Project: Satsop 2.5 to 5.0 Restoration Construction

Synopsis:

- **Sponsor:** GHCD
- **Location:** Grays Harbor County, Olympic Mountains Ecological Unit, Lower Satsop Mainstem GSU (a near term priority area)
- **Landowner:** Multiple Private landowners
- **ASRP Priority Limitations for this location:** Key habitat**,** Temperature, and Habitat Diversity
- **ASRP Priority Actions for this location:** Place Large Wood, Riparian Restoration, reconnect/restore floodplain
- **Cost:** Original Funding- $3,591,987. Current ask: $4,772,384
- **Narrative:**
  - Reach Scale restoration of 2.5 miles along the Satsop River including engineered log jams (ELJs), riparian restoration, and invasives management.
  - Engineered log jam complexes will provide key habitat features for salmon, increase habitat diversity, increase side channel flow, increase channel stability along rapidly eroding banks, and capture sediment.
  - Riparian plantings and invasive management will increase cover to reduce temperature, increase channel stability, increase habitat diversity, and increase long term habitat diversity by providing large wood material inputs.
  - Intended long term outcome for the project is increased floodplain connectivity, reduced channel migration to allow for riparian forests to mature, a substantial increase in stable large wood throughout the reach, and multiple channels.
  - There have been some design changes introduced to this project to obtain a “no rise” certification and avoid CLOMR.
    - ELJs will be embedded either in gravel bars or in the channel banks
    - Several ELJs were removed from the design
      - Note that each ELJ now has more and larger wood pieces, so there will be overall more pieces of wood throughout the project
    - Flood fencing and floodplain roughness triangle ELJs were removed from the design

Outcomes (Funded by this project):

- 2.5 miles of large river restoration
- 34 ELJs (was 63)
- 240 acres of riparian enhancement
- 33 acres of riparian buffer creation

Previous and Related Funding:

- Concept and preliminary design funded by ASRP in 2020 for $188,000
- Final design funded by ASRP in 2021 for an additional $125,000
  - Total design investment: $313,000
- Erosion reduction project (riparian planting) funded by CBS integrated in 2022

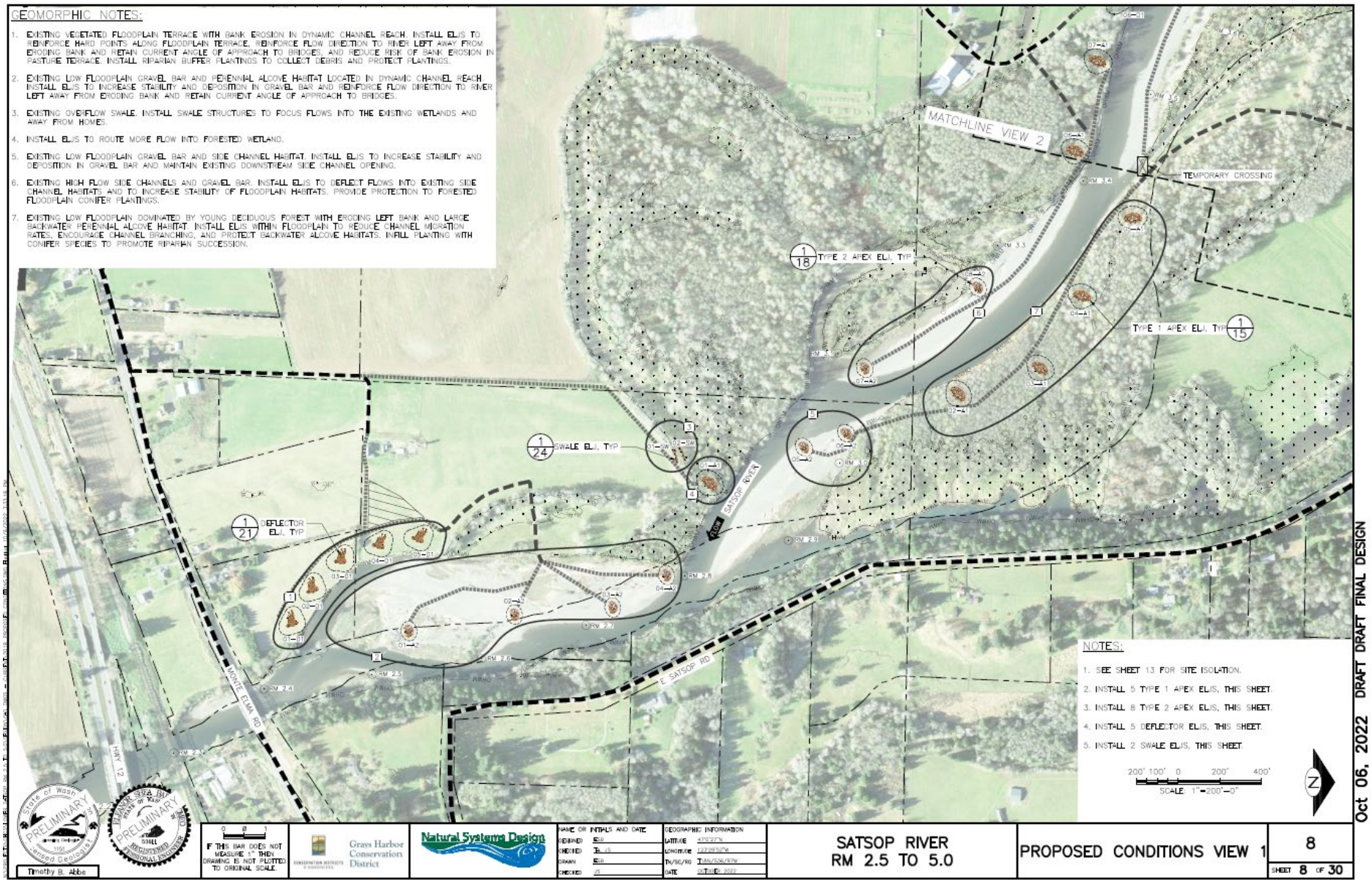
- Along Satsop RM 3.5-4.0
- Completed in 2022

