Texas 2D BLE Analysis QA/QC Checklist

Project Information

HUC-8 Watershed Name & ID:	Coyanosa (13070006) – COYA_006
HUC-10 Watershed Name & ID:	N/A
Modeler:	AtkinsRealis
Reviewer:	AECOM

M1 Review: Terrain, Modeling and Preliminary Tie-In Review (QC Items 1-6)

Modeler Initials:	SG	Reviewer Initials:	RP
Submittal Date:	May 16, 2024	Review Submitted Date:	May 30, 2024
Review Response Date:	July 8, 2024	Backcheck Complete Date:	July 25, 2024
Review Response Date:	August 24, 2024	Backcheck Complete Date:	**August 27, 2024**

M2 Review: Mapping and Completeness Review (QC Item 7) – not included in this submittal

Modeler Initials:	SG	Reviewer Initials:	EDS, SR
Submittal Date:	October 18, 2024	Review Submitted Date:	October 2024 (Sent 2/19/24)
Review Response Date:	April 02, 2025	Backcheck Complete Date:	5/21/2025, 5/30/2025

(Modeler to populate with an "X" for items included in the QC submittal)

Level of Study	
X	2D BLE
	Enhanced BLE

Flood Events			
X	10% ACE (10-year)	X	0.2% ACE (500-year)
X	4% ACE (25-year)	X	1% plus
X	2% ACE (50-year)	X	1% minus
X	1% ACE (100-year)		Observed Rainfall

Instructions

Each section includes instructions to the modeler and reviewer regarding their responsibilities in the completion of this checklist. In the Methodologies / Data Sources tables, grey italic text is added as an example response. Additional sample responses are located in the Texas 2D BLE Guidelines Quick Guide.

Reviewer to indicate if Technical Review items generally comply using a "Pass". If the technical review observes an issue of noncompliance or an item that requires additional attention, an "Fail" should be utilized.

Submittal Checklist

Data submitted for each milestone should be carried through each subsequent milestone. All geospatial layers and models must have same defined projection system as terrain. Modeler to populate with an "X" for items included in the QC submittal.

QA/QC Comments Addressed	
	M1 Comments have been addressed, we understand the comments are an example and not comprehensive of all the errors in the watershed. We have reviewed the entire HUC based on the QA/QC and revised our model accordingly.
	M2 Comments have been addressed, we understand the comments are an example and not comprehensive of all the errors in the watershed. We have reviewed the entire HUC based on the QA/QC and revised our mapping accordingly.
M1: Base Map Data (QC items 1-6)	
X	Location Map (PDF): HUC-8 and HUC-10 boundaries and/or model domain boundary if different from HUC-10s, stream gages, dams (if applicable), mainstem streams (for reference)
X (RAS Mapper)	GIS Map (MXD or Map Package) with the following data included but not limited to: Stream centerlines, model breaklines, rainfall data, WSEL and Depth grids (10, 100, 500-yr), adjacent HUC mapping (available on the BLE viewer or currently studying), 2D connections for inflows/outflows, gages or points of flow comparisons (BFEs, highwater marks, etc.), profile lines, boundary condition lines, refinement regions, model domain boundary, model mesh, DFIRM mapping panels, base map data (roads, aerials, etc.), soils data, land use data, terrain
M1: Technical Report / Documentation (QC items 1-6)	
X	Technical Report / Project Notebook: assumptions, special considerations, and modeling concerns
X	Detailed explanation and support data of variances in methodologies and approaches from recommended guidelines (Should be included in Technical Report / Project Notebook)
X	Internal QA/QC Documentation: comments and responses
X	Flow comparison tables within the technical report
M1: Hydrology (QC items 1-6)	
X	Hydrologic Model (HEC-HMS) model with all associated DSS files for 7 required storm events
X	Hydrologic Data and Parameter Spreadsheets (rainfall calculations, curve number table, gage locations, gage analysis and flow validation)
X (Report/ Results spreadsheet)	Hydrologic modeling notebook including assumptions, notes, and special conditions (if not provided in report)
M1: Hydraulics (QC items 1-6)	
X	Hydraulic Model (HEC-RAS) with all associated files and 7 required storm events run and results available in RASmapper (remove non-final files) Exported Raster Grids for 10, 100-, 500 yr events (using sloping render mode, unless previously coordinated with TWDB) ~~Difference Raster for tie-ins? (for 10-, 100, 500yr events) (add some descriptions)~~
X	Hydraulic Data and Parameter Spreadsheets (Manning's n-value table, infiltration calculations support data-Soils, Land Use, Curve Number table, other calculations/data used in model)
X	Manning's n-value table
X	Precipitation data correctly linked to hydrologic model or hard coded from provided spreadsheet
X	Hydraulic modeling notebook including assumptions, notes, and special conditions (Draft BLE Report with sections related to terrain, modeling and validation)

M2: Mapping (QC item 7)	
X	Flood risk database
X	Modeler to complete topology validation as outlines in the guidelines
X	Modeler to verify mapping meets deliverable requirements as outlined in guidelines
M2: Completeness Review (QC item 8) *See Texas 2D BLE Guidelines Chapter 4 – Deliverables*	
X	Please submit items using the eBFE USGS format and MIP Terrain Folder (see example folder in BLE Resources)
X	Final Technical BLE Report
X	Final cleaned hydrologic model
X	Final cleaned hydraulic model
X	Flood risk database
X	CNMS updates
X	HAZUS results
X	Additional supplemental data: 1) ArcHydro outputs (if applicable), 2) Model domain shapefile, 3) LiDAR Extents Shp file,

Milestone 2 note to production team: Please complete the info on Page 1 and the Submittal Checklist above. Looks like this has not been updated for M2 Reviews.

1 – Model Terrain

Methodologies / Data Sources *(Modeler to populate)*

Terrain Source(s):	Please see technical memo for more detail: Texas West Central LiDAR (2018), Brown County LiDAR (2019), Hurricane LiDAR (2019), Lower Colorado San Bernard LiDAR (2018), and Lampasas LiDAR (2014)
Data Gaps:	None
Source Resolution:	Cell size of 1 x 1 meter
Model Terrain Resolution:	Cell size of 5 x 5 feet
Terrain Horizontal Projection:	North American Datum (NAD) 1983 (2011) Texas State Plane Zone 3 (Central)
Terrain Vertical Projection:	NAVD88
Z Values:	Units of feet
Terrain Buffer:	2,500 feet
Other:	

Technical Review *(Reviewer to confirm with Pass/Fail)*

General Review	
N/A	LiDAR source matches the latest available data at time of project initiation
N/A	Large reservoir or lake extents included in model domain
P	Check visible seams, gaps or holes of LiDAR sources (if more than one source was used)

Review Comments

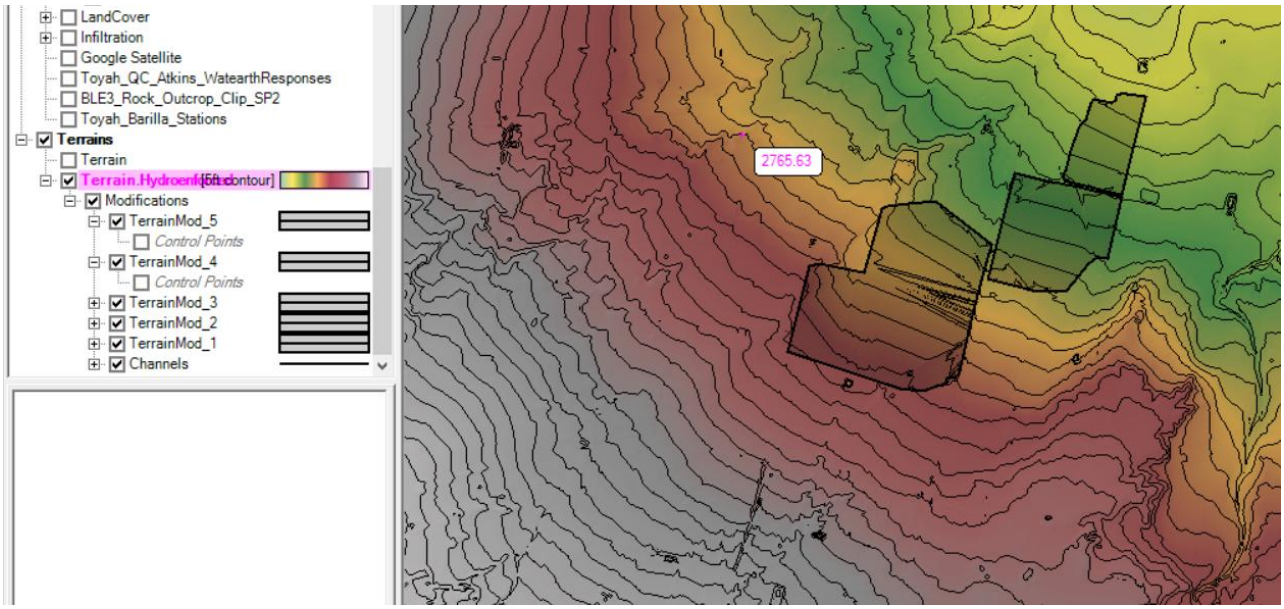
Modeler to Check Box of Acknowledgement during Response to Comments:	Acknowledge that review comments may be example comments and not a comprehensive of all required revisions. Consultant has reviewed provided comments and reviewed for applicability of comment throughout HUC-8.

1. I don't think the terrain modifications that are used for some depressions reflect the latest available data.

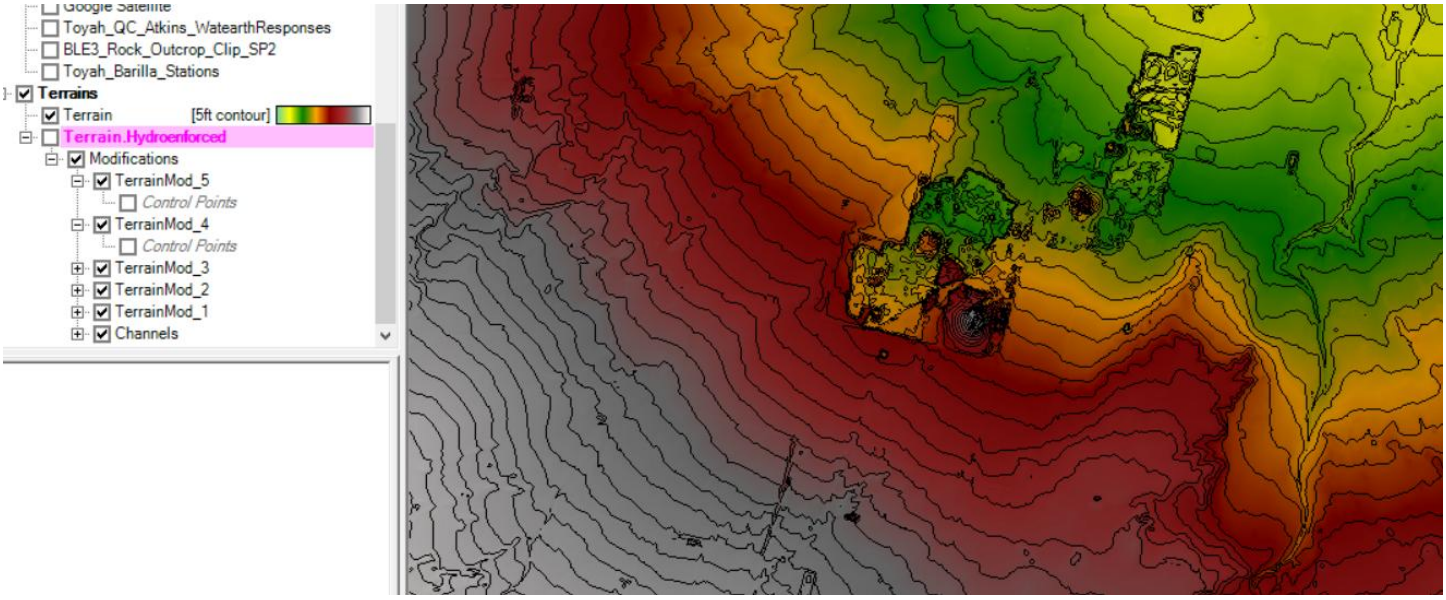
Watearth Response (08/05/2024): There were mining sites/borrow pits present in several of the model domains. The sites included large depressions that were typically 30 to 40 feet deep and up to one mile wide. In some instances, the sites were located near streams and had elevations lower than the stream channel's thalweg. The terrain modification polygons are used to adjust these elevations, and they are removing the mines and borrows from the actual terrain. Below the actual terrain and the terrain with modifications are shown for the same area from Toyah Watershed, which is one of the nearby ongoing watershed studies. This comment was discussed during the over the shoulder call on 07/25/24 between TWDB, AECOM and AtkinsRéalis and use of the terrain modifications accepted as reasonable.

