RECLAMATION DISTRICT NO. 1601
TWITCHELL ISLAND
BOARD OF TRUSTEES MEETING
TUESDAY, JULY 16, 2024
9:00 AM
ENGINEER'S REPORT

I. DWR SYSTEMWIDE MULTI-BENEFIT PROJECT FUNDING SCOPE OF WORK

A. Report on progress of project for activities aimed at addressing erosion-induced damages to the levee waterside slopes and levee roadways along Sevenmile Slough between levee stations 166+50 and 170+50 on Twitchell during the 2023 high water event that DWR is considering funding as part of an Emergency

EXHIBIT A: Email correspondence from David Julian, DWR dated 5/28/24 re DWR 2023 Emergency Levee repair Funding from the Governors' office.

EXHIBIT B: Scope of Work and preliminary estimate prepared by KSN Inc. date June 3, 2024.

II. DELTA LEVEE SUBVENTIONS PROGRAM AB 360

A. Review status of future Delta Levee Subvention Funding.

III. DISTRICT PUMP STATION SOLAR ARRAY

A. Review status of Solar Array Plans.

EXHIBIT C: Email correspondence related to general schedule of activities.

EXHIBIT A

Christopher H. Neudeck

From: Julian, David@DWR <David.Julian@water.ca.gov>
Sent: Tuesday, May 28, 2024 7:41 AM
To: Christopher H. Neudeck
Subject: 2023 Emergency Levee Repair Funding for Twitchell

Hi Chris,

After over a year, our branch finally received 2023 emergency levee repair funding. I remember awhile back when we were putting together our request, we had put down about $300k for Twitchell. Is there still levee repair work on Twitchell that we could use this money for?

Thanks,

David

David Julian, P.E.
Senior Water Resources Engineer, Delta Resiliency Branch
Division of Multi-Benefit Initiatives
California Department of Water Resources
C: (916) 491-0235
David.julian@water.ca.gov
715 P Street, Sacramento, CA 95814
Pronouns: (he, him)

Water.ca.gov

EXHIBIT B

KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

Stephen K. Sinnock, P.E.
Christopher H. Neudeck, P.E.
Neal T. Colwell, P.E.
Barry O'Regan, P.E.

1110-1061

June 3, 2024

Reclamation District No. 1601 - Systemwide Multibenefit Project Funding

Scope of Work

On behalf of Reclamation District No. 1601 (RD 1601), Kjeldsen, Sinnock & Neudeck, Inc. (KSN) has prepared this scope of work (SOW) to provide professional engineering services. The SOW identifies the essential activities aimed at addressing erosion-induced damages to the levee waterside slopes and levee roadways on Twitchell Island.

One erosion site has been identified along the Sevenmile Slough levee for proposed repairs. The site spans approximately from Station 166+50 to Station 179+50. The project's total length is approximately 1,300 lineal feet requiring approximately 1,300 tons of 3-inch minus earthen fill material and 1,500 tons of rock slope protection, consisting of 18-inch minus quarry stone riprap. For a comprehensive understanding of the project scope, a detailed description and photos are provided in **Exhibit A** and a project map is provided in **Exhibit B**.

Scope of Work

Engineering services shall cover a comprehensive range of activities integral to the SOW, spanning from initial development to the final review phase. This encompasses SOW development, surveys, and the preparation of plans and specifications crafted based on engineering design considerations. The culmination of these efforts results in the creation of a final plan set tailored for construction and the subsequent public bidding phase.

Upon transitioning to the construction phase, our services extend to include contract administration, construction inspection, materials and performance testing, and coordination and review during and post-construction. Each of these SOW tasks are described in more detail below.

Task 1 – Project Management and Coordination

This task includes developing, preparing, and submitting the Scope of Work and supporting documentation to the approval of DWR. This task also includes attending routine project related meetings, supporting funding agreement review, providing funding agreement reports, managing project budget, and conducting coordination/outreach with the District and its landowners.

