



# Willowmoor

Floodplain  
Restoration  
Project



## **STAKEHOLDER ADVISORY COMMITTEE MEETING REPORT**

**February 26, 2019**

**Clise Mansion, Marymoor Park**

### **Stakeholder Advisory Committee Members Present**

- Paul Fendt, At-Large
- Brian Landau, City of Bellevue
- Jason Wilkinson, WRIA 8 Salmon Recovery Council
- Jim Trockel, Serve Our Dog Areas
- Dwight K. Martin, Sammamish Home Owners Association
- Reid Brockway, Sammamish Home Owners Association
- Jeanne Justice, City of Redmond
- Greg Helland, Friends of Marymoor Park
- Nancy Myers, At-Large
- Charles Ifft, U.S. Army Corps of Engineers
- Steven Freygang, Sammamish Rowing Association
- Susan Wilkins, Water Tenders
- James P. Mackey III, Lake Sammamish Yacht Club
- Peter Marshall, Eastside Audubon
- Bill Way, At-Large
- Ralph Srjcek, Washington State Department of Ecology
- David Kyle, Trout Unlimited
- Jeremy Lucas, Eastside Audubon
- Martin Nizlek, Washington Sensible Shoreline Association
- Scott Sheffield, Washington Sensible Shoreline Association
- Cleo Neculae, Washington State Department of Ecology
- Mike Arntzen, OneRedmond

### **Flood Control District, King County Staff, and Consultants**

- Michelle Clark, Executive Director, King County Flood Control District
- King County Staff: Steve Bleifuhs, WLRD RFMS Section Manager; Michael Murphy, WLRD Assistant Division Director (interim); Chris Brummer, Project Supervisor; Kate Akyuz, Project Manager; Dan Heckendorf, Lead Engineer; Thomas Bannister, Lead

Ecologist; Judi Radloff, Project Geomorphologist; Monica Walker, Project Planner; Kimberly Matej, Communications Coordinator.

- Tetra Tech: Jerry Scheller, Consultant Project Manager; Bill Fullerton, Consultant Lead Design Engineer
- Stepherson & Associates Communications: Kristin Anderson, Facilitator; Colleen Toomey, Notetaker

### **Audience**

- Emily Flanagan, City of Redmond
- Norah Robinson, Marymoor Park Manager, King County
- Jerry Schuster, City of Bellevue
- Natasha Kacoroski, Eastside Audubon
- Tim McGrudger, Eastside Audubon
- Charlie Klinge, Legal Counsel, Washington Sensible Shoreline Association

## **MEETING SUMMARY**

### **Meeting Purpose and Agenda**

The Willowmoor Stakeholder Advisory Committee (SAC) held its first meeting of 2019 to discuss the Willowmoor Floodplain Restoration Project. The purpose of the meeting was to discuss progress on the preliminary design the selected split-channel alternative including results of hydrologic and hydraulic modeling efforts and development of the split channel alternatives. Facilitator Kristin Anderson welcomed attendees and Michelle Clark, Executive Director of the King County (County) Flood Control District (Flood Control District), as well as new permanent members David Kyle, representing Trout Unlimited, and Scott Sheffield, replacing Gil Pauley as the Washington Sensible Shoreline Association representative. Michelle Clark also welcomed attendees and thanked them for their participation and insight on the project. Kristin provided an overview of the agenda that included Project Study Updates (40 minutes), Break (10 minutes), and Design Alternatives (60 minutes).

### **Project Direction**

The SAC previously met in October 2018, when the project team shared information on the preliminary weir analysis and the hydrologic modeling. Since October, the team has worked on an alternative analysis and cold-water supplementation. Thirty percent design will be completed in the next few months and then presented to the Flood Control District for consideration. Kristin reviewed the following 11 objectives set by the Flood Control District:

1. Develop the split channel alternative that balances the objectives of flood control, habitat restoration, fish passage, and sustainability.
2. Include variable depth pools.
3. Work with Redmond on city flood control efforts, ground water, and Bear Creek.
4. Conduct a feasibility analysis of a dynamic weir including costs and benefits.

5. Conduct a technical analysis of the split channel alternative for fish mortality and sustainability.
6. Include a beaver mitigation plan.
7. Include a maintenance plan for when project is complete.
8. Pursue grant sources to further evaluate cold-water supplementation.
9. Identify funding partners to assume ongoing maintenance costs of cold-water supplementation.
10. Work with Parks to pursue recreational boater access.
11. Continue existing maintenance during design and permitting phases.

