Lower Columbia River Fish Facility Design Review Work Group (FFDRWG)
USACE, Portland District

March 2022 Written Updates

Distributed March 3, 2022

FFDRWG meeting Files

http://pweb.crohms.org/tmt/documents/FPOM/2010/FFDRWG/FFDRWG.html

Action items from previous meetings

- ❑ Corps will upload a copy of the 60% JDA Lamprey passage DDR to the FFDRWG meeting files website.
- ❑ Corps will upload a copy of the 60% TDA Lamprey passage DDR to the FFDRWG meeting files website.
- ❑ Corps will upload a copy of the 90% BON1 Lamprey passage DDR to the FFDRWG meeting files website and Macdonald will initiate a formal FFDRWG review period in March 2022.
- ❑ Corps will upload a copy of the 30% BON2 DDR to the FFDRWG meeting files website so it's available for FFDRWG to review and show to others
    - Lamprey design document reports are coming soon to the FFRDRWG meeting files website. The Corps will notify FFDRWG when they're available.
- ❑ Corps will follow up with FFDRWG on whether the B2 FGE testing equipment will come out immediately or wait until Fall.
    - Still in discussion with PDT for outage scheduling. Working with contractor to determine if there will be two sets of pressure sensors that need to be moved between Unit 14 and 15 and if pressure transducers can remain in the unit and be removed later. A MOC with a more detailed testing schedule and coordinating unit outages for installation and removal of equipment is being developed and will be distributed through FPOM.
- ❑ Corps will find out if Cascades Island subsidence has a potential to affect fish passage and make sure the project is coordinated in the appropriate forum.
    - Cascades Island subsidence is still being investigated, coordinated through FPOM. The Cascades Island fishway is a free-standing structure but maintenance of the fishway was limited by no access to subsiding areas near the fishway. Ladder maintenance is no longer limited with the recent addition of strategically placed crane pads. There is not currently any design effort underway that FFDRWG should be tracking.
- ❑ Corps will present The Dalles backup AWS debris management alternatives at an upcoming FFDRWG
    - EDR shelved at 50% with no funding in FY 22. The Corps will walk through alternatives with FFDRWG at 60% (when the project resumes)

Written project updates

1. JDA turbine rehab – Steve Sipe (PM), Curtis Lipski (TL), Jon Rerecich (FC)
2. TDA AWS Debris Management– Erin Kovalchuk (PM), Mehdi Roshani (TL), Eric Grosvenor (FC)
3. BON Second Powerhouse FGE – Jim Adams (PM), Bridget Bell (TL), Jon Rerecich (FC)
4. JDA adult lamprey passage improvements – Michael Carl (PM), Adam White (TL), Eric Grosvenor (FC)
5. TDA adult lamprey passage improvements – Michael Carl (PM), Adam White (TL), Jake Macdonald (FC)
6. BON1 adult lamprey passage improvements – Michael Carl (PM), Adam White (TL), Andrew Derugin (FC)
7. BON2 adult lamprey passage improvements – Michael Carl (PM), Shari Dunlop (TL), Andrew Derugin (FC)

Fish Facility Design Review Work Group (FFDRWG)
USACE, Portland District
Project Update
Date Prepared/Updated: 2022-2-1

JDA Turbine Rehab

Project Identifier:	P2 #
Project Manager (PM):	Steve Sipe (CENWP-PMF-P) *Steven.C.Sipe@usace.army.mil*
Technical Lead (TL):	Curtis Lipski (CENWP-ENC-HD) *Curtis.L.Lipski@usace.army.mil*
FFDRWG Coordination (FL):	Jon Rerecich/Eric Grosvenor (CENWP-PME) *Jonathan.G.Rerecich@usace.army.mil/Eric.Grosvenor@usace.army.mil*

Project Description

The purpose of this project is to address reliability concerns and maximize production of hydroelectric power at JDA, which includes electrical energy production and electrical grid ancillary services while at the same time, improving survival of fish passing through the turbines. Maximum production of hydroelectric power at JDA will be realized through increased reliability and increased efficiency. Reliability improvements will be realized through a combination of replacement and refurbishment of powertrain equipment to include, but not limited to, turbine runners, shafting, generators, isophase bus, breakers, switches, and transformers. Efficiency improvements will be realized through increased turbine efficiencies associated with new turbine runners and other modifications to the turbines.
The purpose of this project is also to increase survival of turbine passed fish. Increased survival of turbine passed fish will be realized through developing state-of-art hydroelectric turbines to obtain improved fish passage survival through the turbines. The design of the state-of-the-art turbines will be an iterative and collaborative process that focuses on fish-friendly design features and criteria. This iterative and collaborative design process will be similar to the ongoing Ice Harbor L&D turbine runner replacement design and upcoming McNary L&D turbine runner replacement in NWW. Phase 1A recommendations include replacing up to 14 units with combination fixed blade & adjustable blade to obtain improved fish passage survival through the turbines.

