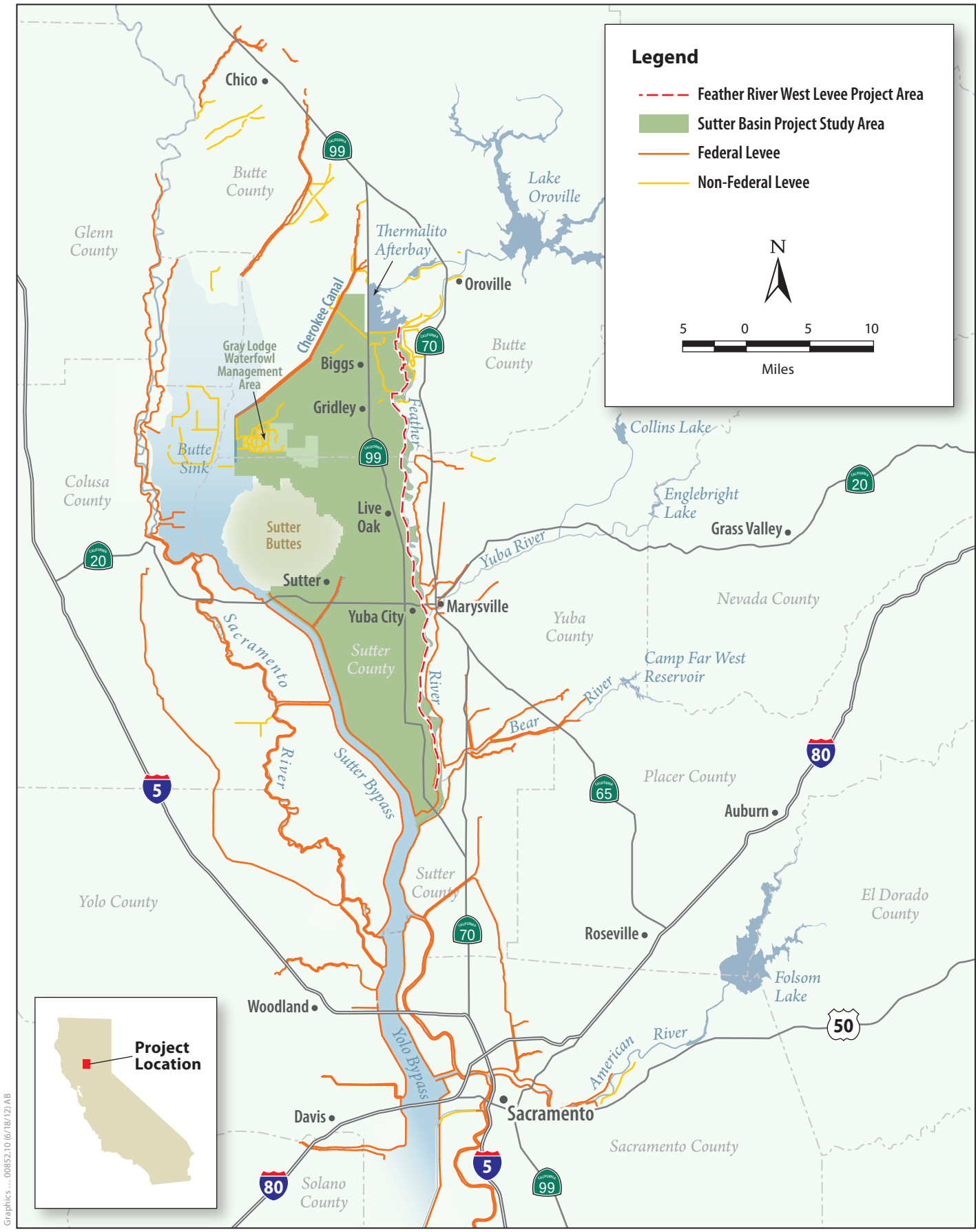
Plates



Graphics ... 00852.10 (6/18/12) AB

Plate 1-1
Regional Setting

State Plan of Flood Control

Lead Agency: DWR
Location: Central Valley
Goal: Guide flood management expenditures under Propositions 84 & 1E
Timeline: Complete Plan by 2014

Sacramento – San Joaquin River Basins Comprehensive Study/Central Valley Integrated Flood Management Study

Lead Agency: USACE and DWR
Location: Central Valley
Goal: Flood damage reduction and ecosystem restoration
Phase: Comp study was completed in 2002; CVIFMS is expected to be complete by 2015

Sutter Basin Project

Lead Agency: USACE and SBFCA
Location: Sutter and Butte counties
Goal: Increase flood protection for communities in Sutter and Butte counties
Phase (Timeline): Feasibility Study and EIS (2011)

Mid-Valley Project

Lead Agency: USACE and State of California
Location: Knights Landing
Goal: Flood risk reduction for Knights Landing
Timeline: Construction by 2016

Natomas Levee Improvement Program

Lead Agency: SAFCA
Location: Natomas Area, Sacramento
Goal: Achieve 200-year flood protection for the Natomas Basin
Timeline: Construction of 100 yr. protection by 2011, 200 yr. protection by 2012

West Sacramento Levee Improvements Project

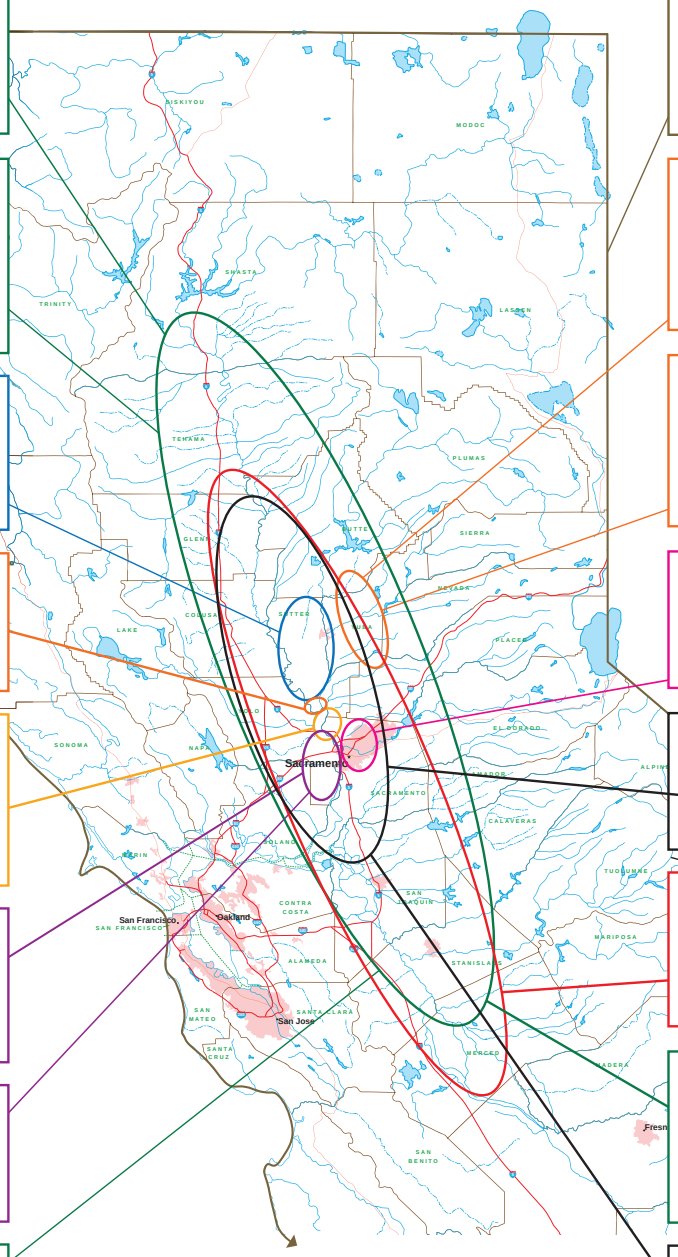
Lead Agency: USACE and WSAFCA
Location: West Sacramento
Goal: Achieve 200-year flood protection for the City of West Sacramento
Phase (Timeline): EIS/EIR (2010)

West Sacramento Project

Lead Agency: WSAFCA, USACE and DWR
Location: West Sacramento
Goal: Comprehensive analysis of the City's levee system
Phase (Timeline): GRR (2012)

Central Valley Flood Protection Plan

Lead Agency: DWR
Location: Central Valley and Sacramento-San Joaquin Delta
Goal: Develop strategies for comprehensive system-wide flood improvements
Timeline: Complete plan by 2012; complete protection measures by 2025



FloodSAFE

Lead Agency: DWR
Location: State-wide, but primarily Central Valley
Definition: Multi-faceted program to improve public safety through integrated flood management.
Timeline: Complete foundational objectives by 2025

Yuba Basin Project

Lead Agency: USACE, DWR, and YCWA
Location: Yuba, Feather, Bear rivers Watershed
Goal: Increase flood protection for communities of Linda, Olivehurst, Arboga, Marysville, and unincorporated areas of Yuba County
Phase (Timeline): GRR (2010)

Three Rivers Levee Improvement Authority Projects

Lead Agency: Three Rivers Levee Improvement Authority
Location: Southern Yuba County
Goal: Increase flood protection for communities in southern Yuba County
Phase (Timeline): Construction of 200-year protection by 2010

American River Common Features Project

Lead Agency: USACE, DWR, and SAFCA
Location: Sacramento metropolitan area
Goal: Reduce flood risks for the City of Sacramento
Phase (Timeline): GRR (2010)

Sacramento River Bank Protection Project

Lead Agency: USACE and DWR
Location: SRFCP
Goals: Federal program to correct levee erosion issues
Phase (Timeline): Ongoing Phase II EIS (2011)

PL 84-99 Rehabilitation Assistance of Flood Control Works

Lead Agency: USACE and DWR
Location: Central Valley and Sacramento-San Joaquin Delta
Goals: Federal program to provide emergency levee repairs
Timeline: Ongoing

Levee Collaborative

Lead Agency: USACE and DWR
Location: Central Valley
Goals: Develop short- and long-term plans to achieve system-wide compliance with USACE standards for the State Flood System in the Central Valley
Timeline: Ongoing

Sacramento River Flood Control System Evaluation

Lead Agency: USACE
Location: SRFCP
Goals: Repairing, raising, and strengthening urban levees
Timeline: Ongoing

ACRONYMS

WSAFCA - West Sacramento Area Flood Control Agency
USACE - U.S. Army Corps of Engineers
SBFCA - Sutter-Butte Flood Control Agency
DWR - Department of Water Resources
SAFCA - Sacramento Area Flood Control Agency
SRFCP - Sacramento River Flood Control Project
YCWA - Yuba County Water Agency

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Plate 1-2

Major Flood Risk Reduction Efforts in the Sacramento Valley

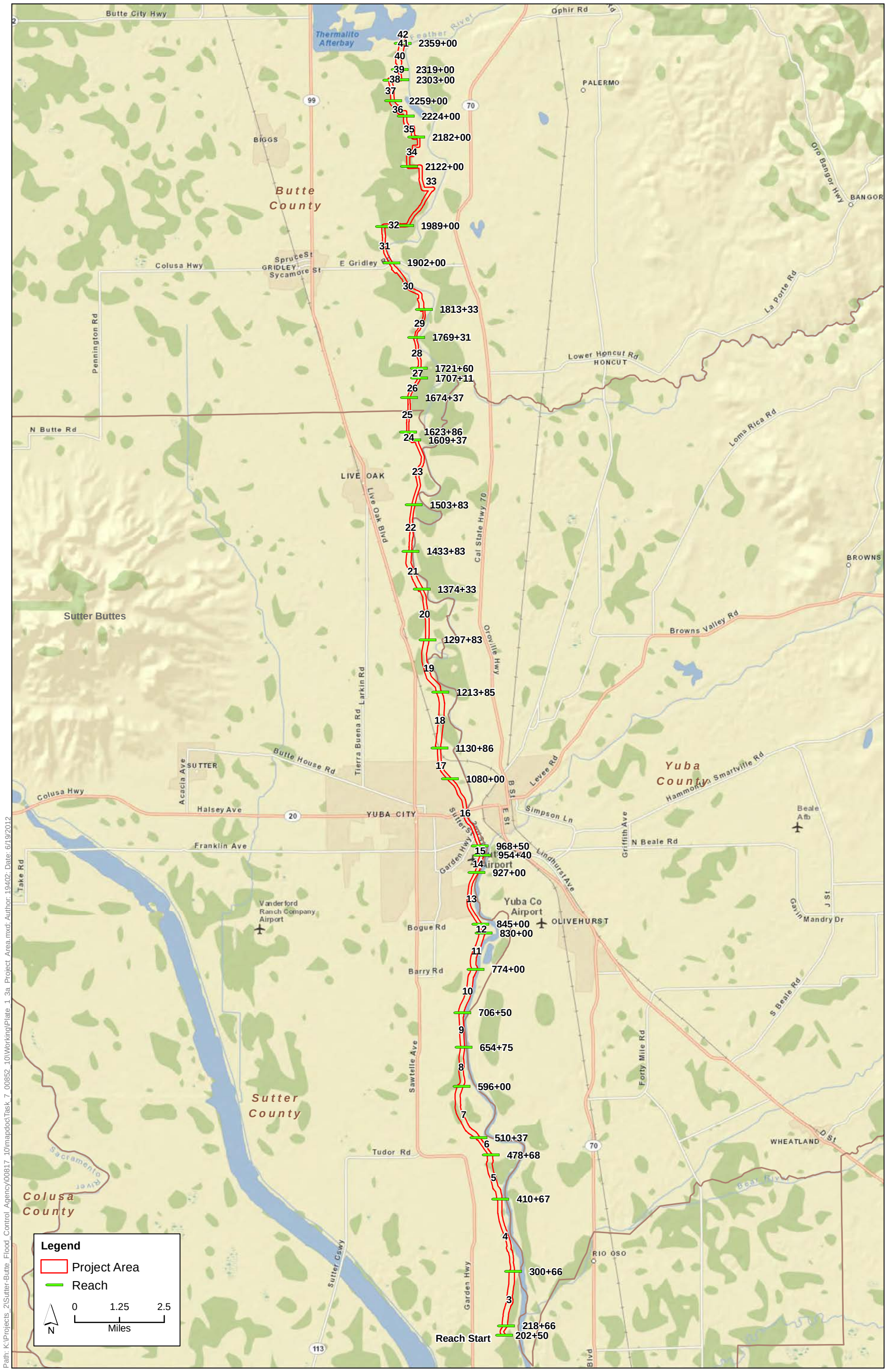

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Plate 1-3a
Project Area

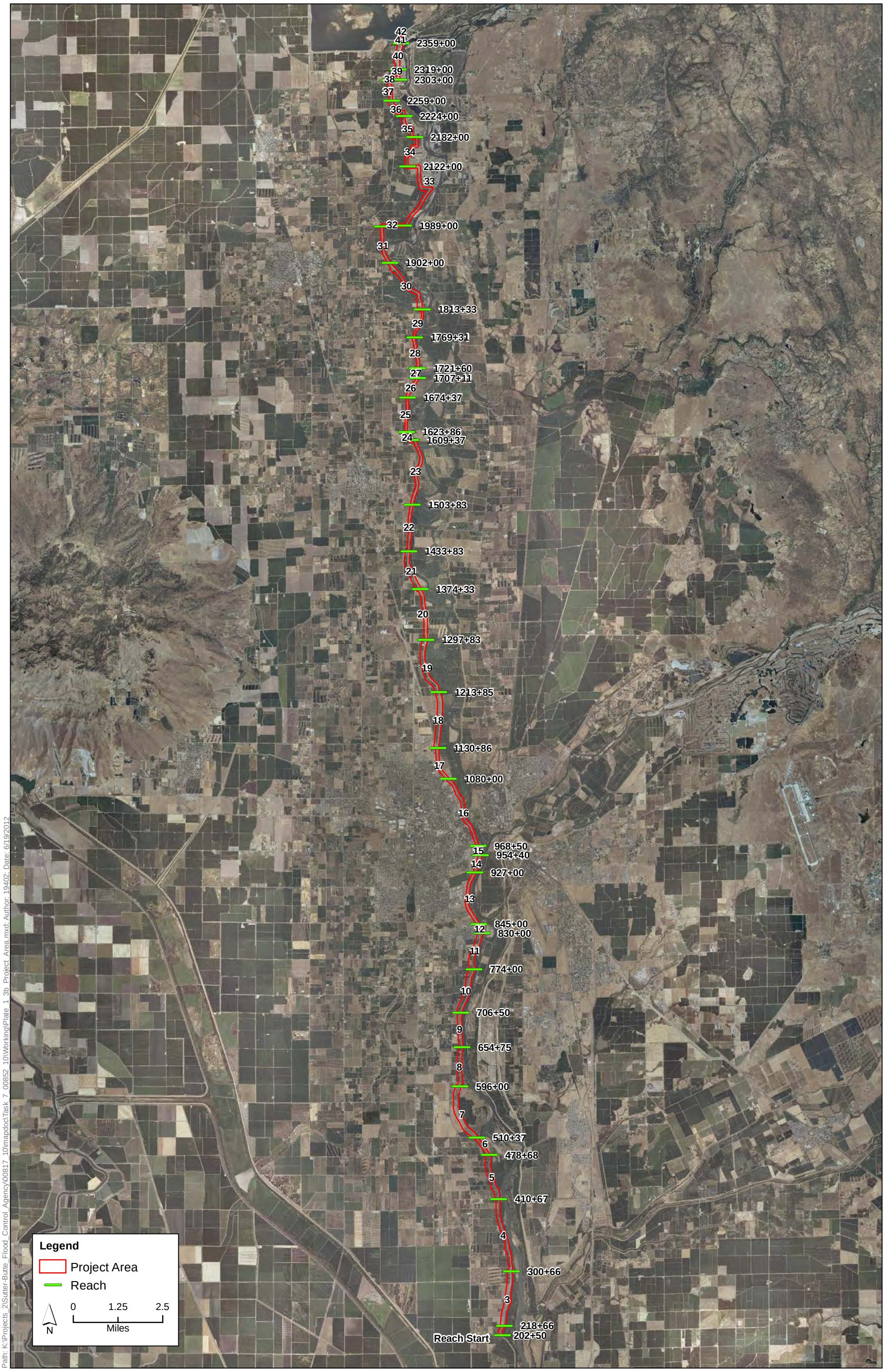

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Plate 1-3b
Project Area

Reach 4. Feather River west levee looking northeast from water side of levee crown. Note mature vegetation on waterside slope. River is off the photo to the right.

Reach 4. Feather River west levee looking northwest from landside of levee crow. Note the Sutter Buttes visible on the horizon and orchards in foreground.

Graphics … 00852.10 (6/26/12) AB

Plate 1-4
Representative Photos of the Project Area

Reach 7. Feather River west levee looking northeast from landside slope. Note the Sutter Buttes to the left along the horizon and the agricultural fields in the foreground.

Reach 8. Feather River west levee looking northeast from waterside slope. Note the mature vegetation along the bank, and the Feather River in the middleground barely visible beyond the near vegetation.

Graphics … 00852.10 (6/26/12) AB

Plate 1-5
Representative Photos of the Project Area

Reach 9. Feather River west levee looking south from the levee crown at Boyd's Pump. Note the boat launching facilities.

Reach 11. Feather River west levee looking south from the crown. Note the river channel at left and the mature vegetation along the bank.

Graphics … 00852.10 (6/26/12) AB

Plate 1-6
Representative Photos of the Project Area

Reach 13. Feather River west levee looking south along the landside slope at the intersection of Shanghai Bend Road. Note the paved public access trail and the residences to the west. The river is at left off the photo.

Reach 14. Feather River west levee looking west from the landside slope at the Sutter County Airport.

Graphics … 00852.10 (6/26/12) AB

Plate 1-7
Representative Photos of the Project Area

Reach 18. Feather River west levee looking north from the levee crown. Note the utility poles at the landside toe of the levee at left with orchards beyond.

Reach 19. Feather River west levee looking west from the land side of the levee crown. Note the Sutter Buttes in the background and orchards in the foreground.

Graphics … 00852.10 (6/26/12) AB

Plate 1-8
Representative Photos of the Project Area

Reach 23. Feather River west levee looking south from the levee crown. Note the residence on the landside toe and the mature vegetation on both the land and watersides of the levee.

Reach 26. Feather River west levee looking north from land side of the crown. Note the irrigation canal, utility poles, and orchards to the left. Also note the decreased levee prism in this reach.

Graphics … 00852.10 (6/26/12) AB

Plate 1-9
Representative Photos of the Project Area

Reach 32. Feather River West levee looking north from the water side of the levee crown. Note orchards on both water side and land side of the levee.

Reach 33. Feather River west levee looking north. Note the orchards on the land side to the left and the aggregate deposits in the floodplain to the right.

Graphics … 00852.10 (6/26/12) AB

Plate 1-10
Representative Photos of the Project Area

Levee seepage is when water moves away from the river channel, either below or through the levee and surrounding land surface (see diagram below). Two main factors contribute to seepage:

- high water pressure within the river (such as during periods when the river is near flood-stage), and
- pervious earth material within and underlying the levee.

The combination of high water pressure and pervious material can be evident in sand boils and water seepage on the land-side of the levee. Under severe conditions, the clay blanket on the land side may be ruptured and the increased flow of the under-seeping water undermines the levee, causing the levee to breach or collapse.

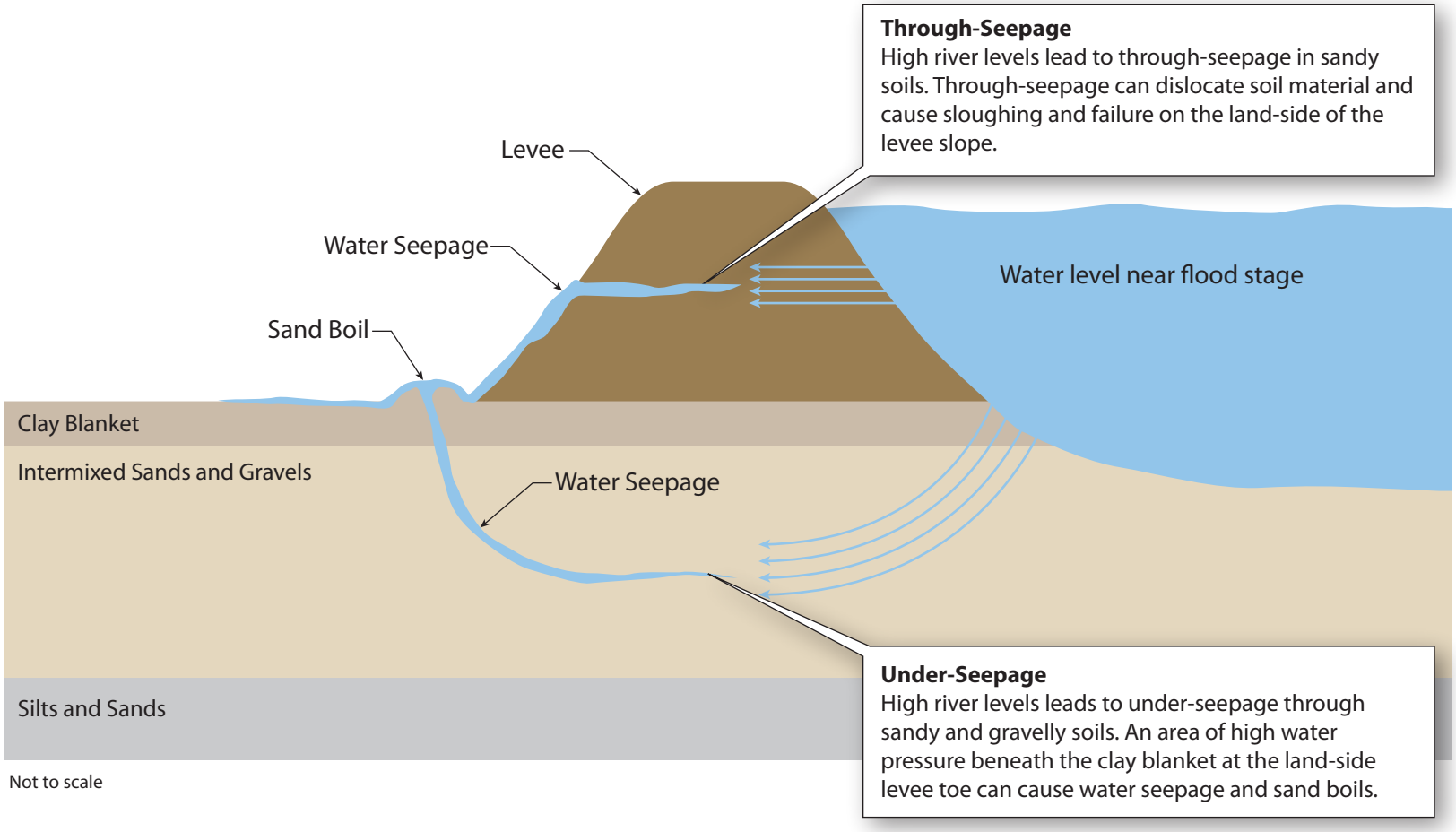

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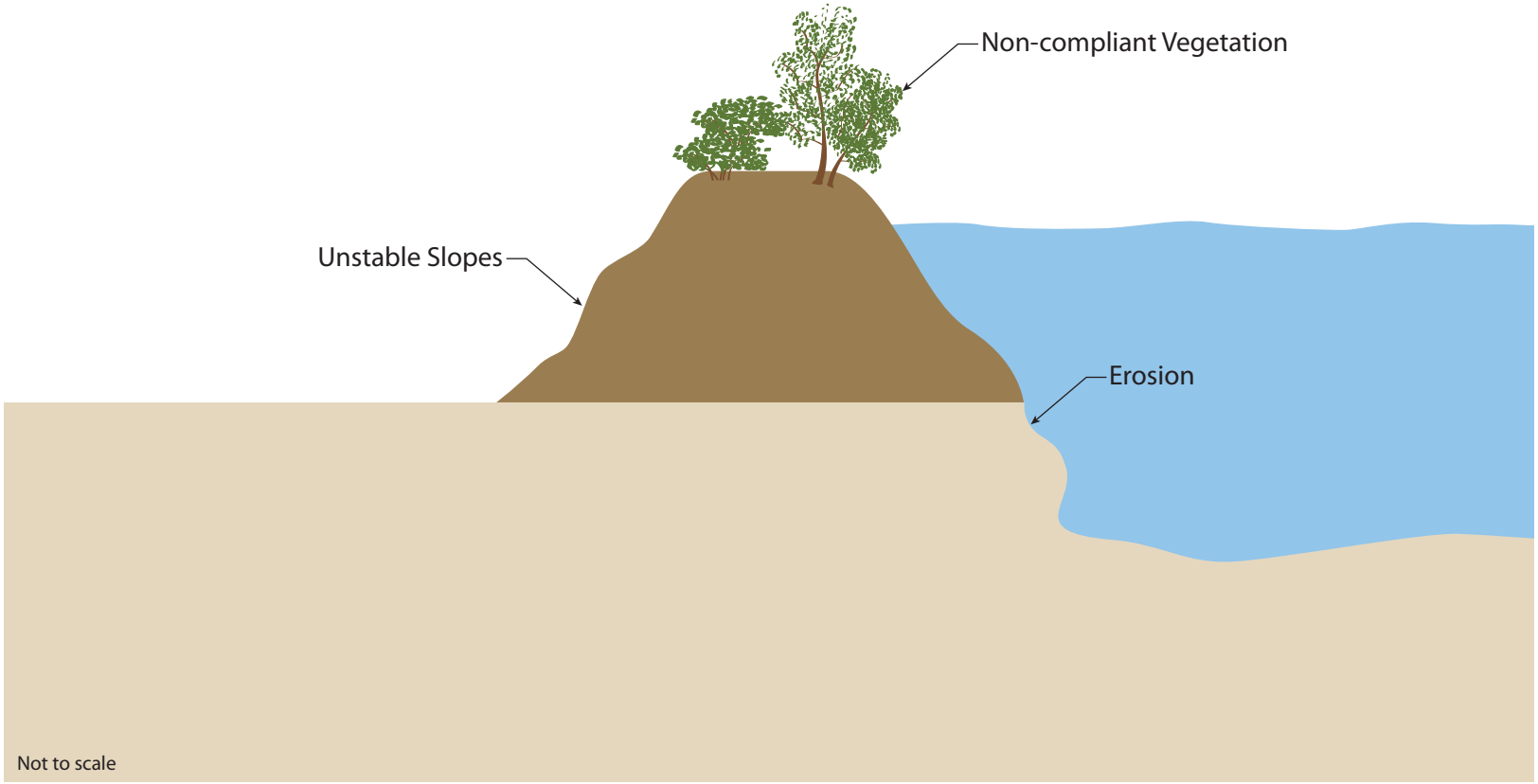
Plate 1-11
Levee Seepage

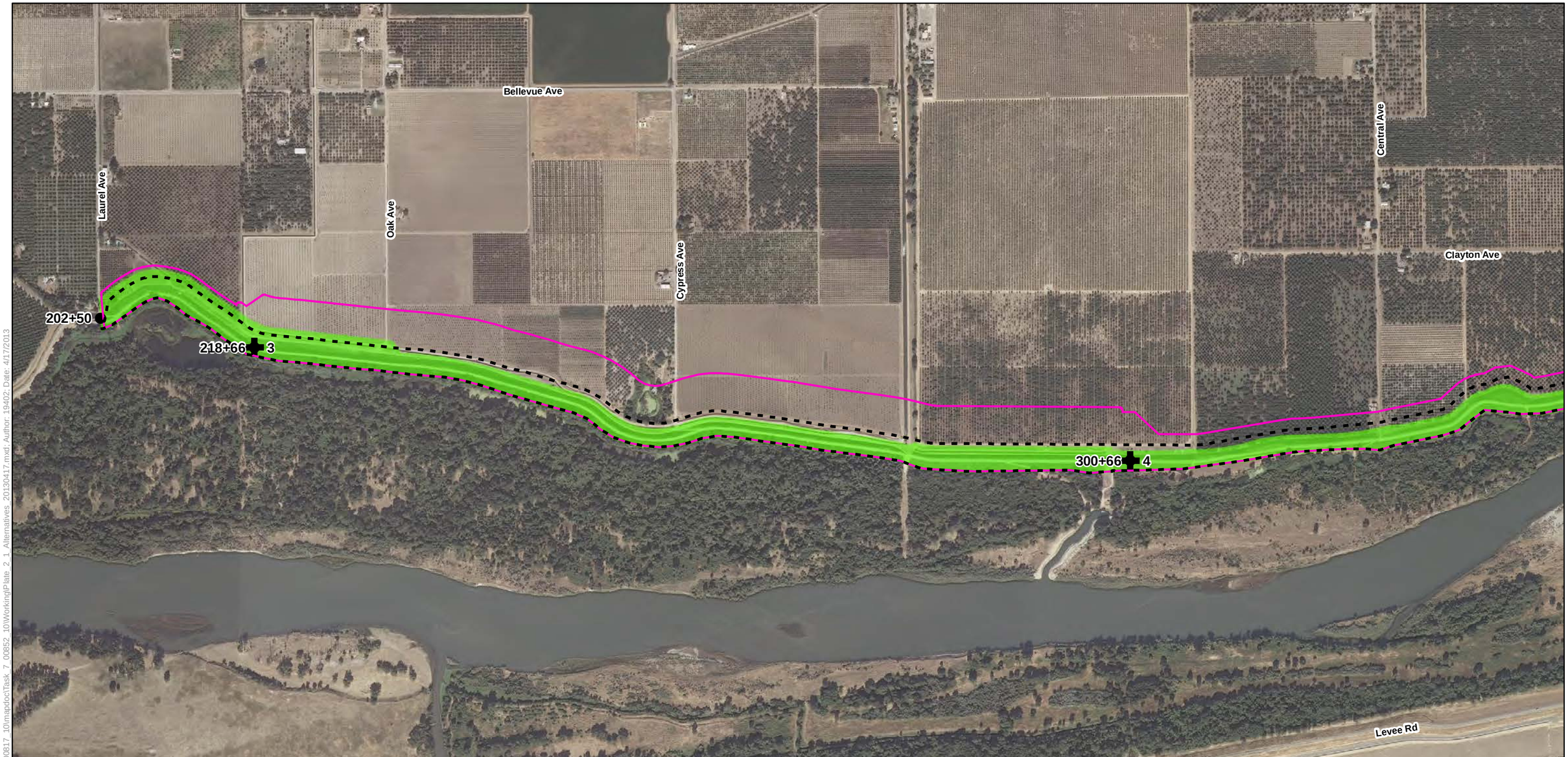
Typical Levee Deficiencies

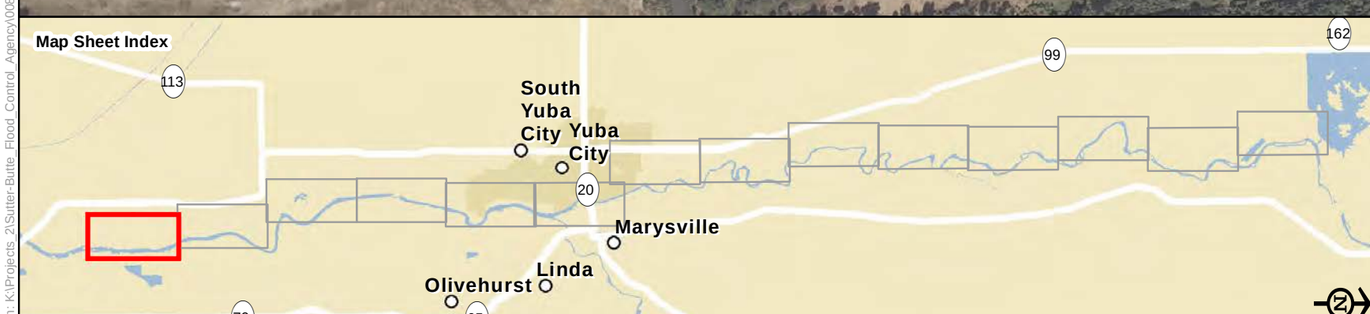
- Unstable Slopes - irregular or overly steepened slopes compromise the levee structure
- Erosion - water flow, wakes, and waves damage the levee by removing soil
- Vegetation and other Encroachments - this can hinder levee monitoring and maintenance, and raise water surface elevation



Graphics ... 00852.10 (6/26/12) AB

Plate 1-12
Other Typical Levee Deficiencies





Legend

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- Alternative 3
- Encroachment
- No Work\Construction Access Only

Plate 2-1
Alternatives 1-3

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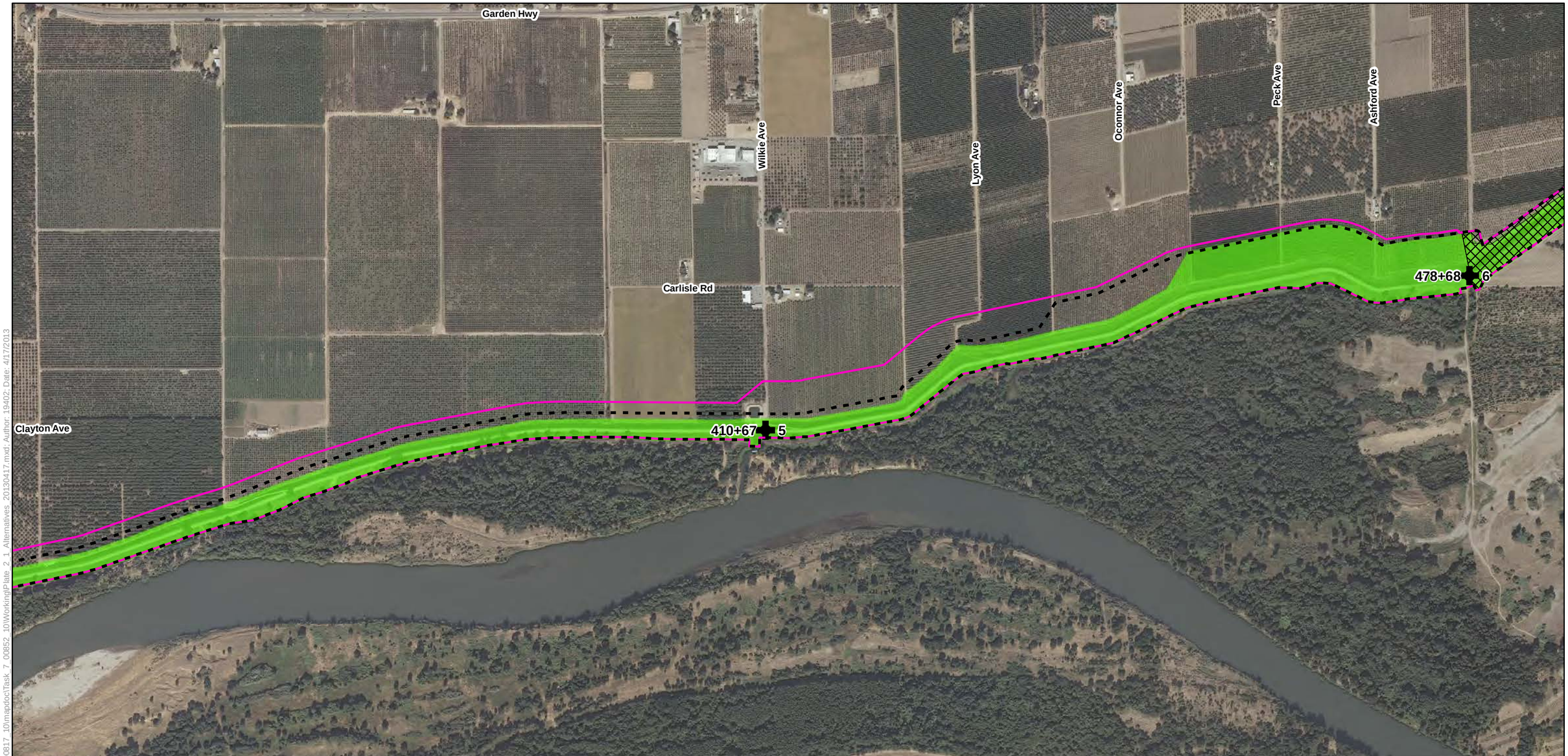

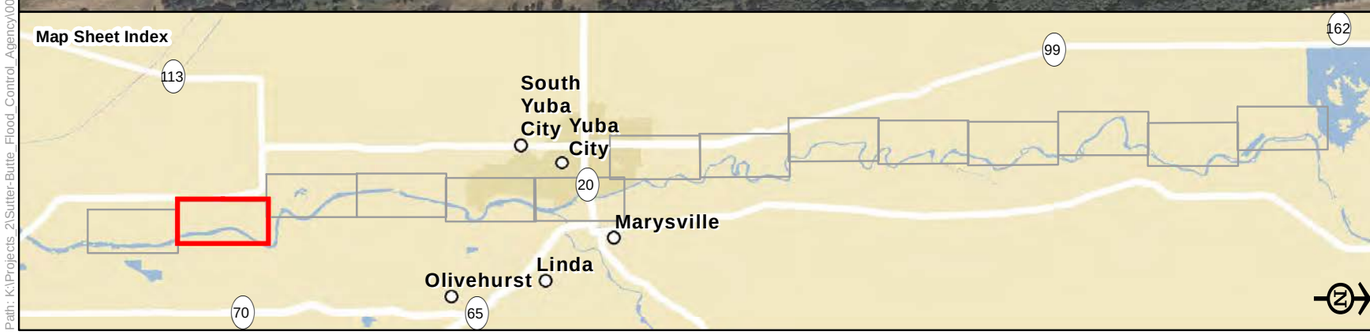

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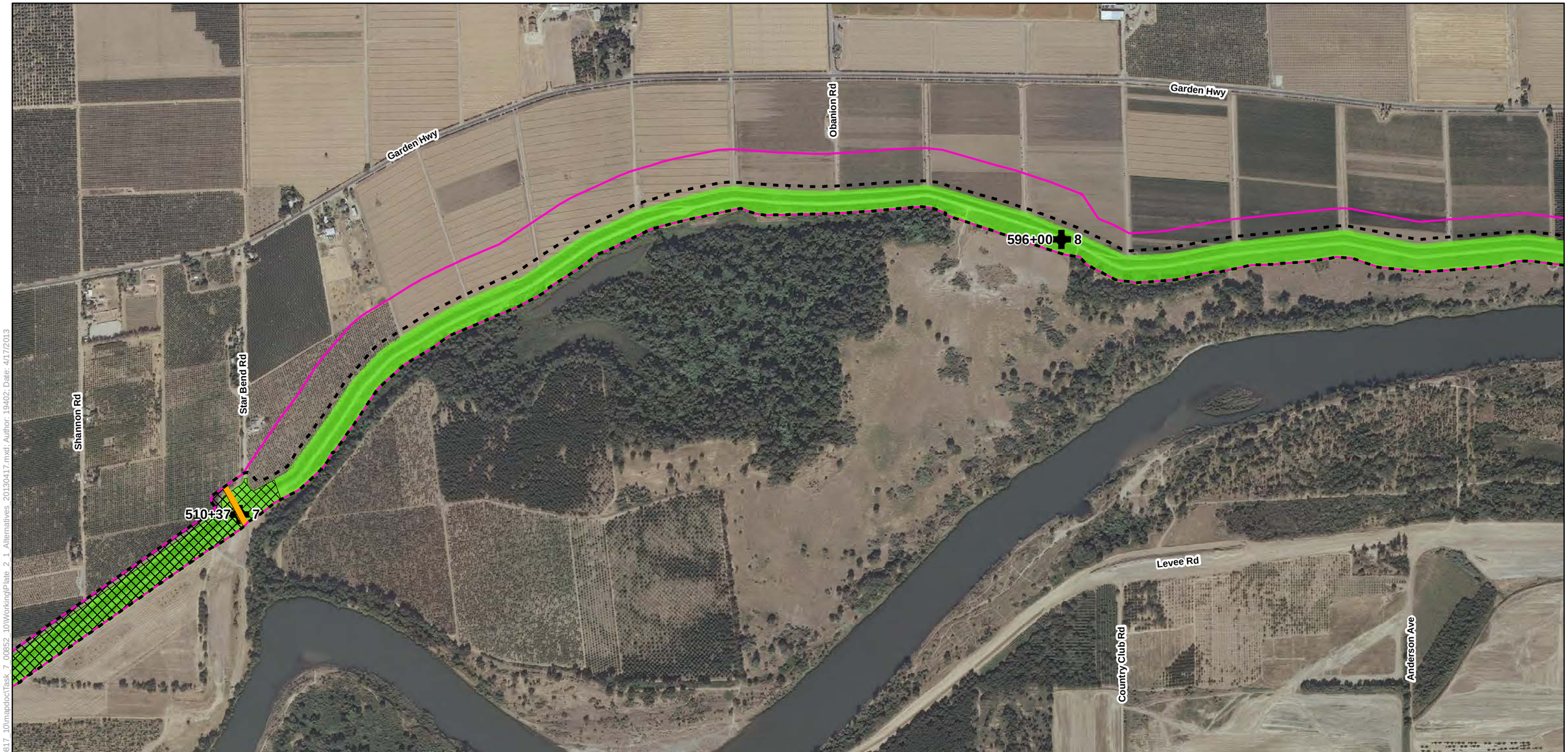

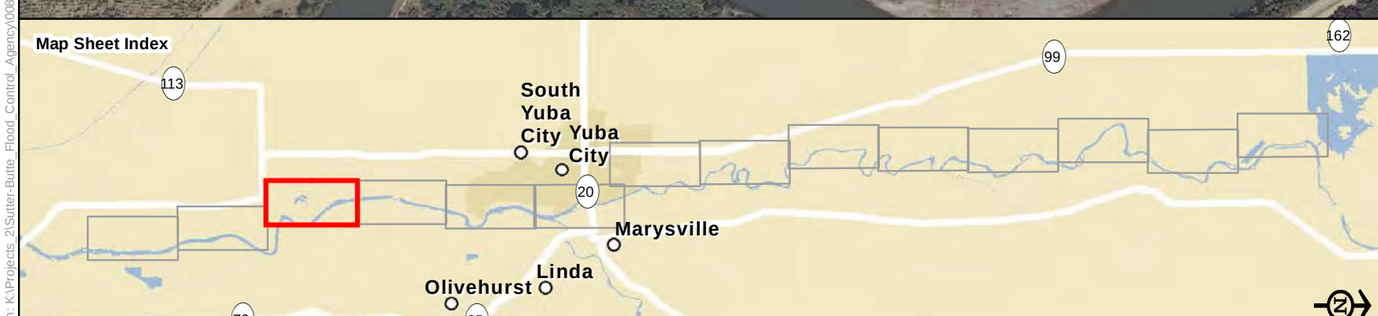

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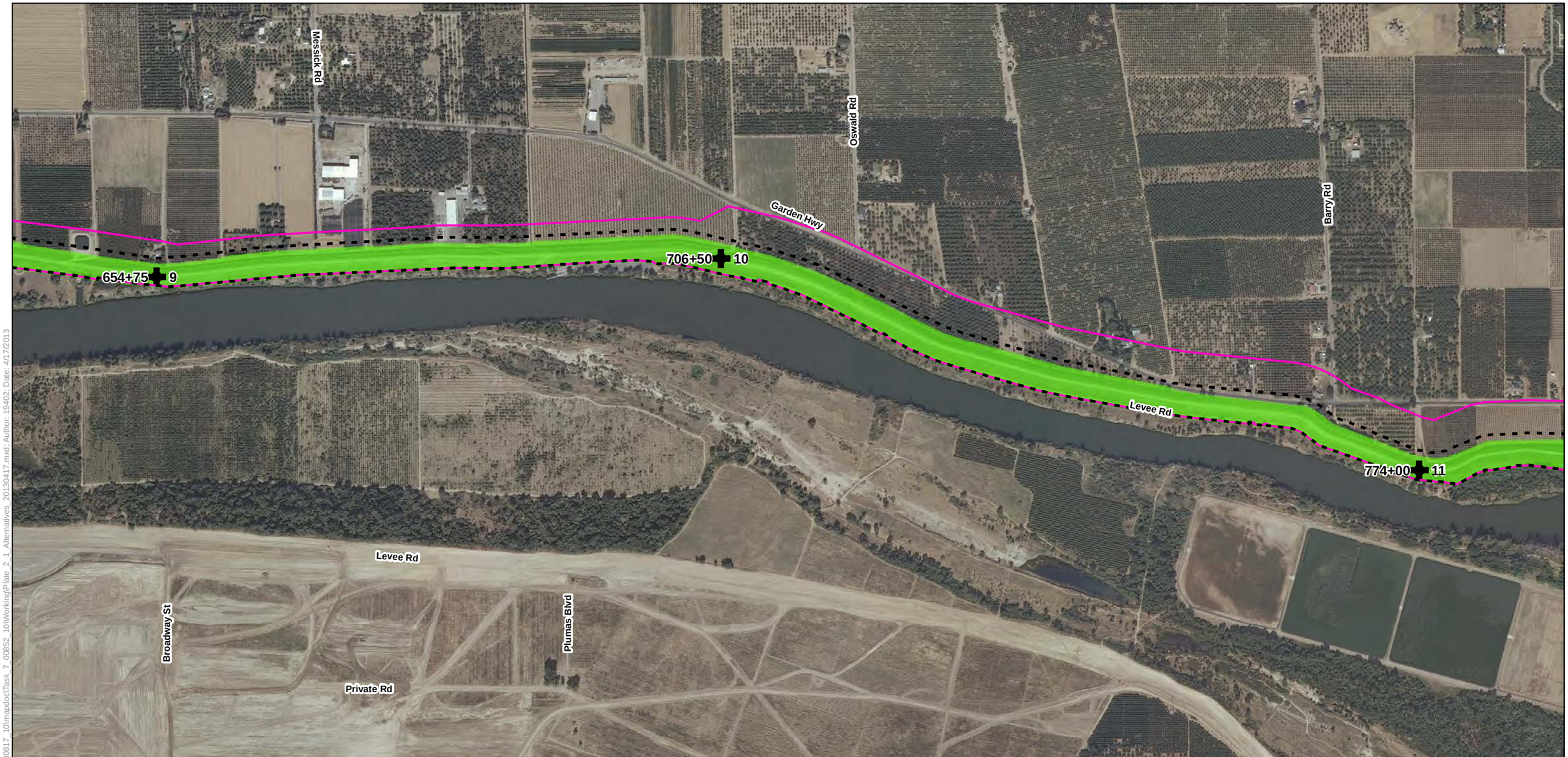

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Windhill Dr
Stowe St
Middleberry Ln
Cambell Ct
Norwich Dr
Stratham Dr
Bogue Rd
Oleander Dr
Garden Hwy
Stonybrook Dr
Bennington Ln
Big Oaks Ct
Big Oaks Dr
Whispering Oaks Dr
Hassett Ave
Winship Rd
Killington Ct
Millfront Ave
White Oak Dr
Burns Dr
Epley Dr
Private Rd
Stewart Rd
Radisson Dr
Brandon St
River Oaks Dr
Mckeehan Dr
Hamstead Ln
Sleepy Dr
Rapid Falls Dr
Burl Ct
Wild River Dr
Putman Ave
Bernard Dr
Garden Hwy
Shady Ct
Carmelo Way
Edgewater Way
Rocky Ct
Lonely Oak St
Private Rd
Black Ct
Pecan Dr
Shanghai Bend Rd
Drummond Dr
Shady Ln
Levee Rd
927+00
14
Persian Loop
Chandler Ct
Idaho Dr
Wasson Ct
Chandler Way
845+00
13
Levee Rd
830+00
12
Eureka Dr
Serr Way

Map Sheet Index

113
South Yuba City
Yuba City
20
Marysville
Linda
Olivehurst
70
65
99
162

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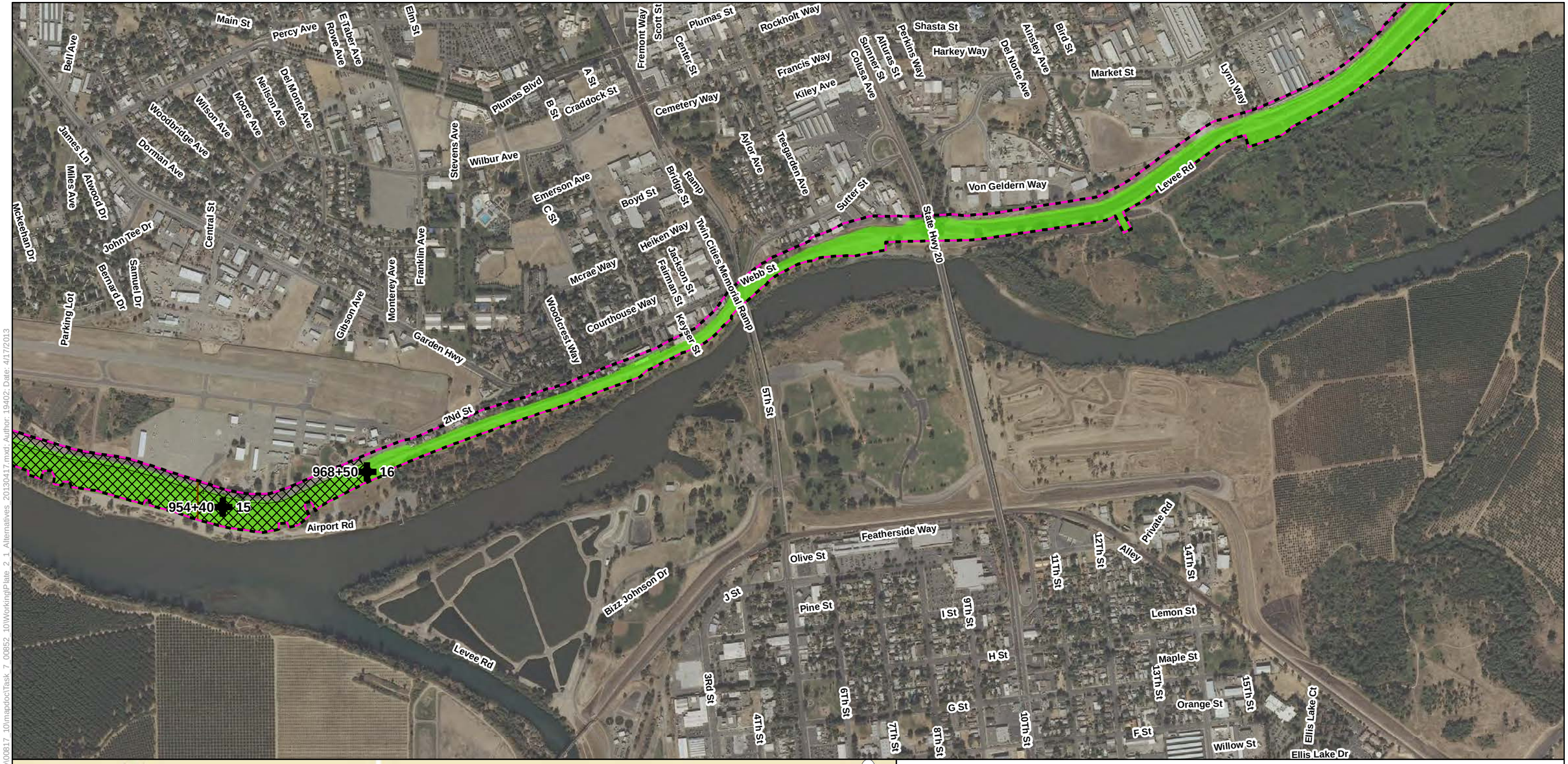

