**U.S. Department of Homeland Security**
FEMA Region VIII
Denver Federal Center, Building 710
P.O. Box 25267
Denver, CO 80225-0267

FEMA

IN REPLY REFER TO: SUBMITTAL ACK

May 4, 2020

The Honorable Jeff Silvestrini
City of Millcreek, UT
3330 S. 1300 E.
Millcreek, UT 84106

Community: City of Millcreek,
Salt Lake County, Utah
Community No.: 490231

Dear Mayor Silvestrini:

This letter acknowledges receipt of correspondence dated April 3, 2020 from Dan Drumiler, Stormwater Engineer, City of Millcreek, regarding the preliminary Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) Report dated July 12, 2019 for Salt Lake County, UT and Incorporated Areas. This submittal included an independent review of the Neff's Creek Hazard Assessment Report and resulting floodplain map.

FEMA has completed their evaluation of the comments and data provided in the submission. The submission did not meet the requirements of an appeal. It was determined that a change to the model was not warranted for the preliminary study. While the existing hydrology may include components that could be improved, it is not incorrect. Additionally, the received hydrological comparison, which utilized StreamStats analyses does not refute the current modeling.

In the letter dated April 3, 2020 from City of Millcreek, four questions were included. Those questions, including our responses, are the following:

1. The peak discharge comparison between the FEMA study, USGS regional regression, and stream gages shows that the determined flows do not fall within the confidence limits required in the FEMA guidance. Would FEMA accept a flow rate of 100 cfs based on calibration of the Hansen Allen and Luce hydrologic model?

   *No, a calibration to the Hansen Allen and Luce model using a flow rate of 100 cfs would not be accepted. An entirely revised hydrology model would need to be submitted and reviewed.*

2. Will FEMA provide documentation of their review of the hydrologic analysis that supports compliance with all FEMA guidance and standards?

   *The review documentation requested is attached to this letter.*

3. The storm distribution used from the hydrologic study was not developed from a federal, state, or local agency. Will FEMA recommend a storm distribution that complies with FEMA guidance and is most appropriate for the Neffs Creek watershed?

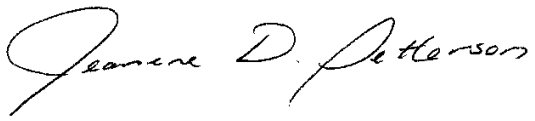
   *The hydrologic model, including the storm distribution component, met current standards and was adopted by FEMA. Additionally, the community supported by the incorporation of the 2007 Study in the 2016 Neff's Creek Flood Hazard Assessment.*

4. Do the deviations from FEMA hydrology guidance and standards warrant an official community appeal?

   *The current hydrology model being used was reviewed, approved and met FEMA guidance and standards at the time it was submitted. Any successful appeal would need to provide an entirely revised hydrology model that meets all FEMA's criteria upon review.*

We appreciate your community's submittal and commitment to having the most accurate flood hazard information available reflected on the FIRM and in the FIS Report. If you have additional questions, please contact Margaret Doherty at our FEMA Regional Office in Denver, CO, by telephone at (303) 854-4887 or by e-mail at Margaret.Doherty2@fema.dhs.gov.

Sincerely,



Jeanine D. Petterson
FEMA Region VIII Mitigation Division Director

cc: Dan Drumiler, Stormwater Engineer, City of Millcreek
Kathy Holder, State NFIP Coordinator
Jamie Huff, State Risk MAP Program Manager
Margaret Doherty, FEMA Region VIII Risk MAP Specialist
Matt McGlone, Regional Technical Coordinator, RSC 8

bcc: Compass Case File
Regional Support Center
FEDD File

# Memorandum

**DATE:** December 10, 2015

**TO:** Brian Murphy (CDM Smith)

**FROM:** Mike Kellogg

**RE:** Neffs Creek Response to Comments Memo

Below are responses to comments received via email on December 7, 2015 and discussed during the conference call December 10, 2015.

1. What relative time period was used to determine the active and inactive portions of the alluvial fan?

Response: Information within the historical record (aerials, mapping, and reports) was used for the analysis.

The revised report will contain more explicit language on the age relationships between the surficial mapping units to clarify the time frames.

2. How was the FLO-2D model domain determined? Why are there active portions of the fan not considered in the model domain?

Response: The model domain was determined by running an existing condition model of Neffs Creek and determining the maximum extent of flood inundation. The domain was modified to bracket the inundation limits.

The entire piedmont landform was identified and mapped as either active or inactive. The project scope was considering only flood inundation from Neffs Creek. The landform mapping extended beyond the inundation limits.

3. Is there additional storm drainage infrastructure that was not included in the model (i.e., culverts, storm drain inlets, etc.)?