Project Schedule

Phase 1 Short Term Schedule	Start	Finish
30% DDR/P&S review	3/12/2020	4/1/2020
60% DDR/P&S review	8/28/2020	9/18/2020
90% DDR/P&S review	9/21/2021	2/18/2022
BCOES review	1/24/2022	11/11/2022

Overall Schedule Milestones	Date
Contract award	October 2024
Collaborative design process Model testing	2024-2029
First unit installation	2031-2033
Unit installation complete	2040-2045

Current Status

- The 1:25 scale physical observational turbine model is being used to inform the development of the Phase 1 Plans and Specifications package, to document the hydraulic conditions that affect the biological performance of the existing JDA turbines and will be used to support the collaborative and iterative design process in Phase 2. Baseline model data collection for Test Series 1 took place from January through June of 2021 with a focus on

validating the relocated model and evaluating potential draft tube modifications. The results were used to guide development of the plans and specifications. ERDC prepared a draft data report documenting Test Series 1; this was provided to agency and external partner staff that participate in the PDT in October 2021. Scoping for Test Series 2 is in progress, with testing expected to begin in March 2022. The focus of Test Series 2 will be data collection to document the baseline hydraulic conditions affecting fish survival within the existing turbine environment (e.g., strike, shear and turbulence).

- The 1:45 JDA general physical model and CFD tailrace model are being used to assess hydraulic conditions affecting juvenile egress and adult approach to the fish ladder entrances. Tailrace flow patterns for both models were validated to a single operating condition in 2020. The physical model was used in 2021 to simulate selected scenarios that had been analyzed using CFD during Phase 1A. The results are currently under review by the PDT. Model runs will resume after further HAC modeling is complete and preliminary options for the turbine mix are established.
- The PDT is investigating the possibility of going with oil-free hubs for the adjustable-blade units. Working with PNNL to complete bushing and corrosion fatigue testing.
- 90% DQC and NMFS review has been completed. NMFS had no comment and DQC comments are in review.

Topics for FFDRWG Review/Coordination

None currently.

Fish Facility Design Review Work Group (FFDRWG)
USACE, Portland District
Project Update
Date Prepared/Updated: 2022-1-28

TDA Backup AWS Debris Management EDR

Project Identifier:	P2 #
Project Manager (PM):	Erin Kovalchuk (CENWP-PMF) *Erin.H.Kkovalchuk@usace.army.mil*
Technical Lead (TL):	Mehdi Roshani (CENWP-ENC) *Mehdi.Roshani@usace.army.mil*
FFDRWG Coordination (FC):	Jon Rerecich (CENWP-PME) *Jonathan.G.Rerecich@usace.army.mil*

Project Description

This project is to evaluate alternatives to remove debris from The Dalles Dam Auxiliary Water Supply (AWS) trash rack. Debris build-up on the rack currently causes high head differential across the rack. Fish Unit Rehab requires the AWS backup system to operate during the rehab to provide adequate flow for fish attraction. Fish Unit Rehab duration is one year per unit for a total of two years. Long term use of the backup AWS system will be part of the alternatives evaluation.

Project Schedule

Milestone	Start	End
Criteria and Constraint Report	4/19/2021	8/6/2021
Value Management	8/9/2021	8/20/2021
Alternative Evaluation Report	8/23/2021	?
Draft Final Report	?	?
ATR	?	?
Final Report	?	?
Closeout	?	?

Current Status

Value Management Study completed.

No Funding in FY 22

Alternative evaluation Engineering Design Report (EDR) shelved at 50%

Topics for FFDRWG Review/Coordination

PDT will solicit FFDRWG participation at the 60% Engineering Design Report (EDR).

