



October 13, 2016

City of Spokane Valley  
Attn: Henry Allen, Development Engineer  
11707 E. Sprague Ave, Ste. 106  
Spokane Valley, WA 99206

**RE: Painted Hills PRD Floodplain/CLOMR Submittal Review #1 from Spokane County  
Response to Comments**

Dear Mr. Allen:

Enclosed are our responses to the Spokane County Engineering (SCE) comments provided to the City of Spokane Valley (CSV) dated January 11, 2016 with regards to the Painted Hills PRD Floodplain/CLOMR first submittal. Following their comment, our response is shown in **bold**.

General comments:

1. As you noted in your comments, Spokane County as well as CSV concurrence is required on the CLOMR application. Please also note that Spokane County cannot concur with the CLOMR application until the issue of jurisdictional maintenance responsibility is determined per 44 CFR 65.10 (c) and 44 CFR 65.6 (a)(12). As a majority of the proposed plat/development is within the City of Spokane Valley we request that the CSV provide written assurance that they will assume jurisdictional responsibility of the O&M of the Gustin Levee/Ditch, Triangle Pond and South Collection Pond. Because the proposed HOA and residents are located in CSV, Spokane County would have to assess citizens within the CSV for the maintenance of flood control facilities within our jurisdiction. Split charges and split responsibilities for plat stormwater and flood control facility maintenance inside and outside the CSV would be confusing and inefficient.

***Although this comment was intended for the City, we offer this additional information.  
The South Collection Pond has been eliminated.***

***The Triangle Pond and the Gustin Levee/Ditch are currently in place. There is an easement to the County over the Triangle Pond for stormwater disposal. The Gustin ditch currently conveys storm water from east of Hwy 27 to the west to the Triangle Pond. Therefore, this is an existing regional facility serving properties both up and downstream of the facility. Because the owners of the Painted Hills project are funding the upgrade of an existing facility, the development and the City of Spokane***

**Valley should not be responsible with future maintenance of a regional facility serving County properties. But until this is resolved, the O&M plan provides for the operation and maintenance of the Gustin Ditch and Triangle Pond to be performed by the Painted Hills PRD Homeowner's Association until such time as the adjacent property in the County develops and then the owner of that development would take over.**

2. Regarding SEPA review and determination, as CSV is the lead on plat review and approval we assume that CSV will be lead agency for SEPA review and that the flood control facilities within unincorporated Spokane County will be included in the scope of that SEPA review. Please contact me to discuss if this is not the case.

**Although this comment was intended for the City, we offer this additional information. A revised SEPA has been provided to the City with a revised detailed description of the storm system proposed to eliminate the compensatory storage within the project.**

3. Permitting: A Spokane County floodplain development permit and grading permit will be required prior to proposed levee and pond construction on lots within unincorporated Spokane County. This work therefore is subject to Spokane County Critical Areas review and may be subject to other State/Federal environmental permits due to potential wetland/stream impacts. We recommend that the applicant contact me to set up a "pre-application" conference for County related activities. Note that at the time of the CLOMR application SCE must be assured that the project will be able to obtain and meet the requirements of all agency permits.

**Pre-application meeting has been held. More detail has been added to the construction plans. The removal of fish designation of the Gustin ditch has been approved by Spokane County.**

4. A detailed Maintenance and Operation plan outlining maintenance responsibilities and funding mechanisms must be provided for all flood control facilities prior to Spokane County community concurrence on the CLOMR application.

**An O & M plan is included with this submittal.**

5. At a minimum a written letter of understanding with facility property owners and any others impacted by the project is needed prior to concurrence with the CLOMR application. The Spokane County facilities outside the plat boundaries including the South Collection Pond, Triangle Pond, and Gustin Ditch and Levee will eventually need a permanent stormwater easement or tract granted by the owners of the affected parcels. This along with any necessary property owner BFE rise permissions are required prior to issuing the floodplain development permit.

