with loose soil and firmed around the plant by tamping (e.g., with the heel of the boot or shoe) to close the hole completely. No airspace shall be left between the cuttings and the soil.
- The cuttings shall be watered immediately after planting to settle the soil and eliminate air pockets. If the base becomes exposed, additional soil shall be placed around the cutting.
- 4.5. <u>Plugs and Seeds</u> Plugs for grasses, rushes, and sedges obtained from native plant nursery(s) shall be planted per the nurseries' specifications and recommendations, but shall follow similar guidelines described above for container stock and cuttings. Plugs shall be a minimum of three (3) inches deep (e.g., 1.25 in diameter X 3 in deep), with the preferred minimum size of 930 cubic inches (e.g., 1 in diameter X 4.75 in deep), or the equivalent size if dividing stock from a larger container. Seeds for herbaceous species shall be seeded in the interstices between plantings, using a method to be specified by the Contractor in the Detailed Planting Plan (Section 1.3A above).

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- 4.6 <u>Mulch</u> The Contractor shall install a mulch layer of weed-free wood products at least three (3) inches thick, in a three (3) ft diameter around the base of all containerized or cutting stock material, unless the species is designated as "herbaceous" in Tables 2-6 of Appendix B. No mulch shall be required around herbaceous species that are seeded or planted with plugs.
- 4.7 <u>Tree Stakes</u> It is the Contractor's responsibility to stake trees if required to protect from wind.
- 4.8 <u>Access</u> Access perimeter gates shall be provided by the District. Access foot paths within the Site shall be allowed if required by the Contractor. Limited vehicle access roads shall also be allowed within the Site subject to review and approval by the District. Irrigation and plantings shall be protected through the access areas. The Contractor shall develop an Access Plan, as discussed in Article II, Division 2, Section 2.3 (Irrigation System) below.
- 4.9 <u>Layout</u> The District shall stake the limits of the Planting zones at 100 foot intervals. When the limits of a zone are defined by a contour line the Contactor shall have the ability to interpolate between the stakes to follow the contour elevation. The Contractor shall be responsible for staking, as necessary, the plant layout and spacing to meet the design presented in the Contractor's Detailed Planting Plan.

5.0 Measurement and Payment

- 5.1 <u>Measurement</u> Restoration planting will be measured by percent complete. The number of plants furnished or installed in accordance with the Contractor's approved Planting Schedule will be used to determine percent complete.
- 5.2 <u>Payment</u> Payment for the work performed under this Section shall be per percent complete as set forth in the Contractor's bid for <u>Bid Item 3</u> Plant Procurement and <u>Bid item 4</u> Plant Installation. All costs of related items to purchase and gather cuttings including delivery and storage are to be included with the price for <u>Bid Item 3</u> Plant Procurement. All costs related to installation are to be included with the price for <u>Bid Item 4</u> Plant Installation.

TECHNICAL SPECIFICATIONS ARTICLE II DIVISION 2 - SITE WORK SECTION 2.3 IRRIGATION SYSTEM

- 1.0 General Requirements
 - 1.1 <u>Scope of Work</u> The work to be performed under this Section shall consist of furnishing all labor, materials, tools, transportation, supplies, equipment, appurtenances, fuel, and power, unless specifically excepted, necessary or required to design, furnish and install the irrigation system required to assure the success criteria of the restoration plantings.
 - 1.2 <u>Description of Work</u> The District has provided an onsite water well for the purposes of plant irrigation. The Contractor shall complete the development of the well onsite with a pump and pressure system. The existing pump may be used if it meets the requirements of the contractors system. The Contractor shall establish an irrigation system consisting of piping, valving, drip emitters and sprinklers, wiring and controls to provide water to the plants. The Contractor shall determine what level of watering is required to ensure plant survival and limit weed propagation per the Performance Standards. It is the responsibility of the Contractor to ensure that all plants are supplied with the proper amount of moisture for plant growth in the establishment and maintenance periods.
 - 1.3 <u>Submittals</u> The following submittal(s) shall be made within twenty (20) days of receiving the notice to proceed. The District will review the material and return to the Contractor within fifteen (15) days of receipt. Any required resubmitted time for revisions will not be counted toward the critical path of the construction schedule.
 - 1.3 A <u>Irrigation Plan</u>. The Contractor shall submit an Irrigation Plan prepared by qualified individual(s) including the following:
 - Plan view of the piping system with system specification such as sizes, materials, and installation methods (e.g., above or below ground installation). The plan view can also show proposed access roads and foot paths per the Access Plan requirement below (1.3 B) and shall make sure that the irrigation system is adequately protected from vehicle and foot traffic.
 - Pipes may be laid above ground within mitigation site and shall be installed in an organized manner. Pipes located outside the boundaries of the actual mitigation site shall be buried with at least 3 ft of cover.
 - Drip and sprinkler watering patterns including frequency and duration information.
 - Control system, electrical schematic and wiring diagram information.
 - The plan shall include description(s) on how the Contractor proposes

to adequately protect the system from vehicle and foot traffic as well as winter freezing.

- Well Development Plan. The Contractor shall submit product specifications for pump and appurtenances to be used.
- The Contractor shall submit specifications on pipe materials, sprinklers, valves and controls.
- The Contractor shall submit flow calculations for well and distribution system.
- The Contractor shall submit pump and control enclosure structure drawing or literature.
- 1.3 B <u>Access Plan</u>. The Contractor shall submit a site map showing proposed access roads and foot paths within the Site that assure that the plant layout and density is not affected by the need for access. The Access Plan shall provide information about protecting irrigation installation. Note, the Access Plan can be included on the plan view of the Irrigation Plan above (1.3 A).
- 1.3 C <u>Operations Manual</u>: Prior to accepting the phase one portion of the contract the contractor shall submit a complete manual with all of the above submittals. A description of the and procedures for operating and maintaining the irrigation system.

2.0 Materials

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2.1 <u>Water Supply</u> – The District has furnished the well for water supply. The well reports for the installation of the well are included in Appendix E. The Contractor is responsible for furnishing and installing the pump and pressure system to assure an adequate water supply and irrigation system. There is an existing meter on the electrical service for the well. If modification to the service or meter is required for the contractor's method of establishing water supply, then the contractor is required to obtain any necessary permits and associated fees. The existing pump system may be utilized by the contractor if is satisfactory for the intended use.

The contractor shall supply a hose spigot at the well for the districts use.

- 2.2 <u>Pipe</u> Pipe materials shall be designed to provide adequate water supply and pressure to irrigate the plants. Material shall be of quality to prevent excessive leakage or breakage.
- 2.3 <u>Irrigation Drip Emitters and Sprinklers</u> Irrigation shall be drip or spray or a combination. It is up to the Contractor to determine which type best provide water supply and limit weed propagation throughout the maintenance periods, as necessary to meet the Performance Standards.
- 2.4 <u>Controls and Wiring</u> Irrigation controls shall be clustered as much as possible and should be shown on the Irrigation Plan view. Timers if used shall be commercially

available and the operation of such should be simple and easy to adjust. All wiring and electrical materials shall be per applicable electrical code.

- 2.5 <u>Electricity</u> Electricity for operation of the pump and electrical controls is provided by the District. The District has a 100 amp, single-phase 120/240v service within 20 ft of its irrigation well. The Contractor is responsible for the cost of the electricity used by the meter at the pump for the duration of the project as well as the maintenance periods.
- 2.6 <u>Control Enclosure</u> The pump controls and irrigation drip and sprinkler control boxes shall be contained in a house or box that is protected from the elements and vandalism. The Contractor shall design and furnish such protection to the satisfaction of the District.

3.0 <u>Construction</u>

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- 3.1 <u>Piping</u> Pipes shall be installed as detailed in Contractor's Irrigation Plan. Pipes may be laid above ground and shall be installed in an organized manner. Pipes shall be installed in such a manner to assure the pipe is adequately protected from vehicle and foot traffic as well as weather or other factors.
- 3.2 <u>Drip Emitters and Sprinklers</u> Drip emitters and sprinklers shall be installed per the Contractor's Irrigation Plan and the manufactures recommendations.
- 3.3 <u>Controls</u> Controls shall be installed per the manufactures recommendations. Controls shall be installed within the enclosure system in an organized manner.
- 3.4 <u>Pump and Pressure System</u> The pump(s) and pressure system shall be installed per the manufactures recommendations. The pump(s) shall be tested to demonstrate performance as identified by the manufacture and the flow calculations provided in 1.3 A above.
- 3.5 <u>Removal</u> At the conclusion of the maintenance periods the Contractor shall remove such portions of the irrigation system as directed by the District. The pump, pump controls and enclosure shall remain and become the property of the District. The District reserves the right to keep any and all part of the irrigation system in place.

4.0 Measurement and Payment

- 4.1 <u>Measurement</u> Irrigation and electrical shall be measured by percent complete as estimated by the District and the Contractor. Materials on hand shall be paid for at invoice value and then stored under the Contractor's control.
- 4.2 <u>Payment</u> Payment for irrigation and electrical shall be made as a percentage complete of bid Item No. 5 Irrigation, as measured above.

TECHNICAL SPECIFICATIONS ARTICLE II DIVISION 2 - SITE WORK SECTION 2.4 – GRADING

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1.0 <u>General Requirements</u>

- 1.1 <u>Scope of Work</u> The work to be performed under this Section shall consist of furnishing all labor, materials, tools, transportation, supplies, equipment, appurtenances, fuel, and power, unless specifically excepted, necessary or required to: excavate the Freshwater Marsh and stockpile the material and construct the complete ramp as shown on the plans and detailed in the Specifications below.
- 1.2 <u>Description of Work</u> The planting plan has been designed to minimize the necessity for earth moving activities on the Site. The only area that will require considerable excavation and grading is the Freshwater Marsh. Other minor grading may occur in other areas (e.g., to smooth out the rough edges and provide access for contractors). The Freshwater Marsh shall be excavated and material transported to the stockpile location. Minor grading to assist in planting, fill in depressions and smooth out areas may be performed in addition to the Freshwater Marsh.

The ramp down the levee shall be constructed from District furnished borrow material and Imported Class 2 Aggregate Base for the top of the road. The contractor shall also furnish and install the culvert and contour to fill to drain to the existing ditches.

2.0 <u>Materials</u>

The material shall consist of onsite material excavated from the freshwater marsh area as designated on the plans.

District furnished borrow material shall come from the district property south of the mitigation site.

The top of the ramp shall have 6" of class 2 AB for the full 20 ft width of the ramp.

The Culvert Pipe shall be corrugated plastic pipe, smooth interior, equivalent to ADS Product N-12 1B ST or equal.

3.0 <u>Construction</u>

- 3.1 <u>Excavation</u> The marsh shall be excavated as shown on the plans, to allow for seasonal inundation necessary to support a variety of wetland plant species (e.g., tules, cattails, sedges and rushes). The bottom shall be dug to the elevation shown and the slope graded to daylight to the top of the excavation. The slope will vary. The goal is to excavate so that during the summer, the soil will remain saturated at or near the surface, and during the winter, the lower elevation areas will support standing water. The estimated amount of material to be excavated for the marsh is detailed on the grading plan. The marsh shall not be excavated with a uniform perimeter, but shall instead be lobed to increase habitat complexity.
- 3.2 <u>Placement</u> The excavated material shall be transported and placed in the stockpile

area designated by the District. It shall be spread uniformly to a maximum thickness of 3 ft and graded to drain.

- 3.3 <u>Compacting</u> No compaction will be required of the Freshwater Marsh Excavation. The district furnished sand shall be compacted to 90% relative compaction and the AB shall be compacted to 95% RC.
- 3.4 <u>Slope Finishing</u> Marsh pond slopes shall be finished with the bucket of an excavator or other equipment to assure the grades shown on the plans.
- 3.5 <u>Miscellaneous Grading</u> the Contractor may perform minor grading to even off planting areas. The District shall approve all minor grading prior to its inception.

4.0 Measurement & Payment

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- 4.1 <u>Measurement</u> The grading will not be measured.
- 4.2 <u>Payment</u> Payment for grading will be on a lump sum basis as stated in the bid schedule under Bid item No. 6- grading

1.0 <u>General Requirements</u>

- 1.1 <u>Scope of Work</u> The work to be performed under this section shall consist of furnishing all labor, materials, tools, transportation, supplies, equipment, appurtenances, fuel, and power, unless specifically excepted, necessary to remove existing fences and install new fences.
- 1.2 <u>Description of Work</u> The entire mitigation site shall be fenced. There is an existing fence that will require removal in certain areas and connections to the new fence. Three double 12 ft gates shall be installed.

2.0 <u>Materials</u>

The material for fence shall be a 5 strand 4-point barbed 12.5 ga (min) wire fence system.

Posts shall be 6 ft steel "t" (t133) posts with wing anchors on 10 ft centers. Line posts shall be installed every 100 ft and shall be steel, 3" diameter x 6 ft long with a 240 lb concrete footing. Angle points and "H" tensioning posts shall be installed every 300 ft. The "H" posts shall be 8 ft long, 4" galvanized steel with 320 lbs of concrete per ea footing. The "H" cross shall be 3" diameter steel weld to each vertical. The angle posts shall be 10 ft long, installed on a batter with 240 lbs of concrete.

Gates shall be 12 ft Powder River Classic Lever Latch gate or approved eq. Gate posts shall be installed as recommended by the manufacturer. The contractor shall supply all necessary accessories as required for a complete installation.

3.0 <u>Construction</u>

- 3.1 <u>Pull Posts</u> Pull posts shall be installed at least every 300 ft. Pull posts shall consist of a double post and struts or angle brace as required. Steel pull assemblies are also acceptable subject to approval of the engineer.
- 3.2 <u>Gates</u>- The contractor shall allow for 3 gate assemblies in the contract to be installed as shown on the plans.
- 3.3 Existing fence- The existing fence materials that are relatively new may be reused if removed in a manner that maintains the integrity of the existing materials. If they are not reused the barbed wire shall be rolled and stockpiled with the posts near the toe of the levee at levee station 247+00.
- 3.4 <u>Staking-</u> The corners of the fence will be staked by the engineer.
- 4.0 <u>Measurement & Payment</u>

4.1 <u>Measurement</u> –. Fencing or gates will not be measured. The lump sum quantity will include removing old fences, connecting to existing fences and installing new fence and gates as shown on the drawings.

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4.2 <u>Payment</u> - Payment for the fence will by lump sum to install the fence as shown on the plans per bid item NO. 7, FENCING.

TECHNICAL SPECIFICATIONS ARTICLE II DIVISION 2 - SITE WORK SECTION 2.6 – MAINTENANCE, PERFORMANCE STANDARDS, AND REMEDIAL PLANTING

1.0 <u>General Requirements</u>

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- 1.1 <u>Scope of Work</u> The work to be performed under this section shall consist of furnishing all labor, materials, tools, transportation, supplies, equipment, appurtenances, fuel, and power, unless specifically excepted, necessary or required to maintain the mitigation Site for three years to meet the Performance Standards described below.
- 1.2 <u>Description of Work</u> Maintenance such as weed control, irrigation supplies and plant replacement shall be performed to comply with the Performance Standards outlined below.
- 1.3 <u>Maintenance and Monitoring Period</u> The formal Maintenance and Monitoring period shall begin February 1, 2007, upon completion of planting, and continue for 36 months, ending January 31, 2010.

2.0 <u>Performance Standards</u>

After three (3) years from the completion of the initial installation (i.e., by February 1, 2010), the mitigation Site shall achieve the following Performance Standards. The Contractor is responsible for maintaining the Site in an adaptively managed way, in coordination with the District such that the Site meets the Performance Standards at the completion of the three-year maintenance period, including re-planting, re-seeding, and weed control as necessary.

- 2.1 <u>Survival of native woody species:</u> At least 80 percent survival of the total planted density of native woody species (total shall include both surviving planted stock and natural recruitment of native woody species). Survival will be measured separately (i.e., stratified) for scrub-shrub types (Dune Scrub and Riparian Scrub), and riparian forest types (Mixed Riparian and Cottonwood/Willow). This performance standard excludes planted oaks in the Mixed Riparian and low Dune Scrub areas, and bush lupine (if planted as an associate species in the Dune Scrub area). Woody species are defined in the "class" category of Tables 2 through 6 in Appendix B. The 80 percent survival requirement will extend to include California rose and California blackberry if planted as associate species in any of the vegetation types.
- 2.2 <u>Vigor of native woody species:</u> The surviving woody species would also need to show signs of health and vigor, meaning at least 80 percent of the surviving woody species (as defined above) have a vigor rating of "4" (defined in the Mitigation Plan [Appendix A] as having 81 percent or more healthy foliage). The vigor requirement excludes planted oaks and bush lupine, but would include California rose and California blackberry if planted as associate species.
- 2.3 <u>Survival of planted oaks:</u> A performance standard for oaks will be 50 percent survival of planted oaks across the entire Parcel (i.e., in both the low elevation Dune Scrub area and Mixed Riparian Forest area combined).

2.4 <u>Percent cover of invasive weeds:</u> Percent cover shall be used to evaluate the success of weed control activities on the Parcel. The focus of weed control will be on particularly invasive, non-native species that create serious problems in California's native ecosystems, as defined by the California Invasive Plant Council (Cal-IPC) (see appendix A appendix). For the purposes of these performance standards, an "invasive weed" is defined as any plant with an "A" or "B" rating on the 1999 Cal-IPC list. The performance standard shall be: (1) 90% free of yellow star thistle by the end of year 3, measured separately (i.e., stratified) for each vegetation type; (2) 75% free of bermuda grass by the end of year 3, measured separately (i.e., stratified) for each vegetation type; and (3) 80% free of all other invasive weeds (defined above) by the end of year three, measured separately (i.e., stratified) for each vegetation type. The percent cover values are based on relative percent cover, which is defined in more detail in the discussion of monitoring methods in the Mitigation Plan.

Vegetation Type	Native woody ¹ species survival	Native woody ¹ species vigor (of surviving stems)	Percent cover free of yellow star thistle	Percent cover free of Bermuda grass	Percent cover free of other invasive weeds ²
Freshwater Marsh	NA	NA	90%	75%	80%
Dune Scrub	80% planted	80%	90%	75%	80%
Riparian Scrub	density ³	Category 4 ⁴	90%	75%	80%
Cottonwood/Willow	80% planted	80%	90%	75%	80%
Mixed Riparian	density ³	Category 4 ⁴	90%	75%	80%

¹ This includes species defined as woody in the "class" category of Appendix B, and California rose and California blackberry, if these species were planted.

² For the purposes of this project, invasive weeds are those defined as category "A" or "B" by the California Invasive Plant Council's 1999 List of Exotic Pest Plants of Greatest Ecological Concern in California (Cal-IPC 1999, see Appendix A).

Appendix A). ³ Does not include oak species or bush lupine (if planted as associate species). Performance standard for oaks is 50% survival of planted density across the Dune Scrub and Mixed Riparian areas combined.

⁴ Category 4 Vigor Rating defined as having 81 percent or more healthy foliage (Appendix A). Vigor performance standard does not include oak species or bush lupine (if planted as associate species). This is 80 percent of the surviving stems.

3.0 Maintenance

- 3.1 <u>Plants</u> The Contractor shall maintain installed plants in a healthy growing condition throughout the formal three-year Maintenance Period. This includes weed control, watering (irrigation and water control) of in-place plants within the project area, and replanting of unhealthy plant material as well as all other necessary operations to ensure each plant is maintained in a healthy growing condition.
 - 3.1.1 <u>Plant Replacement</u> The District shall require the Contractor to replace all dead or dying planted material after Year 1 and Year 2, and replacement of material as necessary to meet Performance Standards in Year 3. By October 1 of each year for a period of three (3) years post-implementation, the District shall report to the Contractor the number and location of plants needing to be replaced, including container stock, cuttings, plugs, and herbaceous species (e.g., where herbs have not developed on bare ground or in areas with heavy weed cover), based on yearly monitoring

data collected as part of the District's Monitoring program, and as necessary to meet the Performance Standards. The Contractor shall replace these plants by January 31 of the following year at the Contractor's expense. The replacement plants shall be installed in the same manner and timing as originally prescribed unless circumstances dictate a different method approved by the District.

3.2 <u>Irrigation</u> – The Contractor shall be responsible for the proper watering of installed plants within the project Site. Contractor shall adjust watering schedules, drip or sprinkler types and durations as necessary to maintain a sufficient water supply to all plantings.

The contractor shall be responsible for maintaining the irrigation system and all its components, protecting it during the winter season, and replacing any parts as necessary to keep the system in proper working order over the duration of the maintenance period.

- 3.3 <u>Weed Control</u> As part of routine maintenance the Contractor shall apply herbicides or perform removal of invasive weeds and non-native plants throughout each year as weeds develop, as required to remove all non-native vegetation and to maintain the Performance Standards described above. The Contractor is responsible for ensuring that at the conclusion of the three (3) maintenance periods the Site shall meet the Performance Standard for percent cover indicated above.
- 3.4 <u>Site</u> The Contractor is responsible for the general maintenance of the Site including but not limited to removal of plant debris, trash, fencing, pipelines and water control structures.
- 3.5 <u>Coordination Meetings</u> The Contractor shall meet with the District representatives on a quarterly basis to discuss maintenance activities, beginning in March 2007. Problems and successes shall be presented by all parties present to aid in the adaptive management of the maintenance activities.
- 3.6 <u>Submittals</u> The Contractor shall provide to the District the following information to aid in development of its Monitoring Report:
 - 3.6.1 <u>Monthly Status Report</u> –The Contractor shall submit to the District a monthly status report detailing the maintenance activities that have taken place during the period, any changes to the weed control or irrigation schedule, and any problems observed on the Site. This report may be informal (e.g., communicated via email).
 - 3.6.2 <u>Yearly Maintenance Report</u> At the end of each growing season during the maintenance period, the Contractor shall submit a Yearly Maintenance Report, including a summary of weed control, which shall include a discussion regarding on-going weed control and herbicide applications for each species. This shall include but is not limited to: methods used, application rates, amount used, application description, coverage area, weather description, successes and/or problems. The Yearly Maintenance Report shall also include a summary for Irrigation, which shall include a discussion regarding irrigation application for each vegetation type and species. This shall include but is not limited to:

application rates, frequency, durations, coverage area, weather description, successes and/or problems.

4.0 <u>District Monitoring Program</u> – The District or its representative shall monitor the Site for conformance to the Performance Standards, as detailed in the Mitigation Plan (Appendix A). The District shall coordinate with the Contractor in a timely manner to ensure information exchange so that the Contractor may maintain the Site appropriately to meet the Performance Standards. The Contractor shall coordinate with the District and ensure implementation of any adaptive management or remedial planting of the Site, as well as provide any information to the District necessary for completion of the District's yearly Monitoring Report (i.e., that information specified in the submittal Section 3.6.2 above)

The management and restoration activities at the Site shall be monitored by the District (or its designated agent) for a period of 3 years following implementation to determine if the habitat restoration goals for the Site are being met. Yearly monitoring of vegetation establishment shall provide guidance to the District to determine if remedial actions are needed. If monitoring reveals that performance standards are not met, remedial activities shall be implemented as described above.

5.0 Measurement & Payment

- 5.1 <u>Measurement</u> Measurement of the maintenance periods shall not be measured.
- 5.2 <u>Payment</u> -- The Contractor will receive four (4) equal quarterly payments throughout the year for payment purposes.

1.0 General Requirements

1.1 <u>Scope of Work</u> - The work to be performed under this section shall consist of furnishing all labor, materials, tools, transportation, supplies, equipment, appurtenances, fuel, and power, unless specifically excepted, necessary or required for the cleanup of the work as shown on the plans and described in these specifications.

2.0 <u>Construction</u>

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- 2.1 <u>General</u> Throughout all phases of construction, including suspension of work, and until final acceptance of the project, the Contractor shall keep the premises occupied by the Contractor in a clean and orderly condition, disposing of refuse in a manner satisfactory to the District and in accordance with existing governmental regulations.
- 2.2 <u>Detailed Requirements</u> Excess or unsuitable stripping, broken pipe, or other waste material shall be removed from the jobsite and disposed of by the Contractor at no additional cost to the Owner, unless otherwise directed by the District. Spills resulting from hauling operations along or across existing waterways, streets, roads, ramps or ferry decks shall be removed immediately by the Contractor. All gutters and roadside ditches shall be clean and free from any obstructions. Any deviation from this practice shall have the prior approval of the District.

In areas where excessive dust, caused by construction operations, is a nuisance to property owners, the Contractor shall frequently wet down the area to control dust.

- 2.3 <u>Final Cleanup of Premises and Work Site</u> As a final condition of acceptance of the work, the Contractor shall carefully cleanup the work and the premises, remove all temporary structures built by or for the Contractor, remove all surplus construction materials, debris, and rubbish of all kinds from the grounds, which the Contractor has occupied, and leave them in a neat condition. The entire project shall be left in a condition that will present a pleasing appearance as viewed in general and in a manner satisfactory to the District.
- 2.4 <u>Completion</u> The Contractor, upon completion of all work, shall restore the areas surrounding the work sites and project sites to a condition as good or better than existed prior to the commencement of work.

3.0 Measurement and Payment

Full compensation for all costs incurred and the work covered in this Section shall be considered as included in the unit price paid for Bid Item 1 –<u>Mobilization</u> as set forth in the Contractor's bid, and no additional or separate compensation will be allowed therefore.





EXHIBIT B Bradford Island Tract 19: Revised 50-Acre Mitigation Plan

FINAL

Prepared for Bradford Island Reclamation District (RD 2059) 311 East Main Street #504 Stockton, CA 95202

> Prepared by Stillwater Sciences 2855 Telegraph Ave., Ste. 400 Berkeley, CA 94705

> > January 24, 2006



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1 INTRODUCTION

1.1 Background

The California Department of Fish and Game (DFG), Delta Levee Habitat Improvement Program is responsible for assessing impacts to certain general habitat types resulting from levee maintenance and improvements in the Sacramento-San Joaquin Delta (Delta) under the Delta Flood Protection Act (SB 34, superceded by Assembly Bill 360). DFG is responsible for ensuring that there is "net long-term habitat improvement" as a result of expenditures made by the California Department of Water Resources (DWR) to Reclamation Districts, which participate in the programs previously mentioned. DFG conducts a habitat assessment of each proposed levee maintenance/improvement project (described in more detail in Section 1.2). Based on this assessment, the total acreage of habitat impacted by the project is determined, and appropriate mitigation is agreed upon between DFG and the responsible Reclamation District.

As part of these AB360 requirements, the Bradford Island Reclamation District No. 2059 (District) is required to develop or purchase 50 acres to mitigate for habitat losses from past, ongoing, and future levee maintenance and improvement works on Bradford Island. The goal of the mitigation is to restore Delta riparian and wetland habitat lost due to levee construction and maintenance, including foraging and nesting habitat for riparian dependent birds and mammals. DFG and DWR completed an environmental assessment on Bradford Island in April 2000. Based on this assessment it was determined that a portion of the 149-acre Tract 19, located on the western side of Bradford Island (Figures 1 and 2), would satisfy DFG mitigation requirements. A 50-acre portion of Tract 19 has been designated as the Mitigation Parcel (Parcel) (Figure 2). The District currently owns fee title and has dedicated the property to DFG as a conservation easement.

The following documents are required by DFG to complete the Mitigation Package for this Parcel:

- Fish and Wildlife Habitat Mitigation Agreement by and between Bradford Reclamation District No. 2059 and California Department of Fish and Game
- Deed of Conservation Easement for the Mitigation Parcel and Declaration of Restrictions (Exhibit A), including the following:
 - Legal Description of Tract 19 (Attachment 1)
 - Map Depicting Bradford Island Tract 19 and Mitigation Parcel (Attachment 2)
 - Legal Description of the Mitigation Parcel (Attachment 3)
- Mitigation Plan for Bradford Island Tract 19 (this document, Exhibit B)

This Mitigation Plan was developed to guide the restoration and management of that portion of Tract 19 under a conservation easement.

1.2 Habitat Impact Determination and Required Mitigation under AB360

After reviewing and understanding a levee project description, the steps toward impact determination include: (1) a field survey of existing habitat (habitat assessment); (2) observation and description of existing maintenance practices that affect the habitat; and (3) the description of the "net habitat" that continues to exist after maintenance practices are carried out. AB360

habitat assessments consist of mapping four different habitat types within the levee project footprint: freshwater marsh, scrub shrub (woody species < 20 ft in height), riparian forest (woody species > 20 ft in height), and shaded riverine aquatic cover.

Levee rehabilitation and maintenance activities are performed pursuant to the provisions of the California Water Code sections 12300 et seq. Levee maintenance project impacts under the AB360 program for Bradford Island are described in Attachment 3 of Exhibit A, and are depicted in Attachment 2 of Exhibit A. Levee maintenance and improvement activities on Bradford Island include impacts to freshwater marsh habitat, scrub-shrub habitat, riparian forest habitat, and various other habitats that are or were on or adjacent to local non-project levees in the Sacramento-San Joaquin Delta (Table 1). These habitat losses are long-term in nature, and occurred or may occur in conjunction with the rehabilitation and maintenance of the levees that surround Bradford Island from the base of the landside levee toe out to a distance of 100 ft from the landside levee toe, as delineated by DFG in an April 2000 habitat assessment. The area of impact also includes planned removal of some riparian forest vegetation, totaling 0.23 acres, from designated borrow sites on Bradford Island.

In order to meet the requirements of no net loss of aquatic and riparian habitat under the AB360 program, DFG believes that establishment and preservation of 2.95 acres of freshwater emergent marsh habitat, 22.06 acres of scrub shrub habitat, and 24.99 acres of riparian forest habitat (total of 50.00 acres) would mitigate for the above specified impacts, and is feasible on Tract 19 (Table 1). The 24.99 acres of riparian forest mitigation include 0.68 acre of mitigation for the planned removal of trees from designated borrow sites on Bradford Island. The 50-Acre Mitigation Parcel shall be established, developed, and maintained as a single habitat mitigation parcel, and the Endowment Account established by Work Agreements BR-03-1.0 and BR-01-1.3 shall be available to meet all of the approved costs and expenses associated with it.

AB360 Habitat Type	Area of Impact (acres)	Mitigation Required (acres)
Freshwater Marsh	1.66	2.95
Scrub Shrub	6.90	22.06
Riparian Forest	8.11	24.99
Other habitat	4.52	*
Totals	21.19	50.00

Table 1. Area of impact for each AB360 habitat type affected by levee maintenance projects on	
Bradford Island, and corresponding mitigation requirements.	

* Mitigation for "other" habitat was included in the above AB360 habitat types.

The remaining portion of Tract 19, consisting of approximately 99 acres (the remainder) shall be managed in accordance with the terms and provisions of a separate Land Management Plan. It is not part of the mitigation program and will remain in cattle grazing until needed for other purposes in accordance with the Land Management Plan.

1.3 Mitigation Parcel Location and Characterization

Tract 19 is located on Bradford Island in Contra Costa County (Figure 1). Twitchell Island is to the north of Bradford Island; Webb Tract is to the east and Jersey Island is to the south. The San Joaquin River flows along the north and west sides of the island. Tract 19 consists of one rectangular shaped parcel in one section, T2N, R3E, M.D.B. and M (Attachment 2 of Exhibit A) and involves one landowner, the District. The Contra Costa County Assessor's Parcel Number is $+ \frac{1}{2}$

26-020-002. The tract is 149 acres total in size. The location of Tract 19 on Bradford Island, and the layout of the 50-acre Mitigation Parcel within Tract 19 are shown in Figure 2.

1.3.1 Historical Land Use

Historically, Tract 19 has been used for agriculture, grazing and sand mining. A large commercial sand mining company owned and occupied the site until the property was sold in 1974. Robert C. Benson and Jean M. Benson as Trustees of the Benson Family Trust (Benson) owned Tract 19 from 1974 to 2003. Tract 19 was sold to the District in January 2003.

The northwest corner of Tract 19 was historically used for growing corn row crops. According to the previous landowner, corn was last grown on the property in 1985. Since the purchase of the property from the sand-mining operator in 1974, grazing has been the primary use of the site.

1.3.2 Adjacent Properties and Current Land Use

The San Joaquin River and four other properties surround Tract 19. The adjacent property to the north is used for grazing. A storage building, a storage container, old farm equipment, and a pile of tires are north of the property line. An underground gas pipeline runs east/west near the north property line. It crosses the island main drain canal that runs north/south the length of the island and then continues across the San Joaquin River.

The San Joaquin River borders Tract 19 to the west. The property to the east of Tract 19 is also used for grazing and is separated from Tract 19 by the north/south main drain canal. A house is on the southeast corner of the property. The property owner indicated that he sold a one-acre parcel in the southwest corner where a house is now located.

The property to the south includes a lake owned by a duck club and used for duck hunting. DWR photos taken in 1983 show flooding on Bradford Island after high water caused a levee breach approximately 700 ft south of Tract 19. The floodwater scoured out a depression that created the large lake that remains today. A dense riparian forest has grown up around the lake and is adjacent to the southern boundary of the Tract 19. Several duck blinds around the lake are visible from the levee road.

1.3.3 Existing Topography, Geology, and Soils

Tract 19 contains a series of sand hills, the tops of which are approximately 6-8 ft above sea level (all elevations reported are relative to the National Geodetic Vertical Datum [NGVD]). The entire tract is below the San Joaquin River 100-year flood elevation. The majority of the Mitigation Parcel is below sea level, but ranges in elevation from 8 ft at the top of the hills in the northeastern portion of the Parcel, to -14 ft in the northwestern and southeastern portions of the Parcel (Figure 3).

DWR staff reviewed the U.S. Department of Agriculture soil survey of Contra Costa County, Jersey Island Quadrangle. According to the map, Tract 19 has alluvium and intertidal deposits formed in the late Pleistocene and Holocene of the Quaternary Epoch. Two soils were identified from two different soil associations: Piper Fine Sandy Loam and Rindge Muck (Figure 4).

Piper Fine Sandy Loam is part of the Piper series, which is mapped throughout Tract 19 as well as throughout Bradford Island. The soils of this series are poorly drained and formed on low aeolian mounds and ridges that have become prominent with subsidence of the surrounding organic soils. Elevation of this soil type ranges from 5–15 ft below sea level. Where these soils are not drained, they are saturated within a depth of 20 to 40 inches throughout the year and are

saturated within a depth of 20 inches for 4 to 12 months each year. In a representative profile the surface layer is moderately alkaline fine sandy loam about 10 inches thick. It is very dark gray in the upper part and light gray in the lower part. The subsoil is mottled, light-gray, moderately alkaline, weakly cemented fine sandy loam about 28 inches thick. The substratum is mottled, pale-brown, moderately alkaline fine sand that extends to a depth of more than 60 inches. The Piper Fine Sandy Loam soil generally has slopes of 2–5 percent, but a few areas are nearly level. Runoff is slow to medium. Permeability is slow in about 80 percent of the area and moderate in 20 percent depending on the amount of cementation. Roots can penetrate to a depth of 20 to 36 inches. The available water capacity is 2 to 4 inches. Agricultural uses on this soil type are primarily for dryland pastureland, small grain, and volunteer hay.

Rindge Muck is part of the Rindge Series, which consists of very poorly drained organic soils that are formed in the Delta. The Rindge series is mapped throughout Bradford Island, as well as on other islands in the Delta. The Delta islands are the only occurrence of this soil type in Contra Costa County. Elevation of this soil type ranges between 5–15 ft below sea level. In a representative profile the surface layer is very dark brown, strongly acidic muck about 14 inches thick. The next layer is very dark gray, strongly acidic muck about 10 inches thick. Below this, to a depth of 60 inches, is black, very acidic to strongly acidic muck. The soils in this series are level or nearly level (0–2 percent slopes). Runoff is very slow. Permeability is rapid and the available water capacity is 10 inches or more. The water table ranges from a depth of about 50 inches in the summer to 12 inches or less in the winter. This soil is subject to peat fires during summer. When allowed to dry, this soil shrinks irreversibly. It will repel water when allowed to air dry. Agricultural uses on this soil type are mainly for row crops, especially corn. Some small areas are in permanent pasture. Other small areas are flooded during part of the year to provide wildlife habitat.

1.3.4 Groundwater

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Five piezometers were installed on a portion of Tract 19 in early September 2003 as part of earlier mitigation planning efforts (TP-1 to TP-5, as shown in Figure 5). The depth to groundwater was measured in these piezometers on September 3, September 11, and September 23, 2003. Four additional piezometers were installed within the boundaries of the current 50-acre Mitigation Parcel in November 2005, and the depth to groundwater was measured on November 15 and November 30, 2005 (TP-6 to TP-9, shown in Figure 5). Three of the original piezometers installed in 2003 remained intact and were also re-measured in 2005.

The measured groundwater levels ranged from 3.1 to 13.7 ft below the ground surface in September 2003 (-8.0 ft to -18.4 ft elevation), and 0.1 to 8.8 ft below the ground surface in November 2005 (-7.4 ft to -17.8 ft elevation). Groundwater levels were highest in piezometers closer to the levee (western boundary of Tract 19) and then declined in a fairly linear manner landward (east). It should be noted that TP-1 may be located on fill resulting from the sandmining operations prior to 1973, and may potentially be reflecting a perched water table rather than the actual groundwater table.

Mean September groundwater elevation for TP-1 through TP-5, and predicted September groundwater elevation for TP-6 through TP-9 (based on rate of decline relationships among the three wells that were measured both in 2003 and 2005) were used in a GIS to interpolate groundwater elevations across Tract 19, as an estimate of late-summer groundwater conditions. The mean or predicted September groundwater elevation at each of the monitoring wells and the interpolated groundwater elevation surface across Tract 19 are shown in Figure 5. It should be noted that because of the limited number of data points used, this should be considered only a rough approximation of the late-summer groundwater conditions at the tract.

The groundwater elevation data were then overlayed with the surface topography to produce an estimated depth to late-summer groundwater across the Mitigation Parcel (Figure 6). Groundwater in the late summer is present within approximately 2 ft of the surface in the northwestern corner of the Mitigation Parcel and in smaller pockets in the eastern portion of the Parcel. Late-summer groundwater levels are furthest from the ground surface (> 18 ft) on the two hills in the northeastern portion of the Parcel.

1.3.5 Biological Characteristics

Tract 19 is heavily disturbed from historical land use activities. Moderate cattle grazing on Tract 19 continues to provide some disturbance. Non-native grasses and a few scattered native trees and shrubs characterize the vegetation on the Mitigation Parcel. Under recent management, seasonal application of 2-4-D and other selective herbicides was intended to keep the grasses dominant to provide maximum forage for grazing cattle.

The dominant plant species present are non-native grasses, especially those cultivated for forage, such as Bermuda grass (*Cynodon dactylon*), as well as annuals such as wild oat (*Avena fatua*), and several brome species (*Bromus* spp.). Native herbaceous species are present in small numbers in the higher elevation sandy soils, including silver bush lupine (*Lupinus albifrons*) and gilia (*Gilia capitata*). Woody vegetation is sparse, and includes a few scattered mature trees of California black walnut (*Juglans californica*), Valley oak (*Quercus lobata*), Goodding's black willow (*Salix gooddingii*), and Fremont cottonwood (*Populus fremontii*). Natural establishment of young trees appears limited, perhaps due to cattle browsing and other disturbances. Nonnative invasive plant species include yellow star thistle (*Centaurea solstitialis*), which is well established on the hills within the boundary of the Mitigation Parcel. Himalayan blackberry (*Rubus discolor*) appears to be limited to the existing stand of Goodding's black willow in the southern portion of the Mitigation Parcel, though it is extensive along the southern fence line of Tract 19.

Several bird species were observed on the Parcel, including Nuttall's Woodpecker (*Picoides nuttallii*), western tanager (*Piranga ludoviciana*), and a white-tailed kite (*Elanus leucurus*) (Stillwater Sciences 2003). Additional wildlife species observed outside of Tract 19 along the northern and eastern levees of Bradford Island are included in Table 2.

<u>2003 (Source: Stillwater Sciences 2003).</u>		
Common Name	Scientific Name	
Birds		
American crow	Corvus brachyrhynchos	
American goldfinch	Carduelis tristis	
American kestrel	Falco sparverius	
Barn swallow	Hirundo rustica	
Brewer's blackbird	Euphagus cyanocephalus	
Cliff swallow	Petrochelidon pyrthonota	
Great egret	Casmerodius albus	
House finch	Carpodacus mexicanus	
Killdeer	Charadrius vociferous	
Mallard	Anas platyrhymchos	
Mourning dove	Zenaida macroura	

Table 2. Wildlife species observed from the northern and eastern levees of Bradford Island in May 2003 (Source: Stillwater Sciences 2003).

Common Name	Scientific Name	
Northern harrier	Circus cyaneus	
Northern mockingbird	Mimus polyglottos	
Red-winged blackbird	Agelaius phoeniceus	
Ring-necked pheasant	Phasianus colchicus	
Rufous-sided towhee (spotted towhee)	Pipilo erythrophthalmus	
Western meadowlark	Sturnella neglecta	
Western grebe	Aechmophorus occidentalis	
Western kingbird	Tyrannus verticalis	
White-tailed kite	Elanus leucurus	
Reptiles and Amphibians	······································	
Pacific tree-frog	Hyla regilla	
Western fence lizard	Sceloporus occidentalis	

A survey of existing habitat within the Mitigation Parcel was conducted by Todd Gardner (DFG) during a field visit on July 16, 2002 (DFG 2002). The Parcel was also visited by staff from DWR, DFG, the District, and Stillwater Sciences in preparation for development of this Mitigation Plan on October 28, 2005. No federally or state listed threatened or endangered species were observed during these two site visits. DWR will prepare a categorical exemption under the California Environmental Quality Act (CEQA) for this Mitigation Plan, including any necessary surveys for the presence of special-status species.

1.4 Project Goals and Objectives

This Mitigation Plan is intended to guide habitat development, mitigation/restoration efforts, and a three-year post implementation maintenance and monitoring period (three-year maintenance period) on the 50-acre Mitigation Parcel. The goal of the mitigation is to restore self-sustaining Delta riparian and wetland habitat lost to levee construction and maintenance on Bradford Island, in order to meet the requirements of the AB360 program (discussed in Sections 1.1 and 1.2).

The objectives are as follows:

- Restoration of the Parcel will meet acreage targets to mitigate the loss of AB360 habitat types, including scrub shrub, riparian forest, and freshwater marsh.
- The restoration design will work within the bounds of physical (e.g., soils, depth to groundwater) and biological (e.g., non-native invasive weeds, sources of seed for natural recruitment) constraints of the site, in order to maximize the likelihood for successful establishment and long-term persistence of native vegetation.
- The restoration design will take advantage of opportunities to enhance existing native vegetation on the Parcel.
- The habitat to be developed by this plan will include higher quality, less fragmented, and higher diversity habitat that is more indicative of historic vegetation for this geographic area. A portion of the Parcel is contiguous with existing high quality habitat at the scour lake to the south. Once the Parcel is restored it will provide a larger habitat area when combined with the lake. This will reduce edge effects as well as potential adverse impacts related to land-use activities on adjacent properties.
- After implementation and the three-year maintenance period of habitat establishment, maintenance, monitoring, and remedial planting (as necessary), the Parcel will attain the performance standards presented in Section 4.1.

1.5 Project Opportunities and Constraints

The Mitigation Parcel has two distinct soil types: Rindge Muck organic (peat) soil and Piper Fine Sandy Loam mineral soil. The Rindge Muck occurs in lower elevation areas and has been subject to subsidence. This soil type presently supports emergent marsh, and riparian scrub and forest habitats on Bradford Island. It remains wet to near the surface even during late-summer (Figure 6), and is therefore likely to provide groundwater levels that will continue to support freshwater marsh and riparian species even after the three-year maintenance period. Bermuda grass is well established in these areas and will need to be monitored for regrowth after initial removal. Establishment of native overstory species is likely to significantly reduce the distribution of Bermuda grass through shading, although it may always be present to some extent in open patches.

Portions of the Mitigation Parcel contain Piper Fine Sandy Loam soil, which occurs on sand hills and ridges up to sea level. It presently supports an oak savannah-like habitat with Valley oak and Goodding's black willow trees, scattered bush lupine shrubs, and annual grasses. There is the opportunity to restore these hills to include a component of stabilized sand dune habitat similar to that currently found in the Antioch Dunes National Wildlife Refuge and Brannan Island State Recreation Area. This rare habitat type has limited opportunities to be restored elsewhere in the Delta. However, although the sand hills in the southern portion of Tract 19 support some native dune species (e.g., bush lupine and gilia), the sand hills in the Mitigation Parcel are more compacted and currently support a substantial population of yellow star thistle. Maintaining a portion of the sand hill with some open areas, as would be necessary to support persistence of dune species such as bush lupine, may provide conditions suitable for continued persistence of yellow star thistle at the site. Providing a more stabilized area with denser native herbaceous species might be necessary to compete with yellow star thistle, though this would constrain the ability to restore a native dune community within the boundary of the 50-acre Mitigation Parcel.

Both the Antioch site and the Brannan site support populations of the endangered Antioch Dunes evening primrose (*Oenothera deltoides* ssp. *howellii*). The Piper soil on Tract 19 appears to have the potential to support a population of the Antioch Dunes evening primrose in the future. Introduction of the federally listed Antioch Dunes evening primrose is not part of this Mitigation Plan, but if restoration of associated dune species is successful, introduction of this listed species might be considered in the future.

1.6 Agency Responsibilities

The District is responsible for (1) developing this Mitigation Plan; (2) implementation of the mitigation project; (3) three years of maintenance (including weed control and irrigation), monitoring, and reporting; and (4) implementation of remedial measures if the performance standards are not met at the end of the three-year maintenance period.

DWR is responsible for providing (1) development funding for implementation of this project and (2) an endowment account of a minimum of \$100,000 for long-term maintenance, as detailed below.

1) Development Phase Payment Terms

DWR shall provide \$1,375,000 to preserve, enhance, and maintain the 50-Acre Mitigation Parcel during the development phase using funds identified by Work Agreements BR-03-5.0 and BR-03-6.0 between the DWR and the District.

2) Long-term Operation and Maintenance

The District shall have the responsibility for all long-term operation and maintenance of the 50-Acre Mitigation Parcel to the extent that funds are available to the District from monies provided to DWR by the California Legislature, pursuant to California Water Code sections 12300 et seq., and earned as interest by the Endowment Account as established by Work Agreements BR-03-1.0 and BR-01-1.3 between the DWR and the District. Should outside funding for the 50-Acre Mitigation Parcel cease, the District will maintain the fences protecting the Parcel and periodically remove trash.

DFG is responsible for ensuring that the requirements of AB360 are met, including (1) approval of this Mitigation Plan and the entire Mitigation Package; (2) oversight of installation, maintenance, and monitoring of the 50-Acre Mitigation Parcel; and (3) ensuring that the final performance standards are met.

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2 **RESTORATION PLANNING & IMPLEMENTATION**

The Mitigation Parcel will be selected for special management activities mitigation (as described in Work Agreements BR-99-01, BR 99-02, BR-03-2.0, and BR-03-4.0). The boundaries of the Mitigation Parcel have been identified by legal description (described in Attachment 3 of Exhibit A, and depicted in Attachment 2 of Exhibit A). In order to meet the AB360 program mitigation requirement of no net loss of aquatic and riparian habitat, the 50 acres of replacement habitat will be developed in proportion to the impacts on the affected types of habitats, as presented in Table 1. The planting design and conceptual layout are discussed in Section 2.1.

2.1 Planting Design

The planting design was based on the following: (1) existing physical (topography, soils, depth to groundwater) and biological (existing vegetation) opportunities and constraints on the Parcel; (2) consideration for the types and acreage of habitats impacted under the AB360 program; (3) discussions between DFG and DWR biologists and the District; and (4) general knowledge of natural, disturbed, and restored plant communities in the area. Five vegetation types are proposed for mitigation on the Parcel: Freshwater Marsh, Dune Scrub (includes high and low elevation areas), Riparian Scrub, Cottonwood/Willow, and Mixed Riparian Forest. Table 3 summarizes the acreage associated with each proposed vegetation type on the 50-acre Mitigation Parcel and how these acreages correspond to the mitigation requirements under AB360 (discussed in Section 1.2 and summarized in Table 1).

AB360 Habitat Type Affected	Required Mitigation Acreage	Proposed Vegetation Type for Mitigation	Approx. Acres	Subtotal	
Freshwater Marsh	2.95	Freshwater Marsh	2.96	2.96	
		Dune Scrub (high)	3.77		
Scrub Shrub	22.06	Dune Scrub (low)	5.10	21.79	
	<u> </u>	Riparian Scrub	12.92		
Riparian Forest	24.99	Cottonwood/Willow	tonwood/Willow 13.61		
	27.99	Mixed Riparian Forest	11.64	25.25	
Totals	50.00		50.00	50.00	

Table 3.	Relationship between AB360 mitigation requirements and the corresponding vegetation
,	type and acreage proposed for mitigation.

