Clean Water Services

DATE: October 30, 2017

TO: Clean Water Services Advisory Commission (CWAC) Members and Interested Parties

FROM: Mark Jockers, Government & Public Affairs Manager

SUBJECT: REMINDER OF AND INFORMATION FOR NOVEMBER 8 MEETING

This is a reminder of the CWAC meeting scheduled for **Wednesday, November 8, 2017.** Clean Water Services will be hosting an optional pre-CWAC tour of the District's new Material Processing Yard prior to the Commission dinner and meeting.

5 p.m.
Optional CWS Material Processing Yard Tour
3990 NE 33rd Ave (south of NE Evergreen Road near Hillsboro Airport)

6 p.m.
Commission dinner for CWAC Members
CWS Main office, 2550 SW Hillsboro Highway

6:30-8:30 p.m.
CWAC Meeting

The CWAC meeting packet will be mailed to Commission members by November 1 and posted to Clean Water Services' website by at CWAC section of our website.

Please call or send an email to Mark Jockers (JockersM@cleanwaterservices.org; 503 681-4450) if you are unable to attend so food is not ordered for you.

Enclosures in this packet include:

- November 8, 2017 Agenda
- CWS Material Processing Yard Fact sheet
- Oregon Solutions Cedar Mill Creek Flood Remediation Collaborative Fact Sheet
- July 12, 2017 Meeting Summary

Clean Water Services Advisory Commission
November 8, 2017

5:00 p.m. **Optional Clean Water Services Material Processing Yard Tour**
3990 NE 33rd Ave
The new facility is located south of NE Evergreen Road near the Hillsboro Airport

6:00 p.m. **Dinner for CWAC members**

MEETING AGENDA

6:30 p.m. **Welcome & Introductions**

6:35 p.m. **Review/Approval of Meeting Notes of July 12, 2017**

6:40 p.m. **Oregon Solutions Team Cedar Mill Creek Flood Remediation Collaborative**
Clean Water Services is part of the Oregon Solutions Cedar Mill Creek Flood Remediation Collaborative, a partnership of local, regional, state and federal agencies; Cities; businesses; nonprofits; and other Washington County organizations who have agreed to work together to address flood risks while providing high quality natural habitat within the Cedar Mill and North Johnson Creek corridors. Governor Brown designated the Collaborative as an Oregon Solutions project in June at the request of Washington County/CWS Chair Andy. Staff will provide an overview of the Project, CWS' role and how it may aid the District in meeting new permit requirements.

- Anne MacDonald, Senior Water Resources Program Manager

Requested action: Informational item

7:25 p.m. **Clean Water Services Research Portfolio**
Clean Water Services supports a number of research projects that support innovation, provide improved design parameters for CIP projects, and promote due diligence related to use of new technologies. Staff will provide an overview of the 2018 research portfolio and their potential contributions.

- Dr. Ken Williamson, Regulatory Affairs Director

Requested action: Informational item

8:10p.m. **Announcements**

8:15 p.m. **Adjourn**

Next Meeting: December 13, 2017

Clean Water Services

MATERIAL PROCESSING YARD

A streamlined system at the new facility allows staff from Clean Water Services, partner cities and other jurisdictions to enter the yard, weigh their trucks, and track material much more accurately than they did at the old Material Processing Yard.

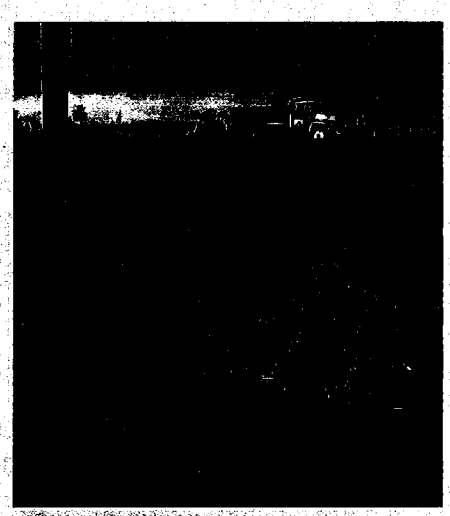
Maintaining a 120-square-mile urban stormwater system involves capturing many tons of material before it enters our pipes and streams. That material has to go somewhere, and most of it can be reused, once properly sorted and cleaned. That's where the material processing yard comes in.

Since 1998, Clean Water Services has processed the material that CWS and its partners generate through street sweeping, catch basin cleaning, pipe maintenance and related activities. For many years, this facility was located in Forest Grove, at Fernhill. It had a couple of basic pieces of equipment, and involved a labor intensive process that relied heavily on time, gravity and evaporation to dry the material before reuse or disposal. As the Fernhill Natural Treatment System grew, it became necessary to find a new location for the material processing yard.

The new yard is opening in the fall of 2017 near the Hillsboro Airport, just off Evergreen Parkway. It offers not only a more central location, but an entirely new approach to resource recovery. Using methods adapted from the mining industry and repurposed equipment, the new facility is designed to recover more and cleaner resources, more efficiently. It's an investment in the health of our growing region.

Benefits

- Higher percentage of material recovered for reuse.
- Faster dewatering times.
- More efficient processes.
- Streamlined truck-weighing system.
- Central location.
- Cleaner work environment.
- Demonstration site for low-impact development approaches.

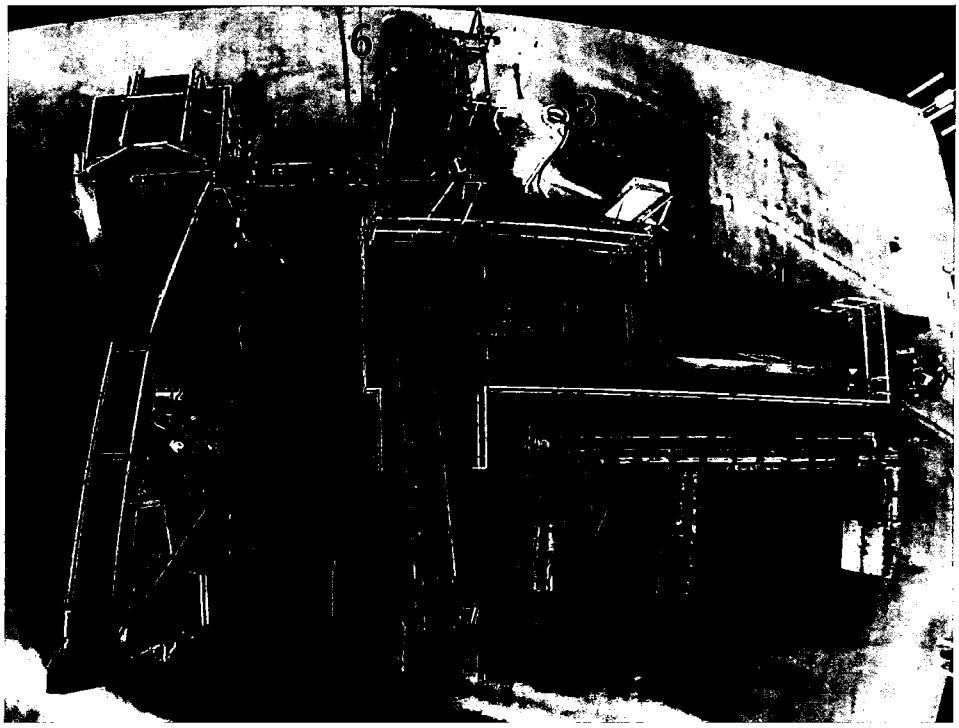


The old facility used the "put it on the ground and let it drain" approach, which is less efficient, particularly in our damp climate.

By the Numbers

- First year of operation: 1998
- New facility opens: 2017
- Cubic yards of material processed per year: 12,000
- Dollars saved for each one-ton load kept out of the landfill: $44.

MATERIAL PROCESSING YARD



How it works
Trucks arrive at the materials processing yard from points near and far in the Tualatin River Watershed. Staff from Clean Water Services, partner cities and other jurisdictions use their key fobs to enter the property and weigh their trucks.

This security camera photo shows what happens next to the material from catch basins, water quality manholes and pipes. This material, which is generally very wet, arrives in the vactor truck that captured it. The operator opens a large hatch and deposits the contents into the receiving pit (1). The trommel (2) and the mix box below it spin, wash and screen the material, using water (3) that recirculates. Litter and large debris travel on a conveyor belt (4) to a storage bin, and eventually to the landfill. After further processing by the sand screw (5), the rock and sand are suitable for reuse, and the water from the recovery/settling tanks (6) is ready to be used again.

The process for street sweeping materials is similar, but uses a different set of equipment and involves less water. The gravel, dirt and leaf debris that remain after the processing are suitable for certain uses, such as construction backfill,non-residential landscaping and quarry reclamation. Depending on test results, expanded uses may be possible in the future.

A backup material storage area (7) is available when needed due to staffing levels, equipment maintenance or other factors.

Resources
Learn the who-when-where-why of street sweeping: **cleanwaterservices.org/for-residents/street-sweeping**.

Find stormwater regulations, reports and more: **cleanwaterservices.org/stormwater**.

What's next
Goals for the first year of facility operations include:

- Test recovered resources to determine if they qualify as clean fill.
- Negotiate additional facility use agreements with jurisdictional partners.
- Install plants and growing medium in LIDA demonstration planters; begin measuring water quality results under variable conditions.
- Refine operating procedures as needed.