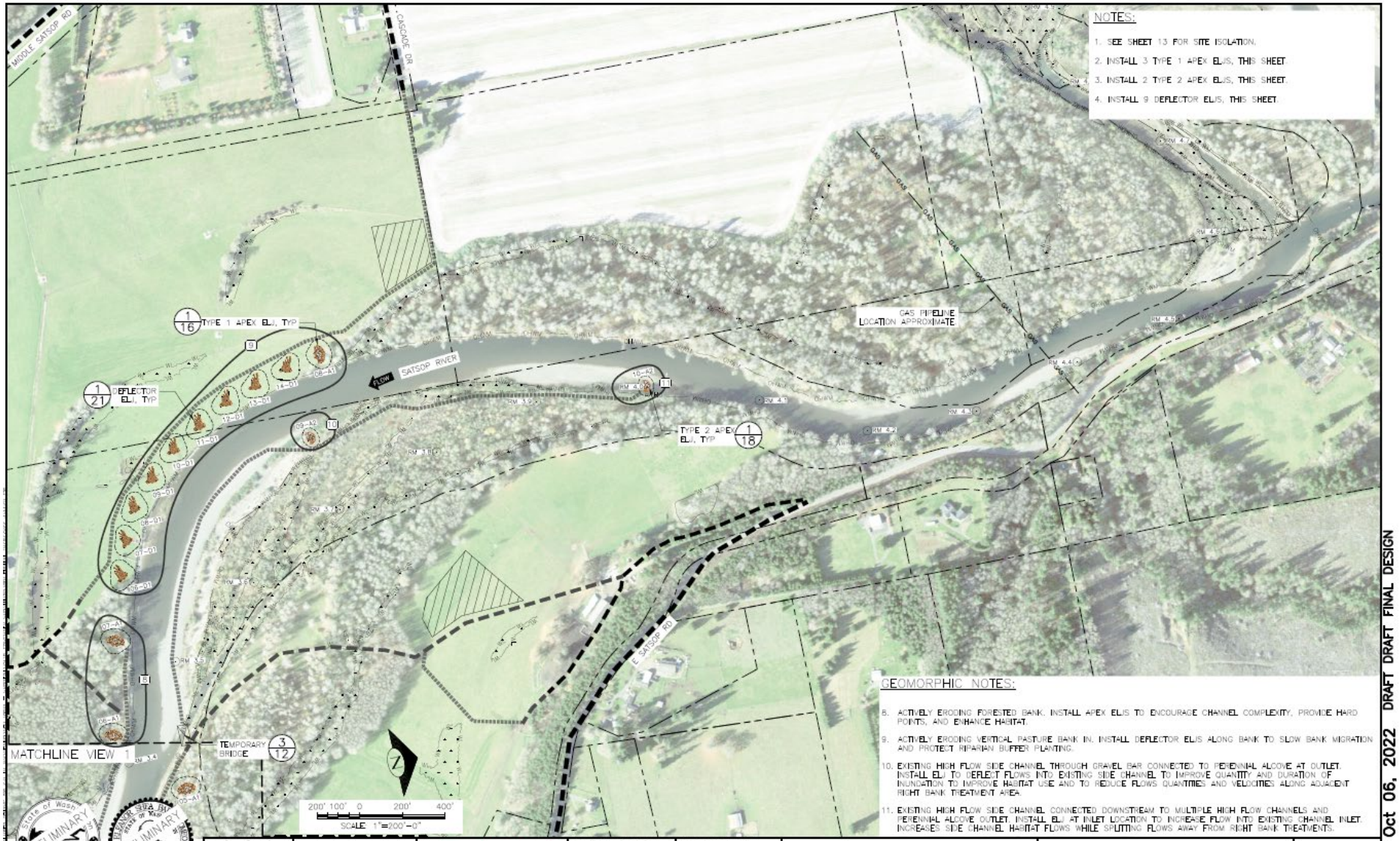
Milestones + Timeframe:

