

GENERAL DESIGN NOTES

- Placement locations based on USFWS 2009 geomorphic analysis
- Structure designs based on natural, stable analogs in White River, WA
- ELJs may deform, gain or lose wood in-time but overall structure will remain persistent
- Scour depth predictions based on 50-year flow but geomorphic features based on bankfull discharge (est. 1911 cfs/1.62 RI)

GENERAL CONSTRUCTION NOTES

- Logs will be delivered and decked via road but then moved by helicopter to placement sites on gravel bars or streambank
- Excavator access route (not shown) is unimproved through side channel and cannot support hauling
- Native gravel excavated from piling and key member trenches shall be temporarily staged in piles outside of wetted channel
- Logs will not be cabled
- Worksite isolation and fish removal will occur, as necessary
- Turbid construction water may be pumped into side channel and is expected to completely filter before reaching river again

General Notes



v. 2.2	
Revision/Issue	Date

Originating Office
 Mid-Columbia River Fishery Resource Office
 US Fish and Wildlife Service
 7501 Icicle Rd.
 Leavenworth, WA 98826
 (509) 548-7573

Project Name and Address
 Dillwater Large Wood Enhancement
 Entiat, WA

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General Notes

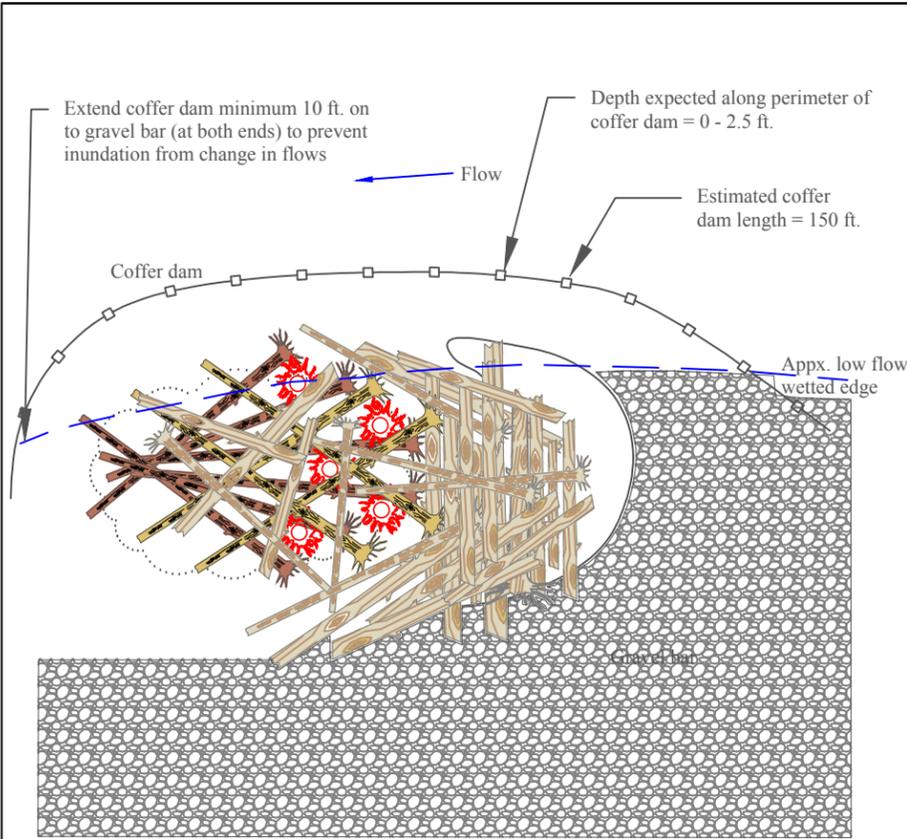


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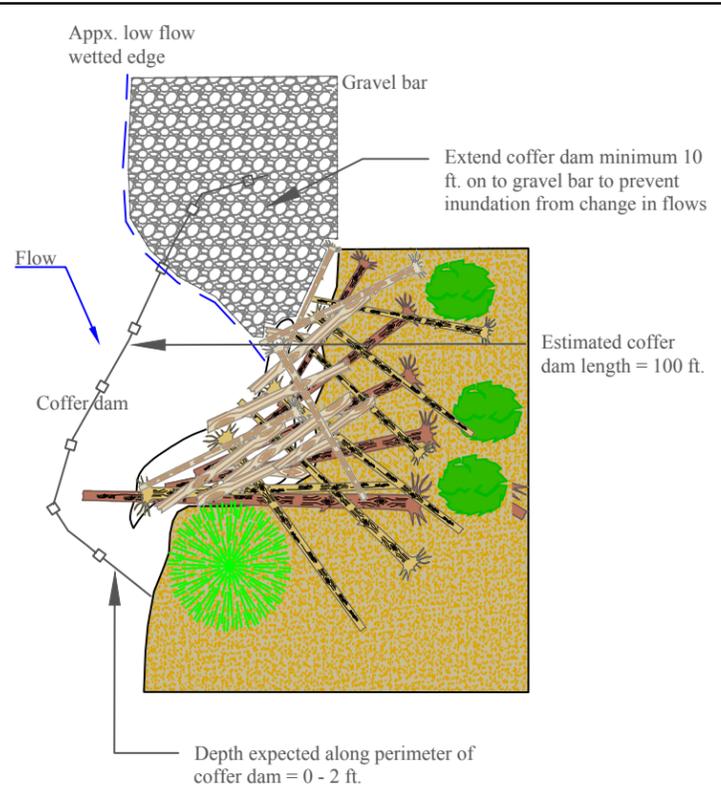
Originating Office
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Project Name and Address
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Created By R. Parrish	Sheet Wetland Delineation
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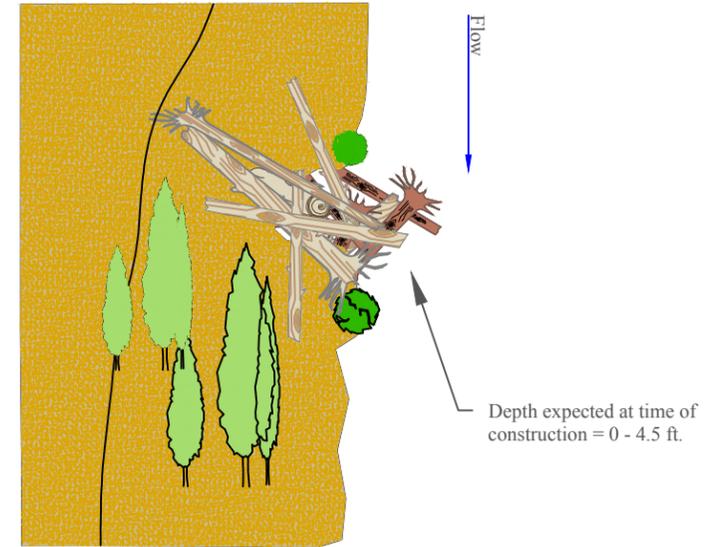
PLAN VIEW OF ELJ 1--COFFER DAM PLACEMENT