Considerations for the longer term include:

- Highest and best use of recovered materials.
- Possible co-location of additional functions.

Revised October 2017

OREGON SOLUTIONS

Cedar Mill Creek
Flood Remediation Collaborative Fact Sheet

We Want to Hear From You

This collaborative effort will require cooperation from many different parties, including you. No single entity is responsible for the flooding, but we can all be a part of the solution. Visit the project website at **www.cmnj.org** to learn more. You can sign up to receive future updates, share your comments and request a presentation to your civic, business or interest group. Or, call 503.477.5615 for more information and to leave comments.

Cedar Mill Creek Flooding

Cedar Mill Creek and its major tributary, North Johnson Creek, drain more than 5,300 acres of eastern Washington County, starting in the West Hills before joining Beaverton Creek in the Tualatin Hills Nature Park. Over the last century, the landscape has been altered to accommodate logging, agriculture, transportation and—beginning in the mid-20th century—urbanization. Wetlands were drained and filled; streams were straightened, buried or re-routed. Many structures were built along the altered streams and in the floodplain before rules were in place to prevent flood-related impacts. With increasing urban density and changing rainfall patterns, homes, businesses and roadways are experiencing more flooding, with the lower reach being most affected.

A Collaborative Approach to Flood Management

The Cedar Mill Creek Flood Remediation Collaborative is a partnership of agencies, businesses, and other interested organizations in Washington County who have agreed to work together to address flood risks while providing high quality natural habitat within the Cedar Mill Creek and North Johnson Creek corridors. Oregon Solutions is guiding this effort by bringing many stakeholders together to better understand local flooding and reach agreement on how we can work together to address these issues. This team is supported by technical experts who are helping to develop a thorough and collaborative way to address flood risks and improve drainage for this area.

1. Shared Understanding
November - December 2017

2. Current Projects: Opportunity Identification
November - January 2018

3. Collaborative and Regulatory Opportunities
February - March 2018

4. Potential Funding and Governance
April - Early June 2018

5. Declaration of Cooperation
Late June 2018

Schedule

Spring 2018
Public Input on Potential Options

Summer 2018
Declaration of Cooperation

Fall 2018 onward
Implementation Begins

This is a long-term process that will take years and commitment from many people.

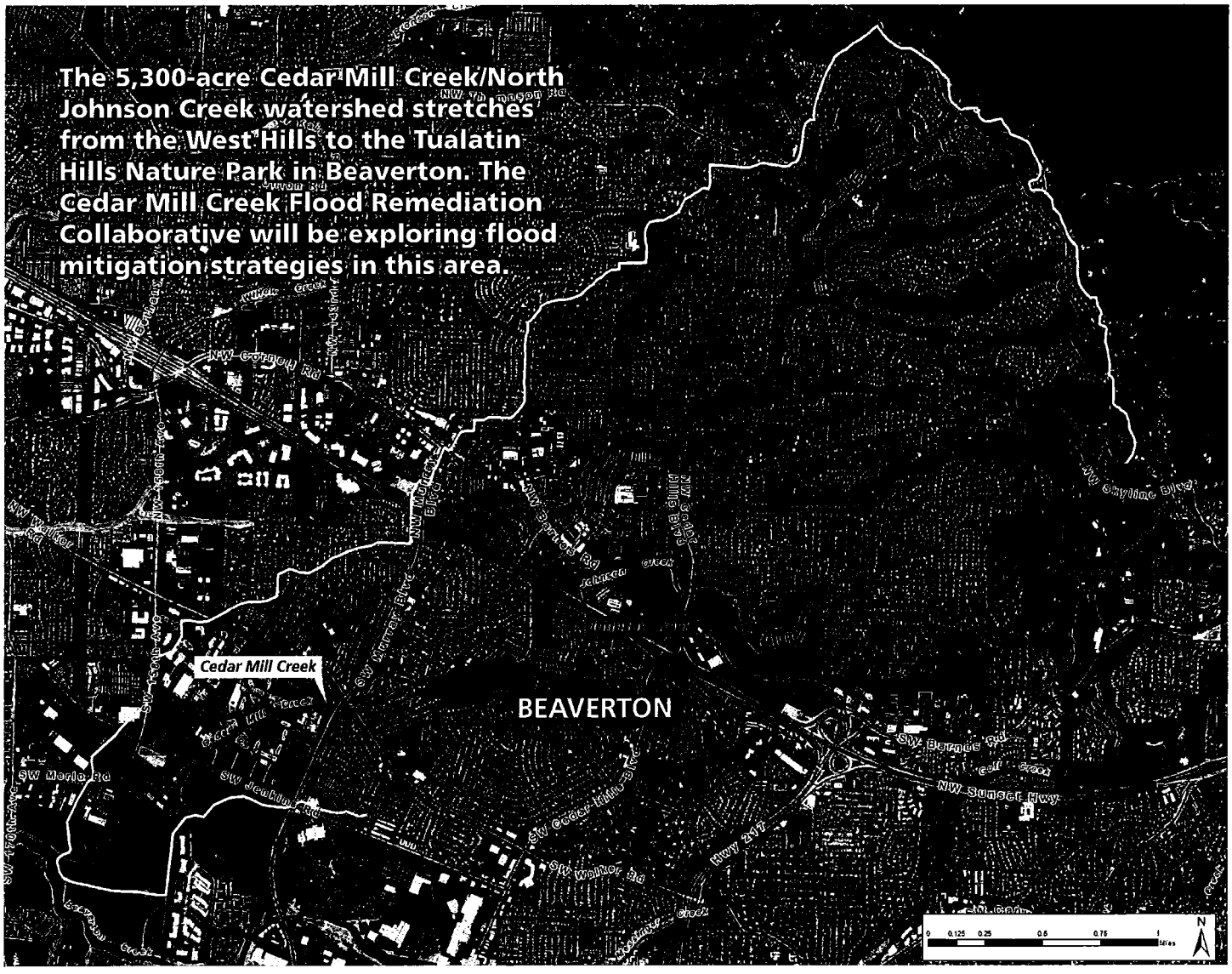
OREGON SOLUTIONS

Cedar Mill Creek
Flood Remediation Collaborative Fact Sheet

Goals of the Collaborative

- Create an approach that minimizes or mitigates flooding impacts while considering economic development, habitat value, and quality of life concerns
- Develop a plan that can be phased
- Identify funding sources
- Consider how multiple agencies' regulations can be addressed in a way that results in the greatest possible good for the public and for the ecosystem, i.e. a basin-wide assessment approach

The Cedar Mill Creek Flood Remediation Collaborative is an Oregon Solutions project, designated by Governor Kate Brown on June 19, 2017



Funding for this phase of the project is provided by Washington County, Clean Water Services and Tualatin Hills Park and Recreation District.

Clean Water Services
Clean Water Advisory Commission
Meeting Notes

July 12, 2017

Attendance

Commission members in attendance included Chair Tony Weller (Builder/Developer), Vice Chair Mike McKillip (District 3-Rogers), Molly Brown (District 2-Malinowski), Lori Hennings (Environmental), John Jackson (Agriculture), Judy Olsen (Agriculture), Stu Peterson (Builder/Developer), Erin Poor (District 1-Schouten), Richard Vial (District 4-Terry), Matt Wellner (Builder/Developer), and Kevin Wolfe (Business), as well as non-voting members David Waffle (Cities) and Bill Gaffi (Clean Water Services District General Manager).

Commission member Art Larrance (At-Large-Duyck) did not attend the meeting.

Attending from Clean Water Services were Elle Allen (Development Services Supervisor), Nora Curtis (Conveyance Department Director), Mark Jockers (Government and Public Affairs Manager), Anne MacDonald (Senior Water Resources Program Manager), Damon Reische (Development Services Division Manager), Diane Taniguchi-Dennis (Deputy General Manager), and Tom VanderPlaat (Water Supply Manager).

Shannon Huggins also attended the meeting as a member of the public.

1. Call to Order

Mr. Weller called the meeting to order at 6:30 PM. The meeting was held in the Tualatin Room at the Clean Water Services Administrative Building Complex in Hillsboro, OR.

2. Previous Meeting Notes

There were no comments regarding the Meeting Notes from June 14, 2017.

3. Design & Construction Standards Update

Mr. Reische ***(presentation attached)*** noted that Clean Water Services is about a year into what is expected to be a three-year process of updating the D&C (Design and Construction) Standards in response to stormwater-related requirements in the NPDES (National Pollution Discharge Elimination System) permit renewed in April, 2016. He reviewed the major drivers, timeline/deadlines, and process for the D&Cs Update, and the Commission's role as charged by the Clean Water Services Board of Directors, all of which have been presented in detail at previous Commission meetings.

The three major issues and deadlines under the NPDES permit are the 1,000 SF (square foot) treatment threshold (requiring treatment for development activities which add or

modify impervious areas of 1,000 SF or more), due April, 2017; LIDA (Low Impact Development Approach) prioritization (requiring LIDA as the first choice for treatment), due April, 2018; and hydromodification (requiring development activities to address the changes to watershed hydrology as a result of increasing impervious area during development), due April, 2019.

