Cowlitz Fish Technical Committee **2021-01**
Decision Document

Project Name	Long-Term Strategy for Annual Gravel Augmentation Settlement Agreement Article 10: Gravel Augmentation.
Date Proposal Submitted	11/30/2020
Date of Requested Decision	1/5/2021
Date Decision was Approved	2/2/2021
Requested By	Travis Nelson

FTC Decision and Justification

FTC agrees that the following decision document is a good path forward to implement the gravel augmentation. FTC representatives from WDFW, Ecology, NOAA, and Tacoma Power were present.

Proposed Decision or Consideration

This Decision Document is intended to account for gravel placement to date per Settlement Agreement Article 10 and the 2004 Gravel Augmentation Plan (2004 gravel plan, attached) and identify a path forward to future gravel placements in the Cowlitz River.

Starting in 2021, Tacoma Power intends to meet the obligations of the FERC license and Settlement Agreement (Article 10), as adopted in 2004 gravel plan, based on the following strategy:

Near term and long term locations

In 2021 through 2023, Tacoma Power will place a minimum of 500 cubic yards of gravel annually on the Barrier Island as part of the Barrier Dam Repair project, as indicated in Decision Document [DD] 2020-02 (attached). This is a requirement of the contractor for the Barrier Dam Repair Project.

By 2024 and through the end of the license (or until superseded by another FTC decision), Tacoma Power will place a minimum of 500 cubic yards of gravel annually downstream of the Barrier Dam. Gravel placement will prioritize sites in the upper half of the 11-mile treatment reach identified in the 2004 plan submitted to FERC.

Gravel specification

At least 500 cubic yards of ½ inch to 4-inch diameter washed round rock, to be placed annually.

2017-2020 deficit

Tacoma Power has a 2,000 cubic yard deficit from not placing gravel in 2017 through 2020. Tacoma Power may begin making up that deficit with excess materials from the Barrier

Dam Project coffer structure. An estimate of total quantity of gravel placement will made and shared with the FTC each year.

2025 is the target year to reconcile all deficit gravel placement.

FTC reporting

The FTC will continue to receive monthly updates on gravel augmentation at regular meetings at least through gravel placement in 2024.

The FTC will receive annual written updates accounting for annual placement actions by volume and location, starting with a report on the 2021 placement action at the Barrier Island.

Milestones

Tacoma Power will meet the following milestones toward development of the long-term plan:

DATE	MILESTONE
3/15/2021	Identify potential gravel augmentation sites, distribute to FTC by 3/30/2021
4/6/2021-5/4/2021	Discussion/approval of sites at FTC meeting (extra meeting contingency)
6/15/2021	Determine permitting needs, access agreements and rights of entry for site(s)
7/15/2021	Determine construction needs to develop the site(s)
8/16/2021	Finalize Gravel Augmentation Plan, distribute review copy to FTC for 30-day review)
9/15/2021	Identify potential modeling needs
9/28/2021	Distribute Final Gravel Augmentation Plan to FTC, with draft decision document
10/5/2021	Approve Final Gravel Augmentation Plan at FTC meeting
11/15/2021	Identify and design (roads, delivery mechanism such as shoot or slide, etc.)
1/15/2022	Apply for all necessary permits, access agreements and rights of entry
8/15/2022	Initiate site modifications
8/15/2024	Initiate gravel augmentation at developed site(s)

Background

Tacoma Power began implementing the 2004 Gravel Augmentation Plan (attached) in 2006, placing 500 cubic yards of gravel annually (on average) at a location on the right bank immediately downstream of the Barrier Dam. Gravel placement was suspended in 2013 and 2014, which was made up in 2015 and 2016, In 2017, the Tacoma Power and the FTC acknowledged that gravel placement at this location was not effective (i.e., gravel was mobilized and transported downstream more slowly than it was being placed).

The FTC agreed that Tacoma would suspend placement in 2017 but make up for it in 2018. Gravel augmentation for 2018 and future years was also suspended. In 2017 through 2020, Tacoma Power and the FTC worked through a series of strategies to restart gravel augmentation, summarized below by decision document (all referenced decision document are attached to this one).

The following summary of final decision documents summarize the past years (2016-2021) intended gravel placement(s) that were not executed due to factors related to environmental conditions, site selection, and constructability constraints. All four referenced decision documents are attached to this one for reference.

DD 2017-10, Postponement of annual gravel augmentation for 2017 (Settlement Article 10: Gravel Augmentation) Approved 9/7/2017 - *attached*

Decision (summarized, see attached document): Tacoma Power will postpone annual gravel augmentation until a different site and/or deployment strategy is developed; revert back to the original placement location if not done by December 2018; and make up for 2017 placement in 2018 (1,000 cubic yards due in 2018).

DD 2019-02 Temporary strategy for annual gravel augmentation (Settlement Article 10: Gravel Augmentation) Approved 1/18/2019 - *attached*

Decision (summarized, see attached full document): Tacoma Power will implement an interim gravel placement strategy in 2019 – 2022, specifically to place gravel below Mill Creek (3,000 cy in total, making up for 1,000 cy postponed placement by 2022). Simultaneously, Tacoma Power will develop a long-term strategy to continue gravel placement at alternate or additional sites. Tacoma Power also to relocate gravel from the current placement location to the Mill Creek location (up to 4,000 cubic yards). (This site was subsequently eliminated because of potential for conflict with recreational use.)

DD 2019-11 Temporary strategy for annual gravel augmentation (Settlement Article 10: Gravel Augmentation) Approved 12/19/2019 – *attached*

Decision (summarized, see attached full document): Tacoma Power will continue postponing gravel placement through 2019 (supersedes DD 2019-02).

DD 2020-02 2021-2023 Gravel Augmentation. Temporary strategy for annual gravel augmentation (Settlement Article 10: Gravel Augmentation) Approved 12/8/2020 - *attached*

Decision (summarized, see attached full document): Tacoma will place up to 1,000 cubic yards annually at the Barrier island between 2021 and 2023 during construction of the Barrier Dam Repair Project.

This decision document (**DD 2021-01 Long-term Strategy for Annual Gravel Augmentation**) supersedes DD 2017-10, DD 2019-02, and DD 2019-11 with respect to long-term gravel augmentation strategy, and incorporates the strategy for 2021-2023 (DD 2020-02).

A running account of annual requirements, placement, and balance owed for gravel augmentation from 2006-2020 is presented in Table 1. Tacoma Power did not place gravel in 2017-2020, and currently owes 2,000 cubic yards of gravel (2017-2020, Table 1).

Table 1. Gravel augmentation requirements and estimated total volume of gravel placed near Barrier Dam through 2020.

Year	Placement Location	Required (yds^3)		Placed (yds^3)		Balance (yds^3)
		Annual	Running total	Annual	Running total	
2006-2012	Barrier Dam	3,500	3,500	3,500	3,500	0
2013[1]	n/a	500	4,000	0	3,500	-500
2014[2]	n/a	500	4,500	0	3,500	-1,000
2015	Barrier Dam	500	5,000	1,000	4,500	-500
2016	Barrier Dam	500	5,500	1,000	5,500	0
2017[1]	n/a	500	6,000	0	5,500	-500
2018[2]	n/a	500	6,500	0	5,500	-1,000
2019[2]	n/a	500	7,000	0	5,500	-1,500
2020[3]	n/a	500	7,500	0	5,500	-2,000

[1] FTC temporarily suspends gravel placement at existing site, no placement
[2] No gravel placement, continued monitoring (pebble counts, additional cross sections added to monitoring)
[3] No gravel placement

Coordination Need

Barrier Dam Repair Project

Permit applications are in review for the Barrier Dam Repair Project, including gravel augmentation for 2021-2023. The FTC will be updated on permit and project status monthly. The FTC will receive annual written updates, starting with a report on the 2021 placement action at the Barrier Island.

