September 4, 2020

Dear Agency Permit Administrators,

This document responds to the Corps of Engineers letter dated September 2, 2020, and clarification provided by Jacalen Printz by email on September 4, 2020. The components of this response include:

a. Description of how the work site will be stabilized and impacts minimized until the next work window.
b. A plan to remove the artificial turf at the work site and the associated downstream turf pieces and pellets.
c. A plan to stabilize the work site while ensuring proper operation of the fish ladder
d. A plan to continuously monitor the fish ladder, water quality, and stabilization at the work site until the next in-water window opens and the Corps authorizes resumption of the originally permitted work.

Each of these components is discussed below and supported by a series of figures cited within the text and included at the end of this document.

A. Proposed Approach to Stabilizing the Work Site and Minimizing Impacts Until Next Work Window

Electron Hydro has evaluated the current condition of the work site and the river channel and developed a proposed approach to stabilize the work site and minimize impacts to the environment and the site. Key objectives of this proposal are summarized below:

1. Stabilize the river channel and existing construction elements within and along the river channel to prevent environmental impacts that would result from erosion and scour of the riverbed and banks modified by in-water excavation and partial demolition of the existing diversion structure.

2. Specifically, prevent formation of excessive head-cut in the riverbed that would potentially and likely originate at the upstream edge of the in-water excavation and migrate upstream causing extensive scour of the riverbed upstream of the diversion.

3. Maintain continuous reliable operation of the existing fish ladder. Fish ladder operation will require the riverbed at the diversion to be raised back up to 1620 ft elevation so water will flow into it from upstream.

4. The riverbed at the diversion at 1620 ft elevation will have to be stable under the range of anticipated flows during the upcoming winter months to ensure the fish ladder functions.

The plan outlined below is the minimum site stabilization plan required to stabilize the work site, minimize impacts to aquatic resources and species and prepare for the high flows in the

Includes 5 Attachments

fall/winter. When analyzing the minimum requirement to stabilize the work site, among several others, the following considerations must be made:

1) The wood diversion is 116 years old, and it is a wooden structure filled with rock for ballast. A little less than half the diversion has been removed. The diversion is secured to the right abutment, and free-floating in the center of the river. There needs to be a solid abutment in the center of the river to secure the existing wood diversion, so it is not displaced by high flows.
2) The fish ladder will not operate unless the diversion is re-installed to 1620, otherwise water will not flow in it from the upstream inlet.
3) Large rock fill is required to be placed in the riverbed to secure this area from unraveling during a flood.
4) Completing the center wall (abutment) will secure the wood diversion on its left side. The wood diversion is secured on its right side by the existing concrete abutment between the river channel and the fish ladder. This approach is the most expedient way to keep the wood diversion in place, thereby maintaining elevation 1620' and the fish ladder. The center wall is already designed, forms constructed, rebar bent and tied, and ready to place and pour.

Attached is a modified Electron Intake Construction Sequencing Plan (**Figure 1**) that itemizes the sequence of the completion of Phase 1. This is to construct only the minimum work required to stabilize the work site. From the plan on **Figure 1**, only items 3, 4, 5 as modified, 9, 12, 13 as modified, 18, and 21 would be constructed.

I have not included items 16 and 17 due to the requirement of "minimum work required" to stabilize the work site. However, this would add sliding resistance, and stability to the center wall and rock diversion foundation, which I recommend.

Items 18 and 21 include placement of large rock in the areas indicated on **Figure 1**. Typical rock material will be large boulders (e.g. 6-man rock and larger) overlying smaller rock, placed by excavator. The approximate total area for rock placement will be 3,200 sq. yd. and the approximately total volume of rock will be 8,500 CY. This rock placement will be temporary to stabilize the work site from October 2020 to July 2021.

