LARIMER COUNTY | ENGINEERING DEPARTMENT

P.O. Box 1190, Fort Collins, Colorado 80522-1190, 970.498.5700, Larimer.org

FLOOD REVIEW BOARD

Date: **October 22, 2020**

Time: **8:30 am, MDT**

Location: **Lake Estes Conference Room, 200 W. Oak St., Fort Collins, CO 80521 and remote via Zoom**

Contact: **Devin Traff, Larimer County Engineering Department**

MEETING MINUTES

Staff Present: Devin Traff, Rusty McDaniel

Board Members: Chad Morris, Elisabeth Ervin-Blankenheim, Chris Thornton, John Hunt

Applicant(s) Present: Christopher Olson, Trevor Glass, David Hoesly, Steve Kaye, Paul Johnson, Aaron Cvar

Mr. Thornton opened the meeting at 8:30 a.m., MDT

Introductions

Item #1. Petition from Public Service Company of Colorado for gas main installation

Mr. Traff introduced the item. A petition on behalf of the Public Service Company of Colorado for the installation of a 4-inch gas main under Eaton Ditch within the Dry Creek Floodway and Floodplain Zoning District using horizontal boring at the following location: SE ¼ of Section 35, Township 8 North, Range 69 West

The project proposes to bore about 400 feet of underground gas line under Eaton Ditch on College Ave north of Willox. The line will be bored under Eaton Ditch about 15 feet below the canal. The project, as proposed, will not result in elevation changes within mapped floodplains and, therefore, no hydraulic impacts. Two bore pits are proposed but are located outside of the floodplain so that there is no ground disturbance proposed within the floodplain. A no-rise certificate has been supplied with report. Scour was not analyzed but the depth of the line (15' below ditch channel) was determined to be buried adequately to protect from scour based on engineering judgment. Code section pertaining to Floodplain Special Reviews is located in Section 4.2.2.G.6.

Mr. Morris asked about the elevation of the canal bed to verify the depth of the bore. Mr. Glass stated the depth of the canal bed is on a plan sheet included with the application. He said they will measure onsite to verify they are 15 feet below the bottom of the canal prior to starting construction. Mr. Thornton asked about specifying on the plans how the pipe will not be bending up too steep on the edges of the canal given that the width of the canal varies from 13-15 feet. Mr. Glass confirmed that they would go beyond the edges as the steel pipe they are installing does not have the flexibility to bend at a sharp angle. As-builts will be provided to the County following project construction to verify depth.

Mr. Hunt asked if the Board has a role in coordination with CDOT and the ditch company and Mr. Traff replied that they do not. The County asked for any easement documentation or access agreements to be included with the floodplain development permit application. Mr. Glass said they have a crossing agreement with the Eaton Ditch company and a permit from CDOT.

Mr. Morris moved to recommend to approve the floodplain special review without any conditions. Mr. Hunt seconded the motion. Motion passed 4-0.

MOTIONED:

- *Mr. Morris moved to recommend approval of this floodplain special review under no indicated conditions. Mr. Hunt seconded the motion. The motion passed 4-0.*

Item #2. Masonville Bridge FPSR

Mr. Traff introduced the project. A petition filed on behalf of Larimer County to review a Floodplain Special Review for a bridge replacement at County Road 27 over the Buckhorn Creek Floodway and Flood Fringe Zoning District at the following location: Section 15, Township 6 North, Range 70 West

This project was brought to the Board at the last meeting. At the September meeting, they requested a reexamination of velocities, the analysis of scour and erosion, and that the riprap design should be reevaluated. The scour was reanalyzed and the original loose riprap design was redesigned with partially grouted riprap and installed to a 36" depth and width of 25 ft from toe of abutment. The engineer determined that no erosion countermeasures would be necessary due to low overbank velocities which would not adversely affect the existing conditions of the area along CR 27. A floodway analysis was performed by the engineer for review by the Board. The CHAMP study serves as the effective model which was corrected to reflect differences in the surveyed ground elevations in the corrected effective/existing condition model. Comparisons between the proposed and existing conditions show no rise in base flood elevations. The proposed bridge does overtop by about 2.6 feet, but the overtopping is improved from the existing bridge (2.9 feet). No configuration to eliminate overtopping was feasible for the design.