AECOM Response (8/27/2024): PASS

With terrain modification:



Without terrain modification (Raw terrain):



2 – Hydrology

Methodologies / Data Sources *(Modeler to populate)*

Software:	HEC-RAS 6.4.1
Rainfall Source:	NOAA Atlas 14
Rainfall Duration:	24 hours
Depth Selection:	Domain Average
Rainfall Temporal Distribution:	HEC-HMS
Areal Reduction:	None
Loss Methodology:	Spatially varied CN
Unit Hydrograph Transform Method:	N/A
Inflow Hydrograph Source:	
Any Deviations from TWDB Guidance? If yes, please describe	
Other: Precipitation spreadsheets are included with the submittal	

Statistical Data *(Modeler to populate)*

Stream Gage Name & ID:	
Stream Gage Name & ID:	
Stream Gage Name & ID:	

Technical Review *(Reviewer to confirm with Pass/Fail)*

Excess Rainfall	
P	Precipitation values are an aerial average of Atlas 14 values for the entire 2D area boundary for each storm event or other appropriate rainfall application
P	CN values appropriately reflect land use and soils for entire 2D area boundary
P	Losses are correctly calculated to establish the excess rainfall hyetographs by checking land use, soils and infiltration layers or other relative information
P	Total precipitation depths for 1%+ and 1%- are calculated correctly
P	Excess rainfall hyetographs are calculated for all storm events (10%, 4%, 2%, 1%, 0.2%, 1%+, and 1%-)
P	Cumulative excess rainfall values are in increasing order from 10%, 4%, 2%, 1%, to 0.2%
P	Cumulative excess rainfall values for the 1%+ and 1%- fall in order with the storm events matching the total precipitation values
Inflow Hydrographs	
N/A	Shape and time-to-peak of any inflow hydrographs resemble past documented large storm events
N/A	Hydrographs reasonable when compared to the other return periods. The shapes should be similar, and hydrographs from different events should not intersect unless there is an engineering reason. Peak flows from a lower return period event should not be higher than a higher return period event
N/A	Contributing hydrographs from another RAS model applied at coincident locations (Provide locations in base map data)
General Hydrology	
Yes	Any flow regulating dams in the model area? (Yes/No)
Yes	Dam modeling methodologies applied and explained? (Yes/No). If yes, provide discharge rating curve calculations and gage analysis documenting regulated versus unregulated records, if applicable.
N/A	Model aligns with documentation of dam modeling approaches.

Other Notes: NA

Review Comments

Modeler to Check Box of Acknowledgement during Response to Comments:

✓	Acknowledge that review comments may be example comments and not a comprehensive of all required revisions. Consultant has reviewed provided comments and reviewed for applicability of comment throughout HUC-8.

1. Some CN values don't match the values the values that would come from the process described in the memo. This image shows some examples (with values that don't match underlined in green). The base CN numbers are described to be AMC I values, while the Calibration Regions are described to have values that represent the average between AMC I and AMC II values. If values were rounded to up to 30, what's the reasoning behind this?

5	Shrub-Scrub : NoData	53	0.2			63
6	Shrub-Scrub : D	53	0.2			63
7	Shrub-Scrub : B	30	0.2			39
8	Shrub-Scrub : C	44	0.2			55
9	Shrub-Scrub : A	30	0.2			30
10	Grassland-Herbaceous : NoData	70	0.2			78
11	Grassland-Herbaceous : D	70	0.2			78
12	Grassland-Herbaceous : B	41	0.2			52
13	Grassland-Herbaceous : C	54	0.2			64
14	Grassland-Herbaceous : A	30	0.2			40
15	Developed, Open Space : NoData	69	0.2			77
16	Developed, Open Space : D	69	0.2			77
17	Developed, Open Space : B	48	0.2			59
18	Developed, Open Space : C	61	0.2			70
19	Developed, Open Space : A	30	0.2			40
20	Developed, Medium Intensity : NoD...	85	0.2			89
21	Developed, Medium Intensity : D	85	0.2			89
22	Developed, Medium Intensity : B	75	0.2			82
23	Developed, Medium Intensity : C	81	0.2			86
24	Developed, Medium Intensity : A	64	0.2			73

Watearth Response (06/05/2024): The modeled watershed is located in western Texas which is in an area where AMCI values are applicable. However, a slight adjustment was made to the AMCI CN values so any value lower than 30 was changed to 30. Please also refer to Salt Draw BLE report for more detailed information on the CN adjustments.
AECOM Response (7/25/2024): PASS

2. See QC shapefile for dams where breaklines weren't included.

Watearth Response (06/05/2024): Breaklines were included for dams with storage greater than 10 ac-ft. However, Watearth will add breaklines to dams shown in the QC shapefile.
Watearth Response (06/24/2024): Breaklines are included and responses are recorded in the QC shapefile.
AECOM Response (7/25/2024): Additional comments added to QC shapefile
Watearth Response (08/05/2024): The comments in QC shapefile are now addressed.
AECOM Response (8/27/2024): PASS

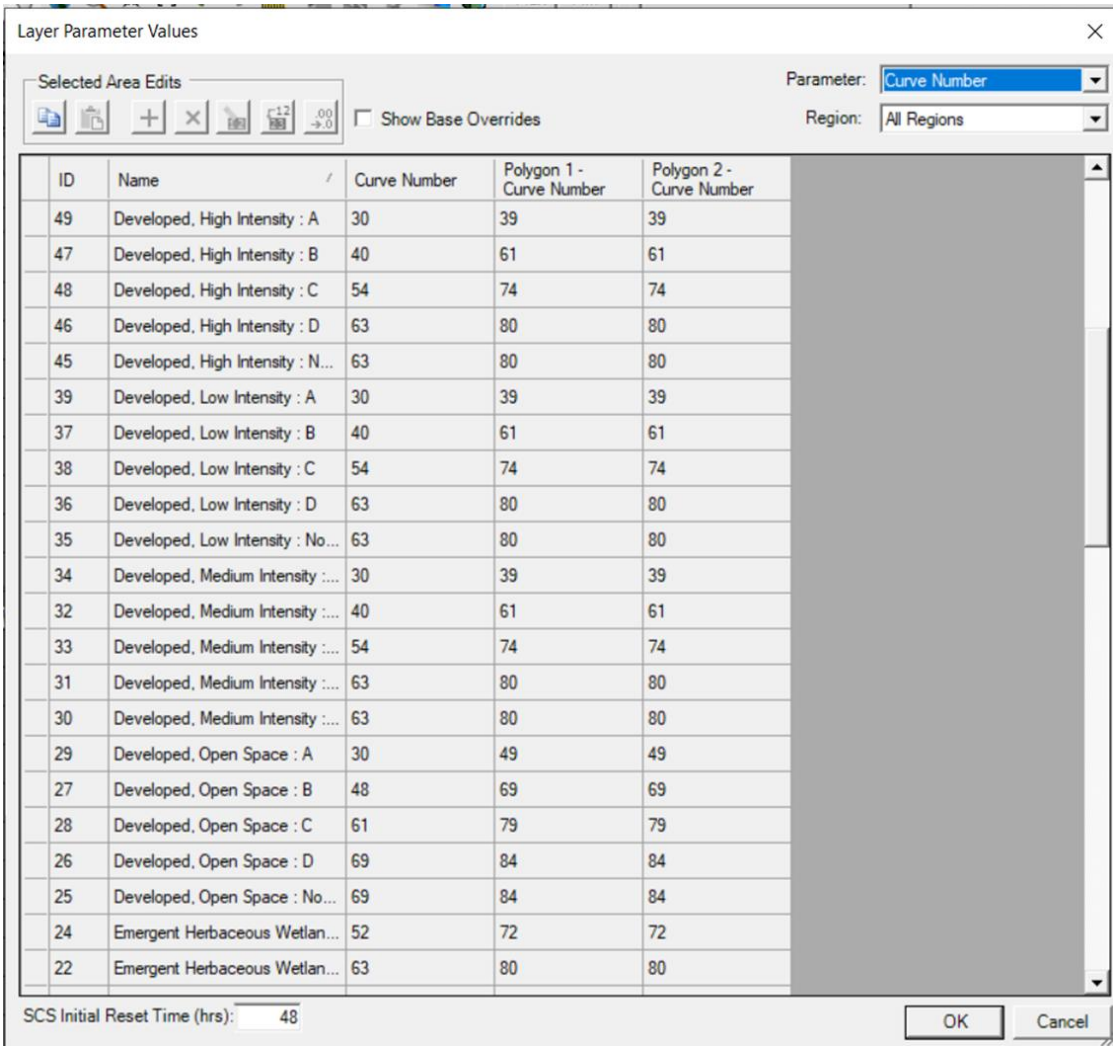
3. Developed landcover Manning's n values don't agree with the table in the TWDB BLE Guidelines and they also look to be composite CN values, so % impervious may be being doubly accounted for.

Watearth Response (06/05/2024): The percent impervious is only used for developed open space type following TWDB guidelines. Manning's n values will be compared to the guidelines and revised if necessary.

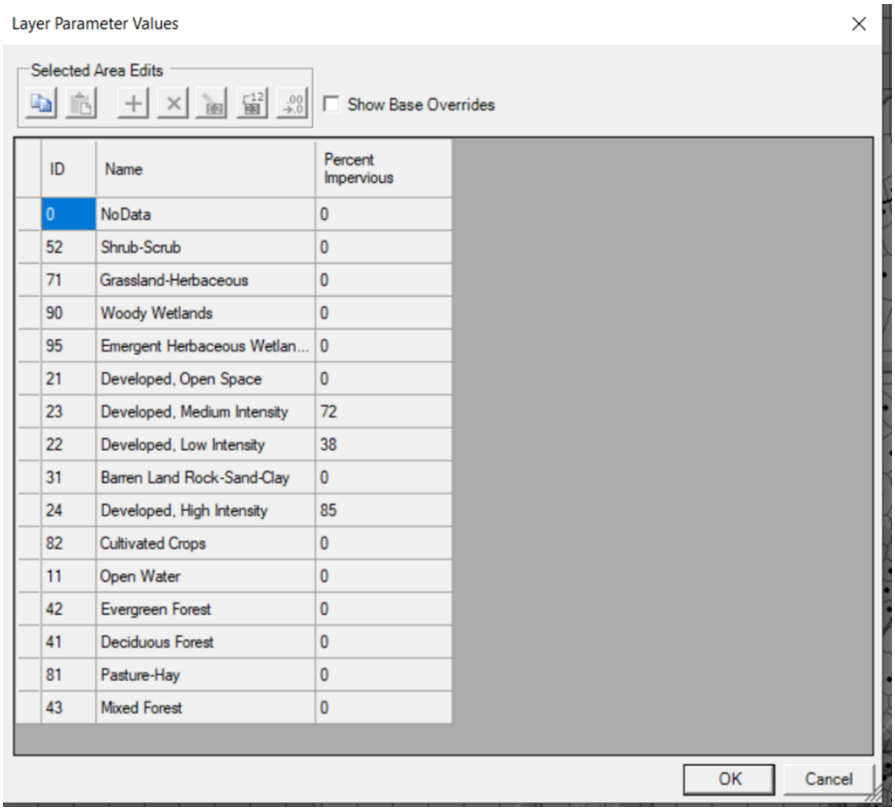
AECOM Response (7/25/2024): Percent impervious is added to all developed area categories. Percent impervious may be being doubly accounted for by high CN values for developed areas and % impervious values being used.