This is aligned with the updates described in DD 2020-02 for planning and implementation of the temporary strategy.

Long-Term Plan

Tacoma Power will work with the FTC and other regulatory entities to secure the necessary federal, state, and local permits, exemptions, and/or authorizations to place material independent of the Barrier Dam Repair project. Required reviews may include US Army Corps of Engineers Section 404; Washington Department of Ecology Section 401 Water Quality Certification, Construction Stormwater General Permit, and Water Quality Protection

Plan; Washington Department of Fish and Wildlife Hydraulic Project Approval; SEPA determination; and local shoreline and critical areas review. Tacoma Power also will work with upland land owners and the Washington Department of Natural Resources (upland and/or aquatic) to secure access agreements and rights of entry.

Monthly updates will be provided at FTC meetings until implementation of the long-term plan is underway. The FTC will continue to receive annual written updates throughout implementation.

Tacoma Power will continue to coordinate with the FTC. Permits, authorizations, and access agreements will be renewed throughout implementation. This will provide an opportunity for periodic conversations about the effectiveness of placement and any need for adaptive management

Summary

Tacoma Power will start the long-term gravel augmentation strategy in 2021-2023 with placement at the Barrier island as part of the Barrier Dam Repair project (DD 2020-02). At least 500 cubic yards of material each year will be placed to meet the annual obligation; any additional placement will be counted toward the 2,000 cubic yard deficit from 2017-2020.

By 2024 and through the end of the license (or until superseded by another FTC decision), Tacoma Power will place at least 500 cubic yards of gravel annually downstream of the Barrier Dam. Gravel placement will prioritize sites in the upper half of the 11-mile treatment reach identified in the 2004 plan submitted to FERC –*attached*.

Tacoma will make up the 2,000 cubic yard deficit by 2025.

Tacoma Power will provide monthly updates to the FTC until implementation independent of the Barrier Dam Repair projects begins. Starting in 2022, the FTC will receive an annual written report of the previous year's gravel augmentation activities including a running account of gravel requirements and placements.

TACOMA POWER

3628 South 35th Street
Tacoma, Washington 98409-3192

TACOMA PUBLIC UTILITIES

ORIGINAL

March 15, 2004

VIA FEDEX
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Secretary:

Re: City of Tacoma, Cowlitz River Project, FERC No. 2016
Settlement Agreement License Article 10, Gravel Augmentation Plan

Settlement Agreement License Article 10 requires Tacoma Power to submit a Gravel Augmentation Plan within nine months of license issuance. By letter dated September 26, 2003, FERC staff established July 18, 2003, as both the effective and issuance date for purposes of license compliance. Enclosed are eight copies of this letter and the referenced plan.

This plan was sent to members of the Fisheries Technical Committee for comment as required by the license. The plan was also sent to the Cowlitz Tribe and presented at an open house, which Tacoma hosted for the public. No written comments were received. Tacoma is proposing to implement the plan this summer with the baseline survey and first year augmentation. We will therefore be applying for permits; however, FERC approval will likely be required before local agencies will act on the applications. We appreciate your action on this plan.

If you have any questions regarding this submittal, please do not hesitate to contact me at (253) 502-8336 or Tom Martin, License Implementation Coordinator, at (253) 502-8298.

Sincerely,

Patrick D. McCarty
Generation Manager

Encl.

cc: Federal Energy Regulatory Commission, Portland Regional Office
Consulting Agencies Distribution

FERC_secy re GravelAug.doc

Cowlitz Hydroelectric Project
FERC No. 2016

Agencies and Tribes Distribution

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City of Tacoma,
Department of Public Utilities, Light Division
Cowlitz River Project
FERC No. 2016

Settlement Agreement License Article 10

Gravel Augmentation Plan

1. INTRODUCTION

This plan is prepared in compliance with the requirements of Settlement Agreement License Article 10, contained in Appendix A of the Federal Energy Regulatory Commission's (the Commission) Order Approving Settlement and Issuing New License for FERC Project No. 2016, issued and effective July 18, 2003. The license article requires the City of Tacoma, Department of Public Utilities, Light Division (Tacoma Power) to develop and file a plan for augmenting spawning gravel below the Barrier Dam within nine (9) months of license issuance.

1.1. PROJECT DESCRIPTION

The Cowlitz Project (FERC No. 2016) is Tacoma Power's largest electricity generating facility and is located on the Cowlitz River, Lewis County, Washington. The Project consists of two dams, the Mayfield Dam at river mile (RM) 52 and Mossyrock Dam, upstream at RM 65. In addition to the project generating electricity and providing flood control, Tacoma operates 3 major parks, manages approximately 14,000 acres of wildlife lands, and owns and funds operation of the Cowlitz Salmon Hatchery (RM 50) and the Cowlitz Trout Hatchery (RM 42). The Barrier Dam, associated with the Cowlitz Salmon Hatchery is located at RM 49.5. The original 50-year license for the Cowlitz Project was issued on December 28, 1951. A new thirty-five year license was issued and became effective on July 18, 2003.

The Mayfield development completed in 1963 includes a 250-foot-high, 850-foot-long, concrete arch and gravity dam that impounds Mayfield Lake, which has a maximum surface area of 2, 250 acres. In addition to the Cowlitz River, inflows from the Tilton River also contribute to Mayfield Lake, which supports public and private recreational facilities. An 854-foot-long power tunnel passes through the right abutment of the dam and terminates at a concrete forebay structure. Four penstocks continue from the forebay structure to the four generating units, which have an installed capacity of 162-megawatts (MW).

The Mossyrock development completed in 1968 includes a 606-foot-high double curvature concrete arch dam that creates Riffe Lake, a 23-mile long, 11,830-acre reservoir with 52 miles of shoreline. Riffe Lake supports several parks and other recreational facilities. Three penstocks, varying in length from 248 to 285 feet, extend down to the powerhouse, which is adjacent to the base of the dam. The powerhouse contains two generating units with room for a third, and has a total installed capacity of 300 MW. Transmission lines link the Mossyrock and Mayfield developments.

1.2. FERC LICENSE

APPENDIX A

SETTLEMENT AGREEMENT LICENSE ARTICLES

Article 10. Gravel Augmentation.

Within 9 months of license issuance, the Licensee shall file for Commission approval a plan to augment spawning gravel below the Barrier Dam to enhance salmonid spawning habitat. The source of gravel, to the extent reasonably available, shall be just upstream of Barrier Dam. The gravel augmentation plan shall include: a) a description of plans to monitor and evaluate the effectiveness of gravel augmentation, including parameters that will be measured to determine the value of gravel placements to salmonid fish reproduction and the stability and life expectancy of such placements, and b) a plan for the discontinuation of gravel augmentation if Barrier Dam is breached, including plans to monitor the post-breach adequacy of gravel supplies and mitigate for any identified gravel shortfalls in the affected reach (Mayfield Dam to the Toutle River). The Licensee shall prepare the plan in collaboration with the Fisheries Technical Committee provided for in the August 2000 Settlement Agreement, or if the Settlement Agreement has become void, with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, Washington Department of Fish and Wildlife and Washington Department of Ecology (referred to as "the FTC or agencies"). When a draft plan has been prepared, it shall be provided to all affected agencies and Tribes for 30-day review and comment. The Licensee shall include with the final plan documentation of consultation and copies of comments and recommendations, and specific descriptions of how the final plan accommodates all comments and recommendations. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on Project-specific information. The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission. Following Commission approval, the plan becomes a requirement of the license, enforceable by the Commission.

