

Cleghorn Springs State Fish Hatchery, 4725 Rimrock Highway

City of Rapid City Ordinance CHAPTER 15.32 Flood Area Construction Regulations

Subsection 15.32.240.D

The following text addresses the specific items requested in Subsection 15.32.240.D of the Rapid City Ordinance and is presented to help in the evaluation of this preliminary submittal for Cleghorn Springs State Fish Hatchery.

- 1) *The danger to health, safety, welfare and property due to increased flood heights or velocities caused by encroachments.*
 - a. Because of the location of the Hatchery in relationship to Rapid Creek, any improvements will cause a change in base flood heights. Above the hatchery Rapid Creek has a wide left overbank floodplain. Below the hatchery Rapid Creek has a wide right overbank floodplain where Red Rock Canyon enters near Chapel Lane. However, right at the hatchery site, from just above the Jackson Springs pump house to the existing Hatchery Building, the floodplain is confined by Highway 44 on the north and a very steep, high bank on the south. This restriction causes flow depths to be greater and velocities to be higher.
 - b. Three (3) layout options with several proposed ground/building elevation scenarios within each option were investigated (~12 models). The accompanying flood study provides a detailed description of each layout option investigated and the resulting top width increases due to encroachments. ***The plans presented with this submittal refer to OPTION 2 presented in the flood study.*** As shown in every option, fairly large increases (~1 foot) in depth due to encroachments result in only minor increases (<7 feet) in floodplain width and nearly all of the width increase occurs on the hatchery side of Rapid Creek. Associated increases in velocity due to smaller flow areas are minor, as shown in the supporting documentation.
 - c. The flood depth changes are recognized only in the areas of proposed improvement. The water surface elevations of all analyzed scenarios match the existing water surface both upstream and downstream of the proposed improvements within state property.
- 2) *The danger that materials may be swept onto other lands or downstream to the injury of any person or property.*
 - a. Public safety is increased with the construction of the proposed Shop/Storage Building. Currently, equipment is stored outside, which could potentially lead to plugging of the Chapel Lane bridge if a major flood occurred. By constructing a wet-floodproofed Shop/Storage Building, the equipment will be stored inside and lessen the likelihood of the equipment causing problems downstream.
- 3) *The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination and unsanitary conditions.*

- a. The proposed office building will be constructed above the Base Flood Elevation at the entrance to the hatchery. City water and sanitary facilities run along the bike path on the south side of the Hatchery property. Sanitary sewer manholes will be protected with concrete collars and where necessary watertight manhole covers will be used. Gate valves and hydrants on the water service will be protected with concrete collars and where necessary concrete bollards to limit damage by floating debris. Protection of facilities will be specified using federal guidance documents for floodproofing of nonresidential facilities.
- 4) *The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual occupant, both present and future.*
 - a. As previously mentioned, by building the proposed Shop/Storage Building, equipment will be protected from being carried away by flood waters, as well as being protected from debris impact. Materials to be stored in the proposed building include fuel, oil, fish food, etc. These materials will be stored at or above the BFE within the building to limit potential damage presented by flooding.
 - b. The State of South Dakota has operated the Cleghorn Springs State Fish Hatchery since 1928. The State will most likely control the property in perpetuity.
 - 5) *The importance of the services provided by the proposed facility to the community.*
 - a. By making the proposed improvements to the Hatchery, the SDGF&P will be able to help perpetuate fish populations in the streams and lakes of the Black Hills. Resident and nonresident fishermen alike bring taxes to the City by spending money on everything from groceries to gas to hotel rooms. The improvements to the hatchery will result in a more cost-effective facility by minimizing depredation from ground- and airborne predators, which will reduce operation costs to the taxpayers of the State of South Dakota.
 - b. The Hatchery provides visitors and especially students educational opportunities to learn about the biology of fish at different stages of growth.
 - 6) *The requirements of the facility for a waterfront location.*
 - a. A fish hatchery, by nature, needs to have available water to operate. The existing facilities are constructed to gravity flow water with pump backup. The proposed system will utilize the same scenario. The groundwater used in the operation of the Hatchery is a nonconsumptive use and outfalls to Rapid Creek.
 - 7) *The availability of alternative locations not subject to flooding for the proposed use.*
 - a. None. The proposed new office facility has been placed out of the 100-yr floodplain near the entrance to the Hatchery. The other proposed buildings need to be constructed in the locations shown for operational efficiency.
 - 8) *The compatibility of the proposed use with existing anticipated or other proposed developments in the foreseeable future.*
 - a. As stated in Item 4, the proposed facilities are only improvements to the existing facility. The State has operated the facility for nearly 80 years. There is no other

anticipated use for the area. No other use than a fish hatchery can be anticipated for this site due to its proximity to Rapid Creek and its floodplain.

9) *The relationship of the proposed use to the comprehensive plan and floodplain management program for the area.*

- a. The existing zoning for the property is Public. As stated in Item #1, with substantial increases in flood depths only small flood width increases are noticed. The difference in the modeled flood widths to the original modeled flood widths is statistically negligible when considering a 13,000 cfs discharge.

10) *The safety of access to the property in times of flood for ordinary and emergency vehicles.*

- a. Only one access point exists for the hatchery in order to control operations and tourist traffic. Topographic constraints limit the availability of other access points. During times of flood warning or flood, the gates will be locked following the employees and any visitors exiting the premises.
- b. The flood study contains a Flood Emergency Operations Plan and Inspection and Maintenance Plan that will both be finalized prior to construction of any of the proposed improvements.

11) *The expected heights, velocity, duration, rate of rise and sediment transportation of the floodwaters expected at the site.*

- a. The HEC-RAS model used to analyze the proposed improvements was extracted from the official Flood Insurance Study model created by the United States Corps of Engineers. The model geometry and results are provided in the flood study accompanying this report. OPTION 2 is the specific description pertaining to the plans submitted.
- b. The model used is a steady state model, which means that design peak flow is entered at specific points of interest in the model. No "routed" flow is used. Therefore, duration and rate of rise of flood is unobtainable. However, according to the National Weather Service, the 1972 flood maximum rate of rise was approximately 3.5 feet in 15 minutes. On June 9, 1972, Rapid Creek went out of its banks at 10:15 pm downtown and at 12:15 am the peak of 50,000 cfs hit downtown. By 5:00 am on June 10th Rapid Creek was back within its banks.
- c. No detailed sediment transport or debris flow studies have been completed for Rapid Creek to our knowledge. Historical information pertaining to flood damage, debris flow, etc associated with the 1972 flood can be found in "*The Black Hills Flood of June 9, 1972 - A Historical Document*", by Midwest Research Publishers.