Storm drains were not considered. The County confirmed early in the project that there is not storm drain infrastructure other than the culverts along the southern diversion channel. The culverts were integrated into the hydraulic model.

4. It appears that a subcritical assumption was used in the FLO-2D model; how does this affect the assumed Manning's n values?

Response: It is a standard of practice to set the limiting Froude to 0.9 or 0.95. We used 0.9 for this study. To determine the total number of grid elements and the magnitude of change in n values, a shapefile was generated considering the ROUGH.OUT output file for each scenario. The results indicate that n values for 5,110 grid elements out of 223,343 (2%) were adjusted by the model. Most of those adjustments were for grid elements within the main flow corridors. The n value adjustments result in conservative flow depths.

5. How were the velocities used for the Zone AO definition obtained? Were they obtained from the same composite flood hazard condition based on the maximum flow depth or determined by compiling the velocity distributions of the 7 scenarios to get the maximum velocity at each element?

Response: Velocities were obtained by generating a maximum velocity raster using all model scenarios. The maximum velocity raster was clipped to each floodplain polygon. The average velocity from each clipped raster was assigned to the corresponding floodplain.

6. In Table 7, Zone AO2,1 is defined as "100-year flow depth between 1.0 foot and 1.5 feet. Average flow velocities of 1 foot/second" and "Zone AO2,2 is defined as 100-year flow depth between 1.5 foot and 2.5 feet. Average flow velocities of 2 foot/second". Is the definition of Zone AO2,1 correct? To be consistent with the definition of the other Zone AOs, Zone AO2,1 may need to be defined as "100-year flow depth between 1.5 foot and 2.5 feet. Average flow velocities of 1 foot/second" or Zone AO2,1 needs to be re-named as Zone AO1,1.

Response: A typo was identified in Table 7 of the report for the AO1 Zone. The error will be corrected in the next revision of the report.

Per FEMA guidelines (Appendix E), Zone A is determined by approximate-study method. No BFEs are shown on Zone A, because detailed hydraulic analyses are not performed. However, now that a detailed hydraulic model has been prepared for the study area using FLO-2D, Zone A of the workmap should be changed to Zone AE. Accordingly, BFEs should be defined within Zone AE and flood hazard profiles need to be provided.

Response: FEMA defines AE zone as riverine. Since this study is not for a riverine landform, zone AE would not be appropriate. For this study, A Zones were assigned to areas that were defined by either (1) depths in excess of 3 feet (maximum depth for AO Zones), or (2) areas of highest flowpath uncertainty (e.g. near the fan apex). Although the Zone A areas are not explicitly defined with a depth value, the modeling result dataset will be available to the reviewing agency to lookup depths on a grid-by-grid basis.

555 17th Street, Suite 1100
Denver, CO 80202
Phone: (303) 383-2300

February 18, 2016

Ms. Jamie Huff
Utah Risk MAP Program Manager
Division of Homeland Security
State Office Building, Room 1110
Salt Lake City, UT 84114

Ms. Huff,

Compass has received and reviewed AECOM's comment response letter, and associated revised report, modeling, and supporting documentation for the study entitled "Neffs Creek Flood Hazard Assessment Response to Comments." The comment response letter provided by AECOM is included as Attachment 1 to this letter and provides explanations and/or corrective actions taken for each comment from our technical review. We reviewed the individual responses and, where necessary, confirmed that the corrective actions were implemented. Based on this review, the revised submittal meets FEMA's Guidelines for shallow flooding and alluvial fan flooding (*Guidelines and Specifications for Flood Hazard Mapping Partners - Appendix E: Guidance for Shallow Flooding Analyses and Mapping* and *Appendix G: Guidance for Alluvial Fan Flooding Analyses and Mapping* [FEMA, 2003]); therefore, we do not have any additional comments. We recommend that the revised Models and Report, resubmitted by AECOM on February 3, 2016 be approved for final acceptance.

Additionally, following discussion with FEMA Region VIII, the alluvial fan will need to be mapped as Zone A with leader callouts labeling the area as an "Active Alluvial Fan." Furthermore, notes will need to be provided in the attribute table of the DFIRM database identifying the area as an "Active Alluvial Fan." And, at a minimum, an executive summary from this study will need to be included in the Flood Insurance Study (FIS).

Further coordination with the Utah Risk MAP Program Manager and FEMA Region VIII, and potentially local stakeholders, is recommended during FIS development to determine if the additional information should be included in the FIS.

If you have any questions or comments regarding this letter, or the AECOM re-submittal, please contact me at 303.383.2429.