23	Developed, Medium Intensity	0.12	72
43	Mixed Forest	0.14	0
22	Developed, Low Intensity	0.09	38
11	Open Water	0.038	0
82	Cultivated Crops	0.035	0
24	Developed, High Intensity	0.16	85

Watearth Response (08/05/2024): This comment was discussed in the 07/25/2024 meeting and CN values in the model have been updated.
The CN values are now the same for all developed areas (low, medium, and high) but have varying impervious percentages as defined in TWDB guidance This way, the impervious percentage is not double accounted through CN values. Screenshot showing updated AMCI CN values and % imperviousness values is shown below



ID	Name	Curve Number	Polygon 1 - Curve Number	Polygon 2 - Curve Number
49	Developed, High Intensity : A	30	39	39
47	Developed, High Intensity : B	40	61	61
48	Developed, High Intensity : C	54	74	74
46	Developed, High Intensity : D	63	80	80
45	Developed, High Intensity : N...	63	80	80
39	Developed, Low Intensity : A	30	39	39
37	Developed, Low Intensity : B	40	61	61
38	Developed, Low Intensity : C	54	74	74
36	Developed, Low Intensity : D	63	80	80
35	Developed, Low Intensity : No...	63	80	80
34	Developed, Medium Intensity :...	30	39	39
32	Developed, Medium Intensity :...	40	61	61
33	Developed, Medium Intensity :...	54	74	74
31	Developed, Medium Intensity :...	63	80	80
30	Developed, Medium Intensity :...	63	80	80
29	Developed, Open Space : A	30	49	49
27	Developed, Open Space : B	48	69	69
28	Developed, Open Space : C	61	79	79
26	Developed, Open Space : D	69	84	84
25	Developed, Open Space : No...	69	84	84
24	Emergent Herbaceous Wetlan...	52	72	72
22	Emergent Herbaceous Wetlan...	63	80	80



ID	Name	Percent Impervious
0	NoData	0
52	Shrub-Scrub	0
71	Grassland-Herbaceous	0
90	Woody Wetlands	0
95	Emergent Herbaceous Wetlan...	0
21	Developed, Open Space	0
23	Developed, Medium Intensity	72
22	Developed, Low Intensity	38
31	Barren Land Rock-Sand-Clay	0
24	Developed, High Intensity	85
82	Cultivated Crops	0
11	Open Water	0
42	Evergreen Forest	0
41	Deciduous Forest	0
81	Pasture-Hay	0
43	Mixed Forest	0

AECOM Response (8/27/2024): PASS

3 – Hydraulic Geometry

Methodologies / Data Sources *(Modeler to populate)*

Software:	HEC-RAS 6.4.1
Loss Methodology:	Spatially varied CN
Soils Source:	SSURGO
Land Cover Source:	NLCD 2021
Manning's Roughness Source:	Assigned Manning's n values based TWDB guidance.
Nominal Mesh Cell Sizes:	300 x300 except for channel refinement regions, breaklines and urban regions, where 150 ft x150 ft was considered.
Any deviations from TWDB Guidance? If yes, please describe.	
Other:	

Technical Review *(Reviewer to confirm with Pass/Fail)*

2D Mesh	
P	2D Boundary delineated along watershed boundary or buffer to ensure all contributing area is included
P	Nominal cell size appropriate for model detail (generally 200 feet, minimum 50 feet for refinement areas)
P	Computation points are at default locations or changes documented
P	Mesh Cell and Face tolerances are default or changes documented
P	No mesh errors
P	Cell face relationships are calculated
Breaklines	
P	Breaklines are consistent with the terrain data
P	Breaklines sufficiently detailed to capture features (thalweg, banks, berms, etc.)
P	Cells do not overlap terrain features where appropriate (i.e., unwanted leaking)
P	Breakline cell sizing and parameters are appropriate
~~F~~P	2D Area Connections placed at applicable benchmarks, gages, or dams
~~F~~P	2D Area Connections set to use normal 2D equation domain for benchmarks and gages. Appropriate modeling approach used for dams.
Manning's N-Values	
P	Manning's n-values associated to land cover data provided
P	Land Cover classifications are sufficiently descriptive within the data table
P	Manning's n-value classifications generally match current aerial imagery
P	Manning's n dataset is associated with the geometry files
General	
N/A	All model datasets each have unique descriptive names

Other Notes: There are two projection files within the Projection folder.

Review Comments

Modeler to Check Box of Acknowledgement during Response to Comments:

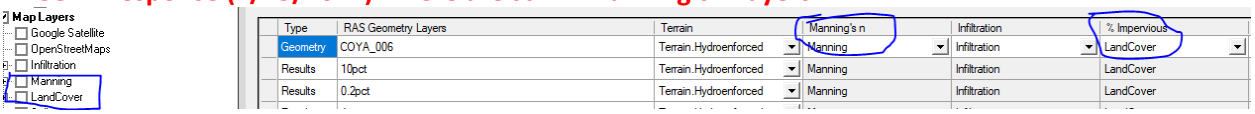
✓	Acknowledge that review comments may be example comments and not a comprehensive of all required revisions. Consultant has reviewed provided comments and reviewed for applicability of comment throughout HUC-8.

1. The model geometry is different than the geometry that was used for the simulations. Please make sure that the geometry in the model is the final version of the geometry and the one that is used for the simulations.

Watearth Response (06/05/2024): The geometry will be revised so there is only one single geometry used in the model.
Watearth Response (06/24/2024): The geometry is revised while responding to comments and after review of perimeter ponding. There is now a single geometry associated with simulations.
AECOM Response (7/25/2024): PASS

2. There are two Manning's n layers. Please delete/remove the one that isn't being used.

Watearth Response (06/05/2024): There is one Manning's layer in the model.
AECOM Response (7/25/2024): There are still 2 Manning's n layers.



AECOM Response (8/27/2024): Model uses "Manning's n" layer for Manning's n values and the "LandCover" layer for % Impervious and for the Infiltration layer. PASS

3. This isn't required by the guidelines, but I suggest using NLCD 2021 and using the Spatially Varied Manning's n on Faces option.

Watearth Response (06/05/2024): Watearth used the NLCD 2019 dataset, but changed to NLCD 2021 dataset to be consistent with all other models in the same region.
AECOM Response (7/25/2024): PASS

4. Model description is missing, main riverine outflow boundary conditions (BC1 and BC6) don't follow naming convention, and plan descriptions don't follow naming convention.

Watearth Response (06/05/2024): The boundary condition names will be revised following the naming conventions.
Watearth Response (06/24/2024): The names are revised to followed naming conventions.
AECOM Response (8/27/2024): Pass

5. There are two projection files within the Projection folder. Please delete/remove the one that isn't being used.

Watearth Response (06/05/2024): The unused projection is removed.
AECOM Response (7/25/2024): There are still 2 projection files.
Watearth Response (08/05/2024): We double checked and there is only one projection file in latest model.
AECOM Response (8/27/2024): PASS

6. The 2D connection for the USGS gage 08435800 doesn't have a descriptive name. I suggest including the gage ID in the name of the 2D connection.

Watearth Response (06/05/2024): The USGS Gage 0835800 is not inside the model, but slightly downstream. It is used to validate the outflow from the model. The SA2D connection in the model is for the outfall.
AECOM Response (7/25/2024): I suggest adding a note about this in the 2D connection description and/or the report memo.
Watearth Response (08/05/2024): This comment was discussed in 07/25 call and description will be added to BLE report as part of M2 submittal.
AECOM Response (8/27/2024): Pass for Milestone 1. Please include a description of this in the final BLE report which will be reviewed during Milestone 2.

M2 AtkinsRéalis response (10/15/2024): In section 3.1 section of the BLE report we added detailed discussion of model validation and figure 3-7 showed location of USGS gages and Table 3-3 showed comparison between BLE and gage flows.
AECOM Response (Oct. 2024): See comment 14 in the report.
AECOM Response (April 2025): PASS

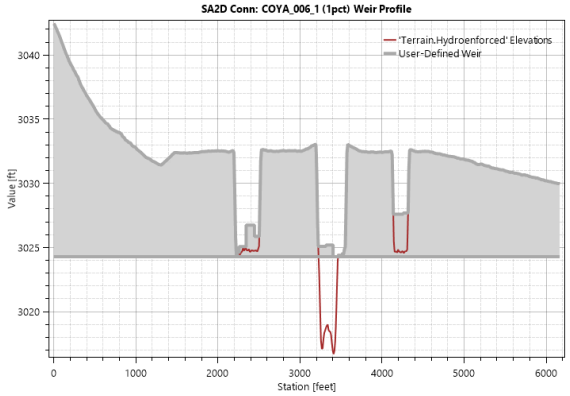
7. See QC shapefile for dams where breaklines weren't included.

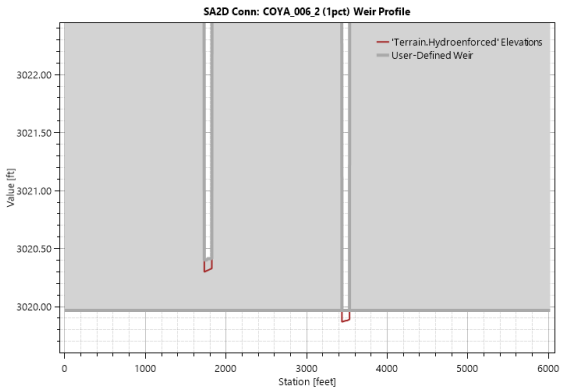
Watearth Response (06/05/2024): Breaklines will be added for the dams. So far, breaklines were only added to dams with greater than 10 ac-ft storage.
Watearth Response (06/24/2024): Breaklines are added to the dam crests pointed in the QC shapefile.
AECOM Response (7/25/2024): Additional comments added to QC shapefile
Watearth Response (08/05/2024): Additional comments in the shapefile are addressed.
AECOM Response (8/27/2024): PASS

8. See QC shapefile for examples where Manning's n classifications look to be incorrect.

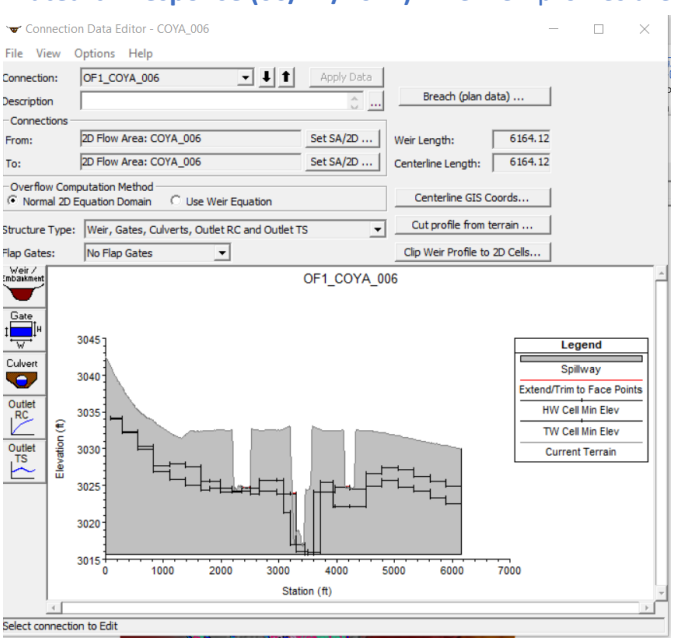
Watearth Response (06/05/2024): The Manning's n values were missing where the model was extended at the outlet. These will be added to the model.
AECOM Response (7/25/2024): PASS

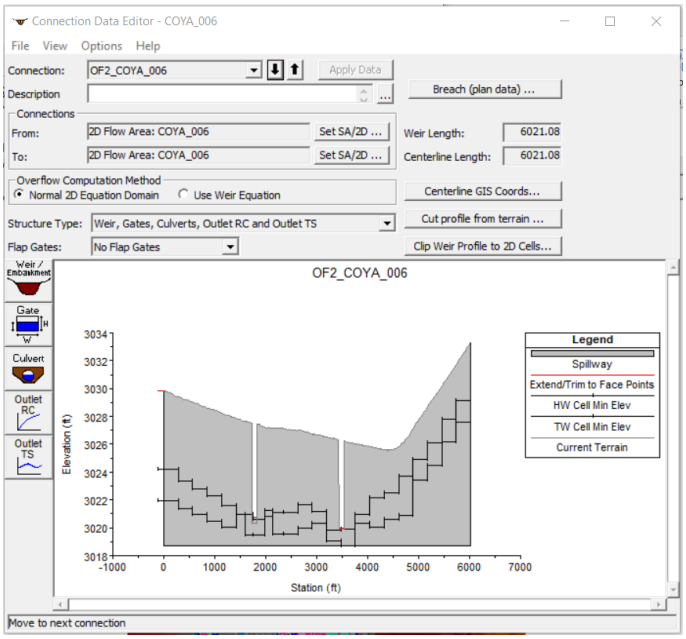
9. The two 2D connection weir profiles don't match the terrain. Please update the weir profiles so they match the terrain.



