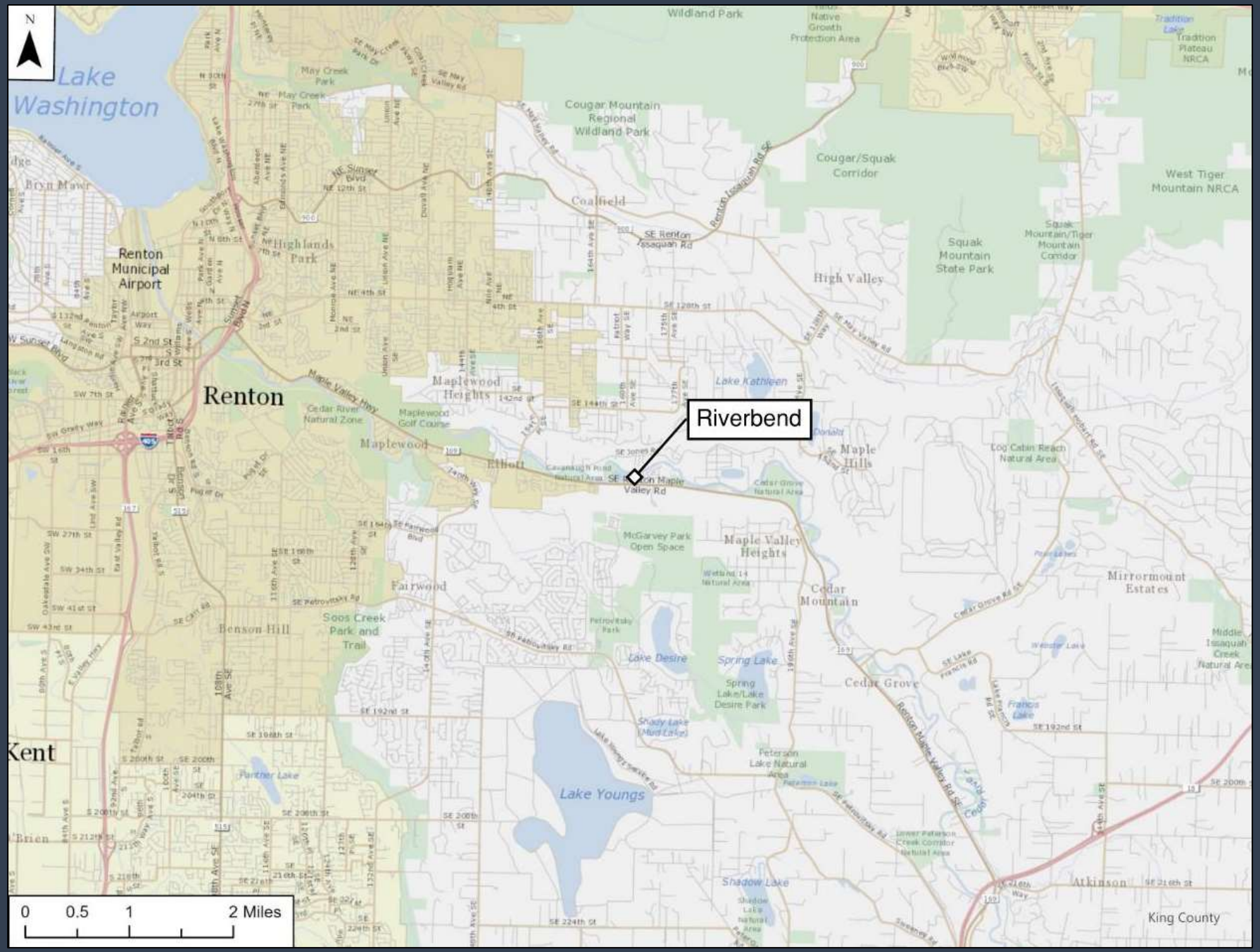
Riverbend

Challenges and Opportunities of Restoring Habitat and Reducing Flood Risk in a Developed, Dynamic Environment

