

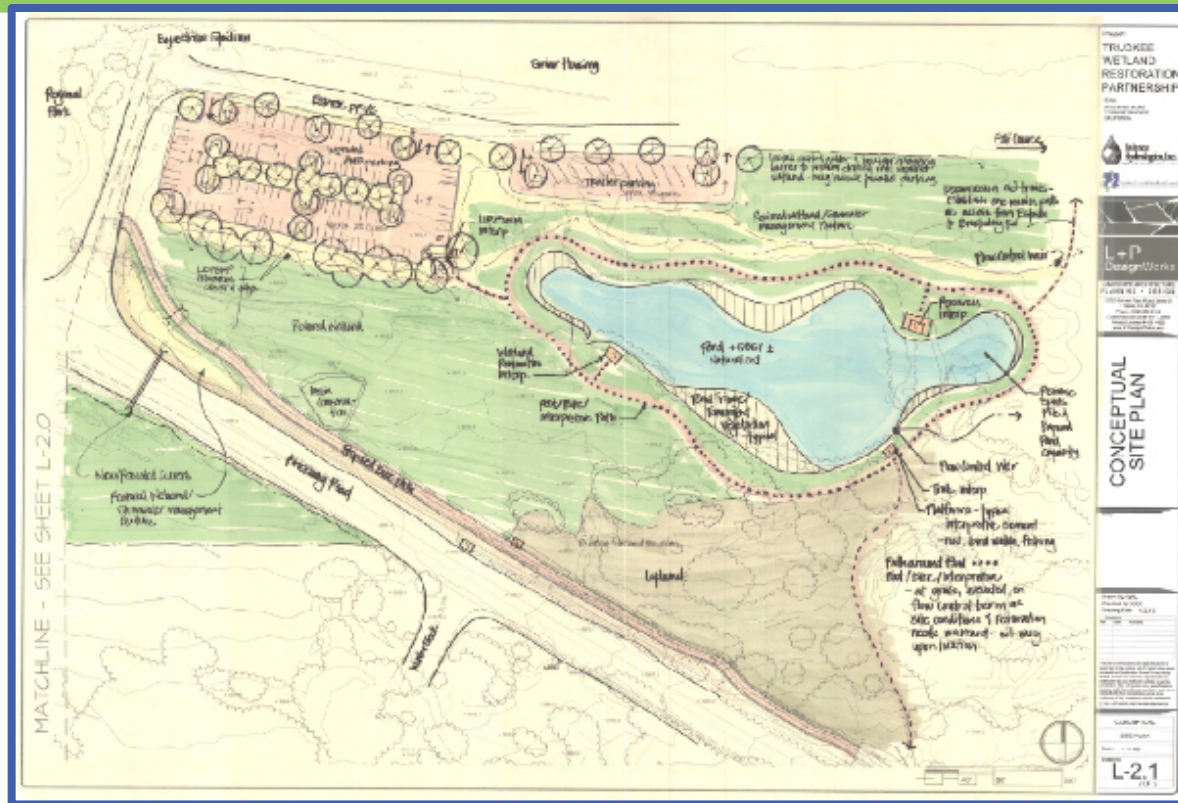


Truckee River Watershed Council

Collaborative solutions to protect, enhance and restore the Truckee River Watershed



Truckee Wetlands Restoration Project



Truckee River Watershed Council
Collaborative solutions to protect, enhance and restore the Truckee River Watershed

Thank you to our Funders

Donors to the



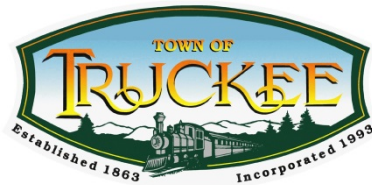
Truckee River Watershed Council
Collaborative solutions to protect, enhance and restore the Truckee River Watershed

TRUCKEE RIVER FUND

Enhancing and protecting our water resources



Department of
Conservation



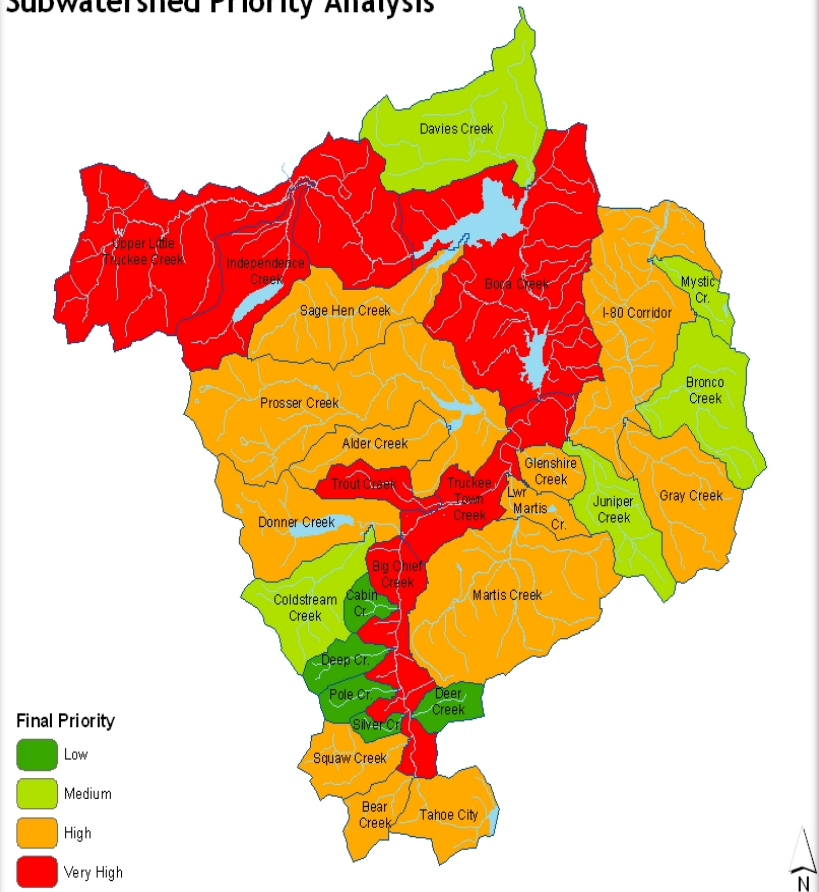
The Truckee River runs from Lake Tahoe to Pyramid Lake



OUR VALUES

- PARTNERSHIPS
- ECOLOGICALLY SOUND
- ECONOMICS

Subwatershed Priority Analysis



TRWC's Programs

RESTORE:
Merrill Davies Stream & Meadow



PROTECT::
Adopt-a-Stream



ENGAGE:
19th Annual Truckee River Day October 19,

THE TRUCKEE RIVER IS NOT PRISTINE.



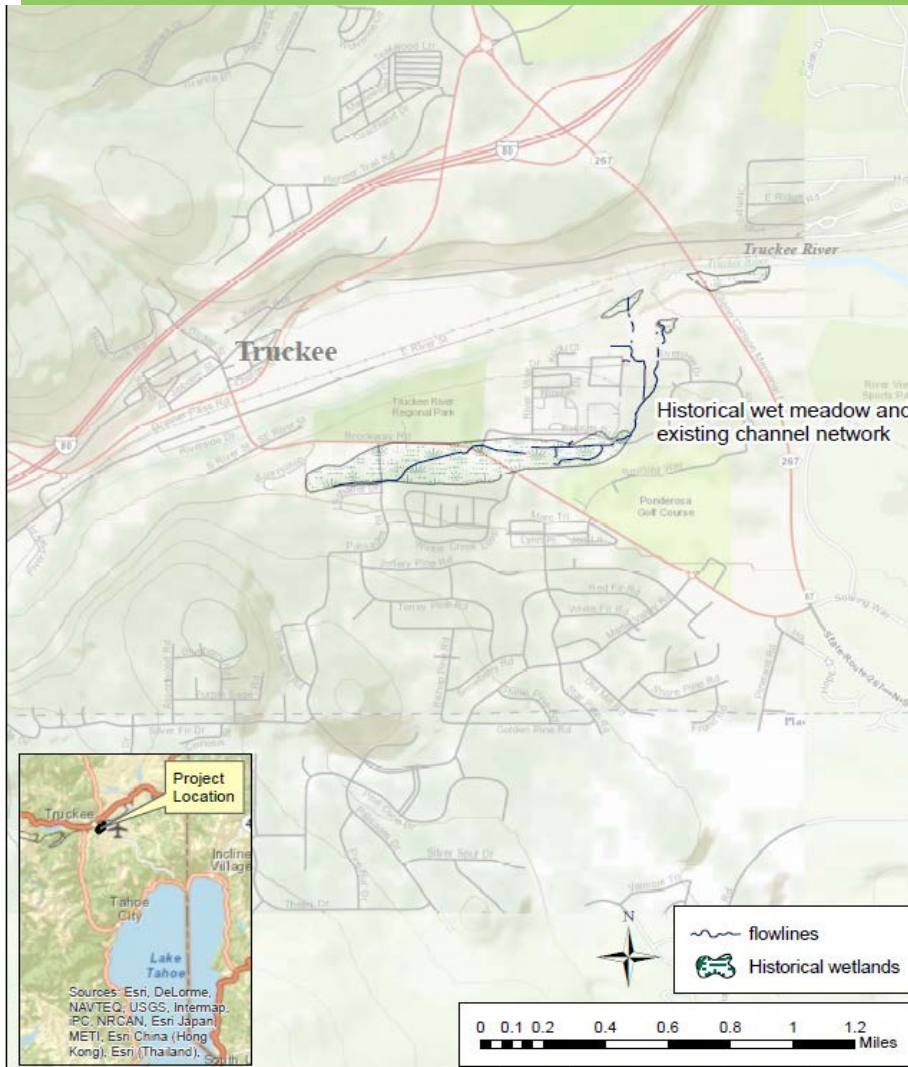
ROADS / DAMS / ERODING
BANKS / DOWNCUTTING



Photo by Mathew Grimm, used by permission of Environmental Defense Fund.

RESTORED ECOLOGICAL FUNCTION / RAISED WATER TABLE / CLEANER WATER

Truckee Wetlands Restoration Project



Presented by
Jeannette Halderman, TRWC
David Shaw, Balance Hydrologics

Thank you Truckee Wetlands Restoration Partnership

- * Town of Truckee
- * Truckee Donner Public Utility District
- * Truckee Donner Recreation and Park District
- * Truckee Sanitation District
- * Truckee Tahoe Airport District
- * Truckee Donner Land Trust

Contact with adjacent land owners

What is the Problem?

