12/14/17

Kevin Cook
Senior Planner
Multnomah County

Re: Case File No. PA-2017-7041. Metro's request to amend Multnomah County's Comprehensive Plan regarding Burlington Creek Forest (BCF) and McCarthy Creek Forest (MCF).

Kevin,
Enclosed is a letter I am sending to the National Marine Fisheries Service, along with enclosures.

I am trying to get a meeting with individual County Commissioners and should be successful in doing so with one or two, or more of them.

The enclosed is self-explanatory.

Regards,

Hank McCurdy

Exhibit D.3

December 14, 2017

US Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Services
12011 NE Lloyd Blvd. Suite 1100
Portland, Oregon 97232

Re: Metro's (Portland area regional government) request to amend Multnomah County's Comprehensive Plan regarding Burlington Creek Forest (BCF) and McCarthy Creek Forest (MCF) and the effect Metro's trails plans will have on the BCF's watercourses McCarthy Creek and Burlington Bottoms.

From: Hank McCurdy
14250 NW McNamee Rd.
Portland, Oregon 97231
503-621-3267
saveforestparkcorridor@gmail.com

Dear Sir or Madam:

Metro has requested that Multnomah County amend its comprehensive plan by adopting Metro's North Tualatin Mountains Access Master Plan (Access Plan) that the

Metro Council adopted in April 2016.[1] The County's planners are presently reviewing Metro's request and are preparing a report that will make recommendations to the Multnomah County Commissioners. The Commissioners may vote on the amendment request in January 2018.

The proposed amendment concerns four forests that Metro owns in the North Tualatin Mountains at the narrowest point in the wildlife corridor between the Coast Range and Forest Park. Two of them are slated for trail development, the BCF and the MCF. Metro's plans for both these forests concern watercourses that are important to EPA listed steelhead and salmon.

The BCF

The BCF is to the immediate west of Burlington Bottoms. It is a Bonneville Power Administration habitat improvement and reclamation site administered by the Oregon Department of Fish and Wildlife. The BCF is located at the bottom of a 900-acre watershed that is the sole source of cold, clean water for Burlington Bottoms. Burlington Bottoms also receives water during the winter

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[1] The Access Plan is available online. Page 28 of the Access Plan has a proposed trails map for the BCF. The abbreviations in this letter and in the erosion memo are as follows: 1.) CEL means conservation easement land and refers to about 315 acres in the watershed that feeds the Burlington Bottoms. The CEL is in eight private ownership hands and is subject to rather strict restrictions such as no clear cutting more than 10 acres every seven years, stream and riparian area protection, and others, which effectively preserve this land as a natural area, 2.) HH Assessment refers to a hydrology and hydraulics assessment done of the watershed and Burlington Bottoms as part of the habitat evaluation process engaged in shortly after the BPA acquired Burlington Bottoms as a habitat mitigation site, 3.) Full Funding Plan refers to Metro's application to the Oregon Department of Parks and Recreation for funding for its trails in the BCF.

and spring overflow of the Willamette River. The BCF is about 350 acres in total. The BCF and the rest of the watershed is zoned CFU, exclusive forest use only.

Metro's Access Plan mentions the existence of Burlington Bottoms, but thereafter completely ignores it. Burlington Bottoms is a remnant of once extensive wetlands that were part of the Columbia and Willamette River ecosystems. See Table A included with this letter. It is a partially completed list of significant species for which Burlington Bottoms is important habitat. Additionally, Burlington Creek, the main stream in the BCF is also according to Metro, highly likely to be used by EPA listed salmonoids.

An overall problem is that Metro has produced several versions of its trails plan for the BCF. It characterizes the Access Plan, the document it wants added as an amendment to the Comprehensive Plan, as a vision, and a guide to development. As a result it has developed several trails plans subsequent to publishing the Access Plan, including its latest trails map of October 2017. And, this last map was not even submitted as part of the great volume of documents and memoranda Metro submitted to the Multnomah County planners in support of its amendment request. Therefore, as demonstrated by past practice, there is a real danger that Metro will alter the trails plan as it sees fit because the Access Plan, if allowed as an amendment, will give it the authority to implement its vision, whatever that vision may turn out to be.

Thus far Metro's vision has been demonstrably in favor of intense mountain biking in the BCF,elevating recreation over protection of the habitat. Metro's vision presents a genuine risk of serious erosion and sedimentation of the BCF streams, Burlington Bottoms and also McCarthy Creek. Included with this letter is a map from the HH Assessment, which gives a good picture of the watershed and its relationship to Burlington Bottoms and McCarthy Creek.

Unfortunately Metro's vision is remarkably short sighted as Metro's ignoring the Burlington Bottoms demonstrates. But there is more. Metro has failed and refused to inventory the wildlife in the BCF and MCF before starting construction of its trails. Something ODFW asked it to do.

Depending on which version of the various trails maps Metro has produced for the BCF that one might choose, Metro proposes to add between 4.85 and 7 miles of new "multi-use" trails for mountain bikers and hikers. Multi-use is a euphemism for mountain bike trail since a great many hikers, generally those who are older and families with young children, will not use these trails for fear of injury from mountain bike/hiker collisions.

There is a tremendous demand for mountain biking trails in the Metro area because there are so few of them within twenty-five miles of the center of Portland. Even the best-designed trails will generate a great deal of erosion when overused. Metro has downplayed the intensity of use

its proposed trails will get claiming that use will be light. This is inaccurate. Use will be heavy. (Access Plan, p. 2).

The Essential Problem

Numerous steep ravines mark the BCF. The soil is highly erodible and the slopes are generally between 25% and 50%. Metro plans between two and five or six trail crossings in the BCF, again depending on which version of the trails map one selects.

The soil in the MCF is even more prone to erosion than that in the BCF. While the slopes where Metro appears to want to put trails in the MCF are not as severe as in the BCF, and while the trails proposed for the MCF are much less extensive, Metro has failed to overlay the slopes and streams clearly on its maps, something it is fully capable of doing. As a result, it is very difficult to evaluate how close trails come to, or if they are located in riparian areas. It is also difficult to determine the slopes of trail locations.

In its latest trails map for the BCF, the October 2017 map, Metro claims to have located the trails on much less steep slopes than previously, but even if true that does not resolve the question of whether or not too much sediment will be washed into the BCF watercourses and then into Burlington Bottoms and McCarthy Creek.

Added to the serious erosion problem based on the soil type and slope, there is the problem of overuse. The engineering report, which Metro has commissioned to evaluate landslide and erosion risk for the BCF describes the sediment that will be generated as silt with "fines content." This report, however does not evaluate Metro's

latest trails map, the October 2017 map, which adds a new segment of trails ("Nature Loop") and increases stream crossings. Nor does it evaluate the Access Plan trails maps for the BCF and MCF, the trails that Metro claims it wants as an amendment to the Comprehensive Plan.

Unfortunately, stream crossings are great sources of sedimentation before and after construction. There is abundant literature that documents the problem of sedimentation presents for spawning fish, but it is also well known that fine sediment interferes with fish gills making it harder for them to breath. Then too there is the problem of accelerating the eutrophication of Burlington Bottoms' lakes as described in the erosion memo included with this letter.

Although there was some interaction between Metro and the ODFW before the Metro Council approved the Access Plan in April 2016 it was not thorough. ODFW was handicapped by Metro's failure to inventory the wildlife. Metro ignored ODFW's advice to inventory the wildlife in the BCF and just went ahead with presenting its Access Plan to the Metro Council anyhow.

Now Metro has engaged with ODFW once again. Of great significance is that in the first round of engagement between Metro and the ODFW, the ODFW asked Metro to reduce the number of trail crossings. Instead, Metro did the opposite. It increased them.