Phase 1 of the D&Cs Update, covering the 1,000 SF threshold and LIDA prioritization requirements, was completed in April, 2017, with LIDA a year ahead of deadline. Revisions mostly affected Chapter 4 of the D&Cs, but there were also changes to Chapters 1, 2, and 6, as well as Appendix B. Staff has developed educational materials about the updated rules, as some projects (such as a lot partition, or a new home on a previously unbuilt lot in an existing development) that were not subject to the old regulations will now be affected. Mr. Reische also described some of the coordination with city and county building/planning departments that will be needed under the updated rules. Staff is already working to smooth that transition. The updated D&Cs document, along with other resources for homeowners, builders, and developers, is available on the Clean Water Services website. It will be updated again when Phase II is completed.

Phase II will primarily address the hydromodification-related requirements in the NPDES permit. One part of this effort will be clarification and definition of stormwater management "approaches" rather than stormwater management "facilities." The new requirements will recognize that managing water quantity with facilities such as upland detention ponds is not the only way to protect water quality. For instance, a VC (vegetated corridor) is not a facility, but in limited circumstances (such as trails or a residential lot where it is difficult to get stormwater out to the street) it could be used as a treatment approach. Phase II will also emphasize site planning requirements that help prevent runoff in the first place, as well as standards for enhancing resiliency of natural resources to accommodate runoff. Overall, Clean Water Services is looking toward addressing hydromodification by restoring/managing entire stream reaches for stormwater, rather than managing stormwater lot by lot or development by development. The projects on Bethany Creek in the North Bethany area are examples of that.

The Phase II kickoff will be a public meeting August 8. Mr. Reische reviewed some of the elements to be considered in developing the hydromodification rules for the D&Cs. There will be several public meetings, an email list, and information will be posted on the Clean Water Services website (www.cleanwaterservices.org/dncupdate) as Phase II proceeds. Public and stakeholder input was very helpful during Phase I, and staff hopes for similar participation during Phase II. Questions or comments can be sent to DnCupdate@cleanwaterservices.org. Mr. Reische noted that proposed standards will be posted/released as soon as each piece is drafted, as was done during Phase I per Commission suggestion. Staff will also provide updates at Commission meetings. Mr. Reische reminded Commission members that their charge from the Board is to be a sounding board for public and stakeholder comments, and to host public meetings if particularly contentious issues arise.

Questions and comments regarding the Design & Construction Standards Update agenda

item are included in Appendix A.

4. Stormwater Management by Reach

Ms. MacDonald provided information about how Clean Water Services will meet the new NPDES permit requirements for addressing hydromodification ***(presentation attached)***. Hydromodification refers to the changes in natural hydrology (the movement of water through a landscape) associated with changes in land use that increase impervious area. As Mr. Reische mentioned earlier, Clean Water Services is moving toward managing the entire reach of a stream to accommodate stormwater, rather than just managing stormwater on one lot or one development at a time. The goal of the stream reach approach is to provide a suite of enhancements—the right things in the right places—to an entire stream that will create a robust and resilient infrastructure to last for decades.

Phase II of the D&Cs update will translate the stream reach strategy into standards as part of the hydromodification plan required by the NPDES permit. The purpose of the hydromodification plan is to protect, enhance, and/or restore the beneficial uses for water ("fishable, drinkable, swimmable") as required under the federal Clean Water Act. The stream reach approach to hydromodification is in keeping with the other watershed-based features of the permit. Ms. MacDonald noted that the stream reach approach can make it easier to integrate requirements of the Endangered Species Act and other regulations from a variety of federal and state agencies.

Ms. MacDonald described how streams in the watershed began to change in the 1800s as trapping, logging, and farming developed, and as more settlers moved in towns grew into cities with more pavement and concrete. The increasing impervious area of urbanization changes runoff patterns—more water comes off faster over a shorter period of time than it would if the landscape had remained in its natural state. This "spike" in runoff pattern results in erosion, stream incision, and decreased infiltration into the soil, each of which in turn creates other conditions that ultimately cause problems for fish, other animals, plants, and people/communities. The hydromodification plan is intended to protect water's beneficial uses by mitigating these adverse effects.

Stream reach stormwater management will still include current practices such as detention, infiltration, and vegetated facilities, but will also integrate stream and wetland and corridor enhancements as supplemental to LIDA. Streams can again access their natural floodplains, spreading out and slowing down the water from a storm event to allow time for infiltration and to dissipate the energy that would cause erosion and incision. Vegetation can be optimized to promote and maintain infiltration over the long term. Real-time controls can make detention facilities more effective by tracking storms on NOAA (federal National Oceanic and Atmospheric Administration) radar and monitoring actual rainfall data from weather stations to regulate the outlet so runoff is released below the erosion threshold; the facility is a pond when detention is needed, but otherwise functions as a vegetated stream corridor. Natural helpers such as beavers can also be part of the strategy. In addition to the work in North Bethany mentioned earlier by Mr. Reische, Ms. MacDonald described the plan for Abbey Creek as an example of

balancing upland and stream corridor efforts in an integrated stream reach approach to managing stormwater.

Ms. MacDonald reviewed the main considerations for developing the hydromodification plan and related D&Cs updates. One important consideration is the design storm (the simplified parameters—duration, intensity, and peaks—which stormwater facilities must be able to accommodate). She anticipates discussion of changing the current design storm criteria, as well as how to apply it in the context of an entire stream reach.

Ms. MacDonald described the staff work already underway on the hydromodification plan, and outlined two partnership projects being implemented.

Questions and comments regarding the Stormwater Management by Reach agenda item are included in Appendix B.

5. Tualatin Basin Water Supply Project/Scoggins Dam Repair

Mr. VanderPlaat provided an update on the Tualatin Basin Water Supply (Joint) Project and the Scoggins Dam seismic upgrade ***(presentation attached)***. The dam and Hagg Lake—the reservoir behind it—are owned Bureau of Reclamation, a federal agency. The Tualatin Valley Irrigation District (TVID), Clean Water Services and the Cities of Hillsboro, Beaverton and Forest Grove are the primary users of the water in Hagg Lake. Clean Water Services uses its allotment to augment flow in the Tualatin River during the summer and fall as part of the water temperature requirements under its NPDES (National Pollution Discharge Elimination System) permit. Up to 70% of river flow during the late summer and early fall is water released from Hagg Lake and cleaned water from treatment facilities.

Clean Water Services has been working with other water users and potential users to study and plan for future water supply, looking 50-100 years into the future. That group first met 17 years ago and the future is arriving: following a dry spring in 2015, Clean Water Services and Tualatin Valley Irrigation District used all of the stored water that was available to them during the summer and fall.

The idea of raising Scoggins Dam to increase the storage capacity of Hagg Lake emerged from the water supply planning group after evaluating a number of possibilities for future water sources. In the midst of discussions about a possible dam raise, new information came to light about the Cascadia subduction zone and the probability of a major earthquake. Reclamation's SOD (Safety of Dams) program inspection determined that Scoggins Dam is its most "seismically challenged" and would need substantial modifications to withstand such a quake. Since then, the idea of constructing a new dam about a mile downstream has gained attention in light of the costs and logistics of seismic upgrades to the existing dam.

Mr. VanderPlaat noted that following years of discussion and an act of Congress, Reclamation's SOD Program is now allowed to partner with other agencies seeking additional benefits including increased storage. - CWS is now working on the Tualatin

Basin Water Supply ***Joint*** Project, with Reclamation as the lead agency and Clean Water Services as the cooperating agency. Formalizing the partner relationship should make for a smoother process and also save time and money as the seismic requirements and the supply needs can be addressed together.

Mr. VanderPlaat reviewed the seismic options considered under Reclamation's SOD program as well as the water supply possibilities being discussed. The two most promising alternatives for meeting seismic requirements and increasing the existing water storage capacity of 56,000 acre-feet are a 25-foot raise of the existing 40-year-old earthen dam (in addition to seismic upgrades) which would increase capacity by 30,000 acre-feet, and a new roller-compacted concrete dam constructed in a natural gap downstream which would increase capacity by 50,000 acre-feet.

Mr. VanderPlaat described and compared construction methods and materials, timelines, costs and how they would be shared, capacity versus fill reliability, and environmental/community factors for each alternative. Environmental impact studies and feasibility design studies are underway to further evaluate each alternative. Reclamation will conduct drilling this summer to assess whether the soils and rock at the potential site of a new dam are suitable for construction. Clean Water Services has begun a feasibility design study of the new dam. Reclamation will provide the feasibility design study for the dam raise. Information developed through these and other activities will affect the final decision.

The cost per acre-foot of water a new dam would be less, and storage capacity would be far greater, than that of upgrading and raising the old dam. However, the Stimson lumber mill just below the existing dam would need to be relocated to suitable property and more/different landowners would be affected than if the existing dam were raised.

The project, whatever its final form, is already in Reclamation's funding pipeline, though it is uncertain how long it might take for the funds to become available. Estimates of costs and shares still vary widely at this point in the process, but Reclamation would pay 85% of the costs for the seismic upgrades to the existing dam and Tualatin Project repayment partners (CWS, TVID, and the Cities of Hillsboro, Beaverton and Forest Grove) would each pay a share of the remaining 15%. Reclamation would not pay for any costs associated with raising the existing dam to increase storage capacity; this cost would be incurred by CWS—the project beneficiary. Reclamation would help pay for a new dam in an amount equivalent to 85% of the cost for retrofitting the existing dam with seismic upgrades.