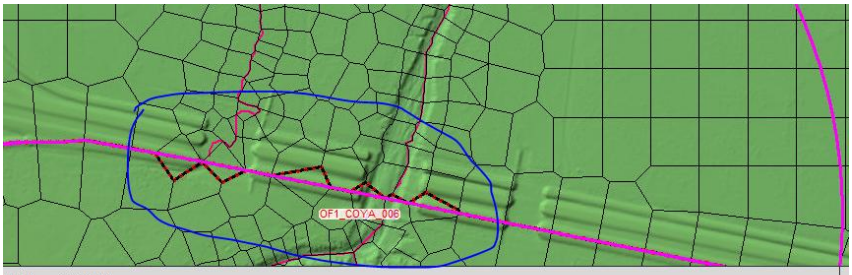


Watearth Response (06/05/2024): The weir profiles will be revised to match the terrain.
Watearth Response (06/24/2024): The weir profiles are as below:





AECOM Response (7/25/2024): A significant portion of the middle channel is blocked I think because of the minimum cell elevations, and other 2D connections have a similar problem. This could be fixed by making sure cells are aligned to the 2D connection and then updating the weir profile. Please do this for every 2D connection.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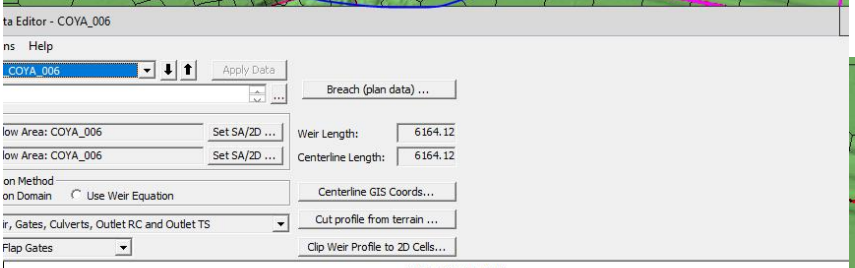
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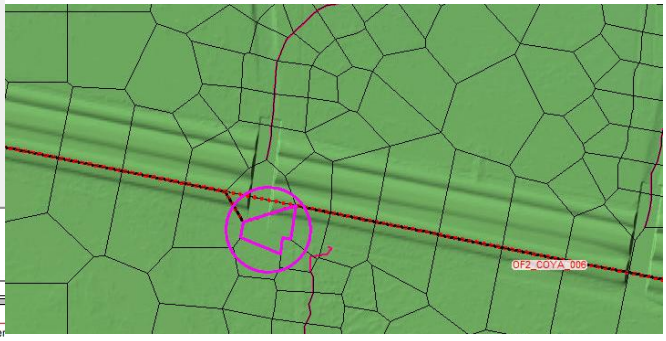
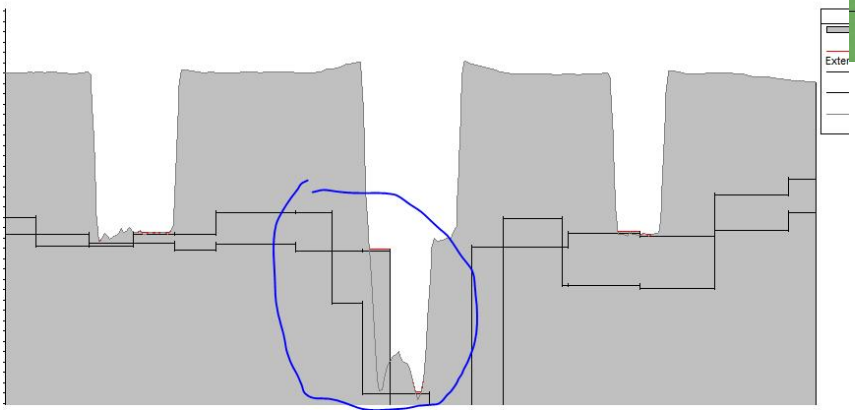
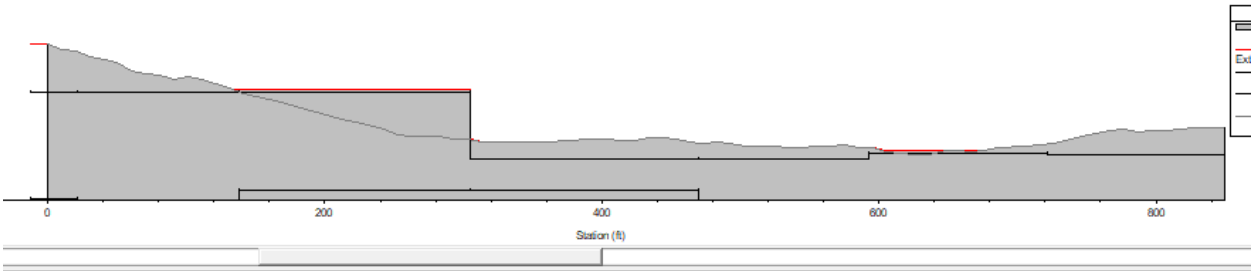
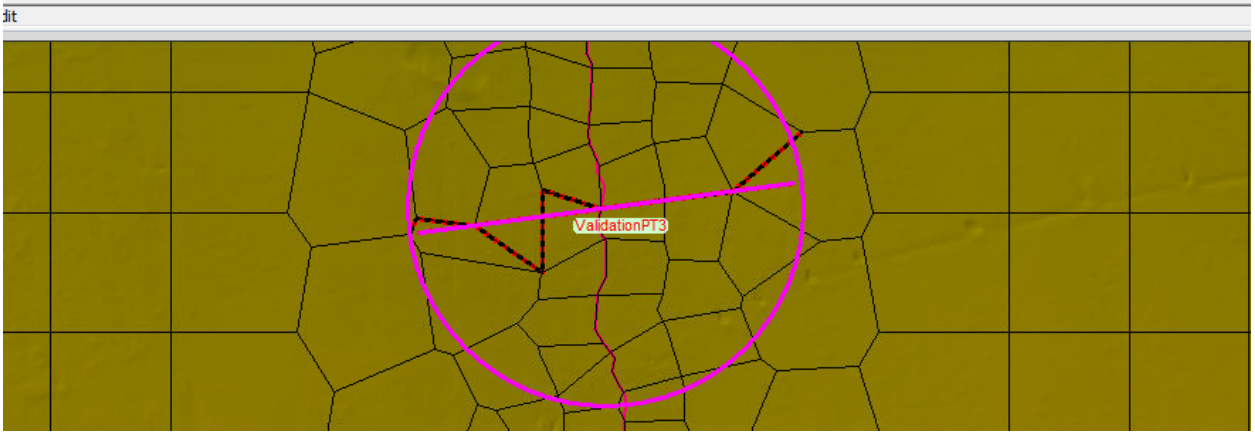
ns Help
COYA_006
Apply Data
Breach (plan data) ...
low Area: COYA_006
Set SA/2D ...
Weir Length:
6164.12
low Area: COYA_006
Set SA/2D ...
Centerline Length:
6164.12
on Method
on Domain
Use Weir Equation
Centerline GIS Coords...
r, Gates, Culverts, Outlet RC and Outlet TS
Cut profile from terrain ...
Flap Gates
Clip Weir Profile to 2D Cells...
OF1_COYA_006