***The south collection pond has been eliminated. The Triangle Pond is currently covered by a stormwater easement.***

***Individual property owner notifications are required if the proposed project results in adverse impacts such as increases in BFEs and SFHAs. Notification is also required for any changes to the floodway whether adverse or beneficial (largely the case for this CLOMR). Individual notification for adverse impacts to BFEs and SFHAs generally is on community letterhead. We will provide text and ask that the City/County add the text to their letterhead which we would then send to property owners. We will need a GIS layer of properties with contact information so that we can identify affected properties for notification. The Floodway notification can be done via public notice in the paper but must come from the community (City/County), (per email communication with FEMA CLOMR review team). We can provide the text to the City and County for this notice.***

***At this time, the notifications have not been sent and based on past project experience, we recommend the notifications be issued after we have City and County approval of the CLOMR package that will be submitted to FEMA and have determined there will be no further modifications to the project (at least prior to FEMA review). This ensures that there is no confusion to properties owners as we work through the review process with the communities. As is typical for CLOMR projects, we will mail the individual notifications just prior to or at the same time we submit the CLOMR to FEMA for review and would request the community post the public notice at that time.***

6. Due to a lack of in-house expertise, SCE is considering hiring a consultant to perform a detailed HSPF model review of the next submittal. Please be sure that this next submittal includes all the necessary backup data to support that effort.

***The HSPF model files have been provided on CD with the resubmittal but they are the original files from the effective FIS since no revisions were made for this project. The HSPF model was used in the original FIS to calculate the final ponded water surface elevations within the golf course based on inflows from the unnamed tributary and the golf course overflow reach, while considering the effects of storage and infiltration in the storage areas. The proposed project plan is to intercept all 1%-annual-chance floodwaters entering the property and remove the area from the 1% floodplain entirely. Since all floodwaters are being intercepted and infiltrated there is no remaining ponded water for the 1% flood and therefore there was no need to update the HSPF model to determine new ponded water surface elevations. The entire area will still be in the floodplain, but it will be mapped as 0.2% annual-chance floodplain (500-yr). The extent of the 0.2% floodplain will be larger than the current effective FIS because of new guidance (FEMA Procedure Memorandum 51) from FEMA regarding how non-certified levees and non-levee embankments are considered in terms of flood protection. These procedures have changed since the effective study was conducted. Even though the***

***proposed project involves certifying and building levees, they won't be certified beyond the 1% flood. It is now required to map the 0.2% based on the assumption that Dishman-Mica Road and the trailer park levee fail as well as the existing levee within the former golf course; therefore, the 0.2% water surface elevations from the stream side of these levees are projected east to the project site.***

7. The official County Engineer's section map references a drainage easement dedication over the triangle property for CRP No. 1923. We have not located a copy of the easement and assuming at this point that the proposed additional use to intercept flood flows with the drywell farm is consistent with or at least not prohibited in some way by the easement in-place. However, this will need to be verified. Additional easement rights will need to be granted by the property owner of APN No. 45343.9052, if the existing easement does not grant rights for the proposed use outright or the easement is no longer in-place. (See enclosed section maps).

***A copy of the storm drainage easement over the subject parcel was provided to us by Gary Nyberg, County Engineering. (Official Volume 659 Page 1805)***

8. The Madison Road drainage especially from the south must be addressed in detail, including basin maps, to insure the adequacy of the drywells to handle the flow. A reference to an "email" from West Consultants in the Painted Hills Flood Control Development Narrative (pond infiltration report) is not sufficient.

***The WCE Flood Control Narrative and the Interior Drainage section of the CLOMR report has been expanded to discuss this. Drainage east of Madison is existing and part of the current FIS.***

9. We have concerns with shallow ground water in Boring #9 near Thorpe Road in July identified in the Geotechnical Evaluation Phase II Report and therefore with the efficacy of the proposed drywells and gravel galleries. Please address.

***Drywells and gravel galleries have been moved to the north end of the property. Three additional borings were performed at the north end of the site in the spring of 2016. Two borings were drilled to 49 feet without encountering groundwater. The third boring was drilled until it encountered groundwater at a depth of 71 feet. The bottom of the proposed gravel galleries will be approximately 15 feet deep. See the report letter dated April 19, 2016 referencing Supplemental Geotechnical Evaluation.***

10. Subsurface infiltration estimates are extrapolations from point sampling. Based upon the scope and nature of the project, we believe it is important to do some full-scale testing of some representative and in-situ drywell and gravel gallery segment installations. Based upon the FEMA and PRD review times involved this testing should be feasible and not be overly time disruptive.