The minimum necessary work cannot be completed prior to September 15. Electron Hydro respectfully requests an in-water work period extension that will provide for a total of 30 days construction time, preferably beginning on September 8th and ending on October 8th, 2020. This time extension is necessary to stabilize the diversion site by completing strategically selected elements of the in-water portion of Phase I, Diversion Repair, Spillway Replacement and Shoreline Protection and using those elements as a foundation and hard points to secure the center of the diversion and large rock placed in the channel at the diversion to maintain elevation 1620 to maintain fish ladder function and prevent extensive scour of the riverbed upstream of the work area. This request would amount to a 23-day total extension beyond the current September 15th permit end date. Electron is committed to working mostly round the clock to accomplish securing the intake site for the winter. If we can finish earlier, then we will.

All forms, reinforcement, rebar structures, rock, steel, and related materials are on site and staged ready for install. Our crews are fully ready.

Please note that four times in the past 6 years the Electron intake has experienced flows of 10,000 cfs during late November through February.

Included with this letter is a daily flow analysis through the end of October (**Figure 2**) and an engineering document supporting a cofferdam design that provides protection for up to 4000cfs (**Figures 3** and **4**). There are no significant project or cofferdam changes anticipated that would require any change to the recently approved WQMP. We will maintain onsite construction and water quality compliance monitors as previously established in the current WQMP.

B. Plan to remove the artificial turf at the work site and the associated downstream turf pieces and pellets

Electron previously developed a Draft Material Removal Plan, dated August 13, 2020 in response to an information request from Pierce County. That plan was previously shared with the Corps of Engineers and other regulatory agencies. Progress has been made with regards to removing Field Turf from the Puyallup River, as noted below.

Field Turf in River

The Puyallup Tribe identified 26 sites within the Puyallup River channel downstream of the Electron diversion where they observed debris within the river channel, not natural to the environment, including Field Turf. Those 26 sites are listed and described on the attached spreadsheet (**Figure 5**). Immediately upon receiving permission from regulatory agencies to remove Field Turf from the river by hand, Electron Hydro crews began to remove that debris on September 1, 2020. As of September 4, 2020, substantial progress had been made such that 23 of the 26 areas have been cleaned and the debris was removed from the Puyallup river valley. The remaining three sites include item #3 (wire from an unknown source), item #4 (iron beam from an unknown source) and #26 (Field Turf from Electron). Items #3 and #4 could not be completed by hand methods and will require equipment to remove. Item #26 could not be removed under present flow conditions, but removal will be feasible during lower water level in river expected to occur in late September of early October as indicated by historic daily flow records.

To the extent safe and accessible, crews will be walking both sides of the river to look for crumb rubber. They will also be looking for more Field Turf pieces. The area of concern is from the Electron diversion to the bridge on the Orting Kapowsin highway, approximately 19 miles below the intake.

The crumb rubber crews will have 5-gallon buckets, soft brush, and dustpan. Any crumb rubber found will be brushed into the dustpan and carried out of the Puyallup River channel in 5-gallon buckets. Once collected, results will be reported including the estimated quantity of material recovered.

Field Turf in Bypass Channel
Once the work site has been stabilized, work will immediately start to re-divert the river to the left bank so the temporary bypass channel may be decommissioned, and Field Turf removed while isolated from the river flow. There will be a 100-ton crane on the left bank and a manlift. The manlift will transport crew across the river. Supplies will be transported across the river with the crane. Large equipment will drive across the river channel. A vacuum truck will be transported by crane across the river.

Once the river is diverted to the left bank, biologists will clear the right bank channel, then the fish ladder of all fish. The downstream entrance of the fish ladder will be restored to original, with all HDPE and geofabric removed. The river just upstream of the HDPE will be graded to force any remaining bypass channel seepage through the fish ladder. This will allow the HDPE area to dry out. Once safe and dry, the HDPE liner will be removed, geofabric liner cut, and Field Turf removed. The turf will be rolled up, carefully retaining the crumb rubber infill within the turf fabric. The rolled-up turf pieces will be placed on the geofabric and rolled up inside the geofabric (much like a burrito) to contain the turf and crumb rubber as it is moved. The rolls will be tied, transported to an area opposite the 100-ton crane, airlifted across the river, and placed in a dump truck for disposal.