2. OBJECTIVES

Prior to the construction of Tacoma Power's hydroelectric and operational dams on the Cowlitz River, sediment was supplied to the Cowlitz River from the watershed upstream of the dams. The construction of the dams modified the natural downstream migration of the sediments in the Cowlitz River which included cobble and gravels suitable for salmon spawning. Studies during Project relicensing (Harza 1999b) demonstrated that the quantity and distribution of suitable substrate does not appear to be a limiting factor for spawning salmon in the Cowlitz River between the Barrier Dam and the Toutle River, however, there is evidence of channel bed armoring between the Barrier Dam and River Mile 40.

3. PLAN

The first requirement of the plan is to assess current bed armoring conditions from the Barrier Dam to River Mile 40 and establish the reach will benefit from and should be targeted for gravel

augmentation. A baseline survey and report to update the findings from the relicensing study (Harza 1999b) will be prepared. From that study, identification of the target reach and monitoring locations will be made. A monitoring plan will then be used to determine the success of the gravel augmentation efforts to reduce bed armoring in this reach of the Cowlitz River that supports a large salmon spawning population. These studies will be done in conjunction with the Fish Monitoring Plan (Cowlitz License Article 15) to assess salmon spawning and the effects of the instream flow requirements.

In accordance with the stated objectives of the article, Tacoma proposes to use native cobble and gravels from immediately upstream of the Barrier Dam to reduce bed armoring in the reach below the Barrier Dam. A large gravel bar currently exists from about the intake to the hatchery to about 500 feet downstream. This gravel bar along with gravels migrating downstream each year from sources below Mayfield Dam, are likely to provide an adequate and long-term source for augmentation below the Barrier Dam. Tacoma plans to create an access road over the river dike allowing access along the river from the hatchery water intake downstream approximately 250 feet. This will allow dredging of the bar by conventional crane and bucket or extend-a-hoe to approximately 40 feet from the shoreline. Dredging five feet deep would yield 1,850 cubic yards. Tacoma proposes to begin the program with an annual amount of 500 cubic yards and so this location alone may supply rock for four years or longer depending on the amount of material naturally migrating in each year. Further access improvements could be made to allow dredging of the gravel bar downstream.

This proposal is similar to two current Tacoma programs. At the Wynoochee Dam Hydroelectric Project and fish collection facility, each year the dredgings upstream of a similar barrier dam are transported and placed along the river downstream. High winter flows then recruit and transport the rock downstream. Tacoma Water has also recently begun a gravel augmentation program on the Green River below its water diversion dam. In that program, gravel is placed into the river in "piers" that extend out into the flow and then are slowly eroded at higher flows. The proposal for the Cowlitz is similar to aspects of each in that we are using native materials dredged above the barrier dam and in proposing to place the material in a pier extending out into the flow.

As required under item b) of this article, Tacoma proposes that if the Barrier Dam is planned to be breached, Tacoma will submit a study plan in advance of the breaching to monitor the post-breach adequacy of gravel supplies and mitigate for any identified gravel shortfalls in the affected reach (Mayfield Dam to the Toutle River).

4. MONITORING, EVALUATION AND REPORTING

Substrate samples will be collected at gravel sampling sites 2 through 12 on the Cowlitz River (Harza 1999b) during the base line study and then at two year intervals within the target reach for a period of ten years. Substrate samples will consist of a surface layer mean grain size and sub-surface layer mean grain size. The degree of bed armoring will be calculated as the difference in mean grain size between the layers. The surface layer will be Wolman pebble counts (Wolman 1954) and the sub-surface layer will be dry sieved. The baseline report will include conclusions regarding the target reach. Follow-up reports will be made at years 5 and 10 will include conclusions on the effectiveness of whether the initial program of 500 cubic yards per year (as proposed herein) has created the desired benefits or if the program should be discontinued or expanded. All reports shall include consultation with the agencies as listed in this license article prior to submittal to the FERC.

5. SCHEDULE

The baseline survey, report and first year gravel placement will all occur in August of year one following the FERC's approval of the plan, and upon acquiring all necessary permits. An interim report to the Commission will be filed by December 31 of year five (second follow-up survey) of the program and a final report with conclusions will be filed to the Commission in year 10. Tacoma assumes that gravel augmentation at some quantity will thereafter become a standard operating requirement of the license.

The plan was mailed to the Fisheries Technical Committee and Tribe on January 21, 2004. A display discussing the proposed plan was available to the public at a Cowlitz License Implementation Open House on February 5, 2004. No comments were received on the plan.

The only change to this plan from that mailed for consultation is the addition of a new study plan should the Barrier Dam be breached. Discussion of this is required by the license, but was not in the draft plan.

REFERENCES:

Harza. 1999b. *Cowlitz River Hydroelectric Project, FERC No. 2016. 1997 and 1998 Technical Study Reports, Volume 1: The 1997 Studies and Volume 2: The 1998 Studies.* Prepared for Tacoma Power. January 1999.

Wolman, M.G. 1954. *A Method for Sampling Coarse River-Bed Material. Trans. American Geophysical Union. 35: 951-956.*

APPENDICES:

1. DRAWINGS

Cowlitz Salmon Hatchery
Gravel Augmentation Plan
Borrow and Placement Sites
Dwg. No. MP4361

LARGE-FORMAT IMAGES

One or more large-format images (over 8 ½" X 11") go here. These images are available in FERRIS at:

For Large-Format(s):
Accession No.: 20040318-007

Security/Availability:

- [X] **PUBLIC**
- [ ] **NIP**
- [ ] **CEII**
- [ ] **NON-PUBLIC/PRIVILEGED**

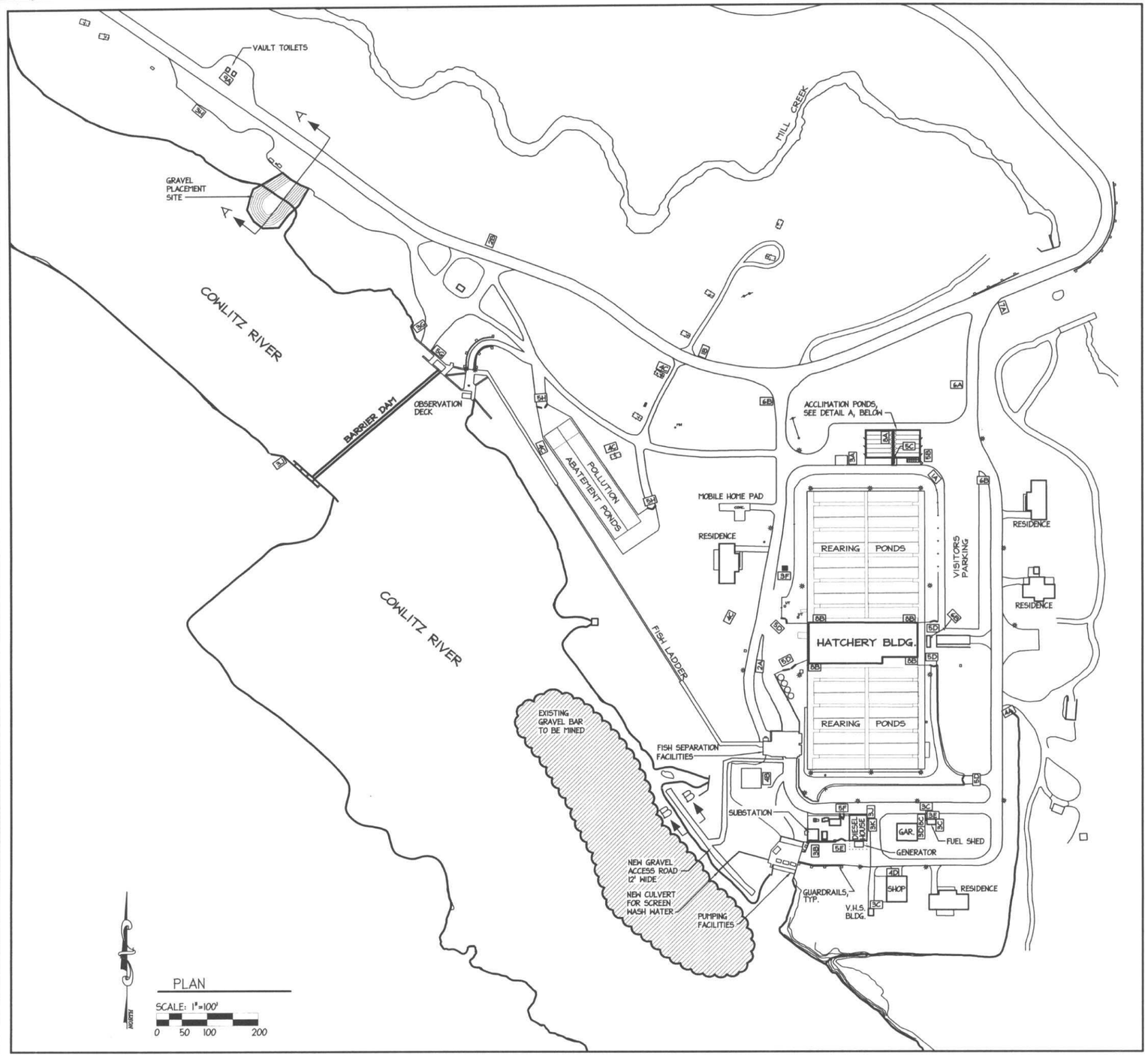
File Date: 3/17/04 **Docket No.:** P-2016

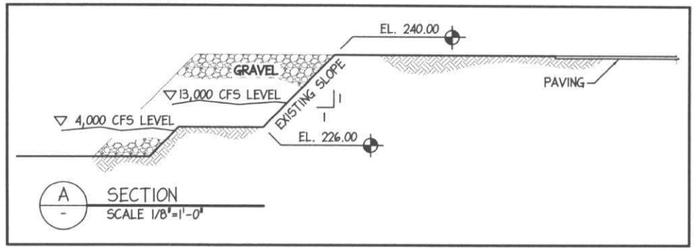
Parent Accession No.: 20040318-0096

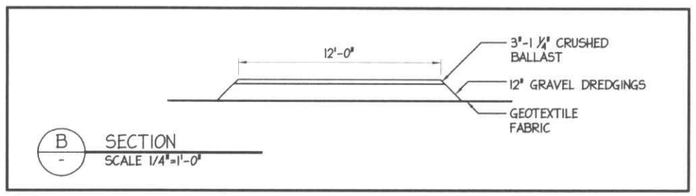
Set No.: 1 **of** 1

Number of page(s) in set: 1

Document Content(s)







NOTES:

1) ROAD
   A) REMOVE VEGETATION AND TOP SOIL FROM NEW GRAVEL ACCESS ROAD
   B) INSTALL GEOTEXTILE FABRIC AND 12" GRAVEL DREDGING
   C) TOP WITH CRUSHED BALLAST AND COMPACT

2) DREDGING
   A) USE CLAM BUCKET OR EXTEND-A-HOE
   B) MACHINERY NOT TO ENTER WATER
   C) OIL SPILL CONTAINMENT MATERIALS SHALL BE ON-SITE

3) GRAVEL PLACEMENT
   A) END DUMP GRAVEL OVER EXISTING SLOPE
   B) PUSH OUT AND LEVEL WITH CAT OR EXCAVATOR
   C) BUILD BERM OUT INTO RIVER AS SIDE SLOPES ALLOW

20040318-0097-01-001 Public

NO.	DATE	REVISION DESCRIPTION	BY	CHECKED	APPD BY

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

SCOPE OF APPROVAL
ORIGINAL DRAWING

STATE OF WASHINGTON STEVEN H. FISCHER 18858 REGISTERED PROFESSIONAL ENGINEER
DATE 8/31/

COWLITZ SALMON HATCHERY
GRAVEL AUGMENTATION PLAN
BORROW & PLACEMENT SITES

DESIGNED	FIELD BOOK
SUBMITTED	AS SHOWN
SUPERVISING ENGINEER	DATE / SCALE
APPROVED	DRAWING NO. MP4361
ASSISTING ENGINEER	SHEET OF

DRAWN	CHECKED	REV. NO.
MSR		0

20040726-3006 Issued by FERC OSEC 07/26/2004 in Docket#: P-2016-066

UNITED STATES OF AMERICA 108 FERC ¶ 62,079
FEDERAL ENERGY REGULATORY COMMISSION

City of Tacoma Project No. 2016-066

ORDER APPROVING GRAVEL AUGMENTATION PLAN PURSUANT TO SETTLEMENT AGREEMENT LICENSE ARTICLE 10

(Issued July 26, 2004)

On March 17, 2004, the City of Tacoma (licensee) filed a Gravel Augmentation Plan, pursuant to article 10 contained in Appendix A of the Order Approving Settlement and Issuing New License for the Cowlitz River Project, issued on March 13, 2002.[1] The Project is located on the Cowlitz River, in Lewis County, Washington.

Article 10 requires the licensee to file, for Commission approval, a plan to augment spawning gravel below the Barrier Dam to enhance salmonid spawning habitat. The gravel augmentation plan shall include plans to monitor and evaluate the effectiveness of gravel augmentation and a plan for the discontinuation of gravel augmentation if Barrier Dam is breached. The gravel augmentation plan shall be prepared in consultation with the Fisheries Technical Committee provided for in the August 2000 Settlement Agreement, or if the Settlement Agreement has become void, with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, Washington Department of Fish and Wildlife, the Washington Department of Ecology and the Tribes for review and comment.

PROPOSED PLAN

The licensee will assess current bed armoring conditions from the Barrier Dam to River Mile 40. A baseline survey and report that will update the findings from the relicensing study will be prepared. A target reach and monitoring locations will be identified. The licensee will use native cobble and gravels from immediately upstream of Barrier Dam to reduce bed armoring in the reach below the dam. The licensee proposes an annual dredging amount of 500 cubic yards. The material will be placed in a pier extending out into the flow. These piers will be slowly eroded at higher flows and transported downstream.

[1] 98 FERC ¶ 61,274

If Barrier Dam is planned to be breached, the licensee will submit a study plan in advance of the breaching to monitor the post-breach adequacy of gravel supplies and mitigate for any identified gravel shortfalls in the affected reach.