The conceptual layout of each vegetation type across the parcel is shown in Figure 7, and this conceptual planting plan relative to physical site characteristics (i.e., depth to estimated latesummer groundwater, existing site topography, soil type) is shown in Figure 8. The physical characteristics found across each vegetation type are also summarized in Table 4, with vegetation types listed from highest to lowest elevation.

Vegetation Type	Elevation Range	Late-summer	Soil Type		
	(ft)	Groundwater			
		Depth (ft)			
High Dune Scrub	>2	18 to 22	Piper Fine Sandy Loam		
Low Dune Scrub	-4 to +2	12.1 to 18	Piper Fine Sandy Loam		
			(with some portions in		
<u> </u>			Rindge Muck)		

Table 4. Physical characteristics across each vegetation t
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Vegetation Type	Elevation Range (ft)	Late-summer Groundwater Depth (ft)	Soil Type
Mixed Riparian Forest	-10 to -4 (north portion of parcel) -12 to -4 (south portion of parcel)	4.1 to 12	Rindge Muck, transitioning to Piper Fine Sandy Loam at upper elevations
Cottonwood/Willow	-14 to -10 (north) -14 to -12 (south)	2 to 6	Rindge Muck
Riparian Scrub	-14 to -12	0 to 4 (mostly 0 to 2)	Rindge Muck
Freshwater Marsh	-14 to -12	0 to 2	Rindge Muck

In order to understand the type of plant community that corresponds to each of the five proposed vegetation types, Table 5 relates the mitigation plan vegetation types to the vegetation classification system and nomenclature used by the California Natural Diversity Database (CNDDB 2002). CNDDB (2002) is based on the series (= alliance) level classification described by Sawyer and Keeler-Wolf (1995), but is structured to be compatible with the earlier Holland (1986, 1990) vegetation classification system.

Table 5. Relation of the mitigation plan vegetation types to the CNDDB (2002) vegetation	ion
classification system. Parentheses indicate similar or associated vegetation types.	

	3 6 1 1	CNDDB	CNDDB (2002) Classification(s)
AB360 Habitat Type	Plan Vegetation	Code(s)	
	Туре		
ł	1		Dominant:
1	f	52.102.00	Bulrush Cattail Wetland
Freshwater Marsh			Smaller patches with possible elements of the
N.			following:
ller	Freshwater	52.104.00	Bur-reed Wetland
рин	Marsh	52.105.00	Duckweed Wetland
esl		45.110.00	Sedge
E.		45.560.00	Rush Riparian Grassland
		41.060.00	Grasslands with Common Reed
		41.061.00	Alkali Common Reed
i		32.060.03	Coyote Brush/Creeping Ryegrass
qn.		32.060.10	Coyote Brush/Purple Needlegrass
Shr	Dune Scrub	71.040.06	Valley Oak - Coast Live Oak/Grass
q		(22.200.00)	(Antioch Dunes Unique Stands)
Scrub Shrub		(32.081.01)	(Silver Bush Lupine Scrub)
ן בי	Riparian	63.100.00	Scrub Willow
	Scrub	63.140.00	Great Valley Willow
2t	_	61.130.01	Great Valley Cottonwood Riparian
ੁੱਚੇ Cottonwood/ (6		(61.130.06)	(Fremont Cottonwood)
F	Willow	(61.202.00)	(Black Willow Riparian Forest and Woodland)
Riparian Forest		(61.211.00)	(Goodding's Willow Woodland)
) ar	Mixed	71.040.07	Great Valley Valley Oak Riparian
Rij	Riparian		
	Forest		

The plant palette and planting densities were determined by:

- (1) Comparison of other restoration projects in the Delta:
 - Decker Island (Reclamation District No. 2026, 2000; D. Showers, pers. comm., 2005),
 - Sherman Island (T. Gardner and D. Showers, unpublished data; site visit November 2005),
- (2) Comparison of other restoration projects within the Sacramento-San Joaquin valley:
 - Tuolumne River (River Partners 2004),
 - Merced River (DWR and DFG 2003),
 - Lower Clear Creek (McBain and Trush et. al 1999),
 - Sacramento River (Alpert et. al 1999; Griggs and Golet 2002; Efseaff et al. 2003)
- (3) Review of the limited data available on species composition and density within natural reference systems:
 - Sacramento River (Wood 2003, Strahan 1984, Vaghti 2003),
 - Cosumnes River (Tu 2000),
 - Antioch Dunes National Wildlife Refuge (USFWS 2002; site visit in September 2003),
 - Brannan Island State Recreation Area (site visit in October 2003 and October 2005).
- (4) Input from DFG and DWR biologists.

The Dune Scrub vegetation type is intended to correspond with the "scrub shrub" habitat type identified by DFG under the AB360 program (see Table 3). Although the species composition of Dune Scrub is not directly "in-kind" mitigation, it includes higher quality, less fragmented, and higher diversity habitat that is more indicative of historic vegetation types found in this geographic area (Vaghti 2003). The species proposed for planting in the Dune Scrub area are more likely to successfully establish and continue to be self-sustaining given the physical constraints (e.g., soils, depth to groundwater) of this particular area on the Mitigation Parcel. Additionally, it takes advantage of the opportunity to enhance the unique sand dune features currently found on the higher elevation hilltops, establishing a small area of dune habitat that is found only in very limited areas of the Delta.

Riparian Scrub areas will be more reflective of habitat that was removed as part of levee maintenance work, and are therefore considered to be "in-kind" mitigation for the "scrub shrub" component, although the planting pallet is much more diverse and includes native understory species. The Mixed Riparian Forest and Cottonwood/Willow Forest will provide a much more diverse and higher quality area than the "riparian forest" habitat type that was lost, as will the Freshwater Marsh area.

The following sections briefly describe mitigation goals for each vegetation type and list the dominant and associated plant species, estimated planting densities for containers/plugs, and estimated number of container/plug plants (\pm 20 percent) to be installed by vegetation type for the Mitigation Parcel on Bradford Island. Vegetation types are listed in order from highest to lowest elevation.

2.1.1 Dune Scrub

<u>Goal</u>: Replace the non-native yellow star thistle and annual grassland species with native shrubs and grasses to create and maintain a native plant community on the drier, moderately high elevation hills (generally -4 to +2 ft NGVD) with sandy soils (Piper Fine Sandy Loam). A secondary goal is to expand the existing (sparse) Valley oak population in the lower elevational zone of this community (Figure 7).

The Dune Scrub vegetation type meets the criteria for "scrub shrub" because of the dominance of toyon (*Heteromeles arbutifolia*) and coyote brush (*Baccharis pilularis*). Control of existing non-native weeds (especially Bermuda grass and yellow star thistle) will be an important management issue. Oaks will be planted in the lower relative elevation zones (depth to late-summer groundwater ≤ 12 ft [Figure 8]) in order to minimize water stress, although a few experimental trees will be scattered at higher elevations.

Some of the potential associated species, such as bush lupine, California croton (*Croton californicus*), and deerweed (*Lotus scoparius*), are native dune scrub species common to the Antioch Dunes National Wildlife Refuge (USFWS 2002) that could serve to expand the existing bush lupine population on Tract 19 and create and maintain a native dune scrub community on the highest elevation sites (generally > 2 ft NGVD) with sandy soils (Piper Fine Sandy Loam). Removal of existing non-native weeds and periodic ground disturbance will likely be required to maintain and enhance these native species, but may conflict with efforts to control yellow star thistle on the sand hills in the Mitigation Parcel.

Oaks and shrubs will be planted in clusters (generally 5–10 trees/shrubs), rather than in a uniform grid spacing. In the higher elevation zone (3.77 acres), coyote brush and toyon will be planted in clusters, on 10 foot centers, for a total density of 100 container plants/acre for a total of 378 plants. Woody species in the lower elevation zone (5.10 acres) will include planting of oak species, and will be planted in clusters at a total density of 150 plants/acre for a total of 766 plants. Grass plugs will be planted in random clusters over approximately 1/3 of the lower elevation zone, for a total of approximately 1,650 plugs/acre on the low zone (8,415 plugs total). A seed mix of herbaceous species, containing both dominant and associated species, will be seeded across the Dune Scrub area.

Table 6 presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting methods for Dune Scrub areas.

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Common Name	Scientific Name	Class	Planting Method	Spacing (ft) (planting in	Density (plants/ acre)	Total Needed
Dominant species – high	elevation dune scriib (3.77 acre			clusters)	(j=====; ===============================	
Coyote brush	Baccharis pilularis	woody/shuub		,	*•	
Toyon	Heteromeles arbutifolia			10	50	189
TOTAL woody and woo	dy/shrub plants	woody	Container	10	50	189
Dominant species - low e	levation dune scrub (5.10 acres)		No estate carto de la composición de		100	378
Coyote brush	Baccharis pilularis	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.				
Тоуоп	Heteromeles arbutifolia	woody/shrub	Container	10	50	255
Valley oak	Quercus lobata	woody	Container	10	50	255
Coast live oak		woody	Container	10	25	128
TOTAL woody and woo	Quercus agrifolia	woody	Container	10	25	128
Mugwort			<u> </u>		150	766
Creeping wildrye	Artemisia douglasiana	herbaceous	Plugs ¹ and seed	3	550	2,805
Needlegrass	Leymus triticoides	herbaceous	Plugs ¹ and seed	3	550	2,805
	Nasella pulchra	herbaceous	Plugs ¹ and seed	3	550	2,805
TOTAL nervaceous plug	s (note that dominant herbs wi	ll also be include	ed in a seed mix)		1,650	8,415
Associated species (for bo	th higher and lower elevational	areas)				0,115
Bush Iupine	Lupinus albifrons	woody/shrub	Container/Seed	• A minimum of	3 associated specie	s shall be included
Yarrow	Achillea millefolium	herbaceous	Seed	in the planting	mix, including at lea	st 2 herbaceous
Elegant clarkia	Clarkia ungiculata	herbaceous	Seed		species.	
California croton	Croton californicus	herbaceous	Seed			
Tufted hairgrass	Deschampsia cespitosa	herbaceous	Seed			
Blue wildrye	Elymus glaucus	herbaceous	Seed			
California poppy	Eschscholtzia californica	herbaceous	Seed			
Gilia	Gilia capitata	herbaceous	Seed			
Gumplant	Grindelia spp.	herbaceous	Seed			
Telegraph weed	Heterotheca grandiflora	herbaceous	Seed			
Deerweed	Lotus scoparius	herbaceous	Seed			
Dove lupine	Lupinus bicolor	herbaceous	Seed			

Table 6. Dominant and associated species to be planted in Dune Scrub areas (8.87 areas)

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Common Name	Scientific Name	Class	Planting Method	Spacing (ft) (planting in	Density (plants/ acre)	Total Needed
N.S	Lupinus succulentus	herbaceous	Seed	<u>clusters)</u>	(p	<u> </u>
Man-root (wild cucumber) 1 Plugs planted in clusters on only		vine	Seed			

1 Thigs planted in clusters on only 1/3 of lower elevation areas.

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2.1.2 Mixed Riparian Forest

<u>Goal</u>: Enhance existing and create additional stands of mixed riparian forest at moderate- to lowelevation areas of Rindge Muck soils, transitioning into Piper Fine Sandy Loam soils at upper elevations. This vegetation type generally occurs in areas 4 to 12 ft above late summer groundwater levels, at approximately -10 to -4 ft NGVD in the north portion of the Parcel, and -12 to -4 in the southern portion of the Parcel.

Fremont cottonwood would dominate the lower elevation areas in the transition down to Cottonwood/Willow Forest, and Valley oak would dominate the upper elevation areas (approximately 8–12 ft above groundwater [Figure 8]) in the transition to Piper Fine Sandy Loam soils and the low elevation Dune Scrub community.

The target density for woody species in the Mixed Riparian Forest is 250 plants/acre, across 11.64 acres, for a total of 2,910 woody plants. Again, woody species will be planted in denser clusters with the interstices planted with associated shrubs, vines, and herbaceous species.

Table 7 presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting method for the Mixed Riparian Forest areas.

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Dominant and associated species to be planted in Mixed Riparian Forest areas (11.64 acres).								
Common name	Scientific name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plants/ acre)	Total Needed ¹		
Dominant species						<u> </u>		
Fremont collonwood	Populus fremontii	woody						
Goodding's black willow	Salix gooddingii	woody	Cuttings	10-12	001	1,164		
Valley oak	Quercus lobata		Cuttings	10-12	100	1,164		
TOTAL woody plants		woody	Container	10-12	50	582		
Associated species		A . The second database from the second			250	2,910		
Box elder								
	Acer negundo	woody ²	Container					
Oregon ash	Fraxinus latifolia	woody ²	Container					
Northern California black walnut	Juglans californica var. hindsii	woody ²	Container	• A minimum of 4 associated species shall be included in the initial planting mix. This shall				
Dutchman's pipevine	Aristolochia californica	shrub/vine	Seed					
California rose	Rosa californica	shrub/vine	Container	include at least - 2 herbs	:			
California blackberry	Rubus ursinus	shrub/vine	Container	- 1 shrub/vin	e			
California wild grape	Vitis californica	shrub/vine	Container					
Mugwort	Artemisia douglasiana	herbaceous	Container/seed ³	 If a woody spe 	cies is/are chosen,	it/they can replace		
Santa Barbara sedge	Carex barbarae	herbaceous	Plugs/seed ³	up to 15% of the total Dominant woody plants, wi a proportional reduction across each of Dominant species, except for oaks. Oaks cannot be replaced				
Blue wildrye	Elymus glaucus	herbaceous	Plugs/seed ³					
Meadow barley	Hordeum brachyantherum ssp. californicum	herbaceous	Plugs/seed ³	 Additional spe 	cies recommendation	ons can be made		
Creeping wildrye	Leymus triticoides	herbaceous	Plugs/seed ³	(e.g., herbs) but will need to be approved by DFG.				
Purple needlegrass	Nasella pulchra	herbaceous	Plugs/seed ³					

Table 7. Dominant and associated species to be a	planted in Mixed Riparian Forest program (11.64 areas)
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1 The "total needed" column is based on the assumption that no woody species will be chosen from the associated list. 2 If woody species are selected from the associated list then the total dominant species needed will be reduced as specified in the table. 3 Contractor shall provide seeding rates.

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2.1.3 Cottonwood/Willow Forest

<u>Goal</u>: Enhance existing and create additional stands of Cottonwood/Willow Forest at low elevations (generally 2 to 6 ft above late summer groundwater levels, approximately -14 to -10 ft NGVD in northern portions of the Parcel and -14 to -12 in the southern portions) areas of Rindge Muck soils. This community type is a transition between the lower elevation Riparian Scrub and Freshwater Marsh, and the higher elevation Mixed Riparian Forest.

The density for woody species for Cottonwood/Willow Forest is 250 plants/acre, across 13.61 acres, for a total of 3,402 plants. Again, woody plants will be planted in denser clusters with the interstices planted with associated shrubs, vines, and herbaceous species.

Table 8 presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting method for the Cottonwood/Willow areas.

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Common name	Scientific name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plants/ acre)	Total Needed ¹	
Dominant species						/	
Fremont collonwood	Populus fremontii	woody	Cutting	8-10		·	
Goodding's black willow	Salix gooddingii	woody	Cutting	8-10	100	1,361	
Box elder	Acer negundo	woody	Container		100	1,361	
Oregon ash	Fraxinus latifolia	woody	Container	8-10	25	340	
TOTAL woody plants			Container	0-10	25	340	
Associated species					250	3,402	
Arroyo willow	Salix lasiolepis	woody ²	Cutting	• A minimum of 4	associated species		
Dutchman's pipevine	Aristolochia californica	sluub/vine	Seed	• A minimum of 5 associated species shall be included in the initial planting mix. This shall include a minimum of:			
California rose	Rosa californica	sluub/vine	Container				
California blackberry	Rubus ursinus	slrub/vine	Container	3 herbs - 1 shrub/vine			
California wild grape	Vitis californica	shrub/vine	Container				
Dogbane	Apocynum cannabinum	herbaceous	Plugs/Seed	• If a woody spec.	ies is/are chosen, it/t	hey can replace up	
Mugwort	Artemisia douglasiana	herbaceous	Plugs/Seed	to 15% of the to	otal Dominant wood duction across each l	y plants, with a	
Santa Barbara sedge	Carex barbarae	herbaceous	Plugs/Seed			Johnnam species.	
Blue wildrye	Elymus glaucus	herbaceous	Plugs/Seed	 Additional spec: 	ies recommendations	s can be made	
Meadow barley	Hordeum brachyantherum ssp. californicum	herbaceous	Plugs/Seed	(e.g., herbs) but	t will need to be app.	roved by DFG.	
Creeping wildrye	Leymus triticoides	herbaceous	Plugs/Seed	1			
Purple needlegrass	Nasella pulchra	herbaceous	Plugs/Seed	1			

Table a	8. Dominant and associated species to be planted in Cottonwood/Willow areas (13.61 naves)

The "total needed" column is based on the assumption that no woody species will be chosen from the associated list.
 If woody species are selected from the associated list then the total dominant species needed will be reduced as specified in the table.

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2.1.4 Riparian Scrub

Goal: Enhance existing and create additional stands of Riparian Scrub at lower elevations (generally 0 to 2 ft above late summer groundwater levels, approximately -14 to -12 ft NGVD) in areas of Rindge Muck soils. This community grades down to the Freshwater Marsh area in the northern portion of the Parcel, and into the higher elevation Cottonwood/Willow zone at the upper edge of its elevation range.

The target density for woody species is 300 plants/acre, across 12.92 acres, for a total of 3,876 plants, with a mixture of willows, buttonbush., and mule fat dominating. Again, woody species will be planted in denser clusters with the interstices planted with associated herbaceous species.

Table 9 presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting methods for the Riparian Scrub areas.

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	-r one to be printed in Repartan Scrub areas (12.92 acres).						
Common name	Scientific name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plan(s/ acre)	Total Needed	
Dominant species				- Crusters)			
Arroyo willow	Salix lasiolepis	woodu			, · 1		
Shining willow or	Salix lucida ssp. lasiandra or	woody	Cutting	6-10	105	1,357	
red willow	S. laevigata	woody	Cutting	6-10	105	1,357	
Buttonbush	Cephalanthus occidentalis	woody	Container	6.10	· · · · · · · · · · · · · · · · · · ·		
Mule fat	Baccharis salicifolia	woody	Container	6-10	45	581	
TOTAL woody plants				6-10	45	581	
Associated species					300	3,876	
Aster	Aster chilensis/A. lentus	herbaceous	Plugs/seed	• A minimum of 2			
Santa Barbara sedge	Carex barbarae	herbaceous	Plugs/seed	 A minimum of 2 associated species will be included in the initial planting mix. Additional species recommendations can be made (e.g., herbs) but will need to be approved by DFG. 			
Saltgrass	Distichlis spicata	herbaceous	Plugs/seed				
Western goldenrod	Euthamia occidentalis	herbaceous	Plugs/seed				
Sneezeweed	Helenium bigelovii	herbaceous	Plugs/seed				
Yellow monkeyflower	Mimulus guttatus	herbaceous	Plugs/seed	-			

Table 9. Dominant and associated species to be planted in Riparian Scrub areas (12.92 agree)
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2.1.5 Freshwater Marsh

Goal: Create a seasonally inundated wetland area, located in the northern portion of the Mitigation Parcel in peaty, muck soils (Rindge Muck). Currently the surface elevation ranges from -14 to -12 ft NGVD. The marsh will be excavated to create topographic variation that ranges from approximately -16 to -14 ft NGVD, which will allow for ponding of water during the winter months, and will retain soil saturation at or near the surface during summer months.

The marsh will be planted with clusters of plugs on 3 ft centers, for a target density of 3,500 plugs/acre. Across 2.96 acres, the estimated total number of plugs would be 10,365. The interstices between plug clusters would be broadcast seeded with associated species. The tule/bulrush and common reed will be planted at lower relative elevations in the marsh, and the sedge and rush species will be planted at higher relative elevations. Cattails are not included in the initial planting mix even though this species was removed as part of the levee maintenance work, because it is assumed that this species will quickly colonize on its own (as noted on Sherman Island Parcel 11 and other Delta islands).

Table 10 presents the dominant and associated species, target species composition for the initial planting mix, and suggested planting methods for the Freshwater Marsh area.

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Common name	Scientific name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plugs/acre)	Total Needed		
Dominant species				Neleo en la la composición de	<u></u>			
Tule/bulrush	Scirpus acutus/ S. californicus	herbaceous	Plugs	3	1			
Common reed	Phragmites australis	herbaceous	Plugs	<u> </u>	887	2,626		
Sedge ¹	Carex spp.	herbaceous		3	887	2,626		
Bog rush	Juncus effusus	herbaceous	Plugs	3	887	2,626		
Baltic rush	Juncus balticus		Plugs	3	280	829		
Iris-leaved rush	Juncus xiphiodes	herbaceous	Plugs	3	280	829		
TOTAL herbaceous pla		herbaceous	Plugs	3	280	829		
					3,500	10,365		
	Calystegia sepium ssp.		· 建国家合作的第三人称单数。 1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-19 1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-1995年-19	a file a statistica a statistica Listo a statistica a	and the effect of the second sec			
Hedge bindweed Catystegia sepium ssp. limnophila		herbaceous	Seed	• A minimum of 2 associated species shall				
Button celery	Eryngium aristulatum	herbaceous	Seed	be included in the initial planting mix.				
Western goldenrod	Euthamia occidentalis	herbaceous	Seed	 Additional species recommendations ca be made (e.g., herbs) but will need to b 				
Sneezeweed	Helenium bigelovii	herbaceous	Seed					
Leather-root	Hoita macrostachya	herbaceous	Seed	approved by DFG.				
California loosestrife	Lythrum californicum	herbaceous	Seed	4				
Yellow monkeyflower	Mimulus guttatus	herbaceous	Seed	-				
Water parsley	Oenanthe sarmentosa	herbaceous	Seed	-				
Hedgenettle	Stachys albens	herbaceous	Seed	-				

Table 10. Dominant and associated species to be planted in freshwater marsh areas (2.96 acres).

2.2 Implementation

2.2.1 Pre-construction Activities

Until mitigation activities commence, the entire Tract 19, including the Mitigation Parcel, will continue to be grazed by cattle in accordance with the existing grazing lease agreements. Grazing may continue within the Mitigation Parcel to control introduced weedy plants such as ripgut brome (*Bromus diandrus*) until construction activities commence.

2.2.2 Initial Weed Removal

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An initial weed maintenance effort will occur prior to revegetation efforts on the Mitigation Parcel, and will focus on elimination of Bermuda grass, yellow star thistle, and Himalayan blackberry. Ongoing weed maintenance will occur throughout the three-year maintenance period (Section 3.2) in order to achieve the performance standards discussed in Section 4.1. If herbicides are used, they will be selected and applied by a licensed applicator in accordance with current regulations. DFG will review and approve any herbicides used on the property.

Bermuda grass is a perennial species that spreads vegetatively through rhizomes and stolons. Bermuda grass will likely be treated with an herbicide (initial spraying typically will occur in Spring), with a follow up application (e.g., in Fall) if regrowth occurs. The dead mat layer may be left for weed suppression. The Freshwater Marsh area may be treated prior to excavation of the marsh. DFG recommends use of the herbicide Roundup Pro, applied using a hose-gun sprayer or backpack sprayer in areas where there is existing native vegetation to minimize impacts to nontarget species. The herbicide should be applied to each plant, but not to the soil surrounding each plant.

Yellow star thistle is well established in the drier portions of the Mitigation Parcel. DFG recommends the use of the herbicide Transline (active ingredient = cloyralid) on yellow star thistle, once in the Spring prior to revegetation, with follow-up applications annually as necessary. Transline is most effective when applied to actively growing or germinating plants. In areas with existing broadleaf vegetation, Transline is typically applied using a hose-gun sprayer or backpack sprayer to minimize damage to existing native vegetation. Besides yellow star thistle, Transline affects only species in the families *Asteraceae, Fabaceae, Solanaceae*, and *Polygonaceae*, and will not affect grass species (DFG 2003). DFG recommends that the herbicide mix should be applied to each plant, including the soil surrounding each plant.

The non-native, invasive Himalayan blackberry is present under the existing Goodding's black willow stand in the southeastern portion of the Parcel and will be treated/removed as necessary to prevent the species from spreading into the newly restored Cottonwood/Willow or Mixed Riparian forests. Himalayan blackberry is also dense and widespread along the ditch/fence line that forms the southern boundary of Tract 19. The District will maintain a right of way corridor between the fence line and the Mitigation Parcel (approximately 30 ft), keeping it clear for vehicle access; therefore, Himalayan blackberry will be kept from encroaching into the Mitigation Parcel.

2.2.3 Grading and Contouring

The planting plan has been designed to minimize the necessity for earth moving activities on the Parcel. The only area that will require considerable excavation and grading is the Freshwater Marsh. The marsh will be excavated to allow for seasonal inundation necessary to support a variety of wetland plant species (e.g., tules, cattails, sedges and rushes). During the summer, the

soil will remain saturated at or near the surface. The marsh will be excavated and contoured to slope gradually up to the surrounding Riparian Scrub and Cottonwood/Willow areas. The estimated amount of material to be excavated for the wetland is about 15,000 cubic yards. The marsh will not be excavated with a uniform perimeter, but will instead be lobed to increase habitat complexity. Excavated material will be moved off-site.

Minor grading may occur in other areas of the Mitigation Parcel (e.g., to smooth out rough edges or provide access for contractors). Outside of the Freshwater Marsh, other areas may be scraped (up to 6 inches) with a blade or disced to aid in removal of non-native seed banks, and to promote native seed germination and establishment from broadcast seeding, but will not require any significant grading or contouring.

2.2.4 Plant and Material Procurement

As much as possible, local plant stock collected from within the legal Delta (see Appendix A for map of legal Delta boundaries), growing under similar ecological conditions (e.g., soils, depth to groundwater) will be used to revegetate the Mitigation Parcel. Container stock, plugs, and herbaceous seed mixes identified in Section 2.1 above will be acquired from a contracted native plant nursery, as will slow-release fertilizer. The contracted nursery will collect material during the appropriate time of year or provide existing in-stock material already collected from within the legal Delta.

Cuttings for Goodding's black willow and arroyo willow may be taken from the Port of Stockton site south of the duck club property, where willows are abundant. Cuttings may also be obtained from other levee areas along Bradford Island or from another suitable location within the legal Delta. Cuttings will be collected during the dormant period for these species, kept moist, and installed on the Parcel within one week of collection. Collection during late fall/early winter will coincide with the species dormancy period and the revegetation schedule.

Potential sources of cuttings within the collection area of the legal Delta will be identified for Fremont cottonwood, mule fat, California blackberry, and shining/red willow. The cuttings may be substituted for the container stock requirements identified in Section 2.1 for each species if it is determined to be more cost-effective.

2.2.5 Plant Installation

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Plant installation will occur during late fall/early winter, after the onset of the first winter rains, in order to maximize success of plant establishment (typically during plant dormancy) and minimize initial irrigation demands.

The location, quantity, and spacing of plants will be installed as specified in Section 2.1 and Figure 7, but may be adjusted by the contractor as necessary to accommodate field conditions.

Planting will follow guidelines developed by the California Department of Conservation (Newton and Claassen 2003), as discussed below.

Container stock will be planted to minimize disturbance of the root system and avoid air pockets in the planting hole. This will generally include the following steps:

- A hole will be excavated to approximately twice the size of the plant's root ball.
- The planting hole will be partially filled with loose, amended soil (including slow-release fertilizer as necessary).

- The plant will be carefully removed from the container, leaving the rootball completely intact.
- Any plants not exhibiting a healthy root system will be discarded
- The plant will be placed into the planting hole and the soil firmed around the plant to bring the soil to slightly above the root crown at finished grade. Weed-stop mats or mulch may be placed around the base of certain plants.
- The plants will be placed in soil depressions or collection basin to increase the amount of precipitation intercepted by the plant and "watered-in" at the time of planting. On slopes, a four-inch high, hand-compacted earth berm will be constructed along the forward edge of the planting terrace for a watering basin.
- Immediately after installation, the plant will be irrigated to settle the soil around the plant. If the root becomes exposed, additional soil will be placed around the root crown.

Cuttings will be procured and planted during dormancy, and will be planted in the correct orientation according to the following basic steps:

- Cuttings will be taken from vigorous-growing, healthy shrubs and trees.
- Willow and cottonwood poles should be approximately 3 to 4 ft long and at least 0.5 inches in diameter at the base, but no larger than approximately 6 inches in diameter. Some shorter cuttings (minimum of 18 inches) can be installed in the Riparian Scrub or Cottonwood/Willow zones where late-summer groundwater levels are 3-4 ft below the ground surface.
- On woody cuttings, the base (end to be planted in the ground) will be cut at a 45 degree angle, and the top will be cut at a 90 degree angle.
- Cuttings will be bundled in lots of 25 to 50, with all basal ends oriented in the same direction to aid in proper installation.
- Most auxiliary branches and leaves will be removed before planting; for grasses and grass-like species, the overall length should be trimmed to about 1/2 their normal height.
- Unless placed in cold storage, cuttings will be planted within two-weeks of procurement.
- Cuttings will be kept moist, will not be left in the sun, and will be transported in covered vehicles to protect them from desiccation.
- Cuttings will be planted in pre-drilled holes so that approximately 4-6 inches of the cutting remains above the ground.
- The hole will be closed with loose soil and firmed around the plant with the heel of the boot to close the hole completely. No airspace will be left.
- The cuttings will be watered immediately after planting to settle the soil and eliminate air pockets. If the base becomes exposed, additional soil will be placed around the cutting.

Plugs for grasses, rushes, and sedges obtained from a native plant nursery will be planted per the nurseries specifications/recommendations, but will follow similar guidelines described above for container stock and cuttings. Seeds for herbaceous species will be broadcast seeded or drill seeded (or another more cost effective and efficient method, as specified by the planting contractor) in the interstices between plantings.

Plant-protectors will not be initially installed. There are no large native mammals on Bradford Island, cattle will be fenced out permanently from the Parcel, and small rodents are uncommon due to large flooding events in the past. Voles do exist on the island but have not posed a problem to local farmers. Beavers are also present, but given the quantity of available forage just south of the Parcel, and the distance from the levee that beavers would need to travel, significant impact is unlikely. Monitoring for herbivory damage will occur at least annually, and if damage

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is found to be impacting seedling success to the extent that performance standards (e.g., survival) may not be attained, plant protectors will be installed.

3 MAINTENANCE & FOLLOW-UP RESTORATION

Following implementation of grading and revegetation, the District will continue to maintain the perimeter fence and irrigation system, and will implement an irrigation and weed maintenance program to meet the schedule and performance standards described in Section 4.

3.1 Irrigation

Plants installed on the Mitigation Parcel will receive watering, as needed, for three years following implementation, as part of site maintenance activities. The District or its designated contractor will monitor all irrigated plants and provide the appropriate amount and frequency of water as site-specific conditions require.

The District has installed a water well in the southwest corner of Tract 19 that will be used to irrigate the Mitigation Parcel. The District will develop an irrigation system appropriate for the Parcel. For example, the higher elevation areas will likely be irrigated with a pressure system that draws water from the well and feeds into a drip system with some sprayers installed as necessary. Lower elevation areas may be flooded (e.g., Freshwater Marsh) or hand watered to recharge soil moisture if necessary. The irrigation system will be adjustable so water flow can be increased or decreased as needed for different areas and during different seasons. The system will be checked and maintained regularly to ensure that it is working properly.

3.2 Post-implementation Weed Maintenance

A three-year period of weed maintenance will include spot use of herbicides, hand removal, and mechanical methods that do not disturb the ground to control invasive weeds as necessary in order to meet performance standards for percent cover.

3.3 Remedial Actions

Should the performance standards (described in Section 4.2 below) not be met at the end of the three year monitoring period, negotiations with DFG will determine any required remedial planting/seeding and additional monitoring. Remedial plantings will be installed in the same manner and schedule as described in Section 2.2.5 (Plant Installation). The District may choose to develop interim performance standards to be met at the end of each year following initial installation, in order to space remedial actions over the three-year period and increase the likelihood for achieving the final performance standards.

4 MONITORING PROGRAM

Management and restoration activities on the Mitigation Parcel will be monitored by the District (or its designated agent) for a period of three years following implementation to determine if the habitat restoration goals (Section 1.5) and performance standards (Section 4.1) for the Parcel are being met. Yearly monitoring of vegetation establishment will provide guidance to the District and DFG to determine if remedial actions are needed. Other projects in the Delta suggest that natural recruitment will supplement the plantings and contribute to meeting the performance standards. If monitoring reveals that performance standards are not met, remedial activities will be implemented as described in Section 3.3 above.

Funding for the monitoring required by this plan shall be provided from DWR's account established for habitat mitigation under California Water Code sections 12300 et seq, as described in Section 1.6 (Agency Responsibility).

4.1 Performance Standards

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DFG and the District have agreed to performance standards for the Mitigation Parcel, which are summarized in Table 11. These performance standards are based on the desire that the site be on a self-sustaining trajectory by the end of the required three-year maintenance period. Requirements were modified from typical DFG mitigation targets (e.g., percent survival of woody species) used on other Delta mitigation projects, and on professional judgment. DFG and the District may, through consensus negotiations, choose to modify these standards based on sitespecific conditions and the results of yearly maintenance and monitoring at the site.

The District shall achieve the following performance standards on the Parcel after three years:

- Survival of native woody species: At least 80 percent survival of the total planted density of native woody species (total shall include both surviving planted stock and natural recruitment of native woody species). Survival will be measured separately (i.e., stratified) for scrub-shrub types (Dune Scrub and Riparian Scrub), and riparian forest types (Mixed Riparian and Cottonwood/Willow). This performance standard excludes planted oaks in the Mixed Riparian and low Dune Scrub areas, and bush lupine (if planted as an associate species in the Dune Scrub area). Woody species are defined in the "class" category of Tables 6 through 10. The 80 percent survival requirement will extend to include California rose and California blackberry if planted as associate species in any of the vegetation types.
- Vigor of native woody species: The surviving woody species would also need to show signs of health and vigor, meaning at least 80 percent of the surviving woody species (as defined above) have a vigor rating of "4" (defined in Section 4.2.2.2 as having 81 percent or more healthy foliage). The vigor requirement excludes planted oaks and bush lupine, but would include California rose and California blackberry if planted as associate species.
- Survival of planted oaks: Establishment of oak species on the Parcel is largely experimental, given the depth to groundwater at the higher elevation portions of the Parcel (Figure 8), and no oaks were removed as a result of the District's levee maintenance activities for which this Parcel constitutes mitigation; therefore, the performance standard for oaks will be 50 percent survival of planted oaks across the entire Parcel (i.e., in both the low elevation Dune Scrub area and Mixed Riparian Forest area combined).

Percent cover of invasive weeds: Percent cover will be used to evaluate the success of weed control activities on the Parcel. The focus of weed control will be on particularly invasive, non-native species that create serious problems in California's native ecosystems, as defined by the California Invasive Plant Council (Cal-IPC). Cal-IPC has produced an Invasive Plant Inventory of non-native species that pose serious problems in California wildlands, and rates these species based on criteria such as severity of ecological impacts on ecosystems, dispersal and establishment characteristics, and current distribution (Warner et al. 2003). The list is "based on information submitted by land managers, botanists, and researchers throughout the state, and on published sources" (Cal-IPC 2006). The original list was published in 1999 and is in the process of being updated (Cal-IPC 2006). For the purposes of these performance standards, an "invasive weed" is defined as any plant with an "A" or "B" rating on the 1999 Cal-IPC list (Cal-IPC 1999). The 1999 list is provided for reference as an appendix to this report (Appendix B). The performance standard will be: (1) 90% free of yellow star thistle by the end of year 3, measured separately (i.e., stratified) for each vegetation type; (2) 75% free of bermuda grass by the end of year 3, measured separately (i.e., stratified) for each vegetation type; and (3) 80% free of all other invasive weeds (defined above) by the end of year three, measured separately (i.e., stratified) for each vegetation type. The percent cover values are based on relative percent cover, which is defined in more detail in the discussion of monitoring methods in Section 4.2.2.3.

Vegetation Type	Native woody ¹ species survival	Native woody ¹ species vigor (of surviving stems)	Percent cover free of yellow star thistle	Percent cover free of bermuda grass	Percent cover free of other invasive weeds ²
Freshwater Marsh	NA	NA	90%	75%	80%
Dune Scrub	80% planted	80%	90%	75%	80%
Riparian Scrub	density ³	Category 4 ⁴	90%	75%	80%
Cottonwood/Willow	80% planted	80%	90%	75%	80%
Mixed Riparian	density ³	Category 4 ⁴	90%	75%	80%

Table 11. Summary of performance standards by vegetation type.

¹ This includes species defined as woody in the "class" category of Tables 6 through 10, and California rose and California blackberry, if these species were planted.

For the purposes of this project, invasive weeds are those defined as category "A" or "B" by the California Invasive Plant Council's 1999 List of Exotic Pest Plants of Greatest Ecological Concern in California (Cal-IPC 1999; Appendix B).

³ Does not include oak species or bush lupine (if planted as associate species). Performance standard for oaks is 50% survival of planted density across the Dune Scrub and Mixed Riparian areas combined.

⁴ Category 4 Vigor Rating defined in Section 4.2.2.2. Vigor performance standard does not include oak species or bush lupine (if planted as associate species). This is 80 percent of the surviving stems.

4.2 Monitoring Methods

4.2.1 Photo Monitoring and Incidental Observations

Photo monitoring from fixed stations in each vegetation type, or from a vantage point (i.e., levee road or hill tops) where multiple vegetation types can be photographed with a panoramic view, will be established to monitor changes over time. Because of the limited amount of excavation likely to occur on the Mitigation Parcel, photo monitoring will begin prior to installation (i.e., pre-construction = baseline). Photographs will be taken at least once each year in the summer after leaf out has occurred. To ensure consistency, the fixed station locations will be recorded using a handheld GPS receiver, the height of the camera stand measured (if used), and a compass bearing of the direction the camera is facing will be taken (or the compass bearing for the start of a panoramic series of photographs) in case the permanent stand/marker is damaged or overgrown with vegetation. Photographs of other notable features or incidental observations will also be taken during each monitoring period.

Qualitative observations on plant stress and likely cause (e.g., herbivory, water stress, pathogens), and distribution and abundance of weeds will be made during routine maintenance activities as well as during yearly quantitative monitoring efforts.

4.2.2 Performance Standards Monitoring

Monitoring of progress toward achieving the project performance standards (discussed in Section 4.1) will occur annually for three years following installation, and at approximately the same time each year. Typically one monitoring event will occur during late spring/early summer during flowering periods of most herbaceous species, to aid in species identification and accurate assessments of percent herbaceous cover. A second monitoring event will occur toward the end of the growing season (e.g., September), in order to assess woody species survival and vigor after the summer.

Although percent survival/density and vigor of woody species, and percent cover of invasive weed species are the only parameters tied to performance standards, other measurements, such as percent cover of all herbaceous species and species richness, will aid in the overall assessment of site conditions and will provide valuable data for future restoration/mitigation efforts in the Delta.

4.2.2.1 Density of woody species

In order to monitor success of planted woody species and account for natural recruitment, the density of woody species (stems per unit area) will be monitored using sampling of permanent plots stratified (i.e., measured separately) by vegetation type and placement of plantings (i.e., woody species will be planted in clusters, especially in the Dune Scrub areas, so plots will be established only within the clustered areas, and not within interstitial herbaceous areas). All woody species will be monitored, regardless of whether the species was planted as part of the original installation (e.g., if sandbar willow [*Salix exigua*] establishes on the Parcel, it will be counted in the overall density of native woody species present).

Permanent plots will be established following initial planting, the baseline density within each fixed plot will be determined, and the mean density of plots, combined by vegetation types as shown in Table 11 (i.e., plots within the Riparian Scrub and Dune Scrub areas will be combined, and plots within the Cottonwood/Willow and Mixed Riparian Forest areas will be combined) will be used as the baseline density value.

Although woody stems will be identified, monitored, and reported by species, the total of all woody species will be used to meet the performance standard. The total of all woody stems in each plot will be calculated, and a mean value among plots will be compared to the mean baseline value, in order to meet the performance standard.

Since no woody species will be planted in the Freshwater Marsh area, density will not be monitored in this area.

4.2.2.2 Vigor of woody species

Vigor will be monitored simultaneously with measurement of woody species density through a visual estimate of foliage, using the following qualitative categories. Healthy foliage is defined as showing no signs of herbivory, nutrient or water stress, or pathogens on stems or foliage.

- 4 = 81 percent (or greater) of foliage appears to be healthy
- 3 = 51 to 80 percent of foliage appears to be healthy
- 2 = 25 to 50 percent of foliage appears to be healthy
- 1 = less than 25 percent of foliage appears to be healthy

Although vigor will be monitored and reported by species, the vigor ratings for all woody species combined will be used to meet the performance standard.

4.2.2.3 Percent cover of herbaceous species and weeds

A line-intercept method will be used to visually estimate percent cover, or a similar standard methodology appropriate to the species assemblages planted (e.g., Daubenmire plots, step-point method, releves; see Elzinga et al. 1998, USDA and USDI 1996, Sawyer and Keeler-Wolf 1995, CNPS 2003), if mutually agreed upon by DFG and the District. Transects will be randomly located in each vegetation type, and may be permanently established depending on the methodology used. For each transect, absolute cover by species will be visually estimated and recorded, as will bare ground and organic litter/debris (e.g., dead plant material such as leaf litter or thatch). Because absolute cover can potentially include canopy overlap among species (Barbour et al. 1998), the absolute cover values will be transformed to a relative percent cover amount, including bare ground and organic litter/debris, which will total 100 percent. Mean percent relative cover values for each vegetation type will be used to meet the performance standards. For example, if three transects were sampled in the Cottonwood/Willow areas, then the mean of these three transects for relative cover of yellow star thistle would need to be less than 10 percent in order to meet the performance standard (Table 11).

Percent cover by species will be estimated for each species to provide appropriate data necessary for adaptive management decisions. A visual estimate of percent cover of overstory strata (shrubs and trees) may be made, as necessary, to account for possible effects of overstory shading on herbaceous species. Percent cover by life-form groupings (e.g., grasses, perennial herbs, annual herbs, etc) or by species may also be included in reporting to allow for more specific analysis of the herbaceous understory and an understanding of the success of certain planting methods and species assemblages.

Species richness will be calculated based on the line intercept method used to calculate percent cover. The total number of species intersecting the transects will be recorded. If a belt-transect or plot-based sampling method is used, species richness will be determined based on the total number of species per unit area observed across all plots.

4.3 Reporting

5

The District, or its designated agent, will be responsible for annual reporting to summarize yearly maintenance activities, monitoring results, and recommendations for remedial action. The reports will include the following sections:

- o Introduction
- o Maintenance Activities Performed
- o Monitoring Methods
- Monitoring Results (qualitative and quantitative results compared to baseline information from the original planting, or compared to previous year(s) results)
- o Achievement of Performance Standards (and interim guidelines if developed)
- o Recommendations for adaptive management and/or remedial planting

4.4 Schedule

Year 1 post-implementation

- 1. The District will maintain the perimeter fence and irrigation system.
- 2. The District will continue watering within the planted area on a schedule to be determined by weather and local site conditions (typically Spring through Fall).
- 3. The District will continue necessary weed control measures that may include hand removal, mechanical and/or chemical control (typically Spring through Fall).
- 4. If the District determines through monitoring that its interim success criteria are not being met, the District will conduct additional plantings of woody plants and herbs (Winter).
- 5. The District will prepare an interim monitoring report summarizing the results of monitoring and describing the maintenance and/or remedial activities that took place, for submittal to DFG (Winter of Year 1).

Year 2 and 3 post-implementation

- 1. The District, DWR, and DFG will review the results of previous monitoring to determine if further routine management of the habitat will be necessary. If it is found that the plants are sufficiently large to be self-sustaining, further watering will be curtailed (Spring).
- 2. If weeding in previous years has been successful, the District will only spot treat small infestations as necessary (Spring through Fall).
- 3. If the District determines through monitoring that its interim success criteria are not being met, the District will conduct additional plantings of woody plants and herbs (Winter of Year 2).
- 4. The District will prepare an interim monitoring report summarizing the results of monitoring and describing the maintenance and/or remedial activities that took place (Winter of Year 2).
- 5. If at the end of Year 3, monitoring determines that the growth and spread of the plantings has not achieved the performance standards described in Section 4.2, the District may, based on negotiations with DFG, initiate remedial planting activities and extend the monitoring of the new plantings for another year (Winter of Year 3).
- 6. The District will prepare a final monitoring report (Winter of Year 3) or it will be considered a yearly interim report, if remedial plantings are required during Winter of Year 3, and a final report will be prepared the following year (Winter of Year 4).

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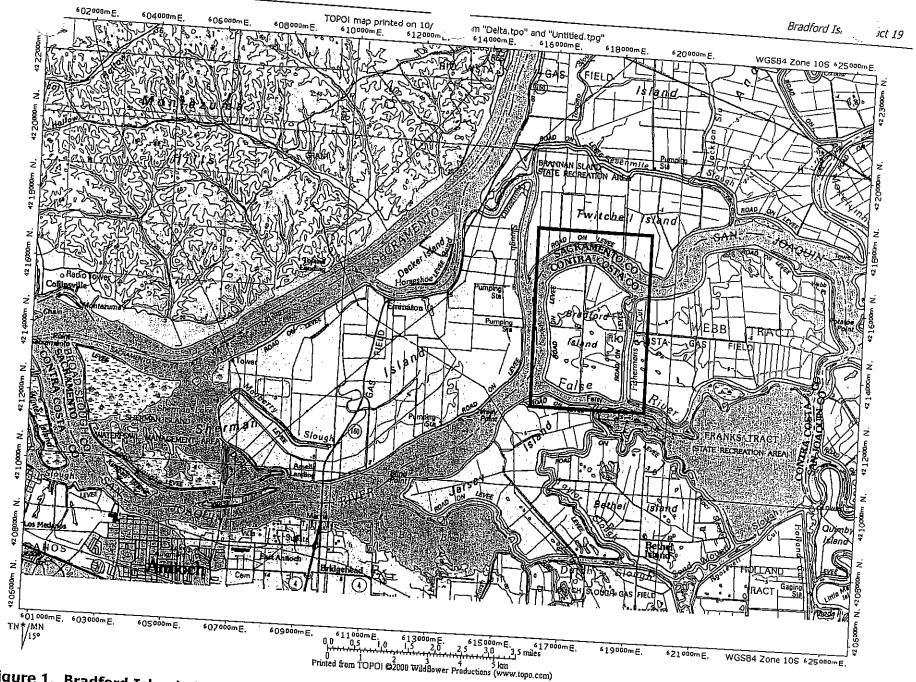
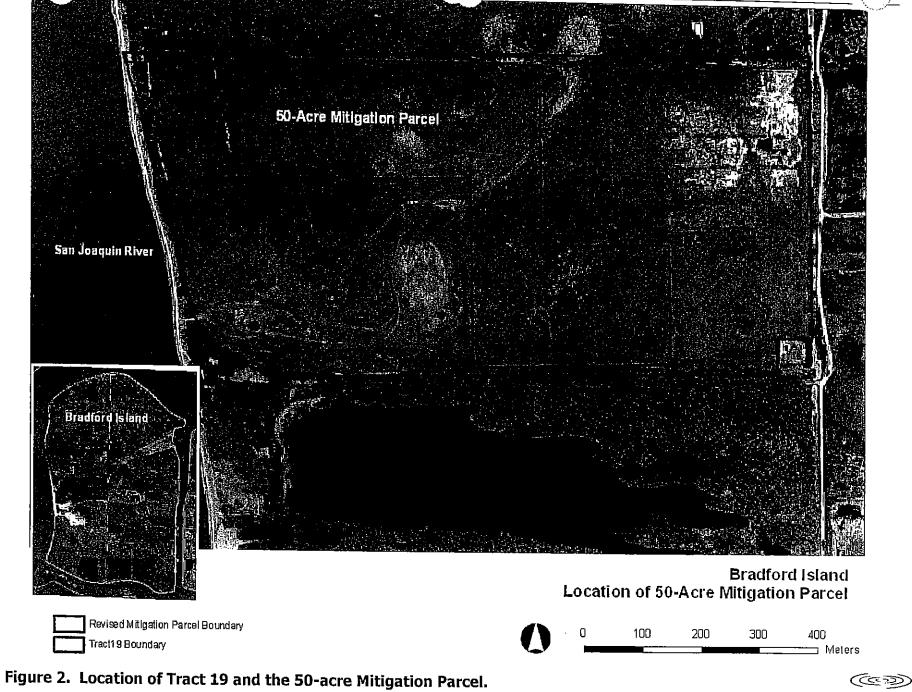


Figure 1. Bradford Island vicinity map.