Mr. VanderPlaat noted that Reclamation would own the completed project, though it has recently suggested that local water managers consider title transfer from federal ownership to local ownership. Clean Water Services and the other repayment contractors first explored the idea in 2006 in hopes it might be a way to move forward more quickly than allowed by the federal process, but Reclamation indicated a title transfer for Scoggins Dam would take 6-8 years.

Mr. VanderPlaat concluded with a review of communication efforts amongst project stakeholders and decision-makers, and Mr. Jockers added kudos to the Oregon Congressional delegation and Clean Water Services Board of Directors Chair Andy Duyck and other members of the Board for their support in handling meetings with Reclamation staff. Mr. Jockers also noted conversations about the water supply project are generally well-received as the public safety aspect makes it a less partisan issue than many.

Mr. Jockers observed that the combined total investment in future community infrastructure with this project and the Willamette project will be close to $2 billion.

Questions and comments regarding the Tualatin Basin Water Supply Project/Scoggins Dam Repair agenda item are included in Appendix C.

6. Announcements

Mr. Jockers said there is no Commission meeting planned for August. The next meeting is scheduled for September 13, 2017.

7. Adjournment

Mr. Weller adjourned the meeting at 8:41 PM.

(Meeting notes prepared by Sue Baumgartner)

Appendix A

Clean Water Services Advisory Commission Meeting Notes
July 12, 2017

Questions and comments regarding Design & Construction Standards Update:

1. Has the "LIDA and Homebuilding" info sheet (mentioned in the presentation) been shared with the homebuilders association?
   1.1. It was just put up on the website a couple of weeks ago, but direct outreach is a good idea and staff will follow up on that.
   1.2. We will also talk about outreach efforts at the Phase II kickoff meeting.

2. Please clarify the sizing criteria from rain gardens to planters—is it 6% to 9%, as it is in some other jurisdictions in the metro area?
   2.1. It's 6% for certain types of facilities—there is no longer a distinction between LIDA facilities and traditional vegetated facilities. They are now all considered "water quality approaches" for stormwater. For something like a traditional vegetated facility with a residency time, the flow through the facility would be used for sizing.

3. How does allowing an exemption to use a VC as a water quality treatment approach for stormwater stop anyone who lives near a riparian buffer from just using that instead of the stormwater system?
   3.1. It is not an exemption; projects still have to meet the requirements in the design standards. Some projects will have specific and unique circumstances—trails would be the most common—that make traditional water quality treatment options for runoff impractical. In such situations, a VC can have value as a treatment option.

4. In Table 4.1, why is the VC as a filter strip an allowable public system but the vegetated corridor preservation is not?
   4.1. That wording is a carryover from the previous version of the D&Cs and refers to maintenance, not ownership. We were trying to recognize the filtering benefit from a VC while staying consistent with VC-related standards that were already in place. A VC is a treatment approach, but it isn't a facility; we were/are not looking for active maintenance of a VC.
   4.2. There may well be a few such inconsistencies and conflicts in the newly revised D&Cs from Phase I; staff expects to find/hear about them and clarify in Phase II.

5. Will the change in VC acceptability affect development projects that began under the old rules during the last boom, and now are moving again under the new rules?
   5.1. VCs were never allowable as the treatment "facility." The new rules don't take anything away; they just add the ability to use some of a VC as a filter strip in very specific circumstances.

5.2. Again, staff expects to find a few things that don't line up and will take a look at that, too.

6. How difficult was it to permit (through DSL—Division of State Lands, Corps—US Army Corps of Engineers, and other agencies) the Clean Water Services pilot project (shown in one of the presentation slides) on Bethany Creek that used grade controls and plantings instead of upland detention?
   6.1. It wasn't hard at all—it was essentially a stream restoration project.
   6.2. The Bethany Creek headwaters were part of an earlier private project that turned an old pond back into a stream but allowed for the area to flood as a way to manage runoff with real-time controls. That project was also approved by DSL and the Corps.

Appendix B

Clean Water Services Advisory Commission Meeting Notes
July 12, 2017

Questions and Comments regarding Stormwater Management by Reach:

1. Wouldn't the vegetated detention pond (shown as an example of real-time controls) be for a regional facility? Are we going to be doing real-time controls for a 10-lot subdivision?
   1.1. Yes, the pond shown is a regional facility.
   1.2. No, given the current economics we don't anticipate that requirements for real-time controls will be part of this D&Cs update, but maybe in 20 years…? We want to build infrastructure that will be in place for 50-plus years, so we just might find ourselves retrofitting small ponds 20 years from now.
   1.3. The use of real-time controls is one way we've been able to add flexibility and resiliency while reducing the footprint of a hard facility design. Passive controls are meant to handle that single design storm, but with real-time controls we've been able to successfully manage a wide variety of storms—including one that was way beyond the design storm—without harming the system downstream.

2. We need to think about amphibians (such as red-legged frogs and other species that are in trouble) as we're doing this (having detention areas that are sometimes ponds and sometimes not); it creates an ecological trap if they lay eggs and then you release the water.
   2.1. The pond shown (in the slide picturing examples of real-time control equipment) was formerly a nursery company's irrigation storage. When the site was developed, they restored the stream and now they basically have this inline pond that provides some detention ability. However, we are not looking to go in and create instream detention ponds. There may be opportunities for detention by reconnecting to the natural floodplain, but that would be a more natural process not involving real-time controls.
   2.2. The point to remember about real-time controls is that if you do need an upland detention pond, using that technology can reduce the size of pond required to accommodate the runoff.

3. It seems like inline ponds could provide an opportunity to work on an event scale. It's hard to time these various little projects to actually be of any benefit, depending on where they are in the basin and how each interacts with the rest of the system. But it could be an advantage to be able to change the controls at inline ponds in various locations to cause flooding sooner or later than it might otherwise occur. Timing really plays into this, but doing things in "silos" as we are now, we don't have that perspective.
   3.1. Your point about timing is a good one to keep in mind for other ecological functions as well.

3.2. Timing would also relate to considerations for wildlife (as a beneficial use of water) under the Clean Water Act.

4. The graph showing December 2015 rainfall as an example of how storms are exceeding design storm conditions is comparing apples to oranges. The current design storm was developed because of phosphorous issues and was based on a summertime event; it was never intended for wintertime treatment.
   4.1. Yes, but if the goal is infiltration rather than just filtering through, the current design storm may not be the most useful one to look at.

5. What about the warmer, wetter winters and more intense storms that are supposed to arrive with climate change; will that affect the design storm revision in the current D&Cs update, and might it affect how soon we next review the design storm?
   5.1. Yes, the idea is to make the system resilient, no matter what. The City of Portland has been looking at this in great detail and Clean Water Services has been talking with people at Portland State University about it. It may become a regional conversation.

6. Anything we can do besides project-specific facilities is great, but there will still be a need for project-specific facilities and now they'll have to be bigger because of the hydromodification requirements. If we change the design storm, would that increase facility size even more?
   6.1. We are trying to look at focusing our effort not on a project-by-project detention vault, for example, but on moving into the stream corridor instead. Where the site/project circumstances are appropriate, we want to look regionally—even in areas of infill-type development. This is where fee-in-lieu comes in.
   6.2. Fee-in-lieu is a fantastic option.

7. Keep in mind that many property lines are done along creeks—project boundaries don't line up with the neighbors' property and then you have multiple landowners who may or may not wish to cooperate with each other or with a developer—so in the non-expansion areas it will be hard for any one developer to do his required frontage because he can't even get to the half on the other side.
   7.1. Different sets of tools will be necessary on the infill areas than what we're able to use in the expansion areas.

8. Most facilities I designed never saw a design event. We should lower the design event and retrofit existing facilities to actually be useful. We have land designated for flood control that never gets used.
   8.1. We are also looking at retrofits as another part of our permit. We have another real-time control pilot project at a facility that was already in place on Butternut Creek, to explore whether an existing structure can be made more efficient.

9. It would be helpful to have real data and look at what a rainstorm actually is. Those (storm types shown in presentation) don't look realistic based on my 30 years of experience.

9.1. Traditionally, a design storm would be applied over the entire tributary area, but that's not how Nature works. Rain doesn't come down uniformly over a basin, so if you use that peak design storm over the whole area you are going to overestimate the flow. There needs to be an "area depth reduction" factor applied.

10. Because we don't know what the future holds we need to think with flexibility in mind, but concrete and steel are not very flexible. It makes a lot of sense to move toward more natural solutions that can accommodate a broader range of events and are less expensive, too.
    10.1. It will be decades before those natural solutions can be put in place everywhere, but you can't just shut down development in a basin while you're waiting for that, so there will have to be an interim solution. The overall direction is great, though.

Appendix C

Clean Water Services Advisory Commission Meeting Notes
July 12, 2017

Questions and comments regarding TBWSP/Scoggins Dam Repair:

1. Would the existing dam still need seismic upgrades if a new one was built downstream?
   1.1. No, there would be no need to reinforce it. There would be no need to breach it, either, though it would need to be notched to allow for flow.

   1.2. What is "reservoir restriction" (in the slide showing Joint Project Alternatives)? Reservoir restriction would simply lower the water level by 20-30 feet without any changes to the existing dam. Neither Reclamation nor Clean Water Services sees this as a realistic approach for Scoggins Dam, but it is just one of the options that Reclamation must consider for every dam it evaluates.

