

Staff Report

for the Special Meeting of the Board of Directors, November 18, 2020

TO: Board of Directors

FROM: Keane Sommers, P.E., Hydroelectric Manager *KSS*
Dar Chen, P.E., G.E., Senior Engineer - Dam Safety

DATE: November 10, 2020

SUBJECT: **Scotts Flat Spillway - Physical Hydraulic Modeling (Sole Source)**

HYDROELECTRIC

RECOMMENDATION:

Approve Task Order 3 in the amount of \$374,540 with HDR to perform physical hydraulic modeling for Scotts Flat Spillway and authorize the Interim General Manager to execute the necessary documents.

BACKGROUND:

On August 14, 2019, the Board of Directors approved a contract in the amount of \$790,883 with HDR to perform Scotts Flat Spillway Upgrade Alternatives Development and Design. The contract covers professional services for the following three phases of work:

- Phase 1 – Alternative and Conceptual Design Development (Task Order 1),
- Phase 2 – Design and Documents for Construction, and
- Phase 3 – Engineering Support during Construction.

Task Order 2 for \$26,484 was approved on September 17, 2020 in order to develop the physical modeling program. The program outlining the scope of the physical hydraulic modeling at a scale of 1:40 for the entire Scotts Flat Spillway was prepared by HDR and was submitted to both the Federal Energy Regulatory Commission (FERC) and California Department of Water Resources, Division of Safety of Dams (DSOD) for their review and comments. Both agencies approved a final program in September 2020.

Task Order 1, Change Order 1 for \$18,925 is in process and will include the cost to complete a stability analysis per DSOD requirements, identification of cross sections for improved hydraulic modeling, and a downstream tailwater analysis.

During Phase 1, it was found that the existing spillway chute and the energy dissipation structure downstream (the lower plunge pool) are deficient to handle the flow of the probable maximum flood (PMF). There are major unknowns regarding the flow patterns and behaviors under the PMF. This information and data are critical to development of conceptual design and alternatives for the spillway upgrades. Both FERC and DSOD require that a physical hydraulic model be built and experimented in order to change the geometry (shapes and dimensions) of the spillway. The modeling will simulate the PMF flow and will record the flow behavior, which is necessary to configure the optimal shape and dimensions of the spillway chute and the energy dissipation structure downstream. The physical hydraulic modeling was not included in the original contract.

The proposed physical hydraulic model will be built in the hydraulic laboratory in Vancouver, British Columbia, Canada, owned and operated by Northwest Hydraulic Consultants (NHC), a subconsultant to HDR. The modeling scope of work will include model design and fabrication, regulatory submittals, instrumentation, model testing and verification, spillway design development testing, and witness testing. If the current COVID-19 public health emergency continues and no District or regulatory personnel can observe the testing at the laboratory, an online witness test program will be conducted.

NHC is a reputable consulting firm that specializes in hydraulics and hydrology in the western parts of the United States and Canada. NHC will lead the hydraulic modeling and has proposed the necessary scope of services at a reasonable cost. HDR is the lead consultants for the Scotts Flat Spillway Upgrades Project and has in-depth knowledge of the spillway. HDR will bridge NHC's modeling, the Phase 1 Alternatives Development, and the Phase 2 Upgrades Design. The team's proposal is reasonable and is recommended by staff.

Award of this contract is in alignment with Goal No. 1 and 2 of the District's Strategic Plan, by replacing critical infrastructure and maintaining compliance with State and Federal regulators.

BUDGETARY IMPACT:

The 2020 Hydroelectric Department Budget includes \$300,000 for the Project and a total of \$2,418,942 (including roll overs) for the Reservoir, Dams, and Waterways Improvement Program. As of September 30, 2020 \$399,366 dollars has been spent and \$455,739 has been encumbered leaving a 2020 balance of \$1,563,837.

KSS
MDC

Attachment:

- Presentation: Scotts Flat Spillway – Physical Hydraulic Modeling

Scotts Flat Spillway - Physical Hydraulic Modeling

Board of Directors Meeting

November 18, 2020




Scotts Flat Spillway

Scotts Flat Spillway

Write a description for your map.