Mr. Thornton asked about the scour design regarding how the velocities from the 500-year event went into the scour and riprap sizing. Mr. Hoesly answered that the riprap would not be necessary for the 500 year but would be most integral for the 10 year.

Mr. Hunt asked about matrix riprap and how the partial grouting can easily turn into full grouting. He recommended that the contractor does a test pad, but that it should be a good solution if done correctly. Mr. Kaye included that they haven't found a contractor yet and asked what size a test pad should be. Mr. Hunt will consult with others and get back to Mr. Kaye, but guesses approximately 10' by 10'.

Mr. Morris asked about the toe down on the upstream and downstream ends. Mr. Hunt also asked what the computed contraction scour was without the armory. Mr. Hoesly replies that it is 31". Mr. Hunt replies that the expected thickness is usually 2 times the D50 and that thicker might not be better and recommended that the 36" thickness should be evaluated.

Ms. Ervin-Blankenheim asked if the apron is larger than the last presentation. Mr. Kaye states that the footprint has not changed and the quantity doesn't impact the wetland. Mr. Morris also asked if the bank contour is followed and Mr. Kaye replied that it will follow the bank contour.

Mr. Thornton asked where the velocities for the D50 calculations came from. Mr. Kaye said that the channel gets wider at the bridge and the velocity hits a critical flow downstream and it will get steeper. Mr. Thornton said there appears to be a discrepancy between the two velocity calculations presented in the report and would like to see further discussion of how those were used in the analysis. Mr. Kaye said that they could provide additional information on the calculations being used. Mr. Thornton said there isn't a calculation for the partially grouted riprap in the report. Mr. Hunt agrees that it is difficult to see where the velocities are coming from.

Mr. Hunt asked about the contraction scour calculations. He asked what the natural bed material is. Mr. Hoesly replied that it should have to be relatively big so that it would not be a live bed. Mr. Hunt also states that the 31" scour seems low and Mr. Hoesly replies that it is 3.1' of scour and the previously mentioned 31" is incorrect. Mr. Hunt also asked if the worst-case scour happens at the overtopping, but Mr. Hoesly replies that it is not for the bridge and that the worst case for the 10 year is the overbanks and a concern of overtopping the road. Mr. Hunt also questions what the worst case for the contraction scour was and Mr. Hoesly replies that it was the 500 year and that's where the 3.1' comes from.

Mr. Morris asked which flood event the road needs to be designed for and Mr. Traff stated that it must pass the 100-year discharge under FEMA regulations.

Mr. Hunt adds that the matrix riprap would hold up to 20 ft/s which alleviates the concern regarding the downstream velocity from the bridge.

MOTION:

- *Mr. Hunt motioned to recommend approval of the Floodplain Special Review with no special conditions. Mr. Thornton seconded the motion. The motion passed 4-0.*

Item #3. 2300 Glade Road Variance

Mr. Traff gave an introduction of the project. A petition filed on behalf of Paul Johnson to review a variance request to allow an existing storage shed and garage addition within the Big Thompson Floodway Zoning District at the following location: SW ¼ of Section 7, Township 5 North, Range 69 West

Two existing structures, a garage addition (carport) and storage shed, were built in the floodway without floodplain development permits in 2000 and 2014 (per the applicant). County code requirements that need to be met for the structures to remain: Floodplain permit must be obtained, New structures in a floodway are prohibited and a variance must be granted by the FRB, Storage use is not an allowed use in the floodway and a variance must be granted by the FRB, Structures in a floodway must show no-rise in base flood elevations through engineering study and certified by a PE. Applicant submitted letters certified by a PE assessing the structural integrity of the structures. The letter regarding the garage addition deems the structure to be safe in the as-built condition. The letter regarding the storage shed deems the structure to be safe for storage use after the implementation of the following repairs: Loft joists should be sheathed with 3/4" OSB, glued and nailed with 8d nails on center, Rafter joints should be reinforced at the ridge lines, each rafter should have a 2x4 gusset on one side, glued and nailed with three 10d nails each rafter. Equivalent structural screws could be used, Each corner of the shed should be anchored with a Minuteman mobile home anchor or equivalent. A hydraulic study was submitted to determine the impact of the structures on base flood elevations (BFEs). CHAMP was utilized as the effective and duplicate effective (DE) conditions. Survey from August 2020 was incorporated to create the corrected effective (CE) model and the two structures were incorporated to create the as-built condition (PP). Comparisons between PP and CE show no rise in BFEs. A floodway analysis was also completed showing difference in floodway elevations between PP and CE. Code section pertaining to variances is located in Section 4.2.2.G.5