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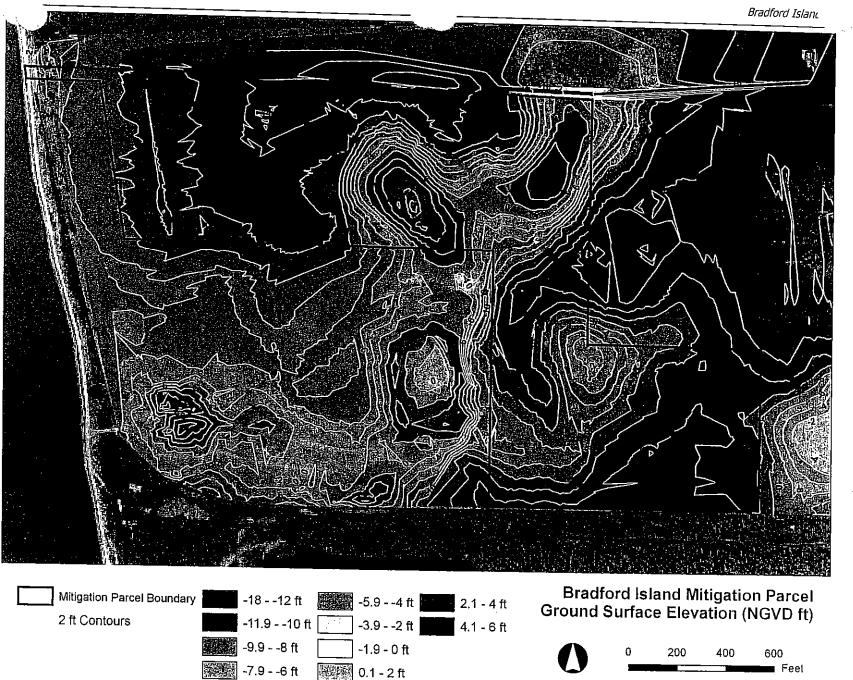


Figure 3. Existing ground surface elevation of the Mitigation Parcel.

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Figure 4. Existing soils and topography.

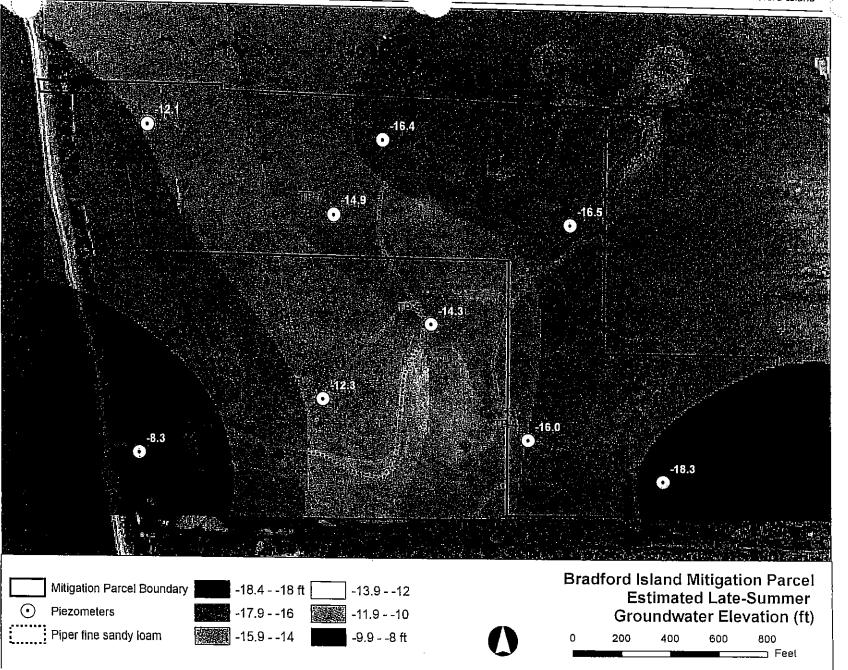
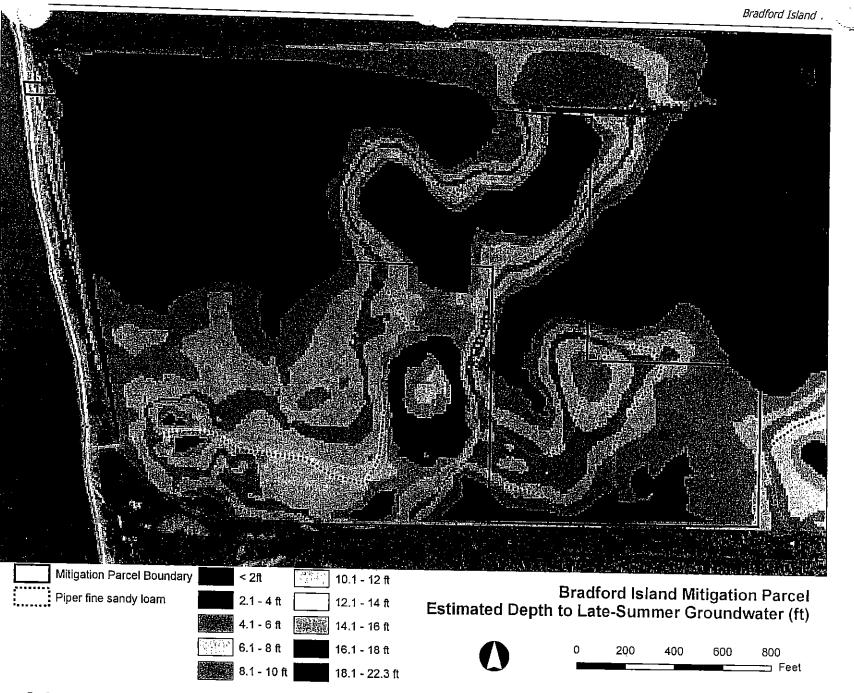


Figure 5. Estimated late-summer groundwater elevation.

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Figure 6. Approximate depth to late-summer groundwater.



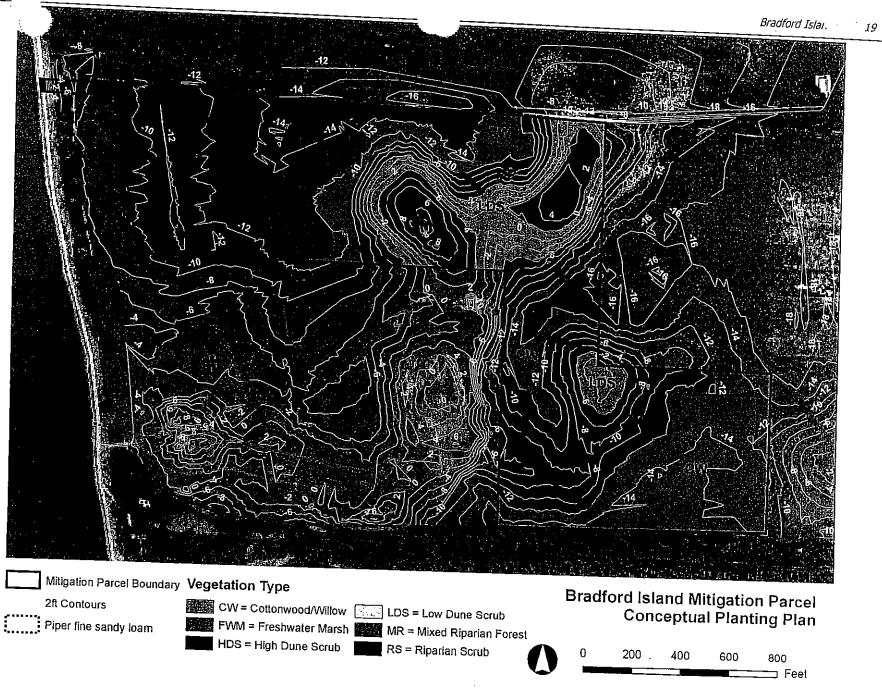


Figure 7. Conceptual planting plan showing vegetation types and existing surface topography.



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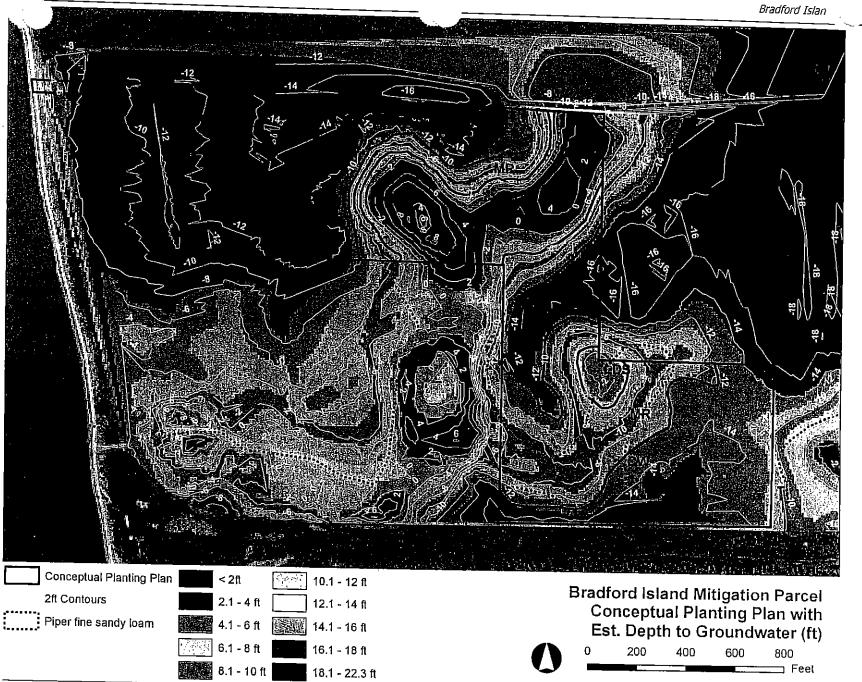


Figure 8. Conceptual planting plan relative to depth to late-summer groundwater.



9

The CalEPPC List: Exotic Pest Plants of Greatest Ecological Concern in California October, 1999

the CalEPPC list is based on information submitted by our members and by land managers, botanists and researchers throughout the state, and on published sources. The list highlights non-native plants that are serious problems **in wildlands** (natural areas that support native ecosystems, including national, state and local parks, ecological reserves, wildlife areas, national forests, BLM lands, etc.).

List categories include:

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A: Most Invasive Wildland Pest Plants; documented as aggressive invaders t displace natives and disrupt natural habitats. Includes two sub-lists; List A-1: Widespread pests that are invasive in more than 3 Jepson regions (see page 3), and List A-2: Regional pests invasive in 3 or fewer Jepson regions.

List B: Wildland Pest Plants of Lesser Invasiveness; invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption; may be wide-spread or regional.

Red Alert: Pest plants with potential to spread explosively; infestations currently small or localized. If found, alert CalEPPC, County Agricultural Commissioner or California Department of Food and Agriculture.

Need More Information: Plants for which current information does not adequately describe nature of threat to wildlands, distribution or invasiveness. Further information is requested from knowledgeable observers.

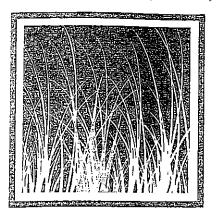
Annual Grasses: New in this edition; a preliminary list of annual grasses, abundant and widespread in California, that pose significant threats to wildlands. Information is requested to support further definition of this category in next List edition.

Considered But Not Listed: Plants that, after review of status, do not appear to pose a significant threat to wildlands.

Plants that fall into the following categories are not Unded in the List:

- rlants found mainly or solely in disturbed areas, such as roadsides and agricultural fields.

nts that are established only sparingly, with minimal impact on natural tats.



1999 List Review Committee:

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- California Native Plant Society
- Ellie Wagner, Botanist
- California Dept. of Transportation
- Peter Warner, Restoration Coordinator
- Golden Gate National Parks
- Association

The CalEPPC list is updated regularly. Please use the form provided to send comments, suggestions on new information to: Peter Warner, 555 Magnolia Avenue, Petaluma, CA, 94952-2080, or via email at peterjwarner@earthlink.net

Thanks to all those who submitted comments for the 1999 list

Latin Name ¹	Common Name	Habitats of Concern and Other Comments Distribution ²	
Ammophila arenaria	European beach grass	Coastal dunes SCo, CCo, NCo	
Arundo donax	giant reed, arundo	Riparian areas cSNF,CCo,SCo,SnC	
Bromus tectorum	cheat grass, downy brome	Sagebrush, pinyon-juniper, other desert communities; increases fire frequency	GB,D
Carpobrotus edulis	iceplant, sea fig	Many coastal communities, esp. dunes	SCo,CCo,NCo,SnFrB
Cenlaurea solstitialis ^c	yellow starthistle	Grasslands	CA-FP (uncommon in SoCal)
Cortaderia jubata	Andean pampas grass, jubatagrass	Horticultural; many coastal habitats, esp. disturbed or exposed sites incl. logged areas	NCo,NCoRO,SnFrB, CCo,WTR,SCo
Cortaderia selloana	pampas grass	Horticultural; coastal dunes, coastal scrub, Monterey pine forest, riparian, grasslands; wetlands in ScV; also on serpentine	SnFrB,SCo,CCo,ScV
Cynara cardunculus ^a	artichoke thistle	Coastal grasslands	CA-FP, esp. CCo,SCo
Cytisus scoparius ^c	Scotch broom	Horticultural; coastal scrub, oak woodlands, Sierra foothills	NW,CaRF,SNF,GV, SCo,CW
Eucalyptus globulus	Tasmanian blue gum	Riparian areas, grasslands, moist slopes	NCoRO,GV,SnFrB, CCo,SCoRO,SCo,nChI
Foeniculum vulgare	wild fennel	Grasslands; esp. SoCal, Channel Is.; the cultivated garden herb is not invasive	CA-FP
Genista monspessulana ^c	French broom	Horticultural; coastal scrub, oak woodlands, grasslands	NCoRO,NCoRI,SnFrB, CCo,SCoRO,sChl,WTR,PR
Lepidium latifolium ^B .	perennial pepperweed, tall whitetop	Coastal, inland marshes, riparian areas, wetlands, grasslands; potential to invade montane wetlands	CA (except KR,D)
Myriophyllum spicatum	Eurasian watermilfoil	Horticultural; lakes, ponds, streams, aquaculture	SnFrB,SnJV,SNH(?); prob. C/
Pennisetum setaceum	fountain grass	Horticultural; grasslands, dunes, desert canyons; roadsides Deltaic GV,CCo,St SnFrB	
Rubus discolor	Himalayan blackberry 🦯	Riparian areas, marshes, oak woodlands	CA-FP
Senecio mikanioides (=Delairea odorata)	Cape ivy, German ivy	Coastal, riparian areas, also SoCal (south side San Gabriel Mtns.)	SCo,CCo,NCo,SnFrB,SW
Taeniatherum caput-medusae ^c	medusa-head	Grasslands, particularly alkaline and poorly drained areas	NCoR,CaR,SNF,GV,SCo
Tamarix chinensis, T. gallica, T. parviflora & T. ramosissima	tamarisk, salt cedar	Desert washes, riparian areas, seeps and springs	SCo,D,SnFrB,GV,sNCoR, sSNF,Teh,SCoRI,SNE, WTR
Ulex europaeus ^B	gorse	North, central coastal scrub, grasslands	NCo,NCoRO,CaRF, n&cSNF,SnFrB,CCo

List A-1: Most Invasive Wildland Pest Plants; Widespread

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- F: Federal Noxious Weed, as designated by the USDA; targeted for federally-funded prevention, eradication or containment efforts.
- A: CA Dept. of Food & Agriculture, on "A" list of Noxious Weeds; agency policies call for eradication, containment or entry refusal.
- B: CA Dept. of Food & Agriculture, on "B" list of Noxious Weeds; includes species that are more widespread, and therefore more difficult to contain; agency allows county Agricultural Commissioners to decide if local eradication or containment is warranted.
- C: CA Dept. of Food & Agriculture, on "C" list of Noxious Weeds; includes weeds that are so widespread that the agency does not endorse state or county-funded eradication or containment efforts except in nurseries or seed lots.
- Q: CA Dept. of Food & Agriculture's designation for temporary "A" rating pending determination of a permanent rating.

For most species nomenclature follows The Jepson Manual: Higher Plants of California (Hickman, J., Ed., 1993).

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- 4	Jist A-2: Most Inv	rasive Wildland Pest Plants; Regional	
Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Ailanthus altissima	tree of heaven	Riparian areas, grasslands, oak woodlands, esp. GV, SCo	CA-FP
Atriplex semibaccata	Australian saltbush	SoCal, coastal grasslands, scrub, "high marsh" of coastal salt marshes	CA (except CaR,c&sSN)
Brassica tournefortii	Moroccan or African mustard	Washes, alkaline flats, disturbed areas in Sonoran Desert	SW,D
Biomus madritensis ssp. rubens	red brome	Widespread; contributing to SoCal scrub, desert scrub type conversions; increases fire frequency	CA
Cardaria draba [®]	white-top, hoary cress	Riparian areas, marshes of central coast; also ag. lands, disturbed areas	Problem only in CCo
Conicosia pugioniformis	narrow-leaved iceplant, roundleaf iceplant	Coastal dunes, sandy soils near coast; best documented in San Luis Obispo and Santa Barbara cos.	CCo
Cotoneaster pannosus, C. lacteus	cotoneaster	Horticultural; many coastal communities; esp. North Coast, Big Sur; related species also invasive	CCo,SnFrB,NW
Cytisus striatus	striated broom	Often confused with C. scoparius; coastal scrub, grassland	SnFrB,CCo,SCo,PR
Egeria densa	Brazilian waterweed	Streams, ponds, sloughs, lakes; Sacramento-San Joaquin Delta	n&sSNF,SnJV,SnFrB, SnJt,SNE
Ehrharta calycina	veldt grass	Sandy soils, esp. dunes; rapidly spreading on central coast	CCo,SCoRO,WTR
Eichhornia crassipes	water hyacinth	Horticultural; established in natural waterways, esp. troublesome in Sacramento-San Joaquin Delta	GV,SnFrB,SCo,PR
ieagnus angustifolia	Russian olive	Horticultural; interior riparian areas	SnJV,SnFrB,SNE,DMoj
aphorbia esula	leafy spurge	Rangelands in far no. CA, also reported from Los Angeles Co.	eKR,NCo,CaR,MP,SCo
Ficus carica	edible fig	Horticultural; Central Valley, foothill, South Coast and Channel Is. riparian woodlands	nSNF,GV,SnFrB,SCo
Lupinus arboreus	bush lupine	Native to SCo, CCo; invasive only in North Coast dunes	SCo,CCo,NCo
Mentha pulegium	pennyroyal	Santa Rosa Plain (Sonoma Co.) and Central Valley vernal pools; wetlands elsewhere	NW,GV,CWSCo
Myoporum laetum	туоролит	Horticultural; coastal riparian areas in SCo	SCo,CCo
Saponaria officinalis	bouncing bet	Horticultural; meadows, riparian habitat in SNE, esp. Mono Basin	NW,CaRH,nSNF,SnFrB, SCoRO,SCo,PR,MP,SNE, GV
Spartina alterniflora	Atlantic or smooth cordgrass	S.F. Bay salt marshes; populations in Humboldt Bay believed extirpated	CCo(shores of S.F. Bay)

List A-2: Most Invasive Wildland Pest Plants; Regional

²Distribution by geographic subdivisions per the Jepson Manual

CA=California CA-FP=California Floristic Province CaR=Cascade Ranges CaRF=Cascade Range Foothills CCo=Central Coast ChI=Channel Islands =Central Western CA Deserts DMoj=Mojave Desert DSon=Sonoran Desert GB=Great Basin

GV=Great Valley KR=Klamath Ranges MP=Modoc Plateau NCo=North Coast NCoRI=Inner NCo Ranges NCoRO=Outer NCo Ranges NW=Northwestern CA PR=Peninsular Ranges SCo=South Coast SCoRI=Inner SCo Ranges SCoRO=Outer SCo Ranges ScV=Sacramento Valley SnJV=San Joaquin Valley SN=Sierra Nevada SNE=East of SN SNF=SN Foothills SNH=High SN SnFrB=San Francisco Bay Area SnGb=San Gabriel Mtns SW=Southwestern CA Teh=Tehachapi Mtns WTR=Western Transverse Ranges

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List B: Wildland Pest Plants of Lesser Invasiveness

· Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution
Ageratina adenophora ^r	eupatory	Horticultural; coastal canyons, coastal scrub, slopes, Marin to CCo,SnFrB,SCo San Diego Co; San Gabriel Mtns.	
Bassia hyssopifolia	bassia	Alkaline habitats	CA (except NW,SNH)
Bellardia trixago	bellardia	Grasslands, on serpentine, where a threat to rare natives	NCoRO,CCo,SnFrB
Brassica nigra	black mustard	Coastal communities, esp. fog-belt grasslands; disturbed areas	CA-FP
Cardaria chalepensis [#]	lens-podded white-top	Wetlands of Central Valley	CA
Carduus pycnocephalus ^c	Italian thistle	Grasslands, shrublands, oak woodlands sNCo,sNCoR, SCo,SeV	
Centaurea calcitrapa ⁸	purple starthistle	Grasslands	NW,sCaRF,SNF,GV,C
Centaurea melitensis	tocalote, Malta starthistle	Widespread; sometimes misidentified as C. solstitialis; perhaps a more serious invader than currently recognized	CA-FP,D
Cirsium arvense ⁸	Canada thistle	Especially troublesome in riparian areas	CA-FP
Cirsium vulgare	bull thistle	Riparian areas, marshes, meadows	CA-FP,GB
Conium maculatum	poison hemlock	Mainly disturbed areas but may invade wildlands; known to poison wildlife; early expanding stage in many areas, esp. San Diego Co. riparian, oak understory	CA-FP
Crataegus monogyna	hawthom	Horticultural; recent invader, colonizing healthy native forest around Crystal Springs reservoir on S.F. peninsula	SnFrB,CCo,NCo,NCo
Ehrharta erecta	veldt grass	Wetlands, moist wildlands; common in urban areas; potential to spread rapidly in coastal, riparian, grassland habitats	SnFrB,CCo,SCo
Erechtites glomerata, E. minima	Australian fireweed	Coastal woodlands, scrub, NW forests, esp. redwoods	NCo,NCoRO,CCo,Snl SCoRO
Festuca arundinacea	tall fescue	Horticultural (turf grass); coastal scrub, grasslands in NCo, CCo	CA-FP
Hedera helix	English ivy	Horticultural; invasive in coastal forests, riparian areas	CA-FP
Holcus lanatus	velvet grass	Coastal grasslands, wetlands in No. CA	CA exc. DSon
Hypericum perforatum ^c	Klamathweed, St. John's wort	Redwood forests, meadows, woodlands; invasion may occur due to lag in control by established biocontrol agents	NW,CaRH,n&cSN,Scv CCo,SnFrB,PR
llex aquifolium	English holly	Horticultural; coastal forests, riparian areas	NCoRO,SnFrB,CCo
lris pseudacorus	yellow water iris, yellow flag	Horticultural; riparian, wetland areas, esp. San Diego, Los Angeles cos.	SnFrB,CCo,sSnJV,SCc
Leucanthemum vulgare	ox-eye daisy	Horticultural; invades grassland, coastal scrub	KR,NCoRO,n&cSNH, SnFrB,WTR,PR
Mesembryanthemum crystallinum	crystalline iceplant	Coastal bluffs, dunes, scrub, grasslands; concentrates salt in soil	NCo,CCo,SCo,Chl
Myriophyllum aquaticum	parrot's feather	Horticultural; streams, lakes, ponds	NCo,CaRF,CW,SCo
Olea europaea	olive	Horticultural and agricultural; reported as invasive in riparian habitats in Santa Barbara, San Diego	NCoR,NCoRO,CCo, SnFrB,SCoRO,SCo
Phaloris aquatica	Harding grass	Coastal sites, esp. moist soils	NW,cSNF,CCo,SCo
Potamogeton crispus	curlyleaf pondweed	Scattered distribution in ponds, lakes, streams	NCoR,GV,CCo,SnFrB, SCo,ChI,SnGb,SnBr,Dl
Ricinus communis	castor bean	SoCal coastal riparian habitats	GV,SCo,CCo
Robinia pseudoacacia	black locust	Horticultural; riparian areas, canyons; native to eastern U.S.	CA-FP,GB
Schinus molle	Peruvian pepper tree	Horticultural; invasive in riparian habitats in San Diego, Santa Cruz Is.	SNF,GV,CWSW,Teh

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Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Schinus terebinthifolius	Brazilian pepper	Horticultural; riparian areas	sSCo
Senecio jacobaea ⁸	tansy ragwort	Grasslands; biocontrol agents established	NCo,wKR,s&wCaR, nSNF, nScV,SW
Spartium junceum	Spanish broom	Coastal scrub, grassland, wetlands, oak woodland, NW forests, esp. redwoods; also roadcuts	NCoRO,ScV,SnFrB, SCoRO,SCo,sChI,WTR
Verbascum thapsus	woolly or common mullein	SNE meadows, sagebrush, pinyon-juniper woodlands; shores of Boggs Lake (Lake Co.)	CA
Vinca major	periwinkle	Horticultural; riparian, oak woodland, other coastal habitats	NCoRO,SnFrB, CCa, sSCoRO,SCo

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Red Alert: Species with potential to spread explosively; infestations currently restricted

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Alhagi pseudalhagi ^A	camel thom	Noxious weed of arid areas; most infestations in California have been eradicated	GV,sSNE,D
^-ctotheca calendula ^A	Capeweed	Seed-producing types are the problem; most are vegetative only	NCo,SnFrB,CCo
) taurea maculosa	spotted knapweed	Riparian, grassland, wet meadows, forest habitats; contact CA Food & Ag if new occurrences found	CaR,SN,nScV,nCW,MP, nSNE,sPR,NW
Crupina vulgaris ^{F,A}	bearded creeper, common crupina	Aggressively moving into wildlands, esp. grassland habitats	NCoR (Sonoma Co.),MP
Halogeton glomeratus ^A	halogeton	Noxious weed of Great Basin rangelands; report locations to CA Food & Ag; goal is exclusion from CA	GB
Helichrysum petiolare	licorice plant	North coastal scrub; one population on Mt. Tamalpais, w. Marin Co.	Not in Jepson
Hydrilla verticillata ^{EA}	hydrilla	Noxious water weed; report locations to CA Food & Ag; eradication program in place; found in Clear Lake (Lake Co.) in 1994	NCoRI,n&cSNF,ScV,SCo,D
Lythrum salicaria ⁸	purple loosestrife	Horticultural; noxious weed of wetlands, riparian areas	sNCo,NCoRO,nSNF,ScV, SnFrB,nwMP
Ononis alopecuroides ^q	foxtail restharrow	Eradication efforts underway in San Luis Obispo Co.; to be looked for elsewhere in CA	CCo; not in Jepson
Retama monosperma	bridal broom	First noted at Fallbrook Naval Weapons Station, San Diego Co; could rival other invasive brooms	San Diego Co.; not in Jepson
Salvinia molesta ^r	giant waterfern	Ponds, lakes, reservoirs, canals	Napa, Sonoma cos., lower Colorado River; not in Jepson
Sapium sebiferum	Chinese tallow tree	Horticultural; riparian, wetland habitats, open areas and understory	ScV,SnFrB; not in Jepson
Sesbania punicea	scarlet wisteria tree 🦷	Horticultural; riparian areas; American River Parkway, Sacramento Co., Suisun Marsh, San Joaquin River Parkway	ScV,SnJV; not in Jepson
-tina anglica	cord grass	Scattered in S.F. Bay	Not in Jepson
Spartina densiflora	dense-flowered cord grass	Scattered in S.F. Bay, Humboldt Bay salt marshes	CCo,NCo
Spartina patens	salt-meadow cord grass	One site in S.F. Bay, also Siuslaw Estuary, OR and Puget Sound, WA	CCo

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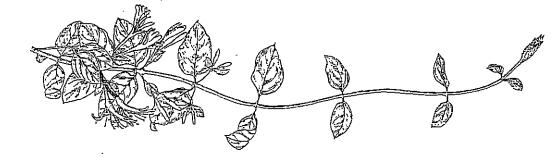
Need More Information

Latin Name'	Common Name	Habitats of Concern and Other Comments	Distribution ²
Acacia dealbata	silver wattle	Aggressive in natural areas?	SnFRB,SCoRO,SCoRI,C
Acacia decurrens	green wattle	Sometimes confused with A. dealbata; aggressive in natural areas	? Unknown
Acacia melanoxylon	biackwood acacia	Reported from S.F. Bay area, central coast, Santa Cruz Is.; spreads slowly; other areas?	SnFrB,SCoRO,SCo,CCo
Aeschynomene rudis ^B	rough jointvetch	Princeton area, Colusa Co.; pest of rice crops; potential threat to riparian, wetland habitats?	ScV
Agrostis avenocea	Pacific bentgrass	Invading vernal pools in San Diego area; attempts at manual eradication unsuccessful so far; problem in other areas?	sNCo,sNCoR,SNF, GV,CW,nSCo
Aptenia cordifolia	red apple	Habitats where invasive?	CCo,SCo,sChl
Asphodelus Jistulosus	asphodel	Common in SCo highway rights-of-way, other disturbed sites; threats to wildlands?	sSnJV,SCo
Carduus acanthoides ^a	giant plumeless thistle	Threatens wildlands?	NCoRI,nSN,SnFrB, nSCoRO,MP
Cistus ladanifer	gum cistus	Horticultural; invades coastal sage scrub, chaparral; areas where problematic?	sCCo,SnGb
Cordyline australis	New Zealand cabbage	Infestation at Salt Point State Park; bird-dispersed; other problem areas?	Not in Jepson
Cotoneaster spp. (exc. C. pannosus, C. lacteus)	cotoneaster	Horticultural; bird-distributed; which species are problems in wildlands?	Unknown
Cupressus macrocarpa	Monterey cypress	Native only to Monterey Peninsula; planted and naturalized CCo, NCo; threat to wildlands?	CCo
Descurainia sophia	flixweed, tansy mustard	Entering Mojave wildlands through washes; threat to wildlands?	CA
Dimorphotheca sinuata	African daisy, Cape marigold	Horticultural; reported as invasive in w. Riverside Co., Ventura Co.; problem elsewhere?	SnJV,SCoRO,SCo,PR
Echium candicans, E. pininana	pride of Madeira, pride of Teneriffe	Horticultural; riparian, grassland, coastal scrub communities; spreads by seed	CCo,SnFrB,SCo,sNCo
Ehrharta longiflora	veldt grass	Reported from San Diego	Not in Jepson
Erica lusitanica	heath	Threat to wildlands?	NCo (Humboldt Co.)
Euphorbia lathyris	caper spurge, gopher plant	Invades coastal scrub, marshes, dunes; Sonoma, Marin cos.; threat to wildlands?	NCo,CCo,GV,SCo
Gazania linearis	gazania	Horticultural; invades grassland in S.F., coastal scrub?	CCo,SCo
Glyceria declinata		Although reported from Central Valley vernal pools, genetic research is needed to confirm identity; plants that have been called G. declinata key in Jepson to native G. occidentalis	Uncertain; not in Jepson
Hedera canariensis	Algerian ivy	Horticultural; invasive in riparian areas in SoCal?	Not in Jepson
	Mediterranean or short-pod mustard	Increasing in western, southern Mojave; threat to wildlands?	NCo,SNF,GV,CW,SCo, DMoj
Hypericum canariense (Canary Island hypericum	Reported in San Diego area, coastal sage scrub, grassland; threat to wildlands?	SCo
Hypochaeris radicata n	ough cat's-ear		NW, CaRF, nSNF, ScV, CW, SCo
Isatis tinctoria ^B d	yers' woad	Well-known invader in Utah; threat to wildlands?	KR,CaR,лSNH,MP
Ligustrum lucidum gl	lossy privet	Horticultural; spreading rapidly on Mendocino coast; problem in other areas?	NCo; not in Jepson
Limonium ramosissimum se ssp. provinciale	ea lavende r	Reported spreading in Carpinteria Salt Marsh; problem in other areas?	Not in Jepson

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	Need Ma	pre Information: Continued	
Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Ludwigia uruguayensis (= L. hexapetala)	water primrose	Invasive in aquatic habitats; non-native status questioned?	NCo,sNCoRO,CCo, SnFrB,SCo
Malephora crocea	ice plant	Invades margins of wetlands, bluffs along SCo	CCo,SCo,sChl ,
Maytenus boaria	mayten	Horticultural; scattered in riparian forests, ScV; east SnFrB	ScV,SnFrB
Mesembryanthemum nodiflor	um slender-leaved iceplant	Abundant on Channel Islands; invades wetlands; habitats where problematic?	SnFrB,SCo,Chl
Nicotiana glauca	tree tobacco	Disturbed places; not very competitive with natives in coastal scrub, chaparral; spreading along Putah Creek {Yolo Co.}; problems elsewhere?	NCoRI,c&sSNF, GV,CW,SW,D
Oxalis pes-caprae	Bermuda buttercup	Invades disturbed sites; invasive in undisturbed habitats?	NCo,NCoRO,CCo, SnFrB,SCoRO,SCo
Parentucellia viscosa		Threat to NCo (Humboldt Co.) dune swales?	NCo,NCoRO,CCo,SCo
Passiflora caerulea	[10] S. Martin, C. S. Samara, and A. S. Samara, "Second Science Sciences, Sciences, Conf. on Science Sciences, Sc	Horticultural; reported from SoCal; threat to wildlands?	SCo; not in Jepson
Pennisetum clandestinum ^{EC}	Kikuyu grass	Disturbed sites, roadsides; threat to wildlands?	NCo,CCo,SnFrB,SCo, Santa Cruz Is.
Phyla nodiflora	mat lippia	Most varieties in CA are native; taxonomy unclear; status of plants in vernal pools, wetlands?	NW(except KR,NCoRH), GV,CCo,SnFrB,SCo, PR,DSon
Pinus radiata cultivars	Monterey pine	Cultivars invading native Monterey, Cambria forests, where spread of pine pitch canker is a concern	CCo
atherum miliaceum	smilo grass	Aggressive in SoCal creeks, canyons; threats to wildlands?	NCo, GV, CW, SCo
Pistacia chinensis	Chinese pistache	Horticultural; invades riparian areas and woodlands in ScV	ScV
Prunus cerasifera	cherry plum	Oak woodland, riparian areas, esp. Marin, Sonoma cos.; bird-distributed; problems elsewhere?	SnFrB,CCo
Pyracantha angustifolia	pyracantha	Horticultural; spreads from seed in S.F. Bay area; bird-distributed; problem elsewhere?	sNCoRO,CCo,SnFrB, SCo
Salsola soda	glasswort	Threat to salt marshes?	nCCo,SnFrB
Salsola tragus ^c	Russian thistle, tumbleweed	Abundant in dry open areas in w. Mojave Desert, Great Basin; not limited to disturbed sites; threats?	CA
Salvia aethiopis ^a	Mediterranean sage	Creates monocultures in E. Oregon grasslands; threat to CA wildlands?	МР
Stipa capensis		Distribution and threats?	Not in Jepson
Tamarix aphylla	athel	Spreading in Salton Sea area; threats to wildlands?	nSnJV,nSCo,D
Tanacetum vulgare	common tansy	Jepson reports as uncommon, escape from cultivation in urban areas; problem in wildlands?	NCo,NCoRO,CaRH, SCoRO
Verbena bonarlensis, V. litoralis	tall vervaln	Horticultural; Invades riparian forests, wetlands; extensive along ScV riparian corridors; roadsides (Yuba Co.); elsewhere?	ScV,nSnJV,nSnFrB,CCo



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Annual Grasses

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Aegilops triuncialis ⁸	barbed goatgrass	Serpentine soils, grasslands	sNCoR,CaRF, n&cSNF, ScV,nCW
Avena barbata	slender wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub, disturbed sites	CA-FP,MP,DMoj
Avena fatua	wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub on deeper soil, disturbed sites	CA-FP,MP,DMoj
Brachypodium distachyon	false brome	Expanding in SoCal; common in Orange Co.	sNCoR,sCaRF, SNF,GV,CW,SCo,sChI
Bromus diandrus	ripgut brome	Coastal dunes, coastal sage scrub, grasslands	CA
Lolium multiflorum	Italian ryegrass	Wetland areas, esp. vernal pools in San Diego Co.; common in disturbed sites	CA-FP
Schismus arabicus	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV,CW,sChI,D
Schismus barbatus	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV,SW,D

Considered, but not listed

Latin Name ¹	Common Name	Habitats of Concern and Other Comments
Albizia lophantha	plume acacia	Not invasive
Anthoxanthum odoratum	sweet vernal grass	Disturbed sites on coast; Marin, Sonoma, Mendocino cos.
Carpobrotus chilensis	sea fig	Native status in question; not a threat to wildlands
Centranthus ruber	red valerian	Horticultural; roadcuts in Marin Co.; not a threat to wildlands
Convolvulus arvensis ^c	field bindweed	Disturbed sites; ag lands
Coprosma repens	mirror plant	No evidence of wildland threat
Crocosmia x crocosmiiflora		Generally in disturbed coastal, urban areas, roadsides
Digitalis purpurea	foxglove	Horticultural; scattered in prairies, meadows, disturbed sites; not a major wildland threat
Dipsacus sativus, D. fullonur	n wild teasel, Fuller's teasel	Roadsides, disturbed sites
Fumaria officinalis, F. parviflor	a fumitory	S.F. Bay area, Monterey Bay salt marshes, sandy disturbed sites
Medicago polymorpha	California bur clover	Grasslands, moist sites; mainly restricted to disturbed sites
Melilotus officinalis	yellow sweet clover	Restricted to disturbed sites in CA
Nerium oleander	oleander	Horticultural; not invasive, although reported from riparian areas in Central Valley, San Bernardino Mtns.
Picris echioides	bristly ox-tongue	Disturbed areas
Silybum marianum	milk thistle	Disturbed areas, especially overgrazed moist pasturelands; may interfere with restoration
Xanthium spinosum	spiny cocklebur	Identified as native in <i>The Jepson Manual</i> (Hickman, 1993) and <i>A California Flora</i> (Murz and Keck, 1968); restricted to disturbed areas
Zantedeschia aethiopica	calla lily	Horticultural; mainly a garden escape in wet coastal areas
Zoysia cultivars	Amazoy and others	Horticultural; no evidence of wildland threat

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ho We Are:

hroughout California, natural wildlands and parks are under attack from invasive pest plants. As natural habitat is replaced by exotic plants, we also lose many of the state's native birds, insects, fish and other wildlife species. People concerned with the protection, management and enjoyment of our natural areas have become increasingly alarmed about the spread of invasive exotic vegetation. Since its formation in 1992, CalEPPC has been dedicated to finding solutions to problems caused by non-native pest plant invasions of the state's natural areas. The objectives of CalEPPC are to:

- provide a focus for issues and concerns regarding exotic pest plants in California;
- facilitate communication and the exchange of information regarding all aspects of exotic pest plant control and management;
- provide a forum where all interested parties may participate in meetings and share in the benefits from the information generated by this council;
- promote public understanding regarding exotic pest plants and their control;
- serve as an advisory council regarding funding, research, management and control of exotic pest plants;

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- facilitate action campaigns to monitor and control exotic pest plants in California; and
- review incipient and potential pest plant management problems and activities and provide relevant information to interested parties.

What We Do:

CalEPPC:

- Holds an annual statewide symposium;
- Co-sponsors regional workshops on control of problem wildland weeds;
- Publishes a quarterly newsletter with timely, practical information;
- Maintains an informative web site at www.caleppc.org
- Sponsors rigorous experiments on control methods for French broom, German ivy, pampas grass and other invasive pest plants;
- Advances public and professional awareness of wildland weed problems and solutions by sponsoring illustrated brochures and a soon-to-be published book on California's worst wildland weeds;
- Is recognized as an authoritative source of new information on all aspects of wildland weed management.

1999 CalEPPC Membership Form

f you would like to join CalEPPC, please remit your calendar dues using the form provided below. All members will receive the CalEPPC newsletter, be eligible to join CalEPPC working groups, be invited to the annual symposium and participate in selecting future board members. Your personal involvement and financial support are the keys to success. Additional contributions by present members are welcomed!

Individual		Institutional	Name
Low Income/ Student*	r 1 5 00	N/A	Affiliation
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Calle del			* Students, please include current registration and/or class schedule

Appendix B.

Plant species list information (Dominant and Associated species) by vegetation type.

Required Mitigation Acreage	Proposed Vegetation Type for Mitigation	Approx. Acres	Subtotal
2.95	Freshwater Marsh	2.96	2.96
22.06	Dune Scrub (high)	3.77	21.79
	Dune Scrub (low)	5.10	
	Riparian Scrub	12.92	
24 99	Cottonwood/Willow	13.61	
	Mixed Riparian Forest	11.64	25.25
50.00	Totals	50.00	50.00
	Mitigation Acrenge 2.95 22.06 24.99	Required MitigationProposed Vegetation Type for MitigationAcreage2.952.95Freshwater Marsh Dune Scrub (high)22.06Dune Scrub (low) Riparian Scrub24.99Cottonwood/Willow Mixed Riparian Forest	Mitigation AcreageType for Mitigation AcresApprox. Acres2.95Freshwater Marsh Dune Scrub (high)2.9622.06Dune Scrub (high) Riparian Scrub3.7724.99Cottonwood/Willow Mixed Riparian Forest11.64

Table 1 Across amounts 5
There is Acreage amounts for various vegetation types and their corresponding Abacon in the
Table 1. Acreage amounts for various vegetation types and their corresponding AB360 mitigation types. AB360 Habitat Required



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 Table 2. Dominant and associated species to be planted in Dune Scrub areas (8.87 acres).

Common Name	Scientific Name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plants/ acre)	Total Needed		
Dominant species – high el	evation dune scrub (3.77 dcres							
Coyote brush	Baccharis pilularis	woody/shrub	Container	10				
Тоуоп	Heteromeles arbutifolia	woody	Container		50	189		
TOTAL woody and woody	/shrub plants	<u> </u>		10	50	189		
Dominant species – low ele	vation dune scrub (5.10 acres)		an 杨书·王弘 [1] [1] [1] [1] [1] [1] [1] [1] [1] [1]		100	378		
Coyote brush	Baccharis pilularis	woody/shub	Container					
Toyon	Heteromeles arbutifolia	woody	Container	10	50	255		
Valley oak ⁱ	Quercus lobata ¹	woody	Container	10	50	255		
Coast live oak ¹	Quercus agrifolia ¹	woody	Container	10	25	128		
TOTAL woody and woody			Container	10	25	128		
Mugwort	Artemisia douglasiana	herbaceous	Plugs ² and seed ³		150	766		
Creeping wildrye	Leymus triticoides	herbaceous	Plugs ² and seed ³	3	550	2,805		
Needlegrass	Nasella pulchra	herbaceous	Plugs ² and seed ³	3	550	2,805		
TOTAL herbaceous plugs	(note that dominant herbs wi		1 lugs and seed	3	550	2,805		
Associated species (for both	higher and lower elevational i	areas)	the set of	www.com.eta.com	1,650	8,415		
Bush lupine	Lupinus albifrons	woody/shrub	Container/Seed ³	Contractor shall	specify spacing and	I douaita. Con		
Yarrow	Achillea millefolium	herbaceous	Seed ³	Associated spec	i speeny spacing and	I density for		
Elegant clarkia	Clarkia ungiculata	herbaceous	Seed ³	-				
California croton	Croton californicus	herbaceous	Seed ³	• A minimum of	3 associated species	shall be included in		
Tufted hairgrass	Deschampsia cespitosa	herbaceous	Seed ³	me planting mix,	including at least 2	herbaceous species.		
Blue wildrye	Elymus glaucus	herbaceous	Seed ³	Contractor sha	II provide seeding r	ates for herbaceous		
California poppy	Eschscholtzia californica	herbaceous	Seed ³	-	plantings.			
Gilia	Gilia capitata	herbaceous	Seed ³	- 4 1 1 4				
Gumplant	Grindelia spp.	herbaceous	Seed ³	• Additional species recommendations can be made (e.g., herbs) but will need to be approved by the District				
Telegraph weed	Heterotheca grandiflora	herbaceous	Seed ³		and need to be apply	free by the District.		
Deerweed	Lotus scoparius	herbaceous	Seed ³					
Dove lupine	Lupinus bicolor	herbaceous	Seed ³					
Arroyo lupine	Lupinus succulentus	herbaceous	Seed ³	1				

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Common Name	Scientific Name	Class	Planting Method	Spacing (ft) (planting in	Density (plants/ acre)	Total Needed	
Man-root (wild cucumber)	Marah fabaceous	vine	Seed ³	clusters)			

Oak container stock has already been set-aside. Contractor will not need to supply. See discussion of District Furnished Stock Material and Appendix C.
 Plugs planted in clusters on only 1/3 of Low Elevation Zone (Low Dune Scrub = LDS).
 Contractor shall provide seeding rates.

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Table 3. Dominant and associated species to be planted in Mixed Riparian Forest areas (11.64 acres).

Common name	Scientific name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plants/ acre)	Total Needed ¹			
Dominant species				<u> </u>		.l			
Fremont cottonwood	Populus fremontii	woody	Cuttings	10-12	100				
Goodding's black willow	Salix gooddingii	woody	Cuttings	10-12		l,164			
Valley oak ²	Quercus lobata ²	woody	Container	10-12	100	1,164			
TOTAL woody plants				10-12	50	582			
Associated species			你们可能没有100mm,你们们的。" ————————————————————————————————————		250	2,910			
Box elder	Acer negundo	woody ³	Container	[14] (24일 11년 11년 	стор П. 2				
Oregon ash	Fraxinus latifolia	woody ³	Container	• Contractor shall specify spacing and density for					
Northern California black walnut	Juglans californica var. hindsii	woody ³	Container	Associated species.A minimum of 4 associated species shall be					
Dutchman's pipevine	Aristolochia californica	shrub/vine	Seed	included in the	ie initial planting mi	x. This shall			
California rose	Rosa californica	sluub/vine	Container	include at lea	ist:				
California blackberry	Rubus ursinus	shrub/vine	Container	- 1 shrub/vi	ous species ine species				
California wild grape	Vitis californica	shrub/vine	Container	-	•				
Mugwort	Artemisia douglasiana	herbaceous	Container/seed ⁴	• If a woody sp	becies is/are chosen, 15% of the total Do	it/they can			
Santa Barbara sedge	Carex barbarae	herbaceous	Plugs/seed ⁴	plants, with a	proportional reduct	ninant woody on across each of			
Blue wildrye	Elymus glaucus	herbaceous	Plugs/seed ⁴	Dominant spe	ecies, except for oak	s. Oaks cannot			
Meadow barley	Hordeum brachyantherum ssp. californicum	herbaceous	Plugs/seed ⁴	 be replaced. Additional species recommendations can be made 					
Creeping wildrye	Leymus triticoides	herbaceous	Plugs/seed ⁴	(e.g., herbs) l	out will need to be ap	ons can be made			
Purple needlegrass	Nasella pulchra	herbaceous	Plugs/seed ⁴	District.					

The "total needed" column is based on the assumption that no woody species will be chosen from the associated list.
 Oak container stock has already been set-aside. Contractor will not need to supply. See discussion of District Furnished Stock Material and Appendix C.
 If woody species are selected from the associated list then the total dominant species needed will be reduced as specified in the table.

4 Contractor shall provide seeding rates.

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Table 4. Dominant and associated species to be planted in Cottonwood/Willow areas (13.61 acres).

Common name	Scientific name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plants/ acre)	Total Needed				
Dominant species				clusters)						
Fremont cottonwood	Populus fremontii	woody	Cutting	T	<u> </u>					
Goodding's black willow	Salix gooddingii	woody		8-10	001	1,361				
Box elder	Acer negundo	woody	Cutting	8-10	100	1,361				
Oregon ash	Fraxinus latifolia	woody	Container	8-10	25	340				
TOTAL woody plants	,	woody	Container	8-10	25	340				
Associated species		1112-112. C. M. C. T. C. P. Martin, Mar			250	3,402				
					1					
Arroyo willow	Salix lasiolepis	woody ²	Cutting	Contractor sha	Ill specify spacing	and density for				
Dutchman's pipevine	Aristolochia californica	shrub/vine	Seed	 Contractor shall specify spacing and density fo Associated species. 						
California rose	Rosa californica	shrub/vine	Container							
California blackberry	Rubus ursinus	sluub/vine	Container	• A minimum of	f 5 associated speci e initial planting m	es shall be				
California wild grape	Vitis californica	sluub/vine	Container	include a min	imum of:	nx. This shall				
Dogbane	Apocynum cannabinum	herbaceous	Plugs/Seed ³	- 3 herbaced						
Mugwort	Artemisia douglasiana	herbaceous	Plugs/Seed ³	- I shrub/vii	ne species					
Santa Barbara sedge	Carex barbarae	herbaceous	Plugs/Seed ³	• If a woody spe	cies is/are chosen,	it/they can				
Blue wildrye	Elymus glaucus	herbaceous	Plugs/Seed ³	replace up to	15% of the total Do	ominant woody				
Meadow barley	Hordeum brachyantherum ssp. californicum	herbaceous	Plugs/Seed ³	 plants, with a proportional reduction across eac. Dominant species. 						
Creeping wildrye	Leymus triticoides	herbaceous	Plugs/Seed ³	Additional and						
Purple needlegrass	Nasella pulchra	herbaceous	Plugs/Seed ³	(e.g., herbs) b District.	cies recommendati ut will need to be a	ions can be made approved by the				

I The "total needed" column is based on the assumption that no woody species will be chosen from the associated list.