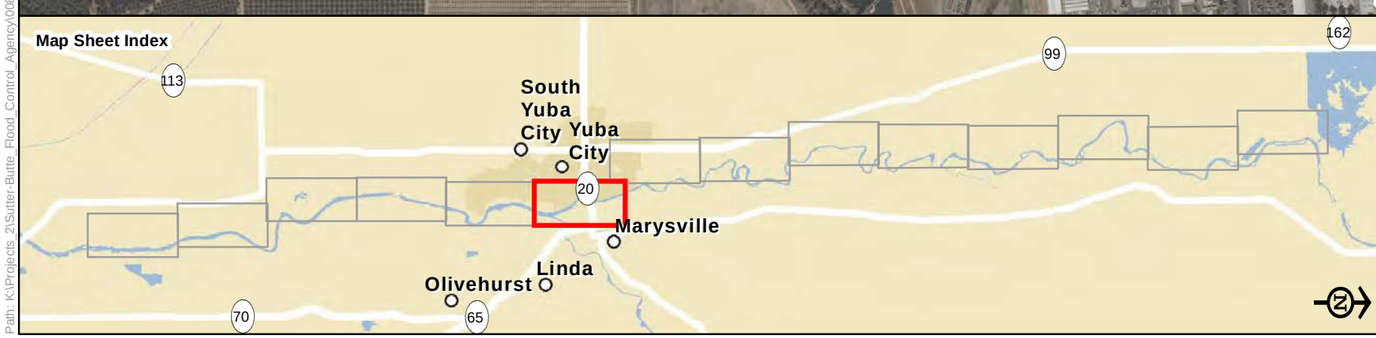

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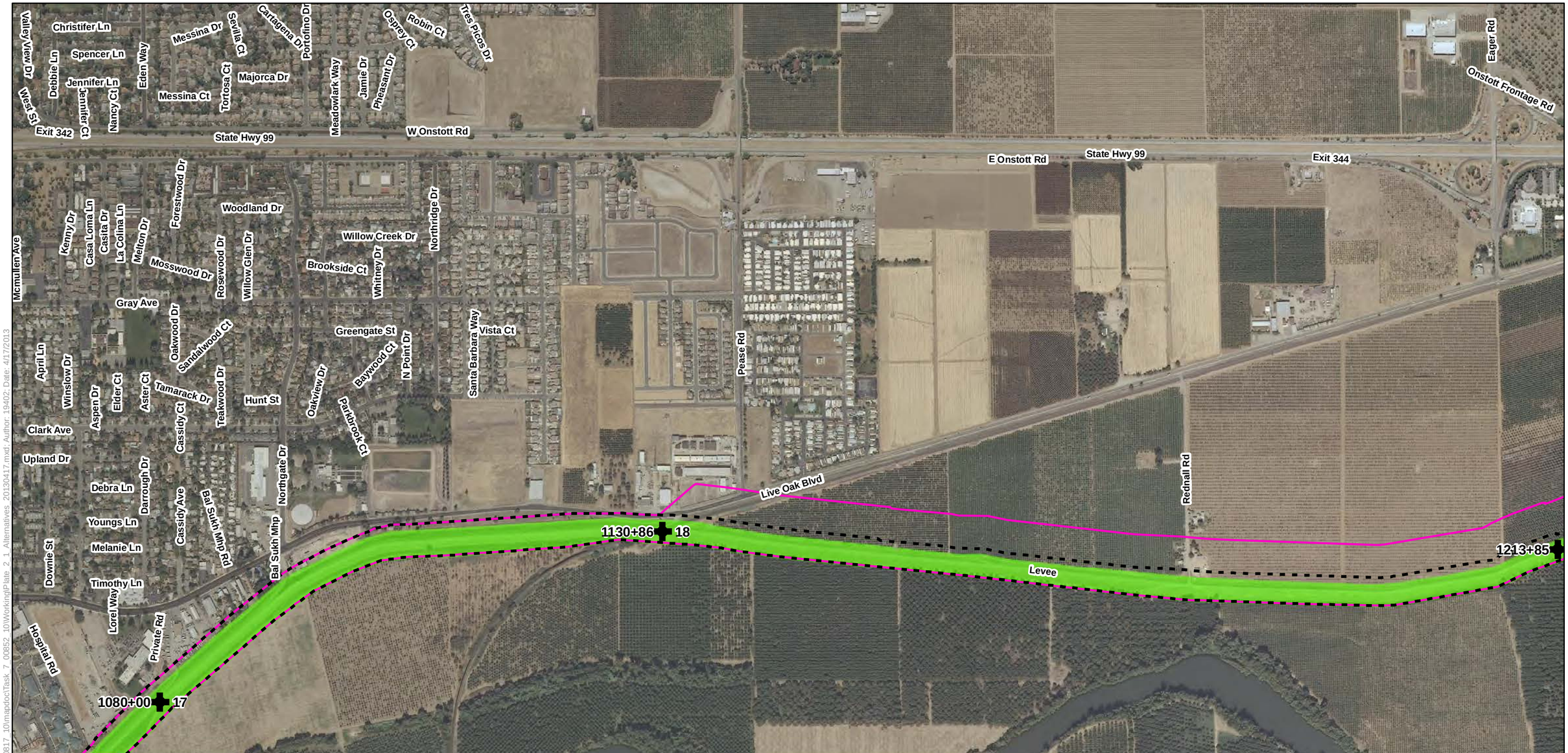

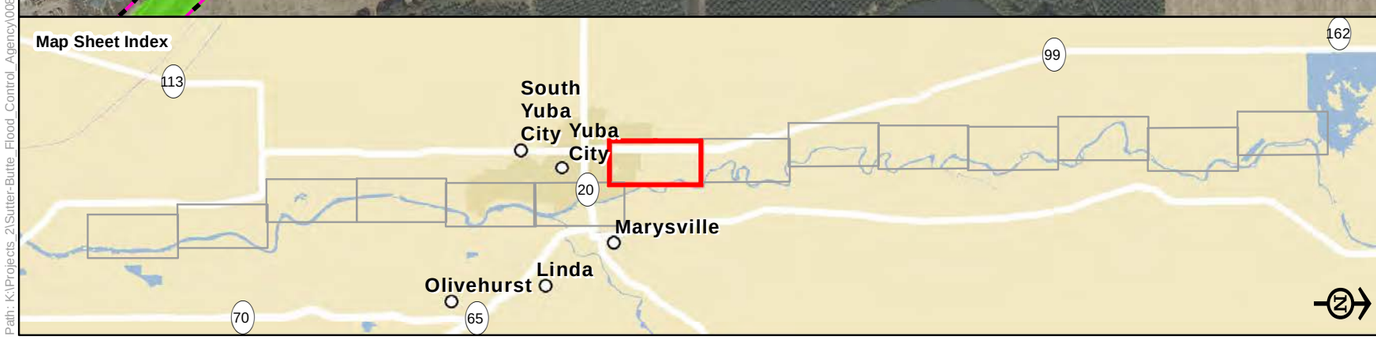

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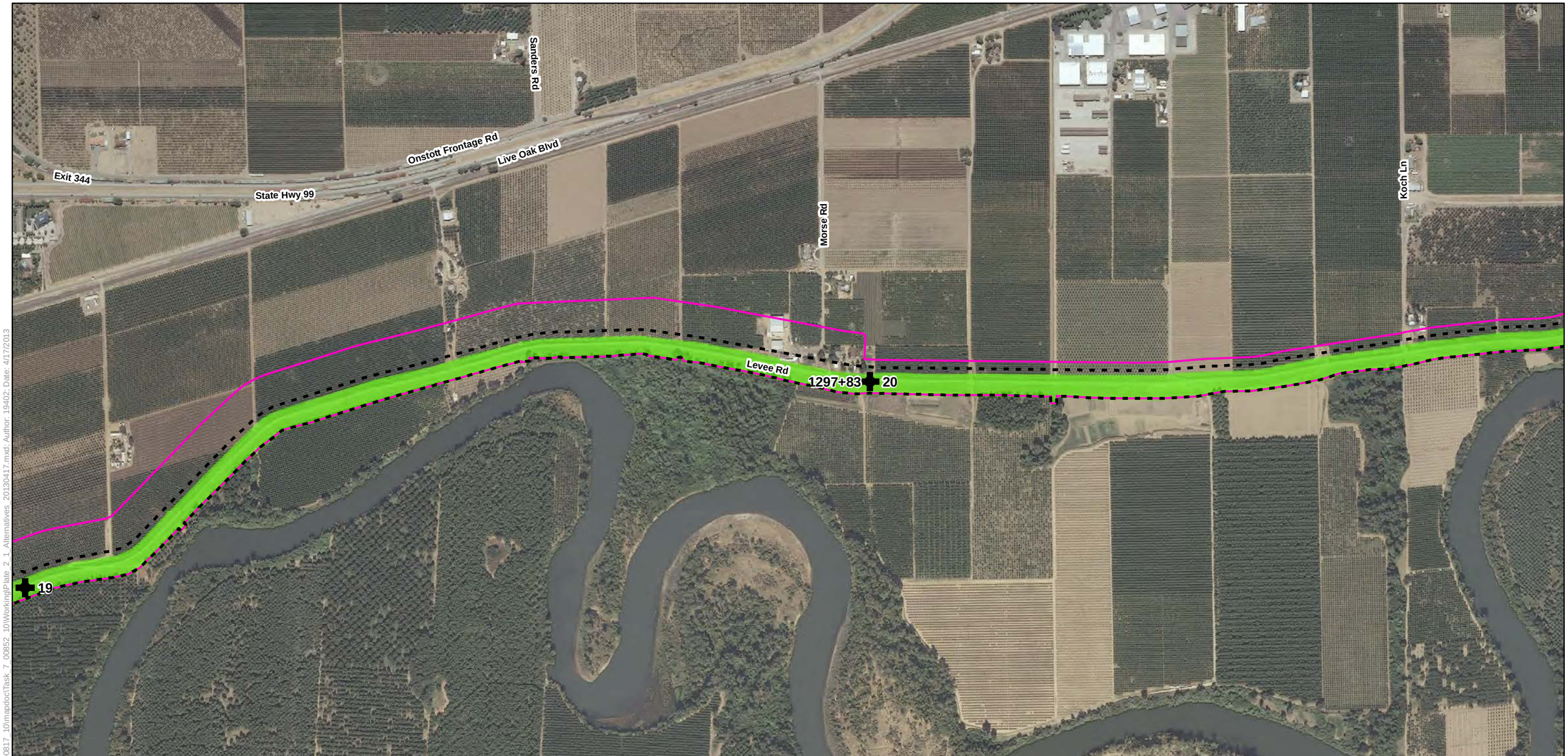

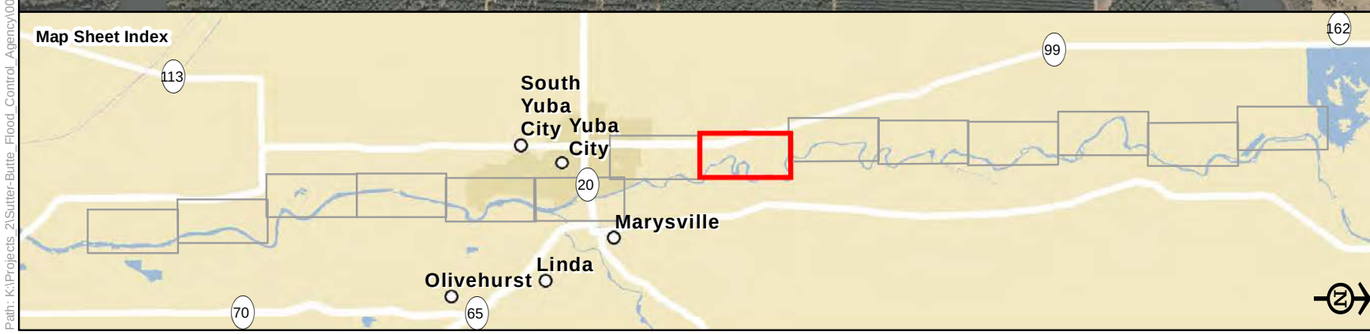

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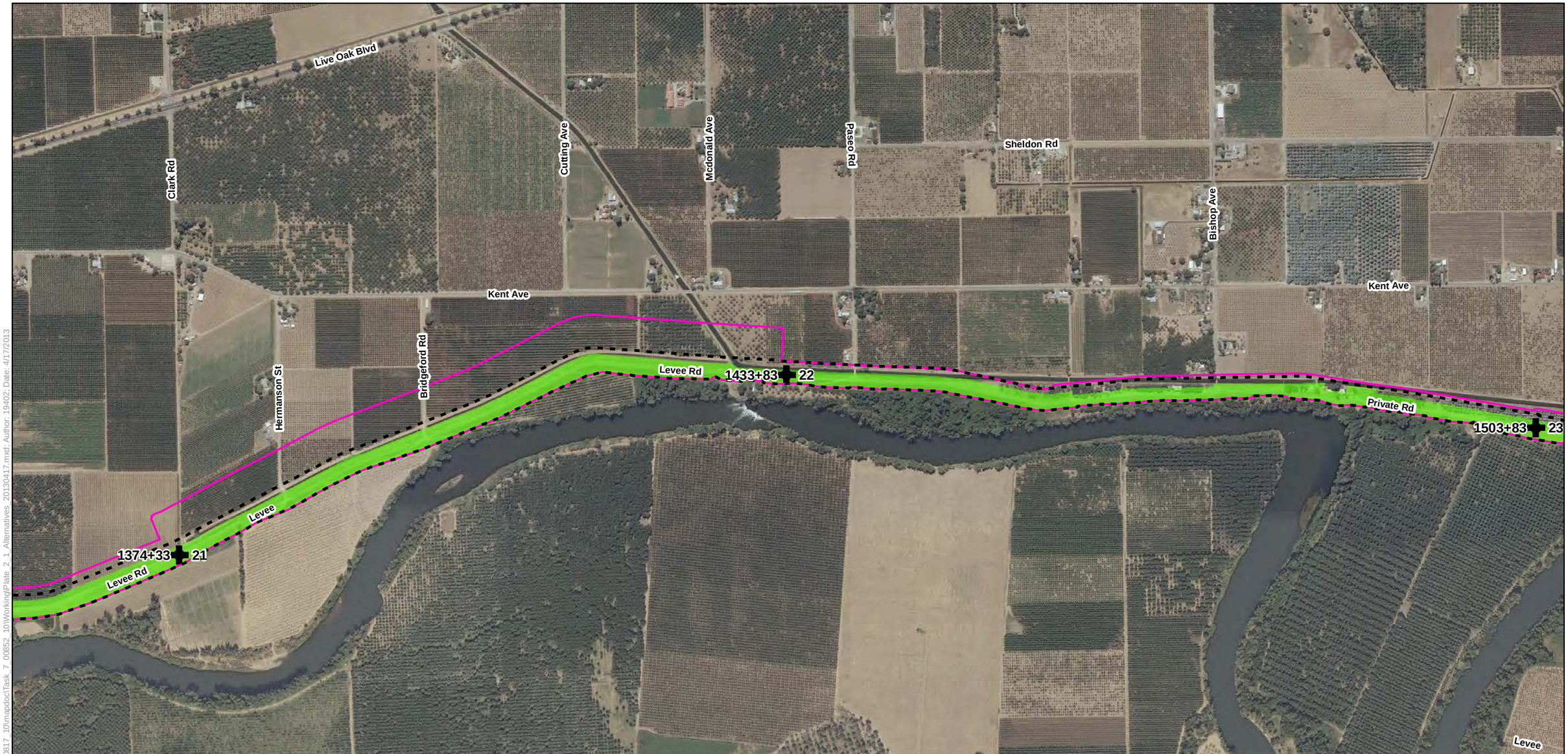

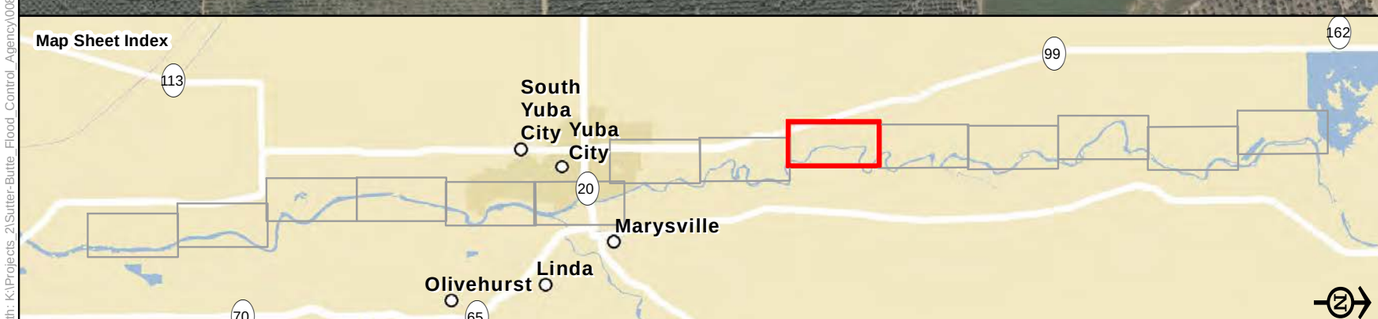

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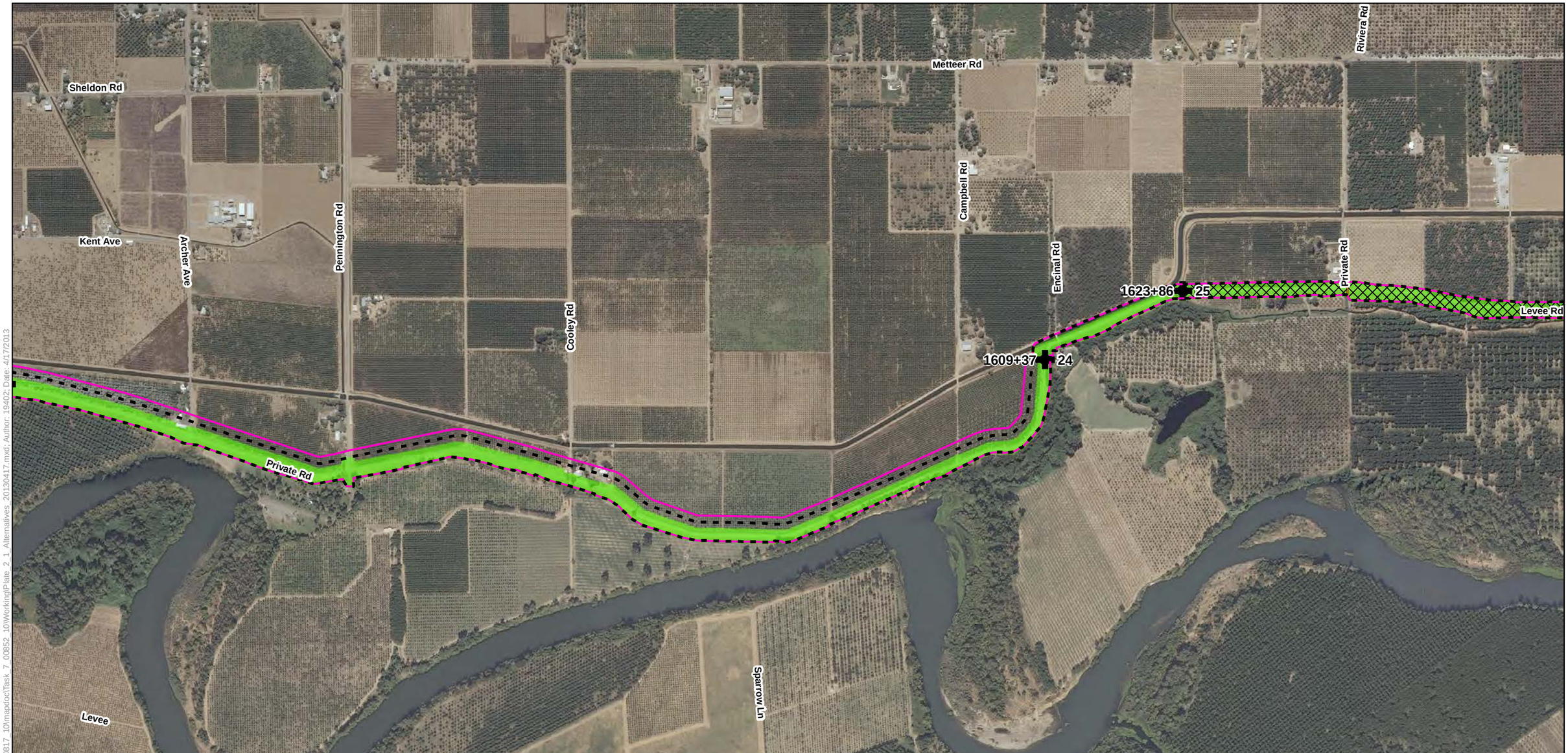

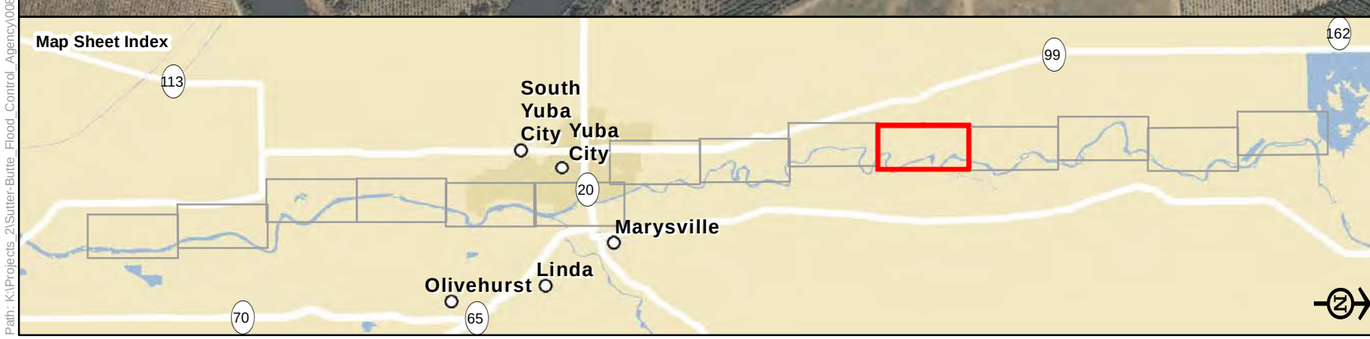

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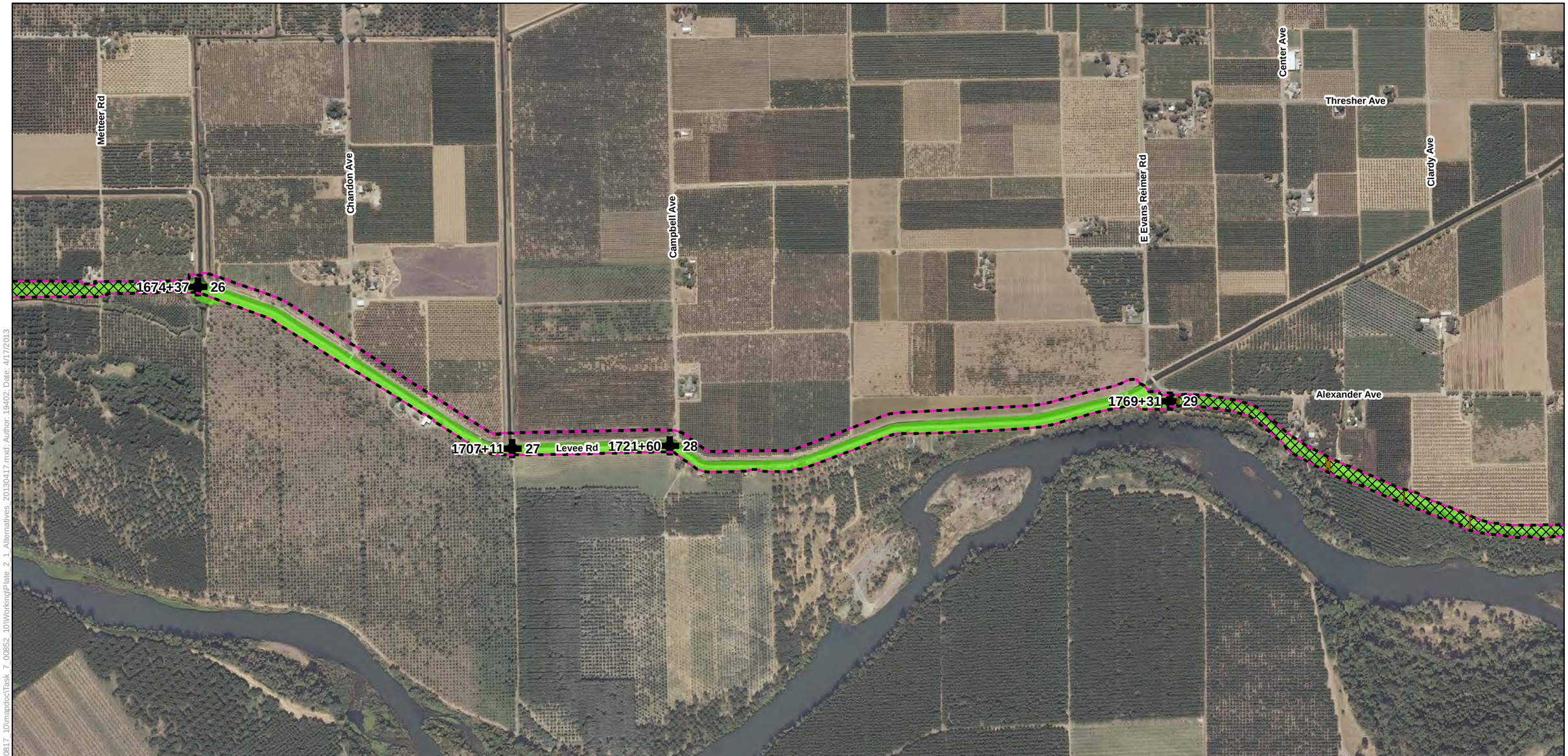

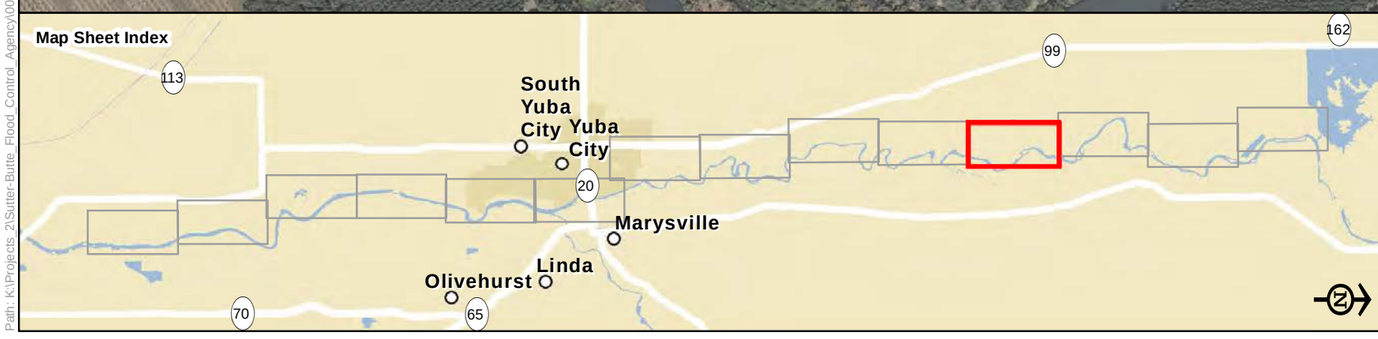

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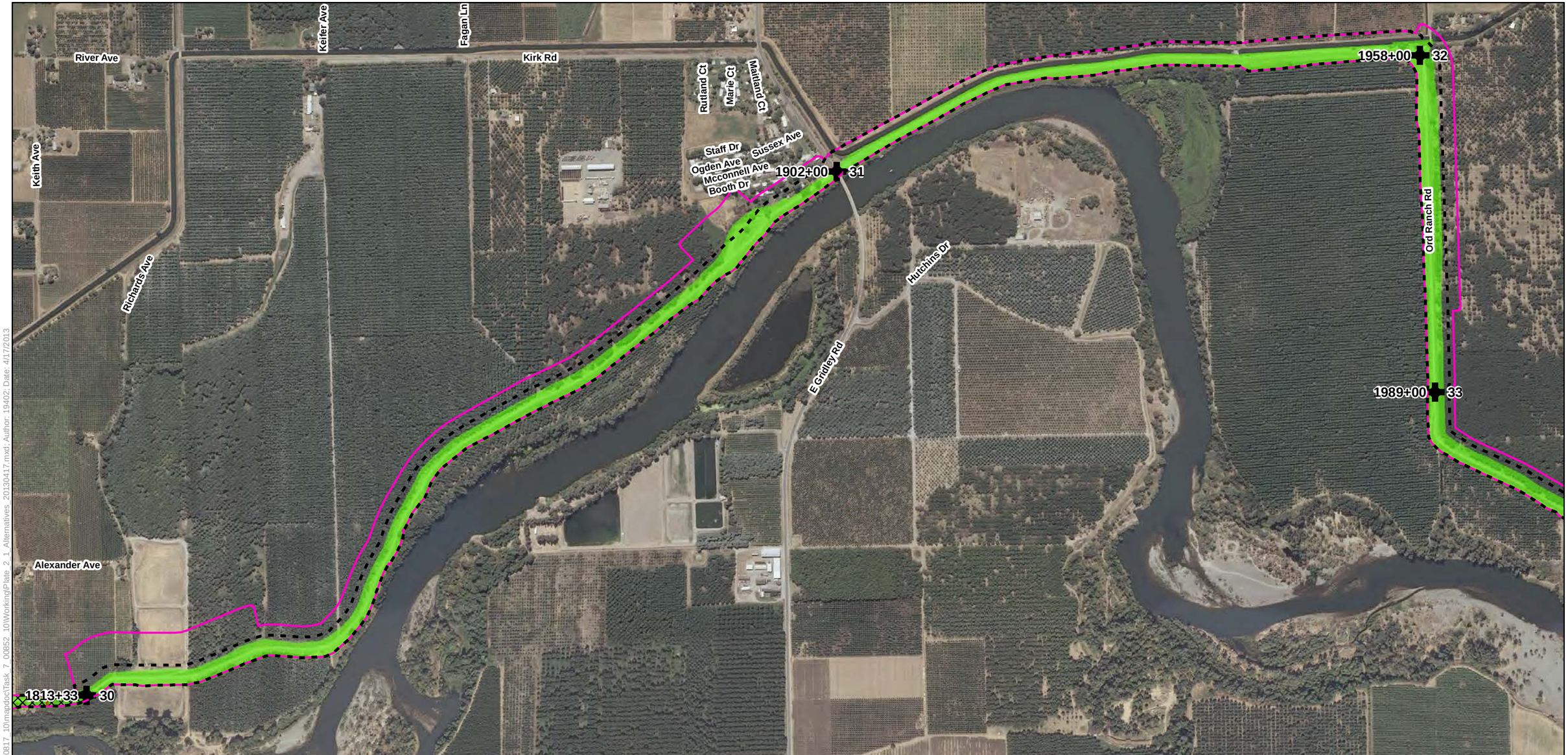

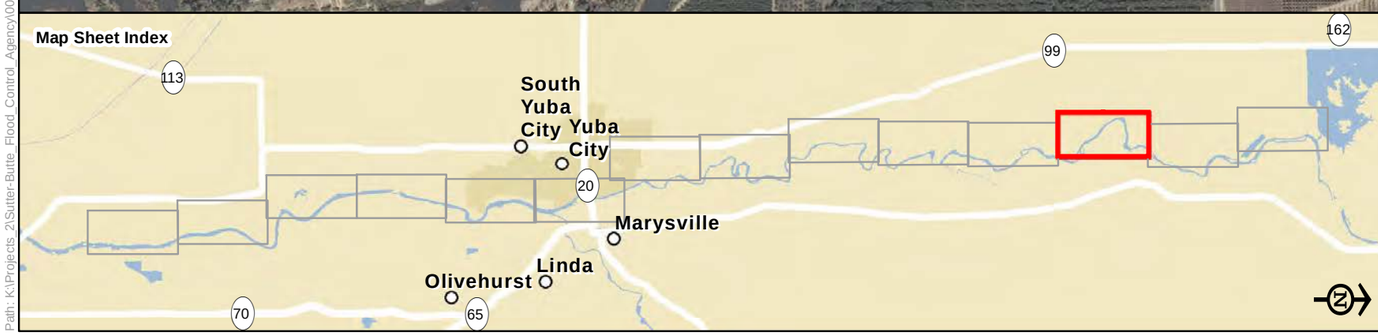

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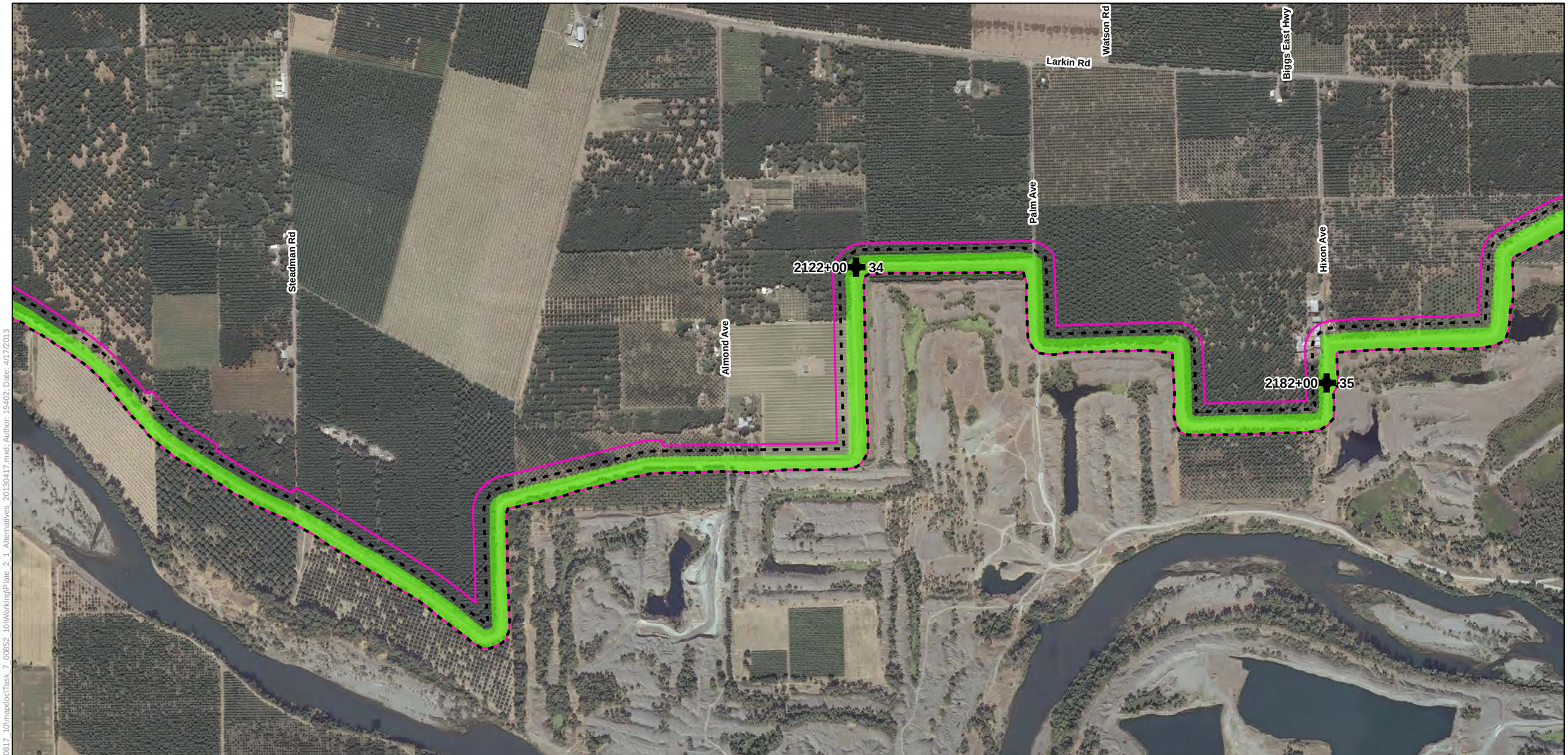

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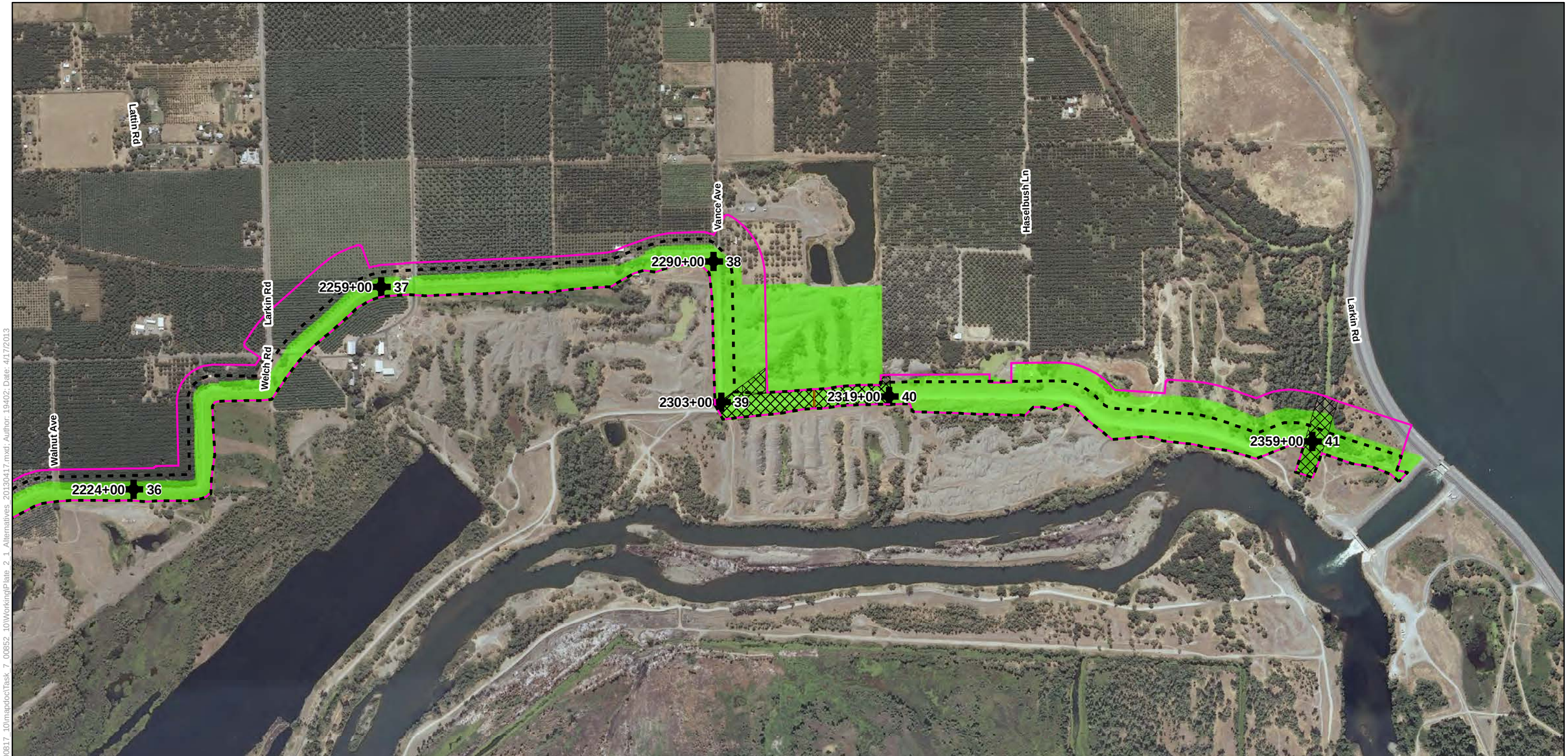

Legend

- Reach
- Station 202+50
- Alternative 1
- Alternative 2
- Alternative 3
- Encroachment
- No Work\Construction Access Only

Plate 2-1
Alternatives 1-3

Sheet 14

0 450 900
Feet

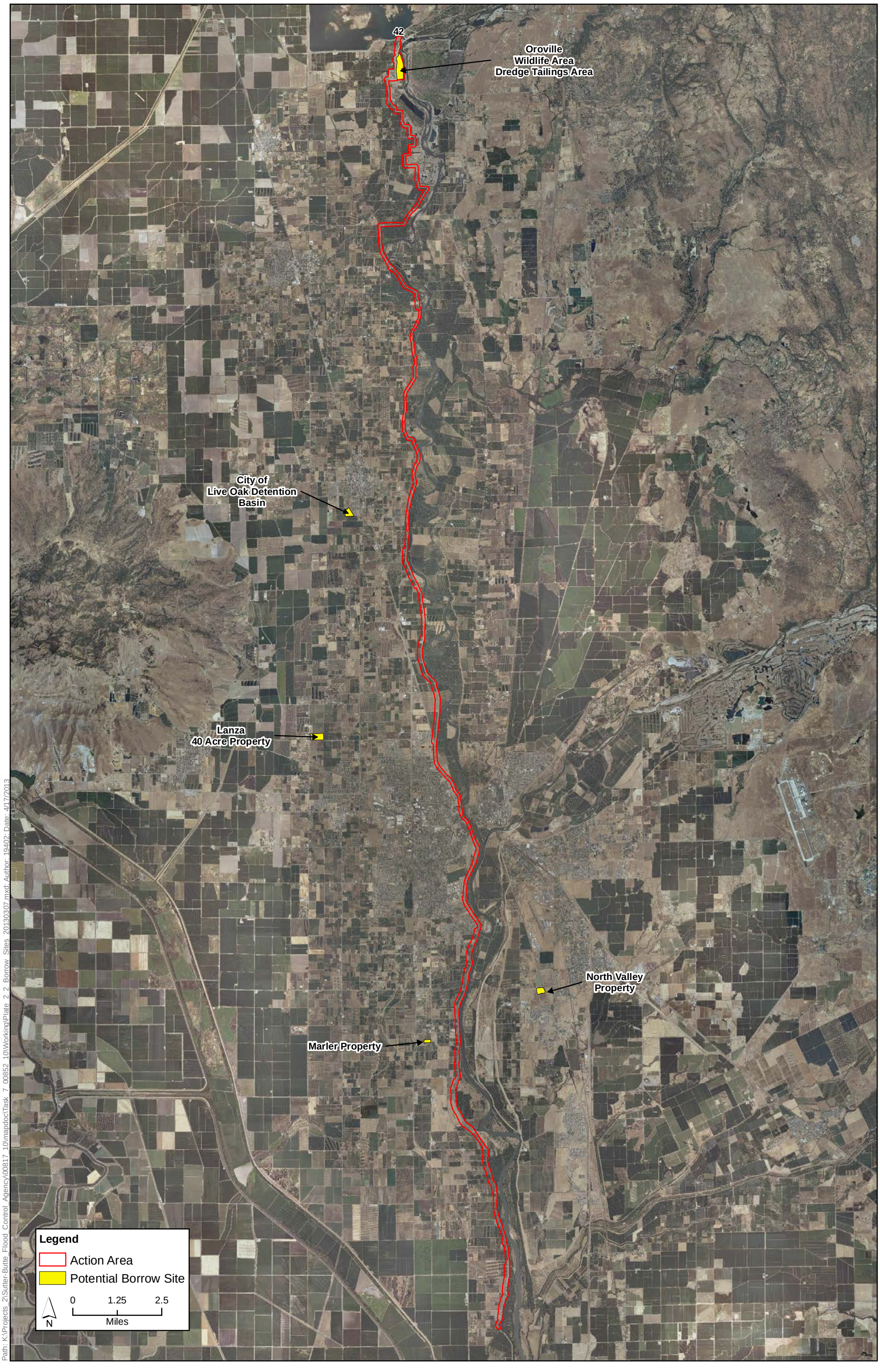

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Plate 2-2
Potential FRWLP Borrow Sites

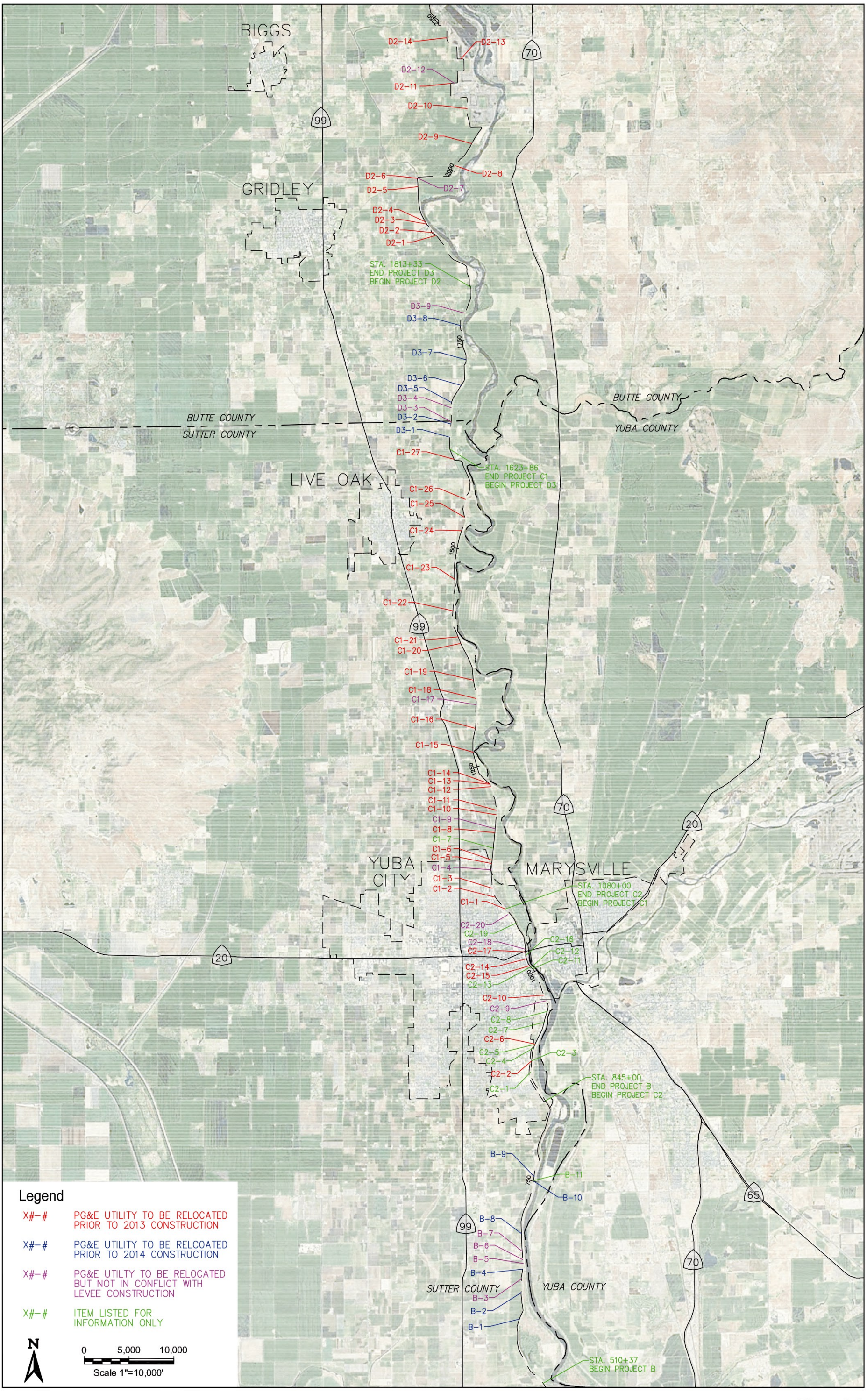


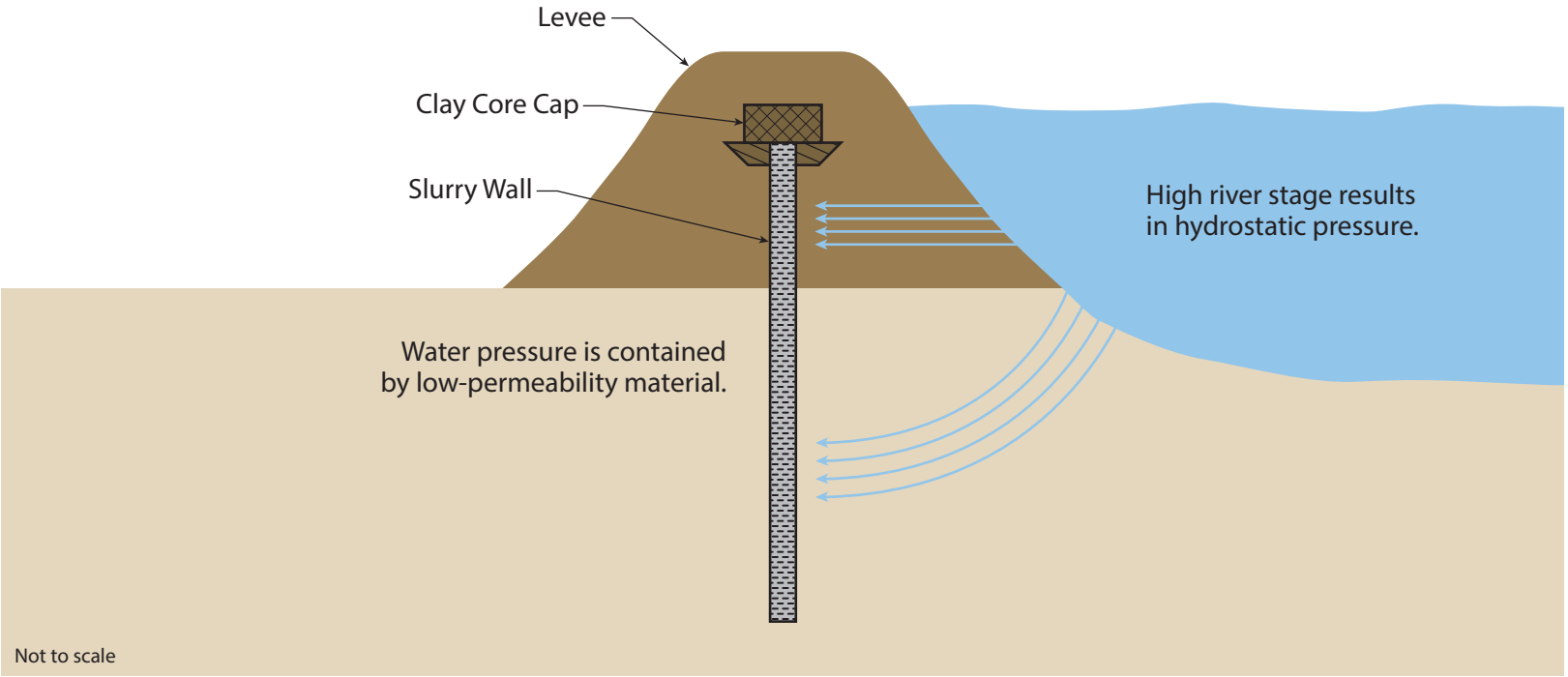
Plate 2-3
PG&E Project Relocations

Concept

Through-seepage is controlled by a low-permeability wall conctructed within the levee cross section.

Details

- Constructed via conventional slot trench, deep soil mixing or jet grouting method.
- Wall is approximately 3′ wide and up to 140′ deep.
- Wall is often capped with a clay core.

