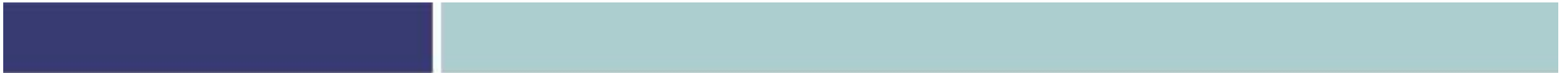




Kersh-Wishkah Flood Reduction

Draft Alternatives

May 15, 2013 – WDFW, Montesano, WA



Presentation Outline



- Background
- Flood History
- Geotechnical Investigation
- Tide and Flood Modeling
- Describe Options
- Review Recommended Alternative
- Discussion
- Contact Information

Background - Location Map

Interactive Projects Map

Legend

Map

Local projects Proposed for Funding (2013):



Local projects Funded (2012):



Critter Pads Funded (2012):



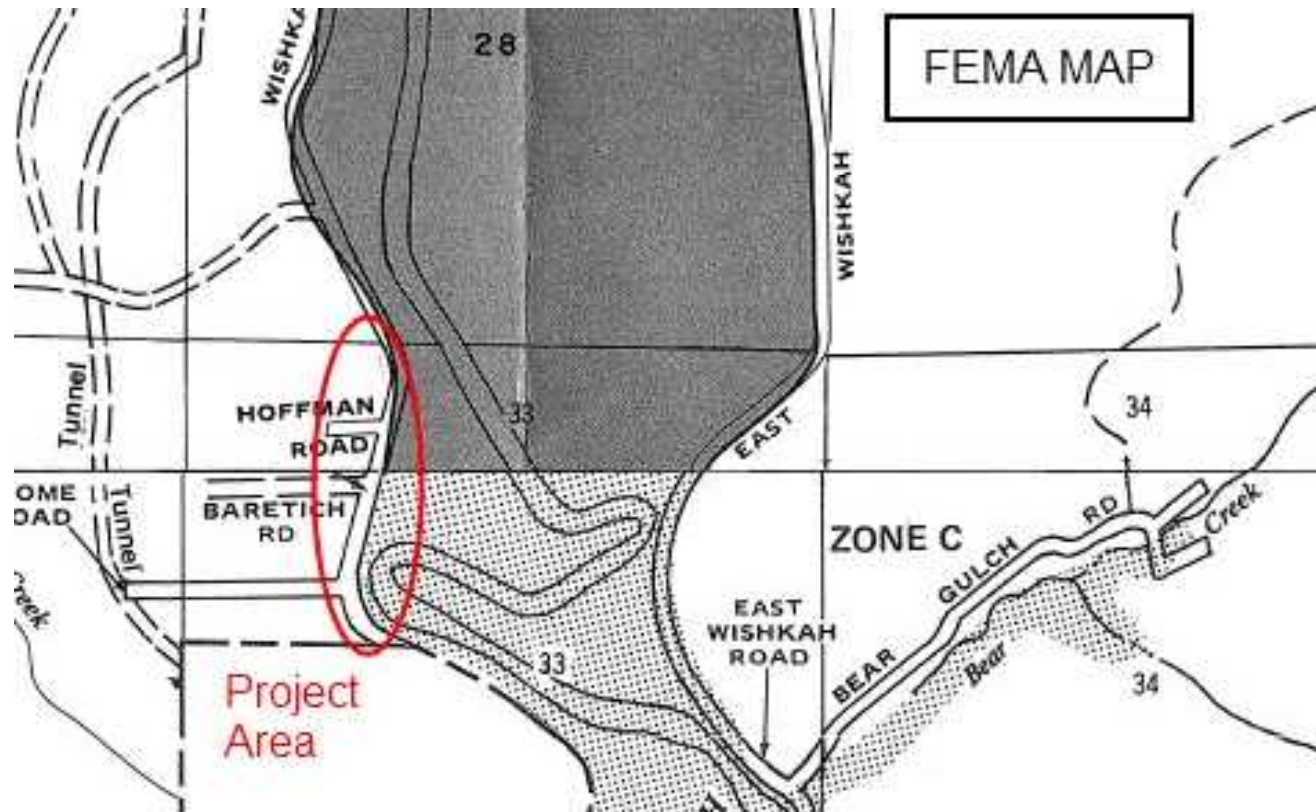
Gages Funded (2011):



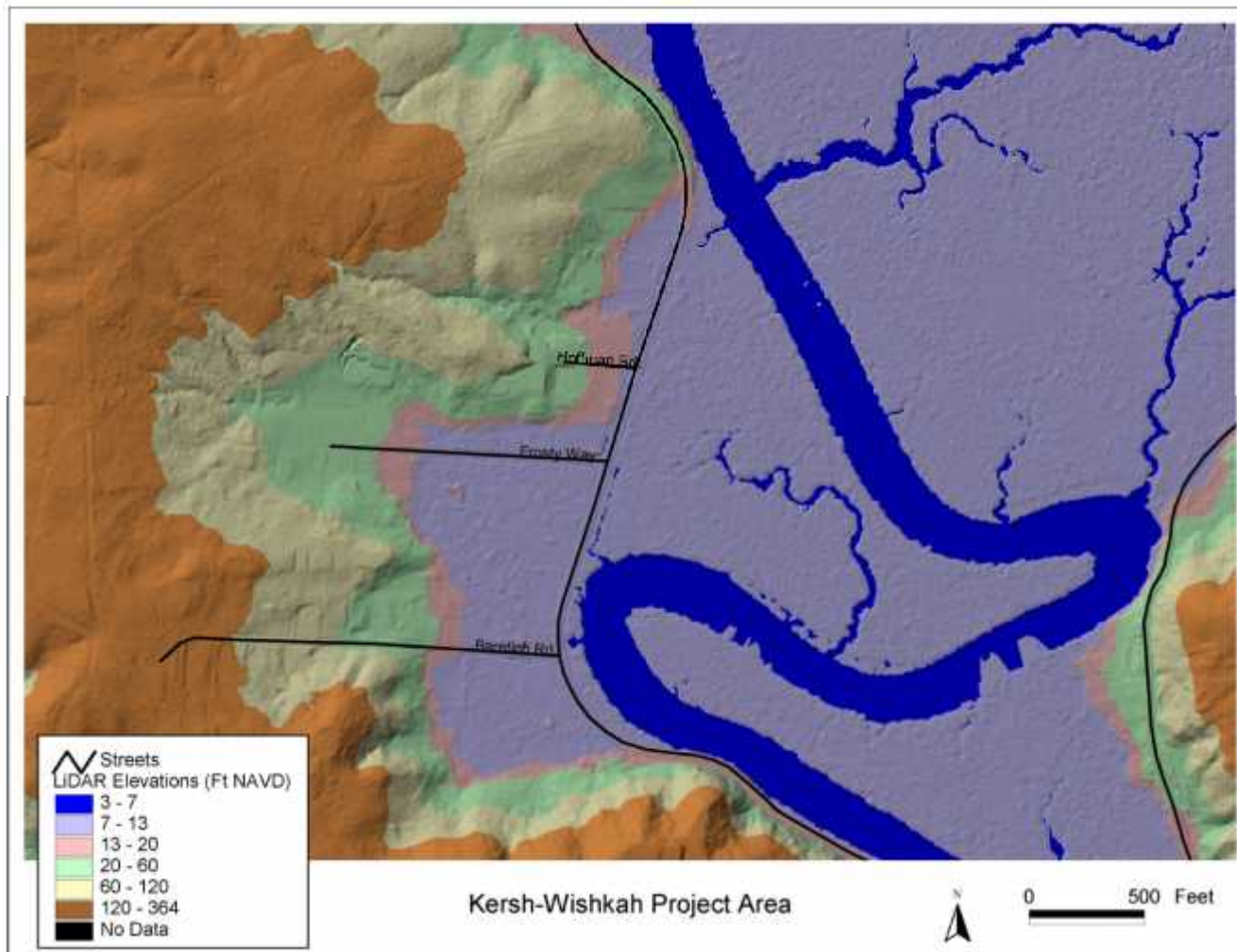
View [CHBA: Projects Funded and Proposed for Funding](#) in a larger map