Presented by Michael Thai

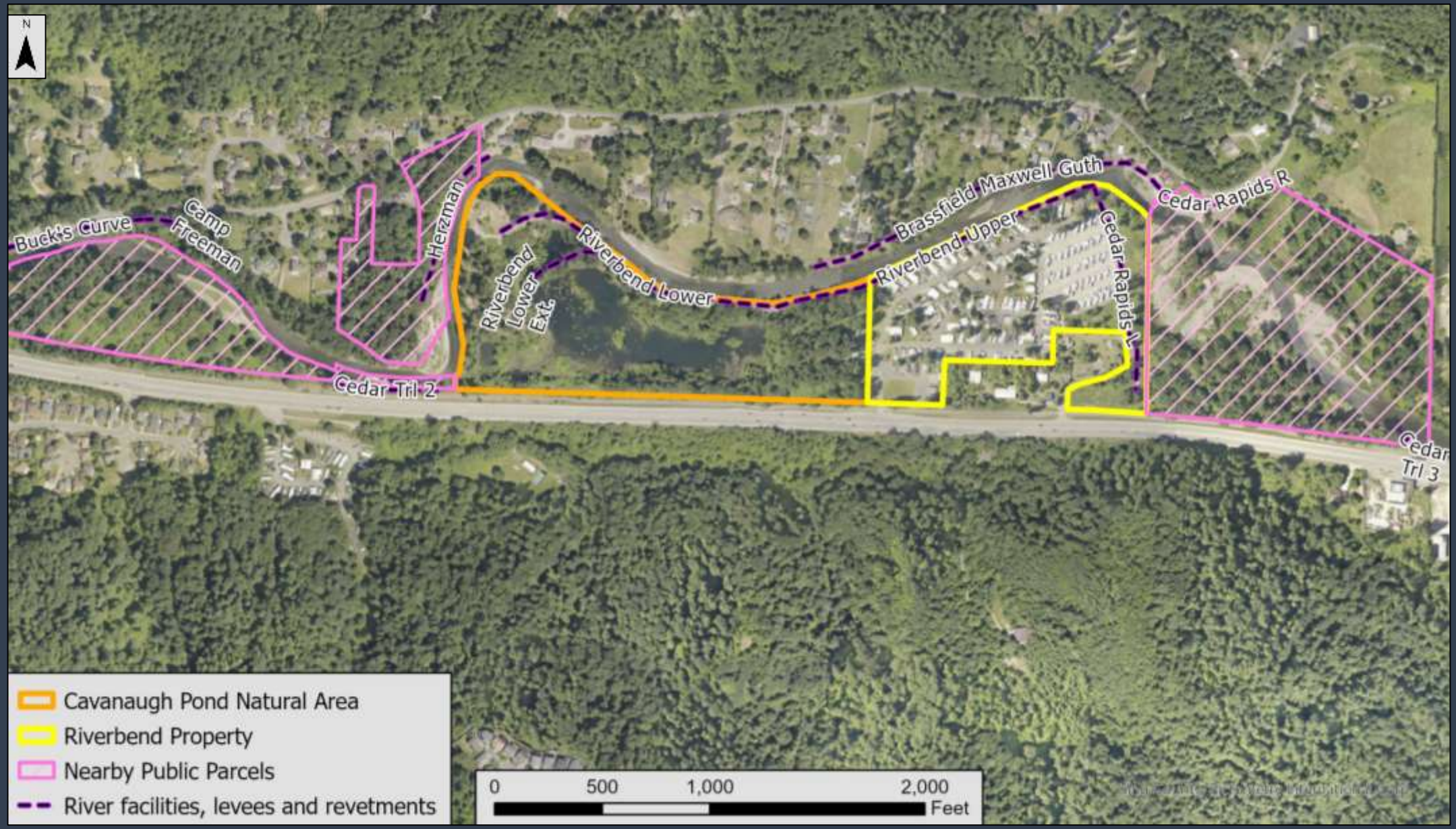
Today's Talk:

1. Intro to the project area
2. Property Acquisition
3. Project goals and problem solving
4. Project adaptation
5. Full implementation
6. Monitoring