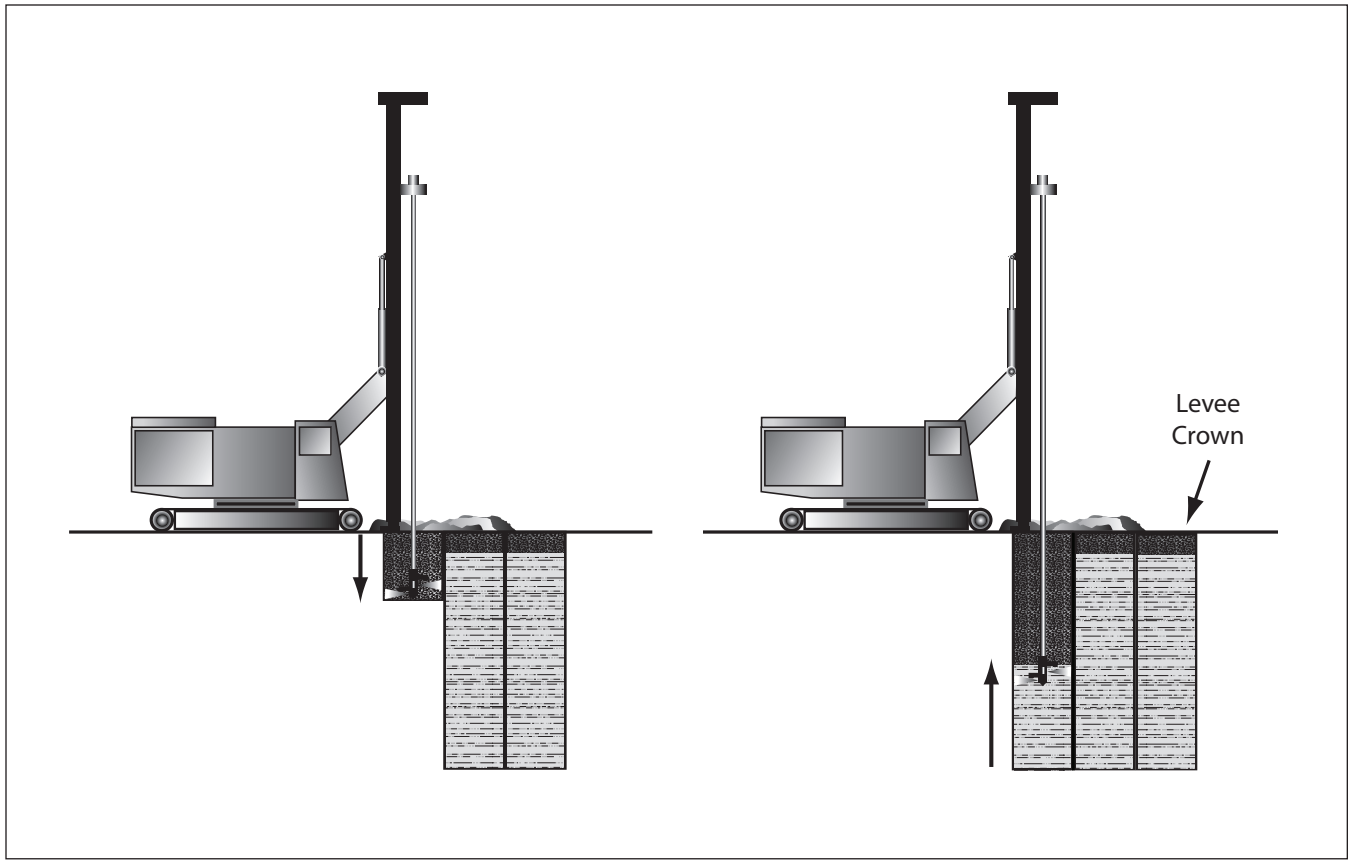


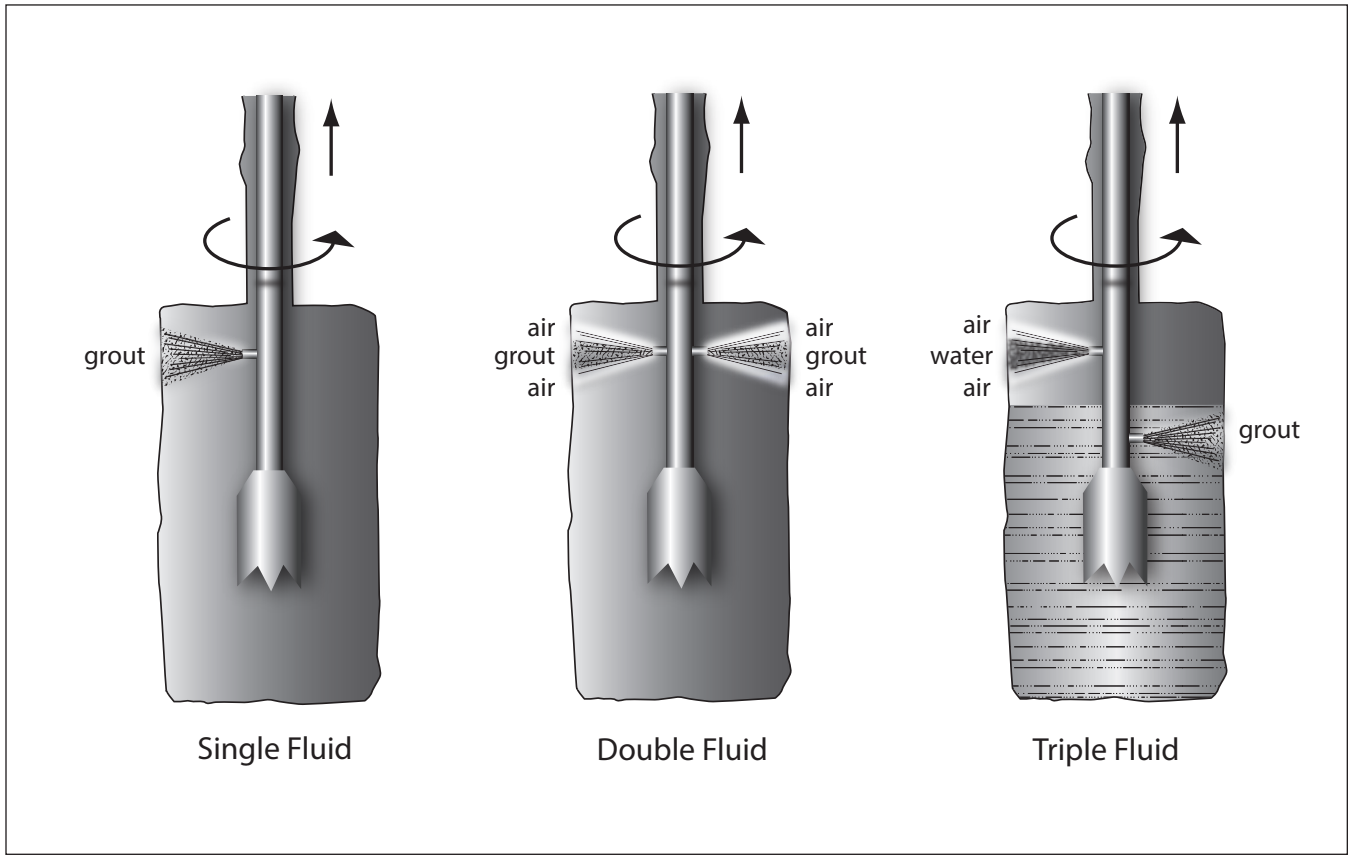
Graphics ... 00852.10 (8/3/12) AB

Plate 2-4
Slurry Cutoff Wall

Graphics . . . 00852.10 (8/3/12) AB

Plate 2-5
Deep Soil Mixing





Graphics ... 00852.10 (8/3/12) AB

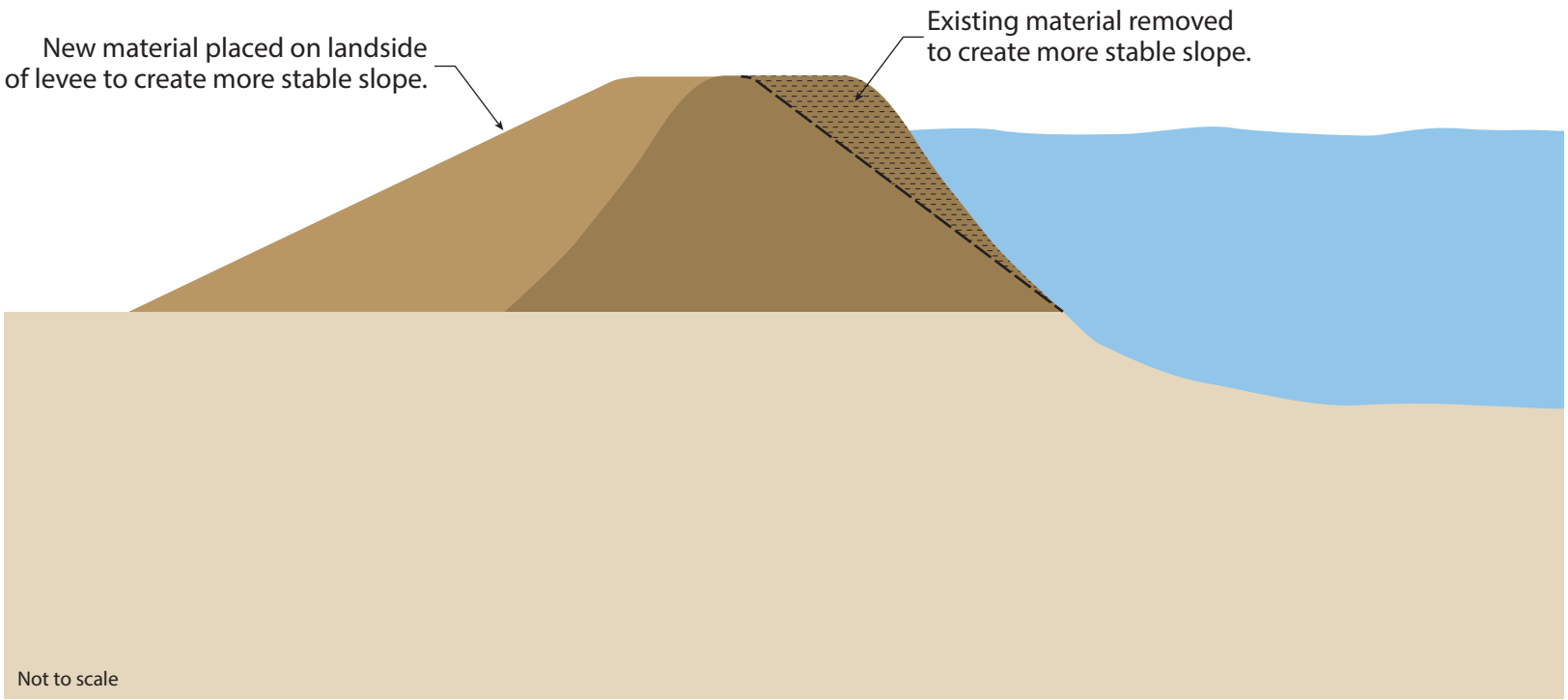
Plate 2-6
Jet Grouting Diagrams

Concept

Flatter slopes are more stable and less susceptible to erosion.

Details

- Slopes are repaired by reforming material on the landside (and waterside if necessary) to create flatter slopes.
- New material will meet current standards.



Graphics ... 00852.10 (8/3/12) AB

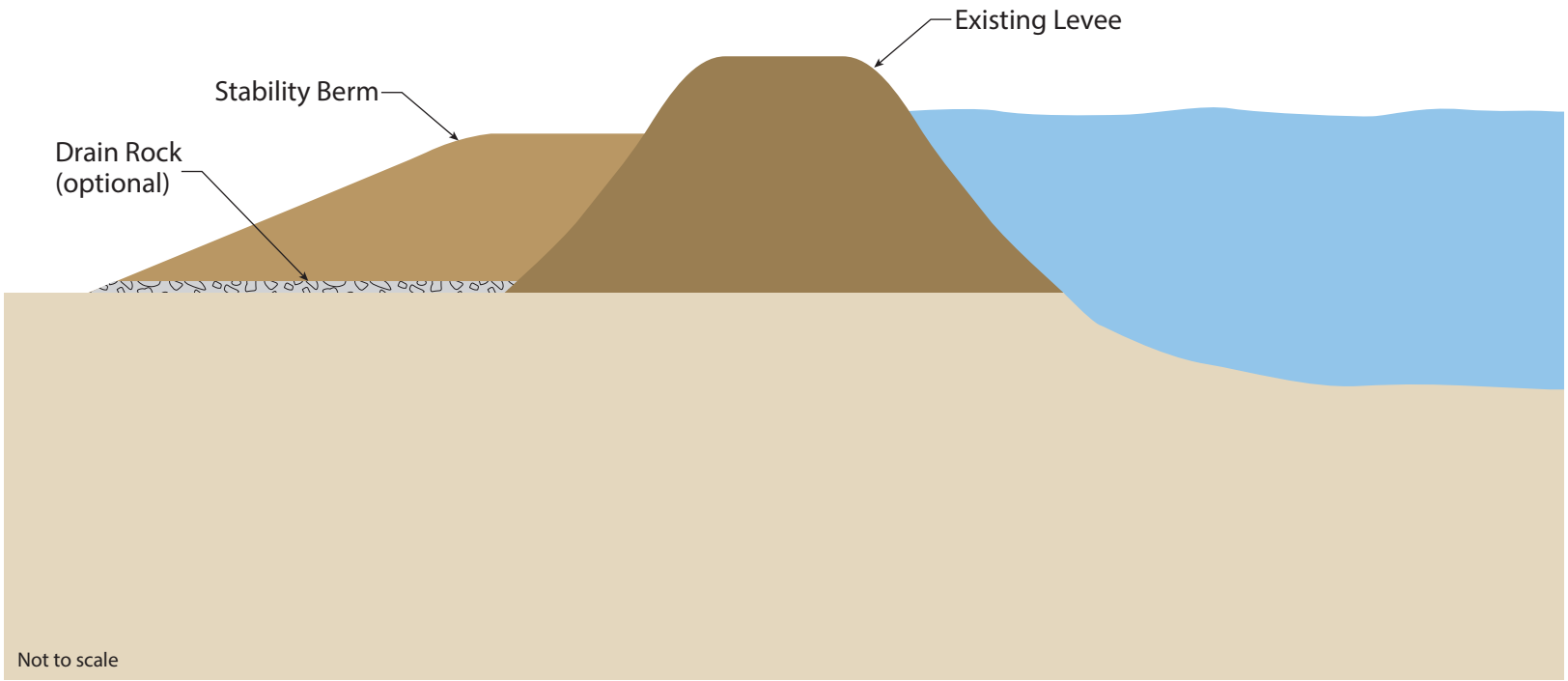
Plate 2-7
Slope Flattening

Concept

Provides additional support to levee to increase strength.

Details

- Berm height is generally 2/3 the height of levee, extending for a distance determined by the structural needs of the levee.
- An optional drainage layer may underlie the berm.



Graphics ... 00852.10 (8/3/12) AB

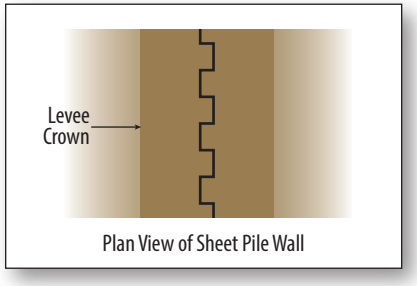
Plate 2-8
Stability Berm

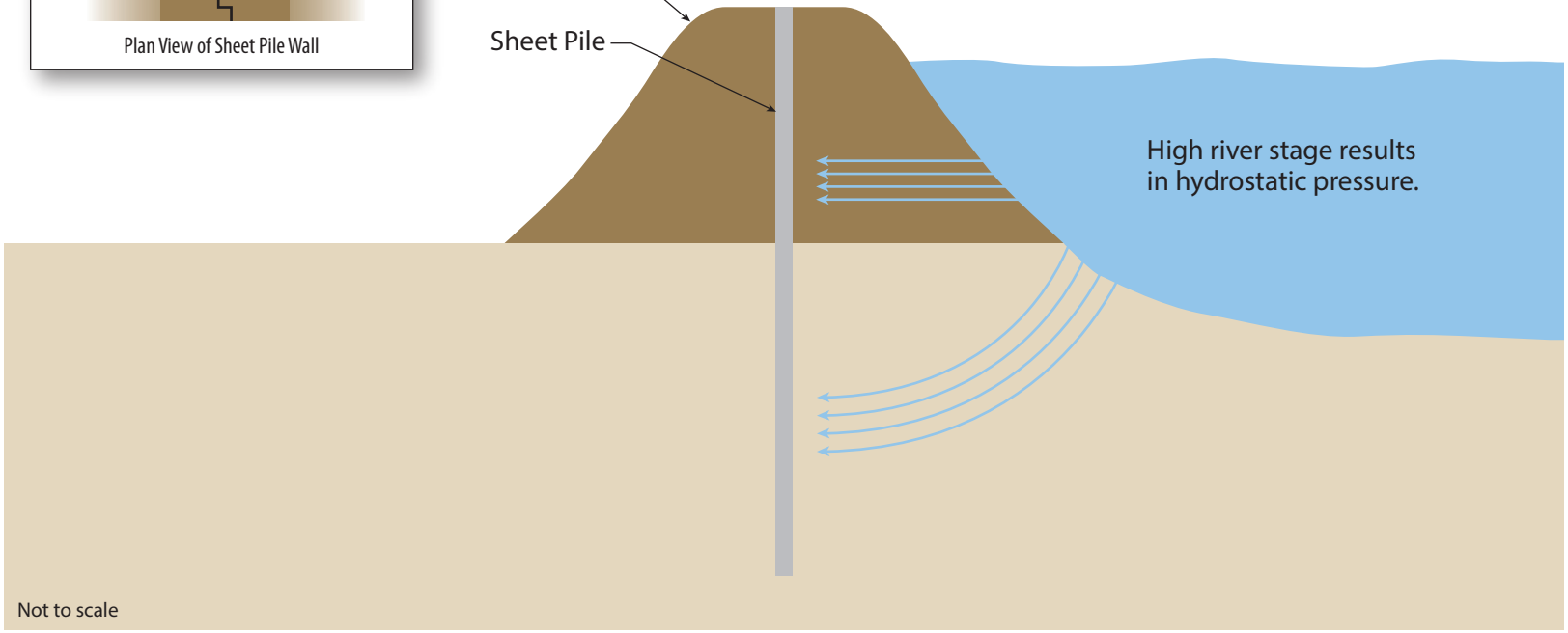
Concept

Steel panels are driven into the levee core to provide a seepage barrier.

Details

- Interlocking steel sheet piles are driven into the ground by a pile driving head attached to a crane.
- Pre-drilling of soil may be necessary if earth is particularly solid.





Graphics ... 00852.10 (8/3/12) AB

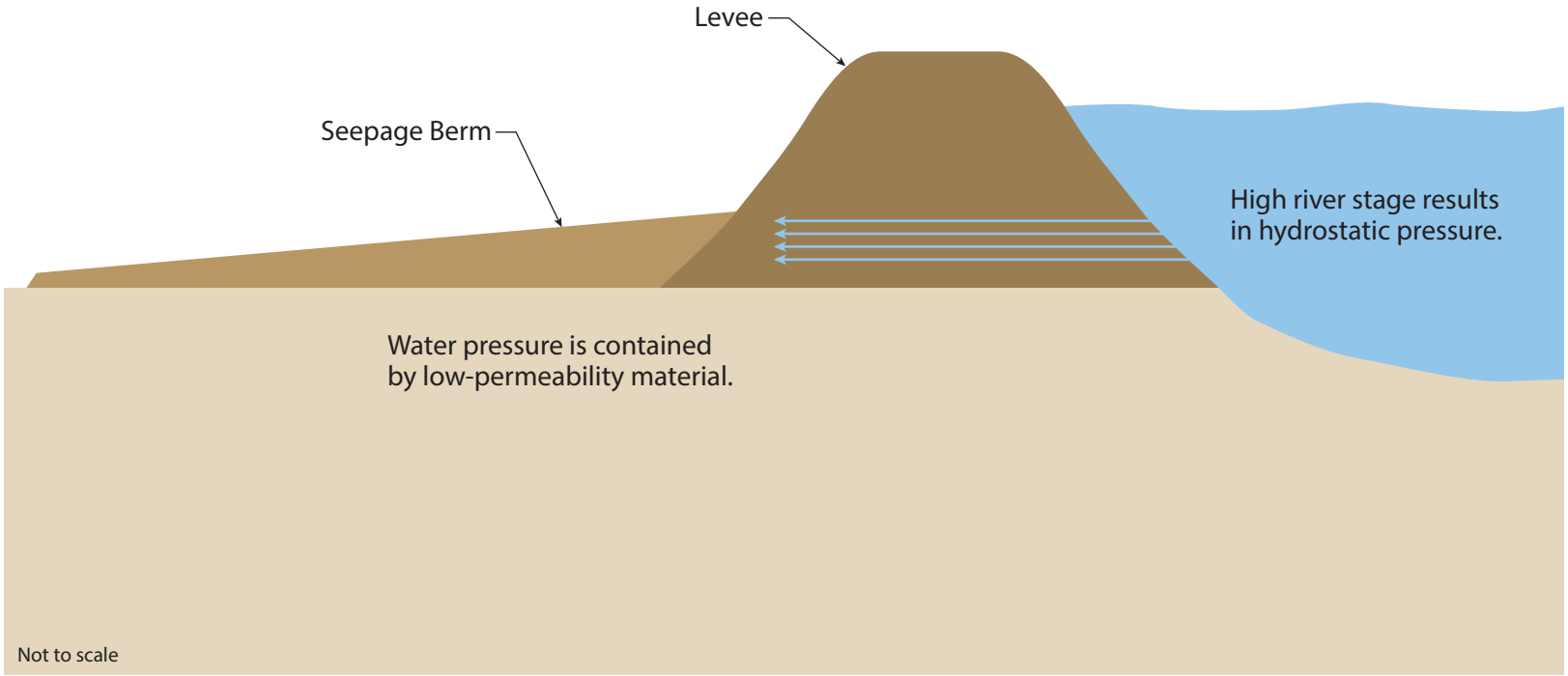
Plate 2-9
Sheet Pile Wall

Concept

Water pressure is contained and dispersed by a thickened soil layer.

Details

- Berm is typically one-third the height of the levee.
- Berm may extend 300′ from the levee.
- Landside toe of berm may include optional relief trench.



Graphics ... 00852.10 (8/3 /12) AB

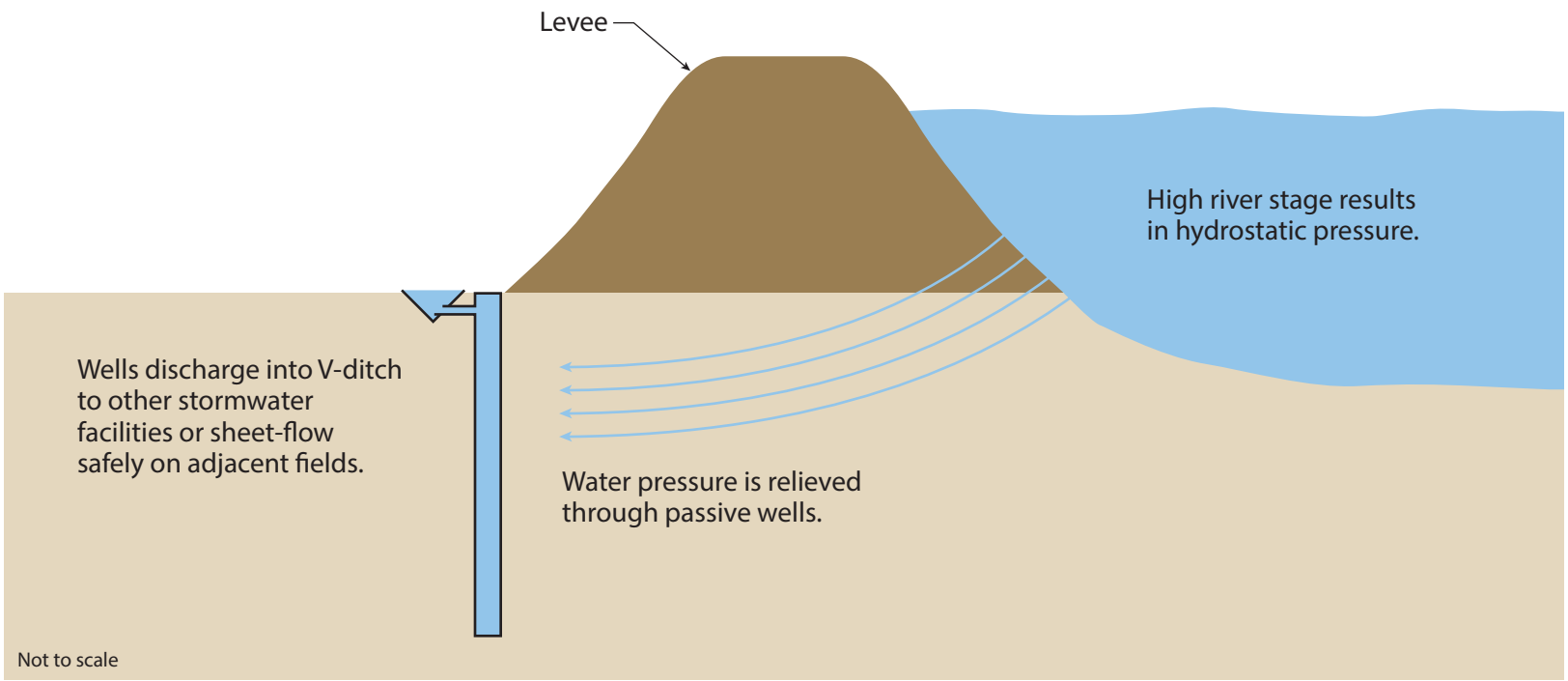
Plate 2-10
Seepage Berm

Concept

Water pressure is relieved via passive wells, which direct water discharge into a collection system.

Details

- Wells are drilled near levee toe, approximately 80′ deep.
- Well spacing is approximately 50′-100′.



Graphics ... 00852.10 (8/3/12) AB

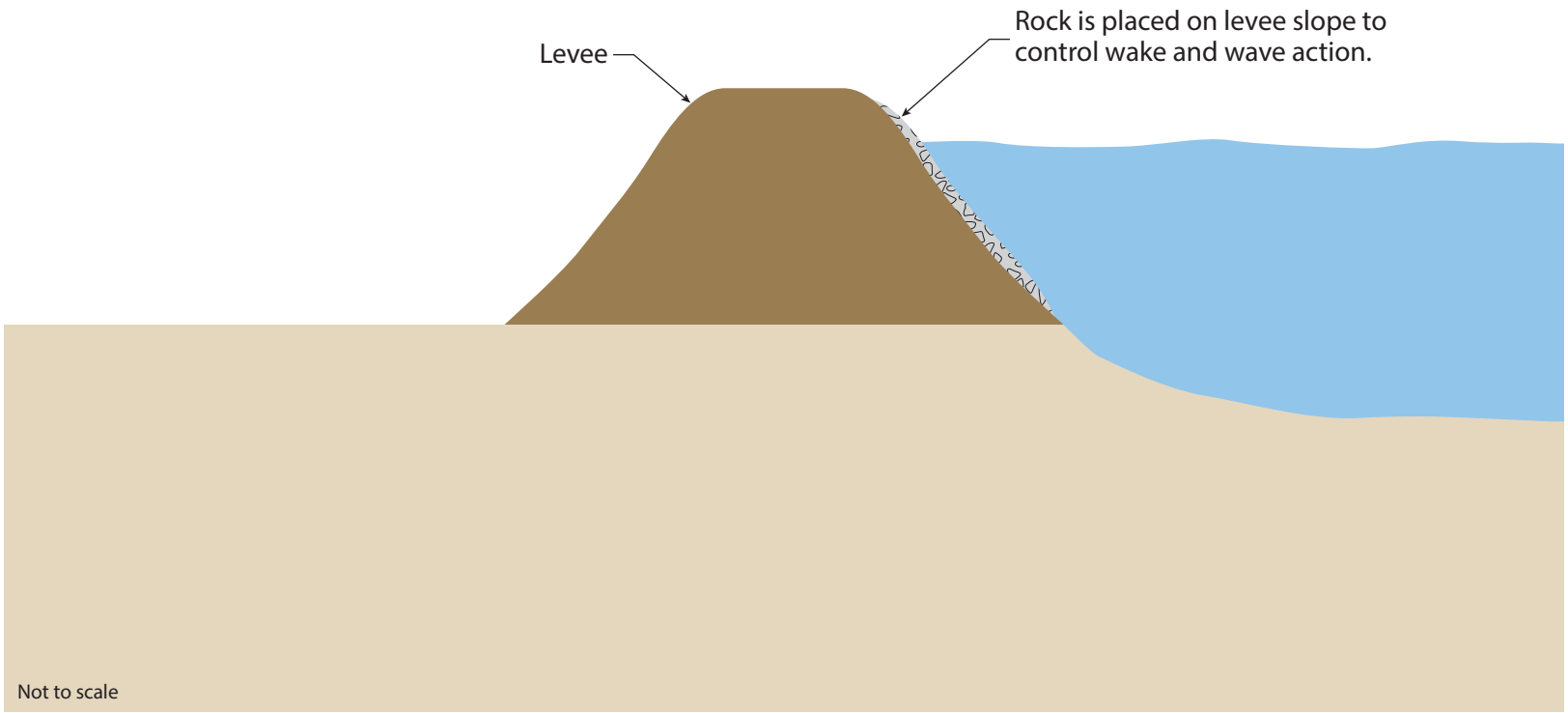
Plate 2-11
Relief Well

Concept

Water-side erosion is prevented by placement of rock.

Details

- Rock is typically 8″-18″ in diameter, placed in a 30″ layer.
- Rock could be covered by soil and/or vegetation.



Graphics ... 00852.10 (8/3/12) AB

Plate 2-12
Rock Slope Protection

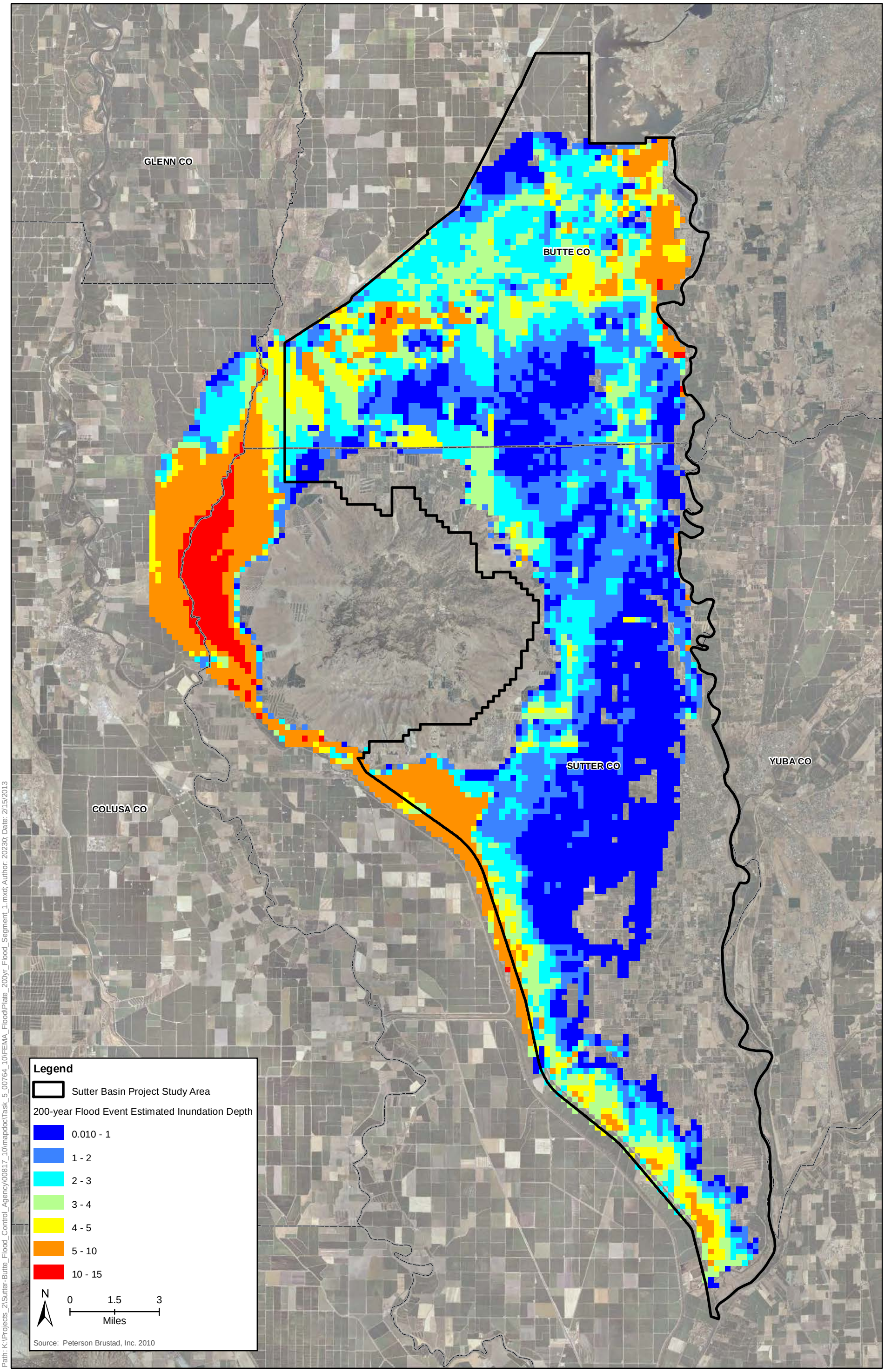


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Plate 2-13
200-year Flood Event Estimated Inundation Depth - Segment 1

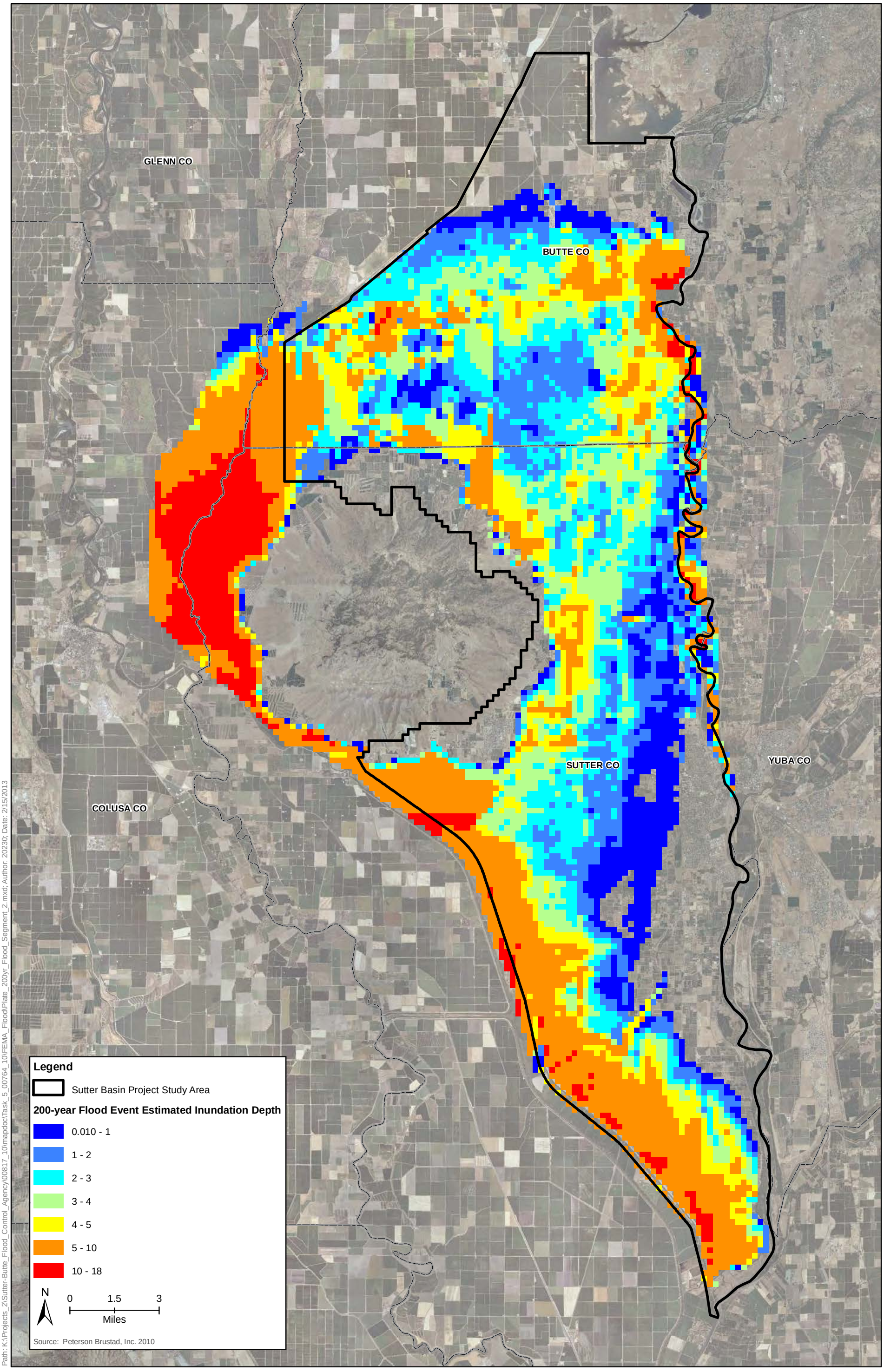

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Plate 2-14
200-year Flood Event Estimated Inundation Depth - Segment 2

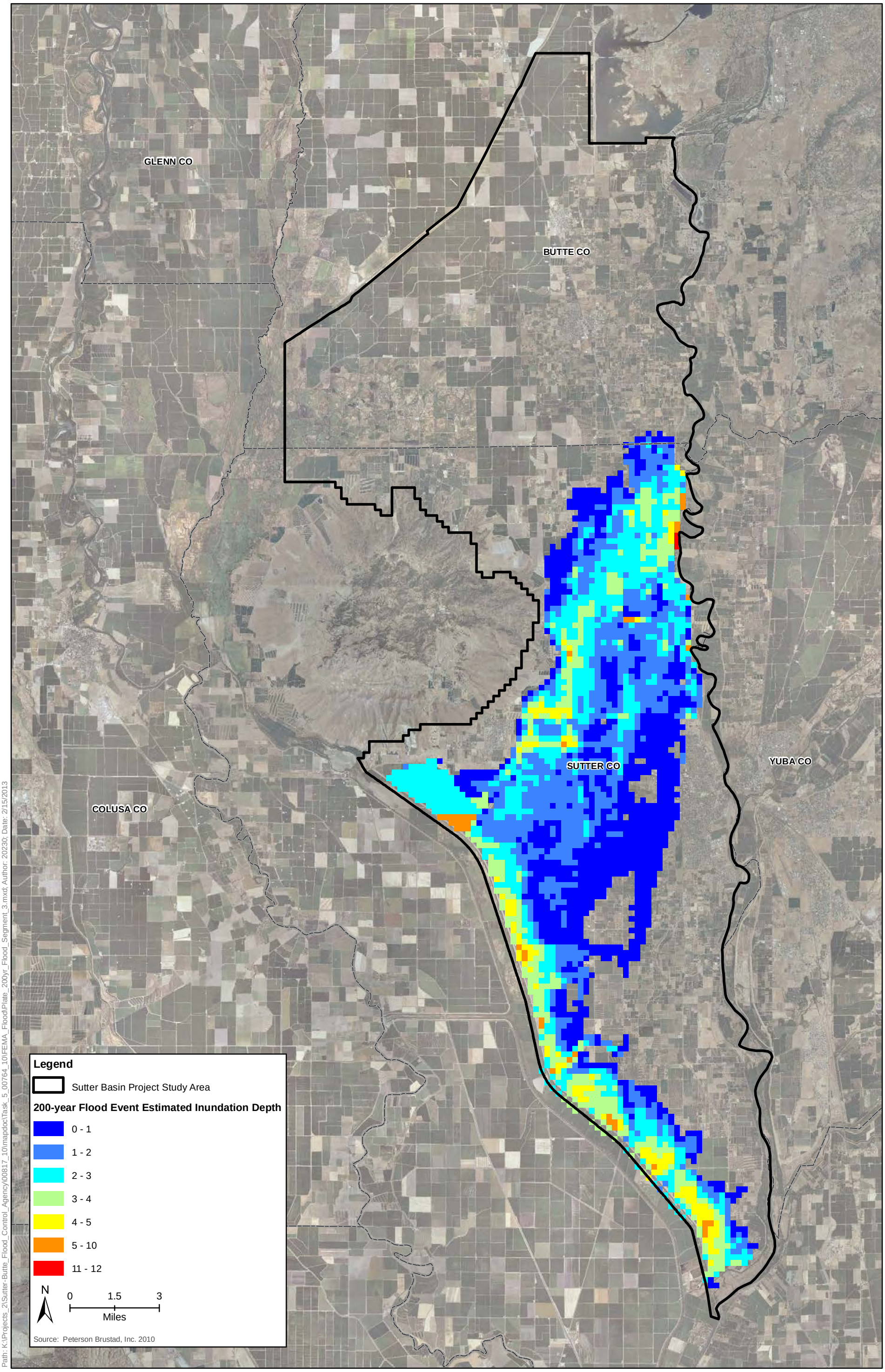

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Plate 2-15
200-year Flood Event Estimated Inundation Depth - Segment 3

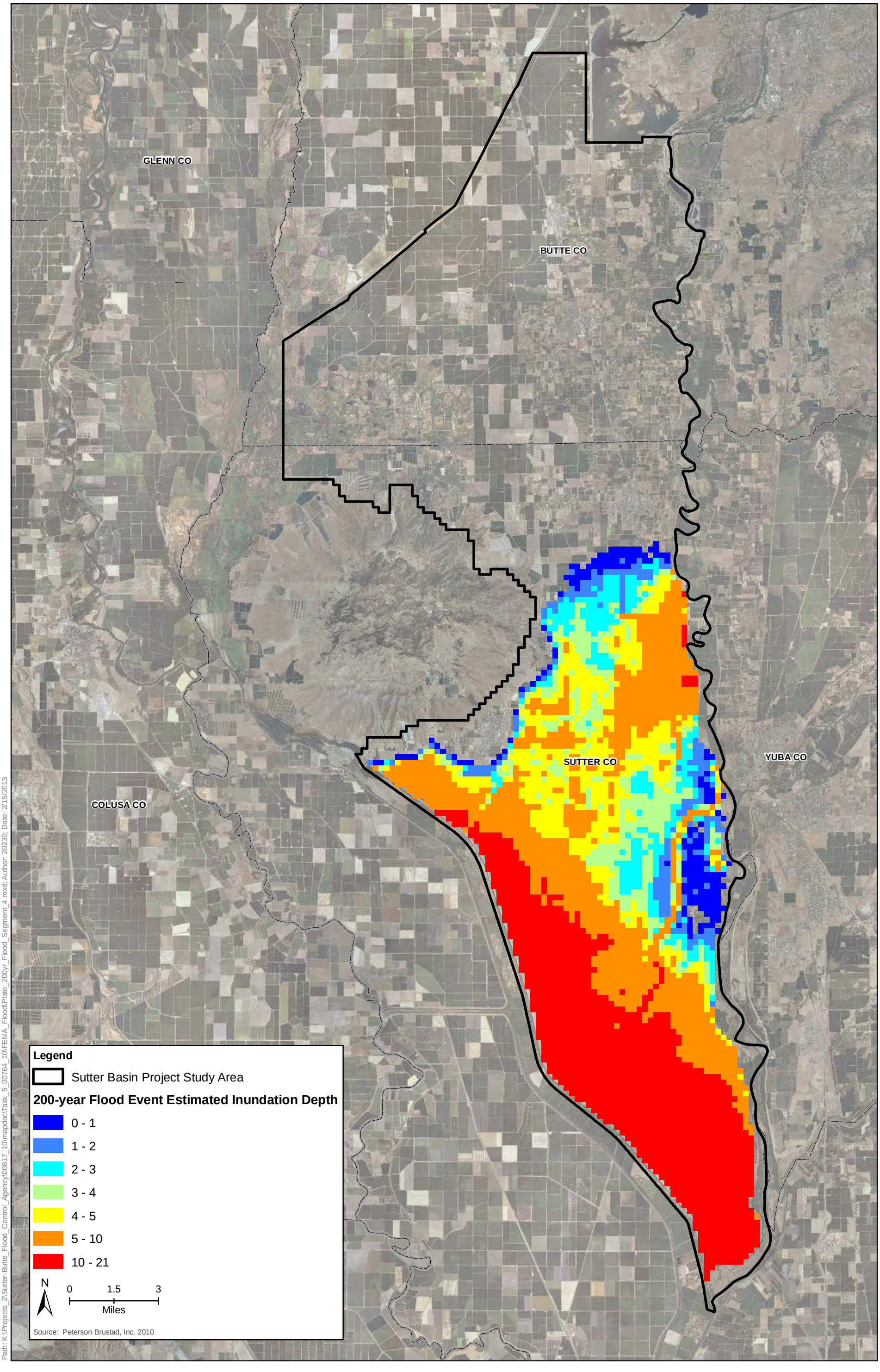

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Plate 2-16

200-year Flood Event Estimated Inundation Depth - Segment 4

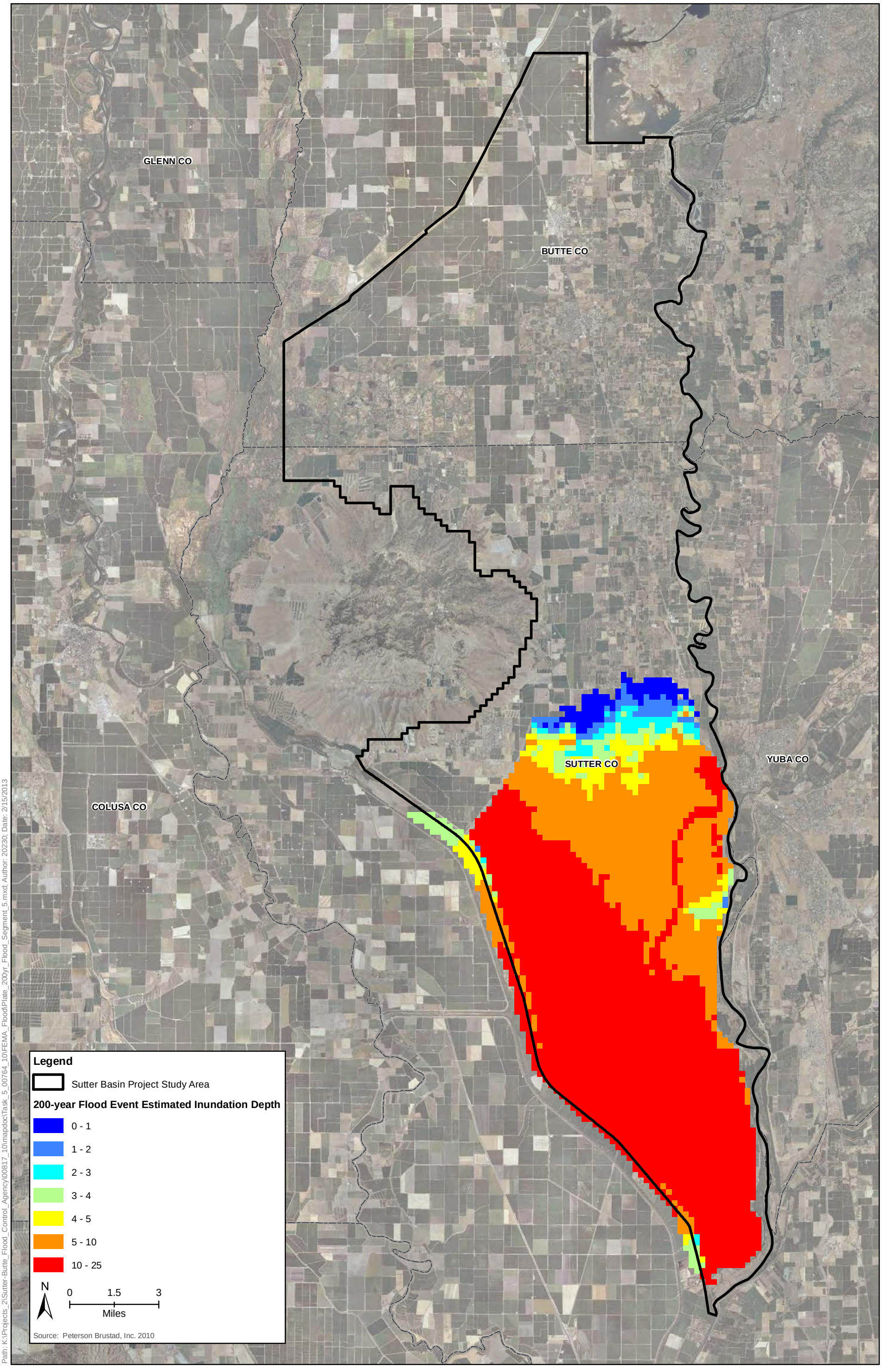

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Plate 2-17

200-year Flood Event Estimated Inundation Depth - Segment 5

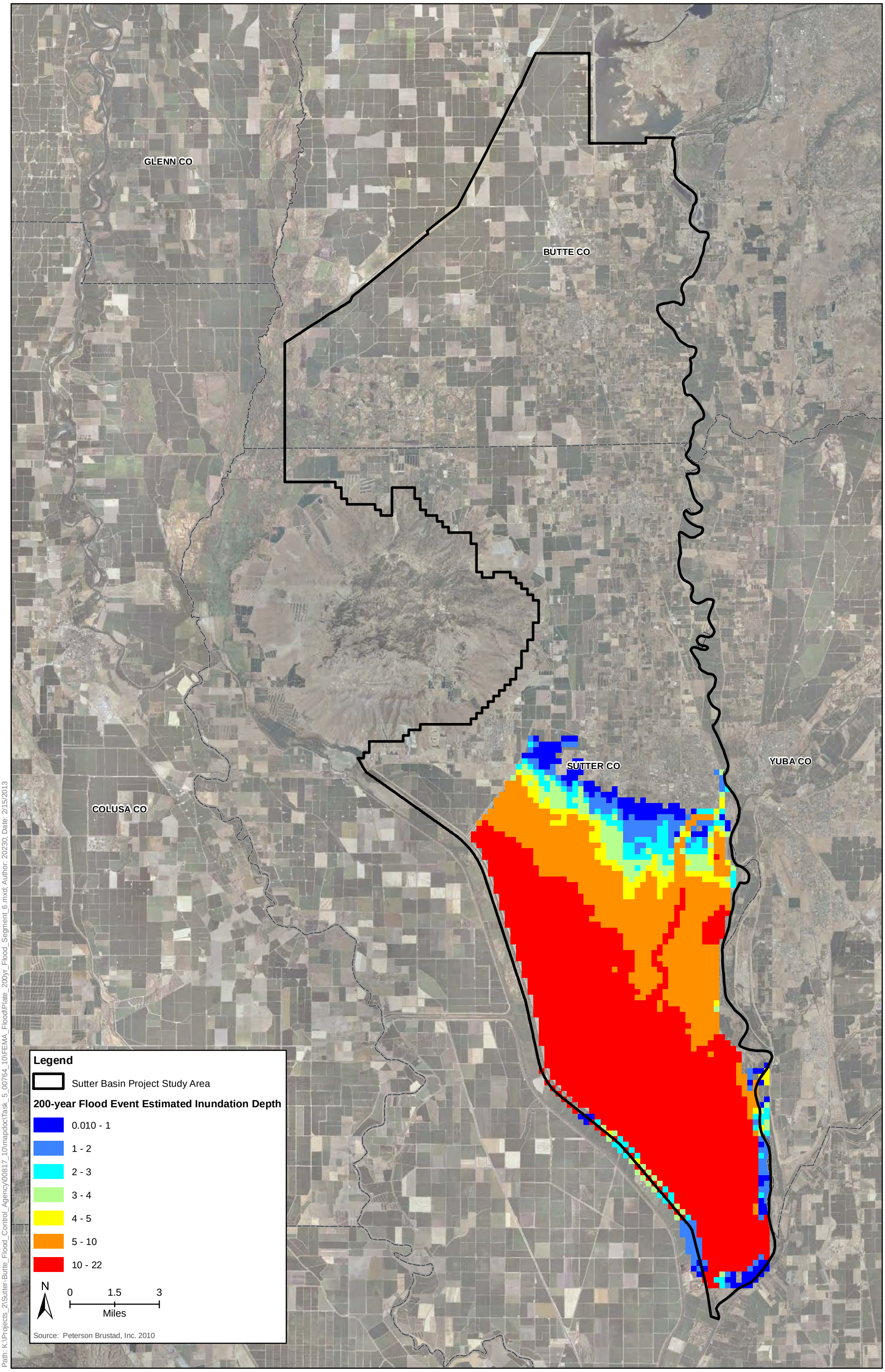

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Plate 2-18
200-year Flood Event Estimated Inundation Depth - Segment 6