- * Fragmented wetland complex
- * None of wetlands are fully functioning
 - * Disconnected Hydrology
 - * Significant storm Runoff
 - * Significant Erosion
 - * Inappropriate Land Use

Truckee Wetlands Restoration Partnership

- * 2010 TRWC convened partnership of land managers, property owners, and stakeholders
- * Goals:
 - * Include all stakeholders
 - * Understand what restoration is achievable
 - * Work in conjunction with other projects
 - * Restore connectivity and function

Project Area Historical and Now

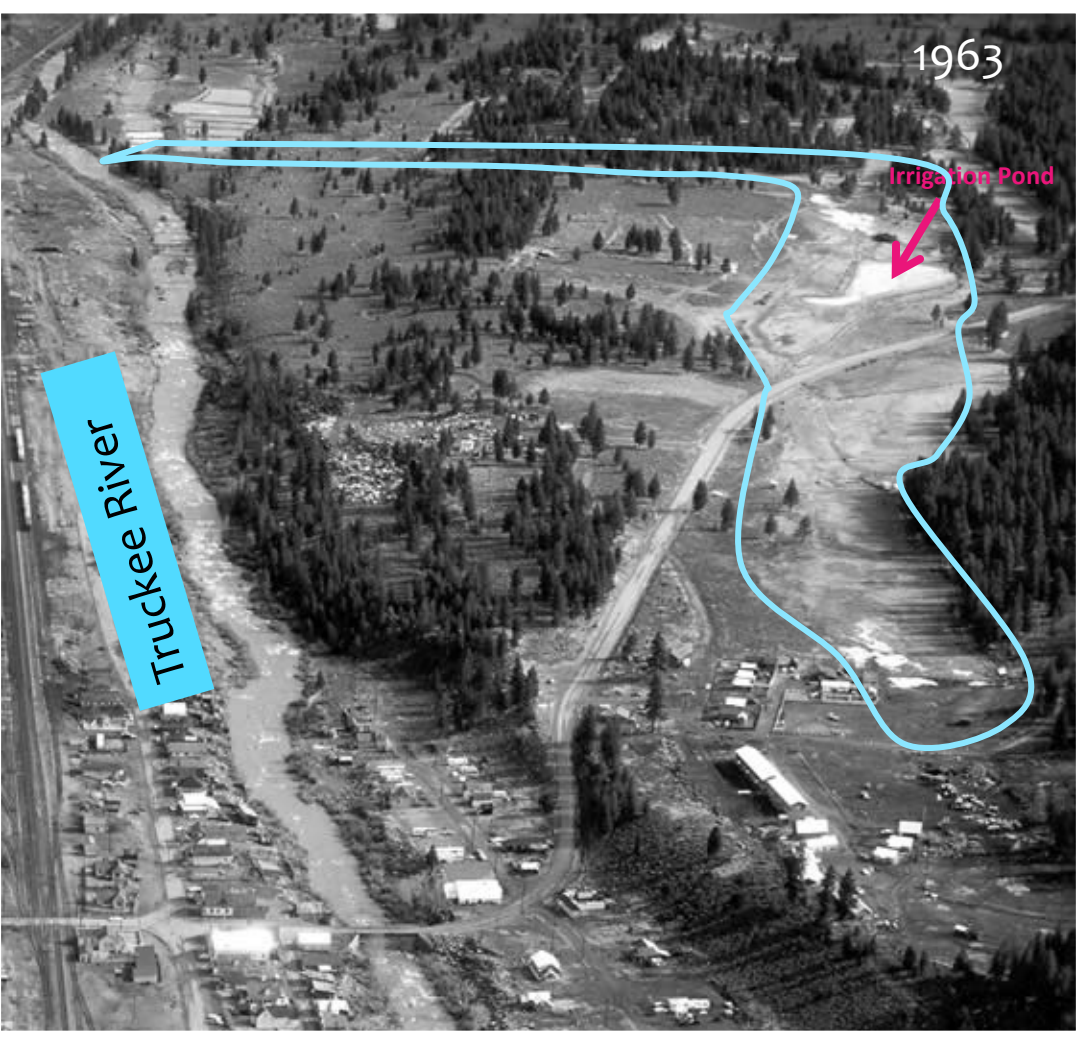
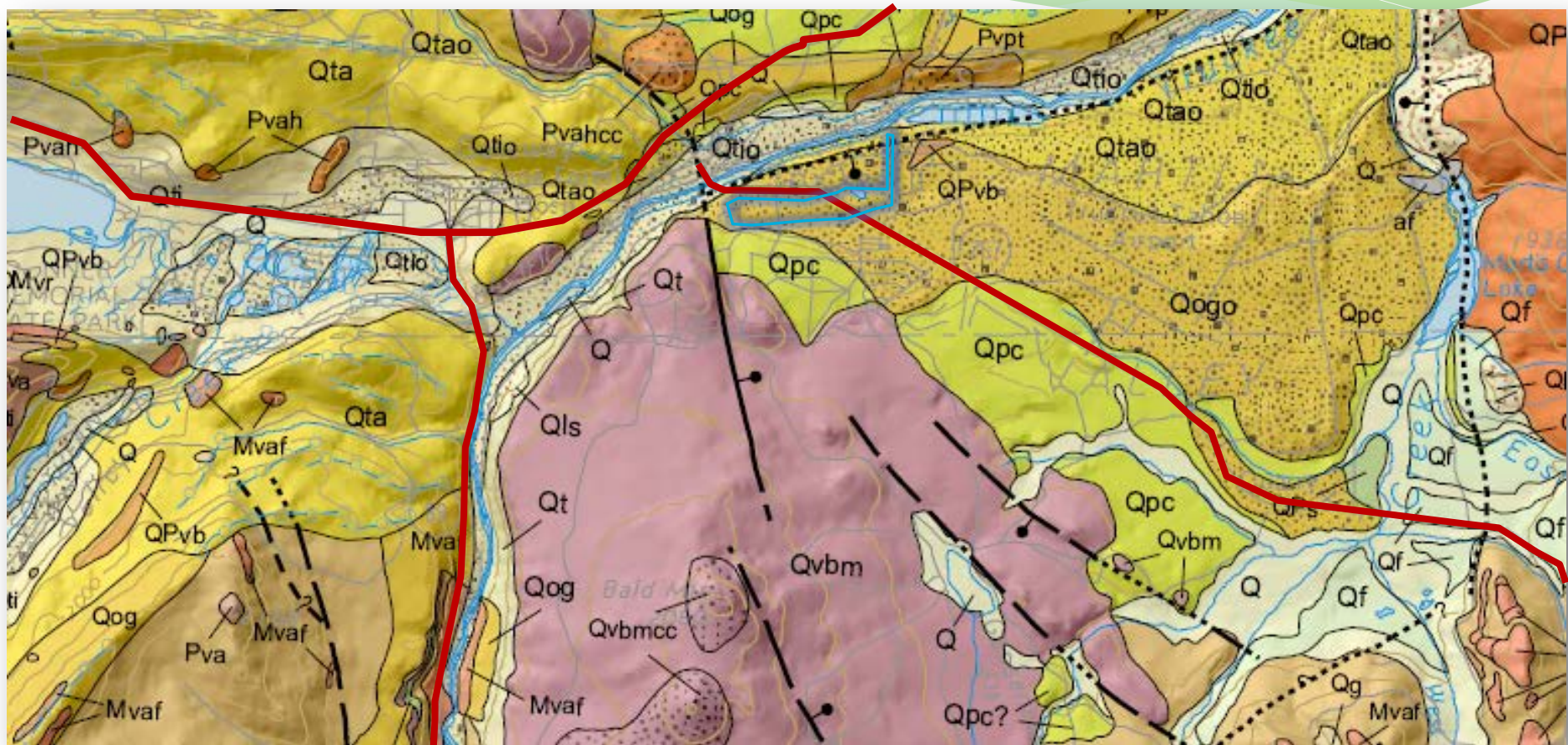


Photo Credit CA Dept of Transportation

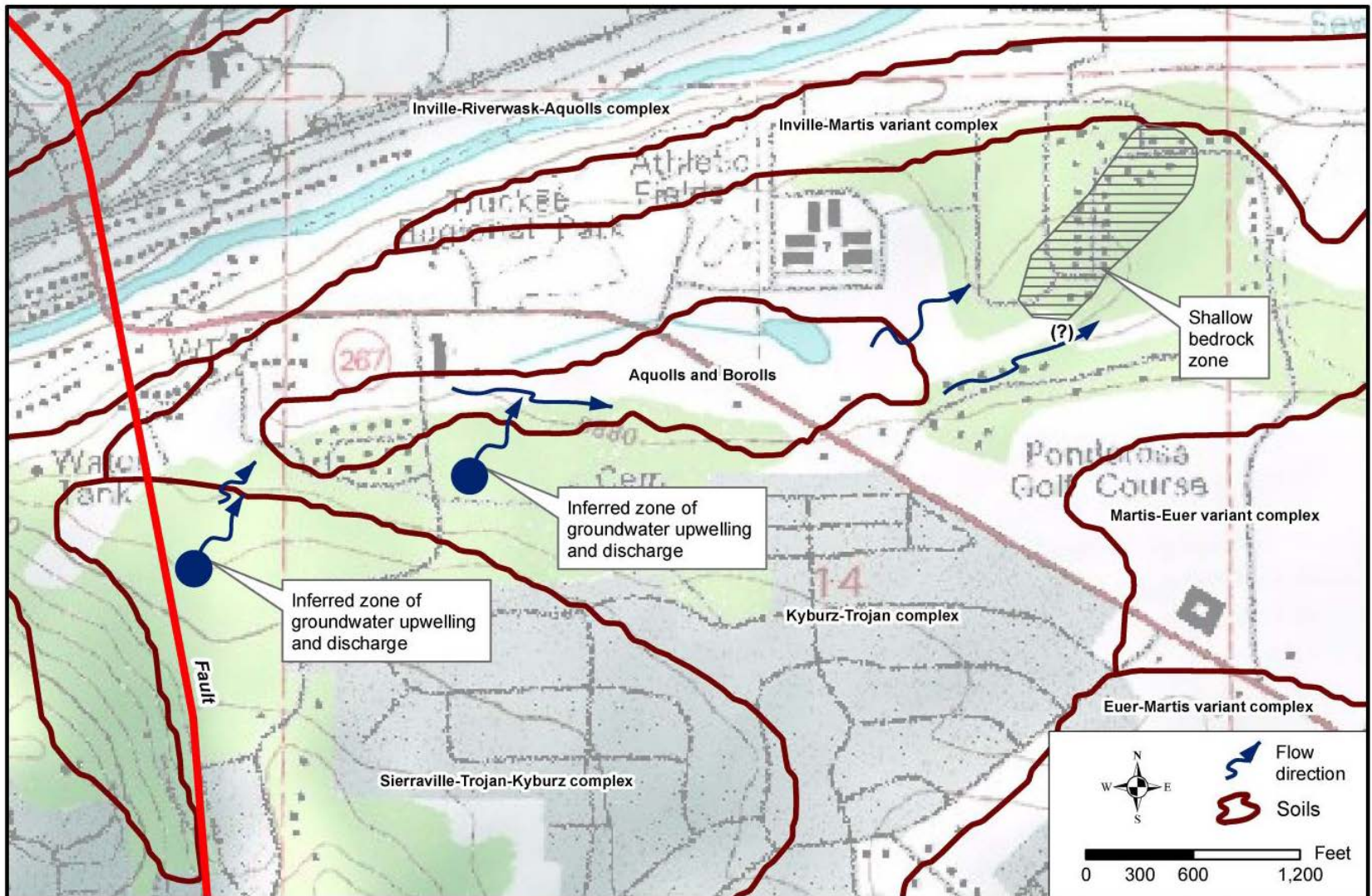
Feasibility Study

- * 2010 – TRWC and Balance compiled
- * Brockway Trails Geotechnical Studies
- * Historical Analysis (others and Balance Hydrologics)
- * Wetland Delineations
- * Current Conditions
- * Soils maps
- * Opportunities and constraints
- * **Recommendation: restoration is possible**

