



June 15, 2016

TO: Flood Authority Members
FROM: Scott Boettcher, Staff
SUBJECT: Lower Satsop Relic Channel Reopening Demonstration Project (WDFW)

The purpose of this memo is to update Flood Authority members and make recommendation on a WDFW funding request for a pilot project to evaluate and demonstrate the effectiveness of a "relic channel reopening" as an additional riverbank protection approach/tool. This topic will be discussed at our 6/16/2016 Flood Authority meeting. Please feel free to call or email if you have questions (i.e., 360/480-6600, scottb@sbgh-partners.com).

A. Background

1. In response to a March 2016 request for additional local projects, the Flood Authority's Projects Committee received six requests for riverbank protection projects from individual landowners in the Wynoochee and Satsop drainages, as well the mainstem Chehalis. See map here (w/ clickable icons) - <http://arcg.is/1RozZHF>.
2. The Flood Authority, at the recommendation of the Projects Committee, elected to not fund these requests at this time as:
 - a. It was not clear how many additional properties in the Basin faced similar problems (riverbank erosion, loss of farmland, loss of cattle and property, etc.).
 - b. It was learned that the WDFW and local Conservation Districts were working on a riverbank erosion strategy that would be used to address such challenges, as well were working to conduct several riverbank erosion pilot projects that demonstrate "state-of-the art" riverbank protection approaches/tools.
 - c. It was also learned that the Grays Harbor County Conservation District was working with some of the landowners to evaluate installation of farm pads and evacuation routes.
3. The Flood Authority's April 2016 decision to not fund these projects at this time is further described here - [https://www.ezview.wa.gov/Portals/_1492/images/Additional%20Projects%20Recommendations%20Memo%2004202016\(1\).pdf](https://www.ezview.wa.gov/Portals/_1492/images/Additional%20Projects%20Recommendations%20Memo%2004202016(1).pdf).
4. In June 2016, WDFW met with Flood Authority staff and submitted a funding request to the Projects Committee for an additional riverbank protection pilot project to demonstrate the efficacy of "relic



channel reopening” as an additional riverbank protection approach/tool. The pilot would be conducted fall 2016 in the lower Satsop at a cost of \$150K. See Attachment A.

5. The Projects Committee met, reviewed WDFW’s request, and found it had substantial merit on the basis that:
 - a. The price (\$75K to \$150K) and timeline (fall 2016) were reasonable.
 - b. The location was familiar (lower Satsop), was rich with background information on hydrology and erosion rates, had willing landowners, had already started the permitting process with regulatory agencies, and was part of a larger effort to address reach-scale problems in the lower Satsop.
 - c. The applicability of “relic channel reopening” as an additional approach/tool to other locations in the basin was thought to be high (i.e., the approach/tool would be broadly transferable).
 - d. The funding approach (shared between Flood Authority and WA Dep’t of Ecology) advances an important partnership between Flood Authority and Ecology that will itself be increasingly important as the Office of Chehalis Basin is implemented and the 2017-19 local project list is developed.
 - e. The funding amount appears available due to there being unspent monies from the earlier Aberdeen Market Street project that has subsequently been re-scoped (to larger North Shore Levee project) and separately funded.

B. Recommendation

The Projects Committee recommends funding WDFW’s relic channel reopening pilot project in the lower Satsop in the fall of 2016 to demonstrate the effectiveness of relic channel reopening as an additional bank protection approach/tool at a cost of \$75K (minimum) to \$150K (maximum) following confirmation by staff that:

- Ecology’s contribution is available as described in Attachment A.
- Flood Authority funds are available as described above (i.e., unspent Market Street monies are sufficient).



ATTACHMENT A

"Lower Satsop Relic Channel Reopening Demonstration Project (WDFW)"



2015-17 Small Projects Recruitment Form

"Additional Local Flood relief Projects"
(for 2015-17 biennium)

Chehalis River Basin Flood Relief

What are small projects? -- In general, small projects are those projects that provide predominantly localized benefit, are capable of being completed within the funding cycle, are supported by the jurisdiction within which the project is proposed, and are vetted and advanced through the Chehalis River Basin Flood Authority's Chehalis Basin Projects Committee.