Included with this letter are several pages of exchange between ODFW and Metro as well as Metro's trails maps for the BCF. Metro is now reengaging a full year after the Metro Councils' approval of the Access Plan, something it should have done well before putting the Access Plan forward as the plan for the BCF and MCF. As can be seen from the series of maps, Metro is significantly, if not radically altering its plan. The last one, the October 2017 version, adds a completely new set of trails, which Metro labels the "Nature Loop."

Again, this last map was not included in the submissions Metro made in support of amending the Comprehensive Plan with its "visionary" Access Plan. While this last version could in fact be a better plan the question still remains whether it presents unacceptable risks for the water courses in the BCF itself and of course, Burlington Bottoms and McCarthy Creek. The water flowing into Burlington Bottoms from the 900-acre watershed, of which the BCF is a vital part, supports six beaver dams in Burlington Bottoms.

I have put together an erosion memo that is part of what I am sending in to the County in opposition to Metro's request to amend the Comprehensive Plan. It is not quite a finished product, but it is complete enough to explain the serious erosion risk present in the BCF. Depending on where the trails are located they may pierce the water table that sits on top of the fragipan, a very compacted layer of soil below the Goble Silt Loam. Goble Silt Loam makes 96% of the soil in the BCF.

The MCF and McCarthy Creek

McCarthy Creek is listed by the Oregon Department of Fish and Wildlife as Essential Salmonoid Habitat. McCarthy Creek and Burlington Bottoms are part of the same floodplain habitat. McCarthy Creek has its headwaters in the MCF. After coming out of the headwaters that are found along McNamee Road and Skyline Boulevard, McCarthy Creek makes its way to Cornelius Pass Road. It flows along that road, goes under Highway 30 where it then proceeds along the northern edges of Burlington Bottoms into the Multnomah Channel.

It is well documented that McCarthy Creek is habitat for adult and juvenile salmon, both Chinook and Coho, as well as a healthy population of Cutthroat trout. A 2012 fish survey showed evidence of salmon spawning beds in McCarthy Creek. Metro believes it to also be a steelhead stream.

Part of the new trail Metro proposes in the MCF comes close to a significant McCarthy Creek headwater tributary. Whether this causes an unacceptable erosion risk is undetermined.

Sue Beilke, the ODFW biologist who has been in charge of administering Burlington Bottoms and Sauvies Island for a number of years, relates that the BCF's streams contribute to McCarthy Creek during increasingly high water periods. Burlington Bottoms and McCarthy Creek both flood throughout the winter and spring. Burlington Bottoms contains a series of braided watercourses and

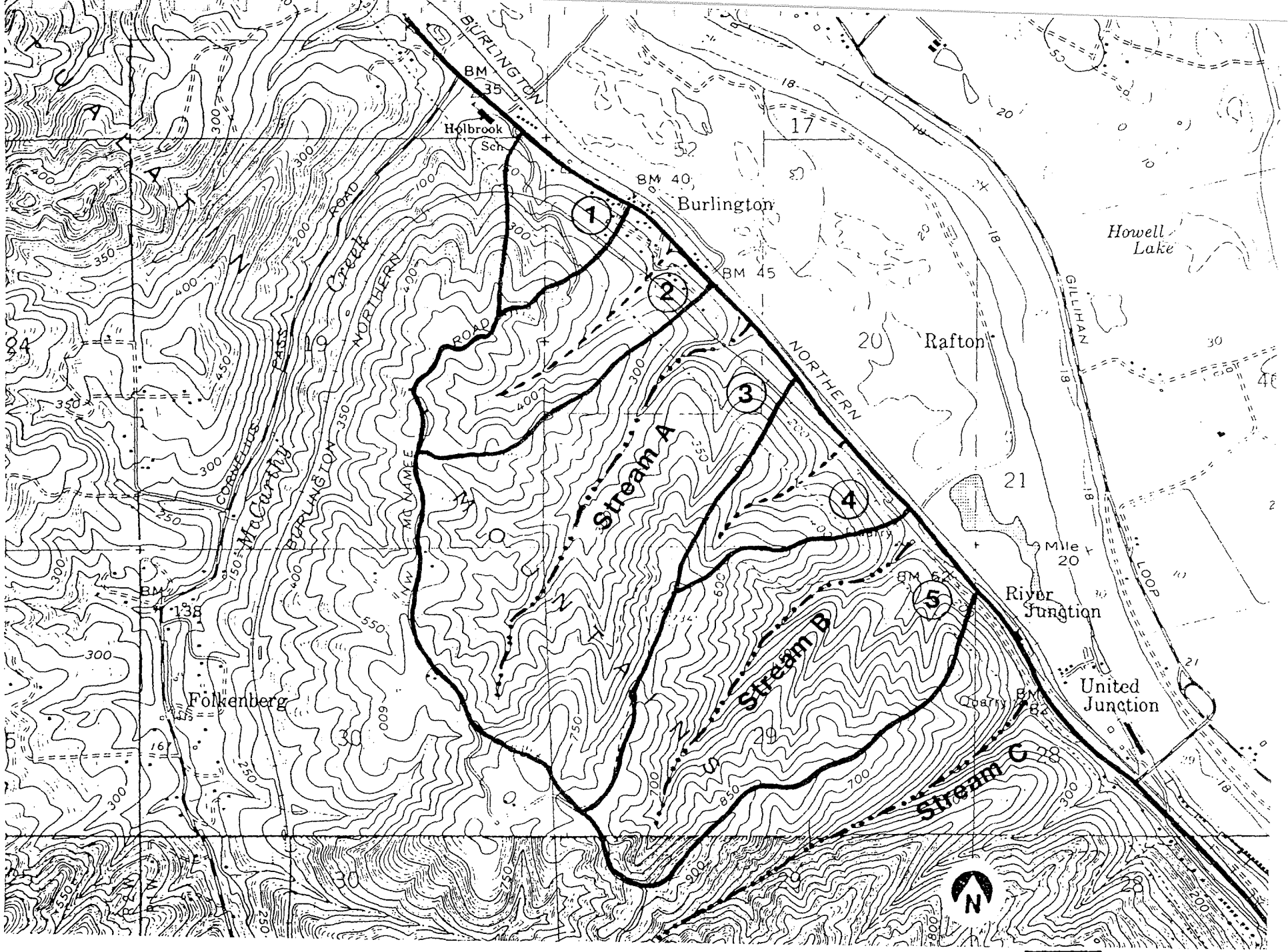
channels with connections to McCarthy Creek so sedimentation from the BCF watercourses will flow into McCarthy Creek during high water events.

It is my belief that Metro's plans present too great a risk to the dwindling runs of surviving anadromous fish that have been the iconic species of our region. Metro's plans need to be scrutinized much more closely than they have been.

Respectfully,

Hank McCurdy
saveforestparkcorridor@gmail.com
503-621-3267

Cc: Kevin Cook, Gary Shepard, Sue Barnes, Commissioners Lori Stegman, Deborah Kafoury, Sharon Meieran, Loretta Smith, Jessica Vega Pedersen



Contributing Sub-Basin Map

W&H PACIFIC

Figure 3

Table A[1]

I. Species	Endangered	Threatened	Candidate species	Sensitive or species of concern	De-liste
Coho Salmon	Yes: State &				

[1] The documentation of the presence of the species in Table A is as follows: Exh. _Burlington Bottoms Wildlife Mitigation Project, Appendix A "Fish and Wildlife at Burlington Bottoms." Appendix A lists the following endangered, threatened, candidate, formerly endangered species deserving of particular attention along with numerous other species of plants, mammals, birds, reptiles, amphibians and fish. The species deserving particular attention are Coho, Chinook and Sockeye Salmon, the Western Pond Turtle, the Tri-colored Black Bird., Columbia White Tailed Deer and the plant Howellia. The federal status of the salmon and steelhead species and steelhead can be found at http://www.nmfs.noaa.gov/pr/species/esa/listed.htm#fish, last accessed September 2, 2017, and at https://www.law.cornell.edu/cfr/text/50/17.11, also last accessed September 2, 2017. See Appendix A of this memo for a discussion of Sockeye Salmon and the division of responsibility between NOAA and some of the other federal agencies designated to administer parts of the EPA regarding the listing of species.