Key Deliverables: Approved Scope of Work, RD 1601 Resolution authorizing both the pursuit of the project and the District President as signatory for project documents, and an executed Project Funding Agreement (PFA).

Task 2 – Site Investigation & Survey

This task includes performing exploratory inspections and surveys of the proposed project site, which will facilitate the development of a conceptual plan for the design of the repairs. Surveys will include both terrestrial and bathymetric RTK surveys. Additionally, a set of preliminary exhibits will be prepared for review by the Department of Water Resources (DWR), inviting their valuable feedback and comments.

Key Deliverables: Conceptual Design Exhibits & Survey Point File Data

Task 3 – Plans and Specifications

Develop a preliminary set of design drawings and a preliminary cost estimate for DWR review and comment. Once comments are collected, a final set of construction documents will be prepared incorporating review comments into the design plans and specifications. A complete set of construction specifications, including contracts, general conditions, special provisions, and technical specifications, will be developed, and combined into a bid package suitable for public bidding. This task also includes coordination with the District and Key Stakeholders throughout the design process.

Key Deliverables: A preliminary set of design drawings with preliminary cost estimate, and a final design bid package with final design drawings and specifications ready for public advertisement.

Task 4 – Permitting

This task involves applying for and obtaining several permits that are required before work is underway. These include a 401 permit from the Regional Water Quality Control Board, a Nationwide 13 404 permit from the U.S. Army Corps of Engineers, and a 1602 permit from the California Department of Fish and Wildlife. The District will comply with all provisions and requirements of the permits during the project.

Key Deliverables: Completed permits from RWQCB, USACE, and CDFW.

Task 5 – Bidding

This task involves the advertisement of the bid package and public bidding administration. This includes site visits, correspondence with plan holders, RFI responses, preparation of addenda, conducting the bid opening, evaluating bids, and preparing a contract award recommendation. The District will comply with all applicable public contract code regulations.

Key Deliverables: Bid addenda, bid summary, and a recommendation to award.

Task 6 – Construction Management

This task comprises the administration of the construction contract. This includes construction inspection, Quality Control/Assurance systems integration, Daily/Weekly/Monthly field reporting as required, progress payments, contract correspondence (submittals, RFIs, field instructions, change orders, etc.), and final completion reporting.

Key Deliverables: Executed construction contract, notice to proceed, weekly construction meeting minutes, monthly project status reporting, completion report, and completion certification by registered civil engineer.

Anticipated Costs

A preliminary cost estimate has been generated identifying costs anticipated for each task. **Table 1** below summarizes anticipated budget amounts for both the design phase and the implementation of construction. The cost estimate will be updated as needed to reflect additional information as it is received. It should be noted that the final project cost is dependent upon actual bid prices received to construct the project. The anticipated engineering and construction management costs are estimated based on costs from similar projects. It is noteworthy that the construction market has experienced notable fluctuations, with changes ranging from up to 20-30% over the past two years.

Table 1 - Preliminary Cost Estimate

Description	Cost
Task 1 – Project Management & Coordination	$12,835.00
Task 2 – Site Investigation & Survey	$16,545.00
Task 3 – Plans & Specifications	$9,240.00
Task 4 – Permitting	$85,000.00
Task 5 – Bidding	$3,240.00
Task 6 – Construction Management	$16,020.00
Sub Total of all Tasks:	**$142,880.00**
Estimated Construction Costs	
Mobilization/Demobilization	$ 7,000.00
Traffic Control	$ 6,000.00
Levee Seal Fill Material	$ 52,000.00
Rock Slope Protection	$ 90,000.00
Sub Total Estimated Construction Costs:	**$155,000.00**
Grand Total	**$ 297,880.00**

Deliverables

The anticipated deliverables include the following documents:

- Task 1 – Project Management & Coordination
  - Produce a completed and approved Scope of Work
  - Executed Resolution by the RD 1601 Board of Trustees
  - Executed Project Funding Agreement
- Task 2 – Site Investigation & Survey
  - Conceptual design exhibits
  - Survey point file data
- Task 3 – Plans & Specifications
  - A preliminary set of design drawings with a preliminary cost estimate
  - A final design bid package ready for advertisement
- Task 4 – Permitting
  - RWQCB Permit
  - USACE Permit
  - CDFW Permit
- Task 5 – Bidding
  - Bid Addenda
  - Bid Summary
  - Recommendation to award
- Task 6 – Construction Management
  - Construction contract
  - Notice to proceed
  - Weekly construction meeting minutes
  - Monthly project status reporting
  - Completion report

- Completion certification by registered civil engineer

Project Contacts

In addition to the support staff for the District and the program managers for DWR, it is essential to include primary District and engineering contacts in all formal correspondence throughout the administration of this PFA. The key project personnel are listed below:

Reclamation District 1601	
President	Mr. Barry Sgarrella (barry@solagra.com)
Superintendent	Mr. Rick Carter Jr. (rd1601@frontiernet.net)
KSN Inc	
District Engineer	Mr. Christopher H. Neudeck (cneudeck@ksninc.com)
Project Manager	Mr. Sean M. Pritchard (spritchard@ksninc.com)

Exhibits

Exhibits accompanying this SOW are listed below:

A. Project Description and Photos
B. Project Map

Exhibit A – Project Description and Photos

Project Description

Reclamation District No. 1601, Sevenmile Slough requires emergency erosion and slope stability repairs along the District's Sevenmile Slough levee from Stations 166+50 to 179+50. The project's total length is approximately 1,300 lineal feet requiring approximately 1,300 tons of 3-inch minus earthen fill material and 1,500 tons of rock slope protection, consisting of 18-inch minus quarry stone riprap. This emergency repair work was prompted by the flood events of 2023 and has progressively deteriorated to the point of threatening Twitchell Island Road. This road is one of the two access and egress routes for the island and provides the region with an alternate connection between State Highway 12 and Highway 160. An adjacent section of Sevenmile Slough levee suffered significant damage that required immediate repairs to be made during the flood event under emergency action in a desperate bid to save the failing Twitchell Island Road. This previous slope failure serves as an indicator as to the potential extent of damage if this next section of levee is not repaired. These project funds will be efficiently applied using standard templates and designs to streamline engineering and bid preparation with limited overhead.

Table 1 - Preliminary Cost Estimate

Description	Cost
Engineering, Bidding, and Project Management	$ 142,880.00
Construction	$ 155,000.00
Grand Total	**$ 297,880.00**

This emergency work is aimed at repairing this additional section of levee in continuation of the two previously repaired locations mentioned above. The following photos show the current conditions of the section of levee needing repairs as well as the pre-construction photos of the previously repaired locations. The first two photos (photos 1 & 2 below) show the current conditions of the site. These photos depict similar conditions to those present immediately prior to the more severe slope failures that made the previous two repair sites necessary under emergency action. Due to the season vegetative growth, it is difficult to make out the vertical to near vertical erosion of the levee slopes, and substantial portions of slope slip that have occurred in this area, however the evidence of those failure are made clear by the lack of the two-foot roadway shoulder, the ripping and tearing of the asphalt, and the pieces of the roadway that have fallen away from the rest of the asphalt roadway. The following two photos (photos 3 & 4 below) show the two emergency repaired sites prior to the slope repairs that became necessary.