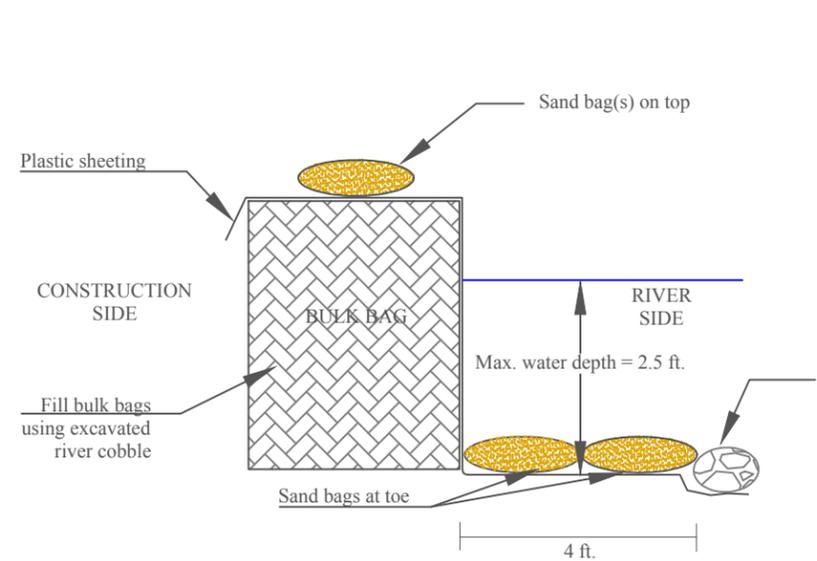
PLAN VIEW OF ELJ 2--COFFER DAM PLACEMENT

ELJ 3 WORKSITE ISOLATION NOTES

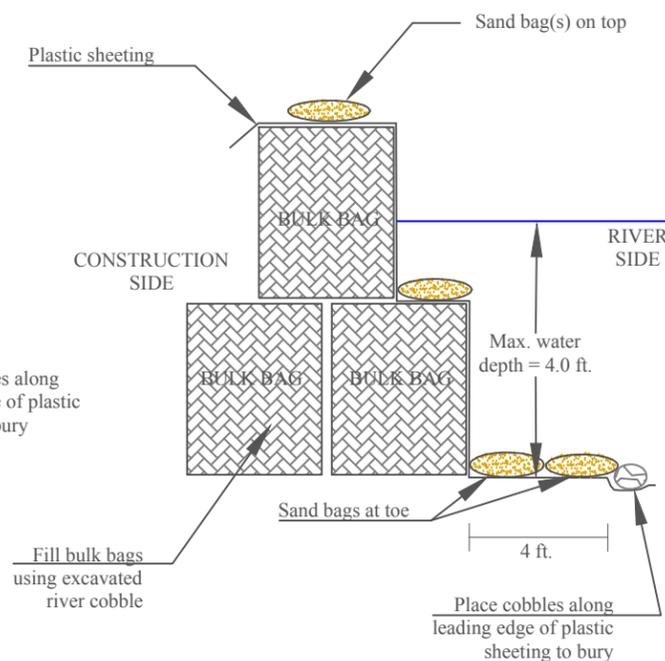
- Work at ELJ 3 may occur in wetted channel, as permits allow
- No coffer dam is required, however, key member trench excavation must occur from land toward water to minimize time working instream
- Backfill must occur immediately after placing key members and will occur from water toward land to minimize turbidity and exposure to flowing water



PLAN VIEW OF ELJ 3



TEMPORARY COFFER DAM DETAIL
(FOR WATER < 2.5 FT DEEP)



TEMPORARY COFFER DAM DETAIL
(FOR WATER 2.5 - 4.0 FT DEEP)

MATERIALS

Bulk bags shall be cube-shaped polypropylene woven fabrics with fully open top, flat bottom, four loops, minimum 2-ton weight capacity, and 5:1 minimum safety factor. Bags shall be filled with existing river cobble.

Plastic sheeting shall be at least 6-mm thickness. Roll length shall cover the entire cofferdam without seams. Minimum 12-ft wide roll shall be used for single layer cofferdam.

PUMPS

Pumping will lower water levels within each confined area to prevent the escape of turbid water under the cofferdam or through voids into the riverbed gravel. The intent of pumping will not necessarily be to remove all the water from the impoundment area, but to create a low-pressure condition so that if there are any leaks, clean water will flow toward the construction area. The Contractor shall be responsible for determining pump capacity requirements to prevent turbid construction water from escaping the impoundment. Pumping shall be in accordance with all applicable permits.

DISCHARGE

Turbid water shall be discharged into the vegetated side channel to allow for infiltration. Cofferdam materials shall be removed after ELJ construction is complete and any construction-related impacts rehabilitated.

General Notes

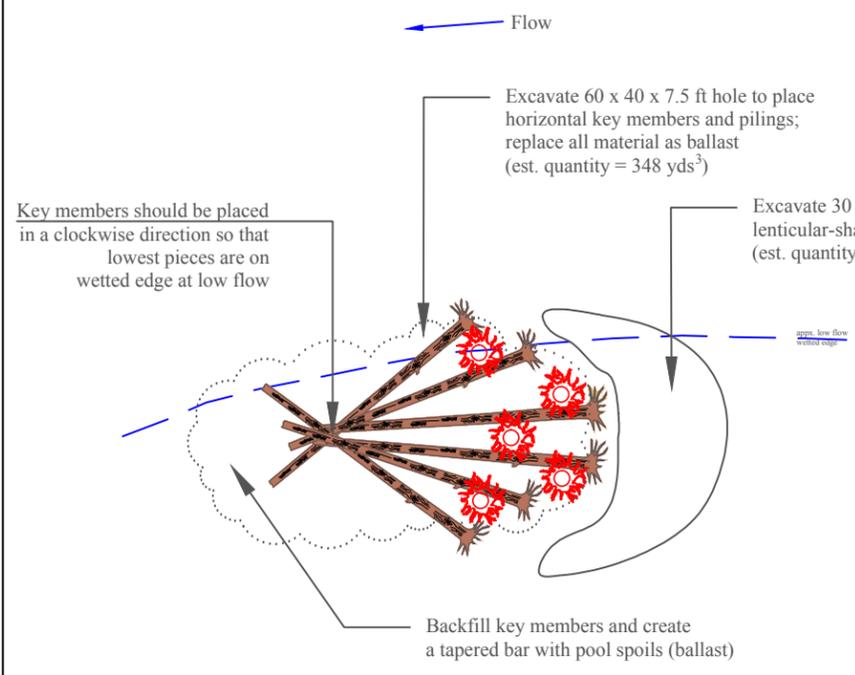
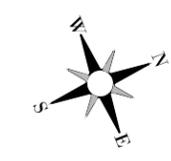


