

MEETING SUMMARY



To: Project File

From: Joanna Rocco
AECOM

Date: June 23, 2017

RE: I-2513 Working Group Meeting #8
NCDOT STIP Project I-2513 (I-26 Connector)

Meeting Attendees:

Michael Dawson – FHWA
Bruce Emory – City of Asheville
Julie Mayfield – City of Asheville
Ken Putnam – City of Asheville
Gwen Wisler – City of Asheville
Alan McGuinn – Asheville Design Center
Tristan Winkler – FBRMPO
Lyuba Zuyeva – FBRMPO
Alice Oglesby – AAC
DeWayne Barton – Burton Street Community

Rick Tipton – NCDOT Division 13
Cole Hood – NCDOT Division 13
Kristina Solberg – NCDOT Division 13
Michael Wray – NCDOT PDEA
Peter Trencansky – Patriot Transportation
Engineering
Neil Dean – AECOM
Celia Foushee – AECOM
Joanna Rocco – AECOM
Chris Werner – AECOM

The project team met with the I-2513 Working Group at 9:00 AM May 26, 2017 in the Land of Sky Regional Council conference room in Asheville, NC. The purpose of the meeting was to discuss the status of the community small group meetings, the status of the traffic operations analysis and preliminary design refinements, the schedule of the Final EIS, action items from the previous Working Group meeting held on February 20, 2017, review the base year calibrated model for the I-2513 traffic microsimulation, review the betterment requests from the City, review the outcomes of the Hillcrest and Fairfax/Virginia small group meetings held in March, review conceptual configurations for Brevard Road, Amboy Road, and Haywood Road, and discuss topics for the next Working Group meeting.

This Working Group meeting was opened to the public. Members of the public are not included in the above meeting attendees list; however are shown on the attached sign-in sheet.

Project Status Update

- Michael Wray and Joanna Rocco gave an update on the status of the small group meetings.
 - The Hillcrest meeting took place on March 21, 2017, and the main topics of discussion included access changes to the Hillcrest community and traffic noise impacts that may result of the project. NCDOT provided attendees an audible demonstration on how traffic noise impacts to their community may be perceived and the process of soliciting input on their preference of noise walls.

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- The project team will meet with the East West Asheville Neighborhood Association (EWANA) community on June 5th and the West Asheville Business Association (WABA) on June 6th.
- Chris Werner provided an update on the traffic operations analysis and preliminary design refinements. The project team met with the Federal Highway Administration (FHWA) on May 9, 2017, where the FHWA requested their headquarters office review the traffic forecast (previous and current), the peak hour volumes comparison from the two forecasts, the draft capacity analysis, the draft hot spot microsimulation, , and the draft conceptual design sketches.
- The revised date anticipated for the Final EIS will be established after comments have been received by FHWA on the items noted above.

Review Working Group Meeting #7 Action Items (Working Group)

- Ken Putnam noted coordination efforts for the City of Asheville to internally finalize the committee members and roles/responsibilities of the AAC are still pending; it is anticipated this information will be finalized within the next 30-60 days, and possibly presented at the next Working Group Meeting.

Review Working Group Meeting #7 Action Items (NCDOT)

- A noise and air representative from NCDOT was present at the March 21, 2017 Hillcrest community meeting as noted above.
- Peter Trencansky of Patriot Transportation Engineering, subconsultant to AECOM, presented the methodology of preparing the base year calibrated model to be used in the project microsimulation. The presentation is attached and will be sent to the FBRMPO for posting on their website.
 - It was noted the project wide microsimulation will determine where there is excess capacity as well as where more capacity is needed.
 - **Aside:** It was questioned if NCDOT will be considering providing a new ramp in the northeast quadrant of the I-40 interchange at Smokey Park Highway. NCDOT responded that multiple concepts are being considered to refine the designs in this area, one of which includes providing this ramp.
 - **Aside:** It was questioned if an interstate can be signed for less than 50 miles per hour. NCDOT responded that according the *American Association of State Highway and Transportation Officials A Policy on Design Standards-Interstate Systems* (January 2005), Design Speed for mountainous or urban areas, the design speed shall be at least 50 miles per hour.
 - **Aside:** A member of the public inquired as to whether the microsimulation takes into account improvements proposed on adjacent roadways in the model. It was explained that the FBRMPO's travel demand model and the traffic forecast includes all of the surrounding roads and fiscally-constrained projects in the area; therefore, the FBRMPO takes the system-level improvements into account.
 - It was requested of the base year calibrated model presentation and corresponding report be made available to the FBRMPO so it may be posted on their website.

Betterments Discussion

Discussions followed regarding the City's betterment requests and the draft cost estimates the project team has prepared.

- The project team requested the City of Asheville determine which betterments they would like implemented into the project before designs are developed. Ken Putnam stated the City would review the latest spreadsheet of betterment costs in efforts to provide NCDOT input on betterments to be included in the design refinement process before Working Group #9.
- With regard to the betterment request along Patton Avenue (cycle track, sidewalks, greenway or multi-transportation path), Ken Putnam will coordinate to confirm this is the City's desire. It was suggested that the cycle track, sidewalks, and greenway could be replaced with a multi-transportation path along the south side of Patton Avenue from Florida Avenue to Clingman Avenue, which could provide the services the City has requested, but with a narrower footprint along Patton Avenue. It was suggested a multi-transportation path could also address the City's Greenway Committee request, which was provided to the project team via email on 2/21/2017.
- It was questioned why the potential benefits for the Burton Street Community were not a part of this discussion. NCDOT explained betterments discussed today are specific to the requests made by the City of Asheville, throughout the project study area. Additionally, it was explained that although the Preferred Alternative is anticipated to benefit the Burton Street Community in the form of improved emergency response times, negative effects to the community would include recurring impacts to community cohesion, the physical aspects of the project, the potential difficulties associated with finding replacement housing within financial means, as well as anticipated effects to the visual environment within the community. In addition to input provided by the Burton Street Community as to how the project team might further refining the designs to lessen the impacts to the community, NCDOT is also interested in receiving input from the community as to what additional transportation improvements might be made in the Burton Street Community to offset or lessen the burden of the overall project impacts. As such, NCDOT has hired a specialized firm to work with the Burton Street Community, in order to help facilitate this discussion. Results of this coordination will be included in future documentation of the project and will also be coordinated with the City of Asheville.

Fairfax Avenue/Virginia Avenue, Brevard Road, Amboy Road

Chris Werner reviewed the discussion that took place at the March 21st Fairfax Avenue/Virginia Avenue small group meeting and reviewed the concepts at Brevard Road and Amboy Road that were developed as a result of public feedback at that meeting. The configuration concept of a split diamond with roundabouts at Amboy Road was presented to the working group (see attached). This configuration is a concept prepared by the project team in order to visualize the ideas identified by attendees of the small group meeting, which are consist with comments provided to the project team via the 2015 Public Hearing and on the 2015 DEIS. This configuration allows for less overall impact at this location as well as a greenway connection that doesn't require pedestrians to cross Amboy Road. It was noted this is at a conceptual stage only, and the project team would like to present this configuration to the residents of Fairfax Avenue/Virginia Avenue before refining the designs. Input from the City is also requested.

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Haywood Road

Chris Werner reviewed the various design concepts that have been developed for the Haywood Road interchange. The original concept on the 2015 Public Hearing Map was a Tight Urban Diamond Interchange (TUDI), which included 5 foot wide sidewalks for pedestrians. The TUDI configuration did not include bike lanes as a part of the designs given the City of Asheville's plans designate Haywood Road as a sharrows facility, meaning the roadway is marked to indicate cyclists and motor vehicles would share the lane. Similar to the design refinement process discussed above from the Fairfax Avenue/Virginia Avenue small group meeting, the project team developed draft concepts in response to the City's and public's comments provided via the 2015 Public Hearing and on the 2015 DEIS. Draft concepts developed and discussed today included a Median U-Turn Diamond Interchange (MUDI), a roundabout interchange, and compressed roundabout interchange (see attached). General pros and cons of each concept were reviewed.

The project team will seek public input on these concepts before designs are refined further. Input from the City is also requested.

Aside: Alice Ogelsby noted WABA would likely have interest in reviewing this concept at the June 6th meeting as well.

Working Group #9 Date and Topics

The date of the next Working Group meeting is anticipated to take place in mid to late July. AECOM will send a poll to the working group members to determine the best day that works for attendees. Discussions at Working Group #9 will include an update on the FEIS schedule, betterment decisions from the City of Asheville, follow up from the EWANA and WABA small group meetings, follow-up from FHWA coordination, AAC finalization, and multimodal committee meeting discussion on the concepts discussed above.

Additional Discussion

Julie Mayfield inquired whether or not a tunnel under the French Broad River to eliminate the flyover bridges had ever been investigated. Chris Werner noted that there was a DEIS comment regarding a tunnel option in Section A, but NCDOT has not considering tunneling the project as a viable alternative. The initial response provide by NCDOT included general concern over the challenges associated with tunneling I-26, as well as the I-240 flyovers, under the French Broad River (FBR). Challenges for I-26 would include the vertical grades required to transition I-26 from a higher elevation at Patton Avenue (west side of the FBR) crossing Emma Road, underneath the FBR, crossing Riverside Drive, and then back up to tie into existing US 19/23/70 prior to Broadway. Similar concerns apply to tunneling the I-240 flyovers, include the vertical grades required to transition I-26 from a higher elevation at Patton Avenue (west side of the FBR) crossing Emma Road, underneath the FBR, crossing Riverside Drive, and then back up to US 19/23/70 near Hill Street and Atkinson Street. NCDOT noted that based on their experience, a tunnel could be five to six times the cost of the bridges. Chris Werner explained that he had recently worked on a 1.2 mile long project, which included a general feasibility assessment of a depressed facility (not a tunnel, yet similar) that estimated approximately \$100 million more in construction cost than a traditional alternative. Any requests to analyze this type of alternative further would need to be more specific, as

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determining the cost and feasibility of a tunnel option would be a large effort for a project of this magnitude.

Public Comment Period

It was requested if NCDOT could provide the percent local traffic versus through traffic for the current and future year scenarios. NCDOT noted this information can be prepared and provided at the next Working Group Meeting.

Action Items

- AECOM to send the FBRMPO a copy of the base year calibrated model presentation to post on their website.
- The City will review the latest spreadsheet of betterment costs in efforts to provide NCDOT input on betterments to be included in the design refinement process before Working Group #9.
- Ken Putnam noted it is anticipated the AAC committee members and roles/responsibilities will be finalized within the next 30-60 days, and possibly presented at the next Working Group Meeting.
- City of Asheville will review and provide comments on the draft concepts presented on Fairfax Avenue/Virginia Avenue, Amboy Road, Brevard Road, and Haywood Road upon presentation at the City's Multimodal Committee on June 28th.
- AECOM will provide the City with copies of the draft concepts prepared for Fairfax Avenue/Virginia Avenue, Amboy Road, Brevard Road, and Haywood Road.
- AECOM to send a poll to working group members to solicit preference on date for Working Group #9 in mid to late July.
- NCDOT will provide percent local traffic versus through traffic for the current and future year scenarios at the next Working Group Meeting
- NCDOT will determine next steps in soliciting feedback from public on design concepts at Amboy Road, Brevard Road, and Haywood Road.