The vacuum truck will vacuum all remaining crumb rubber that spilled on the riverbed within the bypass channel. Crumb rubber will be placed in supersacks and removed via crane. All foreign material will be removed from the river. Gravel will be removed from steel containers, and containers removed via crane. Vacuum truck will be removed via crane.

Once the bypass channel is cleaned and clear, gravel cofferdams will be removed, and flow will be restored to the entire channel width and the fish ladder. Removal of the Field Turf from the temporary bypass channel is expected to be completed within 3 workdays.

C. Plan to stabilize the work site while ensuring proper operation of the fish ladder

The plan to stabilize the site described in Item A above will concurrently ensure proper operation of the fish ladder.

D. A plan to continuously monitor the fish ladder, water quality, and stabilization at the work site until the next in-water window opens and the Corps authorizes resumption of the originally permitted work.

Electron Hydro will continuously monitor Puyallup River flows. Flow volumes effect the stability of bedload in the river. On-site inspections of the temporary diversion and fish ladder operations are proposed as follows:

River flows under 700 cfs, every other week
River flows 700 to 1500 cfs, every week
River flows 1500 to 2500 cfs, every two days
River flows 2500 to 5000 cfs, daily
River flows above 5000 cfs, continuous during daylight hours and emergencies

On-site inspection will include:

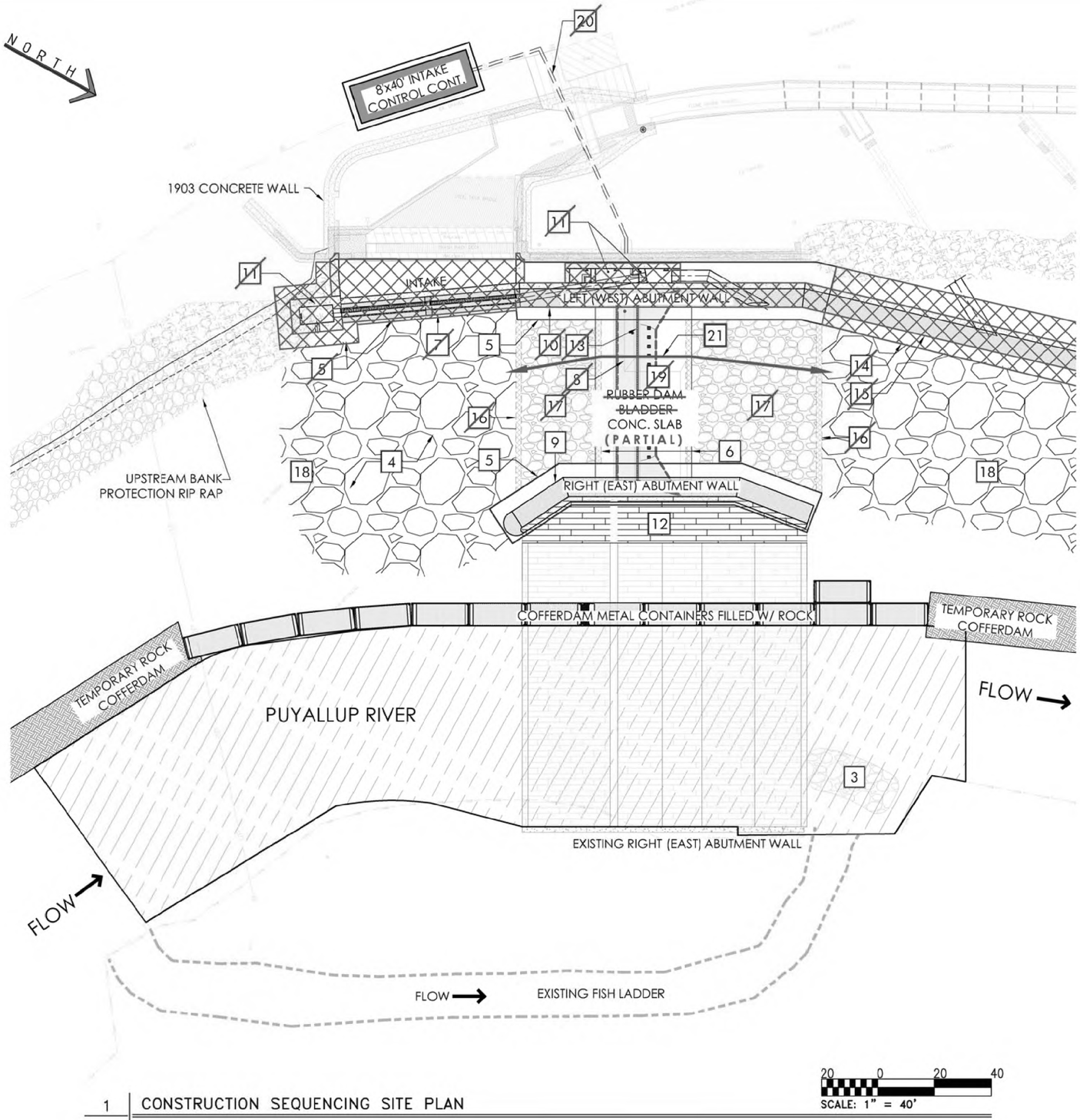
1) Observation that fish ladder is functional and operational
2) Inspection to ensure channel stabilization remains in place