What are additional local flood relief projects? – Additional local flood relief projects are small projects seeking to utilize surplus 2015-17 small project monies as a result of other small projects coming in under budget, being re-scoped or otherwise resulting in surplus resources. Additional local flood relief projects, like small projects are to be completed within the funding cycle, supported by the jurisdiction within which the project is proposed, and vetted and advanced through the Chehalis River Basin Flood Authority's Chehalis Basin Projects Committee.

Instructions:

- a. Please submit additional local flood relief project requests (via this form) to Scott Boettcher (scottb@sbgh-partners.com) no later than 5:00 p.m. April 1, 2016.
- b. Please submit individual project request forms for each project in your jurisdiction, even those projects previously or partially funded in the past.
- c. Note: Parts III and IV below [marked by "(**)"] will be scored as part of the Chehalis Basin Projects Committee's review and evaluation. Part I and II will not be scored.

Part I General	
1. Date:	June 7, 2016
2. Project Name:	Lower Satsop River Streambank Erosion Reduction-Construction
3. Project Location -- Please identify the location of the project as precisely as possible, preferable with latitude/longitude coordinates.	Confluence of Satsop River and the Chehalis River (see attached, Sheet 1)
4. Project Contact -- Please identify who will be	Michelle Cramer



responsible for overseeing and managing the project (i.e., name, email, telephone number, etc.).	Washington Department of Fish and Wildlife 600 Capitol Way North Olympia, WA 98501 360.902.2610 michelle.cramer@dfw.wa.gov
5. Lead Organization -- Please identify the lead organization, agency, entity, etc. responsible for this project. Please identify key partners responsible for assisting in the delivery or implementation of the project.	Washington Department of Fish and Wildlife (WDFW), lead agency Grays Harbor Conservation District (GHCD), key partner
Part II Description, Timing and Cost	
6. Project Description -- Please describe the project, what it is intended to accomplish, and the benefits that will accrue and to whom.	<p>Washington Department of Fish and Wildlife has been working with landowners in the lower Satsop River to develop a project to protect agricultural soils from bank erosion (see attached Satsop River Bank Erosion Photos, Figures 1 and 2). We used engineering studies, hydrodynamic modeling and analysis to develop alternatives and vetted these with stakeholders and regulatory agencies. Our proposal attempts to balance habitat restoration and loss of agricultural terrace soils from accelerated bank erosion exacerbated by artificial channel confinement by Keys Road and channel revetments. We have selected a preferred alternative and have prepared design and permit materials. Our preferred alternative includes excavation of a high flow channel near the confluence with the Chehalis River (see attached, Sheet 1) to reduce velocities within the main channel during erosive flows (see attached, Sheet 3). The overflow channel is located at the site of a historic channel (see attached, Satsop River Overflow Channel Photos, Figures 1-4). A complete project will also include floodplain restoration work upstream at the gravel pits on WDFW property (Sheet 1, future phase – not in this proposal).</p> <p>Grays Harbor Conservation District (GHCD) will formally join WDFW as project partner for the construction of the project. The lower Satsop River is an agricultural community such that GHCD's experience in on-the-ground conservation through technical assistance, construction and education is key to address local community needs.</p>
7. Project Timeline -- Please describe the overall	Permit Package submittal: July 2016