2 If woody species are selected from the associated list then the total dominant species needed will be reduced as specified in the table.

3 Contractor shall provide seeding rates.

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Common name	Scientific name	Class Planting Method		Spacing (ft) (planting in clusters)	Density (plants/ acre)	Total Needed		
Dominant species		nie obeine al nie officier anter Provinsie officier anter anter		clusters)				
Arroyo willow	Salix lasiolepis	woody		T	· · · · · · · · · · · · · · · · · · ·			
Shining willow or	Salix lucida ssp. lasiandra or S.		Cutting	6-10	105	1,357		
red willow	laevigata	woody	Cutting	6-10	105	1,357		
Buttonbush	Cephalanthus occidentalis	woody	Container	<u> </u>		1,357		
Mule fat	Baccharis salicifolia	· · · · · · · · · · · · · · · · · · ·	··	6-10	45	581		
TOTAL woody plants		woody	Container	6-10	45	581		
Associated species				· · · · · · · · · · · · · · · · · · ·	300	3,876		
Aster	Aster chilensis/A. lentus	herbaceous	Plugs/seed ¹		11 0000:64 0000			
Santa Barbara sedge	Carex barbarae	herbaceous	Plugs/seed ¹	Associated spe	Il specify spacing an	nd density for		
Saltgrass	Distichlis spicata	herbaceous	Plugs/seed ¹	-				
Western goldenrod	Euthamia occidentalis	herbaceous	Plugs/seed ¹	• A minimum of	2 associated species	s will be included		
Sneezeweed	Helenium bigelovii	herbaceous	Plugs/seed	in the initial planting mix.				
Yellow monkeyflower	Mimulus guttatus	herbaceous	Plugs/seed ¹	• Additional spec (e.g., herbs) bu District.	tes recommendation will need to be app	ns can be made proved by the		

Table 5. Dominant and associated species to be planted in Riparian Scrub areas (12.92 acres).

1 Contractor shall provide seeding rates.

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Common name	Scientific name	Class	Planting Method	Spacing (ft) (planting in clusters)	Density (plugs/acre)	Total Needed		
Tule/bulrush	Seimus and 40				د			
Common reed	Scirpus acutus/ S. californicus	herbaceous	Plugs	3	887	2 626		
Sedge ¹	Phragmites australis	herbaceous	Plugs	3	887	2,626		
	Carex spp. ¹	herbaceous	Plugs	3	887	2,626		
Bog rush	Juncus effusus	herbaceous	Plugs	3	280	2,626		
Baltic rush	Juncus balticus	herbaceous	Plugs	3		829		
Iris-leaved rush	Juncus xiphiodes	herbaceous	Plugs		280	829		
TOTAL herbaceous pla	nts		Iugo	3	280	829		
Associated species	Calvetagia sonium con	· · · · · · · · · · · · · · · ·	in the group of the	· · · · ·	3,500	10,365		
Hedge bindweed	Calystegia sepium ssp. linnophila	herbaceous	Seed ²	Contractor sha	ll specify spacing a	and density for		
Button celery	Eryngium aristulatum	herbaceous	Seed ²	Associated spe	cies.			
Western goldenrod	Euthamia occidentalis	herbaceous	Seed ²	• A minimum of	2 associated specie	e chall be		
Sneezeweed	Helenium bigelovii	herbaceous	Seed ²	included in the	initial planting mix			
Leather-root	Hoita macrostachya	herbaceous	Seed ²					
California loosestrife	Lythrum californicum	herbaceous		• Additional species recommendations can be made				
Yellow monkeyflower	Mimulus guttatus	herbaceous	Seed ²	(e.g., herbs) but will need to be approved by the District.				
Water parsley	Oenanthe sarmentosa	·	Seed ²					
Hedgenettle	Stachys albens	herbaceous	Seed ²					
Must be local native species		herbaceous	Seed ²					

Table 6. Dominant and associated species to be planted in freshwater marsh areas (2.96 acres).

1 Must be local native species 2 Contractor shall provide seeding rates.

.Hartland Nursery

(Hart Restoration, Inc.)



13737 Grand Island Road Walnut Grove, CA 95690 916.775.4021 phone 916.775.4022 fax

October 14, 2004

Reclamation District 2059 c/o Al Hoslett 311 E. Main Street, Suite 504 Stockton, CA 95202

RE: Custom Plant Growing Contract for Oak Trees

Dear Mr. Hoslett:

Enclosed, please find our Custom Plant Growing Contract as requested by Kevin Tillis during our telephone conversation of October 13, 2004. The species and quantities to be collected and grown are listed in Exhibit A. Under Article 2, I have left the end-date blank as I anticipate the project contractor would need to plant these in the fall of 2005, but I will leave that item to be completed by ou.

14

After you have had an opportunity to review this document, please let me know if there are any changes or corrections needed. I can be reached at (916) 775-4021.

Thank you for the opportunity to provide plants for your restoration project.

Singerely,

cc:

closure

Toni T. Hart

Executive Director Hartland Nursery/Hart Restoration, Inc.

Kevin Tillis Hultgren-Tillis Engineers 2221 Commerce Ave., Suite A-1 Concord, CA 94520



03/03/2005

ARTICLE 5. TERMINATION OF AGREEMENT

Expiration of Agreement

Unless otherwise terminated as provided herein, this agreement shall continue in force until the services provided for herein have been fully and completely performed and shall thereupon terminate unless renewed in writing by both parties.

Termination Upon Notice

Notwithstanding any other provision of this agreement, either party hereto may terminate this agreement at any time by giving 30 days written notice to the other party. Unless otherwise terminated as provided herein, this agreement shall continue in force until the services provided for herein have been fully and completely performed. Expenses incurred that are associated with the execution of this contract, up to the termination date will be reimbursed upon providing proof of the incurred expenses.

EXHIBIT A: PLANT ORDER

			Unit	Extended
0	Qty.	Container	Price	Price
Quercus agrifolia (Coast Live Oak)	400	TP14		
Quercus lobata (Valley Oak)	1,308	TP14		

Sub-total Sacramento Co. 7.75% Sales Tax Order total

EXHIBIT B: MINIMUM REQUIREMENTS

All plants will be vigorous, healthy and free of insects and disease, including damage from insect and disease. All woody plants will have a root system that completely fills the container.

Top growth standard for *Quercus lobata* and *Quercus agrifolia* grown in treepot 14" deep containers will be between 24-36".

This agreement is signed by the following representatives:

Reclamation District 2059

Hartland Nursery

(Signature)	A		,		
10	- 1				
By:	62.	D	feld	sf	_
		<u>ar</u>	V-Les	2	

(Fine Name) Al Warren Hoslett

Title: Secretary

Date: December 6, 2005

(Signature) By:_____ (Print Name) Title:_____ Date: 83/83/2005 V2:V2P

15:51 HE HUSEETT ? DUM GULLT Har restoration

Reclamation District 2059

Custom Plant Growing Contract for Site: <u>Bradford Island</u> -- Tract 19

Agreement made this <u>6th</u> day of December, 2005, between Reclamation District 2059 (RD 2059), business address 311 E. Main St., Ste. 504, Stockton, CA 95202 and Hartland Nursery, an independent contractor, having a principal place of business at 13737 Grand Island Road, Walnut Grove, CA 95690, hereinafter referred to as the Subcontractor.

ARTICLE 1. TERMS OF CONTRACT

This agreement will become effective and will continue in effect until terminated as provided herein.

ARTICLE 2. SERVICE TO BE PERFORMED BY SUBCONTRACTOR

Subcontractor agrees to:

Provide 1,708 plants as specified in Exhibit A, with the minimum requirements as stated in Exhibit B by ______, 2006. Subcontractor will collect plant materials from within the boundaries of the "Legal Delta."

Specific Services

Method of Performing Services

Subcontractor will determine the method, details and means of performing the abovedescribed services.

Place of Performance

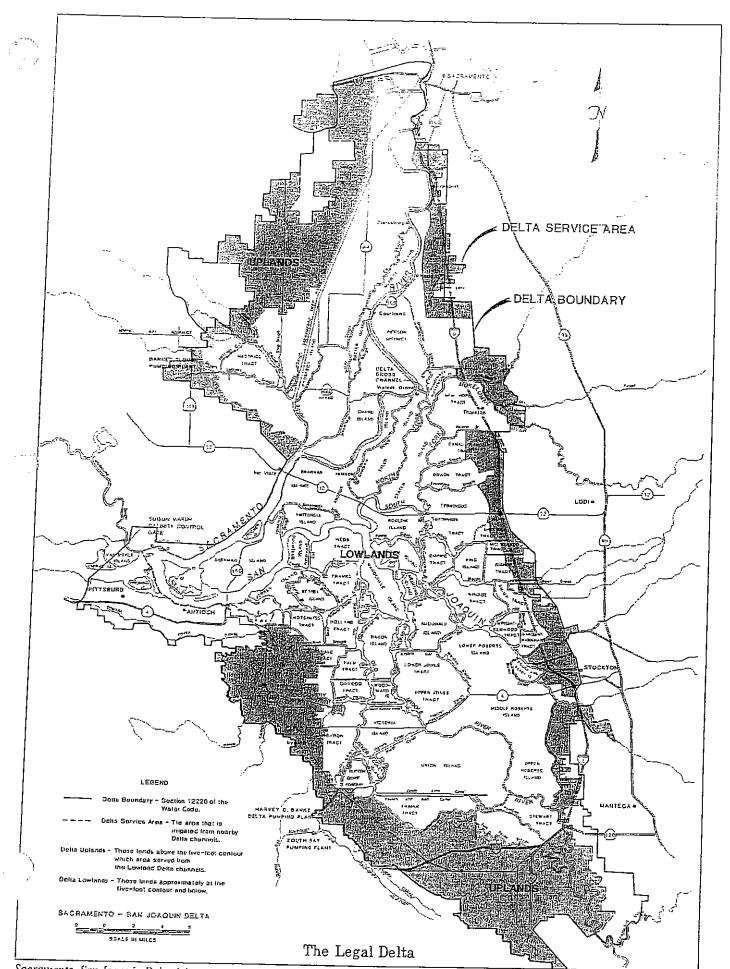
Subcontractor will determine the location of performing the above-described services.

ARTICLE 3. COMPENSATION

In consideration for the services to be performed by Subcontractor, RD 2059 agrees to pay Subcontractor based on the following breakdown:

Plant Materials (for species specifics, please see Exhibit A): Sacramento Connty 7.75% Sales Tax Contract Total

Payment Schedule shall be as follows: 10% of purchase price due at initial agreement Less amount paid under contract dated 10/19/2004 Net amount due at initial agreement 20% of purchase price due at establishment of treepot 14 size plant, post on-site inspection by RD 2059 70% of purchase price due within 21 days of plant receipt



Sacramento-San Joaquin Delta Atlas

Denortment of Water Paroureas



A & L WESTERN AGRIC

URAL LABORATORIES

1311 WOODLAND AVE #1 • MODESTO, CALIFORNIA 95351 • (209) 529-4080 • FAX (209) 529-4736



[]

REPORT NUMBER: 05-069-001

SEND TO: MARTELL WATER SYSTEMS

1818 LOVERIDGE ROAD PITTSBURG, CA 94565

CLIENT: 5036-D

DATE RECEIVED: 03/10/05 DATE COMPLETED: 03/15/05 SUBMITTED BY: LEROY CHACELLOR

CUSTOMER: BRADFORD ISLAND

DATE OF REPORT: 03/15/05

WATER ANALYSIS REPORT

Sample	Lab	Sodium	Calcium	Magnesium	Carbonalo	Bicarbonate						PAGE;	1
ID	Number	Na	Ca		CO ₃	HCQ ₃	Chloride Cl	Conductivity E.C,	рН	Copper	Iron	Manganese	Zinc
		ppm	ppm	ppm	ppm	ppm ×	ppm	mmhos/cm		· Cu ppm	Fe ppm	Mn ppm	Zn ppm
BRADFORD ISL	66341	84	47	55	Ο	259	149	1.06	7.7				
Sample	Phosphorus	Polassium	Nitrate	Sulfate		Discolused	<u> </u>	D				<u> </u>	

Sample ID	Phosphorus P ppm	Polassium K ppm	Nitrate NO ₃	Sulfate SO₄ ppm	Boron B ppm	Dissolved Solids ppm	Hardness	Bacleriologic Total Coliform	al MPN/100ml Fecal	Comments:
BRADFORD ISL	8.14	0.7	<2	31	0.36	678	9pm 344	Conform	Coliform	
										This report applies only to the sample(s) tested. Samples are retained a maximum of thirty days after testing.
										Down Burney
L	<u> </u>	l								Robert Butterfield A & L WESTERN LABORATORIES, INC.

<u>, </u>		DF CALIFORNIA DWR USE ONLY DO NOT FILL IN	 ו
OWNER'S WELL No.		PLETION REPORT]
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Et El	DESCRIPTION	STOCKTON CA 9520)2
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1		Address BRADFORD ISLAND	
3		City County Contra Costa	
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		WATER LEVEL	
		ESTIMATED YIELD * <u>300</u> (G.P.M.) & TEST TYPE	
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TAL DEPTH OF COMPLETED WELL1	<u>43</u> (Feel)	*May not be representative of a well's long-term yield.	
DEPTH BORE- OM SURFACE HOLE	CASING	DEPTH ANNULAR MATERIAL	
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Atlachments		CERTIFICATION STATEMENT	
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 logic Log ell Construction Diagram Geophysical Logs 	NAME Martell \	s report is complete and accurate to the best of my knowledge and belief. Water Systems, Inc. Driller: Leroy Chancellor RPORATION) (TYPED OR PRINTED)	
2 Nogic Log ell Construction Diagram	NAME <u>Martell \</u> (PERSON, FIRM, OR CO	s report is complete and accurate to the best of my knowledge and belief. Water Systems, Inc. Driller: Leroy Chancellor RPORATION) (TYPED OR PRINTED)	

		ELECTRIC LOG	
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All interpretations are opinions based on inferences from electrical or other measurements and Newman Well Surveys cannot and do not guarantee the accuracy or con of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses in sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms conditions set out in our current Price Schedule.

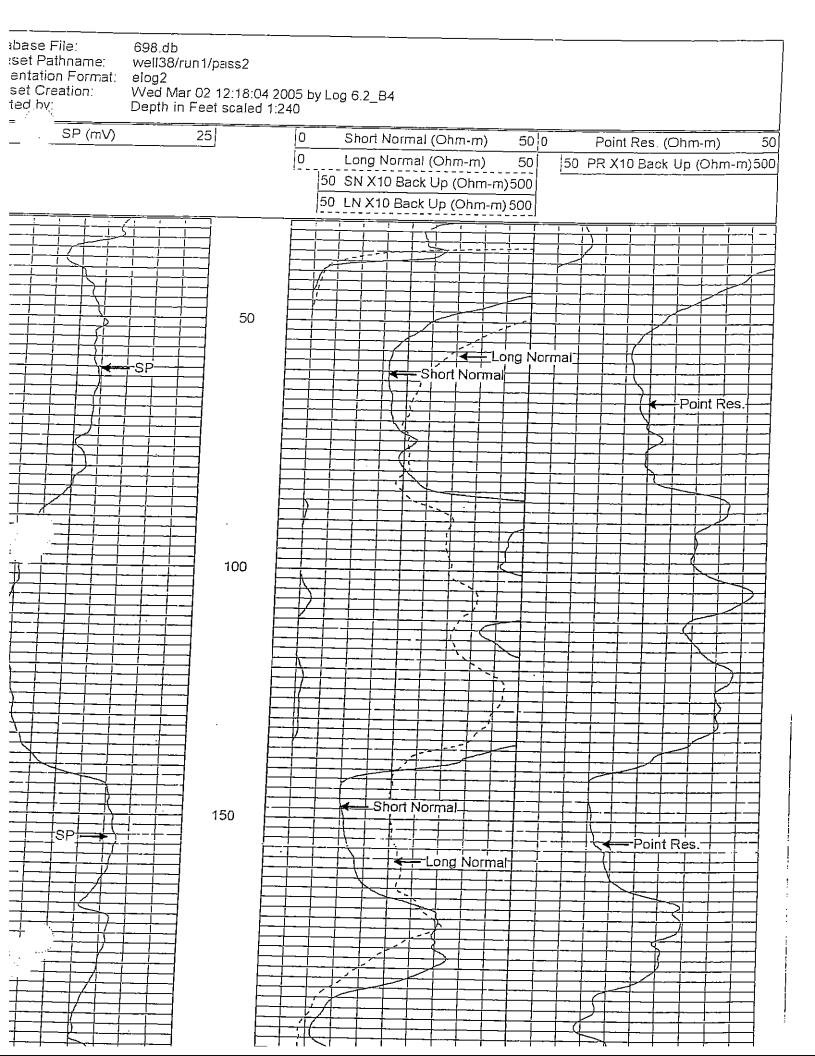
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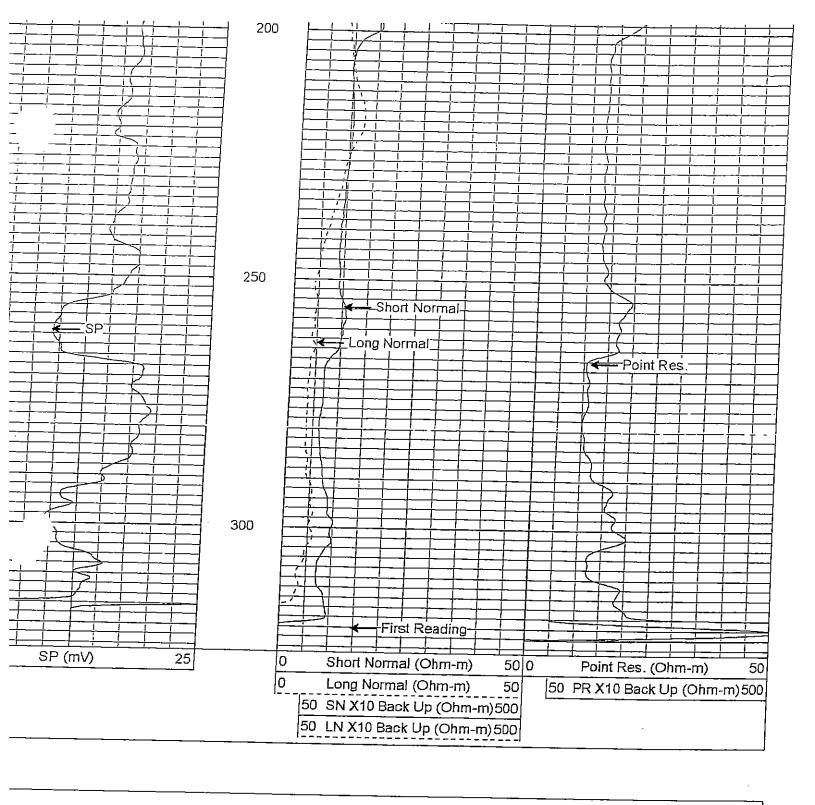
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Class I : Less than 700 ppm (mg/l) Excellent to Good Quality Class II : 700 to 2000 ppm (mg/l) Good to injurious Quality Class III: More than 2000 ppm (mg/l) Injurious to Unsatisfactory

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This interpretation represents our best judgement based on given values. Since all interpretations are opinions based solely on inference from electrical and other measurements, we can not and do not guarantee the accurancy or correctness of this interpretation and shall not be liable fo any cost, damages or expenses that may be incurred from this or any other interpretation.



Contract Form

Sample

Contract No. Reclamation District No. 2059

CONTRACT BETWEEN RECLAMATION DISTRICT NO. 2059 AND ______

This agreement, made and entered this _____ day of _____, 2006 by and between Reclamation District No. 2059 hereinafter DISTRICT and ______ hereinafter CONTRACTOR.

For and in consideration of the payments hereinafter specified to be made by DISTRICT, CONTRACTOR agrees at its own proper cost and expense, to do and or/provide the following in accordance with applicable plans, specifications and appendices and as directed by the District:

The Contract Documents and order of precedence are as follows:

This Contract The plans entitled "Tract 19 Mitigation Site" The Specifications entitled "Tract 19 Mitigation Site" The Appendix A,B,C,D and E said specifications

(Description of work to be filled in later.)

Not withstanding any provision in the contract documents to the contrary, the following provisions shall govern the payment by the District of all statements from the contractor for the work under this contract:

- A. District shall make payment to the CONTRACTOR within a reasonable time after the District receives the funds from The Department of Water Resources (DWR) in payment of the Statement. The amount of each such payment shall not exceed the amount of funds the district receives from the DWR.
- B. DWR and/or the District will retain ten (10%) percent of each progress billing until the Project has been completed and accepted by the District and thirty

days have elapsed after the recording of the Notice of Acceptance with the Contra Costa County Recorder.

The Contract Documents cited above are hereby included and made part of this CONTRACT.

Contractor shall provide DISTRICT with performance bond in the amount of guaranteeing faithful performance of said contract. No payment will be made by DISTRICT until such bond has been received.

CONTRACTOR shall be responsible for its own work, property and/or materials until completion and final acceptance of the work by the DISTRICT. In the event of loss or damage, it shall proceed promptly to make repairs, or replacement of the damaged work, property and/or materials at its own expense, as directed by the DISTRICT. CONTRACTOR waives all rights CONTRACTOR might have against DISTRICT for loss of or damage to CONTRACTOR'S work, property or materials. Payment shall not be construed as a waiver of this or of any other terms of the Contract.

CONTRACTOR shall pay for all material, labor, taxes, insurance or other claims, liabilities, and obligations of any nature arising from any aspect of its work performed under this Contract, and shall furnish satisfactory evidence of such payments upon request of DISTRICT. CONTRACTOR agrees to indemnify, defend and hold harmless the DISTRICT from all suits, liens, or other claims of any nature arising from its failure to make such payments.

CONTRACTOR shall provide and maintain at all times during the performance the following insurance:

Worker's Compensation insurance meeting the requirements of both the State of California and the Federal Longshoreman's and Harbor Worker's Act to the extent applicable.

Insurance covering Public Liability, Property Damage, and Contractor's Contractual Liability arising out of or relating to CONTRACTOR'S performance hereunder (all including but not limited to work performance and operation of automobiles, trucks and other vehicles) in amounts of not less than \$1,000,000 per occurrence, protecting CONTRACTOR and DISTRICT against liability for damages because of injuries (including death) and in an amount of not less than \$1,000,000 per occurrence against liability for damages to property.

All insurance required hereunder shall be maintained in full force and effect in a company or companies satisfactory to DISTRICT, shall be maintained at CONTRACTOR'S expense until performance in full hereof and such insurance shall be subject to the requirement that DISTRICT must be notified by ten (10) days' written notice before cancellation of any such policy. In the event of threatened cancellation for non-payment of premium, DISTRICT may pay same for CONTRACTOR and deduct the same payment from amounts then or subsequently owing to CONTRACTOR hereunder.

Contract

Evidence of such insurance shall be furnished by CONTRACTOR to DISTRICT upon request.

CONTRACTOR specifically obligates itself to DISTRICT in the following respects (and this agreement is made upon such express condition), to wit:

CONTRACTOR shall protect and keep DISTRICT (including its trustees, agents representatives) harmless and free from all liability, penalties, losses, damages, costs, expenses, causes of action, claims and judgments resulting from injury or harm to any person or property arising out of or in any way connected with the performance hereof.

CONTRACTOR shall further hold DISTRICT harmless (including its trustees, agents representatives) from liability or claims for any injuries to or death of CONTRACTOR's employees resulting from any cause whatsoever, and shall indemnify the DISTRICT for any cost, expense or judgment (including attorney's fees) paid or incurred in that behalf.

CONTRACTOR shall be fully and exclusively responsible for and shall pay when due any and all applicable contributions, allowances or other payments or deductions, however termed, required by union labor agreements now or hereafter in force.

CONTRACTOR shall indemnify DISTRICT (including its trustees, agents representatives) against, and save it harmless from any and all loss, damage, costs, expenses and attorney's fees suffered or incurred on account of any breach of the aforesaid obligations and covenants, and any other provisions or covenants of this contract. At any time before final settlement or adjudication of any loss, damage, liability, claim, demand, suit or cause of action for which CONTRACTOR hereby agrees to indemnify and save DISTRICT (including its trustees, agents representatives) harmless, DISTRICT may withhold from any payments due or to become due under this CONTRACT the reasonable value thereof, as determined by the DISTRICT.

CONTRACTOR specifically agrees that it is, or prior to the start of work hereunder will become, a CONTRACTOR and an employing unit subject as an employer, to all applicable Unemployment Compensation Statutes.

CONTRACTOR further agrees as regards, (a) the production, purchase and sale, furnishing and delivering, pricing, and use or consumption of materials, supplies and equipment, (b) the hire, tenure or conditions of employment of employees and their hours of work and rates of and the payment of their wages, and (c) the keeping of records, making of reports, and the payment, collection, and/or deduction of Federal, State and Municipal taxes and contributions that CONTRACTOR will keep and have available all necessary records and make all payments, reports, collections, deductions and otherwise do any and all things so as to fully comply with all Federal, State and Municipal laws, ordinances, regulations and requirements in regard to any and all said matters insofar as they affect or involve the CONTRACTOR's performance of this Contract, all so as to fully relieve DISTRICT (including its trustees, agents representatives) from and protect it against any and all responsibility or liability therefore or in regard thereto.

Contract

CONTRACTOR certifies that he is aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workmen's compensation or to undertake self-insurance in accordance with the provisions of that code, and that it will comply with such provisions before commencing the performance of the work of this contract.

The District's representative for this Project shall be:

Green Mountain Engineering Dominick Gulli PE, PLS 1314 Paloma Avenue Stockton CA 95207 Phone (209) 478-6525 Fax (209) 478-6540 Cellular 9209) 649-4555

All work performed by the contractor on this project shall be completed to the approval of the Districts Representative. All statements for payment shall be submitted to the Districts representative for approval, both as to the satisfactory completion of the work and the amount billed, before the statement is forwarded to the District for payment.

This agreement shall not be modified except by written document executed by the parties hereto.

DISTRICT

CONTRACTOR

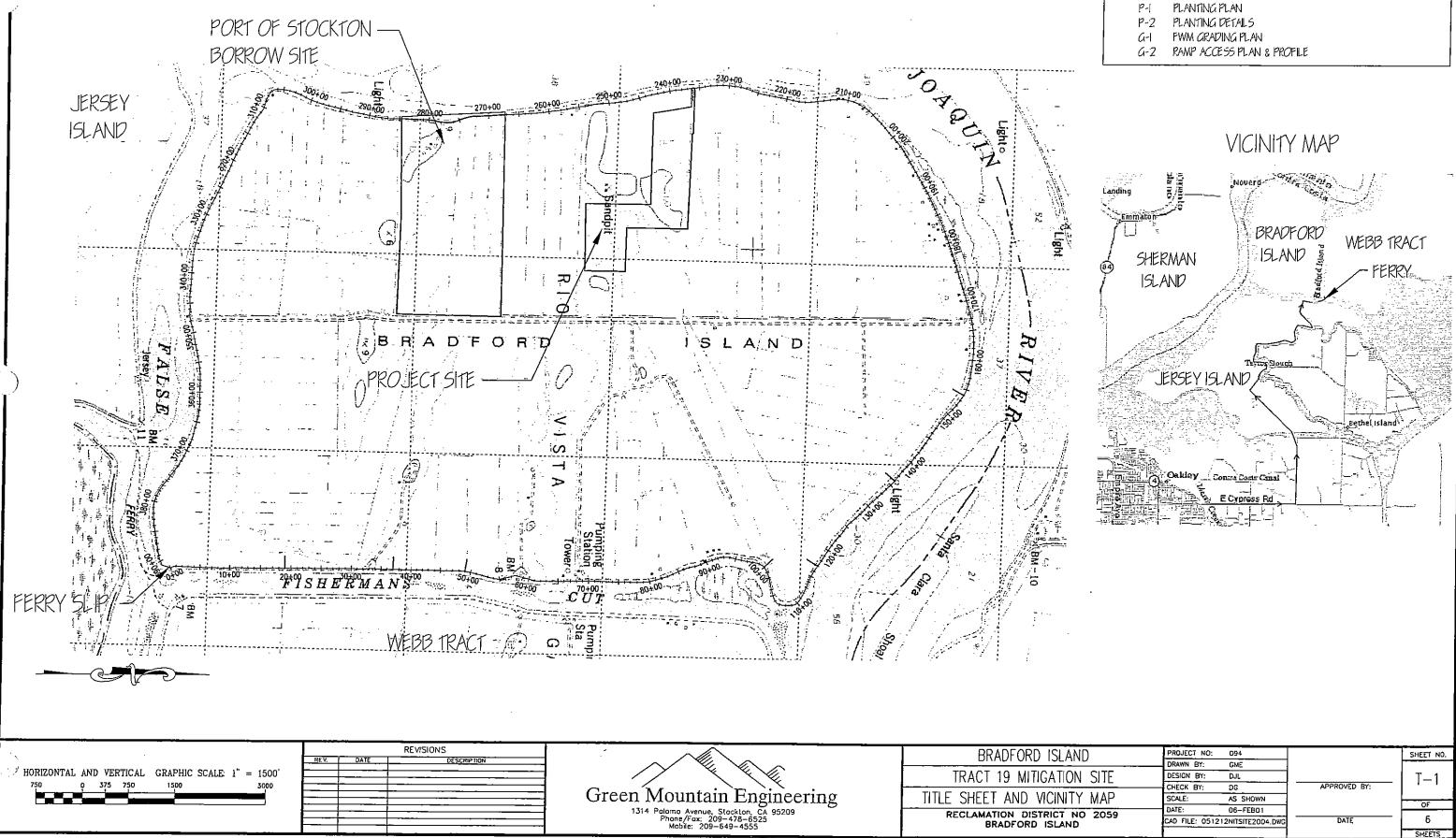
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BY:_____ BY:_____ By:_____ By:_____

Al Hoslett, Attorney, District Secretary 311 East Main St Suite 504 Stockton CA 95202 Phone: (209) 943-5551 Fax: (209) 943-0251

Contract

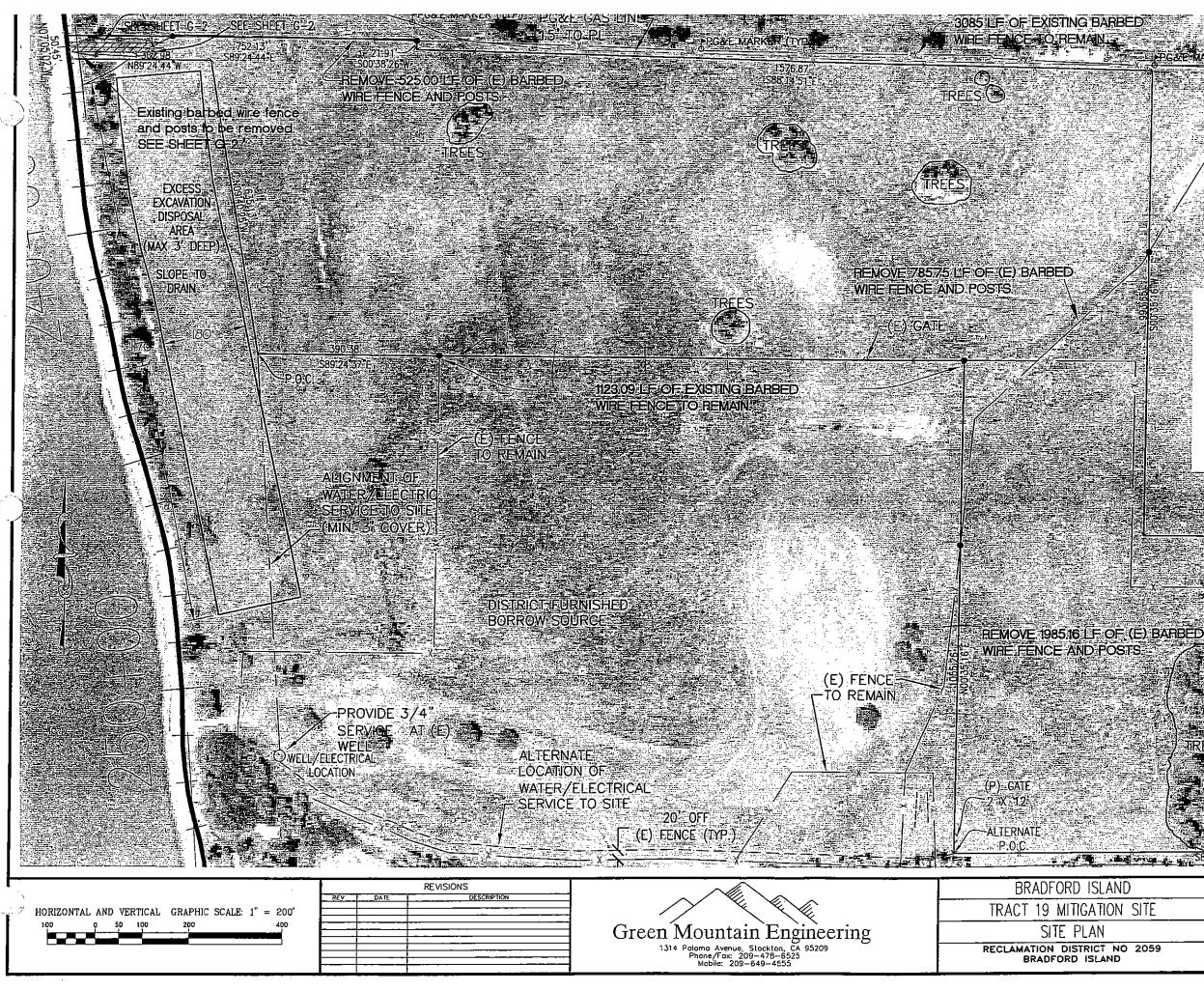
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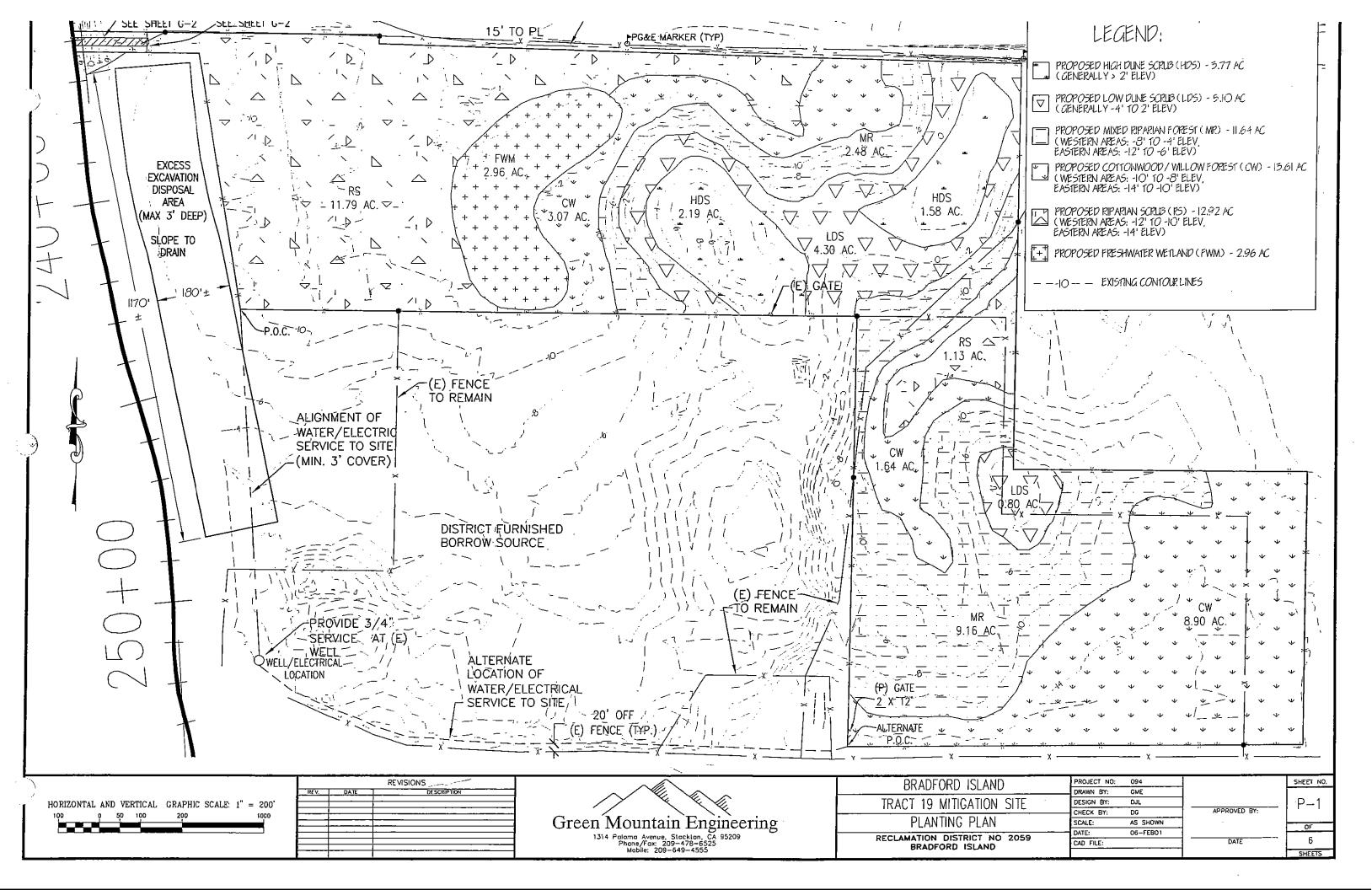
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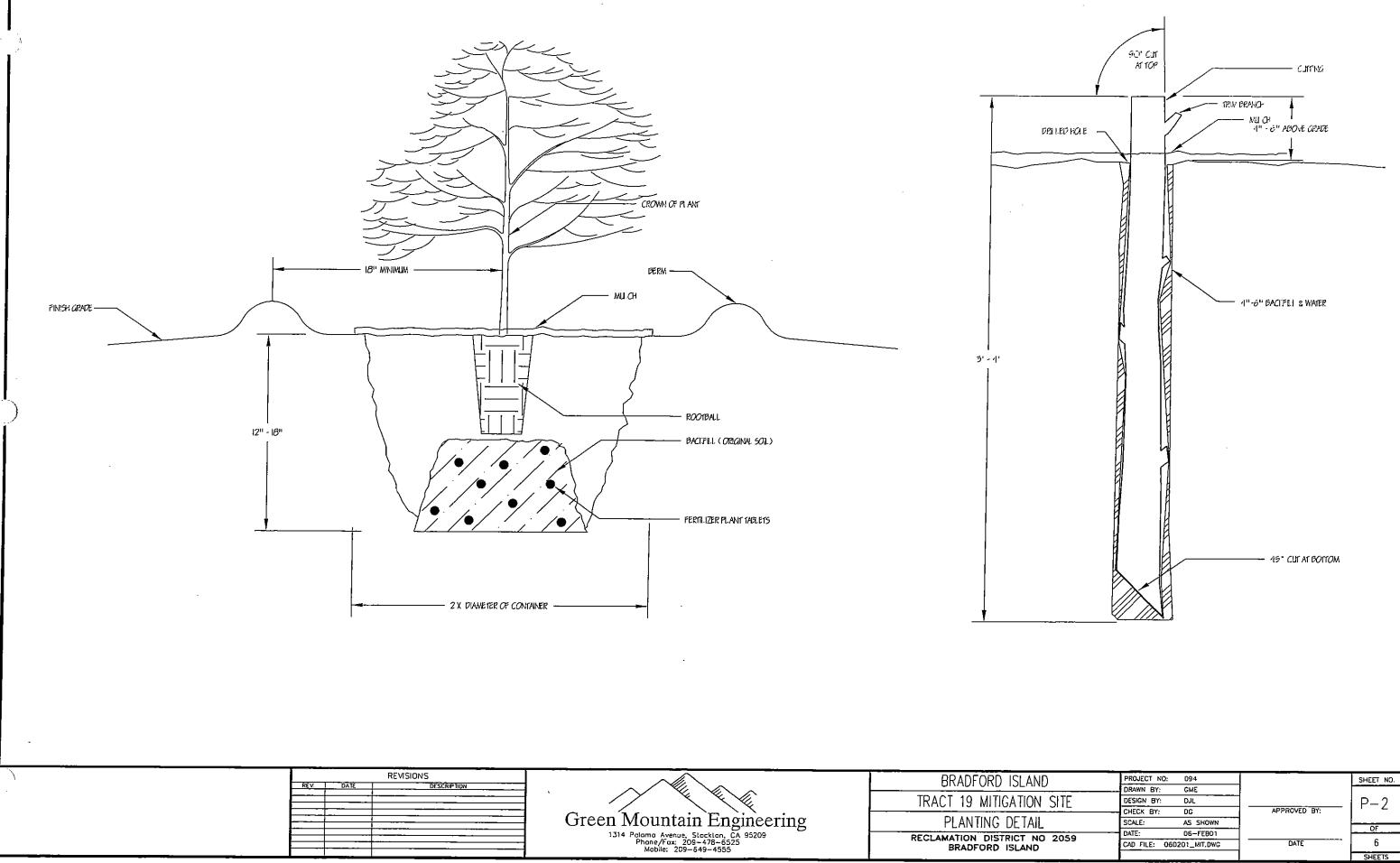
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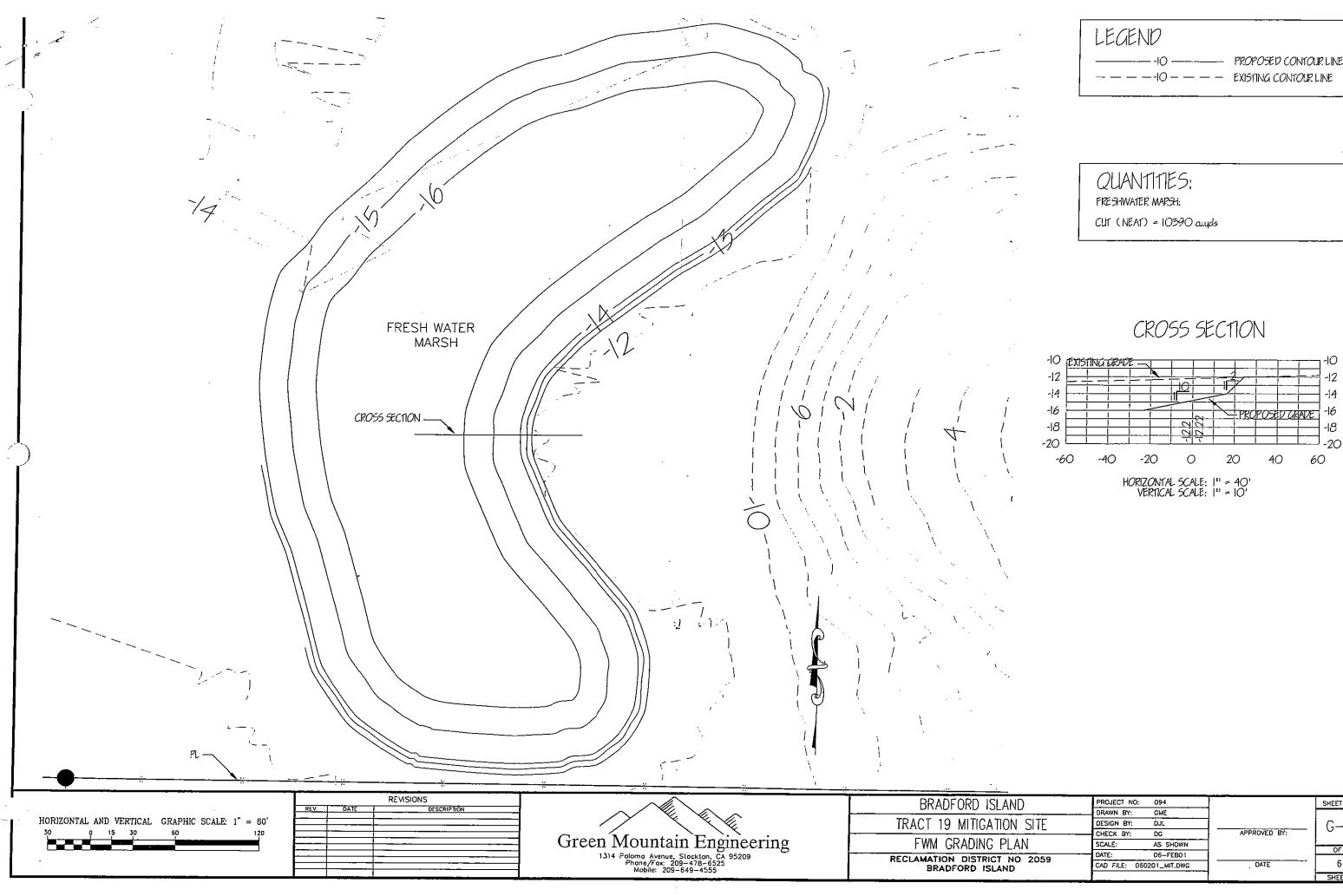
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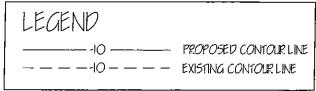
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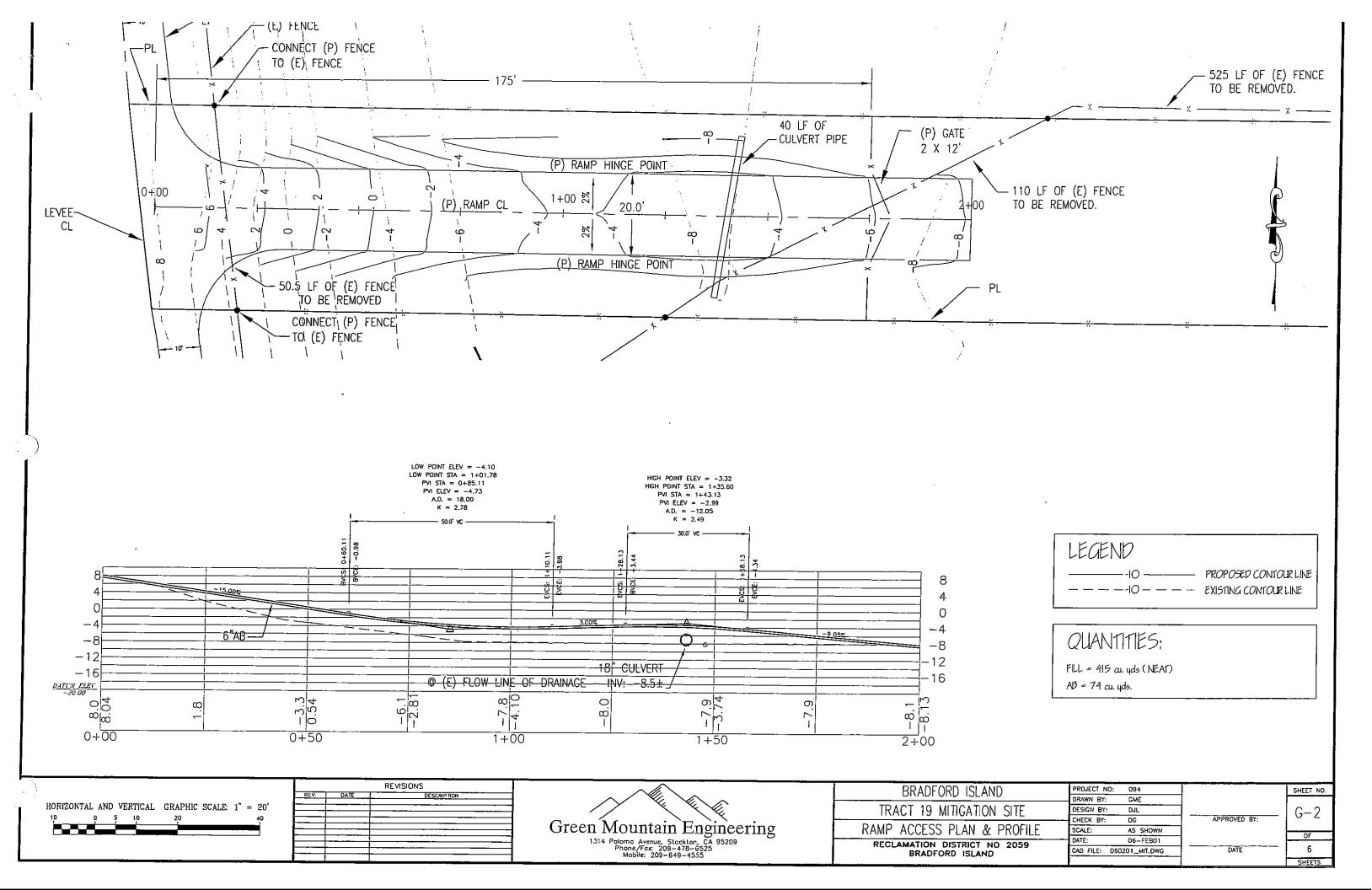








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ATTACHMENT F

MONITORING REPORT



Year Three Monitoring Report for Bradford Island Tract 19: 50-Acre Mitigation Parcel

Final Report

Prepared for Reclamation District 2059 311 East Main Street, Suite 504 Stockton, CA 95202

Prepared by Stillwater Sciences 2855 Telegraph Ave, Suite 400 Berkeley, CA 94705

30 June 2011



Suggested citation:

Stillwater Sciences. 2011. Year three monitoring report for Bradford Island Tract 19: 50-acre mitigation parcel. Final Report. Prepared by Stillwater Sciences, Berkeley, California for Reclamation District No. 2059, Stockton, California.