Additional water quality inspections will be performed weekly if there is a surface discharge, and after a rain event. This inspection includes turbidity measurements, pH as required, and condition of erosion control BMP's. Turbidity measurements would be made at the upstream background sample point and downstream compliance sample point identified in the WQMP using the sampling and measurement methods specified in the WQMP.

I look forward to discussion of this request, thank you for your consideration,

Thom A. Fischer

Thom Fischer, P.E.,
Chief Operating Officer



1 CONSTRUCTION SEQUENCING SITE PLAN

CONSTRUCTION SEQUENCING KEYNOTES

KEYNOTES ARE LISTED IN CONSTRUCTION SEQUENCING ORDER FROM NOTE 3

3 IMPROVING THE FISH LADDER PER THE FISH LADDER OPERATION AND MAINTENANCE PLAN

4 COMPLETE EXCAVATION AND DEWATERING EFFORTS PER THE MODIFIED WATER DIVERSION/RELOCATION PLAN

5 FORM AND POUR FOUNDATIONS FOR THE EAST ABUTMENT WALL THEN ~~INTAKE AND~~ WEST ABUTMENT WALL

6 FORM AND POUR THE TWO CENTER CUTOFF WALLS

~~7 FORM INTAKE WALL, PLACE AND ALIGN THE SLUICE PIPE~~

~~8 SET THE EMBED PIPES FOR THE BLADDER~~

9 FORM UP, PLACE EMBEDS, AND POUR THE EAST WALL

~~10 FORM UP, PLACE EMBEDS, AND POUR THE WEST WALL~~

~~11 FORM AND POUR THE TWO SLUICE PIPE VAULTS, AND THE MECHANICAL DRAIN EQUIPMENT VAULT~~

12 ONCE THE EAST ABUTMENT WALL IS POURED, CONNECT THE REMAINING EXISTING WOOD DIVERSION TO THE EAST ABUTMENT WALL

13 CONCURRENT TO THIS, FORM, ~~PLACE EMBEDS,~~ AND **POUR PARTIAL REINFORCED SLAB** ~~POUR SLAB BETWEEN THE TWO ABUTMENT WALLS~~

~~14 FORM AND POUR DOWNSTREAM ABUTMENT FOUNDATION~~

~~15 FORM AND POUR DOWNSTREAM ABUTMENT WALL SECTION~~

~~16 FORM AND POUR UPSTREAM AND DOWNSTREAM CUTOFF WALLS~~

~~17 POUR AND PLACE BOULDER ARMORING BETWEEN THESE TWO CUTOFF WALLS AND THE CENTER SLAB~~

18 PLACE LARGE RIP RAP DOWNSTREAM OF THE DOWNSTREAM OF THE LOWER CUTOFF WALL, AND UPSTREAM OF THE UPSTREAM CUTOFF WALL

~~19 CONCURRENT TO BUILDING CUTOFF WALLS AND BOULDER ARMORING, POSITION AND BOLT DOWN THE BLADDER ON THE CENTER SLAB~~

~~20 ONCE THE BLADDER IS IN PLACE, CONNECT THE AIR PIPING, DRAIN PIPING, AND BLOWERS BEFORE TESTING THE BLADDER OPERATIONS, TEST BLADDER OPERATIONS~~