Fish Facility Design Review Work Group (FFDRWG)
USACE, Portland District
Project Update

Date Prepared/Updated: 2022-3-3

BON Second Powerhouse FGE

Project Identifier:	P2 #
Project Manager (PM):	Jim Adams (CENWP-PMF) *James.R.Adams@usace.army.mil*
Technical Lead (TL):	Bridget Bell (CENWP-ENC) *Bridget.M.Bell@usace.army.mil*
FFDRWG Coordination (FL):	Jon Rerecich (CENWP-PME) *Jonathan.G.Rerecich@usace.army.mil*

Project Description

Steel plates were installed in all units in the A and B gatewells to restrict flow. During routine inspections, however, it became apparent that the anchoring system for the steel plates was inadequate. In effect, the nuts and anchoring bolts holding down the plates had come loose, posing the risk that the plates could detach and potentially take out a unit. All flow restriction plates were removed from the units. A concrete corbel will be installed in the same location as the flow control plates with the design goal to achieve similar gatewell hydraulic conditions as the flow control plates. This new concrete corbel has been designed to meet the flow criteria established and tested for the previous flow restrictor plates to meet the hydraulic and biological goals.

Project Schedule

CLIN	Status	Description	Award/Exercise Date	Construction Execution Window
1	Mandatory	Mobilization/Demobilization	Awarded December 2020	Complete
2	Mandatory	Unit 15 Construction	Awarded December 2020	Complete
3	Optional	Second Mob/Demob and Unit 11 Construction	Awarded August 2021	Dec 2022-Feb 2023
4	Optional	2 Additional Units	Awarded August 2021	Extend through May 2023
5	Optional	2 Additional Units	Awarded August 2021	Extend through August 2023
6	Optional	2 Additional Units (Unit 18 + 1 more Unit)	Awarded August 2021	Extend through February 2024

Current Status

- Construction in unit 15 is complete. The contractor did great work, and we had very few RFIs and only one modification.
- Optional construction CLINs were awarded August 2021. We will modify the dates of execution extending them out a year to allow us to test in the spring of 2022 prior to installing the remaining corbels.
- AE contract for hydraulic testing in Spring 2022 was awarded in September 2021. Hydraulic tests will be needed in the spring to meet the upper 1% test range of 18.0-18.5 kcfs. A FPOM MOC with a more detailed testing schedule and coordinating unit outages for installation and removal of equipment is being developed.
- Original contract schedule said we would continue with units, 12, 13, 14, 16, and 17 and then end with either 11 or 18 the following IWW. However, the contractor thinks they can do both 11 and 18 in the 2022-2023 IWW and then finish with the remaining units throughout the spring/summer. The PDT is confident they can achieve that after how well unit 15 went. We will confirm their schedule after we get the modification in place.

Topics for FFDRWG Review/Coordination

Feb 2022 FFDRWG ACTION: Jon Rerecich or Max Wilson-Fey will follow up with FFDRWG on whether the testing equipment will come out immediately or wait until Fall after Monday's PDT meeting.

- Still in discussion with PDT for outage scheduling. Working with contractor to determine if there will be two sets of pressure sensors that need to be moved between Unit 14 and 15 and if pressure transducers can remain in the unit and be removed later.

Fish Facility Design Review Work Group (FFDRWG)
USACE, Portland District
Project Update

Date Prepared/Updated: 2022-3-3

JDA adult lamprey passage improvements

Project Identifier:	P2 # 492402
Project Manager (PM):	Michael Carl (CENWP-ENC-DS) *michael.r.carl@usace.army.mil*
Technical Lead (TL):	Adam White (CENWP-ENC) *Adam.J.White@usace.army.mil*
FFDRWG Coordination (FC):	Jacob Macdonald (CENWP-PME) *Jacob.Macdonald@usace.army.mil*

Project Description

Modify NFL LPS to increase the capacity and reliability of the system

This is a fish safety/health issue, and the upgrade needs to happen. Current water supply is insufficient so tank cannot be installed without upgraded water supply. See January 2020 CRS BA § 2.5, pg. 2-85**.**

a. gravity-fed water supply or alternative, more reliable pump configuration.
b. larger collection box

SFL entrance improvements (rounded crest, slot cover/filler)

Caps may not be able to be added to South Ladder entrance weir due to FPP submergence criteria, so the weir may need to be modified more extensively to provide rounded weir crests and guide slot covers.

SFL count station collection and counting structure (trap) improvements

Increase capacity and efficiency of system with a larger opening into box; larger box, modified guide, and removal of gate and counting-related structure.

