

Summary of Additional Data Required to Support a
Conditional Letter of Map Revision (CLOMR)

Case No.: 24-05-2348R

Requester: Shannon Killion, P.E.

Community: City of Indianapolis, IN

Community No.: 180159

The issues listed below must be addressed before we can continue the review of your request.

1. Please address the following comments regarding the submitted hydraulic analysis or provide an explanation for each.

- a. Our review revealed that the model parameters for the structures at Michigan Road at river station 29011.74 and 10th Street at river station 2417.993 differ or could not be verified from the submitted certified surveys. Please ensure that the plans include the dimensions of the structures as well as all elevations necessary for verification of the hydraulic modeling. Please revise the submitted HEC-RAS models and/or the certified surveys so there are no discrepancies.

10th Street: Profile plan sheets have been prepared based on the collected survey data showing the elevations and dimensions of the structure. Terrain data within the crossing utilizes data from the effective FIS (NGVD-0.44ft=NAVD88) merged with DEM topography.

Michigan Road: Survey included linework for a bridge low chord that was not included in the points. The low chord elevations were combined with dimensions from the INDOT construction plans to determine the high chord elevations. Pier dimensions were also updated. In-structure terrain elevations were taken from the survey points.

- b. Our review revealed that the levee option was used in the submitted HEC-RAS model for non-accredited levees. Please note that the levee option should only be used for FEMA Accredited Levees and the use of the ineffective flow area option may be more appropriate. Alternatively, if this is an area of natural high ground and flow will not reach the landward side of the high ground, then it may be more appropriate to truncate the cross sections at the high ground. Please provide documentation to support using the levee option, or make the necessary changes.

Levee stations have been converted to ineffective flow limits for all sections aside from those within accredited levees which include Levee WR-20a, the Indy North Flood Damage Reduction Project, and the proposed Rocky Ripple Levee.

2. The Submitted topographic work map, entitled "White River Rocky Ripple Flood Risk Reduction Project Conditional Letter of Map Revision," prepared by Christopher B Burke Engineering, does not provide essential information required to complete our review of this request. Please submit a revised topographic work map, certified by a registered professional engineer, which shows all the applicable items listed in Section C of Application/Certification Form 2, entitled "Riverine Hydrology and Hydraulics Form," including the following information. Please ensure that there is consistency between the work map, revised hydraulic model and the annotated flood insurance rate map.
 - a. Please show the boundary delineations of the proposed Zone AH located generally between cross sections 15599 to 7872. The floodplain boundaries should generally follow the proposed contours and should be delineated to the elevations calculated in the proposed conditions hydraulic model. It is helpful to use different colored lines as well as line types to distinguish the

boundary delineations. When the proposed Zone AH is added to the work map, please ensure it is consistent with the model or provide an explanation for any discrepancies.

This levee is not accredited. However, it predates the original 1973 Flood Insurance Study, and the embankment penetrations are maintained with manual closures operated by DPW staff. Based on the effective flood elevations, this area was mapped based on a separate interior drainage analysis. The effective base flood elevations have been remapped based on the latest topography.

- b. Our review revealed that the vertical datum is not shown on the work map. Please ensure that the vertical datum, such as NAVD88 or NGVD29, is shown on the certified work map. If the datum is different from the datum of the revised model, please show the conversion factor on the work map along with where the conversion factor was obtained.

The topographic workmap has been updated to specify the NAVD 88 vertical datum and Indiana State Plane East coordinates.

- c. Please ensure non-accredited levees do not show as providing protection from the base (1-percent annual chance) flood.

Areas behind the non-accredited levees have been mapped based on the model flood elevations. Updated floodplains are shown on the topographic workmap and annotated DFIRM. Shapefiles are also provided with this submittal.

3. The top widths of the base floodplain computed in the proposed conditions hydraulic model do not match the floodplain top widths shown on the topographic work map at the cross sections listed below. Please note that large disconnected areas should be mapped as well to match the model. Please revise the work map or hydraulic model as appropriate to resolve these discrepancies. The geometry of the cross sections in the proposed conditions hydraulic model should reflect the topography shown on the workmap.

White River	Base Floodplain Top Width (feet)	
Cross Section	Model	Map (approx.)
28893	1153	612
28765	1020	599
28613	867	652
28233	1405	1246
27735	1736	1685

Site drainage features were initially removed in the right overbank for these sections. The mapping has been revised to show these areas as mapped in the floodplain with the exception of a few isolated low spots. RS 28613 is still slightly wider than in the model due to the floodway not necking down through this area drawing the left overbank wider than modeled. RS 28233 is slightly shorter than modeled due to the removal of isolated low spots being removed from the mapping.