21 PLACE LARGE ROCK IN LOCATION OF REMOVED WOOD DIVERSION TO ELEVATION 1620'

NO.	DATE	REVISION	BY	CK

Electron HYDRO EST 1904

PHASE 1 CONSTRUCTION SEQUENCING SITE PLAN

SCALE PER VIEW

DESIGN: RDM
DRAWN: ESK
CHECKED: TAF
DATE: 09-04-20
JOB#:

SHEET 1 OF 20

DRAWING S0.1

Figure 1

Date: September 3, 2020

To: Agency Administrators

From: Shane Cherry on behalf of Electron Hydro

Re: Electron Hydro Diversion Repair and Spillway Replacement Project
Puyallup River September and October Daily Flows Above 2,000 cfs for 1985 – 2019

Electron Hydro is developing a request for an extension of the in-water work window to facilitate stabilizing the in-water work at the Diversion Repair and Spillway Replacement Project work site. I reviewed daily flow records for the USGS Gage 12092000 "Puyallup River Near Electron, WA" to identify all days in the months of September and October from 1985 to 2019 (35 years) when daily flow exceeded 2,000 cfs. These data may be used to assess the risk of the temporary bypass channel getting overtopped by river flow. The date and daily flow values for each such event are tabulated below:

Date	Daily Flow
9/30/2013	2,250 cfs
9/30/2005	3,220 cfs
10/1/2000	2,440 cfs
10/16/1988	2,730 cfs
10/21/2003	2,280 cfs
10/22/2017	3,920 cfs
10/30/2009	2,530 cfs
10/30/1997	2,220 cfs
10/31/2015	4,000 cfs
10/31/1994	2,150 cfs

Key observations from these daily flow data are summarized below:

1. For period September 1 to October 31, daily flow exceeded 2000 cfs 10 times in 35 years.
2. Each year that occurred, it only happened on one day within the two-month period.
3. The earliest flow that exceeded 2000 cfs was on September 30 (in both 2005 and 2013).
4. The highest flow of 4,000 cfs occurred on 10/31/2015.
5. Risk is low in September but increases progressively through October with the highest probability of high flows occurring in the last 10 days of October.

These data may be used to assess flow-related risks associated with extending in-water work within this period. Keep in mind that these are average daily flow values. Instantaneous flows fluctuated over a 100 cfs range from high to low each day in late August of this year.

11063 Sparkleberry Drive • Fort Myers, FL 33913

Figure 2

These data may be used to assess the potential for river flow overtopping the temporary bypass channel. The risk of overtopping may be used to inform a decision about the timing for ending in-water work as well as any reasonable measures to mitigate the risk of overtopping including modifications to the temporary bypass channel and cofferdams to function effectively under higher flows.

If you have questions about these data, my observations, or applicability of this information please contact me at either of the numbers below.

Respectfully yours,

SHANE CHERRY
Principal Scientist
239.313.7495 (desk)
425.218.9748 (mobile)
shaneconsulting@comcast.net

cc: Thom Fischer, Electron Hydro
Chris Spens, Electron Hydro

Figure 2

Electron Intake Cofferdam Analysis

The existing cofferdam can be modified to prevent flows up to 4,000cfs from entering the construction work area. Modifying the current cofferdam profile and alignment at the upstream end and downstream end can provide this protection.

HEC-RAS 5.0.3 was used to run one-dimensional simulations. The water surface profiles for the 5,000cfs and 4,000cfs flows were overlaid on a coffer dam profile. Selecting the 5,000cfs water surface profile to determine the minimum elevation of the top of the cofferdam was used to determine if at least 1 foot of freeboard was provided over the 4,000cfs water surface profile, and it certainly was adequate.