***A drywell was installed at the north end of the property and a full-scale test was completed on May 6, 2016. See the report letter dated June 28, 2016 referencing Full-Scale Drywell Testing.***

11. Show proposed BFE's on plans.

***Proposed BFE's have been added to the plans.***

12. Provide plans for Madison and Thorpe Road improvements.

***Improvement plans for Madison, Thorpe and Dishman-Mica Roads are included in the submittal.***

13. More detailed plans/maps showing model cross section locations is needed.

***Two additional work maps with larger scales have been included in the revised submittal to supplement the large format figure originally provided in CLOMR Appendix I.***

14. Show jurisdictional boundaries (CSV/Spokane County) and all work sites on plans.

***Jurisdictional boundaries (CSV/Spokane County) and all work sites are shown on plans. There are now separate plan sets to cover work within each jurisdiction.***

15. We are concerned with the use of Hydroflow software for infiltration pond modeling. Please confirm acceptability with FEMA. Also, hydrology should be consistent with HSPF model when determining elevations, especially with collection pond and culverts upstream of Thorpe Road.

***Hydroflow calculations are no longer a part of the modeling.***

16. "Painted Hills PRD Biological Evaluation, Buffer Averaging, and Habitat Management Plan" needs to include potential impact of proposed construction areas outside the plat area itself. Please amend this document to include the South Collection Pond, the Triangle Pond and the Gustin Ditch/Levee and any impacts under the Spokane County Critical Area Ordinance.

***The South Collection Pond has been eliminated. The fish designation for the Gustin ditch has been removed. The Biological Evaluation has been revised.***

17. Provide consistency of the reach names as well as other design details in the Whipple Consulting Engineer reports and West Consultant reports.

***The WCE reports have been amended to be consistent with the WEST naming convention.***

18. Provide two paper copies of future submittals as well as an electronic copy that includes the hydraulic files for ease of review.

***Noted.***

Plans:

1. FC4.0 – Label existing contours south of Thorpe Road.

***Additional labels have been added.***

2. FC4.2 – Design elevation of the top of the levee is unclear in plans and existing and proposed contours are unreadable. Please specify levee construction with more clarity and locate the BFE on plans and sections. Also, clarify any planned modifications to the Gustin Ditch. Is the ditch proposed to be 3 foot in width its entire length?

***Plans have been revised to provide more clarity. The channel cross-section has been revised to indicate regrading to a constant 3-foot bottom width.***

3. FC4.3 – What are the “future Thorpe Road improvements” shown in the South Collection Pond & North Forebay Pond Section? Provide details.

***Future development was in reference to the roadway construction. The plans have been revised to show the roadway construction along with adjacent drainage facilities.***

4. FC5.0 - Madison Road Plans - The Madison Road drainage plan will need to effectively distribute the basin flows involved thru the various cross-culverts and drywells that are planned. It's not obvious that the drywell with intakes planned along Madison have connectivity to the various collection point of runoff or shouldn't be extended further north along Madison. Therefore, the off-plat drainage basins between Madison Road and Horizon Hill Lane need to be defined and the peak flows estimated. At the south end of the area the Stormwater Utility mapping indicates an off-plat basin with forked gully's in the unincorporated County with the flow path crossing Madison Road approximately one block north of the Thorpe Road intersection. (See attached topo & stormwater maps).

***None of the proposed construction will occur on the east side of Madison Road and therefore will not affect the existing drainage conditions. The proposed improvements on the westerly side of Madison Road will replace the four existing culverts from the east side to the west side and rather than have those flows lie in the existing ditches, will collect the flows in the floodwater drain line to be transmitted and disposed of in the drywell/gallery system at the north end of the project. Analysis of those existing basins and flows were part of and included in the West CLOMR application narrative.***

5. FC5.0 – What is “future development” noted in the Madison Road cross sections? Provide details.

***Future development was in reference to the roadway construction. The plans have been revised to show the roadway construction along with adjacent drainage facilities.***

6. FC5.1 – The V-Ditch appears to be closer to 2:1 not 6:1 slope specified in note 6. Provide calculations of rock size for stability.

***The 6:1 slope was intended for the cross-sectional slope. A detail of the v-ditch has been added. Calculations have been provided.***

7. FC5.1 – This sheet currently shows the drywell lid elevation on the pond bottom for the triangle pond; lids should be raised slightly off the bottom to reduce potential contamination.

***Drywell rims have been placed 2 feet above the pond bottom to reduce the potential for contamination and siltation. The primary function of this area is for bottom infiltration and larger storms that do not infiltrate through the pond bottom will then be infiltrated via drywells.***

8. FC5.1 - Stability calculations on the weir north of Thorpe Road are needed.

***Weir has been eliminated.***

9. FC5.1 - The south collection pond will need a maintenance access road off Thorpe Road for dredging and repair activities after a flood event. Also, this pond will serve as the primary sediment pond, not the forebay storage cell on the north side of Thorpe Road. The current 1.38 foot deep sump zone seems adequate for the infrequent flood event involved. We are not seeing any inherent need to berm the collection pond, to be avoided if at all possible. Not clear from plans if this is the case.

