This Fish Passage Barrier Removal design grant should meet the criteria in Manual 22, specifically “Stream Simulation Design Option: This geomorphic approach involves building an artificial stream channel inside the culvert, which provides passage for any fish migrating through the reach. This option is assumed to be satisfactory for adult and juvenile fish passage and tends to be used more frequently at sites where juvenile fish passage is required” and comply with WAC 220-660-200.

* To understand the design elements of these plans we would like you to describe the constraints which may make it challenging to meet this guidance.
* The average BFW provided in the Hydraulic Report is 10 ft. Martin Fox commented on 7/9/2021 “calculating the BFW using the WDFW regression (Barnard et al. 2013), we calculate a BFW of over 19 ft” and WDFW calculated up to 24 ft BFW using Stream Stats. Please see Martin’s full comment attached. The BFW measurements were taken in the reference reach upstream of the crossing in a confined ravine influenced by approximately 70 installed LWD structures. Other creeks nearby of similar basin size and gradient may provide a better reference to drive the design. TRT is concerned that designing a structure using the 10 ft. BFW may not accommodate potential sedimentation and predicted flows. Please help us understand how BFW measurements meet WAC 220-660-200 (3) (e).
* The structure type identified for E Lake Sammamish Pkwy is a “47 ft x 17 ft x 10 ft split box culvert.” It is the preference of FBRB as well as WDFW Water Crossing Design Guidelines to first consider abandonment, which is not an option, then a bridge when replacing a fish passage barrier. This stream has “excessive sediment loading” which required a high flow bypass and sediment basin to be installed upstream of the E Lake Sammamish Pkwy crossing. Annual maintenance is required to remove 60-120 cubic yards per year and the Area Habitat Biologist has issued HPA permits to remove even larger volumes. The Correction Analysis Form uploaded to PRISM provides two alternatives neither of which explore a 3-sided structure or bridge. Please describe why you feel a 47 ft x 17 ft x 10 ft split box culvert will accommodate potential sedimentation, scour, and predicted flows, and why a 3-sided structure or bridge have not been considered.
* The Hydraulic Report recommends each structure to be buried a minimum of 4 feet to “provide for allowable vertical channel adjustment.” In addition, the report states the potential for “rapid incision through alluvial deposits of 5 to 10 feet in the vicinity of ELSP and upwards of 20 feet upstream near the ravine outlet and possible formation of headcuts.” We are concerned that the proposed culvert may scour to the concrete which could result in future impairment of fish passage. TRT would like additional information how the proposed structure addresses these variables and why a 3-sided structure is not being considered.
* The structure crossing E Lake Sammamish Shore LN NE changed from slab bridge cast-in-place deck w/ 18’ opening shown in the 30% plan set to precast split box culvert w/ 17’ opening. Please explain why the design was changed.
* Please provide an updated cross-section for each proposed structure labeled with OHW, 2- yr., and 100- yr. water surface elevations.
* The hydraulic report states “approximately 1.5 to 1.9 feet of clearance (freeboard) between the computed 100‐year water surface elevation and culvert crowns. This is less than the 2 feet recommended for debris clearance in streams with bankfull widths ranging from 8 to 15 feet.” Please explore ways to increase the freeboard given the history of sedimentation at this site.
* Please provide a cross-section of the creek mouth with LWD and rockery labeled with mean high and low lake levels, OHW, 2- yr., and 100- yr. water surface elevations.
* Please provide a cross-section of the relocated channel showing the channel shape, side slopes, and bank armoring labeled with OHW, 2- yr., and 100- yr. water surface elevations.
* The 30% plan set showed hard armoring at the mouth of the creek, but the 60% plans show hard armoring along both sides along the entire relocated creek, between the structures, and extending beyond ELSP. The TRT are concerned that hard armoring beyond the mouth of the creek may exasperate scour and not allow for natural alluvial functions. Please explain the reason for the change to the plans sets and the function of this rock, as well as how the designs plan to incorporate natural materials laid out in WAC 220-660-130 (4) (b) (vi).
* Page 29 of 54 construction plan note 15 “rockery wall see sheet C-701 for detail” but C-701 does not show the detail for this rockery. It appears that these details may be on page C-708 and C-709. Please clarify the correct detail for the rockery wall.
* Page 24 of 54 construction plan note 2 states “install precast concrete wingwall per detail” it is unclear from the detail on sheets C-701 and C-703 if these wing walls are intended to function as retaining walls. In addition, the wingwalls at the inlet of the ELSP structure appear to be parrel to the stream with the potential for the stream to be touching both walls. Please provide additional information explaining the need for these walls and explore options to eliminate this hard armoring.