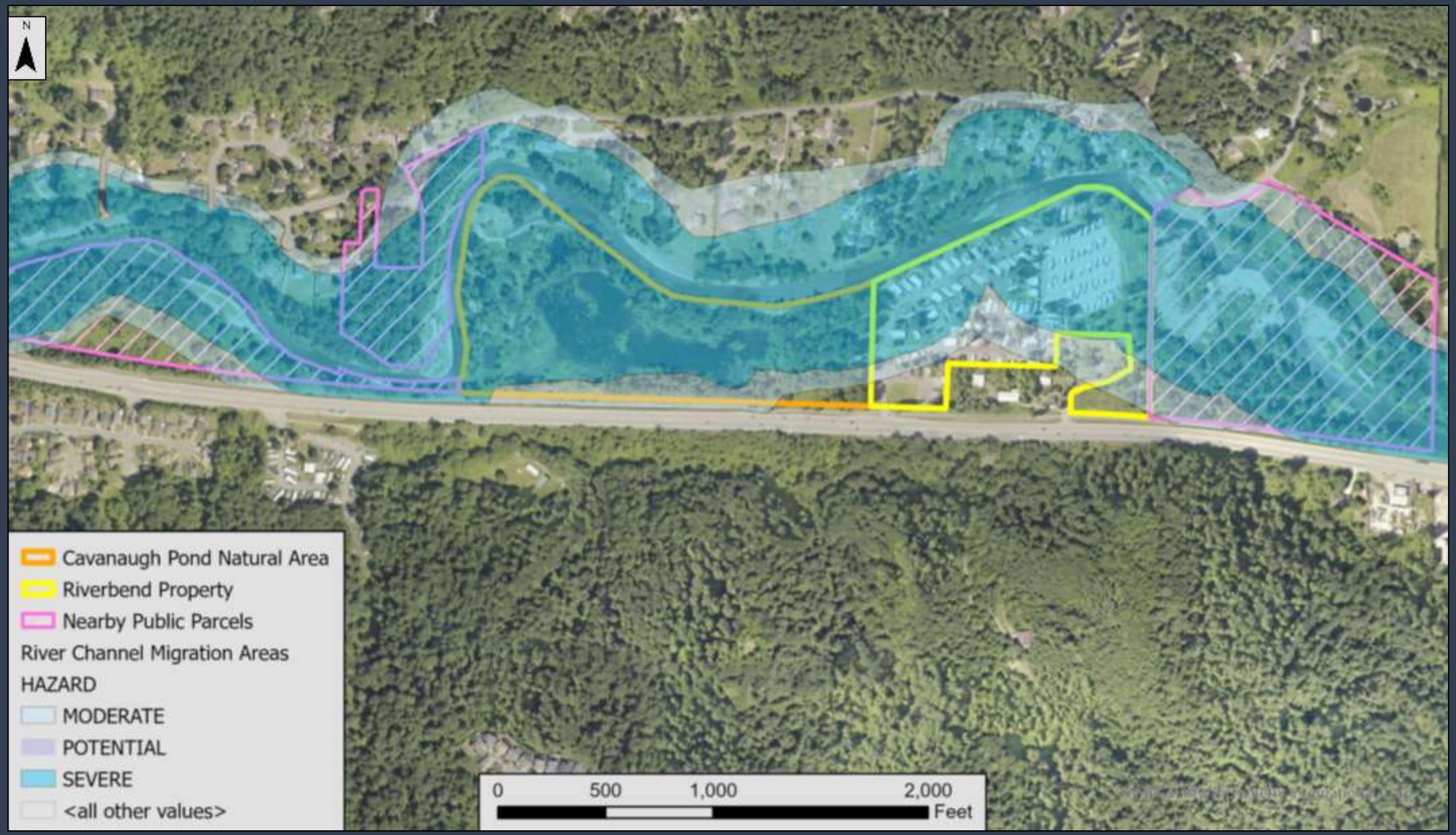

N
Lake Washington
Wildland Park
Native Growth Protection Area
Tradition Lake
Tradition Plateau NRCA
May Creek Park
Cougar Mountain Regional Wildland Park
Cougar/Squak Corridor
West Tiger Mountain NRCA
Bryn Mawr
Coalfield
Renton Municipal Airport
Highlands
Park
Squak Mountain State Park
Squak Mountain/Tiger Mountain Corridor
High Valley
Renton
Maplewood Heights
Lake Kathleen
Riverbend
Maplewood
Maplewood Golf Course
Cedar River Natural Zone
Elliott
Maple Hills
Log Cabin Reach Natural Area
McGarvey Park Open Space
Maple Valley Heights
Fairwood
Cedar Mountain
Mirrormount Estates
Benson Hill
Soos Creek Park and Trail
Lake Desire
Spring Lake
Spring Lake/Lake Desire Park
Cedar Grove
Kent
Panther Lake
Lake Youngs
Peterson Lake Natural Area
Shadow Lake
Atkinson
King County
0 0.5 1 2 Miles

Riverbend Project Area – 2013

Surrounding Public Land



Channel Migration Hazard



Riverbend Mobile Home Park Acquisition

Flood Damage November 1990

Summary of the Riverbend Property Acquisition

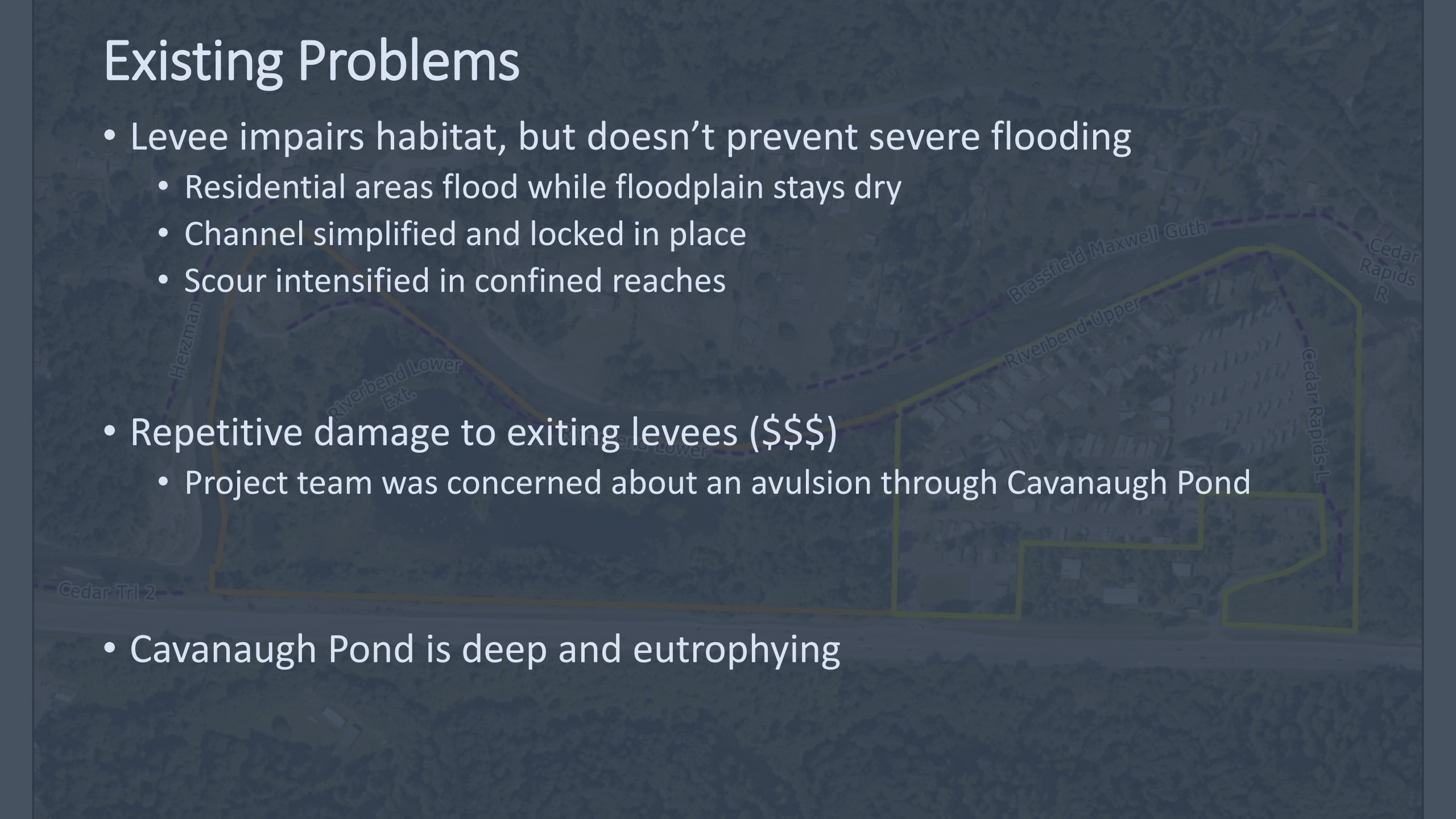
- 18.6 Acres = 87 Mobile Homes + 55 RVs
- Many mobile homes in 100 year floodplain
- Erosion/Channel migration hazard a serious threat
  - Homes closer to river most vulnerable
- Appraised value: $6.75M
- Offer extended January 2013
- Relocation eliminates hazard risk
- Completed 4 miles of contiguous KC ownership on left (south) bank