EXECUTIVE SUMMARY

This report summarizes conditions at the 50-acre Mitigation Parcel (Parcel) on Bradford Island (Reclamation District No. 2059 [District]) at the end of the third growing season since planting was completed in June 2007. Initial planting included native species mixes to recreate two types of riparian forest (Cottonwood/Willow and Mixed Riparian Forest Types), three types of scrub shrub habitat (High Dune Scrub, Low Dune Scrub, and Riparian Scrub), and several acres of freshwater marsh. This is the third annual report to be submitted to the District and California Department of Fish and Game (CDFG). The objective of this report is to document if the habitat restoration goals and performance standards for the Parcel are being met and to provide guidance to the District and CDFG regarding any necessary remedial actions. If performance standards are met during this third year (which is the case), no further monitoring is required. Performance standards for the Parcel were established in the Bradford Island Mitigation Plan (Stillwater Sciences 2006) and require that at least 80% of the planted density (stems per acre) of all woody species survive and that at least 80% of that surviving planted density is healthy (as indicated by the percent of healthy, green leaves on the plant). The performance standards also require that weedy species are controlled such that yellow star-thistle (Centaurea solstitialis) and Bermuda grass (Cynodon dactylon) cover less than 10% and 25% of the area, respectively, and such that all other weedy species cover less than 20% of the area. This report summarizes monitoring results and determinations on whether or not these performance standards have been met for Years 1, 2, and 3 post-implementation. In addition, past adaptive management suggestions and follow-up actions are described as well as steps for monitoring and adaptive management beyond Year 3.

During Year 1 (2007), all performance standards were met except survival of woody species in the Riparian Scrub vegetation group and control of yellow star-thistle and other invasive weeds. At 78% survival of the planted density, woody species survival in the Riparian Scrub vegetation group following the first growing season was just under the performance standards minimum. In response, additional plantings of appropriate woody species were made in these areas during the spring of 2008. In addition, during Year 1, yellow star-thistle cover exceeded the 10% maximum in two vegetation types (Low Dune Scrub and Mixed Riparian) and cover of other invasive weeds exceeded the 20% maximum in the Cottonwood/Willow and Mixed Riparian vegetation types. In response, weeds were mowed in both May (upper portions of the Parcel) and June (lower portions of the Parcel) of the next spring (2008); herbicide was applied to the entire Parcel during April (upper), May (entire), June (upper), and August (problem areas). During Year 2 (2008), all woody plant survival and vigor performance standards were met. Similarly, all weed species were well under control, covering less than 10% of the overall area. After Year 2 monitoring, weed maintenance was continued during 2008, with hand weeding, mowing, and/or hoeing occurring across portions of the Parcel in the spring and fall; herbicide was applied across the entire Parcel in March and April 2008. By Year 3, the site continued to meet all performance standards for woody species survival and vigor, as well as control of all weed species.

Despite project success with respect to performance standards for woody species and weed cover, efforts to control weed cover had the undesirable effect of killing most of the native herbaceous understory originally planted in 2006–2007. Although there are no performance standards for cover of native herbaceous species in the Mitigation Plan, all parties (the District, CDFG, and Department of Water Resources [DWR]) agreed that development of a healthy, self-sustaining native understory would improve the overall project success (Stillwater Sciences 2006; (Meeting with DWR, DFG, Hultgren-Tillis [District Engineers] and Stillwater Sciences on-site 20 November 2007). Thus, as part of the adaptive management of the Parcel, a plan to replant the understory with native herbaceous species was proposed and initiated during the summer and fall

of 2008. This herbaceous understory replanting plan included reseeding a native perennial grass mixture over 75% of the understory planting area in all vegetation types on the Parcel except the Freshwater Marsh, where native herbaceous plant cover was already high. The plan also included planting small clusters of non-graminoid native herbaceous species in the Scrub Shrub areas (River Partners 2008a). Initial results from this understory replanting are summarized in this document under Section 9.3.2 and planting details are provided in detail in Appendix D. In summary, spring 2009 herbaceous plant monitoring demonstrated that native herbaceous cover remained under ten percent across much of the site. More recent non-quantitative observations during June 2011 indicated that native grasses and several native forbs are taking increasing hold and in many areas likely exceeds 10 or even 20% cover. In other areas, such as the High and Low Dune Scrub, native herbaceous cover appeared well below 10%. At the same time, invasive weed cover also appeared well under the 10% threshold during the June 2011 field visit. If additional monitoring is possible, we recommend it focus on documenting whether the native grasses and forbs continue to spread and under what conditions. On-going monitoring on the quality, characteristics and extent of bird and wildlife habitat provided by the site would also be informative for on-going management and other Delta restoration projects. Finally another benefit potentially provided through this mitigation could include carbon sequestration and reduced subsidence rates in the riparian shrublands and forest, particularly compared to other existing land uses on the island. Documenting this process could reveal another important benefit associated with restoration of riparian shrublands and forests in the subsided Delta islands.

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- Appendix D River Partner's herbaceous understory replanting plan for 2008–2009.

1 INTRODUCTION AND BACKGROUND

As regulated under California State Assembly Bill 360 (AB360), the Bradford Island Reclamation District No. 2059 (District) was required to restore 50 acres of land to mitigate for habitat losses from past, ongoing, and future levee maintenance and improvement works on Bradford Island. To meet the requirements of no net loss of Freshwater Marsh, Scrub Shrub, and Riparian Forest habitat under the AB360 program, the California Department of Fish and Game (CDFG) and the District agreed to establish and preserve 2.95 acres of freshwater emergent marsh habitat, 22.06 acres of scrub shrub habitat, and 24.99 acres of riparian forest habitat (total of 50.00 acres) on the Bradford Island Tract 19 Mitigation Parcel (Parcel). The remaining portion of Tract 19 is not part of the mitigation program and will remain in cattle grazing until needed for other purposes in accordance with the Land Management Plan. Figure 1 shows the location of Bradford Island in relation to the greater San Francisco Bay-Delta (Delta) and Figure 2 shows the specific location of the Parcel on the island.

This Year 3 Monitoring Report (Monitoring Report) summarizes all three years' findings, including results from a September 2009 survey on the survival and vigor of native planted and volunteer woody species as well as June 2009 survey results on the areal extent of non-native weedy herbaceous plant species growing on the restoration site. This is the third of three annual reports to be submitted to the District and CDFG; the objective of this report is to document if the habitat restoration goals and performance standards for the Parcel are being met and to provide guidance to the District and CDFG to determine if remedial actions are needed. If performance standards are met during this third year, no further monitoring is required. If monitoring reveals that performance standards are not being met, remedial activities will be implemented as described in Section 3.3 of the Bradford Island Mitigation Plan (Mitigation Plan, Stillwater Sciences 2006) and in the Bradford Island Monitoring Plan (Stillwater Sciences 2007). This Monitoring Report describes the field and statistical methods used to assess performance standards achievement, results to date, recommendations for future actions, and implementation of adaptive management.

The overall goal of the Mitigation Plan is to restore self-sustaining Delta riparian and wetland habitat lost to levee construction and maintenance on Bradford Island, as required by the AB360 program. Five specific objectives, as listed in the mitigation plan (Section 1.4 of Stillwater Sciences 2006), are provided below:

- 1. Restore the Parcel to acreage targets to mitigate the loss of AB360 habitat types, including Scrub Shrub, Riparian Forest, and Freshwater Marsh;
- 2. Create a design that will work within the bounds of physical (e.g., soils, depth to groundwater) and biological (e.g., non-native invasive weeds, sources of seed for natural recruitment) constraints of the site to maximize the likelihood for successful establishment and long-term persistence of native vegetation;
- 3. Create a restoration design that will take advantage of opportunities to enhance existing native vegetation on the Parcel;
- 4. Develop habitat that includes higher quality, less fragmented, and higher diversity habitat that is more indicative of historic vegetation for this geographic area. A portion of the Parcel is contiguous with existing high quality habitat at the scour lake to the south. Once restored, the Parcel will provide a larger habitat area when combined with the lake. This will reduce edge effects as well as potential adverse impacts related to land-use activities on adjacent properties; and

5. Attain performance standards after implementation and the three-year maintenance period of habitat establishment, maintenance, monitoring, and remedial planting (as necessary), as detailed below (Section 3 of this document).

To satisfy these objectives, a planting plan was developed to reflect species composition and densities of reference systems and other Delta restoration projects. A list of plant species selected for each vegetation type is provided in Table 1.

Table 1. Summary of plant species planted in each vegetation type (River Partners 2006,
2008a).

			arian est	Rip	Marsh		
Common name	Scientific name	Cottonwood/ Willow	Mixed riparian	Riparian scrub	High Dune scrub	Low Dune scrub	Freshwater marsh
Trees and shrubs	•				-		
box elder	Acer negundo	Х	Х				
quail bush ¹	Atriplex lentiformis				Х	Х	
coyote brush	Baccharis pilularis				Х	Х	
mule fat	Baccharis salicifolia			Х			
button bush	Cephalanthus occidentalis			Х			
Oregon ash	Fraxinus latifolia	Х	Х				
bush lupine	Lupinus albifrons				Х		
Fremont cottonwood	Populus fremontii	Х	Х				
coast live oak	Quercus agrifolia					Х	
valley oak	<i>Ouercus lobata</i>		Х			Х	
California rose	Rosa californica	Х	Х				
California blackberry	Rubus ursinus		Х				
Goodding's black willow	Salix gooddingii	Х	Х				
red willow ²	Salix laevigata	Х	Х	Х			
arroyo willow	Salix lasiolepis	Х	Х	Х			
shining willow ²	Salix lucida	Х	Х	Х			
Herbaceous understory							
Indian hemp	Apocynum cannabinum	Х					
Mugwort	Artemisia douglasiana	X^4	X^4		X ³	X^4	
Pacific aster	Aster chilensis			Х			
Santa Barbara sedge	Carex barbarae	Х	Х	$\frac{X}{X^4}$			
Clustered field sedge	Carex praegracilis						Х
California poppy	Eschscholzia californica					Х	
western goldenrod	Euthamia occidentalis			X^4			
Great Valley gumweed	Grindelia camporum				X^4	X^4	
Bigelow's sneezeweed	Helenium bigelovii						Х
Telegraph weed	Heterotheca grandiflora				Х	Х	
large leather-root	Hoita macrostachya						Х
Baltic rush	Juncus balticus						Х
Common rush	Juncus effusus						Х
iris-leaved rush	Juncus xiphioides						Х
creeping wildrye	Leymus triticoides	X ³	X ³		X ³	X^4	

		-	rian est	Rip	Marsh		
Common name	Scientific name	Cottonwood/ Willow	Mixed riparian	Riparian scrub	High Dune scrub	Low Dune scrub	Freshwater marsh
California broom	Lotus scoparius				Х	Х	
bush lupine	Lupinus albifrons				Х		
Common monkeyflower	Mimulus guttatus						Х
purple needlegrass	Nassella pulchra	X^3	X^3		X^3	X^4	
Common reed	Phragmites australis						Х
Tule	Scirpus acutus						Х
California bulrush	Scirpus californicus						Х
whitestem hedgenettle	Stachys albens						Х

¹ According to Hickman (1993), referred to as big saltbush.

² This species was not included in the original planting implementation plan (River Partners 2006); however, it was mixed in during replacement plantings and was tracked during all monitoring efforts.

³ Within this vegetation type, this species was not part of the original planting implementation plan (River Partners 2006), but was included in the supplemental herbaceous planting plan (River Partners 2008a).

Within this vegetation type, this species was part of both the original planting implementation plan (River Partners 2006) and the supplemental herbaceous planting plan (River Partners 2008a).

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2 PERFORMANCE STANDARDS

CDFG and the District have agreed to performance standards for the Parcel, which are summarized in Table 2. These performance standards are based on the desire that the Parcel be on a self-sustaining trajectory by the end of the required three-year maintenance period. Requirements were modified from typical CDFG mitigation targets (e.g., percent survival of woody species) used on other Delta mitigation projects, and based on professional judgment. Through consensus negotiations, CDFG and the District may choose to modify these standards based on site-specific conditions and the results of yearly maintenance and monitoring at the Parcel.

Woody species have been planted to create five vegetation types: High Dune Scrub, Low Dune Scrub, Riparian Scrub, Cottonwood/Willow Riparian Forest, and Mixed Riparian Forest. These five woody vegetation types can be aggregated into two more general vegetation groups: Riparian Scrub Shrub, which includes the High and Low Dune Scrub as well as the Riparian Scrub; and Riparian Forest, which includes Cottonwood/Willow and Mixed Riparian Forest types. A sixth vegetation type, Freshwater Marsh, is within a third vegetation group. Throughout this Monitoring Report, the term vegetation *groups* refers to the more general three categories, while the term vegetation *types* will refer to the more specific six plant community types.

According to the Monitoring Plan, the District shall achieve the following performance standards on the Parcel after three years (Stillwater Sciences 2006):

- Survival of native woody species: Within each of the two woody vegetation groups, at least 80% survival of the total planted density of native woody species (total survival shall include both surviving planted stock and natural recruitment of native woody species). This performance standard excludes planted oaks (*Quercus* spp.) and bush lupine (*Lupinus albifrons*), but does include California rose (*Rosa californica*) and California blackberry (*Rubus ursinus*).
- Vigor of native woody species: Within each of the two woody vegetation groups, the surviving woody species need to show signs of health and vigor, meaning at least 80% of the surviving woody species (as defined above) have a vigor rating of "4" (defined as having 81% or more healthy foliage). The vigor requirement excludes planted oaks and bush lupine, but does include California rose and California blackberry.
- Survival of planted oaks: Establishment of oak species on the Parcel is largely experimental and no oaks were removed as a result of the District's levee maintenance activities for which this Parcel constitutes mitigation; therefore, the performance standard for oaks will be 50% survival of planted oaks across the entire Parcel (i.e., in both the low elevation Dune Scrub area and Mixed Riparian Forest area combined).
- **Percent cover of invasive weeds:** Percent cover will be used to evaluate the success of weed control activities on the Parcel. The focus of weed control will be on particularly invasive, non-native species that create serious problems in California's native ecosystems, as defined by the California Invasive Plant Council (Cal-IPC, Cal-IPC 1999). For the purposes of these performance standards, an "invasive weed" is defined as any plant with an "A" or "B" rating on the 1999 Cal-IPC list (Cal-IPC 1999).

The 1999 Cal-IPC list (Cal-IPC 1999) list for the entire state is provided for reference in Appendix A to this report. This list is used for this report rather than the most updated version of the CAL IPC weeds list because the 1999 list was the most up-to-date weeds list at the time that the mitigation agreement was being forged in 2005 and 2006. Since that time, Cal-IPC

has updated the 1999 list two times. These updates have elevated several species into the moderate and high concern categories that were not listed as such in the 1999 Cal-IPC publication. Since performance standards in the Monitoring Plan were established based on the Cal-IPC 1999 list, these newly listed weeds species of concern are not included in the performance criteria. They are, however, noted in Section 5.4.

The performance standards for invasive weeds are applied to each vegetation type separately, rather than to each vegetation group. Maximum percent cover values within each vegetation type for yellow star-thistle, Bermuda grass, and all other invasive weeds (defined above) are defined in Table 2 below. Because both yellow star-thistle and Bermuda grass were well-established weeds at the site prior to restoration activities, separate performance standards were also set for these species (Stillwater Sciences 2006). The percent cover values are based on percent cover within the herbaceous layer, which is defined in more detail in the discussion of monitoring methods in Section 5.2.2.

Vegetation group	Vegetation type	Native woody ¹ species survival	Native woody ¹ species vigor (of surviving stems)	Percent cover free of yellow star- thistle	Percent cover free of Bermuda grass	Percent cover free of other invasive weeds ²
Marsh	Freshwater Marsh	NA	NA	90%	75%	80%
	High Dune Scrub	80%		90%	75%	80%
Riparian Scrub	Low Dune Scrub	planted	80% Category 4 ⁴	90%	75%	80%
Berub	Riparian Scrub	density ³	Cutogory 4	90%	75%	80%
Riparian	Cottonwood/Willow	80%	80%	90%	75%	80%
Forest	Mixed Riparian	planted density ³	Category 4 ⁴	90%	75%	80%

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Table 2. Summ	nary of performan	ce standards by veg	etation group and type.

¹ This includes species defined as woody in the "class" category of Tables 6 through 10 in the Bradford Island Mitigation Plan (Stillwater Sciences 2006), and California rose and California blackberry.

⁴ Category 4 Vigor Rating defined in Section 5.2.1.2. Vigor performance standard does not include oak species or bush lupine. This is 80% of the surviving stems.

² For the purposes of this project, invasive weeds are those defined as category "A" or "B" by the California Invasive Plant Council's 1999 List of Exotic Pest Plants of Greatest Ecological Concern in California (Cal-IPC 1999).

³ Does not include oak species or bush lupine (if planted as associate species). Performance standard for oaks is 50% survival of planted density across the Dune Scrub and Mixed Riparian areas combined.

3 MAINTENANCE ACTIVITIES PERFORMED

River Partners installed the initial plantings on the Parcel during the winter and spring of 2007 according to the Mitigation Plan (Stillwater Sciences 2006) and subsequent amendments to the Planting Plan (River Partners 2006). Managers from River Partners inspected the Parcel during February and March 2007 to ensure that the project was progressing as planned.

The Parcel was mowed during May (upper elevation areas) and June (lower elevation areas) of both Year 1 and Year 2. Additional mowing was performed in the upper areas during March of Year 2. Herbicide was sprayed on the berms of the upper areas in April and June of Year 1 and across the entire Parcel in May of Year 1. During Year 2, herbicide application across the entire parcel was completed one month earlier, in April. During Year 3, herbicide applications and mowing took place as early as March; however, during August some maintenance activities were interrupted due to emergency levee repairs. More specific maintenance and replanting activities performed through January 2010 were provided by River Partners and are summarized in the sections below (River Partners 2007, 2008a–d, 2009, and 2010).

3.1 Planting

3.1.1 Year 1

Planting in most of the Parcel was completed by January 2007; planting in the moister, lower elevation areas was completed by June 2007. Across all vegetation types, a total of 3,985 individuals from container stock and 8,171 cuttings were installed, for a total average of 259 plants per acre. Approximately 600 additional cuttings were also replanted during June 2007.

3.1.2 Year 2

In response to observed survival rates below performance standards for woody species in the Riparian Scrub vegetation types, River Partners planted 1,606 additional woody plants throughout the Riparian Scrub areas including mule fat, button bush, arroyo willow, red willow, shining willow, coyote bush, and quail bush (*Atriplex lentiformis*; according to Hickman [1993], referred to as big saltbush). River Partners also planted 168 supplemental plantings of California rose in the Cottonwood/Willow vegetation type. In addition, during November of 2008, River Partners began implementing the understory replanting plan (River Partners 2008a) by broadcast seeding 2–5 pounds pure live seed of four different plant species in the High Dune Scrub, Low Dune Scrub, Cottonwood/Willow, and Mixed Riparian areas. These plantings are described in greater detail under Section 9.

3.1.3 Year 3

Because girdling of some willow species was observed (apparently by voles, [*Microtus californicus*], Section 8.1.4), in March 2009 approximately 100 cuttings were planted within the Riparian Scrub area directly west of the Freshwater Marsh. The cuttings were obtained from existing healthy trees in that area of the Parcel. During May 2009, the final replanting of the herbaceous understory west of the fresh water marsh was completed; 23,040 Santa Barbara sedge (*Carex barbarae*) plugs were installed and over two pounds of western golden rod (*Euthamia occidentalis*) seeds were planted .

3.2 Irrigation System

3.2.1 Year 1

The irrigation system was installed in a portion of the Parcel by January 2007 and expanded into other portions by May 2007. All areas were irrigated four times each in April and May, followed by weekly irrigation from June through September 2007. Drip line repairs were preformed during August and September 2007.

3.2.2 Year 2

The Parcel was irrigated for 9 days during April 2008 and valves were installed to control irrigation in wet, low-lying areas. Algae were observed clogging drip emitters; thus, during April and May 2008 the lines were flushed for two days to clear the algae. Drip irrigation continued through November 2008.

3.2.3 Year 3

During March of 2009, irrigation drip lines were flushed and repaired in preparation for the irrigation season. After winter rains, irrigation resumed during April; the site was irrigated once a week April through August with irrigation drip line repair on a regular basis. In September, repair work was required on the water pump such that the site was only irrigated twice. Weekly irrigation resumed during October; October was the final irrigation month before winter rains began. Finally, during January 2010, the site was cleared of all irrigation supplies and the recreational vehicle was removed from site.

3.3 Weed Control

3.3.1 Year 1

The drier, higher elevation areas of the Parcel were mowed during May 2007; the remaining lower elevation areas were mowed during June 2007. The later mowing dates for the lower site were necessary because saturated soil conditions in these areas would not support a tractor until later in the season. A Contra Costa County pesticide permit for glyophosphate was acquired in February 2007. Herbicides were sprayed on approximately 30 acres along the berms during April 2007, across the entire Parcel during May 2007, and only along the berms during June 2007. Glyophosphate is a nonselective systemic herbicide that is most commonly sold under the brand name 'Round-up' ©. Round-up was applied to control poison hemlock, Bermuda grass, and other European annual grasses. A permit for application of Clopyralid, a preemergence and postemergence herbicide, was also procured by River Partners and used specifically to control yellow star thistle.

No herbicide spraying was possible due to high winds during July 2007; however, some areas were sprayed during August 2007.

3.3.2 Year 2

Hand weeding and hoeing was performed for one day in January 2008 with a focus on the Bermuda grass within rows and the yellow star thistle. The Parcel was mowed during March 2008 using a tractor and flail mower for eight days. The Parcel was mowed again in May 2008 for three days, followed by hand weeding and hoeing for three more days (two laborers). These earlier mowing dates, compared to the June mowing in 2007, were intended to kill the European annual grasses before they set seed. Due to saturated soil conditions, mowing was not possible on the area west of the pond. In June 2008, the Parcel was mowed again for four days. All but the lower Riparian Scrub areas were mowed and disked during the fall 2008.

Herbicides were applied by hand for one day in March 2008 and for five days in April 2008 using an applicator on an ATV loaded with a spray tank in the upper areas. In addition, two backpack-sprayers applied herbicides to the wet area west of the pond.

3.3.3 Year 3

Beginning in March, weed control was resumed. All berms, where Bermuda grass was continuing to spread, were spot-sprayed during March, April, May, June, and July. Mowing occurred in all accessible areas in March; the site west of the Freshwater Marsh was then mowed in April. By May, the entire site was accessible and was mowed again to kill European annual grasses and other forbs (e.g. poison hemlock) before seed set. Prior to planting the Riparian Scrub understory west of the Freshwater Marsh in May, the area was also spot-sprayed. In June and July, areas were spot-sprayed for yellow star-thistle and Bermuda grass in particular. Almost the entire site was mowed again during September; however, some of the site was not accessible by equipment because of tree growth. The field manager continued to visit the site during November, December, and January for weed monitoring; additional areas were mowed in January 2010.

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4 FIELD MONITORING METHODS

4.1 Photo Monitoring and Incidental Observations

Photo monitoring from fixed stations, designated by a fixed station monument in each vegetation type or from a vantage point (i.e., levee road or hill top) where multiple vegetation types could be photographed with a panoramic view, were established to monitor changes over time. Photographs were taken during June and September 2007 surveys and several paired examples are included in Appendix B. Photographs were also taken from these stations in June and September 2008 and 2009. These are shown with the Year 1 photographs in Appendix B. Permanent plot markers established for each woody plant plot with known GPS points were used as fixed photo-locations; compass bearings of the photograph direction were also recorded for each photograph.

Although nine groundwater wells were established on Tract 19 (six within the Parcel) as part of the Mitigation Plan development (Stillwater Sciences 2006; Figure 3), none of these were found during the June or September 2007 site visits. It is assumed that these wells were destroyed during the construction and planting phases of the project.

4.2 Performance Standards Monitoring

The first monitoring event occurred on 4–6 June 2007 in Year 1. These dates coincided with the flowering periods of most herbaceous species and were selected to aid in species identification and accurate assessments of percent herbaceous cover. By monitoring weed cover at the height of flowering, cover just prior to seed-set was captured; this has important implications for the amount of new seeds delivered to the soil. A second monitoring event occurred on 11 September 2007, prior to leaf drop but after peak summer drought stress, to assess woody species survival and vigor following the first growing season. Weed and woody plant monitoring was performed at similar times of year during years 2 and 3 (Table 3).

Year post-implementation	Dates						
Tear post-implementation	Weed monitoring	Woody plant monitoring					
Year 1	4–6 June 2007	11 Sept 2007					
Year 2	4, 5, 11 June 2008	11, 12 Sept 2008					
Year 3	9–11 June 2009	16–17 Sept 2009					

 Table 3. Herbaceous weed cover and woody plant monitoring dates for years 1 through 3.

4.2.1 Survival and vigor of woody species

To monitor success of planted woody species and account for natural recruitment, the density of woody species (stems per unit area) was monitored by sampling permanent plots stratified by vegetation type. Because woody species were planted in curved rows, plots were centered on planted rows rather than on the inter-row herbaceous areas. All woody species were monitored, regardless of whether the species was planted as part of the original installation or if it established through natural recruitment. For example, if sandbar willow (*Salix exigua*) established through natural recruitment on the Parcel, it was counted in the overall density of native woody species present.

4.2.1.1 Establishing woody species plots

A total of 103 permanent 0.05-acre woody species plots were established with individual dimensions of 120 by 18 ft. The long side of each plot runs parallel to the planting rows, such that one row is included in each plot. Woody species plots are distributed among vegetation types according to their relative extent in the Parcel (Table 4). Overall, a total of 5.15 acres, or slightly over 10% of the Parcel, was sampled.

The distribution of vegetation types has been mapped using GIS, with types delineated as polygons (Figure 4). Woody species plots were randomly located using a grid of 0.05-acre numbered cells overlaid with the GIS layer of vegetation types. Within each vegetation type, the appropriate number of plots (Table 4) was randomly selected from the grid. Maps of these randomly selected plots were brought to the field, along with GPS coordinates for each plot and a high-precision hand-held Trimble GPS unit. The planting row in closest proximity to each plot was selected in the field as the plot's long-axis center line.

Vegetation group	Vegetation type	Total acres	Number of plots	Acres sampled
Marsh	Freshwater Marsh	3.0	3 ^a	0.15
	High Dune Scrub	3.8	11	0.55
Riparian	Low Dune Scrub	5.1	11	0.55
Scrub	Riparian Scrub	12.9	27	1.35
	Scrub total	21.8	49	2.45
Dimension	Cottonwood/Willow	13.6	29	1.45
Riparian Forest	Mixed Riparian	11.6	25	1.25
Folest	Forest total	25.3	54	2.7
Grand total		50	106	5.30

 Table 4. Number of 0.05-acre plots sampled within each vegetation type.

No woody species plots were established in the Freshwater Marsh because no woody species were planted within this vegetation type. However, three herbaceous weed plots were established in this vegetation type.

Woody species plots were permanently marked with fixed-station monuments using 5-ft steel fence posts sunk 1–2 ft into the ground. These fixed-station monuments were installed within the planted row at the northern-most end of each woody species plot; the woody plant at the southern most end of the plot was marked with an aluminum tag. Unique plot codes were recorded in indelible ink on each post and on aluminum tags wired to the post. In addition, the location of each monument was recorded using a high-precision hand-held Trimble GPS unit.

Woody species plots were established on 23–24 May 2007; the distribution of the woody species plots is presented in Figure 5.

4.2.1.2 Data collection for woody species

Planted density and survival measurements

Baseline planted density of woody species was measured during the 4–6 June 2007 monitoring event. Baseline planted density was measured by counting each planted woody species (whether dead or alive at the time), as evidenced by milk carton containers and/or water basins and wood chips, within each plot. The total woody plant counts from each plot were averaged by vegetation

type and within each of the two broader woody vegetation groups, Riparian Scrub and Riparian Forest, to estimate the baseline planted density for the entire Parcel.

For the Year 1, Year 2, and Year 3 survival monitoring on 11 September 2007, 11–12 September 2008, and 16–17 September 2009, respectively, the total of all surviving woody plants including both planted and recruited individuals in each woody species plot was recorded in the field. Because no woody species were planted in the Freshwater Marsh area, woody plant density and survival were not monitored for this vegetation type.

Vigor of woody species

Vigor of woody plant species was monitored simultaneously with measurement of plant survival through a visual estimate of foliage for each plant in each plot, using qualitative categories detailed in Table 5. Healthy foliage is defined as showing no signs of herbivory, nutrient or water stress, or pathogens on stems or foliage.

Category	Description
1	less than 25% of foliage appears to be healthy
2	25–50% of foliage appears to be healthy
3	51–80% of foliage appears to be healthy
4	81% (or greater) of foliage appears to be healthy

 Table 5. Vigor categories used in field monitoring.

Although vigor was monitored and reported by species, the combined vigor ratings for all woody species within the two woody vegetation groups (Riparian Scrub and Riparian Forest) was used to assess whether or not the site is meeting the performance standard (see Section 7).

4.2.2 Percent cover of invasive weeds

4.2.2.1 Establishing herbaceous species transects

A total of 108 permanent herbaceous species transects were established during the first annual monitoring event in June 2007; each transect was 100-ft long. The starting point for each transect coincides with the fixed-station monuments established for the woody species plots (Section 5.2.1.1). Thus, the fixed station monuments were used to mark the northern-most end of the woody species plots as well as the starting point for each weed transect. From the starting point, each weed transect extends 100 ft in a direction determined by randomly selecting a compass bearing; a list of random bearings was generated in the office using a random number generator. If the transect, set at the original bearing, extended outside of the vegetation type boundary or across another transect, the next bearing on the list was used until the entire transect fell within a single vegetation type (Figure 6). Each transect was revisited each monitoring year; during each monitoring event, the original compass bearing was used to recreate the original transect location.

Herbaceous species transects are distributed among the vegetation types in the Parcel according to their relative extent (Table 4). Five weed transects were also placed and marked with fixed-station monuments in the Freshwater Marsh vegetation type.

4.2.2.2 Data collection for herbaceous species

A point-intercept method was used to estimate percent cover of herbaceous species and Cal-IPC 1999 listed invasive weed species (Cal-IPC 1999). Percent cover was estimated by recording the

number of 'hits' of each species at 25 sample points along each 100-ft weed transect, such that two out of 25 hits along one transect was recorded as 8% cover for that species along that particular transect. Herbaceous species 'hits' were determined by vertically dropping a .25 indiameter dowel, sharpened at the tip, every 4 ft along the transect. The first plant touched by the pointed tip was recorded as the 'hit' for that point. Bare ground and organic litter/debris (e.g., dead plant material such as leaf litter or thatch) were also recorded at points where there was no vegetative cover. This method is more time consuming than visual estimates of percent cover, but is far less subject to individual bias and variation among field crews and sample days (Elzinga et al. 1998). By recording 25 hits per transect, estimates of changes in percent cover $\pm 4\%$ can be detected in that particular transect over time.

All plants were identified to species based on the Jepson Manual (Hickman 1993). If unknown species were encountered in the field, a sample was collected for identification in the lab using a dissecting microscope.

5 DATA MANAGEMENT AND ANALYSIS

Field data were recorded on forms and entered into a database at the office. Each data set was subjected to Quality Assurance/Quality Control (QA/QC) measures, including a check against the field data sheets by a second Stillwater staff member. Once entered in the database, the data were summarized and analyzed using Microsoft Excel 2003TM.

5.1 Initial Planted Density and Survival of Woody Species

To calculate the initial planted density, the overall mean, standard deviation, and 95% confidence intervals of the number of non-oak, non-lupine woody plants installed per acre (as documented during June 2007 field surveys) was calculated for each vegetation type and the broader vegetation groups (Riparian Scrub and Riparian Forest). Separately, the mean, standard deviation, and 95% confidence intervals of the density of oak and lupine woody plants installed per acre were similarly calculated per vegetation type. Because these 'planted densities' were measured several months following actual planting, and included fairly high numbers of unknown plants that were dead and unidentifiable, densities provided in the Planting Plan (River Partners 2006) are included as 'target densities' for reference only. Achievement of survival performance standards was based on comparing June 2007 field-measured planted densities with September 2007, 2008, and 2009 measured densities.

The density of surviving non-oak, non-lupine woody plants per plot in the two vegetation groups was calculated and compared to 80% of the measured planted density to assess achievement of the survival performance standard (Section 3). Surviving woody plants were those given a 1, 2, 3, or 4 vigor rating during each fall field monitoring event. The mean and standard deviation for the density of surviving non-oak and non-lupine woody plants within the Riparian Scrub and Riparian Forest groups were then calculated and compared to 80% of the measured planted density. Similarly, the mean and standard deviation survival densities for all oak species in the combined areas of Riparian Scrub and Riparian Forest groups were compared to 50% of the measured planted density, based on the performance threshold for oak species (Section 3).

Statistical comparison of the threshold measured planted densities and surviving densities was performed using one-tailed paired-sample t tests. The paired-sample test was used because measurements were collected in the same plots over multiple time periods ('repeated measures'; Elzinga et al. 1998). We chose one-tailed tests because the performance standards require that the plant density does not fall below a particular threshold, thus we only needed to test for change in one direction (Elzinga et al. 1998). Differences were considered significant for p < 0.10. When the hypothesis was rejected and the surviving mean density was less than the threshold planted mean density, the performance standard was considered not met and remedial measures were recommended (Section 8).

5.2 Vigor of Woody Species

The number of woody plants (excluding oaks and lupines) assigned a '4' vigor rating was summed for each plot and converted to the number of vigor '4' plants per acre. These density values were then averaged for each vegetation group. Eighty percent of the density of surviving woody plants in each plot (excluding oaks and lupines) was calculated and used to assess attainment of vigor performance standards. Significant differences between the 80% surviving density and vigor '4' density for each vegetation group were identified using paired-sample one tailed t-tests (Elzinga et al. 1998). Differences were considered significant for p < 0.10. When the

hypothesis was rejected and the mean vigor 4 woody plant density was less than the threshold survival mean density, the performance standard was considered not met and remedial measures were recommended (Section 8). There is no vigor performance standard for the oak and bush lupine species because establishment of these species on the Parcel is considered experimental (see Section 2).

5.3 Percent Cover of Invasive Weeds

All plant species recorded along weed transects were classified as an invasive weed or not based on its status in the Cal-IPC 1999 list (Cal-IPC 1999). Those species assigned an A or B rating were classified as 'invasive weeds' (see Appendix A). If a plant was not assigned an A or B rating, or was assigned a lower threat 1999 Cal-IPC rating (Cal-IPC 1999), it was not classified as an 'invasive weed'. Yellow star-thistle and Bermuda grass were placed in unique classes, since they are each associated with unique performance standards (Table 2 and Section 3).

Mean percent relative cover for each invasive weed species was estimated for each vegetation type using the point intercept data (Section 4.2.2). The absolute cover value for each species within a vegetation layer (herbaceous, shrub, and tree) along each weed transect was transformed to relative percent cover values, which sum to 100% within a vegetation layer. Mean percent cover values for invasive weed species within each vegetation type were compared to performance standards, whereby percent cover of yellow star-thistle within the herbaceous layer must be under 10%, percent cover of Bermuda grass within the herbaceous layer must be under 25%, and percent cover of all other weed species combined must be under 20% within the herbaceous layer (Stillwater Sciences 2006).

5.4 Data to Support Adaptive Management

In addition to the data collection and analysis required to assess attainment of the performance standards, data has also been summarized to provide information useful for future management of this and other mitigation/restoration parcels in the Delta. Initial planted densities were calculated for each of the five vegetation types, as well as for each species. Mean and standard deviation of overall and species-specific planted density within each of the five woody vegetation types was also calculated as baseline information. To aid in the overall assessment of site conditions and management for plant survival, survival rates and vigor levels for each vegetation type and for each woody species were calculated. Along the weed transects, percent cover for non-weedy species was also estimated to provide appropriate data necessary for adaptive management decisions. Percent cover by species within vegetation types was also calculated and is presented in Section 6. While not tied to performance standards, these measurements are expected to aid in the overall assessment of site conditions. Finally, any wildlife observations made during site visits were recorded as incidental observations in this report (Section 6.5).

6 MONITORING RESULTS

6.1 Initial Planted Density and Survival of Woody Species

During 4–6 June 2007 baseline sampling, observed initial planting densities were either within or close to target densities stated in the revised planting plan (Table 6; River Partners 2006). The 95% confidence interval of planted densities for the Riparian Scrub (186 to 224) overlapped with the target density (219) for this vegetation group (Table 6). The target density for the Riparian Forest (260) was slightly greater than the upper bound of the 95% confidence interval for the planted density (229 to 254; Table 6).

The numbers of dead/unknown planted stems averaged approximately 30 to 40 stems per acre and were similar across four of the five woody vegetation types. More dead/unknown stems were recorded in the High Dune Scrub, where dead/unknown stem density averaged 74 stems per acre. Many dead and unidentifiable woody plants were recorded (as 'species unknown') in the Riparian Forest vegetation group, indicating high mortality for some species within the first few months following the mid-winter installation. More details on which species had the greatest initial mortality are provided in Section 6.4.1. Coefficients of variation were 29% for the Riparian Scrub and 20% for the Riparian Forest, reflecting moderate differences in planted densities among plots.

6.1.1 Year 1

During Year 1, woody plant survival in the Riparian Scrub vegetation group averaged 159 plants per acre, at the very lower end of the 95% confidence interval for 80% of the June 2007 planted density (Table 6). The target density for the Riparian Scrub group, based on the planting plan submitted by River Partners in June 2006, is 219 plants per acre; the measured planted density was 205 plants per acre. Eighty percent of the measured plant density is 164 plants per acre, a value that is within, but at the high end of, the 95% confidence interval for the measured Year 1 surviving density (130 to 189 plants per acre; Table 6). Thus, survival rates met performance standards for the Riparian Scrub.

Woody plant survival in the Riparian Forest vegetation group averaged 486 plants per acre, over two times the amount required by the performance standards (193 plants per acre) and nearly two times the target density of 260 plants per acre (Table 6). Coefficients of variation in the surviving planted densities were quite high: 60% for the Riparian Scrub and 136% for the Riparian Forest; these reflect large variation among plots, especially in the Riparian Forest vegetation group which had high numbers of naturally recruited (volunteer) woody plants in some areas.

According to the performance standards, oak survival must be equal to or exceed 50% of the planted density. As detailed in Table 7, planted oak density was very close to surviving oak density (16 versus 15 plants per acre) during Year 1. These field measured oak densities during Year 1 were also similar to the target planting oak density of 18 plants per acre. There are no performance standards for the lupine; however, the measured planted and survival densities during Year 1 were statistically indistinguishable. The target density for lupine is 8 plants per acre, far more than the planted and Year 1 surviving densities of 1.2 plants per acre (Table 7). The low measured planted and survival densities for lupine were likely due to high mortality during the first winter in the dune areas, as discussed in Section 6.4 below.

6.1.2 Year 2

At the end of Year 2, woody plant survival in the Riparian Scrub vegetation group increased from 159 (Year 1) to 193 stems per acre. This translates to 94% survival of the original planted density, well above the 80% required by the performance standards (Table 2). Woody plant survival in the Riparian Forest vegetation group decreased from 486 to 306 stems per acre; however, this translates to 127% of the planted density and is still well above 80% of the planted density, as required by performance standards (Table 2). The inter-annual difference in measured stem density in the Riparian Forest Group is likely a reflection of differences in crew members counting stems and suckers (primarily Goodding's black willow [*Salix gooddingii*]) in the field. Coefficients of variation remained high for both the Riparian Scrub and Riparian Forest group due to dense recruitment of Goodding's black willow.

Oak survival densities averaged 15 stems per acre in Year 2, exactly the same as was measured in Year 1 (Table 7). Lupine survival during Year 2 was also identical to Year 1, and averaged 1.2 stems per acre. During Year 2, mean survival densities of both oak and lupine were within 6 percent of the original measured planted densities, and well within the 95% confidence interval for the measured planted density for both groups of species.

6.1.3 Year 3

Woody plant survival in the Riparian Scrub vegetation group increased from 159 and 193 stems per acre (Years 1 and 2) to 276 stems per acre (Year 3). This translates to 135% survival of the original planted density, well above the 80% required by the performance standards (Table 2). Woody plant survival in the Riparian Forest vegetation group changed from an observed decrease between Year 1 and Year 2 (486 to 306 stems per acre) to an observed increase between Year 2 and Year 3 (306 to 471 stems per acre). This translates to 195% of the planted density and continues to be well above 80% of the planted density, as required by performance standards (Table 2). Coefficients of variation remained high for both the Riparian Scrub and Riparian Forest vegetation groups (i.e., 74% and 101%, respectively); and, as documented in both Year 1 and Year 2, remained greatest for the Riparian Forest group due to dense recruitment of Goodding's black willow.

Oak survival densities averaged 34 stems per acre in Year 3, over double the Year 1 and Year 2 observations of 15 stems per acre both years (Table 7). Lupine survival during Year 3 increased two orders of magnitude from Year 1 and 2; the average density in Year 3 was documented at 198 stems per acre (Table 7) due to successful inter-row seedling colonization. Mean survival densities were well within (oak) or greatly exceeding (lupine) the 95% confidence interval for the measured planted density for both groups of species.

6.2 Vigor of Woody Species

For each vegetation group, the densities of plants assigned a vigor rating of 4 are presented in Table 8; for comparison, 80% of the measured planted density is also presented.

6.2.1 Year 1

Within the Riparian Scrub vegetation group, well over 80% of the surviving plants were assigned a 4 vigor rating (Table 8; average 153 stems per acre with vigor 4 out of an average of 159 plants per acre that survived, or approximately 96%). In the Riparian Forest areas, the average density of

vigor 4 plants observed was 385 per acre. This value is just under (79%) the 80% threshold for of the average planted density of 486 plants per acre. However, the 95% confidence intervals for the Riparian Forest survival and vigor 4 densities overlap (i.e., 308 to 664 and 254 to 515, respectively).

6.2.2 Year 2

During Year 2, 90% of the Riparian Scrub surviving plants were assigned a vigor of 4 (Table 8; 174 stems per acre out of 193 stems per acre). Within the Riparian Forest, 92% of the surviving plants had a vigor rating of 4 (281 stems per acre out of 307 stems per acre).

6.2.3 Year 3

Within the Riparian Scrub vegetation group, over 80% of the surviving plants were assigned a 4 vigor rating (Table 8; average 260 stems per acre with vigor 4 out of an average of 276 plants per acre that survived, or approximately 94%). In the Riparian Forest areas, the average density of vigor 4 plants observed was 409 per acre. This equates to approximately 87% of the surviving plants with a vigor of 4.

6.3 Percent Cover of Invasive Weeds

Details on the percent cover of each weed species and overall invasive weed cover in each vegetation type are provided in Table 8. A more detailed breakdown of weedy species common to some of the vegetation types is provided in Section 6.4.2.

6.3.1 Year 1

Yellow star-thistle mean cover approached or exceeded the 10% limit in three of the vegetation types during Year 1. In the Mixed Riparian Forest, yellow star-thistle cover averaged 11%; however, variation among plots was high (see Table 9). Similarly, in the Low Dune Scrub, the mean percent cover for yellow star-thistle exceeded the 10% threshold by 4% during Year 1. Cover of yellow star-thistle also approached the maximum performance standard in the High Dune Scrub at 9% \pm 11. Percent cover of Bermuda grass was generally low. The highest cover for this species was documented in the High Dune Scrub, where it averaged 8%; in no areas did cover of this weed approach or exceed the 25% performance standard during Year 1. Overall, percent cover of invasive weeds was greatest in the Cottonwood/Willow and the Mixed Riparian Forest vegetation types. In both of these types, invasive weeds averaged approximately 27–28% cover during Year 1; however variation among plots was high (Table 9).

6.3.2 Year 2

Yellow star-thistle, which must not have greater than or equal to 10% cover in any vegetation type, was nearly absent from all six vegetation types during Year 2 monitoring. The highest cover for the species was documented in the High Dune Scrub (i.e., 0.5% cover). Although Bermuda grass was present in four of the seven vegetation types during Year 2, it never approached the performance standards maximum of 25% (i.e., when present, it ranged from 1.3 to 7% cover). Similarly, average invasive weed cover was also well below the performance standards maximum of 20% in all vegetation types, with percent cover ranging 0.4–10% (Table 9).

6.3.3 Year 3

Yellow star-thistle continued to occur infrequently throughout the Parcel, with virtually no cover observed in three of the six vegetation types (Cottonwood/Willow, Riparian Scrub, and Freshwater Marsh) during the June 2009 survey. Cover of this invasive weed averaged less than 10% (the performance threshold) in the remaining three vegetation types; it was highest in the Low Dune Scrub, where yellow star-thistle cover averaged 6.2% (Table 9). Bermuda grass was documented in all vegetation types but the Freshwater Marsh; however, it did not approach or exceed the 25% threshold in any vegetation type. Bermuda grass was most common (averaged between 5 and 10%) in the Low Dune Scrub, High Dune Scrub, and Mixed Riparian vegetation types, where it was most frequently observed within the planted rows. Finally, percent cover of all invasive weeds was also below the threshold of 20% throughout the Parcel; however, high cover of invasive weeds was observed in the Cottonwood/Willow Riparian Forest (9.2% \pm 13.8), Mixed Riparian Forest (7.7% \pm 9.7), and Low Dune Scrub (6.6% \pm 9.2).

Vagatation		Tongot	Measured planted density ²		80% of measured planted density ²		Year 1 survival density ²		Year 2 survival density ²		Year 3 survival Density ²	
Vegetation group	Vegetation type	Target density ^{1, 2}	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval
Marsh	Freshwater Marsh	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Riparian Scrub	High Dune Scrub Low Dune Scrub Riparian Scrub	219	205 (68)	186 to 224	174 (50)	159 to 190	159 (96)	130 to 189	193 (78)	177 to 208	276 (204)	220 to 333
Riparian Forest	Cottonwood/Willow Mixed Riparian	260	241 (47)	229 to 254	193 (38)	183 to 203	486 (661)	308 to 664	306 (359)	211 to 403	471 (478)	344 to 599

Table 6. Woody species planted density and survival by vegetation group (oak and lupine species not included), Years 1, 2, and 3.

¹ Target densities are reported from River Partners 2006 for reference only. Achievement of survival performance standards is based on comparing June 2007 measured planted densities with September 2007 (Year 1), 2008 (Year 2), and 2009 (Year 3) measured survival densities.
 ² All density values presented as storms are seen.

All density values presented as stems per acre.

Table 7. Oak and lupine species planted density and survival over entire parcel, Years 1, 2, and 3.

	Target		ed planted nsity ²		l survival nsity ²		2 survival ensity ²	Year 3 survival density ²		
Species	planted density ^{1, 2}	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	
Oak	18	16 (35)	10 to 23	15 (33)	9 to 22	15 (33)	9 to 22	34 (43)	22 to 46	
Lupine	8	1 (7)	0 to 3	1.2 (7)	0 to 3	1.2 (7)	0 to 3	198 (382)	27 to 424	

¹ Target densities are reported from River Partners 2006 for reference only. Achievement of survival performance standards is based on comparing June 2007 measured planted densities with September 2007 (Year 1), 2008 (Year 2), and 2009 (Year 3) measured survival densities.

² All density values presented as stems per acre.

		80% of measured planted density ^{1, 2}		Year 1				Year 2				Year 3			
Vegetation group	Vegetation type			Survival density ²		Vigor	Vigor 4 density ²		Survival density ²		Vigor 4 density ²		Survival density ²		Vigor 4 density ²
		Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval
Marsh	Freshwater Marsh	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Riparian Scrub	High Dune Scrub	174 (50)	150 to 100			130 to 189 153 (92)	125 to 182	193 (78)	177 to 208	174 (72)	154 to 195	276 (203)	219 to 332	260 (202)	204 to 316
	Low Dune Scrub			159 (96)											
	Riparian Scrub														
Riparian Forest	Cottonwood/ Willow	193	183 to 203	486	308 to 66/	385	254 to	307 (359)	211 to 403	281 (361)	182 to 380	471 (478)	343 to 598	409 (419)	293 to 525
	Mixed Riparian	(38)	105 10 205	(661)		(486)	515								

Table 8. Woody species vigor by vegetation group in relation to 80% planted density and survival (oak and lupine species not included), Years1, 2, and 3.