2. What about future municipal water demand?
   2.1. Municipal and industrial demand projections are not included in these scenarios This project is looking only at increasing the supply of water for flow augmentation.
   2.2. Beaverton, Hillsboro, Forest Grove and other cities will be getting their future municipal and industrial water from the Willamette Water Supply Project. However, Hagg Lake is their cheapest source and it already exists, so additional capacity would provide an option for drinking water if needed further in the future.

3. Weren't the past demand projections (that prompted the water supply study) for municipal water? Why would we need so much more capacity just for flow augmentation?
   3.1. Partly because changing regulations will require greater flow; partly because as the population grows the amount of wastewater moving through treatment plants will increase and the effluent will be warmer, so more flow of cooler water from the reservoir will be needed to counteract that; and partly because some carryover water will be needed, especially during drought years when the reservoir may not fill.
   3.2. Half of the thermal mitigation required by the NPDES permit comes from released water.

4. It's important to remember that water supply is long term—the horizon is 50 years or more. Think about the people that decided to do Bull Run for the City of Portland and look at who all it supplies today; think about Forest Grove developing its own watershed back when all they had was a cannery and a few people, and Tualatin building its connection to Bull Run when its population was 4,000.

5. There is no disagreement with the value of foresight, but we should still be sure the demand and future demand justifies the building of so much capacity.

6. How big is the Stimson mill site—what's involved in relocating it?
   6.1. Stimson owns 640 acres (one legal section), encompassing most of the land between the existing dam and the potential downstream dam site.
   6.2. The actual relocation site would need to be about 80 acres. Stimson would like to keep the mill in the same general area because of their local land and timber interests. The relocation site would need to have rail, power, and water service and be zoned appropriately (rural-industrial, which may require special approval from the state legislature).
   6.3. Clean Water Services has done a value analysis of the mill which recognizes the value of the rural jobs as well as the mill itself. The cost of compensating/relocating the mill and about 23 other affected residents would be about $100 million, which is included in the preliminary cost estimates for constructing a new dam.

7. Who will be doing the actual design and construction—will it go out on bid, will Reclamation engineers do it…?
   7.1. That is something that will have to be negotiated depending on which alternative is chosen. Clean Water Services is doing the design study on the new dam with Reclamation review, and Reclamation is doing the design study on the existing dam with Clean Water Services review.
   7.2. Clean Water Services would likely be able to get construction done more quickly but it may be problematic to arrange for reimbursement from Reclamation instead of the other way around.

8. Producing enough concrete for a project of this size could be a big issue—the construction industry already has trouble with a shortage of aggregate reserves.
   8.1. Yes, we have seen this first-hand as four bidders for a recent project withdrew because they couldn't be sure of getting the aggregate they would need.
   8.2. It is very expensive to haul rock, so there must be a close source of aggregate or the costs for a new roller compacted concrete dam would go way up.
   8.3. Stimson has a former quarry near the potential new dam site and we will see how much rock might still be available there.

9. The Willamette (drinking water) project will be done in 2026; when will this project be done?
   9.1. Roughly the same time; given recent conversations and activities, it looks like we would start moving dirt by 2023 and then it would be 3-4 years to completion.

10. Which is better for Clean Water Services—owning the dam or having Reclamation own it?

10.1.1. We could likely build it cheaper and quicker if we owned it, but the time benefit is lost if the title transfer takes seven years and then we would also be giving up Reclamation's share of the cost.

10.1.2. It seems like the title transfer could be expedited with Congressional action, and then might Reclamation just be willing to write a check for what would have been their share in exchange for giving up the long-term liability of ownership?

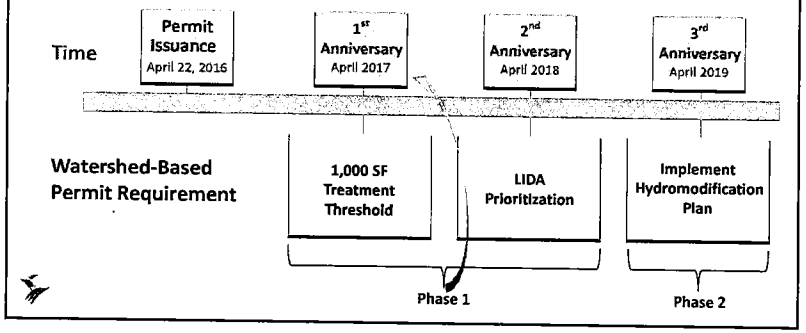
DESIGN AND CONSTRUCTION STANDARDS UPDATE

July 12, 2017

CWAC
Damon Reische, PWS
Development Services Division Mgr.

Clean Water Services

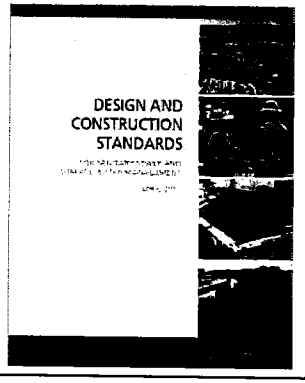
Design & Construction Standards Update Process



Topics Included in Phase 1 of Updated Standards

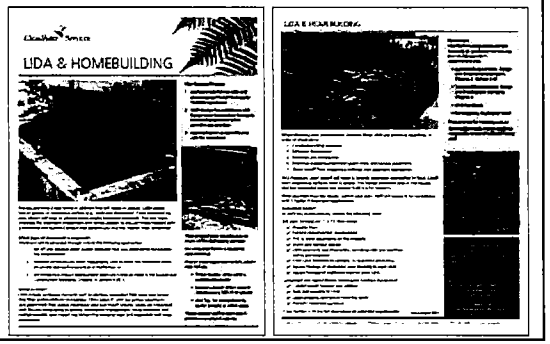
- Chapter 1 Definitions
  - Add & clarify existing definitions
- Chapter 2 Administrative Procedures
  - Erosion control permit threshold
  - 1200-CN references
  - Clarify maintenance requirements
  - Submittal requirements for Model Homes, "LIDA lots," construction on single family residential lots
- Chapter 4 Runoff Treatment & Control
  - 1,000 SF treatment threshold
  - LIDA prioritization
  - Redevelopment
- Chapter 6 Erosion Prevention & Sediment Control
  - Require supplemental plans to address:
    - Runoff control during wet weather
    - Dewatering
    - Concrete treatment of soils
  - Reference to stream and wetland restoration BMPs
  - Reference to 1200-CN
  - Protocol for use of chitosan
- Appendix B Standard Details
  - Update & standardize formatting
  - Minor content changes

Implementation of Phase 1 Standards



1,000 SF Threshold is a Big Change for Small Projects:

- Resources on CWS website
- Coordinate with Building Depts.
  - Plan Review
  - Inspection
  - O&M



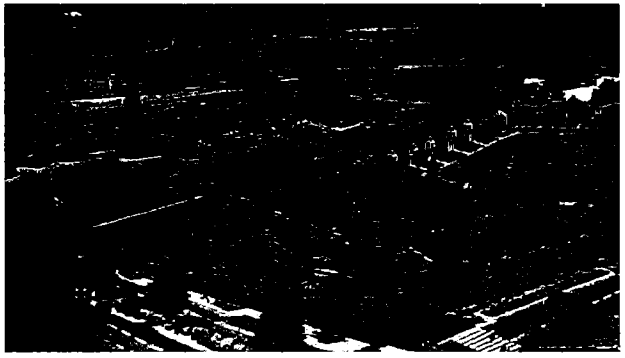
New Terminology

- Water Quality or Quantity Approach:

An engineered or natural feature designed or protected to provide stormwater management.

Approaches consist of water quality and quantity facilities, natural systems, and other low impact development approaches.

Phase 2 of the D&C Update & Hydromodification

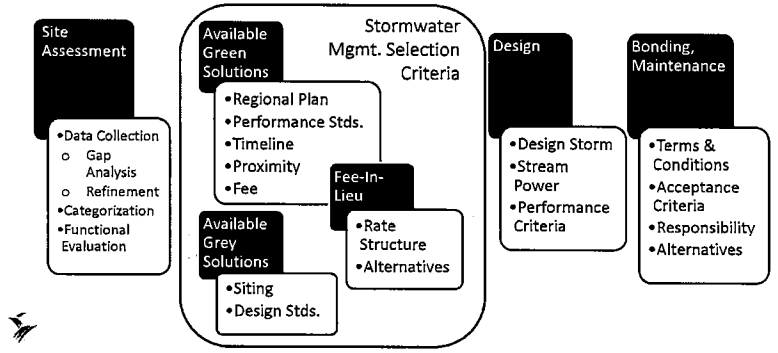


Phase 2 of the D&C Update

Outreach & Stakeholder Involvement

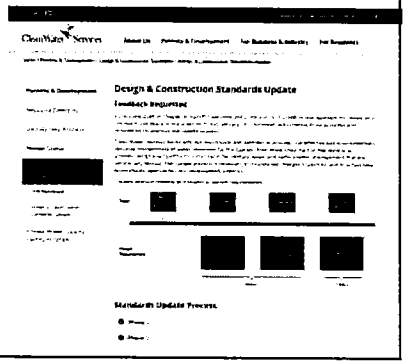
Phase 2 Kickoff Meeting	Hydromod. Work Plan	Draft Hydromod. Assessment	D&C Standards Update
August 8, 2017	Fall 2017	Winter 2018	April 2019
	Scope & Schedule	Strategic Concept	

Considerations for Integrating Hydromodification Into the D&C Standards



How to Stay Involved

- Check out the D&C Update Webpage
  cleanwaterservices.org/dncupdate
- Get on the Email List (link on webpage)
- Submit comments or questions
  DnCupdate@cleanwaterservices.org



STORMWATER MANAGEMENT AT THE REGIONAL SCALE

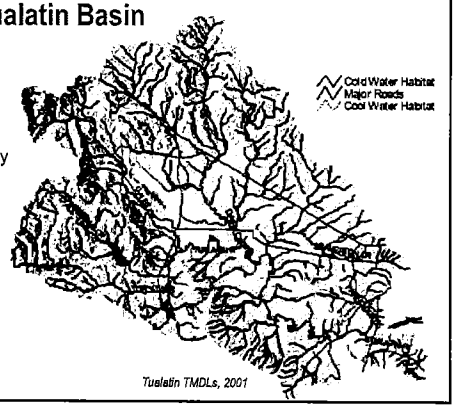
July 12, 2017

CWAC
Anne MacDonald, CEG
Sr. Water Resources Program Mgr.