	Federal EPA				
Sockeye Salmon	Yes: Federal EPA				
Chinook Salmon	Yes: Federal EPA				
Steelhead	Yes Federal EPA				
Howellia		Yes: Federal EPA			
Western Pond Turtle		Threatened Oregon	Yes: Federal		

		EPA, Endangered Washington EPA	EPA		
Tri-Colored Black Bird		Yes Federal EPA	Yes: California EPA		
Townsends Big Eared Bat, aka, Pacific Big Eared Bat			Yes: California EPA Spe		
Bald Eagle					yes
Columbia White		Yes, - removed as a listed species			yes

Tailed Deer		Multnomah County			
Aleutian Goose		No longer listed			Yes
Red-Legged Frog				Yes: Oregon	

INTERGOVERNMENTAL CONSULTATION FORM

STATE / FEDERAL AGENCY REVIEW

A REVIEW OF A PROPOSED OUTDOOR RECREATION PROJECT WHICH FEDERAL ASSISTANCE HAS BEEN REQUESTED

Project Name:	Burlington Creek Forest Natural Surface Trails
Project Sponsor:	Metro Parks and Nature
Return Date:	Wednesday, April 26, 2017

To Agency Addressed: **This is a Federal Aid Grant. A comment is required.**
If your agency cannot respond by the return date, please notify us immediately.

PROGRAM REVIEW AND COMMENT

We have reviewed the subject notice and have reached the following conclusions on its relationship to our plans and programs:

[ ] It has no effect.
[ ] We have no comment.
[ ] Effects, although measurable, would be acceptable.
[X] It has adverse effects. (Explain in Remarks Section.)
[ ] We are interested, but require more information to evaluate the proposal. (Explain in Remarks Section.)
[X] Additional comments for project improvement. (Attach if necessary).

REMARKS

See Attachment 1

Agency: Oregon Department of Fish and Wildlife

Reviewed By: Susan P. Barnes, Regional Conservation Biologist, West Region
Name Title

Return to: Karen Vitkay
Metro Parks and Nature
600 NE Grand Avenue
Portland, Oregon 97232

cc: Rocky Houston, Recreational Trails Program Coordinator
Oregon Parks and Recreation Department
725 Summer St. NE, Suite C
Salem, OR 97301

Attachment 1. ODFW Remarks and Additional Comments for OPRD Federal Aid Grant

Project Name: **Burlington Creek Forest Natural Surface Trails**
Project Sponsor: **Metro Parks and Nature**

[X] It has adverse effects.

The proposed trails are expected to negatively affect movement and dispersal of native amphibians though habitat fragmentation and changes in micro-habitat conditions. Another anticipated adverse impact from trail development is direct mortality of amphibians that become entrapped in bike ruts and inadvertently run over. Adverse impacts are expected to be greatest where trail development is the densest (e.g., areas of multiple switchbacks). While these impacts are anticipated for all native amphibians known/suspected to occur at the Burlington Forest Creek site, of particular concern are northern red-legged frog, a protected species identified as a Species of Greatest Conservation Need in the Oregon Conservation Strategy (ODFW 2016). Northern red-legged frog and several other native amphibian species have been documented moving between the Burlington Creek Forest site and ODFW's Palensky (Burlington Bottoms) Wildlife Area. Movements are seasonal in nature with frogs moving from the moist forested habitats of the North Tualatin Mountains to wetland habitats at Palensky in the late fall/early winter for breeding/egg-laying, and then from Palensky back to the North Tualatin Mountains in late winter/early spring. Timing and patterns of overland movements are related to and affected by environmental conditions (e.g., air temperature, precipitation events). Please see ODFW's letter to Metro dated February 26, 2016 for more information (attached).

[X] Additional comments for project improvement.

ODFW appreciates Metro's mission to try to balance protection and improvement of habitat conservation values and provision of public access to nature and outdoor recreational opportunities. Designation of a core habitat area in the northern portion of the Burlington Creek Forest site, minimization of new stream crossings, and use of existing roads in the current proposed project is commendable. That said, ODFW offers the following comments for project improvement and to address the above described anticipated adverse effects:

1. ODFW recommends removing Trail # F and the 0.4 mi segment of Trail #D (Trail #A and #F connector trail) from the proposed trail development plan, at least until habitat use and movement patterns of amphibians (and other priority wildlife species) are better understood.

2. If the above noted trails are not removed from the planned project, ODFW recommends altering trail design specifications and implementing additional actions to decrease anticipated adverse effects on amphibians related to habitat fragmentation and entrapment.

E.g., use elevated trail designs to allow amphibians to move freely under the alignment and avoid direct mortality.

3. ODFW recommends considering amphibian movements between non-breeding and breeding habitats when planning and implementing seasonal trail seasonal closures.

4. ODFW recommends Metro coordinate with ODFW and amphibian conservation partners to design and sponsor an amphibian movement study at the Burlington Creek Forest site and/or other Metro properties to better understand local amphibian movement patterns between breeding and non-breeding habitat, the impacts of trail development and various recreational activities on amphibians, and strategies for anticipated mitigation adverse impacts.

Thank you for the opportunity to review and comment on the proposed project. If you have any questions please contact me at susan.p.barnes@state.or.us or (971) 673-6010.

Sincerely,

Susan P Barnes

Susan P. Barnes
Regional Conservation Biologist
West Region

Oregon
Kate Brown, Governor

Department of Fish and Wildlife
West Region
17330 SE Evelyn Street
Clackamas, OR 97015
Phone: 971-673-6000
Fax: 971-673-6070

February 26, 2016

Olena Turula
Metro
600 NE Grand Avenue
Portland, OR 97323

Re: ODFW Comments on Tualatin Mountains Natural Area Metro's Recommended Alternative

Dear Ms. Turula,

Thank you for the opportunity to provide input on the future management of the Tualatin Mountains Natural Area (TMNA), specifically Metro's proposed Recommended Alternative affecting the Burlington Creek Forest, Ennis Creek Forest, McCarthy Creek Forest, and North Abbey Creek Forest properties. The Oregon Department of Fish and Wildlife (ODFW) recognizes Metro secured the properties as a result of voter-approved bond measures and is tasked with protection and conservation of natural resource values while providing some level of recreation and other public use benefits. In accordance to our mission and authorities, ODFW has reviewed Metro's current proposal for the TMNA and offers the following comments and recommendations:

Comments:

Habitat loss, degradation, and fragmentation is the primary threat to Oregon's fish and wildlife. Invasive species, degradation of water quality, barriers to movement, and anthropogenic caused disturbances and hazards are additional challenges. Trails fragment habitat, are vectors for invasive species, and can increase sedimentation, negatively affect water quality. While there are benefits to providing access to nature, human presence and recreational trail development can have adverse effects on wildlife by increasing stress/reducing fitness, disrupting breeding and foraging behaviors, and increasing risk of direct mortality and illegal collection. Amphibians are particularly sensitive to changes in micro-habitat conditions and vulnerable to direct mortality and illegal collection. It has been documented that amphibians can get trapped in ruts created by off-road bike tire tracks, causing them to get run over or making them more vulnerable to predation and illegal collection.