STIP I-2513 I-26 Connector
WORKING GROUP #8 MEETING SIGN IN SHEET

May 26, 2017

NAME	AGENCY/ORGANIZATION	EMAIL
Celia Foushee	AECOM	celia.foushee@aecom.com
Joanna Rocco	AECOM	joanna.rocco@aecom.com
Jule McFarland	City of Asheville	jule.mcfarland@cityofasheville.com
Guwen Wisler	City of Asheville	guwenwisler@cityofasheville.com
Keri Puryear	COA	KPURYEAR@ASHVILLE.GOV
Bruce Emory	Asheville Multinodal Transport Center	emory22@charter.net
ALAN MCGUINN, FKA	ASHEVILLE DESIGN CENTER	alan.mcginn@acd-design.com
Lyuba Zuyeva	FERMPO	lyuba@landofsky.org
Michael Dawson	FHWA	michael.dawson@dot.gov
Cole Hood	NEDOT / Div. 13	chood@ncdot.gov
Kristina Solberg	NEDOT DIV. 13	Ksolberg@ncdot.gov
Rick Tipster	NEDOT DIV 13	Rtipster@ncdot.gov
Tristan Winkler	FERMPO	tristan@landofsky.org
ALAN ROSSITER	WEICHERT CONSULTANTS - UNIVERSITY	rossiter@maximuspropreres@gmail.com
SUZANNE BLOTTIS	MONITOR	sblottis@gmail.com
MARY TRAUER	DUAC	mary@mttrauer.net



STIP I-2513 I-26 Connector
WORKING GROUP #8 MEETING SIGN IN SHEET

May 26, 2017

NAME	AGENCY/ORGANIZATION	EMAIL
Paul Gray	Westford Neighborhood	paulgray@yahoo.com
Katherine Poteroff	Bluestone LLC	kathpoteroff@gmail.com
Reuben Moore	IMTEP for Bluestone <small>Engineer for</small>	reuben.moore@imtreasure-engineering.com
Bill Lalonde	DUSD	lalsin@vll@gmail.com
DeWayne Barton		
Alice Oglesby		

MEETING SUMMARY



To: Meeting Attendees

From: Joanna Rocco
AECOM

Date: July 13, 2017

RE: Gray Bat Survey Coordination Meeting
I-26 Connector Status Update
NCDOT STIP Project I-2513 (I-26 Connector)

Meeting Attendees:

Marella Buncick – US Fish and Wildlife Service (USFWS)
Katherine Caldwell – NC Wildlife Resources Commission (NCWRC)
Joey Weber – NCWRC
Mike Dawson – Federal Highway Administration (FHWA)
Cole Hood – NCDOT Division 13
Roger Bryan – NCDOT Division 13
Kathy Herring – NCDOT NES, Biological Surveys
Chris Manley – NCDOT NES, Biological Surveys
Heather Wallace, CALYX
Joanna Rocco – AECOM

A meeting was held on June 29, 2017 at the NCDOT District office at 11 Old Charlotte Highway in Asheville to discuss gray bat survey needs. Following introductions and a review of the meeting purpose, discussion began regarding the federally-listed gray bat in the project study area and what surveys would be needed for the I-26 Connector project. Main discussion items held during the meeting are listed below:

- A discussion was held regarding the timing of the completion of Section 7 consultation. It was noted the Section 7 consultation and the Biological Opinion (BO) must be completed before FHWA would sign the Record of Decision (ROD), which is currently scheduled for completion by the end of 2018.
- The current project schedule includes design refinements on the preferred alternative to be completed this fall, the FEIS in Spring 2018, and the ROD by the end of 2018. Sections C and B are currently scheduled for right of way acquisition in 2019. The project has the potential to be a Design Build project.
- Structure checks should occur this summer. The need for additional studies, such as radio telemetry and acoustics has yet to be determined.

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- A discussion was held regarding the research study to gather data related to the gray bat, in an effort to develop a Programmatic Consultation with USFWS for transportation projects in NCDOT Divisions 13 and 14, within the French Broad River basin.
 - It is anticipated this study would provide endangered species consultation/compliance for most projects and their effects on gray bats for the next five years. It was agreed a request for proposals (RFP) should be prepared as soon as possible with a 60-day turnaround from RFP to receipt of proposals. Kathy Herring will prepare a preliminary proposal for the group's review, and a meeting could be held late July/early August to determine next steps for the research study. In the meantime, data collection may begin for I-2513.
 - It is anticipated the product could aid in providing minimization measures that can be incorporated into multiple projects.
- It was agreed an additional meeting with the project team would be beneficial, potentially in October, to discuss the refined designs and data that's been collected so far to help focus 2018 survey areas.

Action Items

- Kathy Herring to prepare a preliminary RFP for the group's review.
- The project team to hold additional meeting to discuss preliminary RFP and purpose of research study in late July/early August.
- The project team to hold additional meeting in October to discuss refined designs and data collection results/next steps.
- NCDOT and CALYX to develop a bat survey plan in coordination with USFWS and WRC to begin various surveys.

MEETING SUMMARY



To: Project File

From: Celia Foushee
AECOM

Date: September 18, 2017

RE: I-2513 Working Group Meeting #9
NCDOT STIP Project I-2513 (I-26 Connector)

Meeting Attendees:

Michael Dawson – FHWA	Kristina Solberg – NCDOT Division 13
Bruce Emory – City of Asheville	Nick Scheuer – NCDOT Bike & Ped
Julie Mayfield – City of Asheville	Daniel Sellers – NCDOT TPB
Todd Okolichany – City of Asheville	Derrick Weaver – NCDOT
Ken Putnam – City of Asheville	Michael Wray – NCDOT
Gwen Wisler – City of Asheville	Neil Dean – AECOM
Lyuba Zuyeva – FBRMPO	Celia Foushee – AECOM
DeWayne Barton – Burton Street Community	Tom Hepler – AECOM
Rick Tipton – NCDOT Division 13	Joanna Rocco – AECOM
Cole Hood – NCDOT Division 13	Chris Werner – AECOM
Brendan Merithew – NCDOT Division 13	

The project team met with the I-2513 Working Group at 1:00 PM on July 27, 2017 in the Land of Sky Regional Council conference room in Asheville, NC. The purpose of the meeting was to discuss the status of the community small group meetings, the status of the traffic operations analysis and preliminary design refinements, on-going coordination efforts with FHWA, the schedule of the Final EIS, action items from the previous Working Group meeting held on May 26, 2017, review the betterment requests from the City, discuss the Haywood Road interchange concepts, review the elevations in Section B, and discuss topics for the next Working Group meeting.

This Working Group meeting was opened to the public. Members of the public are not included in the above meeting attendees list; however, they are shown on the attached sign-in sheet.

Project Status Update

- Michael Wray and Joanna Rocco gave an update on the status of the small group meetings.
 - The East West Asheville Neighborhood Association (EWANA) meeting took place on June 5, 2017 and the West Asheville Business Association (WABA) meeting was held on June 6, 2017. The purpose of the meetings were to provide the residents of the EWANA and WABA communities an opportunity to ask questions regarding the I-26 Connector Project, review the design concepts at Amboy Road, Brevard Road, and Haywood Road, and get feedback from the community on the impacts and benefits to their community from the

project. Several attendees expressed safety concerns for bicyclists and pedestrians for the roundabout and “oval-about” interchange options at Haywood Road.

- The project team will meet with the Fairfax Avenue/Virginia Avenue community on September 7, 2017. This will be the second meeting with the community.
- Neighborhood Solutions is now under contract with the Burton Street community to begin working with them to determine appropriate mitigation opportunities for the community. NCDOT will receive updates from Neighborhood Solutions and relay these updates to the Working Group.
- Chris Werner provided an update on the traffic operations analysis and preliminary design refinements. The Federal Highway Administration (FHWA) headquarters office reviewed the traffic forecast (previous and current), the peak hour volumes comparison from the two forecasts, the draft capacity analysis, the draft hot spot microsimulation, and the draft conceptual design sketches. Based on the information provided, FHWA is in agreement with the proposed interstate access concepts for route continuity and lane balancing. Once all traffic studies have been finalized, anticipated by September, the studies will be available and posted to the project and FBRMPO websites. It was also announced that based upon traffic and design analyses completed thus far, the collector/distributor roadways in Section C are no longer needed and six travel lanes are feasible in Section A. Auxiliary lanes may be provided where needed between entrance ramps and exit ramps.
- The current schedule is as follows:
 - Final EIS: summer 2018
 - Record of Decision: late winter 2018/early winter 2019
 - Sections C and B right of way and construction: 2020

Review Working Group Meeting #8 Action Items (Working Group)

- Ken Putnam provided an update regarding the City’s selection of betterments. City representatives met on June 7, 2017 and June 23, 2017 to review the betterments recommendations and costs provided by AECOM and provided the following comments:
 - Request for the additional one-foot berm width as the City’s preferred cross-section at all locations within the project limits where it can be accommodated.
 - Request for a cycle track along the Amboy Road corridor.
 - Request for a multi-use transportation path along the south side of Patton Avenue from Florida Avenue to the west side of the Jeff Bowen Bridges and a sidewalk along the north side of Patton Avenue.
 - Request for the multi-use transportation path along Patton Avenue be extended from the Jeff Bowen Bridges to Clingman Avenue.
- Ken Putnam noted coordination efforts for the City of Asheville to internally finalize the committee members and roles/responsibilities of the AAC are still pending; it is anticipated this information will be finalized within the next 30-60 days.
- Ken Putnam provided comments from the community on the draft concepts presented on Amboy Road, Brevard Road, and Haywood Road (see attached).

Review Working Group Meeting #8 Action Items (NCDOT)

- A copy of the base year calibrated model presentation from Working Group #7 has been posted to the French Broad River MPO website at the following link: http://fbrmpo.org/wp-content/uploads/2017/05/170525_FBRMPO_Board_I-2513_Microsimulation_Pres.pdf

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- Draft conceptual sketches of Amboy Road, Brevard Road, and Haywood Road were provided to NCDOT Division 13 and City staff on 5/30/2017.
- NCDOT was requested to provide the percent local traffic versus through traffic for the current and future year scenarios. NCDOT is currently compiling the data to present in a graphic. *Update: See attached memorandum.*

Betterments Discussion

Discussions followed regarding the City's betterment requests as presented during the review of action items list from Working Group #8.

- Regarding bicycle/pedestrian access to Carrier Park, the City requested a multi-use transportation path close to Amboy Road to access the park and also requested a connection from Shelburne Drive along the north side of Amboy Road.
- The City of Asheville requested to have a multi-use transportation path connecting Brevard Road and Amboy Road.
- The Working Group agreed the draft conceptual design at Amboy Road and Brevard Road is the preferred alternative design.
- It was noted the Amboy Road Bridge will need to be wide enough to accommodate for the future Amboy Road widening project.
- At Hanover Street, the Working Group still needs to discuss rerouting options for the buses.
- NCDOT and the City will continue to discuss the betterments requests outside of the Working Group forum.

Haywood Road

Chris Werner reviewed the various draft design concepts that have been developed for the Haywood Road interchange in response to the City's and public's comments provided via the 2015 Public Hearing, the 2015 DEIS, and the EWANA and WABA small group meetings. Draft concepts developed included a Median U-turn Diamond Interchange (MUDI), a roundabout interchange, and compressed roundabout interchange (or "oval-about"). It was noted public feedback on the roundabout interchange and compressed roundabout interchange was mostly negative due to bicycle and pedestrian safety concerns. Furthermore, the MUDI option is not feasible from a geometric design perspective. Based upon preliminary traffic analyses, the original Tight Urban Diamond Interchange (TUDI) design is successful in preventing traffic from queuing down ramps and onto I-26 through lanes. The compressed roundabout interchange results in traffic on ramps queuing onto I-26 during peak hours. It was noted, with both options, substantial traffic delays can be expected on Haywood Road; however, this also currently occurs and is present in the 2040 No-Build scenario. Based on current traffic analysis, the TUDI will be carried through as the recommended option in the Final EIS.