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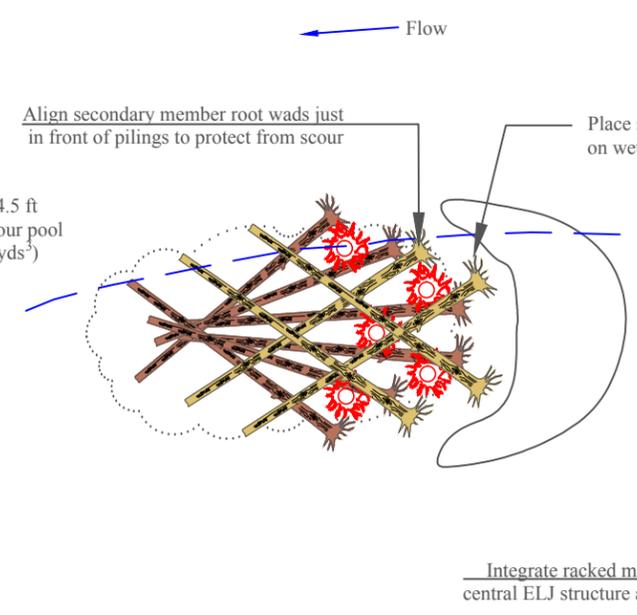
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(509) 548-7573

Project Name and Address
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Entiat, WA

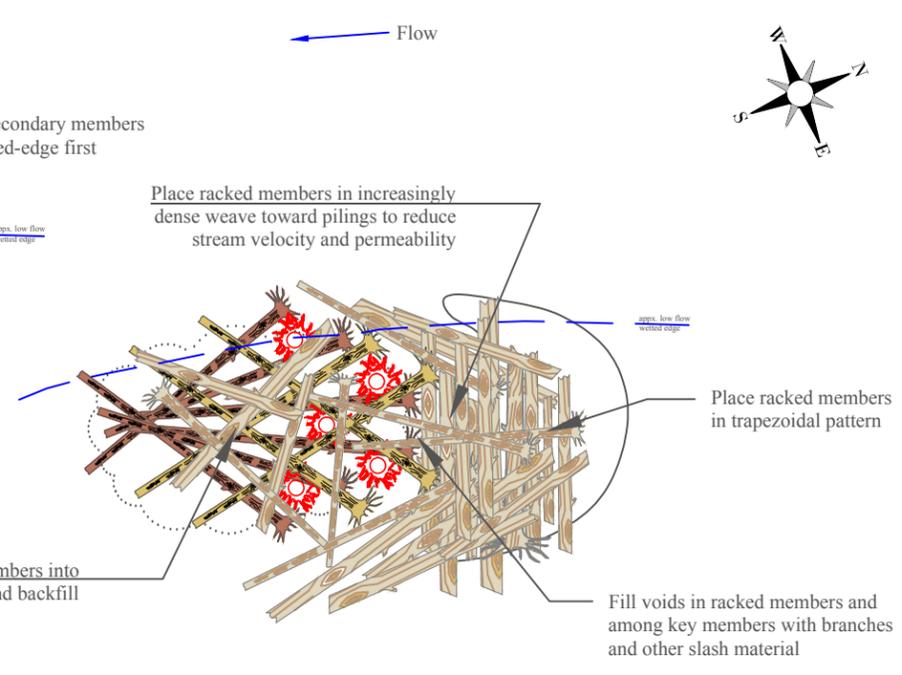
Created By R. Parrish	Sheet Coffer dam detail
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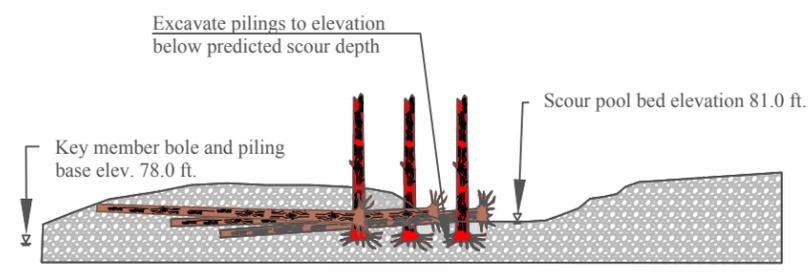
PLAN VIEW OF KEY MEMBERS AND PILINGS
 6pcs. at 40 - 60 ft. x 22" + DBH (horizontal trees)
 5pcs. at 20 ft. x 22" + DBH (pilings)



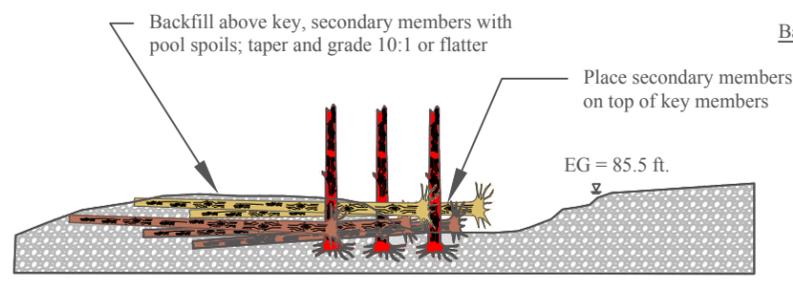
PLAN VIEW OF SECONDARY MEMBERS
 4pcs. at 40 - 60 ft. x 22" + DBH



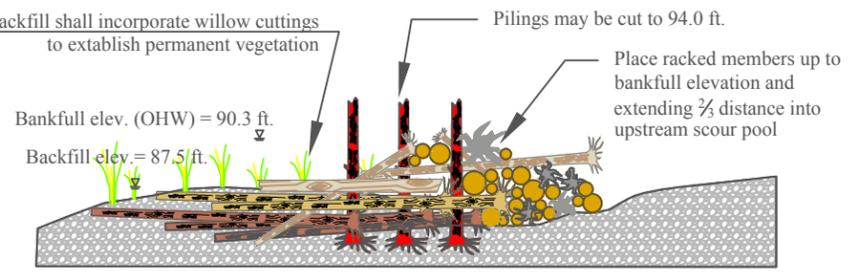
PLAN VIEW OF RACKED MEMBERS
 35+ pcs. at 20 - 40 ft. x 14" - 22" + DBH



LONGITUDINAL PROFILE OF KEY MEMBERS AND PILINGS



LONGITUDINAL PROFILE OF SECONDARY MEMBERS



LONGITUDINAL PROFILE OF RACKED MEMBERS



MID-CHANNEL JAM 1 LOCATION PHOTO

GENERAL STRUCTURE NOTES

- Designed to provide fish habitat at all flows (perennial)
- Located on existing depositional bar and adjacent to side channel where splitting flows may dissipate energy
- ELJ is mid-channel-type based on analogs from White River (WA)
- ELJ will incorporate any existing on-site wood
- Internal structure should be packed with lots of branches, slash to reduce velocities inside structure
- Cut-fill balance must be equal since material cannot be hauled off-site
- Construction of this ELJ should occur after completing #2
- All work shall occur from dry gravel bar after worksite isolation
- Turbid water created may be pumped into adjacent side channel to naturally filter