Background – FEMA data

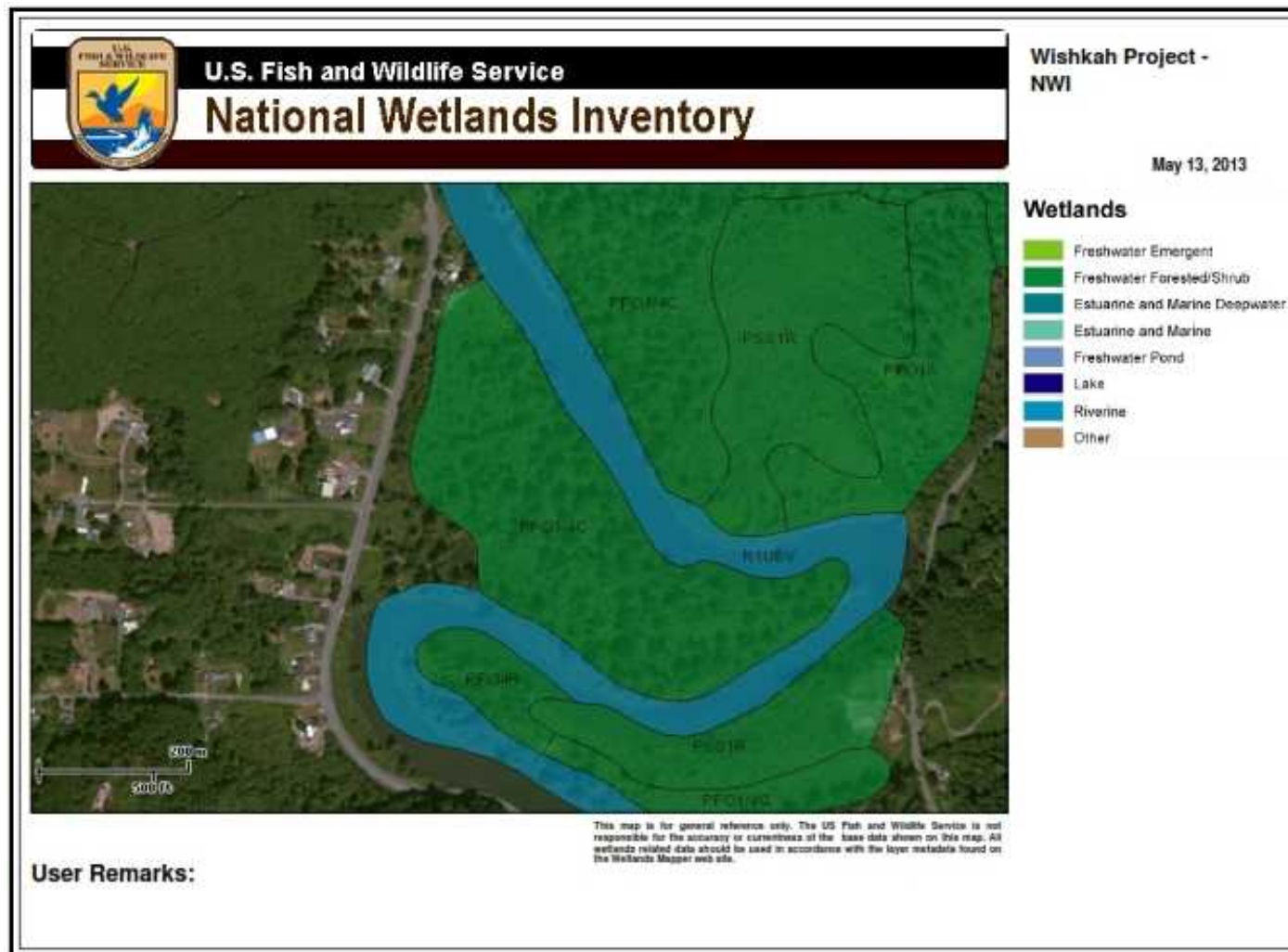
- Detailed FEMA study from mouth to City Limits of Aberdeen
- No detailed study in project area
- Mapped floodplain does not reflect reality



Background – LiDAR Map (FEMA, 2009)