All four TMNA properties lie within Oregon Conservation Strategy (OCS) Conservation Opportunity Areas and provide fish and wildlife resource values of interest to ODFW. The Burlington Creek Forest (BCF) tract is of particular interest to ODFW because of its proximity to the 417-acre Palensky (a.k.a. Burlington Bottoms) Wildlife Mitigation Area managed by ODFW. Palensky provides important habitat for a variety of wildlife species include migratory songbirds,

waterfowl, pond-breeding amphibians, and native turtles. Red-legged frog are a target wildlife species and are monitored annually as part of the mitigation plan for the Palensky Wildlife Mitigation Area. Even though separated by Highway 30 and Burlington Northern railroad lines, seasonal movements of native amphibians including red-legged frog have been well documented between Palensky and the BCF tract. Movements are considered significant and predictable based on observations of live and dead animals recorded since acquisition of the Palensky site in 1991. It appears that the BCF tract provides important foraging and over-wintering habitat for amphibians breeding at Palenksy, in particular red-legged frogs. For example, during a 20-minute period on one night in 2014, 46 red-legged frogs and 3 northwestern salamanders were observed crossing Highway 30 during a heavy rain event. This count was made standing opposite Burlington Creek (Beilke pers. comm. 2015). At the same location in 2015, 140 red-legged frogs were observed moving from BCF to Palensky during a single survey period. Red-legged frogs are on Oregon's Sensitive Species List (ODFW 2008), are classified as "Nongame Wildlife Protected" (OAR 635-044), and are Strategy Species in the OCS (ODFW 2006, 2016 *under review*)

ODFW is concerned that proposed trail development in BCF may negatively affect red-legged frogs and other native amphibians that regularly move between Palensky and BCF. ODFW is also concerned trail development on the generally steep slopes of the BCF tract may result in increased soil erosion and sedimentation into Burlington Creek and the numerous seeps, springs and unnamed tributaries present on the property. While ODFW expects wildlife in general to benefit over the long-term from Metro's planned forest management prescriptions aimed at increasing tree growth and developing mature / late-successional conifer forest characteristics (e.g., multi-layer tree canopy, snags and down wood), we are unsure if these actions will off-set negative effects likely to result from trail development (e.g., habitat fragmentation) and resulting increased human presence (e.g., disturbance).

Recommendations:

1. Avoid / Minimize construction of new trails and other infrastructure, especially in areas of high quality habitat. Utilize existing roads, trails and other right-of-ways (e.g., power-line corridors) whenever possible to reduce additional habitat fragmentation. Minimize the extent (length and width) of new trail and road.

2. Site new trails and other infrastructure away from streams, including headwater streams (perennial or intermittent). Recommended buffer widths are to be developed on a site specific basis and depend upon site characteristics (e.g., soil, topography), but generally ODFW recommends trails be sited at least 100 m from the 100-year OHW mark of streams, including intermittent and non-fish bearing streams.

3. Avoid / Minimize stream crossings by trails and roads. When crossing streams, use bridges or other designs that do not constrain the stream channel or impede fish and wildlife movement. Consider climate change in crossing designs.

4. Improve existing trails and stream crossings as necessary to improve/protect stream flow and riparian area function, water quality, and fish and wildlife movement. Decommission trails and roads whenever possible.

5. Select trail designs that minimize soil erosion and trail rutting, discourage access / use by amphibians and reptiles, and/or allow wildlife movement underneath trails at designated locations.

6. Implement seasonal trail closures to protect priority wildlife species, e.g., during the peak of amphibian activity (breeding season).

7. Survey / Monitor wildlife presence and habitat use patterns to inform trail siting, habitat management practices, and management of public access (e.g., possible seasonal trail closures).

8. Avoid and minimize direct mortality of fish and wildlife species present at the time of project construction, in particular species or age classes thereof that are not able readily move out of harm's way (e.g., amphibian larvae, aestivating turtles, nestling birds). Conduct vegetation management with wildlife in mind (e.g., nesting birds). Use exclusion techniques to keep wildlife out of active work zones. Conduct preconstruction wildlife surveys to locate wildlife. Note: an ODFW Fish Salvage Permit and/or an ODFW Wildlife CHTR Permit may be needed to facilitate avoidance / minimization of direct mortality to fish and wildlife that may be present.

We appreciate the opportunity to review Metro's proposed plans for the Tualatin Mountain Natural Area. If you have any questions or need additional information regarding ODFW's comments or recommendations above please contact me at susan.p.barnes@state.or.us or (971) 673-6010.

Sincerely,

Susan P Barnes

Susan P. Barnes
Regional Conservation Biologist
West Region

Cc: ODFW (Don VandeBergh, Tom Murtagh, Mark Nebeker, Sue Beilke)

Sue Beilke

From: Susan Barnes <Susan.P.Barnes@state.or.us>
Sent: Tuesday, October 17, 2017 1:52 PM
To: Sue Beilke
Subject: FW: Burlington: Trail Design - review requested
Attachments: BFC_Overview30%_Oct2017_forODFW.pdf; RTP_Intergovtl_Consultation_Form_ODFW_v2.doc; ODFW BCF Nat Trails OPRD Intergovt form June 26 2017.pdf

Importance: High

Hi Sue –

Metro has made a few adjustments to their proposed trail alignment at Burlington Forest. I wanted to give you a chance to review and chime in. I've attached my previous comments fyi (June 2017 comments for OPRD grant/ODFW consultation and Feb 2016 general comments to Metro).

Metro is requesting feedback by 10/25/17. Can you squeeze in looking/thinking about this? we chat over the phone if that's easier. I'm just starting my review of their current proposal.

Susan Barnes
Regional Conservation Biologist
West Region

Oregon Department of Fish and Wildlife
17330 SE Evelyn Street
Clackamas, OR 97015
Tel: (971)673-6010
Email: susan.p.barnes@state.or.us

From: Karen Vitkay [mailto:Karen.Vitkay@oregonmetro.gov]
Sent: Wednesday, October 11, 2017 3:44 PM
To: susan.p.barnes@state.or.us
Cc: Katy Weil <Katy.Weil@oregonmetro.gov>; Jonathan Soll <Jonathan.Soll@oregonmetro.gov>
Subject: Burlington: Trail Design

Susan,

Thank you for recently discussing the Burlington Creek Forest Park project with Katy Weil. She conveyed to me your priority concerns with two of the trail alignments. Based on those, I've made some adjustments to the alignments and am requesting your reconsideration. The changes are highlighted in the attached maps as well as below:

- Alignment D – You expressed concern about this alignment with respect to frog passage. Alignment D has been reduced from 0.3 miles to 0.2 mile.

- Alignment F - You expressed concern about this alignment with respect to frog passage particularly the eastern

section of this alignment. This alignment has been shifted to the west. Shifting the alignment necessitates a new bridge crossing over an intermittent drainage. The change most likely makes this segment a longer term project which would not be implemented in the near term. Also, please note that the length of segment F (0.5 miles) has been substantially reduced from the master plan (1.4 miles) shown on page 3 of the attached for reference.

Alignment AA – Please also note that this is a new nature loop which replaced length of trail removed from alignment A.

Please know that we are committed to evaluating trail usage, monitoring wildlife and measuring potential impacts at the site. As stated in the master plan, we reserve the right to adjust trail alignments and usage as well as implement seasonal closures if we find impacts that do not reflect our mission to protect wildlife habitat and water quality.

If you find the attached revised plans acceptable, we ask that you review your response on the attached consultation form. Please don't hesitate to contact any one of us should you have questions.

