NPS Form 10-900
(Rev. 8-86)

2757

OMB No. 1024-0018

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NATIONAL REGISTER

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name: Cushman No. 2 Hydroelectric Power Plant
other names/site number: Lower Cushman Dam Project

2. Location

street & number: Skokomish River ☐ not for publication
city, town: Hoodsport ☒ vicinity
state: Washington code: WA county: Mason code: 045 zip code: 98548

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
		Contributing	Noncontributing
☐ private	☐ building(s)		
☒ public-local	☒ district	1	buildings
☐ public-State	☐ site		sites
☐ public-Federal	☐ structure	5	structures
	☐ object		objects
		6	0 Total

Name of related multiple property listing:
Hydroelectric Power Plants in Washington State

Number of contributing resources previously listed in the National Register: 0

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this ☒ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☒ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Jacob E. Thorn — October 12, 1988
Signature of certifying official — Date

Washington State Office of Archaeology & Historic Preservation
State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of commenting or other official — Date

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:

☑ entered in the National Register. ☐ See continuation sheet. — Patrick Andrus — 12/15/88
☐ determined eligible for the National Register. ☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____

Signature of the Keeper — Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)	Current Functions (enter categories from instructions)
INDUSTRY/energy facility	INDUSTRY/energy facility

7. Description

Architectural Classification (enter categories from instructions)	Materials (enter categories from instructions)
Other/constant radius concrete arch	foundation concrete
Neoclassical	walls concrete
	roof
	other

Describe present and historic physical appearance.

Located on the North Fork of the Skokomish River near the Hood Canal, Cushman Hydroelectric Power Plant No. 2 includes a monumental Neoclassical powerhouse and a constant radius concrete arch dam. The constituent elements are described below:

HEADWORKS:

Dam (1930): (Lower Cushman Dam) Constant radius concrete arch; impounds 8,000 acre feet of water. Impounds the used and overflow waters from Plant No. 1 and creates reservoir whose surface level extends to the tailwater at Powerhouse No. 1. Consequently all available fall above Plant No. 1 is used.

Dam rises 235 feet above bedrock, and has an upstream radius of 135 feet. It is 60 feet long at the base, and 450 feet long at the crest. The crest supports a 12 1/2 foot wide parapeted roadway. Dam is flanked at the east end by a concrete gravity abutment and at the west end by a 50 foot high concrete thrust block. Structure contains 38,000 cubic yards of concrete.

Spillway (1930): Located at west end of dam. It is concrete-lined. Water level is regulated by three 14 1/2 foot high by 40 foot drop gates. The sluice gate manual controls and the adjustable siphon automatic controls are mounted in the weir structure. The gates are the floating type; they are hinged along the upstream horizontal axis. The lower portion of the gate floats in a sealed, water-filled chamber. The height of the gate crest is regulated by the water level in this chamber which is controlled by the siphons.

Outlets/Valves (1930): Near the base of the dam, there are two steel-lined eight foot diameter outlets. Each outlet is controlled by two 78 inch free discharge Pelton butterfly valves manufactured by the Pelton Water Wheel Company. Outlets are protected on the upstream side by trash racks. Valves are housed in a concrete cantilever structure.

Intake (1930): Located at east end of dam. Consists of short channel 30 feet deep, a 17 by 17 foot Broome self closing type headgate, and a 30 inch bypass valve. Mechanical hoist used to operate gate is housed in a concrete structure. Intake equipped with trash racks.

Outlet Tunnel (1930): 13,000 foot long, 17 foot diameter concrete-lined tunnel reinforced with steel. Lining is 15 inches thick. Tunnel is circular in section. Its slope is two and one-half feet per 1,000. It was driven through gravel and hardpan, and terminates at a surge tank.

Surge Tank (1930): Larner differential-type surge tank; 65 feet in diameter, 94 feet high; internal riser 14 feet in diameter.

[X] See continuation sheet

Penstocks: Approximately 1,000 feet long, the three steel-lined penstocks enter the powerhouse.

POWERHOUSE AND EQUIPMENT:

Powerhouse (1930): Reinforced concrete structure, steel frame; rectangular in plan, 80 feet by 180 feet; four stories high. Rises 75 feet above ground level and 105 feet above its base. Equipped with 125 ton Whiting crane. Built by J.E. Bonnel and Son of Tacoma. Architecture is influenced by Neoclassical style: formal, rigid symmetry; building has monumental proportions; finished with polished surface; building organized into distinct horizontal divisions by pronounced belt; bracketed projecting cornice crowned by parapet; flat roof; large arched windows.

Generator Units (1930; 1952): Two Allis Chalmers reaction-type Francis turbines direct connected to Allis Chalmers generators were installed in 1931. A third unit was installed in 1952. The original turbines produce 37,500 hp and operate at 300 rpm on the 440 foot volts at a power factor of 90 percent. They were removed in 1975 to 30,000 KW.

