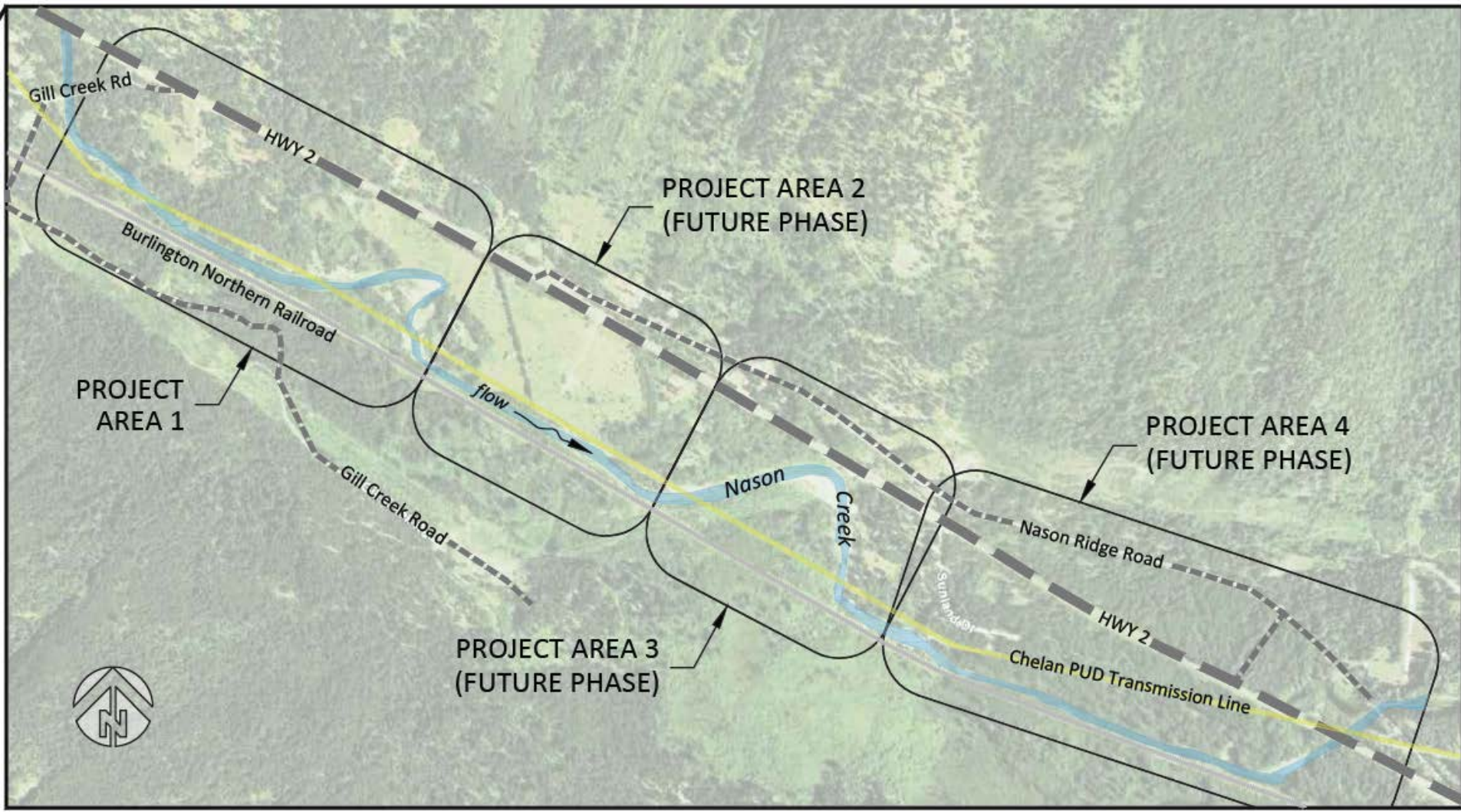


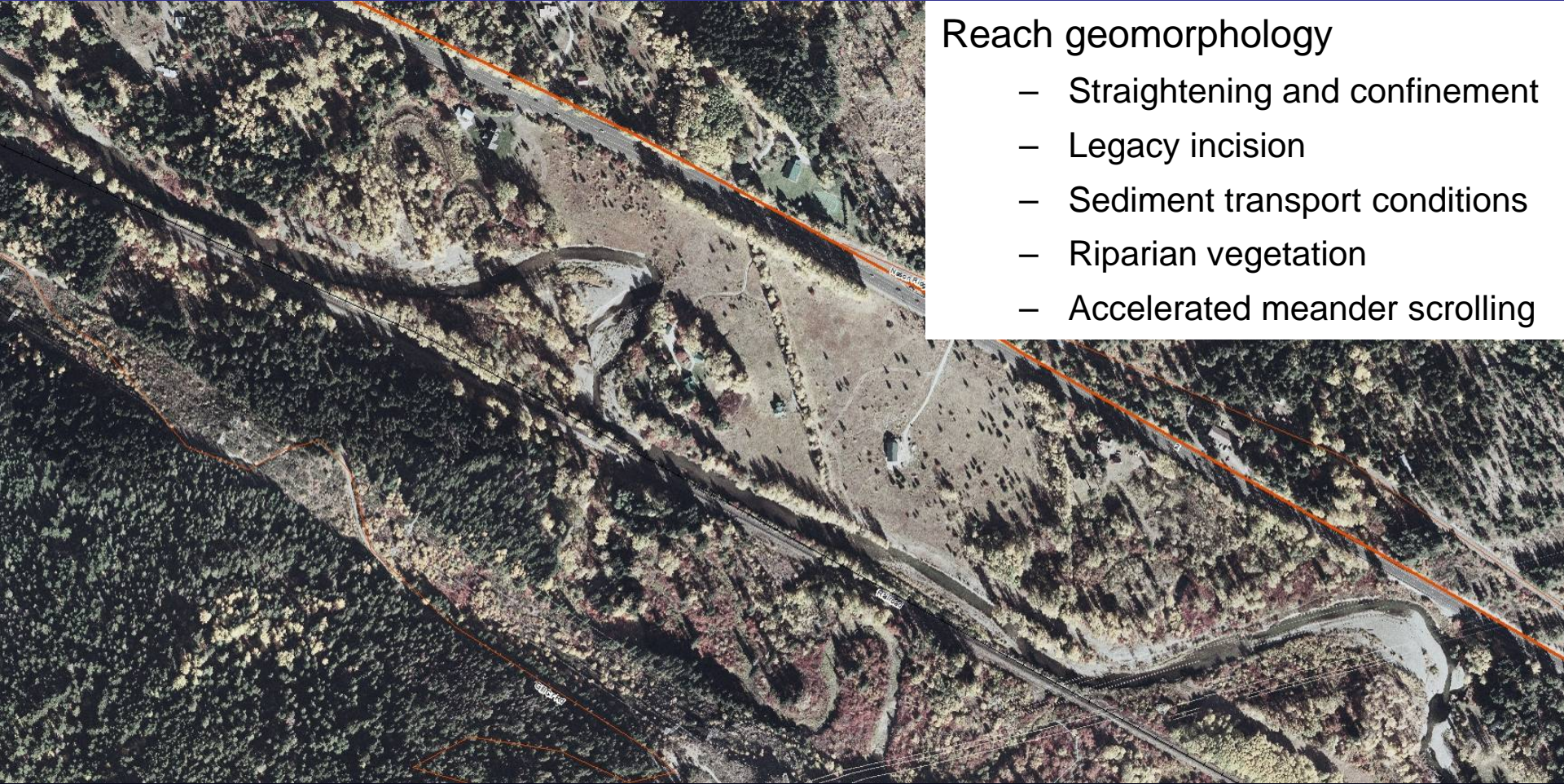
Nason LWP First Bend



Nason LWP First Bend



Nason LWP First Bend



Reach geomorphology

- Straightening and confinement
- Legacy incision
- Sediment transport conditions
- Riparian vegetation
- Accelerated meander scrolling

Nason LWP First Bend

Site conditions

- Accelerated bank erosion
- No woody streambank or riparian vegetation
- Low floodplain roughness (in oxbow and on field)
- Log jam at downstream end of bend
- Poor margin habitat along bank