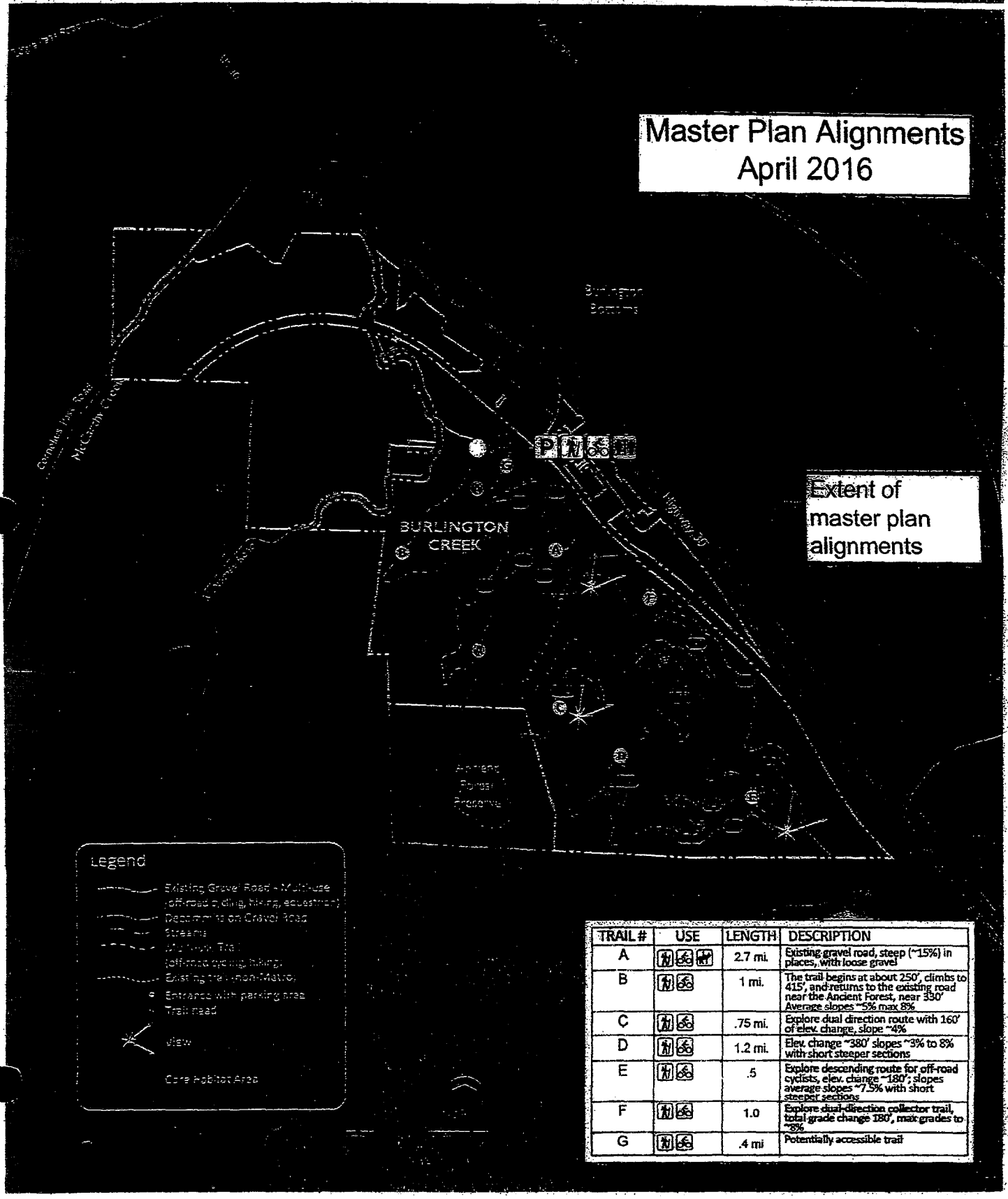
Thank you.

Karen Vitkay, PLA
Senior Regional Planner
Parks and Nature

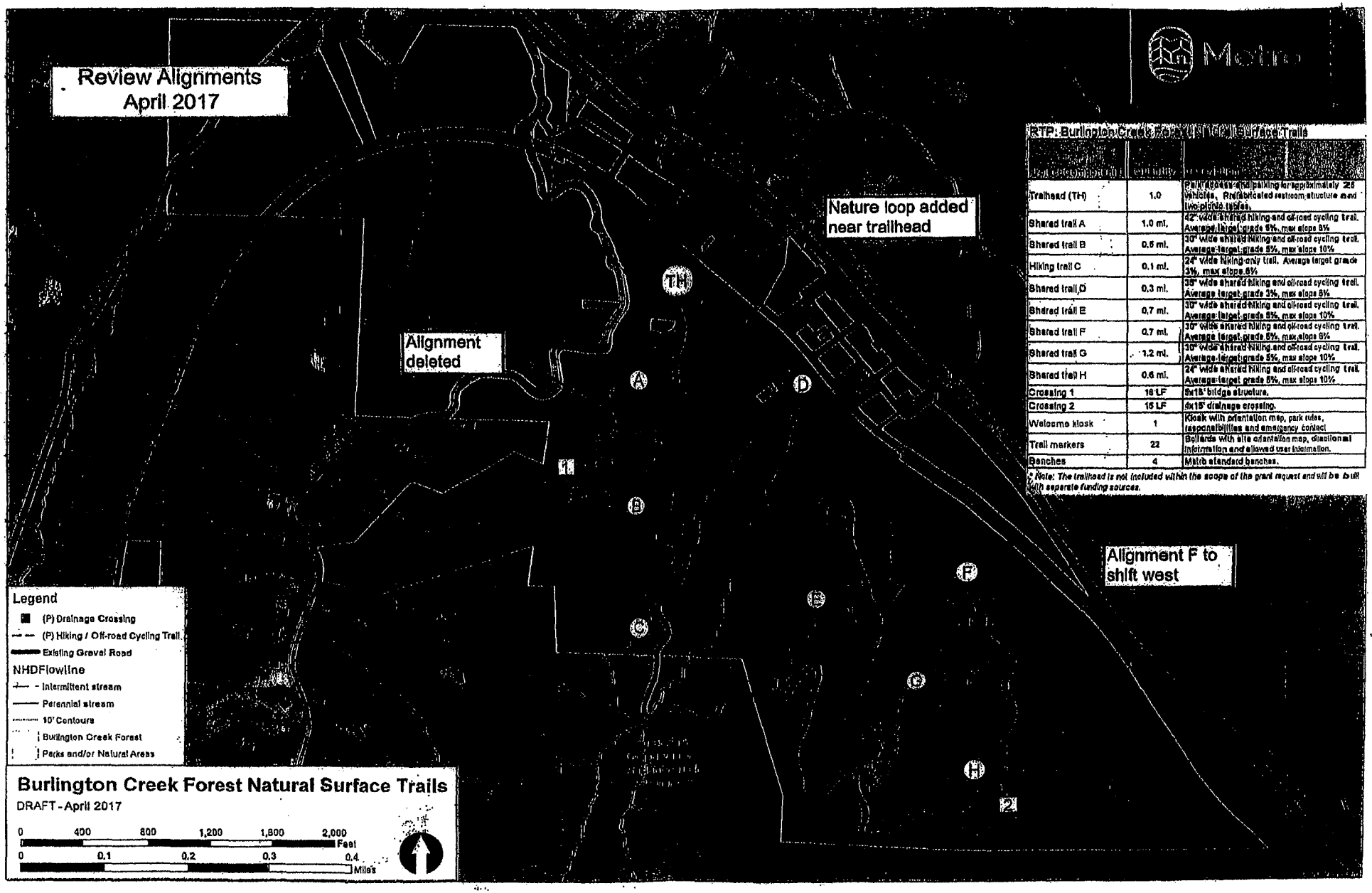
Metro | oregonmetro.gov
600 NE Grand Ave.
Portland, OR 97232-2736
503-797-1874

NORTH TUALATIN MOUNTAINS

BURLINGTON CREEK



TRAIL #	USE	LENGTH	DESCRIPTION
A		2.7 mi.	Existing gravel road, steep (~15%) in places, with loose gravel
B		1 mi.	The trail begins at about 250', climbs to 415', and returns to the existing road near the Ancient Forest, near 330' Average slopes ~5% max 8%
C		.75 mi.	Explore dual direction route with 160' of elev. change, slope ~4%
D		1.2 mi.	Elev. change ~380' slopes ~3% to 8% with short steeper sections
E		.5	Explore descending route for off-road cyclists, elev. change ~180'; slopes average slopes ~7.5% with short steepest sections
F		1.0	Explore dual-direction collector trail, total grade change 180', max grades to ~8%
G		.4 mi	Potentially accessible trail