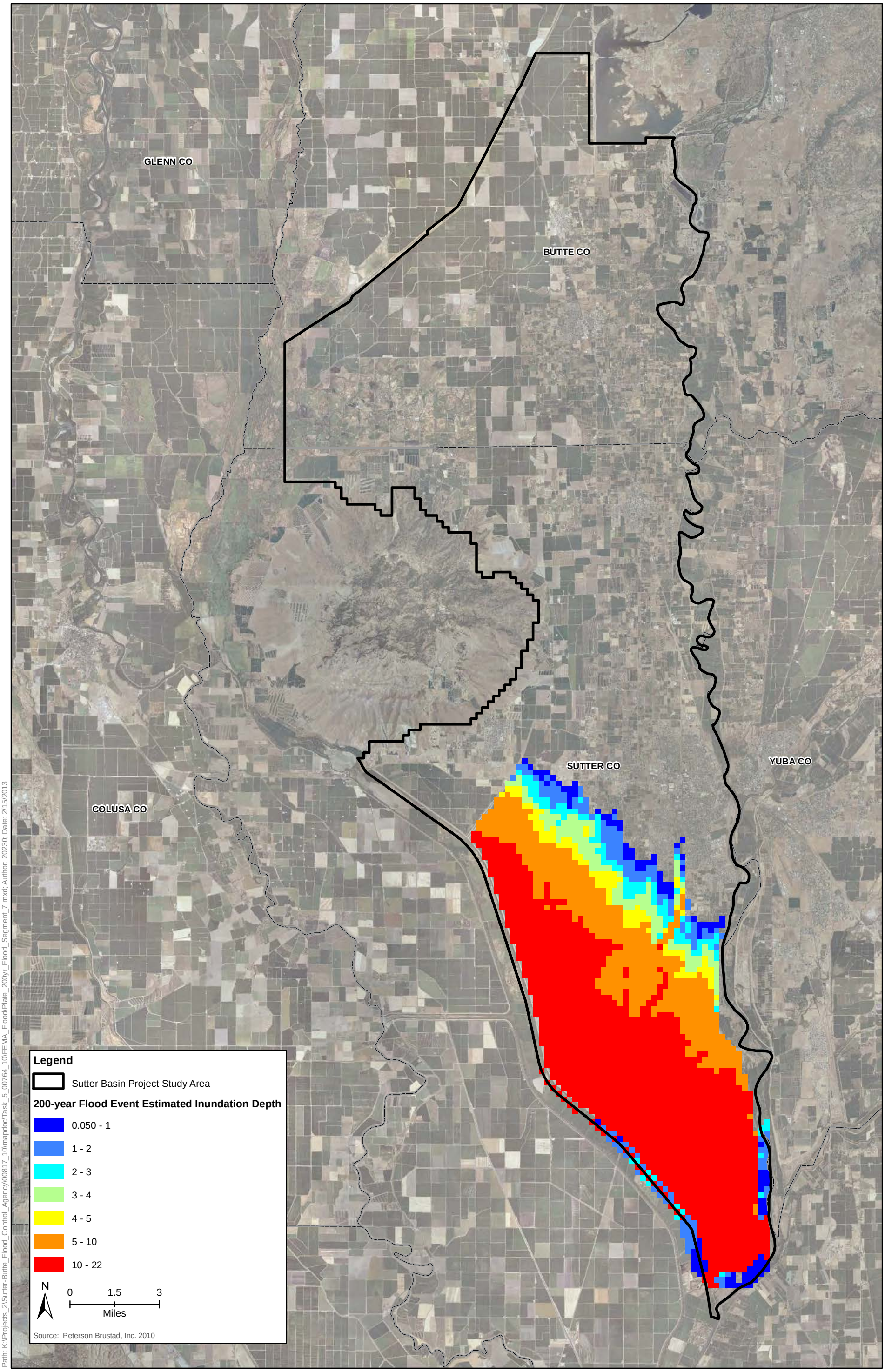

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Plate 2-19
200-year Flood Event Estimated Inundation Depth - Segment 7

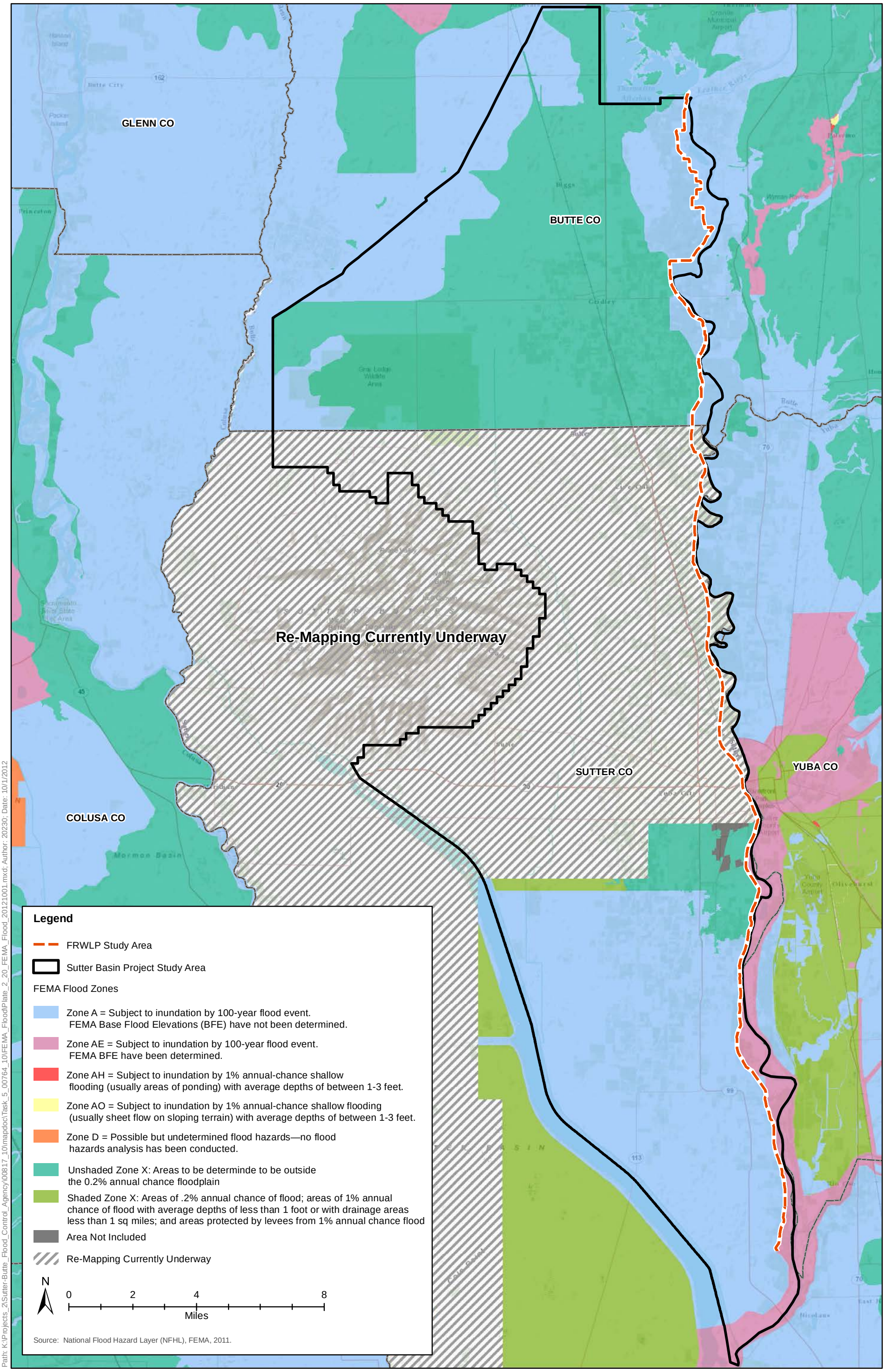

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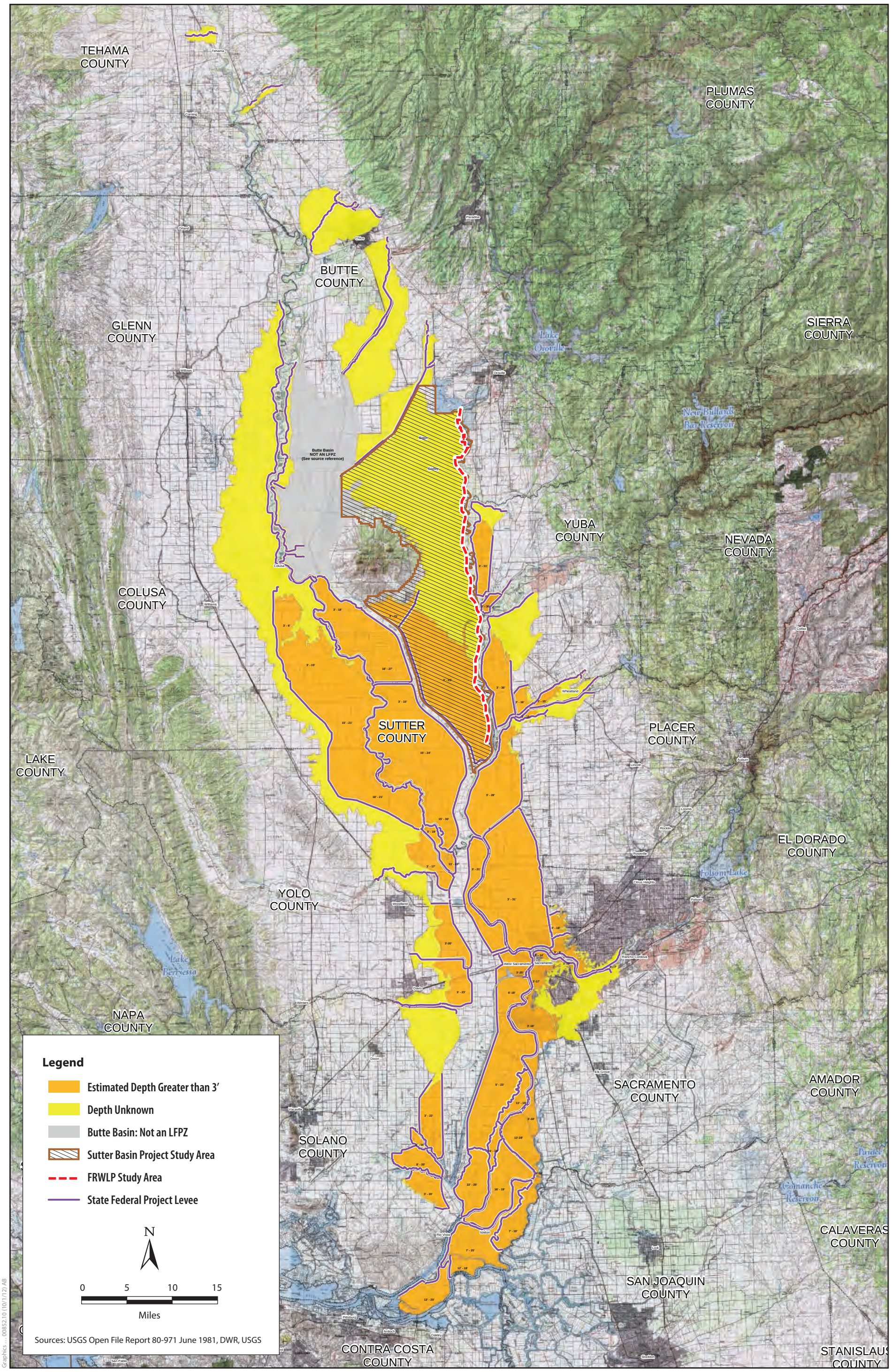
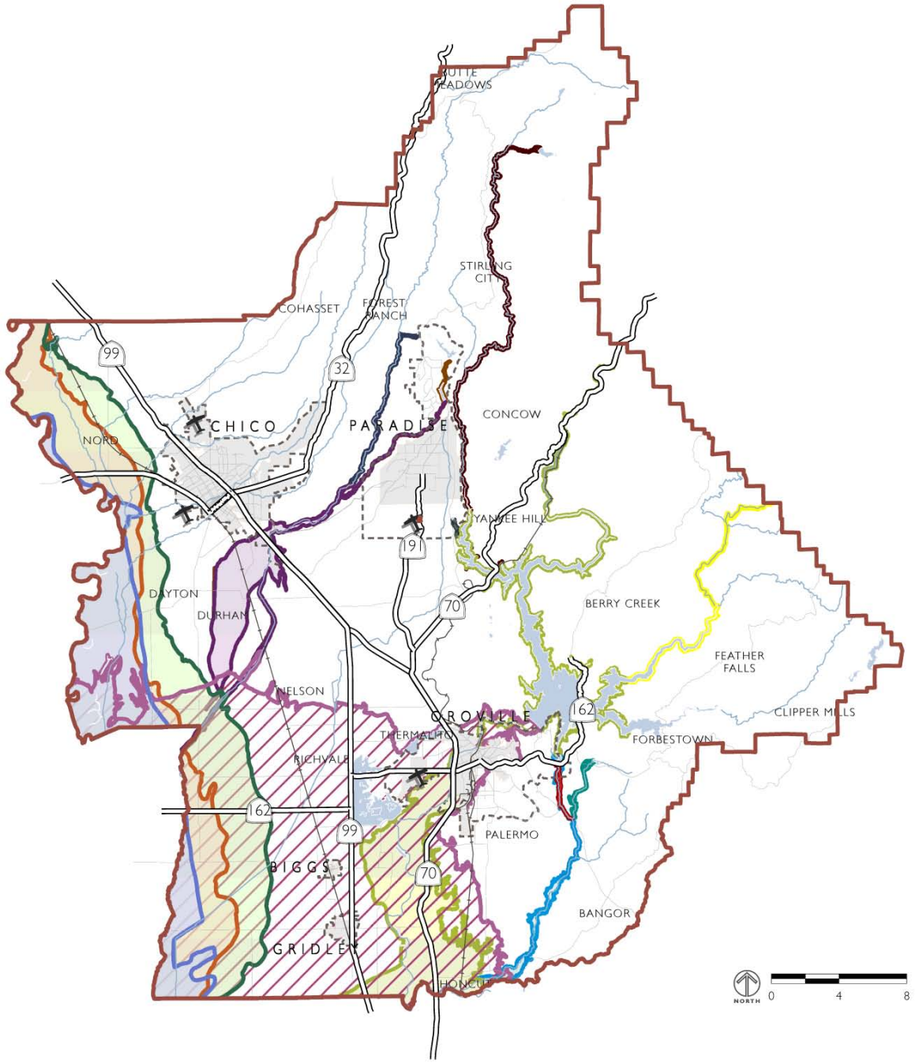
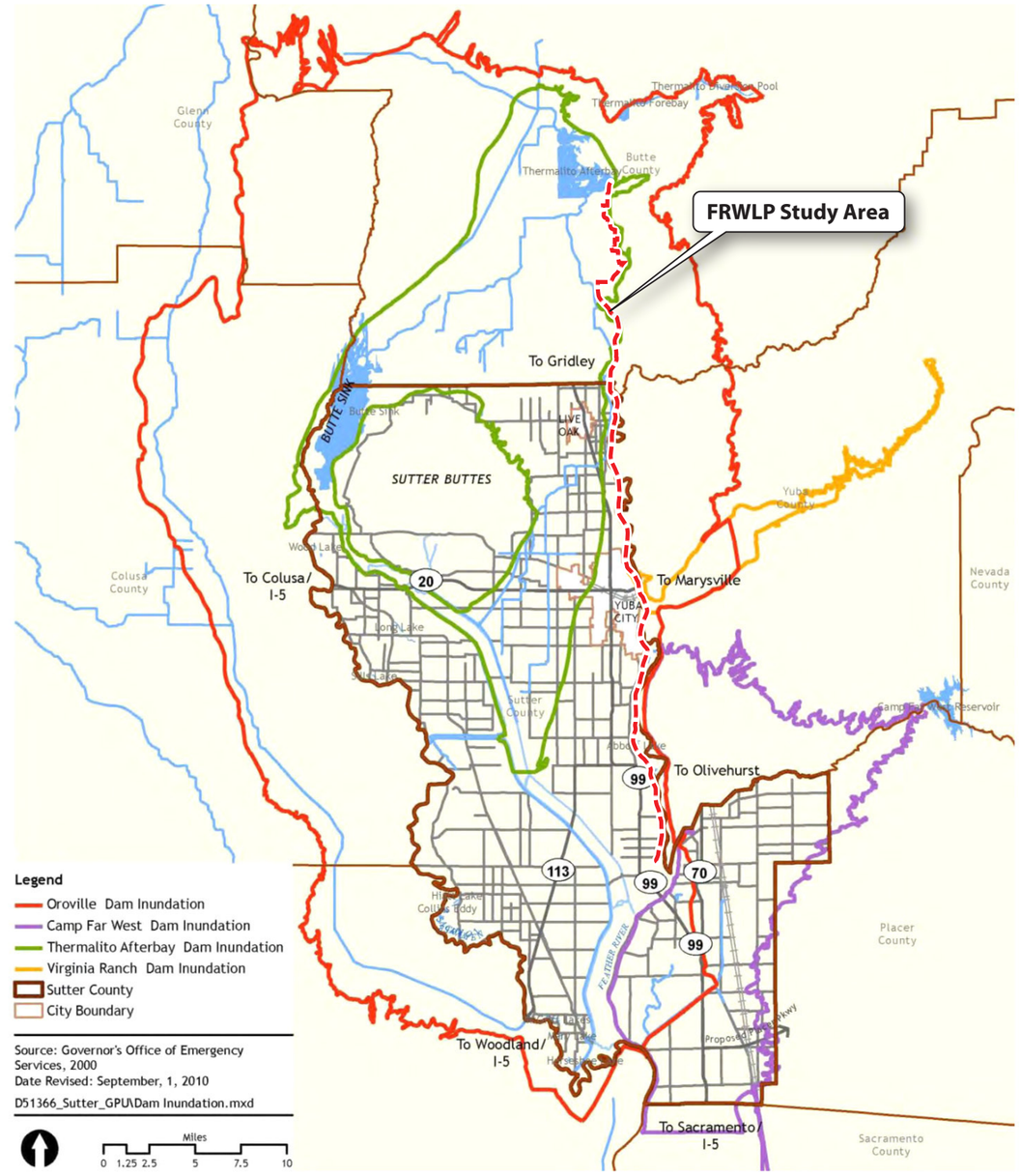
Plate 2-20
FEMA Zones



Graphics ... 00852.10 (10/1/12) AB

Plate 3.1-1
Levee Flood Protection Zones



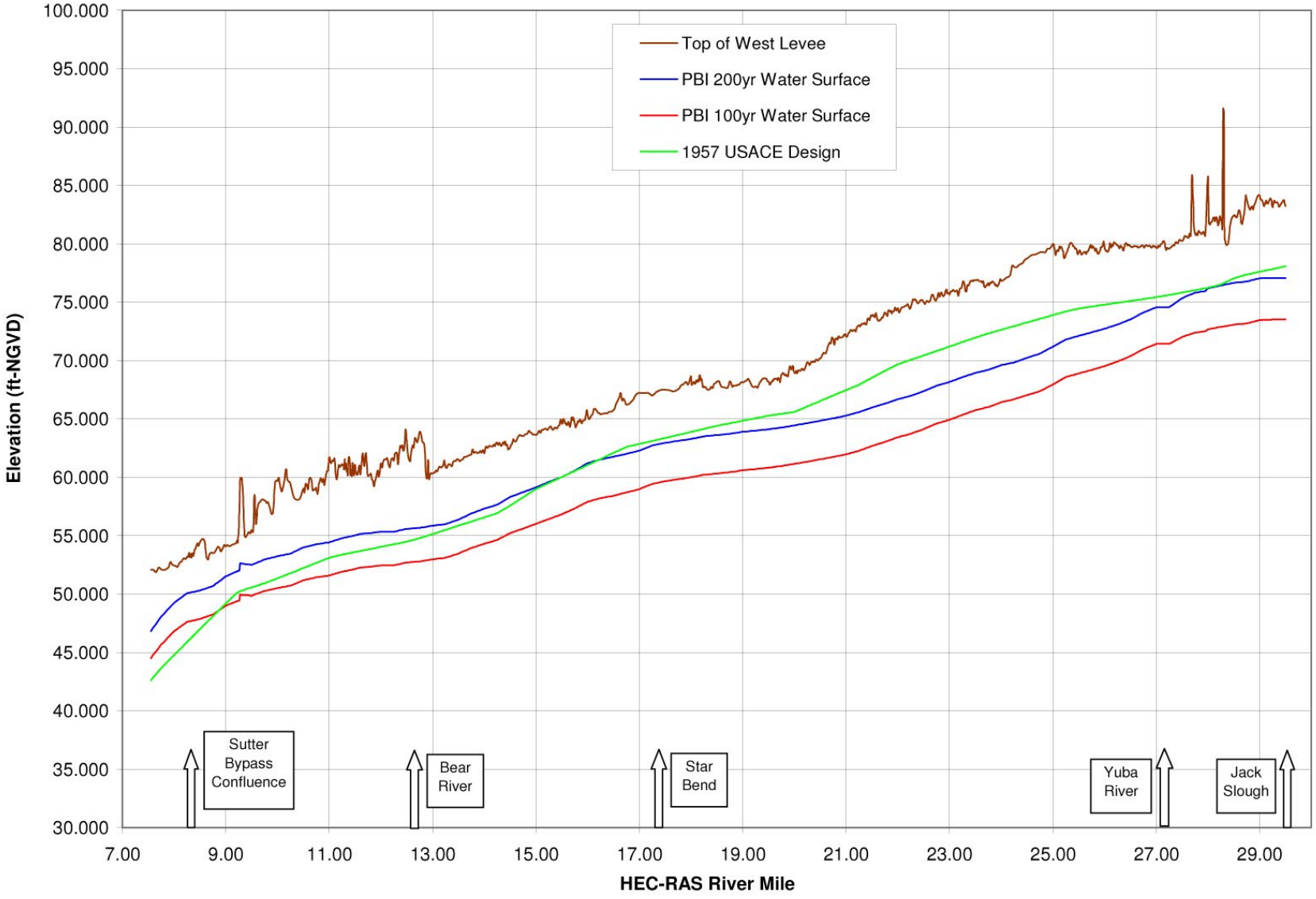


Sources: Butte County Geographic Information Systems, 2009; California Office of Emergency Services, 2006.

- Airports
- Highways
- Railroad
- Major Roads
- Sphere of Influence
- City/Town Limits
- County Boundary
- Black Butte Dam Inundation Area
- Whiskeytown Dam Inundation Area
- Shasta Dam Inundation Area
- Lake Oroville Dam Inundation Area
- Lake Almanor Dam Inundation Area
- Kunkle Dam Inundation Area
- Frenchman Dam Inundation Area
- Magalia Dam Inundation Area
- Paradise Dam Inundation Area
- DeSalba Dam Inundation Area
- Philbrook Dam Inundation Area
- Miner's Ranch Dam Inundation Area
- Bidwell Bar Dam Inundation Area
- Lake Wyandotte Dam Inundation Area

Graphics ... 00852.10 (6/19/12) AB

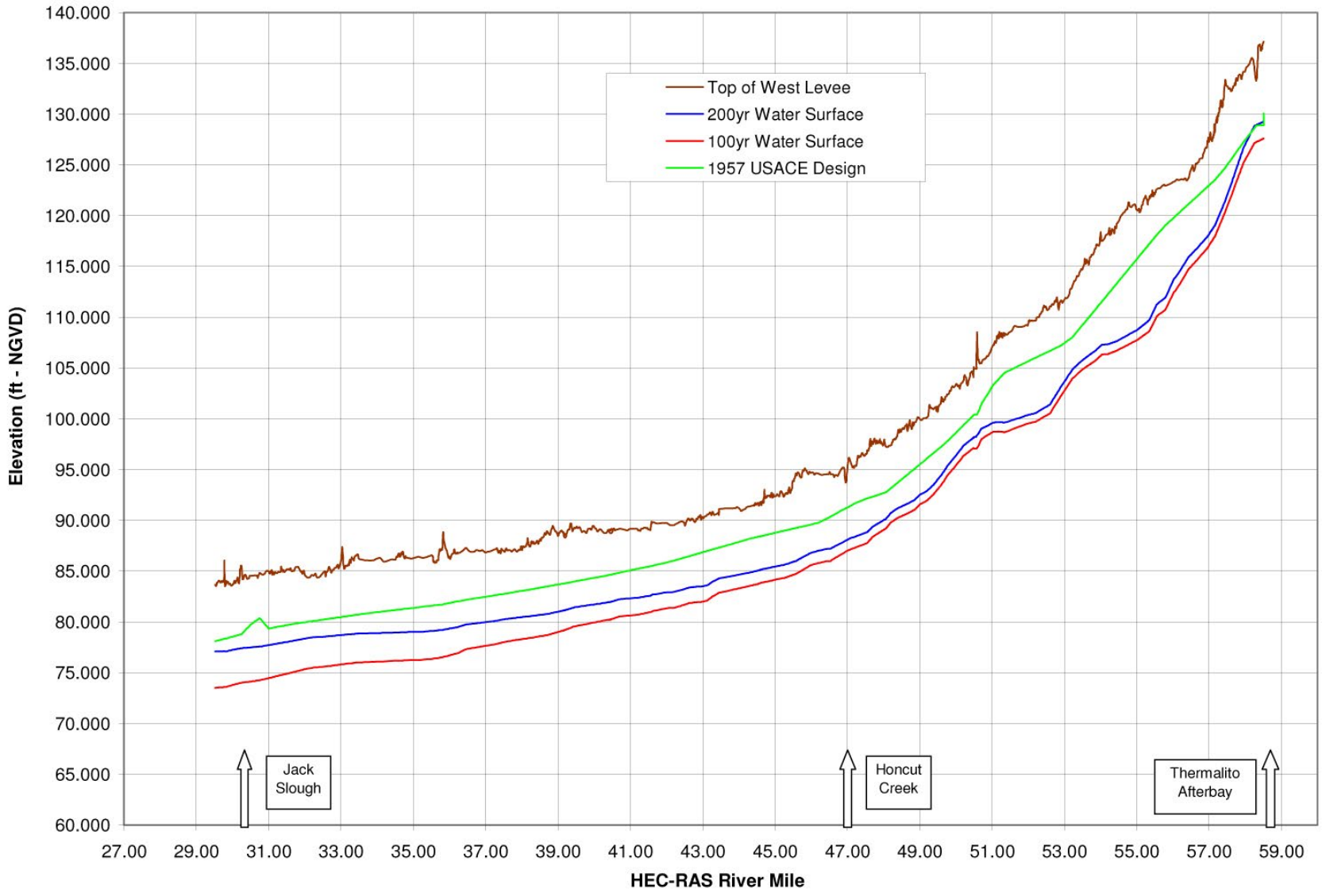
Plate 3.1-2
Dam Inundation Areas



Source: Peterson Brustad, Inc. 2010. Sutter Butte Flood Control Agency's Early Implementation Program Project Report for the Feather River West Levee Rehabilitation Project. Figure 9

Graphics ... 00852.10 (10/1/12)

Figure 3.1-3
Lower Feather River Freeboard Profile



Source: Peterson Brustad, Inc. 2010. Sutter Butte Flood Control Agency's Early Implementation Program Project Report for the Feather River West Levee Rehabilitation Project. Figure 8

Graphics ... 00852.10 (10/1/12)

Plate 3.1-4
Upper Feather River Freeboard Profile

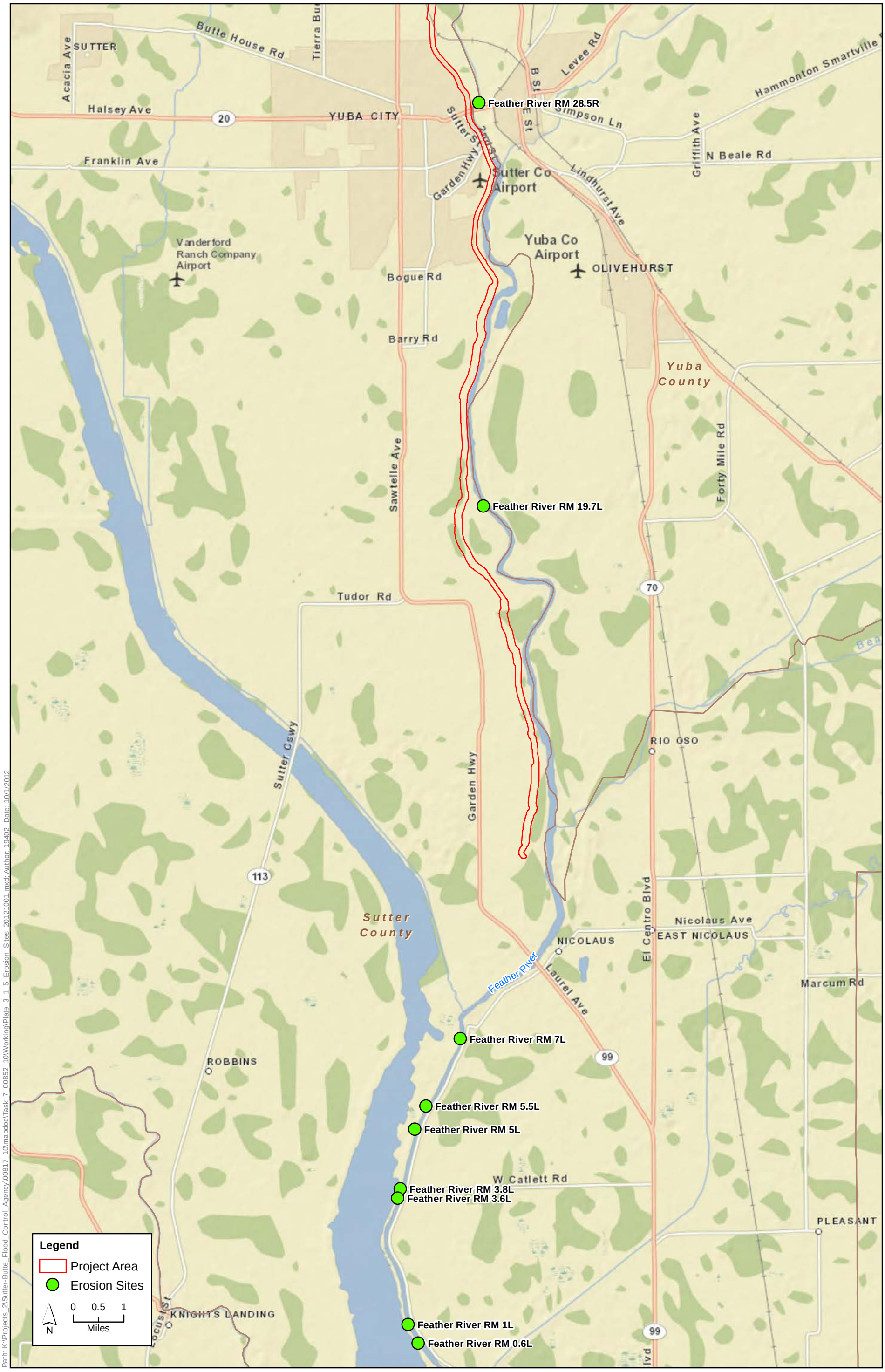


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Plate 3.1-5
Erosion Sites

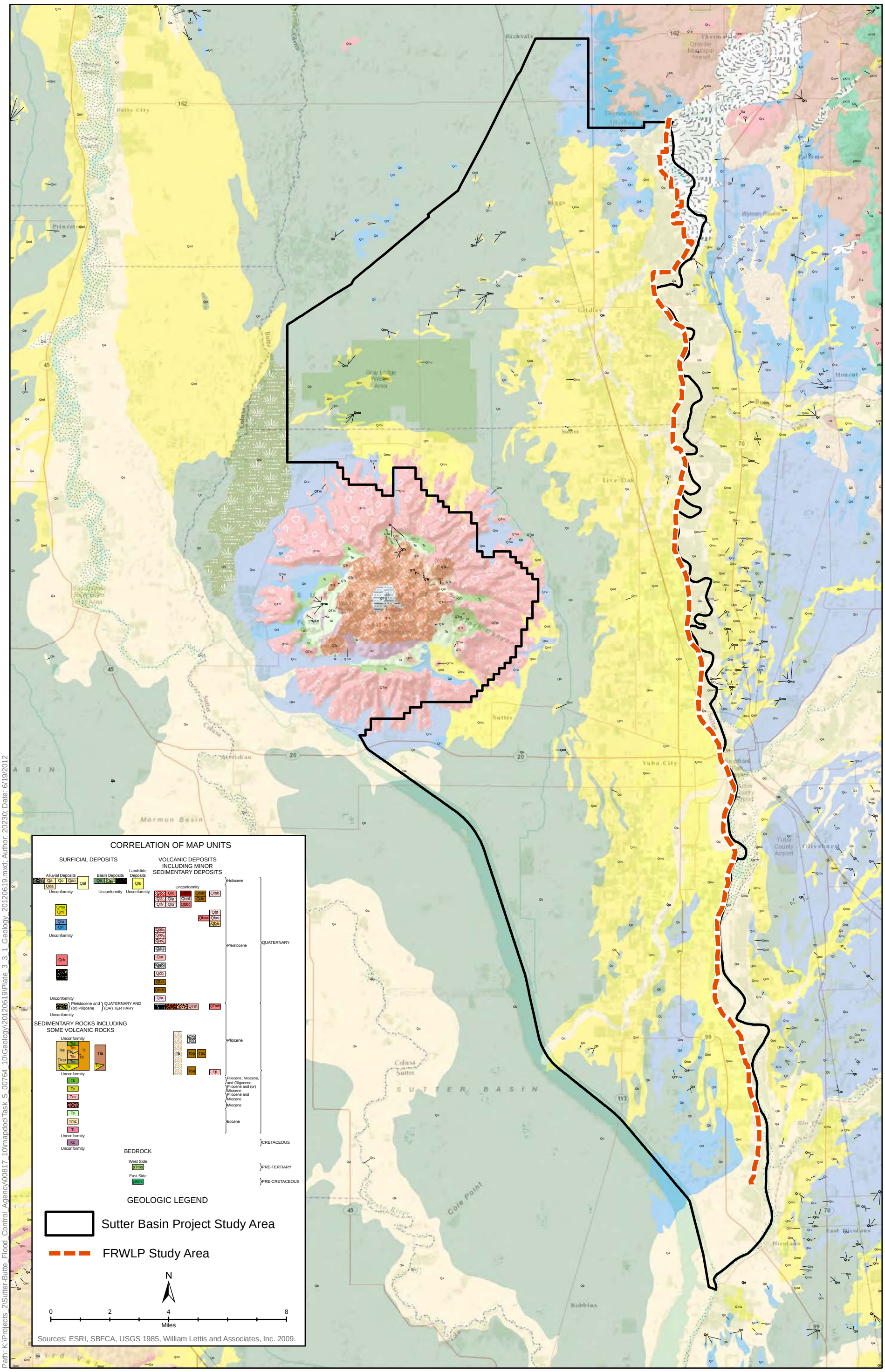

Plate 3.3-1
General Geologic Map

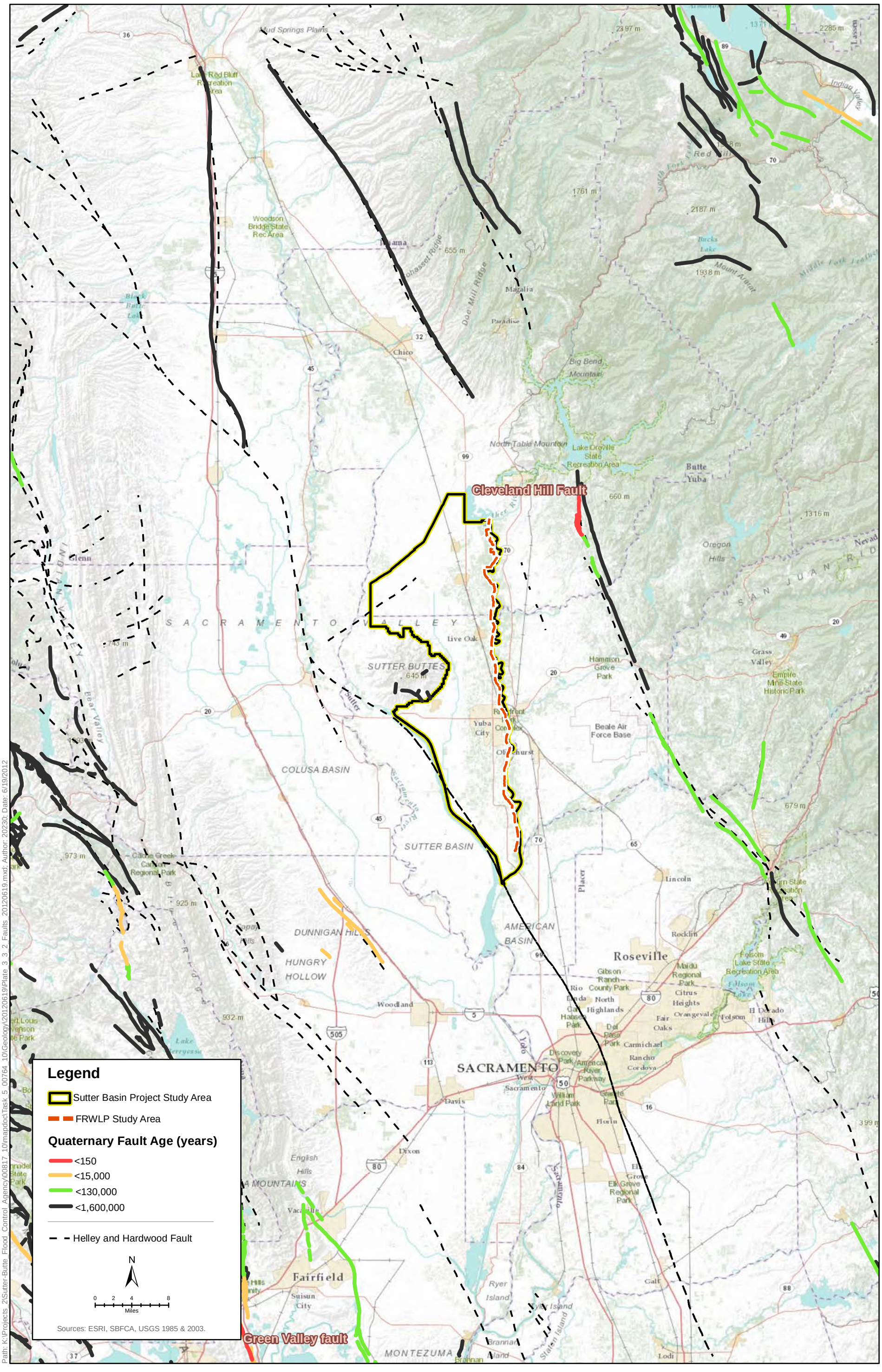

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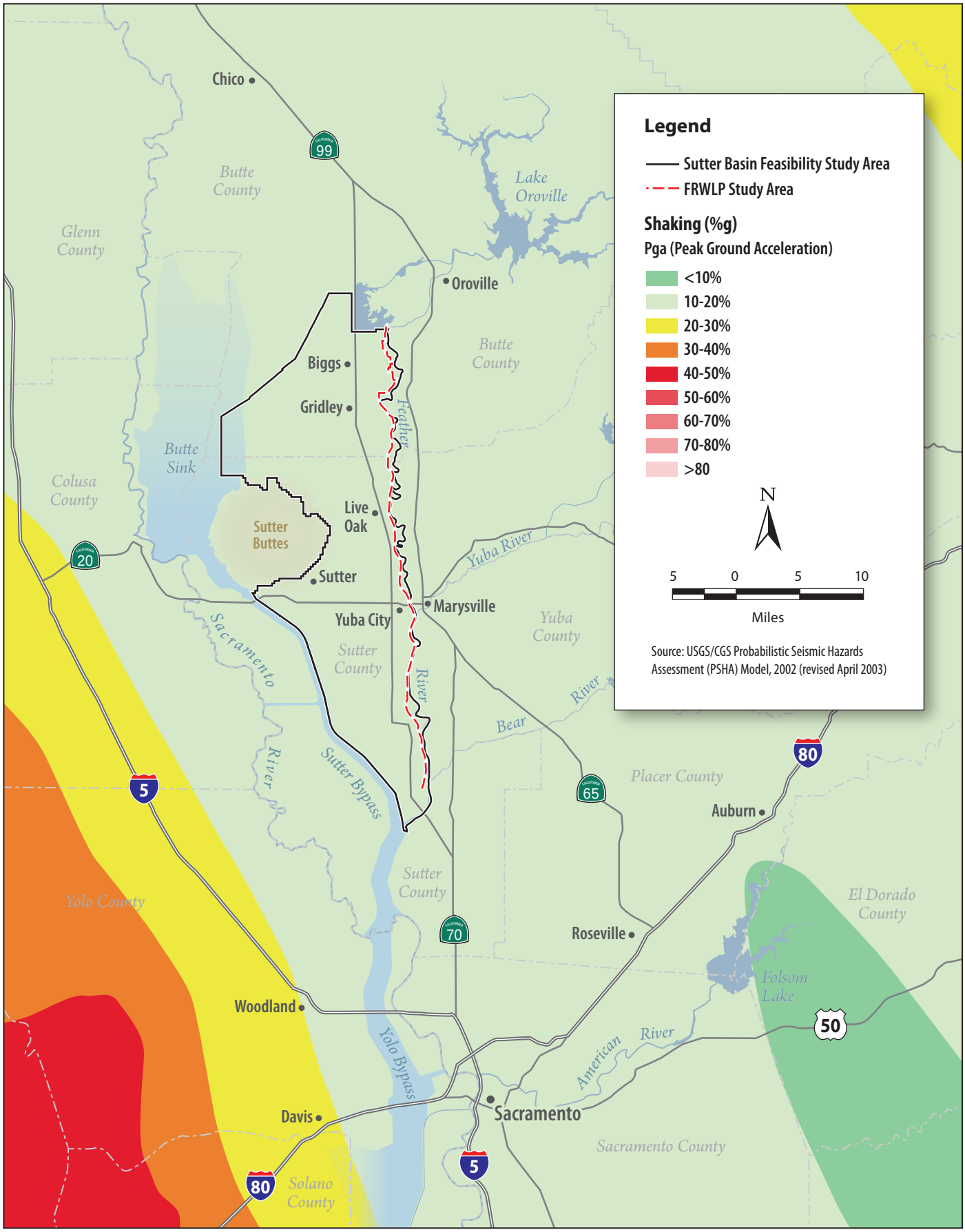
Plate 3.3-2
Geologic Faults Near the Study Area



Graphics ... 00852.10 (6/19/12) AB

Plate 3.3-3
Minimum Peak Horizontal Ground Acceleration in the Study Area Vicinity

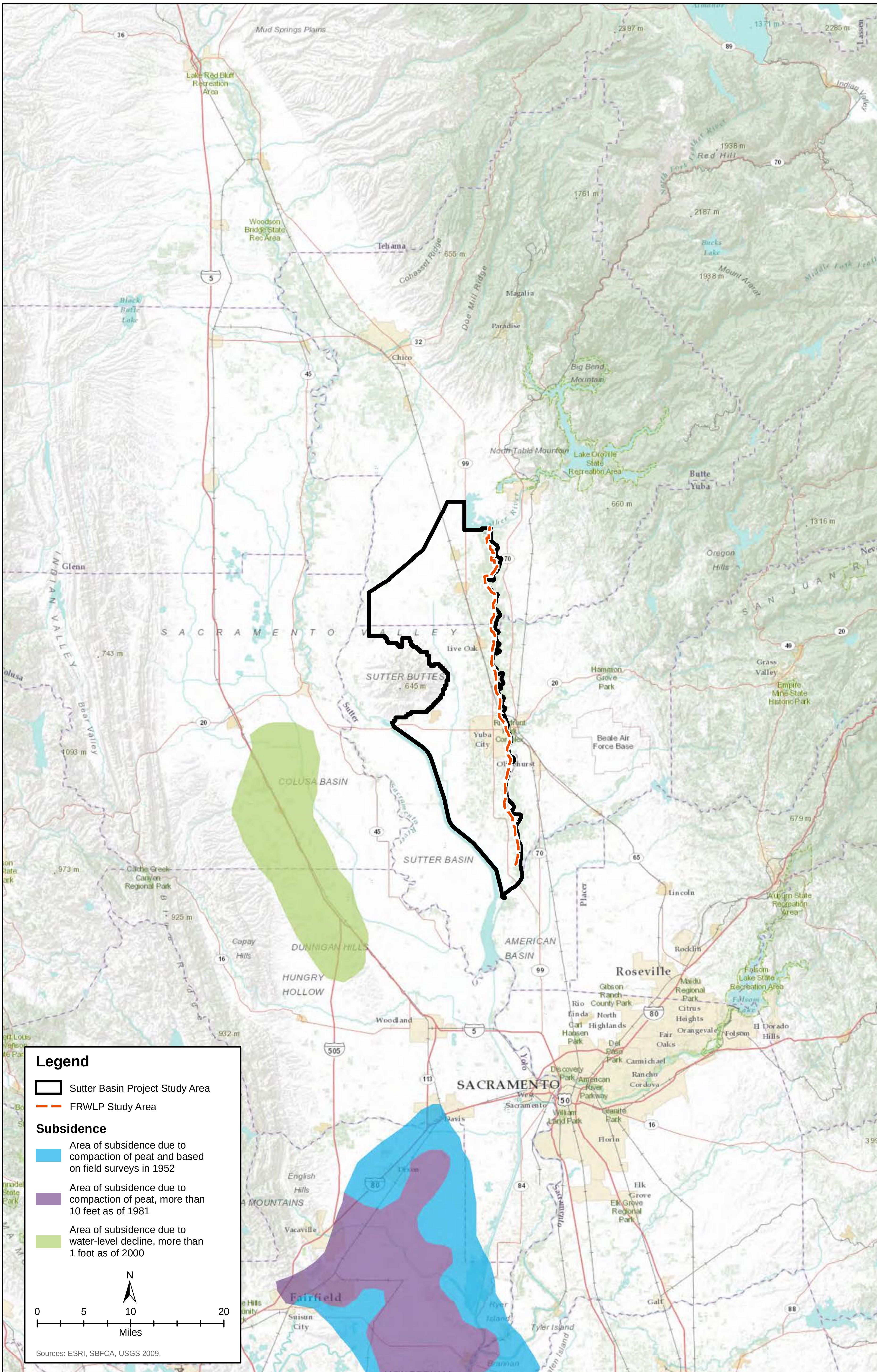


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Plate 3.3-4
Subsidence in the Study Area Vicinity

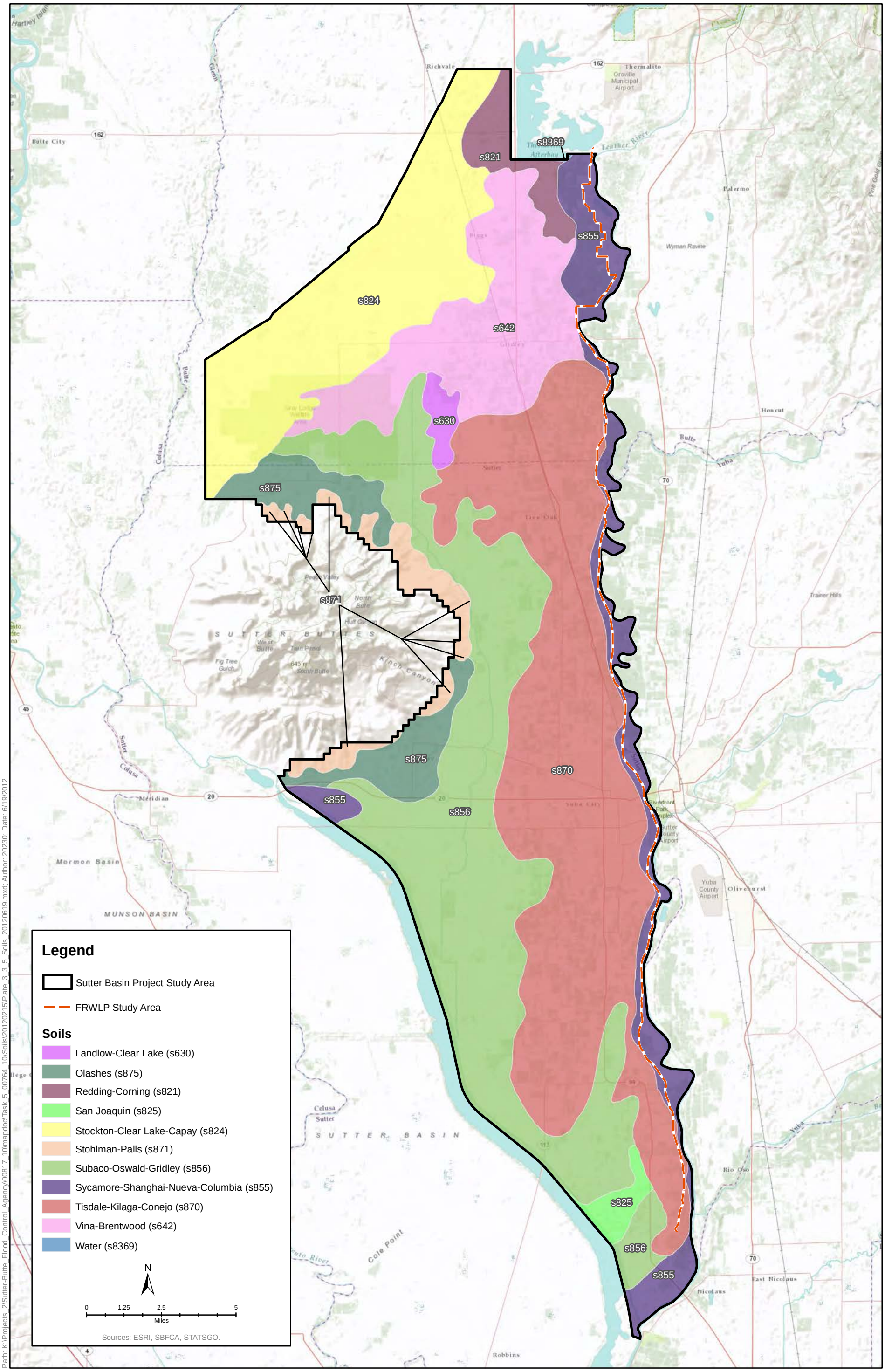

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Plate 3.3-5
Soils in the Study Area

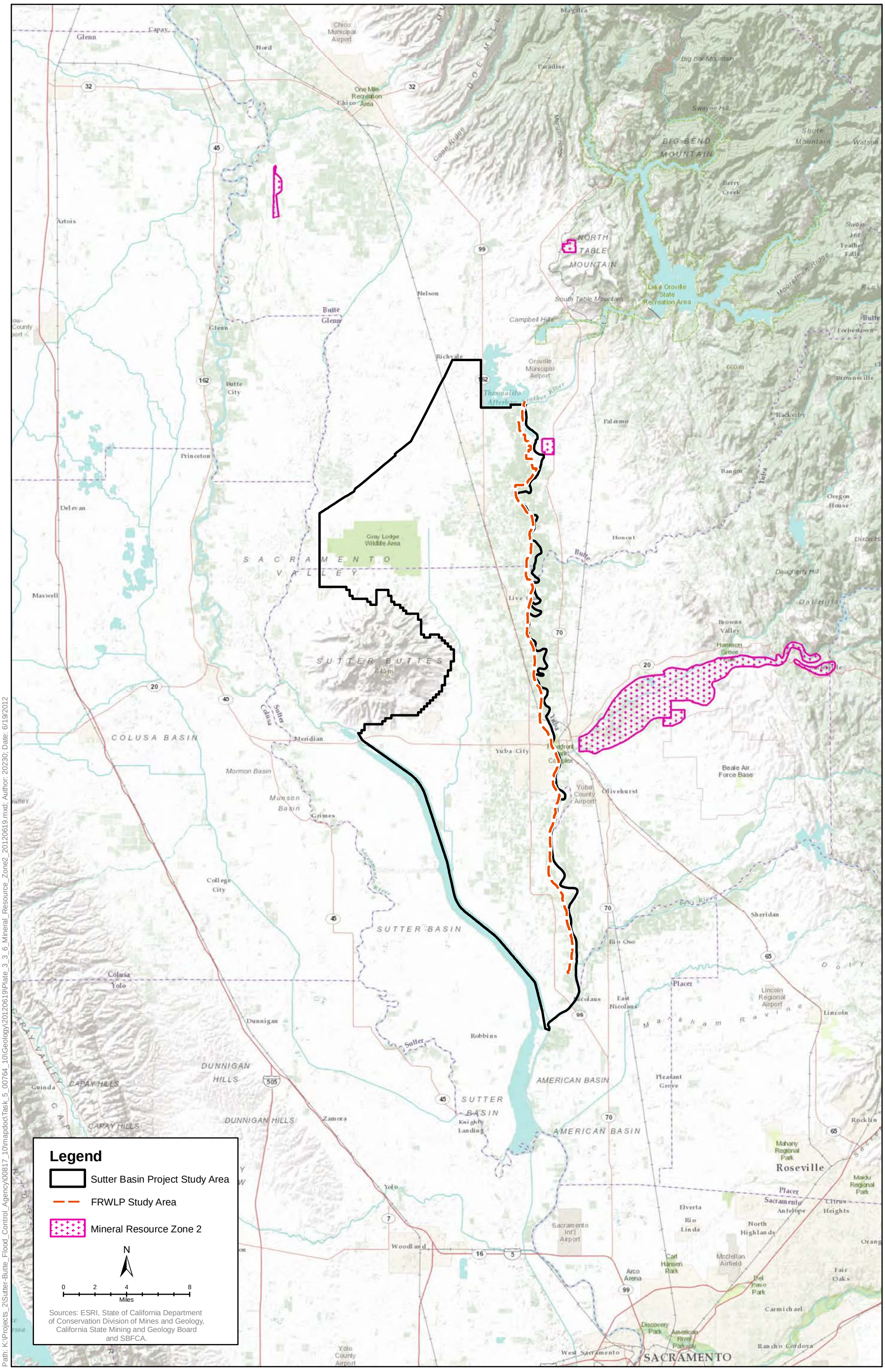
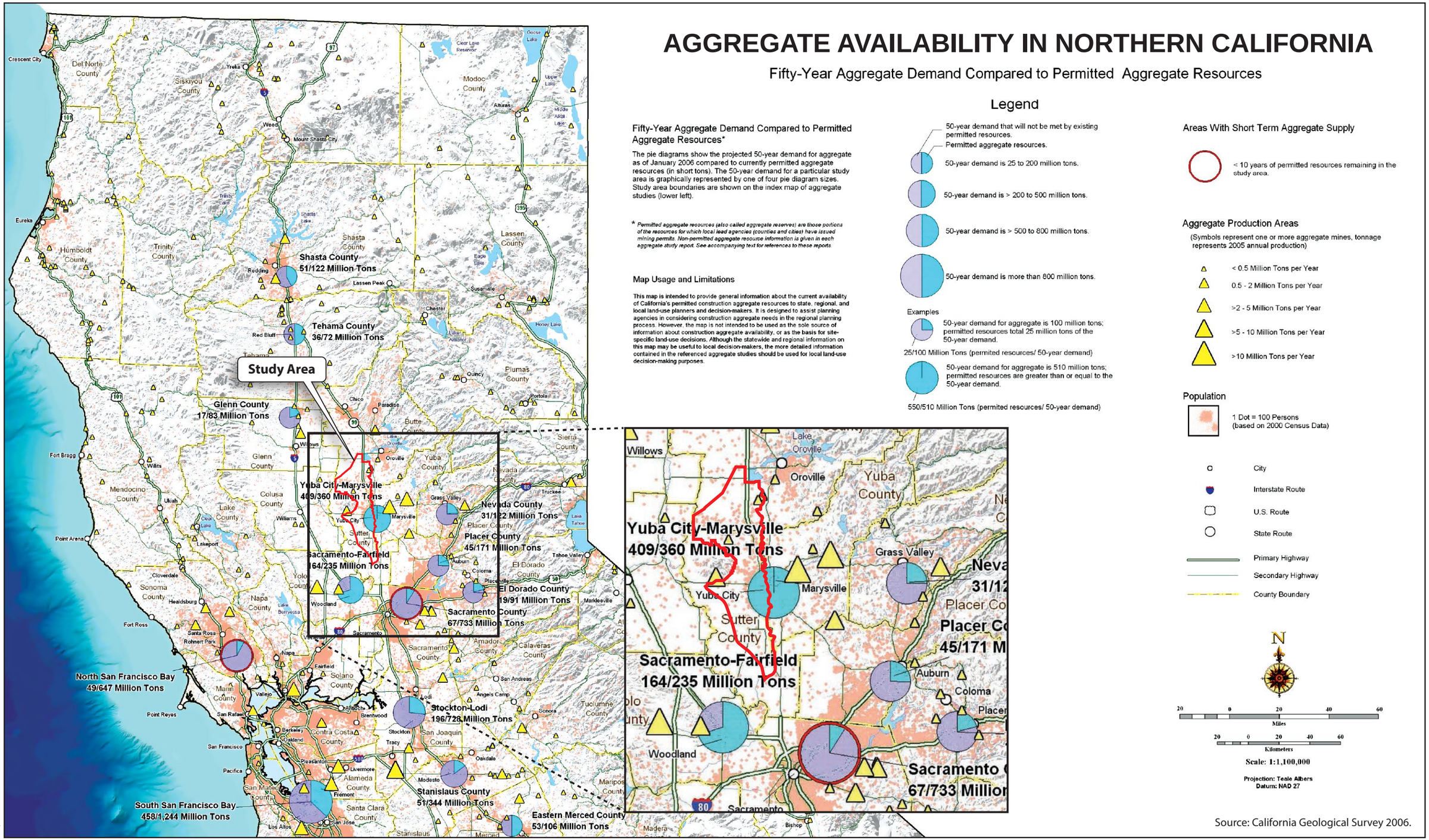