Nason LWP First Bend

Site conditions



Nason LWP First Bend

Planform geometry analysis



Nason LWP First Bend

Other indicators of imminent avulsion

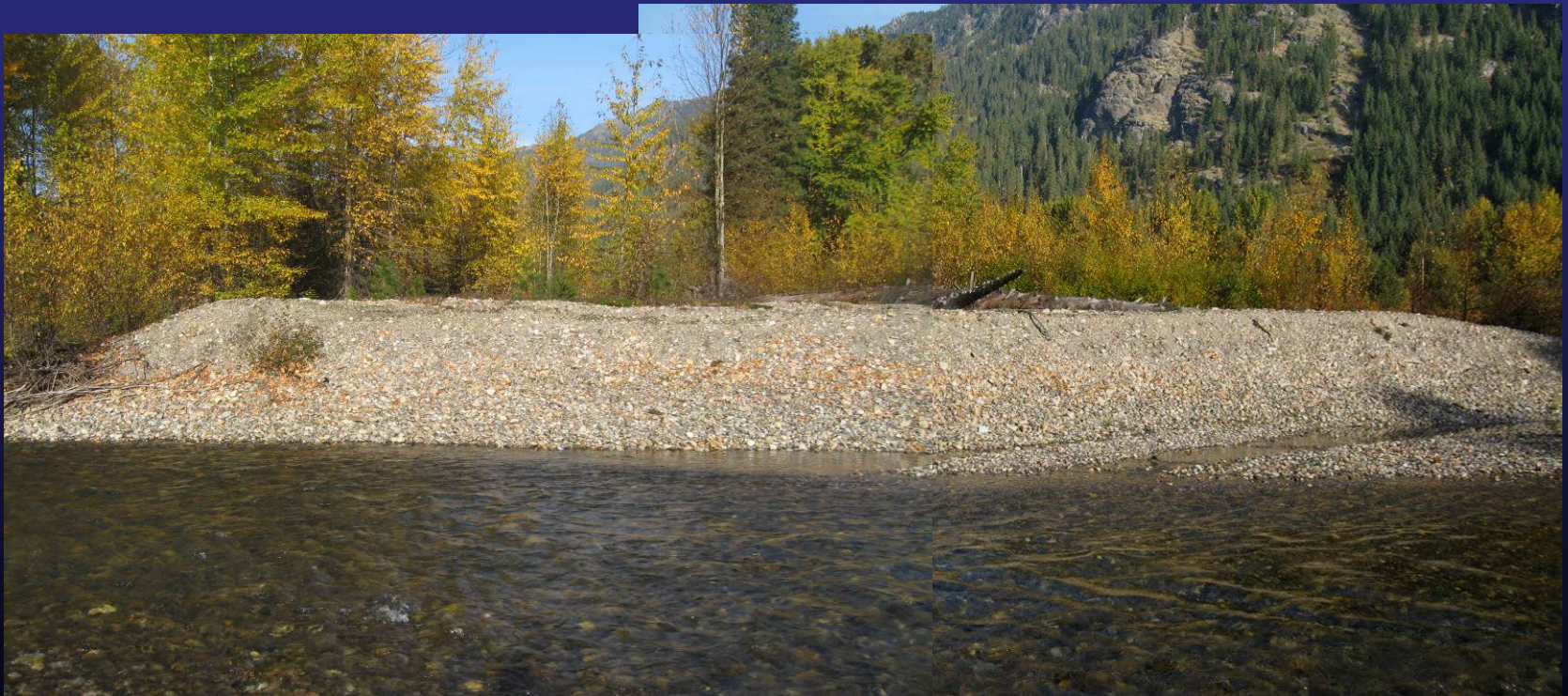
- Headcut along railway embankment



Nason LWP First Bend

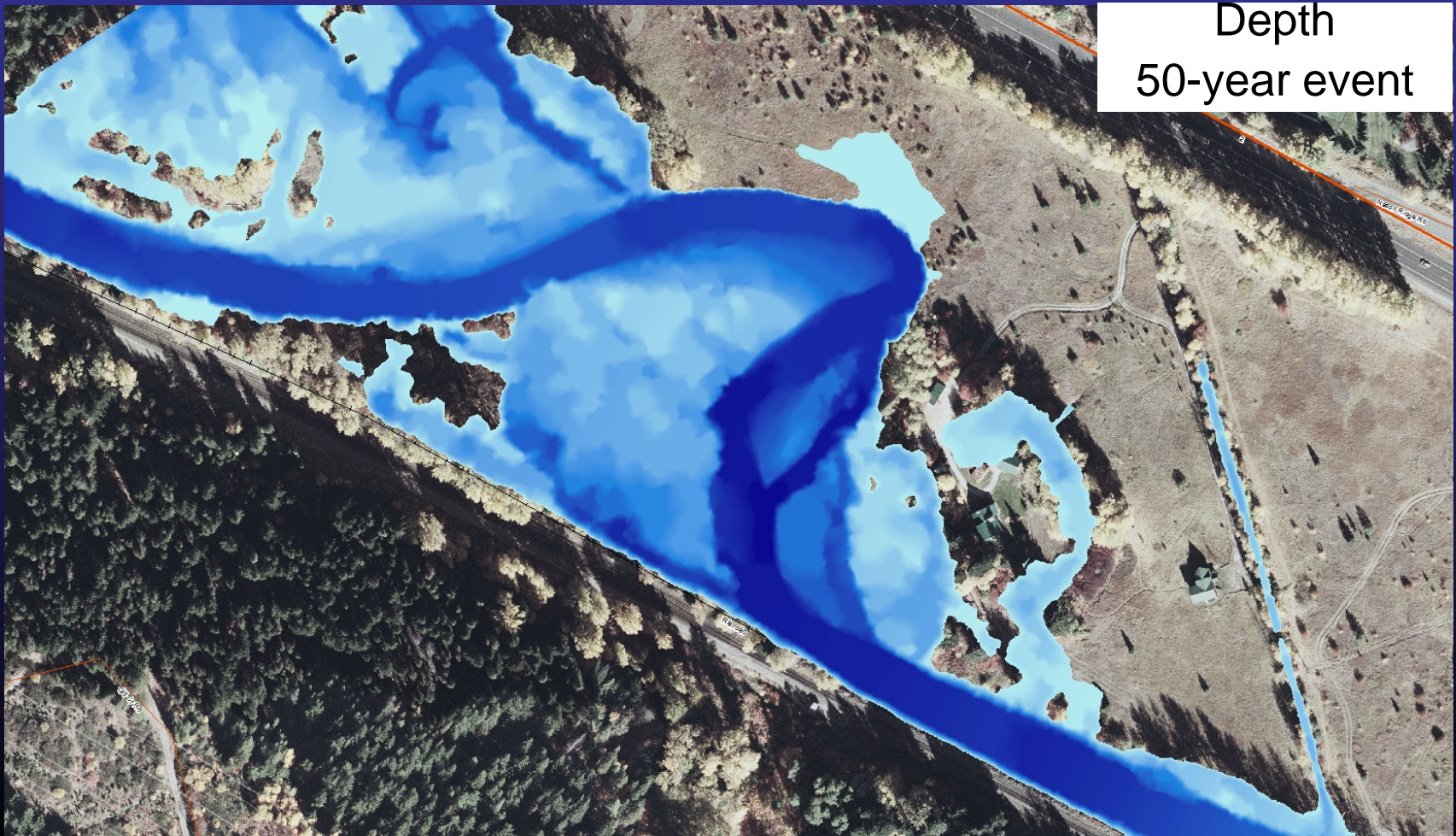
Other indicators of imminent avulsion

- Large bar deposits



Nason LWP First Bend

Hydraulic modeling



Nason LWP First Bend

Existing avulsion risk