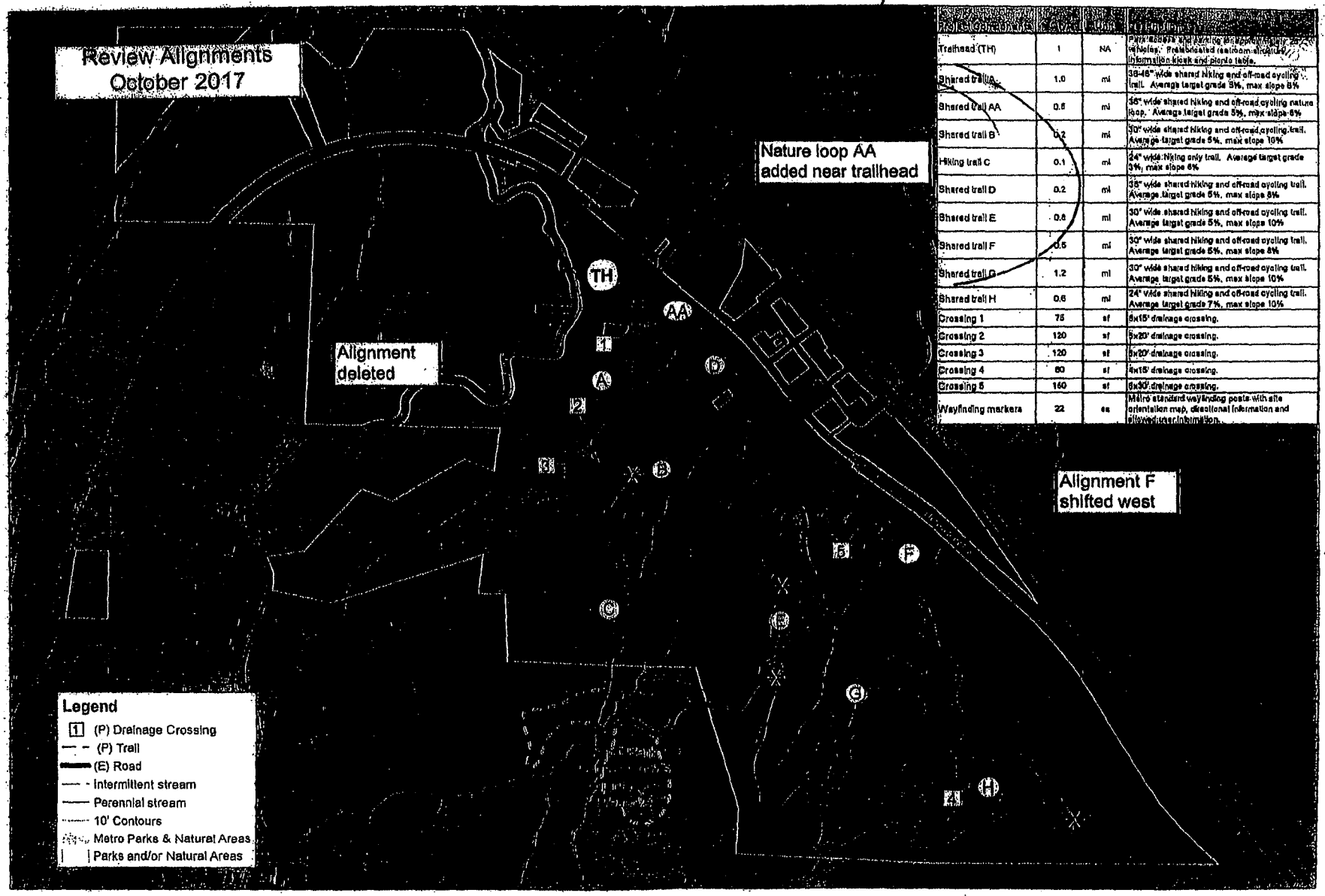


RTP: Burlington Creek Forest Natural Surface Trails

Trailhead (TH)	1.0	Paved access and parking for approximately 25 vehicles. Prefabricated restroom structure and two picnic tables.
Shared trail A	1.0 mi.	42" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 8%
Shared trail B	0.6 mi.	30" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 10%
Hiking trail C	0.1 mi.	24" wide hiking-only trail. Average target grade 3%, max slope 8%
Shared trail D	0.3 mi.	36" wide shared hiking and off-road cycling trail. Average target grade 3%, max slope 8%
Shared trail E	0.7 mi.	30" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 10%
Shared trail F	0.7 mi.	30" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 8%
Shared trail G	1.2 mi.	30" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 10%
Shared trail H	0.6 mi.	24" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 10%
Crossing 1	16 LF	5x16' bridge structure.
Crossing 2	15 LF	4x15' drainage crossing.
Welcome kiosk	1	Kiosk with orientation map, park rules, responsibilities and emergency contact
Trail markers	22	Bollards with site orientation map, directional information and allowed user information.
Benches	4	Match standard benches.

* *Note: The trailhead is not included within the scope of the grant request and will be built with separate funding sources.*

New!



Trailhead (TH)	1	NA	Parking for approximately 20 vehicles. Prefabricated restroom structure, information kiosk and picnic table.
Shared trail A	1.0	mi	36-48" wide shared hiking and off-road cycling trail. Average target grade 3%, max slope 8%
Shared trail AA	0.5	mi	36" wide shared hiking and off-road cycling nature loop. Average target grade 5%, max slope 8%
Shared trail B	0.2	mi	30" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 10%
Hiking trail C	0.1	mi	24" wide hiking only trail. Average target grade 3%, max slope 8%
Shared trail D	0.2	mi	36" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 8%
Shared trail E	0.8	mi	30" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 10%
Shared trail F	0.5	mi	30" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 8%
Shared trail G	1.2	mi	30" wide shared hiking and off-road cycling trail. Average target grade 5%, max slope 10%
Shared trail H	0.6	mi	24" wide shared hiking and off-road cycling trail. Average target grade 7%, max slope 10%
Crossing 1	75	sf	5x15' drainage crossing.
Crossing 2	120	sf	5x20' drainage crossing.
Crossing 3	120	sf	5x20' drainage crossing.
Crossing 4	60	sf	4x15' drainage crossing.
Crossing 5	150	sf	5x30' drainage crossing.
Wayfinding markers	22	ea	Metro standard wayfinding posts with site orientation map, directional information and allowed user information.

0 400 800 1,200 1,600 Feet

0 0.1 0.2 0.3 0.4 Miles

DRAFT

Burlington Creek Forest
Trail Overview

Erosion

There is currently a 2.9-mile gravel loop road in BCF. The Access Plan triples that distance by adding another 4.85 to 7 miles of trails, confining those additional trails and the loop road to roughly 66% of the BCF, an area of only about 224 acres. (Access Plan, p. 28. Full Funding Plan, p. ,).[1] Obviously, such an addition will significantly change the character of those 224 acres.

The Access Plan also calls for the construction of parking lots, bathrooms, benches, bike racks, and picnic areas in addition to the trails. (Access Plan, p. 37). Of course all human access has a negative impact on habitat, but the impact the Access Plan will have will be extreme.

As the Access Plan states, the soil in the BCF is primarily Goble Silt Loam. This soil type predominates on the east side of the Tualatin Mountains ridge where the BCF is located. The

[1] Metro proposes several different lengths for the trails to be added to the BCF. The differing lengths will be discussed in this memo under the heading "What is the Plan? Due Process and Metro's process." Depending on what version of Metro's trails map one chooses te length ot the proposed trails varies

additional trails the Access Plan calls for will be almost entirely on Goble Silt Loam. (Access Plan, p.28, Exh, 3, HH Assessment, p.14, Figure 8).[2]

The HH Assessment (Exh. 3, p. 13) points to a USDA-SCS classification scale rating various soil types' runoff intensity from A to D with A being the lowest and D the highest intensity. Goble Silt Loam is rated C, the second highest.