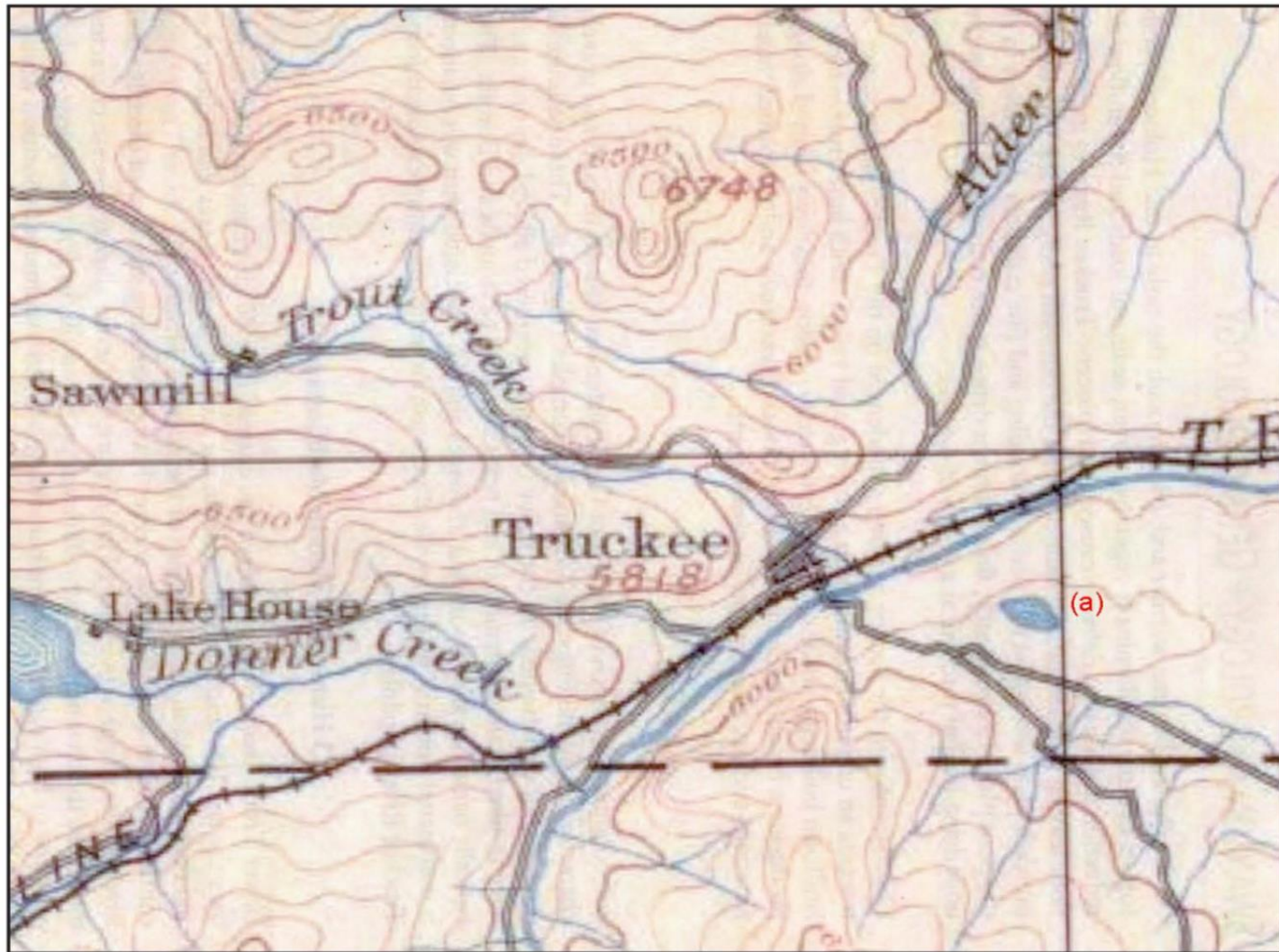
Geology



Historical Wetland Soils



Historical Map

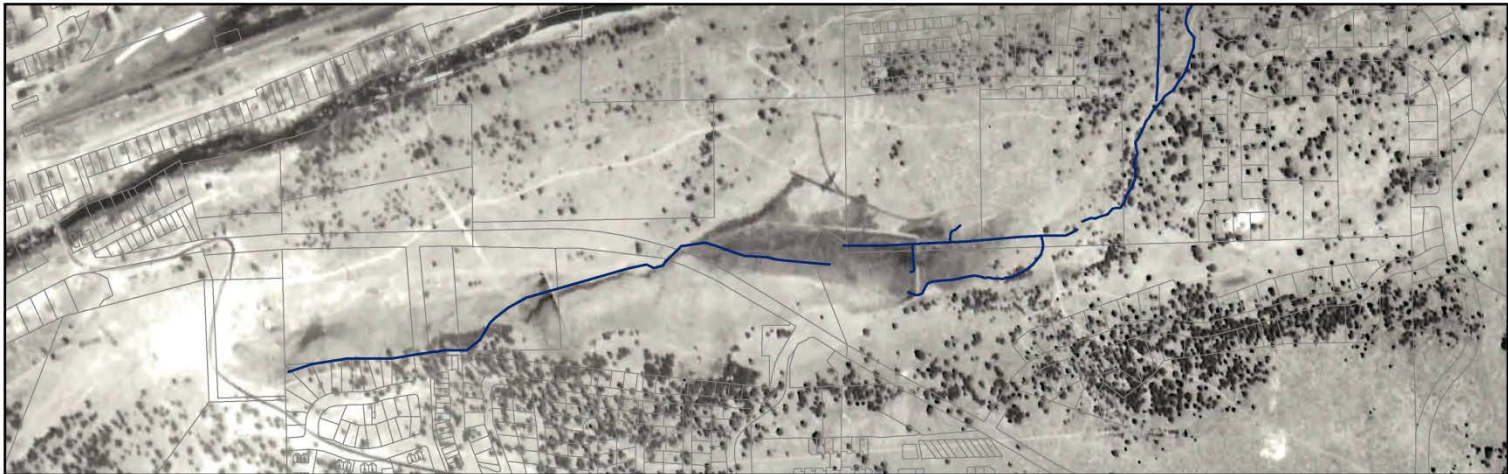


1939 Aerial Photography

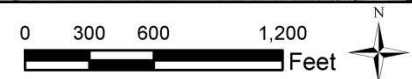


Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

2010



1939



1972



(Source: USFS)

Inferred Historical Wetland Extent



Impaired Areas



Impaired Areas



Impaired Areas



Truckee Wetlands Restoration Project Assessment

- * Truckee Wetlands Restoration Feasibility Study
- * Soil and Hydrology
- * Analysis of Irrigation
- * Conceptual Design
- * Continued partner meetings

Soils and Hydrology

- * Evaluate soils and their water-holding properties
- * Estimate water volumes and expected flow rates
- *
- * Evaluate surface and groundwater interaction
- * Collect baseline data