PROFILE VIEW
 NOT TO SCALE

General Notes

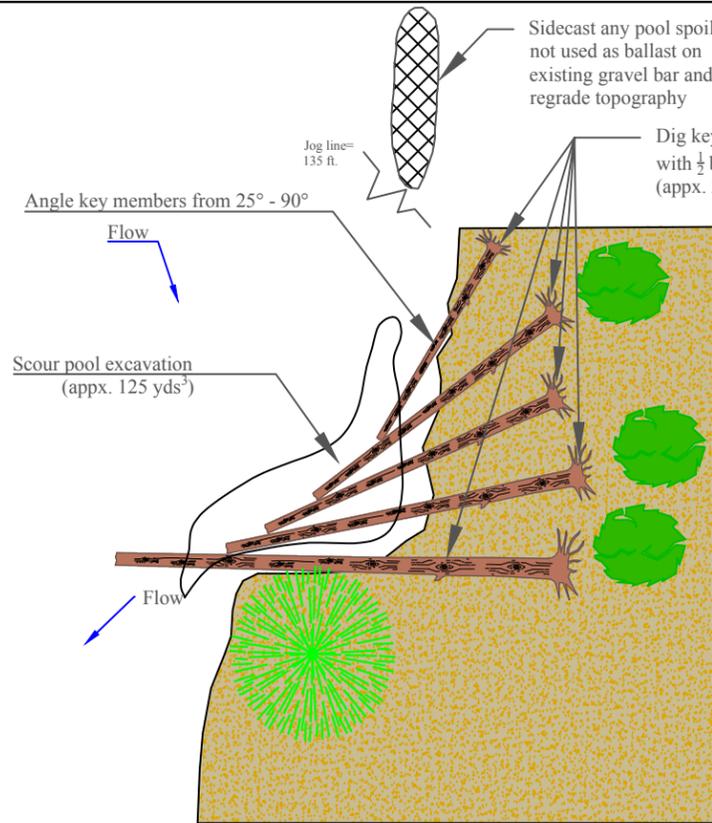


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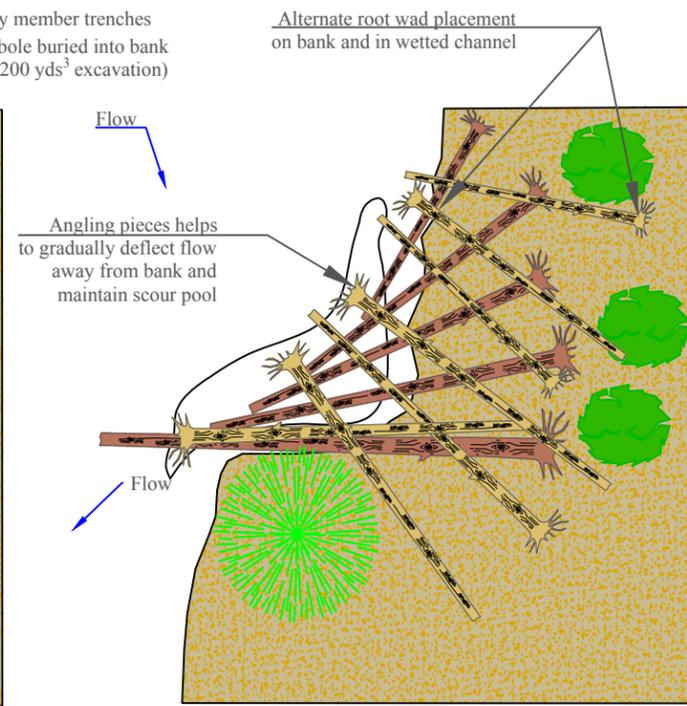
Originating Office
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 US Fish and Wildlife Service
 7501 Icicle Rd.
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 (509) 548-7573

Project Name and Address
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 Entiat, WA

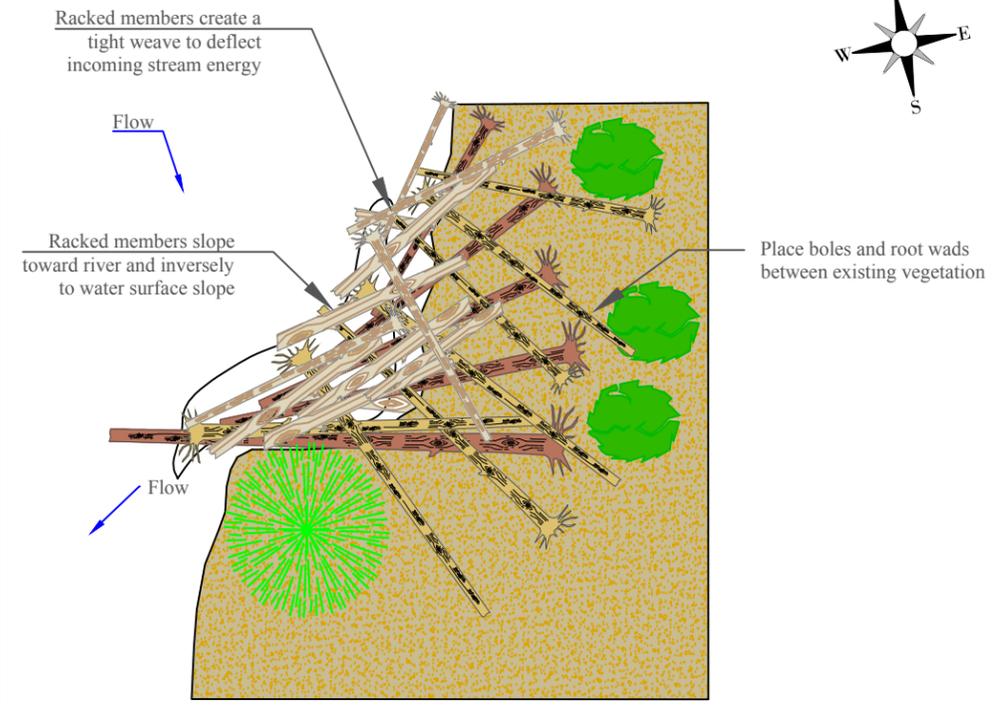
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PLAN VIEW OF KEY MEMBER DETAIL
5pcs. at 40 - 60 ft. x 22" + DBH