Section B Elevations

Chris Werner, Neil Dean, and Tom Hepler discussed the controlling points in Section B that require the elevations as currently designed. It was noted the design team has thoroughly investigated all conceivable horizontal and vertical alignment options which would result in lower elevations of the proposed facilities. After much study it is concluded that the only practical modifications to the hearing map alignments would consist of vertical alignment changes and then would result in small reductions of less than 10 feet

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in elevation. The exact elevations will not be determined until bridge structures have been designed, which would occur during the final design. Control points that were noted include the following:

- Patton Avenue is at its existing elevation with I-26 passing underneath in a cut.
- Grade on I-26, just north of Patton Avenue, is controlled by the tie from Ramp D (Patton Avenue to I-26 northbound/I-240 eastbound) whose elevation at the tie point is controlled by Patton Avenue elevations and maximum grade design criteria.
- At Hill Street, I-240 eastbound and westbound are controlled by the minimum horizontal curve minimum radius required for the design speed. A constructability issue also evolves around existing bridge over Patton Avenue, which needs to remain open until this leg of WB I-240 is in service. The ramp from Patton Avenue to I-240 westbound was studied as a partial diamond but it resulted in a similar impact to the Hill Street area and it does not function well. Moving the ramp closer to I-240 westbound would increase the skew angle and bridge length and shorten the weaving distance to US 19/23/70 below the minimum required for the traffic and design speed.
- Elevations of I-240 eastbound and westbound are controlled by the minimum clearances over Hill Street and subsequently under Atkinson Street followed by the tie to Patton Avenue. I-240 eastbound is also controlled by clearance over US 19/23/70 southbound which in turn must clear Hill Street. Hill Street is currently designed at its maximum grade in order to tie into Atkinson Street.
- The grade on I-240 westbound is controlled by the clearance required over I-26; which, as previously noted, is controlled by Ramp D (Patton Avenue to I-26 northbound/I-240 eastbound).
- I-240 westbound is at the minimum horizontal radius, therefore shifting it closer to I-240 eastbound would shorten the weaving distance between US 19/23/70 exit and Patton Avenue entrance.

Future Working Group Date and Topics

The date of the next Working Group meeting will be determined as project milestones are met. Discussions at Working Group #10 may include the final visualizations, the Traffic Microsimulation Results, AAC finalization, follow up from the Fairfax Avenue/Virginia Avenue small group meeting, and coordination effort updates by Neighborhood Solutions with the Burton Street community.

Additional Discussion

Chris Werner announced to the Working Group he will be leaving AECOM and will begin working with the North Carolina Department of Transportation as of July 28, 2017. Joanna Rocco will be the new point of contact as the project manager for AECOM.

Public Comment Period

Reuben Moore inquired as to whether a signature bridge was still being considered for the bridges/flyovers across the French Broad River. It was explained the focus will now be on the Jeff Bowen Bridges. Julie Mayfield noted the visualizations may help the AAC determine how they will desire the bridges to appear.

Action Items

- Ken Putnam noted it is anticipated the AAC committee members and roles/responsibilities will be finalized within the next 30-60 days, and possibly presented at the next Working Group Meeting.
- NCDOT will provide percent local traffic versus through traffic for the current and future year scenarios at the next Working Group Meeting. *Update: See attached memorandum.*
- NCDOT will post the Traffic Capacity Analysis on the FBRMPO's website once it has been reviewed and finalized.
- NCDOT will receive updates from Neighborhood Solutions and relay these updates to the Working Group.



STIP I-2513 I-26 Connector
WORKING GROUP #9 MEETING SIGN IN SHEET

July 27, 2017

NAME	AGENCY/ORGANIZATION	EMAIL
Celia Foushee	AECOM	celia.foushee@aecom.com
KEN PATTANAN	COA	KPATTANAN@ASH3MUSKLE.GOV
Bruce Emory	COA - Metropolitan Transportation Commission	emory22@charter.net
Julie Neffield	COA	julienefield@okpanval.com
Todd Okolichan	COA	toko@okcolichan.com
Guene Wisker	COA	guenewisker@okcouncil.com
Jas Crickston	Buncombe County	JAS.CRICKSTON@BUNCOMBECOUNTY.ORG
Rick Tipton	NCDOT	rtipton@ncdot.gov
Kristina Solberg	NCDOT	K1solberg@ncdot.gov
Cole Hood	NCDOT	chood@ncdot.gov
BRENDAN MERRITHEN	NCDOT	bwmerrithen@ncdot.gov
Lyuba Zuyeva	EREMPO	lyuba@landofsky.org
Michael Dawson	EMWA	michael.dawson@dot.gov
Daniel Sellers	NCDOT - TPB	dsellers1@ncdot.gov
Debra Ann Weston	Hood Huggers Intermodal	br@hoodhuggers.com
Nick Schenver	NCDOT Bike & Ped	



WORKING GROUP #9 MEETING SIGN IN SHEET

July 27, 2017

NAME	AGENCY/ORGANIZATION	EMAIL
Joanna Pocco	AECOM	
Neil Dean	AECOM	
Derrick Weaver	NCDOT	
Tom Hepler	AECOM	
Michael Wray	NCDOT	
Chris Werner	AECOM	
	SELC	
Reuben Moore	JMTE	reuben.moore@junteagveengineering.com
Bonnie Potest	Public	lasonnepotest@gmail.com



MEMORANDUM

To: Project File

From: Andrew Bell, PE, PTOE
AECOM

Date: August 31, 2017

RE: I-2513 I-26 Connector
Interstate Trips – Local vs Thru Traffic

At a project working group meeting held on May 26, 2017, a question was asked relating to the amount of local area traffic using the freeways in the Asheville area compared to the non-local traffic. In response to this request, a cursory analysis was performed using the Select Link tool in the French Broad River Travel Demand Model (FBRM) to estimate the percentage of local traffic using the area interstates and the percentage of through traffic. The FBRM utilizes data based on local land use plan inputs to project trips around the Asheville area roadway network. The current version of the FBRM (FBRTDM v2), which was the same version used for the current I-2513 Traffic Forecast, projects traffic to a future year of 2040, which is the future year selected for the I-2513 Project.

To help estimate the percentage of local trips on the area interstates, several representative locations were selected in and around Asheville:

- 1: I-40 – Between I-26 and US 19-23-74A (Smoky Park Highway)
- 2: US 19-23-70 – North of SR 1781 (Broadway)
- 3: I-26 – East of I-40
- 4: I-40 – East of I-240 (east of Asheville)
- 5: I-240 – Between SR 3556 (Amboy Road) and US 19-23 Business (Haywood Road)

For each of the selected sites, an analysis was performed to estimate the percentage of traffic heading to or coming from the main perimeter freeway corridors. These perimeter locations include:

- A: I-40 – Between I-26 and US 19-23-74A (Smoky Park Highway)
- B: I-26 – East of I-40
- C: US 19-23-70 – Between Hill Street and SR 1781 (Broadway)
- D: I-40 – East of I-240 (east of Asheville)

It is assumed for the sake of this analysis that trips passing through the representative analysis locations and the perimeter freeway locations are through trips. For some of the sites analyzed, the perimeter sites are either redundant or along the main route to and from downtown Asheville. For these scenarios, only the locations that would be reasonable destinations or origins for through trips were included in the calculations. In other words, locations that are identical to the representative location or are redundant were not included in the overall calculation of through trips. By removing the assumed through trips, the remainder of the trips were assumed to be trips originating or ending in the immediate Asheville area.

The results of the analysis are shown in the table and figures below. Percentages are shown, and are used to calculate Annual Average Daily Traffic (AADT).

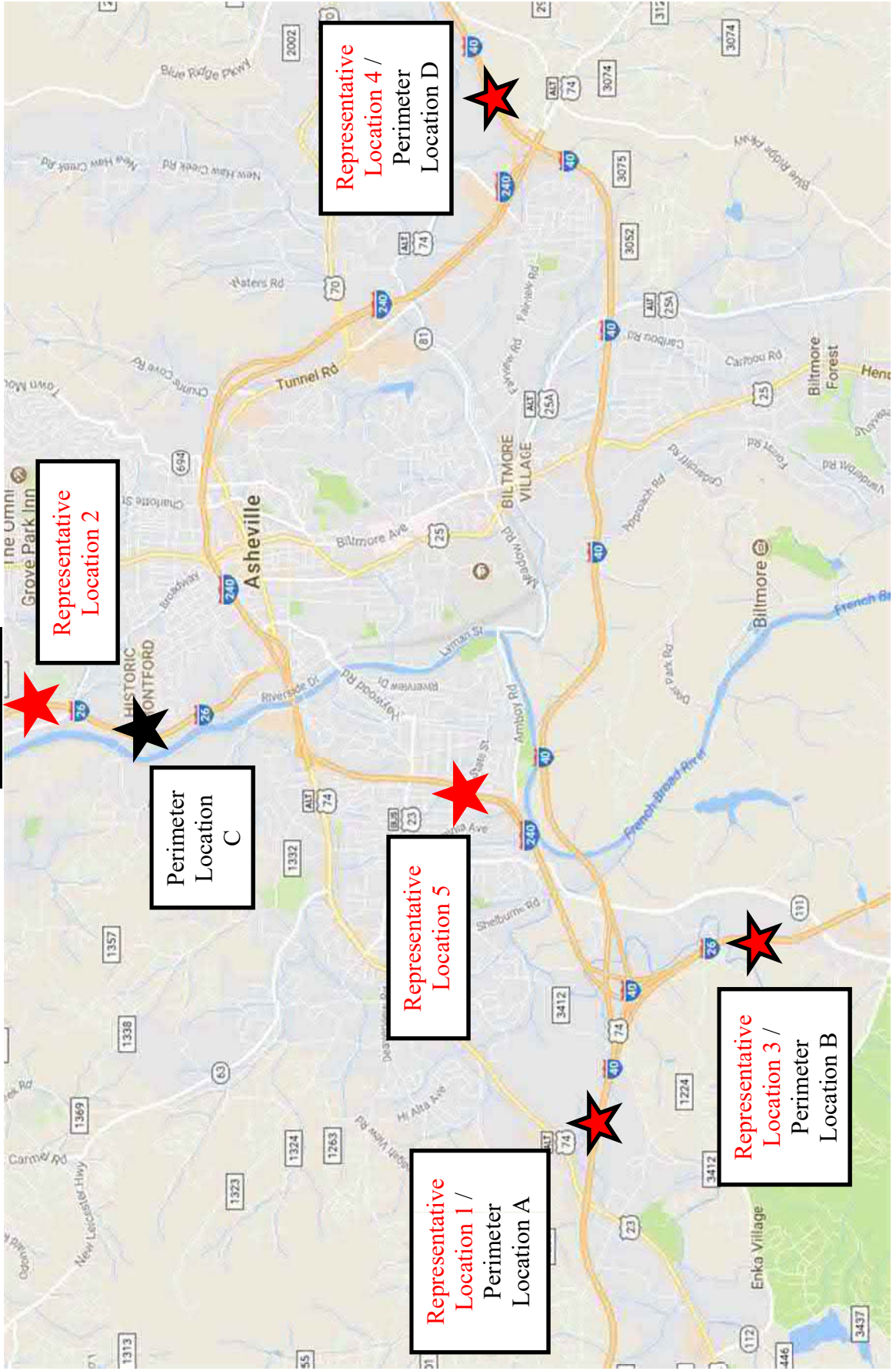
		Perimeter Locations					
		A	B	C	D	Total Through Trips	Assumed Local Trips
Representative Locations (2015 AADT)	1 (80,000)	N/A	30% (24,000)	8% (6,400)	15% (12,000)	53% (42,400)	47% (37,600)
	2 (59,000)	10% (5,900)	15% (8,850)	N/A	6% (3,540)	31% (18,290)	69% (40,710)
	3 (81,000)	38% (30,780)	N/A	15% (12,150)	1% (810)	54% (43,740)	46% (37,260)
	4 (61,000)	20% (12,200)	1% (610)	6% (3,660)	N/A	27% (16,470)	73% (44,530)
	5 (57,000)	38% (21,660)	50% (28,500)	29% (16,530)	0% (0)	26% (14,820)	74% (42,180)

- 1: I-40 – Between I-26 and US 19-23-74A
- 2: US 19-23-70 – North of SR 1781
- 3: I-26 – East of I-40
- 4: I-40 – East of I-240
- 5: I-240 – Between SR 3556 and US 19-23 Business