- Created by human disturbance
 - Denuded streambank vegetation (root strength)
 - Denuded floodplain roughness (across oxbow)
 - Legacy incision
 - Sediment imbalance
- Consequences of avulsion
 - Additional straightening of reach
 - Loss of pool-riffle habitat
 - Probable stranding of existing log jam

No Action Alternative



No Action Alternative



Benefits

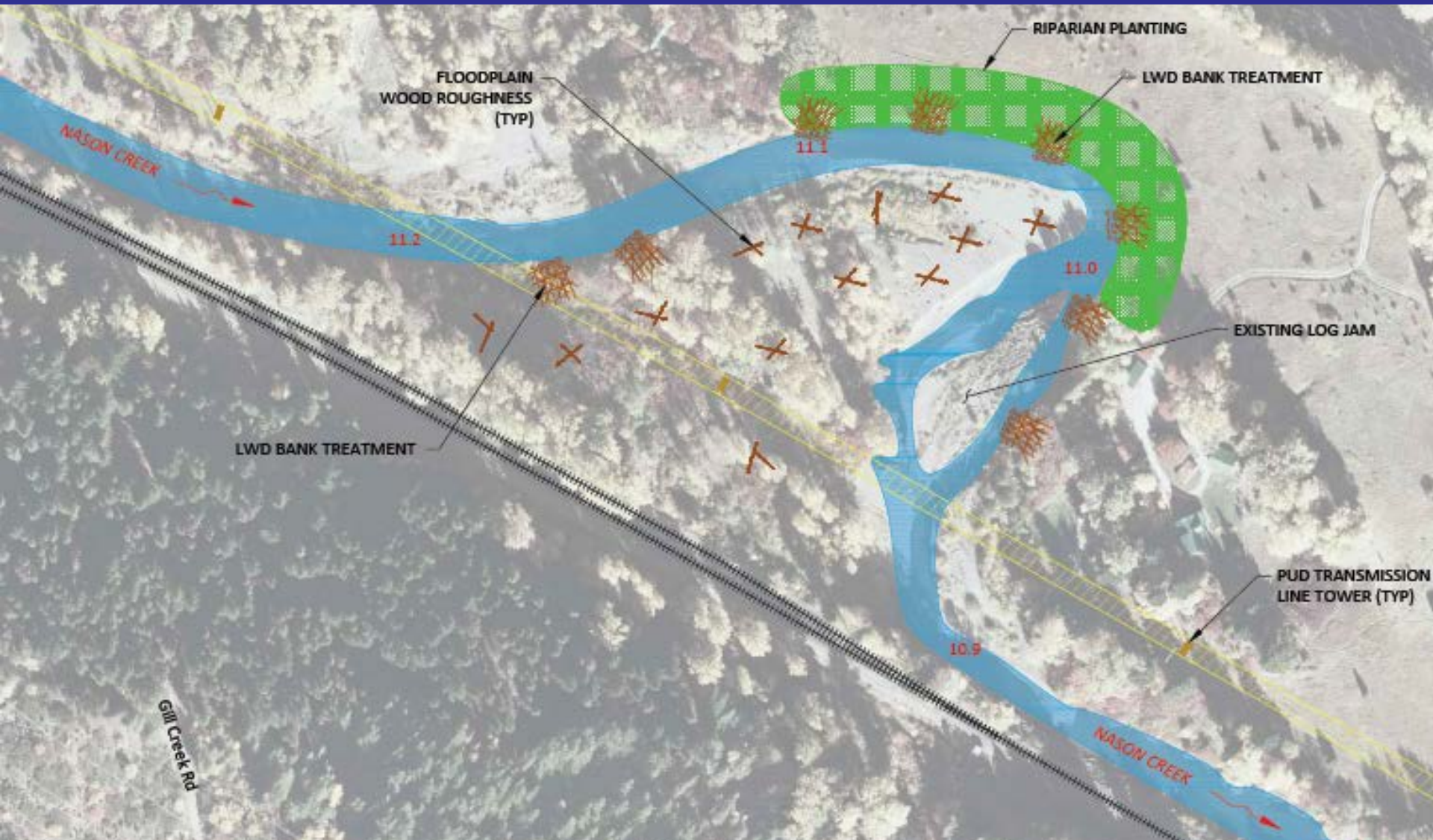
- Low cost and effort
- Wait and see approach