***South collection pond has been eliminated.***

CLOMR Application and Report:

1. A page outlining the files associated with the HEC-RAS projects, plans, geometries, reaches, and flows should be included in the report as each project appears to have numerous reaches within the plans associated with it and it is hard to understand which is which.

**The report has been revised to summarize this information in tabular format**

2. An explanation of the Manning's n-values used in the revised HEC-RAS sections should be included in the report.

**The report has been revised to provide this information**

3. Provide a more detailed explanation of the flows used in the proposed HEC-RAS model such as at which River Station the flows change.

**The report has been revised to provide this information**

4. Page 5 - The unnamed tributary 100-year flow on page 5 is noted as 20 cfs while on page 10 the 100-year flow is mentioned as 16 cfs as does Table 1 on page 15. HEC-RAS also shows the flow as 16 cfs. Please review.

**The 20 cfs statement on page 5 was in error and has been revised to read 16 cfs. 20 cfs is the 0.2% annual chance flood flow and 16 cfs is the 1% annual chance flood flow.**

5. Page 5 – Consider the previously un-mapped/un-modeled overflow of Chester Creek into the golf course overflow reach about 3000 feet south of Thorpe Road. This may increase the 100-year flow in the golf course overflow reach.

***The flow split 3,000 feet south of Thorpe Road is the overflow point that is the origin of the golf course overflow path which is already accounted for in the FEMA models and CLOMR materials. Due to this, we requested clarification on the comment from Marianne Barrentine. She indicated that the comment is referring to an observed but unmapped flow split which occurs at the private driveway approximately 1,500 feet downstream of Thorpe Road. Marianne provided a series of photos that show some overtopping which had occurred in March of 2012. The photos show water leaving the main channel upstream of the culvert and flowing both east and west. One photo also shows what appears to be water splitting to the east from just downstream of the culvert. The western split is both mapped and modeled in the effective FIS but the eastern splits are not. WCE visited the site in order to provide WEST a summary of current observations. During the visit they also spoke with the property owner. Based on LiDAR data and site observations, the mapped western flow split appears to be the major flow path north of the culvert.***

***Based on LiDAR data, the approximate low point in the right bank is 2021.4 ft. This is higher than the 0.2% annual chance flood based on the effective FIS model at XS 23051 (US face of culvert). It should be noted that due to riparian vegetation, the LiDAR data could be providing elevations that are too high. For comparative purposes, the effective model was modified to provide more resolution at the culvert. The left overbanks of the four cross sections used to***



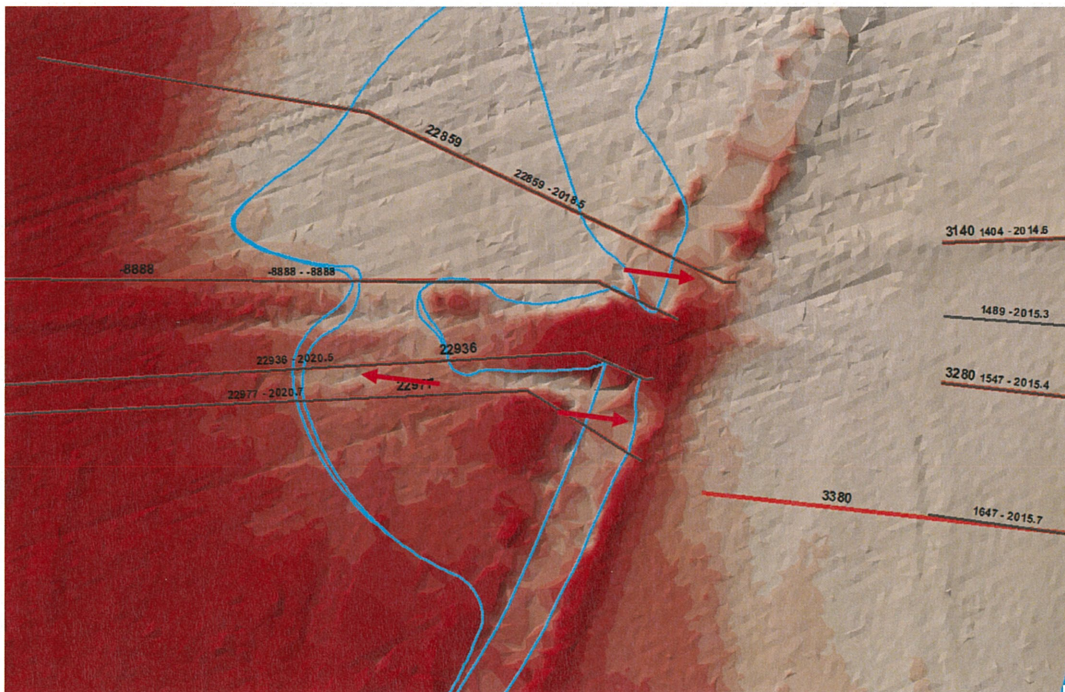
***model the culvert opening (23090 through 22972) were converted to ineffective flow and the low spots to the east and west of the culvert were converted to lateral structures and set to optimize in RAS. This is a more complex and detailed method of approximating the two-dimensional flow conditions present at the site within the confines of a one-dimensional model. Even with the changes, the model only indicated overtopping along the western flow path and no overtopping is shown along the eastern flow path either upstream or downstream of the culvert.***