Background – NWI Wetland Map



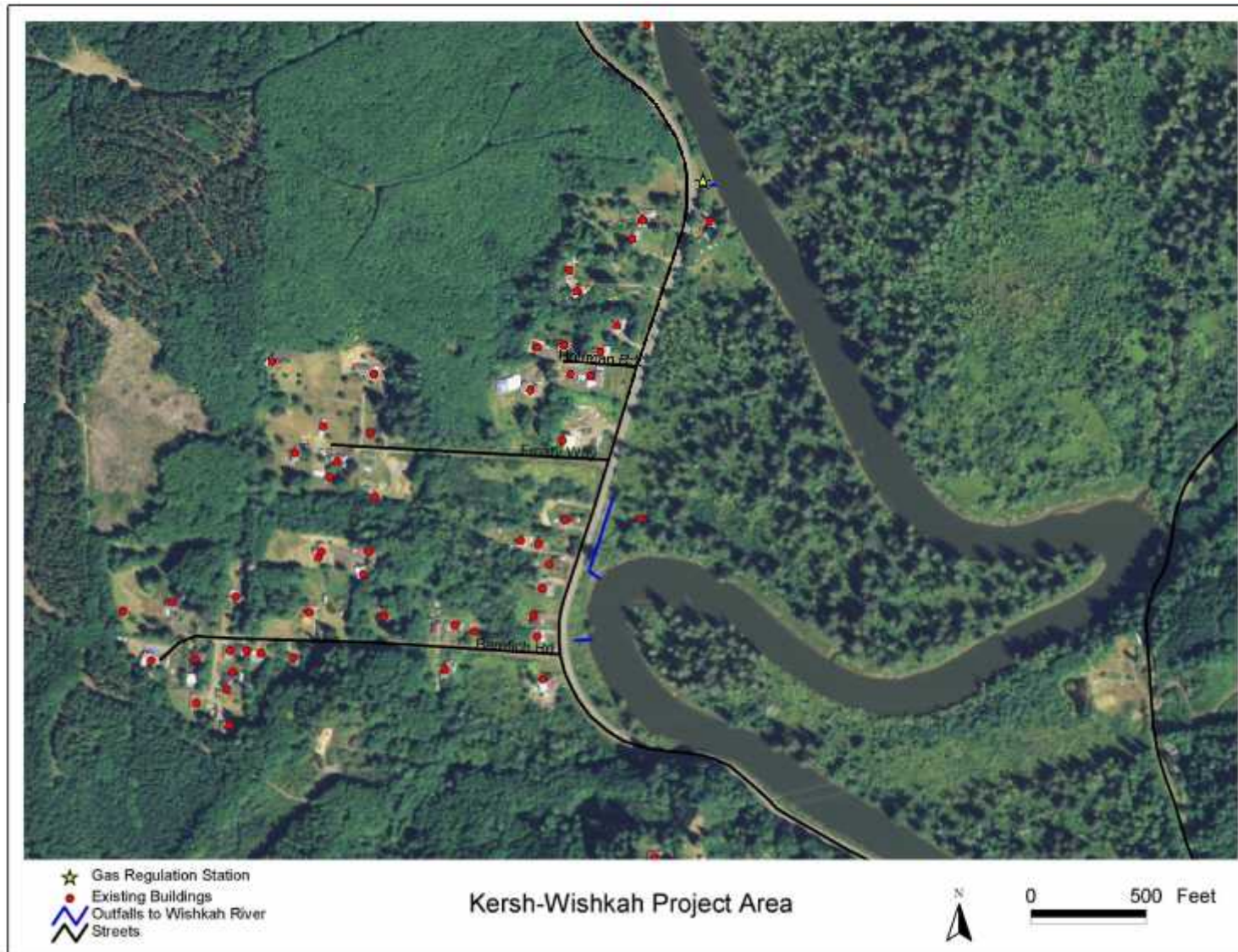
Background – Project Area Map, 1942



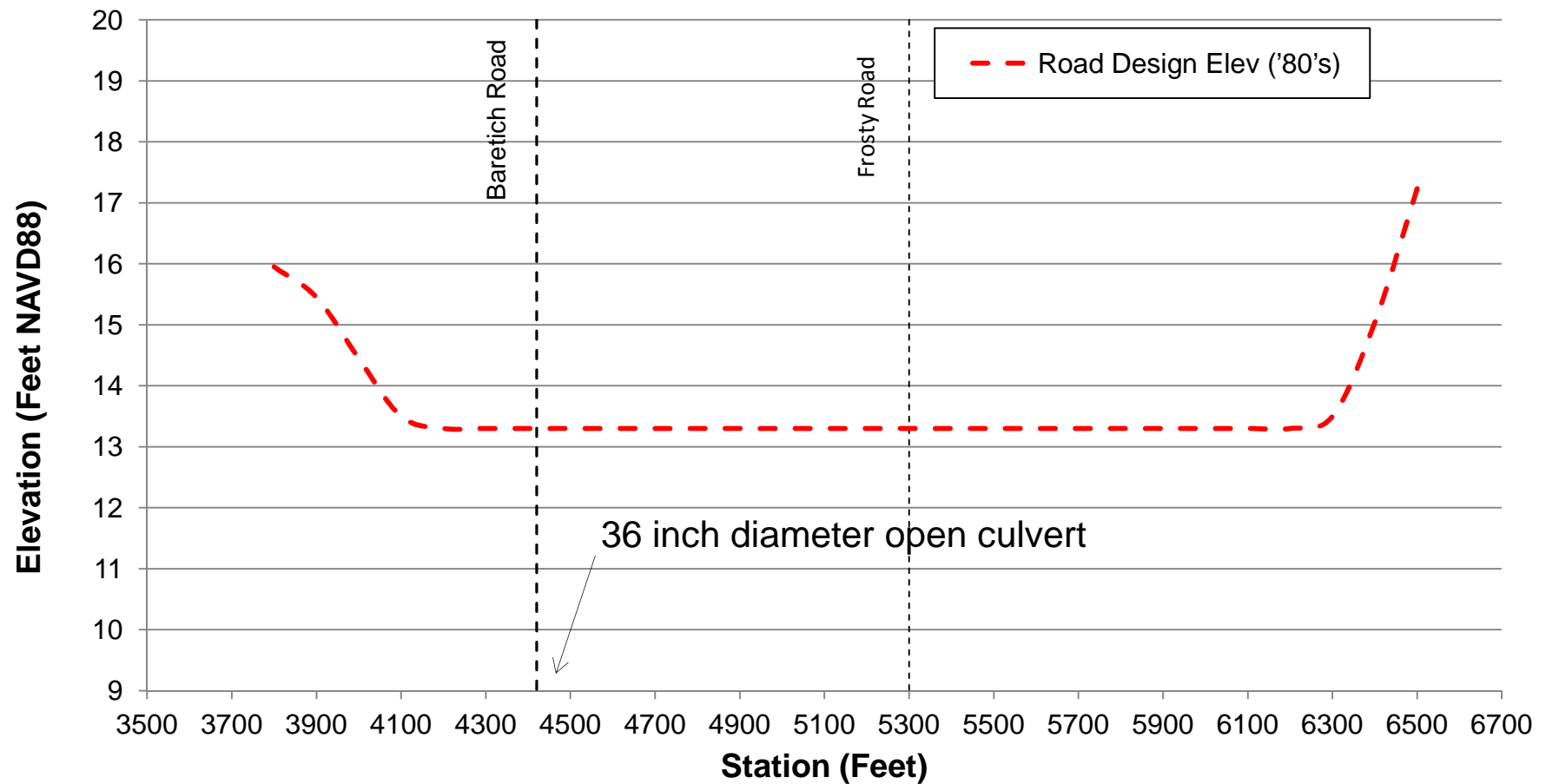
Background – Project Area Map, 2011



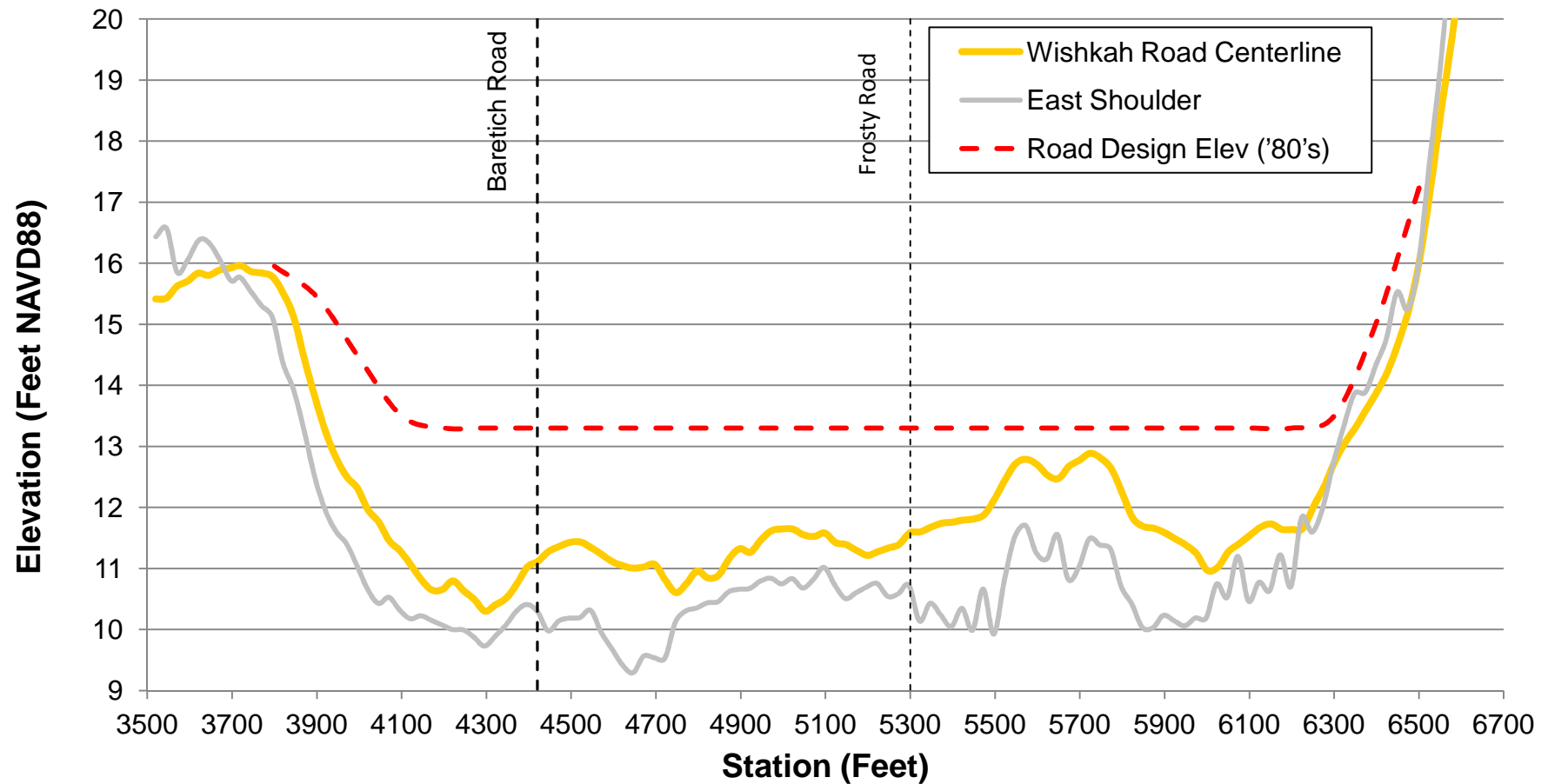
Background – Project Area Map, 2011



Background - Wishkah Road Elevation, 1980's Design



Background - Wishkah Road Elevation, 1980's Design vs. 2009 LiDAR



Background – Baretich/Wishkah Road Culvert



Flooding History - Photos



Flooding History - Photos

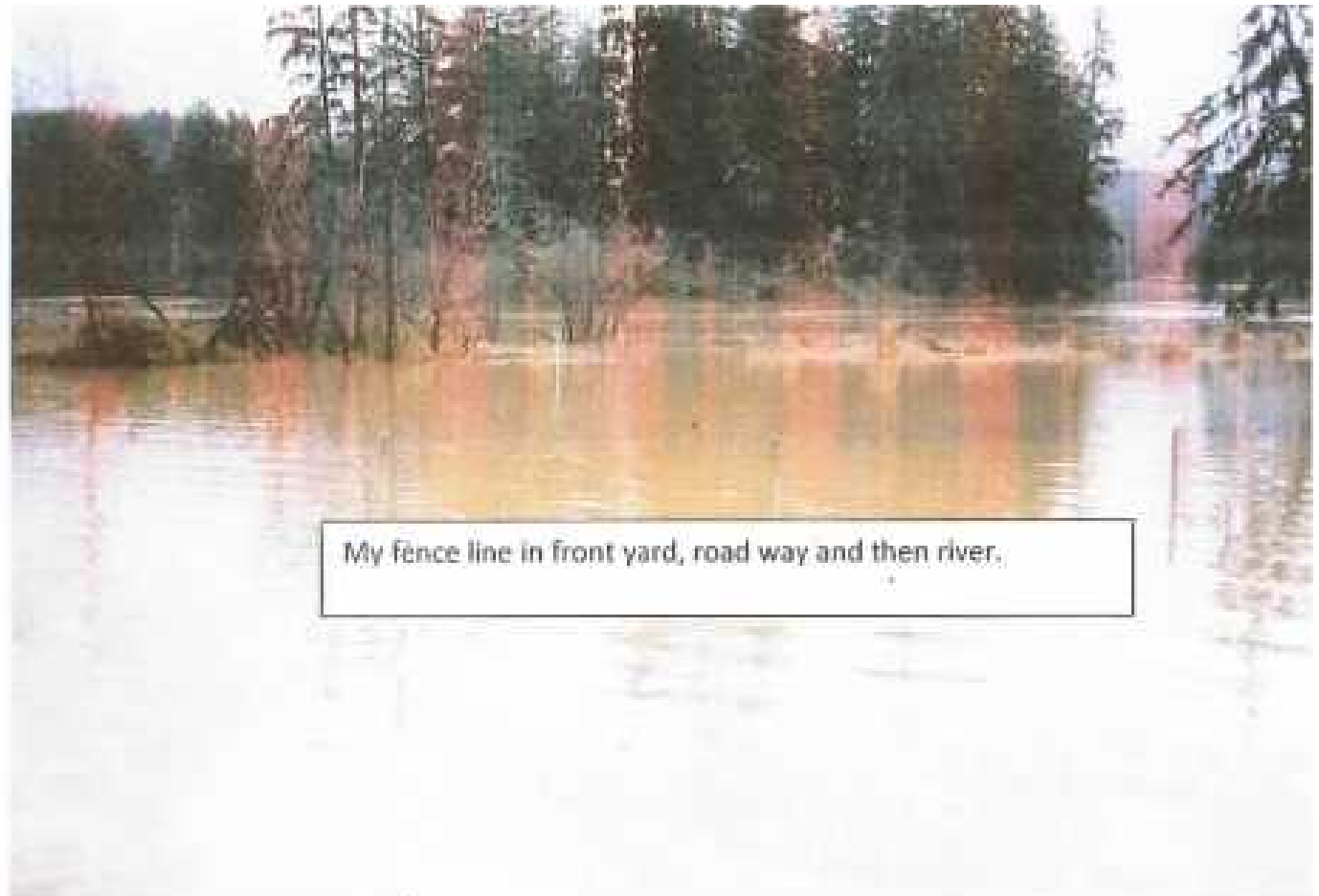


Flooding History - Photos