Risks/Constraints

- Does not decrease avulsion risk
- Avulsion likely to decrease habitat quantity and quality
- Potential abandonment of pool-riffle habitat, and existing log jam, due to avulsion
- Uncertain human actions may result from flood damage

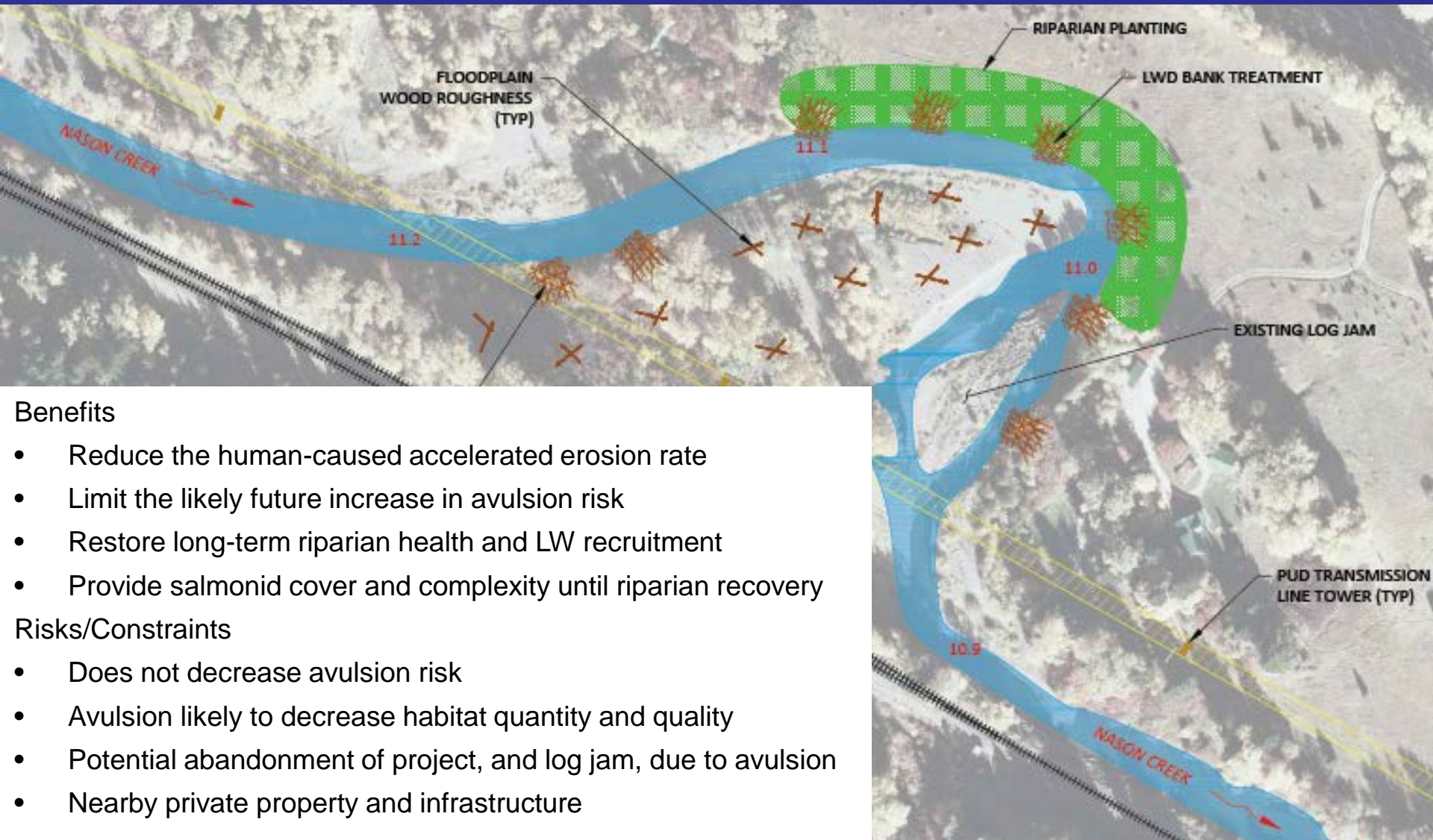
Alternative 1

LW and riparian enhancement of existing alignment