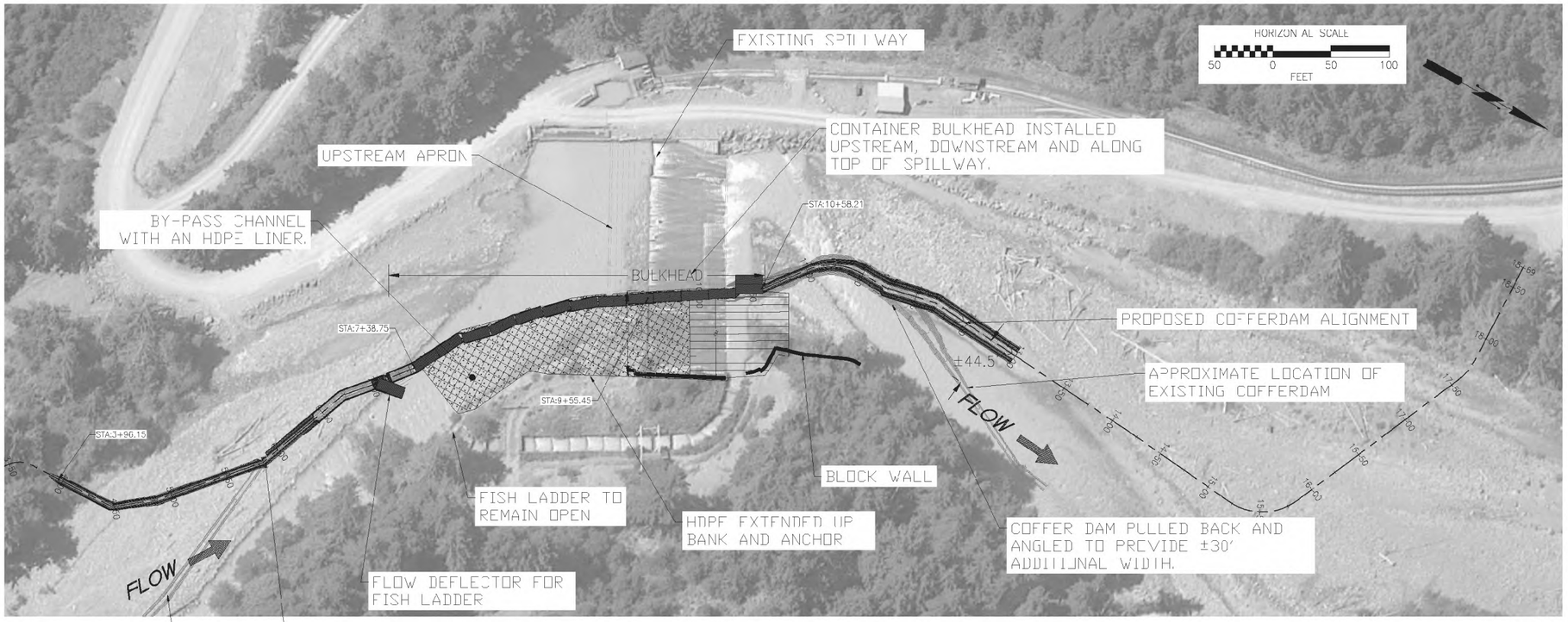
The upstream alignment starts a deflection toward the left bank shore about 600' from the start of the current cofferdam alignment. This provides more flow area reducing the velocity and ties into the left bank shore at higher elevation that will prevent flow passing behind the cofferdam.

Downstream, the cofferdam alignment was again deflected toward the left bank to provide more flow area to reduce water flow velocity.

There are draw-downs and hydraulic jumps that occur upstream and downstream from the bypass spillway. The largest jump occurs where the flow depth goes from about 4' to around 14' before leveling out. Upstream, the jump is less dramatic and occurs where a deflector has been placed opposite from the fish ladder to ensure adequate flow.