* Page 24 of 54 shows the stream channel narrowing between the two structures of the Lake Sammamish Trail and ELSP. Please explain the reason for this narrow section of stream.
* Page 25 of 54 construction plan note 6 states “Install rockery per detail. See sheet C-708. Height varies from 1.01-4.5’.” please clarify the intended functionality of the walls, provide the heights and include them in the channel cross-section.
* The Hydraulic report identifies the pebble count from reference reach as a “well-graded mixture” with a D50 of 54 mm or 2.1 inches. WAC 220-660-190 (6)(a)(vi) states “The median particle size of sediment placed inside the stream-simulation culvert must be approximately twenty percent of the median particle size found in a reference reach of the same stream.” The proposed sediment mix 1 “three parts 12 inch” cobbles mixed with two parts streambed sediments”. Please provide the gradation curve identifying the D16, D50, D84, D100 confirming the proposed mix meets twenty percent of the median particle size found in the reference reach.
* The Hydraulic report identifies the pebble count from reference reach as a “well-graded mixture” with a D50 of 54 mm or 2.1 inches. TRT is concerned that this mix #1 has been coarsened relative to natural conditions and may resist mobility in some reaches, not allowing natural stream processes described in WAC 220-660-190 (2) (a), and therefore would not meet the guidelines laid out for a FBRB grant. Please provide the reasons for coarsening the mix and at which flows these sediments will mobilize.
* The 60% plan set identify streambed mix #2 as a 1:1 mix of 1-man to 2-man boulders with streambed sediment. TRT is concerned that due to the confined nature of the stream and the high likelihood of scour, section B-B on page 36 of 54 which shows a minimum of 1.5’ of streambed mix 1 that streambed mix #2 could be exposed and may pose future fish passage issues, additional maintenance needs, and a potential for subsurface flows. The natural stream most likely does not have a subgrade of this size. TRT recommends using a less coarse mix to ensure continued fish passage for the life of the structure to meet FBRB grant guidelines. Please provide reasoning for this mix.
* Page 34 of 54 Section A-A Precast Split Box Culvert plan view identifies “one-man boulder barbs” to be used for stream meander. Meander bars should be deformable over time. TRT is concerned that one-man boulders buried at 50% will not be deformable.
* The LWM layout on the plans show many pieces that are perpendicular to the banks. When LWM is placed like this they have the potential to act more like a weir than a habitat feature. TRT recommends more diversity in the lateral and vertical positioning of the LWM placement and structure sizes, which would allow to be engaged at a diversity of flows to maximize their habitat benefits. The TRT also suggests placing the wood pieces into the thalweg to allow them to interact with all flows, providing more fish and riparian benefits. Please see Martin Fox’s comment on 7/9/2021 for additional LWM layout recommendations.
* Page 26 of 54 show LWM which is being used as bank protection. The construction plan notes 3 states “install large woody debris feature per detail. See sheet C-703”, but detail on C-703 does not show this LWM configuration. Please provide detail on how this LWM configuration will be installed. It is the preference of the TRT that all wood installations function as habitat and be unanchored.
* The FBRB guidelines, as well as WAC 220-660-190 (3) (a), state that this structure must provide unimpeded fish passage at all life stages. TRT is concerned that the proposed 6.3% grade at the mouth of the stream may preclude access to the creek for juvenile fish. Please describe how the relocated stream design structure address this.
* The proposed slope of 6.3% indicates stream simulation design option 2 which defines the channel type as step-pool. Please provide plans illustrating how this will be accomplished using LWM and boulder including pool spacing and low flow channel layout.
* The hydraulic report states “Computed maximum flow velocities are low, ranging from 3.5 to 5 feet per second (fps), reflecting the high roughness coefficient selected” and “Detailed hydraulic model output can be found in Appendix X.” but the report did not include Appendix X. TRT would like to see the hydraulic model to compare the natural conditions to the proposed conditions and understand the predicted velocities at each structure and throughout the stream channel.
* Please describe how these designs address future climate change and what the predicted flow increase is over the 100-year WSE.
* The 60% plans identify a bypass pipeline with pump please provide details on fish exclusion and the stream bypass plan including pump and fish screen sizes.
* Demolition notes state “remove existing concrete dam.” Please provide details on how this work will be accomplished.
* The deconstruction plans state that a septic system will be removed please clarify if there is an existing drain field.
* TRT request that all trees that are removed from the project area >4” DBH and 6’ tall remain onsite with rootwads intact and utilized in LWM layout.
* Please identify any ditches within the project area and show these on the next plan set. We recommend ending all ditches above the 100 year WSE to prevent road and tire toxicants from entering the stream and increasing the likeliness of salmonid mortality.