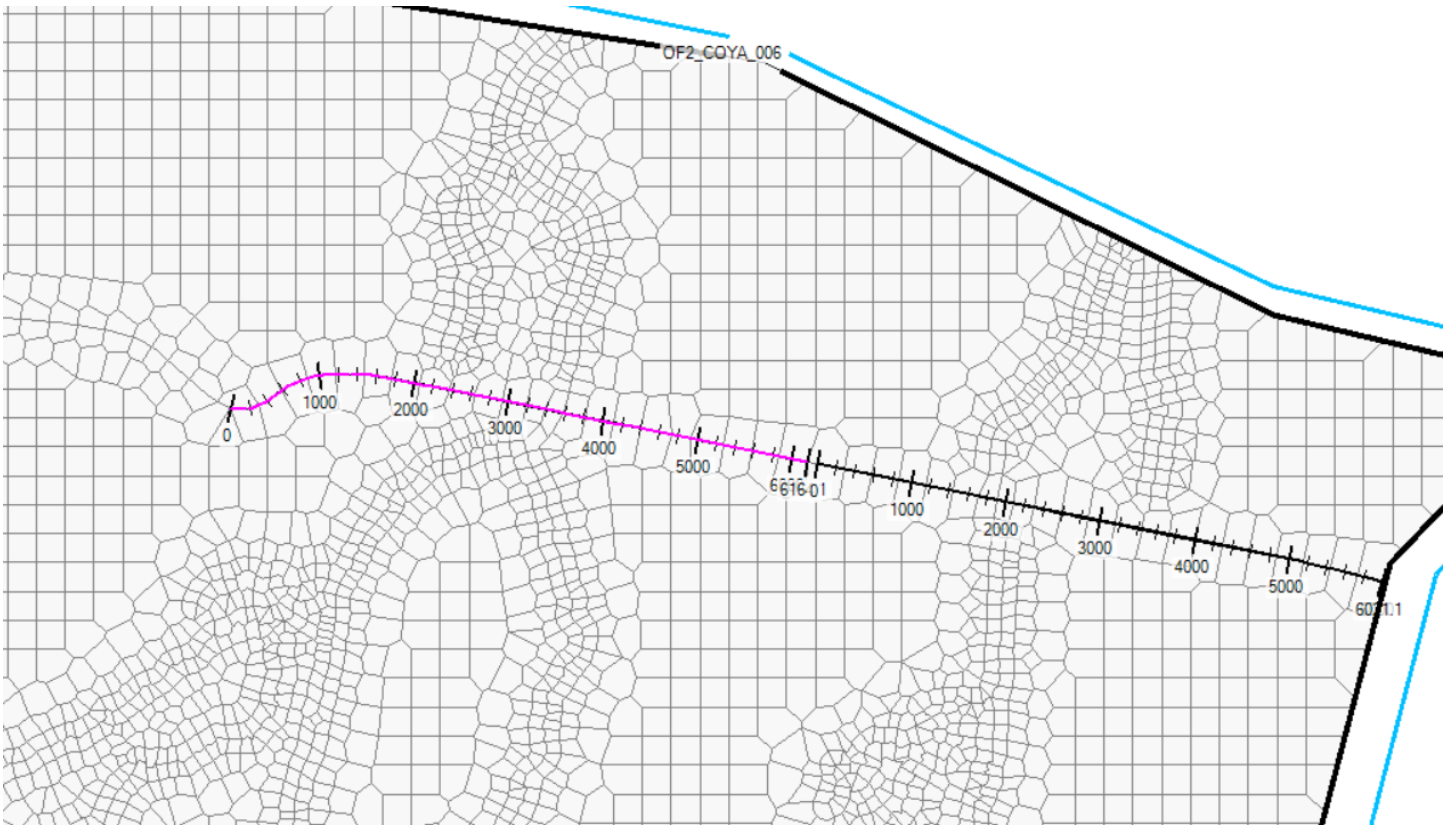

OF2_COYA_006

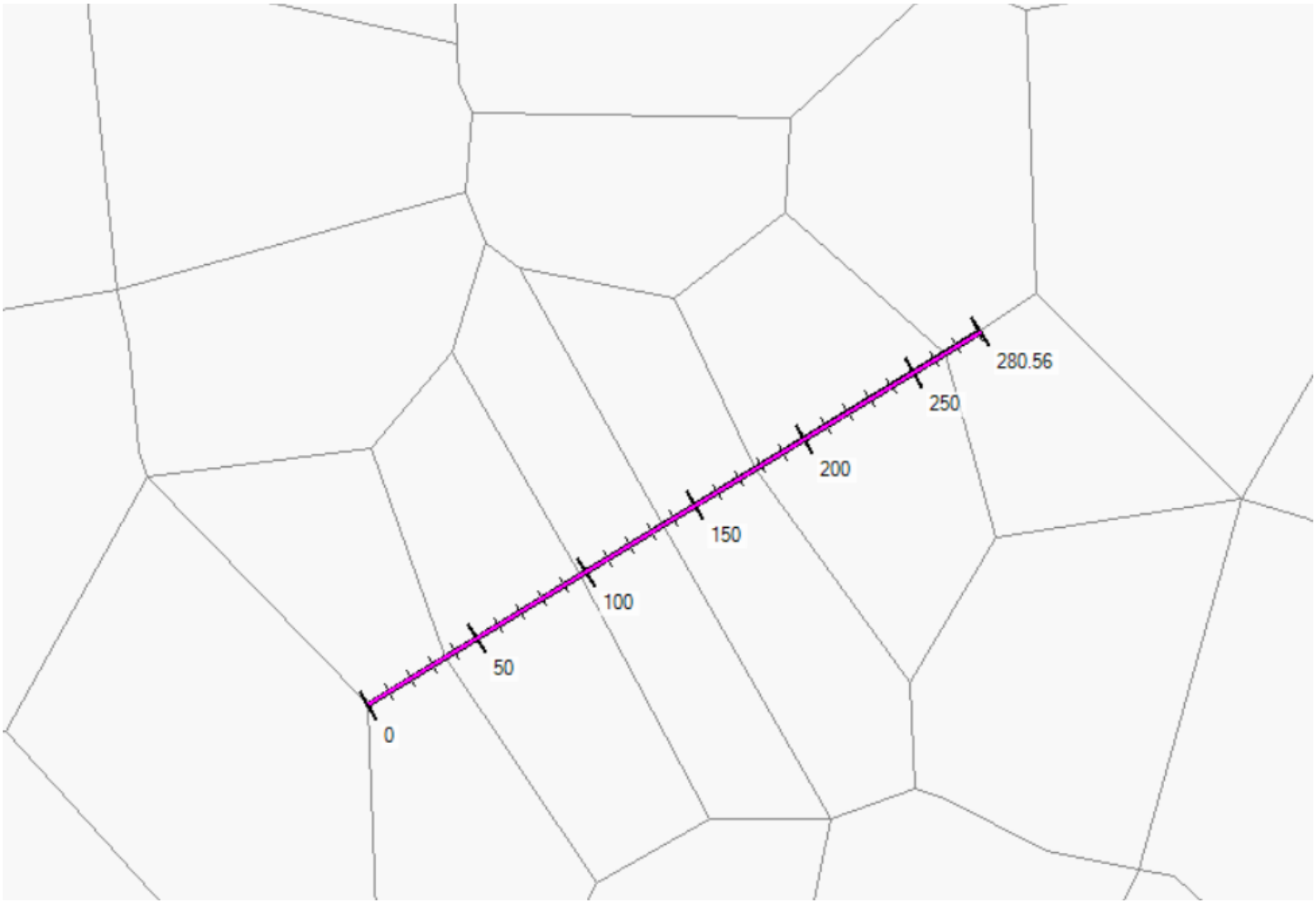


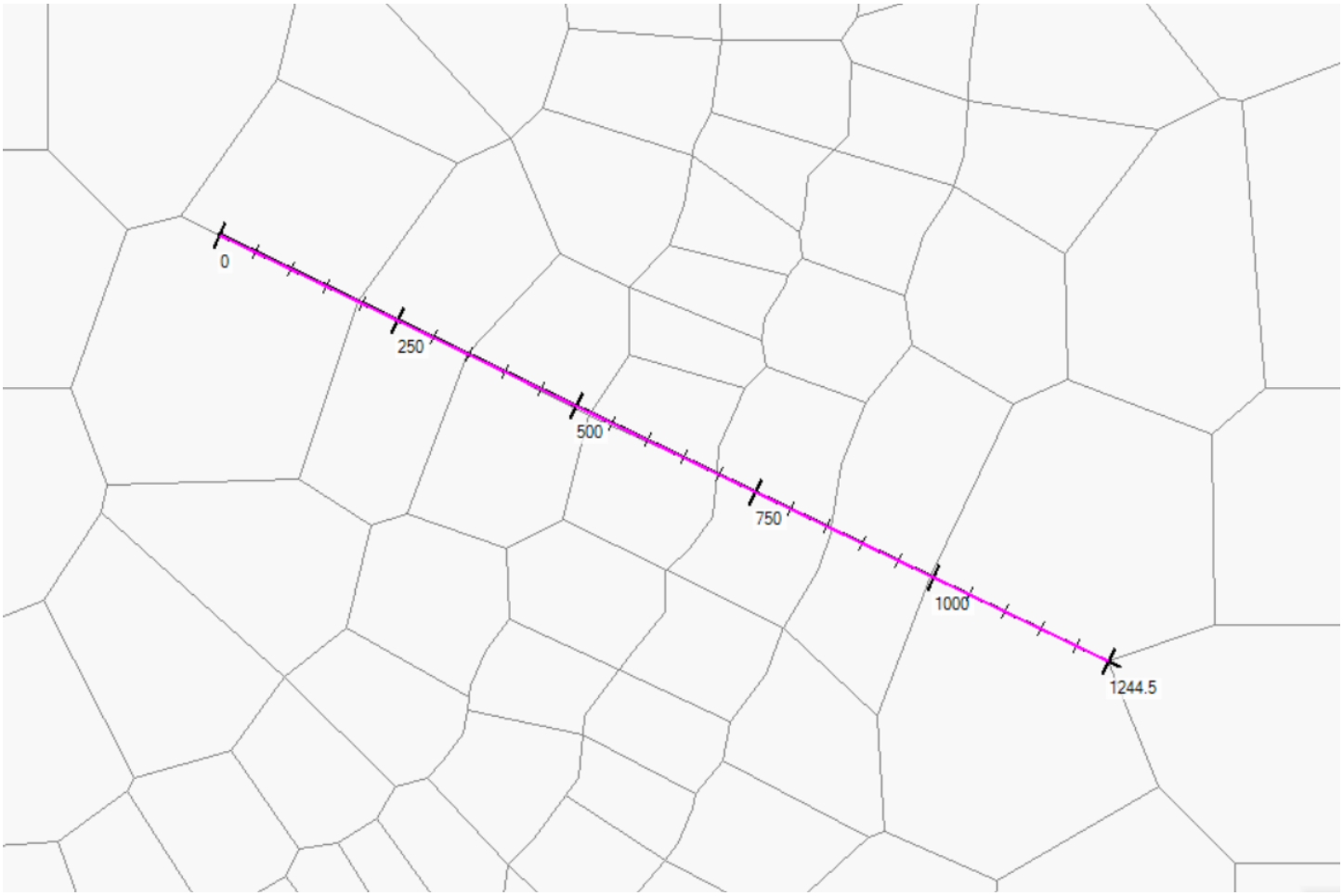

0
200
400
600
800
Station (ft)

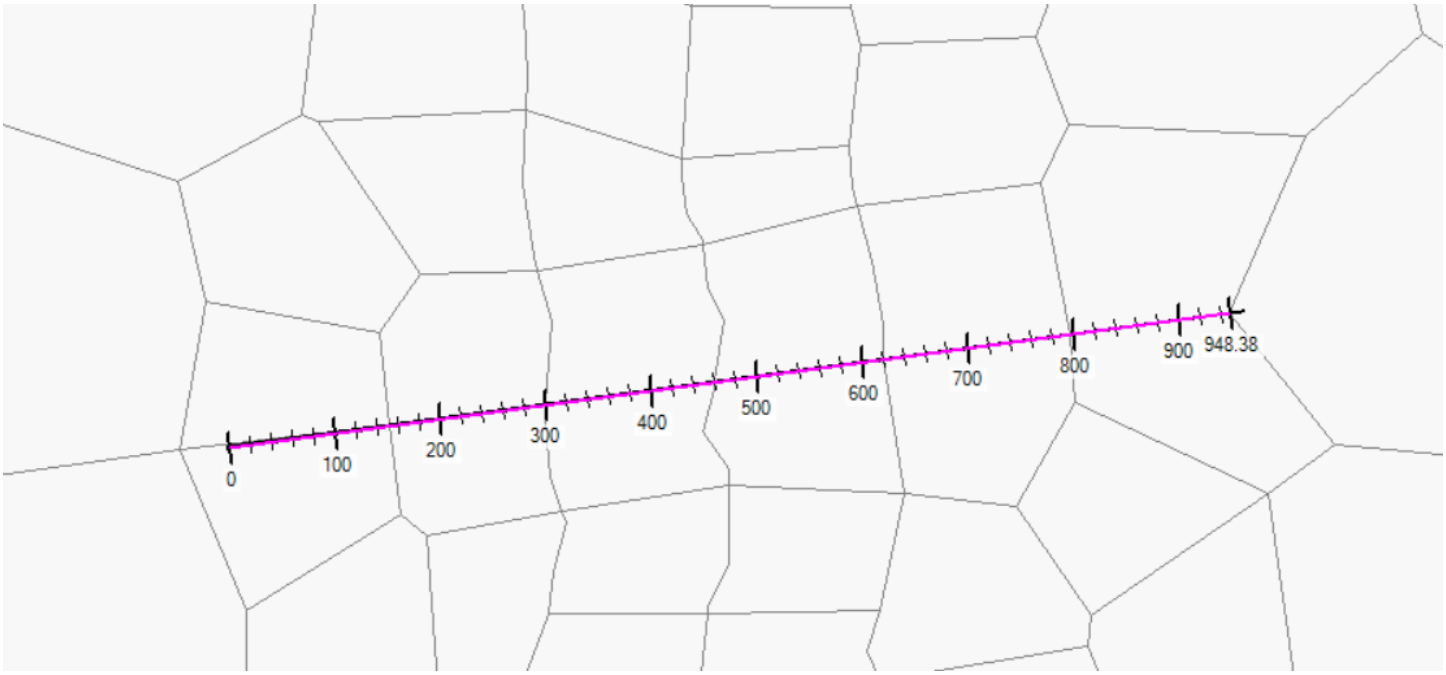

ValidationPT3

Watearth Response (08/05/2024): As discussed during 07/25 call, all Sa/2D connections enforced and checked for any blocked channels are not blocked. All SA2D connections are enforced so that the cell alignments are good. Please see snips below:

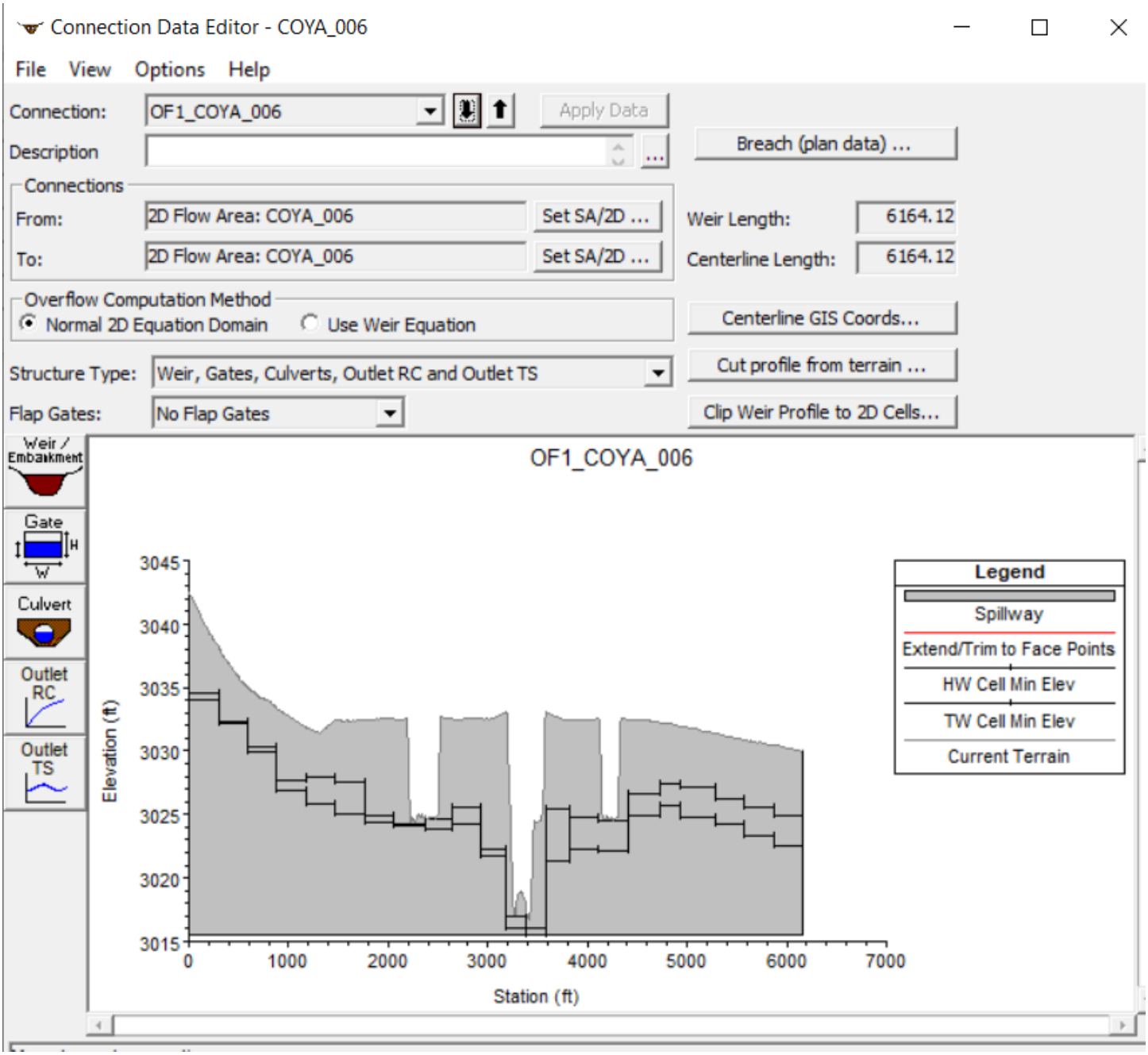



280.56
250
200
150
100
50
0


0
250
500
750
1000
1244.5


0
100
200
300
400
500
600
700
800
900
948.38


0
100
200
300
400
500
551.05



AECOM Response (8/27/2024): PASS

10. The table for this section doesn't have the right reference spreadsheet for Manning's n or the right landcover source.