Flooding History - Photos

1/1/09



Flooding History - Photos

1/1/09

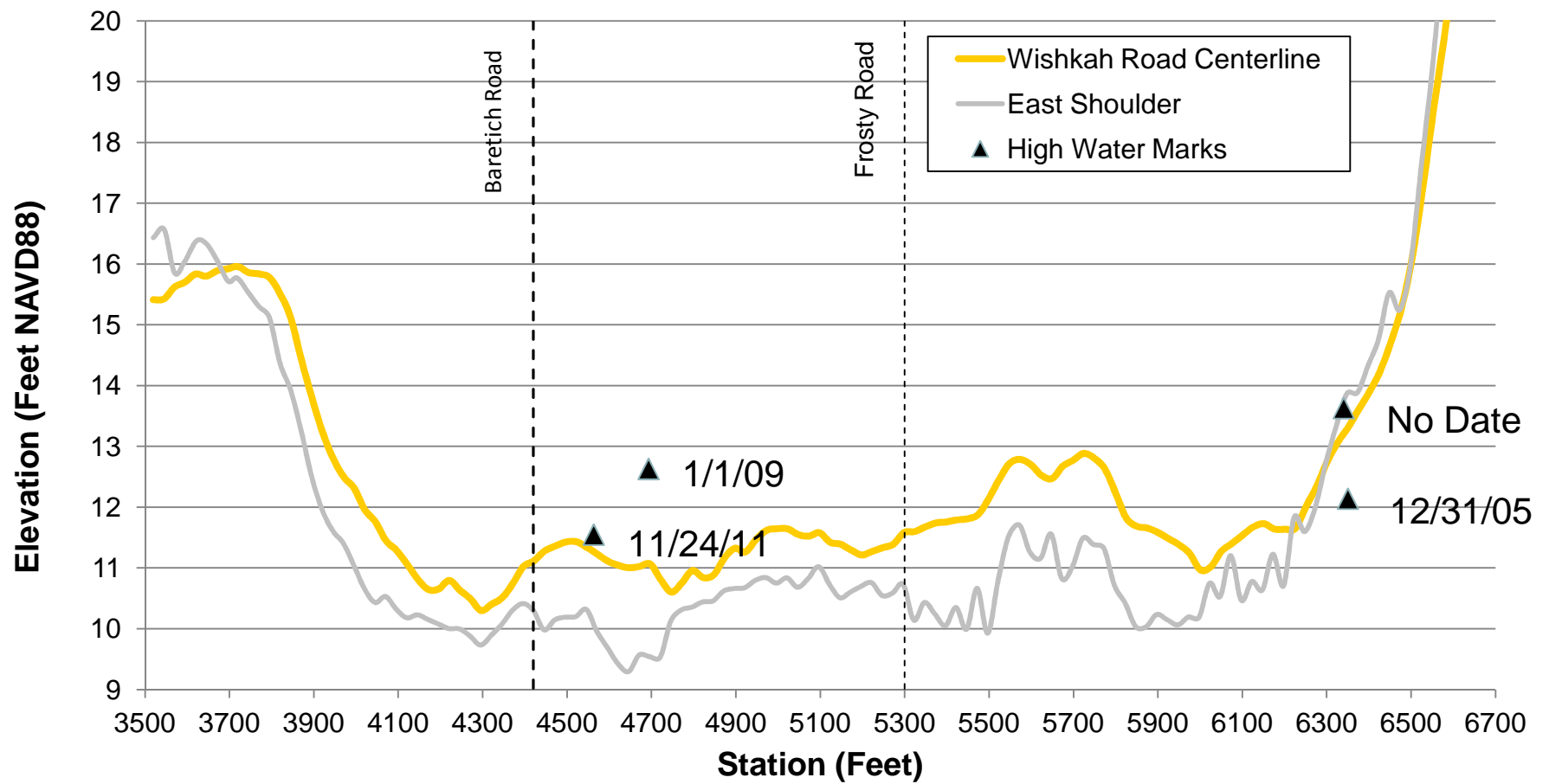


Flooding History – Homes Affected

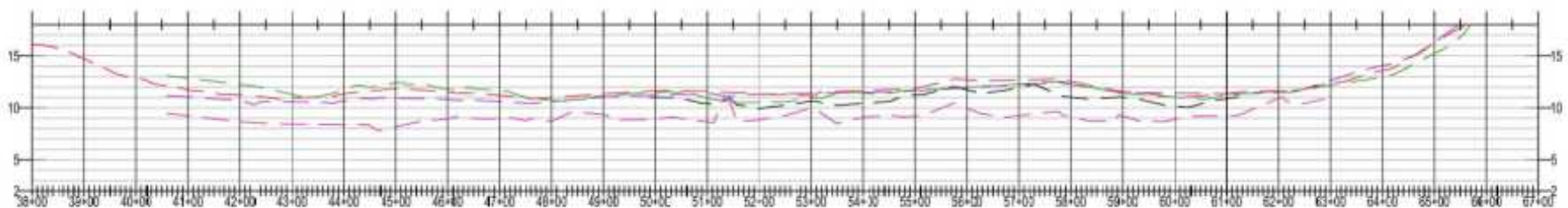
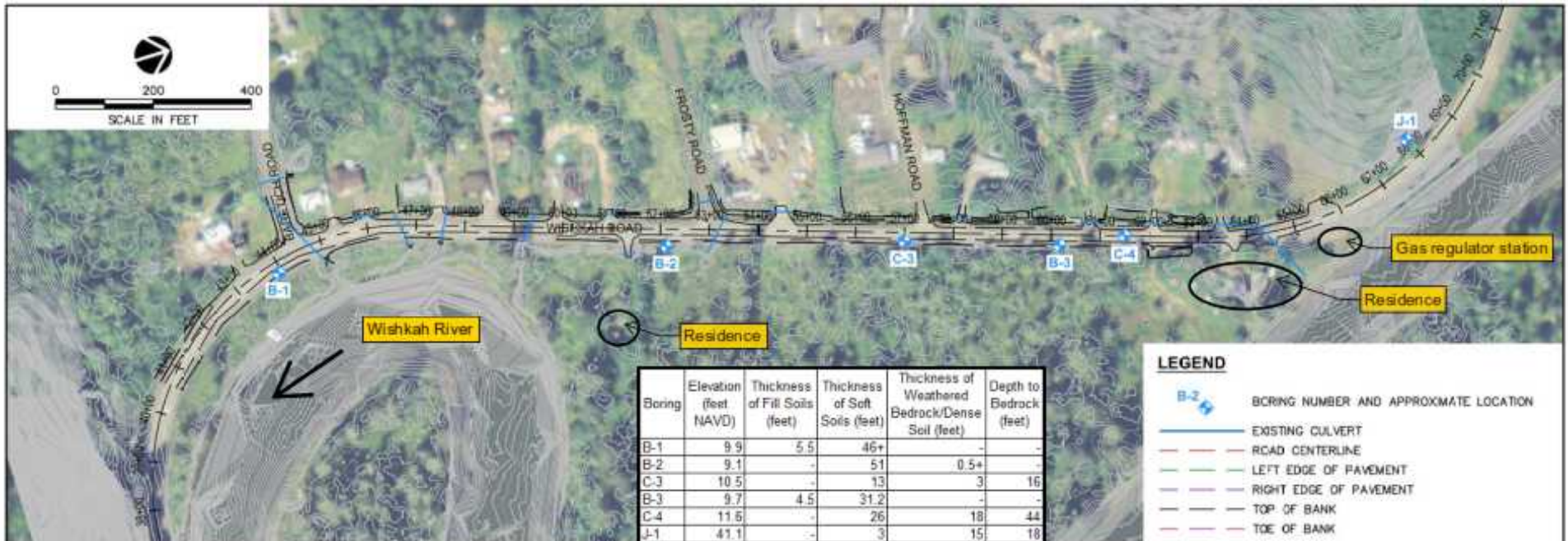


- Approximately 9 residences in the floodplain within the project area west of Wishkah Road
- Multiple out-buildings
- Access to about 60 residences affected
- County policy is to close the road when water is over ~12 inches deep to minimize damage to homes from wake of passing vehicles