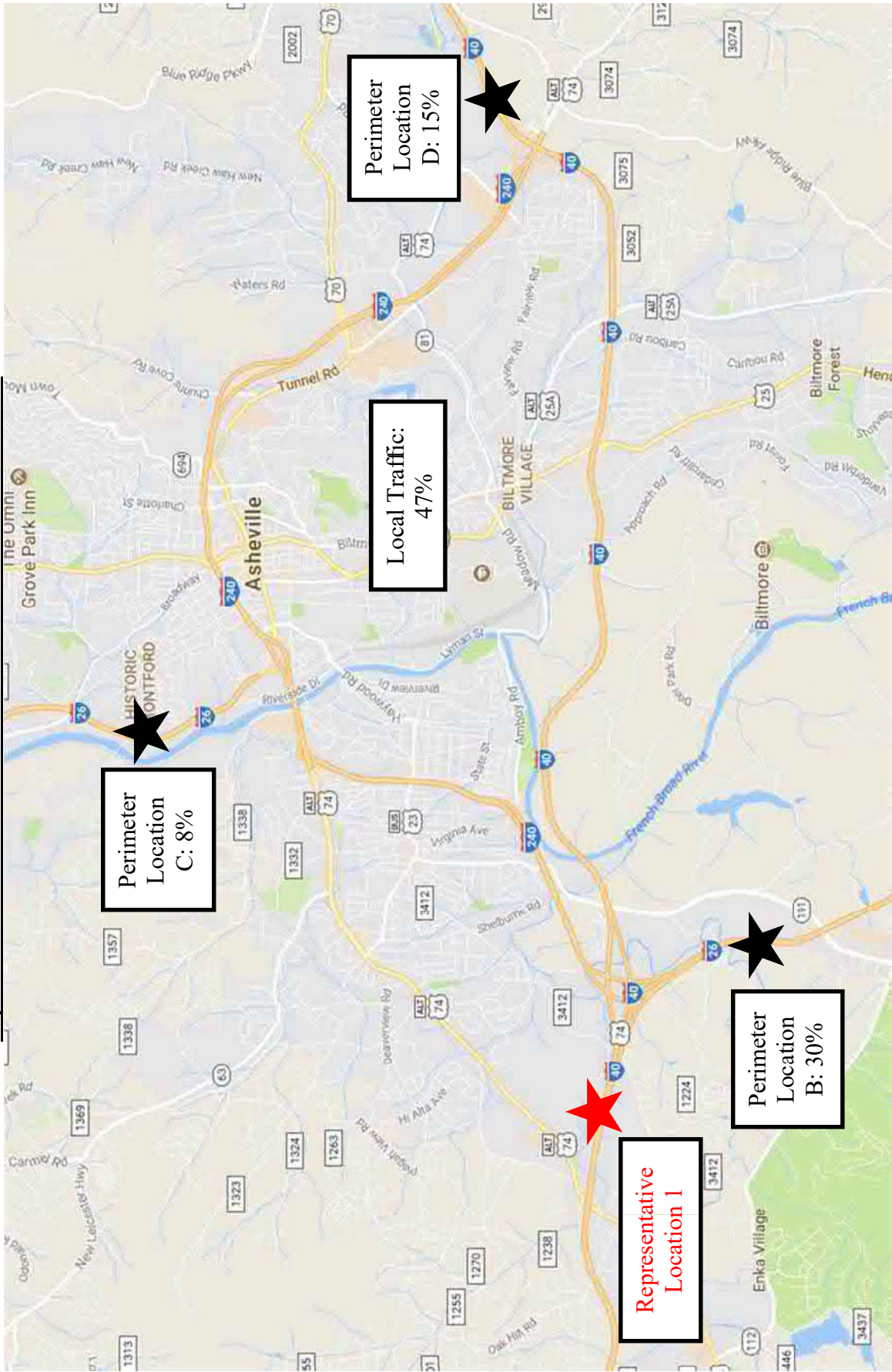
- A: I-40 – Between I-26 and US 19-23-74A
- B: I-26 – East of I-40
- C: US 19-23-70 – Between Hill Street and SR 1781
- D: I-40 – East of I-240

AADT information obtained from NCDOT Traffic Volume Map:
<http://ncdot.maps.arcgis.com/apps/webappviewer/index.html?id=5f6fe58c1d90482ab9107ccc03026280>

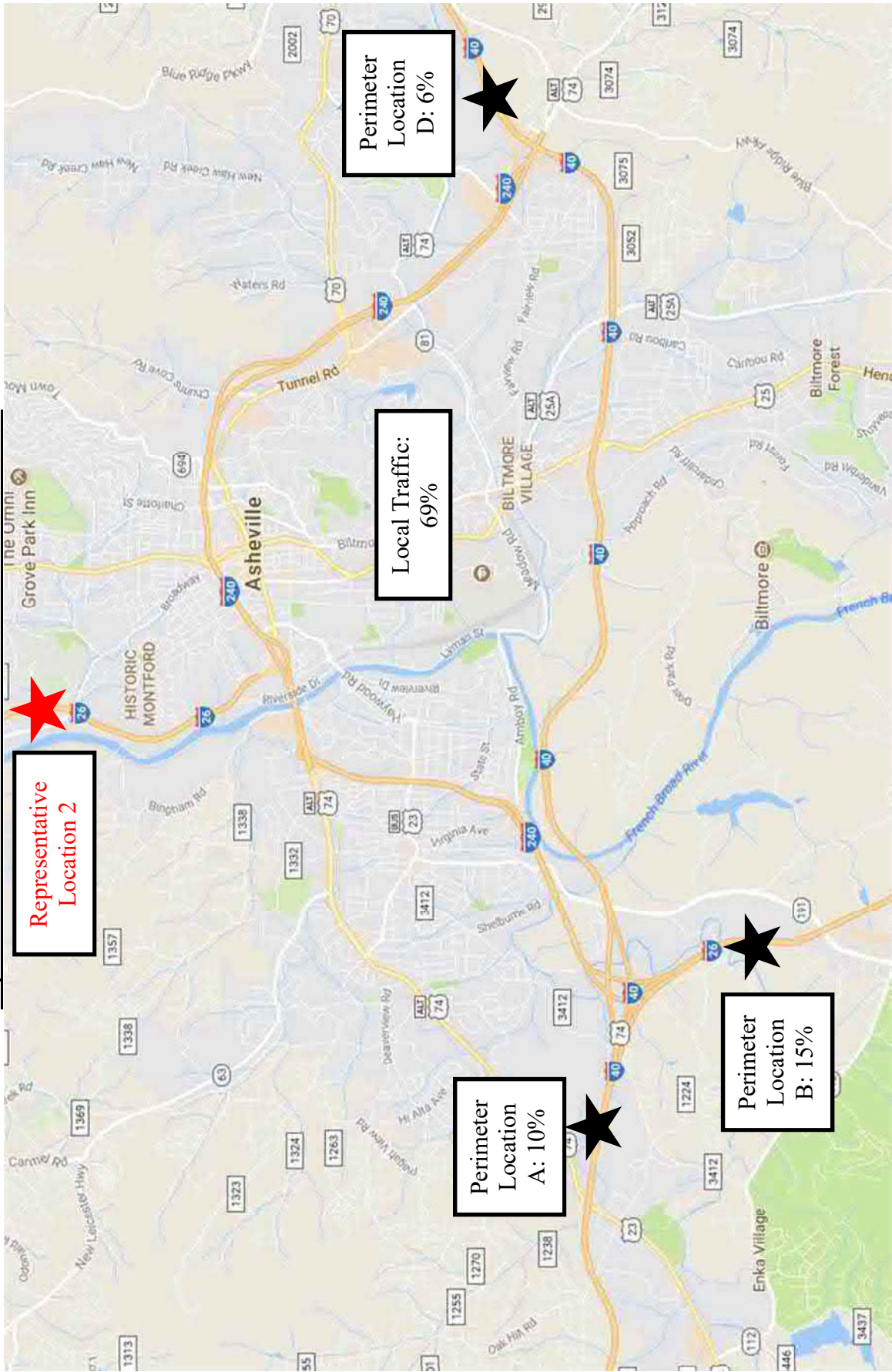
Study Overview



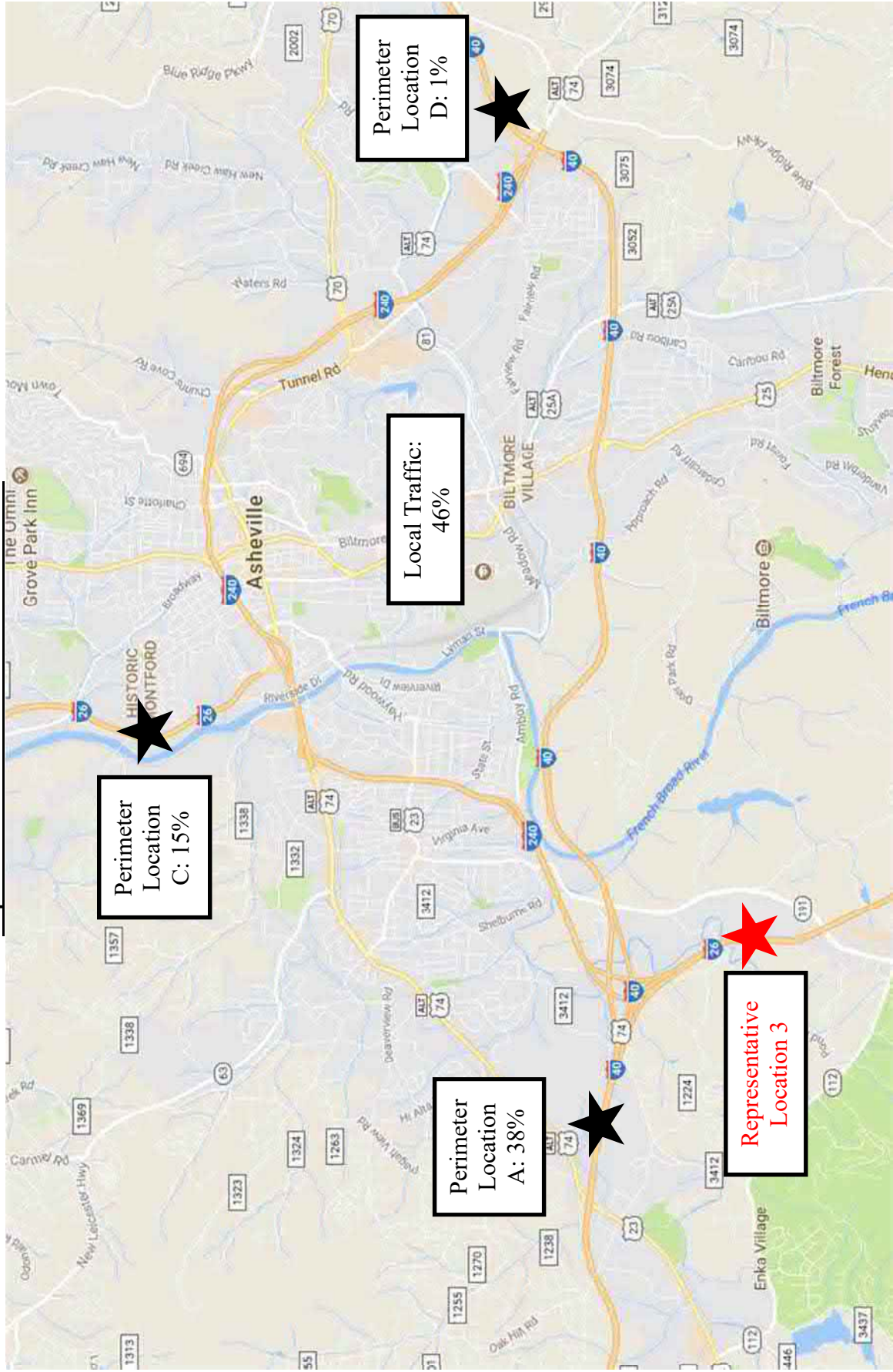
Representative Location 1: I-40 – between I-26 and US 19-23-74A