Clean Water Services

Beneficial Uses in the Tualatin Basin

- Salmonid Spawning, Rearing
- Anadromous Fish Passage
- Resident Fish and Aquatic Life
- Public, Private Domestic Water Supply
- Industrial Water Supply
- Irrigation, Livestock Watering
- Hydropower
- Wildlife and Hunting, Fishing
- Boating, Water Contact Recreation
- Comm'l Navigation, Transportation
- Aesthetic Quality



Tualatin TMDLs, 2001

Clean Water Act & OR Rules

- Stormwater Part of Watershed Permit
- *Endangered Species Act (ESA) Consultation With EPA*
- *By project* via SLOPES*

Protect Beneficial Uses

- Cold, cool water habitat [*Listed species*]
- Irrigation, Recreation, Fishing, Aesthetics

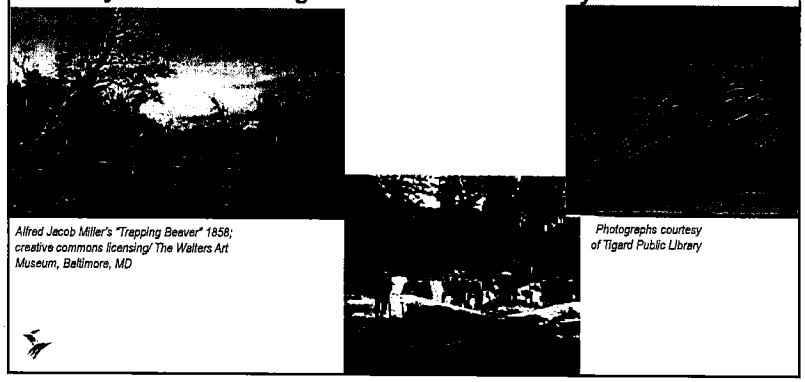
Water Quality Impacts

- Turbidity/ suspended sediment [SOD, P, Hg]
- Temperature

D&C Standards

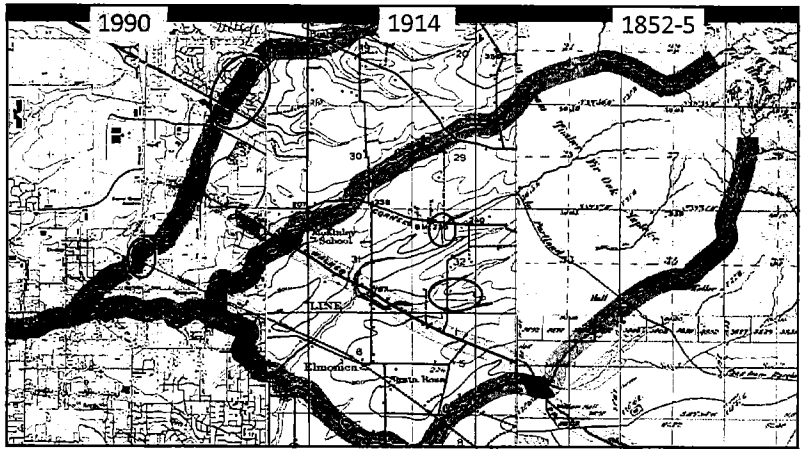
- Performance requirements
- Performance responsibilities

Early Channel Changes In the Tualatin Valley

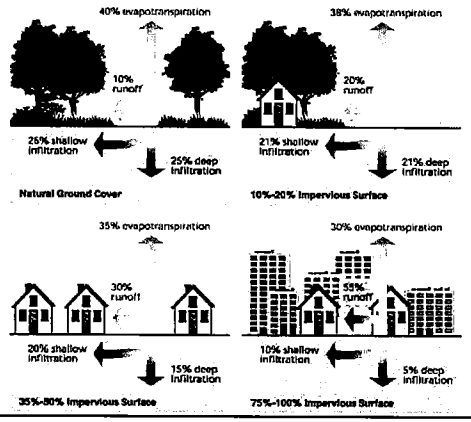


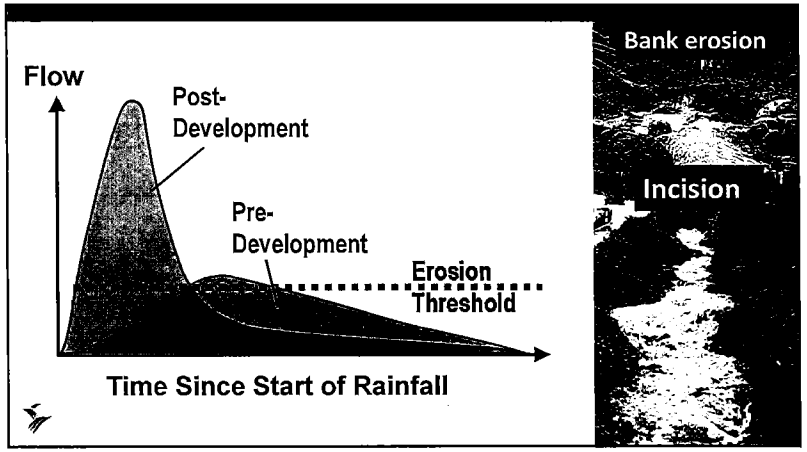
Alfred Jacob Miller's "Trapping Beaver" 1858; creative commons licensing/ The Walters Art Museum, Baltimore, MD