Flooding History – Recent Flood History



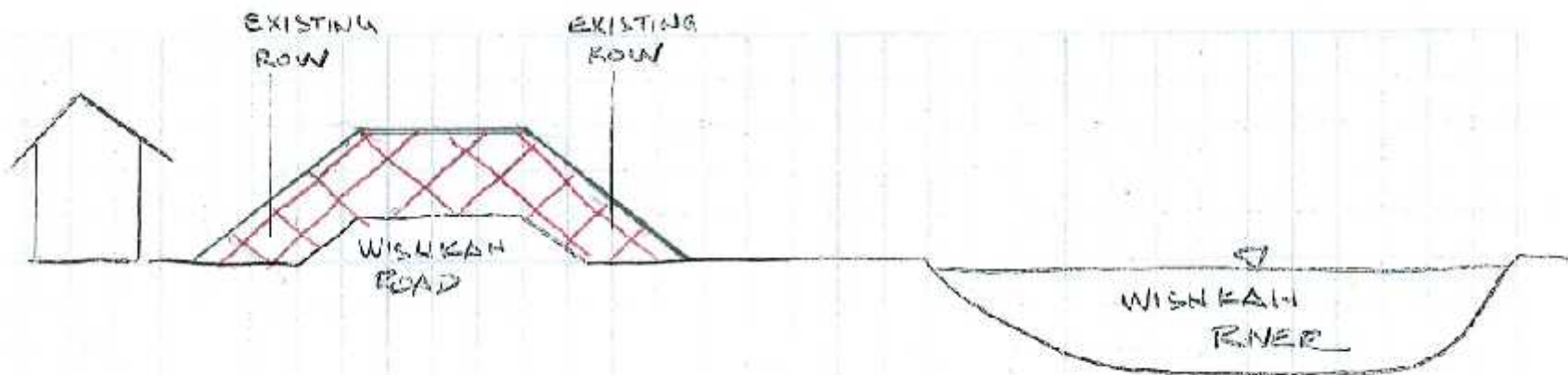
Geotechnical Investigation



PROFILE VIEW OF ROAD ALIGNMENT

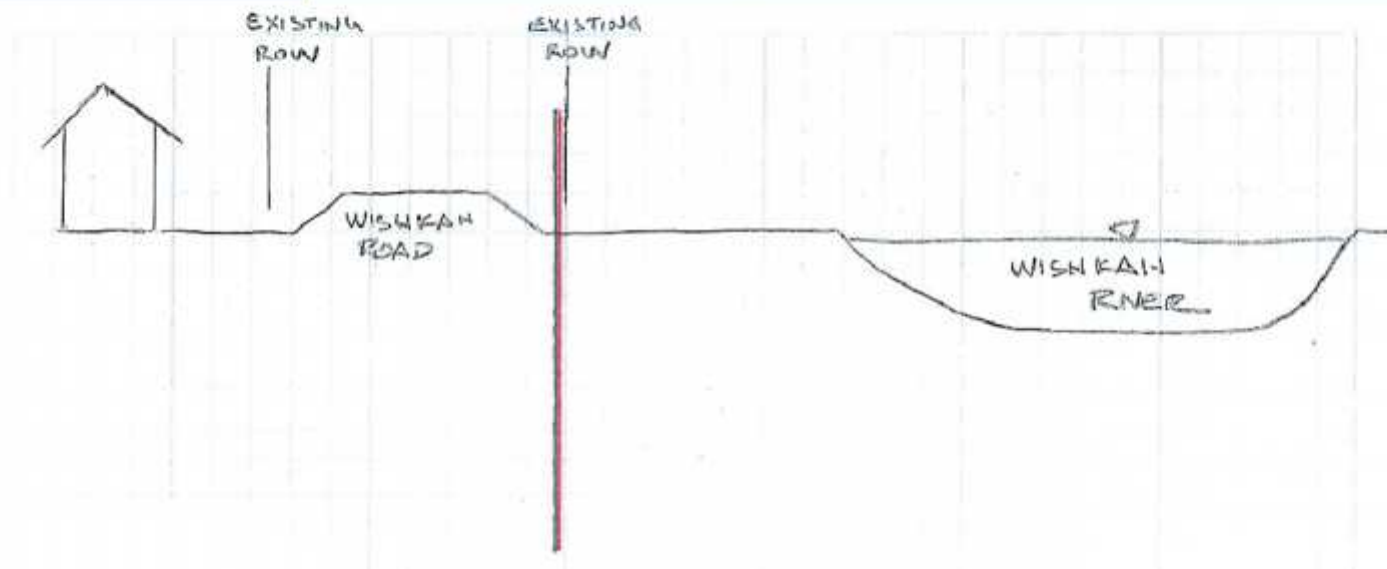
Option 1 – Raise Road

- Features – Raise road grade to provide flood protection
- Advantages – Flood protection for road and homes
- Disadvantages – More ROW, grade/access issues, potential settlement of underground utilities, cost to rebuild roadway section, reduced floodplain volume, infeasible due to predicted settlement
- Critical issues – Open culvert and soft, settling soils