Alternative 1

LW and riparian enhancement of existing alignment



Benefits

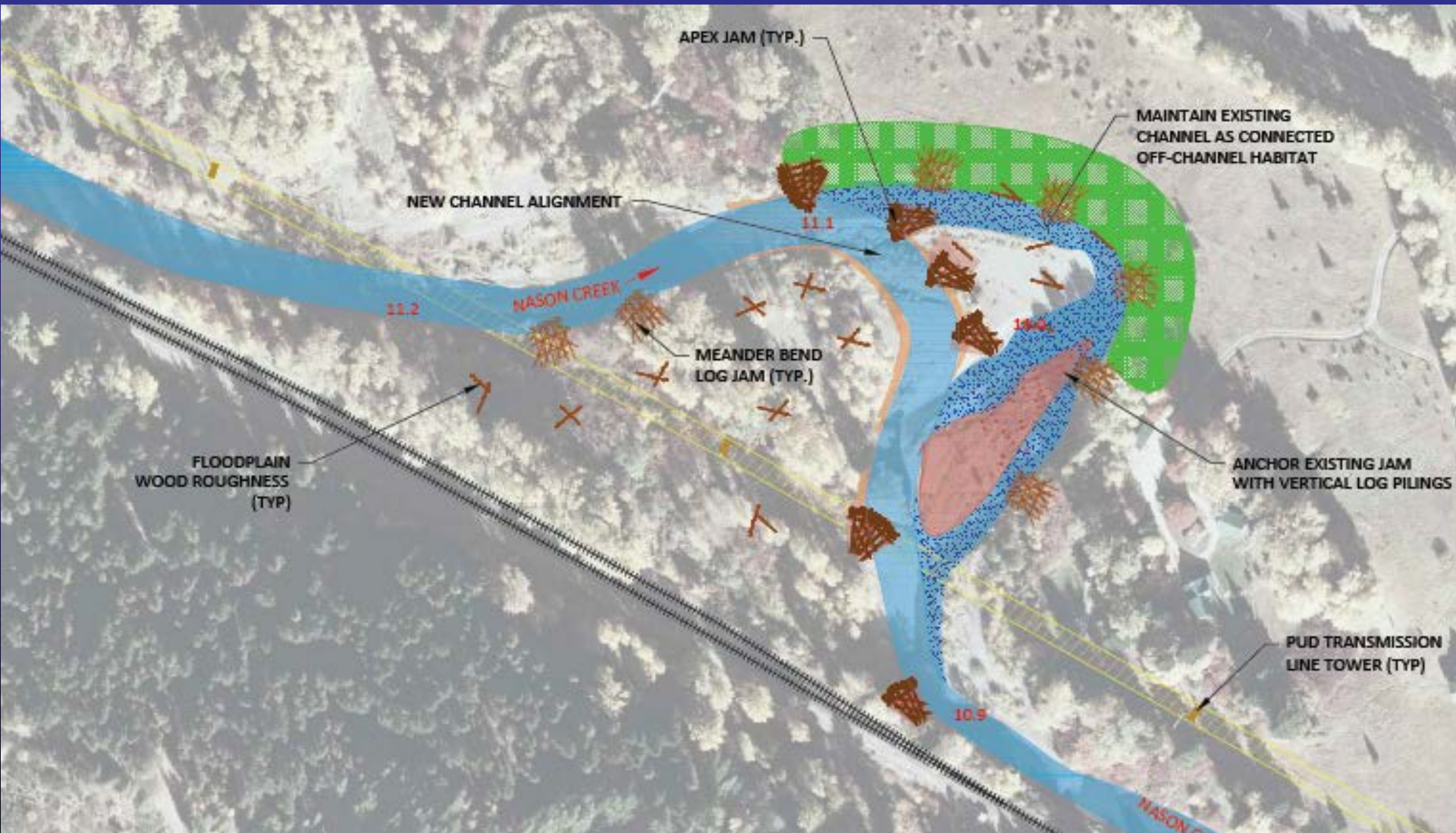
- Reduce the human-caused accelerated erosion rate
- Limit the likely future increase in avulsion risk
- Restore long-term riparian health and LW recruitment
- Provide salmonid cover and complexity until riparian recovery