Project Schedule

Design: FY 2021 – FY 2022
- 30% DDR – July 2021
- 60% DDR – November 2021
- 90% DDR – March 2022
- BCOES – May 2022

Construction: December 2022 - March 2023
Evaluation/Closeout: FY 2023

Current Status

90% DDR is underway. PDT is moving forward with a gravity feed water supply from behind existing picketed leads near the count station via an existing diffuser drain line. A surplus holding tank at JDA will be modified and relocated to serve as the larger collection box.

Topics for FFDRWG Review/Coordination

FFDRWG review of 60% DDR.

Fish Facility Design Review Work Group (FFDRWG)
USACE, Portland District
Project Update

Date Prepared/Updated: 2022-3-3

TDA adult lamprey passage improvements

Project Identifier:	P2 # 492403
Project Manager (PM):	Michael Carl (CENWP-ENC-DS) *michael.r.carl@usace.army.mil*
Technical Lead (TL):	Adam White (CENWP-ENC) *Adam.J.White@usace.army.mil*
FFDRWG Coordination (FC):	Jacob Macdonald (CENWP-PME) *Jacob.Macdonald@usace.army.mil*

Project Description

Lamprey collection system (LPS) at the east fish ladder junction pool

Provide a ramp (or multiple) for lamprey to swim out of the junction pool and into a collection box located below the upper segment of the fish ladder for upstream transport. See January 2020 CRS BA § 2.5, pg. 2-85**.**

Modify elevated orifices in EFL exit weirs 154-157

Provide better lamprey passage options through the 4 control weirs at the upstream end of the east fish ladder.

Bulkhead slot covers

Design and install bulkhead slot covers at all four fishway entrances.

Project Schedule

Design: FY 2021 – FY 2022
- 30% DDR – August 2021
- 60% DDR – February 2021
- 90% DDR – May 2022
- BCOES – July 2022

Construction: December 2022 - March 2023
Evaluation/Closeout: FY 2023

Current Status

60% DDR is underway. Preferred LPS design includes gravity-fed water supplied from an existing auxiliary penstock in the dam, a large collection box on the deck near the junction pool, and 1-3 climbing ramps reaching down to the fishway floor.

Topics for FFDRWG Review/Coordination

FFDRWG review of 60% DDR.

Fish Facility Design Review Work Group (FFDRWG)
USACE, Portland District
Project Update

Date Prepared/Updated: 2022-3-3

BON1 adult lamprey passage improvements

Project Identifier:	P2 # 492400
Project Manager (PM):	Michael Carl (CENWP-ENC-DS) *michael.r.carl@usace.army.mil*
Technical Lead (TL):	Adam White (CENWP-ENC) *Adam.J.White@usace.army.mil*
FFDRWG Coordination (FC):	Jacob Macdonald (CENWP-PME) *Jacob.Macdonald@usace.army.mil*

Project Description

The project scope is divided into three parts:

Entrance Modifications

Modify the B-branch fish ladder entrance to improve lamprey passage. This includes a variable-width entrance weir with rounded edges, guide slot fillers or covers to aid lamprey passage along the walls, and bollards on the channel floor for hydraulic refuge.

Lamprey Collection

Provide an alternate route for lamprey entering the B-branch of the Bradford Island fish ladder. Fish would climb up a flume structure to a holding tank on the deck of the dam and be transported upstream by Tribal fisheries personnel. This will be designed so that in the future we could extend the system to provide volitional passage to the Bonneville forebay.

Serpentine Section Extensive Minor Mods

Upgrade the serpentine section of the Bradford Island fish ladder to improve lamprey passage by rounding corners, providing refuge boxes, and lamprey orifices.

Project Schedule

Design: FY 2021 – FY 2022
- 30% DDR – July 2021
- 60% DDR – October 2021
- 90% DDR – March 2022
- BCOES – April/May 2022

Construction: December 2023 - March 2024
Evaluation/Closeout: FY 2024

Current Status

90% DDR is underway. PDT is investigating alternatives for gravity-fed water supply pipe routing.