Plate 3.3-6
Mineral Resource Zone 2 in the Study Area Vicinity

AGGREGATE AVAILABILITY IN NORTHERN CALIFORNIA

Fifty-Year Aggregate Demand Compared to Permitted Aggregate Resources



Graphics...00852.10 (6/19/12) AB

Plate 3.3-7
Aggregate Demand and Availability in Northern California and the Study Area

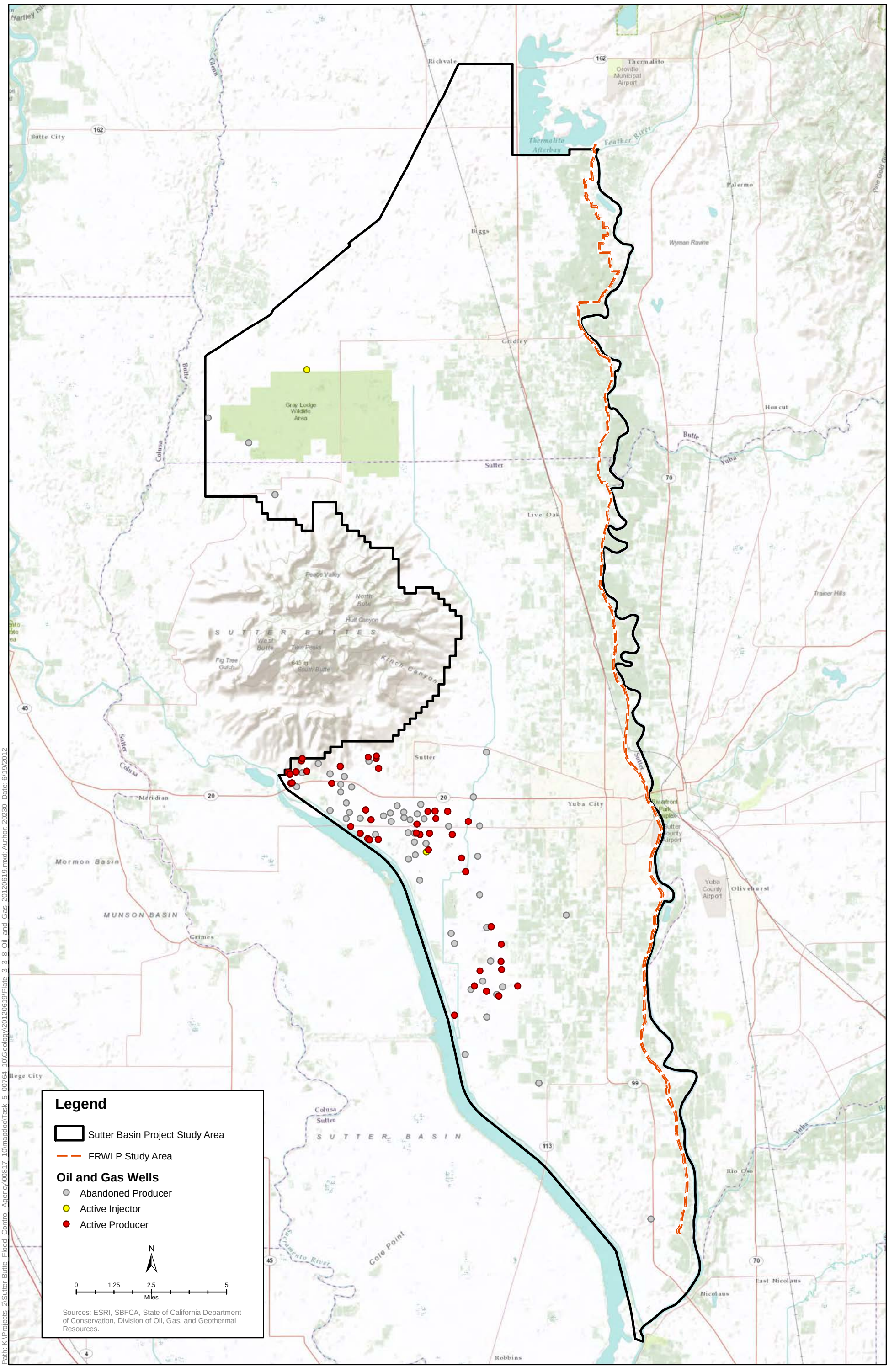


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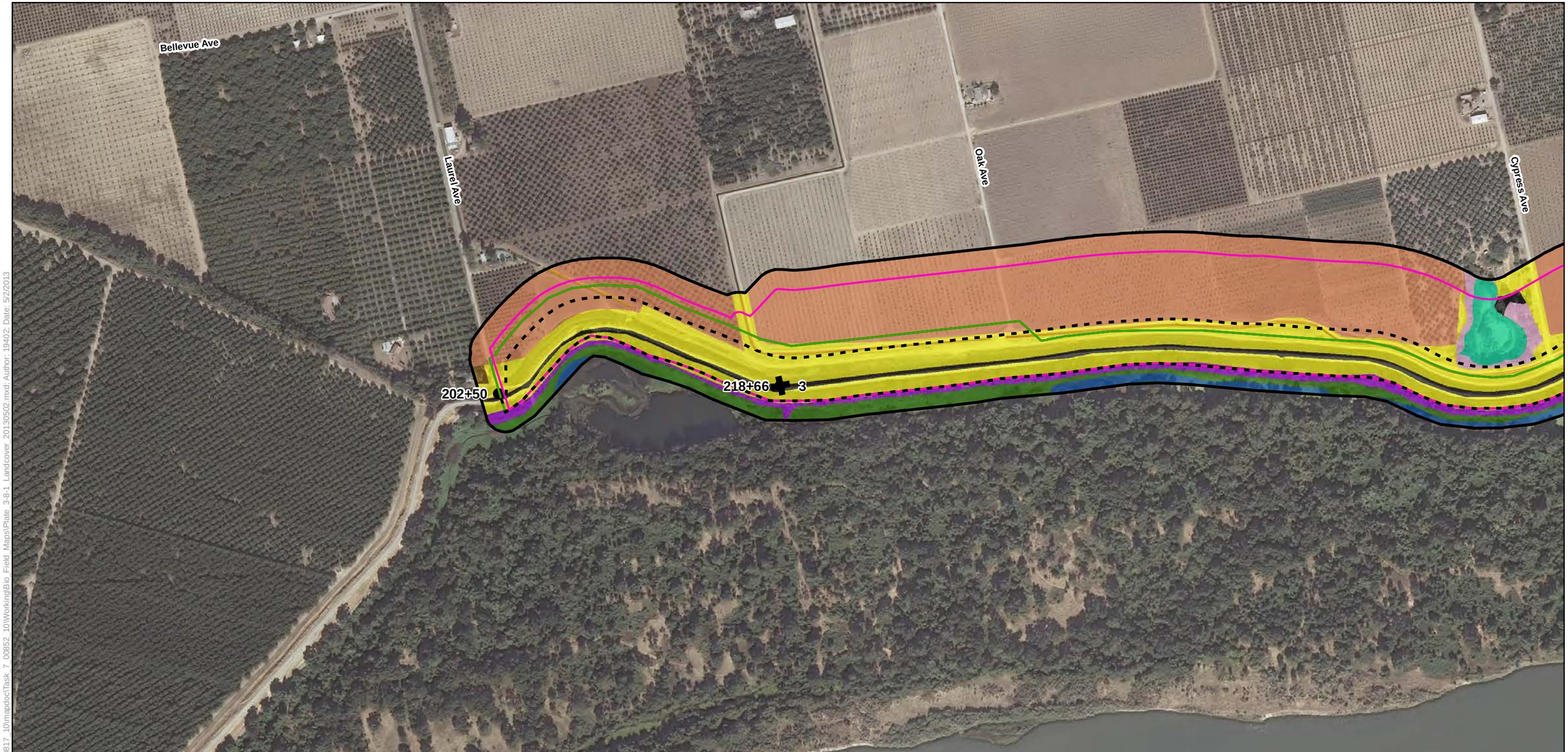
Plate 3.3-8
Oil and Gas Wells Within the Study Area



Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 1

0 250 500
Feet

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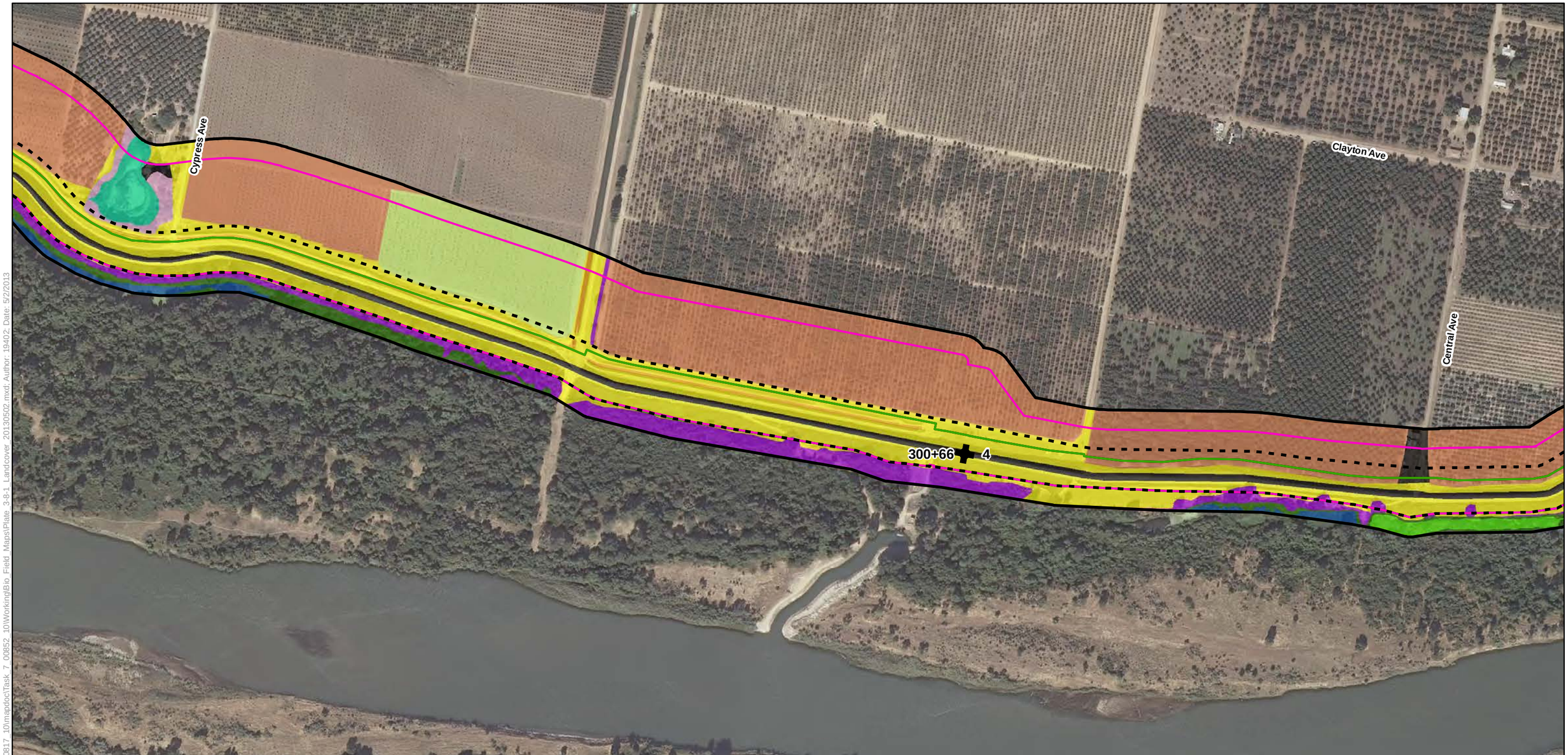

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 2

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Feet

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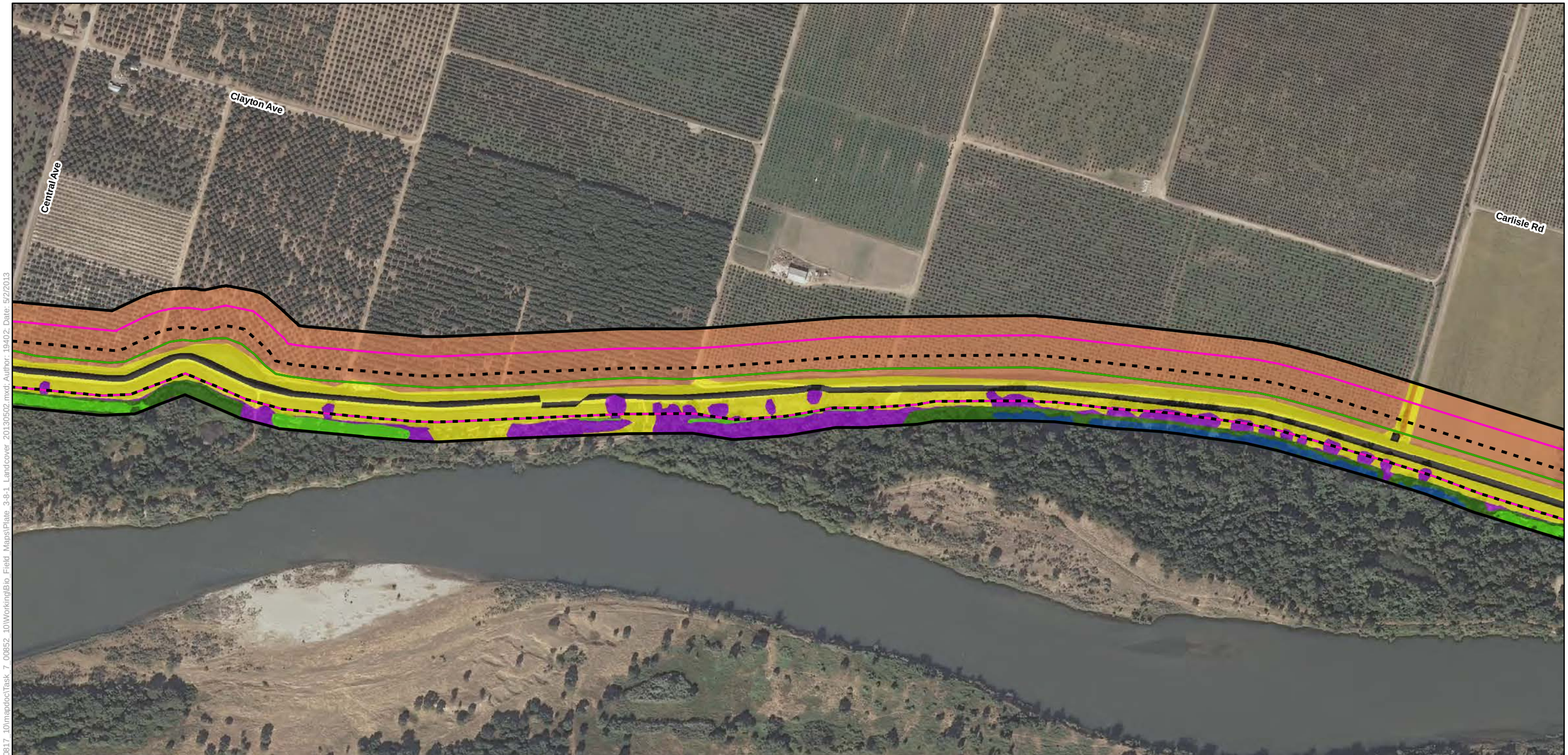

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 3

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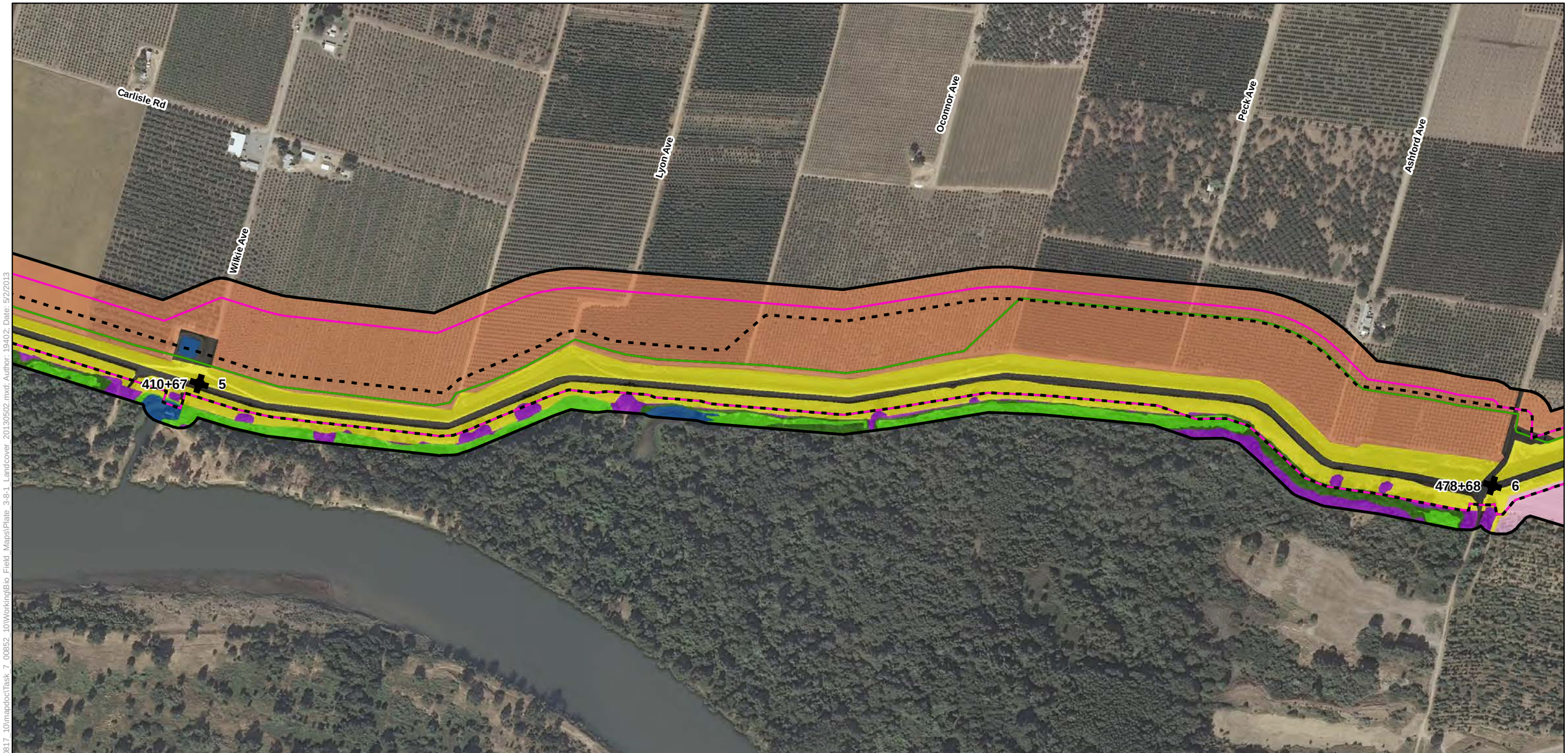

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 4

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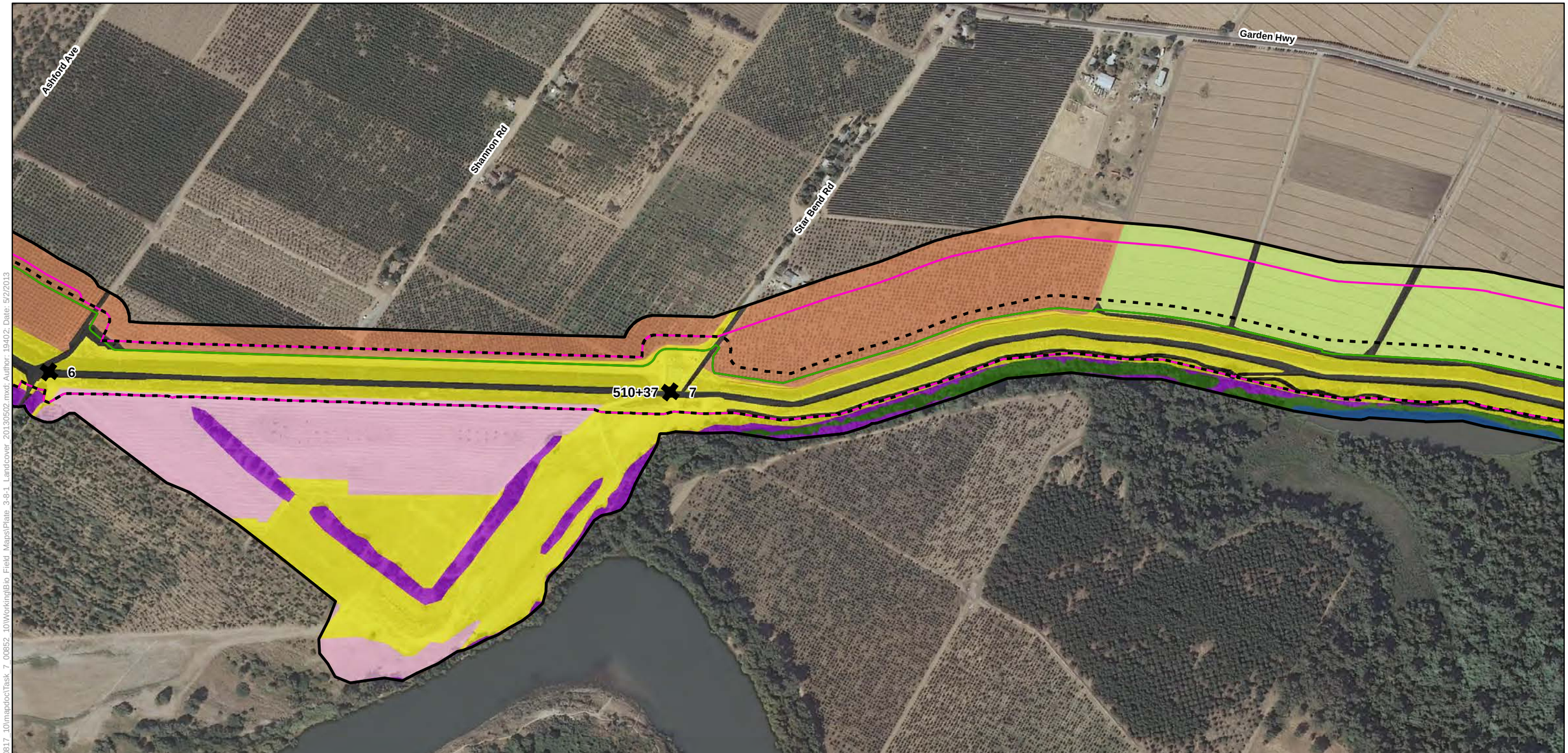

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 5

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Feet

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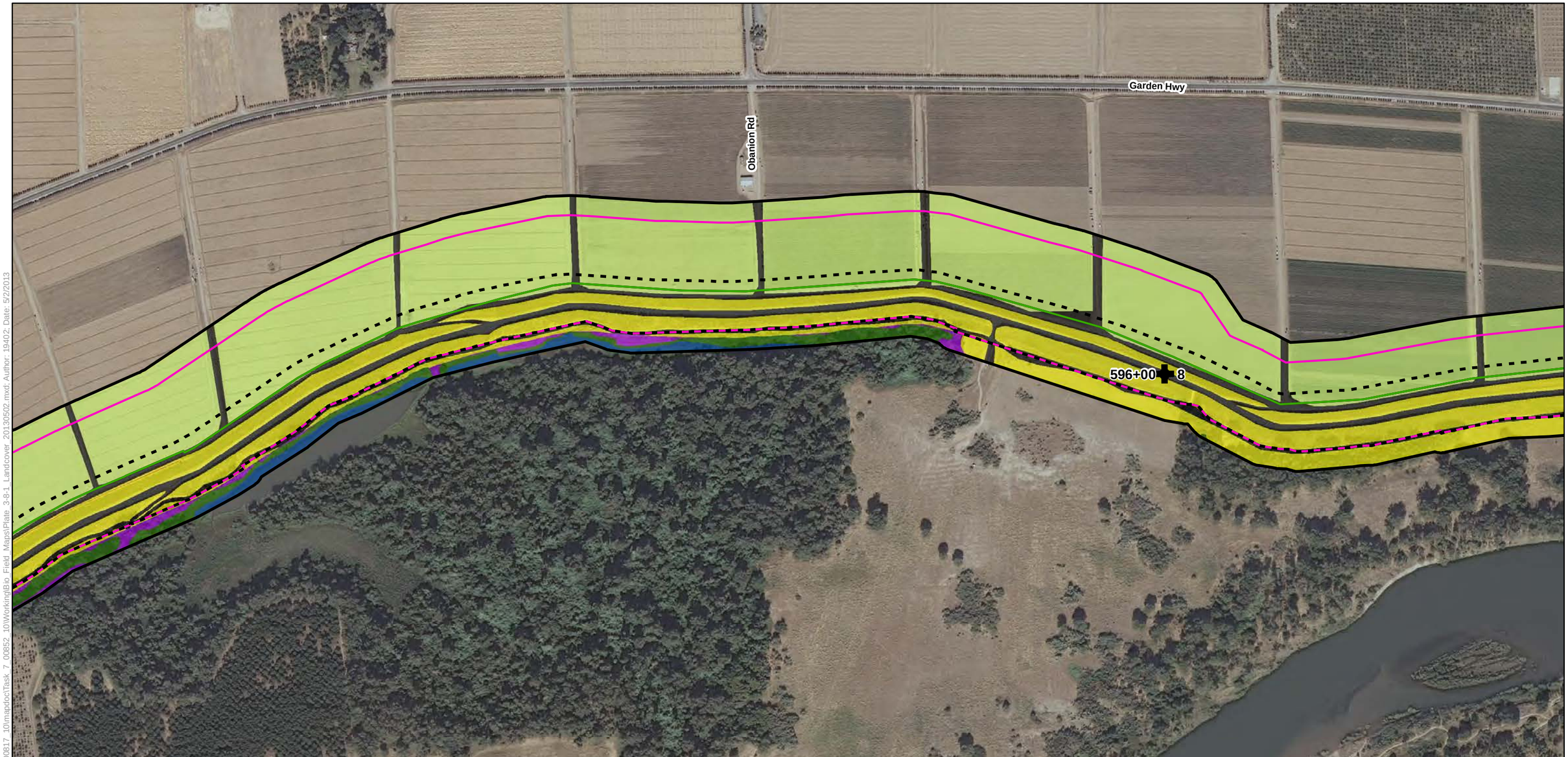

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 6

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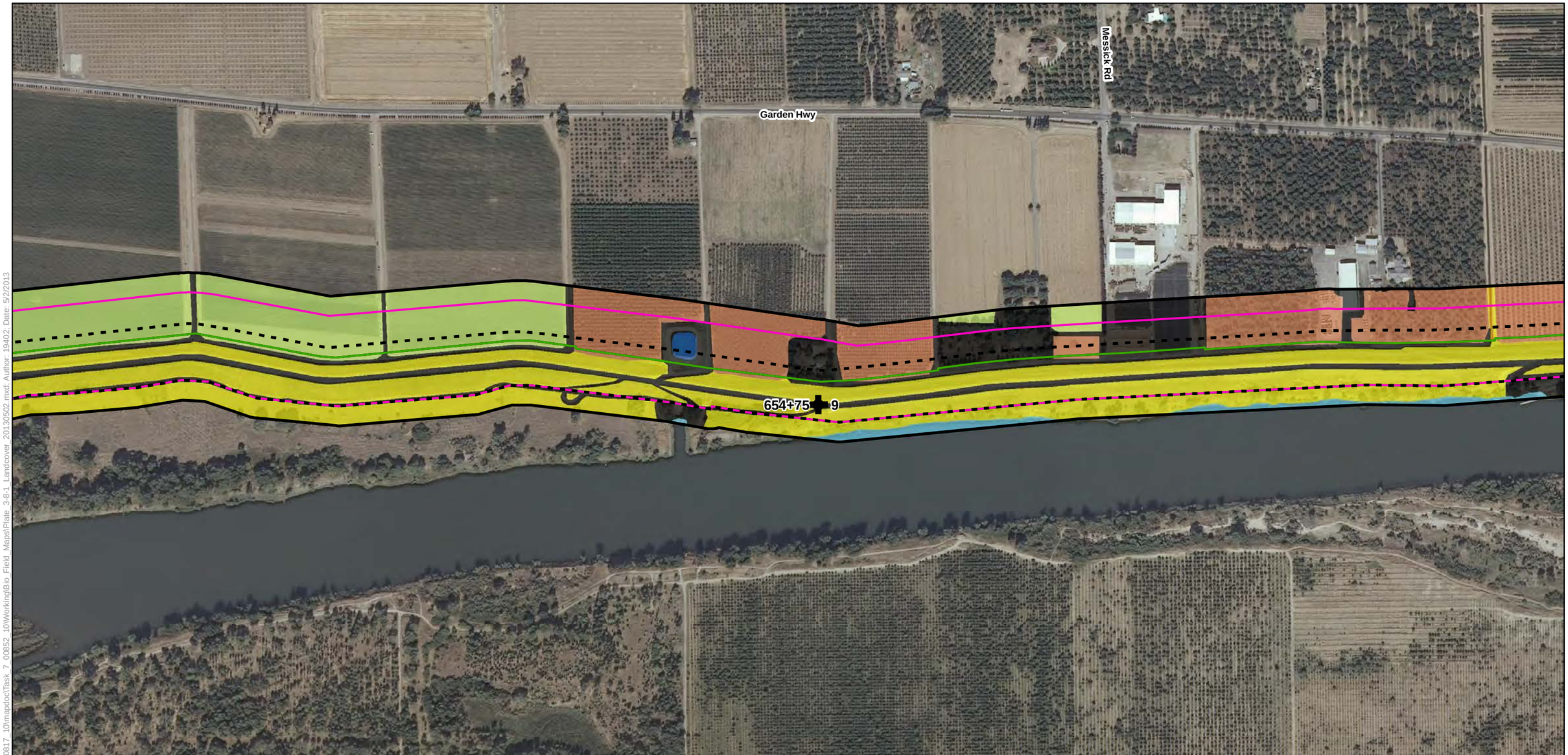

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 7

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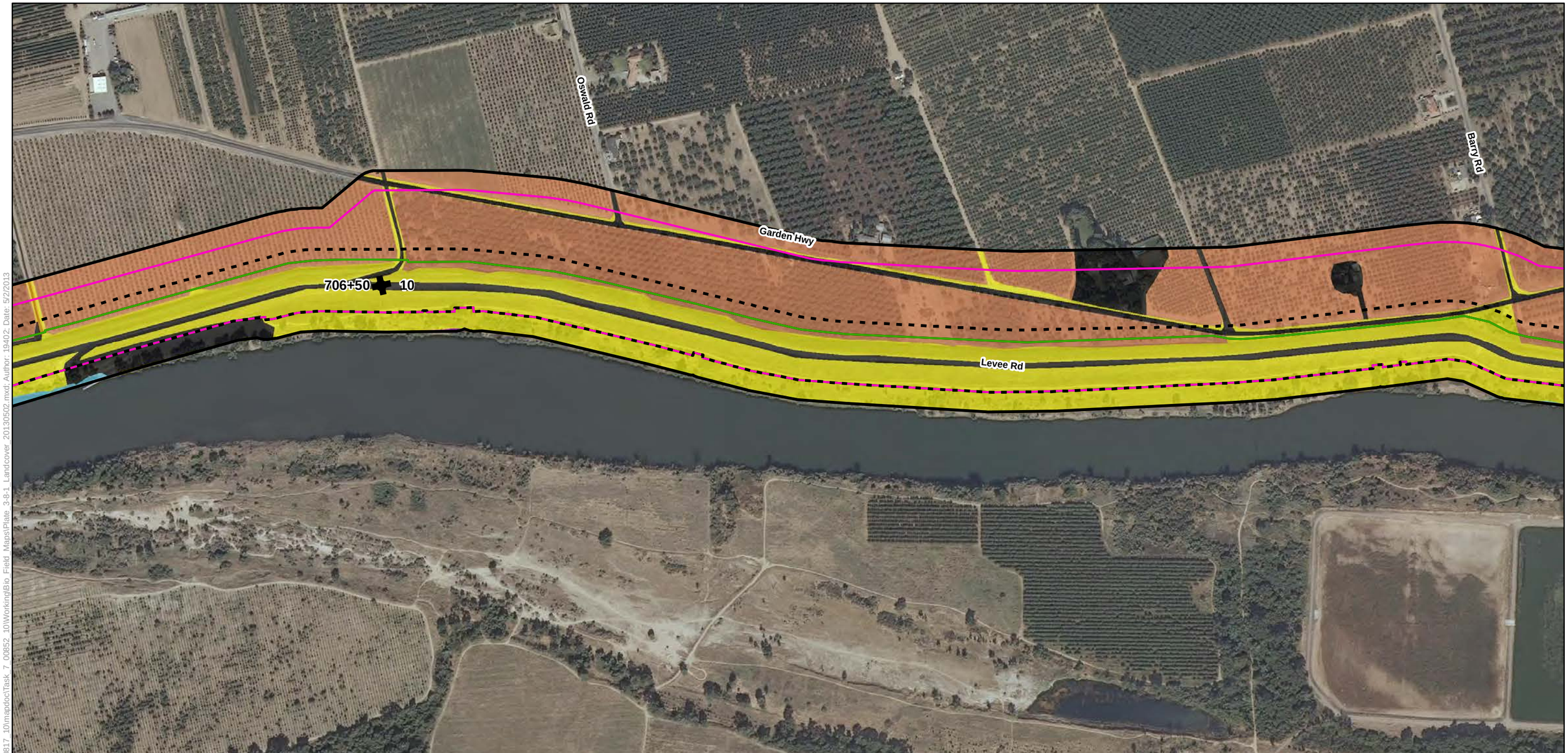

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 8

0 250 500
Feet

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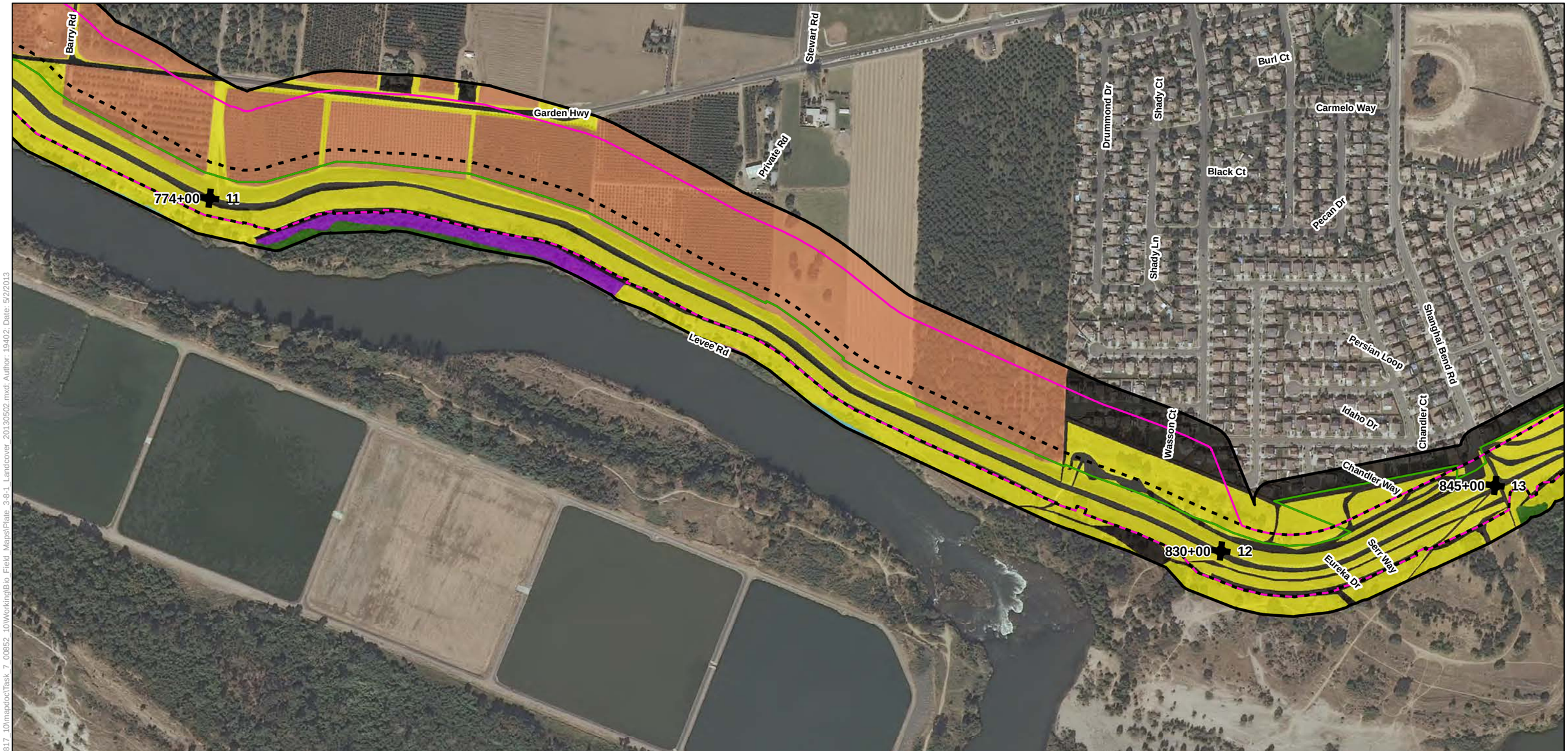

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
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- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 9

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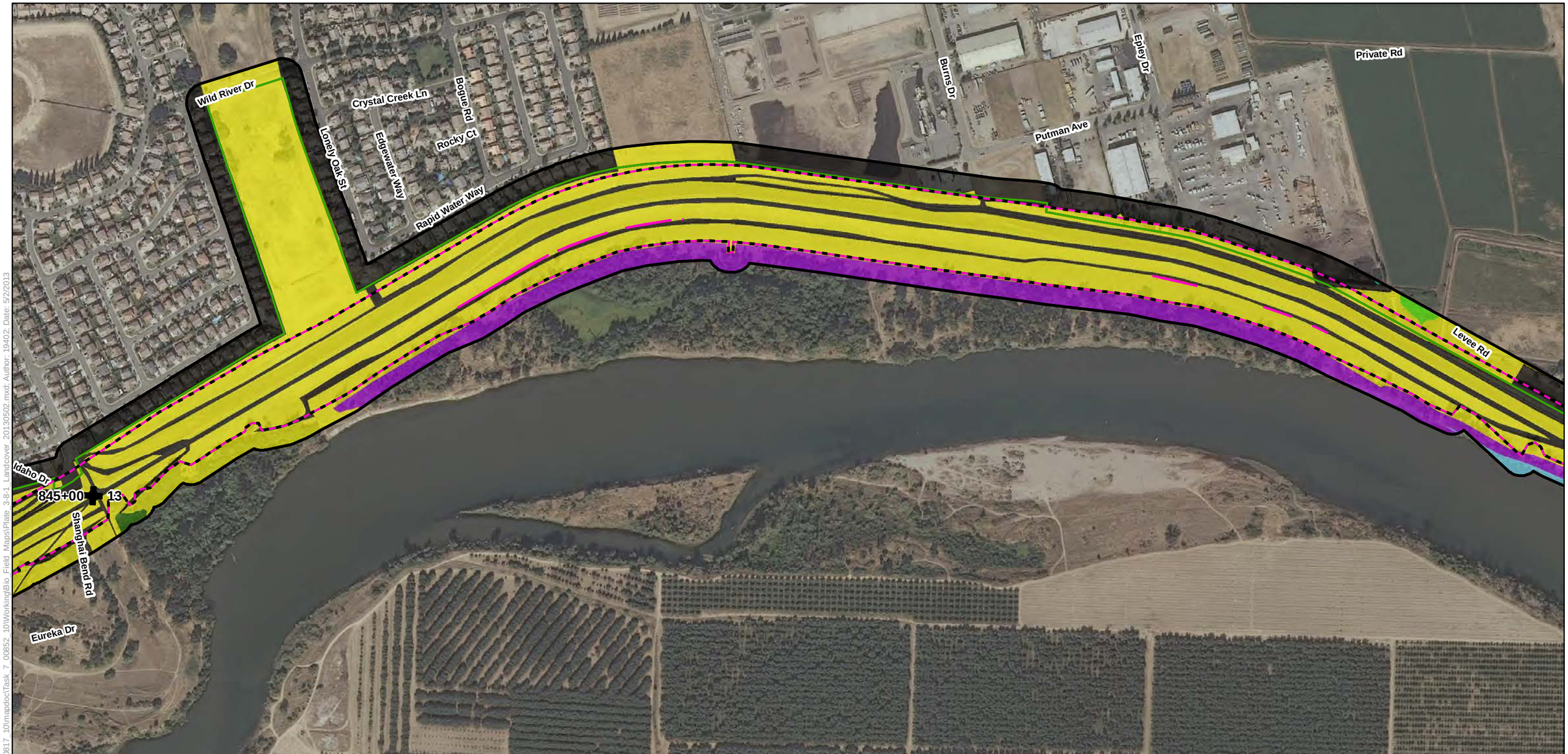

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 10

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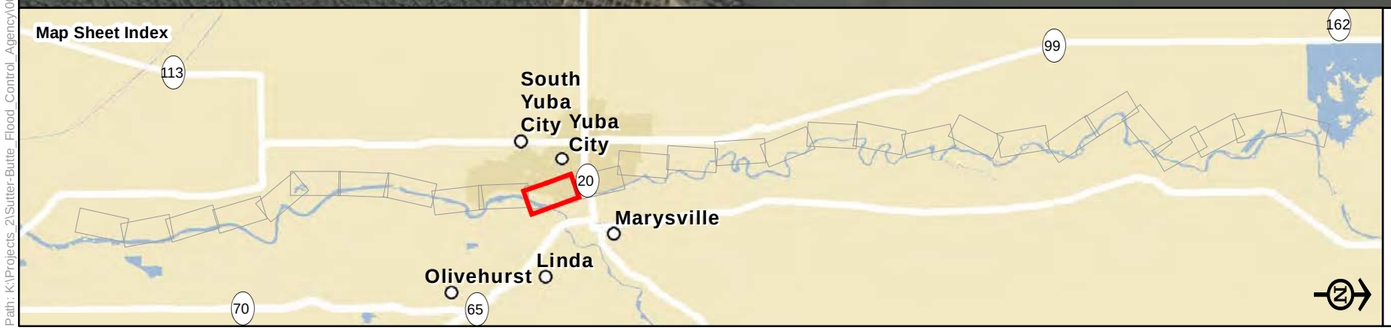

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 11

0 250 500
Feet

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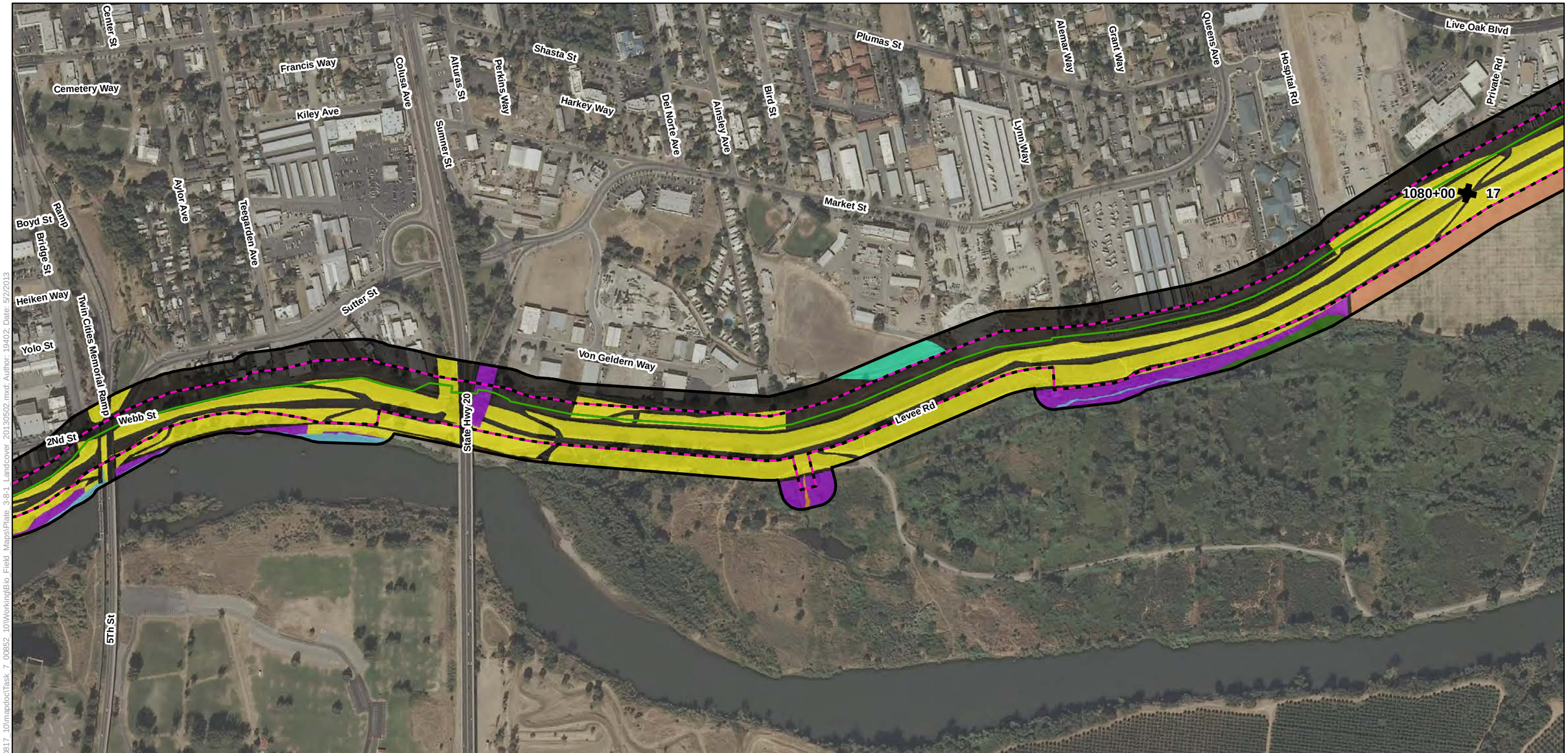

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 12

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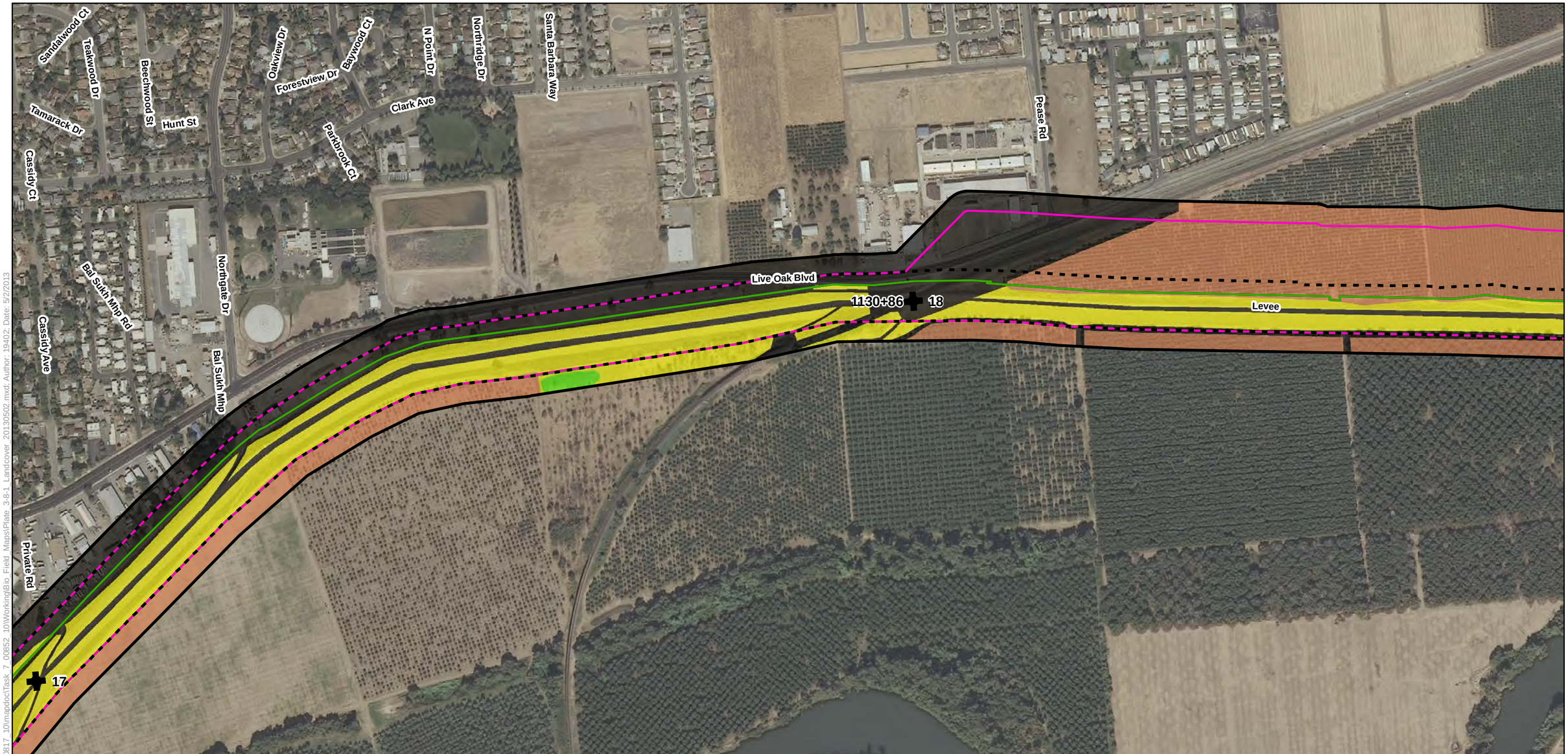