Project Goals

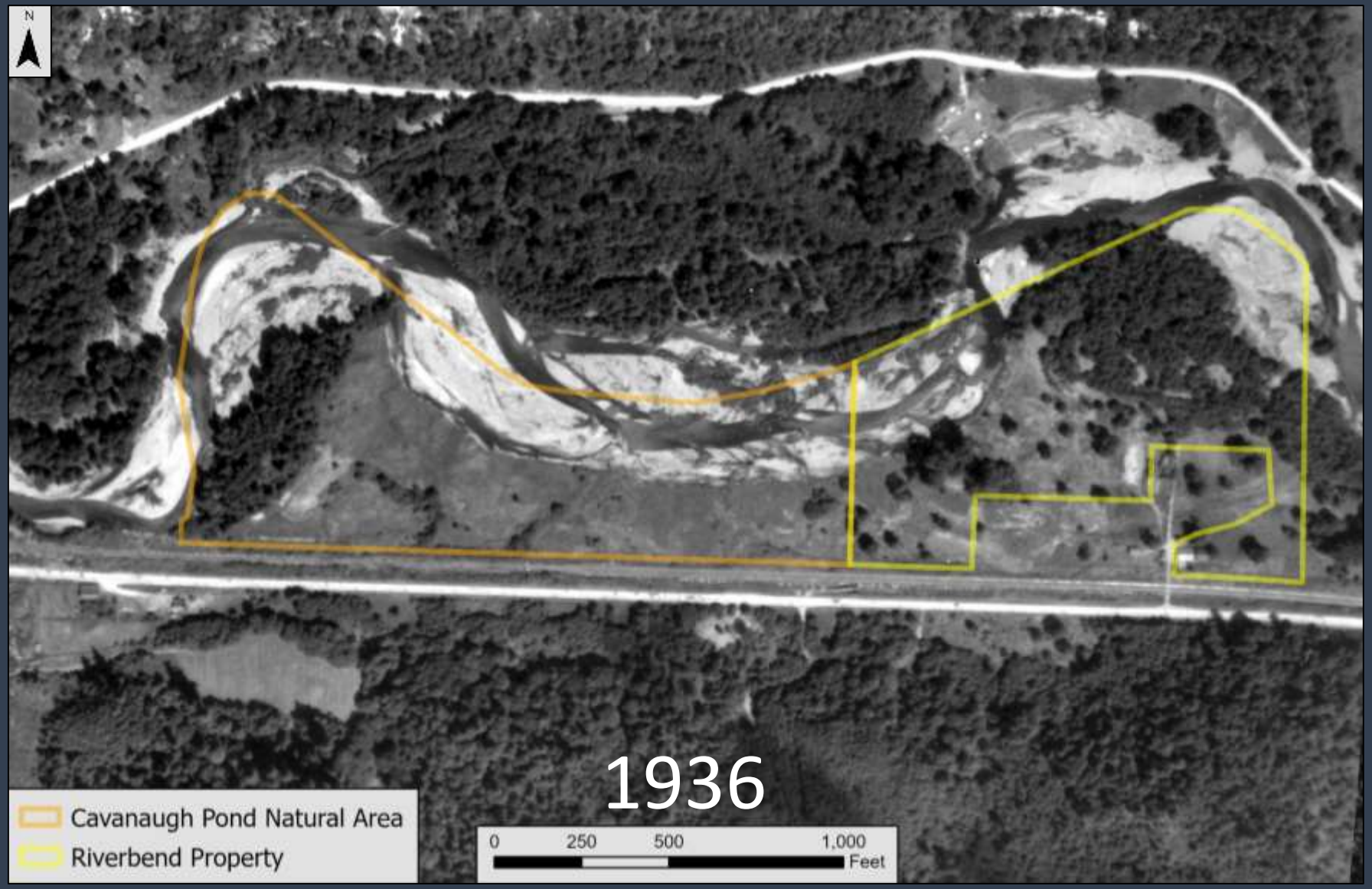
- Improve quality, quantity, and sustainability of salmonid spawning and rearing habitat
- Reduce flood and erosion risks to people, property, and infrastructure
- Accommodate public use consistent with future ecological conditions on site
- Balance flood and ecological benefits and other objectives with project costs

Existing Problems

- Levee impairs habitat, but doesn't prevent severe flooding
  - Residential areas flood while floodplain stays dry
  - Channel simplified and locked in place
  - Scour intensified in confined reaches
- Repetitive damage to exiting levees ($$$)
  - Project team was concerned about an avulsion through Cavanaugh Pond
- Cavanaugh Pond is deep and eutrophying



Levee impairs habitat - Channel simplified and locked in place



Levee impairs habitat - Channel simplified and locked in place

Flood in 1965

Repetitive damage to exiting levees ($$$) – project team was concerned about an avulsion through Cavanaugh Pond