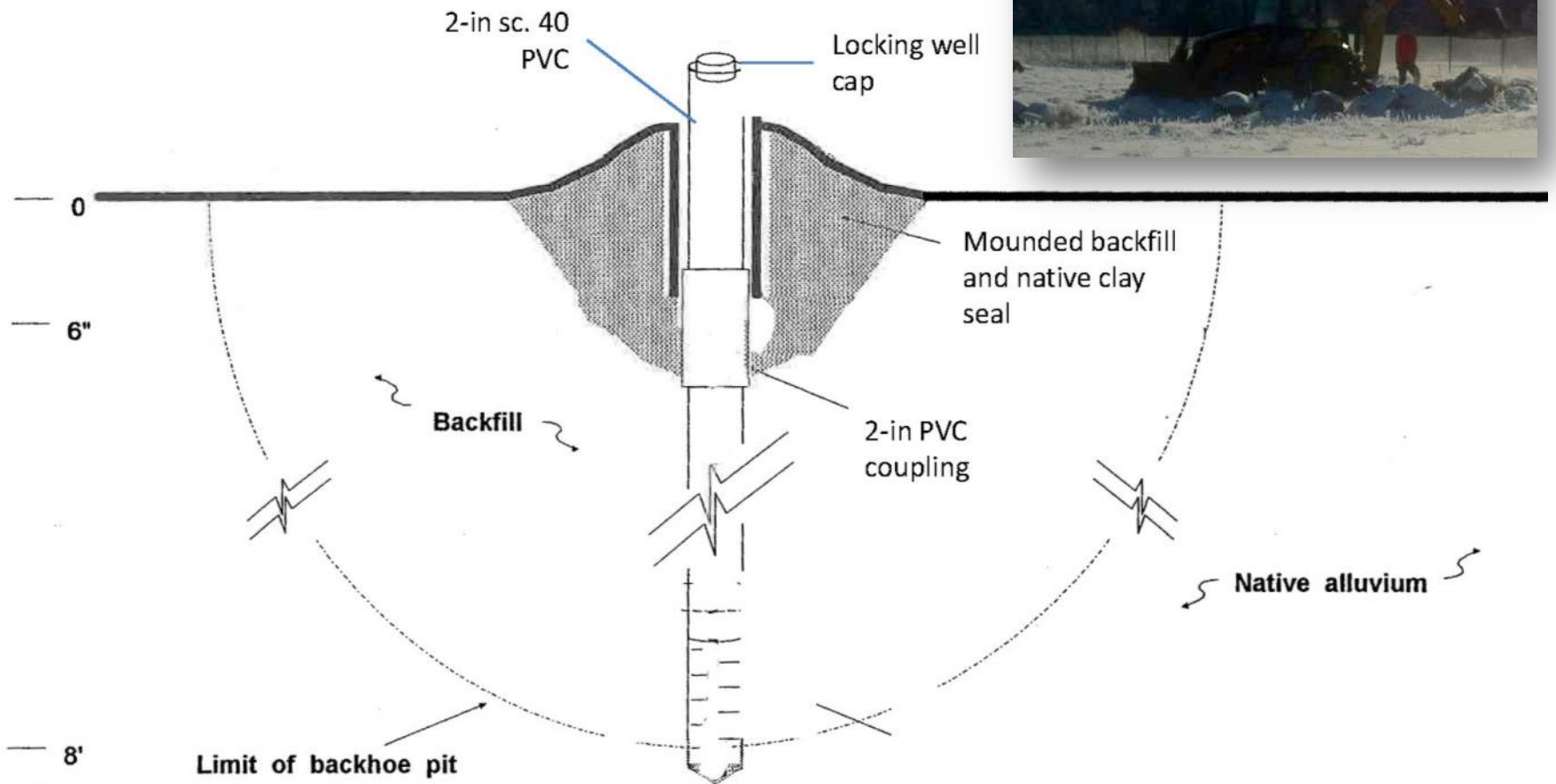
Soils and Hydrology



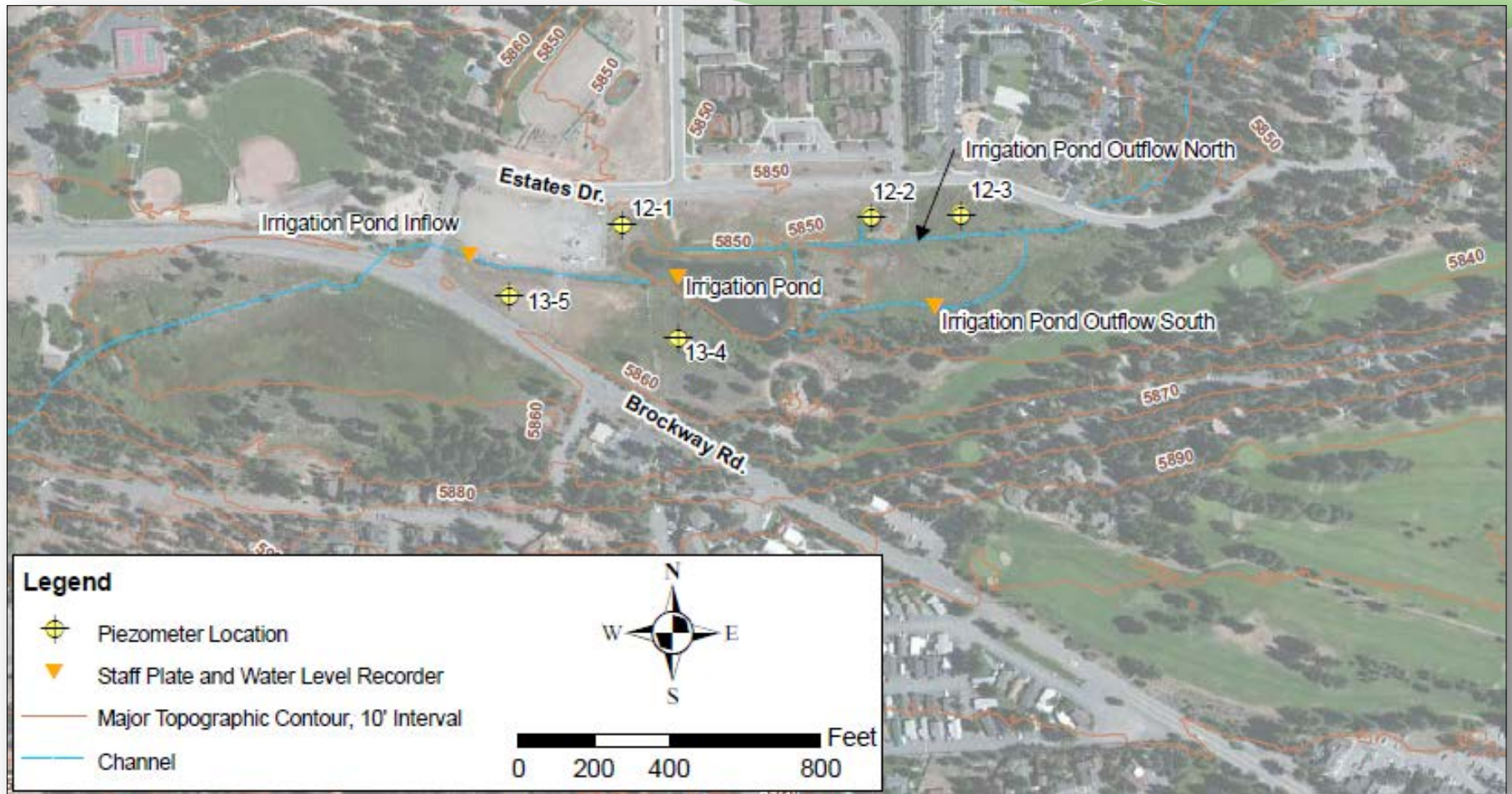
Inferred Geologic Structure



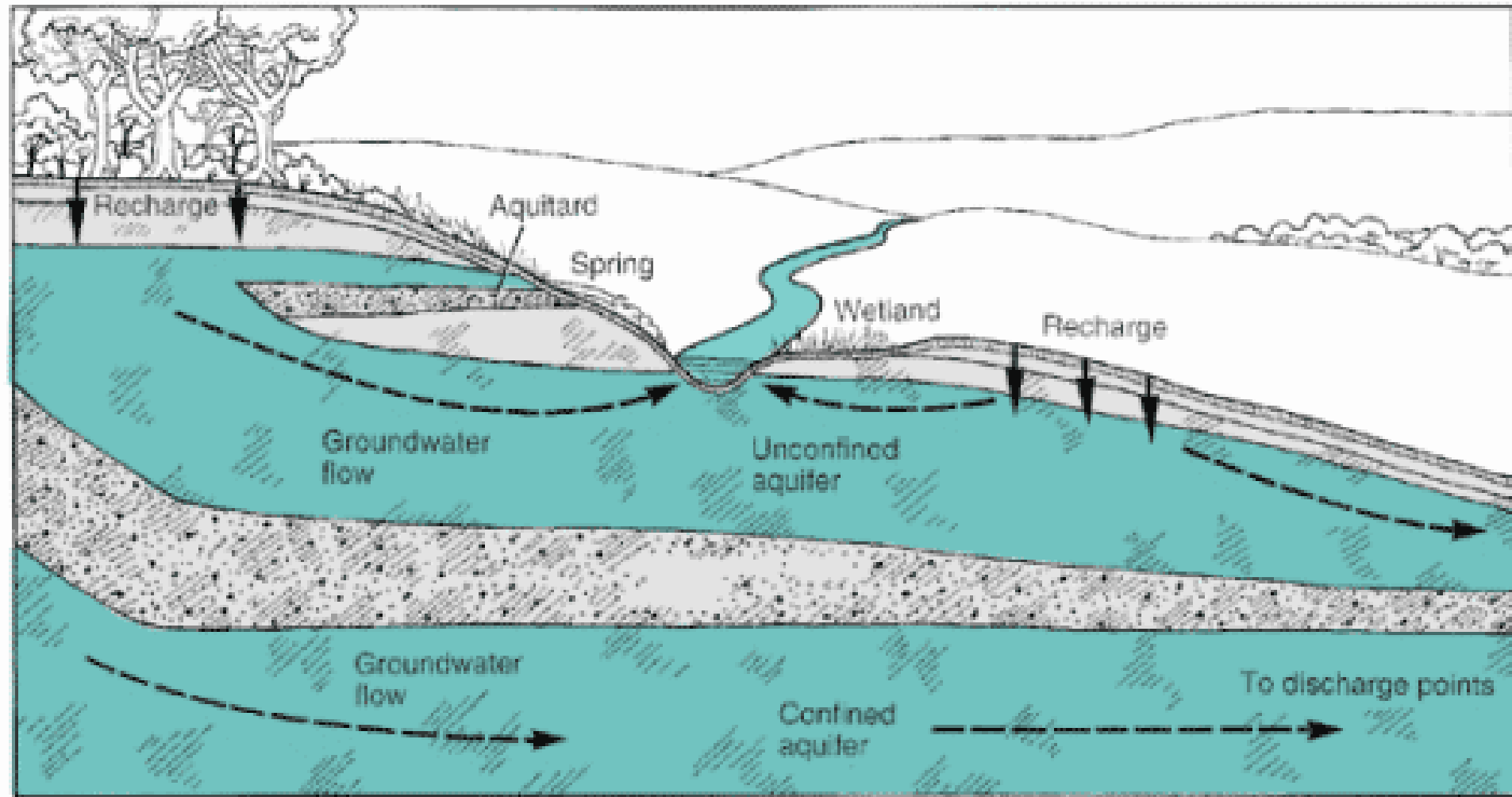
Soils & Groundwater Investigation



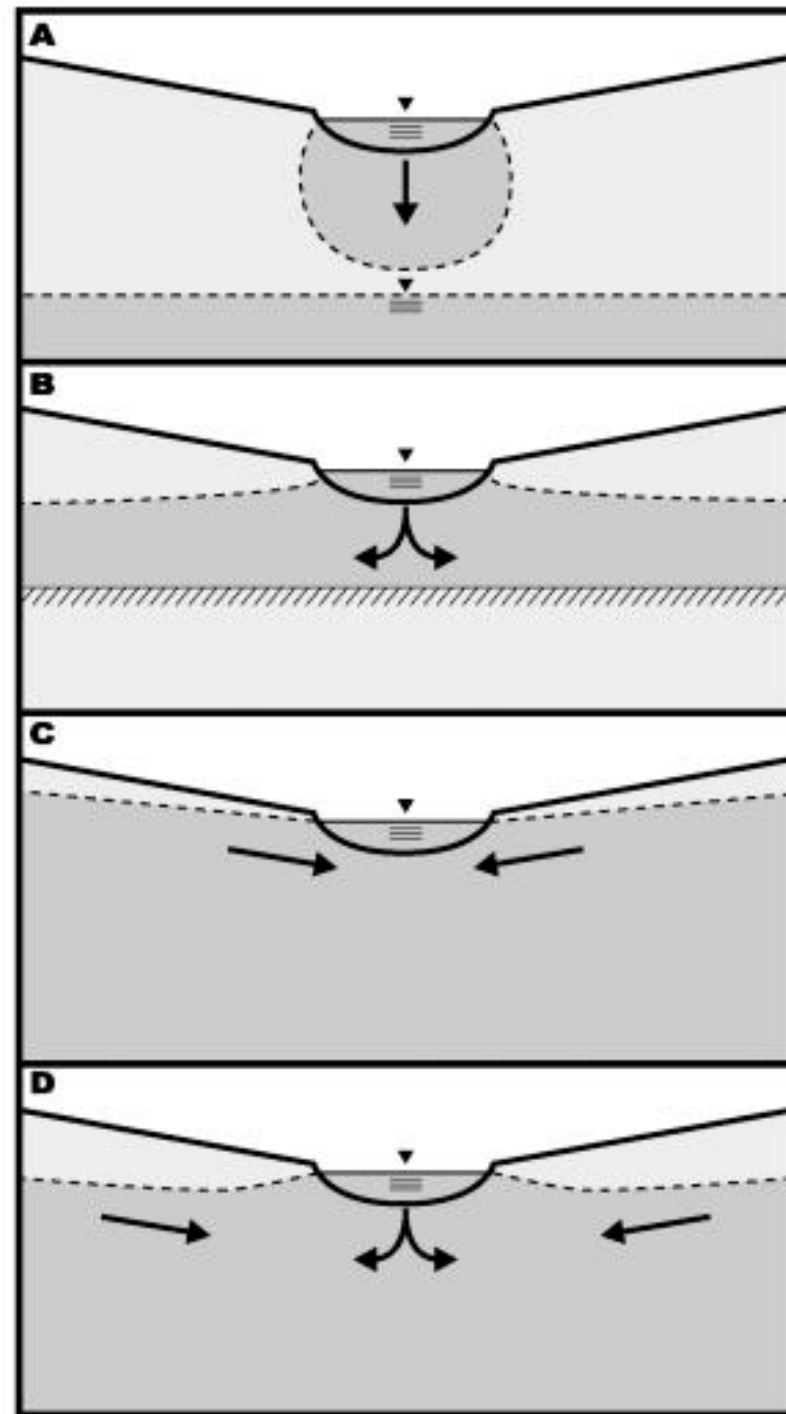
Surface and Groundwater Monitoring



