

June 26,1988

02RZ007

Scott J. Kenner PE  
2420 Cruz  
Rapid City,SD 57702

Mr. Jim Anderson  
426 E. College  
Rapid City, South Dakota 57701

RE: Hydraulic Analysis of Lot 3 of NW 1/4, SW 1/4, SEC 5, T1N,  
R8E, Black Hills Meridian

Dear Jim;

I have completed a hydraulic analysis of the above referenced lot. The analysis consists of two steps. In the first step I evaluated the effect of the existing fill on the 100 year flood elevation. In the second step I evaluated how much of the property could be filled to a level above the "Base Flood Elevation" (BFE) and encroach on the channel within the limits of raising the BFE one foot. The encroachment analysis requires the development of a floodway. The "Floodway" as defined by the city ordinance is:

"The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot."

The results are discussed below. The HEC2 water surface profile computer program was used in the analysis along with the recently revised 100 year floodplain analysis on Rapid Creek from Cambell Street to Jolley Lane.

Step 1: The hydraulic evaluation of the existing condition, which takes into account the fill that has been placed in the floodplain, shows that the BFE (100 year flood elevation) is 3164.03. The original BFE, prior to fill being placed in the flood plain, is 3162.25. The new BFE caused by the fill is 1.78 feet higher than the original BFE. The existing fill is in violation of the Floodplain Building District Ordinance. (reference HEC2 printout A100EX.OUT)

Step 2: To evaluate the amount of fill and possible encroachment the original condition of the floodplain was assumed. An additional cross section was inserted approximately 500 feet downstream of existing cross section 3.0 in order to include the entire depth of the property and therefore the encroachment thru the depth of the property. By encroaching on the channel one is

actually creating a floodway. A floodway must be developed such that all property owners along the creek have an equal opportunity to encroach on the channel. Thus the step two evaluation has looked at the development of a floodway thru the previously identified study reach( Cambell Street to Valley Drive). The results of the floodway analysis show that approximately 50% of the property can be filled and developed in accordance with the flood plain regulations. The floodway boundary is delineated on the attached map of the property. The floodway delineation thru the entire reach is not included with this report, but is available upon request. The velocities along the floodway boundary are not excessive( 2.45 to 3.88 fps ) and normal vegetation can provide the necessary erosion protection provided fill slopes are at a maximum of 3H to 1V.

RECOMENDATIONS:

- 1)The existing fill within the floodway boundary must be removed and the area graded to original contours.
- 2)The floodplain ordinance requires that commercial structures be floodproofed to 1 foot above the regulatory flood protection elevation. The regulatory flood protection elevation is 1 foot above the BFE. Therefore, to provide complete flexibility for land use I recommend that final grade of any area developed in the flood fringe be a minimum of two feet above the BFE. This would be a final grade of 3164.2 along the west edge with a continuous grade to 3160.9 along the east edge of the property.
- 3)The fill slopes along the floodway boundary should be a minimum of 3H to 1V. This will allow the use of vegetation for erosion protection.

Very Truly Yours

  
Scott J Kenner PE