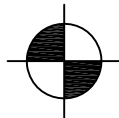
<p>timeline for completion of the project as well any interim stages or phases.</p>	<p>Complete Final Design: August 2016 Permits in Hand and Contracting: September 2016 Excavate High Flow Channel: October 2016</p>
<p>8. Project Cost and Funding -- What is the cost of this project? What are the on-going maintenance and operation requirements? Is it clear who will be responsible for on-going maintenance and operations costs?</p>	<p>Excavate a high flow channel at the site of a historic channel to reduce velocities at eroding sites along the lower right bank of the river that are eroding rapidly. Cost estimate: \$150,000 Match (DOE): \$75,000 Funding request: \$75,000</p> <p>There will be no need for ongoing maintenance and operation.</p>
<p>9. Other Funding -- Please explain the extent to which other funding sources or funding partners are available.</p>	<p>WDFW has received funding through the Chehalis Restoration and Protection Grants to complete final design and permitting for all elements of the lower Satsop River project. In addition, DOE has indicated that up to \$75,000 may be available for construction of the overflow channel.</p>
<p>Part III (**) Completion and Doability by June 30, 2017</p>	
<p>10. Project Completion -- Does the funding requested complete (or substantially complete) a project that has already been started? If so, please explain.</p>	<p>Yes. In 2012, the Chehalis River Basin Flood Authority funded the "Satsop River Floodplain Restoration" project to study removing the rip rap revetment on WDFW land and develop 25+ alternatives for floodplain restoration and bank erosion reduction. Analysis indicated that rip rap removal as a stand-alone project would not meet the project's floodplain restoration and bank protection goals. In 2014, the Chehalis River Basin Flood Authority funded the "Lower Satsop River Floodplain Restoration Project, Phase 2" to restore natural fluvial processes and floodplain connectivity along the lower Satsop River to reduce bank erosion, preserve agricultural soils, and improve fish and wildlife habitat. The Chehalis Restoration and Protection Projects recently awarded funding to WDFW to complete final designs and permits.</p>
<p>11. Project Doable -- Can this project or the stage/phase for which funding is sought be completed by June 30, 2017? Does the project face problem areas that could impact its doability and timeline, e.g., permitting or regulatory unknowns.</p>	<p>We will have 100% design plans completed by summer 2016. We have been working with landowners and stakeholders in both community meetings and individual/small group meetings to develop these plans since 2014. In addition, we have discussed permitting with regulatory agencies and will submit permit applications by July 2016. We will be shovel-ready for the overflow channel by late September/ early October 2016.</p>



	<p>The construction of the high flow channel will be done above the OHWM and outside the in-water work window. There is a possibility in-water work will be needed for the construction of the high flow channel in which case, we will request a time extension to complete during the in-water work windows. Although we have been working with regulatory agencies on development of the project, it is possible that permitting will delay project implementation. Given the recent changes at the proposed high flow channel location, the amount of work proposed is minimal and may be more easily permitted than previously indicated.</p>
<p>12. Project Impacts -- Please identify how any project impacts will be mitigated and if that mitigation will be accomplished by June 30, 2017?</p>	<p>We expect mitigation requirements to be identified through the permitting phase. Wetland delineation has been completed for the proposed project and we have been meeting with regulatory agencies for over 2 years as the project elements develop. The proposed high flow channel may impact forested wetlands and may require mitigation and monitoring.</p>
<p>Part IV (**) Benefits Stated and Quantified</p>	
<p>13. Emergency Response -- Please explain how this project enhances our ability to respond in a flood emergency (e.g., does it keep critical access roads, transportation facilities, etc. open and functional.)</p>	<p>The focus of this project is to protect prime agricultural soils from active bank erosion along the right-bank caused primarily by Keys Road which is located in the channel migration zone. Keys Road periodically floods and is closed to emergency response vehicles. Constructing an overflow channel will alleviate right-bank erosion while a long-term strategy is developed, potentially including a feasibility study to relocate Keys Road so critical access for emergency response is not closed due to flooding.</p>
<p>14. Essential Infrastructure Protection -- Please explain how this project protects essential infrastructure (as well the risks or consequences of not acting this funding cycle).</p>	<p>While this project does not directly protect infrastructure, the river frequently floods Keys Road and results in repetitive road closures. Keys Road was constructed through several abandoned channels of the Satsop River and it's only a matter of time before the river captures an abandoned channel and threatens/destroys parts of Keys Road. The construction of Keys Road has reduced the channel migration corridor and forced the channel to migrate to the west and erode prime agricultural soils.</p>
<p>15. Public Health, Safety and Welfare -- Please explain how this project protects public health, safety and welfare.</p>	<p>By constructing the high flow channel there will be a reduction of velocities and flow depths along the actively eroding agricultural streambanks of the lower Satsop River.</p>