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 13

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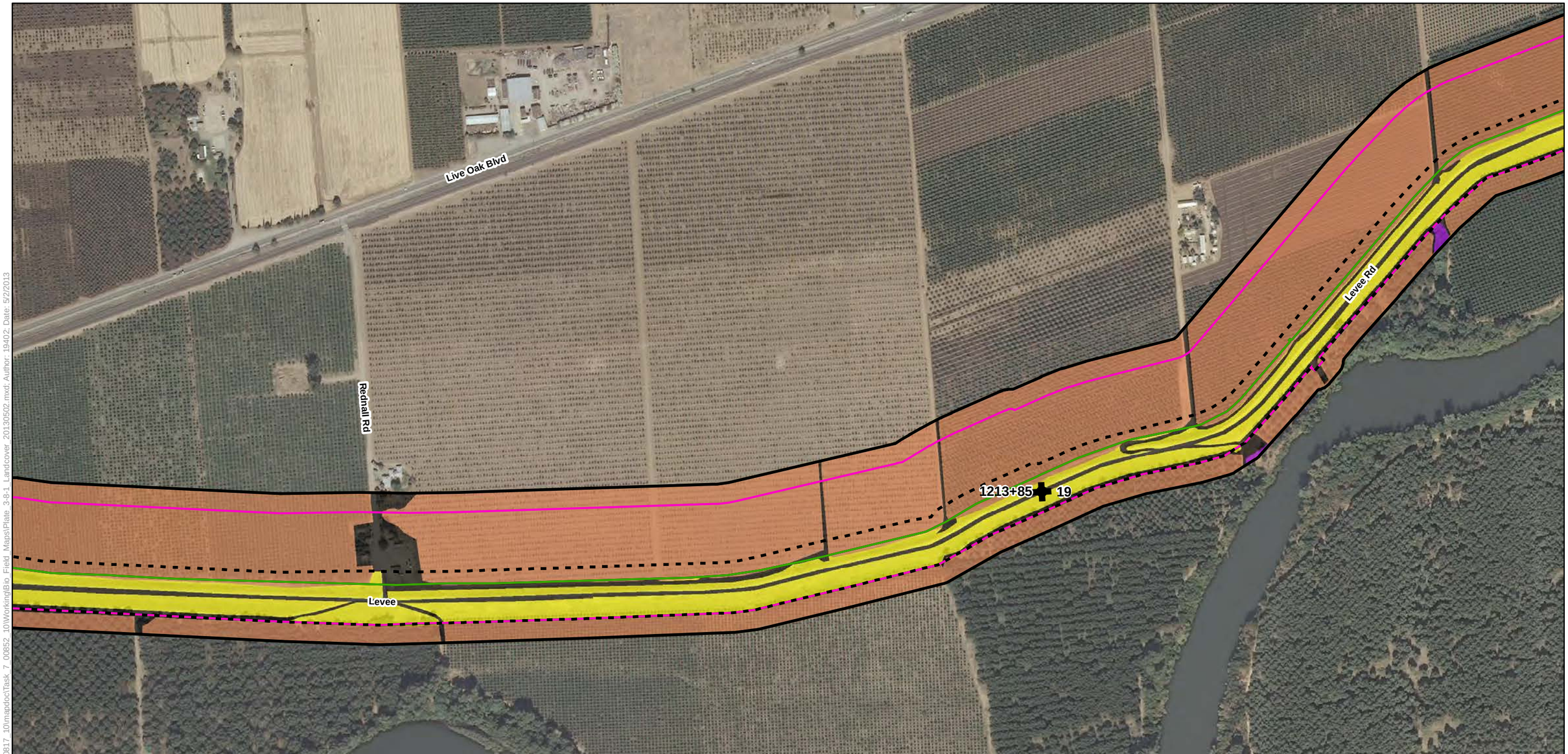

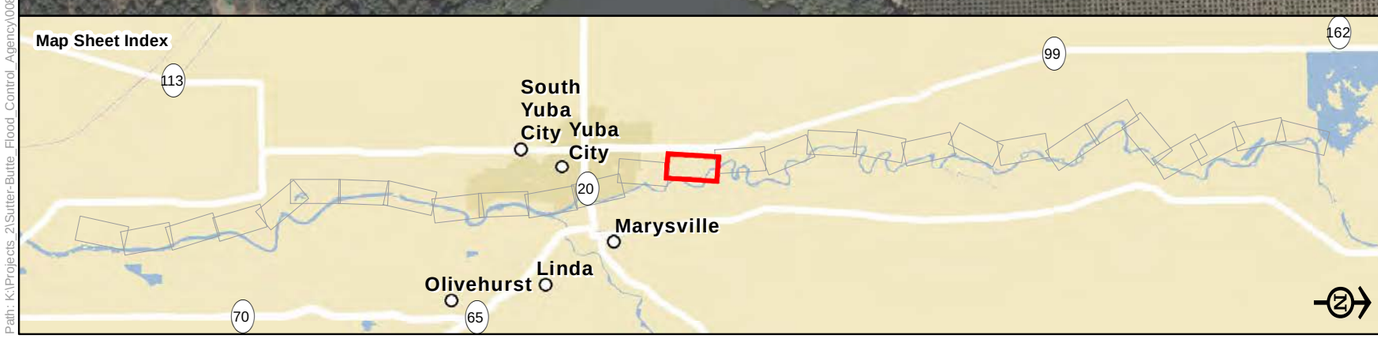

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 14

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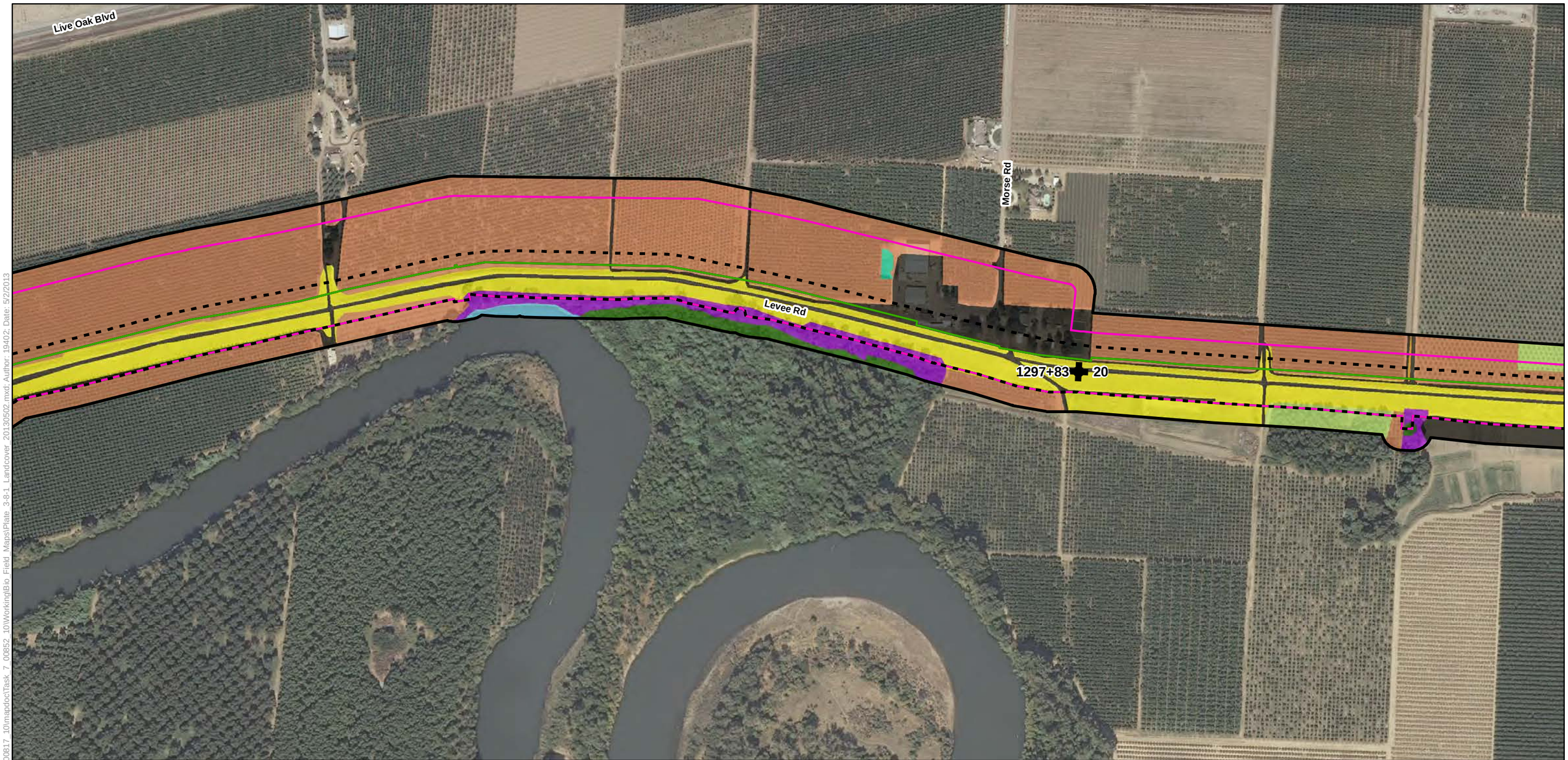

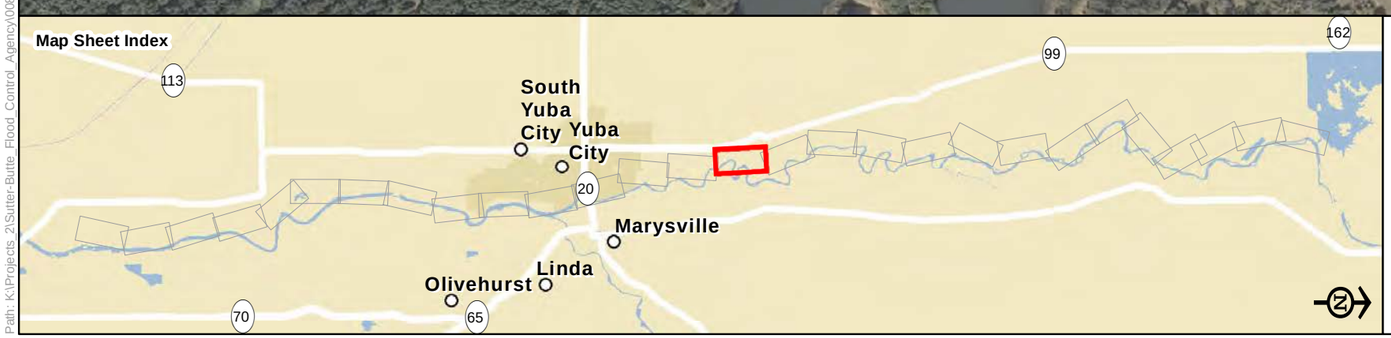

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 15

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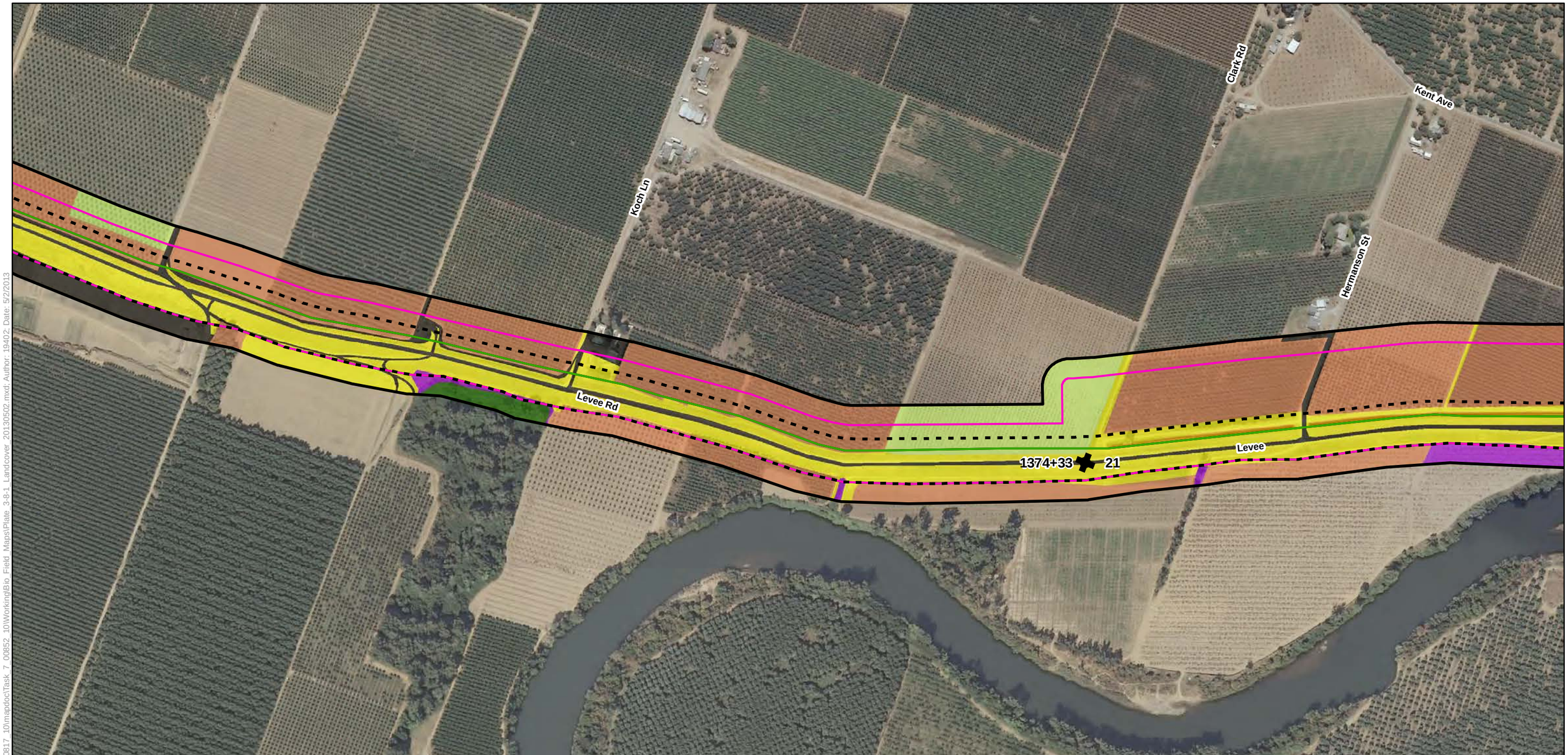

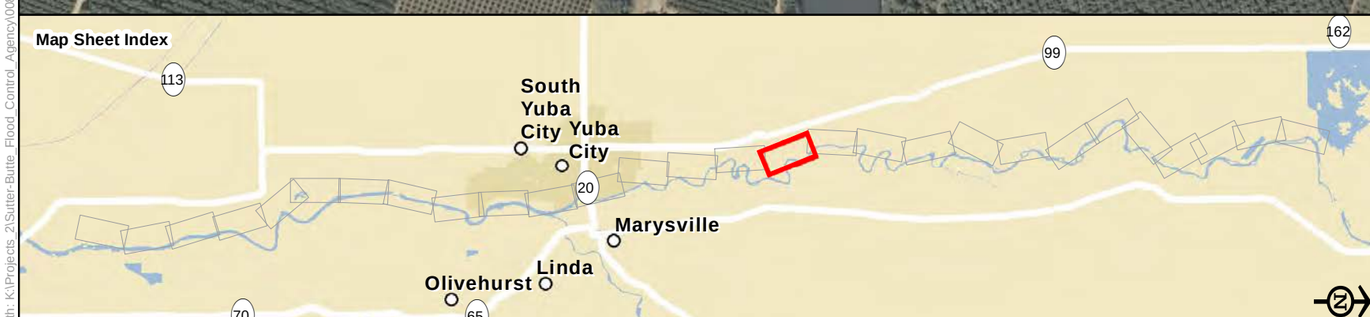

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 16

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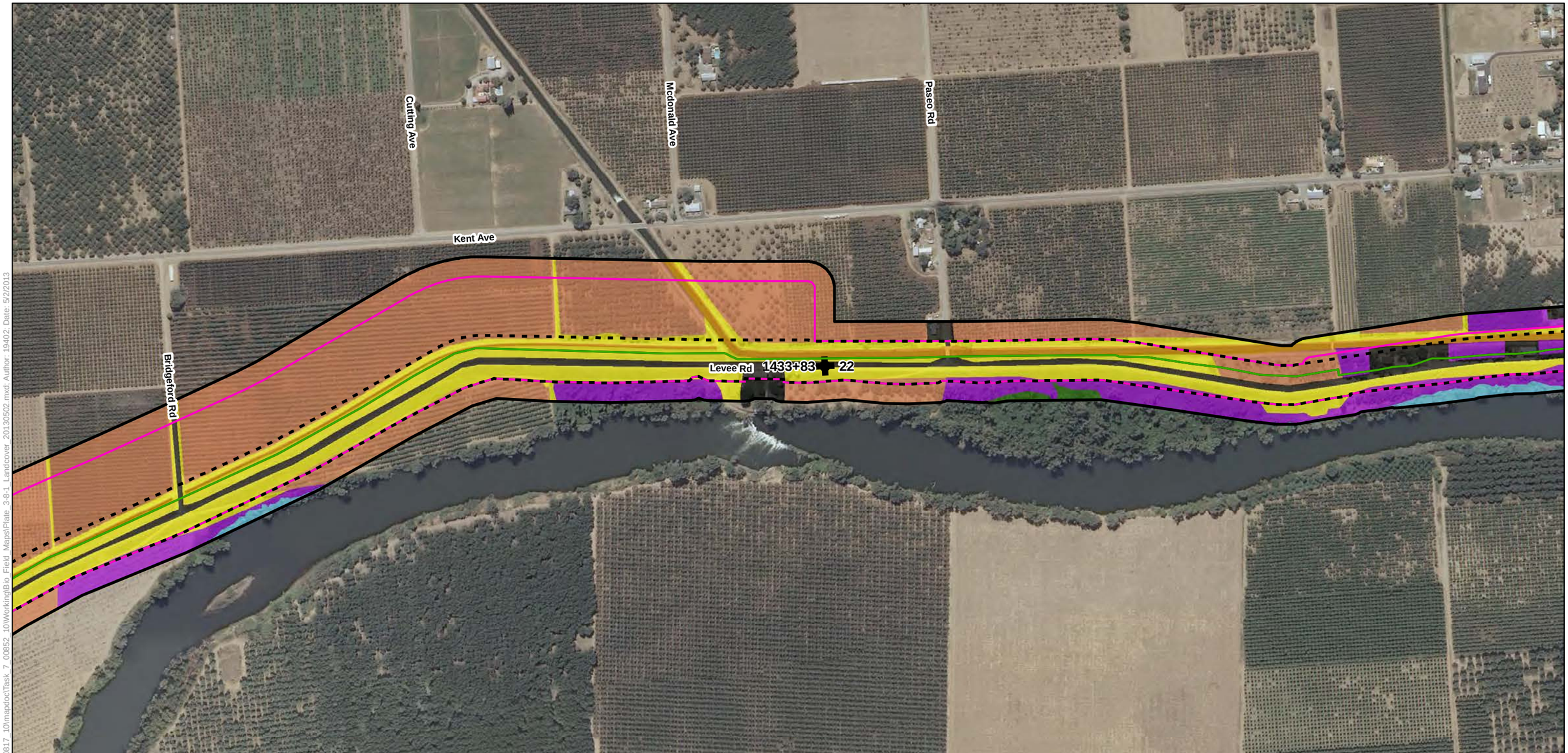

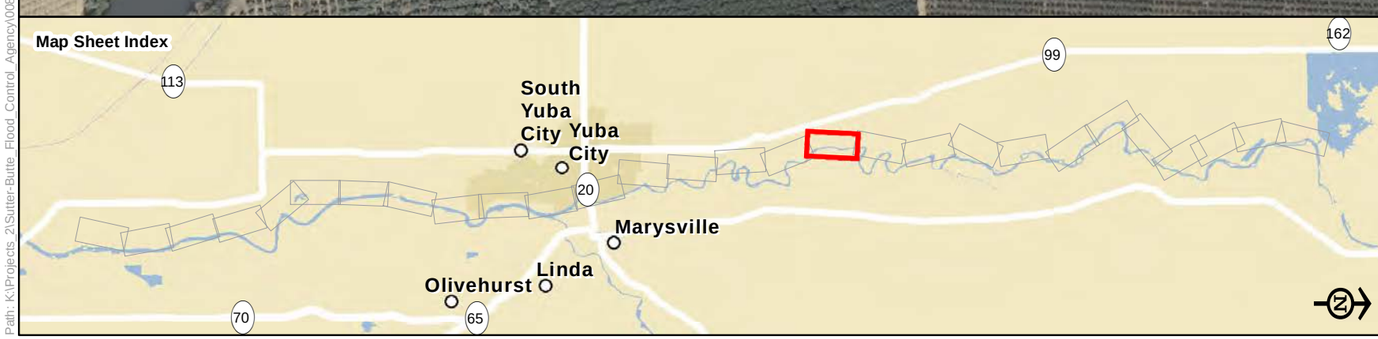

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 17

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Feet

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Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
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- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 18

0 250 500
Feet

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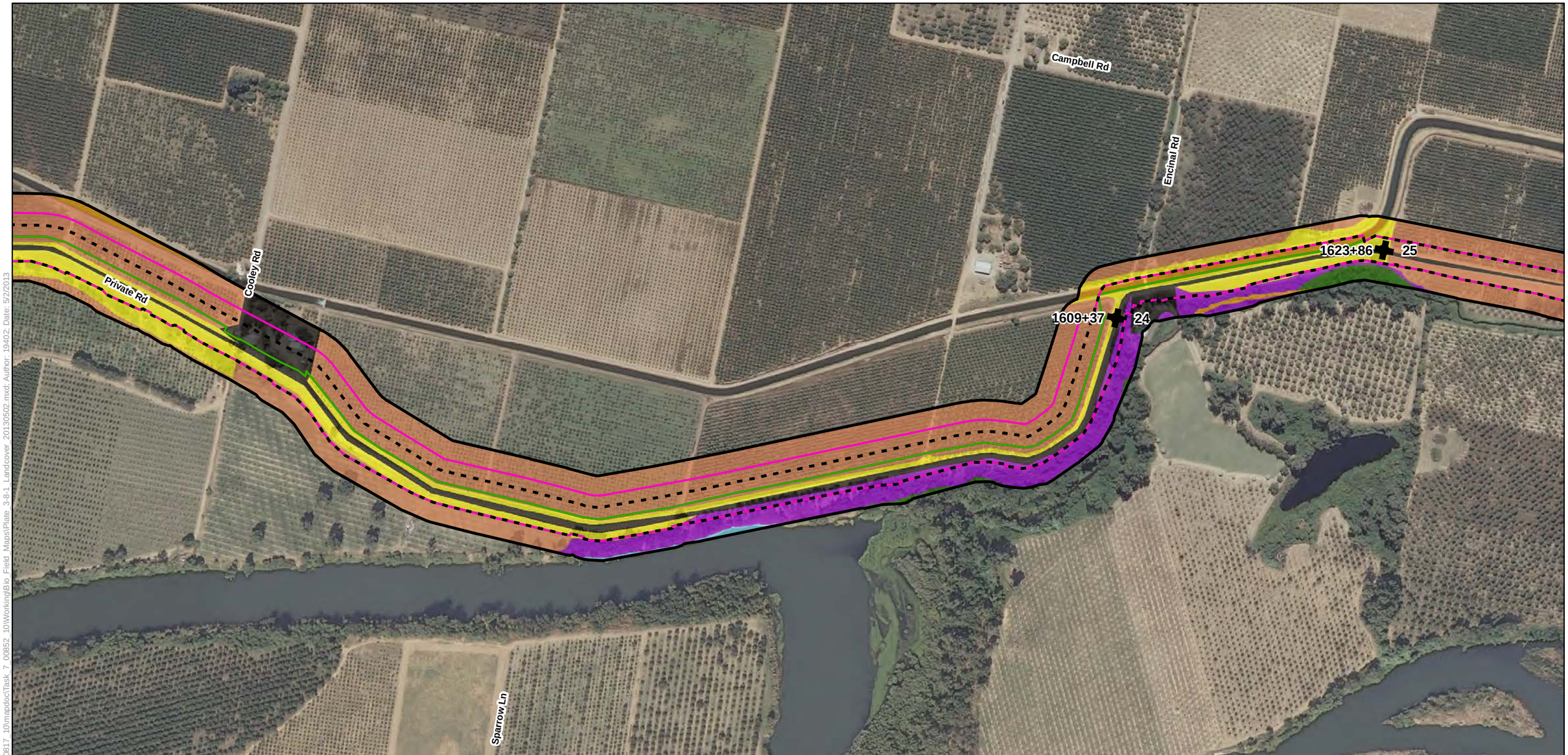


Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

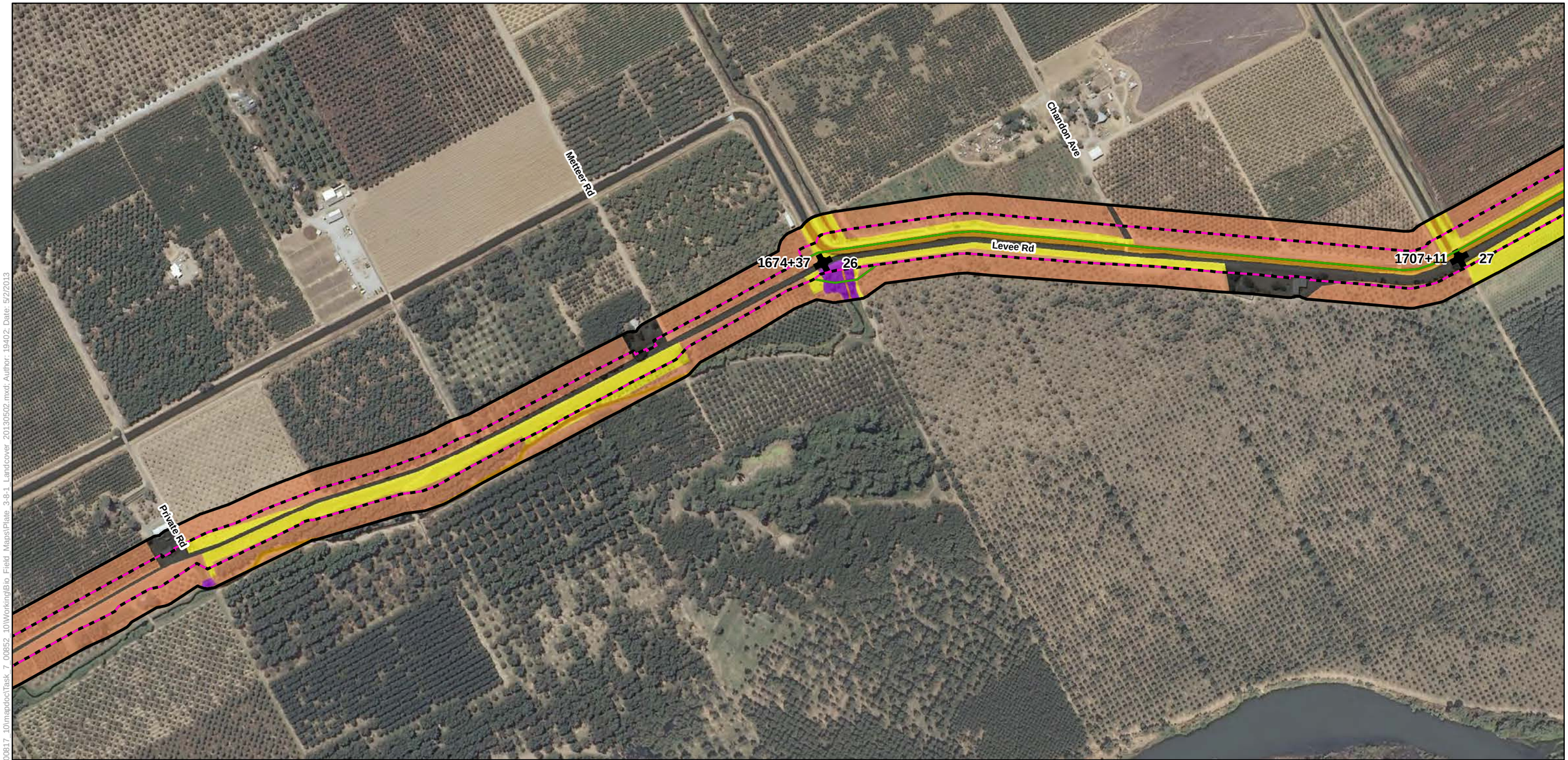
- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 19

0 250 500
Feet

Path: K:\Projects_2\Sutter-Butte_Flood_Control_Agency\00817_10\mapdoc\Task_7_00852_10\Working\Bio_Field_Maps\Plate_3-8-1_Landcover_20130502.mxd; Author: 19402; Date: 5/2/2013



Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 20

0 250 500
Feet

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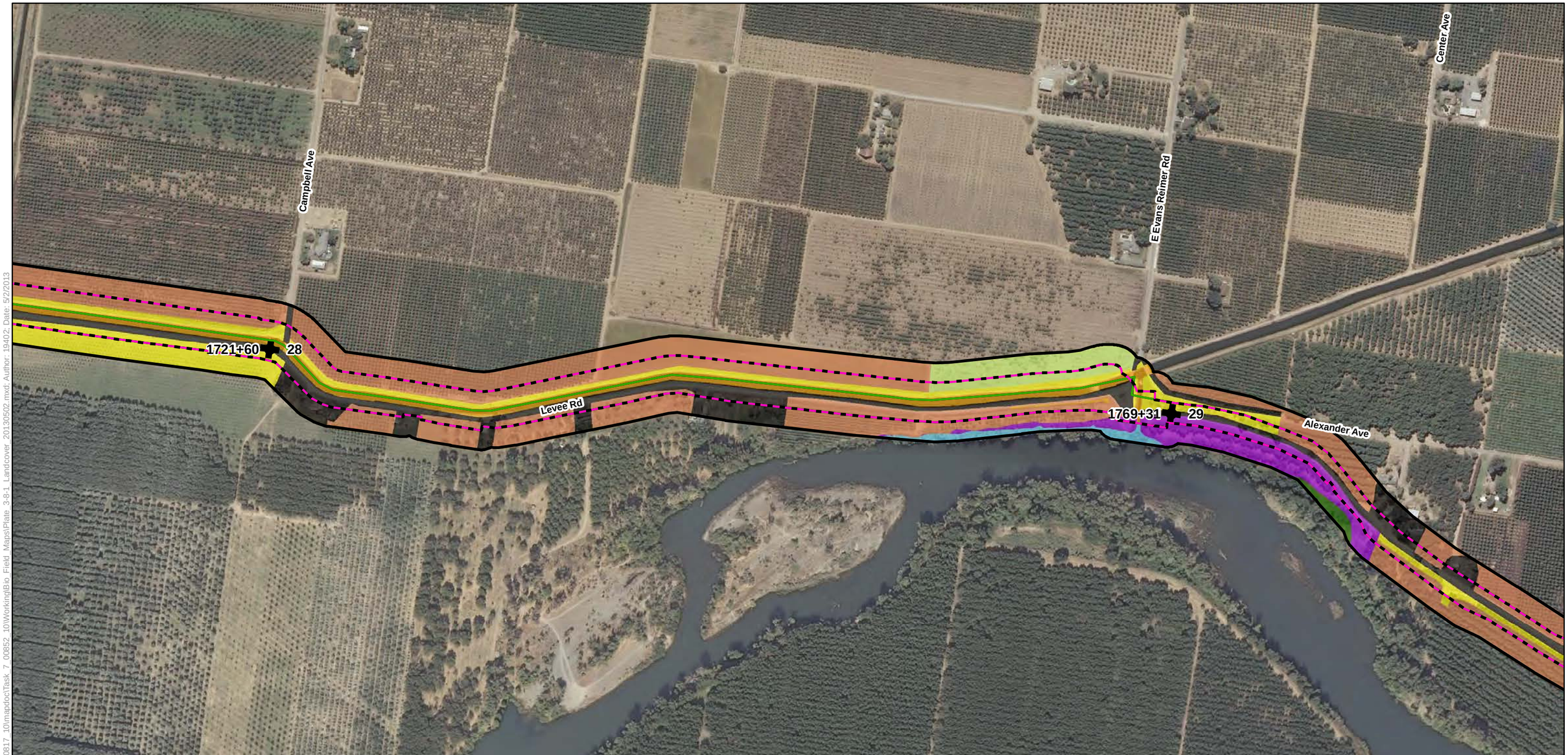

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
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- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 21

0 250 500
Feet

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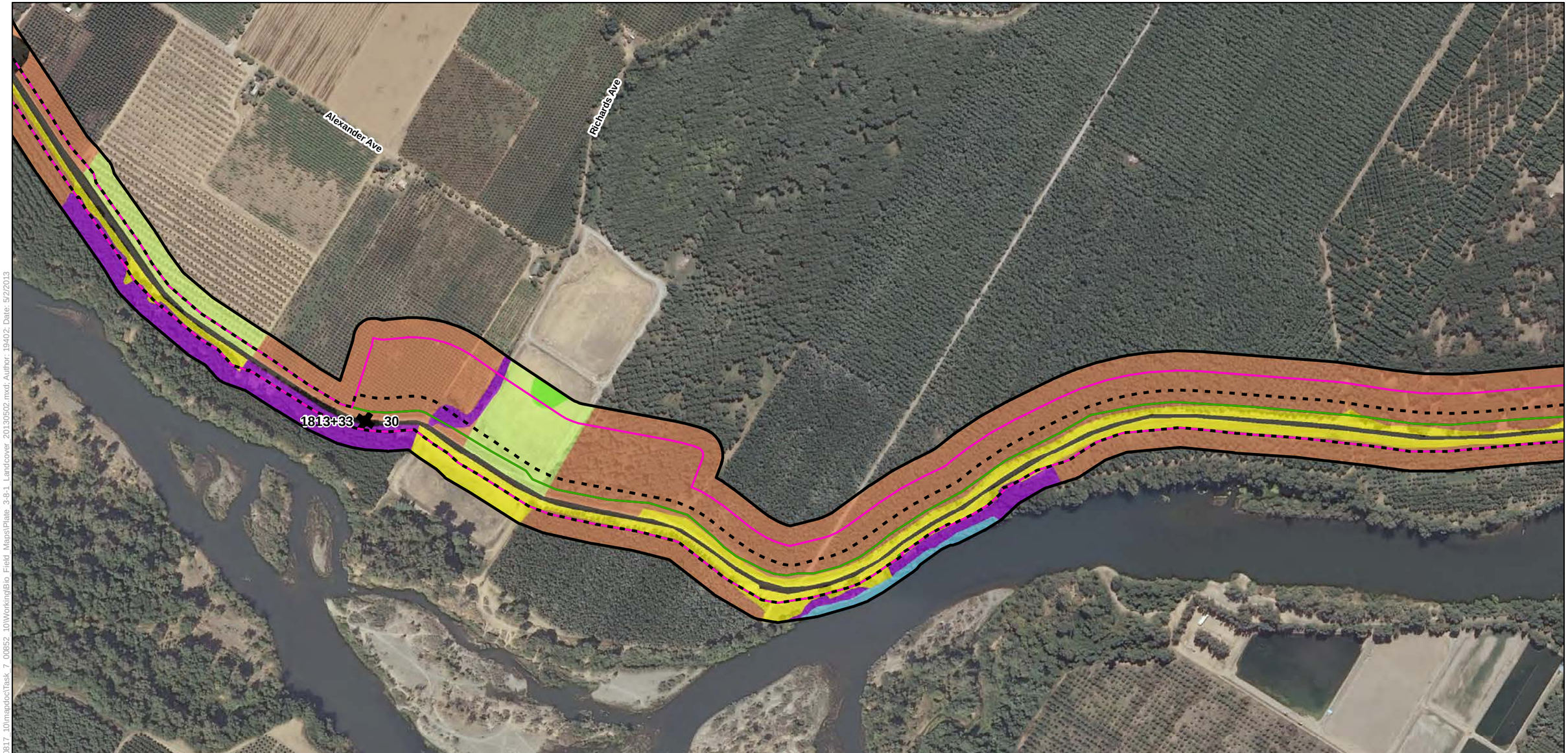

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
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- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 22

0 250 500
Feet

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Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 23

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Feet

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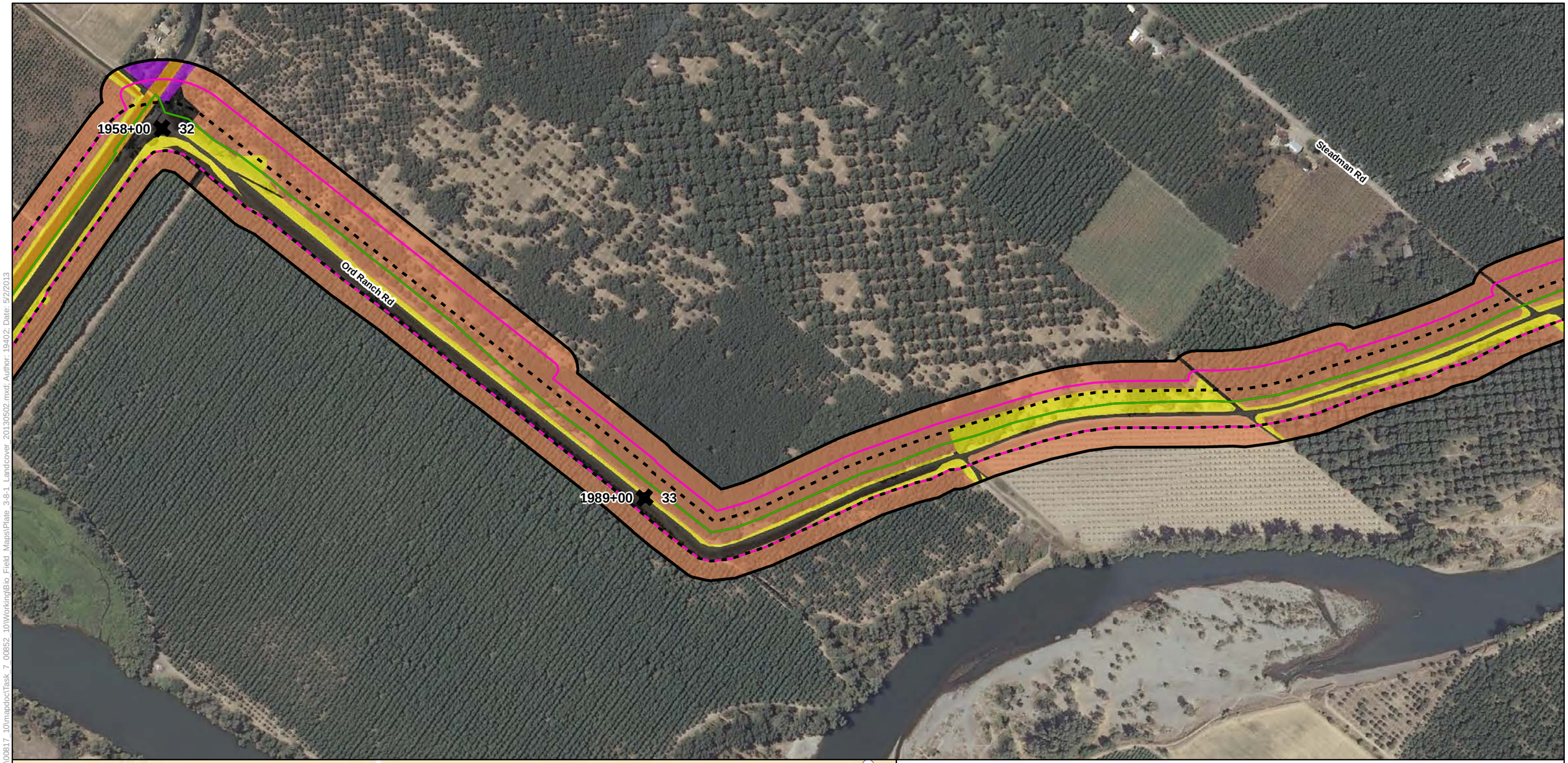

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 24

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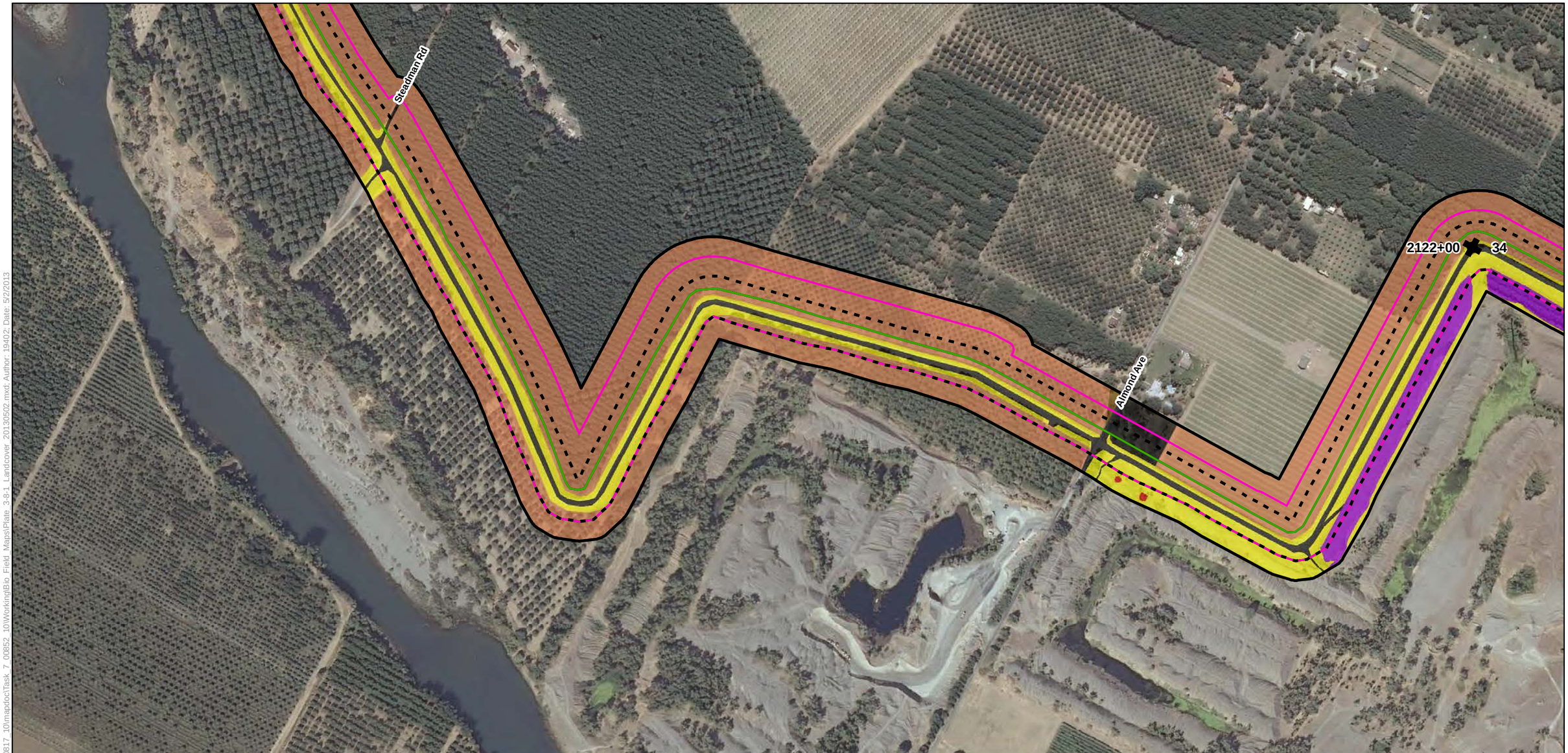
Feet

Path: K:\Projects_2\Sutter-Butte_Flood_Control_Agency\00817_10\mapdoc\Task_7_00852_10\Working\Bio_Field_Maps\Plate_3-8-1_Landcover_20130502.mxd; Author: 19402; Date: 5/2/2013



Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 25

0 250 500
Feet

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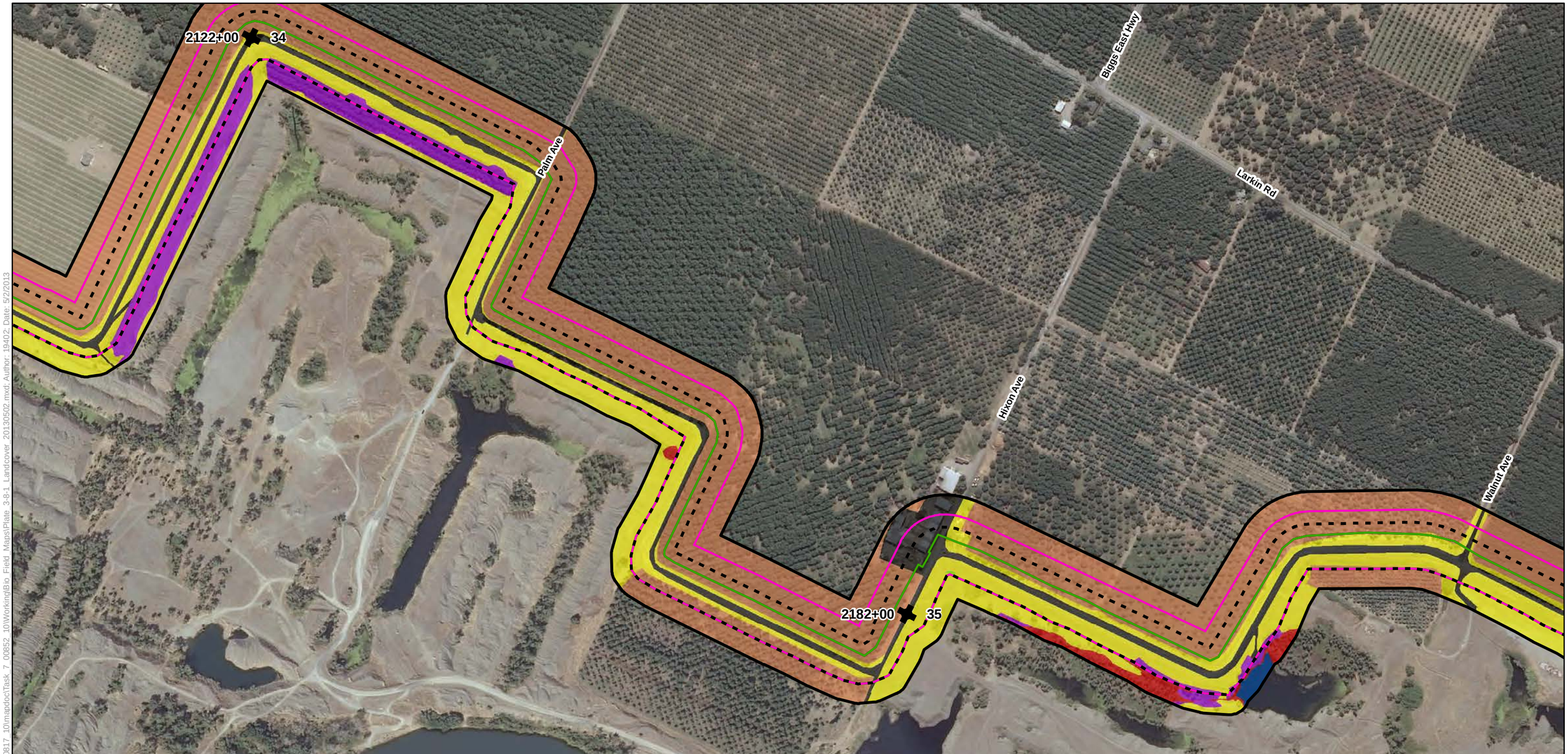

Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 26

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Feet

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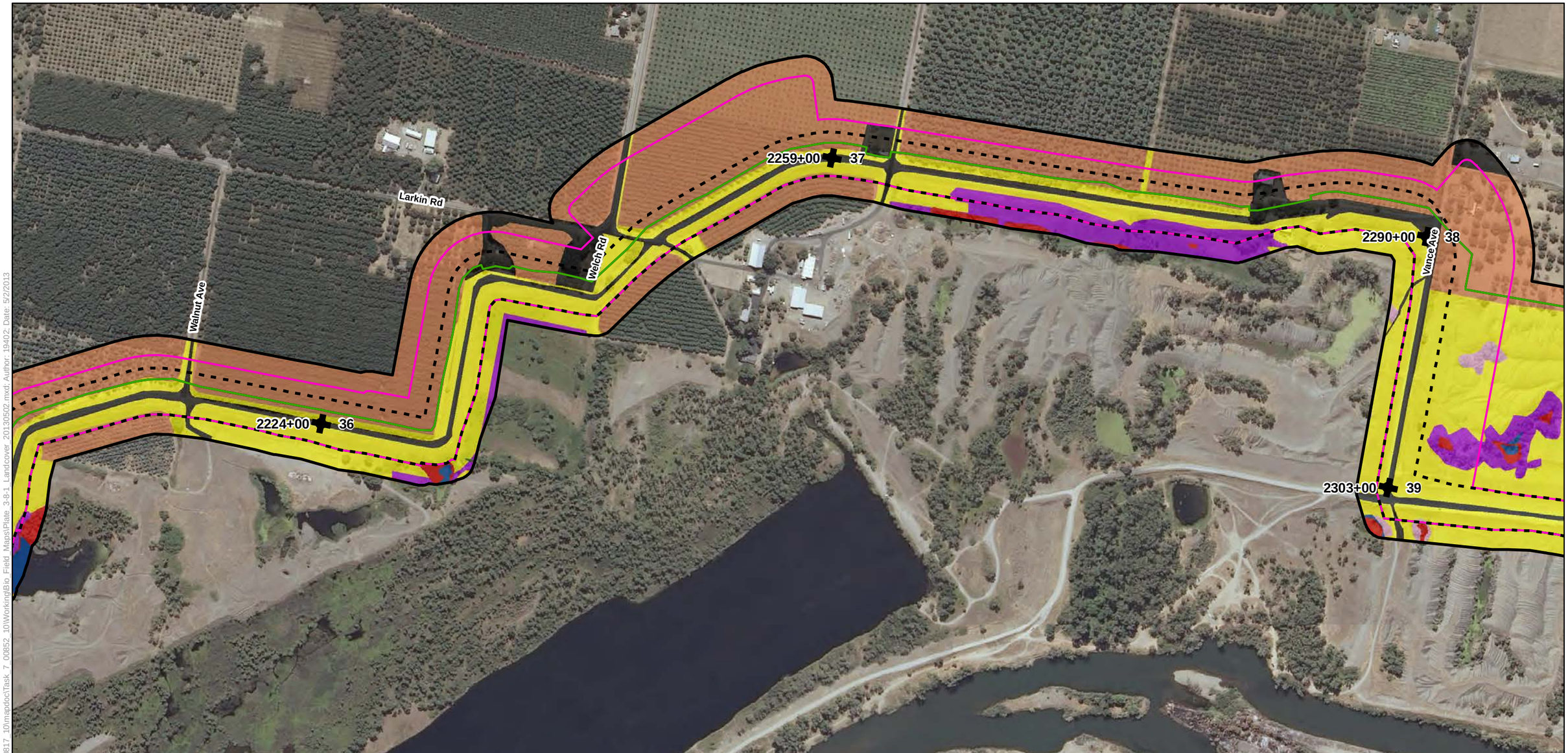


Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

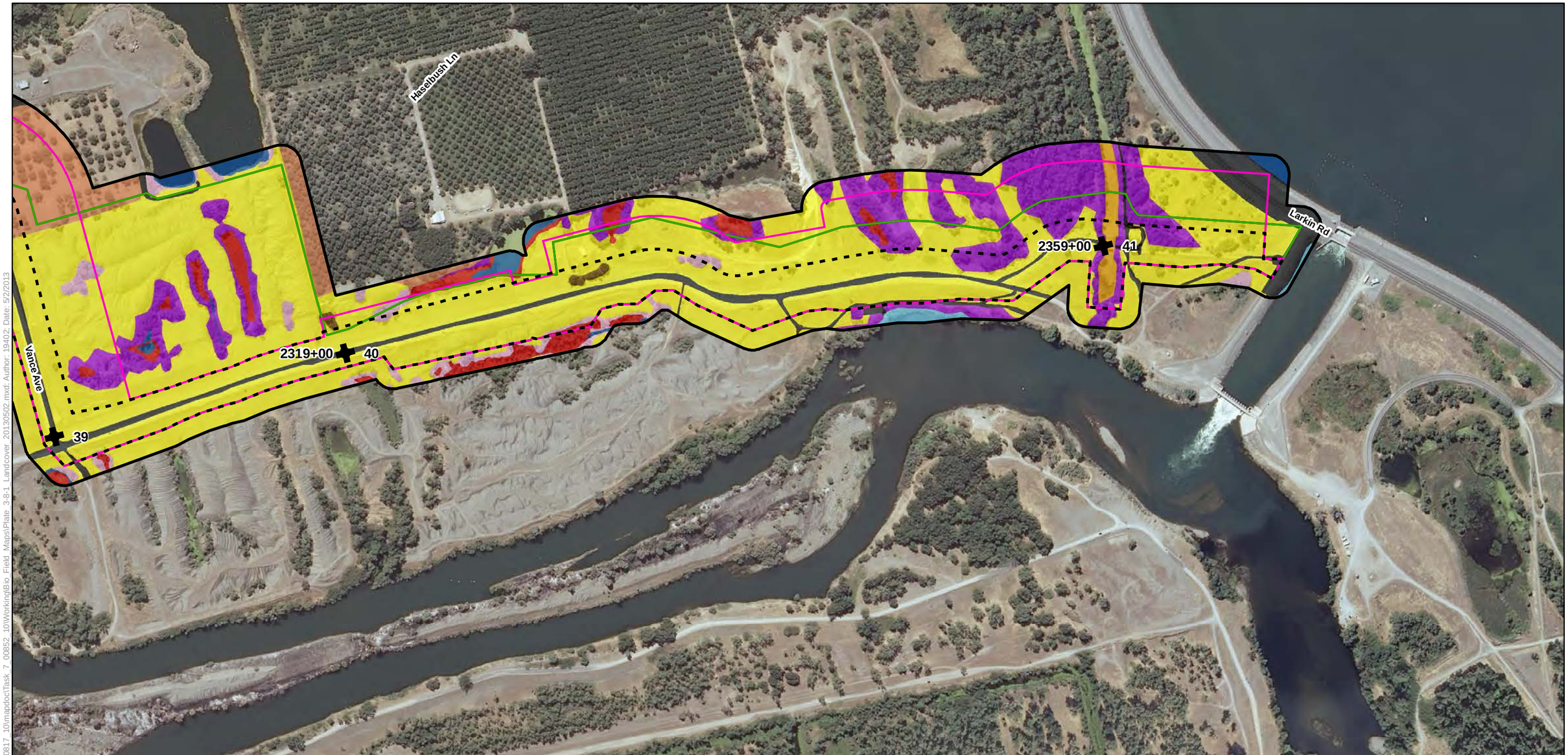
- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 27