Exciters: Above the generators are the main exciters (250 volts, 400 amps) and above that the pilot exciter (250 volts, 24 amps).

TRANSMISSION SYSTEM:

Power from the generators is sent to an outdoor transformer yard located directly behind the powerhouse and from there it is transmitted to Tacoma. Originally the current was sent to the Cushman substation. Today two 115 KV lines transmit the current to the Pearl Substation.

Contributing Structures:

Dam (inc. Spillway)
Headgate/Intake Structure
Water Conveyance (inc. Tunnel)
Surge Tank
Penstocks (3)

Contributing Buildings:

Powerhouse

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:

☐ nationally ☒ statewide ☐ locally

Applicable National Register Criteria ☒ A ☐ B ☒ C ☐ D

Criteria Considerations (Exceptions) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G

Areas of Significance (enter categories from instructions)	Period of Significance	Significant Dates
Engineering	1929-1938	1930-1931
Industry		
Architecture		

Cultural Affiliation
N/A

Significant Person
N/A

Architect/Builder
Tacoma City Light
Powerhouse: J.E. Bonnel and Sons

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

Cushman Hydroelectric Plant No. 2 is a significant example of state-of-the-art high head hydroelectric technology from the early 1930s, and is closely associated with the expansion of industry and commerce in Tacoma. In addition, the plant includes an architecturally distinguished powerhouse, characterized by a monumental scale and Neoclassical design. The well preserved plant meets the registration requirements established in the Hydroelectric Power Plants in Washington Multiple Property Documentation Form.

Historical Background: While the Cushman Plant No. 1 was built to meet an unprecedented increase in domestic power and light demands, Cushman Plant No. 2 was constructed primarily to serve the load requirements of an expanding commercial power market. Since its inception, the municipal utility sold power for commercial purposes in order to reduce the cost of residential power and light. The city managers also understood that the adoption of policies to encourage the establishment of large and small industries within the city limits would play an instrumental role in the "building up of Tacoma."[1] Following the completion of Cushman No. 1 in 1926, several large industrial enterprises located plants in Tacoma. A City Light Department publication reported that the growing number of industries in Tacoma and the decision of others to move to the city clearly indicated that a "shortage of electrical energy would be reached in 1930 unless the power output was increased." As a result, in December 1927, the Public Utility Commissioner, Ira S. Davisson, submitted a resolution to the city council for the construction of the second unit of the Cushman Power Project which ultimately would provide an additional 90,00 hp for the city of Tacoma.[2]

In 1929 contractors began work on the construction of the Cushman No. 2 installation. This ambitious project included the construction of a 240 foot high concrete arch dam located on the North Fork of the Skokomish river, several miles downstream from the Cushman No. 1 dam. Because the flow of water could be controlled at the Cushman No. 1 dam, the work crews were not forced to confront the hazards of spring floods in the construction of the second dam. In order to divert the river flow during construction, a 900 foot long, 2,200 cfs capacity flume was built. The construction of the flume across the foundation excavation proved to be difficult. Twelve by 20 feet in section, this timber structure was supported on high posts. The river diversion was also accomplished by building a 23 foot high rock filled timber crib cofferdam across the stream bed 300 feet above the dam site.[3]

☒ See continuation sheet

9. Major Bibliographical References

"Cushman Power Plant No. 2 for Tacoma," Western Construction News, November 10, 1930.

☐ See continuation sheet

Previous documentation on file (NPS):
- ☐ preliminary determination of individual listing (36 CFR 67) has been requested
- ☐ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☐ recorded by Historic American Buildings Survey # _____
- ☐ recorded by Historic American Engineering Record # _____

Primary location of additional data:
- ☐ State historic preservation office
- ☐ Other State agency
- ☐ Federal agency
- ☐ Local government
- ☐ University
- ☐ Other

Specify repository: _____

10. Geographical Data

Acreage of property 25

Quadrangle Name: Hoodsport Scale: 1:24000

UTM References Northern Section

	Zone	Easting	Northing
A	10	484820	5249260
B	10	484920	5249300
C	10	484910	5249100
D	10	486960	5246620

☒ See continuation sheet

Verbal Boundary Description

The nominated property is a linear system with boundaries described on the attached Hoodsport and Skokomish Valley USGS maps.

☐ See continuation sheet

Boundary Justification

The nominated property includes the headworks, powerhouse, transmission yard, and operators' houses historically associated with the Cushman No. 2 project.

☐ See continuation sheet

11. Form Prepared By

name/title Lisa Soderberg
organization Office of Archy and Historic Pres. date October 23, 1986
street & number 111 West 21st Avenue, KL-11 telephone (206) 753-4011
city or town Olympia state Washington zip code 98504

The dam foundation was excavated 75 feet below the stream bed. A concrete mixing plant equipped with two one-yard mixers was located on the east bank. The concrete was placed by gravity method and by chutes suspended from a 240 foot Archer tubular tower.