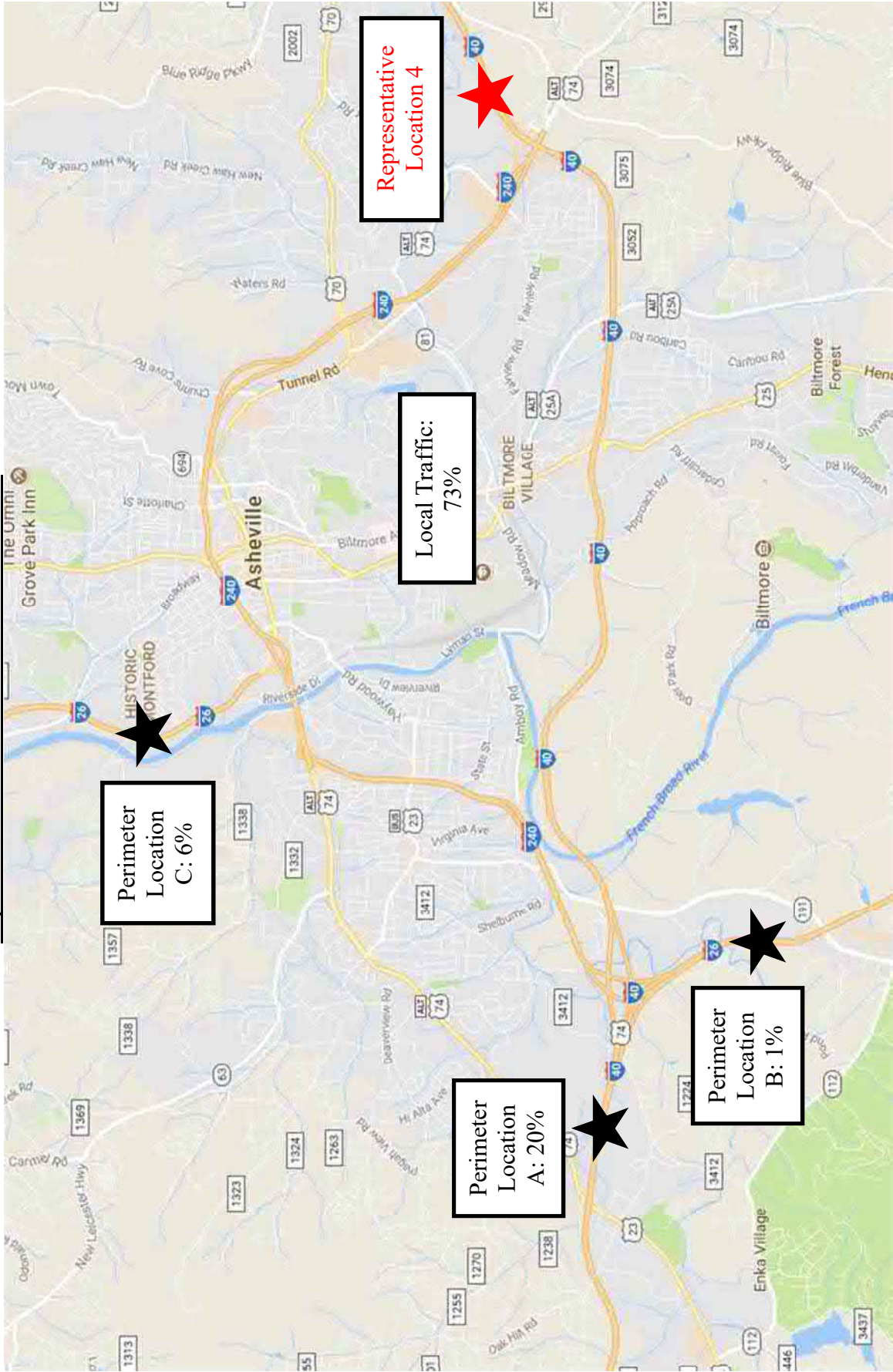
Representative Location 2: US 19-23-70 – North of SR 1781



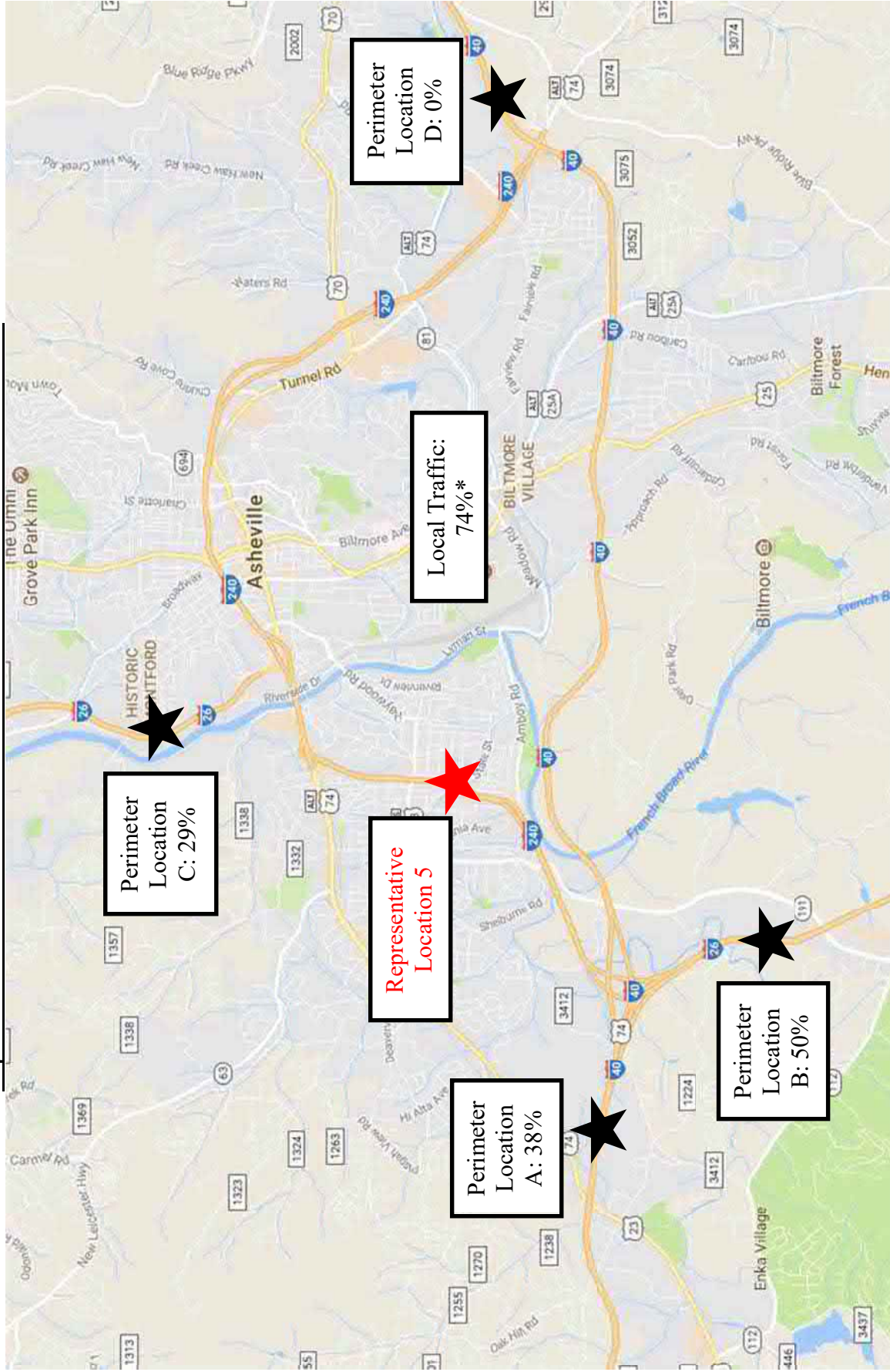
Representative Location 3: I-26 – East of I-40



Representative Location 4: I-40 – East of I-240



Representative Location 5: I-240 – Between SR 3556 and US 19-23 Business



* Based on remainder of trips not passing through US 19-23-70 (29%) and US 19-23-74A/I-26 (88%). See below.

Since Representative Analysis Location 5 is internal, a different methodology was used to calculate the estimated local traffic. It was assumed that non-local traffic would be required to travel through either Perimeter Location A or B as well as Perimeter Location C (no volume travels between Representative Analysis Location 5 and Perimeter Location D). Since travel to Perimeter Locations A and B make up 88% of the traffic, and travel to Perimeter Location C makes up 29% of the traffic, it is assumed that 29% of this 88% would travel between Perimeter Locations A and B and Perimeter Location C. Therefore, multiplying both factors together calculates to approximately 26% of the trips as non-local trips.

Representative Location 5 (I-240 – Between SR 3556 and US 19-23 Business) services the highest percentage of assumed local trips with 74%. Representative Location 3 (I-26 – East of I-40) services the highest percentage of assumed through trips with 54%. All representative locations service between 46% and 74% of local trips and between 26% and 54% of through trips.

It should be noted that this analysis is intended to be a cursory analysis only, and is not based on any exhaustive research or detailed traffic modeling. Only freeway locations have been considered in this study, and the inclusion of non-freeway arterials in the area could affect the results. In order to obtain more detailed information, a more in-depth analysis would be required, such as a vehicle-based origin-destination analysis.

Meeting Summary

To: Meeting Attendees
From: Kathy Herring
NCDOT-Biological Surveys Group
Date: August 8, 2017
RE: Gray Bat Research RFP Meeting
Meeting Attendees:

Marella Buncick – US Fish and Wildlife Service (USFWS)
Susan Cameron - USFWS
Katherine Caldwell – NC Wildlife Resources Commission (NCWRC)
Cole Hood – NCDOT Division 13
Ricky Tipton – NCDOT Division 13
Kristina Solberg –NCDOT, Division 13
Roger Bryan – NCDOT Division 13
Kathy Herring – NCDOT NES, Biological Surveys
Chris Manley – NCDOT NES, Biological Surveys
Tyler Stanton, NCDOT, Biological Surveys
Heather Wallace, CALYX
Joanna Rocco – AECOM

A meeting was held on August 8, 2017 at the NCDOT Division 13 office at 55 Orange Street in Asheville to discuss the gray bat research need statement and programmatic Section 7 consultation. Discussion began regarding the need to emphasize the primary focus of the research. Main discussion items held during the meeting are listed below:

- The research should focus on where the bats are in relation to NCDOT projects in Div 13 and 14; the characteristics of the structures that the bats are using.
- There was an indication that a literature search should be included in the research tasks
- The researchers should also suggest possible minimization and conservation measures based on the outcomes of the research
- Set standard conservation measures for the duration of the PBO, the research itself will not be the only conservation measure
- The NCDOT indicated that it needs an MOU signed by all stating that NCDOT will commit to conservation measures (TBD based on summer/winter 2017 survey analysis) and to fund a research project concerning the distribution, foraging, roosting, and migration patterns of the gray bat if the USFWS agrees to develop a Programmatic consultation/compliance for all projects in the French Broad River basin in Divisions 13 and 14 for the next 5 years.
 - This consultation would be re-visited at the end of the 5 year period

- Marella indicated that she will be in conversations with FHWA regarding Washington and Oregon DOT's programmatic consultations for all Section 7 species to see how they were developed.
- Kathy Herring indicated that she would finalize the Research Need Statement and submit to John Kirby of NCDOT's research and Development group by next Wednesday at the latest. We will request a 30 day limit for submittal of proposals.
- The group agreed that we should meet again at that time to discuss the proposals.
- It was agreed an additional meeting with the project team would be beneficial, potentially in October, to discuss the refined designs and data that's been collected so far to help focus 2018 survey areas.

Action Items

- Kathy Herring to finalize RFP and submit to John Kirby
- NCDOT to draft an MOU for circulation
- The project team to hold additional meeting in October to discuss refined designs and data collection results/next steps.