Risks/Constraints

- Does not decrease avulsion risk
- Avulsion likely to decrease habitat quantity and quality
- Potential abandonment of project, and log jam, due to avulsion
- Nearby private property and infrastructure

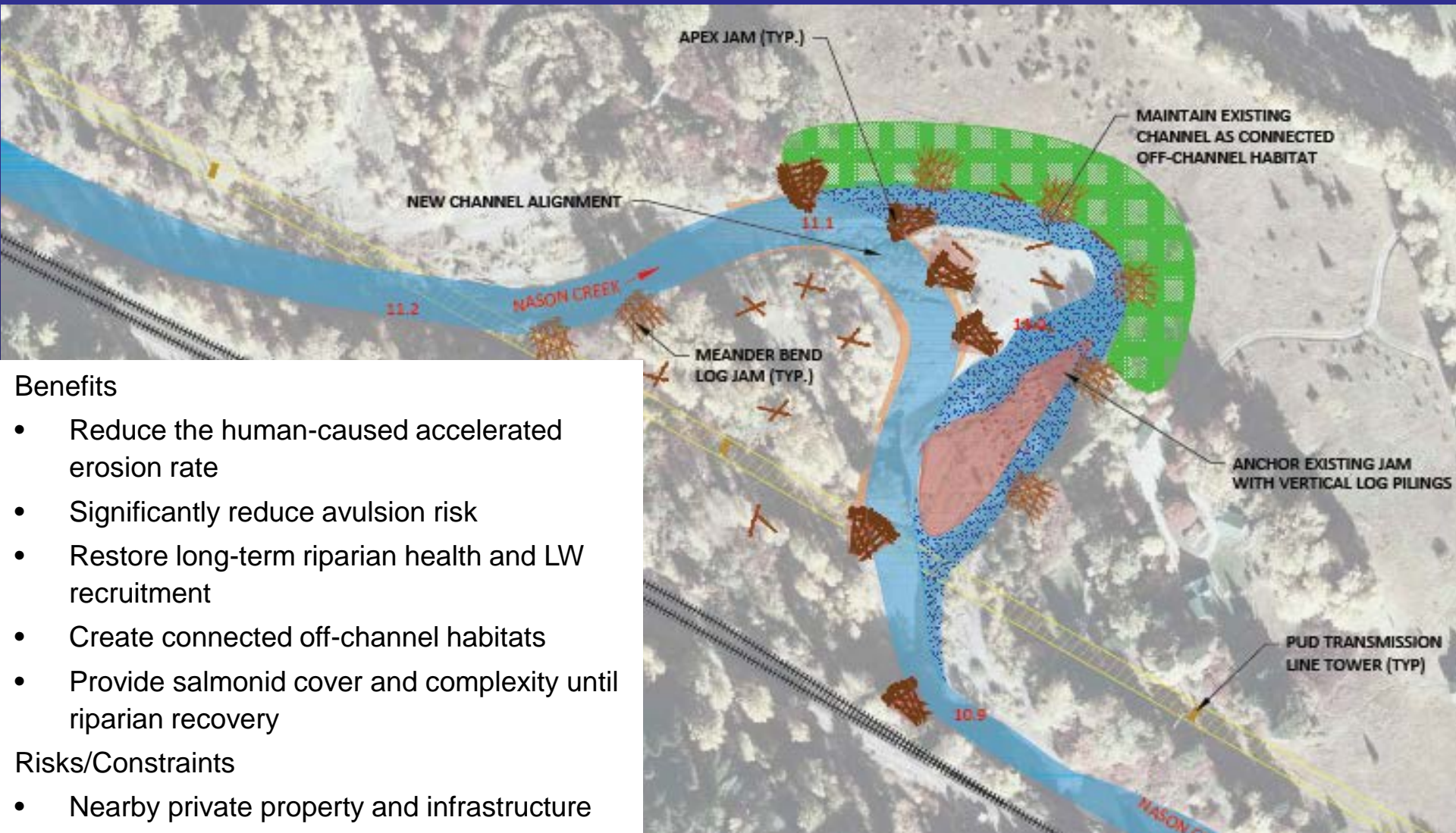
Alternative 2

Re-alignment and creation of off-channel habitat



Alternative 2

Re-alignment and creation of off-channel habitat



Benefits

- Reduce the human-caused accelerated erosion rate
- Significantly reduce avulsion risk
- Restore long-term riparian health and LW recruitment
- Create connected off-channel habitats
- Provide salmonid cover and complexity until riparian recovery