- Final design and permitting: 2022/23
- Phase 1 construction: summer 2023
- Phase 2 construction: summer 2024
- Riparian revegetation, enhancement, and monitoring: winter 2022- 2028

Feedback:

- Final design review that this project has a large potential for habitat uplift and that expected project outcomes have not significantly deviated from those initially proposed. No engineering “red flags” were found in the design.
- Future projects of this scale would benefit from receiving additional funding for establishing baseline habitat data through surveys and monitoring project impacts.


GEOMORPHIC NOTES:
1. EXISTING VEGETATED FLOODPLAIN TERRACE WITH BANK EROSION IN DYNAMIC CHANNEL REACH. INSTALL ELJS TO REINFORCE HARD POINTS ALONG FLOODPLAIN TERRACE, REINFORCE FLOW DIRECTION TO RIVER LEFT AWAY FROM ERODING BANK AND RETAIN CURRENT ANGLE OF APPROACH TO BRIDGES, AND REDUCE RISK OF BANK EROSION IN PASTURE TERRACE. INSTALL RIPARIAN BUFFER PLANTINGS TO COLLECT DEBRIS AND PROTECT PLANTINGS.
2. EXISTING LOW FLOODPLAIN GRAVEL BAR AND PERENNIAL ALCOVE HABITAT LOCATED IN DYNAMIC CHANNEL REACH. INSTALL ELJS TO INCREASE STABILITY AND DEPOSITION IN GRAVEL BAR AND REINFORCE FLOW DIRECTION TO RIVER LEFT AWAY FROM ERODING BANK AND RETAIN CURRENT ANGLE OF APPROACH TO BRIDGES.
3. EXISTING OVERFLOW SWALE. INSTALL SWALE STRUCTURES TO FOCUS FLOWS INTO THE EXISTING WETLANDS AND AWAY FROM HOMES.
4. INSTALL ELJS TO ROUTE MORE FLOW INTO FORESTED WETLAND.
5. EXISTING LOW FLOODPLAIN GRAVEL BAR AND SIDE CHANNEL HABITAT. INSTALL ELJS TO INCREASE STABILITY AND DEPOSITION IN GRAVEL BAR AND MAINTAIN EXISTING DOWNSTREAM SIDE CHANNEL OPENING.
6. EXISTING HIGH FLOW SIDE CHANNELS AND GRAVEL BAR. INSTALL ELJS TO DEFLECT FLOWS INTO EXISTING SIDE CHANNEL HABITATS AND TO INCREASE STABILITY OF FLOODPLAIN HABITATS. PROVIDE PROTECTION TO FORESTED FLOODPLAIN CONIFER PLANTINGS.
7. EXISTING LOW FLOODPLAIN DOMINATED BY YOUNG DECIDUOUS FOREST WITH ERODING LEFT BANK AND LARGE BACKWATER PERENNIAL ALCOVE HABITAT. INSTALL ELJS WITHIN FLOODPLAIN TO REDUCE CHANNEL MIGRATION RATES, ENCOURAGE CHANNEL BRANCHING, AND PROTECT BACKWATER ALCOVE HABITATS. INFILL PLANTING WITH CONIFER SPECIES TO PROMOTE RIPARIAN SUCCESSION.
MATCHLINE VIEW 2
TEMPORARY CROSSING
1/18 TYPE 2 APEX ELJ, TYP
1/15 TYPE 1 APEX ELJ, TYP
1/24 SWALE ELJ, TYP
1/21 DEFLECTOR ELJ, TYP
SATSOP RIVER
MONTE ELMA RD
E SATSOP RD
HWY 12
NOTES:
1. SEE SHEET 13 FOR SITE ISOLATION.
2. INSTALL 5 TYPE 1 APEX ELJS, THIS SHEET.
3. INSTALL 8 TYPE 2 APEX ELJS, THIS SHEET.
4. INSTALL 5 DEFLECTOR ELJS, THIS SHEET.
5. INSTALL 2 SWALE ELJS, THIS SHEET.
200' 100' 0 200' 400'
SCALE: 1"=200'-0"
PRELIMINARY
Timothy B. Abbe
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT PLOTTED TO ORIGINAL SCALE.
Grays Harbor Conservation District
Natural Systems Design
NAME OR INITIALS AND DATE
DESIGNED SDB
CHECKED TA 10
DRAWN SDB
CHECKED JS
GEOGRAPHIC INFORMATION
LATITUDE 47°03'37"N
LONGITUDE 123°35'52"W
TN/SC/RG T18N/S36/R7W
DATE OCTOBER 2022
SATSOP RIVER
RM 2.5 TO 5.0
PROPOSED CONDITIONS VIEW 1
8
SHEET 8 OF 30
Oct 06, 2022 DRAFT DRAFT FINAL DESIGN