MEETING SUMMARY



To: Meeting Attendees

From: Celia Foushee
AECOM

Date: November 3, 2017

RE: Gray Bat Survey Coordination Meeting
I-26 Connector Status Update
NCDOT STIP Project I-2513 (I-26 Connector)

Meeting Attendees:

Marella Buncick – USFWS	Chris Manley – NCDOT NES
Katherine Caldwell –NCWRC	Tyler Stanton – NCDOT NES
Yates Allen – NCDOT Division 13	Heather Wallace, CALYX
Cole Hood – NCDOT Division 13	Neil Dean – AECOM
Rickey Tipton – NCDOT Division 13	Celia Foushee - AECOM
Marissa Cox – NCDOT NES	Joanna Rocco – AECOM

A meeting was held on October 25, 2017 at the NCDOT Division 13 office at 55 Orange Street in Asheville to provide an update of the current and future Gray bat survey efforts. Following introductions and a review of the meeting purpose, discussion began regarding status of the I-26 Connector project and preliminary gray bat survey results. Main discussion items held during the meeting are listed below:

- CALYX completed the structure checks within the I-26 Connector project study area in summer 2017 and found one culvert with bats roosting near Hill Street and Riverside Drive. They found bat staining and bats flying around but could not identify if Gray bats were present.
- USFWS and NCWRC completed emergence counts at the culvert in September. About 200 bats flew out of the outlet and 2 bats flew out through the inlet. Acoustic recordings to determine the species were inconclusive.
- At a follow-up field visit, NCWRC was able to identify a Gray bat inside the culvert.
- Surveys will continue this winter to determine if Gray bats are roosting in the Hill Street culvert. Furthermore, additional acoustic detectors will be placed at the opening of the culvert and at other locations within the project study for monitoring. An acoustic detector is currently deployed at the culvert outlet to monitor bat activity into the fall/winter. In the spring of 2018, additional monitoring will occur by acoustic detectors, emergence counts, and mist netting.
- It was noted it is important to determine how the bats are using the culvert to determine the level of impacts; i.e. if there is a hibernaculum in the winter or maternity roost found in the spring there would be a higher level of impact from construction in the area.
- The information gained during the surveys and through the detectors will be used for the I-26 Connector project Section 7 consultation as well as the NCDOT Gray bat research project.

MEETING SUMMARY

October 27, 2017

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- It was noted that one bat with a transmitter is flying to Marshall and back to the day roost south of the project via the French Broad River corridor. If night lighting is used for construction of the flyover bridges, that could have an effect on the travel patterns of the bats. Takes/impacts would likely be measured in time of construction activities occurring.
- Monitoring may also need to occur after construction to determine the effects the project had on the bat population.
- NCDOT noted if any of the culverts are metal they will need to be replaced due to age and structure deterioration. NCDOT can provide a structures engineer to accompany USFWS and NCWRC during the winter surveys; otherwise, a consultation would be required for non-permitted individuals to access the culvert if bats are using the culvert in the winter. If no bats are present a consultation is not required.
- A review of the final surveys was held to determine the extent of the metal pipes in the culvert system and their location. NCDOT will coordinate with NCWRC and USFWS to complete the required surveys in a single trip.
- NCDOT will provide the updated preliminary designs and hydraulic structures update to USFWS and NCWRC.
- It was agreed an additional meeting with the project team would be beneficial, potentially in January or February, to discuss the preliminary designs and data that's been collected so far to help focus 2018 survey areas.
- AECOM reviewed the proposed design changes in Sections C and A that were recently submitted to NCDOT for review.

Action Items

- NCDOT will coordinate with NCWRC and USFWS to complete the required winter surveys of the Hill Street culvert.
- NCDOT will provide the updated preliminary designs and hydraulic structures update to USFWS and NCWRC.
- The project team to hold additional meeting in January or February to discuss preliminary designs and data collection results/next steps.

MEETING SUMMARY



To: Meeting Attendees
Project File

From: Joanna Rocco
AECOM

Date: September 28, 2018

RE: **Biological Assessment and Bridge Construction Meeting**
NCDOT STIP Project I-2513 (I-26 Connector)
NCDOT Division 13 Conference Room, Asheville NC

Meeting Attendees:

Felix Davila, FHWA	Marissa Cox, NCDOT – Biological Surveys*
Michael Dawson, FHWA	Mike Sanderson, NCDOT – Biological Surveys*
Jim Martin, FHWA	C.W. Patterson, NCDOT – Right of Way Unit
Lori Beckwith, USACE	Matt Lauffer, NCDOT – Hydraulics
Monte Matthews, USACE*	Kevin Fischer, NCDOT – Structures Management Unit
Marella Buncick, USFWS	Carla Dagnino, NCDOT - EAU
Claire Ellwanger, USFWS	Jeff Hemphill, NCDOT – EAU
Derrick Weaver, NCDOT – Environmental Policy Unit	Heather Wallace, CALYX
Theresa Ellerby, NCDOT – Project Management Unit	Neil Dean, AECOM
Kevin Moore, NCDOT – Project Management Unit*	Claudia Lee, AECOM*
Yates Allen, NCDOT – Division 13	Celia Miars, AECOM
Roger Bryan, NCDOT – Division 13	Joanna Rocco, AECOM
Cameron Cochran, NCDOT – Division 13	David Hering, NCDOT-- Design Build
Randy McKinney, NCDOT – Division 13	

*Joined meeting via telephone

The project team met with representatives from the US Army Corps of Engineers (USACE) and the US Fish and Wildlife Service (USFWS) on July 25, 2018 to discuss the Biological Assessment (BA) for the gray bat and Appalachian elktoe, two federally endangered species with biological conclusions of “May Affect – Likely to Adversely Affect” for the I-26 Connector project. The purpose of the meeting was to review project commitments that NCDOT may potentially make, particularly during construction of the bridges over the French Broad River and Hominy Creek by the design build team.

Joanna began the meeting with a brief status update of the project. The preliminary design revisions are currently being finalized for the preferred alternative and impacts have been summarized in the draft Final Environmental Impact Statement (FEIS). NCDOT anticipates having the FEIS signed this fall and a design public hearing held afterward to solicit comments on the FEIS and project design. It is anticipated the Record of Decision (ROD) will be signed in early 2019, and the project let later in the year.

MEETING SUMMARY

September 28, 2018

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Heather gave a brief status update on the gray bat surveys and noted acoustic detectors will remain and continue to collect data, but that the BA will be based on data collected through the last week of July. Gray bats were recorded at all detectors. Structure checks are complete, including 51 bridges and 15 culverts. The Hill Street culvert near Southern States was identified as a gray bat roost in 2017. No additional roosts were identified during the structure checks. The bats roosting in the Hill Street culvert remain active per acoustic surveys; however, bats have not been recorded as a part of the emergence counts in 2018. (Since the meeting, gray bats were captured exiting the culvert.) USFWS will issue their Biological Opinion (BO) before the ROD is signed.

David Hering from NCDOT Design Build Unit gave an overview of the design build process, and noted that the style, material, and/or design of the project may change during this process; however, one of the main goals during the design build process will be to reduce impacts of all types. The design build team will have meetings with the environmental and regulatory resource agencies prior to letting the project as well as during construction to ensure environmental commitments are followed. David noted there is potential for new commitments to come up based on availability of new data. David will send Marella the contract language used for the Bonner Bridge Replacement project, as this project included various coordination aspects as part of the scope of work for the design build team.

Major discussion items regarding the biological assessment and bridge construction are summarized below:

- Environmental Compliance and Design-Build Coordination
 - Marella stressed the importance of having a design build liaison during construction, especially due to the complexities of the project, the amount of simultaneous construction of other projects, and the amount of environmental commitments that must be adhered to throughout the process. Derrick will set up a meeting with Division 13 to address the appropriate approach for implementation of commitments during construction and spell out what types of coordination should occur, such as monthly agency meetings, construction inspection meetings, etc.
 - Derrick will set up a meeting with Division 13 to address the appropriate approach for implementation of environmental commitments during construction.
- Hill Street Culvert System
 - The Hill Street culvert system is an active area for the gray bat, therefore the hydraulics of this system should be evaluated as part of the BA. Matt Lauffer from NCDOT Hydraulics Unit will set up a meeting with NCDOT Biosurveys and the Hydraulics Unit to discuss an approach moving forward on this assessment. Matt Lauffer also to contact USGS to request installation of monitoring gauge at the culvert outlet.
 - Marella cautioned that the culverts necessary to construct the new bridge over the river north of the Hill Street culvert should not affect the hydraulics within the culvert.
 - Marella would like to know plans for replacement of culvert sections within the entire system before she can further discuss the possibility of allowing work to occur at specified distances from the concrete box culvert section.
- Hydraulic Modeling
 - Causeways will not restrict more than 50% of the French Broad River and Hominy Creek channel widths, and there must be an adequate river opening maintained for river user safety. Potential additional restrictions for short durations deemed acceptable-will be coordinated with USACE prior to construction and included in the river user safety plan and permit application.

MEETING SUMMARY

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- An updated hydraulic model will be developed for the French Broad River to help the team's understanding of how construction of the bridges will impact the river and associated floodway.
- Construction Phasing
 - Marella requested a phasing plan that groups construction activities by project sections, and outlines where night work will occur. The plan should identify construction locations, start times, durations, and night time activities for all bridges, and for any NCDOT bridge replacement or major construction projects adjacent to I-2513. A construction plan should be developed for each structure. Then the individual plans can be reviewed and pieced together to determine if some activities should be limited/changed based on the all the activities occurring in close proximity to one another. The plan will be developed after the bat acoustic data is concluded for the end of July and sufficient time has been allowed for analysis. Results of the acoustic analysis may contribute to the development of this plan.
 - An additional meeting will be held to discuss construction phasing once data from the acoustic surveys has been processed and evaluated.
- Night Work and Lighting
 - Commitments to night work type, duration, and intensity should be included in BA.
 - Marella suggested that someone approach Southern States about reducing/changing the lighting in their back parking lot near the culvert outlet. If lighting could be reduced in this area, this would serve as a conservation measure for the project.
 - Marella is most interested in eliminating light and noise on causeways at night. Other lighting and noise needs to be identified and explained, but is of less concern in terms of effects on bats.
 - Marella suggested that NCDOT might limit construction lighting a specified distance from the river bank, or eliminate lighting near the river during certain times of year when this would be most impactful to bat activity. Also, any lights used on land adjacent to the river should be directed toward the ground, rather than shining over the water.
 - Lighting during and post-construction will be prescriptive due to the potential impact on the gray bat. For example, red lights will be used to alert river users to the causeway locations, and lighting used during night work will face away from the river, when practicable.
- Stream Monitoring
 - Begin stream monitoring of French Broad River up to one year prior to construction, during construction, and post construction to determine baseline conditions, then any bank erosion, scour, etc. that might be associated with construction.
 - Design Standards for Sensitive Watersheds (DSSW) were discussed but no commitment made.
- River User Safety
 - A river user safety plan will be developed and will include information regarding the control of falling debris during bridge demolition.
 - Lori also asked that the river user plan incorporate "positive controls" to guide river users through the causeway openings, and that red lights stay on all night.
- Gray Bat Monitoring and Conservation Measures
 - Acoustic monitoring for gray bats will continue through the fall of 2018. Monitoring will also be required at some locations immediately before, during and after construction. These locations will be determined after review of the 2017/2018 acoustic data. This monitoring will help determine changes in bat activity due to construction.
- Smith Mill Creek is directly across the river from the Hill Street Culvert. Randy mentioned that a temporary work bridge will likely be needed across this creek. Marella stated that there is an opportunity to develop conservation measures associated with construction activities at this bridge.

MEETING SUMMARY

September 28, 2018

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A preliminary list of conservation measures were reviewed and revised, and is appended to this meeting summary.

The meeting concluded at 3:15 p.m.

Action Items:

- David will send Marella the contract language used for the Bonner Bridge Replacement project.
- Derrick will set up a meeting with Division 13 to address the appropriate approach for implementation of environmental commitments during construction.
- Matt Lauffer will set up a meeting with NCDOT Biosurveys and the Hydraulics Unit to discuss an approach moving forward on the assessment of the Hill Street culvert system. **Meeting occurred on August 23rd.**
- Matt Lauffer will contact USGS to request installation of monitoring gauge at the Hill Street culvert outlet. **After visiting the site in person, Matt decided the base flow is too low and the water too shallow to install a gauge.**
- An updated hydraulic model will be developed by NCDOT and AECOM for the French Broad River to help NCDOT's design-build team's understanding of how construction of the bridges will impact the river and associated floodway.
- An additional meeting will be held to discuss construction phasing once data from the acoustic surveys has been processed and evaluated. **Acoustic and hydraulic analysis are underway.**

I-2513: I-26 Asheville Connector

Preliminary Conservation Measures

Note that gray highlighting indicates portions of a commitment that have yet to be resolved.

Project Design Modification for Avoidance and Minimization

- Collector/distributor roads eliminated and retaining walls added along Hominy Creek to avoid stream impacts
- Daylighting approximately 440 ft. of Smith Mill Creek (currently piped) by redesigning ramps
- Reduced overall impacts to streams by 724 linear ft.
- Reduced overall impacts to wetlands by 0.63 ac.