Watearth Response (08/05/2024): The Manning's n values are defined per TWDB guidance. Updated note in methodologies / data sources section.

AECOM Response (8/27/2024): PASS

4 – Hydraulic Boundary Conditions

Technical Review *(Reviewer to confirm with Pass/Fail)*

Boundary Review	
P	External boundaries connected to 2D mesh
P	Boundary conditions everywhere flow could build up at the boundary of the 2D mesh
P	Boundary conditions have a hydrograph or elevation/slope data assigned
N/A	Input hydrographs consistent with hydrologic data (DSS, manual entry)
P	Precipitation data is consistent with hydrologic data (DSS, manual entry)
P	Downstream boundary consistent with ground slope or known downstream WSEL
N/A	Flow hydrographs applied at appropriate locations
N/A	Energy grade slope for hydrograph distribution is reasonable
N/A	Internal rating curves appropriate and documented for control structures (if applicable)
	Modeling Tie-ins: Check for flow continuity between upstream/downstream model domains for all profiles (e.g. matching flow hydrographs)

Review Comments

Modeler to Check Box of Acknowledgement during Response to Comments:

✓	Acknowledge that review comments may be example comments and not a comprehensive of all required revisions. Consultant has reviewed provided comments and reviewed for applicability of comment throughout HUC-8.

1. I calculated the terrain slope near the BC6 line to be about 0.0036, not 0.002 which is currently being used. I suggest changing the slope to 0.0036.

Watearth Response (06/15/2024): The slopes are examined again and revised bases on actual terrain slope.
AECOM Response (7/25/2024): PASS

5 – Hydraulic Model Execution

Methodologies / Data Sources *(Modeler to populate)*

Unsteady Plan Names			
10% ACE (10-year):	10pct	0.2% ACE (500-year):	0.2pct
4% ACE (25-year):	4pct	1% plus:	1plu
2% ACE (50-year):	2pct	1% minus:	1min
1% ACE (100-year):	1pct		
Other:			

Statistical Data *(Modeler to populate)*

Time Step:	Advanced time step based on Courant condition (7.5-60 Seconds)				
Courant Value:	Min: 0.45	Max: 2	Simulation Length:	96	hours
Computation Interval:	30	seconds	Model Runtime:	4-6	hours
Hydrograph Output Interval:	10	minutes	Mapping Output Interval:	10	minutes

Technical Review *(Reviewer to confirm with Pass/Fail)*

Execution Review	
P	Appropriate 2D parameters are used (Boundary Conditions, Time Step, Simulation Length, etc.)
P	Hydrograph Output Interval and Mapping Output Interval set at a reasonable interval to capture peaks
P	Model runtime is reasonable (< 12 hours, but dependent upon model size)

Review Comments

Modeler to Check Box of Acknowledgement during Response to Comments:

✓	Acknowledge that review comments may be example comments and not a comprehensive of all required revisions. Consultant has reviewed provided comments and reviewed for applicability of comment throughout HUC-8.

1. See previous comment about BC6 in section 4.

Watearth Response (06/15/2024): The slopes are measured and used in the model.

AECOM Response (7/25/2024): PASS

2. Mapping output interval in the table above should be 10 minutes, not 60 minutes.

Watearth Response (08/05/2024): The mapping interval is changed to 10 min and confirmed that it is 10 min in the model.

AECOM Response (8/27/2024): PASS

6 – Hydraulic Model Results

Methodologies / Data Sources *(Modeler to populate)*

Flow Validation/Gage Analysis	
Software:	*N/A*
Methodology	Combination of gage analysis and Area-flow chart.
Removal of Outliers and Justification	*N/A*
Review of Appropriateness of Gage Analysis results: 1) Check if there is a control structure upstream build in period of record, 2) Is the period of record sufficient, 3) Are there any gaps in the period of record, 4) Q vs A plot included 5) Wide confidence bands relative to flows?	
Validation Notes (describe parameter adjustments): Refer to the Validation Memo under documentation folder of this submittal.	
Other:	

Technical Review *(Reviewer to confirm with Pass/Fail)*

Computation Checks	
P	Model runs with no cell errors
P	Volume balance is within tolerance (ΔV < 1% is ideal, however 2% to 3% can be acceptable for rain on mesh)
Results Spot Checks *Check at all critical structures, major confluences, a handful of headwater tributaries, downstream end, at benchmarks, and a handful of randomly selected locations.*	
~~F~~P	No visible spikes in WSEL visibly present with a single cell
~~F~~P	WSEL and depth grids appear reasonable (no artificial dips or spikes)
~~F~~P	Visual verification flooding is connected downstream for all significant contributing areas (> 64 acres)
~~F~~P	Velocity grids appear reasonable (no unusually high velocity areas or Courant values greater than 2)
P	No crossing profiles between all events
N/A	Inflow and outflow hydrograph timing is reasonable as compared to the peak
P	Spills into/from adjacent HUCs appropriately accounted for
P	WSEL tie-in between model domains and HUCs along major rivers/streams where inflows are applied
Results Full Checks	
P	Computational time step meets ideal Courant condition

P	Diffusion Wave: $\frac{V\Delta T}{\Delta X} \leq 2$ (Up to 5) (Results are unit-less)
P	Model simulation is long enough to pass the entire hydrograph through the model (minimum of 12 hours past the peak, preferably 24 hours)
P	Hydrographs at internal and external boundaries are smooth
P	Contributing areas are contained with 2D mesh or accounted for with inflow hydrographs
P	No flow trapped at 2D boundary
N/A	Visual verification mapping is reasonable compared to effective
Flow Verification	
P	Peak flow gage analysis performed on all gages in the watershed with sufficient data
P	All gages used have an appropriate period of record (10 to 20+ years)
P	All gages used have no extensive gaps in record which would impact the analysis
There is a gage with a gap in the record, but I don't think conditions for the gage changed significantly during the gap.	
P	Gage analysis results validated to other sources (Regression, USGS, etc.)
P	Results at applicable benchmarks justified (gages, HWMs, effective BFEs)
P	Peak discharges comparable to gages, effective/prior studies, regional regression equations

Review Comments

Modeler to Check Box of Acknowledgement during Response to Comments:

✓	Acknowledge that review comments may be example comments and not a comprehensive of all required revisions. Consultant has reviewed provided comments and reviewed for applicability of comment throughout HUC-8.

1. Extreme velocities in some locations (see QC shapefile for examples).

Watearth Response (06/05/2024): There are some high velocities in the steep Davis Mountains region of the model, but there are not higher than 15 ft/s, and are reasonable for this terrain. Please refer to Salt Draw BLE report for further explanation of challenges for the region.

AECOM Response (7/25/2024): There are velocities > 15 ft/s. Pending on final BLE report.
Watearth Response (08/05/2024): As discussed in the 07/25 call, revised BLE report will be submitted with M2 submittal and we will discuss high velocities as part of that update.
AECOM response (8/27/2024): Pass for Milestone 1. The final BLE report will be reviewed/checked during Milestone 2.
M2 AtkinsRéalis response (10/15/2024): In section 3.2 Challenges section of the BLE report we added discussion of high velocities, things we tried to resolve hot spots.
AECOM response (Oct. 2024): PASS

2. 2D connection for USGS gage 08435800 is in the wrong location.

Watearth Response (06/05/2024): The USGS Gage 08435800 is not inside the model domain. This gage is located about 8 miles downstream of the model. As there is only one gage inside the model domain with a small drainage area, USGS gage 08435800 is used to determine the validation of the outfall coming from this watershed model.

AECOM Response (7/25/2024): PASS

3. The model is missing a 2D connection for USGS gage 08435660. Also, this gage has peak flow data from water years 1971-1976 and from 2008-2020. There is no gage analysis documentation (PRT file) provided for this gage.

Watearth Response (06/05/2024): The gage analysis is added into this watershed model folder.

AECOM Response (7/25/2024): PASS
It was noted during review that the physical location of the gage, just downstream of Highway 118 (Texas Mountain Trl), is just over 2,000-ft upstream of the location of the 2D connection in the model. It is unlikely that the discrepancy should cause much issue with comparison of flows from the two locations (gage vs. model), so providing only as an FYI and for the team's use, as needed.

M2 AtkinsRéalis response (10/15/2024): It does make sense that the gage would likely be located at the Highway. However, during modeling we could not find gage location in imagery or in google street view at the highway crossing. So, we placed the SA/2D connection close to the USGS gage location in the shapefile, which was bit downstream. Also note that flow records at this gage were from 60's and 70's so the current gage location could have moved since then.

4. Besides the comparisons to gage data, the model should include about 5 more comparisons to InFRM and/or regression equation peak flow data. See section 2.4.1 of the TWDB BLE Guidelines.

Watearth Response (06/05/2024): There are other validation locations in the model where the results were checked using profile lines. 2D connections will be added to these locations for ease of examining the validation results.

AECOM Response (7/25/2024): Is there a spreadsheet that includes data about the flow/area chart data? I suggest using the regression equations for the area instead. https://pubs.usgs.gov/sir/2009/5087/pdf/sir2009-5087.pdf
Watearth Response (06/05/2024): This comment was discussed in the 07/25 call. The regression equations are not suitable for this study area, however detailed discussion of model validation using gage analysis and flow- area plots is included in Validation Memo. A copy of Validation Memo is included in the reporting and documentation folder of the M1 Backcheck submittal.
AECOM Response (8/27/2024): PASS

5. There are WSE cell errors in the simulations. They are relatively small, but the guidelines don't specify a certain acceptable threshold.

Watearth Response (06/05/2024): After revisions made to the model, if the WSE cell errors persist, Watearth will look further into removing these errors.

AECOM Response (7/25/2024): PASS. Reported WSE cell errors appear to be gone.

6. Tie-in between this model and the Pecos model is not within +/- 0.5 feet

Watearth Response (06/05/2024): The tie ins were not performed at the submission of this model. Since then, model perimeters are extended to facilitate smoother tie ins between neighboring watersheds.

AECOM Response (7/25/2024): PASS

7. Effective data exists in the area, but it is generally very old, so it makes some sense why the effective data differs from the data in this model.

Watearth Response (06/05/2024): Agree, the effective data is old, so is not expected to be similar.

AECOM Response (7/25/2024): PASS

8. WSEL and depth grids have abnormalities. (See QC shapefile for examples)

Watearth Response (06/05/2024): Please refer to Salt Draw BLE report by AtkinsRealis on their section on challenges during modeling which addresses the comment on depth abnormalities in the most upstream portion of the streams in Davis Mountains.

AECOM Response (7/25/2024): Pending on final BLE report.
Watearth Response (08/05/2024): This comment has been discussed as part of co-ordination calls and the BLE report will include discussion of this item. The BLE report will be submitted with M2 submittal.
AECOM Response (8/27/2024): Pass for Milestone 1. The final BLE report will be reviewed/checked as part of Milestone 2.
M2 AtkinsRéalis response (10/15/2024): In section 3.2 Challenges section of the BLE report we added discussion of excessive depths in mountainous areas and discontinuities along WTR_LN.
AECOM response (Oct. 2024): PASS

9. There are disconnects in flooding. (See QC shapefile for examples)

Watearth Response (08/05/2024): The discontinuous flood plain occurs in the western portion of the watershed where steep Davis Mountains are located. Some cells will be adjusted around this portion of the model to reduce the discontinuity. However, these are small steep streams and some discontinuity is difficult to avoid with a larger mesh size.