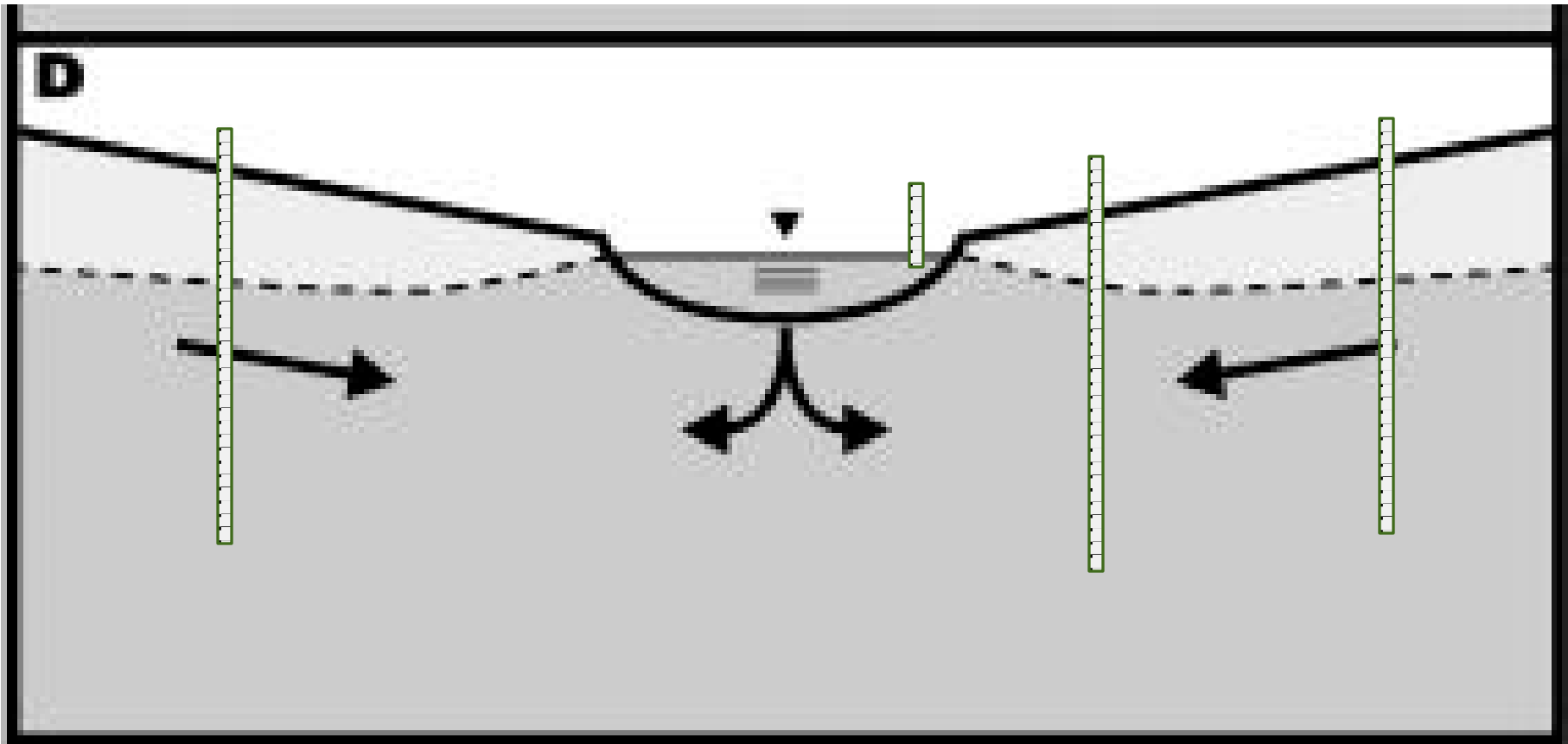
Surface – Groundwater Interaction



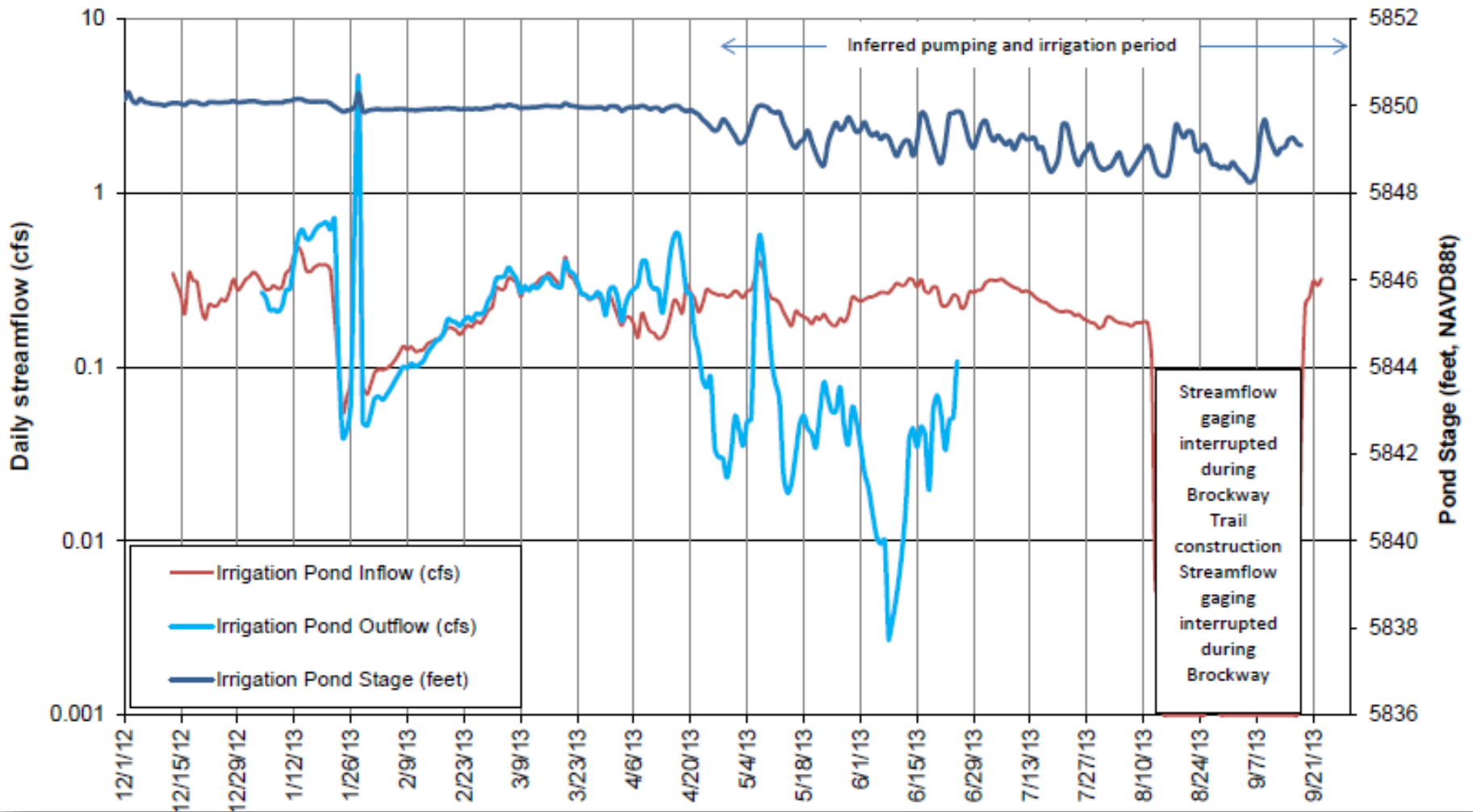
Surface – Groundwater Interaction



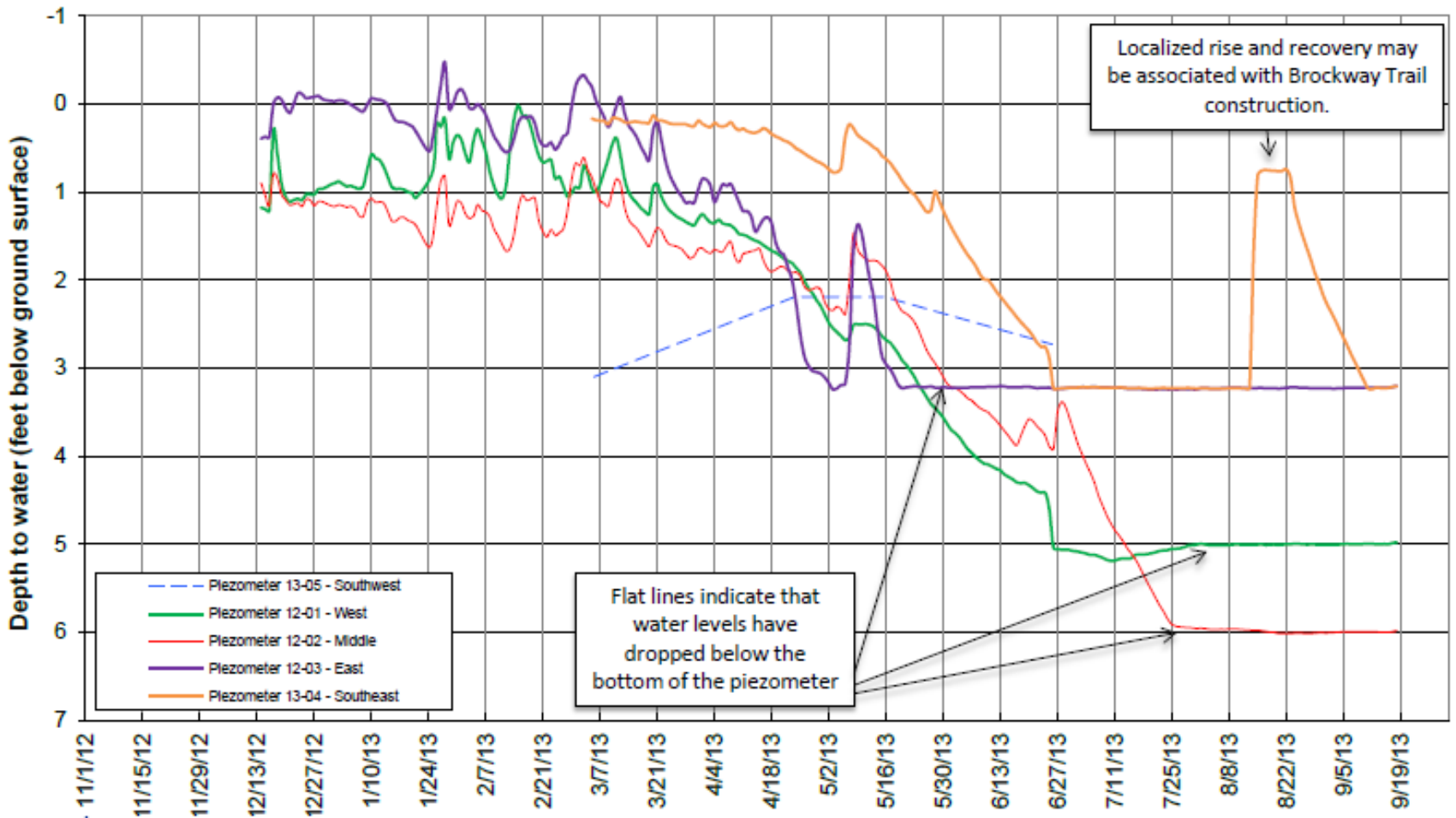
Surface – Groundwater Interaction



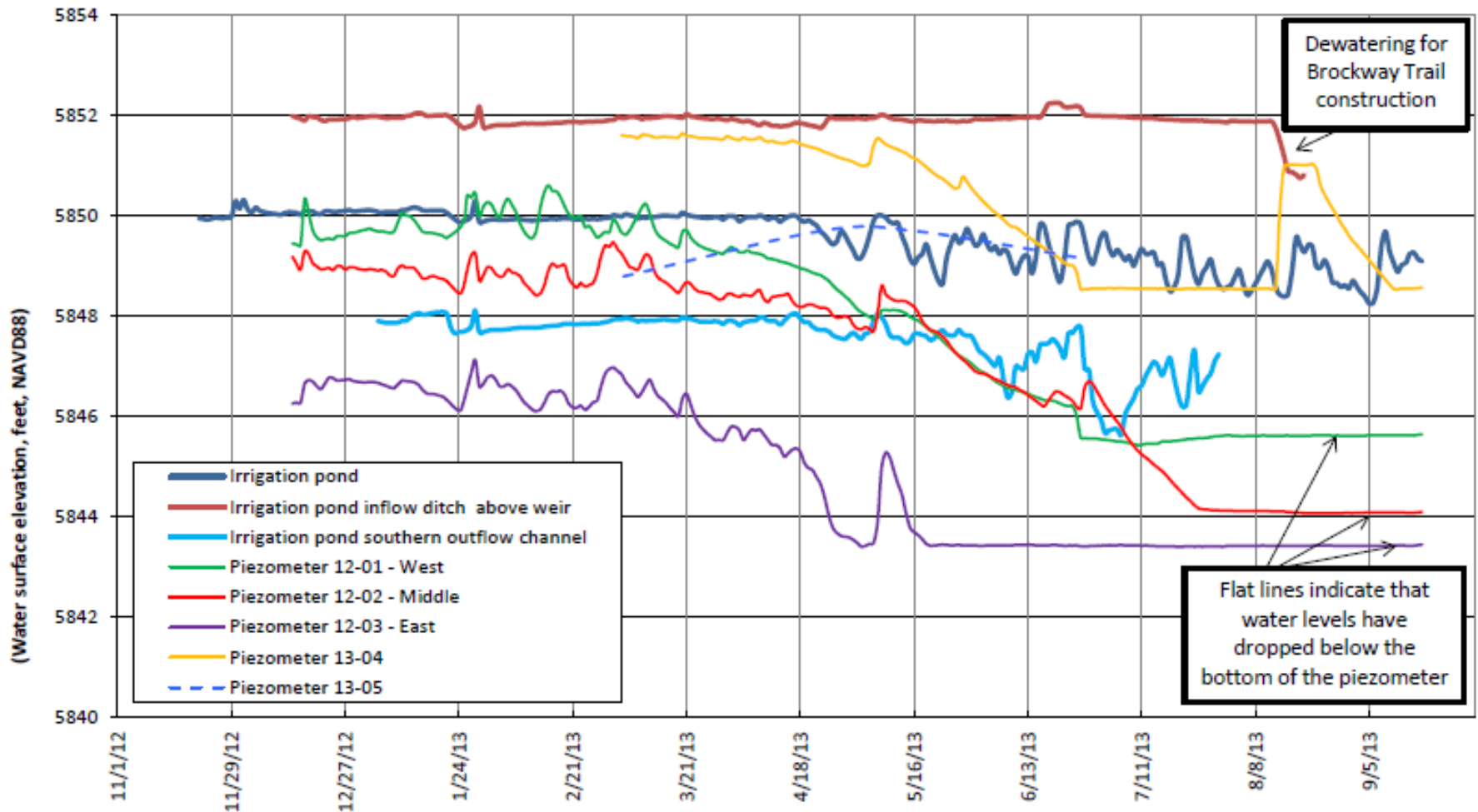
Irrigation Pond Water Level, Inflow, Outflow