Legend

 Scotts Flat Spillway

Scotts Flat Dam

Raised
Spillway
Crest, 1964

Scotts Flat Spillway

Upper
Plunge Pool,
1964

Old Spillway Chute, 1948

Flip Bucket Under
Lower Plunge Pool,
1952

Google Earth

300 ft

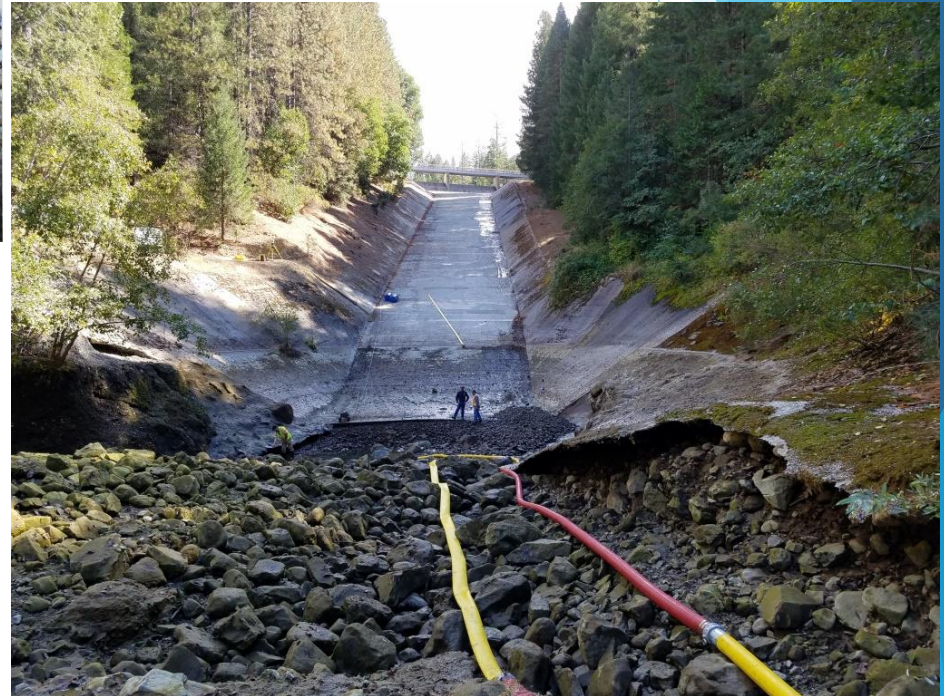


Scotts Flat Lower Plunge Pool Repair, Inspection, Survey



1997

2018



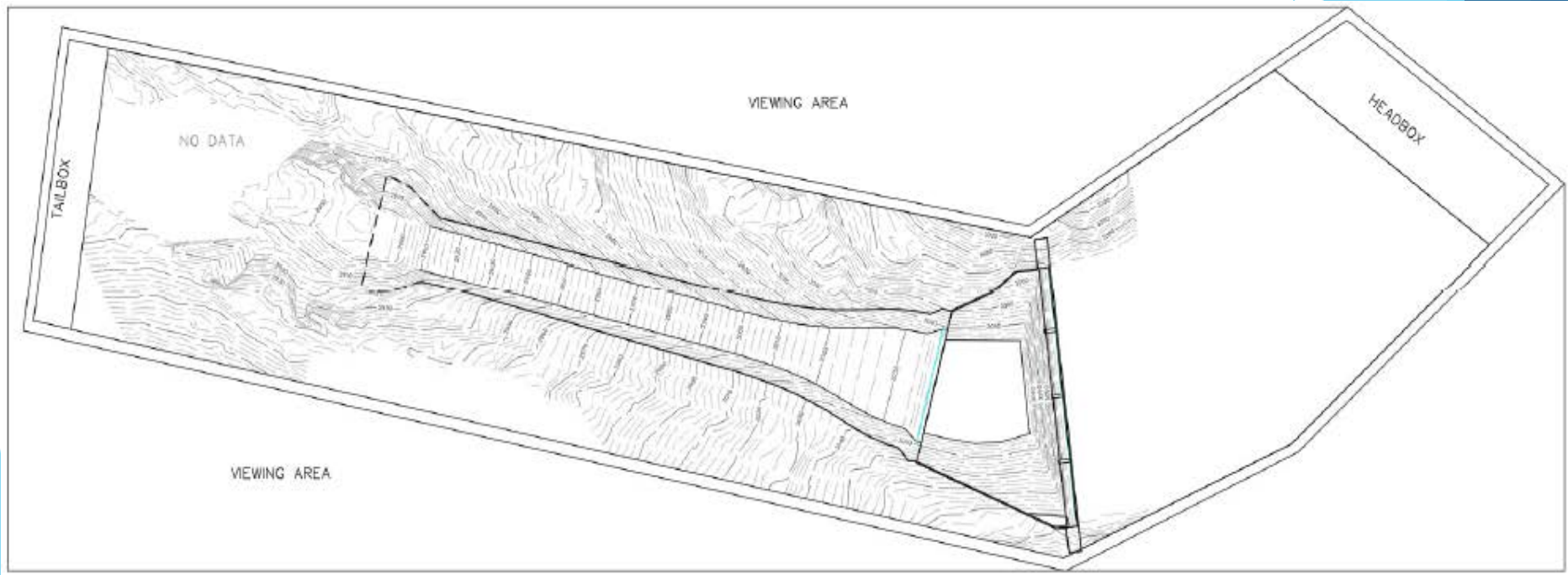
Scotts Flat Spillway Physical Hydraulic Modeling

Background

- ▶ PMF Flow = 24,000 CFS
Record High = 4,500 CFS in 1997
- ▶ Spillway Chute walls can be overtopped
- ▶ The existing Lower Plunge Pool could suffer damage leading to head cutting into the spillway.
- ▶ FERC and DSOD require physical hydraulic modeling be performed to change geometry of the existing spillway.



Scotts Flat Spillway Physical Hydraulic Model

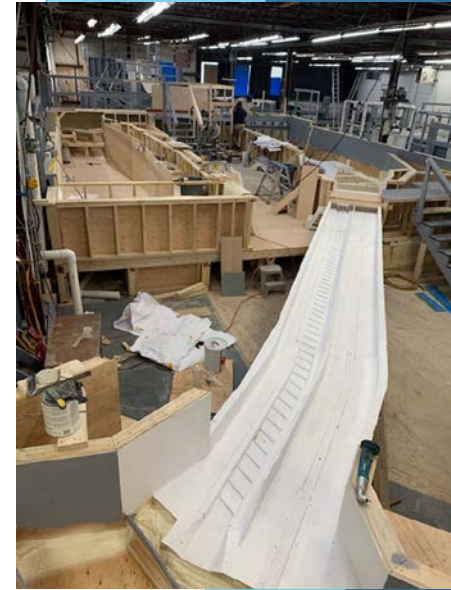


Model (1:40) to be built and tested at NHC Hydraulic Laboratory, Vancouver, B.C., Canada

hydraulics laboratory



nhc
northwest hydraulic consultants
water resource specialists



Physical Hydraulic Modeling

- ▶ Scope of Work
 - ▶ Model Design and Fabrication
 - ▶ Instrumentation
 - ▶ Shakedown and Initial Testing
 - ▶ Design Development Testing
 - ▶ Witness Testing and Recording
- ▶ Deliverable
 - ▶ Optimal Model with Hydraulic Data for Design

Sole-Source Consultant

- ▶ The HDR Team has performed the alternatives study and prepared the physical hydraulic modeling program approved by DSOD and FERC. The team has the best knowledge.
- ▶ The HDR Team will bridge among the modeling study by NHC, the current alternatives development, and the next-phase design of the spillway upgrades.
- ▶ The work scope is sound and the costs are reasonable.



Recommendations

Approve a Task Order in the amount of \$374,540 with HDR to perform Scotts Flat Spillway Physical Hydraulic Modeling and authorize the Interim General Manager to execute the necessary documents.



Questions?