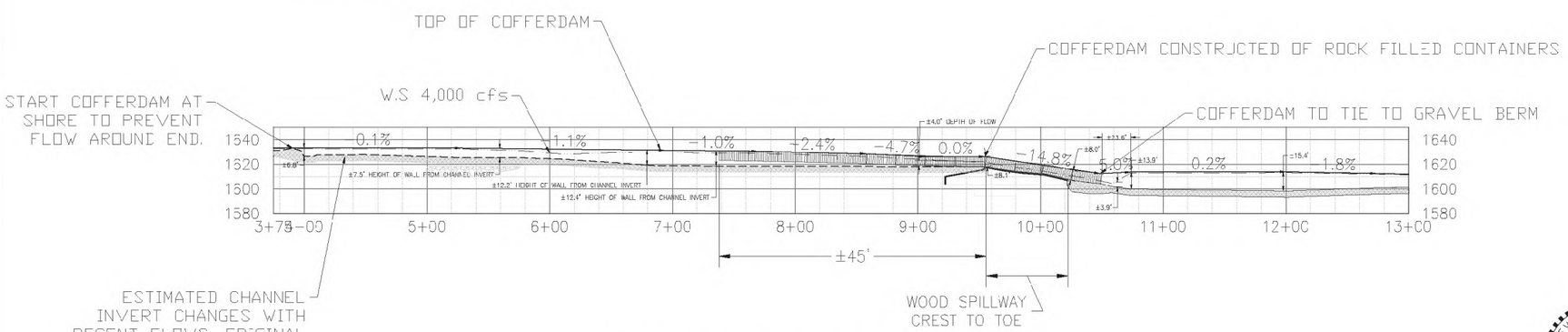
Velocities along the cofferdam range from 10-20 fps and 2-3 man rock should be placed at the toe of the cofferdam for one hundred feet downstream of the spillway and in the vicinity of the fish ladder flow deflector. Provided by: Steven P. Goodrich, P.E. WA PE-27025

Figure 3



1/1 TEMPORARY COFFERDAM PLAN
PLAN VIEW 1"= 50' (FOR 22x34)

VERTICAL SCALE
1 0 2 3
FEET



2/E TEMPORARY COFFERDAM PROFILE
PROFILE 1"= 50' HORZ. & 1"=2' VERT.' (FOR 22x34)

NO.	DATE	REVISION	BY	CK
9				
8				
7				
6				
5				
4				
3				
2	9/3/2020	REVISED COFFERDAM ALIGNMENT & FLOW	SPG	
1	5/3/20	COFFERDAM W/ SECTIONS CONCEPT	SPG	

Electron HYDRO EST 1984

DIVERSION REPAIR, SPILLWAY REPLACEMENT AND BANK PROTECTION

COFFERDAM SITE PLAN AND PROFILE

PIERCE COUNTY WASHINGTON

DESIGN: TAF
DRAWN: SPG
CHECKED: TAF
DATE: 9/3/2020
JOB#: 11011900

SHEET 01 OF 1

DRAWING 01

DATE & TIME: September 3, 2020 14:33
PLOTTED BY: STEVEG

FILE NAME & LOCATION: E:\Projects\ELECTRON\DWG\Design\Intake\ELE_Intake_tempFeature_Rev2.dwg