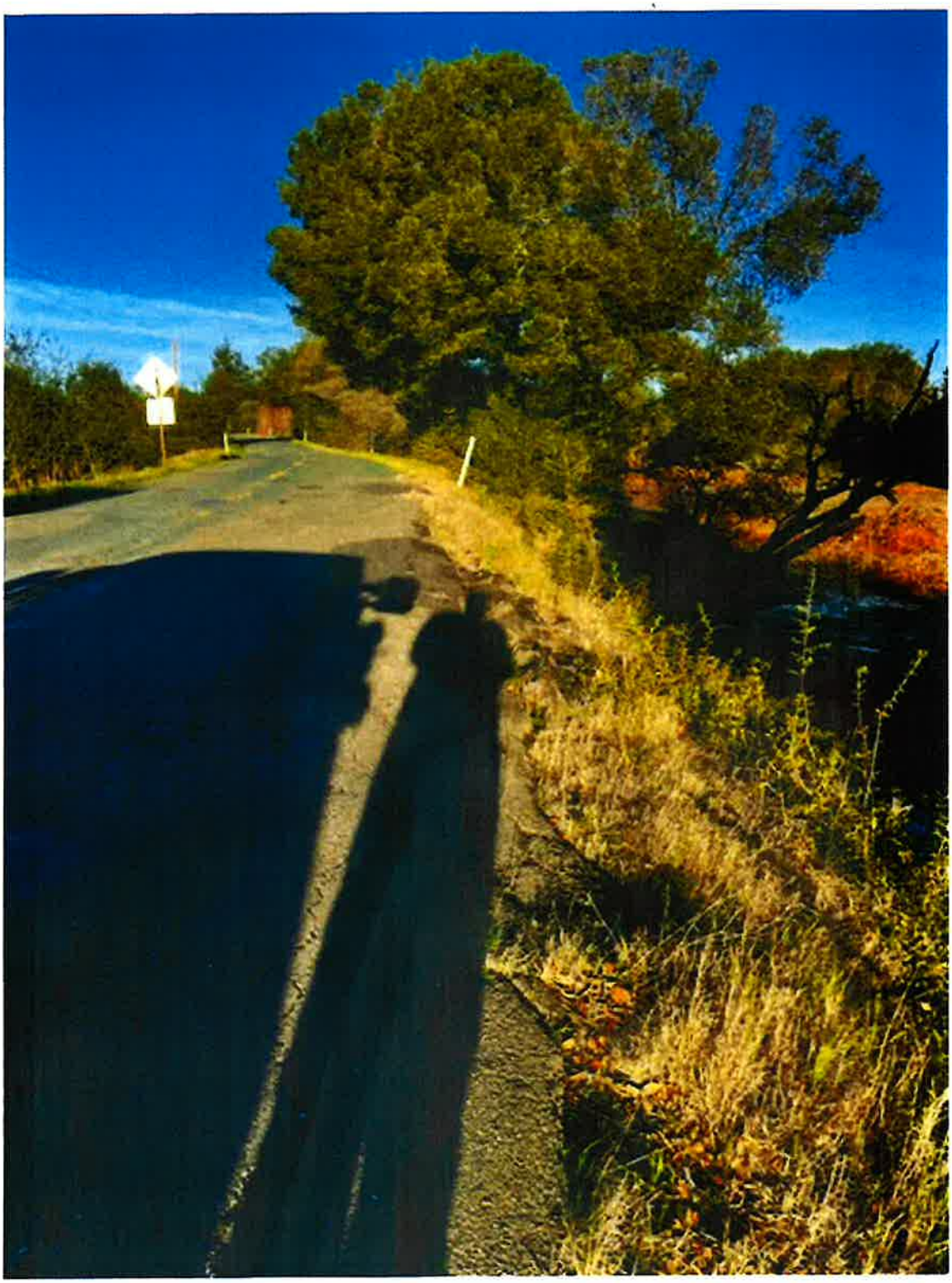


PHOTO 1: EXISTING DAMAGE SITE CONDITIONS

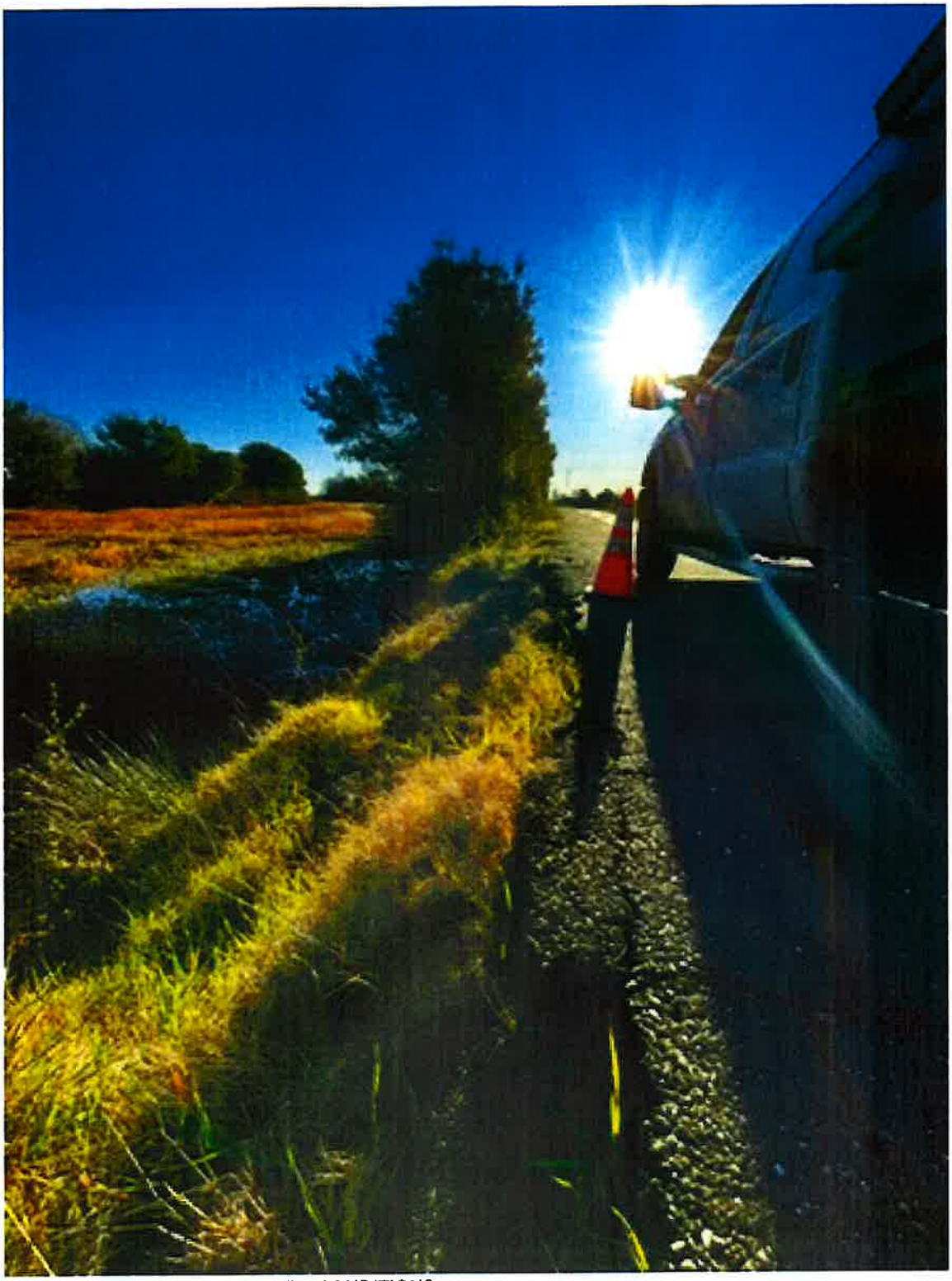