To monitor the site, substrate samples will be collected at identified gravel sampling sites during the baseline study and then at two year intervals within the target reach for a period of ten years. The degree of bed armoring will be calculated as the difference in mean grain size between the layers. A baseline report will include conclusions regarding the target reach. Follow-up reports will be made at years 5 and 10 and will include determinations on the effectiveness of the initial program of placing 500 cubic yards of gravels in creating the desired benefits or if the program should be discontinued or expanded. All reports will include consultation with the required resource agencies prior to filing with the Commission.

The baseline survey, report, and first year gravel placement will occur in August of year one following the Commission's approval of the plan, and upon acquiring all necessary permits. An interim report to the Commission will be filed by December 31 of year five of the program and a final report with conclusions will be filed with the Commission in year ten.

AGENCY CONSULTATION

A draft of the Gravel Augmentation Plan was sent to the Fisheries Technical Committee and Tribes on January 21, 2004. A display discussing the proposed plan was made available to the public at an Open House on February 5, 2004. No comments were received on the plan.

RECOMMENDATIONS AND CONCLUSIONS

The licensee does not state whether the baseline report will be filed with the Commission. The licensee should file the baseline report with the Commission by December 31, 2004. The five-year interim and ten-year reports, and any proposed changes to the Gravel Augmentation Plan, should be filed for Commission approval. All of the reports should include documentation of agency and tribal consultation.

The licensee is reminded that article 417 of the Order Amending New License[2], issued July 9, 2004, requires the licensee to develop best management plans in consultation with NOAA Fisheries. These best management plans require Commission approval, prior to implementing the Gravel Augmentation Plan.

[2] 108 FERC ¶ 61,031

The filed Gravel Augmentation Plan should help enhance salmon spawning habitat. The filed plan, satisfies the requirements of article 10 contained in Appendix A of the Order Approving Settlement and Issuing New License for the Cowlitz River Project; this plan should be approved, as modified.

The Director orders:

(A) The Gravel Augmentation Plan, filed March 17, 2004, pursuant to article 10 contained in Appendix A of the Order Approving Settlement and Issuing New License, issued, on March 13, 2002, for the Cowlitz River Project, as modified by paragraph (B), is approved.

(B) The baseline study report shall be filed with the Commission by December 31, 2004. The five-year interim report and the ten-year comprehensive report shall be filed with the Commission by December 31 of year five and year ten of the study, respectively. The reports shall include for approval, any recommendations for changes to the Gravel Augmentation Plan. The reports shall be sent to the Fisheries Technical Committee provided for in the August 2000 Settlement Agreement, or if the Settlement Agreement has become void, with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, Washington Department of Fish and Wildlife, the Washington Department of Ecology and the Tribes for review and comment. The licensee shall include with the report documentation of agency consultation, copies of comments and recommendations, and specific descriptions of how the agencies' and Tribes' comments are accommodated by the report. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on site specific information.

(C) This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. § 385.713.

George H. Taylor
Chief, Biological Resources Branch
Division of Hydropower Administration
and Compliance

Cowlitz Fish Technical Committee **2017-10**
Decision Document

Project Name	Postponement of annual gravel augmentation for 2017. Settlement Article 10: Gravel Augmentation.
Date Proposal Submitted	8/31/2017
Date of Requested Decision	9/07/2017
Date Decision was Approved	9/07/2017
Completed By	Florian Leischner

FTC Decision and Justification

The following voting members were present for this decision: WDFW (Tom Wadsworth), TPU (Travis Nelson), NMFS (Michelle Day), WA Dept. of Ecology (Carol Serdar), WA Chapter of TU (Paul Sparks).

The FTC supports the postponement as described in this document to meet the intended objective of augmenting gravel below Barrier Dam.

Proposed Decision or Consideration

Approve the postponement of the annual gravel augmentation until a different site and/or deployment strategy is developed. If this is not done by December 31, 2018, then we will revert back to placement at the current location. The 500 cubic yards (yards^3) of gravel placement required for 2017 will be made up in 2018; therefore the 2018 augmentation will total 1000 yards^3.

Background

As per Settlement Article 10 of the Cowlitz license. Tacoma must annually place 500 yards^3 of gravel sized ½-inch to 4 inches near the river downstream of the Barrier Dam. Gravel was augmented annually since 2006 and placed on the right bank (looking downstream) downstream of the barrier dam for natural recruitment to the channel. Due to insufficient magnitude and frequency of high winter flow events that can transport a majority of the material annually, gravel has been accumulating on the bank faster than being transported downstream.

The gravel has been placed on the right bank in an area of low hydraulic energy. In contrast, the left bank is where the main thalweg of the river is located. Efforts are underway to re-establish driving access to the left bank through WA State Department of Natural Resources forestry land.

It is assumed that access for gravel trucks to unload material on the left bank will be available by spring of 2018.

In addition, alternative placement strategies are being developed such as in-stream rather than bank placement and alternate locations downstream. Drafting of such alternatives and approvals will occur over the next nine months and are not ready for 2017.

Placing the majority of the material on the left bank, and/or changing the placement strategy altogether, should increase the dispersion rate of spawning material to downstream locations where they can benefit the naturally spawning salmon.

Coordination Need

The FTC will be updated on the progress of re-establishing driving access to the left bank and any alternative strategies.

Summary of Potential Impacts

No placement of gravel along the Cowlitz River bank near Barrier Dam for 2017. Make-up will occur in future years, to account for years lost (500 yards^3 per year).

Cowlitz Fish Technical Committee **2019-02**
Decision Document

Project Name	Temporary strategy for annual gravel augmentation Settlement Article 10: Gravel Augmentation.
Date Proposal Submitted	11/27/2018, Resubmitted 12/24/2018
Date of Requested Decision	01/11/2019
Date Decision was Approved	01/18/2019
Requested By	Florian Leischner

FTC Decision and Justification

The FTC agreed that gravel placement is not effective in the current location and therefore supports this interim plan identified in this document. The existing location is low energy and the alternate location has higher stream energy and is therefore, more likely to remobilize the material. This decision was made in accordance with FTC meeting protocols and without the participation of our federal representatives due to the federal government shutdown.

Proposed Decision or Consideration

Tacoma Power proposes to implement an interim gravel augmentation strategy. This will occur 2019 through 2022. This will reinstate the placement of gravel and move a portion of the existing gravel pile. The gravel will be placed into the Cowlitz River below Mill Creek. In 2017 the FTC Decision Document # 2017-10 temporarily suspended the 2004 Gravel Augmentation Plan and the placement of gravel. Simultaneously, Tacoma Power will implement this interim strategy and develop a long-term strategy for continuation of gravel placement at alternate or additional site locations.

Background

Settlement Agreement - Article 10 of the Cowlitz license required that Tacoma prepare a Gravel Augmentation Plan to augment spawning gravel below the Barrier Dam to enhance salmonid spawning habitat. The plan was to include: a) a description of plans to monitor and evaluate the effectiveness of gravel augmentation, including parameters that will be measured to determine the value of gravel placements to salmonid fish reproduction and the stability and life expectancy of such placements, and b) a plan for the discontinuation of gravel augmentation if Barrier Dam is breached, including plans to monitor the post-breach adequacy of gravel supplies and mitigate for any identified gravel shortfalls in the affected reach (Mayfield Dam to the Toutle River). Tacoma prepared a Gravel Augmentation Plan in 2004, which proposed to focus on the 11 miles of river and to annually place 500 cubic yards (yds^3) of native cobble and gravels near the river downstream of the Barrier Dam. The plan was approved by FERC in that same year.