### **Recreation Workshop Highlights**

Jerry Scheller, project manager from Tetra Tech, then provided a brief recap of the recreation workshop hosted in October 2018. Twenty-five members of the public, including some SAC members, attended the workshop. Because the project is in Marymoor Park, there are many existing uses. The recreation workshop was held to inform park users about the project and to learn about their interests in the project and how it interacts with surrounding uses. Participants were asked what they like about current recreational elements, what they dislike and what would they change. Several ideas were shared at the workshop, some in and some out of scope for the project. The project team's focus for recreation is navigability. Highlights of public feedback included:

- Improve/maintain boat access and portage at weir
- Improve access to and signage in the project area
- Provide wildlife viewing in new side channel area
- Reduce sedimentation from dog access points
- Improve access to Marymoor Park
- Reduce concert noise with vegetation
- Create a new lake or riverside dock at Marymoor Park
- Create a bridge across the river at the project site

### **Hydrologic Modeling**

Jerry then recapped the hydrologic modeling information shared at the October meeting. The calibration was within the target ranges applied to the project. The model is conservative (i.e., generally matches very closely), but (if over) is over at high flows and (if under) is under at low flows. The Hydrologic Modeling Technical Memorandum is available on the website.

### **Hydraulic Model Domain and Calibration**

Jerry also provided a recap of the updated hydraulic model domain and calibration. The model extends about four miles to NE 116th to include Redmond's stormwater outfalls. The team is

using five gauges. 51m gauge is located at the weir (1995). Transition Zone gauges were installed in 2011 to understand the Transition Zone performance.

Water levels from the gauges were used to calibrate the hydraulic model. Jerry noted that the team has used a robust calibration process. The process notes vertical and horizontal variation in hydraulic roughness throughout the channel in the Transition Zone. There is also seasonal variation due to in-channel vegetation growth (elodea) downstream of the Transition Zone primarily summer and early fall impact. Jerry shared a table (slide 8 in attached PowerPoint) that captured calibration results at the Transition Zone, the Transition Zone weir and downstream of Bear Creek. The calibration period extended from 2014 to 2017, corresponding with a period of maintained condition in the Transition Zone.

Calibration evaluated the full range of flows during that period, comparing the simulated to the observed condition. The table shows a representation of the calibration results for three large storm events. Table shows that for these events we are within our target of 0.5 feet. Attendees also received a handout that showed stage hydrographs for each of these sites from 2015 to 2017.

## **Permitting**

Kate Akyuz, project manager from King County, then provided an overview of the permitting process. As previously mentioned, the team is developing an alternatives analysis, then a 30 percent design for a split channel project as directed by the Flood Control District. The team hopes to complete 30 percent design later this spring. The Flood Control District will review the alternatives analysis before the team works on 30 percent design, and the 30 percent design before any permits are submitted.

Once the project team has an approved 30 percent design, it will enter formal permit discussions with the regulatory agencies. The first permit nexus is the State Environmental Policy Act (SEPA) process. Because this is a multi-benefit project, the project will be self-mitigating, King County anticipates a Mitigated Determination of Non-significance (MDNS) and the team will document that through the SEPA checklist.

Next, the team will initiate the United States Army Corps of Engineers' (Corps) Section 408 project approval, an approval (rather than a permit) that provides permission from the Corps to modify the 1964 Sammamish River Flood Control project.

The Corps recently updated the 408 process. In the past, a project proponent had to wait until 60 percent design to consult with the Corps on Section 408. Now a project can submit at 30 percent design to confirm technical approaches and regulatory interpretations. This timing will also help confirm the project team approach to Endangered Species Act and Cultural Resources consultations.

If the Flood Control District approves this project to move forward to the 60 percent design later this year, the 60 percent design formal documentation for the Corps will be complete in the

summer of 2020. This will include formal applications for the Section 408 approval, Section 10 and 404 permits, and the related cultural resources and Endangered Species Act consultations.

### **Permitting: Defining the ESA Action Area**

Kate then reviewed work the project team is doing to determine the Endangered Species Act (ESA) action area. Balancing flood and habitat objectives for the project has been a high interest topic.

When the team submits 30 percent design documentation to the Corps, it will need to submit draft biological documentation for Section 7 ESA consultation with the National Marine Fisheries Service (NMFS). One of the key features of the documentation is defining the project action area.