The water, which operates the turbines, is diverted at the dam into a 17 foot diameter concrete lined tunnel. Driven through loose gravel and hardpan, the construction of this 13,000 foot structure proved to be a major, labor-intensive undertaking. It was necessary to erect "a 225 man camp equipped with all modern conveniences" at each end of the tunnel in order to house the men who carried out the work.[4]

The completion of the tunnel resulted in the design of several pieces of innovative equipment. A pneumatic concrete gun and a collapsible steel form that moved on a carriage were developed specifically for the project to facilitate the process of lining the tunnel. The Hackley concrete guns held two cubic yards of concrete and were operated by air pressure. This process enabled the workers to place 40 linear feet of lining, which had an average thickness of 15 inches, per day.

An article in Western Construction News claimed that another interesting feature of the job was that the concrete for the entire perimeter was placed, or shot, in a single operation, resulting in a perfect, circular form without voids. All steel used for reinforcing was bent inside the tunnel in a bender of "special design." The concrete aggregates used in the tunnel lining were secured from the Pioneer Sand and Gravel Company pits at Steilacoom. They were transported 100 miles by barge to the contractor's wharf on Hood Canal. The cement and aggregate were trucked to the two portals where they were mixed in Koehring one-yard mixers. Special two-yard dump cars were manufactured to haul the concrete through the tunnel.[5]

The tunnel terminates at a 94 foot high surge tank which serves to regulate the pressure in the long conduit. The bottom of the tank is connected to the tunnel liner; at the end of the liner just beyond the surge tank is a three-branch steel manifold which, when fabricated, was purported to be the largest of its kind. Each branch is 10 1/2 feet in diameter and contains a butterfly valve which regulates the flow of water into the 1,350 foot long steel penstocks. The water is conveyed through the penstocks to the turbine casings under a head of 440 feet. The water operates three reaction type Francis turbines. Two of the vertical turbines were installed when the plant was constructed in 1931.[6] They produce 37,500 hp and are direct connected to 30,000 KW Allis Chalmers generators.[6] The third unit and penstock were installed in 1952. The generated current is sent to an outdoor transformer yard located directly behind the powerhouse, and from there it is transmitted to Tacoma. The generating equipment is housed in a massive, Neoclassical concrete structure.

Typical of most high head developments in Washington of this period, the long water conveyance system consisted of an enormous power tunnel driven through rock. The construction of this tunnel was a significant engineering feat. The innovative equipment designed specifically for this project was also noteworthy.

Although construction of the facility represented a significant achievement for the utility, the project provided no mitigation for the serious loss of fish runs, the inundation of wildlife habitat, or the disruption to the tradition cultural and subsistence

economy of the Skokomish tribe. Any assessment of the historical impact of this plant must recognize the damage inflicted on both the native inhabitants and the natural environment.

Specifically, construction of the Cushman Dam projects on the North Fork Skokomish River in 1926 and 1930 inflicted severe damages on salmon and steelhead resources and the other instream uses of the North Fork and main stem Skokomish River. Prior to the construction of the dams, the North Fork Skokomish River supported large runs of winter and summer steelhead trout; spring, summer and fall chinook salmon; coho salmon; spring, summer and fall chinook salmon; coho salmon; early and late chum salmon; and smaller runs of pink and sockeye salmon.

Besides destroying almost 80% of the historical fish runs on the Skokomish, the dam projects have had a devastating impact on the Tribe's economy and ability to provide opportunities for tribal members to earn a living and obtain food for their families. This is because the projects were sited on top of usual and accustomed fishing sites in use since ancient times.

In addition, development of the Cushman dams have greatly displaced and reduced the wildlife resources that tribal members are dependent on for their subsistence. Outflows from Cushman Powerplant No. 2 on the Hood Canal continue to attract salmon and steelhead, diverting them from their natural spawning destinations; and adequate passage areas in the Skokomish River are still blocked and are currently eliminating access to many miles of good fish habitat.

According to tribal officials, the Cushman dams also symbolize to the Skokomish Tribe the condemnation of their tribal lands and water resources for the benefit of a public utility located over 60 miles from the reservation. An equitable share of the revenues and taxes generated by the operation of these dams have never been returned to the Skokomish Tribe for helping educate, house, and provide health and social services for the tribe, according to the officials. Tribal leaders note that promises made by the City of Tacoma to provide employment opportunities and financial assistance to elders without electrical services were ignored and eventually forgotten.

The location of Lake Cushman caused by the construction of the dams has had a major impact on the destruction of major archaeological and cultural resources. To this day areas where village sites were located are being pillaged and looted by non-tribal members drawn to the sites.