¹ Planted densities measured in June 2007 measured planted densities with September 2007 (Year 1), 2008 (Year 2), and 2009 (Year 3) measured survival densities.

² All density values presented as stems per acre.

T 7 4 4*	G	C	Performance	Year 1 me	easured cover ¹		2 measured cover ¹	Year 3 measured cover ¹		
Vegetation type	Common name	Scientific name	standard for cover	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	
	Yellow star- thistle	Centaurea solstitialis	<10%	0.4 (2)	0 to 1	0 (0)	0 to 0	0 (0)	0 to 0	
Cottonwood/ Willow	Bermuda grass ²	Cynodon dactylon	<25%	0.4 (1)	0 to 1	4.4 (7)	1.7 to 7	1.2 (2)	0.4 to 2.0	
	Invasive weeds	N/A	<20%	$28(28)^3$	18 to 38	0.4 (2.2)	0 to 1.2	9.2 (13.8)	4.3 to 14.2	
	Yellow star- thistle	Centaurea solstitialis	<10%	$11(12)^3$	6 to 16	0 (0)	0 to 0	1.6 (3.4)	0.2 to 2.9	
Mixed Riparian	Bermuda grass ²	Cynodon dactylon	<25%	2 (5)	0 to 4	1.3 (3.5)	0 to 2.7	3.1 (4.0)	1.5 to 4.7	
-	Invasive weeds	N/A	<20%	27 (22) ³	18 to 36	0.7 (1.7)	0 to 1.4	7.7 (9.7)	3.8 to 11.5	
	Yellow star- thistle	Centaurea solstitialis	<10%	0 (0)	0 to 0	0 (0)	0 to 0	0 (0)	0 to 0	
Riparian Scrub	Bermuda grass ²	Cynodon dactylon	<25%	0.2 (1)	0 to 0.5	2.4 (4)	0.8 to 3.9	0.9 (1.7)	0.3 to 1.6	
	Invasive weeds	N/A	<20%	6 (17)	0 to 13	1.3 (3.8)	0 to 2.8	3.5 (5.6)	1.4 to 5.7	
High Dune Scrub	Yellow star- thistle	Centaurea solstitialis	<10%	9 (11) ³	2 to 16	0.5 (1.7)	0 to 1.5	1.8 (3.7)	0 to 4.0	
	Bermuda grass ²	Cynodon dactylon	<25%	8 (7)	4 to 12	0 (0)	0 to 0	5.5 (8.1)	0.7 to 10.2	
	Invasive weeds	N/A	<20%	10 (11)	3 to 17	0.5 (1.7)	0 to 1.5	1.8 (3.7)	0 to 4.0	

 Table 9. Percent cover of invasive weeds by vegetation type, Years 1, 2, and 3.

Vegetation type	Common name	Scientific name	Performance standard for cover	Year 1 me	easured cover ¹		2 measured cover ¹	Year 3 measured cover ¹	
				Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval
	Yellow star- thistle	Centaurea solstitialis	<10%	$14(12)^3$	7 to 21	0 (0)	0 to 0	6.2 (9.4)	0.7 to 11.7
Low Dune Scrub	Bermuda grass ²	Cynodon dactylon	<25%	4 (5)	0 to 7	7 (7)	3 to 11	6.9 (6.5)	3.1 to 10.7
	Invasive weeds	N/A	<20%	15 (12) ³	7 to 23	7 (7)	3 to 11	6.6 (9.2)	1.1 to 12.0
	Yellow star- thistle	Centaurea solstitialis	<10%	0	0 to 0	0 (0)	0 to 0	0 (0)	0 to 0
Freshwater Marsh	Bermuda grass ²	Cynodon dactylon	<25%	1 (2)	0 to 3	0 (0)	0 to 0	0 (0)	0 to 0
	Invasive weeds	N/A	<20%	1 (2)	0 to 3	10 (2.3)	8 to 12	2.0 (2.3)	0 to 4.3

1

All percent cover numbers reflect relative percent cover within the herbaceous vegetation layer. Bermuda grass is not listed under Cal-IPC (1999); however, performance standards were set because, like yellow star-thistle, this species was well-established 2 at the site prior to restoration activities (Section 3 and Stillwater Sciences 2006).

3 Average percent cover measured is within 5% of maximum allowable level.

6.4 Data to Support Adaptive Management

6.4.1 Woody species-specific survival and vigor

The Years 1, 2, and 3 survival of healthy woody species in relation to the target and measured planted densities are provided for each vegetation type in Tables 10 through 14 and the following sections. This information is not related to specific performance standards, but rather is presented to help identify locations and plant species that are doing particularly well or poorly in the Parcel.

6.4.1.1 Year 1

Within the Cottonwood/Willow vegetation type, California rose appeared to have high mortality rates between the time of planting and the initial planting density measurements made in June 2007 (Table 10). The target planted density of 15 plants per acre represents nearly five times the initial density measured in June 2007 and survival recorded later in September 2007. All other woody species in this vegetation type showed high survival and vigor ratings. Many volunteers of Goodding's black willow were documented, resulting in much higher apparent survival densities compared to target or measured initial planted densities.

In the Mixed Riparian vegetation type, California rose survival rates were much higher than those observed in the Cottonwood/Willow areas and were similar to the target planting densities (Table 11). Also, within the Mixed Riparian, the target planted density for both Fremont cottonwood (*Populus fremontii*) and valley oak (*Quercus lobata*) were much higher than the measured planted densities (90 versus 36 Fremont cottonwoods per acre and 50 versus 37 valley oaks per acre). However, subsequent Year 1 survival and vigor ratings were high for both of these species. Natural recruitment of Goodding's black willow did not occur to any significant degree.

Two woody species measured planted densities closely matched the targets in the Riparian Scrub vegetation type (mule fat [*Baccharis salicifolia*] and button bush [*Cephalanthus occidentalis*]); however, the measured planted densities for willows were only 60–65% the target densities (Table 12). Survival of plants with a 4 vigor rating was also close to 100% of the measured planted density for mule fat, but the density of vigor 4 rated stems of willows (*Salix spp.*) and button bush decreased over the Year 1 growing season. Red willow (*Salix laevigata*) was not listed in the Planting Plan (River Partners 2006); however, it was observed to be planted and thriving throughout the Parcel during Year 1, presumably mixed in with the shining willow (*Salix lucida*) saplings during planting. Note that within Riparian Scrub Year 1 monitoring, there was some uncertainty in the data collected for arroyo (*Salix lasiolepis*), red, and shining willows; therefore, we collapsed the categories to present the most accurate overall willow survival densities (Table 12).

Within the High Dune Scrub, coyote brush (*Baccharis pilularis*) was planted in densities that exceeded the target density provided in the Planting Plan (River Partners 2006) and survived in good health (Table 13). However, both quail bush and bush lupine were observed to be planted at less than one-third their target densities. These numbers may reflect high mortality rates between the time of actual planting and the measured planted density survey conducted in spring because there were fairly high densities of 'unknown' (dead) woody plants observed at that time. The overall density of woody plants recorded as 'unknown' (dead) was 73 ± 52 plants per acre. Those quail bush and bush lupine plants that were alive remained in good health through the fall. Thus, it appears the highest mortality rates for these species occurred within the first few months of installation, a time during which there was also an unusually heavy frost.

Similar to our High Dune Scrub observations, in the Low Dune Scrub the observed planted density of coyote brush exceeded the target density provided in the Planting Plan (River Partners 2006); however, survival was relatively low (Table 14). The measured planted density of quail bush was less than one-quarter of the stated target density (Table 14), but survival of those plants from June to September was high. The target and measured planted densities of coast live oak (*Quercus agrifolia*) and valley oak were nearly equal and both species exhibited high subsequent survival rates.

6.4.1.2 Year 2

Year 2 survival densities of vigor 4 rated woody plants in the Cottonwood/Willow vegetation type was similar to that measured in Year 1, with three exceptions (Table 10). Densities of both California rose and Goodding's black willow increased due to remedial plantings of California rose and continued natural recruitment of Goodding's black willow. In addition, vegetative propagation of California rose via runners was frequently observed; however, many of these individuals were exposed to mowing and herbicide treatments because they were colonizing between the planted rows. Densities of red/shining willows in vigor 4 category decreased between Year 1 and Year 2, from an average of seven stems per acre down to only one stem per acre. This can likely be attributed to the leaf rust commonly observed on the red willows, which decreased their vigor rating. The minor decrease in observed vigor 4 rated Fremont cottonwood trees was likely due to wind throw, which was frequently observed on the eastern end of the parcel.

Within the Mixed Riparian Forest, the densities of woody plants in the vigor 4 rating category observed in Year 2 were similar to Year 1, except for three species (Table 11). Healthy box elders (*Acer negundo*) decreased from an average of 14 stems per acre in Year 1 to an average of 8 stems per acre in Year 2. Increased healthy California rose and arroyo willow plants were documented in Year 2, as a result of remedial plantings installed in winter 2007–2008.

In the Riparian Scrub vegetation type, the density of plants with a vigor 4 rating either remained the same or increased for all woody species between Year 1 and Year 2 (Table 12). The greatest increase was observed in mule fat vigor 4 densities, which more than doubled. The density of vigor 4 willow species also increased by nearly one-quarter of that measured in Year 1. Despite 91 new button bush cuttings installed (i.e., 7.8 new stems per acre), the density of vigor 4 individuals of this species did not change: many individuals were observed with signs of rust or desiccation along leaf edges.

Observed density of plants with a vigor 4 rating increased overall in the High Dune Scrub vegetation type (Table 13). This increase was largely due to remedial plantings of the quail bush; the density of healthy quail bush plantings increased five-fold. In addition, coyote brush vigor increased. The density of bush lupines in the vigor 4 category remained stable between Year 1 and Year 2, indicating that once established, these plants are likely to survive.

Similar to our High Dune Scrub Year 2 observations, within the Low Dune Scrub remedial plantings of quail bush also increased the density of healthy individuals; here, the density increased four-fold (Table 14). In addition, coyote brush vigor also increased. Documented healthy coast live oak plants remained the same between Year 1 and Year 2, while many of the planted valley oak lost vigor and showed signs of desiccation and drought stress.

6.4.1.3 Year 3

In the Cottonwood/Willow vegetation type, densities of vigor 4 rated woody plants remained either constant or increased from Year 2 observations (Table 10). Minor increases were documented in both Fremont cottonwood and red/shining willow; major increases were documented in both California rose and Goodding's black willow, apparently due to vegetative propagation by both as well as continued natural recruitments of Goodding's willow. California rose density increased by an order of magnitude while Goodding's black willow increased nearly 300% from Year 1 to Year 3.

Within the Mixed Riparian Forest, the densities of woody plants with vigor 4 increased from Year 2 to Year 3 across all species except one group, red/shining willows (Table 11). The other eight species showed increases from just a few stems/acre (box elder, Oregon ash [*Fraxinus latifolia*], and Fremont cottonwood), to the nearly four-fold increases in densities observed in California rose, which, as also observed in the Cottonwood/Willow forest, has increased significantly via vegetation propagation.

Of the four woody species planted in Riparian Scrub, two species showed increased vigor 4 densities and two species showed decreased vigor 4 densities between Year 2 and 3; however, all species had increased densities compared to Year 1 observations (Table 12). Although both mule fat and red/shining willow had decreases in the mean density of vigor 4 stems/acre, the confidence intervals overlapped with the Year 2 estimates. Button bush exhibited modest (10%) increases in densities of vigor 4 individuals while arroyo willow over doubled in healthy stems/acre.

As observed in Year 2, again in Year 3 all High Dune Scrub woody species increased in densities of vigor 4 stems/acre (Table 13). Observed increases ranged from 16% (quail bush), to 22% (coyote brush), to nearly seventeen-fold (bush lupine). The huge documented increases of bush lupine were due to successful seedlings becoming established both within the planting rows and down-wind of the now large planted individuals, in the between-row area.

Finally, within the Low Dune Scrub, all woody species showed increased densities of vigor 4 individuals, of at least a few stems/acre (Table 14). The largest observed increases were documented for valley oaks; vigor 4 rated individuals dropped from a mean of 29 stems per acre in Year 1, to 11 stems per acre in Year 2, but by Year 3, plants were becoming well-established at 25 stems per acre with a vigor rating of 4. Improved irrigation contributed to improved health, vigor, and successful establishment of the valley oak plantings.

Table 10. Cottonwood/Willow woody species density (stems/acre) with a vigor 4 rating compared to target and initial measured planted
densities, Years 1, 2, and 3.

			Measured planted		Survival density in vigor 4 category						
		Target	de	nsity	Ye	ar 1	Ye	ar 2	Ye	ar 3	
Common name	Scientific name	planted density	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	
box elder	Acer negundo	25	17 (44)	1 to 33	17 (43)	1 to 32	16 (43)	4 to 27	18 (44)	2 to 34	
Oregon ash	Fraxinus latifolia	25	19 (44)	3 to 35	17 (42)	2 to 32	18 (42)	7 to 29	17 (41)	2 to 32	
Fremont cottonwood	Populus fremontii	90	83 (72)	57 to 110	67 (63)	45 to 90	56 (53)	42 to 71	66 (63)	43 to 88	
California rose	Rosa californica	15	3.4 (19)	0 to 10	3 (15)	0 to 8	7 (38)	0 to 17	28 (152)	0 to 84	
Goodding's black willow	Salix gooddingii	95	83 (65)	60 to 107	155 (156)	99 to 210	251 (488)	119 to 383	443 (553)	242 to 645	
arroyo willow	Salix lasiolepis	15	8 (24)	0 to 17	7 (17)	1 to 13	8 (20)	3 to 13	7 (21)	0 to 15	
red/shining willow	Salix laevigata/S. lucida	0	0 (24)	0.017	7 (26)	0 to 17	1 (4)	0 to 2	6 (18)	0 to 12	

Table 11. Mixed Riparian woody species density (stems/acre) with a vigor 4 rating compared to target and initial measured planted densities,Years 1, 2, and 3.

			Measure	d planted	Survival density in vigor 4 category						
		Target	der	nsity	Year 1		Year 2		Year 3		
Common name	Scientific name	planted density	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	
box elder	Acer negundo	7.5	18 (33)	5 to 31	14 (30)	2 to 26	8 (15)	0 to 10	13 (28)	2 to 24	
Oregon ash	Fraxinus latifolia	7.5	10 (30)	0 to 22	9 (23)	0 to 18	7 (20)	0 to 15	9 (25)	0 to 19	
Fremont cottonwood	Populus fremontii	90	36 (49)	17 to 55	36 (44)	17 to 54	35 (43)	19 to 52	36 (45)	18 to 54	
valley oak	Quercus lobata	50	37 (47)	18 to 55	28 (41)	11 to 45	21 (32)	8 to 33	31 (42)	15 to 48	
California rose	Rosa californica	15	19 (44)	2 to 37	14 (38)	0 to 30	30 (114)	0 to 74	112 (368)	0 to 256	
California blackberry	Rubus ursinus	15	9.6 (23)	1 to 19	6 (19)	0 to14	7 (29)	0 to 18	13 (48)	0 to 31	
Goodding's black willow	Salix gooddingii	95	78 (63)	54 to 103	77 (63)	51 to 104	71 (53)	51 to 91	80 (62)	56 to 104	
arroyo willow	Salix lasiolepis	0	9 (21)	1 to 17	2.6 (7)	0 to 6	27 (49)	9 to 46	38 (55)	16 to 59	
red/shining willow	Salix laevigata/S. lucida	0	(Salix sp.)	1 to 17	4.3 (13)	0 to 10	6 (18)	0 to 13	2 (8)	0 to 5	

 Table 12. Riparian Scrub woody species density (stems/acre) with a vigor 4 rating compared to target and initial measured planted densities,

 Years 1, 2, and 3.

			Measured planted		Survival density in vigor 4 category						
		Target density		Year 1		Ye	ar 2	Year 3			
Common name	Scientific name	planted density	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	
mule fat	Baccharis salicifolia	45	40 (70)	14 to 66	42 (69)	14 to 69	102 (75)	62 to 142	86 (145)	31 to 141	
button bush	Cephalanthus occidentalis	45	50 (73)	22 to 77	38 (67)	12 to 65	37 (62)	23 to 51	41 (69)	16 to 67	
arroyo willow	Salix lasiolepis	105	64 (55)	44 to 85	97 (72)	6 to 125	34 (46)	24 to 44	78 (65)	53 to 102	
red/shining willow	Salix laevigata/S. lucida	105	68 (83)	37 to 99	97 (12)	0 10 125	90 (68)	75 to 105	79 (108)	38 to 119	

Table 13. High Dune Scrub woody species density (stems/acre) with vigor 4 rating compared to target and initial measured planted densities,
Years 1, 2, and 3.

			Measur	ed planted	Survival density in vigor 4 category							
		Target	de	density		Year 1		ar 2	Year 3			
Common name	Scientific name	planted density	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval		
quail bush	Atriplex lentiformis	50	16 (23)	3 to 30	11 (14)	2 to 19	58 (44)	50 to 67	67 (51)	38 to 96		
Coyote brush	Baccharis pilularis	50	73 (40)	49 to 67	71 (43)	44 to 98	96 (37)	89 to 104	117 (82)	70 to 163		
bush lupine	Lupinus albifrons	100	11 (21)	0 to 23	11 (21)	0 to 24	11 (21)	7 to 15	182 (368)	0 to 390		

Table 14. Low Dune Scrub woody species density (stems/acre) with vigor 4 rating compared to target and initial measured planted densities,Years 1, 2, and 3.

			Measur	ed planted	Survival density in vigor 4 category						
		Target	de	density		Year 1		ar 2	Year 3		
Common name	Scientific name	planted density	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	
quail bush	Atriplex lentiformis	50	9 (24)	0 to 23	9 (24)	0 to 23	40 (24)	35 to 45	44 (25)	29 to 58	
Coyote brush	Baccharis pilularis	50	56 (45)	30 to 83	29 (35)	8 to 50	40 (38)	32 to 48	42 (37)	20 to 64	
coast live oak	Quercus agrifolia	25	26(37)	4 to 47	27 (39)	4 to 51	27 (39)	19 to 35	35 (45)	8 to 61	
valley oak	Quercus lobata	25	33 (41)	9 to 57	29 (37)	7 to 51	11 (21)	7 to 15	25 (38)	3 to 48	

6.4.2 Herbaceous plant species-specific cover information

The Years 1, 2, and 3 percent relative cover of the six most common herbaceous plant species for that year are provided for each vegetation type in Tables 15 through 20 and the following sections. This information is not related to specific performance standards, but rather is presented to help identify locations and plant species that are doing particularly well or poorly in the Parcel.

The tables also indicate whether each of the six most common herbaceous species are native or non-native; if non-native, the Cal-IPC weed status based on the 1999 and 2011 lists are provided (Cal-IPC 1999, 2011). The Cal-IPC ratings are provided for the 1999 list because this is the list on which the Monitoring Plan performance standards are based, and for the 2011 list because this is the most up-to-date information source on plant species weed status. Because the species changed between monitoring years, numbers are only reported for the six most common in each year. Those species on List A and rated 'High' from Cal-IPC 1999 and Cal-IPC 2011, respectively, are considered the "most invasive wildland pest plants documented as aggressive invaders that displace natives and disrupt natural habitats" (Cal-IPC 1999). Those species on the Cal-IPC 2011 List B and 'Moderate' lists are considered "wildland pest plants of lesser invasiveness... that spread less rapidly and cause a lesser degree of habitat disruption" (Cal-IPC 1999). Those rated as 'Limited' on the Cal-IPC list are essentially nuisance species with minor ecological impacts but that are locally persistent. For both lists, a 'no' indicates that the species had not been evaluated by Cal-IPC (1999, 2011) and is not on the list.

6.4.2.1 Year 1

The herbaceous layer in the Cottonwood/Willow vegetation type was dominated by poison hemlock (*Conium maculatum*, 26%), Italian ryegrass (*Lolium multiflorum*, 32%), and annual beard grass (*Polypogon monspeliensis*, 18%; Table 15); poison hemlock and Italian ryegrass are both on the Cal-IPC Moderate lists (2011). The only native herbaceous plant species in the set of six most common species observed in the Cottonwood/Willow vegetation type was spearscale (*Atriplex triangularis*), with an estimated cover of 2%.

As in the Cottonwood/Willow vegetation type, the herbaceous layer of the Mixed Riparian vegetation type was dominated by non-native species, several of which are listed in the Cal-IPC 1999 list of invasive exotic weeds (Cal-IPC 1999, Table 16). None of the top six species were native; ripgut grass (*Bromus diandrus*, 28%), poison hemlock (16%), and Italian ryegrass (16%) were observed at the highest cover, with yellow star-thistle also covering 11% of the area. Native herbaceous species made up less than 3% total relative cover; native species observed included common fiddleneck (*Amsinckia menziesii*), creeping wildrye (*Leymus triticoides*), and spearscale.

The herbaceous layer in the Riparian Scrub vegetation type was dominated by Italian ryegrass (75%), with lesser amounts of annual beard grass (8%), poison hemlock (5%), and mouse barley (*Hordeum murinum*, 2%; Table 17). Two native herbaceous species were among the six most common species observed: cursed buttercup (*Ranunculus sceleratus*, 1%) and toad rush (*Juncus bufonius*, 1%).

Within the High Dune Scrub, yellow star-thistle covered approximately 10% of the area (9%, Table 18). Ripgut grass, not considered an invasive exotic on the Cal-IPC 1999 list (Cal-IPC 1999), but listed as a 'Moderate' concern weed species in the Cal-IPC 2011 list, covered nearly half of the herbaceous layer (48%). Three other non-native species dominated: Bermuda grass (8%), longbeak storksbill (*Erodium botrys/E. cicutarium*, 12%), and mouse barley (6%), two of which are also of 'Moderate' concern and the other (storksbill) of 'Limited' concern according to

Cal-IPC 2011. One native species, common fiddleneck, was among the six most common species observed, with approximately 6% cover.

In the Low Dune Scrub, ripgut grass covered nearly 50% of the herbaceous layer and yellow starthistle covered nearly 15% of the area (Table 19). Other non-native herbaceous species were also common, including mouse barley (4%), barley (*Hordeum* sp., 8%), and hedge mustard (*Sisymbrium officinale*, 7%). One native species, common fiddleneck, was one of the six most common species, with approximately 5% cover.

In the Freshwater Marsh, the non-native Italian ryegrass and annual beard grass, both weeds of Moderate concern (Cal-IPC 2011) made up nearly two-thirds of the herbaceous cover (35% and 24%, respectively; Table 20). Two native species made up approximately 15% of the cover: toad rush and tall flatsedge (*Cyperus eragrostis*); two other non-native species were included in the list of six most common species: hyssop loosestrife (*Lythrum hyssopifolium*) and bristly ox-tongue (*Picris echioides*).

6.4.2.2 Year 2

Overall herbaceous cover in the Cottonwood/Willow vegetation type dropped dramatically between Year 1 and Year 2, primarily due to earlier-season and more aggressive mowing and herbicide treatments. The composition of herbaceous species was similar, with smaller proportions of Italian ryegrass and poison hemlock compared to Year 1 (Table 15). Spiny sow thistle (*Sonchus asper*), a non-native not listed under Cal-IPC (1999, 2011), increased in cover from less than 2% to 6% cover between Year 1 and Year 2.

In the Mixed Riparian, overall herbaceous cover dropped dramatically between Year 1 and Year 2, from over 80% to less than 10%; this drop was largely attributed to earlier-season and more aggressive mowing and herbicide treatments. Yellow star-thistle cover was reduced from 11% to less than 0.5% cover (i.e., it was no longer one of the six most common species; Table 16); other difficult weed species, including poison hemlock, Italian ryegrass, ripgut grass, Bermuda grass, annual beard grass, and spiny sow thistle, were also reduced to below 5% cover before setting seed during Year 2.

Although weed cover was down from Year 1 in the Riparian Scrub, weeds and non-native annual grasses covered over 50% of the area (Table 17). As most of this vegetation type occurs in the lower elevation, wetter areas of the Parcel, much of the area had not been repeatedly mowed prior to June surveys. A thick thatch, primarily composed of mowed Italian ryegrass, covered most of the area between planting rows; however, the Italian ryegrass also was regenerating under the thatch or had been pushed down rather than cut by the mower and was still alive and flowering.

As observed in the other vegetation types, overall herbaceous cover in the High Dune Scrub during Year 2 was only a fraction of that observed during the Year 1 monitoring event (Table 18). Ripgut grass and longbeak storksbill, the most common non-native species in Year 1, covered less than 0.5% of the area during Year 2. Percent cover of Bermuda grass remained the same; this species persisted primarily between plantings along the planted rows where herbicide treatments and mowing were less rigorous. Cover of the native common fiddleneck decreased from 6% to less than 0.5% between Year 1 and Year 2.

In Low Dune Scrub, cover of ripgut grass was reduced to less than 5% compared to 46% cover observed during Year 1 (Table 19). Other non-native herbaceous species common during the Year 1 monitoring event, such as yellow star-thistle and barley, were absent or uncommon during

Year 2. Bermuda grass had the highest percent cover during the Year 2 monitoring event, with an average of 7% cover. Other non-native species covered less than 2 percent of the area. Cover of the native common fiddleneck decreased between Year 1 and Year 2, such that it was no longer one of the most common species documented.

Within the Freshwater Marsh, aside from tall flatsedge, which increased in cover, the composition of dominant herbaceous species changed completely between Year 1 and Year 2 (Table 20). Nonnative Italian ryegrass and annual beard grass gave way to native narrow-leaved cattail (*Typha angustifolia*) and common tule (*Scirpus acutus* var. *occidentalis*). These cattails and tules formed a tall canopy (> 8 ft), under which several non-native herbaceous species persisted. The most common among these were velvet grass (*Holcus lanatus*) and bird's-foot trefoil (*Lotus corniculatus*, 10% cover each). Common rush (*Juncus effusus*) also replaced the smaller stature toad rush along the margins of the tule and cattail stands.

6.4.2.3 Year 3

Overall herbaceous cover in the Cottonwood/Willow vegetation type was similar in Year 2 and Year 3 (Table 15). Dominant herbaceous species composition was also similar, although cocklebur (*Xanthium strumarium*) replaced spearscale as one of the most common native species (3%). Poison hemlock, rated a 'Moderate' concern weed (IPC 2011) did increase from 5% (Year 2) to 9% (Year 3); however, it remained below the peak levels observed in Year 1 (26%).

Within the Mixed Riparian, overall herbaceous cover increased from Year 2; however, this increase is attributed to an observed increase in non-native species (Table 16). As observed in the Cottonwood Willow vegetation type, the Cal-IPC rated weed poison hemlock increased from Year 2 (1%) to Year 3 (6%) while remaining below Year 1 levels (16%). Two other species documented within the list of the most common species were weeds commonly observed in previous years (Bermuda grass and Italian ryegrass); the remaining three species most commonly observed were also non-native species, but had not been previously documented in abundance (prickly lettuce [*Lactuca serriola*], perennial ryegrass [*Lolium perenne*], and common knotweed [*Polygonum arenastrum*]).

By the third monitoring year, herbaceous cover in the Riparian Scrub area was reduced to approximately 25%, most of which was dominated by non-native species (Table 17). Only one native species was documented within the six most common species, spearscale at 2% relative cover. The Cal-IPC rated weed poison hemlock was again documented at low cover (3%). Other common species included Italian ryegrass (3%), bristly ox-tongue (3%), common knotweed (2%), and annual beard grass (3%).

Overall herbaceous cover within High Dune Scrub increased between Years 2 and 3, largely attributed to increased cover of non-native plant species (Table 18). The only native species documented within the most common species was common fiddleneck, at 3% cover. Ripgut grass and longbeak storksbill, which were both present in Year 1 but not in Year 2, were again documented in Year 3 (5% and 4%, respectively). Other common non-native herbaceous species recorded were Bermuda grass (5% in Year 3, similar to previous years' observations), Italian ryegrass (2% in Year 3, a slight increase in cover from Year 2), and common knotweed (7%, newly documented as one of the most common species).

In Low Dune Scrub, species composition shifted slightly and overall herbaceous cover increased to 30–40% (Table 19). Ripgut grass continued to be controlled well under Year 1 levels, but had

increased from 2% (Year 2) to 6% (Year 3). Percent cover of Bermuda grass remained the same as Year 2 (7%), but cover of prickly lettuce increased (0.5% in Year 2 to 7% in Year 3). Several species were either newly documented, or not observed during Year 2 monitoring, including shepherd's purse (*Capsella bursa-pastoris*, 4%), sour clover (*Melilotus indicus*, 6%), and hedge mustard (7%). Unfortunately, yellow star-thistle, a Cal-IPC List A species, was documented as one of the most common species in Year 3, at 6% cover.

Although species composition within the Freshwater Marsh shifted slightly in Year 3, many of the most common species documented during Year 2 continued to dominate (Table 20). All of the most common species were native; the non-native species velvet grass and bird's-foot trefoil, observed in Year 2, were replaced by toad rush and California bulrush (*Scirpus californicus*) in Year 3. With the exception of common tule, which doubled in cover from Year 2 to Year 3, percent cover of tall flatsedge, common rush, and narrow-leaved cattail were similar between Years 2 and 3.

			Weed statu	s	Year 1		Y	ear 2	Year 3	
Common name	Scientific name	Native (yes/no)	Cal-IPC (1999) ¹	Cal-IPC (2011) ²	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval
Spearscale	Atriplex triangularis	Yes	No	No	2 (4)	0 to 4	3 (8)	0.3 to 6	N/A	N/A
ripgut grass	Bromus diandrus	No	Annual Grass	Moderate	3 (8)	0 to 6	N/A	N/A	N/A	N/A
poison hemlock	Conium maculatum	No	List B	Moderate	26 (28)	16 to 36	5 (7)	2 to 7	9 (13)	4 to 13
Italian ryegrass	Lolium multiflorum	No	Annual Grass	Moderate	32 (17)	26 to 39	7 (9)	4 to 10	10 (11)	7 to 14
birdfoot trefoil	Lotus corniculatus	No	No	No	4 (6)	2 to 6	11 (17)	5 to 17	7 (11)	3 to 11
annual beard grass	Polypogon monspeliensis	No	No	Limited	18 (25)	8 to 27	9 (10)	5 to 12	12 (13)	8 to 17
spiny sow thistle	Sonchus asper	No	No	No	N/A	N/A	6 (6)	3 to 8	N/A	N/A
common sow thistle	Sonchus oleraceus	No	No	No	N/A	N/A	N/A	N/A	3 (4)	2 to 4
Cocklebur	Xanthium strumarium	Yes	No	No	N/A	N/A	N/A	N/A	3 (8)	1 to 6

Table 15. Cottonwood/Willow herbaceous species percent relative cover observed for the six most common species within each monitoring year.

¹ List A species are considered the "most invasive wildland pest plants documented as aggressive invaders that displace natives and disrupt natural habitats;" List B species are considered "wildland pest plants of lesser invasiveness… that spread less rapidly and cause a lesser degree of habitat disruption;" and species listed as "No" indicates that the species had not been evaluated (Cal-IPC 1999).

			Weed state	15		Year 1		Year 2	Year 3		
Common name	Scientific name	Native (yes/no)	Cal- IPC (1999) ¹	Cal-IPC (2011) ²	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	
ripgut grass	Bromus diandrus	No	Annual Grass	Moderate	28 (18)	21 to 35	2 (1)	0 to 6	N/A	N/A	
yellow star-thistle	Centaurea solstitialis	No	List A	High	11 (12)	6 to 16	N/A	N/A	N/A	N/A	
poison hemlock	Conium maculatum	No	List B	Moderate	16 (23)	7 to 25	1 (2)	0 to 1	6 (9)	2 to 9	
Bermuda grass	Cynodon dactylon	No	No	Moderate	N/A	N/A	1 (4)	0 to 3	3 (4)	2 to 5	
mouse barley	Hordeum murinum	No	No	Moderate	7 (12)	3 to 12	N/A	N/A	N/A	N/A	
prickly lettuce	Lactuca serriola	No	No	No	N/A	N/A	N/A	N/A	7 (7)	4 to 10	
Italian ryegrass	Lolium multiflorum	No	Annual Grass	Moderate	16 (16)	9 to 22	0.5 (2)	0 to 1	10 (11)	5 to 14	
perennial ryegrass	Lolium perenne	No	No	No	N/A	N/A	N/A	N/A	2 (4)	1 to 4	
common knotweed	Polygonum arenastrum	No	No	No	N/A	N/A	N/A	N/A	2 (3)	1 to 4	
annual beard grass	Polypogon monspeliensis	No	Annual Grass	Moderate	N/A	N/A	1 (6)	0 to 4	N/A	N/A	
hedge mustard	Sisymbrium officinale	No	No	No	4 (7)	1 to 7	N/A	N/A	N/A	N/A	
spiny sow thistle	Sonchus asper	No	No	No	N/A	N/A	0.7 (2)	0 to 1	N/A	N/A	

Table 16. Mixed Riparian herbaceous species percent relative cover observed for the six most common species within each monitoring year.

¹ List A species are considered the "most invasive wildland pest plants documented as aggressive invaders that displace natives and disrupt natural habitats;" List B species are considered "wildland pest plants of lesser invasiveness... that spread less rapidly and cause a lesser degree of habitat disruption;" and species listed as "No" indicates that the species had not been evaluated (Cal-IPC 1999).

			Weed Status	5	Y	ear 1	Y	ear 2	Year 3		
Common name	Scientific name	Native (yes/no)	Cal-IPC (1999) ¹	Cal-IPC (2011) ²	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	
spearscale	Atriplex triangularis	Yes	No	No	N/A	N/A	1 (2)	0 to 2	2 (3)	1 to 3	
poison hemlock	Conium maculatum	No	List B	Moderate	5 (16)	0 to 12	1 (4)	0 to 3	3 (6)	1 to 6	
Bermuda grass	Cynodon dactylon	No	No	Moderate	N/A	N/A	2 (4)	1 to 4	N/A	N/A	
mouse barley	Hordeum murinum	No	No	Moderate	2 (4)	0 to 3	N/A	N/A	N/A	N/A	
toad rush	Juncus bufonius	Yes	No	No	1 (2)	0 to 2	N/A	N/A	N/A	N/A	
Italian ryegrass	Lolium multiflorum	No	Annual grass	Moderate	75 (26)	65 to 85	41 (22)	33 to 49	3 (7)	1 to 6	
bird's-foot trefoil	Lotus corniculatus	No	No	No	N/A	N/A	1 (3)	0 to 2	N/A	N/A	
bristly ox-tongue	Picris echioides	No	Considered, but not listed	Limited	N/A	N/A	N/A	N/A	3 (10)	0 to 6	
common knotweed	Polygonum arenastrum	No	No	No	N/A	N/A	N/A	N/A	2 (9)	0 to 5	
annual beard grass	Polypogon monspeliensis	No	No	Limited	8 (12)	4 to 13	3 (4)	1 to 4	3 (8)	0 to 6	
cursed buttercup	Ranunculus sceleratus	Yes	No	No	1 (3)	0 to 2	N/A	N/A	N/A	N/A	

Table 17. Riparian Scrub herbaceous species percent relative cover observed for the six most common species within each monitoring year.

¹ List A species are considered the "most invasive wildland pest plants documented as aggressive invaders that displace natives and disrupt natural habitats;" List B species are considered "wildland pest plants of lesser invasiveness... that spread less rapidly and cause a lesser degree of habitat disruption;" and species listed as "No" indicates that the species had not been evaluated (Cal-IPC 1999).

			Weed status		Ye	ar 1	Y	ear 2	Year 3	
Common name	Scientific name	Native (yes/no)	Cal-IPC (1999) ¹	Cal-IPC (2011) ²	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval
common fiddleneck	Amsinckia menziesii	Yes	No	No	6 (10)	0 to 12	N/A	N/A	3 (4)	0 to 6
ripgut grass	Bromus diandrus	No	Annual grass	Moderate	48 (28)	31 to 66	N/A	N/A	5 (7)	2 to 9
yellow star-thistle	Centaurea solstitialis	No	List A	High	9 (11)	2 to 16	0.5 (1)	0 to 2	N/A	N/A
Bermuda grass	Cynodon dactylon	No	No	Moderate	8 (7)	4 to 12	7 (7)	3 to 11	5 (8)	1 to 10
longbeak storksbill	Erodium botrys/ E. cicutarium	No	No	-/Limited	12 (12)	4 to 19	N/A	N/A	4 (7)	7 to 7
gum plant	Grindelia stricta	Yes	No	No	N/A	N/A	0.5 (2)	0 to 2	N/A	N/A
mouse barley	Hordeum murinum	No	No	Moderate	6 (8)	1 to 11	N/A	N/A	N/A	N/A
prickly lettuce	Lactuca serriola	No	No	No	N/A	N/A	1 (3)	0 to 2	N/A	N/A
Italian ryegrass	Lolium multiflorum	No	Annual grass	Moderate	N/A	N/A	0.5 (2)	0 to 2	2 (4)	0 to 4
common knotweed	Polygonum arenastrum	No	No	No	N/A	N/A	N/A	N/A	7 (8)	2 to 11
spiny sowthistle	Sonchus asper	No	No	No	N/A	N/A	2 (4)	0 to 4	N/A	N/A

Table 18. High Dune Scrub herbaceous species percent relative cover observed for the six most common species within each monitoring year.

¹ List A species are considered the "most invasive wildland pest plants documented as aggressive invaders that displace natives and disrupt natural habitats;" List B species are considered "wildland pest plants of lesser invasiveness... that spread less rapidly and cause a lesser degree of habitat disruption;" and species listed as "No" indicates that the species had not been evaluated (Cal-IPC 1999).

			Weed statu	s	Y	'ear 1	Y	ear 2	Year 3		
Common name	Scientific name	Native (yes/no)	Cal-IPC (1999) ¹	Cal-IPC (2011) ²	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	
common fiddleneck	Amsinckia menziesii	Yes	No	No	5 (6)	2 to 9	N/A	N/A	N/A	N/A	
ripgut grass	Bromus diandrus	No	Annual grass	Moderate	46 (17)	36 to 56	2 (6)	0 to 6	6 (9)	1 to 12	
shepherd's purse	Capsella bursa- pastoris	No	No	No	N/A	N/A	N/A	N/A	4 (3)	3 to 6	
yellow star-thistle	Centaurea solstitialis	No	List A	High	14 (125)	7 to 21	N/A	N/A	6 (9)	1 to 12	
Bermuda grass	Cynodon dactylon	No	No	Moderate	N/A	N/A	7 (7)	3 to 11	7 (6)	3 to 11	
mouse barley	Hordeum murinum	No	No	Moderate	4 (6)	0 to 8	N/A	N/A	N/A	N/A	
barley	Hordeum sp.				8 (15)	0 to 17	N/A	N/A	N/A	N/A	
prickly lettuce	Lactuca serriola	No	No	No	N/A	N/A	0.5 (2)	0 to 2	7 (7)	3 to 11	
burclover	Medicago polymorpha	No	Considered, but not listed	Limited	N/A	N/A	1 (2)	0 to 2	N/A	N/A	
sour clover	Melilotus indicus	No	No	No	N/A	N/A	N/A	N/A	6 (9)	1 to 12	
hedge mustard	Sisymbrium officinale	No	No	No	7 (9)	1 to 13	N/A	N/A	7 (8)	3 to 12	
spiny sowthistle	Sonchus asper	No	No	No	N/A	N/A	0.4 (1)	0 to 1	N/A	N/A	
cocklebur	Xanthium strumarium	Yes	No	No	N/A	N/A	0.5 (2)	0 to 2	N/A	N/A	

Table 19. Low Dune Scrub herbaceous species percent relative cover observed for the six most common species within each monitoring year.

¹ List A species are considered the "most invasive wildland pest plants documented as aggressive invaders that displace natives and disrupt natural habitats;" List B species are considered "wildland pest plants of lesser invasiveness… that spread less rapidly and cause a lesser degree of habitat disruption;" and species listed as "No" indicates that the species had not been evaluated (Cal-IPC 1999).

			Weed statu	S	Ŋ	lear 1	Ŋ	Year 2	Year 3	
Common name	Scientific name	Native (yes/no)	Cal-IPC (1999) ¹	Cal-IPC (2011) ²	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval	Mean (std dev)	95% confidence interval
tall flatsedge	Cyperus eragrostis	Yes	No	No	6 (6)	1 to 12	12 (7)	5 to 19	9 (11)	0 to 19
velvet grass	Holcus lanatus	No	В	Moderate	N/A	N/A	10 (2)	7 to 12	N/A	N/A
toad rush	Juncus bufonius	Yes	No	No	9 (7)	3 to 15	N/A	N/A	3 (6)	0 to 9
common rush	Juncus effuses	Yes	No	No	N/A	N/A	4 (3)	1 to 7	4 (5)	0 to 9
Italian ryegrass	Lolium multiflorum	No	Annual grass	Moderate	35 (23)	15 to 55	N/A	N/A	N/A	N/A
bird's-foot trefoil	Lotus corniculatus	No	No	No	N/A	N/A	10 (17)	0 to 27	N/A	N/A
hyssop loosestrife	Lythrum hyssopifolium	No	No	Limited	6 (6)	1 to 11	N/A	N/A	N/A	N/A
bristly ox-tongue	Picris echioides	No	Considered, but not listed	Limited	2 (3)	0 to 5	N/A	N/A	N/A	N/A
annual beard grass	Polypogon monspeliensis	No	No	Limited	24 (33)	0 to 53	N/A	N/A	N/A	N/A
common tule	Scirpus acutus var. occidentalis	Yes	No	No	N/A	N/A	9 (13)	0 to 22	20 (15)	6 to 34
California bulrush	Scirpus californicus	Yes	No	No	N/A	N/A	N/A	N/A	6 (10)	0 to 15
Narrow-leaved cattail	Typha angustifolia	Yes	No	No	N/A	N/A	39 (6)	33 to 45	35 (8)	27 to 43

Table 20. Freshwater Marsh herbaceous species percent relative cover observed for the six most common species within each monitoring year.

¹ List A species are considered the "most invasive wildland pest plants documented as aggressive invaders that displace natives and disrupt natural habitats;" List B species are considered "wildland pest plants of lesser invasiveness… that spread less rapidly and cause a lesser degree of habitat disruption;" and species listed as "No" indicates that the species had not been evaluated (Cal-IPC 1999).

6.5 Wildlife Observed During Monitoring Events

Three bird species were observed on the Parcel during the June 2007 monitoring event. These include a white-tailed kite (*Elanus leucurus*), a loggerhead shrike (*Lanius ludovicianus*), and a common yellow throat (*Geothlypis trichas*). Several raptors were observed flying over the parcel and adjacent lands during the June 2008 monitoring events. During 2009 monitoring events, in addition to hearing several red-tailed hawk (*Buteo jamaicensis*) calls, surveyors noted thousands of garden spiders (likely from the family Araneidae), tree damage caused by voles and/or other rodent species, and evidence of river otters (*Lutra canadensis*) in the Freshwater Marsh.

7 ACHIEVEMENT OF PERFORMANCE STANDARDS

7.1 Survival and Vigor of Woody Species

7.1.1 Year 1

For Year 1, the Parcel was in compliance with performance standards for woody species survival in the Riparian Forest vegetation group because significantly more than 80% of the initial planted density measured (not including oaks and lupines) was observed to have survived the 2007 growing season (one-tailed paired-sample t-test: t statistic 3.21; p = 0.001; Table 21; Figure 7). As detailed in Section 6.4.1 above, the observed increase in woody plant density was largely due to high recruitment of Goodding's black willow.

In contrast, in the Riparian Scrub vegetation group, survival of woody plants was out of compliance. The density of living woody plants decreased below the acceptable threshold during the 2007 growing season, bringing this area out of compliance (one-tailed paired-sample t-test: t statistic = 1.321; p =0.097; Table 21; Figure 7). As detailed in Section 6.4.1, species suffering greatest mortality in this vegetation group include button bush in the Riparian Scrub vegetation type, quail bush in the High Dune Scrub, and coyote brush in the Low Dune Scrub.

During Year 1, the Parcel was in compliance for all woody plant vigor performance standards in both vegetation groups. Although the average density of stems with vigor 4 ratings was just shy of the 80% performance standard for the Riparian Forest vegetation group, statistical comparison between the two measured populations (80% of surviving plants versus plants with vigor 4 rating) showed that there was no statistical difference between the two (Table 21; Figure 8). Thus, although the *measured* average was below 80%, there is not sufficient certainty that the *actual* population of vigor 4 plants was under the 80% performance threshold of surviving plant density. In addition, the surviving density in this comparison represented over 200% of the measured planted density due to high survival of planted individuals and high levels of natural recruitment.

Finally, planted oak density was very similar to surviving oak density; survival exceeded the 50% threshold established in the performance standards (Table 21; Figure 9). Although no performance standards were established for the lupine, the measured planted and survival densities during Year 1 were statistically indistinguishable.

7.1.2 Year 2

For Year 2, the Parcel is in compliance with the performance standards for woody species survival in both the Riparian Forest and Riparian Scrub vegetation groups because at least 80% of the planted density survived through the second growing season. The average surviving density was significantly higher than 80% of the planted density for both groups (one-tailed paired-sample t-test: p < 0.01 for both groups; Table 21; Figure 7).

The Parcel is also in compliance with performance standards for woody species vigor in the Riparian Forest and Riparian Scrub vegetation groups because significantly more than 80% of the living woody plants were observed to have a vigor rating of 4 after the Year 2 growing season (one-tailed paired-sample t-test: p = 0.002 and p = 0.0001 for the Riparian Forest and Riparian Scrub, respectively; Table 21; Figure 8). As detailed in Section 6.4.1 above, the apparent increase in woody plant density was due to high recruitment of Goodding's black willow and vegetative reproduction of the California rose, and occurred despite some girdling damage by voles.

Oak survival densities again exceeded the performance standard during Year 2 monitoring (Table 21; Figure 9). Similarly, lupine survival densities were similar to the measured planted densities, although no performance standard was required.

7.1.3 Year 3

By the third year of monitoring, all woody species performance standards were met, including survival and vigor targets (Table 21; Figures 7 and 8). Survival rates in both the Riparian Scrub and Riparian Forest well-exceeded the performance standards (one-tailed paired-sample t-test: p = 0.0361 and p = 0.0009 for the Riparian Scrub and Riparian Forest, respectively). In addition, substantial numbers of Fremont cottonwoods had grown to over 40 ft tall in the three years since they were planted. And although vole damage continues to occur in the Lower Riparian Scrub west of the Freshwater Marsh, many girdled trees were replanted with species that appear to be less preferable to the voles (e.g., button bush).

Oak survival densities surpassed performance standards; observed densities were over 200% of the measured planted densities (Table 21; Figure 9). Lupine survival during Year 3 increased two orders of magnitude from Year 1 and 2; lupines were observed to be self-propagating within the dune scrub community.

7.2 Percent Cover of Invasive Weeds

7.2.1 Year 1

During Year 1, the Parcel was in compliance for many of the invasive weed performance standards but out of compliance for control of yellow star-thistle in the Low Dune Scrub and Mixed Riparian vegetation types and out of compliance for total invasive weed species cover in the Cottonwood/Willow and Mixed Riparian vegetation types (Table 21; Figures 10 through 15).

Percent cover of yellow star-thistle averaged 11 and 14% in the Mixed Riparian and Low Dune Scrub vegetation types, respectively (Table 9). For both of these vegetation types, variation in yellow star-thistle cover was high among plots, and the 95% confidence intervals span the 10% threshold. In these two cases, over half of the confidence intervals lay above the 10% threshold; therefore we concluded that the performance standard for yellow star-thistle control had not been met (Table 21). Although the 95% confidence interval also extended beyond the threshold level for yellow star-thistle in the High Dune Scrub vegetation types (2–16%, Table 9), performance standards were assumed to have been attained because over half the 95% confidence interval was below the threshold level.

As summarized in Table 8, the average cover for total invasive weed species cover exceeded the maximum performance threshold in the Cottonwood/Willow and Mixed Riparian vegetation types. Because variation was high among plots, we could only be 95% confident that the true average cover for these types were somewhere between 18–38% and 18–36% cover, respectively (Table 9). However, because most of these ranges were above the 20% threshold, the performance standards for maintaining low weedy species cover were considered not to have been attained (Table 21). Although the 95% confidence interval also extended beyond the threshold level for invasive weeds in the Low Dune Scrub (7–23%, Table 9), performance standards were assumed to have been attained because most of the 95% confidence interval was below the threshold level.

7.2.2 Year 2

During Year 2, the Parcel was in compliance for control of all weeds, including yellow starthistle, Bermuda grass, and the total invasive weed species (Table 21; Figures 10 through 15).

7.2.3 Year 3

By the third and final monitoring year, the Parcel continued to be in compliance for control of all weeds, including yellow star-thistle, Bermuda grass, and the total invasive weed species (Table 21; Figures 10 through 15). Although in one vegetation type, Low Dune Scrub, the 95% confidence interval for yellow star-thistle extended beyond the threshold level (0.7–11.7%, Table 9 and Figure 14), performance standards were assumed to have been attained because most of the 95% confidence interval was below the threshold level of 10%.