Depth to Groundwater



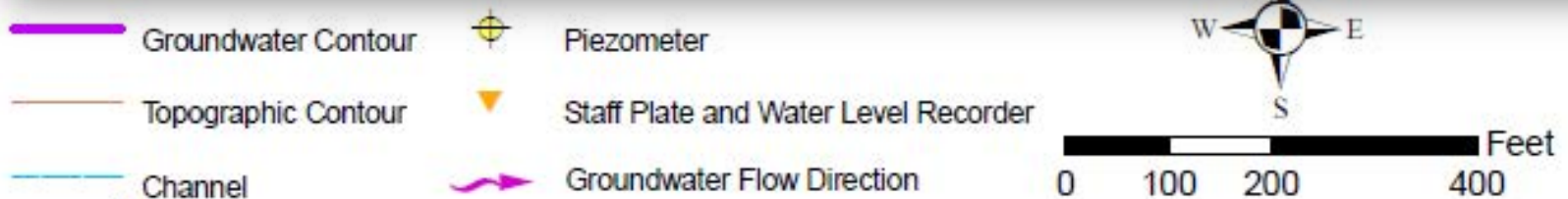
Groundwater Elevations



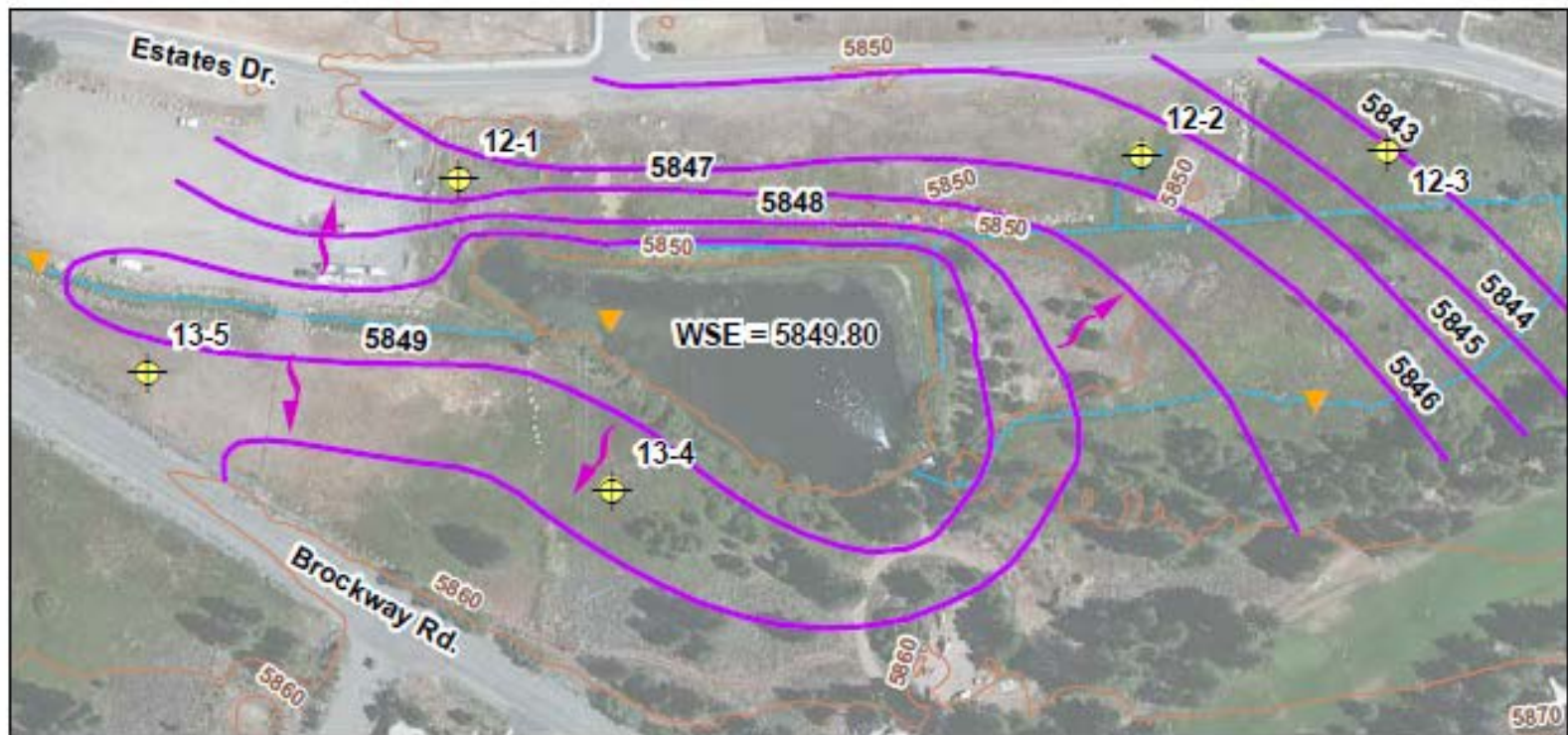
Shallow Groundwater Flow Direction (Winter)



January 4, 2013 (Winter)



Shallow Groundwater Flow Direction (Summer)

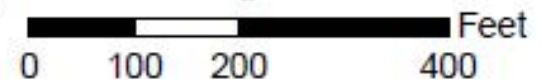


Legend

June 25, 2013 (Summer)

Basemap Source: ESRI

- | | |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|  Groundwater Contour |  Piezometer |
|  Topographic Contour |  Staff Plate and Water Level Recorder |
|  Channel |  Groundwater Flow Direction |



Analysis of Irrigation Pond Hydrology

	INFLOW				OUTFLOW							
	Inflow from ditch ¹		Direct Precipitation ²		Pond outflow ¹		Estimated evaporation from pond ³			Estimated Irrigation Use ⁴		
	gpm	gpd	inches	gpd	gpm	gpd	ft	gpm	gpd	gpd	days/wk	gpm
October	80	115,200	1.58	1,799	nm	nm	0.45	4.2	6,092	120,000	6	70
November	121	174,493	6.05	7,118	nm	nm	0.31	2.9	4,241	0	0	0
December	120	172,800	7.33	8,346	nm	nm	0.22	2.1	2,989	0	0	0
January	206	297,285	0.48	547	224	323,136	0.13	1.2	1,708	0	0	0
February	63	90,478	0.13	164	58	84,015	0.08	0.8	1,139	0	0	0
March	130	187,419	1.47	1,674	135	193,882	0.11	1.0	1,509	0	0	0
April	94	135,717	0.51	600	108	155,105	0.17	1.6	2,306	120,000	6	70
May	103	148,643	1.78	2,027	40	58,164	0.29	2.8	4,014	120,000	6	70
June	121	174,493	0.45	529	13	19,388	0.41	3.9	5,665	120,000	6	70
July	108	155,105	0.03	34	0	0	0.56	5.3	7,600	120,000	6	70
August	81	116,329	0.01	11	0	0	0.59	5.6	8,113	120,000	6	70
September	126	180,956	0.85	1,000	0	0	0.53	5.0	7,259	120,000	6	70

Summary of Findings

- * Artificial fill on historical wetland soils in places, but not everywhere
- * Bedrock terrace with seasonal and disconnected hydrology and limited groundwater storage
- * Springflow conveyed across wetland; limited subsurface flow between pond and shallow groundwater
 - * Surface flows should be used to restore hydrology

Restoration Objectives & Concept Design

- * 5 Areas of focus
- * Improve hydrology of meadow (remove ditches/channels)
- * Attenuation
- * Expand meadow and riparian habitat area
- * Reduce Erosion/sedimentation
- * Create recreation/education opportunities