Topics for FFDRWG Review/Coordination

FFDRWG review of 90% DDR

Fish Facility Design Review Work Group (FFDRWG)
USACE, Portland District
Project Update

Date Prepared/Updated: 2022-3-3

BON2 adult lamprey passage improvements

Project Identifier:	P2 # 492401
Project Manager (PM):	Michael Carl (CENWP-ENC-DS) *michael.r.carl@usace.army.mil*
Technical Lead (TL):	Shari Dunlop (CENWP-ENC) *Shari.L.Dunlop@usace.army.mil*
FFDRWG Coordination (FC):	Jacob Macdonald (CENWP-PME) *Jacob.Macdonald@usace.army.mil*

Project Description

Full redesign of control section (EDR/DDR, P&S, Construction).
2020 CRS BA Chapter 2: Proposed Action (pg.2-85): "This measure would modify the serpentine-style flow control sections of Bonneville Dam's Washington Shore and Bradford Island fish ladders, converting them to Ice Harbor-style vertical slot with submerged orifices configurations. This would improve passage conditions for adult lamprey and likely reduce stress and delay for adult salmon, steelhead, and bull trout. All full-duplex passive integrated transponder (PIT) arrays currently located in the control sections of these ladders would be replaced in kind or improved to maintain or enhance current levels of detection of PIT-tagged anadromous fish.

Project Schedule

Design: FY2021-FY2024
Construction: Winter 2024/2025
Evaluation/Follow-on: FY2025-FY2026
Closeout: FY 2027
Preliminary Milestones:

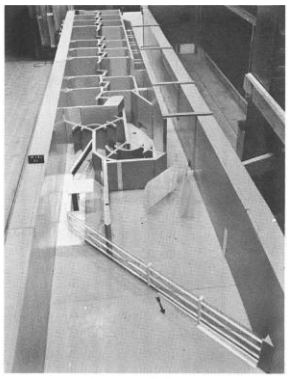
- ❑ Project Kick-Off: ~ August 2021
- ❑ 30% DDR: ~ January 2021
- ❑ 60% DDR: ~ June 2022 ***FFDRWG review ~July 2022**
- ❑ 90% DDR: ~ October 2022 ***FFDRWG review ~November 2022**
- ❑ Draft-Final: ~ September 2022 (FY23 Q1) ***FFDRWG review ~Oct 2022**
- ❑ [Start P&S after 90% DDR DQC is complete, ~November 2022]

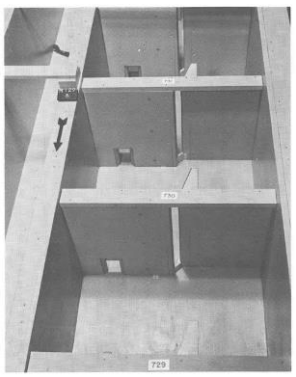
Current Status

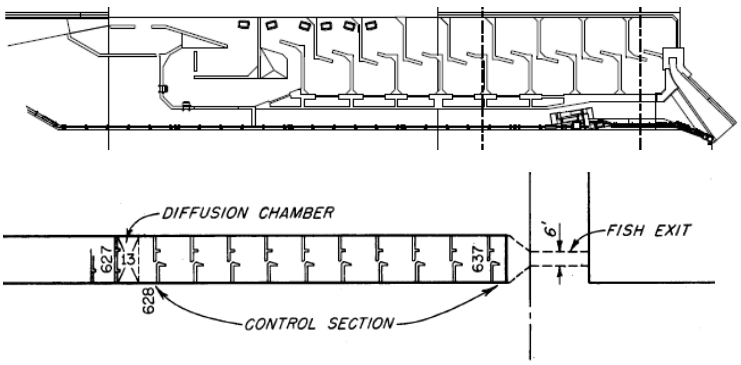
Screening-level hydraulic analysis was completed for four variations to achieve the CRS BA proposed action of replacing the serpentine control section with a vertical slot and orifice configuration. A site-specific cost estimate determined that the total project cost (not including evaluation/follow-on) would be in the $5M to $7M range. The PDT is now setting up 3D CAD and computational fluid dynamics (CFD) models to support the DDR design development work. PSMFC is additionally working on designs for the new PIT antenna arrays. The 30% DDR is currently undergoing internal review.