AECOM Response (7/25/2024): Pending on final BLE report.
AECOM Response (8/27/2024): Pass for Milestone 1. The final BLE report will be reviewed/checked as part of Milestone 2.

M2 AtkinsRéalis response (10/15/2024): In section 3.2 Challenges section of the BLE report we added discussion of excessive depths in mountainous areas and discontinuities along WTR_LN.
AECOM response (Oct. 2024): PASS

10. The 08435800 gage is in what I think is the list of gages used in the process of creating the regression equations (website below). This site also has a 1% peak flow for 08435800 of 21,232 cfs, which is reasonably close to the 1% estimate from your flood frequency analysis.
    https://pubs.usgs.gov/sir/2009/5087/Downloads/Appendix1_677trimmedQTs.txt

    Watearth Response (08/05/2024): The model has been validated using 08435800 gages, however, this gage is located in the Imperial model domain located downstream of Coyanosa Domain. Discussion of model validation is included in Validation memo.

AECOM Response (8/27/2024): PASS

11. Methodologies / Data Sources table in this section does not list the correct information.

Watearth Response (08/05/2024): Methodologies / Data Sources section updated. Refer to validation memo.

AECOM Response (8/27/2024): PASS

7 – M1.5 Minor Post Processed Grids

Review Comments – 8/28/2024

The comments below must be addressed, and revised M1.5 minor post processed grids resubmitted in order to allow TWDB to count Independence as "SMA":

- Depth Rasters – No comments - Noted.
- WSEL Rasters – No comments - Noted.

The notes below are for documentation and to potentially alert the production team to issue that may need to be addressed during Milestone 2 final BLE map production – they do NOT require response or revised submittal for this M1.5 process:

- Reviewer notes/confirmation:
  -M1 backcheck is complete and comments are closed out - Noted.
  -All files are present and viewable - Noted.
  -Please confirm during M2 production that inland threshold is used in processing final mapping. It was noted through use of an in house script that some areas smaller than approximately 0.33-acres exist in the minor post processed depth grids, however, there were few enough that its likely due to clipping. Please just be aware during final map production.

  M2 AtkinsRéalis response (10/15/2024): Inland mapping threshold metric was applied for this watershed. A readme file was submitted on 08/28/2024 following initial M1.5 mapping submittal package. All polygons smaller than 0.33 acres are due to data clean up: clipping, smoothing, etc.

  -Extents of 1% WSE and Depth grids align, and extents of 0.2% WSE and Depth grids align - Noted.
  Full mapping exists through entire HUC8 - Noted.

7 – Mapping Results

Technical Review *(Reviewer to confirm with Pass/Fail)*

Hydraulic Model	
F	HEC-RAS model with results, pertinent data and required storm events
Flood Risk Database	
F	All features fully populated per current FEMA guidelines
	All features aligned and clipped to USGS HUC-8 boundary including: -Mapping should extend through entire HUC-8 -No mapping beyond HUC-8 boundary
P	Mapping (FLD_HAZ_AR) consistent between depth and WSE grids to polygons for all three required mapped events. The depth grid, water surface elevation grid and floodplain polygon extents must match per FEMA requirements, including the filling of holes, spillways, lake/pooled areas.
F	Containment within Events: (10% floodplain contained within 1% and 0.2%)
	Centerline Containment within the 1% floodplain extents
P	Holes filled in polygon, depth and WSE grids: Holes Filled within the contiguous floodplain anything less than or equal to 2 acres in the 1- and 0.2% floodplain extents and anything less than or equal to 0.5 acres in the 10% floodplain extents. This should be clearly documented in the report.
	Tie-ins **Clarification:** Tie-Ins realted to WSEL must be within 0.5ft for the following scenarios: 1) with currently studied HUCs (within the Team), 2) 2D HUCs available on the EBFE viewer, 3) Model Domain Tie-Ins must be 0.5 feet for all reoccurrence intervals 4)FEMA requires water surface elevation tie-ins within 0.5 ft for the mapped event of 10%, 1% and 0.2%. If mapping tie ins cannot be achieved: 1)Adjacent study not completed, 2) Adjacent study completed in 1D, or 3) Adjacent study completed with different modeling and mapping methodology causing tie in achievement to be difficult 1) Need to add AOMI area as AOMI_TYP = NP and AOMI_INFO = Spill area. In need of further engineering analysis. Where complex mapping tie ins between domains/HUCs exist, prior coordination with TWDB at M1 is recommended. (Ex. Braided channels) **Please verify for Model Tie-Ins (Flow):** o Each event needs to achieve flow continuity at the SA/2D connection. (E.g. Flow hydrographs must match at SA 2D connection between model domains). o A SA/2D connection line may be used to obtain a flow hydrograph between two model domains. The flow hydrograph obtained from the SA/2D connection line should match the Inflow Hydrograph Boundary condition to the downstream model domain. **Please verify for Model/ Mapping Tie-Ins (WSEL):** o Mapping tie ins (WSEL, Depth) are required for all modeled events across the entire floodplain's width at one location in the model's overlap region. This is validated using a raster calculation between both models' WSEL grids. You must meet the WSEL tie in requirements and the SA/2D connection flow continuity between models.

	The WSEL tie ins requirement of ±0.5 ft. must be met in all model profiles (10, 25, 50, 100, and 500 yr.) and for 10, 100 and 500-yr for mapping products. Review of fringe mapping tie ins between study HUCs and other adjacent HUCs are within the ±0.5 ft. Both Model domains/HUC boundaries need to be in the ±0.5 ft.
	Waterbodies Added (Lakes/Ponding Areas/Reservoirs) Water bodies of lake and reservoir inundation areas of 20 acres or greater or named (NHD waterbodies dataset) should be merged into final floodplains (FLD_HAZ_AR) and water areas (WTR_AR).
P	Boundary interfaces align matching or identified as AOMI
	Centerline Containment (WTR_LN) within 1% floodplain extents
	Schema
F	Review that DTL_STUD_AR and DTL_STUD_LN to ensure coverage of the NFHL effective detailed studies.
	Reviewed that BFE feature values against the 1% annual chance event (ACE) water surface elevation (WSE) grid within +/- 1 foot

Review Comments

Modeler to Check Box of Acknowledgement during Response to Comments:

✓	Acknowledge that review comments may be example comments and not a comprehensive of all required revisions. Consultant has reviewed provided comments and reviewed for applicability of comment throughout HUC-8.

1. Please note that it doesn't appear that the most up-to-date version of this QAQC ITR checklist has been used in the submittal, please plan to transfer all information from this copy to the updated/correct version upon resubmittal of Milestone 2 for backcheck.

   Response 20250331: QC Document Updated

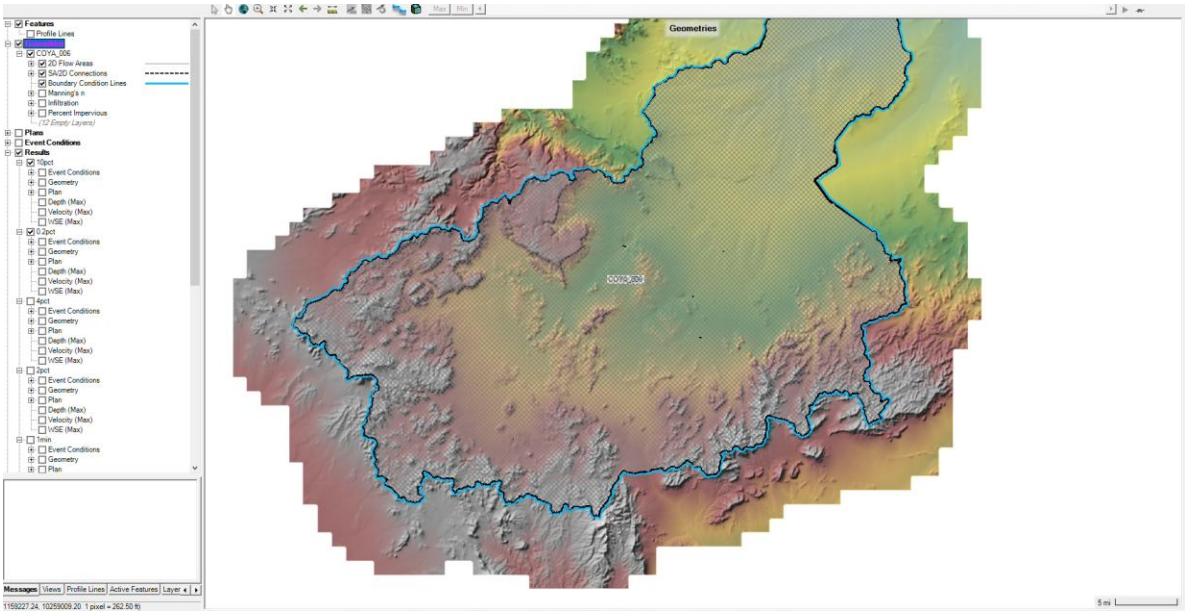
   Backcheck – Approved, EDS

2. The USGS084235660 2D connection should be renamed to USGS08435660 in the HEC-RAS geometry. This connection should also be renamed in the DSS file. This and note below likely no model/mapping result impact, but recommend cleaning up before final delivery to TWDB/USGS.

   Note: "Mesh not created" in RAS Mapper and the Geometry Data shows that there are 40 cells with more than 8 sides. I think this might be because of cells aligning to the perimeter of refinement regions in RAS Mapper, but not in the Geometry Data. This is likely not a problem.

   Response 20250331: Please open the model in RAS version 6.4.1. The model did not show any mesh errors when opened in 6.4.1. Please see screenshot below. As suggested in the comment the SA/2D connection was renamed to USGS08435660 in the model geometry and DSS. However in the results (.p.hdf) files previous name will appear as the model was not rerun.

   Backcheck – PASS, RP



3. Modeler initials and submittal date need to be filled in for Mapping Review section at the beginning of this document

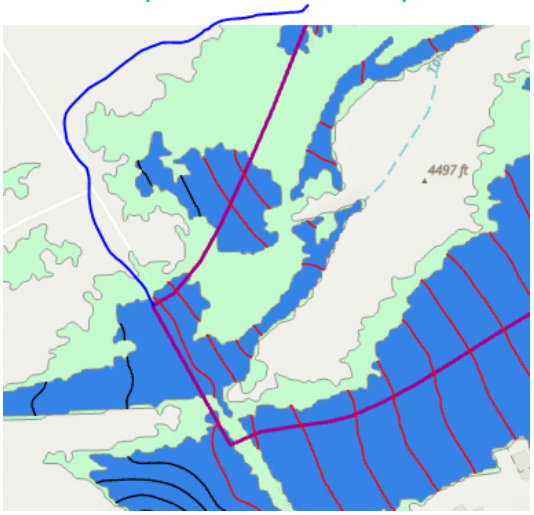
Mapping Review (QC Item 7) – not included i	
Modeler Initials:	
Submittal Date:	
Review Response Date:	

Response 20250331: Modelers initials updated

Backcheck – Approved, EDS

4. Adjustments should be made to the DTL_STUD_AR polygon. The polygon is meant to be bound the effective detailed study area polygons while also covering the floodplain boundaries from the BLE study that represents the flooding source. See bookmarks for an example and then review other locations. Blue line below is an example as well.

Response 20250331: Expanded DTL_STUD_AR to cover effective AE (and A#s), and BLE floodplains.