4. Please note that FIRM panels 18097C0137F, 18097C0139F, 18097C0141F, and 18097C0143F have been updated. Please re-submit annotated Flood Insurance Rate Maps (FIRM) on updated panels 18097C0137g, 18097C0139G, 18097C0141G, and 18097C0143G effective August 14, 2024 that shows the revised boundary delineations of the base floodplain, 0.2-percent-annual-chance floodplain, regulatory floodway, area with reduced flood risk due to levee, and Zone AH as shown on the updated work map and how they tie-in to the boundary delineations shown on the effective FIRM at the downstream and upstream ends of the revised reach. Please use different colors to differentiate the proposed and effective boundary delineations. Also, please show the title block of the effective firm on the annotated firm.

In addition, please provide the annotated FIMR panel 18097C0135F revised by effective LOMR (Case No. 22-05-2392P) dated March 20, 2024. Please ensure that the annotated FIRM shows graphical tie-in at the upstream end and reflect any changes that result from resolving comments above.

The updated FIRM panels have been added to the annotated Flood Insurance Rate Map (FIRM). Please note that the “G” panels available from the FEMA Map Service Center are not spatially referenced. Care has been taken to spatially reference the panels to allow for an accurate overlay of the proposed mapping over the effective mapping, however minor visual discrepancies may still occur in the exhibits. The actual mapping shapefiles are accurately tied into the Marion County DFIRM database shapefiles so there should not be an actual data discrepancy.

5. Our review revealed the levee does not tie into the natural high ground at the upstream end of the revision area. The submitted freeboard profile indicates the levee elevation at the upstream end is 720 feet, however the topography shown on the certified topographic workmap shows lower elevations at the same location. Please revise the freeboard profile and/or the certified workmap to resolve this discrepancy or provide justification.

At the upstream end, the proposed levee ties into the Indianapolis North Flood Damage Reduction Project which is a FEMA-accredited levee. The freeboard profile correctly shows the elevation of the Rocky Ripple Levee at 720 feet, tying into the existing levee at 719.32 feet per Sheet C-220 of the drawings. Due to scale, density of data, and overlapping datasets, not all the data is shown on the topographic workmap. However, it is documented in the report, and the data has been previously provided (reference Etica survey area No. 4 USACE tie-in).

6. Please provide the actual DEM or a GIS-compatible terrain file used to develop the XP-SWMM 2d grid. Specifically, please submit the merged surface from the 2016 Marion County DEM and proposed levee contours in a compatible format. If a GIS-compatible DEM is unavailable, clarify how to interpret what appears to be a text file which was most recently submitted.

The merged DEM is provided with this submittal. Also, the XPTin file that was included with the original submittal contains the analysis surface which can be exported from XPswmm for use in GIS.

7. The proposed levee system is intended to provide flood protection from the White River staging, but it continues to remain unclear whether flood stages along Central Canal could impact the interior area. While the previously submitted response describes the canal’s function and planned gate structures, it does not provide technical justification demonstrating that hydraulic connectivity or backwater effects will not occur.

Please provide supporting data or certification confirming that the Central Canal remains hydraulically disconnected under specific flood conditions. Additionally, submit design documentation or an operational plan detailing the gates’ functionality during extreme storm events. The assessment should also address the contributing drainage area to the east to ensure

that, when the gates are closed, water levels within the canal do not spill into the levee-protected area.

A HEC-HMS analysis was developed to determine the capability of the Central Canal to contain the runoff from the immediate drainage area between the USACE canal gate and the proposed Rocky Ripple Levee canal gate. It should be noted that the Central Canal is a protected waterway and water source for the Citizens Energy Group water treatment plant, and direct discharging into the canal is minimal. A storm sewer system within this area exists to bypass the canal and discharge further downstream. The watershed was delineated utilizing the 2016 Marion County Digital Elevation Model (DEM) and primarily focused on the drainage area that could contribute based solely on overland flow. City of Indianapolis land use categories were established based on 2021 aerial photography and soil data obtained from the NRCS Web Soil Survey. This data was combined to calculate curve numbers for the watersheds. Times of concentration were calculated based on TR-55 methodology. Rainfall data was obtained from NOAA Atlas 14, and per the City's stormwater ordinance, the Huff distribution was used. The Indianapolis North Flood Damage Reduction Project serves as an obstruction to overland flow so any area that could have contributed behind the levee was not included in this analysis.

The 10- and 100-year storm events were analyzed to determine the contributing runoff volume potentially entering the canal. The 10-year storm was analyzed to determine the volume of water assumed to be collected by the extensive storm sewer system. The runoff volume for the 10-year storm was subtracted from the 100-year runoff volume for the North basin which does not have a direct outlet to the canal. Based on the results of this analysis, the peak flood elevation within the canal is approximately 712.06 compared to a breakout elevation of 713.8.