Measures to Avoid/Minimize Effects to Gray Bat during Hill Street Culvert Construction

- NCDOT will conduct a hydraulic evaluation of the culvert system to generate a baseline of information.
- NCDOT will maintain water sources that provide baseflow to the culvert (non-stormwater sources) to provide a naturally occurring continual water source.
- NCDOT will monitor the hydraulics of the culvert system during and following construction.
- NCDOT will monitor bat activity at the culvert before, during, and after construction. Acoustic monitoring and emergence surveys will be conducted between April and October.
- NCDOT will investigate options to monitor bat activity inside the culvert, potentially with a thermal camera. This may also include micro-habitat monitoring using temperature/humidity dataloggers.
- Replacement of a portion of the Hill Street culvert system will be necessary due to deterioration of the culvert material. The portions that will be replaced will ultimately depend on the final design. In general the pipes to be replaced will likely be the ones under 2 ft. in diameter. NCDOT will try to retain as many large pipes as possible. NCDOT will complete the replacement of this section of the culvert during winter (October 15 through April 1) when no MYGR are not expected to be using the box culvert. If work must be conducted between April 2 and October 14, NCDOT will monitor noise levels inside the culvert and stop work whenever noise levels exceed an established threshold.

Measures to Avoid/Minimize Effects to Gray Bat during Road Construction

Roadway Construction Lighting

- NCDOT will limit all construction-related lighting to whatever is necessary to maintain safety in active work areas closest to the French Broad River, Hominy Creek, and Smith Mill Creek (dates to be determined after review of acoustic data).
- Construction-related lighting will be indirect in nature, and will not project into adjacent forested areas or over the water surface of the French Broad River, Hominy Creek, or Smith Mill Creek, whenever practicable. (Marella suggested that lighting adjacent to the river might be limited or eliminated within a specified distance from the water, and/or during times of year when it would be most impactful to bats, and should shine toward the ground. This distance and/or time frame has not yet been determined.)

Measures to Avoid/Minimize Effects to Gray Bat during Bridge Construction

Night Time Construction Activities

- NCDOT will develop a phasing plan to limit night work, particularly during the pup season (dates to be determined). Descriptions of night work type, duration, and intensity will be included in the BA. Commitments related to limitations on night work will also be presented in the BA.

- Marella suggested that lighting adjacent to the river might be limited or eliminated within a specified distance from the water, and/or during times of year when it would be most impactful to bats, and should shine toward the ground rather than over the water. This distance has not yet been determined.

Red Safety Lighting

- For construction of all bridges over the French Broad River, NCDOT will place solar-powered, steady-state red lights on the causeways to alert river users to their locations.

Measures to Avoid/Minimize Effects to Gray Bat and Appalachian elktoe during Bridges Construction

Causeways-French Broad River, Hominy Creek, and Smith Mill Creek

- Causeways will not restrict more than 50% of the existing channel width of the French Broad River, Hominy Creek, and Smith Mill Creek. Potential additional restrictions of the channel may be necessary for short durations, and these additional restrictions will be coordinated with USACE and USFWS prior to permitting.
- NCDOT will begin stream monitoring of the French Broad River up to one year prior to construction, during construction, and post construction to determine baseline conditions, then any bank erosion, scour, etc. that might be associated with construction.
- NCDOT will require the contractor to use clean rock (free of debris and pollutants) for the construction of the causeways to minimize unnecessary sediment input into the river.
- Causeway material will be removed to the extent practicable and either disposed of off-site or used in areas that require permanent stone protection after project completion. NCDOT will also require that concrete barriers (barrier rail) be placed along the downstream edge of each causeway to limit the downstream movement of causeway material during high flow events.
- If the final causeway plan is staged, causeway material will be added/removed as needed for each stage to minimize the causeway footprint over the length of the project.
- To minimize disturbance to the riverbed, all readily detectible causeway material will be removed, to the extent practicable, while removing as little of the original riverbed as possible.
- Construction fabric will not be used under the causeway material, as it has a tendency to tear into tiny pieces and float downstream during removal.
- Any equipment that is placed on the causeways will be removed any time throughout a work day when the water level rises, or is expected to rise overnight, to a point where the equipment could be flooded, or during periods of inactivity (two or more consecutive days). The only exception to this measure is that the drill rig and crane may be left in place for periods of inactivity; however, they must also be removed if the water rises, or is expected to rise, to a point where the drill rig and crane could be flooded.
- NCDOT will require its contractor to have clean, non-leaking equipment, diapers on-site for each causeway, and spill kits located at each causeway.

Containment

- All construction equipment shall be refueled outside the 100-year floodplain or at least 200 feet from all water bodies (whichever distance is greater) and be protected with secondary containment. During crucial periods of construction and demolition, when the drill rig and crane cannot be moved, the drill rig and crane can be refueled while inside the 100-year floodplain provided that spill response materials (such as spill blankets and fueling diapers) are used during the refueling. Hazardous materials, fuel, lubricating oils, or other chemicals will be stored outside the 100-year floodplain or at least 200 feet from all water bodies (whichever distance is

greater), not in a Water of the U.S. Areas used for borrow or construction by-products will not be located within wetlands or the 100-year floodplain.

- When constructing drilled piers for the I-240 and I-26 French Broad River bridges, a containment system will be developed so that material does not enter the river. Material by-product will be pumped out of the shaft to an upland disposal area to the extent practicable and treated through a proper stilling basin or silt bag.
- Construction of all bridges will be accomplished in a manner that prevents uncured concrete from coming into contact with water entering or flowing in the river.
- Removal of existing bridges shall be performed so as not to allow debris to fall into the water. If debris is dropped in a waterway, it will be immediately removed.
- NCDOT will not place bridge bents in Hominy Creek.

Avoidance/Minimization to Gray Bat and Appalachian elktoe during Road Construction and Bridge Replacement

Erosion Control Measures -The SEC plan will be in place prior to any ground disturbance for all bridge replacements and construction. When needed, combinations of erosion control measures (such as silt bags in conjunction with a stilling basin) will be used to ensure that the most protective measures are being implemented.

- Uncovered areas shall be limited to a maximum total area of 20 ac.
- Erosion and sedimentation control measures shall be designed and constructed to provide protection from the runoff of the 25-year storm event, instead of a 10-year storm.
- Sediment basins will have a settling efficiency of at least 70 percent for the 40-micron (0.04mm) size soil particle transported into the basin by the runoff of a two-year storm.
- Newly constructed open channels shall be constructed with side slopes no steeper than two horizontal to one (2:1) vertical if a vegetative cover is used for stabilization. The angle for side slopes shall be sufficient to restrain accelerated erosion.
- Ground cover sufficient to restrain erosion must be provided within 15 working days or 60 calendar days following completion of construction, whichever period is shorter.
- Environmentally Sensitive Areas will be demarcated within the Action Area.
- The Environmentally Sensitive Areas will be defined by a 50-ft. buffer zone on both sides of jurisdictional streams measured from top of streambank, in which the following shall apply:
 - The Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations.
 - Once grading operations begin, work shall progress in a continuous manner until complete.
 - Erosion control devices shall be installed immediately following the clearing operation.
 - Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment.
 - Seeding and mulching shall be done in stages on cut and fill slopes that are greater than 20 ft. in height measured along the slope, or greater than 2 ac. in area, whichever is less.
 - All sedimentation and erosion control measures, throughout the project limits, must be cleaned out when half full of sediment, to ensure proper function of the measures.

Agency Coordination

- NCDOT will attempt to arrange one meeting between each individual NCDOT Design-Build Team that is proposing to construct the project and the permitting agencies.
- NCDOT will arrange, for each shortlisted team, a meeting with representatives of the regulatory agencies prior to the due date for the submission of Technical and Price Proposals. The

discussions and answers provided at these meetings are not contractually binding, but intend to offer the NCDOT Design-Build Teams an opportunity to inquire as to the permitting process as well as specific team concepts.

- A revised Section 7 Consultation may be necessary depending on the NCDOT Design-Build Team's final alignment and approach to construction staging and access. In such case, the NCDOT Design-Build Team shall be responsible for all work noted in the Project Special Provision, "Construction Access and Staging". In addition, the NCDOT Design-Build Team shall draft a letter, for NCDOT review and FHWA's signature, requesting concurrence from the USFWS, as necessary, to document compliance with Section 7 of the Endangered Species Act for those species requiring such concurrence.
- NCDOT will revisit CP4A with the Merger Team after the BA is submitted to discuss any new avoidance and minimization efforts for major crossings of the French Broad River and Hominy Creek including those in the Biological Assessment.
- The NCDOT Design-Build Team will adhere to project commitments within the ROD and the Biological Opinion relating to Section 7 of the Endangered Species Act. The NCDOT Design-Build Team will be required to prepare information required for any event in which NCDOT and FHWA reinstate Section 7 consultation with the USFWS. It is possible that consultation be reinstated prior to Concurrence Point 4B and again at Concurrence Point 4C. NCDOT will continue to identify avoidance and minimization measures to all Waters of the U.S. and ensure that major hydraulic structures associated with the project are designed and installed to minimize negative impacts to stream stability (and therefore, water quality) to the greatest extent practicable. As part of this process, NCDOT and the NCDOT Design-Build Team will continue to coordinate with the Merger Team to identify avoidance and minimization measures and ensure that project impacts are minimized to every practicable extent, including impacts to federally protected species.
- The NCDOT Design-Build Team shall meet with NCDOT personnel and regulatory agency representatives around the time of the 4C meeting in order to review the project and project commitments. At this time, the USFWS shall be afforded the opportunity to meet with key NCDOT Design-Build Team members and NCDOT employees to provide education on the effects of artificial lighting, noise, and construction on nearby wildlife habitat and behavior. The NCDOT Design-Build Team shall contact NCDOT Environmental Analysis Unit in order to schedule these meetings. Every effort shall be made to have this meeting prior to submitting the permit application.
- The NCDOT Design-Build Team will invite regulatory agency representatives to the pre-construction meeting for the proposed project, as well as to all subsequent field inspections prior to construction, to insure compliance with all special project commitments.
- The NCDOT Design-Build Team will provide USFWS with the sediment and erosion control plan and allow 15 days for review.
- The NCDOT Design-Build Team will provide regulatory agency representatives with the demolition plan for all bridges and allow 15 days for review. All agencies will be notified prior to start of demolition so they may have a representative on site.
- The NCDOT Design-Build Team will contact USFWS if new information about MYGR is discovered, as it relates to the project.
- The NCDOT Design-Build Team will report any dead bats found on the construction sites to USFWS.

Conservation Measures to Benefit Gray Bat

Monitoring for MYGR Return and Activity:

- NCDOT will conduct acoustic monitoring for MYGR at some locations immediately before, during and after construction. These locations will be determined after review of the 2017 acoustic data. This monitoring may help determine changes in bat activity due to construction. NCDOT will coordinate the locations and time frame for acoustic monitoring with USFWS.
- To determine whether MYGR avoid the active construction zone, NCDOT will investigate the use of night-vision video recordings, or other methods, in an attempt to monitor bat activity at the bridge while active night time construction is underway.

Hill Street Culvert Hydraulic Monitoring:

- NCDOT will monitor hydraulics at the Hill Street culvert following construction to determine if there has been a change in flow regime.

NCDOT-Sponsored MYGR Research Project:

- NCDOT, with the cooperation of the USFWS and NCWRC, committed to a three year study on MYGR within the French Broad River Basin. This study will serve as a conservation measure for NCDOT projects within the Divisions 13 and 14 for a limited time. NCDOT will provide \$900,000 in funding Indiana State University to conduct the research project, which will aid in the recovery and conservation of MYGR. The end goal is to gather the information needed to allow NCDOT and USFWS to enter into a programmatic consultation to cover MYGR for NCDOT Divisions 13 and 14, as well as help to develop species-specific avoidance and minimization measures.