Sincerely,

Brian Murphy

Brian Murphy, P.E., CFM

Cc: Sean McNabb; FEMA
Remmet DeGroot, Tom Wright, Brie Hurwitch; AECOM
Jordan Williams, Eli Gruber; Compass

Attachments: AECOM Comment Response Letter (dated January 27, 2016)

# Memorandum

**DATE:** February 3, 2016
**TO:** Brian Murphy (CDM Smith)
**FROM:** Mike Kellogg
**RE:** Neffs Creek Flood Hazard Assessment Response to Comments
**CC:** Remmet DeGroot (AECOM), Brie Hurwitch (AECOM)

Below are responses to comments received via email on January 27, 2016.

COMMENTS

Stage 1
Compass does not have any comments on the methodology employed or the documentation provided.

*Response: No response required.*

Stage 2
Comment #1
The report should explicitly state what relative time period is being used to distinguish between active and inactive portions of the alluvial fan (e.g., 100 years, 1000 years, etc.).

*Response: Information within the historical record (aerials, mapping, and reports) was used for the analysis.*

*The report was revised (Section 5.1.1) to contain more explicit language on the age relationships between the surficial mapping units to clarify the time frames.*

Comment #2
Some portions of the alluvial fan specified as active in this analysis are not included as part of the model domain in Stage 3. Compass recommends including an explanation of the process for determining the appropriate model domain and if any of the active, non-modeled alluvial fan areas are subject to potential flooding from tributaries not considered as part of this project scope.

*Response: The model domain was determined by running an existing condition model of Neffs Creek and determining the maximum extent of flood inundation. The domain was modified to bracket the inundation limits.*

*The entire piedmont landform was identified and mapped as either active or inactive. The project scope was considering only flood inundation from Neffs Creek. The landform mapping extended beyond the inundation limits. An explanation of the model domain development rationale was added to Section 7.5.1.1 of the report.*

Stage 3

Comment #1

The report does not discuss some model input information important to documenting assumptions. Compass recommends including discussion on all model inputs, including:

- Model time step and total simulation time;
- Inflow hydrograph (show plot of hydrograph);
- Surface detention values;
- Bulking concentration factor;
- Hydraulic structure locations and rating curve development; and
- Outflow boundary conditions.

*Response: Descriptions for all the points listed above were added to the report in Section 7.5.1.*

Comment #2

The maximum flow depth figures presented in Section 7 of the report currently do not show any depths less than 0.5 feet and it appears that there are "islands" of inundated area. Compass suggests either making the 0 to 0.5 foot range of inundated area visible (the entire layer can be made 50% transparent to show aerial photo), or stating explicitly in the report that the maps do not display any inundation less than 0.5 feet. It is understood that 0.5 feet is the minimum regulatory flood depth, but context is needed to interpret and understand results.

*Response: Text was added to Section 7.5.1.8 to clarify that flow depths less than 0.5 feet are not shown in the figures.*

Comment #3

The report does not address the downstream boundary condition (outflow cells). Upon examination of the topography it appears reasonable to assume that water would flow across Wasatch Boulevard without backwatering and causing significant ponding. Compass recommends providing rationale/justification for placement of the outflow cells.

*Response: Text was added as Section 7.5.1.6 regarding selection of the project downstream boundary condition.*

Comment #4

The model does not incorporate or account for any local drainage infrastructure beyond the series of culverts along the south edge of the model. Compass recommends providing documentation to justify this assumption (e.g., information from local agencies and/or field verification).

*Response: Text was added as Section 7.5.1.5 that discusses drainage infrastructure in the project area.*

Comment #5
The limiting Froude number is set to 0.9 in the model controls. Compass recommends discussing the subcritical flow assumption, providing justification, and discussing the effect that this has on Manning's n values during the model runs (ROUGH.OUT file indicates very large Manning's n values in the main flow channels).

*Response: Text was added as Section 7.5.1.7 that discusses the limiting Froude number selection.*

Comment #6
Compass recommends providing a source for the selection of Manning's n values used in the modeling and presented in the report.

*Response: Text was added to Section 7.5.1.4 to clarify the source of the Manning's n values used in the model.*

Comment #7
Compass recommends providing a detailed description for each of the 7 model scenarios. This will provide insight into the rationale used for placement of "virtual" levees and help convince the reader that the composite map represents the worst case flood scenario.

*Response: Text and a table were added to Section 7.5.1.9 for clarification.*

Comment #8
The report provides discussion to explain how the maximum depths were composited to represent the flood hazard condition using results for the 7 flow path uncertainty model scenarios. Compass recommends providing similar discussion in the report to explain how the velocities used for the Zone AO definition were determined.

*Response: Text and a figure were added as Section 7.6.1 to clarify the development of the composite velocity raster and Zone AO velocity assignments.*

Comment #9
Based on the definition of Zone AO2,1 in Table 7, it should be re-named as Zone AO1,1.

*Response: Table 7 contained a typo and has been corrected.*