Photographs courtesy of Tigard Public Library

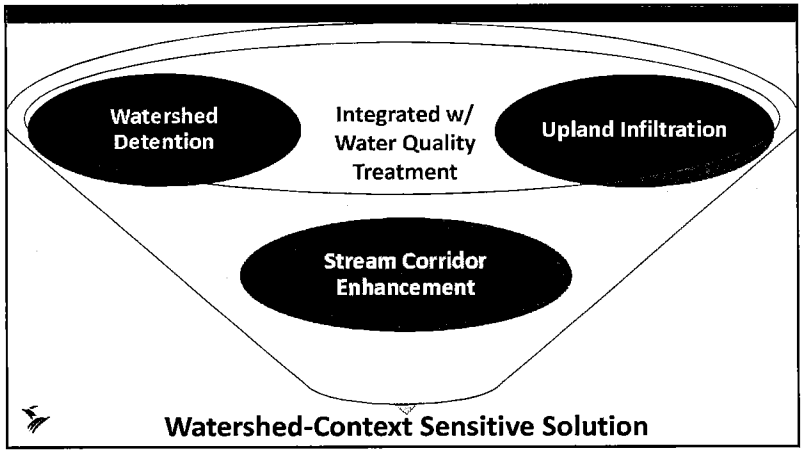


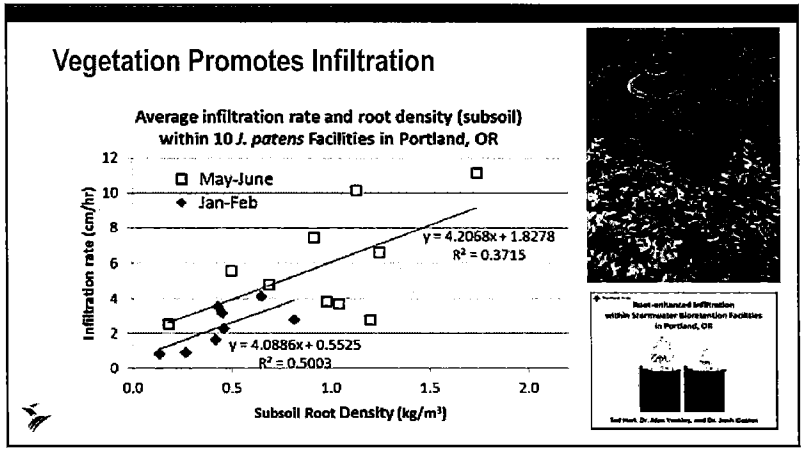
Urbanization–Related Runoff Changes

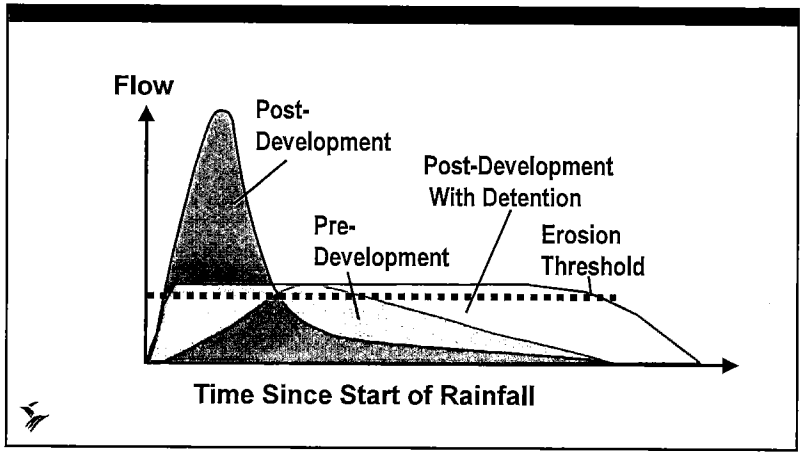


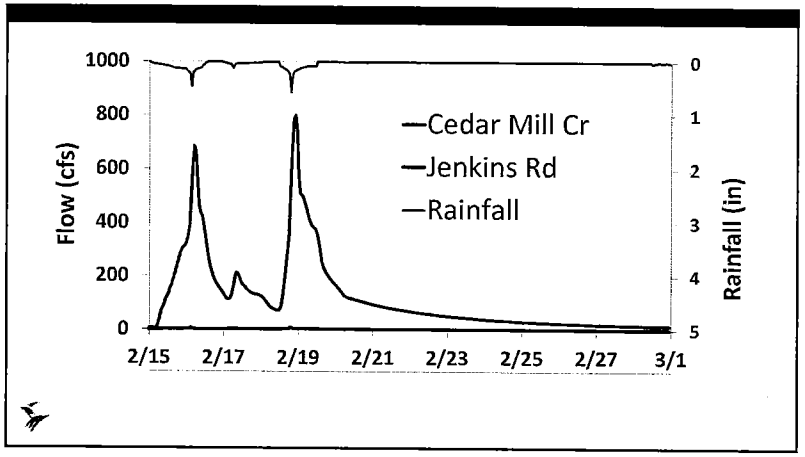


Water	• Increased runoff rates, volumes • Increased velocity, flow, and frequency of erosive flow rates • Decreased baseflow and increased summer instream temperature
Earth	• Reduced infiltration • Channel erosion (bed and banks), altered channel geometry (more uniform) • Increased turbidity associated with bed, bank erosion
Plants	• Reduced vigor from reduced baseflow • Riparian plant loss by erosion from winter floods
"Fish & Bugs"	• Lower foraging success → turbidity • Less algae, macroinvertebrates, spawning habitat → channel instability • Fewer flood/ thermal refugia → altered channel geometry, lower baseflow • Increased disease → increased summer temperatures
People	[illegible]

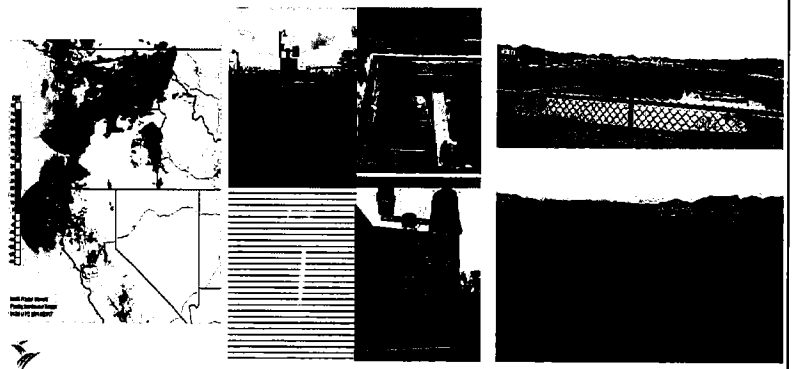






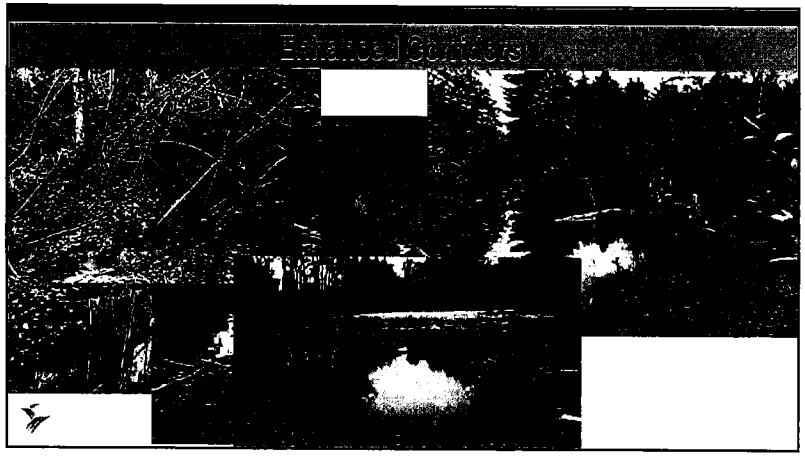


Real-Time Controls for Detention



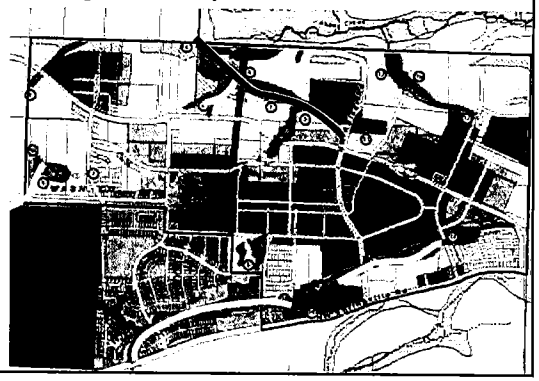
Stream Corridor & Wetland Enhancements

- In lieu of, supplemental to typical LIDA facilities & detention
- Weigh risk & opportunity in prioritization

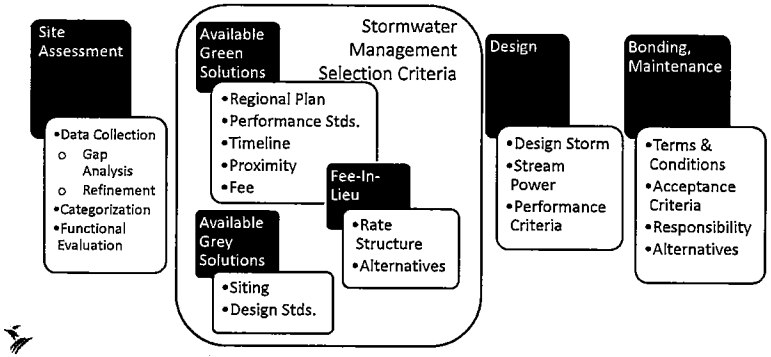


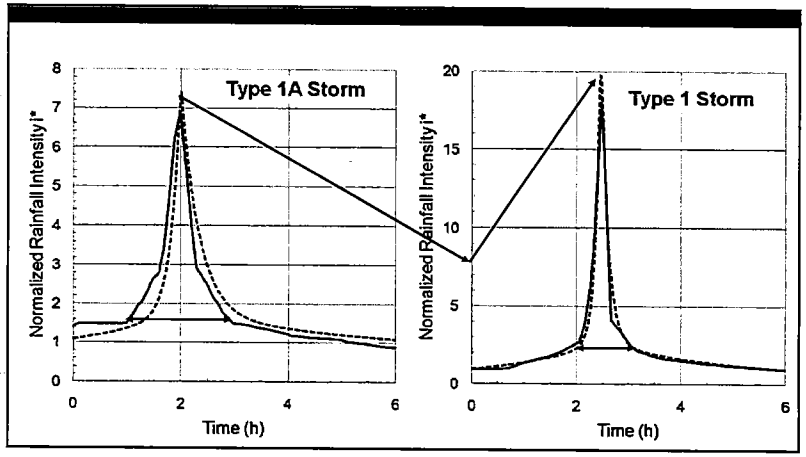
Integrating Stormwater Management of Uplands & Stream Corridors

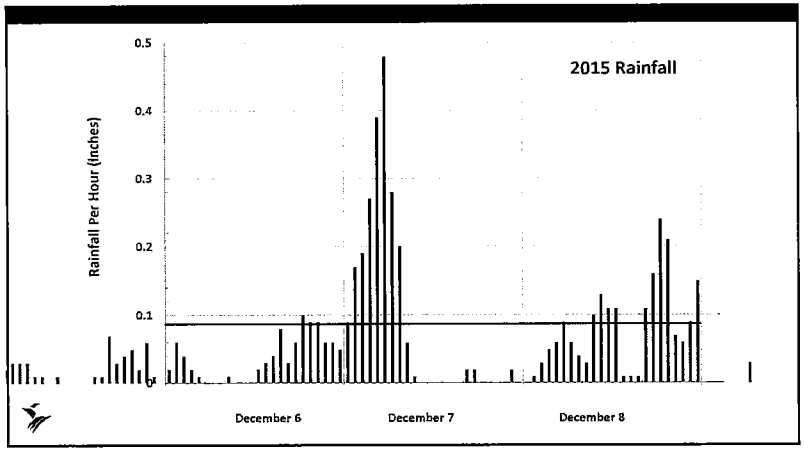
Abbey Creek example



Considerations In D&C Standards

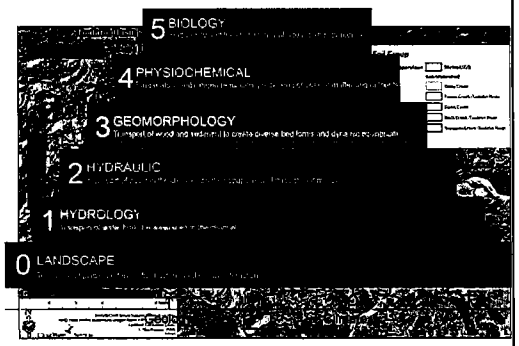






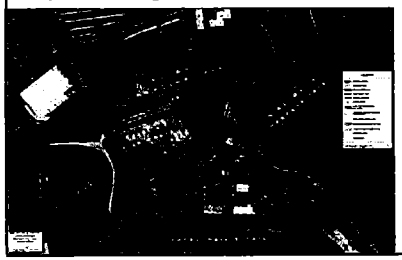
What's Happening Now

- Internal analysis:
  - GIS
  - Performance metrics
  - Decision points
- Work plan preparation for DEQ

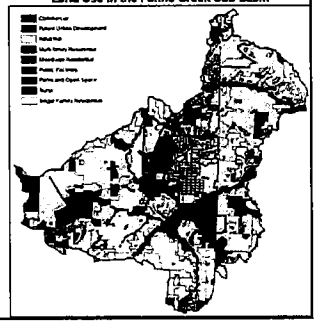


What's Happening Now (ctd.)