Levees impaired habitat and made flooding worse

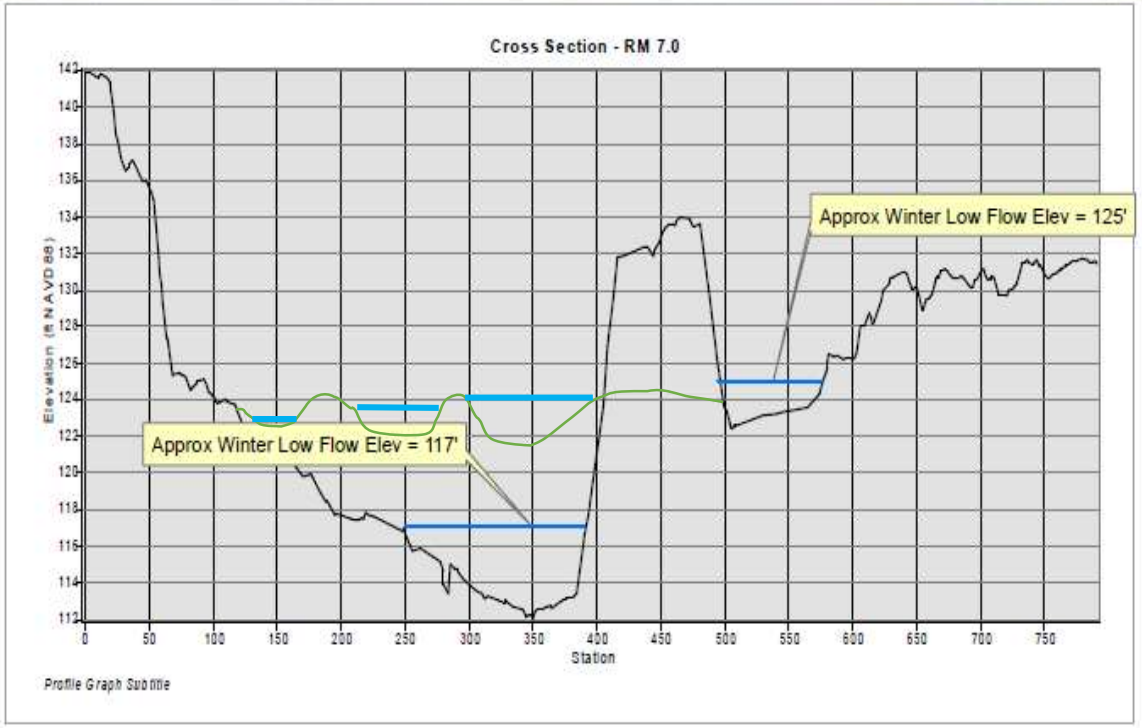
Flooding (~20-year flood)
January 8, 2009
7,870 cfs @ Landsburg