<p>16. Residential, Commercial and/or Agricultural Protection -- Please explain how this project protects residential, commercial and/or agricultural interests and communities and the benefits of acting (or consequences of not acting) this funding cycle. Consider factors like number of structures at risk, number of people at risk, historic frequency of flood damage, magnitude of benefit to be gained for the cost, etc.).</p>	<p>The Satsop River is actively migrating at the location of the proposed overflow channel. Based on 2D hydraulic modeling and geomorphology, the channel will continue to migrate an average of 35 feet per year which would erode into the relic channel within 5 years. Excavating the overflow channel will accelerate this natural process and alleviate continued bank erosion along the right bank rather than experiencing 5 more years of extensive bank erosion.</p> <p>If the project is not funded, additional loss of agricultural soils will continue; the river has migrated 600 feet from 2009-2016 along the lower right bank near the confluence with the Chehalis River. This is a significant amount of soil loss and the rate of erosion has been exacerbated by the construction of Keys Road within the Channel Migration Corridor.</p>
<p>17. Other Project Impacts -- Please explain how this project impacts or is potentially impacted by another project.</p>	<p>Providing a high flow channel to alleviate the velocities and flow depths along the right bank will reduce the rate of erosion and basically buy time until a more comprehensive approach, such as relocating Keys Road and addressing the chronic sources of sediment from upstream sources, can be developed. Without action, additional bank hardening will continue along the river corridor (often resulting in additional erosion to neighboring properties) as well as continued loss of agricultural lands. Funding opportunities are being sought to develop this comprehensive approach.</p>
<p>18. Anything Else -- Please feel free to offer any additional information (e.g., photos, maps, drawings, etc.) that would be helpful to better understand the scope, timeline and benefits of this project.</p>	<p>The partnership with the Grays Harbor Conservation District is very important to meeting the goals of the overall project. Please contact Mike Nordin of the Grays Harbor Conservation District at 360-208-4451 if you have additional questions about this aspect of the project.</p>



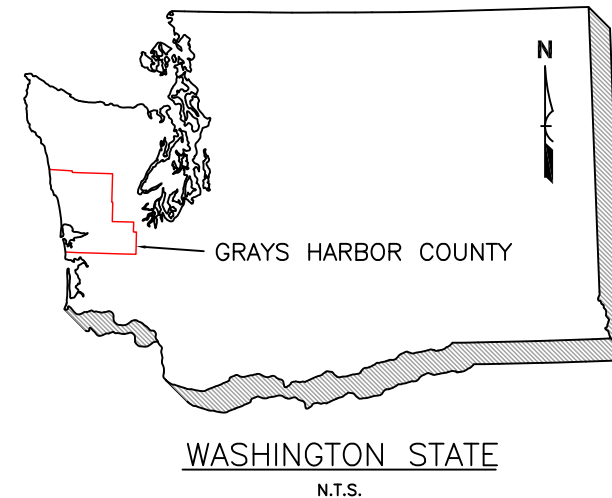
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NORTH



AREA MAP

SCALE: 1" = 250'



Sheet Index

- 1 Cover Sheet
- 2 High Flow Channel Plan View
- 3 High Flow Channel Plan View (20 Scale)
- 4 High Flow Channel Profile & Sections
- 5 Pond Area - Existing Conditions
- 6 Pond Area - Plan View Phase 1
- 7 Pond Area - Plan View Phase 2

Directions to Site

Site is South of Highway 12 on Keys Road along the Satsop River. For Pond Area access use entrance through WDFW gate at the west side of Keys Road. For High Flow Channel access enter Staging area Shown above.

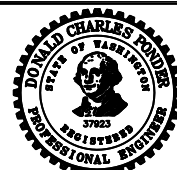
Survey Disclaimer

This is not a boundary survey. Elevations shown are based on an assumed datum. Topographic information was gathered under direction of the engineer for the sole purpose of design and construction of this project. Property lines, easements, and right of way locations displayed are approximate based on information obtained from recorded documents, for reference purposes only.