NOTES:

1. SEE SHEET 13 FOR SITE ISOLATION.
2. INSTALL 3 TYPE 1 APEX ELJS, THIS SHEET.
3. INSTALL 2 TYPE 2 APEX ELJS, THIS SHEET.
4. INSTALL 9 DEFLECTOR ELJS, THIS SHEET.

GEOMORPHIC NOTES:

8. ACTIVELY ERODING FORESTED BANK. INSTALL APEX ELJS TO ENCOURAGE CHANNEL COMPLEXITY, PROVIDE HARD POINTS, AND ENHANCE HABITAT.
9. ACTIVELY ERODING VERTICAL PASTURE BANK IN. INSTALL DEFLECTOR ELJS ALONG BANK TO SLOW BANK MIGRATION AND PROTECT RIPARIAN BUFFER PLANTING.
10. EXISTING HIGH FLOW SIDE CHANNEL THROUGH GRAVEL BAR CONNECTED TO PERENNIAL ALCOVE AT OUTLET. INSTALL ELJ TO DEFLECT FLOWS INTO EXISTING SIDE CHANNEL TO IMPROVE QUANTITY AND DURATION OF INUNDATION TO IMPROVE HABITAT USE AND TO REDUCE FLOWS QUANTITIES AND VELOCITIES ALONG ADJACENT RIGHT BANK TREATMENT AREA.
11. EXISTING HIGH FLOW SIDE CHANNEL CONNECTED DOWNSTREAM TO MULTIPLE HIGH FLOW CHANNELS AND PERENNIAL ALCOVE OUTLET. INSTALL ELJ AT INLET LOCATION TO INCREASE FLOW INTO EXISTING CHANNEL INLET. INCREASES SIDE CHANNEL HABITAT FLOWS WHILE SPLITTING FLOWS AWAY FROM RIGHT BANK TREATMENTS.

Oct 06, 2022 DRAFT DRAFT FINAL DESIGN

PRELIMINARY NOT FOR CONSTRUCTION
Timothy B. Abbe

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT PLOTTED TO ORIGINAL SCALE.

Grays Harbor Conservation District

Natural Systems Design

NAME OR INITIALS AND DATE	
DESIGNED	SLB
CHECKED	TA
DRAWN	SLB
CHECKED	JS

GEOGRAPHIC INFORMATION	
LATITUDE	47°0'27"N
LONGITUDE	123°29'50"W
TWSC/RG	T18N/R5W/R7W
DATE	OCTOBER 2022

SATSOP RIVER
RM 2.5 TO 5.0

PROPOSED CONDITIONS VIEW 2

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SHEET 9 OF 30