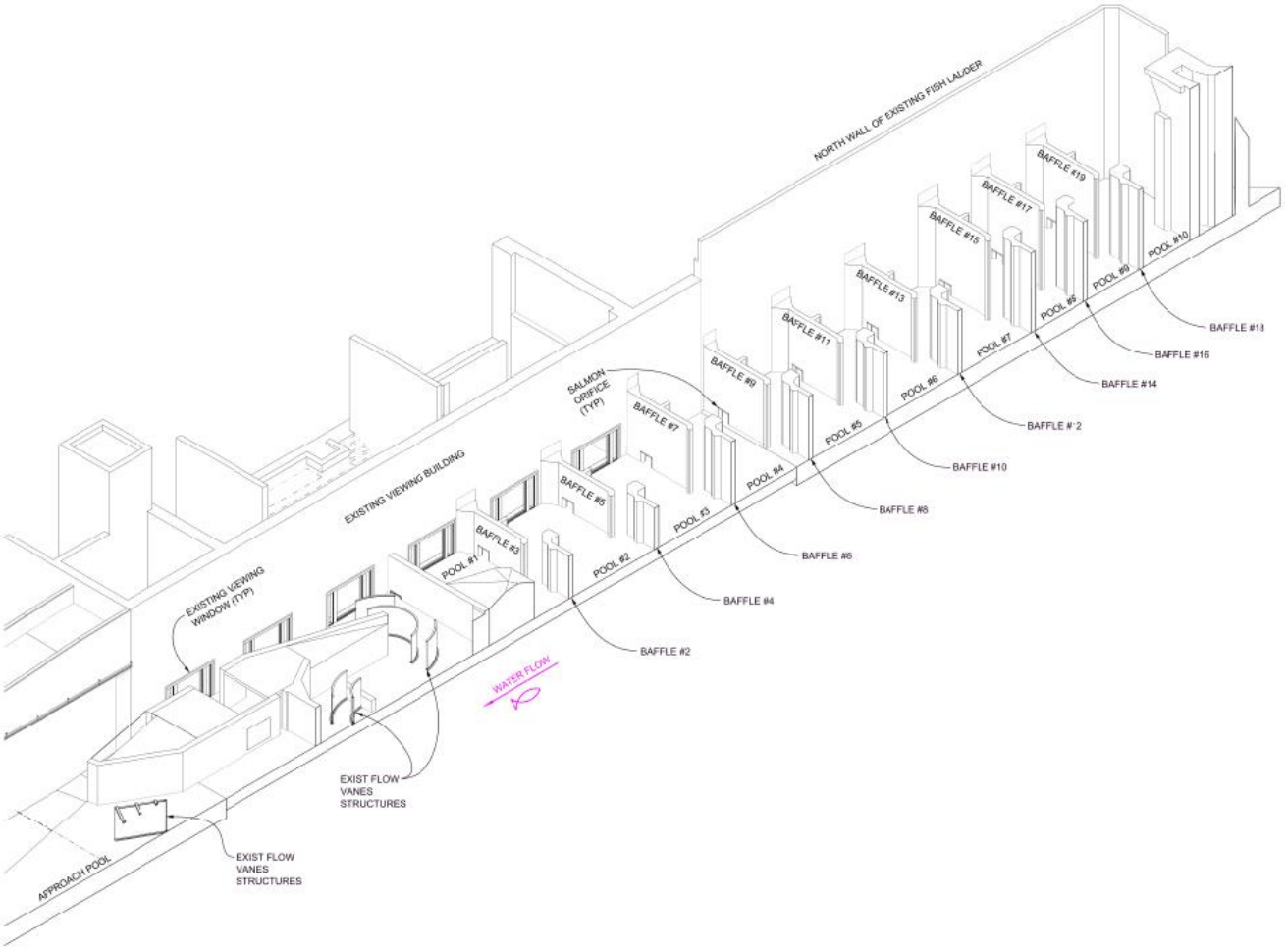
Topics for FFDRWG Review/Coordination

FFDRWG review of 30% DDR? Yes or No.






DIFFUSION CHAMBER
6'
FISH EXIT
627
3
637
628
CONTROL SECTION


NORTH WALL OF EXISTING FISH LADDER
BAFFLE #19
BAFFLE #17
BAFFLE #15
BAFFLE #13
BAFFLE #11
BAFFLE #9
BAFFLE #7
BAFFLE #5
BAFFLE #3
BAFFLE #2
BAFFLE #4
BAFFLE #6
BAFFLE #8
BAFFLE #10
BAFFLE #' 2
BAFFLE #14
BAFFLE #16
BAFFLE #13
POOL #10
POOL #9
POOL #8
POOL #7
POOL #6
POOL #5
POOL #4
POOL #3
POOL #2
POOL #1
SALMON ORIFICE (TYP)
EXISTING VIEWING BUILDING
EXISTING VIEWING WINDOW (TYP)
WATER FLOW
EXIST FLOW VANES STRUCTURES
EXIST FLOW VANES STRUCTURES
APPROACH POOL