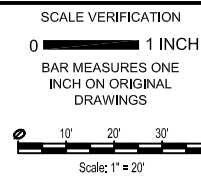


STATE OF WASHINGTON
DEPARTMENT OF FISH & WILDLIFE
HABITAT PROGRAM

SYM	DATE	BY	REVISION DESCRIPTION



PROJECT NO: xx-xxxx
DESIGNED BY: M. Cramer
CHECKED BY: D. Small
DRAWN BY: K. Corwin
FILE: EG Pilot Channel Area cropped.dwg

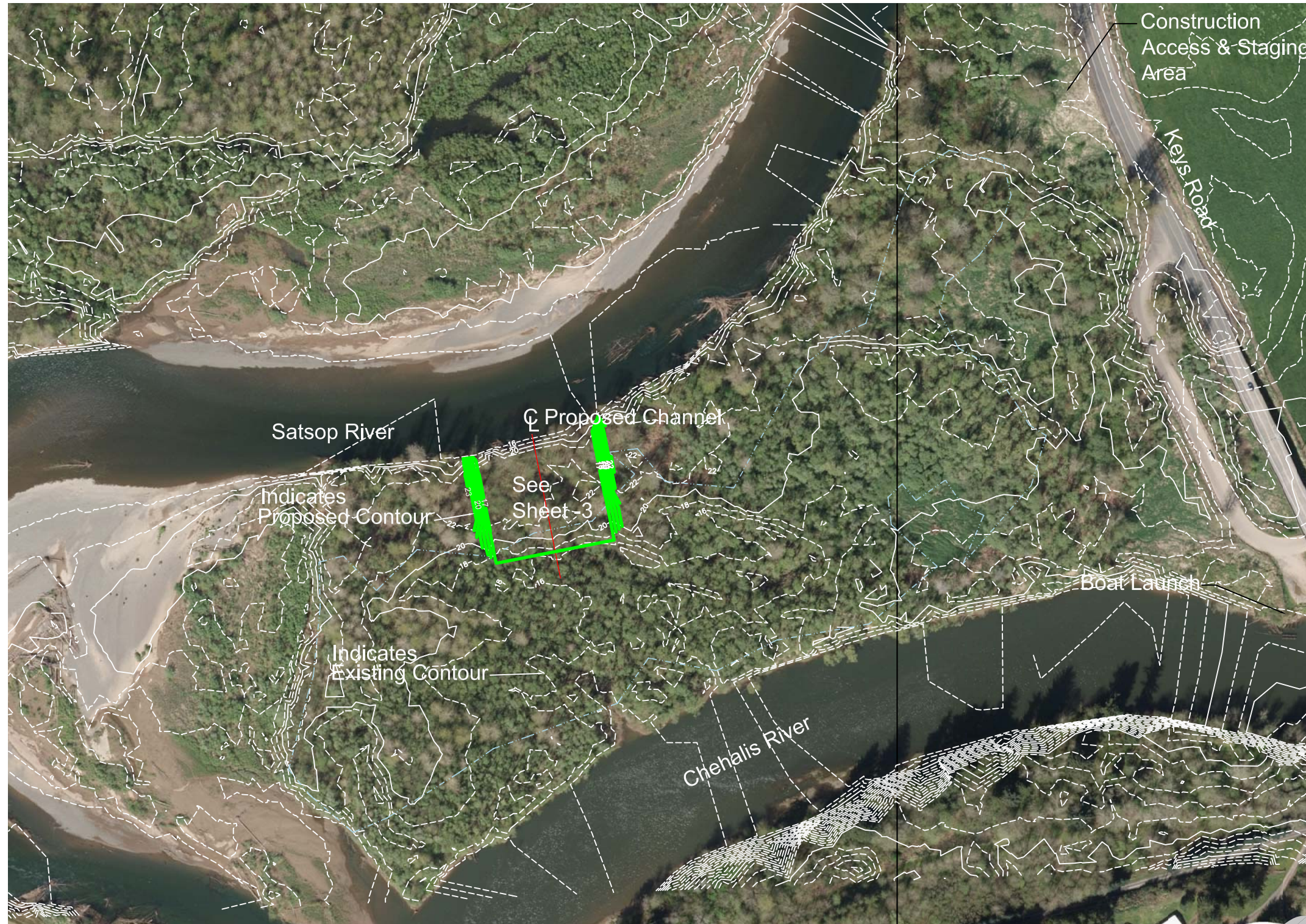
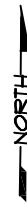


Lower Satsop River Habitat Restoration
Biological Monitoring and Final Design
Cover Sheet