Culverts under Legacy Trail - Outfall at Truckee River

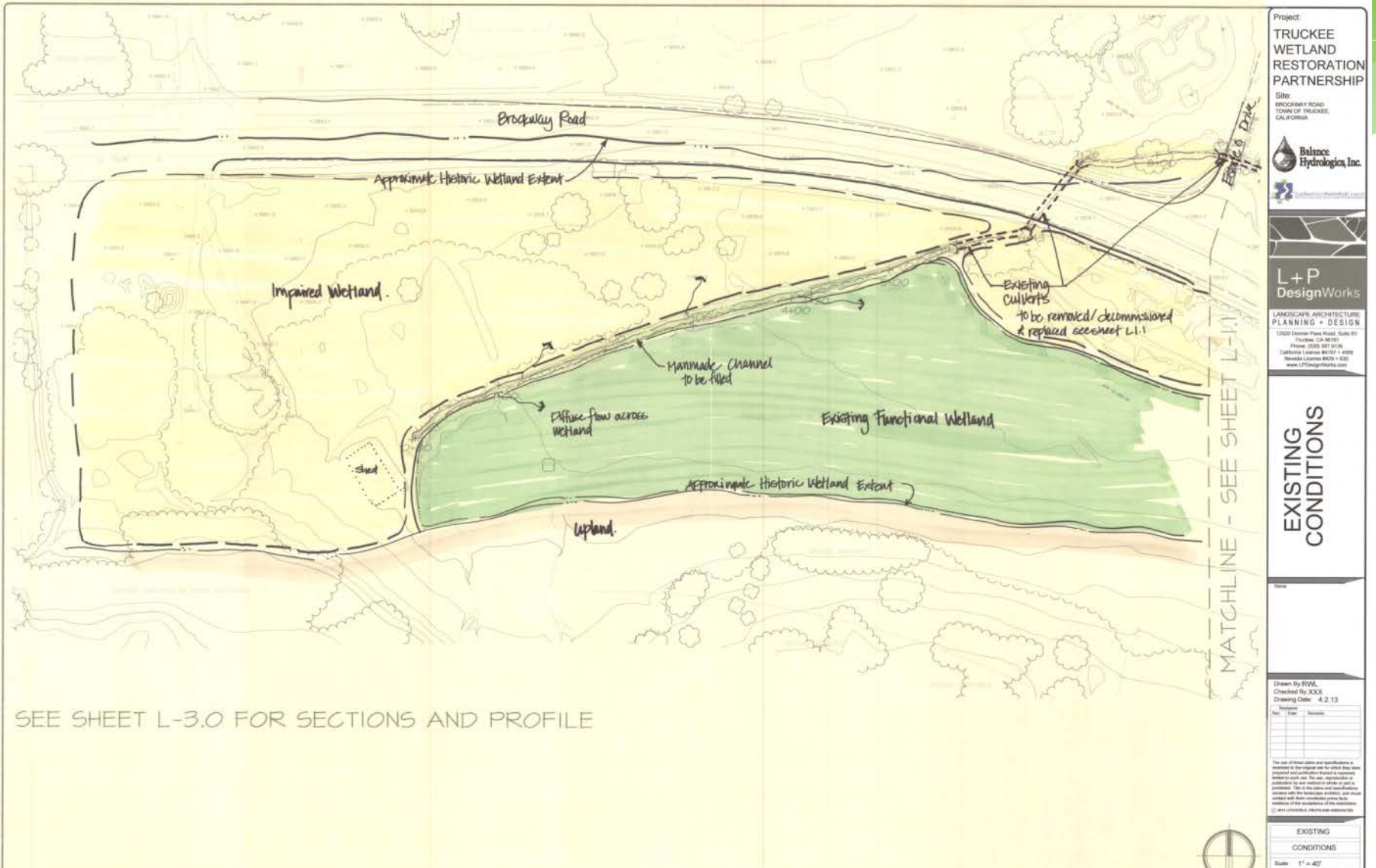


Outfall at Truckee River

5 Areas of Focus



Focus Area 1 – Existing Conditions



SEE SHEET L-3.0 FOR SECTIONS AND PROFILE

Project:
TRUCKEE WETLAND RESTORATION PARTNERSHIP

Site:
BROCKWAY ROAD
TOWN OF TRUCKEE,
CALIFORNIA



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EXISTING CONDITIONS

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Checked By: XXX
Drawing Date: 4.2.13

Sheet No. _____

Scale: _____

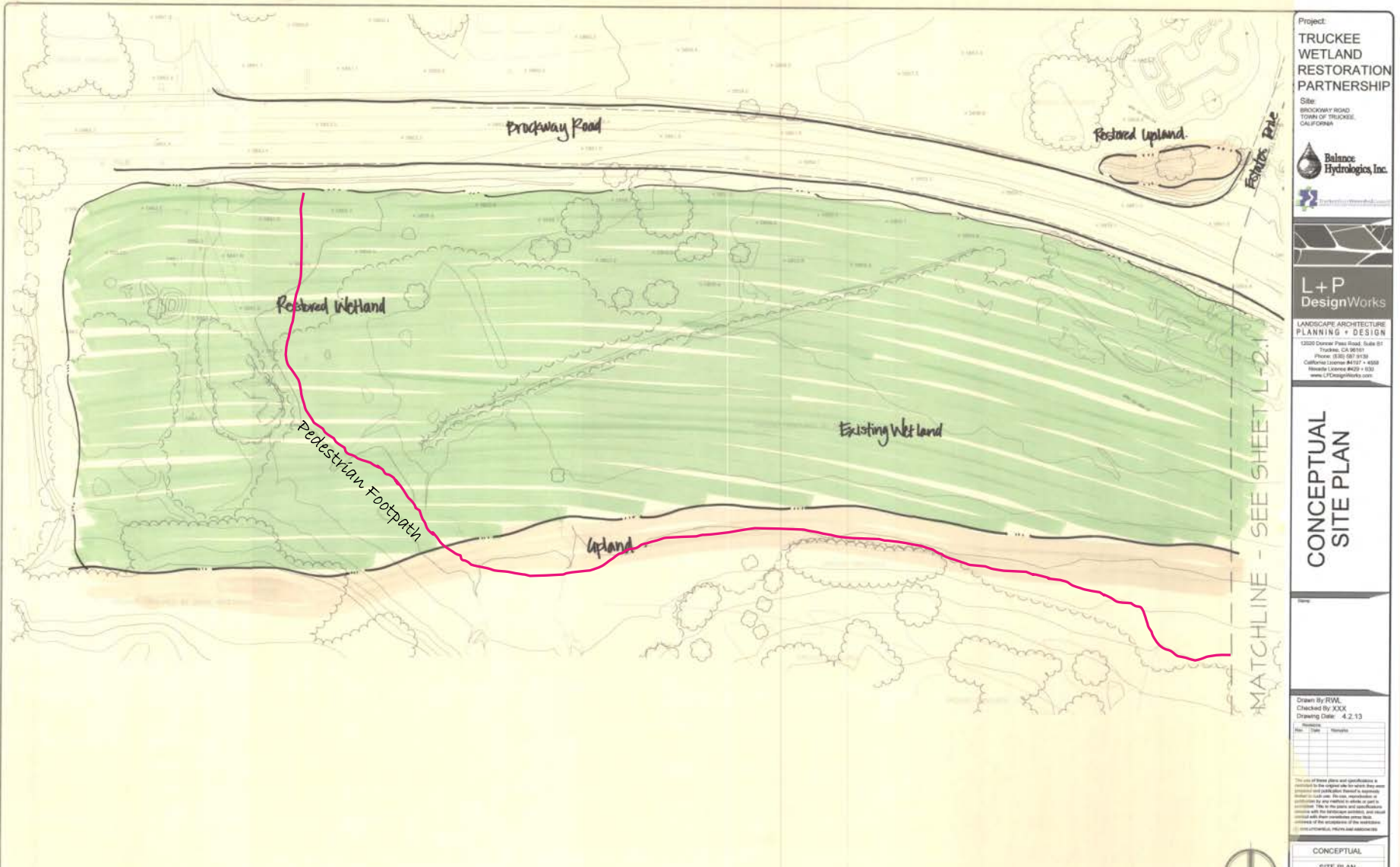
North Arrow

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EXISTING
CONDITIONS

Scale: 1" = 40'

Focus Area 1 – Restored Condition



Project:
**TRUCKEE
WETLAND
RESTORATION
PARTNERSHIP**

Site:
BROCKWAY ROAD
TOWN OF TRUCKEE,
CALIFORNIA



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**CONCEPTUAL
SITE PLAN**

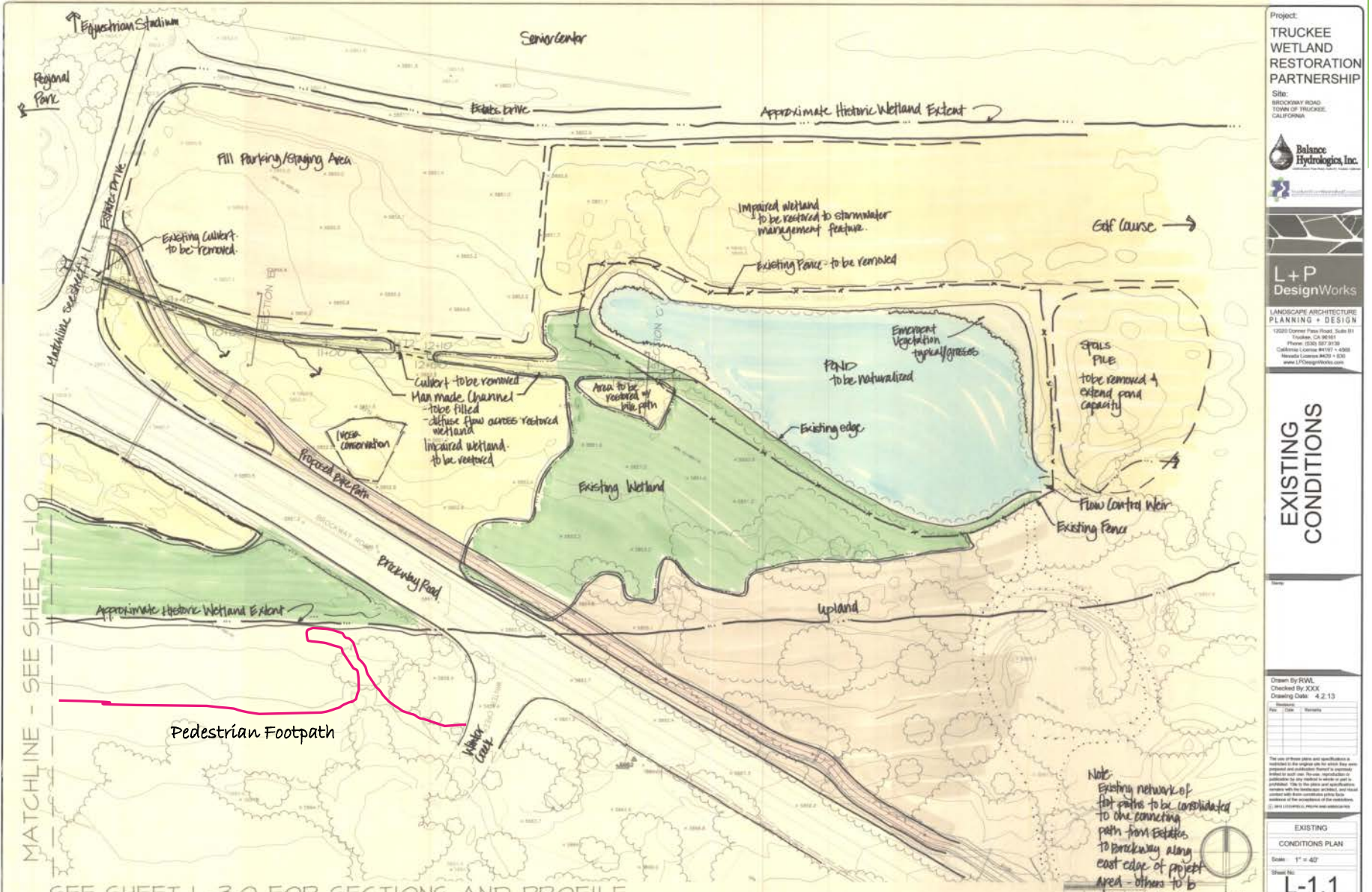
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Checked By: J.C.K.
Drawing Date: 4.2.13