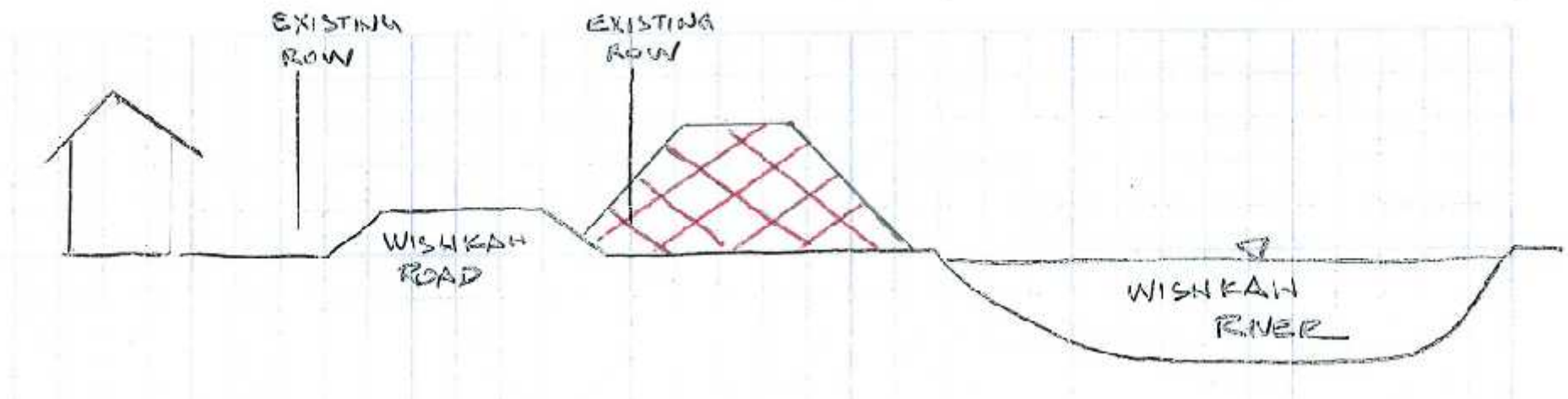
Option 2 – Sheet Pile Flood Wall

- Features – Interlocking z-type steel sheet pile with embedment depth 2-2.5 times height above ground
- Advantages – Flood protection for road and homes, minimal disturbance, no additional ROW likely
- Disadvantages – Added cost if obstructions are encountered
- Critical issue – Open culvert



Option 3 – Levee

- Features – Separate embankment for flood protection
- Advantages – Flood protection for road and homes, minimal disturbance to roads and residences
- Disadvantages – Requires more ROW, disturbance to sensitive areas, stability concern next to river, reduced floodplain storage volume, infeasible due to settlement
- Critical issues – Open culvert and soft, settling soils



Option 4 – Relocate Road

- Features – Move road to elevate it above floodplain
- Advantages – Flood protection for road
- Disadvantages – Requires ROW, doesn't protect homes, high cost
- Critical issues – Topography and cost = infeasible

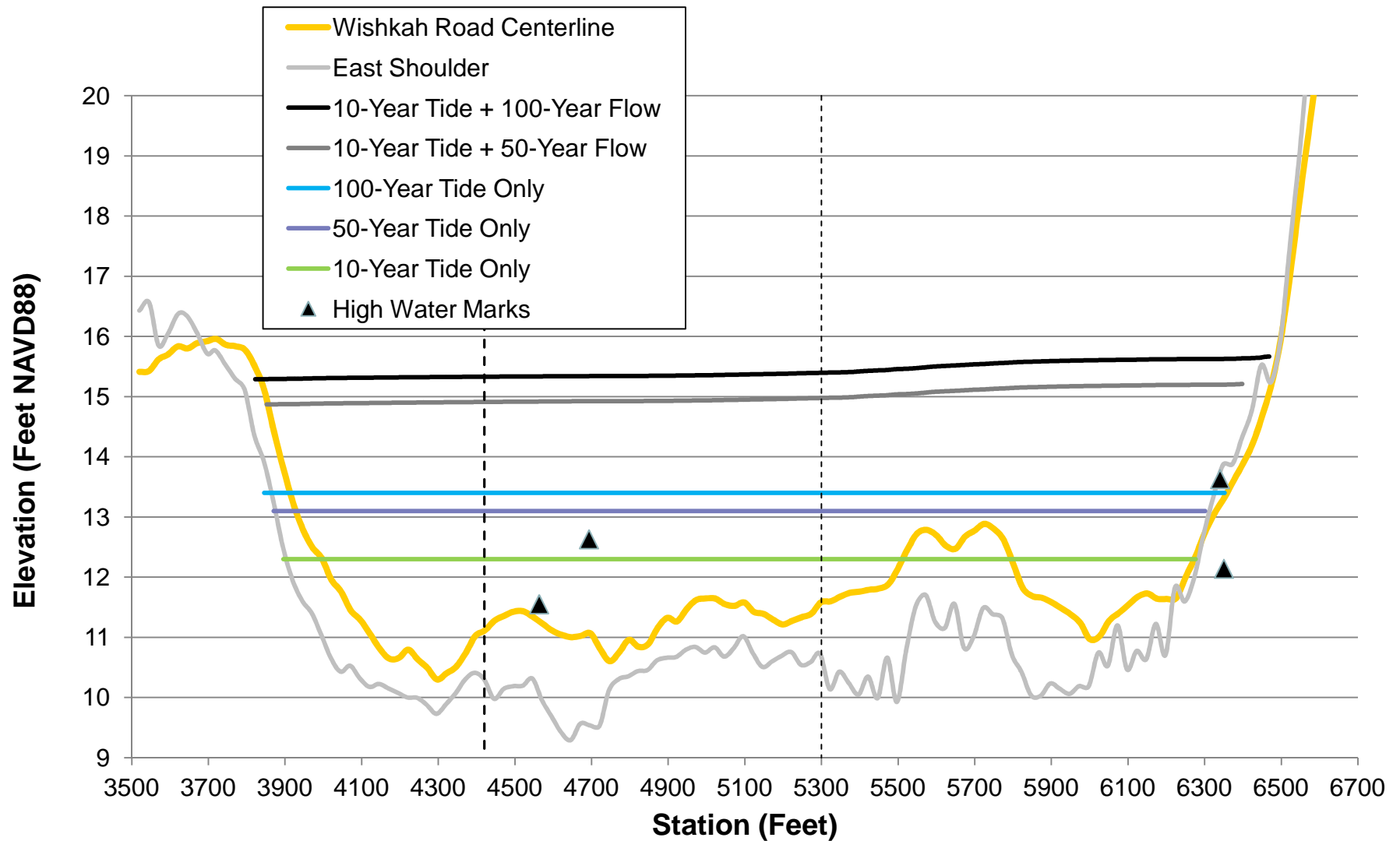
Characteristics of Possible Wishkah Road Realignment:				
		Existing	Alternative 1	Difference
Length		4,550	7,300	2,750
Minimum Elevation (ft NAVD)		10	13	3
Maximum Elevation (ft NAVD)		27	190	163
Maximum Slope		6%	33%	27%