***Typically, FEMA study modeling is based on an assumption of unobstructed flow, meaning that sediment present within a culvert will be cleared out during a flood. In rare cases where fairly significant sedimentation is present, culverts in FEMA models can be modeled with obstructions. In this case, the culvert was modeled with an obstruction based on survey data collected at the time of the original study. The culvert is 6.5 feet in diameter and was blocked to a depth of 1.6 feet based on excessive sedimentation observed during the FIS survey and choked channel conditions downstream of the culvert (vegetation and sediment). Based on photos taken during the recent site visit by WCE, the culvert appears to be nearly half full with sediment within the barrel (see final photo below showing interior of barrel). This indicates that significant sedimentation may have taken place since the FIS was conducted and that the channel and culvert conveyance has not been maintained. The model was rerun after adjusting the blocked obstruction to a depth of three feet in order to simulate the sediment that was observed to be nearly to the midpoint of the barrel height. Under these conditions, the model showed approximately 5 cfs leaving via the right flow path and 32 cfs via the left flowpath upstream of the culvert. Since no stream gage data are available on Chester Creek it is unknown what size flood event occurred in 2012 and if the modeled 5 cfs flow is a reasonable estimate. Additionally, the model did not show flow leaving the channel downstream of the culvert as was observed in 2012. This could be due to the model cross section downstream of the culvert not adequately representing the current conditions and channel aggradation since the FIS.***

***During the site visit, the property owner stated that the channel has not been maintained and that the conditions have been steadily deteriorating for many years. Based on this statement, the modeling exercise, and comparison of the FIS data to recent observations by WCE it is likely that lack of culvert maintenance and maintaining the channel conveyance is the cause for the observed flow split. It should be considered that an FIS (and CLOMR/LOMR for that matter) is only representative of conditions at the time of the analysis. If conditions on the watercourse are not maintained, flooding conditions can grow worse over time as appears to be happening here. The pipe system design by WCE has a design flow capacity of 84 cfs which is approximately 1.3 times the 64 cfs flow for the Golf Course Overflow Reach; therefore, there is a safety factor for additional flows such***

*as may come from this obstructed culvert; however, it is strongly recommended that this and other culverts on Chester Creek be maintained in order to prevent loss of conveyance over time. If the sedimentation is allowed to continue without proper maintenance, the golf course flow splits (here and the main split upstream) are likely to increase over time, worsen flooding along the overflow path, and reduce the factor of safety built into the infiltration system. In order to alleviate this flow split, it is recommended the blockage of the culvert be addressed by the County immediately.*

*Ultimately, determining how this new flow split should be handled from a FEMA mapping perspective is something that should be discussed further with the County. If the County wants this addressed in more detail and included in the CLOMR, additional survey and modeling would be needed. It should also be considered that revising the modeling to show additional flow leaving the channel would possibly involve reducing downstream flows on the main channel of Chester Creek which is a significant undertaking well beyond this project and the CLOMR.*





6. Figure 5 showing the golf course overflow facilities design drawing specifically the drywells along Madison Road don't match the locations or number of facilities of that of sheet FC5.0 of the construction plans.