			Marsh Riparian scrub			crub	Riparian	forest	Oak species	
Year	Performance standard		Freshwater Marsh	High Dune Scrub	Low Dune Scrub	Riparian Scrub	Cottonwood/ Willow	Mixed Riparian	Low Dune Scrub and Mixed Riparian Forest	
	Native	Survival ³	N/A	78% no		202%		94%		
	woody ²	(% of planted density)	14/24			yes		yes		
	woody species	Vigor (% surviving stems=vigor 4) ⁴	N/A	96% ves		79% ves		N/A		
r 1		% cover free of yellow star-	100%	91%	86%		99.6%	89%	N/A	
Year	Weeds	thistle	yes	yes	no	N/A	yes	no		
~		% cover free of Bermuda	99%	92%	96%	NT/A	99.6%	98%	N/A	
		grass	yes	yes	yes	N/A	yes	yes		
		% cover free of other	99%	90%	85%	N/A	72%	73%	N/A	
		invasive weeds ⁵	yes	yes	yes	IN/A	no	no		
	Native	Survival ³ (% of planted density)	N/A	N/A 94% yes		127% yes		N/A		
	woody ² species	Vigor (% surviving stems=vigor 4) ⁴	N/A	90% yes		92% yes		N/A		
ır 2		% cover free of yellow star-	100%	99.5%	99.5% 100%		100%	100%	NI/A	
Year		thistle	yes	yes	yes	N/A	yes	yes	N/A	
	Weeds	% cover free of Bermuda	100%	100%	93% yes N/A		96%	99%	N/A	
		grass	yes	yes			yes	yes	IN/ A	
		% cover free of other	90%	99.5%	93%	N/A	99.6%	99%	N/A	
		invasive weeds ⁵	yes	yes	yes	11/7	yes	yes	1 1/ / 1	

Table 21. Acl	hievement of performance	e standards by vegetatio	n aroup and type	during Year 1, Yea	ar 2, and Year 3 monitoring ¹ .
			. <u>.</u>		

	Performance standard		Marsh	Riparian scrub			Riparian forest		Oak species	
Year			Freshwater Marsh	High Dune Scrub	Low Dune Scrub	Riparian Scrub	Cottonwood/ Willow	Mixed Riparian	Low Dune Scrub and Mixed Riparian Forest	
	Native	Survival ³	N/A	135%			195%		213%	
	woody ² species	(% of planted density)	11/71	yes			yes		yes	
		Vigor	N/A	94%			87%		N/A	
3		(% surviving stems=vigor 4) ⁴	\mathbf{N}/\mathbf{A}	yes		yes				
	Weeds	% cover free of yellow star-	100%	98%	94%	100%	100%	98%	N/A	
Year		thistle	yes	yes	yes	yes	yes	yes	IN/A	
		% cover free of Bermuda	100%	95%	93%	99.1%	99%	97%	N/A	
		grass	yes	yes	yes	yes	yes	yes	IN/A	
		% cover free of other	98%	98%	93%	98%	91%	92%	N/A	
		invasive weeds ⁵	yes	yes	yes	yes	yes	yes	1N/A	

¹ "Yes" indicates the performance standard was met, "no" indicates it was not met.

² This includes species defined as woody in the "class" category of Tables 6 through 10 in the Mitigation Plan (Stillwater Sciences 2006), and California rose and California blackberry.

³ Does not include oak species or bush lupine (if planted as associate species). Performance standard for oaks is 50% survival of planted density across the Dune Scrub and Mixed Riparian areas combined.

⁴ Category 4 Vigor Rating defined in Section 5.2.1.2. Vigor performance standard does not include oak species or bush lupine. This is 80% of the surviving stems.

⁵ For the purposes of this project, invasive weeds are those defined as category "A" or "B" by the California Invasive Plant Council's 1999 List of Exotic Pest Plants of Greatest Ecological Concern in California (Cal-IPC 1999) This page intentionally left blank ..

8 RECOMMENDATIONS FOR ADAPTIVE MANAGEMENT

8.1 Year 1

8.1.1 Woody species plant density and vigor

Across the Parcel during Year 1, the Riparian Scrub vegetation group, including High Dune Scrub, Low Dune Scrub, and Riparian Scrub, required remedial plantings to achieve plant density performance standards. Species suffering greatest mortality in the Riparian Scrub vegetation group during Year 1 included button bush in the Riparian Scrub vegetation type, quail bush and bush lupine in the High Dune Scrub, and coyote brush in the Low Dune Scrub. Overall, the average 80% of planted density was 174 stems per acre in the Riparian Scrub vegetation group and the surviving density was 159 stems per acre. The difference between these two population averages is 15 plants per acre. Over the 21.8 acres of Riparian Scrub, this equates to a total of 327 plants that need to be added to the Riparian Scrub vegetation group. Assuming only 70% survival, we recommend a minimum of approximately 467 plants should be installed during the second planting season. Species selected for remedial plantings should target increasing site biodiversity as well as likelihood of survival on the Parcel.

8.1.2 Weed control and the herbaceous understory

Weed control is focused on particularly invasive, non-native species that create serious problems in California's native ecosystems, as defined by Cal-IPC (1999). During Year 1, control of invasive weed species appeared to be sufficient in most of the vegetation types, because nearly all percent cover values were within the performance standards. However, the percent cover of invasive weed species (either total or specific to yellow star-thistle) exceeded the performance thresholds in the Cottonwood/Willow, Mixed Riparian, and Low Dune Scrub vegetation types. Therefore, additional weed control activities are required in these vegetation types. As detailed in Section 7.4.2, common target weeds in these vegetation types include poison hemlock and yellow star-thistle.

To reduce the cover of invasive weeds, mechanical methods that do not disturb the ground (e.g., hand removal) as well as the spot use of herbicides are recommended. General descriptions of treatment methods used to control weed species are given below:

- **Manual and mechanical**—hand pulling with various tools, mowing, cutting, and burning. These treatments are often the most labor intensive but are commonly the most successful for smaller infestations.
- **Chemical**—treatment with a variety of chemicals approved for use in designated habitats. Chemical treatment is often the quickest and lowest cost response to an infestation; however, there are potential detrimental effects on habitat quality when herbicides are used. For instance, many commonly used herbicides persist in the soil where they can affect local terrestrial wildlife and those applied adjacent to stream corridors can affect water quality and habitat for fish and macroinvertebrates.
- **Biological**—approved biocontrol agents such as insects and fungi that damage or kill the host plant or grazing by sheep, cows, horses, or goats. Biocontrol agents, if proven successful, can be applied to a large infested area. Grazing can also be applied to both small and large infestations. Disadvantages of grazing may be the effect on native species (e.g., trampling or eating).

• **Integrative**—treatments that combine categories of treatment; for instance, mowing or cutting followed by herbicide application. These treatments are often the most creative and can be the most effective, though results may vary from site to site depending on micro-site characteristics.

8.1.2.1 Controlling for yellow star-thistle

Control over yellow star-thistle was out of compliance in the Low Dune Scrub and Mixed Riparian Forest vegetation types during Year 1 (Section 7.3); therefore, additional weed control targeting yellow star-thistle was needed.

The Nature Conservancy's "Global Invasive Species Initiative," headquartered in U.C. Davis, recommends removal of all above ground parts of yellow star-thistle prior to viable seed production as an effective control method (DiTomaso 2001). Because this species can flower and produce seeds year-round in the Delta, close monitoring of the growth and development of yellow star-thistle on the Parcel must be done to ensure that physical removal or cutting is properly timed to kill plants prior to seed-set, but not so early that production of more flower heads is encouraged (DiTomaso 2001). For large infested areas, the Bradley method (Fuller and Barbe 1995) can be applied. This involves physically removing yellow star-thistle by starting at the outward edge of the population and moving in towards the center. Repeated visits are required to ensure that no new seeds are produced. Using the Bradley method, it is possible to control relatively large yellow star-thistle infested areas (<40 acres) with low-cost and low-impact.

Application of the herbicide Transline (active ingredient is clopyralid) is another option for yellow star-thistle control and can be highly effective. However, this herbicide has been shown to be persistent in the soil (approximately 9.5 months in coastal Oregon), be highly soluble in ground and surface water, and have 'substantial' effects on animal reproductive systems (EPA 1991, as cited in Cox 1998).

For all of these control measures, follow-up monitoring and response are necessary to ensure the area does not become re-infested. Because yellow star-thistle seeds can remain viable for up to ten years, re-infestation is likely (DiTomaso 2001). Also, because germination and growth are triggered by warm soil temperatures that result from direct insulation on bare soil, spread and/or re-infestation of yellow star-thistle can be limited by growth of dense cover of other plant species (DiTomaso 2001). Thus, eradication should be followed up with active native revegetation.

8.1.2.2 Controlling for annual European grasses

In addition to these weeds that are part of the performance standards, for Year 1 it is recommended that two non-native species, listed as 'annual grasses' by 1999 Cal-IPC, also be targeted for control. These annual grasses are Italian ryegrass and ripgut grass. As detailed in Section 6.4.2, these two species occupy nearly one-half of the vegetated area in all but the Cottonwood/Willow and Freshwater Marsh vegetation types. Relative cover of Italian ryegrass is approximately 75% in the Riparian Scrub, while relative cover of ripgut grass approaches 50% in the High and Low Dune Scrub vegetation types. Italian ryegrass and ripgut grass grow quickly and frequently out-compete native grasses and some native broad-leaved species (such as California plantain [*Plantago erecta*]; Weiss 1999 and Weiss 2003, Kon and Blacklow 1989, Gordon and Rice 1993, Rice and Nagy 2000), making it more difficult to establish native herbaceous cover. Moreover, Italian ryegrass provides little important value as a food source for native animal species (Yarrow and Yarrow 1999). Similarly, ripgut grass only provides 'poor late season forage' for grazing animals (Kon and Blacklow 1989, DiTomaso and Healy 2006).

8.2 Year 2

8.2.1 Woody species plant density and vigor

Woody plant density and the vigor of surviving plants improved between Year 1 and Year 2, mainly due to remedial plantings in the Riparian Scrub vegetation type (more details on remedial planting are provided in Appendix C). Performance standards were either met or exceeded and no adaptive management, other than maintaining current conditions, including irrigation, is recommended.

8.2.2 Weed control and the herbaceous understory

Weed cover for Year 2 met the performance standards throughout the Parcel. The primary difference between weed control activities during Year 1 and Year 2 involved the timing of when weeds were cut and/or herbicide applied: criteria were met when weed control activities were timed to prevent seed set during Year 2. As discussed at length in other communications, development of a native herbaceous understory is highly desirable, although not specified under the performance standards for the mitigation plan (Stillwater Sciences 2006). Therefore, a plan for herbaceous understory replanting was developed (Appendix D; River Partners 2008a); implementation occurred from fall 2008 through spring 2009.

8.3 Year 3

8.3.1 Woody species plant density and vigor

Although survival densities within the Riparian Forest decreased slightly between Year 2 and Year 3, in both the Riparian Forest and Riparian Scrub vegetation groups, mean survival density was well above both original measured densities and target planting densities. Fremont cottonwood densities never reached either the measured planted or target planted densities in the Cottonwood/Willow vegetation type; however, overall woody planted densities were well above that required by performance standards. Therefore, no remedial actions are recommended.

8.3.2 Weed control and the herbaceous understory

Similarly, by Year 3, the Parcel continued to meet all performance standards set for controlling invasive species. Although yellow star-thistle cover was on the increase in Low Dune Scrub, it was still within acceptable levels.

Native herbaceous cover remained low across much of the site in spite of the native herbaceous planting effort implemented during fall 2008. Total herbaceous cover was generally around 50% (i.e., between 46.2–67.3% in Cottonwood/Willow, Mixed Riparian, and Dune Scrub vegetation types; Figure 16); lowest cover was documented in Riparian Scrub at 26.6% while the highest cover was documented in Freshwater Marsh (91%; Figure 16). Unfortunately, except within Freshwater Marsh, only 1.9–7.6% of the documented total herbaceous cover was composed of native plant species (Figure 16). It is not unusual for native grass species to take 2 to 3 years to become established with proper management in a restored grassland, since once established, many native grasses are better competitors for limited resources (Kephart and Amme 1992; Seabloom et al. 2003). Creeping wild rye and Baltic sedge for example, are both rhizomatous species that could slowly but surely spread from established areas to cover wider extents, even with dense European annual grass cover. Thus, monitoring six to twelve months following the

herbaceous understory replanting efforts is unlikely to capture the potential survival and establishment extent of several of the most densely planted native species. Although not required, if additional monitoring is conducted across the site, it should focus on documenting whether the understory replanting that occurred from fall 2008 through spring 2009 was successful at establishing a native herbaceous understory.

9 IMPLEMENTATION OF ADAPTIVE MANAGEMENT

9.1 Improving woody species plant density

In response to survival rates below the performance standards for woody species in the Riparian Scrub vegetation group, River Partners planted 1,606 additional woody plants throughout the Riparian Scrub areas. These species included mule fat, button bush, arroyo willow, red/shining willow, coyote brush, and quail bush (Table 22). Although survival densities were within the performance standards, a supplemental planting of California rose was also performed in the Cottonwood/Willow vegetation type (168 plants). All container stock (coyote brush, quail bush, and California rose) was Legal Delta-sourced and procured from Hartland Nursery. All cuttings (mule fat, arroyo and red willow, button bush) were collected by River Partners on the Bradford Island Parcel. Red willow was not listed in the Planting Plan (River Partners 2006); however it was observed to be planted and thriving throughout the Parcel during Year 1. Thus, it was decided to include red willow in the 2008 spring replanting.

Common name	Scientific name	Riparian scrub type (# plants)	High dune scrub type (# plants)	Low dune Scrub type (# plants)	Riparian scrub group (total # plants)
quail bush	Atriplex lentiformis	0	148	209	357
Coyote brush	Baccharis pilularis	0	0	105	105
mule fat	Baccharis salicifolia	39	0	0	39
button bush	Cephalanthus occidentalis	91	0	0	91
arroyo willow	Salix lasiolepis	533	0	0	533
red willow	Salix laevigata	481	0	0	481
Totals		1,144	148	314	1606

Table 22. Number of supplemental woody plants installed during the spring 2008 re-planting of
the Riparian Scrub area (21.79 acres), by species and vegetation type.

9.2 Weed control and the herbaceous understory

During Years 2 and 3, River Partners adjusted the timing of weed control activities to prevent seed set by mowing in early to mid May rather than June. This targeted the annual European grasses, cutting them before seed set, as well as several of the herbaceous spring flowering weed species, such as poison hemlock and bull thistle. A summary of the most common weeds on the Parcel and most effective management practices is provided in Table 24. An important management action for controlling annual grass cover was to ensure that mowing occurred over repeated years prior to seed set. Other species required direct and repeated herbicide application along with mowing and hand hoeing.

9.3 Improving native herbaceous species plant cover

Initial herbaceous understory plantings were largely eliminated in the process of attempting to deplete the seed bank of weedy species through mowing and herbicide applications. Although there are no performance standards in the Mitigation Plan for development of a native herbaceous understory, because this area currently includes over 65% of the overall Parcel, it is an important part of the overall success of the project (Stillwater Sciences 2006). To restore dominance of

native herbaceous species on the Parcel, in July 2008, River Partners submitted a detailed understory replanting plan based on the original Mitigation Plan (Stillwater Sciences 2007; River Partners 2008a; Appendix D). A broad scale replanting effort was implemented during the fall 2008 and continued through the spring of 2009. Details are provided in Table 23 and Appendix D.

	Percent understory covered							
Vegetation type	Purple needlegrass (pure live seed [pls]/acre)	Creeping wildrye (pls/acre)	drye (nls/acre) gumweed		Santa Barbara sedge density in plugs/acre	Western goldenrod density in pls/acre	Planting method	Planting time
Freshwater Marsh	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
High Dune Scrub	75% (5 lbs)	75% (5 lbs)	25% (2 lbs)	25% (4 lbs)			Broadcast seeding; alternating rows by graminoids versus broadleaved (3:1) followed by harrowing graminoid rows	Nov 2008
Low Dune Scrub	75% (5 lbs)	75% (5 lbs)	25% (2 lbs)	25% (4 lbs)			See High Dune Scrub	Nov 2008
Riparian Scrub	-	-	-	-	2,700	0.25 lbs	Preparation: Herbicide spray and mulching; Manual planting using dibble sticks	Spring 2009
Cottonwood/ Willow	75% (5 lbs)	75% (5 lbs)	25% (2 lbs)				See High Dune Scrub	Nov 2008
Mixed Riparian	75% (5 lbs)	75% (5 lbs)	25% (2 lbs)				See High Dune Scrub	Nov 2008
Seed/Plug Source ¹	Cosumnes River, Sacramento County	Yolo Bypass, Yolo County	Ryer Island, Sacramento County	Yolo Bypass, Yolo County	Yolo Bypass, Yolo County	San Joaquin National Wildlife Refuge		

 Table 23. Planting plan for understory native herbaceous species by River Partners, as of fall 2008.

All seeds and plugs were supplied by Hedgerow Farms.

Species common name	Scientific name	IPC-2011 Status	Effective management actions
Yellow star thistle	Centaurea solstitialis	High	Spot herbicide spraying with backpack held applicators
Bermuda grass	Cynodon dactylon	Moderate	Spot herbicide spraying with backpack held applicators, between and within planted rows
Poison hemlock	Conium maculatum	Moderate	Mowing and/or herbicide application prior to seed set for multiple years (seed longevity up to 3 yrs); increasing canopy closure
European annual grasses ¹		Moderate	Mowing prior to seed set for repeated years; increasing canopy closure

Table 24. Effective management for controlling weed species at the Bradford Mitigation site.

¹ European annual grasses at the Parcel included soft brome (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), velvet grass (*Holcus lanatus*), Mediterranean and mouse barely (*Hordeum marinum* and *H. murinum*) and Italian ryegrass (*Lolium multiflorum* and *L. perenne*).

10 CONCLUSIONS AND GENERAL RECOMMENDATIONS

Overall, the mitigation at Bradford Island Tract 19 has been highly successful. Four and a half years after initial planting, survival of all woody species exceeds performance standards and herbaceous weed species are all under control. During June 2011, Stillwater Sciences personnel visited the Parcel to meet with Agency staff and the District engineer regarding the progress of the mitigation site and plans for long-term management, and later that month to walk the entire site for qualitative observations on plant survival, growth, and status of the herbaceous understory. During these visits, we observed not only high survival but also extraordinary growth rates in the riparian vegetation types. Canopy closure was at or above 80% for most of the Cottonwood/Willow and Riparian Scrub vegetation types. In the Cottonwood/Willow and Mixed Riparian areas, tree heights often exceeded 12 m (40 ft) and in the Riparian Scrub, individual shrubs were often over 9 m (30 ft) tall with canopy widths of similar extents. The live and valley oak species on the other hand, demonstrated far less rigorous growth and few of these exceeded 3 m in height. Planted shrubs in the Mixed Riparian, High and Low Dune Scrub vegetation types, including California rose, quail bush, coyote brush, and bush lupine, were also large and robust by June 2011, with canopy diameters of 2–4 m.

In the closed canopy areas of the Cottonwood/Willow areas, qualitative observations during June 2011 indicated that native graminoids and several native forbs are taking increasing hold, and in many areas, cover likely exceeds 10% or even 20%. For example, creeping wild rye cover appeared greater in the Mixed Riparian and Cottonwood/Willow vegetation types than last observed in 2009 and Baltic sedge plugs had expanded and spread vegetatively from their 2009 plantings in the Riparian Scrub areas. Several native forb species, including mugwort, spearscale, western goldenrod, and gumweed had also increased notably in extent in the Riparian Scrub, the Mixed Riparian, and the Cottonwood/Willow vegetation types. Although native herbaceous cover appeared well below 10% in the High and Low Dune Scrub, invasive weed cover also appeared well under the 10% threshold during the June 2011 field visit.

If additional monitoring and adaptive management is possible, we recommend a focus on documenting and managing for the continued spread and establishment of native graminoids and forbs in the Mixed Riparian, Riparian Scrub, and Cottonwood/Willow vegetation types. Monitoring should also focus on tracking and managing for establishment and spread of a native graminoid and forb understory in the High and Low Dune Vegetation types.

We also recommend that other important aspects of the Bradford Mitigation site be monitored so that the value of this type of mitigation and lessons learned can be most powerfully communicated to both decision makers and practitioners considering other mitigation and restoration sites in the Delta and elsewhere. The tall, nearly closed canopy riparian forest on the Parcel is contiguous with a pre-existing riparian stand created from a scour pond just to the south. Together these areas are likely to provide important wildlife and bird habitat. As mentioned above, Stillwater personnel observed signs of river otter occupation in the freshwater marsh, and many birds which are now using the site. Documentation of the bird and wildlife species present, potential appropriate habitat available for other species (such as the giant garter snake), and changes in species density and diversity as the riparian forest and shrublands mature would provide valuable information for future restoration and mitigation projects. In addition, Bradford Island is among the most subsided of the Delta Islands and loss of carbon through traditional agricultural land practices continues in surrounding rangelands (Merrill et al. 2010). Replanting this area with fast growing riparian species is likely to have reduced such carbon losses and possibly have increased carbon sequestration. Given the challenge put forth for California in

AB32, some quantification of the change in carbon balance at the Bradford mitigation site could reveal another set of potential benefits gained through restoration of native riparian vegetation on Delta rangelands. Continued monitoring, with appropriate adaptive management where needed, could occur on a less frequent bases, such as every 3–5 years, rather than annually. This would minimize cost while allowing for the critical long-term monitoring needed to understand and communicate the important increases in biodiversity of wildlife, bird, and plant species, as well as potential reduction in net greenhouse gas emissions that can be gained through restoration of lands in the Sacramento-San Joaquin Delta.

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Figures

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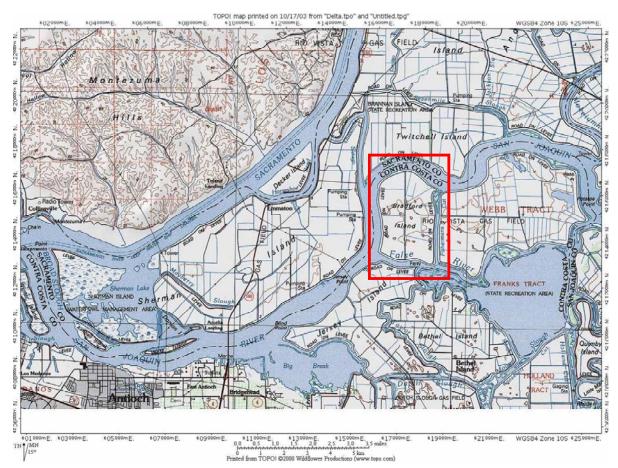


Figure 1. Bradford Island vicinity map.

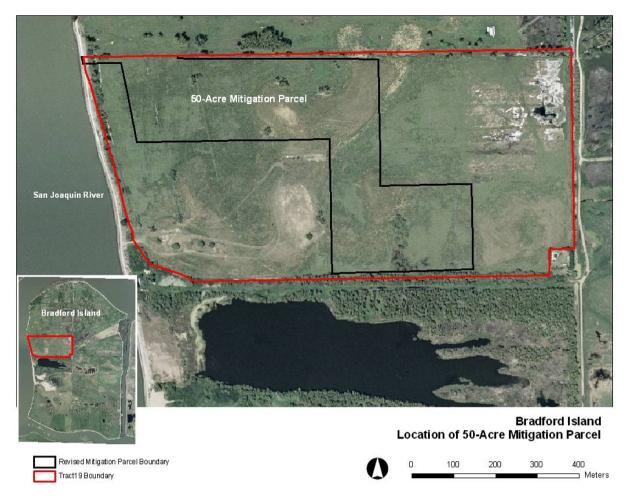


Figure 2. Location of Tract 19 and the 50-acre Mitigation Parcel.

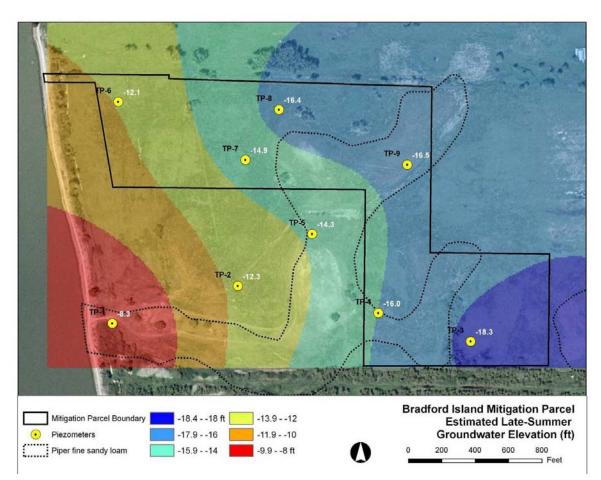


Figure 3. Location of groundwater wells and estimated late-summer groundwater elevation (from Stillwater 2006).

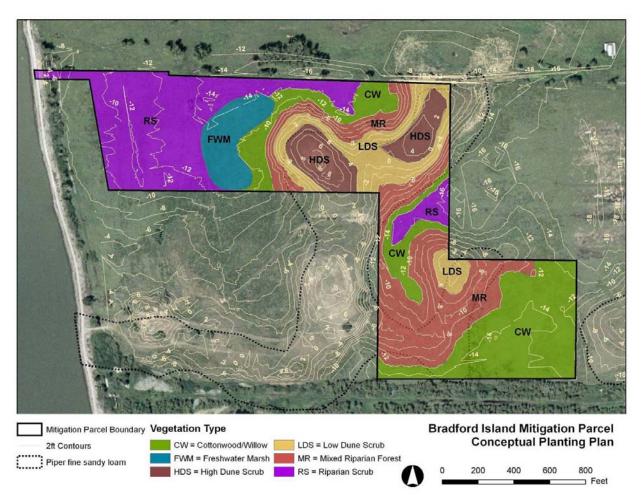


Figure 4. Approximate distribution of planted vegetation types and existing surface topography (Stillwater 2006).

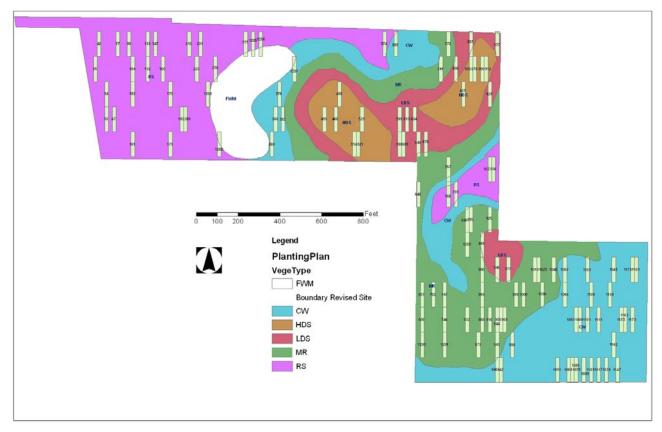


Figure 5. Distribution of woody species monitoring plots in relation to planted vegetation types.

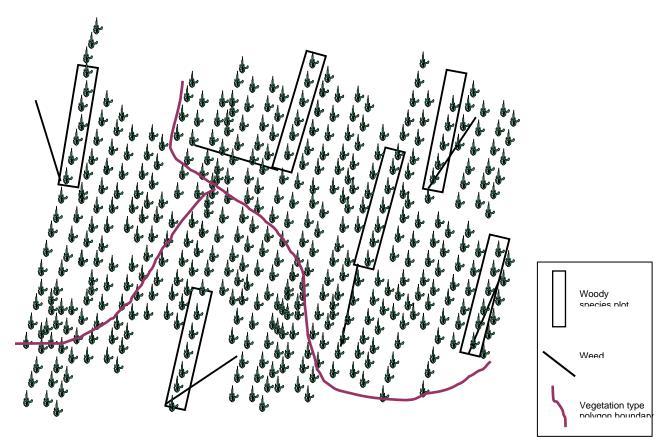


Figure 6. Sketch of woody species plot and weed transect layout within vegetation type polygons.

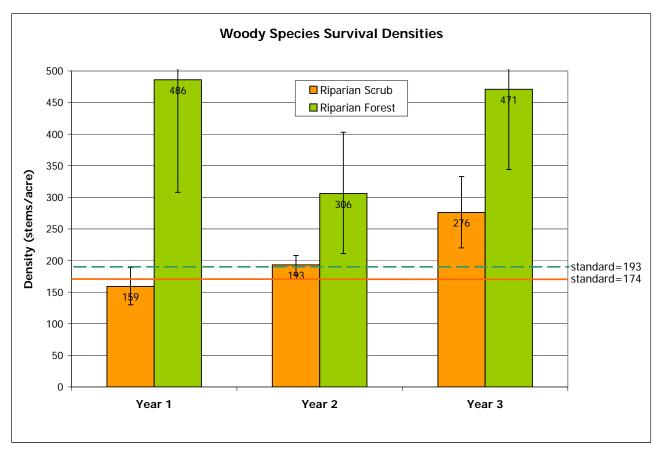


Figure 7. Mean woody species survival densities, including 95% confidence intervals, within Riparian Scrub and Riparian Forest vegetation groups, Years 1-3.

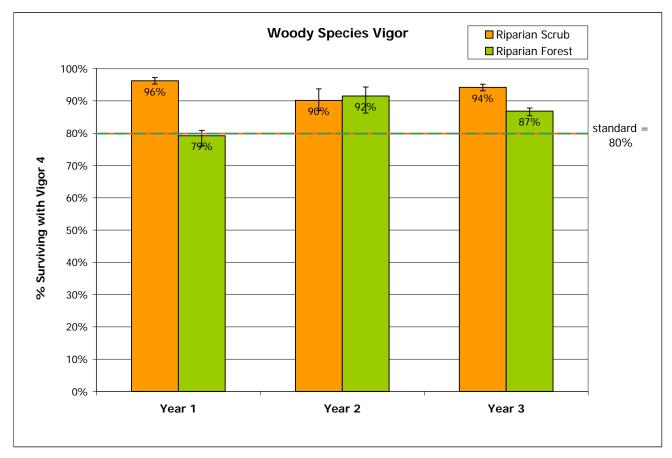


Figure 8. Percent of surviving woody species with vigor 4, including 95% confidence intervals, within Riparian Scrub and Riparian Forest vegetation groups, Years 1-3.

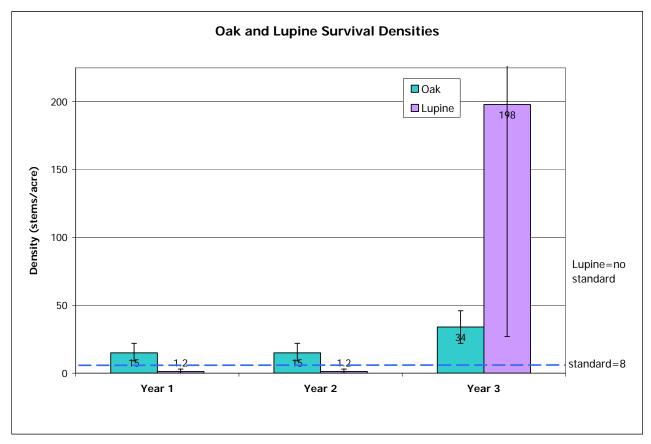


Figure 9. Mean oak and lupine species survival densities, including 95% confidence intervals, Years 1-3.

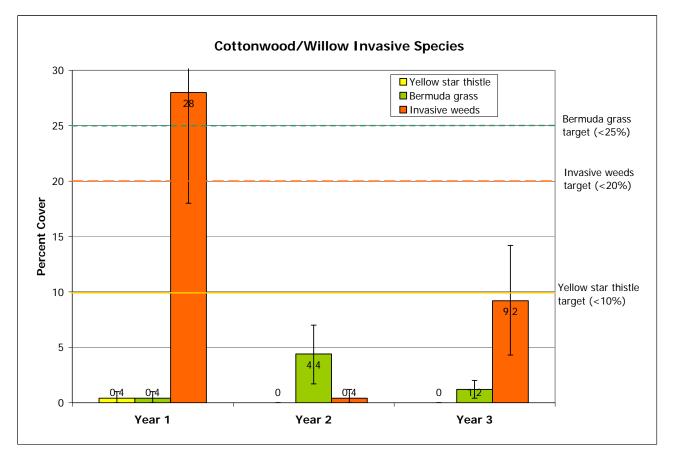


Figure 10. Mean percent cover of invasive weed species, including 95% confidence intervals, within the Cottonwood/Willow vegetation type, Years 1-3.

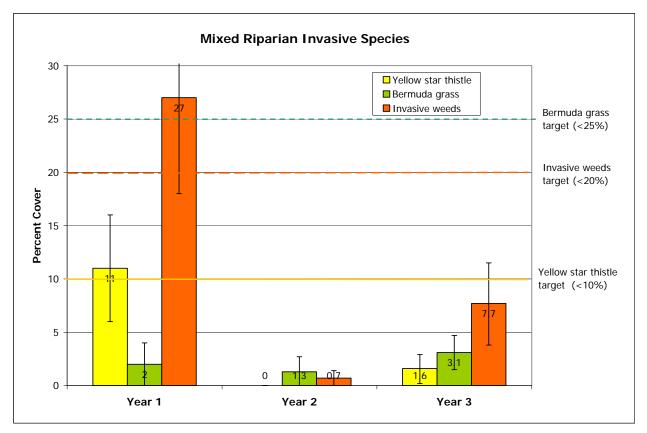


Figure 11. Mean percent cover of invasive weed species, including 95% confidence intervals, within the Mixed Riparian Scrub vegetation type, Years 1-3.

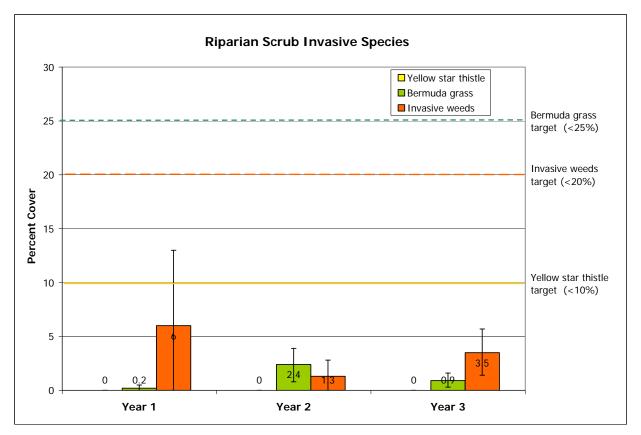


Figure 12. Mean percent cover of invasive weed species, including 95% confidence intervals, within the Riparian Scrub vegetation type, Years 1-3.

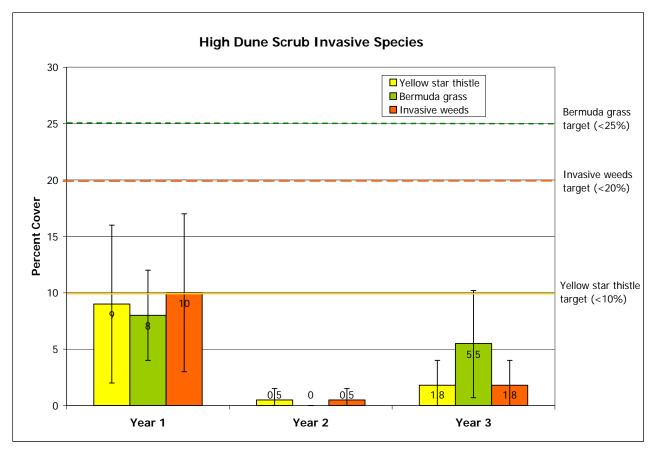


Figure 13. Mean percent cover of invasive weed species, including 95% confidence intervals, within the High Dune Scrub vegetation type, Years 1-3.

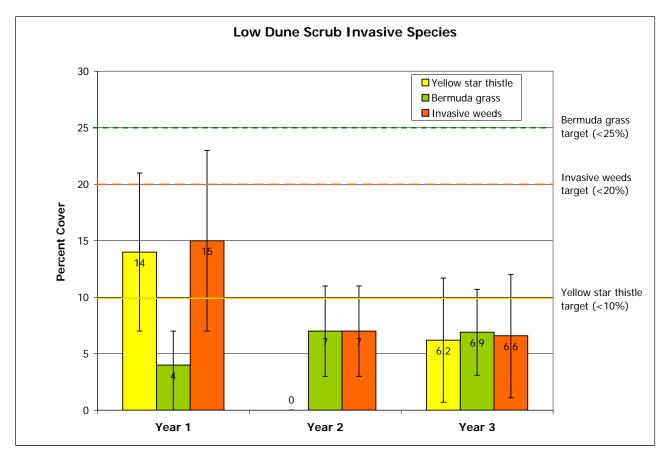


Figure 14. Mean percent cover of invasive weed species, including 95% confidence intervals, within the Low Dune Scrub vegetation type, Years 1-3.

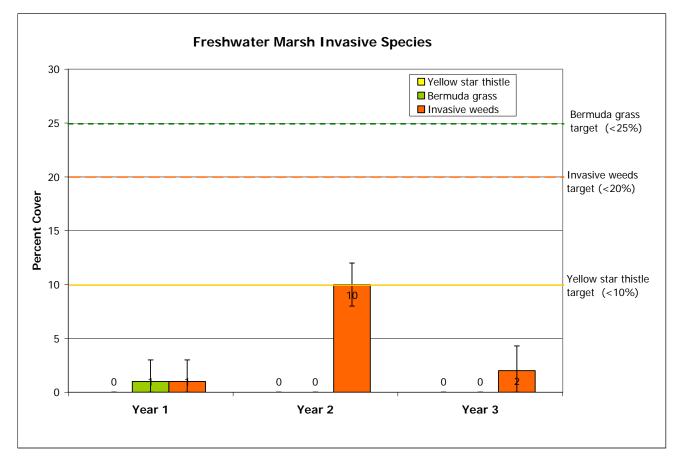


Figure 15. Mean percent cover of invasive weed species, including 95% confidence intervals, within the Freshwater Marsh vegetation type, Years 1-3.

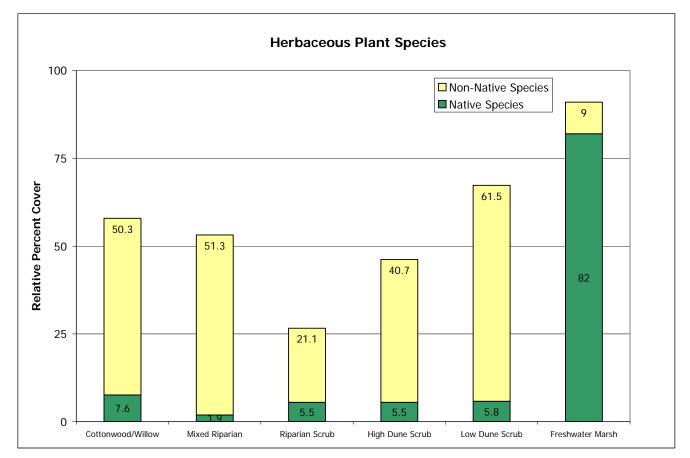


Figure 16. Mean percent cover of herbaceous plant species, including native and non-native species, documented during Year 3 monitoring.

Appendix A

1999 Cal-IPC Weed List for the State of California

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The CalEPPC List: Exotic Pest Plants of Greatest Ecological Concern in California

October, 1999

The CalEPPC list is based on information submitted by our members and by land managers, botanists and researchers throughout the state, and on published sources. The list highlights non-native plants that are serious problems **in wildlands** (natural areas that support native ecosystems, including national, state and local parks, ecological reserves, wildlife areas, national forests, BLM lands, etc.).

List categories include:

List A: Most Invasive Wildland Pest Plants; documented as aggressive invaders that displace natives and disrupt natural habitats. Includes two sub-lists; List A-1: Widespread pests that are invasive in more than 3 Jepson regions (see page 3), and List A-2: Regional pests invasive in 3 or fewer Jepson regions.

List E: Wildland Pest Plants of Lesser Invasiveness; invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption; may be widespread or regional.

Red Alert: Pest plants with potential to spread explosively; infestations currently small or localized. If found, alert CalEPPC, County Agricultural Commissioner or California Department of Food and Agriculture.

Need More Information: Plants for which current information does not adequately describe nature of threat to wildlands, distribution or invasiveness. Further information is requested from knowledgeable observers.

Annual Grasses: New in this edition; a preliminary list of annual grasses, abundant and widespread in California, that pose significant threats to wildlands. Information is requested to support further definition of this category in next List edition.

Considered But Not Listed: Plants that, after review of status, do not appear to pose a significant threat to wildlands.

Plants that fall into the following categories are not included in the List:

- Plants found mainly or solely in disturbed areas, such as roadsides and agricultural fields.
- Plants that are established only sparingly, with minimal impact on natural habitats.



1999 List Review Committee:

Dr. Lars W.J. Anderson, Research Leader U.S. Dept.of Agriculture-ARS Aquatic Weed Research Lab.

Dr. Joe DiTomaso, Extension Weed Ecologist Weed Science Program Department of Vegetable Crops University of California, Davis

Dr. G. Fred Hrusa, Senior Plant Systematist Plant Pest Diagnostics Center California Department of Food & Agriculture

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CalEPPC List Committee:

Ann Howald, Instructor Santa Rosa Junior College

Ds John Randall, Invasive Weed Specialist The Nature Conservancy

Jake Sigg, President California Native Plant Society

Ellie Wagner, Botanist California Dept. of Transportation

Peter Warner, Restoration Coordinator Golden Gate National Parks Association

The CalEPPC list is updated regularly. Please use the form provided to send comments, suggestions or new information to: Peter Warner, 555 Magno-Ha Avenue, Petaluma, CA, 94952-2080, or via email at peterjwarner@earthlink.net

Thanks to all those who submitted comments for the 1999 list.

List A-1: Most Invasive Wildland Pest Plants; Widespread

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Ammophila arenaria	European beach grass	Coastal dunes	SCo,CCo,NCo
Arundo donax	giant need, arundo	Riparian areas	cSNF,CCo,SCo,SnGb,D,G
Bromus tectorum	cheat grass, downy brome	Sagebrush, pinyon-juniper, other desert communities; increases fire frequency	GB,D
Carpobrotus edulis	keplant, sea fig	Many coastal communities, esp. dunes	SCo, CCo, NCo, SnFrB
Centaurea sol stitialis $^{\rm C}$	yellow starthistic	Grasslands	CA-FP (uncommon in SoCal
Cortaderia jubata	Andean pampas grass, jubatagrass	Horticultural; many coastal habitats, esp. disturbed or exposed sites ind. logged areas	NCo,NCoRO,SnFrB, CCo,WTR,SCo
Cortaderia selloana	pampas grass	Hosticultural; coastal dunes, coastal scrub, Monterey pine forest, ripartan, grasslands; wetlands in ScV; also on serperritine	SnFrB,SCo,CCo,ScV
Cynara cardunculus ^a	artichoke thisfle	Coastal grasslands	CA-FP, esp. CCo,SCo
Cyttisus scoparius ^C	Scotch broom	Horticultural; coastal scrub, oak woodlands, Sierra foothills	NW,CaRF,SNF,GV, SCo,CW
Eucalyptus globul us	Tasmanian blue gum	Ripatan areas, grasslands, moist slopes	NCoRO,GV,SnFrB, CCo,SCoRO,SCo,nChI
Foeniculum sulgare	wild fennel	Grasslands; esp. SoCal, Channel Is.; the cultivated garden herb is not invasive	CA-FP
Genisia monspessul ana ^c	French broam	Hosticultural; coastal scrub, oak woodlands, grasslands	NCoRO,NCoRI,SnFrB, CCo,SCoRO,sChI,WTR,PR
Lepidium latifolium ^a	perennial pepperweed, tall whitetop	Coastal, inland maishes, itipatian areas, wetlands, grasslands; potential to invade montane wetlands	CA (except KR,D)
Myriophyllum spicatum	Eurasian watermilfoil	Horticultural; lakes, ponds, streams, aquaculture	SnFrB,SnJV,SNH(?); prob. C
Pennisetum setaceum	fountain grass	Hosticultural; grasslands, dunes, desert canyons; roadsides	Deitaic GV,CCo,SCo, SnFrB
Rubus discolor	Himalayan blaciberry	Riparian areas, marshes, oak woodlands	CA-FP
Senecto mikanioides (=Delatrea odorata)	Cape ivy, German ivy	Coastal, riparian areas, also SoCal (south side San Gabriel Mtns.)	SCo, CCo, NCo, SnFrB, SW
Taeniatherum caput-medusa e ^C	medusa-head	Grasslands, particularly alkaline and poorly drained areas	NCoR,CaR,SNF,GV,SCo
Tamarix chinensis, T. gallica, T. parvifiora & T. ramosissima	tamarisk, salt cedar	Desert washes, riparian areas, seeps and springs	SCo.D.SnFiB,GV,sNCoR, sSNF,Teh,SCoRI,SNE, WTR
Ulex europaeus ⁸	gorse	North, central coastal scrub, grasslands	NCo,NCoRO,CaRF, n&cSNF,SnFrB,CCo

¹Noxious Weed Ratings

F: Federal Noxious Weed, as designated by the USDA; targeted for federally-funded prevention, eradication or containment efforts.

A: CA Dept. of Food & Agriculture, on *A* list of Noxious Weeds; agency policies call for eradication, containment or entry refusal.

B: CA Dept. of Food & Agriculture, on "B" list of Noxious Weeds; includes species that are more widespread, and therefore more difficult to contain; agency allows county Agricultural Commissioners to decide if local eradication or containment is warranted.

C: CA Dept. of Food & Agriculture, on "C" list of Noxious Weeds; includes weeds that are so widespread that the agency does not endorse state or county-funded eradication or containment efforts except in nurseries or seed lots.

Q: CA Dept. of Food & Agriculture's designation for temporary "A" rating pending determination of a permanent rating.

For most species nomenclature follows The Jepson Manual: Higher Plants of California (Hickman, J., Ed., 1993).