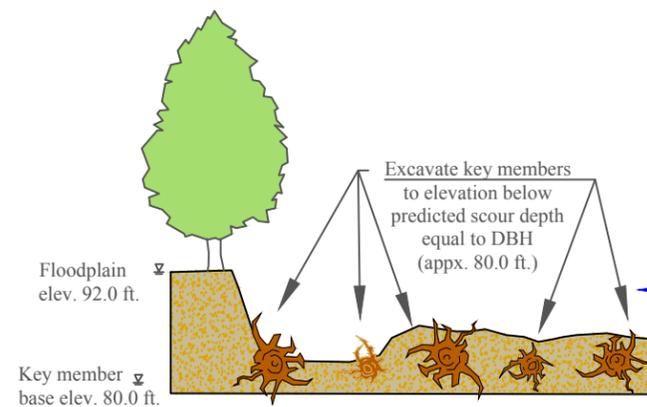


PLAN VIEW OF SECONDARY MEMBER DETAIL
7pcs. at 40 - 60 ft. x 22" + DBH

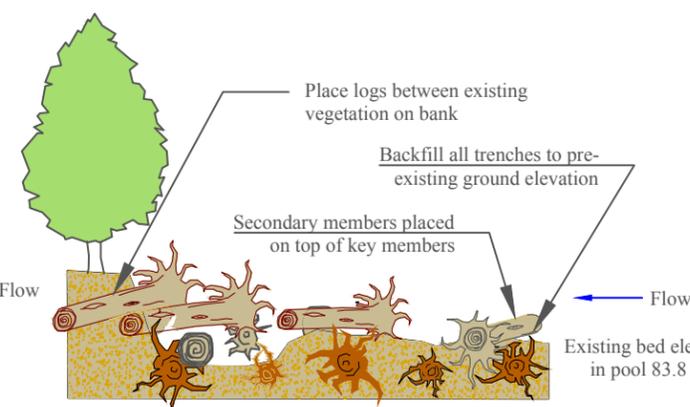


PLAN VIEW OF RACKED MEMBER DETAIL
28+ pcs. at 30 ft. x 14 - 22" + DBH

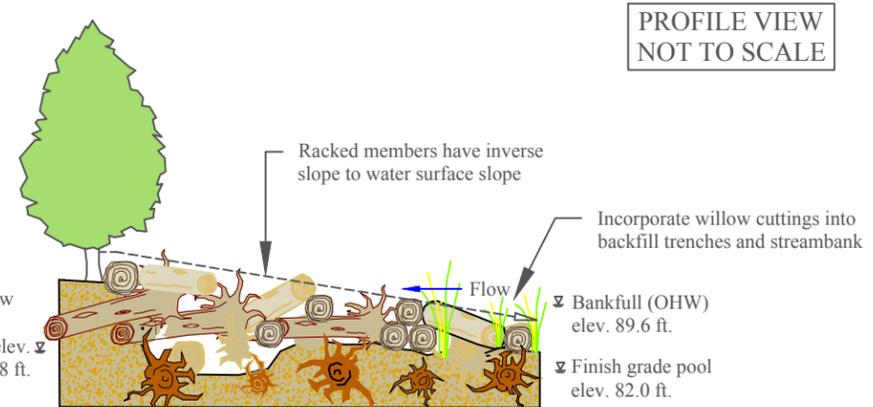
0 ft 10 ft 40 ft



LONGITUDINAL PROFILE OF KEY MEMBERS



LONGITUDINAL PROFILE OF SECONDARY MEMBERS



LONGITUDINAL PROFILE OF RACKED MEMBERS

PROFILE VIEW
NOT TO SCALE

GENERAL STRUCTURE NOTES

- Designed to provide fish habitat at all flows (perennial)
- ELJ will enhance and utilize all existing wood
- ELJ is deflector-type based on analogs from White River (WA)
- Internal structure should be packed with lots of branches, slash to reduce velocities along streambank
- Cut-fill balance must be equal since material cannot be hauled off-site
- Construction of this ELJ should occur after completing #4



DEFLECTOR JAM 2 LOCATION PHOTO



Front view of ELJ showing generalized slope of structure from bank (L) toward river (R) (typical)