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Sheet:
1 of 7



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High Flow Channel Plan View

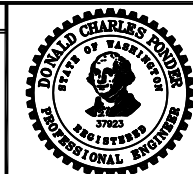
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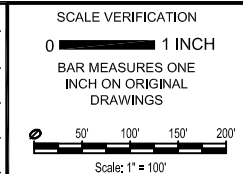


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Lower Satsop River Habitat Restoration
Biological Monitoring
and Final Design
High Flow Channel Plan View

Date:
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2 of 7



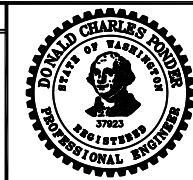
High Flow Channel Plan View

Scale: 1" = 20'

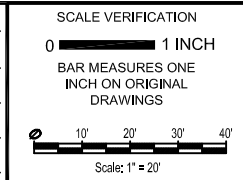


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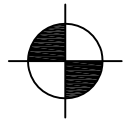


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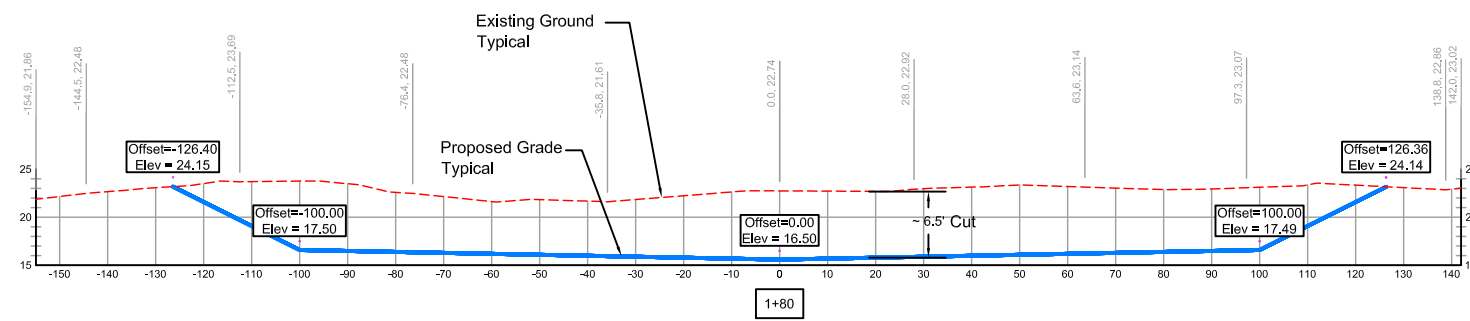
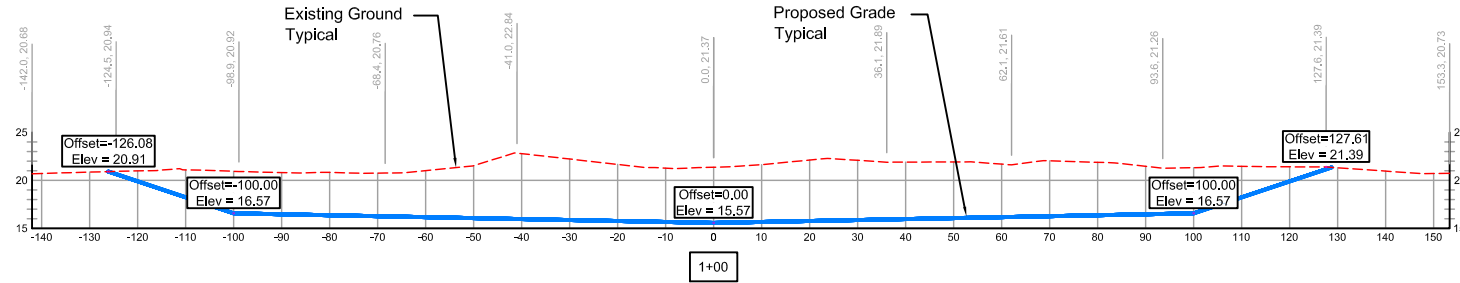
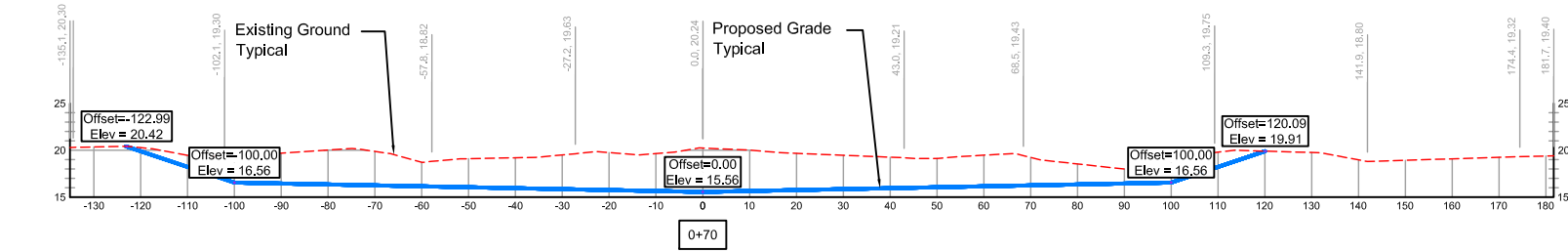