Due to the quantity of depressional areas within the watershed, a HEC-RAS 2d rain on grid analysis was also performed to confirm the results of the HEC-HMS analysis. This analysis showed that flood elevations within the Central Canal reached 712.77.

The analyses demonstrate that flood stages along the Central Canal do not impact the interior area of the Rocky Ripple Levee. A memorandum providing additional documentation of both analyses is included with this submittal.

8. 44 CFR 65.10(c)(2) requires a joint probability analysis of levee interior areas and external riverine flooding unless it can be demonstrated that hydraulic connectivity does not exist. While the response assumes no connectivity due to backflow preventers, technical documentation or certification is needed to verify their reliability under extreme conditions.

Please provide supporting data confirming that the backflow preventers will function as intended during prolonged submersion and potential debris or sediment accumulation. Additionally, clarify whether the submitted O&M documentation includes maintenance and inspection procedures from these preventers. If the interior area can be reliably demonstrated to remain hydraulically isolated, a joint probability analysis may not be required.

There is hydraulic connectivity between White River and the protected areas on the landward side. However, we have provided a conservative interior drainage analysis (i.e., a case of complete coincidence) by assuming a 100-year interior storm event and that no interior runoff exits through the gravity outfalls or other means other than infiltration. Assuming that no runoff exists through the gravity outfalls is an appropriate conservative assumption considering the elevation of the outfalls relative to flood elevations and the likelihood that the outlets would be submerged for much of the duration of the 1-percent-annual-chance flood event.

All gravity outfalls are fitted with at least one automatic closure (flap gate and/or inline check valve). In addition, all gravity outfalls 24 inches in diameter and larger have secondary, manually operated

sluice gates housed in gate wells. Operations and maintenance procedures for backflow prevention are outlined in the following sections of the operations and maintenance manual:

- Operation Prior to a Flood Event
 - Inspection of the levee to check that “flap gates are unobstructed, swing freely when moved by hand, and are in the closed position” and “sluice gates are in the open position, unobstructed, and ready for operation if necessary” (Section 3.2)
- Operation During a Flood Event
 - Monitoring to check if “flap gates and check valves are working properly” and “gatewells, inlets, and outlets are free from debris and excessive sediment deposits” (Section 3.3.1)
 - Closing of sluice gates triggered by actual or forecasted gage stages or when flooding of the protected area occurs due to backflow (Section 3.3.3)
- Operation After a Flood Event
 - “Check flap gates and check valves for blockage and proper operation” and “verify that sluice gates are in the open position” (Section 3.4)
- Program of Maintenance (Section 5.7)
 - An appropriate program of routine maintenance is provided for interior drainage gravity outfalls.

9. The prior response regarding initial water levels addresses soil saturation but does not clarify why the initial water level was set at ground elevation rather than possibly incorporating some amount of normal pool in the 2D model. The concern is whether the interior drainage area would naturally retain pooled water under normal conditions, as completely dry initial conditions may not accurately reflect real-world hydrology.

Please provide supporting hydrologic data or justification for the chosen initial water levels, particularly in relation to any depressions or low-lying areas that may typically hold standing water. If appropriate, update the model to better represent expected conditions.

It is our opinion that dry initial conditions are appropriate and that the model does not need to be “pre-flooded” given the soils in the area and observations from a recent storm event. The area was inspected immediately following a 10-year storm event in April 2025 which did not show areas of ponding or pooling within the interior area. This storm event occurred following a period of repetitive storm events over several days which is not a typical condition. Photos and videos along Riverview Drive taken during the April 2025 event are included with this submittal. Furthermore, interior drainage analyses performed by our team for other levees in Indianapolis that were accredited by FEMA did not use “pre-flooded” conditions.

10. Our review of the submitted draft notification letter revealed that the draft needs revised prior to mailing. Please use the attached revised draft notification to prepare the final notification. It is suggested that a copy of the revised draft be submitted for a final check before mailing. Proof of final notification is required to satisfy this comment. Documentation of legal notice may take the form of a signed copy of the letter sent along with either a mailing list or certified mailing receipts. The individual legal notices must be sent on community letterhead or the community must provide a statement confirming that all affected property owners have been notified of the floodway revision.

A revised draft notice is included with this submittal for your review.

11. If the above-referenced items significantly change the modeling and/or mapping that was previously approved by IDNR, please provide recertification from IDNR.

Changes in flood elevations and mapping are minimal based on the changes made for revision. Therefore, IDNR recertification was not sought.