- Oregon Solutions/ Jenkins Rd. programmatic permitting



- Transportation & Growth Management grant



STAY TUNED!

"To restore a river you need to involve just about everybody."
- Paul Bruchac on the state of Colorado River, Denver Post, June 23, 2017

Tualatin Basin Water Supply Project

CWAC Meeting
July 12, 2017

Tualatin Basin
WATER SUPPLY PROJECT

What is been going!

- Passed Joint Project Legislation (Finally! An 8-year effort)
- Clean Water Services – NPDES Permit Issuance
- Working together on one Joint Project!
- Reclamation and Clean Water Services Partnership
  - Appraisal Review level of Alternatives Completed
  - Joint Project Team meetings
- Change Management

Tualatin Basin

JOINT PROJECT STATUS – Shared Goals

- Federal SOD Project
  - Protect public safety
  - New Policy Guidance (D&S)
- TBWSP
  - Protect public safety
  - Secure supply
  - CWS Long term needs

Tualatin Basin

Project History (why is this taking so long!)

- 2000 - 2004 – Water Supply Feasibility Study
- 2004 – 2008 – Joint Funding Agreement
  - 40 foot Dam raise and Multiple Source Option (25' raise)
- 2008- 2014 – CSZ Seismic Issue/ Safety of Dams Review
  - Most seismically challenged dam in Reclamation
- 2014- 2017 – SOD/TBWS Joint Project
  - Scoggins Dam raise – 12' to 25' raise – 15 - 30K Acre-feet
  - Downstream Dam - same as existing lake – 50K acre-feet

Tualatin Basin

Clean Water Services' Project Goals

- Need for Additional Storage
  - Water quality/NPDES Permit
  - All available stored water used in 2015 (future is today)
  - Demands anticipated to increase
  - Scoggins Dam is still best option

Tualatin Basin

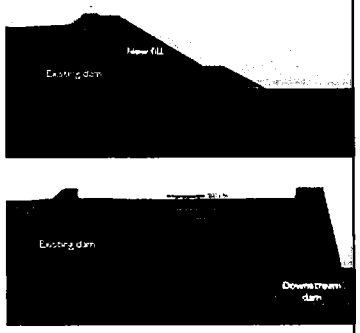
Benefits of CWS Stored Water

- Temperature Management Plan requirement
- Flow Augmentation for Water Quality Trading Program
  - Expensive alternatives – Chiller Units
  - Tree for All Program
  - Stored Water Releases are a high percentage of the river flow during the summer – up to 50%
- Stored Water needed for long range flexibility
- Increasing regulatory requirements for future flows

Tualatin Basin

Dam Alternatives

- Reclamation SOD
  - Modify existing dam facility Reclamation alternatives)
- CWS Dam Raise alternatives
  - Raise the existing dam
  - Downstream dam

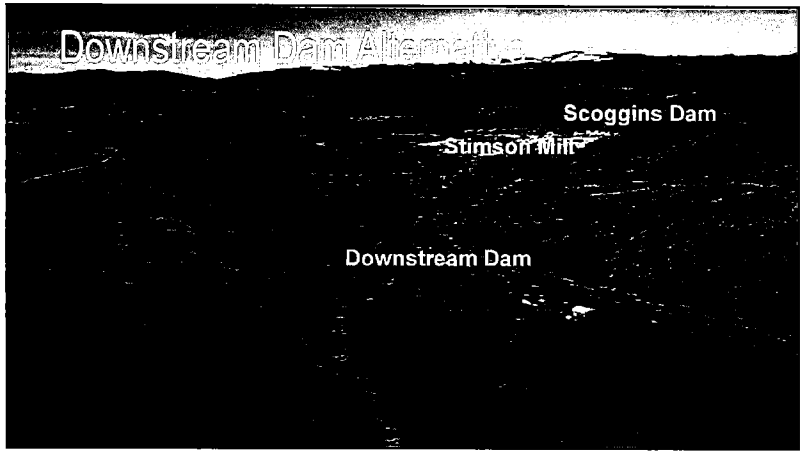


Tualatin Basin

TBWSP Joint Project Alternatives

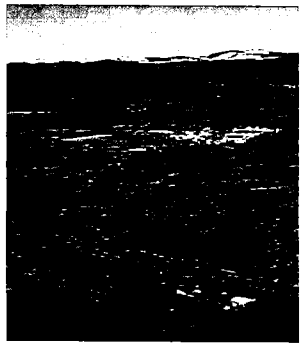
- Appraisal level evaluations complete
  - Reclamation – SOD
    1. Excavate and Replace (rockfill)
    2. Excavate and Replace (soil cement)
    3. Excavate and Replace (braced excavation)
    4. Do nothing
    5. Breach Dam
    6. Reservoir Restriction
  - CWS Raise
    1. Existing Embankment (15K or 30K AF)
    2. New RCC Dam Downstream (50K AF)

Tualatin Basin



Benefits of Downstream Dam

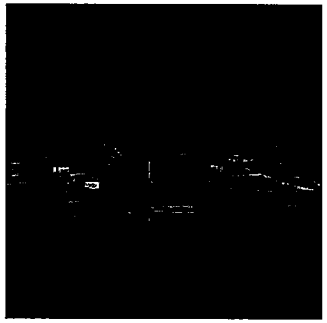
- Address seismic hazard
- At a narrow gap in valley
- Additional water storage capacity
- Potential cost savings
- Proven construction material
- Increase recreational opportunities
- Generational investment



Tualatin Basin

Challenges of Downstream Dam

- Inundation of larger area
- Limited Geotechnical information
- Stimson Mill and other properties
- Environmental concerns
  - Water Quality Protection
- Schedule impact
- Water rights



Tualatin Basin

CWS Dam Raise Reliability Review

- Existing Dam – 84%
- Two Pool Model Operation – 73 years of historical data
- Existing Dam Raise
  - 15K at 15K CWS annual demand – 54%
  - 30K at 30K CWS annual demand - 47%
- Downstream Dam (provides carryover supply)
  - 50K at 15K CWS annual demand – 85%
  - 50K at 30K CWS annual demand – 61%

Tualatin Basin

Appraisal Level Cost Estimates

	15,000 AF Added	30,000 AF Added	50,000 AF Added
Option 2 – Embankment		$571M	
		$19,033/AF	
Option 3 – RCC D/S			

- Option 1 – Reclamation SOD Cost $115M to $270M
- Option 3 include $ 100M for relocations and remediation

Tualatin Basin

Joint Project Cost Share Estimates (Planning Level)

- Reclamation SOD Shares (85% Federal and 15% Local)
  - Low estimate - $115 M – Local $17.25 M
  - High estimate - $270 M – Local $40.5 M
- CWS Dam Raise Share – (100% less SOD)
  - Option 2 (12' raise – 15K AF)- $322M to $167M
  - Option 2 (25'raise – 30K AF) - $456M to $301M
  - Option 3 (D/S Dam – 50K AF) - $238M to $83M

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Opportunities and Challenges

- Federal Funding – SOD Budget
  - Impact of other SOD Projects
    - Large Capital SOD – FY22
- Project Schedule
  - Feasibility Design – 2 to 3 years
  - Continued collaboration with Reclamation
  - Risk Concerns

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Stakeholder Communications

- New website – www.TualatinBasinWatersupply.org
- Newsletter for Project Update - 2017
- Project meeting with D/S Neighbors – March 22
- Washington DC Trip – May 2017
- Communications Plan for near term activities

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What's old is new!

- Title Transfer
  - Local Water Managers Coordination
    - Governance
  - Reclamation Coordination and Review
  - Schedule Impact
  - Legislation – Congressional Approval
  - Costs and Timing

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NEXT STEPS

- Joint Project Feasibility Level Designs –
- Environmental Review – NEPA Strategy
- Stimson Coordination – Incremental approach
  - Geotechnical Investigation (drilling)
  - Relocation (Mill and Adjacent Landowners)
  - Site Assessments and Remediation
- Water Managers and Stakeholder Coordination

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