Action area is a biological determination of the reach of the proposed action on listed species. The action area is not limited to the project footprint, but it includes all habitat used by listed species that the project may impact. The County team met informally with the Corps a few months back and asked for guidance on what the ESA action area may include. Because this project is altering the seasonal water level around the lake, the action area will need to include the areas used by chinook where the water level may change. This includes lake fringe wetlands.

The extent of lake fringe wetlands is typically concurrent with the Ordinary High Water (OHW) elevation.

Using Bellevue as an example, Bellevue's Shoreline Master Program has a defined OHW elevation of 28.2 feet. If the project team were to borrow this elevation for this project, then it would need to document the potential project impact on wetlands used by chinook salmon up to elevation 28.2.

The project team has heard from several SAC members that there can be large differences in the horizontal distance between the Corps' original estimated OHW elevation of 27 feet and the municipal shoreline master program OHW elevations set at 28.2 or 28.18 feet.

Some members report that a difference of one foot in elevation can mean 10 to 30 feet of horizontal distance of shoreline. And that is a lot of property to consider. The project team has heard that consistent high lake elevations are problematic for docks, cause shoreline erosion, and could be a risk to building setbacks. The project team has also heard that the wetlands on the north shore of the lake are very flat and that even a modest reduction in lake elevation could negatively impact these.

At the October 2018 SAC meeting, the project team committed to examine this issue further using available lidar elevation data.

The project team's research showed that a foot of elevation can mean tens of feet of horizontal distance on the east and west shores, more so on the west shore than the east shore, because the east shore is generally steeper. The north shore wetlands, though, are extremely flat relative to the rest of the lake. It appears from the lidar that the north shore is approximately 40 times flatter than the east and west shores. Going from 27 to 29 feet in vertical elevation on a typical section of the west shore is a horizontal distance of a little over 30 feet. On the north shore it is more than 1,300 feet. A modest rise or fall in lake elevation has a significantly bigger effect on the north shore wetlands than it does on the residential areas.

Because of this phenomenon, the project team is constrained from proposing to regulatory agencies a significant drop in lake elevation. The lakeshore wetlands are protected by the Clean Water Act under Section 404, and the ESA, Section 7. Chinook on Lake Sammamish are not only protected by the ESA, but also subject to Tribal Treaty Rights.

When the ESA action area is proposed to the Corps at 30 percent design in a few months, the County will be required to document the presence and quality of the north shore wetlands, the extent to which they are used by ESA listed salmonids, and whether the proposed project would have any impacts on them.

## **Design Alternatives**

Jerry Scheller and Bill Fullerton from Tetra Tech then provided an overview of the design alternative analysis. Due to time constraints, the team was not able to discuss all slides in this section of the presentation. (Slides 17-24 were excluded from the presentation.)

The team is currently considering two split channel alternatives. These alternatives were compared to an existing, maintained condition in the baseline, "no action" alternative.

Design criteria were developed to meet all Flood Control District motion requirements, regulatory constraints, and existing maintenance and use agreements. Alternatives will be scored using the evaluation criteria which were provided as a handout to attendees.

Both split channel alternatives include a manually-operated dynamic weir in the mainstream channel and a static elevation weir inlet to the side channel. Cold-water concepts were evaluated and paired with each alternative as a second variation of each one.

## **Criteria**

The project team will use several criteria elements to assess the alternatives. Design criteria are items that are either original Corps project performance standards or that have hard and fast regulatory constraints. Any alternative developed needs to meet these criteria. One challenge is that the existing condition does seem to violate one of the Corps design criteria; 29 feet at 1,500 cfs is not met for some events. Design criteria that do not have formal scoring include the following:

- Hydrology and Hydraulics
  - Do not increase downstream peak flood flows
  - Maintain minimum lake level above 25.4 feet NGVD29
  - Maintain lake level below elevation 29 feet NGVD29 for 1,500 cfs below Bear Creek
- Aquatic Habitat
  - Maintain upstream and downstream fish passage
  - Avoid or minimize effects to lake fringe wetlands
- Recreation
  - Maintain navigation through the Transition Zone

The evaluation will also use scored criteria. These categories will be scored separately and normalized to 100 points each for ease of evaluation by distinct funding partners. Scored criteria include:

- Hydrology and Hydraulics
  - Lake stage
  - Redmond stormwater outfalls
- Aquatic Habitat
  - Salmon
  - Wetlands
  - Water quality
- Construction, Operations, and Maintenance
  - Construction impacts
  - Maintenance costs
  - Permitting risk

### **Cold-water Supplementation**

Bill Fullerton provided additional overview of the cold-water supplementation analysis that the team conducted. Four cold-water supplementation approaches were initially considered for this round of alternatives:

- Hypolimnetic withdrawal: This process consists of removing cool water at approximately 10<sup>0</sup> C and mixing with the surface water at the Transition Zone weir. Bill reviewed impacts of the hypolimnetic withdrawal on kokanee habitat based on water temperature and dissolved oxygen. Suitable habitat declines throughout the later summer. The long-term average amount of optimal kokanee habitat in September is predicted to decline 10 to 20 percent under the withdrawal scenarios modeled. In consideration of the County's

emergency declaration on kokanee survival and in consultation with various permitting agencies, this alternative is no longer under consideration for further analysis. For the time being it has been replaced by Concept 8 from the conceptual design Cold Water Supplementation Analysis that can be found on the project website (King County, 2014). This concept is a substitute high volume cold water supplementation mechanism that draws warm water from the lake surface and runs it through a manifold on the lake bottom to cool the water. This replacement alternative has the potential to release 10-20 cfs of cool water at the weir just as the hypolimnetic withdrawal had been intended to.

- Hyporheic exchange: This process consists of cooling water through exchange of surface flow with subsurface flow through the bed substrate. The hyporheic option involves promoting the exchange of surface flow and shallow subsurface or hyporheic flow in the stream bed of the side channel. A concern with the hyporheic cold-water option is its long-term sustainability from the possible gradual reduction in the level of hyporheic exchange from sediment delivered by Tosh Creek. This will be further addressed in the 60 percent design.
- Deep pumped groundwater: This process consists of pumping cooler groundwater and mixing it with surface flow at the Transition Zone weir or in the side channel. The original 2015 plan was for 1 well = 3 cfs in the shallow alluvial aquifer. This plan was based on assuming similar yields as wells drawing from shallow alluvium 1 to 2 miles away from the project area. For the current work, groundwater exploration was conducted to identify site specific aquifer characteristic. During the exploration, the shallow aquifer encountered from 0 to 70 feet and another aquifer encounter between 170 and 255 feet were deemed unsuitable for pumping at the rate desired for cold-water supplementation. A third aquifer was encountered at about 600 feet that was more promising and it was tested. Overall yield was lower than expected. Further analysis requires more wells that are not paired with either alternative right now. The yield issue makes this cold water supplementation not cost effective relative to the lake withdrawal or hyporheic options and has been removed from consideration for the time being. This could be revisited in the future with further study of the deep aquifer. .
- No cold-water supplementation: Used as the baseline comparison, this approach includes no cold-water supplementation activity. This option could be used with any variation of the split channel alternative.

Two cold-water supplementation options emerged as viable: hyporheic and lake water heat exchange unit.

## Design Alternatives – Components

Bill Fullerton then reviewed the current design alternative components. To develop the two side channel alternatives, the team used all the analysis previously presented. The manually operated dynamic weir will be used in both alternatives. The plan form of the channel is highly

constrained which led to a single general alignment for the two side channel alternatives, but different channel geometry and pairing with the cold-water supplementation approaches.

The following alternatives are currently under development:

**Alternative 1** is a wide channel paired with the lake water heat exchange unit to maximize floodplain connectivity. It would modify existing weir with the manually operated dynamic weir. This alternative would include the following: remove willows from the center channel and regrade, create pools in the center low flow channel and place gravel in those pools, bench back the left bank floodplain, create high flow connections from mainstem and plant tall trees to provide shade over the main channel.

In developing the side channel design, the project team found several constraints due to elements such as the Tosh Creek alluvial fan, future expansion of W Lake Sammamish Parkway, tie-ins to Tosh Creek, sensitive cultural sites and potential wetland impacts.

The project team is currently working on designing recreation features. This alternative design will include dog access improvements, signage about the flood works and habitat, and portage options for small boats, and addressing sedimentation from the existing dog water access areas.

- **Alternative 1a:** Wide side channel, without lake withdrawal heat exchange unit.
- **Alternative 1b:** Wide side channel, paired with “big water” lake withdrawal heat exchange unit.

**Alternative 2** is a narrow channel with a passive hyporheic cold-water solution. It is narrow to maximize shading potential. This option has the same alignment and profile as Alternative 1, including the same mainstream and recreational features. Alternative 2 will have added features to maximize hyporheic connections. These features include narrower channel for shading, expanded depth and placement of gravel/cobble, sediment wedges, and added subsurface clay barriers to promote upwelling of subsurface flow.

- **Alternative 2a:** Narrow channel, without hyporheic flow exchange.
- **Alternative 2b:** Narrow channel, paired with hyporheic flow exchange enhancement/optimization.