The Access Plan goes on to state that Goble Silt Loam soils are "moderately well drained," in contrast to the Cascade Silt Loam on the west side of the ridge found in the MCF and Abbey Creek Forests, which are "somewhat poorly drained soils." (Access Plan, p. 11). The implication is that the soil in BCF presents no significant problem, which is inaccurate. These statements, combined with Metro's failure to state that Goble Silt Loam is in fact highly erodible or discuss the impact of the fragipan on trail development, are misleading. Metro, however,

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[2] Burlington Bottoms is a BPA mitigation site for the loss of habitat caused by the BPA's dam s on the Columbia and Willamette rivers. As part of an intergovernmental agreement the ODFW is in charge of the effort to restore and maintain Burlington Bottoms as the important habitat that it is.

does concede that "Sediment harms water quality and degrades amphibian and fish habitat." Metro also acknowledges that "Overall, the topography of the four sites is steep with typical slopes between 20 and 50 Percent." (Access Plan, pp.11-3).

Beyond conceding the obvious Metro avoids the risks presented. For instance, in Appendix C to the Access Plan it describes Goble Silt Loam, the soil that predominates in the watershed (see the discussion of the watershed immediately below) overall, including in the BCF, and mentions the fragipan, but avoids mentioning how far below the surface it is found. The distance between the surface of the soil to the fragipan is important to know in order to evaluate the erosion effects trails will have.

The HH Assessment presents a more accurate and complete picture of the soil, streams, slope gradients and their impact for the future.[3] The HH Assessment treats the Burlington Creek Forest, the CEL and the other private lands contiguous to the BCF and the

[3] Burlington Bottoms is a BPA mitigation site for the loss of habitat caused by the BPA's dams on the Columbia and Willamette Rivers. As part of an intergovernmental agreement the ODFW is in charge of the effort to restore and maintain Burlington Bottoms as the important habitat that it is.

CEL as one watershed, which it is. It divides this watershed, comprising of some 900 acres, into five sub-basins. (Exh. 3, HH Assessment, 5-6). (The 900 acres will be referred to as "the watershed."). The watershed is the sole source of water for Burlington Bottoms, aside from water entering Burlington Bottoms during the springtime high flow periods of the Willamette and Columbia rivers. (Exh. 3, pp. 1, 7).

Some of the streams contained in the sub-basins are unnamed, but all can be readily identified for purposes of this discussion as can be seen from the map at page 6 of the HH Assessment. See Appendix A to this memo also.

After the HH Assessment was published there was some concern expressed about whether certain streams were perennial or ephemeral with two of the major streams, Burlington Creek and "Stream B," originally designated as perennial. (Exh. 3, HH Assessment. p.7). The more conservative view was that they were

ephemeral.[4]That debate has no been resolved by the USGS now finding that Burlington Creek is a perennial stream. (Full Funding Plan, Exh ,p.). In its submissions to the County, the engineers Metro hired also depict Sream B as a perennial watercourse. In any case, Burlington Creek (Stream A on the HH Assessment map, p. 6) and Stream B drain significant areas of hundreds of acres each.

The highest point in the watershed is 940 feet while the elevation of Burlington Bottoms averages 34 feet. (Exh. 3, HH Assessment, p. 6). Burlington Creek (Stream A) has a reach of well over a mile and Stream B, a reach of just over a mile. (Exh. 3, HH Assessment, p.7).

As of 1993 the HH Assessment estimated that every other year a storm would generate a flow of 33 cubic feet per second into Burlington Bottoms and a ten-year event would generate 81 cubic feet per second. (Exh. 3, p. 8).[5]

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[4] See the clarifying correspondence stapled to the beginning of the HH Assessment.

[5] While a measurement of cubic feet per second is not overly abstract the volume of water flowing into Burlington Bottoms from the watershed can more concretely be thought of in terms of a common object such as a filing cabinet. The HH Assessment estimates the flow from the watershed into Burlington Bottoms during a pre-global

With more extreme weather patterns brought on by global warming the frequency of heavy rain storms and other intenseweather events is increasing. What was in 1993 a ten year event generating 81 cubic feet of water inflow per second will be more frequent. The HH Assessment did not measure a heavy rainfall event. (Exh. 3, p. 13).

Two things tend to filter some, but only some, sediment out of the water flowing into Burlington Bottoms from the watershed. These are the ballast for the rail line bed that is directly adjacent to Highway 30, and the vegetation in Burlington Bottoms itself. The railroad ballast removes heavy sediment. (HH Assessment, Exh. 3, p. 13). However, the ballast acts a filter for only some water flowing into Burlington Bottoms. The two major streams flowing into Burlington Bottoms, Burlington Creek and Stream B go through culverts underneath the railroad line, as do most of the

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warming two year event is the equivalent of more than three standard sized filing cabinets filled with water per second, each measuring 27" x 52" x 45". What the volume will be in the extreme weather events is unknown, but the authors of the HH Assessment estimate that a pre-global warming ten year event would generate 81 cubic feet per second, that is, about 6.6 standard sized filing cabinets full of water per second for a period of seventeen hours. (HH Assessment, p. 8).

other watercourses. (Exh. 3, p. 16).

The vegetation in Burlingotn Bottoms helps filter out sediment, but only where the culverts do not discharge water directly into the Burlington Bottoms lakes. The HH Assessment states that most do not, but offers no more information beyond that. (Exh. 3, p. 13). Where the culverts do not discharge directly into the lakes also leaves some unanswered questions. The vegetation in Burlington Bottoms, through the restoration efforts of the ODFW, has been undergoing substantial change since about 2004.

The ODFW instituted a formal plan in 2004 to restore native plants and reduce especially Reed Canary Grass and Himalayan Blackberries. (Exh.9).The question is: even presuming the plantings have matured, do they act as effective sediment filters for both heavy and fine sediment? Further, will the replanted native plants be sufficient in the face of increasingly sever rain storms that will wash unprecedented levels of sediment into the streams and Burlington Bottoms?

The injection of sediment into Burlington Bottoms and also into Burlington Creek will have well known negative consequences for salmon spawning beds and the clogging of fish gills. But also, since the lakes in Burlington Bottoms are already shallow, sedimentation will accelerate the process of filling the lakes up turning them into marshes and then bogs, eliminating fish habitat. (Exh. 9, pp. 18, 39).

Phosphorous is a nutrient that stimulates plant growth in lakes. The origin of the phosphorous in the Burlington Bottoms lakes has not been scientifically determined, but it is suspected that it comes from the Willamette and Columbia Rivers during the spring freshets. (HH Assessment, Exh.3, p. 37). Phosphorous frequently comes from fertilizers, animal waste, and detergents, all things that are present upstream in the Willamette Valley.

(http://www.ecy.wa.gov/programs/wq/plants/lakes/problem

s.html, last accessed November 7, 2017, and https://www.rmbel.info/lake-eutrophication/).

Horseshoe Lake, the largest in Burlington Bottoms, is already eutrophic, meaning that it already has excessive nutrients. (Exh. 9, HH Assessment, p. 9). A eutrophic lake is one that is dominated by aquatic plants or algae. When plants die and decay they deplete the dissolved oxygen in the water that fish need to survive. When the plant biomass becomes too high fish die-offs result. (http://www.ecy.wa.gov/programs/wq/plants/lakes/problems.html, last accessed November 7, 2017).

The reason sedimentation is closely associated with lakes becoming eutrophic is not hard to understand. The shallower a lake is the more light can penetrate to the bottom, which along with nutrients stimulates plant growth, sometimes explosively. (https://www.rmbel.info/lake-eutrophication/) last accessed November 7,2017).

(http://www.ecy.wa.gov/programs/wq/plants/lakes/problem

s.html, last accessed November 7, 2017, and https://www.rmbel.info/lake-eutrophication/). Regardless where sedimentation combines with the phosphorous already present in the Burlington Bottoms lakes plant growth will accelerate. So, sedimentation discharge into Burlington Bottoms is a serious concern.