Pond Modification

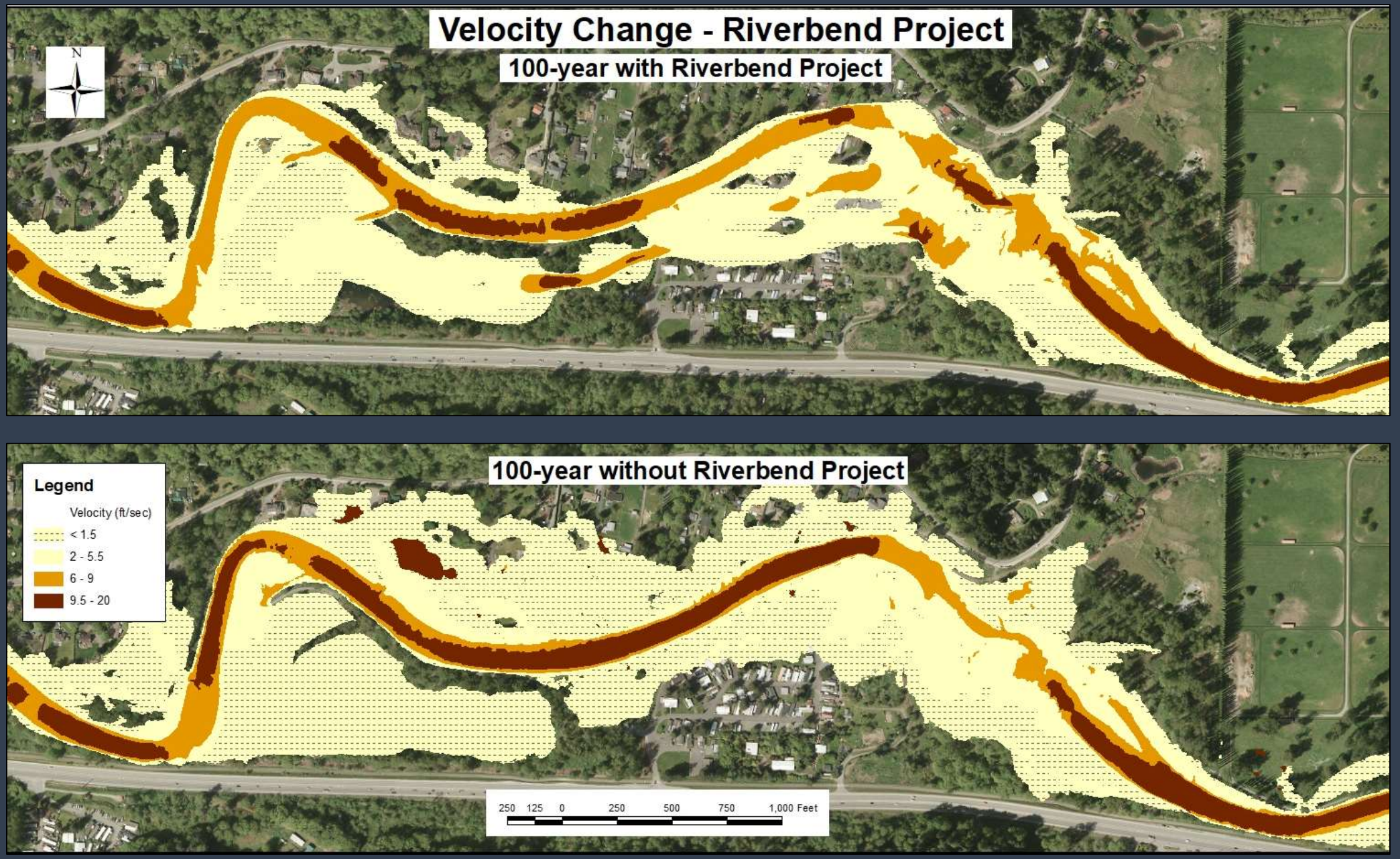
150 75 0 150 300 450 600 Feet

Bathymetric Cross Section

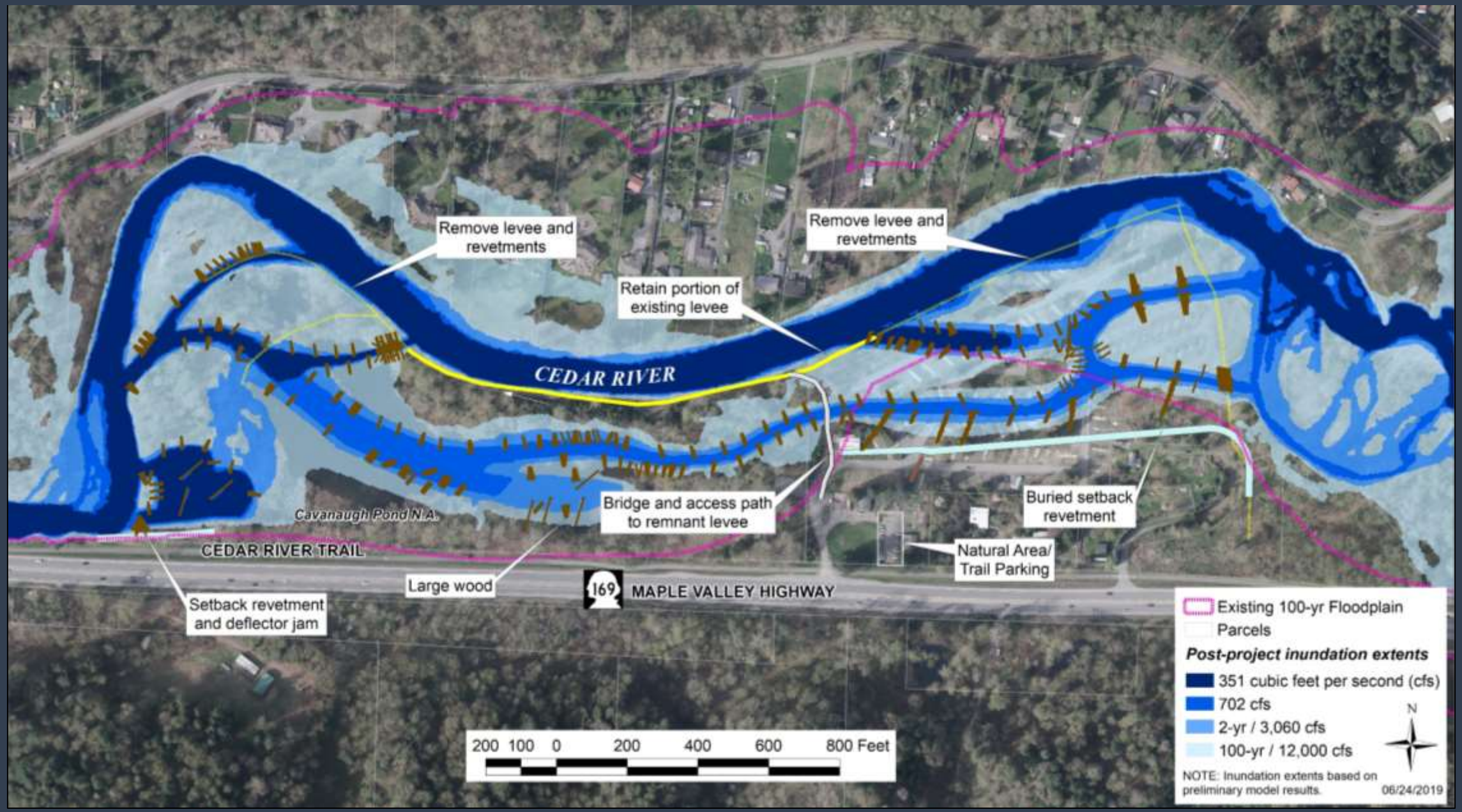
Riverbend Levee Setback



Preliminary Design Concept


Velocity Change - Riverbend Project
100-year with Riverbend Project
N
100-year without Riverbend Project
Legend
Velocity (ft/sec)
< 1.5
2 - 5.5
6 - 9
9.5 - 20
250 125 0 250 500 750 1,000 Feet