**Alternative 3** is the ongoing maintenance option with no cold-water supplementation, using the existing weir and no side channel.

## QUESTIONS AND ANSWERS

Kate and Kristin then opened the floor to questions from SAC members.



**Q1: Could you provide a timeline, at least via email, of what the steps will be, so we understand the number of steps that are taking place? (Brian Landau)**

Kate responded that the next steps will include conducting the alternatives analysis, which will be shared with the Flood Control District for review and approval. Michelle Clark noted that the report will summarize how each of the 11 objectives in the authorizing project motion are addressed. The report will be transmitted to the board who are acutely interested in this project. She anticipates that the review process will take several months. The Flood Control District Board will then vote to approve the selected variation of the split channel alternative. The Flood Control District Board is taking interest in projects earlier in design and is committed to sharing their decision making at a public meeting.

Kate also said design information will be shared at the public meeting. Some of the permitting details are still not clear as an action area has not yet been defined. The action area relates to the 407 process and is biological, not geographic. Along with the Corps, the National Oceanic and Atmospheric Administration (NOAA) determines the appropriate action area. The action area is likely to be determined by chinook salmon and the potential effects on the species. Juvenile chinook salmon use the wetland habitats for rearing, and the County will have to demonstrate that the project will not adversely impact the wetlands. Wetlands share a boundary that is concurrent with ordinary high-water marks.

**Q2: The Bellevue Shoreline Master Plan (SMP) update set the level and permitting assuming that level. The ordinary high-water level is an assessment based on several factors. Is this the highest it could be or what it is? (James Mackey)**

Kate replied that the Bellevue OHW level was provided as an example only, but that the information is dated. The project team will have to do some additional analysis using current data and field measures.

In relation to James' question, SAC member Martin Nizlek commented that the Bellevue SMP was not adopted in 2004. Rather, the study was conducted in 2004.

**Q3: Does the ESA action area include the entire Sammamish River? (Paul Fendt)**

Kate replied that it's unknown as the ESA action area has not yet been delineated. It was not raised as an issue by the Corps ESA Coordinator. She noted that she frequently receives the comment "I'm really concerned about wetlands. The north shore area is very flat. Accommodations could damage wetlands. Accommodations could also impact property extensions." Aerial photos the project team is currently using demonstrate elevation levels and it's clear that the north shore is flat. The south shore is the next flattest, then the west and finally the east. However, the project team has not done a lot of analysis on this and there is a lot of variability on the lake. One foot of elevated lake levels can have a large impact on properties. This will be a major constraint for the County because of endangered species.

**Q4: The Washington State Department of Ecology did not accept the study in 2004. You may use the study, but you'd need to adjust it to be behind the true water level. The definition of ordinary high water is the key matter. Levels occur naturally and can change naturally. The problem that exists on the lake is that it could change (law permitting). I am unaware of any process that has permitted the OHW level to change. When the vegetation was put in, the current level jumped up and is consistently high even after maintenance. A differential of six inches makes a difference in impact of project loss as well as environmental degradation. During the period of deferred maintenance, residents faced approximately \$10 million in property damages. Our organization is not averse to environmental goals but is concerned that the project is not addressing better ways to maintain lake conditions. (Martin Nizlek)**

Kate asked Martin to clarify what vegetation he was speaking about: upstream, downstream, or Transition Zone. Martin replied he was speaking about all three. Kate replied that the Corps documentation captured a two- to ten-year return period with the assumption that the level was going to rise six inches and rise after 1998. Martin said he has seen contrary information and Kate said the team would be happy to share documentation.

**Q5: The model for the 1998 revision is reflected by the measurement you depict, correct? There wasn't any vegetation that was installed. Rather, it just was mowed or managed. The vegetation maintenance effort had a big impact. (Greg Helland)**

Kate answered that a minimum of ten years is preferred, but that there isn't a lot of data within that period. Greg then commented that it is a natural dynamic weir and the data limitations are problematic. Kate said water level changes and water levels would be subject to Corps concurrence and the County may need to ask the Corps to publish a formal determination.

**Q6: Public Works has been trying to determine the ordinary high-water mark to guide design and build efforts with Bellevue and Issaquah. Corps provided an addendum which identified 27 feet as the ordinary high-water mark, but it did not seem like they spent a lot of time on that determination. It seems like the Corps may have a different definition which is fine until we come to a nexus such as this. Ecology's definition pertains to land marks, soil characteristics, and debris. When my team conducted the study for Bellevue, we took 35 different stations in Bellevue and tried to determine variability. Anyone who wanted to develop had to conduct a water mark study. In my opinion, it has always been inaccurate that the Corps identified 27 feet as the ordinary high-water mark because 27 feet is under water. Work done along the shoreline is why the line is important. (Bill Way)**

Kate thanked Bill for his input.