The current method of placing gravel in the Cowlitz River includes stockpiling gravel along the right back at the river margin downstream of Barrier Dam. This method should allow for natural movement of gravel into downstream areas if flows are sufficient to mobilize and transport the gravel. Gravel moves during peak flows; bedload transport calculations estimate a flow of 15,000-20,000 cfs is necessary to cause substantial bedload transport within the channel in the reach downstream of Barrier Dam. Due to the lack of large flows to transport gravel, this method has not been effective in the short-term at providing large amounts of additional spawning-sized gravel to the Cowlitz River downstream of Barrier

Dam where it could be utilized by fish and other aquatic organisms (License Article 10 objectives), but some of the stockpiled material has been moved into the river and downstream and will likely provide long-term benefits (Gravel Augmentation Plan 10-Year Report, 2014). The 10-year report indicated that "if gravel is not mobilized after peak flows have occurred, placement by an alternate method will be considered to put gravel in areas that are more likely to be utilized by spawning fish."

Tacoma augmented gravel annually from 2006 to 2012 and 2015 to 2016. Augmentation for years 2013 and 2014 were made up in 2015 (Table 1) and 2016. Placement was suspended again (FTC Decision Document # 2017-10) in 2017. Less than 5,500 yds^3 remains in the current gravel pile near Barrier Dam.

Table 1. Pervious gravel augmentation requirements and estimated total volume of gravel placed near Barrier Dam.

Year	Required (yds^3)		Placed (yds^3)		Balance (yds^3)
	Annual	Running total	Annual	Running total	
2006-2012	3,500	3,500	3,500	3,500	0
2013[1]	500	4,000	0	3,500	-500
2014[2]	500	4,500	0	3,500	-1,000
2015	500	5,000	1,000	5,000	-500
2016	500	5,500	1,000	5,500	0
2017[1]	500	6,000	0	5,500	-500
2018[2]	500	6,500	0	5,500	-1,000

[1] FTC temporarily suspends gravel placement at existing site, no placement
[2] No gravel placement, continued monitoring (pebble counts, additional cross sections added to monitoring)

Tacoma proposes to restart the placement in 2019 with an interim strategy to use a site downstream of Mill Creek while preparing a long-term gravel augmentation strategy and securing access to additional locations.

Interim Strategy

The interim strategy 2019 through 2022 is to relocate gravel augmentation activities from the current location on the right bank below barrier dam to the right bank immediately downstream of the mouth of Mill Creek (Figure 1). Tacoma anticipates that gravel placed at the Mill Creek location will be more readily mobilized by the typical winter flow than where the gravel has been placed in the past.

Based on the annual required placement of 500 cubic yards (yds^3) that was temporarily suspended after 2016, there will be a minimum of 1,500 yds^3 placed in 2019 to make up for 2 years without gravel placement. An additional 1,500 yds^3 will be added at the Mill Creek location in 2022 to be up to date with augmentation requirements. Tacoma also proposes to relocate up to 4,000 yds^3 (2000 yds^3 in 2019 and 2000 yds^3 in 2022) from the existing gravel site. Although 5,500 yds^3 have been placed at the Barrier Dam site, some material has moved downstream and not all material will be recovered.

Tacoma is not required to move this material, but changing the gravel augmentation location meets the intent of the License and will allow for the river to more readily mobilize the gravel, prevent the deposition of gravel at the boat launch and minimize the safety concerns of the increasing gravel pile.

Tacoma Power anticipates staggering gravel placement events between 2019 and 2022 to minimize the amount of channel fill at any given time and to provide time for the river to mobilize placed material downstream. The proposed schedule places 1,500 yds^3 of gravel in 2019 and in 2022, with up to 4,000 yds^3 moved from the existing pile by the end of 2022 (Table 2). This schedule and approach may be adjusted during permitting based on input from the regulators.

Table 2. Proposed gravel augmentation below Mill Creek

Year	Annual Requirement (yds^3)	Proposed (yds^3)	Requirement Running Balance (yds^3)	Relocated from Original Pile (Estimated maximum yds^3)	Running Amount Placed (yds^3)
2019[1]	1,500	1,500	0	2,000	3,500
2020[2]	500	0	-500	0	3,500
2021[2]	500	0	-1,000	0	3,500
2022[1]	500	1,500	0	2,000	7,000

[1] Place 1,500 yds^3 of new gravel downstream of Mill Creek to make up the required deficit
[2] No placement; continue monitoring

Tacoma Power proposes a strategy that allows for contractor flexibility to determine the method of gravel placement. The permits will cover the method discussed to date, truck transport/delivery with a temporary heavy equipment crossing at Mill Creek, but will allow for the contractor to use alternate methods with similar or lower construction-related impacts to aquatic and/or recreational resources. This will be coordinated with the regulatory agencies during permitting.

The Mill Creek gravel augmentation site will be monitored to determine the effectiveness of the site for gravel augmentation and transport to meet Article 10 objectives. Proposed monitoring includes visual assessment/photo points and surveyed transects. Photos will be taken of the gravel augmentation site before placement, immediately after placement, and approximately three months after placement (after spring high flows). Permanent markers established near the piles to gage size of the pile or volume of gravel that did not move into the river. Transects will be utilized to determine if gravel has been moved into the river in the immediate vicinity of the pile or if it has been transported farther downstream. A transect(s) will be established across the gravel stockpile or the river bank extending out into the river a sufficient distance to cover the potential area of gravel movement, assuming that distance can be surveyed safely. Another transect will be established approximately 200 feet downstream of the new site. The relative elevation (relative to a local benchmark) will be surveyed along each of the transects prior to gravel placement, immediately following placement, and annually during summer low flow, and the results will be compared to determine if placed gravel has moved off the gravel pile and, if so, if it has

been moved into the river and the approximate distance transported downstream.

Milestones for the interim strategy include:

- 2018, fall. Tacoma Power adds cross-section surveys to support project planning and future monitoring
- 2019, winter. Tacoma Power/FTC approves interim strategy
- 2019, winter. Tacoma Power engineering develops drawings and approach for permitting and construction bids
- 2019, winter. Tacoma Power coordinates with regulators (WDFW, Ecology, USACE, WDNR, Lewis County) to determine permitting requirements and, if necessary, adjust project in response to regulatory input, includes a site visit
- 2019, winter. Tacoma Power submits permit applications, prepares associated documentation including Ecology's Water Quality Protection Plan
- 2019, summer. Permits received; gravel placement timing as determined by permits.
- 2020, 2021. No additional gravel placement anticipated, continue monitoring to assess gravel movement
- 2022. Additional gravel placement, continue monitoring.
- 2022 Long-term strategy will be complete.

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It is anticipated that a long-term strategy will be complete by 2022. As such, this interim strategy will terminate on or before 12/31/2022 and the long-term strategy will be implemented.

