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July 8, 2021

City of Lee's Summit
Development Services
220 SE Green Street
Lee's Summit, Missouri 64063

Attn: Karen Quackenbush/Gene Williams

Re: HEC RAS Responses to comments
Application Number: PL20211059
Application Type: Residential Preliminary Development Planning
Application Name: Summit Point 2nd Plat (Phase II)
Location: 510 NE Chipman Road, Lee's Summit, MO 64063
Response to June 4, 2021 Comments
CFS Project No. 21-5065

Karen/Gene,

Below are responses to the comments dated June 4, 2021. We are resubmitting revised HEC RAS study with this response letter.

1. It does not appear that the FEMA model was extended as requested. The geometry appears to be the same as it was in the first submittal. Here are the models that are required:
    a. Duplicate Effective Model – this is the FEMA model that you run on your computer. It is untouched or modified in any way. *CFS has included a copy of the FEMA model given to us by the City.*
    b. Corrected Effective Model – this is the FEMA model with possible updates to the geometry. It could be that you have updated survey for any of the FEMA cross-sections, or maybe their Manning's "n"value is representative of stream conditions that don't match what you have observed. If you do not have any updated info, then this would look exactly like the Duplicate effective model. *CFS has included a copy of the FEMA model given to us by the City. No changes or additional cross-sections were added to the base model.*
    c. Pre-Existing Conditions Model – this is the FEMA model with changes that pertain to your project. It is in this model that you can add cross-sections, culverts, etc. Sheet DAM-3 (HEC-RAS Cross Section Location Map) from your 05-13-21 Summit Point HEC-RAS Study is very appropriate. It shows the FEMA sections

and your sections on one document. Regarding the cross sections downstream of Independence Ave., you should be starting with the FEMA model. It is necessary for this model to have cross-sections G and F. This is necessary so that we can compare cross-sections appropriately. Currently, you have a model that does not have any of the FEMA sections. When looking at the cross-sections in the vicinity of Swann Circle and Independence Ave, it appears that they are not spaced accurately to show the culvert crossings. *CFS has combined the FEMA model given to us by the City with the model written for the Summit Point site. The FEMA model is complete and includes Sections G and F downstream of Independence Avenue. The cross-section numbering for the Summit Point model was revised to match into the FEMA model stationing that began with zero at the confluence with Tributary P2 to Prairie Lee Lake.*

   d. Post Conditions Model – this is where you would take the Phase II development and incorporate it into the model. It is difficult to tell from your report, but it appears that the 3:1 slopes off the west edge of the development encroach into the cross-sections. For example, RS 11086.04 as shown on sheet DAM-3 of the HEC-RAS Study. It appears that the slopes are approximately 57 ft from the centerline of the stream. When reviewing the cross-section in the HEC-RAS model, it appears that the fill slope would be somewhere between the right bank and station 328.5. It is in this model that you would modify the geometry of the cross section to incorporate the proposed 3:1 slopes. *CFS used the Pre-Existing Conditions model with the combined FEMA model and the model written for the Summit Point site, and revised the cross-sections along the Summit Point site to reflect the proposed grading.*

2. The CFS model does not have any of the FEMA cross-sections in it; therefore, it is not possible to compare the WSE at the downstream limit. The model needs to be revised to include the FEMA sections. *The combined FEMA-CFS models include all of the cross-sections in the original FEMA model.*
3. In the applicant's resubmittal, it is stated "If the public systems currently back up, they will back up the same amount after our development." With the information submitted, staff is not able to determine if it will back up the same amount. The only way that staff feels confident in evaluating the effects of the proposed development on the public system would be to compare the WSE for a cross section between 10280.58 and 10097.67 for the pre-existing conditions and post conditions models. *The Post-Development Conditions Model was revised to modify the cross-sections along the Summit Point site to reflect the proposed grading and detention.*
4. Floodplain delineation at cross-section 11086 does not agree with the report. It appears the delineation at this location was based on the lower Mannings "n" values shown in the sensitivity analysis. Text of the report recommended 0.045 for the channel, and 0.10 for the overbank area, with a corresponding WSE-100 of 1003.71 at that location. *RS 11086 (revised station RS 6465.03) was revised to use Manning's n-values of 0.100 for the left and right over-banks and 0.045 for the main channel.*
5. Using the Mannings "n" values shown in the text of the report, the base flood elevation in the vicinity of cross-section 11086 is too close to determine. It lies very close to the property line, and as such, that area could be interpreted as being either in the floodplain or outside the floodplain. We revised the cross section based on additional survey and have shown the property line on the cross section. The flood plain, per the Pre and Post Conditions Model, is shown outside of the Summit Point Property.
6. Using the "ineffective flow area" tool in HEC-RAS requires that a real world assessment be made upstream of the "ineffective flow area". In this case, the stream goes out of its banks at cross-section 11086 where the levy does not exist, and travels northward into this "ineffective

flow area". According to the report, the only flows shown within this side channel behind the levy (i.e., the "ineffective flow area") were from the on-site drainage area. It did not include the 100 year flows that are outside the stream bank at cross-section 11086. The limits of the floodplain, therefore, will be larger than shown. *With the updated and more accurate cross section the models show the 100 year flow does not go over onto the Summit Point property at 11086.*

7. In lieu of providing a 1D manual calculation of the floodplain limits described in the above comment, it may be necessary to perform more advanced modeling (e.g., partial 2D connected to 1D) to account for the stream leaving its banks upstream of the levy. *See response to comment 6 above.*
8. Modeling in the northeast corner of the site shows a small hydraulic jump occurring. Recommend using the highest value for the base flood elevation in the subcritical region (i.e., 995.00) rather than the elevation at this transient hydraulic jump. Reliance on a transient hydraulic jump to occur to determine a base flood elevation is not a conservative practice, and not recommended. *The higher elevation built-up by the water going over the roadway has been used to set the minimum 100-yr WSEL along the lower portion of the site.*
9. The applicant may need to provide all appropriate stormwater information to FEMA based on the federal requirements contained in 44 CFR 65.3 which mandates that all studies in "Unnumbered A Zones" for proposed developments be submitted for review by FEMA. City staff will require a Letter of Map Revision (LOMR) be submitted to and approved by FEMA prior to formal approval of any final development plan. *We are sending the report and model to FEMA for a determination of requirements.*

Please call or email if you have further questions or comments.

Respectfully,

Cook Flatt & Strobel Engineers, P.A.

Lance W. Scott, P.E.
Vice President