Risks/Constraints

- Nearby private property and infrastructure

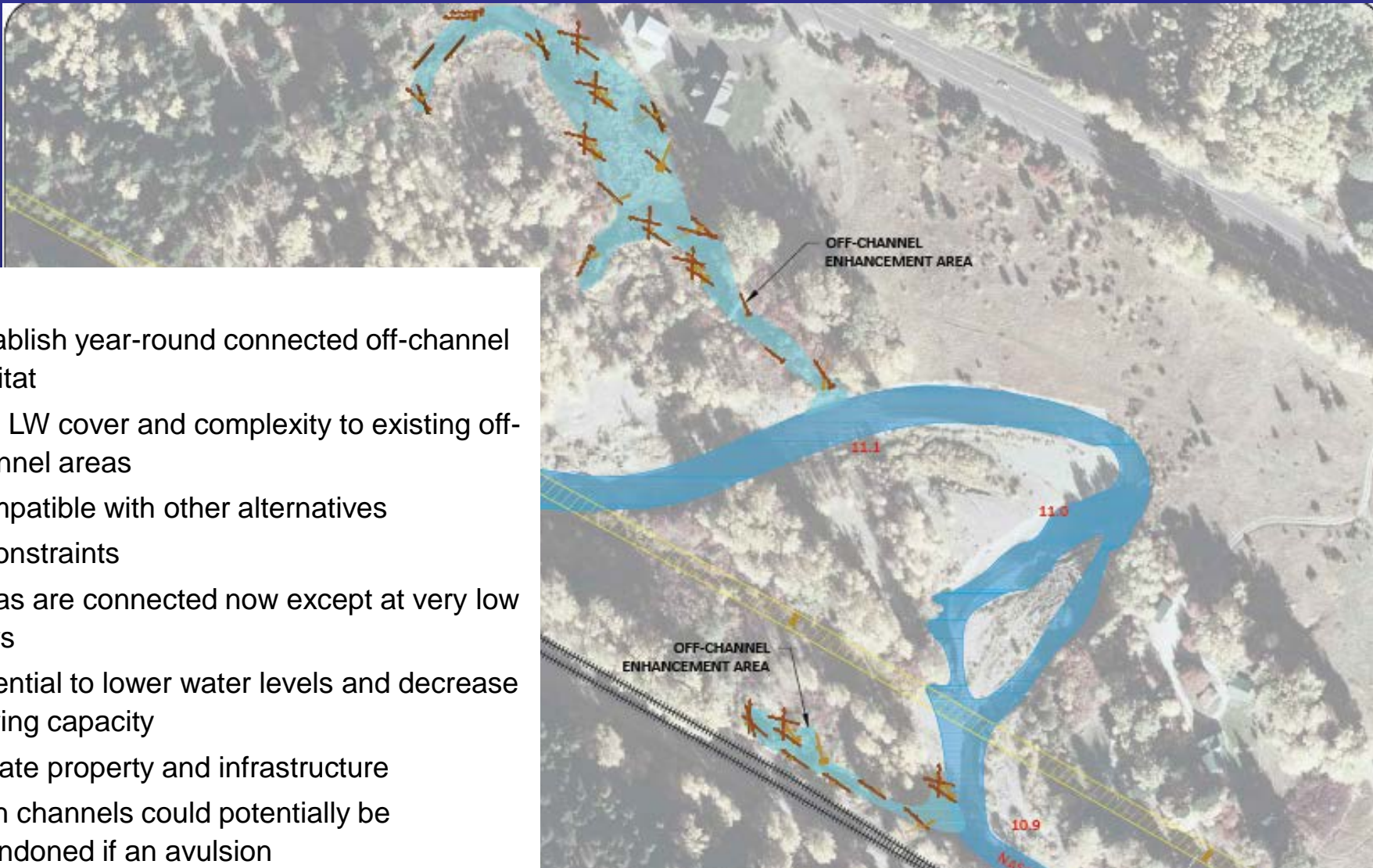
Alternative 3

Enhance existing off-channel habitat



Alternative 3

Enhance existing off-channel habitat



Benefits

- Establish year-round connected off-channel habitat
- Add LW cover and complexity to existing off-channel areas
- Compatible with other alternatives

Risks/Constraints

- Areas are connected now except at very low flows
- Potential to lower water levels and decrease rearing capacity
- Private property and infrastructure
- Both channels could potentially be abandoned if an avulsion