Lower Satsop River Habitat Restoration
Biological Monitoring
and Final Design
High Flow Channel Plan View

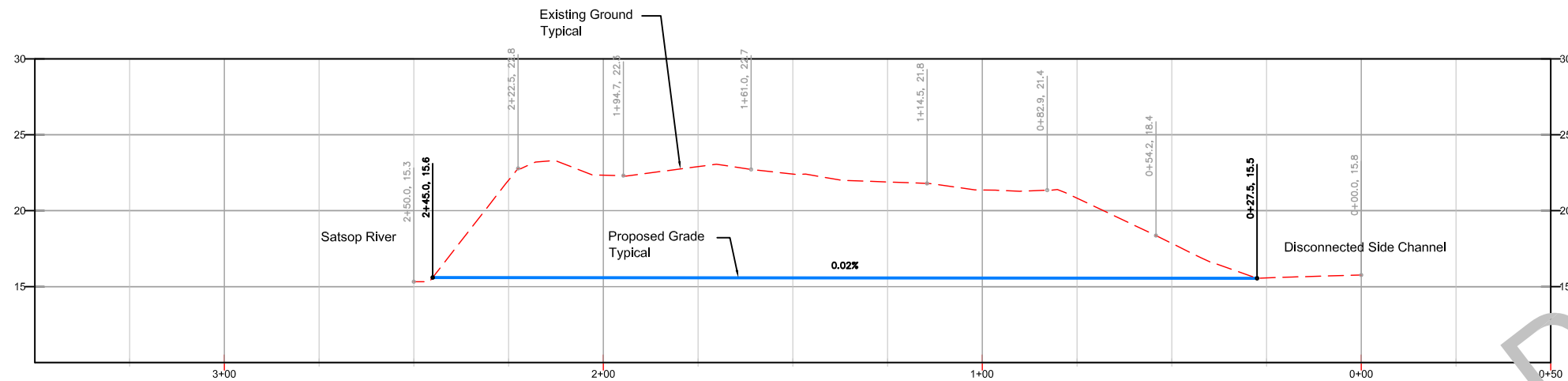
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High Flow Channel Sections
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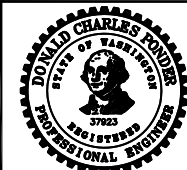
High Flow Channel Profile
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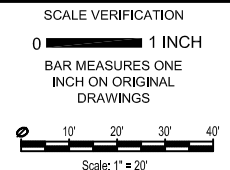


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Lower Satsop River Habitat Restoration
 Biological Monitoring
 and Final Design
 High Flow Channel Profile and Sections

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1-7-16
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Satsop River Bank Erosion Photos



Figure 1. Eroding Bank looking upstream along right-bank of Satsop River, August 2015



Figure 2. Eroding Bank looking upstream along right-bank of Satsop River, November 2014

Satsop River Overflow Channel Photos



Figure 1. Overflow channel entrance-looking upstream, February 2016



Figure 2. Overflow channel entrance, February 2016



Figure 3. Overflow channel-looking south into the channel, December 2015



Figure 4. Overflow channel path-Looking south into channel pathway. Note fine sediment deposition from recent overbank flood flow, February 2016