

To: City of Billings, Planning Division
From: Craig Dalton, P.E. - Project Engineer
Date: December 23, 2015
Subject: Hydraulic Study of the Cove Creek Floodplain

Performance Engineering and Consulting (PEC) has conducted a hydraulic study of the Cove Creek drainage north of Rimrock Road. Floodplain modeling was performed using the publicly available Corps of Engineers HEC-RAS 5.0 and private FLO-2D software. The purpose of conducting the study was to model the floodplain for both the existing and proposed conditions and determine what impacts, if any, construction of the subdivision may have on the base flood elevations (BFE) of the Cove Creek floodplain. To this point the study has been completed and presented to the City Floodplain Administrator, Brian Anderson. Mr. Anderson has placed a conditional approval on a local floodplain permit pending a determination on whether this project requires an update to the Special Flood Hazard Area (SFHA) map by way of a Conditional Letter of Map Revision (CLOMR) through FEMA. A CLOMR application was submitted to FEMA November 17th, and is currently in the review process and awaiting their determination. Following a determination by FEMA, a floodplain permit can be finalized by the City with as-built drawings submitted to FEMA in order to produce a Letter of Map Change for the constructed project area. The details of the proposed development can be seen on the Preliminary Plat included with this package.

The existing Cove Creek SFHA map was adopted by the City of Billings in 2013 and currently extends from an area approximately 4 miles northeast of the project site south to Rimrock Road, the southern extents of the original study. The peak discharge rate for the 100-year storm event was determined to be 1,370 cubic feet per second (cfs). Runoff through the drainage remains fairly channelized until reaching the northern boundary of the Yellowstone Country Club Golf Course, where it begins to exhibit the characteristics of overland sheet flow. Eventually the floodwaters make their way to Rimrock Road which acts as a levee, impounding runoff from the drainage and increasing the width of the

impacted area directly north of the roadway. The floodplain area currently encompasses approximately 30.5 acres of property west of the Yellowstone Club Estates (YCE) subdivision, one-half of the properties within YCE, and approximately 11.4 acres of the proposed project area.

The proposed Glynn Abbey development is a residential subdivision consisting of 33 lots and 3.70 acres of open space area. A single main road loop will be constructed through the property in addition to one cul-de-sac side street. Montana state and local statutes require all buildings within the SFHA to be constructed with a finished floor elevation a minimum of 2-feet above the 100-yr BFE. In an effort to elevate roadways and lots within the SFHA, material will be excavated from the proposed pond areas, in addition to offsite imported material, and utilized in grading the impacted roadways and lots. The proposed grading of the site will require approximately 5,200 cubic yards of imported material.

In compliance with the City of Billings Floodplain Regulations, an evaluation of potential impacts to onsite and offsite BFE's was analyzed. Using two-dimensional modeling software, the existing and proposed floodplain conditions were modeled in effort to compare BFE's and assess any offsite impacts the project may have on surrounding properties. As anticipated, BFE elevations within the project site were elevated in areas where fill would be placed, however, these impacts were offset by the additional storage capacity provided by the excavated pond and open space areas. Additionally, offsite impacts were analyzed to ensure the proposed project does not adversely affect the flood hazard on adjacent properties. A comparison of the pre- and post-development BFE's on adjacent offsite properties revealed no adverse change in the base flood elevations to existing structures on neighboring properties.

If you have any questions about the information above please feel free to contact me at 406-384-0080 or craig@performance-ec.com.

Cc: Glynn Abbey LLC, File