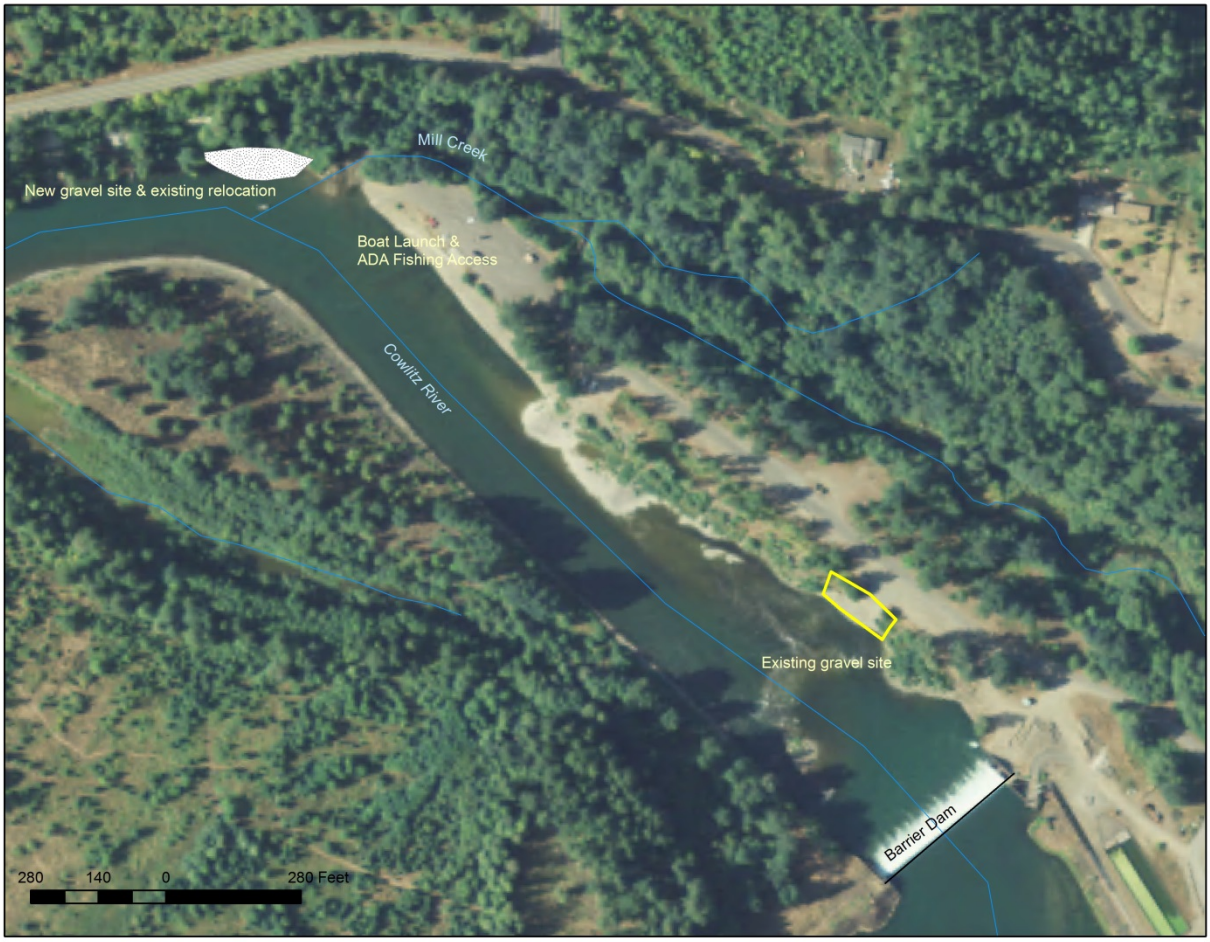

Figure 1. Existing and proposed gravel placement sites.

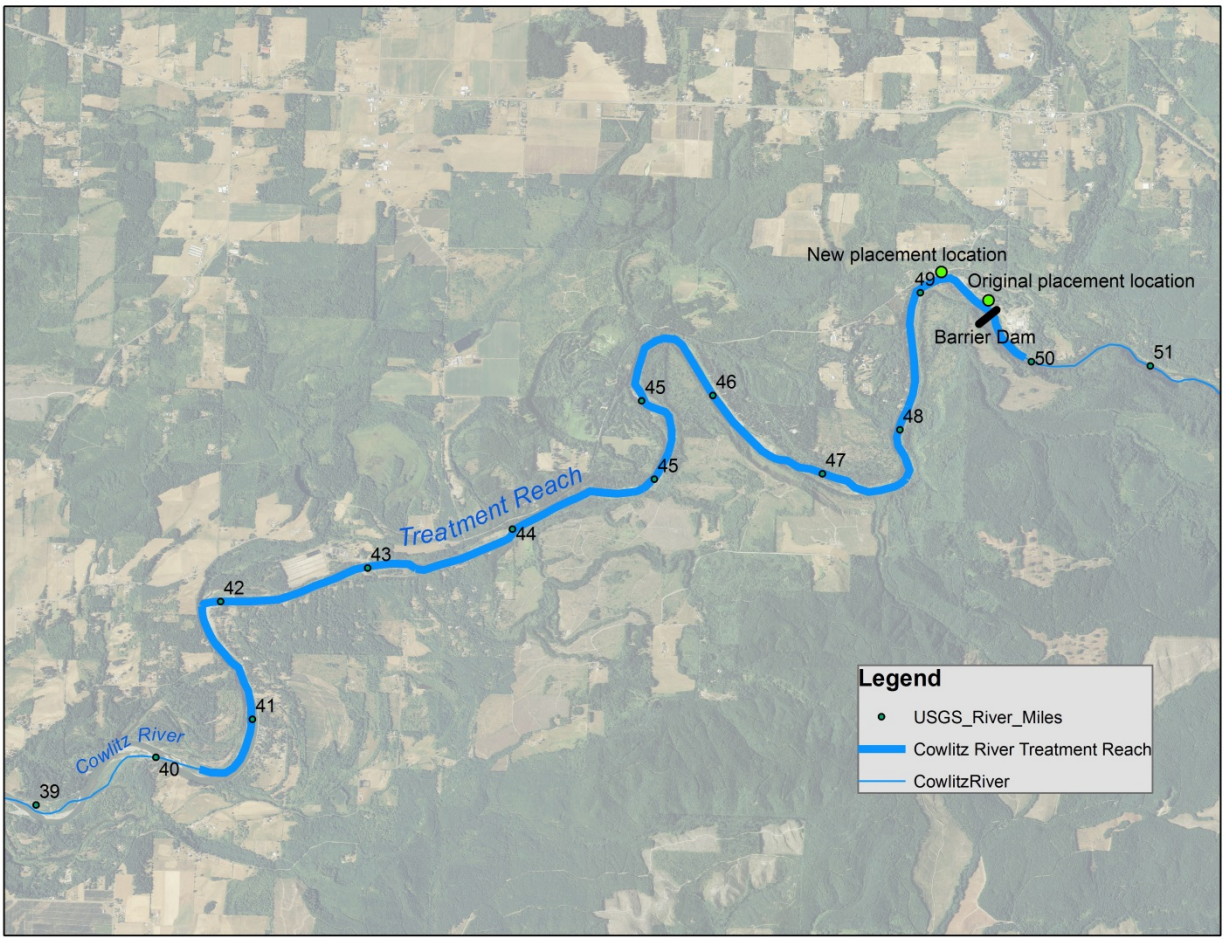

Figure 2. Focus reach, 11 miles downstream from Barrier Dam.

Coordination Need

Tacoma will secure all required permits and provide monthly updates to the FTC regarding the status of the gravel placement.

Summary

Reinstate the placement of gravel into the Cowlitz in 2019 that was temporarily suspended since the end of 2016. Tacoma will develop a long-term strategy to continue to identify additional gravel placement locations that effectively provide spawning gravel into the focus reach of the Cowlitz as described in the Gravel Augmentation Plan as required by Article 10 of the License.