0 250 500
Feet

Path: K:\Projects_2\Sutter-Butte_Flood_Control_Agency\00817_10\mapdoc\Task_7_00852_10\Working\Bio_Field_Maps\Plate_3-8-1_Landcover_20130502.mxd; Author: 19402; Date: 5/2/2013



Legend

- Biological Study Area
- Alternative 1
- Alternative 2
- Alternative 3
- Reach
- Station 202+50

Land Cover Types

- Developed
- Ditch/Canal
- Field and Row Crops
- Forested/Shrub Wetland
- Oak Woodland
- Open Water
- Orchard
- Pond/Basin
- Riparian Forest
- Riparian Scrub-Shrub
- Ruderal
- Seasonal Wetlands
- Stream/River
- Tailings Wetlands

Plate 3.8-1
Land Cover Types in the Biological Study Area for Alternative 1-3

Sheet 28

0 250 500
Feet

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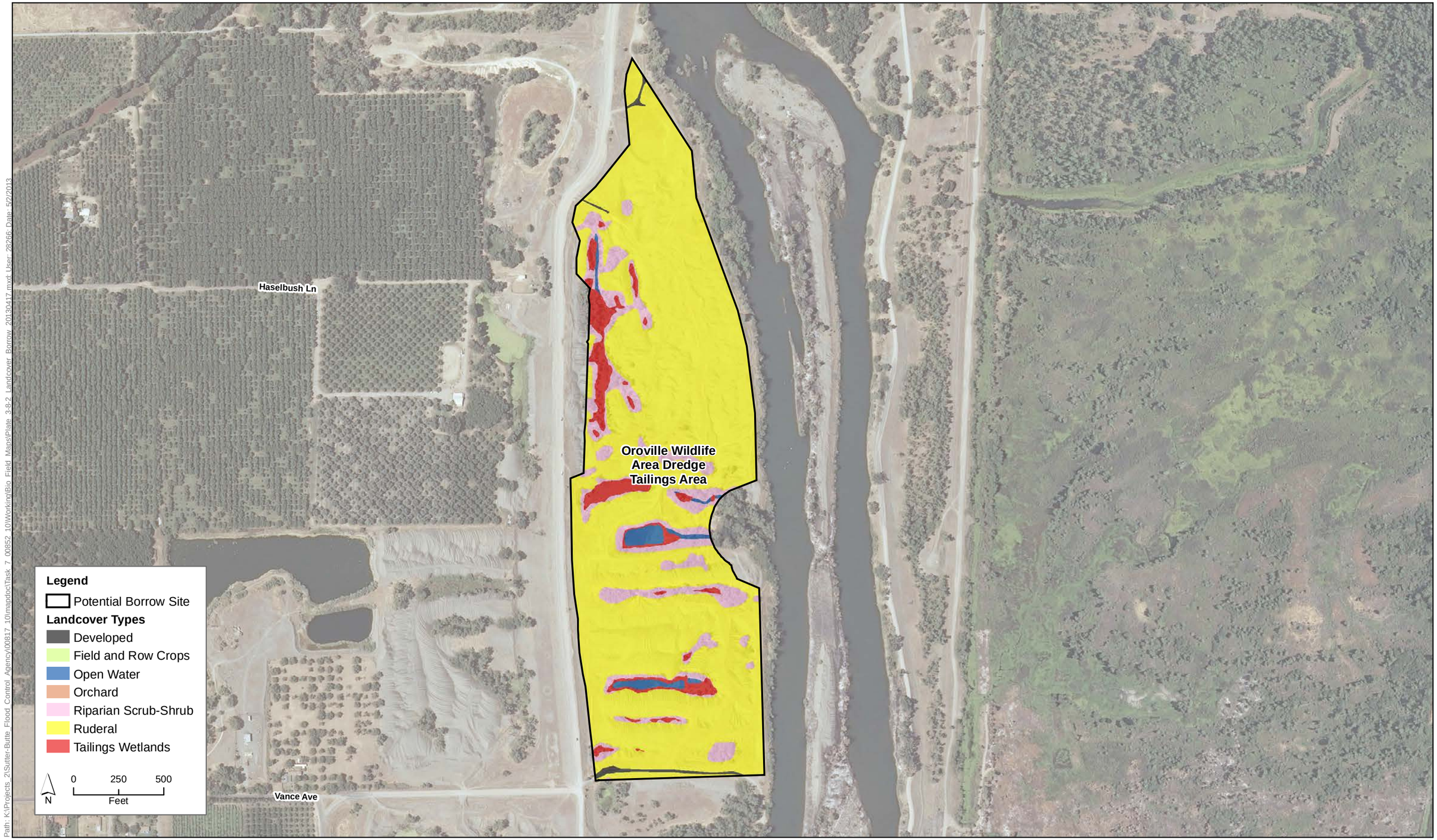

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Figure 3.8-2
Landcover Types at the Potential Borrow Sites

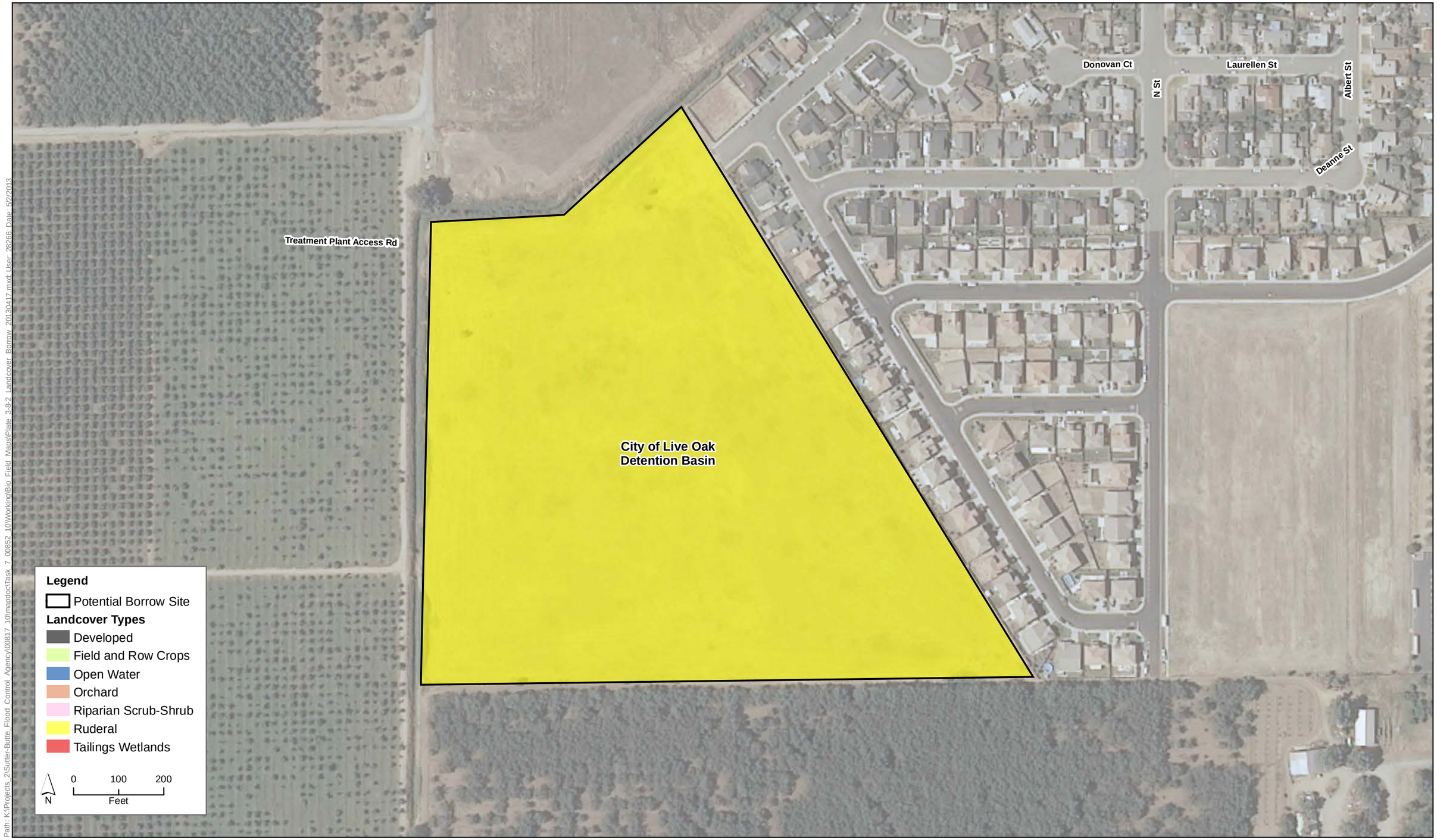

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Figure 3.8-2
Landcover Types at the Potential Borrow Sites

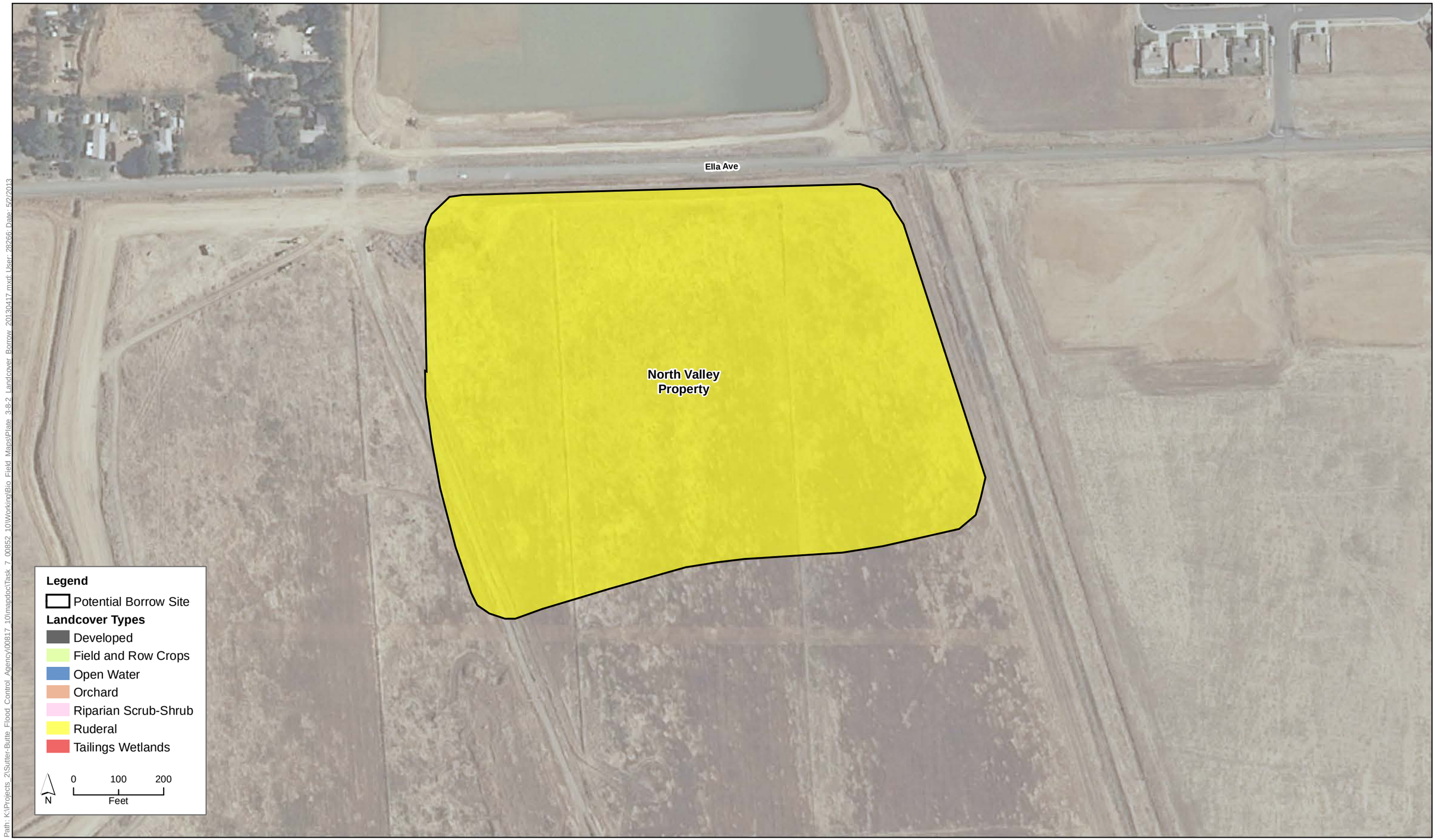

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Figure 3.8-2
Landcover Types at the Potential Borrow Sites

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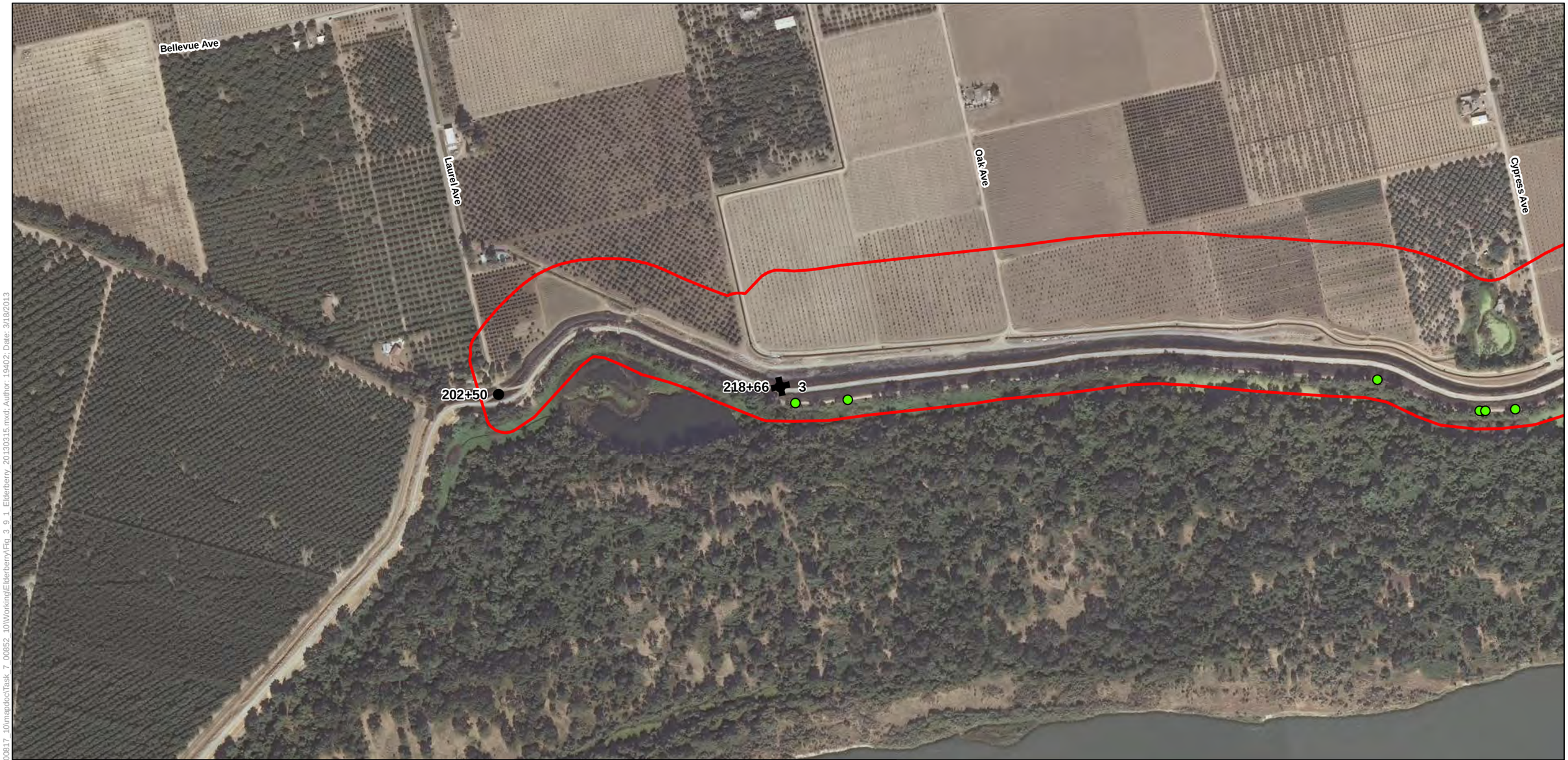
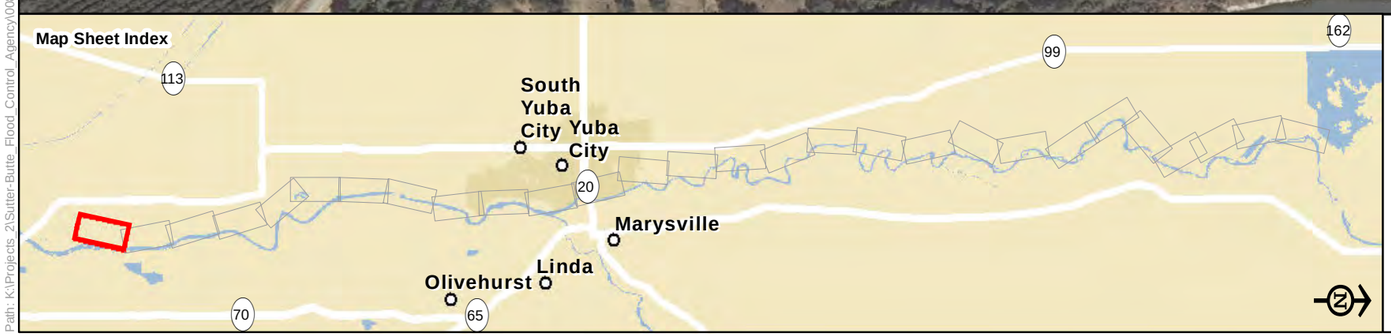
Figure 3.8-2
Landcover Types at the Potential Borrow Sites

Path: K:\Projects_2\Sutter-Butte_Flood_Control_Agency\00817_10\mapdoc\Task_7_00852_10\Working\Bio_Field_Maps\Plate_3-8-2_Landcover_Borrow_20130417.mxd User: 28266 Date: 5/2/2013

Figure 3.8-2
Landcover Types at the Potential Borrow Sites





Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 1

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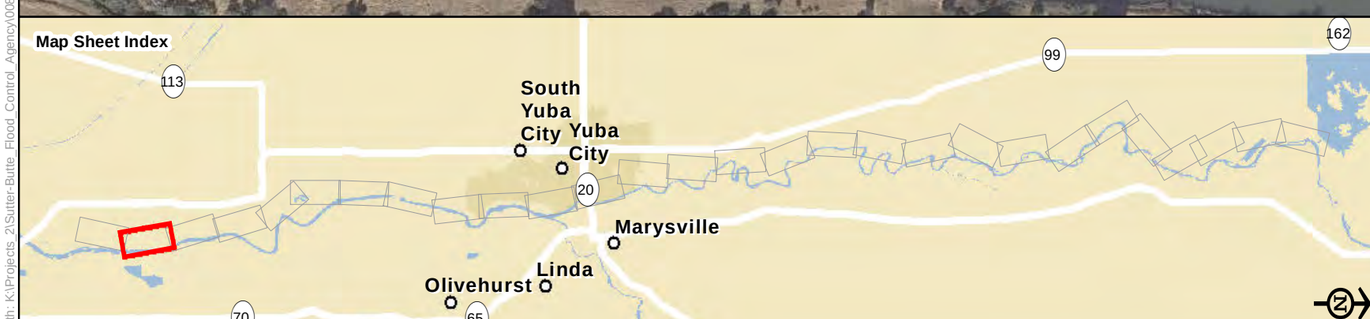

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 2

0 250 500
Feet

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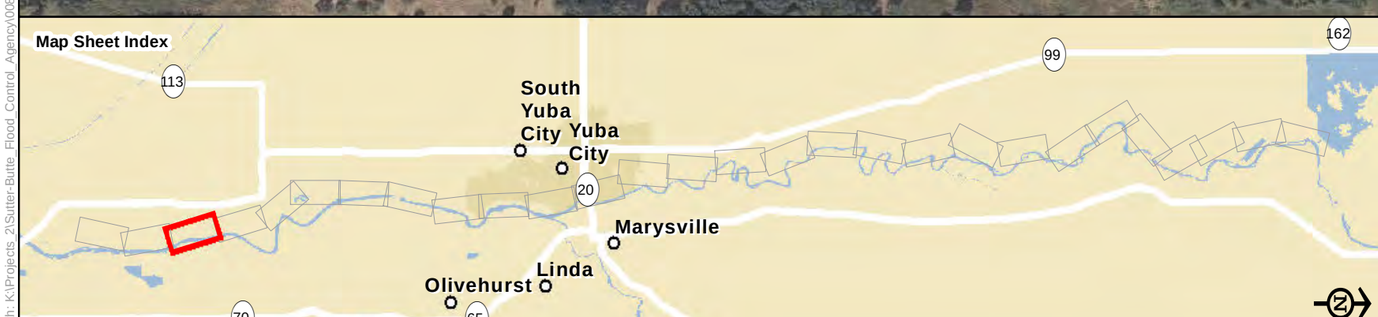


Legend

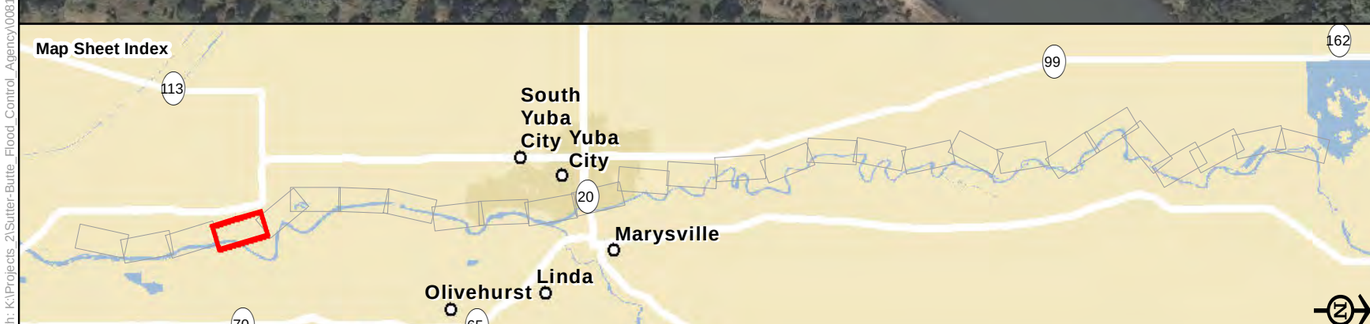
- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 3

0 250 500
Feet

Path: K:\Projects_2\Sutter-Butte_Flood_Control_Agency\00817_10\mapdoc\Task_7_00852_10\Working\Elderberry\Fig_3_9_1_Elderberry_20130315.mxd: Author: 19402: Date: 3/18/2013



Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 4

0 250 500
Feet

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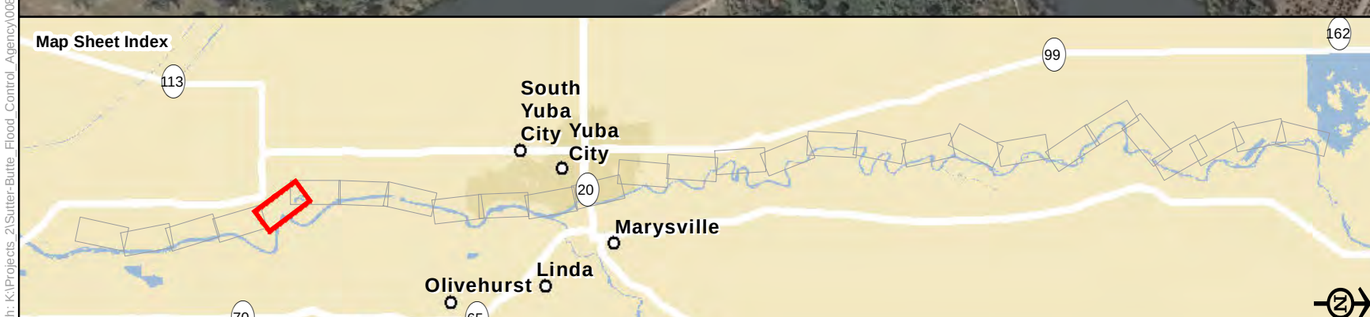

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 5

0 250 500
Feet

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Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 6

0 250 500
Feet

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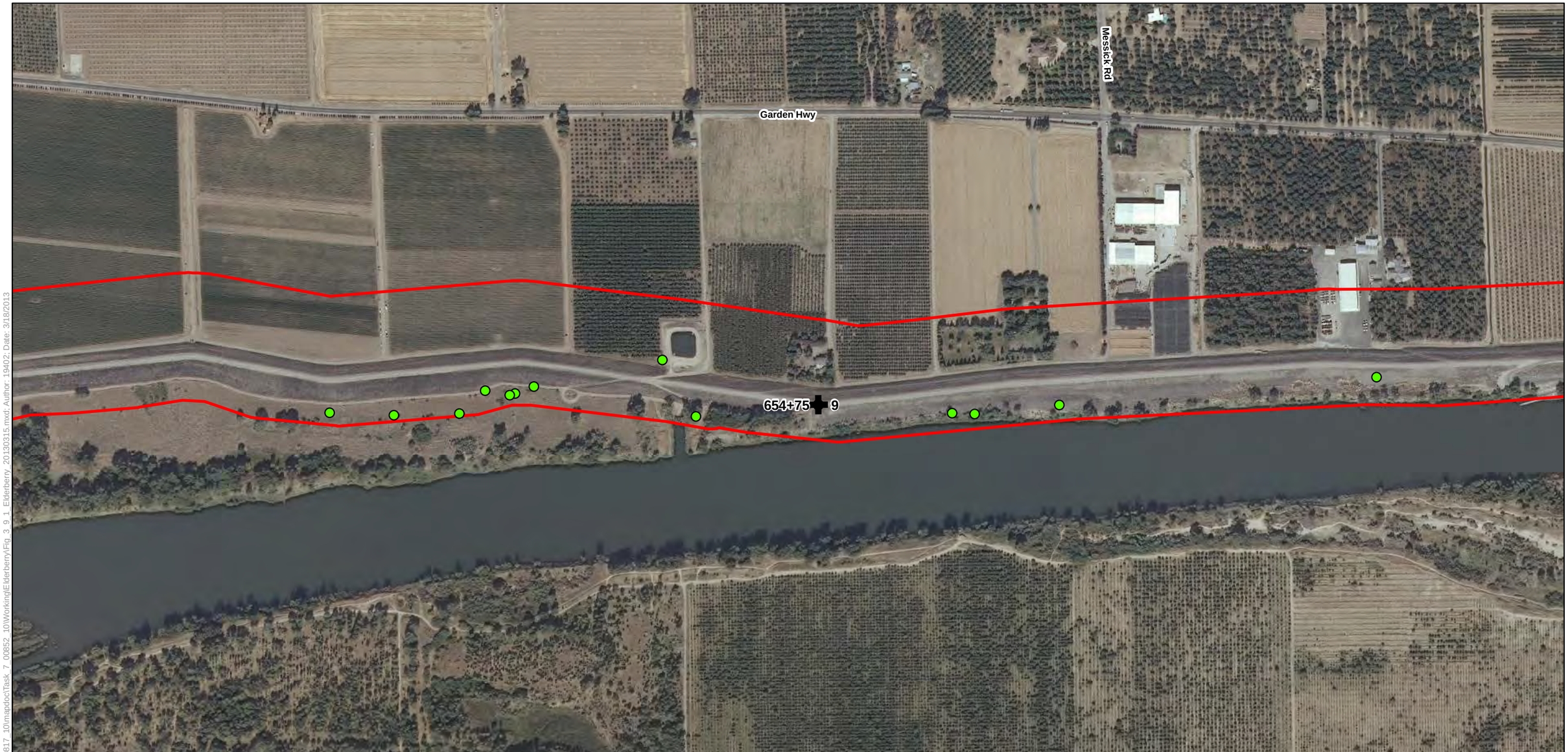

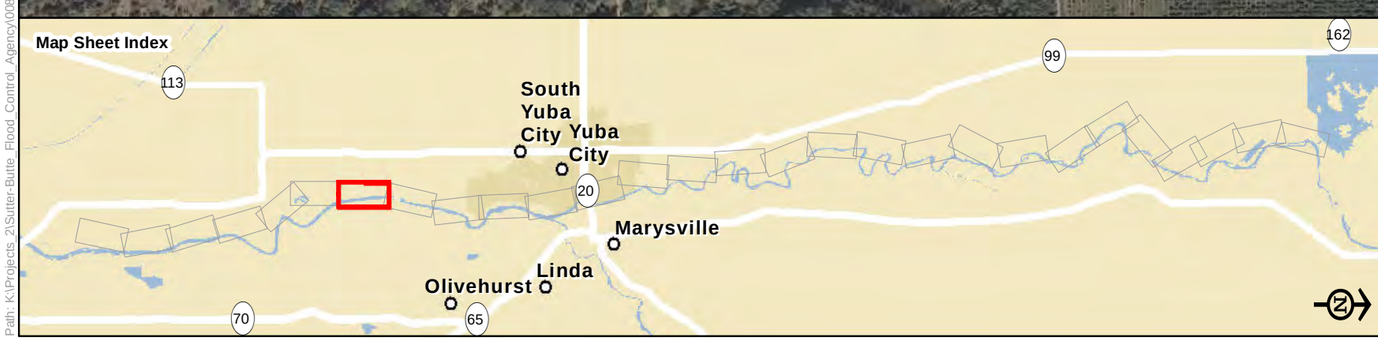

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 7

0 250 500
Feet

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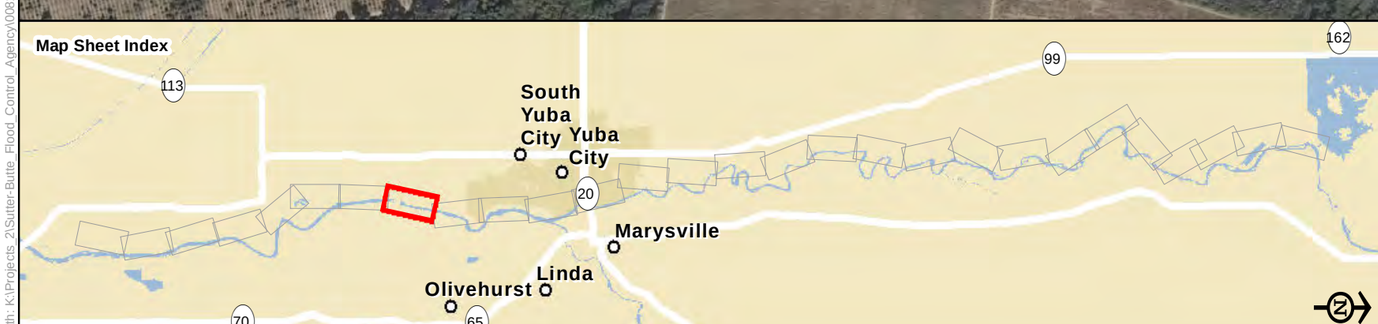

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 8

0 250 500
Feet

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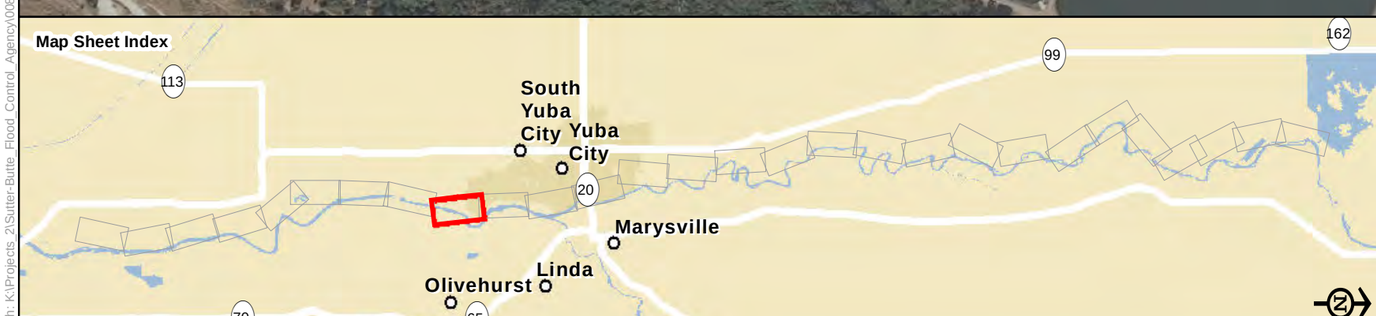


Legend

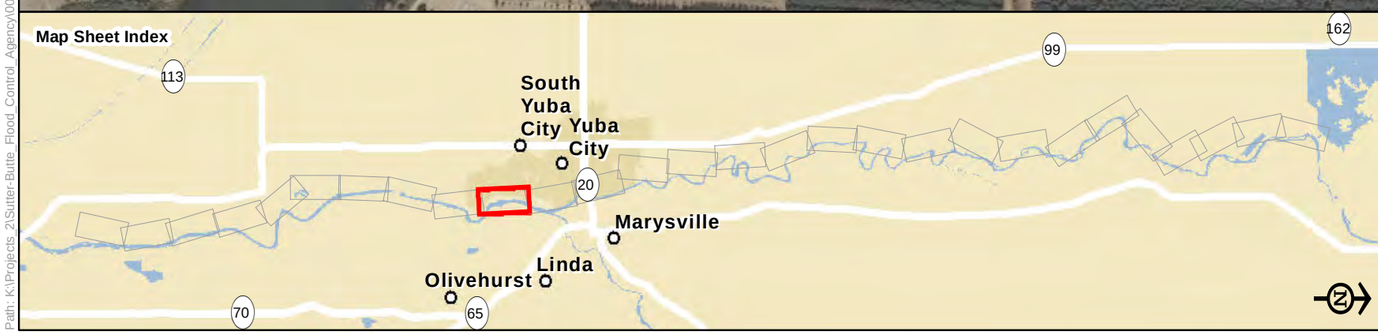
- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 9

0 250 500
Feet

Path: K:\Projects_2\Sutter-Butte_Flood_Control_Agency\00817_10\mapdoc\Task_7_00852_10\Working\Elderberry\Fig_3_9_1_Elderberry_20130315.mxd; Author: 19402; Date: 3/18/2013



Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 10

0 250 500
Feet

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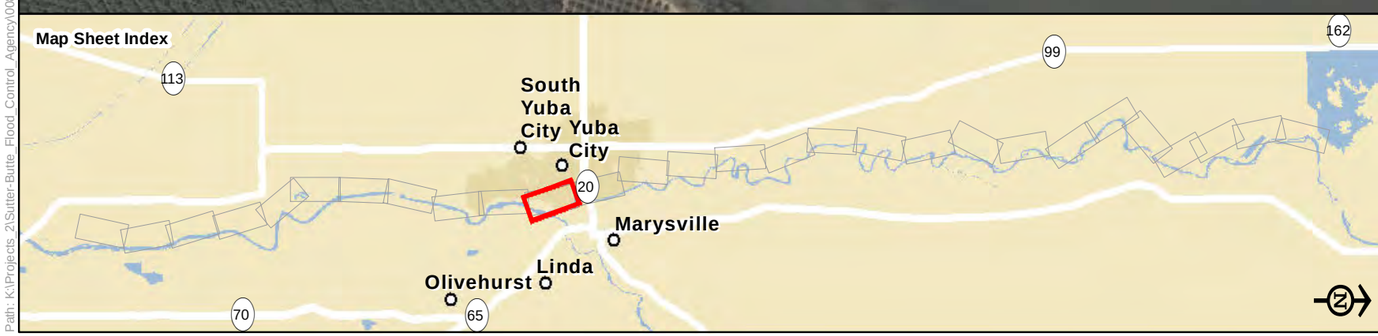

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 11

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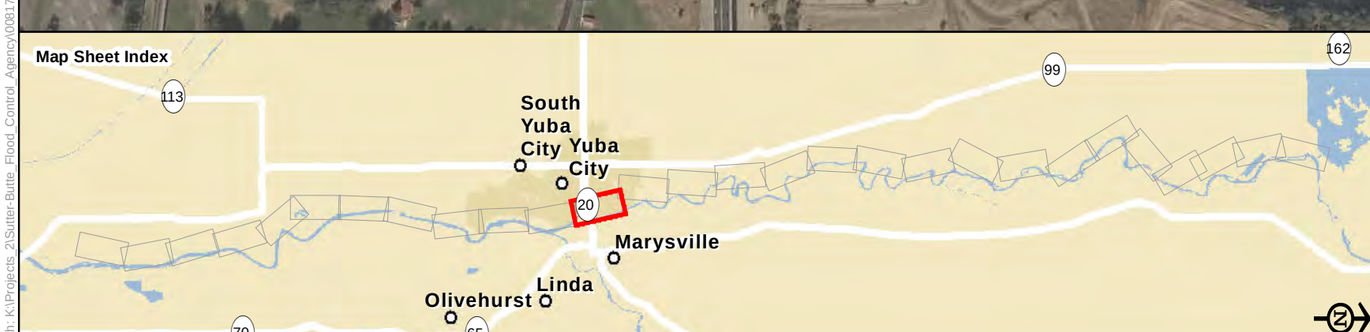

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 12

0 250 500
Feet

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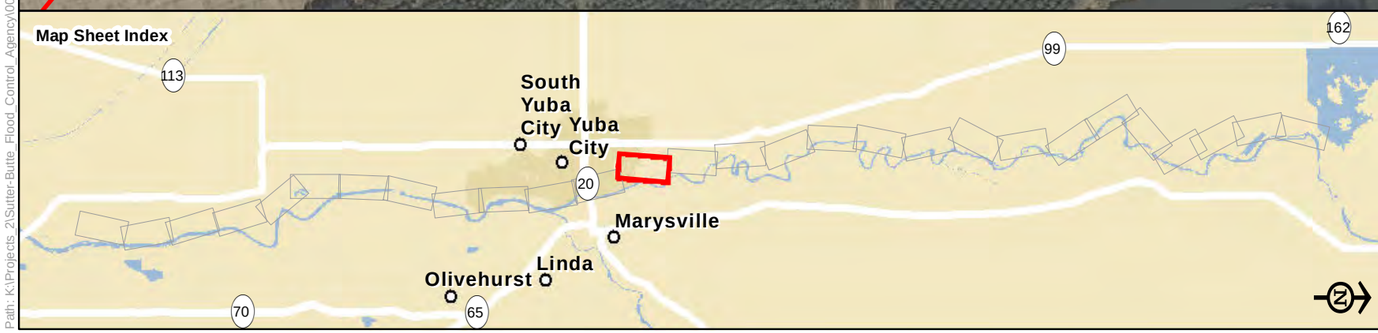

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 13

0 250 500
Feet

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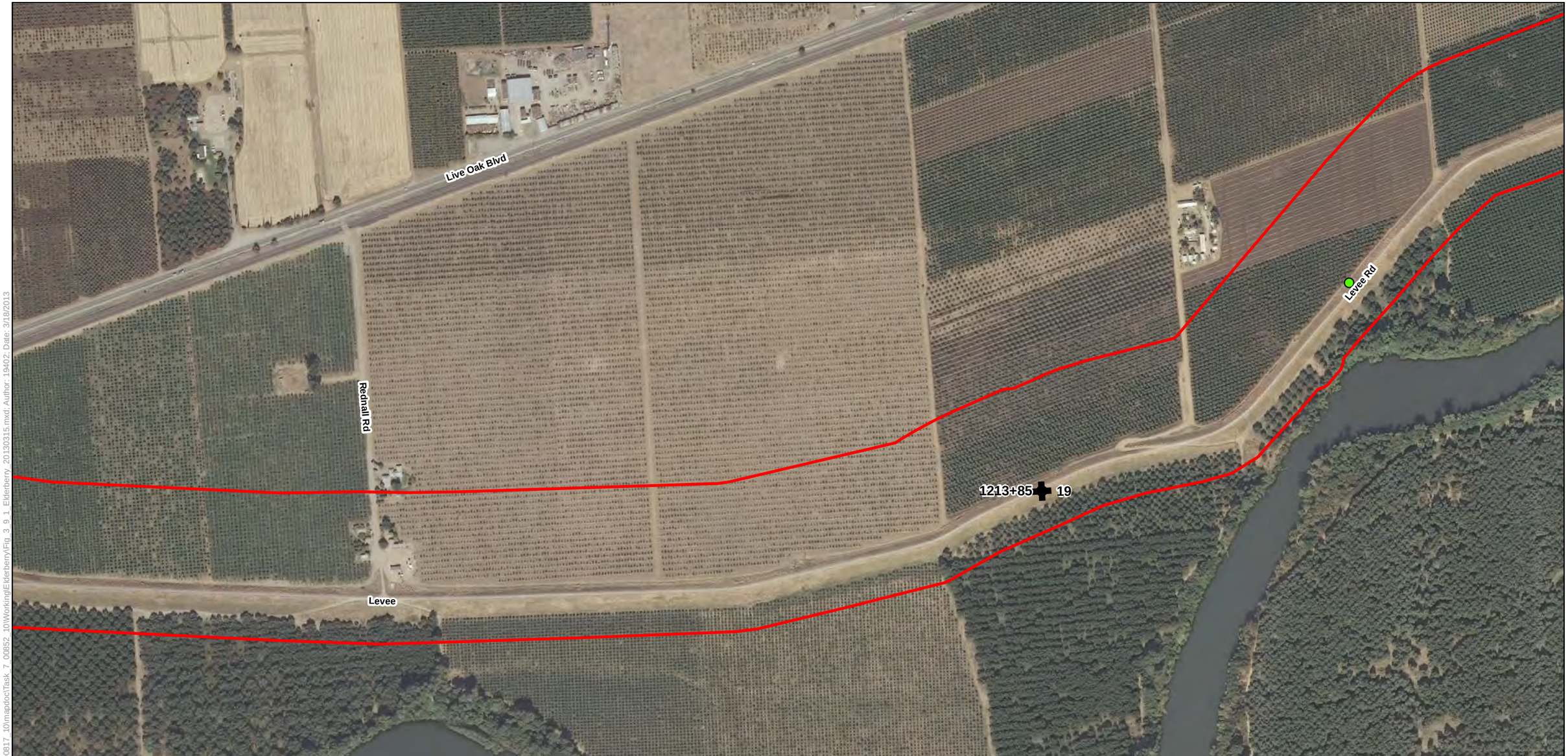

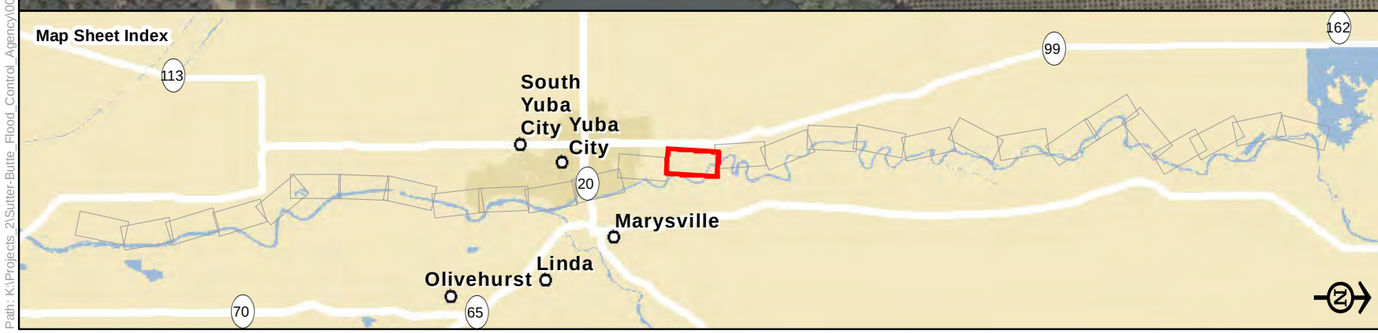

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 14

0 250 500
Feet

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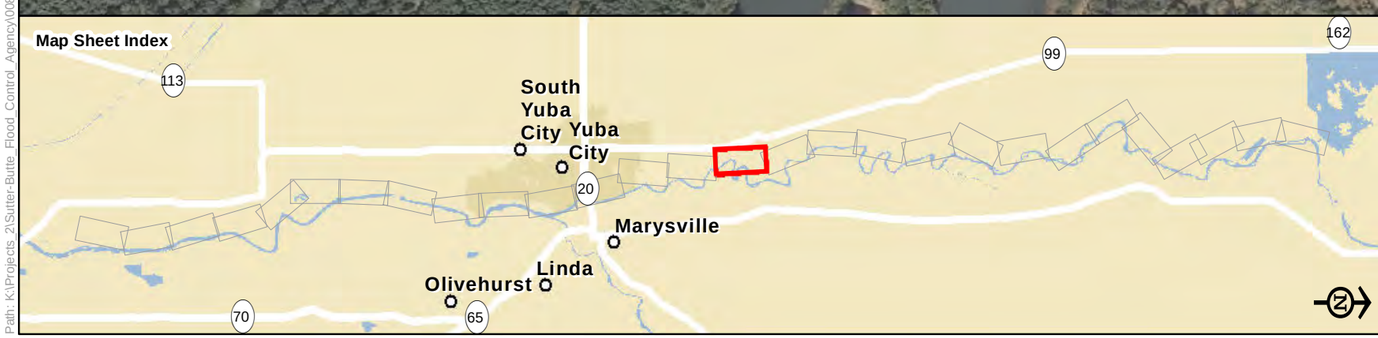

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 15

0 250 500
Feet

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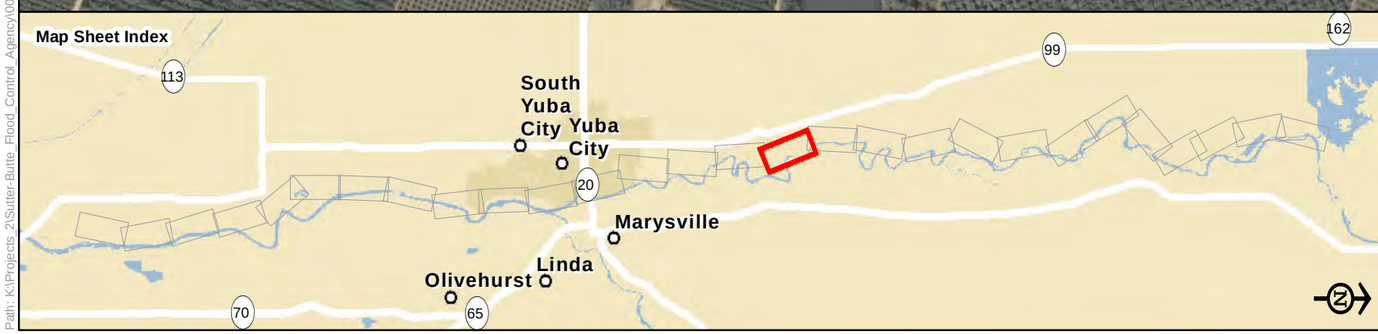

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 16

0 250 500
Feet

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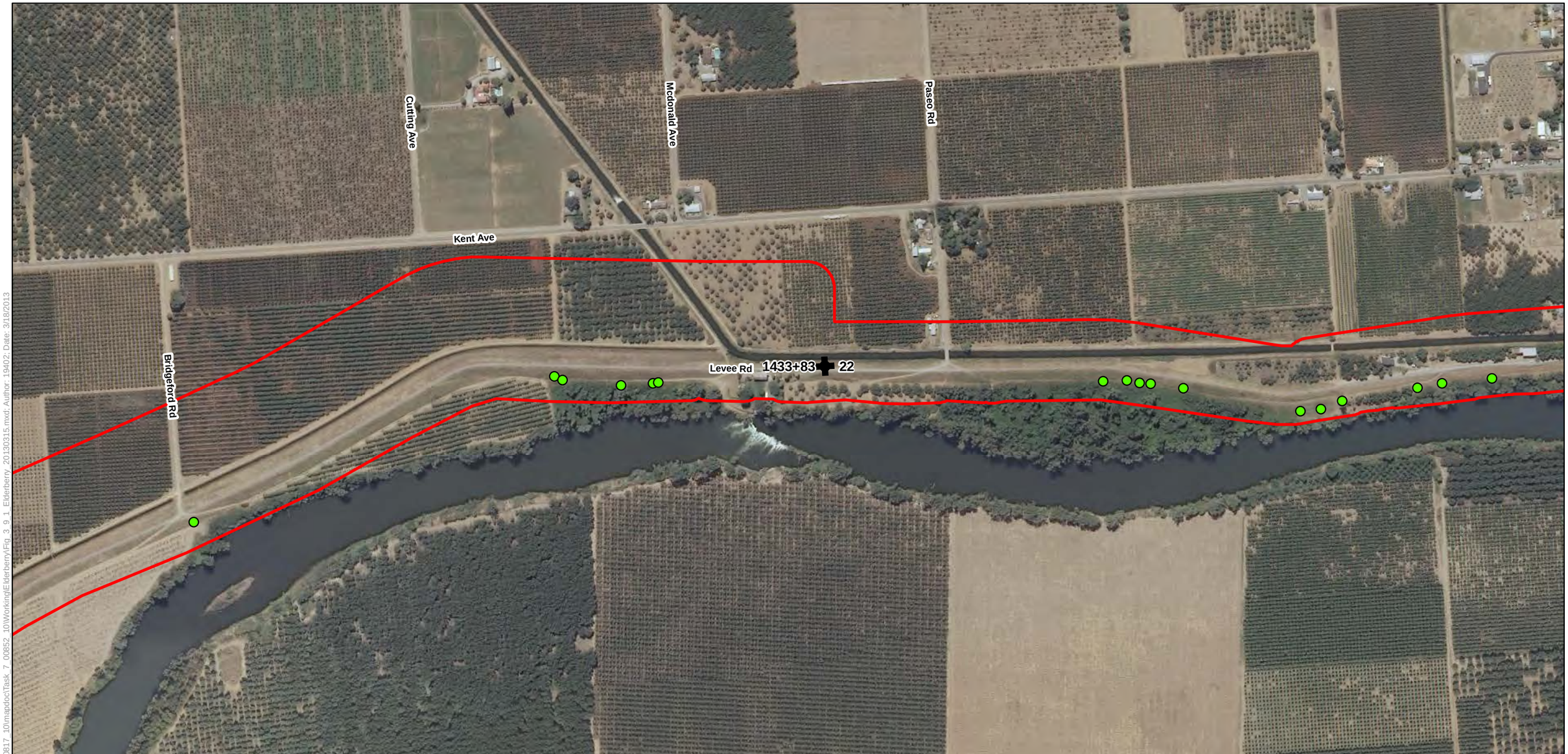