**Q7: The ordinary high-water mark is the third rail of property and environmental studies and may not have value to this project given the determined action area. The definition of ordinary high-water mark has become so difficult and creates animosity. It is a very messy issue and people have become vicious in how they approach it in public and in court. Ecology has created a manual and was forced to put in a caveat that excludes property. Surveyors say the ordinary high-water mark is the common resting point of water. Ecologists have a different answer. (Dwight Martin)**

Kate thanked Dwight for his input.

**Q8: In this chart (referencing Slide 12), two lines at right have only one circle below them. How do they represent the three-quarters line? The sample set is too small and doesn't work for four years. The issues began in 1989 and the real concern is that the ordinary high-water mark is moving as we speak. It will be in a different location by the time this project is finished. I reject the report findings. Regarding low water elevation, it's clear that the low level rose in 1998 and there haven't been lake levels below that since then. Also, since the 1998 notch weir, the low water level is higher than it was. The low level is going back to dates in the 1990s. Residents and boat owners fear boats will slip under docks and rocking waves will cause bodily harm. I want to be sure the low level is accurately reflecting current levels in reports and analysis. How many homes would lose boat access? This is an important cost to owners. (James Mackey)**

Kate replied that Jim made a good point about the low level. She said the project team will revisit the criteria and look at the low levels. They will also examine Corps activities. The notch was added to the weir to allow for chinook passage. The sill was raised, and it increased the ordinary high-water mark. The project team needs to consider how tightly to bracket those lows and highs in the system. If one is adjusted, the other must also be adjusted. The project is limited by what it can do in the system and in the Transition Zone to regulate the realities in seasonal variation.

**Q9: I struggle with how many data points we have, because things have been changed and it doesn't consider how vegetation maintenance caused damage. As a property owner, I have concerns. If you can keep water level higher, it creates lower temperatures and more wetlands for fish. However, this conflicts with property owner needs. There is a conflict and we need to talk about those tradeoffs. Whatever is done, we'd like to see the performance bench marks. What is the plan if we do this wrong? (Scott Sheffield)**

Kate thanked Scott for his input.

**Q10: Why was 3 cfs with ground water and why was study on kokanee confined to 10 and 20? (Martin Nizlek)**

Kate replied they are different alternatives with one being significantly more expensive. Bill added that the study showed conception representation of the cold water. One of the concerns for Hyporheic is long-term sustainability. Sediment issues with Tosh Creek was important as well. The 3 cfs was based on wells in Redmond. This project decided to get site specific information. The team drilled the well to test and found it was not yielding flows that would provide 3 cfs. A single well only provided about 1 cfs (deep water ground).

**Q11: What is the oxygen level when you are pulling water out? I am concerned for salmon. (Scott Sheffield)**

Kate replied water would have to be aerated to support the salmon.

**Q12: What is the purpose of the high flow connections shown in the Alternative 1 drawings? (Paul Fendt)**

Kate replied that it is proposed new inundation. Bill added that the performance could be adjusted, but with back water in the system, there may not be a lot of exchange.

**Q13: Could silt be removed? (James Mackey)**

Michelle Clark replied there always must be a baseline that we measure against.

**Q14: What's not going to be designed? What is the decision structure? How is it going to be evaluated? Is water going down the stream and salmon? (Martin Nizlek)**

There are constraints on the side channel. At high flow: dance between water going over different locations. Jerry said topics were similar to what we discussed in preliminary design. Other factors include lake stages.

**Q15: The alternatives as depicted include big water with wide channels? Is there a reason that only these two are paired together? Could you consider big water with other options? I don't want the bigger cold-water option disregarded. (Jason Wilkinson)**

Bill Fullerton replied the project team can pair other channel options with cold water supplementations. Michelle Clark noted that the Flood District Control Board may consider several different combinations before the project reaches 30 percent design.

**Q16: What is the heat exchange unit and what is its impact on salmon? (David Kyle)**

Kate replied the team does not anticipate a negative impact of the heat exchange unit on kokanee or other salmon. Lake Sammamish is stratified in the summer months, meaning there are about 15 meters of warm water on the surface or epilimnion.