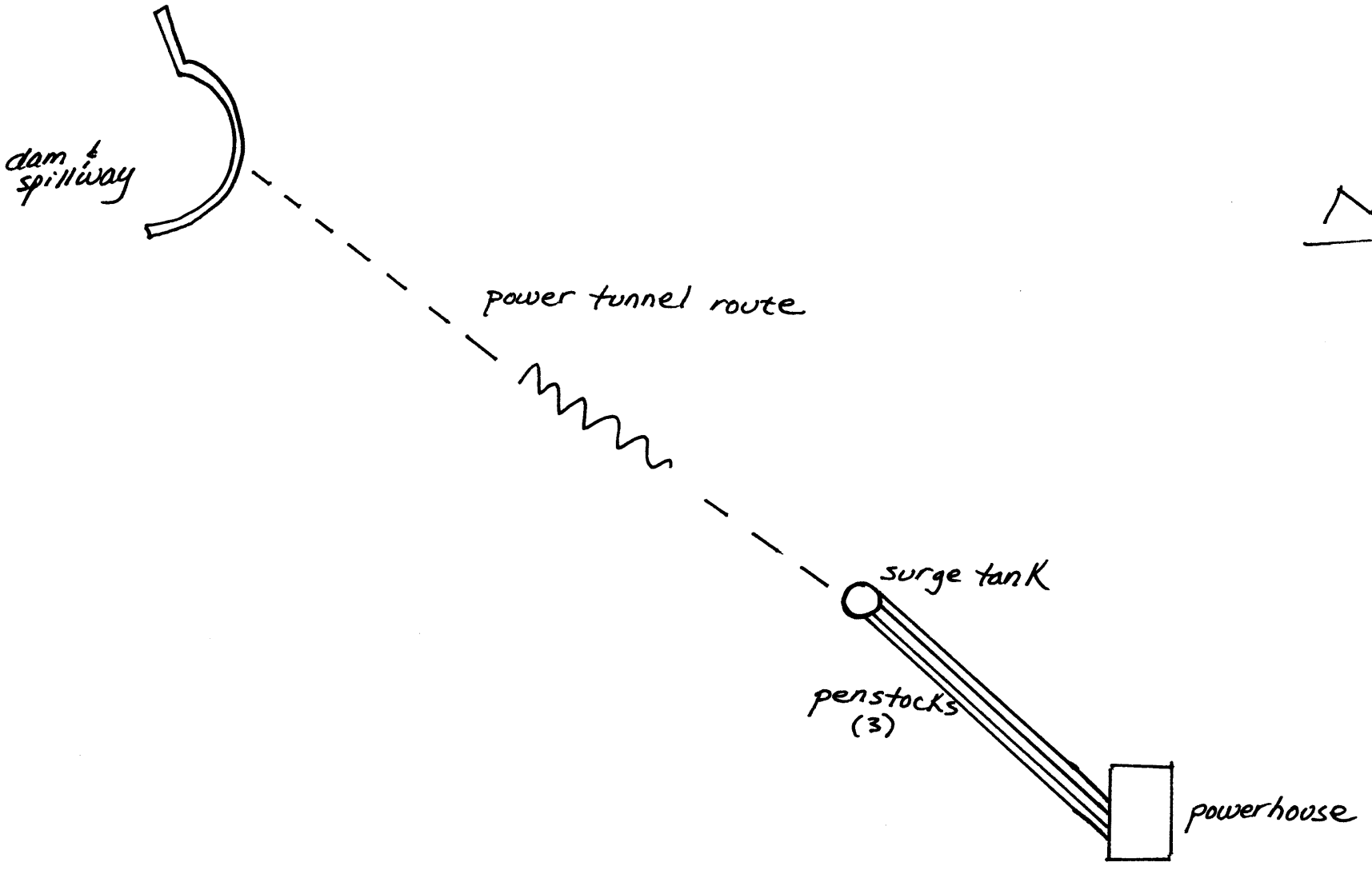
[1]"Purchase of Lake Cushman Power Site," Journal of Electricity, Vol. 43, No. 8, October 15, 1919, p. 361.
[2]City of Tacoma, Department of Public Utilities, Light Division, 1926-27 Information Book, p. 18.
[3]"Cushman Power Plant No. 2 for Tacoma," Western Construction News, November 10, 1930, p. 539.
[4]Ibid., p. 540.
[5]Ibid., p. 542.
[6]Ibid., p. 543.

UTM References Continued:

Southern Section Quadrangle Name: Skokomish Valley Scale: 1:24000

A 10 486960 5246640
B 10 487650 5246300
C 10 487610 5246220
D 10 488060 5246120
E 10 488030 5246000

SKETCH MAP



Cushman No. 2 Hydroelectric Power Plant
Hoodsport vicinity, Mason Co., WA
Not to Scale
All elements contribute