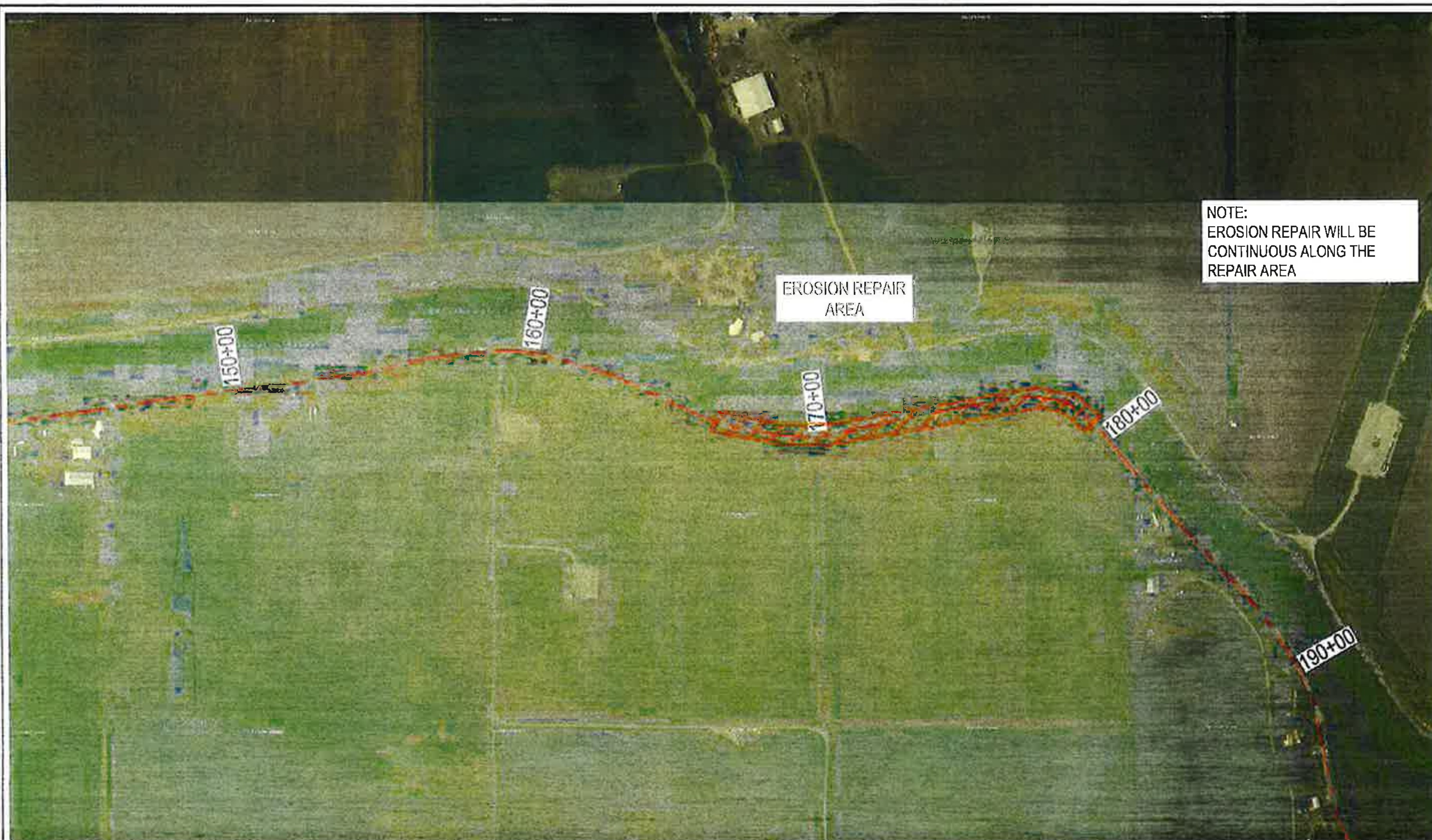