Riverbend Levee Setback and Floodplain Restoration Project



Permits and Pathways

- U.S. Army Corps of Engineers
  - Nation Wide Permit 13
  - Nation Wide Permit 27
    - Clean Water Act Section 404 Permit through (WDOE)
    - ESA Section 7 Consultation (NOAA and NMFS)
  - Letter of Map Amendment/Revision (FEMA)
- State of Washington
  - HPA (WDFW)
  - Aquatic Use Authorization (DNR)
  - Construction Stormwater GP (DOE)
  - SEPA Compliance
  - WSDOT
- King County
  - Clearing and Grading Permit
  - Shoreline Exemption
  - Floodplain Development Permit
  - Parks Memo

Multiple Funding Sources

Acquisition

- KC Flood Control District
- RCO – PSAR
- Conservation Futures
- Community Watershed Management Grant
- KC Mitigation Reserves Program
- Open Space Fund
- KC Parks – PEL

Design

- DOE – Floodplains by Design Grant
- RCO – SRFB Grant
- KC SWM funds
- KC Flood Control District
- Seattle Public Utilities

February 8, 2020
8,740 cfs at Renton
~40-year flood

February 10, 2020
5,530 cfs at Renton
~40-year flood

CRT2 Emergency Repair – February 2020

Adapting to Change

Avulsion Reset Reach Conditions

- Complex habitat with off channel connection
- Significant gravel deposition AND head cutting
- Reset thalweg elevation of entire reach
- Undermined remaining levee
- *Requires reassessment and redesign*

Phase 1 – 2020

- Completion of Demolition
- Install buried setback through MH park
- Remove/Relocated Powerlines
- Extension of protection of Cedar River Trail

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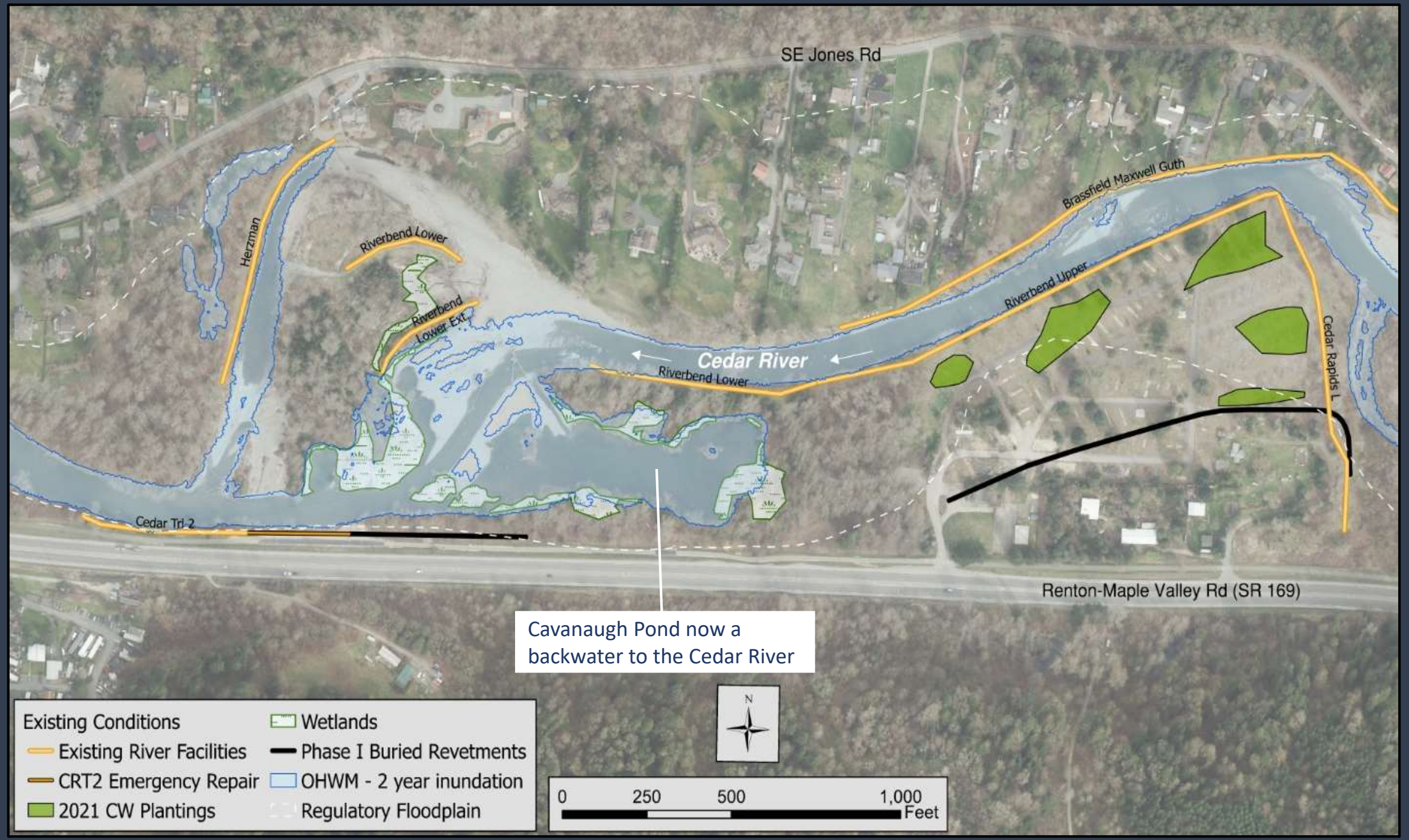
Cottonwood Staking