General Notes

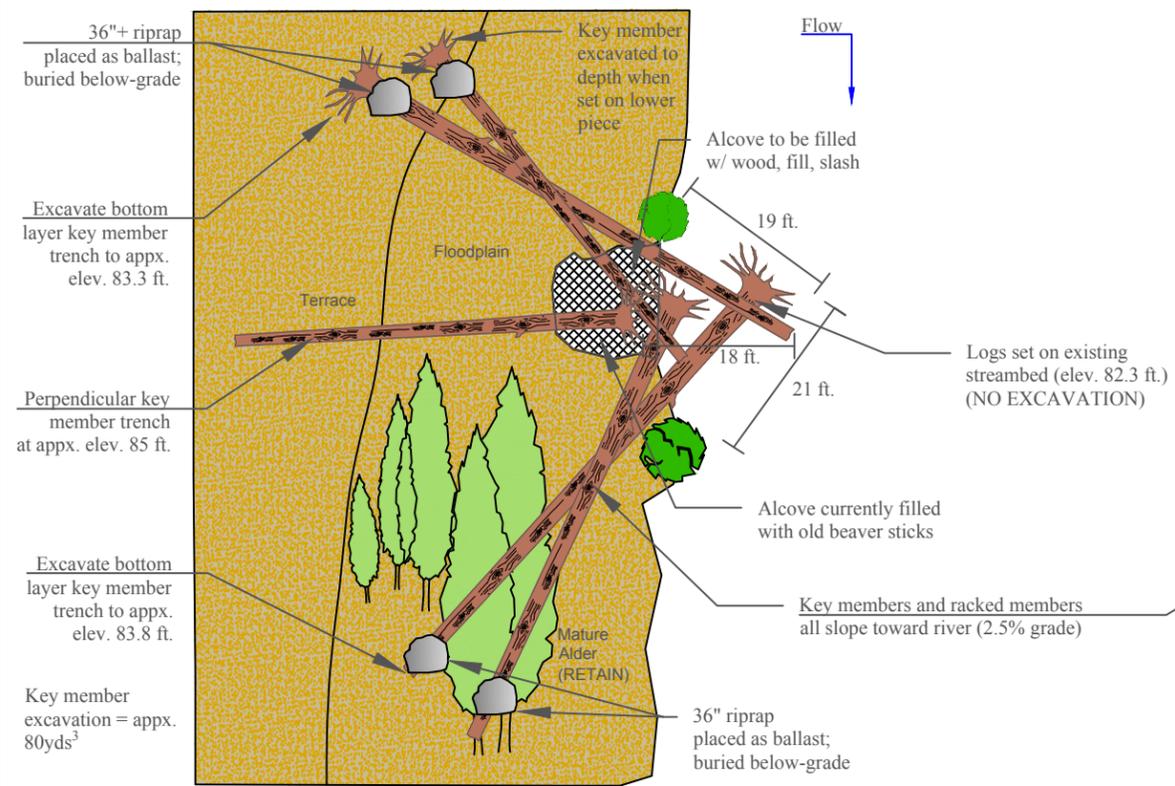


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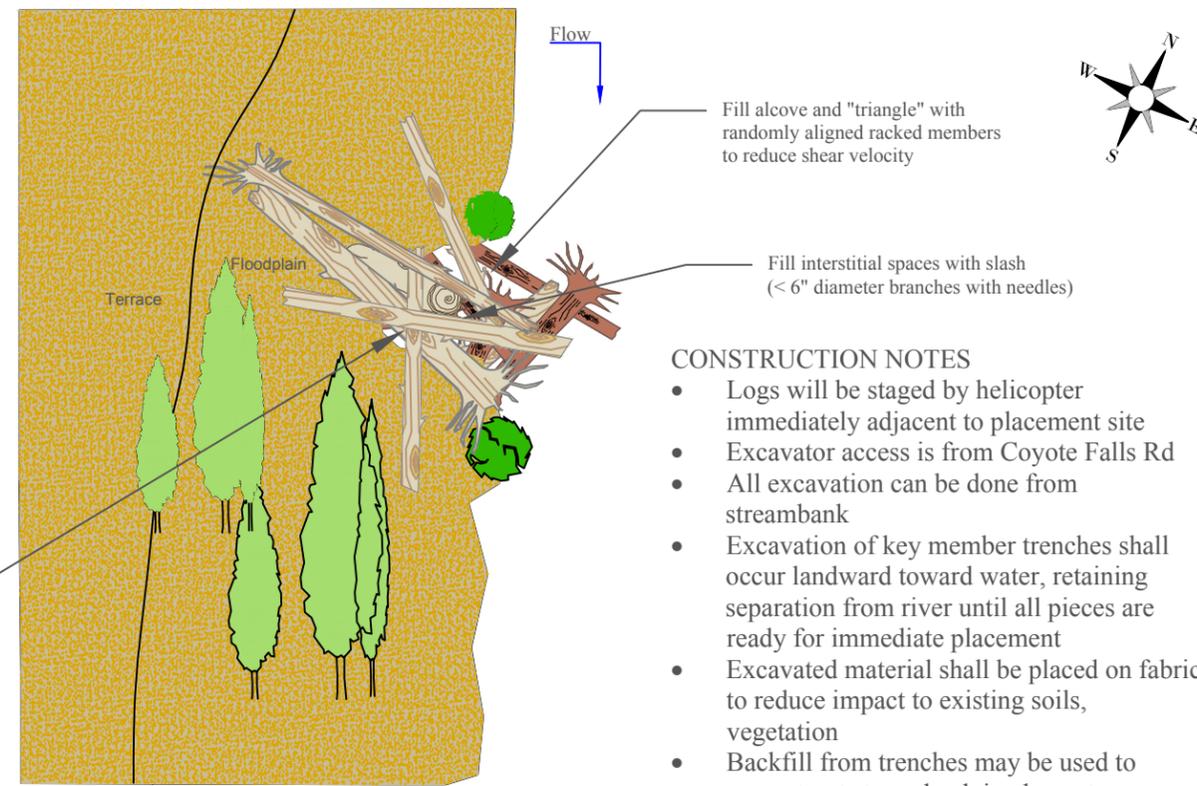
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Dillwater Large Wood Enhancement
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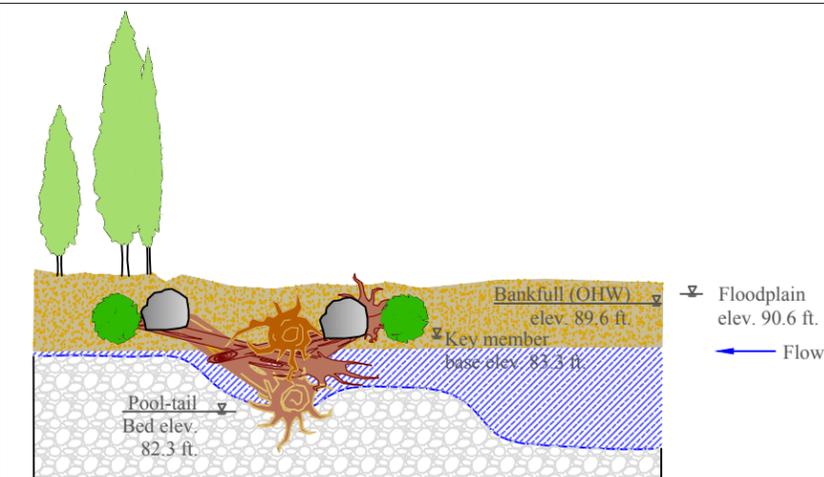
PLAN VIEW OF KEY MEMBER DETAIL
5pcs. at 40 ft. x 22" + DBH



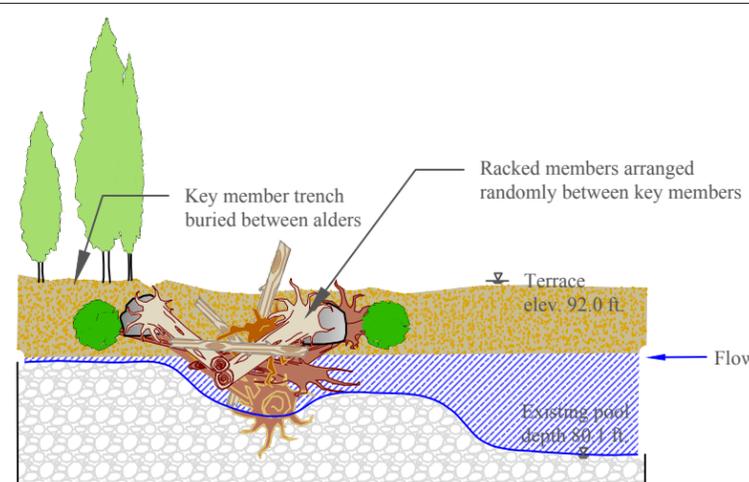
PLAN VIEW OF RACKED MEMBER DETAIL
20pcs at 20 ft. x 14" - 22" DBH

CONSTRUCTION NOTES

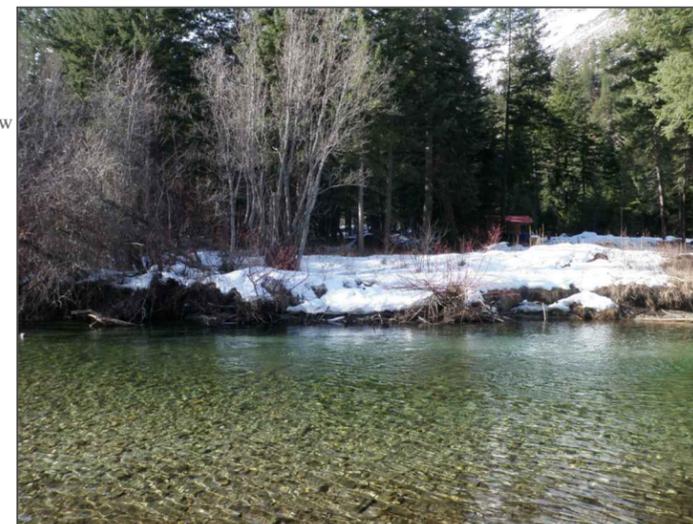
- Logs will be staged by helicopter immediately adjacent to placement site
- Excavator access is from Coyote Falls Rd
- All excavation can be done from streambank
- Excavation of key member trenches shall occur landward toward water, retaining separation from river until all pieces are ready for immediate placement
- Excavated material shall be placed on fabric to reduce impact to existing soils, vegetation
- Backfill from trenches may be used to reconstruct streambank in alcove to adjacent bank elevation (appx. 11 yds³)



LONGITUDINAL PROFILE OF KEY MEMBERS



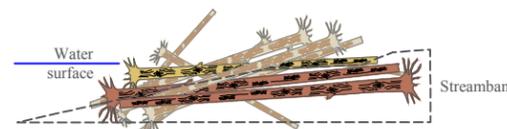
LONGITUDINAL PROFILE OF RACKED MEMBERS



DEFLECTOR JAM 3 LOCATION PHOTO

GENERAL STRUCTURE NOTES

- Designed to provide fish habitat at all flows but will be overtopped at >bankfull flows
- ELJ is porous to allow flow-thru and reduce shear stress and velocity on streambank
- Rocks and key members buried, keyed into floodplain
- Most wood should be within low flow channel; only raked wood visible above water surface
- Cut-fill balance must be equal since material cannot be hauled off-site
- Construction of this ELJ should occur last to enable work during lowest river flows