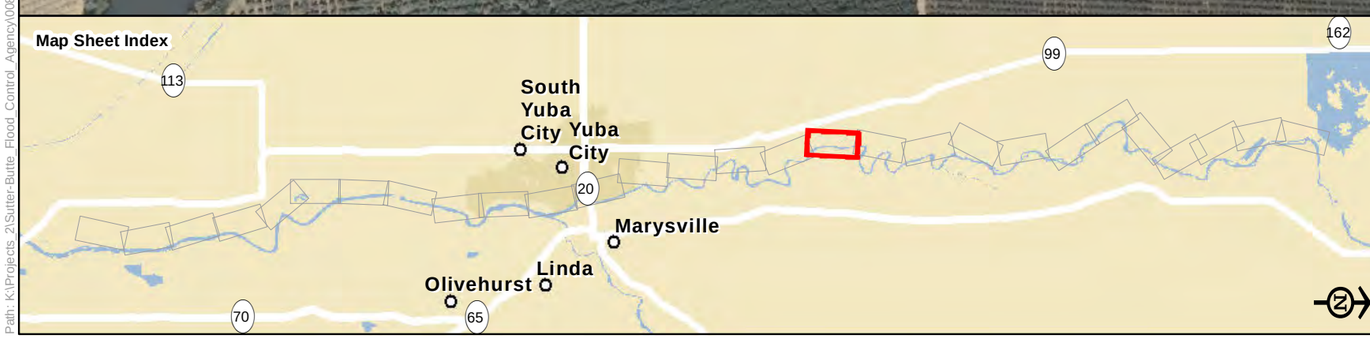

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 17

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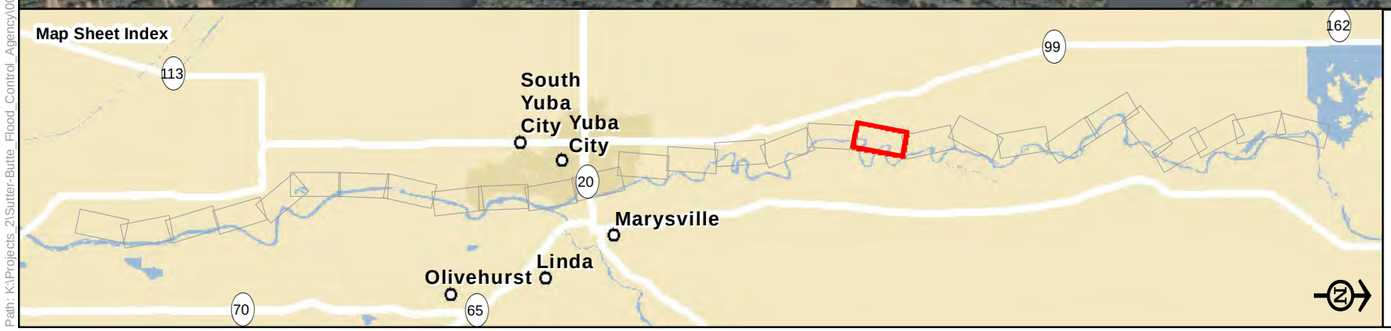

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 18

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Feet

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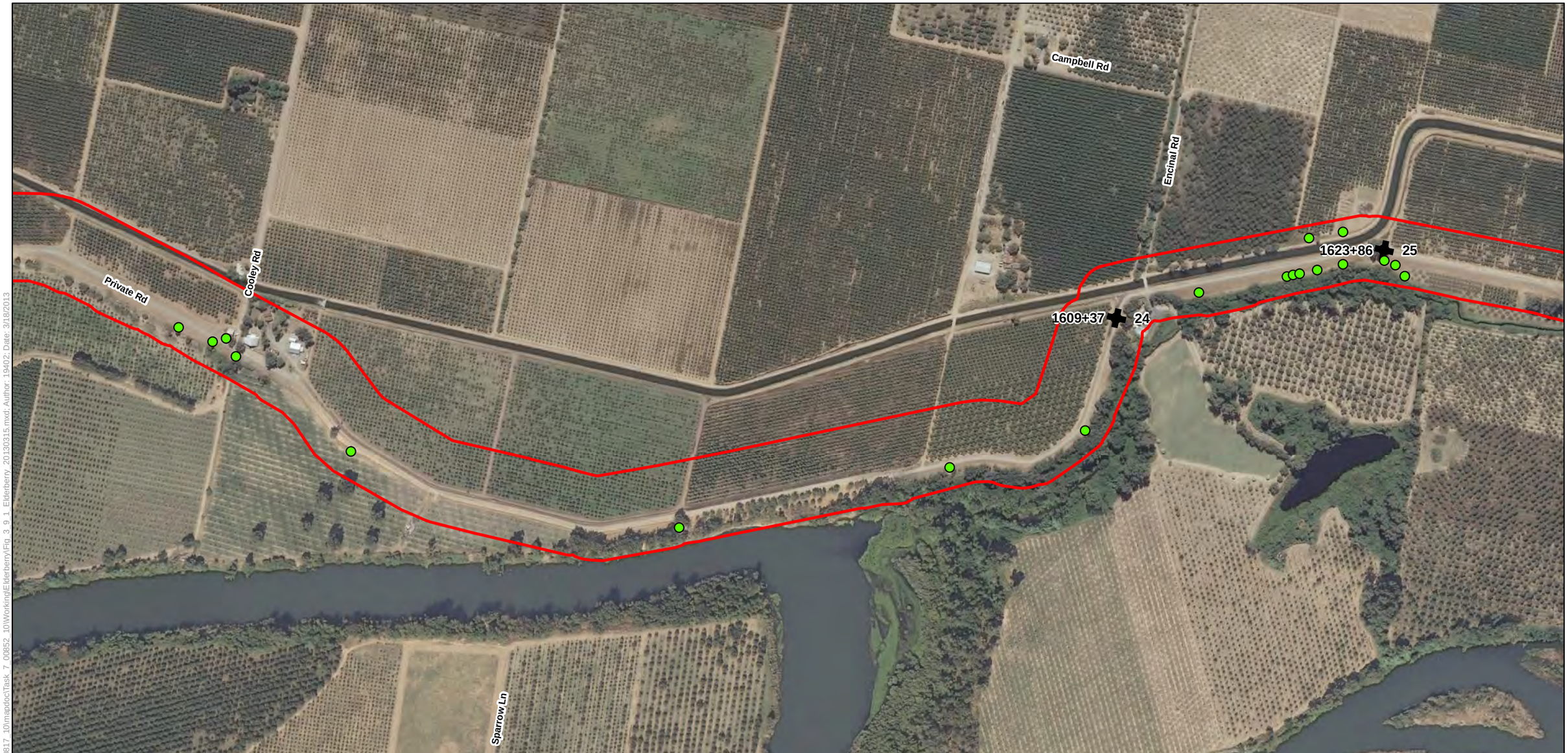

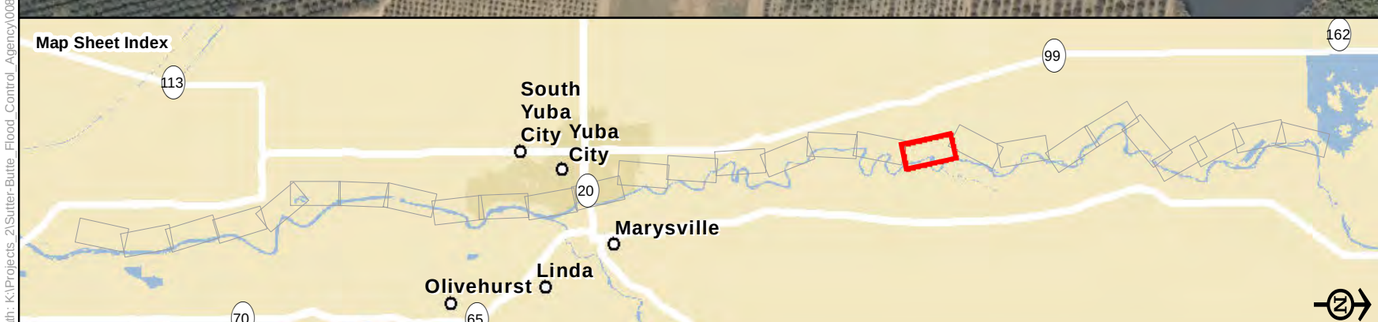

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 19

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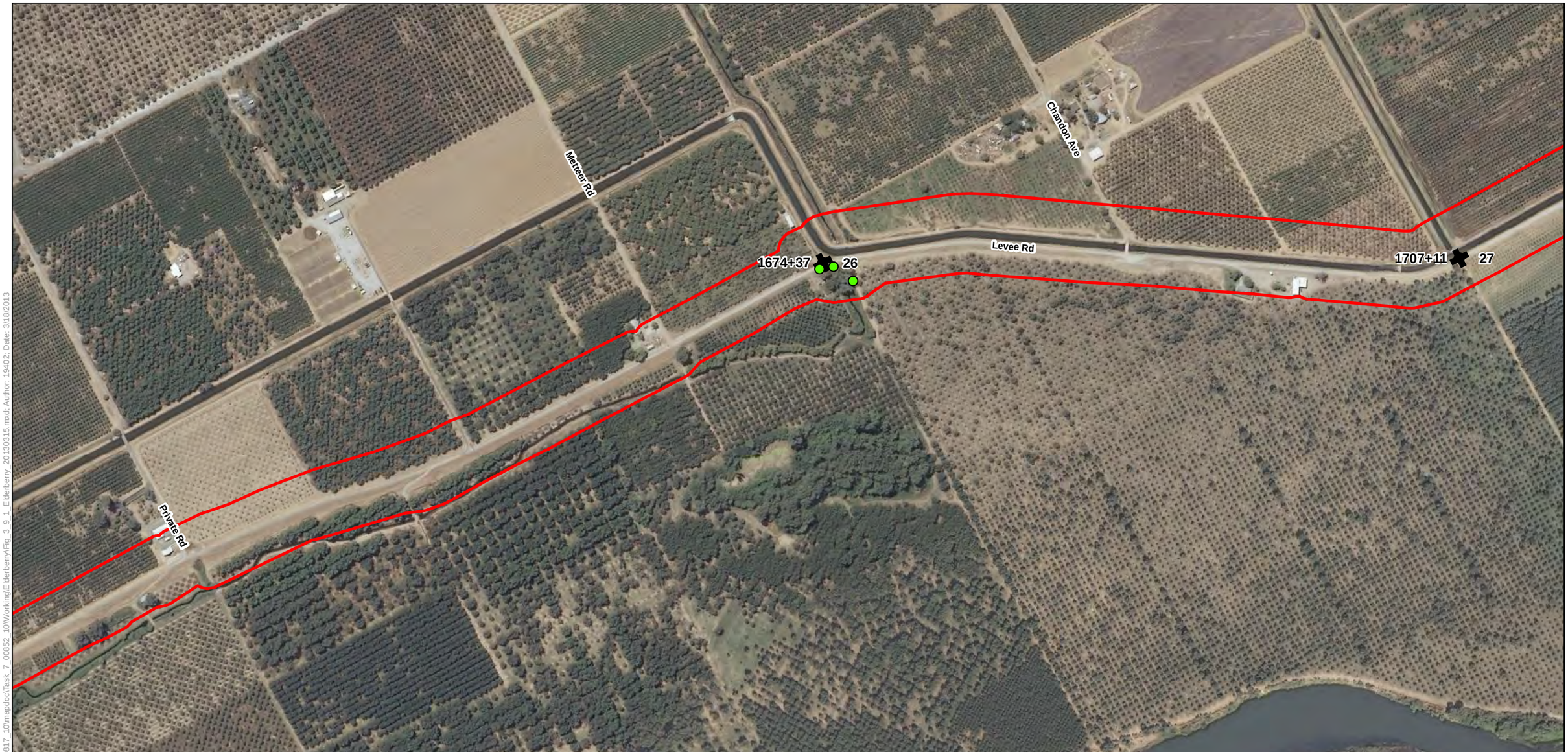

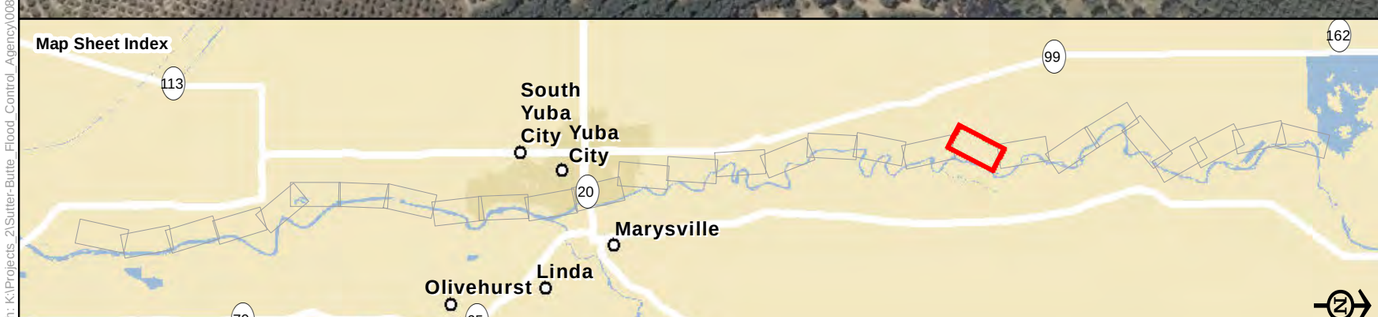

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 20

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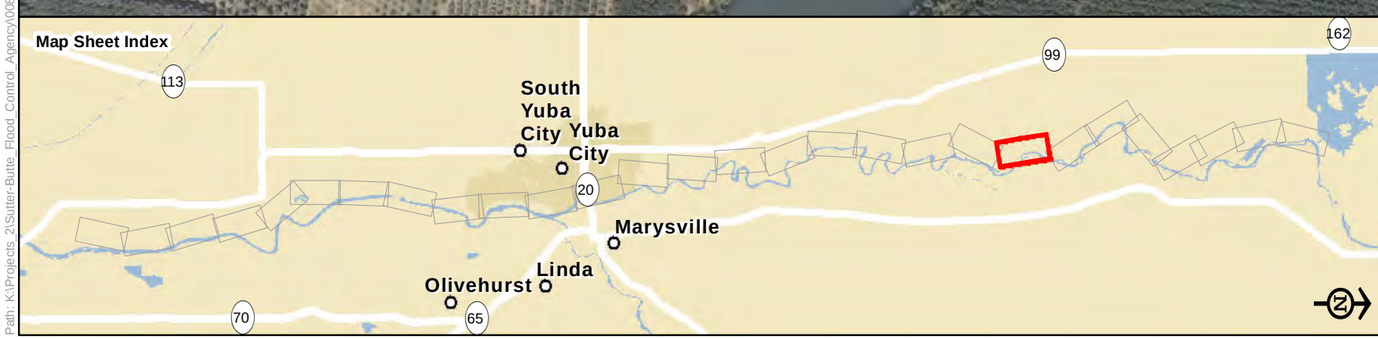

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 21

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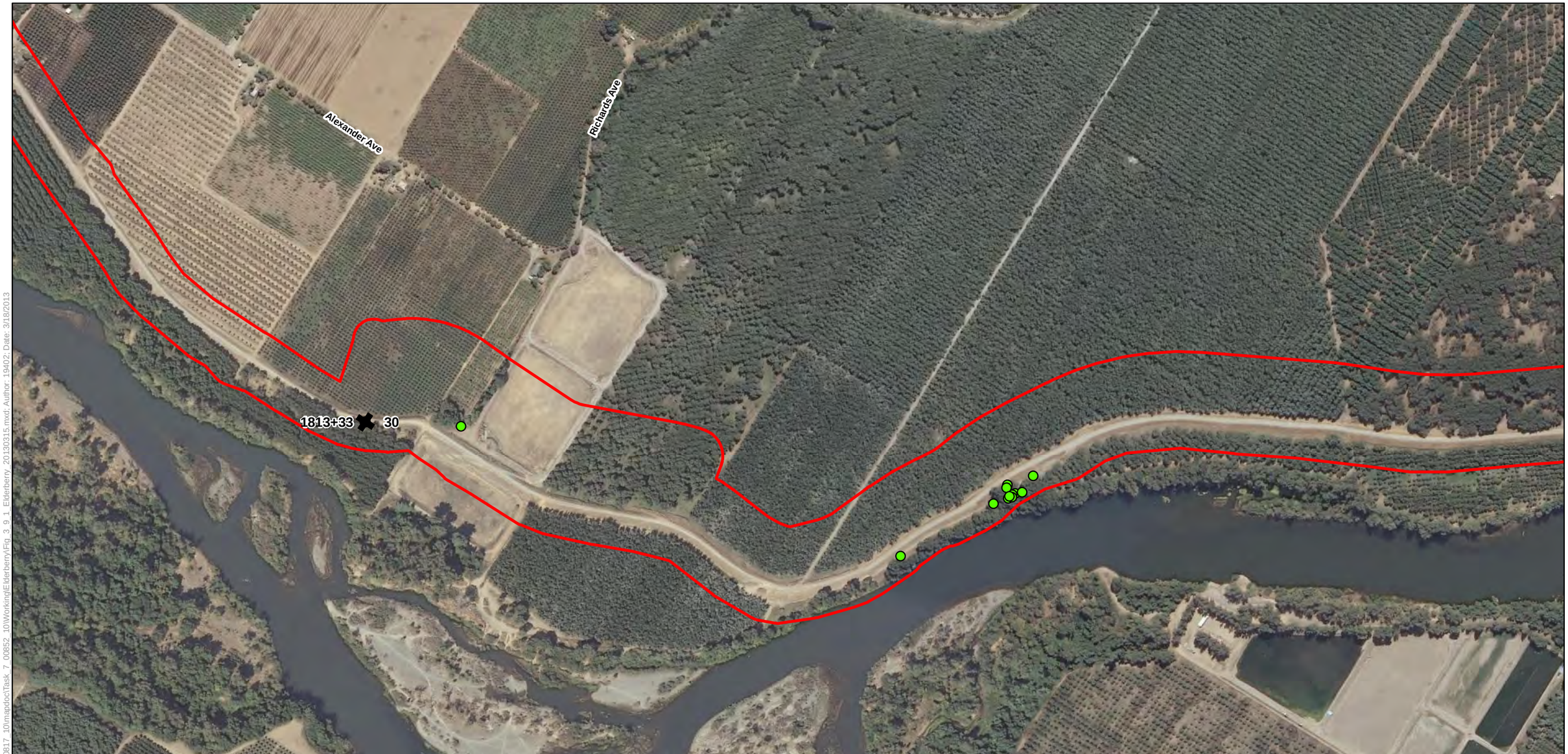

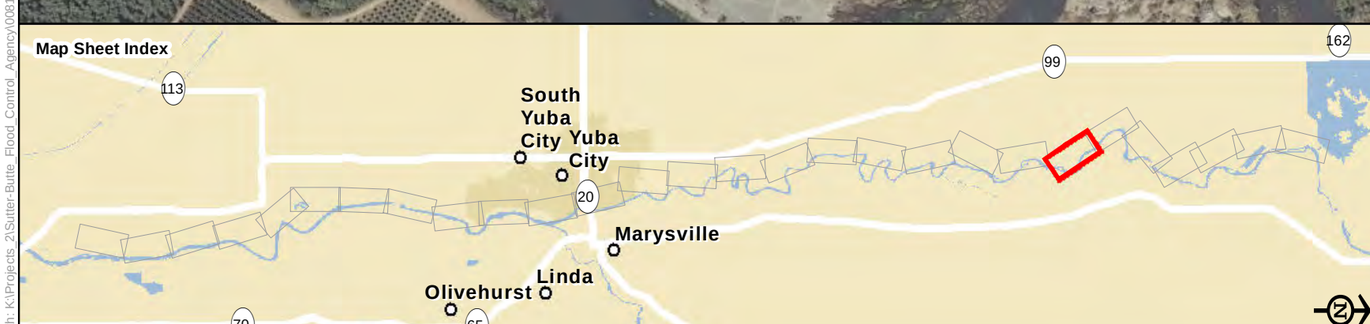

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 22

0 250 500
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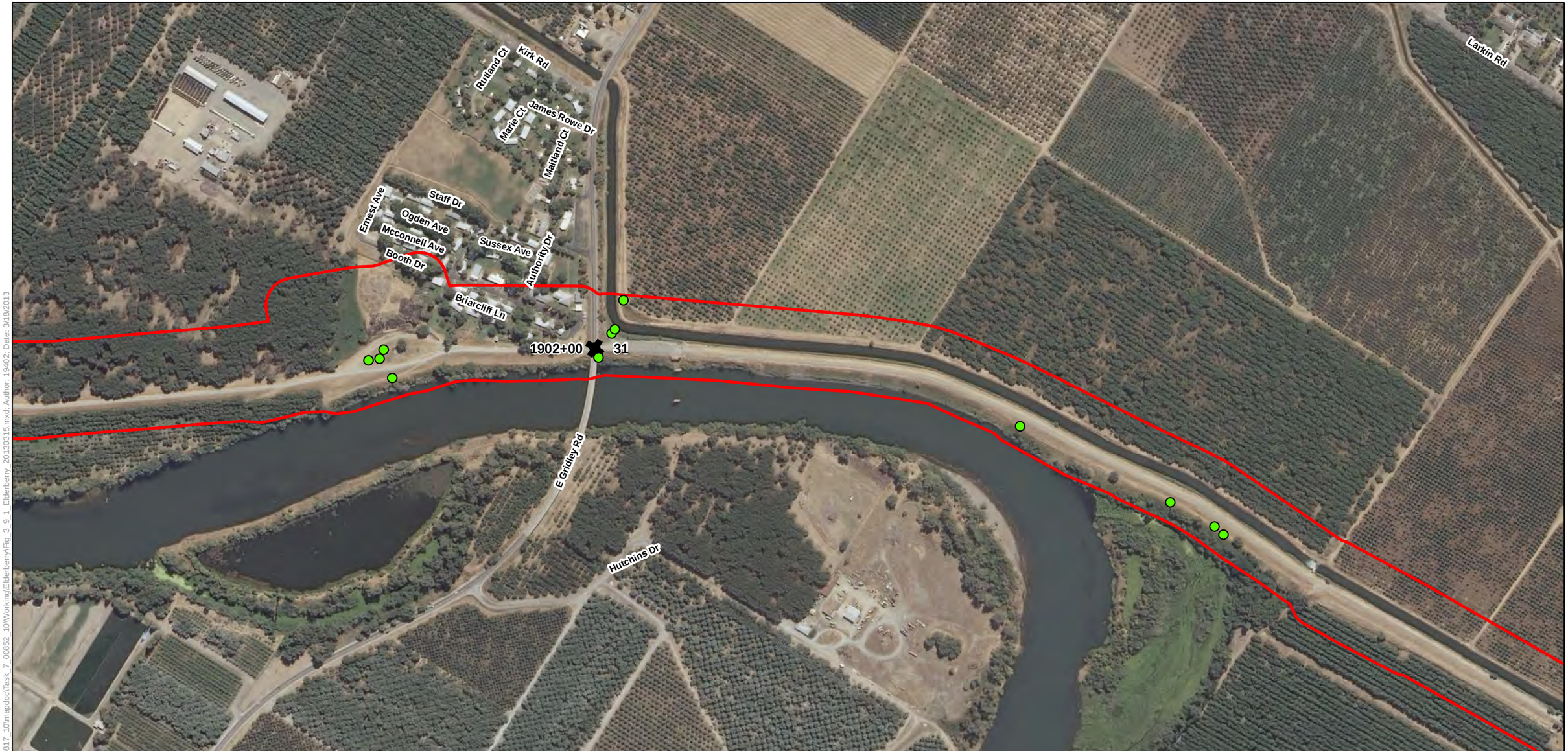

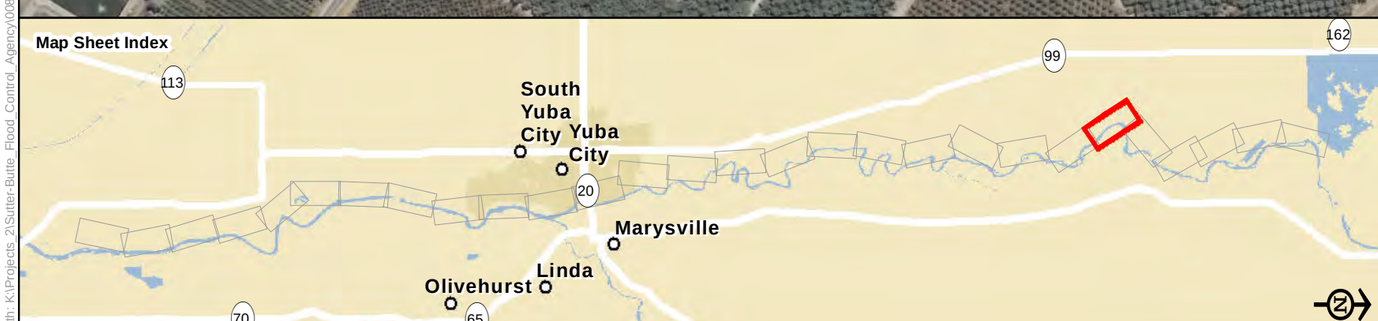

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 23

0 250 500
Feet

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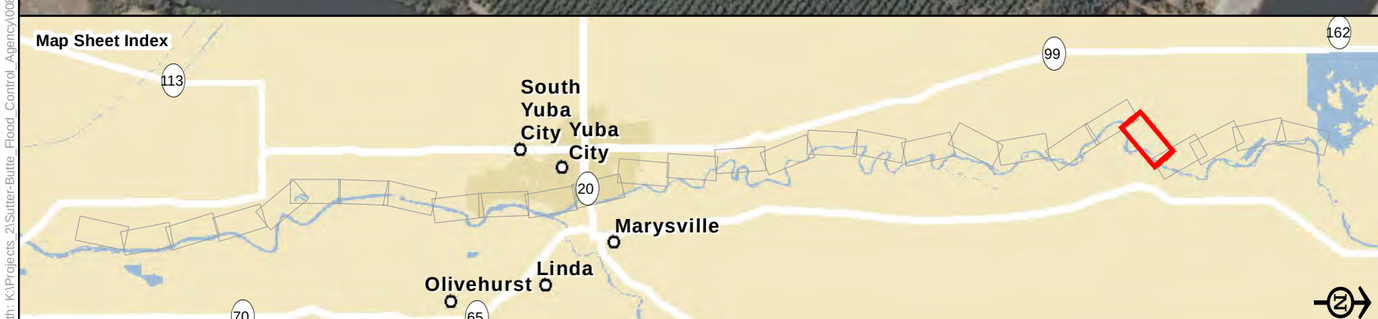

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 24

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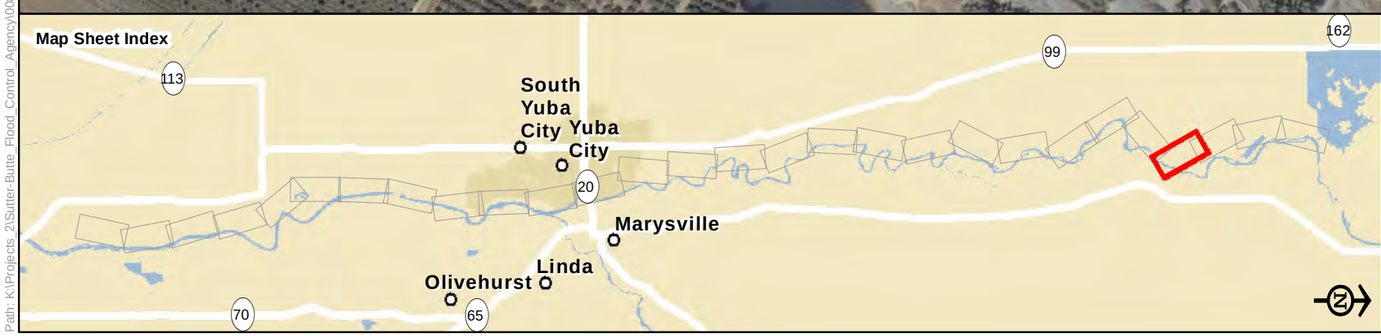

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 25

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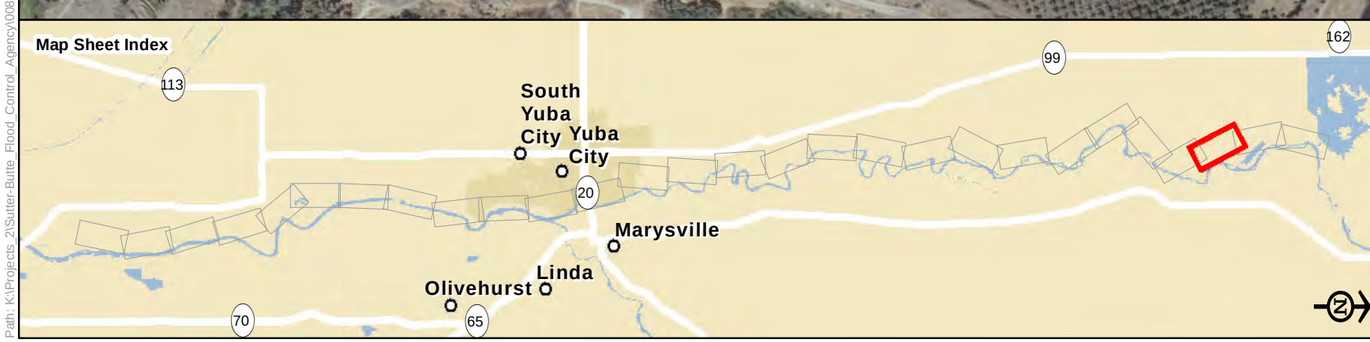

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 26

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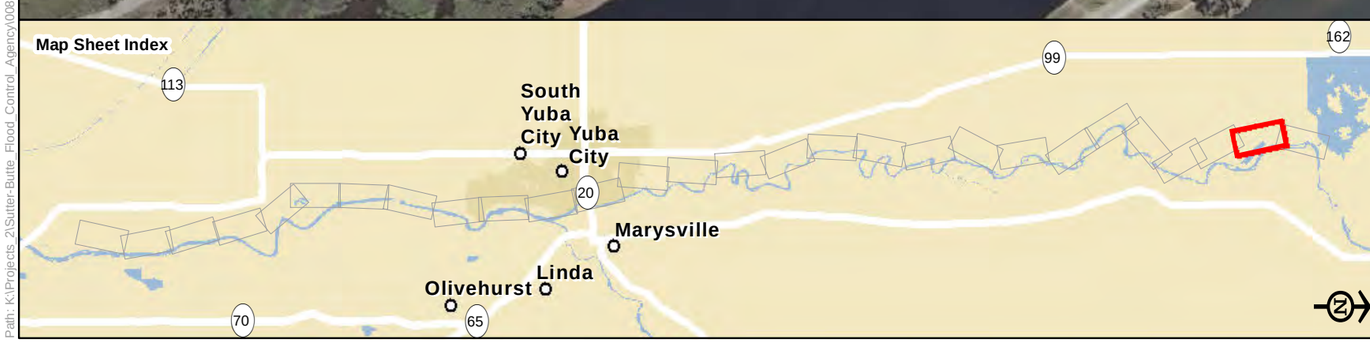

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 27

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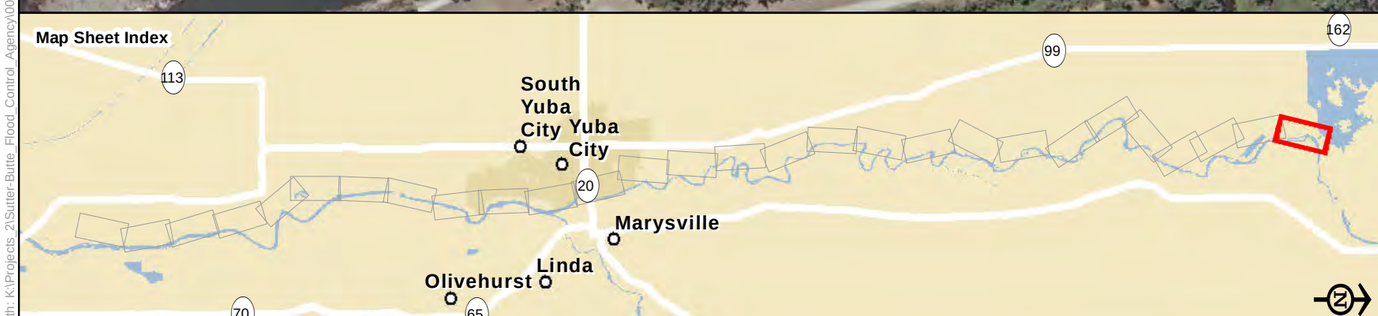

Legend

- Biological Study Area
- Potential Borrow Site
- Reach
- Station 202+50
- Elderberry Shrub

Plate 3.9-1
Approximate Locations of Elderberry Shrubs in the Study Area

Sheet 28

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Feet

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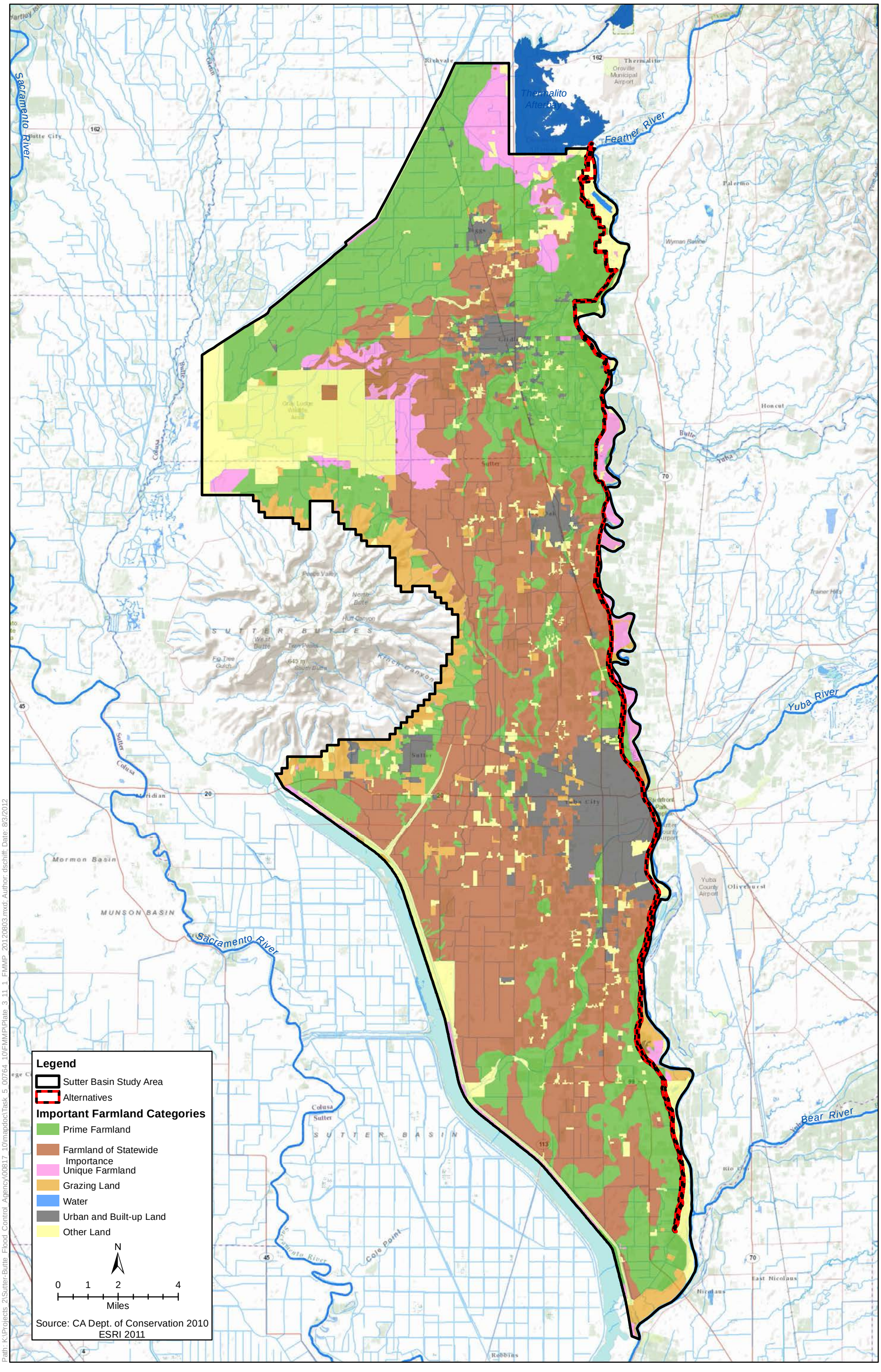

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Plate 3.11-1
Important Farmland Within the Study Area

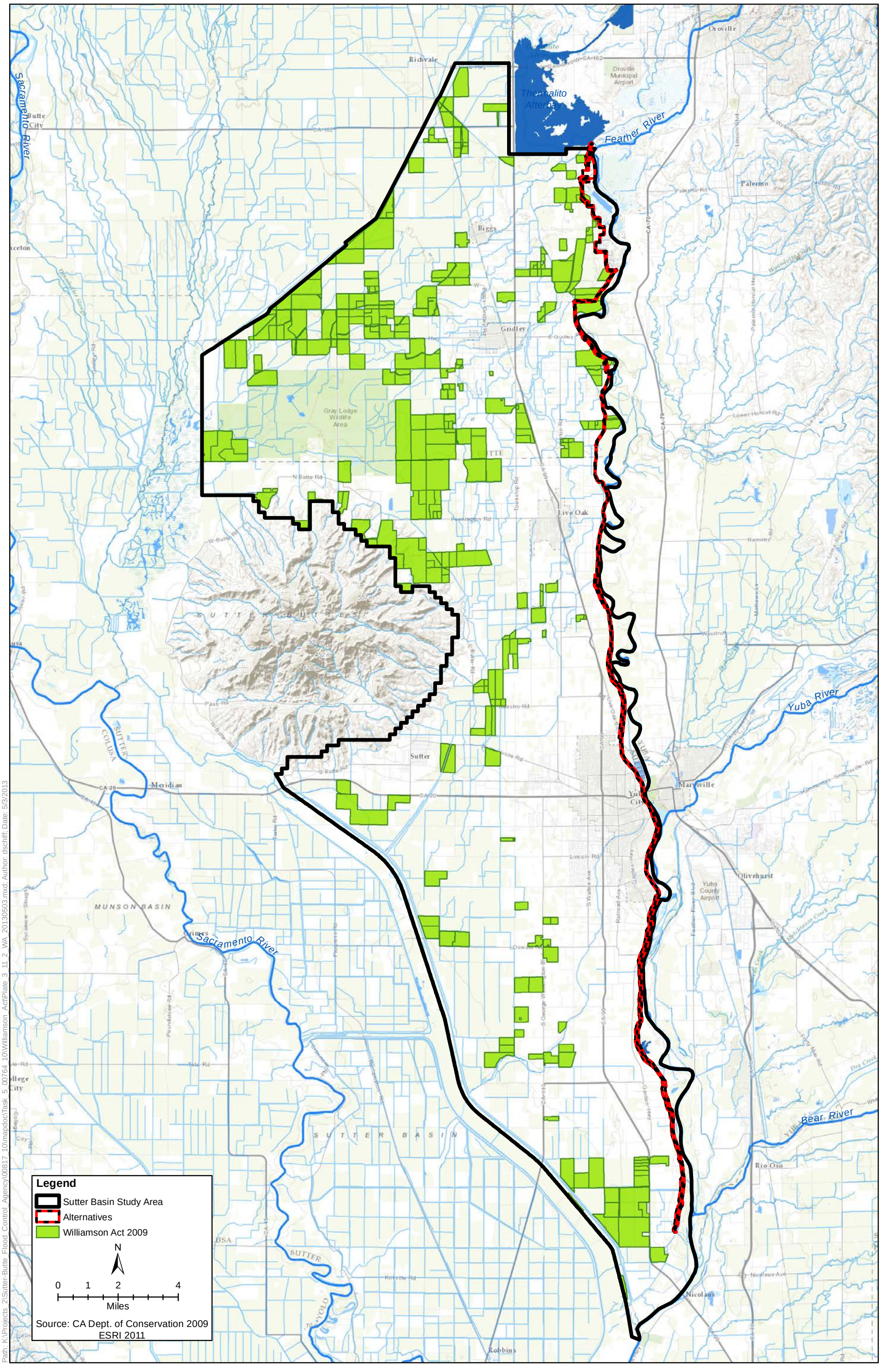

Plate 3.11-2
Williamson Act Lands in the Study Area

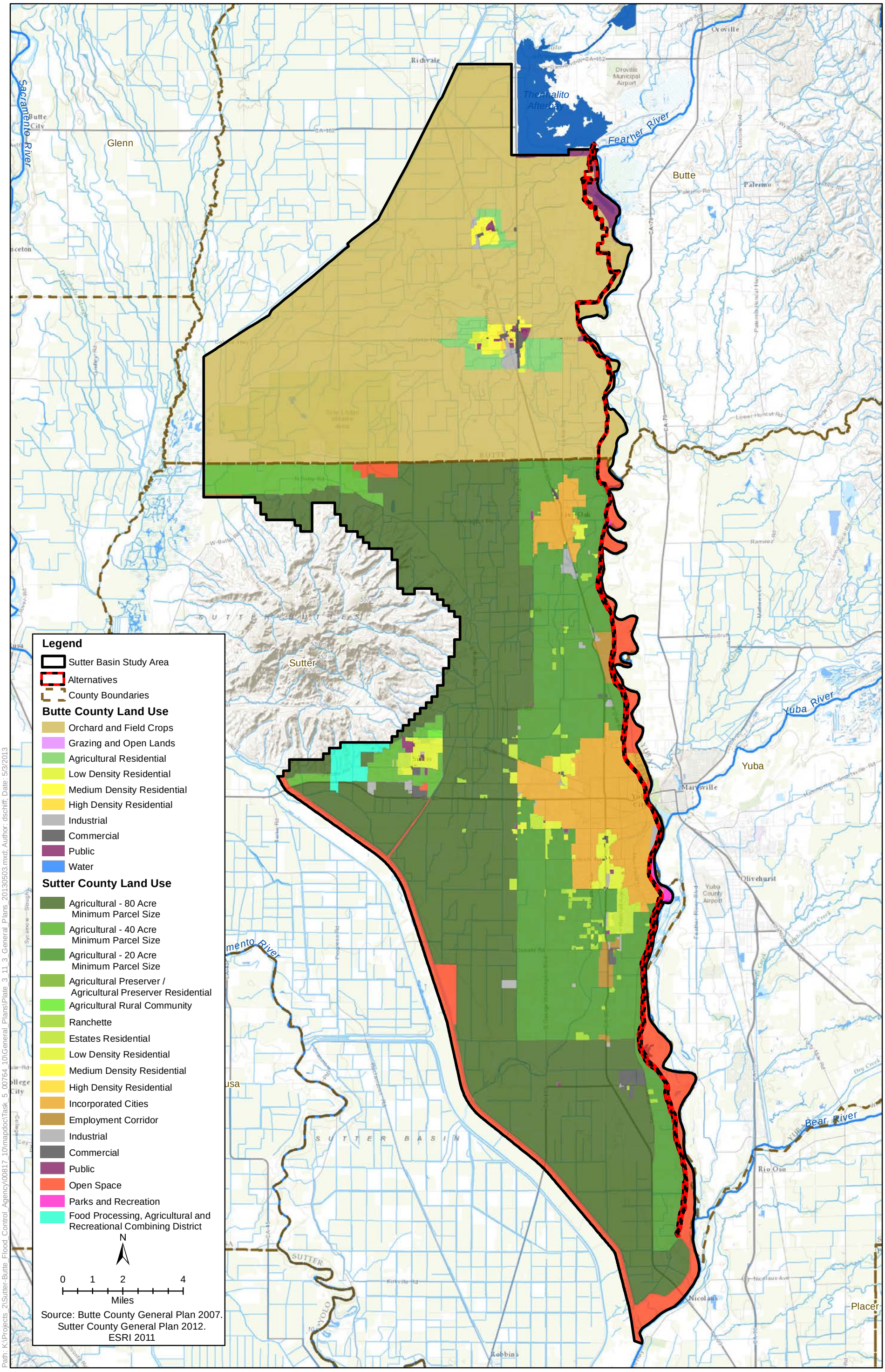

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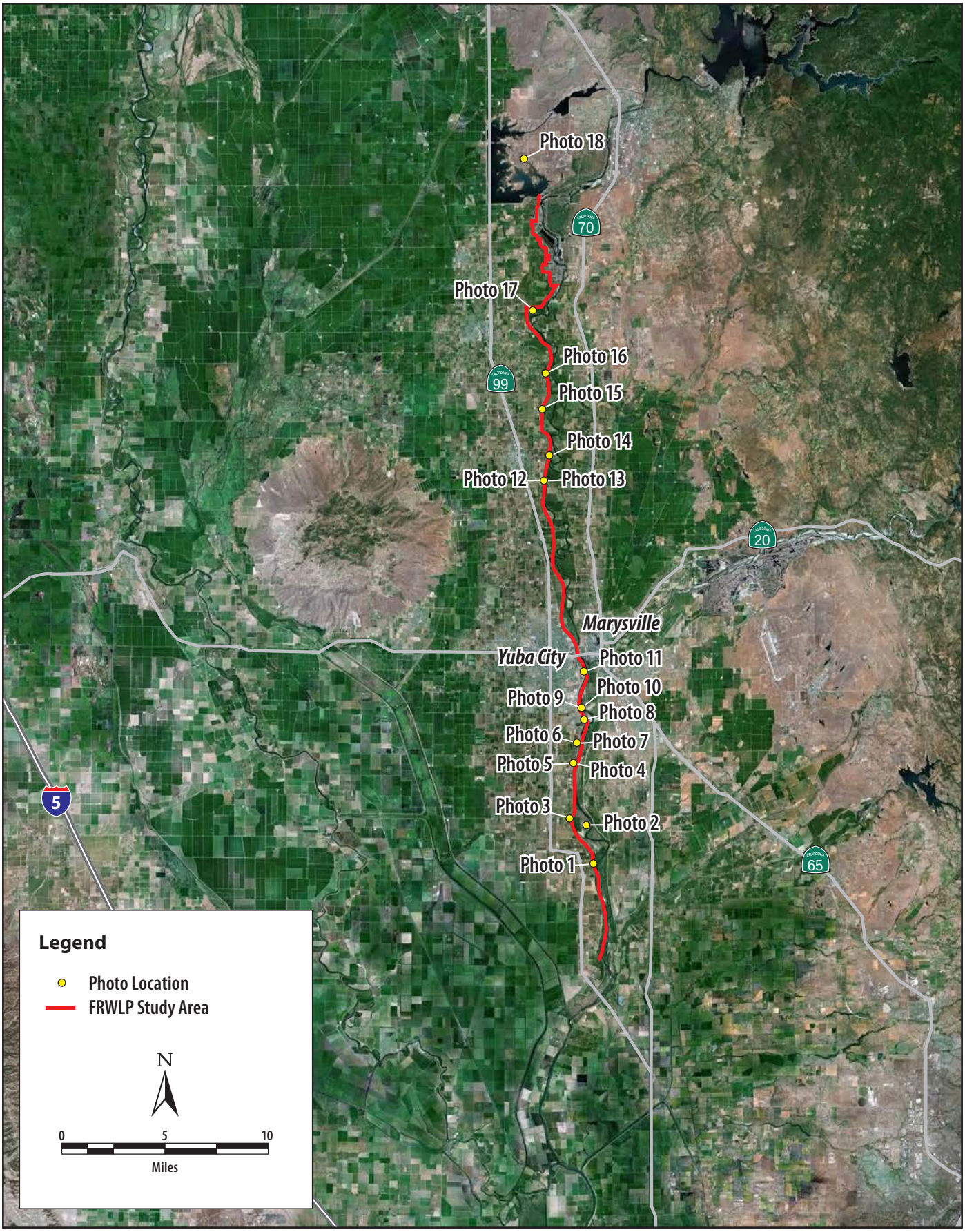
Plate 3.11-3
Land Use Designations Within the Study Area



Graphics ...00852.10 (6/19/12) AB

Plate 3.13-1
Representative Photograph Locations

Photo 1. Within Reach 5, view from atop the levee, looking west over view adjacent orchards.

Photo 2. View looking south over adjacent agricultural fields near Star Bend.

Graphics …00852.10 (6/19/12) AB

Plate 3.13-2
Representative Photographs

Photo 3. Within Reach 7, view from atop the levee, looking west over adjacent agricultural land.

Photo 4. View looking north toward the Sierra Gold Nursery.

Graphics …00852.10 (6/19/12) AB

Plate 3.13-2
Representative Photographs

Photo 5. View of Feather River looking south near the Sierra Gold Nursery.

Photo 6. Within Reach 10, view from atop the levee, looking west over Garden Highway to adjacent orchards.

Graphics …00852.10 (6/19/12) AB

Plate 3.13-2
Representative Photographs

Photo 7. Within Reach 10, view from atop the levee, looking southeast at riparian vegetation associated with the Feather River.

Photo 8. View from atop the levee, looking west over vegetation to a residential subdivision in Yuba City.

Graphics …00852.10 (6/19/12) AB

Plate 3.13-2
Representative Photographs

Photo 9. View from atop the levee, looking southeast at riparian vegetation adjacent to the Feather River.

Photo 10. View from atop the levee, looking northwest towards a residential subdivision within Yuba City.

Graphics …00852.10 (6/19/12) AB

Plate 3.13-2
Representative Photographs

Photo 11. View from atop the levee looking northwest at the Sutter County Airport.

Photo 12. View from atop the levee looking southwest.

Graphics …00852.10 (6/19/12) AB

Plate 3.13-2
Representative Photographs

Photo 13. View from atop the levee looking north at an adjacent structure.

Photo 14. View from atop the levee looking northeast at the Live Oak Park and Recreation Area.

Graphics …00852.10 (6/19/12) AB

Plate 3.13-2
Representative Photographs

Photo 15. View from atop the levee looking north at adjacent orchards.

Photo 16. View from atop the levee looking southwest at adjacent vineyard located within the Feather River corridor.

Graphics ...00852.10 (6/19/12) AB

Plate 3.13-2
Representative Photographs

Photo 17. View looking east toward East Gridley Road Bridge over the Feather River with agricultural fields in the floodplain.

Photo 18. View of Sutter Buttes in the background, looking southwest from Thermalito Afterbay.

Graphics ...00852.10 (6/19/12) AB

Plate 3.13-2
Representative Photographs

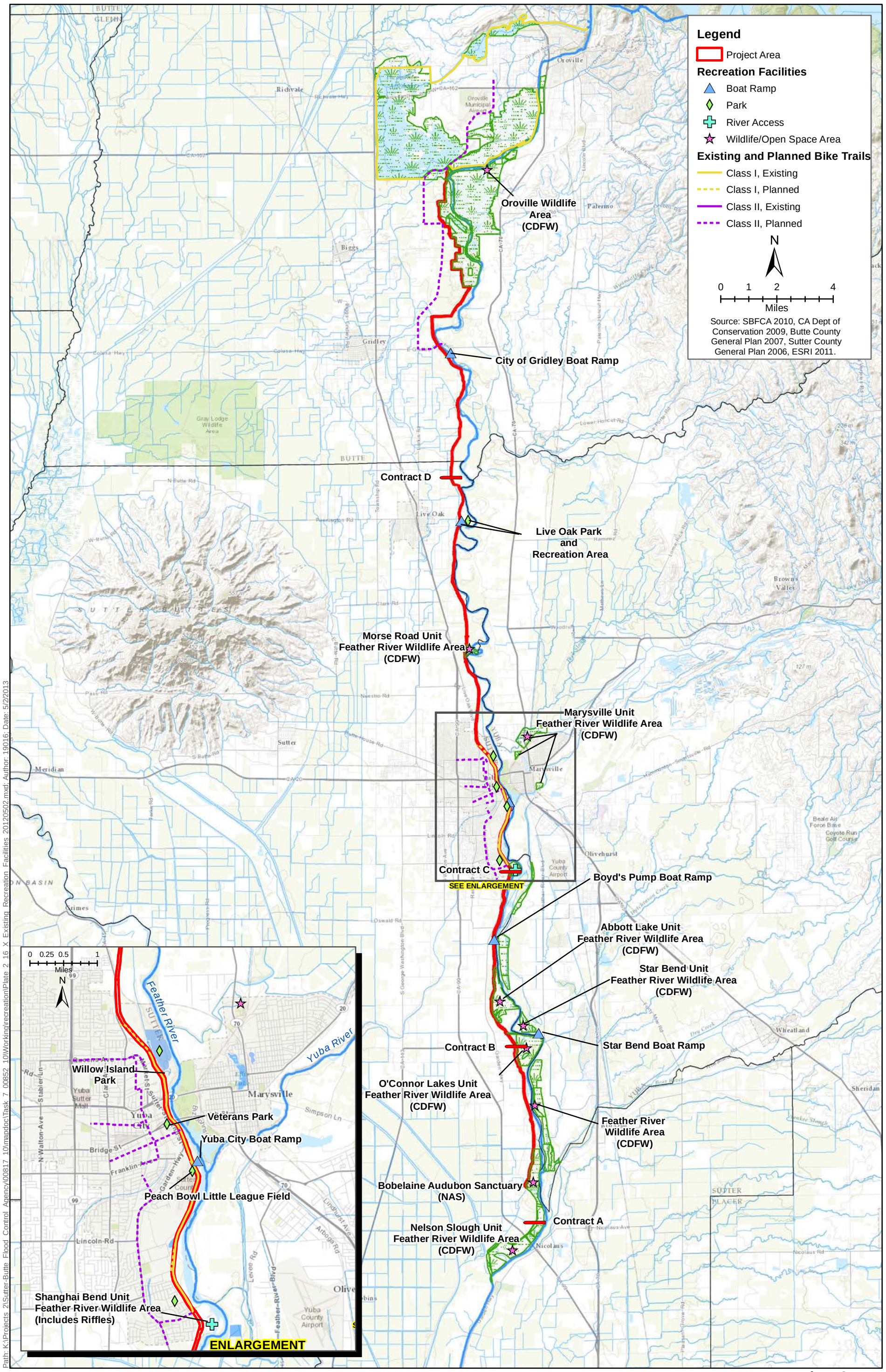


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Plate 3.14-1
Existing Recreation Facilities
Near the Project Area