Cowlitz Fish Technical Committee **2019-11**
Decision Document

Project Name	Temporary Strategy for Annual Gravel Augmentation Settlement Article 10: Gravel Augmentation.
Date Proposal Submitted	11/26/2019
Date of Requested Decision	12/3/2019
Date Decision was Approved	12/19/2019
Requested By	Florian Leischner

FTC Decision and Justification

The FTC concurs that Tacoma Power will continue postponing gravel placement through 2019. Members present at the 12/3/2019 meeting supported the decision including representatives from WDFW, Ecology, and Tacoma Power; the representative from the Yakama Nation was present on the phone. The decision document was circulated to the full FTC by email for 7-day review on December 12, 2019; no comments were received.

Proposed Decision or Consideration

Tacoma Power proposes to continue to postpone the gravel augmentation strategy through 2019. In 2017 the FTC Decision Document # 2017-10 temporarily suspended the 2004 Gravel Augmentation Plan and the placement of gravel.

This supersedes Decision Document #2019-02.

Background

Settlement Agreement - Article 10 of the Cowlitz license required that Tacoma prepare a Gravel Augmentation Plan to augment spawning gravel below the Barrier Dam to enhance salmonid spawning habitat. The plan was to include: a) a description of plans to monitor and evaluate the effectiveness of gravel augmentation, including parameters that will be measured to determine the value of gravel placements to salmonid fish reproduction and the stability and life expectancy of such placements, and b) a plan for the discontinuation of gravel augmentation if Barrier Dam is breached, including plans to monitor the post-breach adequacy of gravel supplies and mitigate for any identified gravel shortfalls in the affected reach (Mayfield Dam to the Toutle River). Tacoma prepared a Gravel Augmentation Plan in 2004, which proposed to focus on the 11 miles of river below the Barrier Dam and to annually place 500 cubic yards (yds^3) of native cobble and gravels near the river downstream of the Barrier Dam. The plan was approved by FERC in that same year.

The current method of placing gravel in the Cowlitz River includes stockpiling gravel along the right bank at the river margin downstream of Barrier Dam. It was felt that this method should allow for natural movement of gravel into downstream areas if flows are sufficient to mobilize and transport the gravel. Gravel moves during peak flows; bedload transport

calculations estimate a flow of 15,000-20,000 cfs is necessary to cause substantial bedload transport within the channel in the reach downstream of Barrier Dam. Due to the lack of recent large flows to transport gravel, this method has not been effective in the short-term at providing large amounts of additional spawning-sized gravel to the Cowlitz River downstream of Barrier Dam where it could be utilized by fish and other aquatic organisms (License Article 10 objectives). Some of the stockpiled material has been captured by the river, transported downstream and will likely provide long-term benefits (Gravel Augmentation Plan 10-Year Report, 2014). The 10-year report indicates that "if gravel is not mobilized after peak flows have occurred, placement by an alternate method will be considered to put gravel in areas that are more likely to be utilized by spawning fish."

Tacoma augmented gravel annually from 2006 to 2012 and 2015 to 2016. Augmentation shortfalls for years 2013 and 2014 were made up in 2015 (Table 1) and 2016. Placement was suspended again (Decision Document # 2017-10) in 2017. Less than 5,500 yds^3 remains in the current gravel pile near Barrier Dam.

Table 1. Previous gravel augmentation requirements and estimated total volume of gravel placed near Barrier Dam.

Year	Required (yds^3)		Placed (yds^3)		Augmentation Deficit (yds^3)
	Annual	Running total	Annual	Running total	
2006-2012	3,500	3,500	3,500	3,500	0
2013[1]	500	4,000	0	3,500	-500
2014[2]	500	4,500	0	3,500	-1,000
2015	500	5,000	1,000	4,500	-500
2016	500	5,500	1,000	5,500	0
2017[1]	500	6,000	0	5,500	-500
2018[2]	500	6,500	0	5,500	-1,000
2019[2]	500	7,000	0	5,500	-1,500

[1] FTC temporarily suspends gravel placement at existing site, no placement
[2] No gravel placement, continued monitoring (pebble counts, additional cross sections added to monitoring)

Tacoma previously proposed to restart gravel placement in 2019 (Decision Document #2019-02) at new locations. Tacoma will not have the necessary permits and authorizations in place to accomplish this.

Coordination Need

Tacoma will prepare a work plan describing the necessary steps to resume and catch up with gravel augmentation requirements under License Article 10, including a proposed timeline with key coordination points with the FTC. Tacoma will share a draft work plan with the FTC for the January 2020 meeting.

Tacoma will continue to provide monthly updates to the FTC regarding the status of the gravel placement.

Summary

Tacoma will continue to postpone the placement of gravel into the Cowlitz through 2019. At the January 2020 FTC Meeting Tacoma will share a draft work plan that provides details for future gravel placement.

Cowlitz Fish Technical Committee **2020-02**
Decision Document

Project Name	2021-2023 Strategy for Annual Gravel Augmentation Settlement Agreement Article 10: Gravel Augmentation.
Date Proposal Submitted	9/1/2020
Date of Requested Decision	12/1/2020
Date Decision was Approved	12/8/2020
Requested By	Travis Nelson

FTC Decision and Justification

The FTC concurs that Tacoma Power will pursue and execute gravel placement up to 1,000 cubic yards annually at the location listed in this decision document between 2021-2023. The location proposed in this decision document was reviewed and supported by the FTC.

FTC members present represented WDFW, Ecology, and Tacoma Power. This Decision document will be circulated to FTC members not present and become final on 12/8 if no objections are received.

Proposed Decision or Consideration

Execute gravel placement of up to 1000 cubic yards *(1-4" washed round rock)* annually over the next three years. Gravel is proposed to be placed at the Barrier Island location below the Barrier Dam repairs on the left side of the river looking downstream. This material would be credited to the quantities required in the gravel augmentation plan as adopted into the FERC license and Settlement Agreement – Article 10.

The location of gravel placement on the Barrier Island would be sited and oriented to promote recruitment of the gravel to the river thalweg.

Background

The Tacoma Power Barrier Dam repair project scheduled for 2021-2023 will use gravel of the correct specification and quantity to be utilized in the gravel augmentation project. Once the use of these materials is no longer needed in the water diversion for the repair work associated with the Barrier Dam, it will be placed at the Barrier Island.

This decision document does not preclude placement of gravel or quantities in other locations in the lower Cowlitz River. These topics will be, addressed in a separate decision document related to a long-term gravel augmentation plan.

In 2017, as documented by Decision Document #2017-10, Tacoma Power proposed to postpone gravel augmentation through 2020. In 2019, decision document #2019-02

acknowledged the current gravel placement location on the right bank of the Cowlitz below the barrier was not an effective location and alternate locations would be pursued.

The Barrier Island concept for gravel placement was discussed with the FTC at the September, October, and November 2020 FTC meetings.

Barrier Island

Coordination Need

Tacoma will prepare a Barrier Island Gravel Augmentation work plan and provide detailed monthly updates to the FTC regarding the status of the gravel placement during 2021-2023. Based on the nature of the Barrier Dam construction, there may be a need for adaptive management and any changes to gravel placement will be discussed with the FTC as soon as possible. Quantities will be accounted for on an annual basis and a written update will be provided to FTC. Materials will be monitored for migration to adaptively manage future gravel placement.

Tacoma Power will present the longer-term gravel augmentation plan at the January 2021 FTC meeting.

Summary

Tacoma Power will pursue gravel placement of up to 1000 cubic yards annually, at Barrier Island over the next 3 years, in conjunction with the Barrier Dam construction.