Geotechnical Report Findings

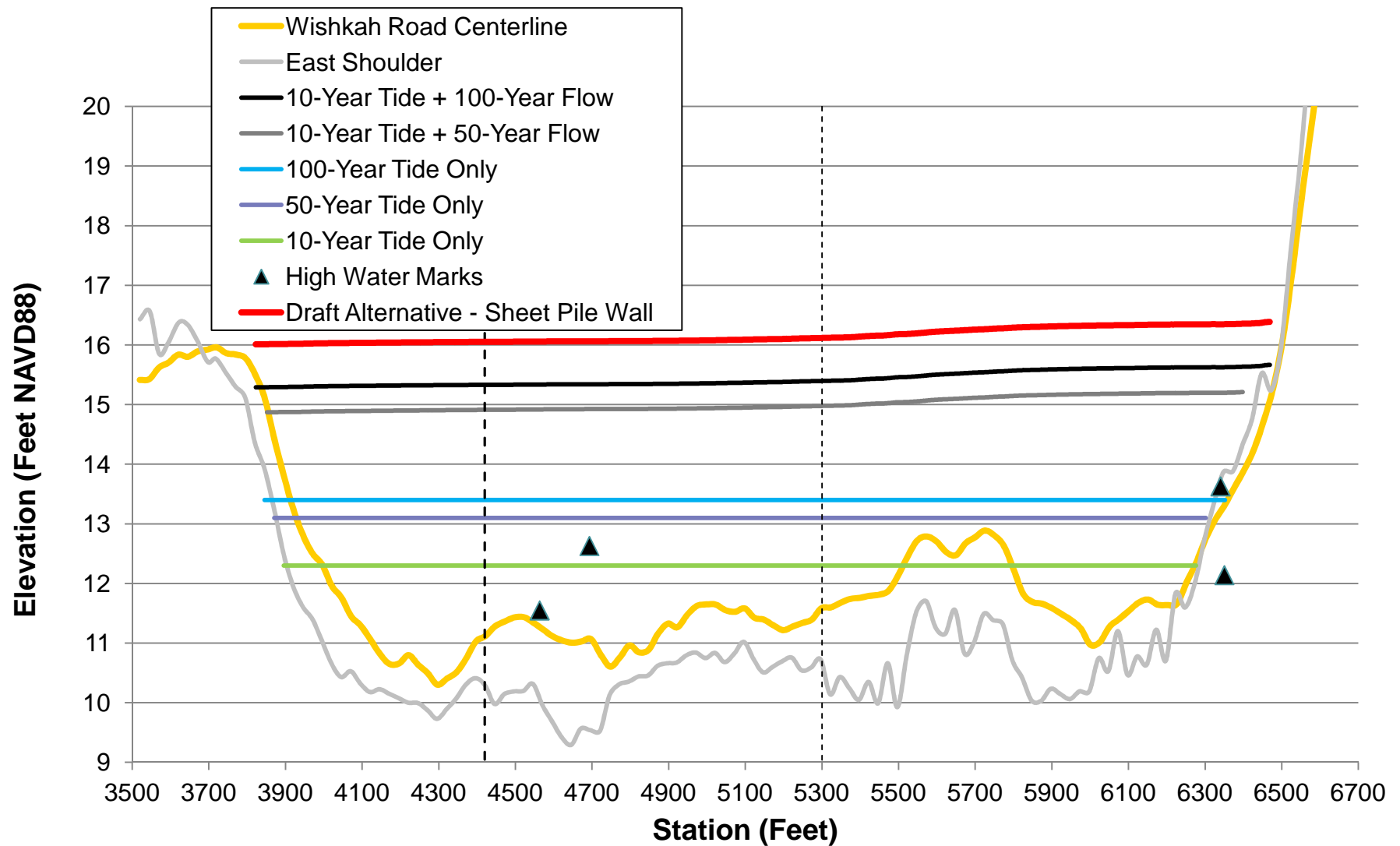


- Soft soils encountered throughout
- Depth of soft soils is less in northern portion of the project, where weathered bedrock was encountered at varying depths
- Sheet pile flood wall appears to be feasible
- Raising road or building a new levee not recommended due to expected settlement and subsidence