PHOTO 2: EXISTING DAMAGE SITE CONDITIONS

PHOTO 3: PREVIOUSLY REPAIRED SITE PRE-REPAIR CONDITION

PHOTO 4: PREVIOUSLY REPAIRED SITE PRE-REPAIR CONDITION

Exhibit B – Project Map



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www.ksninc.com

RECLAMATION DISTRICT 1601
TWITCHELL ISLAND

PROJECT MAP

DRAWING SCALE: 1" = 150'
ORIGINAL DRAWING SCALE: 0 ½" 1"
EXHIBIT NO. B
PAGE NO. 1

EXHIBIT C

Christopher H. Neudeck

From: Jeff Mueller
Sent: Tuesday, June 11, 2024 6:47 AM
To: Christopher H. Neudeck
Subject: RE: I am preparing Twitchell's Engr'ing report
Attachments: Twitchell Island Reclaim_ Dist__Project.VC0-Report.pdf; Twitchell Island Reclaim_ Dist__Project.VC2-Report.pdf; Twitchell Island Reclaim_ Dist__Project.VC3-Report.pdf

CEQA is complete. Civil and Structural plans are complete, and Cecil & Cecil are currently working on the electrical design. Attached are three reports evaluating alternate panel tilt angles in an energy optimization study.

- Base 7deg tilt - 4.18 kwh/kwp/day - 638 MWh/yr
- 35deg tilt - 4.35 kwh/kwp/day - 664 MWh/yr (4% greater production from base)
- 35deg tilt, larger spacing - 4.5 kwh/kwp/day - 687 MWh/yr (7% greater production from base)

We are waiting to hear back from the District on whether they would like to adjust the panel tilt angle.

KSN is currently working on the Sacramento County Building Permit application and we should have it submitted this week.

We are on track with the District's proposed schedule:

Building Permits	June-July
C&C Electrical Drawings complete	July 15
RD-1601 Board Approves Bid Package	July 16 (Regular July Meeting)
Project Bids	July 19
RD-1601 Board Approves Successful Bidder	August 9 (Special Meeting)
Project Award	August 12
Pile Driver sub award	August 15 (not required)
Steel Fabrication supplier award	August 15 (not required unless we separately bid a steel procurement package)
Pile Driving complete	September 15
Structural Steel arrives on site	October 15
Structural Steel & solar erection	October 15 – November 15
Solar power transmission lines to POI	December 1
Wait for PG&E to interconnect	

EXHIBIT I

Christopher H. Neudeck

From: Jeff Mueller
Sent: Tuesday, June 11, 2024 6:16 AM
To: barry@solagra.com
Cc: Christopher H. Neudeck
Subject: FW: Twitchell Solar - Energy Modelling and tilt considerations
Attachments: Twitchell Island Reclaim_ Dist__Project.VC0-Report.pdf; Twitchell Island Reclaim_ Dist__Project.VC2-Report.pdf; Twitchell Island Reclaim_ Dist__Project.VC3-Report.pdf

Barry,

Please find below analysis and attached reports from Cecil & Cecil, evaluating alternative tilt angles for the solar panels on our Twitchell project. The analysis compares the current 7-degree tilt with two additional scenarios: a 35-degree tilt and a 35-degree tilt with wider spacing.

The findings suggest that adjusting the tilt angle could lead to better energy production and improved dust prevention, potentially increasing annual production by up to 7%. The attached reports provide more detailed modeling results for your review and consideration.

Please evaluate these findings and share your thoughts. The Cecil & Cecil team is available to discuss this in more detail if needed.

Thanks,
Jeff

From: Coreen Cecil <ccecil@cecilinc.com>
Sent: Monday, June 10, 2024 1:47 PM
To: Jeff Mueller <jmueller@ksninc.com>
Subject: Twitchell Solar - Energy Modelling and tilt considerations

Happy Monday Jeff,

We want to confirm that the very low tilt of the panels is final.

I've attached three quick modelling reports from our engineers showing the expected annual production with the as designed 7deg tilt, 35deg tilt and 35deg tilt with wider spacing.

The normalized production for the three scenarios are:

base - 4.18 kwh/kwp/day - 638 MWh/yr
35deg tilt - 4.35 kwh/kwp/day - 664 MWh/yr (4% greater production from base)
35deg tilt, larger spacing - 4.5 kwh/kwp/day - 687 MWh/yr (7% greater production from base)

We have kept the soiling losses the same for all three options, however, the soiling losses are likely to be much higher for the base scenario. The small tilt will likely accumulate more dust and general debris, and will require more rain to clean naturally. The 35deg tilt provides better "self-cleaning" along with the higher production. This means that the percent difference noted above are likely conservative, and the actual difference is greater in real life.

These changes shouldn't affect the electrical design.

Please confirm the client is firm in the decision of installing a 7 degree tilt on the panels.

Thank you,
Coreen Cecil
President
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916-519-7466 M
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