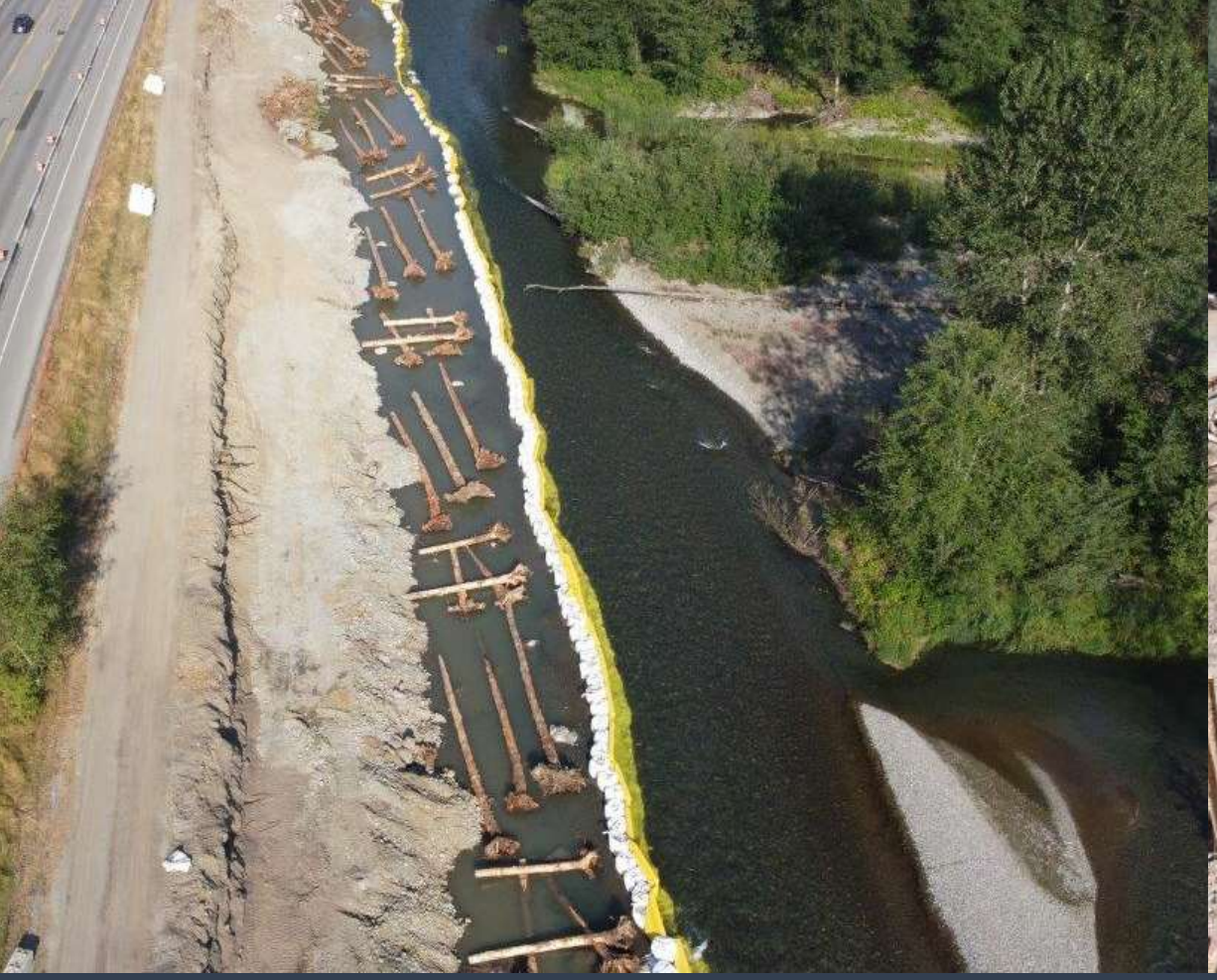
- Winter 2021
- 3.5 acres
- 5,600 cottonwood stakes


SE Jones Rd
Herzman
Riverbend Lower
Riverbend Lower Ext
Brassfield Maxwell Guth
Riverbend Upper
Cedar River
Riverbend Lower
Cedar Rapids L
Cedar Trl 2
Renton-Maple Valley Rd (SR 169)
Cavanaugh Pond now a backwater to the Cedar River
Existing Conditions
Existing River Facilities
CRT2 Emergency Repair
2021 CW Plantings
Wetlands
Phase I Buried Revetments
OHWM - 2 year inundation
Regulatory Floodplain
N
0
250
500
1,000
Feet


2-yr flood flow
Typical winter flow
Planting Area
Brassfield Maxwell Guth
Herzman
Riverbend Lower Ext.
Cedar Trl 2
1
2
3
4
4
Phase II Revetments (2022)
Phase I Revetments (2020)

Isolate and Fill Cavanaugh Pond

Excavate Side Channel in mobile home park area



Isolate in-water work areas for riprap removal and log jam construction

Build log jams in floodplain

Spread compost and mulch (select areas), then plant


2-yr flood flow
Typical winter flow
Planting Area
Brassfield Maxwell Guth
Herzman
Riverbend Lower Ext.
Cedar Trl 2
1
2
3
4
4
Phase II Revetments (2022)
Phase I Revetments (2020)

10-year Monitoring Plan

- Fish and habitat surveys
- Geomorphic change analysis using LiDAR
- Surface water level – floodplain connectivity
- Temperature analysis – possibly
- Vegetation establishment
- Weed management

Thank you to the project team, sponsors, and partners!

- KC Flood Control District
- KC Water and Land Resources Division
- KC Parks – PEL
- Seattle Public Utilities
- Puget Sound Energy
- WRIA 8
- RCO – PSAR and SRFB Grants
- DOE - Floodplains by Design Grant

Contractor: Rodarte Construction

Construction Management: SPU

KC Project Team:

Jon Hansen, Sarah McCarthy, Alex Hallenius, Todd Hurley, Deb Pessoa, Tracy Winjum, Cristina Olivares – many more over the years