Front view of ELJ showing generalized slope of structure from bank (R) toward river (L) (typical)

PROFILE VIEW
NOT TO SCALE



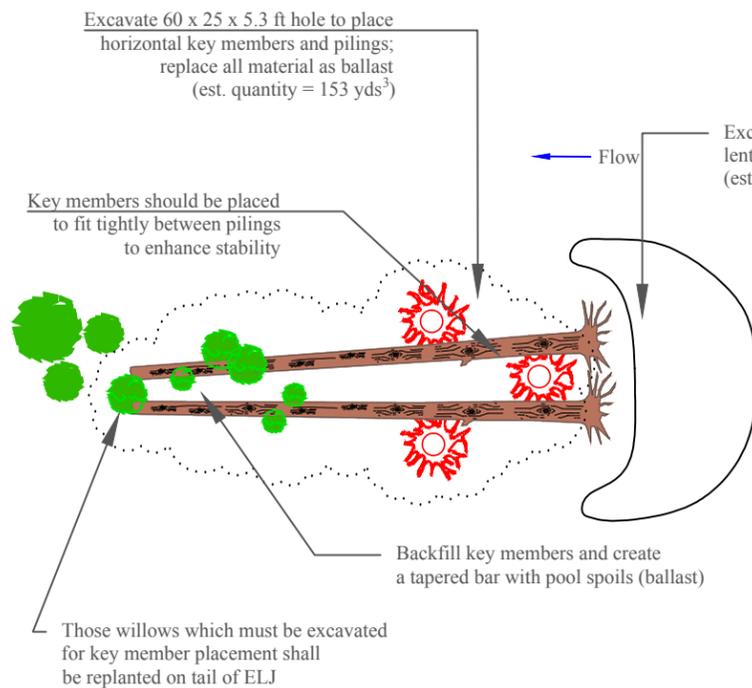
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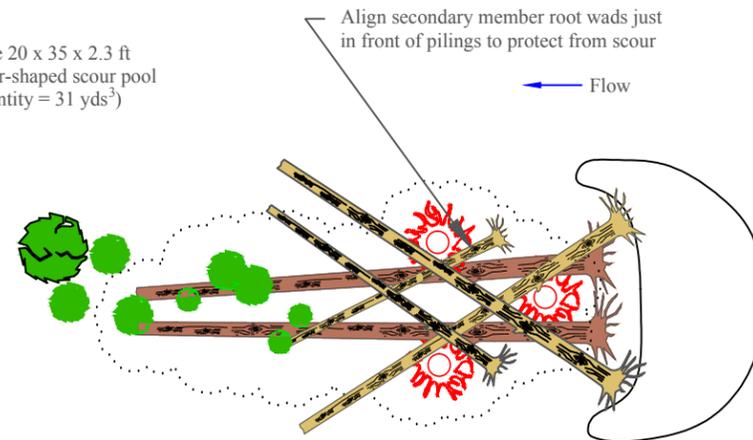
Project Name and Address
Dillwater Large Wood Enhancement
Entiat, WA

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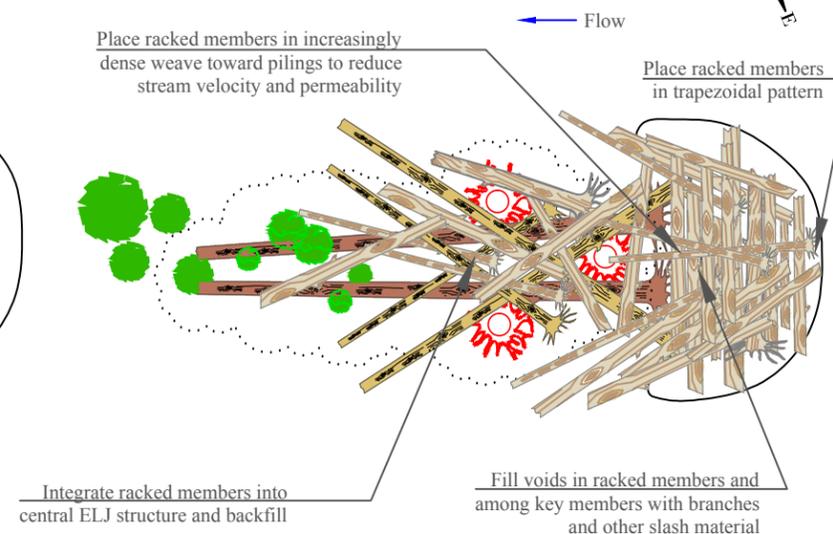
General Notes



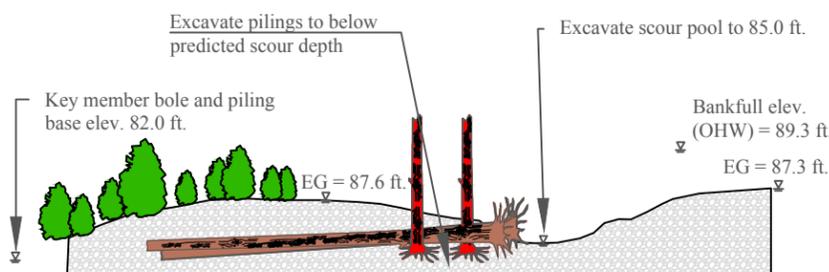
PLAN VIEW OF KEY MEMBERS AND PILINGS
 2pcs. at 40 - 60 ft. x 22" + DBH (horizontal trees)
 3pcs. at 20 ft. x 22" + DBH (pilings)



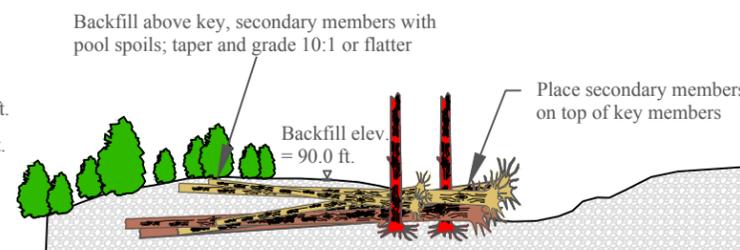
PLAN VIEW OF SECONDARY MEMBERS
 4pcs. at 40 - 60 ft. x 22" + DBH



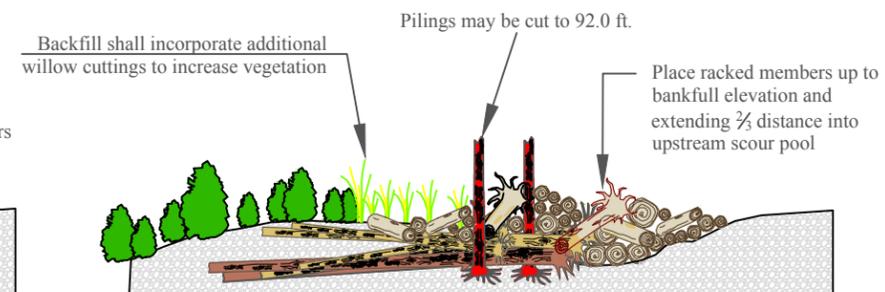
PLAN VIEW OF RACKED MEMBERS
 30+ pcs. at 20 - 40 ft. x 14" - 22" + DBH