Figure 4

EH0001065

Figure 5
Electron Turf Removal **as of: Sep 4, 2020**

Item #	River Mile	Lattitude	Longitude	Description	Update Sep 4, 2020 (Electron)
#1	41.6	46.908376°	-122.039250°	Black Debris caught on rocks.	Found, water level too high to safely remove
#2	41.4	46.910208°	-122.041786°	Black debris in water.	Found, water level too high to safely remove
#3	41.35	46.910592°	-122.042586°	Thin pipe [wire], hose or similar dangling downstream from rock.	USGS stream gage equipment? Requires equipment or cut-off
#4	41.15	46.912533°	-122.045241°	Iron beam or bar imbedded in substrate of river bar.	Found, no safe way to remove without equipment
#5	40.9	46.914646°	-122.049127°	May be artificial turf hung up on rock at confluence with Niesson Cr. (note confluence and main channel differ from 2018 aerials.) RM 40.9	Found, removed
#6 (to #10)	40.85	46.915717°	-122.049689°	#6 is Black sheeting caught on log. Black sheeting and artificial turf scattered among rocks and logs of a mid-channel bar and logjam (items #6 to #10) close enough that separate lattitude/longitude were not discernable. The river splits here and the major portion of the river flows in the left channel. The overflight initially traveled down the left channel then returned to the split and followed the right channel. RM 40.8	Found, bundled up for removal at point 17
#7	40.85	46.915717°	-122.049689°	Length of black sheeting caught in rocks	Found, bundled up for removal at point 17
#8	40.85	46.915717°	-122.049689°	Artificial turf hung up on rock	Found, bundled up for removal at point 17
#9	40.85	46.915717°	-122.049689°	Artificial turf hung up on rocks near log jam.	Found, bundled up for removal at point 17
#10	40.85	46.915717°	-122.049689°	Black sheeting caught on rocks.	Found, bundled up for removal at point 17
#11 (to #16)	40.85	46.915960°	-122.050077°	#11 is Black plastic sheeting - Several debris items (#11 to #16) scattered through this channel area. Close enough that separate Lat/Lon were not discernable.	Found, bundled up for removal at point 17
#12	40.85	46.915960°	-122.050077°	Artificial turf hung up on rock	Found, bundled up for removal at point 17

Figure 5

Electron Turf Removal **as of: Sep 4, 2020**

#13	40.85	46.915960°	-122.050077°	Sheet or plate (possibly metal) wrapped around rock	Found, bundled up for removal at point 17
#14	40.85	46.915960°	-122.050077°	Black sheeting wrapped around rock	Found, bundled up for removal at point 17
#15	40.85	46.915960°	-122.050077°	Length of pipe, hose or line streaming downcurrent	Found, bundled up for removal at point 17
#16	40.85	46.915960°	-122.050077°	Black sheeting wrapped around rock	Found, bundled up for removal at point 17
#17 (to #21)	40.75	46.916875°	-122.051044°	#17 Black plastic caught among rocks on upstream end of a river bar with other nearby debris items (#18 to #21) where they were close enough that separate Lat/Lon were not discernable.	Found, bundled up for removal at point 17
#18	40.75	46.916875°	-122.051044°	Square reddish may be metal/iron panel	Found, bundled up for removal at point 17
#19	40.75	46.916875°	-122.051044°	Artificial turf on rock.	Found, bundled up for removal at point 17
#20	40.75	46.916875°	-122.051044°	Black sheeting hung up on small log	Found, bundled up for removal at point 17
#21	40.75	46.916875°	-122.051044°	Black sheeting hung up on rocks	Found, bundled up for removal at point 17
#21.5	40.7	46.917418°	-122.051304°	Black plastic sheeting shreds hung up on rock in main channel.	Found, bundled up for removal at point 17
#22	40.85	46.916233°	-122.049486°	#22 Artificial turf hung up on rock at upstream end of gravel bar. #22 to #24 are located in the right channel and close together.	Found, bundled up for removal at point 17
#23	40.85	46.916233°	-122.049486°	#23 Black sheeting among on gravel/rocks of gravel bar.	Found, bundled up for removal at point 17
#24	40.85	46.916297°	-122.049644°	Black sheeting hung up on gravels in small distributary of right channel.	Found, bundled up for removal at point 17
#25	40.45	46.920617°	-122.054841°	Artificial turf tangled in root wad of tree in left side of main channel. (Note main channel differs from Google Earth 7/25/2018 imagery).	Found, removed
#26	39.8	46.928488°	-122.057959°	Artificial turf caught on rocks in mid channel ahead of gravel bar.	Found, water level too high to safely remove

= Not Removed as of this date
= Removed from the River and bundled in P-105 Geoliner for removal
= Removed from OHWM

Figure 5