The thin middle layer is called the metalimnion and that is where the kokanee habitat is. Below that, at the bottom, is a thick layer of cold water, 10 to 15 meters deep, called the hypolimnion. The heat exchange manifold would run at the bottom of the lake and be buffered by that very thick bottom, cold layer preventing the kokanee habitat from warming up. Bill described current conception of surface intake and piping

**Q17: It is hard to attend meetings during business hours. Can we consider moving meetings to after 5 p.m.? (Mike Artzen)**

Michelle replied the project team will consider later times for future meetings. Kate noted that SAC meeting has been scheduled based on availability of most members.

**Q18: Speaking about habitat impact, it is important to account for elevation and diameter. What are the dredging impacts? I am excited by the prospect of hyporheic. No one looks at clean water supply. You are in situation with no sediment input at weir, meaning if the hyporheic were in the main stem instead of the side channel you wouldn't have to worry about sedimentation. Also, why are you putting in the clay? It should be uninterrupted inter-gravel flow. (Bill Way)**

Bill Fullerton responded saying the clay dams are meant to work with the sediment (gravel) wedges. The warm surface flow in the channel is infiltrated into the gravels in the sediment wedge. The subsurface clay dam at the downstream end causes the flow to resurface and upwell, mixing with the surface flow again. The dams do not prevent the flow from infiltrating at the upper end of the sediment wedge, as that process is driven by the elevation difference in the channel between the upstream end of the sediment wedge and the clay dam. The project team will be getting a better idea of water levels along the channel when it does excavation.

This strategy proved very effective on a stream restoration project in Idaho. It even created areas with springs in the overbank. For this strategy for generating hyporheic flow and exchange to work, there needs to be a gradient in channel. That is why the sediment wedges and clay dams are used only in the steeper side channel reach below the Tosh Creek confluence. If we placed clay dams in the very flat channel upstream of the Tosh Creek confluence, they would block the hyporheic flow; however, in the steep channel downstream of the confluence, the gradient drives the flow into and through the sediment wedge. The clay dams just result in the flow resurfacing.

Bill Way also briefly discussed carbon footprint and said Hyporheic has a lot of value and doesn't require the ongoing carbon input and maintenance. Michelle replied that these were all things the project team would be looking at.

**Q19: How do you keep the level at two and half feet in wide channel? How do you keep water in there? Some July's we have very little water. Our groundwater has iron bacteria. Does it have influence? Is it a manual type thing? (Nancy Myers)**

Bill Fullerton replied, It is purely hydraulics. Minimum of a foot depth will support fish transport. The project team is trying to cool a wider channel in some options. Shading could be used as another tactic.

**Q20: By enhancing the environment in this way, are we enhancing it for any predator species? (Nancy Myers)**

Bill Fullerton replied he is not a biologist, but salmon do have to spawn somewhere.

Kate replied that the idea with benching is that the project team will have created some shallow areas. There are not shallow habitats everywhere now. Kate said more is better. Jason Wilkinson also noted that focus is migratory and not all spawning. Kokanee may spawn in side channel. Nancy then asked which channel fish would prefer, and Bill said size of channel is overall similar.

**Q21: In looking at alternatives, it is possible to hear from other SAC members about what pros and cons they have for each option. Are there significant differences between these options? We are focusing very myopically right now. (Scott Sheffield)**

Kate replied that bracketing is creating constraint. This team must be responsible to get to 30 percent design and meet the 11 objectives put forward by the Flood Control District. Kate said the project team will provide the documentation for input during alternatives analysis. She said the team will take comments now and at other milestones. Kate also encouraged SAC members to reach out to the Flood District Control Supervisors (King County Council) to provide feedback.

**Q22: Will there be another SAC meeting? (Martin Nizlek)**

Michelle said SAC could reconvene after the Alternatives Analysis is complete.

**Q23: There is a lack of quantifiable process in analysis. It is quite subjective. The Dynamic weir is close to being thrown out, and there is a documentable difference when the weir is at 26 feet. I encourage you to look at flow models. What are true differences that will be witnessed? (Martin Nizlek)**

Jerry replied that the evaluation point is at the lake. Marty asked if the evaluation point level is likely to change. Jerry said it will be higher.

**Q24: I'm not seeing a social component: triple bottom line. Triple bottom line should be the norm for a project of this size. There are a lot of criteria currently and within each category they are weighted the same. Some are more important than others. Long-term costs should be weighted higher. Otherwise it can skew determination. (Brian Landau)**

Kate replied that within categories, the project team has talked about this as a weakness and they will talk about this more. The current process is to normalize scores. The Flood Control District will look at this. It is not the charge of the project team to weigh, but the team can talk about this more.