LONGITUDINAL PROFILE OF KEY MEMBERS AND PILINGS



LONGITUDINAL PROFILE OF SECONDARY MEMBERS



LONGITUDINAL PROFILE OF RACKED MEMBERS

GENERAL STRUCTURE NOTES

- Designed to provide high flow refugia (> appx. 1400 cfs)
- Located on existing depositional bar/island where wood would naturally accumulate
- ELJ is mid-channel-type based on analogs from White River (WA)
- ELJ will enhance splitting flows around island at high flow
- Internal structure should be packed with lots of branches, slash to reduce velocities inside structure
- Cut-fill balance must be equal since material cannot be hauled off-site
- Construction of this ELJ should occur after completing #5
- All work shall occur on dry gravel bar; no worksite isolation should be necessary
- Any turbid water generated may be pumped into adjacent side channel to naturally filter



MID-CHANNEL JAM 4 LOCATION PHOTO

PROFILE VIEW
 NOT TO SCALE

General Notes

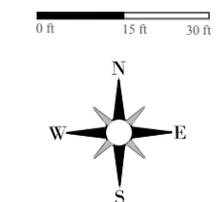
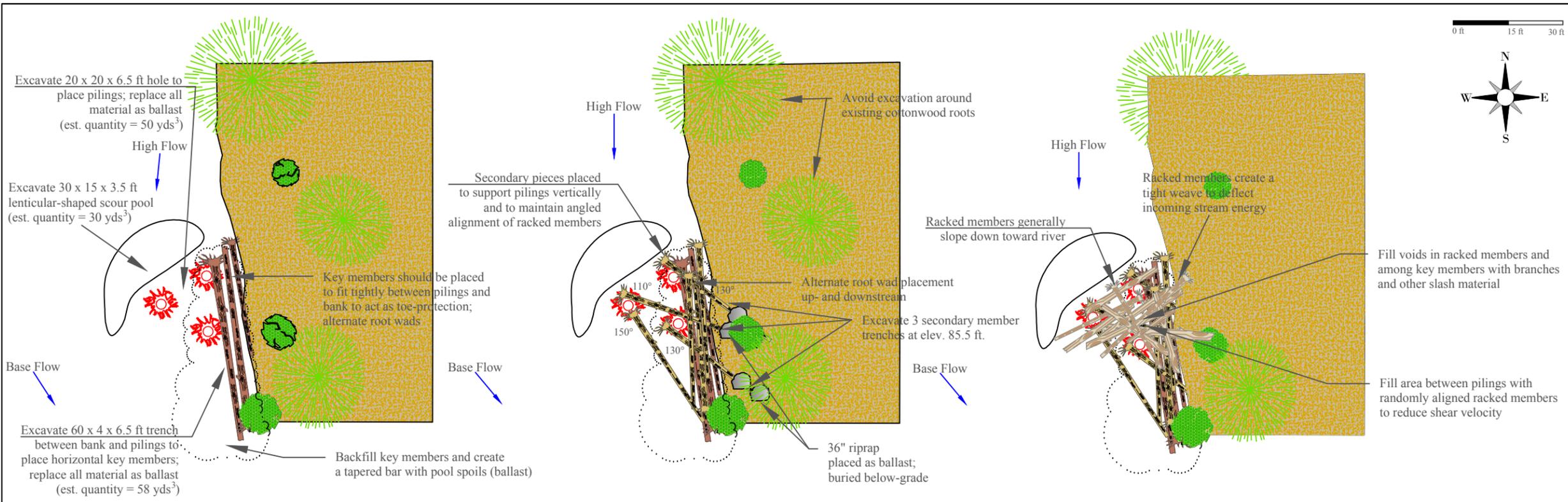


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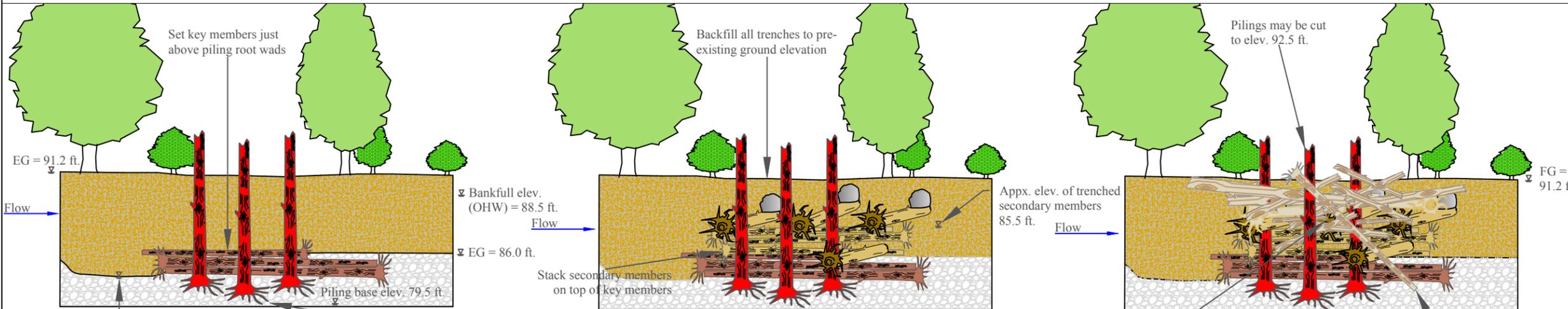
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PLAN VIEW OF KEY MEMBERS AND PILINGS
 3pcs. at 40 - 60 ft. x 22" + DBH (horizontal trees)
 3pcs. at 20 ft. x 22" + DBH (pilings)

PLAN VIEW OF SECONDARY MEMBER DETAIL
 7pcs. at 40 - 60 ft. x 22" + DBH

PLAN VIEW OF RACKED MEMBER DETAIL
 27+ pcs. at 30 ft. x 14 - 22" + DBH



LONGITUDINAL PROFILE OF KEY MEMBERS

LONGITUDINAL PROFILE OF SECONDARY MEMBERS

LONGITUDINAL PROFILE OF RACKED MEMBERS

GENERAL STRUCTURE NOTES

- Designed to provide high flow refugia (> appx. 1000 cfs)
- NOT intended to arrest bank erosion, but will neither accelerate erosion
- ELJ is deflector-type based on analogs from White River (WA)
- Internal structure should be packed with lots of branches, slash to reduce velocities inside structure
- Cut-fill balance must be equal since material cannot be hauled off-site
- Construction of this ELJ should occur first
- All work shall occur on dry gravel bar; no worksite isolation should be necessary
- Any turbid water generated may be pumped upstream into adjacent side channel to naturally filter



DEFLECTOR JAM 5 LOCATION PHOTO

PROFILE VIEW NOT TO SCALE

General Notes

v. 2.2

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