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1	List A-2: Most Inv	asive Wildland Pest Plants; Regional	
Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Ailanthus altissima	tree of heaven	Riparian areas, grasslands, oak woodlands, esp. GV, SCo	CA-FP
Atriplex semibaccata	Australian salibush	SoCal, coastal grasslands, scrub, "high marsh" of coastal salt marshes	CA (except CaR, dksSN)
Brassica tournefortii	Moroccan or African mustard	Washes , alkaline flats, disturbed areas in Sonoran Desert	SW,D
Bromus madritensis ssp. rubens	red brome	Widespread; contributing to SoCal scrub, desert scrub type conversions; increases fire frequency	CA
Cardaria drabaª	white-top, hoary cress	Riparian areas, marshes of central coast; also ag. lands, disturbed areas	Problem only in CCo
Conicosi a pugioniformis	narrow-leaved iceplant, roundleaf iceplant	Coastal dunes, sandy solls near coast; best documented in San Luis Obispo and Santa Barbara cos.	CCo
Cotoneaster pannosus, C. lacteus	cotoneaster	Horticultural; many coastal communities; esp. North Coast, Big Sur; related species also invasive	CCo,SnFrB,NW
Cytisus striatus	striated broom	Often confused with C. scoparius; coastal scrub, grassland	SnFiB,CCo,SCo,PR
Egeria densa	Brazilian waterweed	Streams, ponds, sloughs, lakes; Sacramento-San Joaquin Delta	n&sSNF,SnJV,SnFrB, SnJt,SNE
Ehr harta cal yci na	veldt grass	Sandy soils, esp. dunes; rapidly spreading on central coast	CCo,SCoRO,WTR
Eichhornia crassi pes	water hyacinth	Horticultural; established in natural waterways, esp. troublesome in Sacramento-San Joaquin Delta	GV,SnFrB,SCo,PR
Ela eagnus angustifolia	Russian olive	Horticultural; interior riparian areas	SnJV,SnFrB,SNE,DMoj
Euphorbia esula*	kafy spurge	Rangelands in far no. CA, also reported from Los Angeles Co.	eKR,NCo, CaR,MP,SCo
Ficus carica	edible fig	Horticultural; Central Valley, foothill, South Coast and Channel Is. ripatian woodlands	nSNF,GV,SnFrB,SCo
Lupinus arbor eus	bush lupine	Native to SCo, CCo; invasive only in North Coast dunes	SCo,CCo,NCo
Mentha pulegium	pennyroyal	Santa Rosa Plain (Sonoma Co.) and Central Valley vernal pools; wetlands elsewhere	NW,GV,CW,SCo
Myoporum laetum	myoporum	Horticultural; coastal riparian areas in SCo	SCo,CCo
Saponaria officinalis	bouncing bet	Horticultural; meadows, riparian habitat in SNE, esp. Mono Basin	NW,CaRH,nSNF,SnFrB, SCaRO,SCo,PR,MP,SNE, GV
Sparitina alternifiora	Atlantic or smooth condgrass	S.F. Bay salt marshes; populations in Humboldt Bay believed extirpated	CCo(shores of S.F. Bay)

Exotic Pest Plants of Greatest Ecological Concern in California

List A-2: Most Invasive Wildland Pest Plants; Regional

²Distribution by geographic subdivisions per the Jepson Manual

CA=California CA-FP=California Floristic Province CaR=Cascade Ranges CaRF=Cascade Range Foothills CCo=Central Coast ChI=Channel Islands CW=Central Western CA D=Deserts DMoj=Mojave Desert DSon=Sonoran Desert GB=Great Basin GV=Great Valley KR=Klamath Ranges MP=Modoc Plateau NCo=North Coast NCoRO=Outer NCo Ranges NCoRO=Outer NCo Ranges NW=Northwester n CA PR=Peninsular Ranges SCo=South Coast SCoRI=Inner SCo Ranges SCoRO=Outer SCo Ranges ScV=Sacramento Valley SnJV=San Joaquin Valley SN=Sierra Nevada SNE=East of SN SNF=SN Foothills SNH=High SN SnFrB=San Francisco Bay Area SnGb=San Gabriel Mtns SW=Southwestern CA Teh=Tehachapi Mtns WTR=Western Transverse Ranges

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List B: Wildland Pest Plants of Lesser Invasiveness

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Ageratina a deno phor a ^r	eupatory	Horticultural; coastal canyons, coastal scrub, slopes, Marin to San Diego Co; San Gabriel Mtns.	CCo, SnFrB, SCo, SCoRO
Bassia hyssopifolia	bassia	Alkaline habitats	CA (except NW,SNH)
Belladia trixago	belardia	Grasslands, on serpentine, where a threat to rare natives	NCoRO,CCo,SnFrB
Brassica nigra	black mustard	Coastal communities, esp. fog-belt grasslands; disturbed areas	CA-FP
Cardaria chalepensis ⁸	lens-podded white-top	Wetlands of Central Valley	CA
Carduus pycnocephalus ^C	Italian this tie	Grasslands, shrublands, oak woodlands	sNCo,sNCoR, SNF,CW, SCo,ScV
Centaurea calcitrapa®	purple starthistle	Grasslands	NW,sCaRF,SNF,GV,CW,SW
Centaurea melitensis	tocalote, Malta starthistle	Widespread; sometimes misidentified as C. solstitials; perhaps a more serious invader than currently recognized	CA-FP,D
Cirslum arvens e ⁸	Canada this tie	Especially troublesome in riparian areas	CA-FP
Cirslum vulgare	bull thistle	Riparian areas, marshes, meadows	CA-FP,GB
Contum maculatum	poisan hemiodk	Mainly disturbed areas but may invade wildlands; known to poison wildlife; early expanding stage in many areas, esp. San Diego Co. riparian, oak understory	CA-FP
Crataegus monogyna	hewthom	Horticultural; recent invader, colonizing healthy native forest around Crystal Springs reservoir on S.F. peninsula	SnFrB,CCo,NCo,NCoR
Ehrharta erecta	veldt grass	Wetlands, moist wildlands; common in urban areas; potential to spread rapidly in coastal, riparian, grassland habitats	SnFrB,CCo,SCo
Erechtites glomerata, E. minima	Australian fireweed	Coastal woodlands, scrub, NW forests, esp. redwoods	NCo,NCoRO,CCo,SnFrB, SCoRO
Festuca ar undinacea	tall fes cue	Horticultural (turf grass); coastal scrub, grasslands in NCo, CCo	CA-FP
Hedera heltx	English ivy	Horticultural; invasive in coastal forests, riparian areas	CA-FP
Holcus Ianatus	velvet grass	Coastal grasslands, wetlands in No. CA	CA exc. DSon
Hypericum perforatum ^c	Klamathweed, St. John's wort	Redwood forests, meadows, woodlands; invasion may occur due to lag in control by established biocontrol agents	NW,CaRH,n&cSN,ScV, CCo,SnFrB,PR
llex aquifolium	English holly	Horticultural; coastal forests, riparian areas	NCaRO,SnFrB,CCo
Iris pseudocorus	yellow water iris, yellow flag	Horticultural; riparian, wetland areas, esp. San Diego, Los Angeles cos.	SnFrB,CCo,sSnJV,SCo
Leucanthemum vulgare	cx-eye dalay	Horticultural; invades grassland, coastal scrub	KR,NCoRO,n&cSNH, SnFrB,WTR,PR
Mesembryanthemum crystallinum	crystalline iceplant	Coastal bluffs, dunes, scrub, grasslands; concentrates salt in soll	NCo,CCo,SCo,Chl
Myrlophyllum aquaticum	parrot's feather	Horticultural; streams, lakes, ponds	NCo,CaRF,CW,SCo
Olea europaea	olive	Horticultural and agricultural; reported as invasive in ripatian habitats in Santa Barbara, San Diego	NCoR, NCoRO, CCo, SnFiB, SCoRO, SCo
Pha laris aquatica	Harding grass	Coastal sites, esp. moist sofis	NW,dSNF,CCo,SCo
Potamogeton crispus	aurlyleaf pondweed	Scattered distribution in ponds, lakes, streams	NCaR,GV,CCo,SnFrB, SCo,Chl,SnGb,SnBr,DMoj
Ricinus communis	castor bean	SoCal coastal riparian habitats	GV,SCo,CCo
Robinia pseudoacacia	bladk locust	Horticultural; riparian areas, canyons; native to eastern U.S.	CA-FP,GB
Schinus molle	Peruvian pepper tree	Honticultural; invasive in riparian habitats in San Diego, Santa Cruz Is.	SNF,GV,CW,SW,Teh

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Exotic Pest Plants of Greatest Ecological Concern in California

List B: Continued

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Schinus terebinthi folius	Brazilian pepper	Horticultural; riparian areas	sSCo
Sene do jacobaea®	tansy ragwort	Grasslands; biocontrol agents established	NCo,wKR,s&wCaR, nSNF, nScV,SW
Spartium junceum	Spanish broom	Coastal scrub, grassland, wetlands, oak woodland, NW forests, esp. redwoods; also roadcuts	NCoRO,ScV,SnFiB, SCoRO,SCo,sChI,WTR
Verbascum thapsus	woolly or common mullein	SNE meadows, sagebrush, pinyon-juniper woodlands; shores of Boggs Lake (Lake Co.)	CA
Vinca major	pertwinkle	Horticultural; tiparian, oak woodland, other coastal habitats	NCoRO,SnFrB, CCo, sSCoRO,SCo

Red Alert: Species with potential to spread explosively; infestations currently restricted

Alhagi pseudahagi ^A camel thomNoxious weed of arti areas; most infestations in CalifoniaGVASRE, DArdotheca calenduls ^A OppeweedSeedproducing types are fite problem; most are vegetative onNCo, SETB, COCintoure are anaculoso ^A spotted inspacedRiprian, grassind, wet meadows, forest habitat; cortiscSRSN, SCV, ACW, MP, GN, CA, Food & Ag if arew occurrences foundNCo, SETB, COCiupina aulgaris ^A bearded creeper common oruginaAggressively moving into witilands, eap. grassland habitatsNCo (Sonoma Co.), MPHalogeton glomenatus ^A halogetonNatious weed of Great Basin rangebardi, report locations to CA Food & Ag; goal is exclusion from CAGBHalogeton glomenatus ^A kootoc plantNatious weed of Great Basin rangebardi, report locations to Not in JepsonNot in JepsonHydrilla uerital like tr ^A kootoc plantNatious weed of Great Basin rangebardi, report locations to CA Food & Ag; goal is exclusion from CANot in JepsonHydrilla uerital like tr ^A hydrillaNoticus weed of Great Basin rangebardi, report locations to Not in JepsonNot in JepsonHydrilla uerital like tr ^A hydrillaNoticus weed of Great Basin rangebardi, report locations to CA Food & Ag; goal is exclusion from CANot in JepsonIndustry and cortexkontexNorticutural; noxious weed of weetands, riperian areasNCo, NO: NO: SCV, NO: NO: SCV, NO: NO: SCV, NO: NO: SCV, NO: NO: SCV ScriPEB, numberIndustry and cortexkontal restharrowEradexinton efforts underwey in San Luis Obispo Co; to to in Sportson Rover, pointSen, Sononacca, lower Sportson Rover, point </th <th>Latin Name¹</th> <th>Common Name</th> <th>Habitats of Concern and Other Comments</th> <th>Distribution²</th>	Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Central res maculosof spotted knapweed Riparian, grassland, wet meadows, forest habitati; context CA Food & Ag if new occurrences found CaR_SN_nScV_nCW_MP, nSNE_sPR_NW Crupina uulganti ^{7A} bearded creeper, common crupina Aggressively moving into wildlands, esp. grassland habitats NCoR (Sonoms Co.), MP Halogeton glomeratur ^A helogeton Nocious weed of Great Basin rangebind; report locations to CA Food & Ag; goal is exclusion from CA GB Halogeton glomeratur ^A helogeton North coastal scrub; one population on Mt. Tamalpais, w. Marin Co. Not in Jepson Hydrille weritel llata ^{FA} bydrilla Noxious weed; report locations to CA Food & Ag; eaclication program in place; found in Clear Lake (Lake Co.) in 1994 Not in Jepson Hydrilla Noxious weed of wetlands, ripartan areas aNCo,NCoRO,NSNF,ScV,SoR,O SnFBB,nwAP Ononis alopecuroides ^o foxtal restharrow Eradication efforts underway in San Luis Obispo Co.; to be locked for elsewhere in CA ScO, not in Jepson Retama monosperma bridal broom First noted at Failtrook Naval Weapons Station, San Diego Co.; to tin Jepson San Diego Co.; not in Jepson Salvinia molesta ^F glant weterfer n Ponds, lakes, reservoirs, canab ScV, SnFR, not in Jepson Salvinina molestar ^F glant weterfer n <t< td=""><td>Alhagi pseudalhagi^</td><td>camel thom</td><td></td><td>GV, sSNE, D</td></t<>	Alhagi pseudalhagi^	camel thom		GV, sSNE, D
CA Food & Ag if new occurrences found nSNE, sPR, NW Crupina us/garis ^{FA} bearded creeper, common crupina Aggressively moving into wildlands, esp. grassland habitats NCoR (Sonoma Co.), MP Halogeton glomeratus ^A halogeton Noxious weed of Great Basin rangebnds; report locations to CA Food & Ag; goal is exclusion from CA GB Helichrysum petiolare kootoce plant North coastal scub; one population on Mt. Tamalpals, w. Marin Co. NCoR (Sonoma Co.), MP Hydrilla weritelille to ^{FA} hydrilla Noxious weter weed; report locations to CA Food & Ag; eadlicin program in place; found in Clear Lake (Lake Co.) in 1994. NCoRI, n&CSP, nSNF, ScV, Son, Distr, ScV, Son, FB, nwMP Ononis alopecurolides ^Q foxtall restharrow Eradication efforts underway in San Luis Obispo Co.; to be boked for elsewhere in CA CO; not in Jepson Salvinia molestar ^F glant waterfern Ponds, lakes, reservoirs, canab San Diego Co.; not in Jepson Salvinia molestar ^F glant waterfern Ponds, lakes, reservoirs, canab ScV, SnFrB; not in Jepson Salvinia puricea cord grass Scattered in S.F. Bay, Humboldi Bay salt markes ScV, SnJV; not in Jepson Salvinia molestar ^F dense-flowered cord grass Scattered in S.F. Bay, Jano Suisaw Estuary, OR and CO; NCO	Arctotheca calendula ^A	Capeweed	Seed-producing types are the problem; most are vegetative only	NCo,SnFrB,CCo
common arupina Control of the transmission of transmissi transmissing transmission of transmission of transmission of tran	Centaurea ma culosa*	spotted knapweed		
CA Food & Ag; goal is exclusion from CA Schulener of CA Helichrysum petiolare kontice plant North coastal scrub; one population on Mt. Tamalpals, w. Marin Co. Not in Jepson Hydrilla ueriticillato ^{FA} hydrilla Noxious water ueed; report locations to CA Food & Ag; endication program in pbce; found in Clear Lake (Lake Co.) in 1994 NoCoRI p&cCNF ScV/SCo,D endication program in pbce; found in Clear Lake (Lake Co.) in 1994 NoCoN ORD p.SNF ScV, SSC performance Lythrum salicaria ^B purple loosestiffe Horticultural; notious weed of wetlands, ripartan areas aNCo,NCoRO p.SNF ScV, SSC performance Ononis alopecuroides ^Q foxtall restharrow Eradication efforts underway in Sen Luis Obispo Co.; to be looked for elsewhere in CA CO; not in Jepson Retama monosperma bridal broom Parts noted at Fallbrook Naval Weapons Station, San Diego Co; not in Jepson San Diego Co.; not in Jepson Salvinia molesto ^F glant waterfer n Ponds, lakes, reservoirs, canals Nea, Sonama cos., bwer Colorado Rwer; not in Jepson Salvinia molesto ^F glant waterfer n Ponds, lakes, reservoirs, canals ScV, SnFrB; not in Jepson Salvinia molesto ^F glant waterfer n Ponds, lakes, reservoirs, canals ScV, SnFrB; not in Jepson Sapura sebiferum Chinese tallow tree Horticultural; riparian areas; American River Parkway, Scr, SnF	Crupina sulgaris ^{FA}		Aggressively moving into wildlands, esp. grassland habitats	NCoR (Sonoma Co.), MP
W. Martin Co. W. Martin Co. Hydrilla werticillata ^{TA} hydrilla Noxious weter weed; seport locations to CA Food & Ag; endication program in place; found in Clear Lake (Lake Co.) in 1994 NCGRI, n&cSNF, ScV, SCO, D Lythrum salicarla ^a purple loosestiffe Horticultural; noxious weed of wetlands, riparian areas sNCO, NCORO, nSNF, ScV, SCO, D Ononis alopecuroides ^Q foxtall restharrow Eradication efforts underway in San Luis Obispo Co.; to be looked for elsewhere in CA CO; not in Jepson Retarma monosperma bridal broom First noted at Fellbrook Navel Weapons Station, San Diego Co.; and in Jepson San Diego Co.; not in Jepson Saluinia molesta ^F giant waterfern Ponds, lakes, reservoirs, canals Neap, Sonoma cos., lower Colorado River; not in Jepson Saluinia molesta ^F giant waterfern Ponds, lakes, reservoirs, canals ScV, SnFrB; not in Jepson Saluinia molesta ^F giant waterfern Ponds, lakes, reservoirs, canals ScV, SnFrB; not in Jepson Sapurm sebiferum Chinese tallow tree Horticultural; riparian, wetland habitats, open aseas and undestory ScV, SnJV; not in Jepson Spartina anglica cord grass Scattered in S.F. Bay, Humboldt Bay sak marshes ScV, SnJV; not in Jepson Spartina densifiora dense-flowered cord grass Scattered	Halogeton glomeratus ⁴	halogeton		GB
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Could rival other invasive brooms Jepson Saluinia molesta ^F giant waterfern Ponds, lakes, reservoirs, canals Napa, Sonoma cos., lower Colorado River; not in Jepson Saplum sebiferum Chinese tallow tree Hotticultural; riparian, wetland habitats, open aseas and undestory ScV, SnFrB; not in Jepson Seabania punicea scarlet wisteria tree Hotticultural; riparian aseas; American River Padoway, Secremento Co., Suisun Marsh, San Joaquín River Padoway, Secremento Co., Suisun Marsh, San Joaquín River Padoway ScV, SnJV; not in Jepson Spartina anglica cord grass Scattered in S.F. Bay Not in Jepson Spartina densifiora dense-flowered cord grass Scattered in S.F. Bay, Humboldt Bay salt marshes CCo, NCo Spartina patens salt-meadow cord grass One site in S.F. Bay, also Susiaw Estuary, OR and CCo	Ononis alopecuroides ^o	foxtail restharrow		CCo; not in Jepson
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Spartina patens salt-meadow cord grass One site in S.F. Bay, also Siuslaw Estuary, OR and CCo	Spartina anglica	cord grass	Scattered in S.F. Bay	Not in Jepson
	Spartina densiflora	dense-flowered cord grass	Scattered in S.F. Bay, Humboldt Bay salt marshes	CCo,NCo
	Spartina patens	salt-meadow cord grass		CCo

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Need More Information

Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Acacia dealbata	silver wattle	Aggressive in natural areas?	SnFRB,SCoRO,SCoRI,CCo
Acacia decurrens	græn wattle	Sometimes confused with A. dealbata; aggressive in natural areas?	Unknown
Acacia melanoxylon	bladwood acacia	Reported from S.F. Bay area, central coast, Santa Cruz Is.; spreads slowly; other areas?	SnFrB,SCoRO,SCo,CCo
Aeschynomene rudis ⁸	rough jointvetch	Princeton area, Colusa Co.; pest of rice crops; potential threat to riperian, wetland habitats?	ScV
Agrosilis avenacea	Padific benigrass	Invading vernal pools in San Diego area; attempts at manual eradication unsuccessful so far; problem in other areas?	sNCo,sNCoR,SNF, GV,CW,nSCo
Aptenia cordì folia	sed apple	Habitats where invasive?	CCo,SCo,sChl
Asphodelus fistulosus	asphodel	Common in SCo highway rights-of-way, other disturbed sites; threats to wildlands?	sSnJV,SCo
Carduus a canthol des ⁴	giant plumeless thistle	Threatens wildiands?	NCoRI,nSN,SnFrB, nSCoRO,MP
Ostus ladant fer	gum cistus	Horticultural; invades coastal sage scrub, chaparral; areas where problematic?	sCCo,SnGb
Cordyl ine austra lis	New Zealand cabbage	Infestation at Salt Point State Park; bird-dispersed; other problem areas?	Not in Jepson
Cotoneaster spp. (exc. C. pannosus, C. lacteus)	cotoneaster	Horticultural; bird-distributed; which spedes are problems in wildlands?	Unknown
Cupressus macrocarpa	Monterey cypress	Native only to Monterey Peninsula; planted and naturalized CCo, NCo; threat to wildlands?	œ
Descurainia sophia	filtoweed, tansy mustard	Entering Mojave wildlands through washes; threat to wildlands?	CA
Dimorphotheca sinuata	African daisy, Cape marigold	Horticultural; reported as invasive in w. Riverside Co., Ventura Co.; problem elsewhere?	SnJV,SCoRO,SCo,PR
Echlum candicans, E. pininana	pride of Madeira, pride of Teneriffe	Horticultural; ripartan, grassland, coastal scrub communities; spreads by seed	CCo,SnFrB,SCo,sNCo
Ehrharta longiflora	veldt grass	Reported from San Diego	Not in Jepson
Erica lusitani ca	heath	Threat to wildlands?	NCo (Humboldt Co.)
Euphorbia lathyris	caper spurge, gopher plant	Invades coastal scrub, marshes, dunes; Sonoma, Marin cos.; threat to wildlands?	NCo,CCo,GV,SCo
Gazania linearis	gazania	Horticultural; invades grassland in S.F., coastal scrub?	CCo,SCo
Glyceria decli nata		Although reported from Central Valley vernal pools, genetic research is needed to confirm identity; plants that have been called G. dedinata key in Jepson to native G. occidentalis	Uncertain; not in Jepson
Hedera canariensis	Algerian ivy	Horticultural; invasive in riparian areas in SoCal?	Not in Jepson
Hirschfeldia incana	Mediterranean or short-pod mustard	Increasing in western, southern Mojave; threat to wildlands?	NCo,SNF,GV,CW,SCo, DMoj
Hypericum canariense	Canary Island hypericum	Reported in San Diego area, coastal sage scrub, grassland; threat to wildlands?	SCo
Hypochaeris radicata	iough cat's-ear	Widespread in coastal grasslands, wetlands; threat to wildlands?	NW,CaRF,nSNF,ScV, CW,SCo
Isati s tinctoria®	dyers' woad	Well-known invader in Utah; threat to wildlands?	KR,CaR,nSNH,MP
Ligustrum lucidum	glossy privet	Horticultural; spreading rapidly on Mendocino coast; problem in other areas?	NCo; not in Jepson
Limonium ramosissimum ssp. provinciale	sea lavender	Reported spreading in Carpinteria Salt Marsh; problem in other areas?	Not in Jepson

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		<u> </u>	
	Need Mor	re Information: Continued	
Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Luđwigia uruguayensis (= L. hexapetala)	water primrose	Invasive in aquatic habitats; non-native status questioned?	NCo,sNCoRO,CCo, SnFrB,SCo
Malephora crocea	ice plant	Invades margins of wetlands, bluffs along SCo	CCo,SCo,#Chl
Maytenus boaria	mayten	Horticultural; scattered in riparian forests, ScV; east SnFrB	ScV,SnFrB
Mesembryanthenum nodiflorum	slender-leaved iceplant	Abundant on Channel Islands; invades wetlands; habitats where problematic?	SnFrB,SCo,ChI
Nicotiana glauca	tree tobacco	Disturbed places; not very competitive with natives in coastal scrub, chaparral; spreading along Putah Creek (Yolo Co.); problems elsewhere?	NCaRI,c&sSNF, GV,CW,SW,D
Oxal is pes-capra e	Bermuda buttercup	Invades disturbed sites; invasive in undisturbed habitats?	NCo,NCoRO,CCo, SnFrB,SCoRO,SCo
Parentucell ia viscosa		Threat to NCo (Humboldt Co.) dune swales?	NCo,NCoRO,CCo,SCo
Passiflora caerulea		Horticultural; reported from SoCal; threat to wildlands?	SCo; not in Jepson
Pennisetum clandestinum ⁹⁰	Kikuyu grass	Disturbed sites, roadsides; threat to wildlands?	NCo,CCo,SnFrB,SCo, Santa Cruz Is.
Phyla nodi flora	mat lippia	Most varieties in CA are native; taxonomy unclear; status of plants in vesnal pools, wetlands?	NW(except KR,NCoRH), GV,OCo,SnFrB,SCo, PR,DSon
Pinus radiata cultivars	Monterey pine	Cultivais invading native Monterey, Cambria forests, where spread of pine pitch canker is a concern	CC ₀
Pipiatherum miliaceum	smio grass	Aggressive in SoCal creeks, canyons; threats to wildlands?	NCo,GV,CW,SCo
Pistocia chinensis	Chinese pistache	Horticultural; invades riparian areas and woodlands in \ensuremath{ScV}	SdV
Prunus cerasifera	cheny plum	Oak woodbind, riparian areas; esp. Marin, Sonoma cos.; bird-distributed; problems elsewhere?	SnFrB,CCo
Pyracantha angustifolia	pyracantha	Horticultural; spreads from seed in S.F. Bay area; bird-distributed; problem elsewhere?	sNCoRO, CCo, SnFrB, SC
Salsola soda	glasswort	Threat to salt marshes?	nCCo,SnFrB
Salsola tragus ^c	Russian thistle, tumbleweed	Abundant in dry open areas in w. Mojave Desert, Great Basin; not limited to disturbed sites; threats?	CA
Salvia aethiopis ^a	Mediterranean sage	Creates monocultures in E. Oregon grasslands; threat to CA wildlands?	MP
Stipa capensis		Distribution and threats?	Not in Jepson
Tamartx aphylla	athel	Spreading in Salton Sea area; threats to wildlands?	nSnJV,nSCo,D
Tanacetum vulgare	common tansy	Jepson reports as uncommon, escape from cultivation in urban areas; problem in wildlands?	NCo,NCoRO,CaRH, SCoRO
Verbena bonari ensis, V. litoralis	tall vervain	Horticultural; invades riparian forests, wetlands; extensive along ScV riparian corridors; roadsides (Yuba Co.); elsewhere?	ScV,nSnJV,nSnFrB,OCo

Exotic Pest Plants of Greatest Ecological Concern in California

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		Annual Grasses	
Latin Name ¹	Common Name	Habitats of Concern and Other Comments	Distribution ²
Aegilops triuncialis ^a	barbed goatgrass	Serpentine solls, grasslands	sNCoR,CaRF, n&cSNF, ScV,nCW
Auena barbala	slender wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub, disturbed sites	CA-FP,MP,DMoj
Avena fatua	wild cat	Lower elev. In SoCal; coastal sibpes, coastal sage scrub on deeper soil, disturbed sites	CA-FP,MP,DMoj
Brachypodium distachyon	false brome	Expanding in SoCal; common in Orange Co.	sNCoR,sCaRF, SNF,GV,CW,SCo,sChI
Bromus dlandrus	ripgut brome	Coastal dunes, coastal sage scrub, grasslands	CA
Lolium multiflorum	Italian syegrass	Wetfand areas, esp. vernal pools in San Diego Co.; common in disturbed sites	CA-FP
Schismus arabicus	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV,CW,sChl,D
Schismus barbatus	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV,SW,D

Considered, but not listed

Latin Name ¹	Common Name	Habitats of Concern and Other Comments
Albizia lophantha	plume acacia	Not invasive
Anthoxanthum odoratum	sweet vernal grass	Disturbed sites on coast; Marin, Sonoma, Mendocino cos.
Carpobrotus chilensis	sea fig	Native status in question; not a threat to wildlands
Centranthus ruber	red valerian	Horticultural; roadcuts in Marin Co.; not a threat to wildlands
$Convolvulus arvensis^{C}$	field bindweed	Disturbed sites; ag lands
Coprosma repens	mirror plant	No evidence of wildland threat
Crocosmia x crocosmit/lora		Generally in disturbed coastal, urban areas, roadsides
Digital is purpurea	foxglove	Horticultural; scattered in prairies, meadows, disturbed sites; not a major wildland threat
Dipsacus sativus, D. fullonum	wild teasel, Fuller's teasel	Roadsides, disturbed sites
Fumaria officinalis, F. parviflora	fumitory	S.F. Bay area, Monterey Bay salt marshes, sandy disturbed sites
Medicago polymorpha	California bur clover	Grasslands, moist sites; mainly restricted to disturbed sites
Melilotus officinalis	yellow sweet clover	Restricted to disturbed sites in CA
Nertum oleander	oleander	Horticultural; not invesive, although reported from siparian areas in Central Valley, San Bernardino Mtns.
Picris echioides	bristly ox-tongue	Disturbed areas
Silybum marianum	milk thistle	Disturbed areas, especially overgrazed moist pesturelands; may interfere with restoration
Xanthium spinosum	spiny cocklebur	Identified as native in The Jepson Manual (Hickman, 1998) and A California Flora (Munz and Keck, 1968); restricted to disturbed areas
Zantedeschia a ethiopica	calla lily	Horticultural; mainly a garden escape in wet coastal areas
Zoysla cultivars	Amazoy and others	Horticultural; no evidence of wildland threat

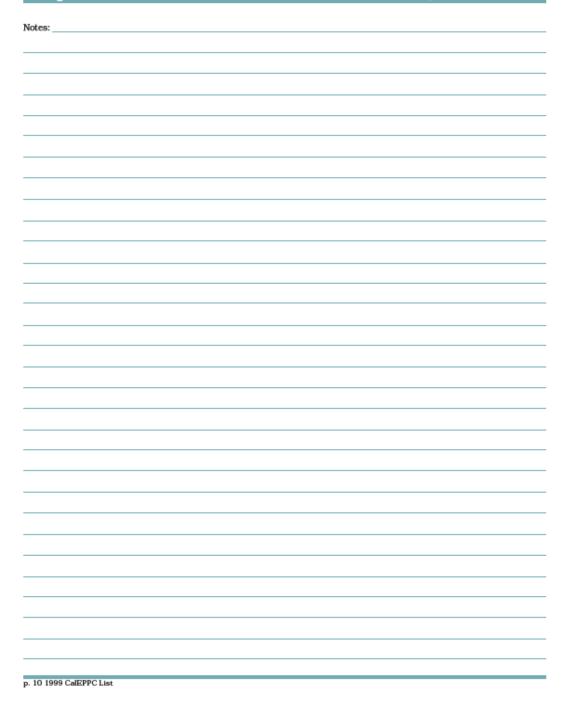
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Request for Information: Exotic Pest Plants of Greatest Ecological Concern in CA

Please use this form to propose adding a new plant to the CalEPPC list or to provide other comments. Please provide as much detail as possible. Use the second side of this form or attach additional sheets if more space is needed. Please mail completed form to: **Peter Warner, 555 Magnolia Avenue, Petaluma, CA, 94952-2080**. Comments can be submitted by email to **peterjwarner@earthlink.net**

Species Name:				
Does this weed displace healt is it mainly restricted to distu			iral areas, etc.?	
In which region(s) of Californi Indicate county(ies) and/or Jo				
Which native communities do	es it infest?			
List any rare plants, animals	or communities th	nreatened by this	weed:	
How does it spread? (Seeds ca	arried by wind, bir	rds, other animal	s; vegetative runners?)	
Is this plant a recent invader	of California wildl	ands? Ideas abou	ut how it got here?	
Is this plant sold by nurseries or other activities that might				
Describe any techniques that Have they been successful? If				
Other comments?				
Name:		Affiliation:		
Address:		City:	State:	Zip:
Phone:	FAX:		email:	
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Request for Information: Exotic Pest Plants of Greatest Ecological Concern in CA



Who We Are:

Throughout California, natural wildlands and parks are under attack from invasive pest plants. As natural habitat is replaced by exotic plants, we also lose many

A national is replaced by excitic plants, we also lose many of the state's native birds, insects, fish and other wildlife species. People concerned with the protection, management and enjoyment of our natural areas have become increasingly alarmed about the spread of invasive exotic vegetation. Since its formation in 1992, CalEPPC has been dedicated to finding solutions to problems caused by non-native pest plant invasions of the state's natural areas. The objectives of CalEPPC are to:

- provide a focus for issues and concerns regarding exotic pest plants in California;
- facilitate communication and the exchange of information regarding all aspects of exotic pest plant control and management;
- provide a forum where all interested parties may participate in meetings and share in the benefits from the information generated by this council;
- promote public understanding regarding exotic pest plants and their control;
- serve as an advisory council regarding funding, research, management and control of exotic pest plants;

- facilitate action campaigns to monitor and control exotic pest plants in California; and
- review incipient and potential pest plant management problems and activities and provide relevant information to interested parties.

What We Do:

CalEPPC:

- Holds an annual statewide symposium;
- Co-sponsors regional workshops on control of problem wildland weeds;
- Publishes a quarterly newsletter with timely, practical information;
- Maintains an informative web site at www.caleppc.org
- Sponsors rigorous experiments on control methods for French broom, German ivy, pampas grass and other invasive pest plants;
- Advances public and professional awareness of wildland weed problems and solutions by sponsoring illustrated brochures and a soon-to-be published book on California's worst wildland weeds;
- Is recognized as an authoritative source of new information on all aspects of wildland weed management.

1999 CalEPPC Membership Form

If you would like to join CalEPPC, please remit your calendar dues using the form provided below. All members will receive the CalEPPC newsletter, be eligible to join CalEPPC working groups, be invited to the annual symposium and participate in selecting future board members. Your personal involvement and financial support are the keys to success. Additional contributions by present members are welcomed!

Individual In	astitutional	Name
	I/A	Affiliation
Family \$40.00 C	Regular \$100.00 Contributing \$250.00	Address
Sustaining \$100.00 State	atron \$500.00 Sustaining \$1000.00	City/State/Zip
Lifetime \$1000.00 Please make an additional contribution in my name to: Student/Low Income membership: \$		Office Phone
		Home Phone
Cape Ivy Biocontrol Fund:	\$	Fax
Please make your check payable t with this application form to:	to CalEPPC and mail	email
CalEPPC Membership ¹⁰ Sally Davis 32912 Calle del		* Students, please include current registration and/or class scheduk

The California Exotic Pest Plant Council is a California 501(c)3 non-profit, public benefit corporation organized to provide a focus for issues and concerns regarding exotic pest plants in California, and is recognized under federal and state tax laws as a qualified donee for tax dedudble charitable contributions.

1999 CalEPPC List p. 11

The CalEPPC List: Exotic Pest Plants of Greatest Ecological Concern in California

October, 1999

Potential uses for this list:

- · Informing the public
- · Targeting species for control efforts
- · Alerting restorationists to potential problem species
- · Aiding those who comment on environmental documents
- Soliciting additional information on exotic plants with unknown or changing status

NOT FOR RESALE

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PERMIT NO. 1117 MISSION VIE JO. C.A MISSION VIE JO. C.A MISSION VIE JO. C.A Appendix B

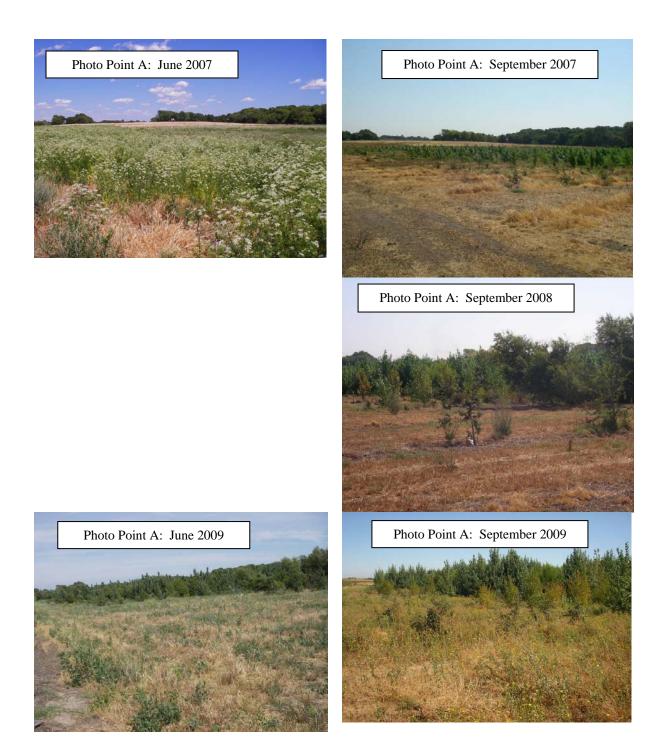
Site Photographs

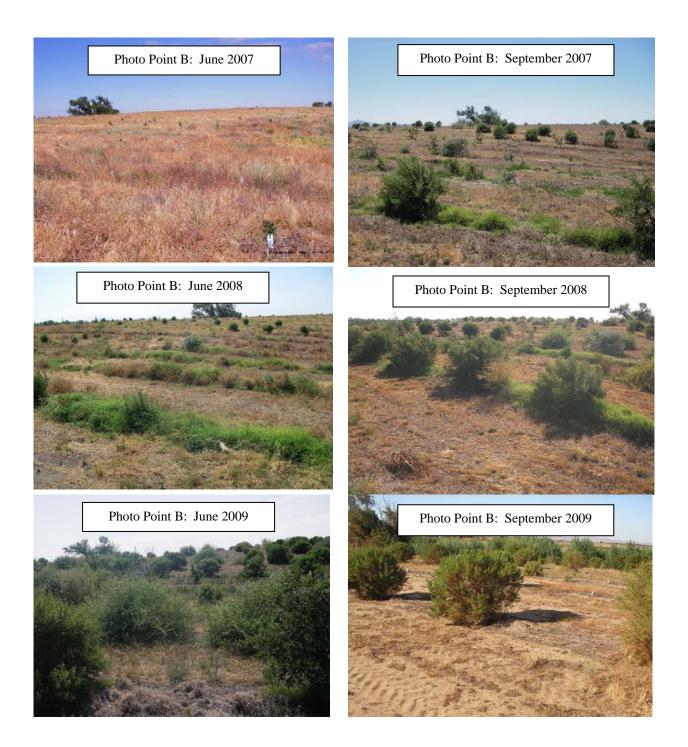
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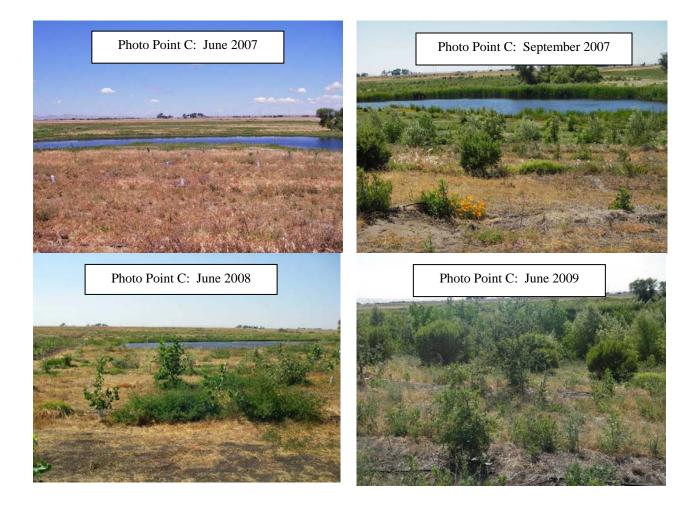


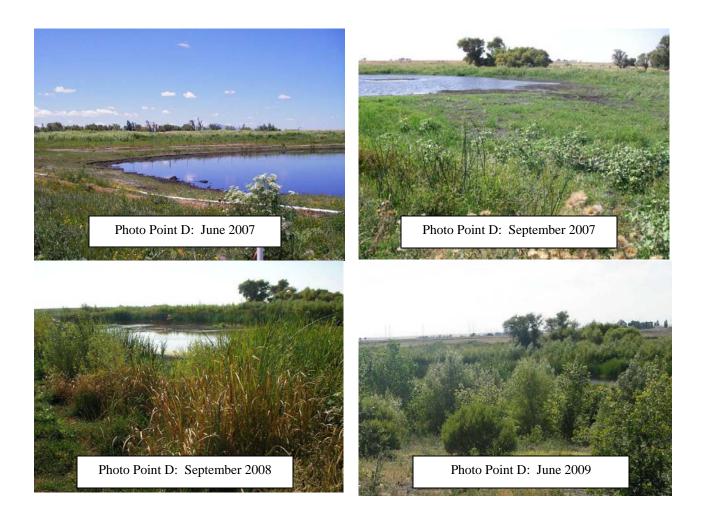


Photo-points A–D by year in relation to vegetation type polygons. Photo-points taken from points A–D in June 2007, September 2007, June 2008, September 2008, June 2009, and September 2009 are presented in the following pages.













Appendix C

River Partners Supplemental Planting Plan for Woody Species 2008

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BRADFORD ISLAND TRACT 19 MITIGATION SITE DRAFT: YEAR 2 SUPPLEMENTAL PLANTING PLAN FOR WOODY SPECIES February 11, 2008

Prepared for:

- Reclamation District 2059, Stockton, CA
- Green Mountain Engineering, Stockton, CA
- Hultgren-Tillis Engineers, Concord, CA
- Stillwater Sciences, Berkeley, CA

Prepared by:

River Partners 806 14th St. Modesto, CA 95354

I. SUPPLEMENTAL PLANTING PLAN

Riparian Scrub vegetation type, woody species

Year 1 monitoring results for the Bradford Island Tract 19 50-acre mitigation parcel (Stillwater Sciences 2007) showed that overall woody species survival density of the Riparian Scrub vegetation group was below the required 80% of measured planted density. Mid-winter planting exposed plants in this area to extreme weather conditions that were adverse their survival.

In a post-growing season field meeting and related memo, Stillwater Sciences indicated that planting 467 woody-stemmed plants in the Riparian Scrub area would bring the current plant numbers up to the required 80% of planted density levels.

River Partners will address the issue in year 2 with a supplemental planting of 1610 woody plants throughout the Riparian Scrub area. Mulefat, buttonbush, arroyo willow, red/shining willow, coyote bush, and quail bush will be re-planted and/or supplemented at levels estimated to bring them back to or near 100% target densities. Estimates were based on vegetation sampling results of "vigor 4" survival densities. Table 1 shows proposed supplemental planting numbers for woody species. A proposal for a native herbaceous planting will be submitted separately.

Table 1. Number of supplemental woody plants to be installed in Year 2 re-planting of the Riparian Scrub area (19.92 acres), by species and vegetation type, Bradford Island.

Common name	Scientific name	Riparian Scrub group	Riparian Scrub type	High Dune Scrub type	Low Dune Scrub type
Mule fat	Baccharis salicifolia	39	39	0	0
Buttonbush	Cephalanthus occidentalis	91	91	0	0
Arroyo willow	Salix lasiolepis	533	533	0	0
Red willow	Salix laevigata	481	481	0	0
Coyote bush	Baccharis pilularis	171	0	0	105
Quail bush	Atriplex lentiformis	295	0	156	205
	Totals	1610	1144	156	310

Riparian Forest vegetation group, woody species

Overall survival density of the Riparian Forest vegetation group surpassed target densities. However, survival of California rose was lower than ideal, because of its unique functional role in providing understory habitat structure for wildlife. River Partners will conduct a supplemental planting of 168 California rose plants in the cottonwood/willow zone, to bring this species to or near estimated 100% of target densities.

II. PLANTING DESIGN AND INSTALLATION

Planting design and installation will follow descriptions in River Partners' 2006 Planting Plan for the Bradford Island Tract 19 Mitigation Site.

III. PLANT PROCUREMENT

All container stock (coyote bush, quail bush, and California rose) for the year 2 supplemental planting will be Legal Delta-sourced and procured from Hartland Nursery, 13737 Grand Island Rd., Walnut Grove, CA, 95690. All cuttings (mule fat, arroyo willow, buttonbush, and red willow) will be collected by River Partners on the Bradford Island project site.

IV. REFERENCE

Stillwater Sciences. 2007. Year One Monitoring report for Bradford Island Tract 19: 50-acre mitigation parcel. Prepared by Stillwater Sciences, Berkeley, California for USDI Bureau of Reclamation, District 2059, Stockton, California.

Appendix D

River Partners Herbaceous Understory Replanting Plan 2008-2009

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BRADFORD ISLAND TRACT 19 MITIGATION SITE HERBACIOUS UNDERSTORY PLANTING PLAN River Partners July 2008

L PLANT PROCUREMENT

River Partners will procure plant materials from Hartland Nursery, Hedgerow Farms, and Pacific Coast Seed based upon the availability of Legal Delta Source Seed. See Table 1 for nursery location information. (Table 7 details which species the nurseries will provide).

 Table 1. Nursery location and type of plant material provided for the Bradford Island

 Tract 19 Mitigation Project.

Nursery	Location	Plant Material
Hedgerow Farms	21740 County Road 88 Winters, CA 95694	Seeds and Plugs
Pacific Coast Seed	533 Hawthorne Place Livermore, CA 94551	Seed
Hartland Nursery	13737 Grand Island Road Walnut Grove, CA 95690	Plugs

II. PLANTING DESIGN

River Partners will plant the understory species for each vegetation type as defined in the Bradford Island Tract 19 Mitigation Plan. Plant Associations are detailed in Tables 2-6, including species, species mix, planting method, and density for each species. The area planted with understory species covers 65 % of the total acreage, based on between row spacing.

Species selected for each ecotype were selected from the list of associated species outlined in the Bradford Island mitigation plan. Grass seed will be mixed and applied at a ratio of 1:1.

Modification: River Partners is proposing to use non-Delta sources for the following understory species because Delta sources are not available from Pacific Coast Seed, or Hedgerow Farms

Purple Needlegrass: Source Cosumnes River

Table 2. Herbaceous understory plant species to be planted in the High Elevation Dune Scrub areas. Total acreage of High Dune Scrub is 3.77. The acreage available for understory species is 2.5 acres

Mixture	Percent Understory Covered	Common Name	Scientific Name	Class	Percent in Mixture	Planting Method	Density (PLS/acre)
А	75.04	Purple Needlegrass	Nasella pulchra	Herbaceous	50 %	Broadcast	5 Ibs
A 75 %	Creeping Wild Rye	Leymus tricoides	Herbaceous	50 %	Broadcast	5 Ibs	
В 25 %	25.04	Mugwort	Artemisia douglasiana	Herbaceous	50 %	Broadcast	2 Ibs
	25 %	Gumplant	Grindella camphorum	Herbaceous	50 %	Broadcast	4 lbs

Table 3. Herbaceous understary plant species to be planted in the Low Elevation Dune Scrub areas. Total acreage of Low Dune Scrub is 5.10 acres. The acreage available for understary species is 3.37 acres.

Misture	Percent Understory Covered	Common Name	Scientific Name	Class	Percent in Misture	Planting Method	Density (PLS/acre)
		Purple Needlegrass	Nasella puickna	Herbaceous	50 %	Broadcast.	5 lbs
A 75%	Creeping Wild Ryc	Legense tricoides	Ertazeous	50 %	Broadcast	5 lbs	
B 25%		Magwart	distantia devoicelegade	Herbaccous	50.%	Broadcast	2lbs
	Gumplant	Grinslella compheran	Herbaceous	50.55	Broadcest	41bs	

Table 4. Herbaceous understary plant species to be planted in the Mixed Riparian Forest areas. Total acreage of this area is 11.64 acres. The area available for understory planting is 7.68 acres.

Misture	Percent Understory Covered	Common Name	Scientific Name	Class	Percent in Misture	Planting Method	Density (FLSiame)
A 75%		Purple Needlearass	Nesella suichts	Herbacerus	50.%	Breadcast	5 lbs
	Creeping Wild Bye	Leptens triculties	Herbaceous	50 %	Broadcast	2 lbs	
В	25.55	Magwort	Antemitic douglations	Estaceus	50.%	Broadcast	2.08

Table 5. Herhaceous understory plant species to be planted in the Cottoewood/Willow areas. Total acreage of this area is 13.61 acres. The area available for understory planting is 8.98 acres.

Mixture	Percent Understory Canared	Common Name	Scientific Name	Class	Percent in Misture	Planting Mictool	Density (PLS/acre)	
A 75%	~~		Purple Neodlograss	Nevelia pulchro	Hirsbaceous	50.%	Breadcast	5 lbs
	10 %	Croeping Wild Rys	Leymus tricsider	Hirsbaceous	58.%	Broadcast	5 lbs	
в	25 %	Magwort	Artemisia douglaciana	Hisbaceous	50.%	Broadcast	2 lbs	

Table 6. Herbaceous understory plant species to be planted in the Riparian Scrub areas Total acreage of this area is12.92 acres. The area available for understory planting is 8.53 acres.

Common Name	Scientific Name	Class	Planting Method	Spacing (ft) (within clusters)	Density (PLS/acre)	Total (# plants/lb live seed)
Santa Barbara Sedge	Carex barbarae	Herbaceous	Plugs	4	2700	23,250
Goldenrod	Euthamia occidentalis	Herbaceous	Broadcast	N/A	0.25	

Table 7. Plant material suppliers for the Bradford Island Mitigation Tract 19 Project. Suppliers may change due to availability.

Common Name	Scientific Name	Class	Supplier	Source
Purple Needlegrass	Nasella pulchra	Herbaceous	Hedgerow Farms	Sacramento County: Cosumnes River
Creeping Wild Rye	Leymus tricoides	Herbaceous	Hedgerow Farms	Yolo County: Yolo Bypass
Mugwort	Artemisia douglasiana	Herbaceous	Hedgerow Farms	Sacramento County: Ryer Island
Gumplant	Grindella camphorum	Herbaceous	Hedgerow Farms	Yolo County: Yolo Bypass
Goldenrod	Euthamia occidentalis	Herbaceous	Pacific Coast Seed/Hedgerow Farms	To be determined
Santa Barbara Sedge	Carex barbarae	Herbaceous	Hedgerow Farms	Yolo County: Yolo Bypass

III. PLANT INSTALLATION

A. Plant Layout

The understory area is defined as the area between the planted rows. This area covers 2/3 of the total acreage. All calculations of understory area are based on this fraction.

In the Dune Scrub areas, mugwort (*Artemisia douglasiana*) and gumplant (*Grindella camphorum*) will be seeded in small clusters covering approximately 25 % of the herbaceous area. A mixture of Purple Needlegrass (*Nasella pulchra*) and Creeping Wild Rye (*Leymus tricoides*) will be applied to the remaining 75 %. Seeding will follow the same design in the Cottonwood/Willow and the Mixed Riparian Forest areas but these areas will not be planted with gumplant.

In the Riparian Scrub area, sedge plugs will be planted in clusters and plant spacing may vary between 2 and 4 ft. Goldenrod (*Euthamia occidentalis*) will be broadcast seeded in the open areas.

B. Planting Methods

1. Plugs

Santa Barbara sedge (*Carex barbarae*) plugs will be planted in Spring 2009. Plugs will be planted manually using dibble sticks. Plugs will be planted in random clusters.

2. Seed

Planting of herbaceous understory seed will begin in the fall/winter 2008, once the rains have "flushed" the winter weeds. Herbicide application will take place just prior to planting to minimize weed competition. Seeds for herbaceous species will be applied at rates specified in Tables 2-6 using a broadcast seeder followed by a harrow. Seeding rates are in pounds of pure live seed (PLS) per acre.

IV. Planting Schedule

Please see the attached planting schedule for the Bradford Island Tract 19 Mitigation Project

Tasks	2008		2009			
	S	F	w	S	S	F
Prepare Areas for Restoration		1.8				
Establish Layout for Restoration						
Plant Grasses and Other Broadcast Species		2211	10.0	IN LE		
Plant Sedge Plugs				122		
Maintain Riparian Plantings	-	-				1

' Table 8.	Timeline for the	Implementation of the	Understory at	Bradford Island.
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