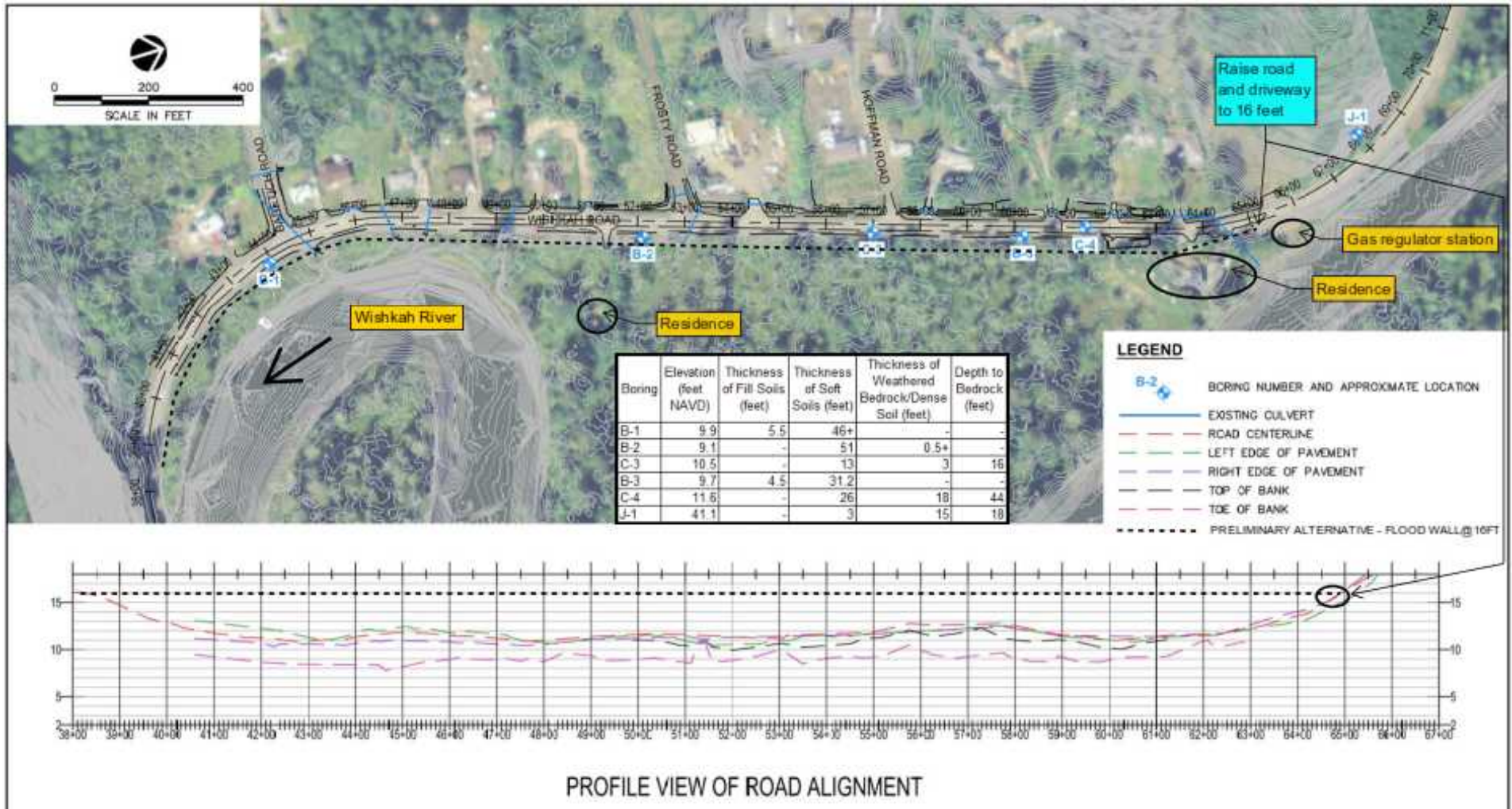
Flooding History – Modeling Results



Describe Alternative – Recommended Height

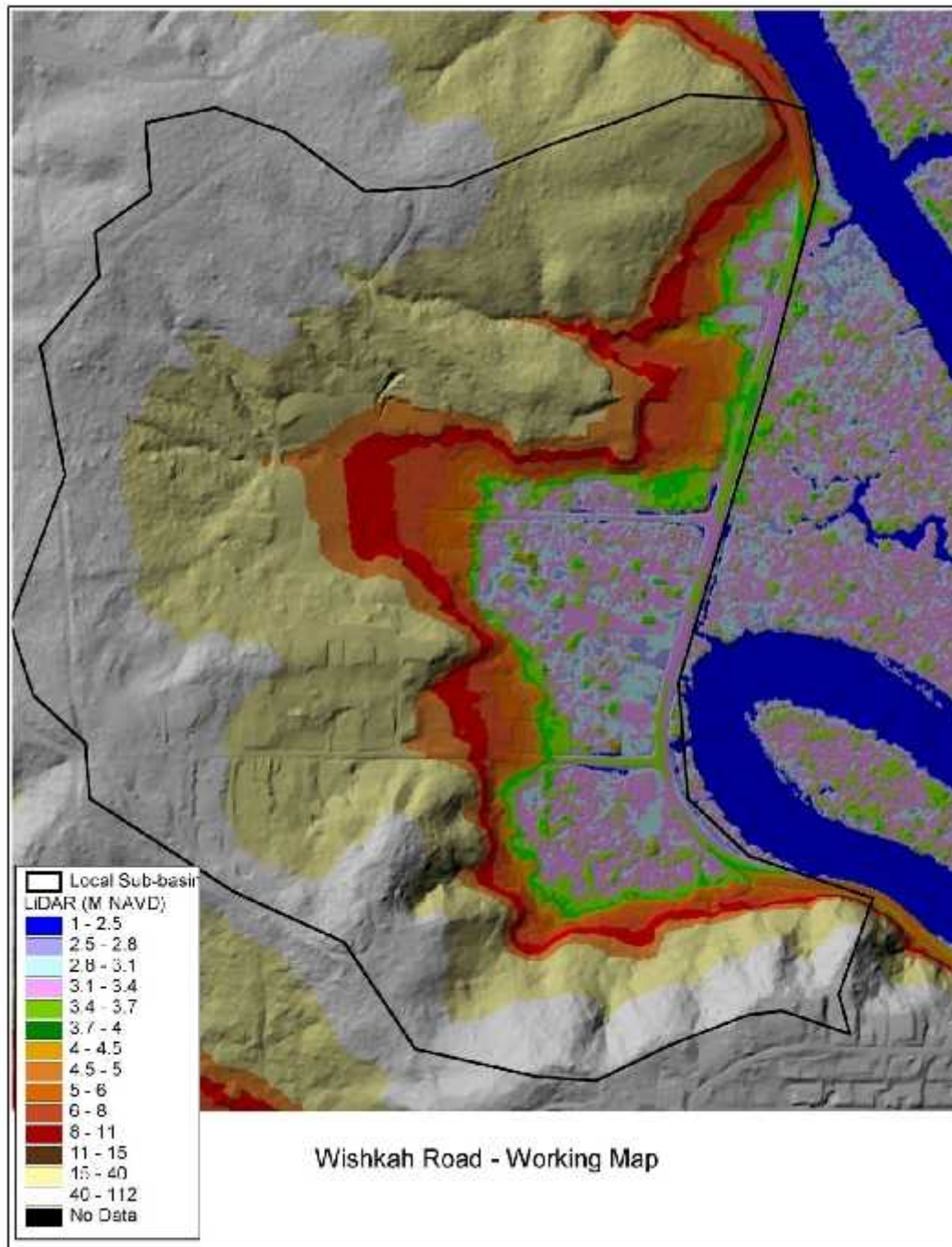


Draft Alternative – Flood Wall @ 16' NAVD



Draft Alternative – Local Drainage

- Local sub-basin
- Local “reservoir”
- Tidal channel – potential fish habitat enhancement



Design and Permit Considerations



- Open culvert at Baretich Road – flapgate needed to avoid flooding
- No flapgate reportedly due to presence of fish (stickleback) when last studied
- Monitor fish presence along Baretich Road and/or mitigate for reduced access from river



Design and Permit Considerations



- Wetland impacts
- Access to gas regulator station
- Evaluate feasibility of raising portions of the road to reduce costs (at ends and possibly in northern 1/3)
- Local flooding and sizing of drainage structures through wall



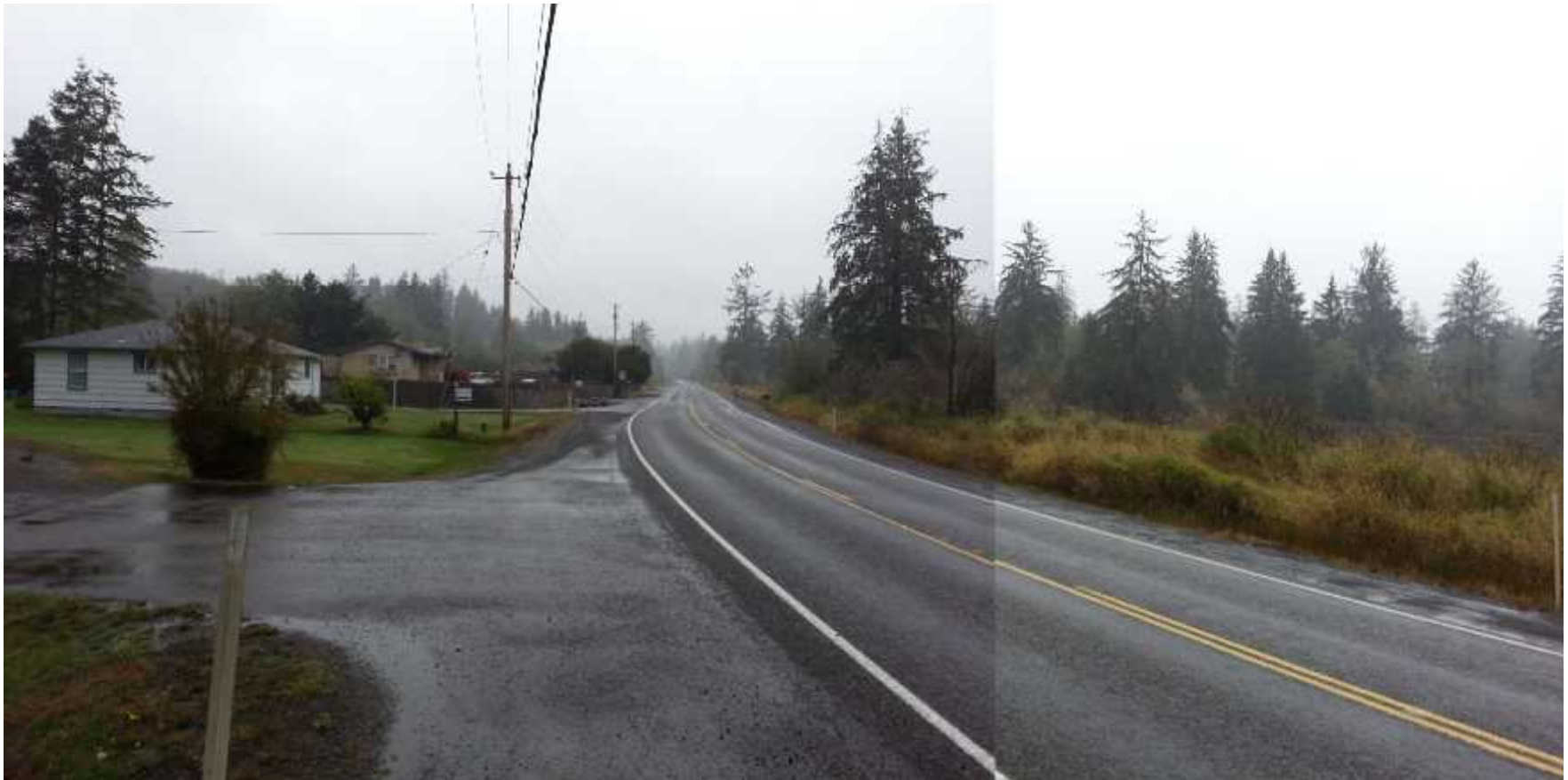
Design and Permit Considerations



- Purchase residences on east side of road to:
 - Restore floodplain
 - Remove potential water quality threats
 - Provide potential habitat improvement opportunities
- Project cost



Discussion



Contacts



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