Mr. Hunt asked if it was in the 2D portion of the Champ Model and Mr. Cvar replied that it was not in the 2D model. He added that he confirmed the correct model with Tina and Devin.

Mr. Thornton asked how it stated in the narrative that the cross section ran through the garage and that he added another cross section and that he added the blocked areas. Mr. Cvar replied that the terminology was an asbuilt model whereas it might truly be a current conditions model. He ran duplicate effective and corrected effective with the new cross section. The new cross section seems to run through the garage addition. He also adds that Mr. Johnson corrected him that it's not quite a garage addition which doesn't change much of the floodplain modelling, but might affect the code compliance rules.

Mr. Cvar explains that he found zero change and zero rise because of a slight dip in the ground to where it's not much of a conveyance zone. The floodway bulges out in the 100-year near the site. The two structures are relatively small structures/footprints.

Mr. Morris asked if the model shows other blockages from other structures and Mr. Cvar replied that there weren't other blockages and that it would be difficult to model all of the structures. Mr. Hunt agreed that there seemed to be minimal impacts to floodway conveyance.

Mrs. Ervin-Blankenheim asked if there was possible debris in the floodway due to the additional work. Mr. Cvar replied that he had not considered that question yet. Mr. Traff added that it would be more of an issue with code compliance especially if there was a safety issue from an engineer. Tony added that there were no concerns with safety and that Mr. Baker approved it. Mr. Traff stated that the storage unit was ok, but that repairs would be recommended. Mr. Johnson added that the repairs have been completed.

Mr. Hunt stated that a few years ago a similar case was proposed and they had required wet flood proofing and wonders if this would be applicable to this suggestion. Mr. Traff replied that wet flood proofing would be beneficial. Mr. Hunt asked if flood protection would be relatively deep. Mr. Cvar replied that it was 1.5' deep and that the additional 18" of protection could be added.

Mr. Thornton states that similar situations would discuss the uses of the buildings and what materials would be used/put in it as if it was a proposed new addition as opposed to a pre-existing structure.

Mr. Hunt adds that wet flood proofing should include ventilation on upstream and downstream, flood resistant materials, structurally sound, and that electric utilities should be elevated. He asked if there are regulations for stored materials. Mr. Traff replied that the material limitations are typically outdoor storage and pertain to animal/plant health. Mr. Traff adds that there's electrical in the garage addition, but not in the storage shed (there's power for the pump that comes from underground).

Mr. Hunt asked if the area is subject to sediment deposition. Mr. Johnson replied that there was debris deposition, but not much sediment. Mr. Hunt states that the shed and the addition should not cause a rise, but there should be consistency with regard to flood proofing constraints.

Mr. Morris states that along with the consistency efforts, general flood proofing should allow flow to pass through the structures and that the hazardous stored items might need to be secured. Mr. Johnson stated that most hazardous items are elevated on steel shelving.

Mr. Hunt asked what the requirements are for flood proofing. Mr. Traff replied that it should be flood proofed up to the flood protection elevation, ventilation no higher than 1' from the ground on 2 sides of the structure (1 in^2 per 1 ft^2 of enclosed area, unless evaluated by an engineer) and flood resistant materials up to flood protection elevation.

Mr. Cvar adds that the left overbank velocity is 1.18 ft/s, which the structure while not enclosed should allow for flow through the structure.

Mr. Thornton asked about ventilation of the smaller shed for setting a precedent for future cases and the rest of the board agreed that it should be included.

MOTION:

- *Mr. Hunt moved to approve the variance with the condition that venting be added to the storage shed to fulfill the remaining wet floodproofing requirements. Mrs. Ervin-Blankenheim seconded the motion. The motion passed 4-0.*

Meeting adjourned 10:45 am, MDT