Global warming will make the watershed's sedimentation problem worse. It is well known as the earth's atmosphere warms there is greater ocean evaporation and the warmer the atmosphere the greater its capacity to hold water vapor. And so, as the Union of Concerned Scientists has said: "As the Earth warms powerful storms are becoming the new normal." (http://www.ucsusa.org/global_warming/science_and_impacts/impacts/global-warming-rain-snow-tornadoes.html#.Wa82bBR6rzI, last accessed September 4, 2017.) The HH Assessment likewise states that: "In the future run-off from the off-site watershed will have an increasing influence on both peak inflows and water

quality of Burlington Bottoms. (Exh. 9, p. 5).[6] Metro, to its credit, acknowledges in its corridors science literature review that extreme weather events will occur. (Exh. 2, p.).

Because of the soil type and steep slopes the watershed is especially prone to sedimentation. Goble Silt Loam covers approximately 96% of the 900 acre watershed and Wauld Very Gravely Loam covers the remaining 4%. (Exh. 9, HH Assessment, p.13.). The HH Assessment concluded that with regard to Goble Silt Loam on 30% to 60% slopes that: "Due to the steep slopes and only moderate permeabililty, the erosion potential is considered high." (Exh. 9, p. 13.). It draws the same conclusion for Goble Silt Loam even where the slope is only 15 to 30 percent, that is, that "the hazard for erosion is high." (HH Assessment, Appendix 3, p. 30.)

Appendix 3 of the HH Assessment, "Soil Survey

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[6] Houston Texas has had three five hundred year floods in just the last few years. Of course a 500 year or 1000 year flood event is an abstraction in the United States since there are no flood records going back that far. However, it is clear that the occurrence of intense weather events has reached an extreme beyond what was imagined just short while ago. https://www.vox.com/science-and-health/2017/8/28/16211392/100-500-year-flood-meaning. Last accessed September 24, 2019).

Information" provides a good deal of detail. Appendix 3 is a copy of excerpts from the U.S. Department of Agriculture's Soil Survey of Multnomah County. As will be explained more fully below when Multnomah County's zoning maps are discussed, the additional trails the Access Plan proposes are on slopes ranging from 25% to in excess of 45%.

Appendix 3 to the HH Assessment notes that fragipan, a solid compacted soil mass that is significantly impermeable, is found 30 to 45 inches below the surface on both 15% to 30% slopes and also on 30% to 60 % percent slopes. The fragipan is generally 5 feet or more thick (Exh.9, HH Assessment Appendix 3, p. 39-40).[7] As close to the surface of the land as it is, the fragipan has significant implications for trail building.

Not only is the slope important for analyzing the erosive impact of trails, but so too is the width of the trail, as the following

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[7] A fragipan is a diagnostic horizon in USDA soil taxonomy. They are altered subsurface soil layers that restrict water flow and root penetration. (https://en.wikipedia.org/wiki/Fragipan, last accessed September 5, 2017). Section 17-E states Goble silt loam soils are only moderately permeable above the fragipan and slow below the fragipan, and that the fragipan itself is five feet thick and greater.

discussion will show. Cutting a trail into an average slope in the BCF would eliminate much of the moderately permeable Goble Silt Loam soil on top of the fragipan. An imaginary square with 30-inch sides illustrates the problem. The Access Plan proposes that the new trails for the BCF be 30 inches wide. (Access Plan, p. 21, Exh. 11, point 13).[8] In the Full Funding Plan Metro calls for trail widths from 24" to 48" wide. (Full Funding Plan, Exh. 6, RTP form p. 1)

Cutting the imaginary square in half results in a triangle with one 90-degree angle and two 45-degree angles, and with two sides of the triangle that are 30 inches long on either side of the 90-degree angle. Imagine further that the triangle represents the cut that must be made into a 45-degree slope to establish a trail 30 inches wide.[9]

In order to have a somewhat level trail bed a cut must be made 30 inches deep into the soil because the 90 degree angle of

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[8] The International Mountain Biking Association, whose advice on mountain biking trail construction Metro has been welcomed, calls for trails 2' 'to3 0" wide in the memo it supplied to Metro and which Metro refers to favorably.

[9] Metro plans to make the trails 24" to 36" wide. (Exh. ? Access Plan???)

the triangle has to be placed into the slope. This means that the Access Plan version of the trails Metro proposes will sit directly on top of the fragipan in some places, and that the fragipan will be only 15 inches below the surface of the trail bed in others. In places the distance to the fragipan could be even less if Metro follows the recommendations of Portland's Trail Design Guidelines, and the International Bicycling Association memo as it apparently intends to do (Access Plan, p.37, EAxh 11).) These guidelines recommend removing organic material in order to establish the trail bed on "mineral soil" for mountain biking. (See Portland's Trail Design Guidelines (https://www.portlandoregon.gov/parks/article/250110, last accessed September 5, 2017, p.37). Where the trail sits right on top of the fragipan almost no rainwater will be absorbed. This means that nearly every inch of water that falls on these portions of the trail will be runoff.

Even if the trail bed did not sit right on top of the fragipan significant problems will result. This is because from December to

April of each year a water table is perched on top of the fragipan. (HH Assessment, Exh. 3, Appendix 3, pp.39-40).

Next imagine that the trail is constructed on a far gentler slope of 25 degrees and is 48" inches wide. Twenty-five degrees is 57.77% of an exactly vertical line (90 degrees). Installing a 48" wide trail would require a vertical cut into the slope 27.33" deep to allow for a 48" trail bed. This too would more than likely cut into the perched water table. For a 30" wide trail bed the cut would be 17.3 inches deep, and even though it would not cut into the perched water table it would eliminate more than half of the moderately absorbent soil above the fragipan.

Given that even with the full compliment of undisturbed soil above the fragipan, that is, without any trail or other such disturbance, it is not sufficiently absorbent to avoid the formation of a perched water table, the problems are obvious even without a trail that cuts to the fragipan. Where the trail does cut into the perched water table the result will be like taking a jug of water and tipping it over from December to April, causing runoff even when

it is not raining.

Further, trails on steep slopes are prone to incision, meaning that they will become deeper. (Exh.1, p. 12). This means that where the trails do not sit directly on the fragipan over time they will come closer and closer to the fragipan worsening the erosion problem even more as time passes.

While it is true, as Metro states, the research is inconclusive as to the comparative erosive effects of mountain biking versus hiking, hopefully common sense has a role.[10] Mountain biking has a channeling effect since bike ruts are continuous while the impressions of the human foot tends to create puddles more so than channels. Mountain biking tire ruts will encourage erosion. The more mountain bikers use the trails the deeper and more channelized the ruts will become.

If all the foregoing was not enough, once the trails begin to be used erosion will worsen. Trail use has a dual effect. Firstly, it

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[10] By way of example, all the conflicting research on whether cigarette smoking was injurious to health simply muddied the waters on the issue while common experience was that smoking ultimately shortened lives.

loosens the top layer of soil, making it easier to wash away. The second effect is that the soil below the loosened layer becomes compacted making it less absorbent. (Exh. 1, pp. 10-12). As will be discussed in more detail below, the use of the proposed trails will not be light, contrary to Metro's contention. (Access Plan, p. 2). Instead, it will be heavy, and it may in fact be very heavy because the demand for mountain biking trails within the Portland metropolitan area is so high as will be discussed later in this memo..

Portland's Forest Park provides an example of what the additional "multi-use" trails will mean for the BCF. As will be discussed below "multi-use trail" is something of a euphemism for mountain biking trail because hikers avoid multi-use trails to avoid injury from mountain bikes.

An experimental .3- mile single-track mountain biking trail was installed in Forest Park. It has not been a success. Exh.12 has photos and an explanation of the experiment. Even with the best of intentions and maintenance by the Northwest Trail Alliance and