***This figure has been updated with the latest plan sheet from WCE. This figure is only meant as a general overview of the facilities; detailed plan sheets are provided in CLOMR Appendix K. Additionally, dry wells are no longer being placed at the outlets to these culverts as they are being connected to the north/south culvert that conveys flow to the infiltration facility.***

7. Page 10 of the report notes that the Collection Pond south of Thorpe is 215 feet wide by 215 feet long. Please confirm this as the Collection Pond details on sheet FC5.1 of the construction plans are not shown to this dimension and clarify irregular shape in body of report. River Station 54 in the HEC-RAS model shows the Collection Pond bottom to be 110 feet which does not match the 215 feet as mentioned in the report. Please review.

***This comment is no longer applicable based on the revised design by WCE.***

8. Page 13 of the CLOMR Appendix notes the Highway 20 culvert crossing as the upstream limit. This should be Highway 27 culvert crossing.

***Report has been revised to read Highway 27***

9. Page 13 – Review of the final plat drainage plans is required prior to issuing a floodplain permit to insure there is no increase in runoff that would impact County properties or alternatively, CSV assurance that this is the case.

***Noted***

10. Page 15 under Site Investigation notes that Ken Puhn of WEST Consultants conducted a site visit on 12/18/2015. However, the year should most likely be 2014.

***The report has been revised***

11. Figures 8 and 9 show the layout of the HEC-RAS cross-sections. However, the figures are hard to read and a scaled layout of the HEC-RAS sections with this information should be provided to allow for checking of the reach lengths, cross-section lengths, etc. All cross-sections should be shown and labeled.

***There figures have been revised and large scale workmaps are provided in CLOMR Appendix I***

12. Page 20 - Explain model result differences in DEM and CEM.

***The minor differences in results between the DEM and the published FEMA data are likely due to computational differences between RAS Version 3 which was used for the original study and Version 4 (the latest version available at the time of the CLOMR submittal) which is being used for this analysis. The Corrected Effective Models (CEM) are updated versions of the DEMs that may correct any errors that occur in the DEM, add any additional needed cross sections, and/or incorporate more detailed topographic information than that used in the DEM. Report section "Correct Effective Model (CEM)" describes the changes made to the CEMs. These changes are responsible for the differences in results shown in the comparison table.***

13. Check the weir data in the proposed HEC-RAS files as the width and length don't match construction sheet FC5.1.

***Weir has been eliminated.***

14. MT-2 Form, page 2 – Please use the most current available LIDAR contours for modeling, not 2003 which we assume were used in the original FEMA model.

***The revisions being made as part of this CLOMR are atypical. For most CLOMRs, updating the overbank areas in the Pre-Project Conditions model is important because of development or other significant changes that have occurred since the original FIS. Additionally, for most typical CLOMRs the effective FIS model geometry is based on very old data collected by inferior methods. In this case the FIS models are relatively recent and the LiDAR data they are based on is of very high quality. Further, the overbank areas of the Golf Course Overflow Reach and the Unnamed Tributary within the floodplain that are affected by this project have not changed since the original FIS and so it wasn't deemed necessary to update all of the model cross sections for the significant number of RAS plans and geometries involved in this study. The 2003 LiDAR supports very accurate 2' contours similar to current LiDAR technology and due to the lack of changes in the floodplain the newer LiDAR would not be expected to improve the models or result in improvements in simulated results.***

15. MT-2 Form, page 3 - Include proposed unincorporated Spokane County facility areas in ESA documentation.

***These areas have been addressed in the revised biological evaluation.***

16. The Riverine Structures form needs to include all structures, including levees and weirs not just the Thorpe Road culverts.


***The Forms have been updated to include this information.***

17. It appears that the proposed map revision will include the entire current Storage Area 1 as a Shaded X zone. Please explain in the report the rationale for this.

***The levees along Dish-Mica Road and the right bank of Chester Creek through the project site will be certified for the 1%-annual-chance flood. Accordingly, FEMA will not consider them as being able to provide protection for the 0.2% annual-chance flood event. In this case, the floodplain would have to be mapped assuming the levees fail or effectively do not exist. Due to this, Storage Area 1 will still need to be mapped as Shaded X. The proposed boundary of the Shaded X Zone is based on projecting the water surface elevations from the stream side of the levees to the landward side of the levees.***

If you have any questions, please don't hesitate to contact our office at 893-2617. We are also available to meet with either CSV and/or SCE staff to discuss these responses further.

Sincerely,  
WHIPPLE CONSULTING ENGINEERS, INC.

A handwritten signature in blue ink, appearing to read "Mark Krigbaum".

Mark Krigbaum, PE

Cc: Marianne Barrentine, Spokane County

Email copies:

Ken Puhn, West Consultants

Paul Nelson, IPEC