



LEE'S SUMMIT

MISSOURI

May 6, 2021

RE: HEC-RAS Modeling for Summit Point Apartments Phase 2

Public Works Engineering Comments

1. Within the report, it is stated that there was no readily available HEC-RAS model of Tributary P3 to Prairie Lee Lake. The Public Works Department has the 2006 model. It makes sense that any modeling done would start with the effective model. The effective model upstream section is approximately at the same location as the CFS duplicate model downstream section. It is therefore necessary to extend the FEMA effective model to produce your final model of the tributary. In addition to the HEC-RAS model, the PW Department also has the AutoCAD work map for the tributary.
2. The Duplicate Effective Model created by CFS Engineers appears to utilize a much lower flow rate for the tributary. The FEMA effective model flowrate at the upstream end is 750 cfs for the 100-yr storm event. The rate at the downstream end of the CFS duplicate model appears to be only 485 cfs. It appears that when entering flows into your model one of two options are available. One – use the 750 cfs for the entirety of the model. Two – justify use of lower flows with a more detailed hydrologic report that reflects real world conditions, compares an appropriately updated flow rate to that of the FEMA flow rate, and then using the same methodology calculates flow rates for the sections upstream of the Independence Avenue culvert.
3. The Manning's n-value is a critical component in any HEC-RAS model, and use of a value that is lower than what it truly represented can result in fictitiously low water surface elevations. Public Works staff agrees with the assessment by Development Services staff that the use of a Manning's n-value of 0.03 is too low. Looking at Table 3-1 in the HEC-RAS Reference Manual indicates that the roughness coefficient should be between 0.030 for a stream that is clean, straight, and full with no rifts or deep pools and 0.1 for a stream that is very weedy, with deep pools, or floodways with heavy stands or timber and brush. It appears that in the Duplicate model created by CFS a Manning's n-value of 0.03 is used. It does not appear that the stream is clean and straight. In the body of the report, it is stated, that photos and field observations of the creek supported the use of a Manning's n of 0.03; however, no such photos are presented in the report. Given the sensitivity of the model run results on the roughness coefficient, please provide support in the form of pictures in the report.
4. Public Works staff has compared the water surface elevations at the downstream



- end of the CFS model to that of the upstream end of the FEMA Effective model. The water surface elevation from the CFS duplicate model is significantly lower than that of the FEMA effective model. This could speak to the use of a Manning's n that is too low, flows that are too low, and other problems with the model. It seems necessary to produce a model that has more realistic water surface elevations at the downstream end.
5. Public Works staff also agrees with Development Services in the cross-sections from RS 10856.09 to RS 10280.58 need to utilize measures to insure that areas outside the main channel are not included in the active flow. Use of ineffective flow arrows are applicable.
 6. A small, public system drains the yards of the homes along the south side of Swann Circle. This system, outlets into the tributary at approximately RS 10280.56. Even a comparison of the water surface elevation from the CFS duplicate model and applying that elevation as the tailwater condition for the public system shows that there will be issues with the system backing up into the yards. Public Works staff has further concerns with this system after model changes as discussed earlier are incorporated. Future modeling efforts should include analysis of this system, and should communicate that improvements will not cause flooding to adjacent properties along Swann Circle.
 7. In conjunction with comment 6, please address other minor drainage structures along the tributary. Namely, assure that improvements for Summit Point will not adversely affect the detention basin for the Summit Ridge apartments located on the north side of the stream.

Please contact Karen Quackenbush with the Public Works Department at (816) 969-1800 with any questions regarding these comments. Additionally, I would be happy to provide you with my resources for the FEMA model and work map.

Sincerely,

Karen G. Quackenbush, PE
Senior Staff Engineer