NO.	REVISION	DATE

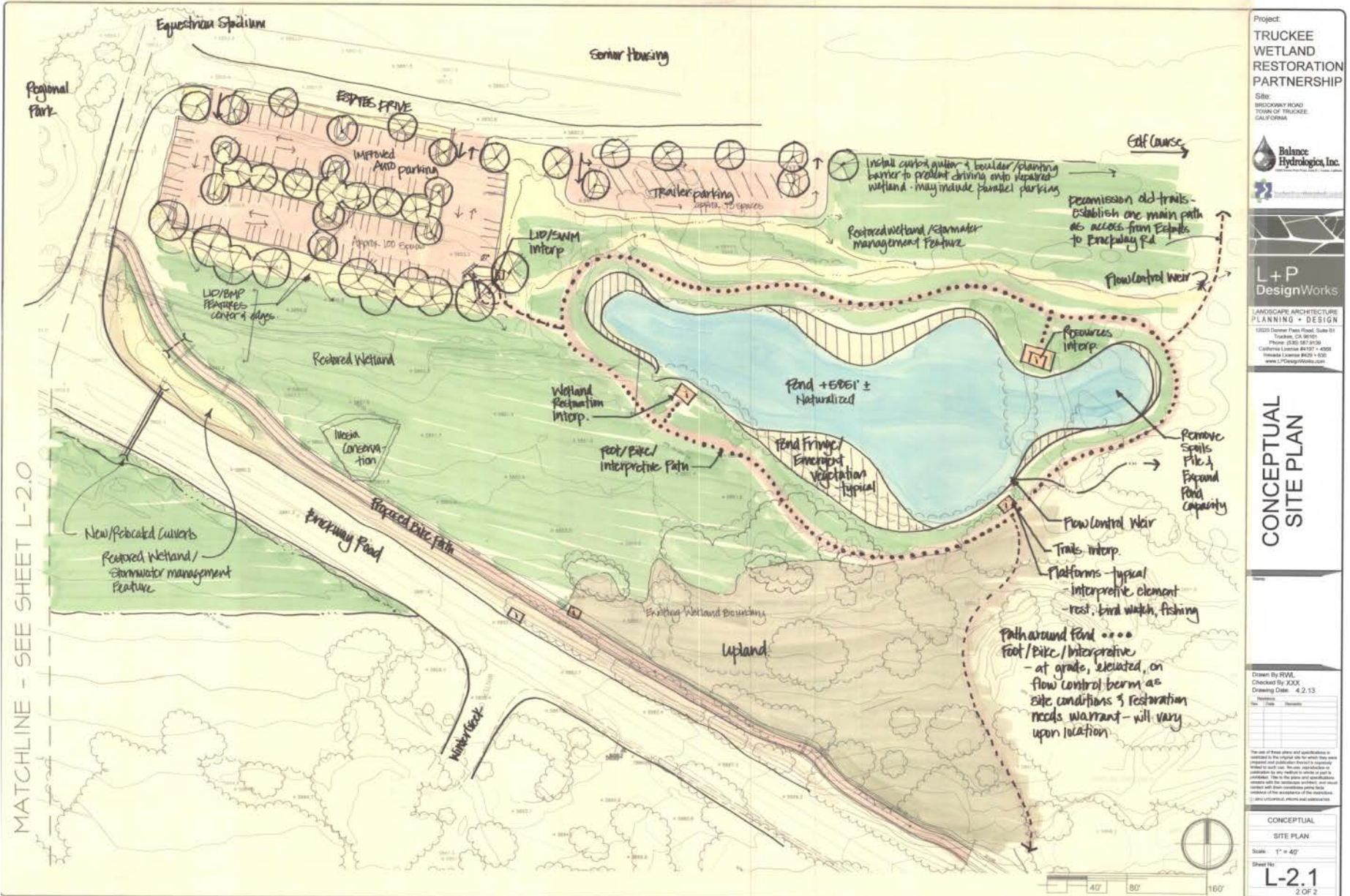
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CONCEPTUAL
SITE PLAN

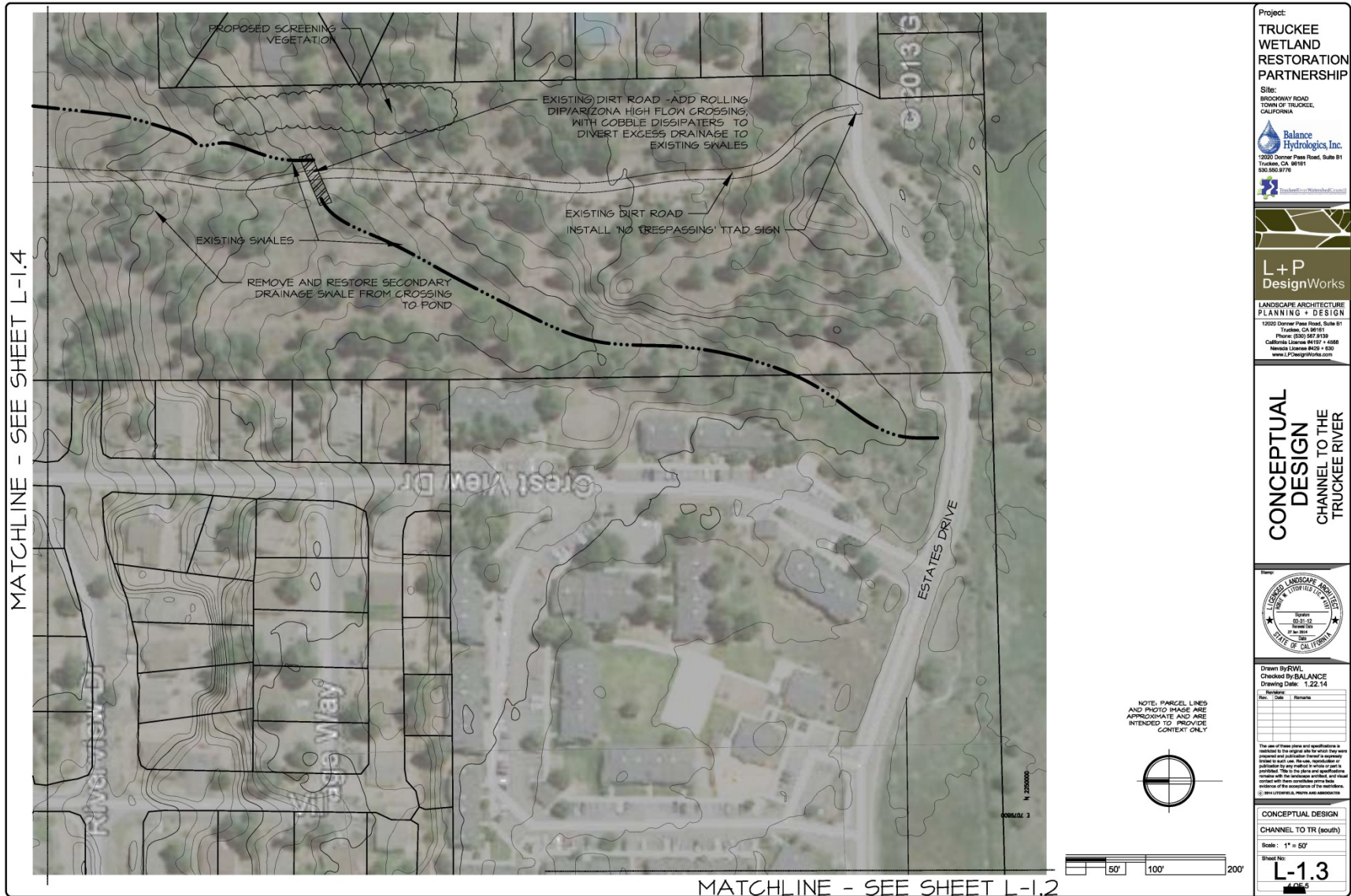
Focus Area 2 - Existing Conditions



Focus Area 2 – Restored Condition



Focus Area 3 – Restored Condition



MATCHLINE - SEE SHEET L-1.4

MATCHLINE - SEE SHEET L-1.2

Project:
TRUCKEE WETLAND RESTORATION PARTNERSHIP

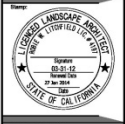
Site:
 BROADWAY ROAD
 TOWN OF TRUCKEE,
 CALIFORNIA

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 Truckee, CA 96161
 530.450.9770
www.balancehydro.com

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CONCEPTUAL DESIGN
 CHANNEL TO THE TRUCKEE RIVER



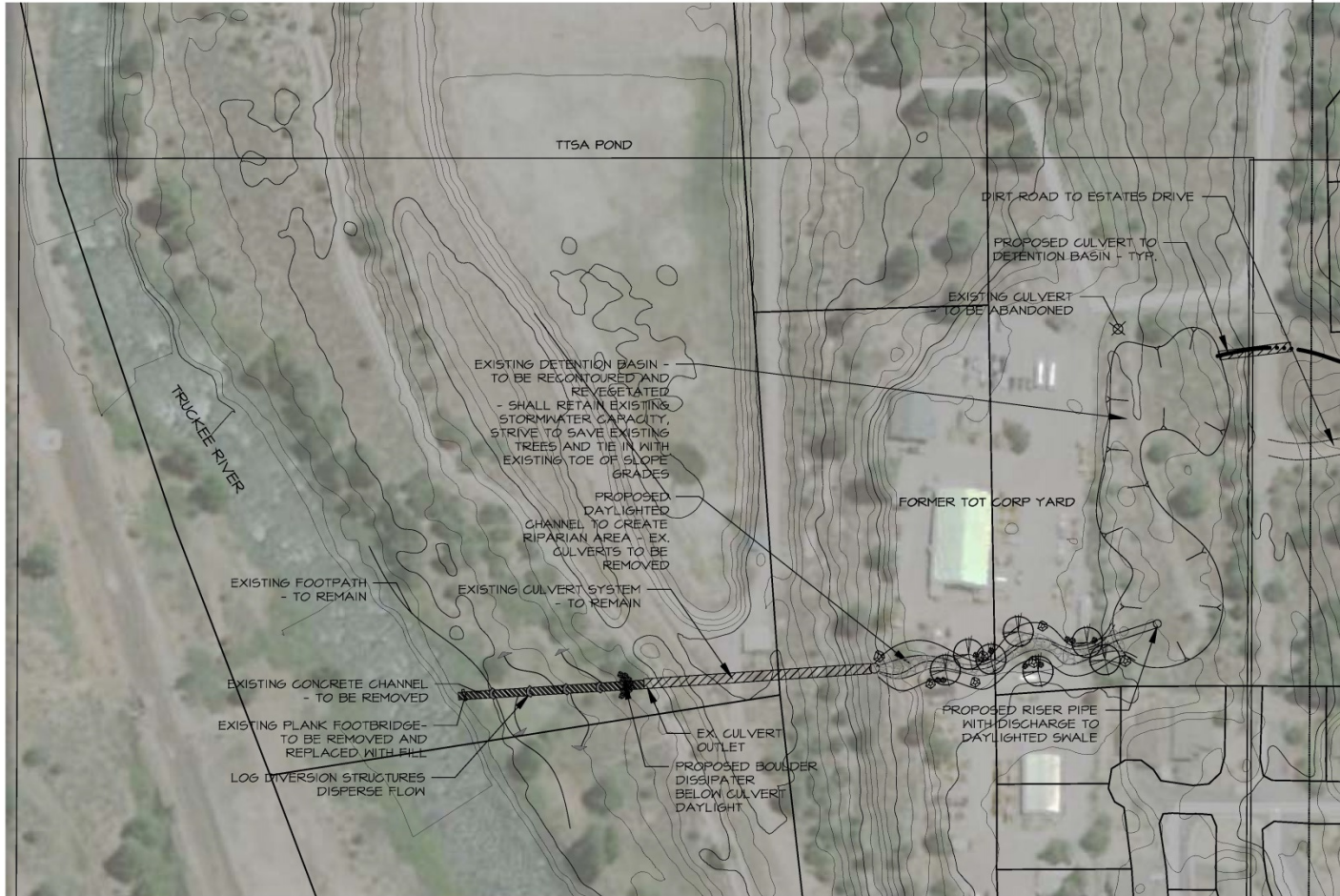
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 Checked By: BALANCE
 Drawing Date: 1.22.14

Revisions	Date	Revised

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CONCEPTUAL DESIGN
 CHANNEL TO TR (south)
 Scale: 1" = 50'
L-1.3
 PAGE 5

Focus Areas 3, 4 & 5 – Restored Condition



Project:
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Site:
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 CALIFORNIA

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CONCEPTUAL DESIGN CHANNEL TO THE TRUCKEE RIVER



Drawn By: RWL
 Checked By: JCK
 Drawing Date: 1.22.14

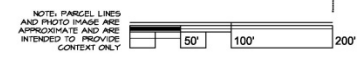
Rev.	Date	Remarks

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CONCEPTUAL DESIGN
 CHANNEL TO TR (north)

Scale: 1" = 100'

Sheet No:
L-1.4
 4 OF 5



MATCHLINE - SEE SHEET L-1.3

Next Steps

- * 2014/2015 Design
- * 2015-2018 Phased Implementation
 - * Focus Area 1, 2 & 3
 - * Focus Area 4
 - * Focus Area 5
- * 2015-2023 Post-Implementation Monitoring



THANK



YOU!!