**Q25: Expanding on Question 24 above, could you explain the evaluation criteria table? (Charles Ifft)**

Kate replied that the project team developed evaluation criteria first (unbiased development). The Flood Control District motion states the need to balance the objectives, so they normalized among the categories to allow the Flood Control District to see the comparative value within categories. The team did not weight within the categories either, but that is something they could look at. Kate also welcomed recommendations from SAC members about weighting.

**Q26: Flood control should be weighted high. (Charles Ifft)**

Jerry replied that the project team borrowed columns from the design goals and objectives from the original design. None of the design criteria are completely new. Kate also noted the team does not have pre-1998 data on maintenance. It would require a massive effort of everyone along the lake to get that information. To get a sense of cost relevancies, the team would have a tough analysis. Kate said the team would love SAC member input by email on this topic.

**Q27: Economic impact is extremely important to everyone. [Question to Martin Nizlek] Why was \$10 million the number for property damage? Does high water equal more damage? If so, it's an economic damage that we can't understate. (Mike Artzen)**

Martin replied that his group asked 300 of 1,000 property owners about damage from lake levels. Two hundred twenty responded. Eighty percent reported that they had suffered losses. Martin said the average loss was \$14,000. He said he then extrapolated it exceeded \$10 million in total damages. Martin will send report to Kate.

Kate reiterated the team is hearing two things: the need to keep low levels at a certain level and manage storm events. Bracketing the ups and downs of the lake level in a tighter range than



present is proving to be very challenging given the many factors out of project team control and project scope such as Bear Creek Flows and large consecutive storm occurrences. Several of the highest lake elevation events have occurred during periods of high transition zone vegetation maintenance, so there are practical limits to how much the transition zone configuration can tighten the range of lake levels.

**Q28: I recall that the group developed the objectives and criteria in the concept development process. The City of Redmond is keeping an eye on the project as the city has all these issues to consider as they have lakeshore residents, businesses downstream of the lake, and ecological objectives in their own planning documents. I appreciate all the emails and updates. (Jeanne Justice)**

This was the final comment of the night, and the meeting concluded.

Two comment cards were submitted at the end of the meeting. Those scanned comment cards are included in Appendix A below.

**Appendix A: Scanned comment cards**

Comment Card 1

Please share any comments you have in the space below:

(Martin)

Levels at weir not lake, right?  
If 1/2' error, how can decisions of inches be acceptable?  
Model is →  
Calib to current maint. rally  
Swing Comparison to WA ±18"  
Cost to ~~residents~~ residents not included  
What scenarios antic. for 2 weir open.

DRAFT





⑥ Alternatives with Dynamic Weir (Seasonal) Need to Indicate/Evaluate when seasonally water flow is reduced/increased in synchronization with when rainfall is high vs. low in order to avoid spring floods after March 15 + in keeping with goal of 1962 design memorandum objective. Reducing outflow Feb 15 to June 30 (as in Dynamic Weir Report) seems illogical from a flood control objective standpoint.

**STAKEHOLDER ADVISORY COMMITTEE**

February 26, 2019

⑦ Project needs to consider and factor in Bear Creek impact and potential for dry summers - expand scope which will make value of Dynamic Weir more powerful in adapting to changing conditions to support flood control and lake level stabilization.

⑧ USE water level at the LAKE, not the weir for criteria in establishing lake level goals

Comment Card 2

Please share any comments you have in the space below:

9 yrs after Homeowners raised issue 6 yrs since project start. Project approval is still 5+ YEARS out and completion 10 years out

- ① While project continues, without removal of willows and remaining silt from TZ, vegetation which determines OHWM and wetlands designation are increasing. Criteria for "success" are no longer based on pre-maintenance failure but on post-failure "modified existing condition". This is unacceptable - if I take your land then wait 10 years and give you 1/2 of it back this is not justice
- ② DATA for period post 2012 maintenance is too short for an analysis based on annual highest water level - 6 data points - and appears too low in effort
- ③ Low summer water levels ARE dangerous to boaters at docks that are too high, reducing access where propeller may hit lake bottom (especially in waves), where boats no longer can dock - will county pay for and permit dredging to restore function to Homeowners - This was part of weir design
- ④ Split channel reduces water available through weir for navigability of small human powered boats
- ⑤ Performance Scoring Sheet does not indicate baseline period for reduction of high water levels