Backcheck – Approved, EDS

5. BFE_2D features should be split at the DTL_STUD_AR polygons and only those portions within the DTL_STUD_AR polygon should be shown as 'Not Mapped'.
   Response 20250331: BFEs split by DTL_STUD_AR, and multipart-to-singlepart, and unique ID renumbered.
   Backcheck – Approved, EDS

6. All feature classes VERSION_ID field should be named as 'BLE_MMYYYY' based on the submittal date (note this issue discussed with Atkins on follow-up Toyah call – okay to respond/address consistent with that discussion).
   Response 20250331: Agreed, no changes made.
   Backcheck – Approved, EDS

7. COM_NFO_ID should be populated with a unique value (often matches CID, but need something unique for the 48OTHR values.
   Response 20250331: Made it the CID values. For the OTHRs, added _1 and _2 to make them unique.
   Backcheck – Approved, EDS

8. DTL_STUD_LN should not be empty, line features should be in CNMS database, if not they'd need to be digitized.
   Response 20250331: DTL_STUD_LN s added
   Backcheck – Approved, EDS

9. DTL_STUD_AR – This should be exploded to be singlepart after consultation/confirmation.
   AtkinsRéalis response (05/23/2025): DTL_STUD_AR exploded to singlepart
   Backcheck: Pass, EDS

10. TENPCT_FP, V_DATUM and LEN_UNIT field should be empty or NULL
    Response 20250331: Updated relevant fields for these features.
    Backcheck – Approved, EDS

11. Confirm all NHD features greater than 20 ac are included in WTR_AR. No editing/modification of polys added to WTR_AR are expected or typical. Please reference the email sent from Sean Sutton at AECOM dated 2/17/25, as well as the previous emails from that thread, when assessing and responding to this comment, as it provides additional clarification on this topic.
    Response 20250331: 20 acres = 871,219 sqft. There are no features in the 'Missing Waterbodies' QC FC that are close to that value. Also no waterbodies from NHD with acreage >= 20 that are in Coyanosa.
    Backcheck – Approved, EDS

12. Please review BFE_2D_Testpoints provided. 25.1% of the test points fail. This is likely due to steep slope and cupping, but should be reviewed.
    Response 20250331: The testpoints were reviewed and all failed areas are related to steep slopes and cupping. As part of a review, additional thresholds were reviewed and the results are as follows:
    Total Points: 1,107,956
    Total above abs|1|: 133,459, 12.5%
    Total above abs|2|: 25,476, 2.3%
    Total above abs|5|: 1,299, 0.12%
    Total above abs|10|: 111, 0.01%
    Backcheck – Approved, EDS

13. Please see TEN_PCT_FP_Containment provided, one area from the 10pct looks like it needs to be removed.

Response 20250331: Deleted 1 polygon. Renumbered unique IDs.
Backcheck – Approved, EDS

14. The submittal checklist at the start of this document for M2 (section 7/section8) submittal is incomplete.
Response 20250331: Submittal checklist updated
Backcheck – Approved, EDS

8 – Completeness Review

Technical Review *(Reviewer to confirm with Pass/Fail)*

File Structure and Naming	
F	Deliverables provided in TWDB/FEMA required file folder structure and naming convention
P	Data missing (if any) documented in report and ReadMe file within the required folder
Report	
P	Technical 2D BLE report documents all assumptions, special considerations, etc.
P	Flow validation and difference discussed in report
P	Flow comparisons discussed in report
Hydrologic Model	
P	HEC-HMS model with results, pertinent data and required storm events
Hydraulic Model	
F	HEC-RAS model with results, pertinent data and required storm events
Flood Risk Database	
F	All features fully populated per current FEMA guidelines
CNMS	
F	Updated correctly with new centerlines
F	A1-A5 checks complete
F	CNMS Post- Processing Complete
HAZUS	
F	Run per FEMA guidance

Review Comments

Hazus

1. S_FRAC_Ar shouldn't be clipped by watershed. According to the Flood Risk Assessment Guidance, exported Hazus data should include any census blocks that intersect the watershed and should not be clipped.
Response 20250331: Recreated S_FRAC_AR without clipping.
Backcheck – Approved, EDS

2. Additionally, the census blocks that were considered inventory of the project footprint / watershed, but were not considered a loss, should have their loss populated as -8888 rather than 0.
Response 20250331: Recreated S_FRAC_AR and populated loss as -8888 rather than for census blocks that are part of the project footprint but not considered a loss.
Backcheck – Approved, EDS

File Structure and Naming

3. For the submittal, please make sure to follow the folder structure outlined in Section 2.5 of the TWDB BLE Guidelines.

   Response 20250331: submittal follows the folder structure outlined in Section 2.5

   Backcheck – the eBFE folder structure is different. Is there different a different folder structure for this type of submittal?

   Backcheck 2 – Approved, EDS

4. Modeler initials and submittal date need to be filled in for Completeness Review section at the beginning of the document

Completeness Review (QC Item 8) – not inclu

Modeler Initials:	
Submittal Date:	
Review Response Date:	

   Response 20250331: Agree. Section for QC Item 7 updated as requested. However, note that this checklist has been converted to the latest template and no longer has the section for QC Item 8.

Backcheck – Approved, EDS

Report

5. Several comments have been added to the report.

   Response 20250331: All comments in report have been addressed

   Backcheck – Approved comments I made, EDS

Flood Risk Database

6. See comments Section 7.

   Backcheck – Approved, EDS

CNMS

7. S_Studies_Ln is empty

   Response 20250331: Populated.

   Backcheck – Approved, EDS

8. Post processing is incomplete with the empty S_Studies_Ln

   Response 20250331: Populated.

   Backcheck – Approved, EDS

9. CNMS references/section incomplete in the report.

   Response 20250331: Report updated

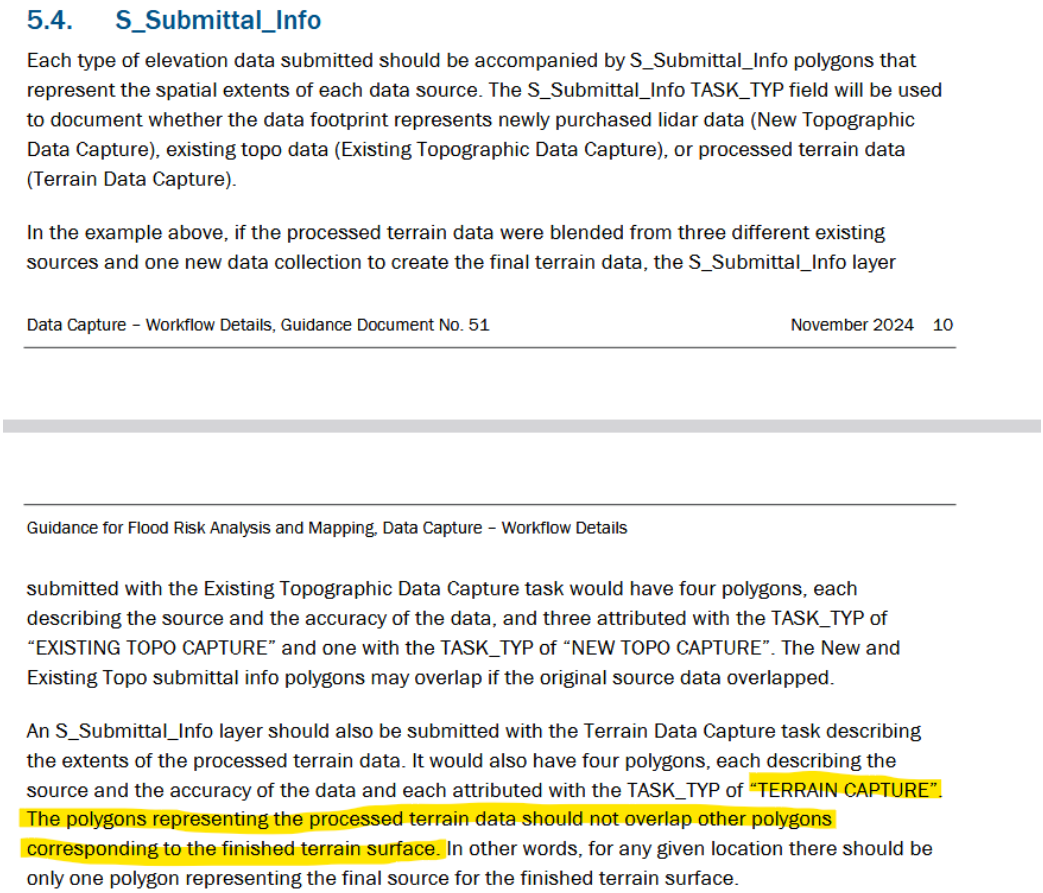
   Backcheck – Approved, EDS

Terrain

1. Source_Index does not fully cover all tiles delivered in 'Bare_Earth_DEM' raster. Please add necessary tiles to cover.
   AtkinsRéalis response (05/23/2025): Source_Index extended to cover 'Bare_Earth_DEM'
   Backcheck – Approved, EDS

2. S_Submittal_Info is much larger than the extents of the Source_Index and raster deliverable in 'Bare_Earth_DEM'. Please consider clipping to the revised Source_Index (see comment above)
   AtkinsRéalis response (05/23/2025): S_Submittal_Info clipped to Source_Index
   Backcheck – Approved, EDS

3. S_Submittal_Info should also follow FEMA Data Capture Guidance where TERRAIN CAPTURE tasks should not have overlapping polygons from different sources.



5.4. S_Submittal_Info

Each type of elevation data submitted should be accompanied by S_Submittal_Info polygons that represent the spatial extents of each data source. The S_Submittal_Info TASK_TYP field will be used to document whether the data footprint represents newly purchased lidar data (New Topographic Data Capture), existing topo data (Existing Topographic Data Capture), or processed terrain data (Terrain Data Capture).

In the example above, if the processed terrain data were blended from three different existing sources and one new data collection to create the final terrain data, the S_Submittal_Info layer

Data Capture – Workflow Details, Guidance Document No. 51 November 2024 10

Guidance for Flood Risk Analysis and Mapping, Data Capture – Workflow Details

submitted with the Existing Topographic Data Capture task would have four polygons, each describing the source and the accuracy of the data, and three attributed with the TASK_TYP of "EXISTING TOPO CAPTURE" and one with the TASK_TYP of "NEW TOPO CAPTURE". The New and Existing Topo submittal info polygons may overlap if the original source data overlapped.

An S_Submittal_Info layer should also be submitted with the Terrain Data Capture task describing the extents of the processed terrain data. It would also have four polygons, each describing the source and the accuracy of the data and each attributed with the TASK_TYP of "TERRAIN CAPTURE". The polygons representing the processed terrain data should not overlap other polygons corresponding to the finished terrain surface. In other words, for any given location there should be only one polygon representing the final source for the finished terrain surface.

   AtkinsRéalis response (05/23/2025): Overlap removed
   Backcheck – Approved, EDS

4. Remove the TX_WestTexas_2018_D19_Lidar_Mapping_report.pdf file from the Spatial_Files folder. It's already submitted properly in the Task_Documentation\Source folder.
   AtkinsRéalis response (05/23/2025): report removed
   Backcheck – Approved, EDS

5. Metadata comments
   a. The <pubdate> in the <citation> and <timeperd> sections should be set to the MIP Submission Date.
      AtkinsRéalis response (05/23/2025): Date Updated

Backcheck: Pass, EDS

b. Update bounding coordinates based on changes made in comments above about Source_Index and S_Submittal_Info
AtkinsRéalis response (05/23/2025): Bounding coordinates updated
Backcheck – Approved, EDS

c. <placekey> entries are missing some values. Please ensure the REGION, STATE, COUNTY, COUNTY-FIPS, COMMUNITY, FEMA-CID and HUC8 code is entered for each community in the purchase geography.
AtkinsRéalis response (05/23/2025): Updated
Backcheck: Pass, EDS

d. Replace miphelp@riskmapcds.com in all locations with updated MIPHelp address of fema-riskmap-ithelp@fema.dhs.gov
AtkinsRéalis response (05/23/2025): Email updated
Backcheck – Approved, EDS

e. <srccontr> text should be input in the CONTRIB field in L_Source_Cit for each TOPO#
AtkinsRéalis response (05/23/2025): Updated
Backcheck: Pass, EDS

f. In the <eainfo> section, an entry should be added for the Source_Index deliverable
AtkinsRéalis response (05/23/2025): Updated
Backcheck: Pass, EDS

QA/QC Checklist Approval

This 2D Base Level Engineering Analysis QA/QC Review is in compliance with the contract requirements and all task checkpoints are complete. The independent QC Team has reviewed the analysis, presented review comments to the Production Team Task Leader, and discussed any problems or issues. The Task Leader, QC Manager, QC Reviewer, and Project Manager have signed the QA/QC Checklist to confirm that all comments have been received, addressed, and documented appropriately.

QA/QC Team – AECOM		**Production Team – AtkinsRéalis**	
Rana, Samagra Digitally signed by Rana, Samagra DN: cn=Rana, Samagra, ou=USAUS2, email=Samagra.Rana@aecom.com Date: 2025.06.11 12:55:28 -07'00'		Rachel Kenney Forster Digitally signed by Rachel Kenney Forster DN: O=AtkinsRealis, CN=Rachel Kenney Forster, E=rachel.forster@atkinsrealis.com Reason: I agree to specified parts of this document Location: Date: 2025.06.18 11:46:37-05'00' Foxit PDF Editor Version: 13.1.6	
Samagra Rana	6/11/2025		
QC Manager	Date	Task Lead	Date
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QC Reviewer	Date	Project Manager	Date