Conservation Measures to Benefit Appalachian Elktoe

French Broad River Conservation Funding:

- NCDOT will provide \$500,000 in funding to the North Carolina Nongame Aquatic Projects Fund for the French Broad River Conservation Plan (FBRCP) proposed by USFWS, which will aid in the recovery and conservation of Appalachian elktoe. The funding will be held by the NCWRC. A multi-agency/organization group of mussel species experts, including USFWS and NCDOT, will determine how to expend the funds, which may include the following: species reintroduction, early warning and emergency production capacity, genetic management program, and other appropriate activities as described in the FBRCP.

French Broad River Geomorphology Monitoring:

- To ensure bridge construction at the French Broad River crossing will not result in substantial changes to channel stability (scour, erosion, etc.), NCDOT will conduct river channel monitoring at the I-26 bridge construction site to document the morphological condition at the French Broad River bridge site and to evaluate the impacts of construction and temporary causeways on river habitat. Monitoring activities will consist of the following:
 - Surveying the French Broad River channel bathymetry and riverbanks before and during the construction of the I-26 crossing (approximately 3.5 years). Mapping will occur before construction and then every quarter during construction, with one final survey after the causeways are all removed, and will cover at least 100 ft. upstream and 250 ft. downstream of the causeway locations.

- A complete digital terrain model (DTM) of the stream bed and banks from each survey conducted will be prepared. NCDOT will retain an experienced firm or staff members to analyze the DTM and compile a final report to be submitted to USFWS.
- If monitoring at the French Broad River reveals excessive bank erosion, bank instability, or sedimentation associated with the bridge replacement, NCDOT will work to identify the cause and will make improvements to address the problems in a timely manner.

| *Other*

- Define checkpoints after BO is issued. Monitoring, reporting, meetings, etc.

MEETING SUMMARY



To: Project File

From: Celia Miars
AECOM

Date: August 4, 2018

RE: I-2513 Working Group Meeting #10
NCDOT STIP Project I-2513 (I-26 Connector)

Meeting Attendees:

Michael Dawson – FHWA	Daniel Sellers – NCDOT TPB
Bruce Emory – Asheville Multimodal Transportation	Simone Robinson – Public Participation Partners*
Julie Mayfield – City of Asheville	Woody Farmer – Aesthetic Advisory Committee
Todd Okolichany – City of Asheville	Ted Figura – Aesthetic Advisory Committee
Ken Putnam – City of Asheville	David Nutter – Aesthetic Advisory Committee
Gwen Wisler – City of Asheville	Mike Zukosk – Aesthetic Advisory Committee
Alan McGuinn – Asheville Design Center	Theresa Ellerby – NCDOT, PMU
Lyuba Zuyeva – FBRMPO	Derrick Weaver – NCDOT, EPU
Steve Cannon – NCDOT Division 13	Neil Dean – AECOM
Brendan Merithew – NCDOT Division 13	Celia Miars – AECOM
Randy McKinney – NCDOT Division 13	Joanna Rocco – AECOM
Stephen Sparks – NCDOT SPOT	Eric Spalding – AECOM

*Attended by phone

The project team met with the I-2513 Working Group at 1:00 PM on July 31, 2018 in the Land of Sky Regional Council conference room in Asheville, NC. The purpose of the meeting was to provide an update of the project status, review action items from the previous working group meeting held on July 27, 2018, discuss the design revisions, recent coordination with the Burton Street Community, review the 360 vantage points, and discuss the Aesthetic Advisory Committee (AAC).

Project Status Update

- Joanna Rocco gave an update on the status of the following items:
 - Design revisions – since the last Working Group meeting in July 2017 the project team has been updating the designs of the preferred alternative. Additional information regarding specific changes was included in later discussions.
 - Traffic capacity analysis – the project team completed the updated analysis and based the preferred alternative designs on analysis.
 - Traffic microsimulation – the project team completed a microsimulation which confirmed the laneage and configurations recommended for the designs; some changes have been

MEETING SUMMARY

August 4, 2018

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made to the designs since then and additional updates to the microsimulation will follow. Bruce Emory requested an additional meeting to discuss the microsimulation with the project team.

- Merger team coordination – The project team met with the merger team to discuss avoidance and minimization measures implemented on the project and received concurrence on July 18th.
- Gray bat/mussel surveys – CAYLX is preparing a biological assessment with USFWS for two endangered species that may be affected by project (Appalachian elktoe and gray bat).
- Cost estimate review – the project team will hold a workshop in early September with NCDOT and FHWA and all of the technical leads of the project; FHWA will complete a risk-based review to verify the accuracy and reasonableness of the cost estimate
- Historic property coordination – the project team is meeting with representatives of the Aycock School on 08/16/18 to discuss impacts to the school and potential mitigation opportunities. Similar coordination will occur for Riverside Cemetery with the City of Asheville and the AAC. This meeting has not been set.
- Traffic noise analysis – currently underway.
- Status of FEIS and public hearing – the FEIS is scheduled to be signed this fall and the public hearing will be held approximately 30 days after.

Review Working Group Meeting #9 Action Items (Working Group)

- Ken Putnam noted it is anticipated the AAC committee members and roles/responsibilities will be finalized within the next 30-60 days, and possibly presented at the next Working Group meeting.
 - The AAC has been formed and members were presented at this meeting.

Review Working Group Meeting #9 Action Items (NCDOT)

- NCDOT will provide percent local traffic versus through traffic for the current and future year scenarios at the next Working Group Meeting.
 - This information was attached with the Working Group #9 meeting summary.
- NCDOT will post the Traffic Capacity Analysis on the FBRMPO's website once it has been reviewed and finalized.
 - The Traffic Capacity Analysis is still underway.
- NCDOT will receive updates from Neighborhood Solutions and relay these updates to the Working Group.
 - This is an item discussed later in the meeting. Additional information is included below.

Design Revision Discussion

Discussions followed regarding the design revisions of the preferred alternative.

- Number of Lanes in Section A
 - Based on updated traffic analyses, the eight-lane typical section in Section A was reduced to six lanes with auxiliary lanes.
 - The existing pedestrian bridge over I-240 is now shown to be removed.
- I-26 Configuration between Amboy Road and Brevard Road
 - Based on updated traffic analyses and local input, the Amboy Extension has been replaced with a split diamond configuration.
 - Roundabouts are proposed at Amboy Road.
 - Amboy Road now travels underneath I-26.

MEETING SUMMARY

August 4, 2018

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- Vehicular traffic no longer has access to Fairfax Avenue and Virginia Avenue via the split diamond configuration, bicycle/pedestrian access is not precluded in this area.
 - A multi-use path is proposed to the north of the split diamond ramp.
 - The ramps are proposed as two lanes due to the need for two lanes leaving the roundabout and approaching Brevard Road.
- I-40 Collector/Distributor (C/D) Roads
 - The C/D roads in Section C have been eliminated based upon updated traffic analyses.
 - Impacts were reduced to the residences along Montgomery Street.
 - At Smokey Park Highway, a ramp was added in Quadrant A for a free flowing right turn onto Smokey Park Highway.
 - The loop configuration in Section B will remain, in relatively the same place.
- I-26/I-240/Patton Avenue Interchange
 - As requested by the City of Asheville per design concepts from Sam Schwartz, the project team revised the interchange to an urban diamond configuration.
 - Additional right-of-way would be needed for this change; however, minimal residential impact increases are expected.
 - The Working Group noted they would prefer the original design to keep the footprint of the project smaller. Derrick noted that by showing the diamond interchange configuration in the FEIS and at the public hearing, there is still the opportunity during final design for additional minimization efforts and to return to the original design if necessary; however, by showing the original design now this could preclude the opportunity for design changes in final design if additional right-of-way would be needed.
 - After the meeting the Working Group met privately to discuss which option they would prefer to show. It was determined to move forward with the diamond interchange configuration and also discuss the original design in the FEIS.
 - The diamond configuration allows opportunity to daylight parts of Smith Mill Creek.
- Laneage and project footprint
 - The project team presented right-of-way comparison figures showing areas where right-of-way has increased or decreased since the 2015 designs. See attached.
 - Derrick discussed each area showing changes in the right-of-way and AECOM displayed the public hearing maps for 2015 and 2018 on the screen to discuss why the change occurred.
- Elevations
 - The reconfiguration of the Patton Avenue interchange increased the elevations of the bridges to the west of the river by approximately 14 feet; however, the elevations of the proposed roadway at Riverside Cemetery was decreased by approximately 6 feet.
 - Julie Mayfield requested additional information to better understand the purpose of the elevation at Riverside Cemetery.
- Betterments
 - No major discussions occurred regarding this topic.
 - Ken Putnam noted the betterments list as it stands now is sufficient.
- Sam Schwartz coordination
 - No additional discussion occurred.

MEETING SUMMARY

August 4, 2018

Page 4 of 4

Burton Street Coordination

Simone Robinson discussed the ongoing coordination efforts with the Burton Street community. The Community Plan has been completed and presented to the Planning and Economic Development Committee. This committee will recommend the plan to the City Council.

360 Vantage Points

The 360 vantage points are available on the NCDOT website. However, recent updates to the website may have broken the link. NCDOT will correct the link on the website and send out the link to the Working Group to review.

Aesthetic Advisory Committee

Ken Putnam noted this meeting and the betterments list can set the stage for the responsibilities of the AAC. The AAC and the City will coordinate to present the betterments list to the City Council. The project team will coordinate with the City to hold an additional meeting with representatives from the NCDOT Roadside Environmental Unit to discuss aesthetic options for the project.

Action Items

- NCDOT will correct the visualization link on the website and send out the link to the Working Group to review.
- NCDOT will coordinate with Bruce Emory to meet to discuss the microsimulation and its results.
- NCDOT will coordinate with Julie Mayfield to present additional cross sections and design information regarding the proposed height of the roadway and retaining wall at Riverside Cemetery.
- The project team will coordinate with the City to hold an additional meeting with representatives from the NCDOT Roadside Environmental Unit to discuss aesthetic options for the project.

MEETING SUMMARY



To: Project File

From: Celia Miars
AECOM

Date: August 31, 2018

RE: **I-2513 Traffic Analyses Discussion**
NCDOT STIP Project I-2513 (I-26 Connector)

Meeting Attendees:

Julie Mayfield – City of Asheville	Brendan Merithew – NCDOT, Division 13
Ken Putnam – City of Asheville	Derrick Weaver – NCDOT, EPU
Gwen Wisler – City of Asheville	Neil Dean – AECOM
Bruce Emory – Asheville Multimodal Transportation	Celia Miars – AECOM
David Nutter – Aesthetic Advisory Committee	Joanna Rocco – AECOM
D.J. Gerkin – SELC	Eric Spalding – AECOM
Lyuba Zuyeva – FBRMPO	Peter Trencansky - Patriot
Randy McKinney – NCDOT, Division 13	

The project team met with representatives from the City of Asheville August 27, 2018. The City of Asheville requested the meeting to discuss additional questions and concerns regarding the preferred alternative designs and traffic analyses, including the microsimulation. Prior to the meeting, Bruce Emory submitted specific questions to the project team to guide the meeting (attached).

Andrew Bell began the meeting with a brief overview of the microsimulation and Highway Capacity Manual (HCM) analysis. The HCM analysis analyzes segments of the project to determine if they will meet the required level of service (LOS), while the microsimulation analysis analyzes the project area cumulatively to determine how each segment works together.

Responses to the questions received prior to the meeting are attached. A summary of other discussions is included below.

- Local driver parameters are taken into account using the calibrated base model for the traffic microsimulation. For the model, rolling terrain was used throughout.
- Andrew Bell gave an example of an instance where the microsimulation analysis showed a different scenario from the HCM analysis and it resulted in an enhancement to the designs. This design revision alleviated trucks slowing due to the grade.
- It was noted the microsimulation analysis has also been used to validate many of the findings of the HCM analysis as well as provide changes to the design where necessary such as increasing storage lengths or optimizing signal timing.

MEETING SUMMARY

August 31, 2018

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- NCDOT guidelines are used to determine the LOS and is calculated in the same density in the microsimulation analysis as in the HCM analysis.
- The accuracy of the HCM analysis and the level of confidence for the microsimulation analysis is dependent upon the locally-derived data provided in the French Broad River MPO travel demand model.
- Regarding the cross sections on the bridges crossing the French Broad River in Section B, it was noted that the necessary safety measures for sight distance requires wider shoulders or lower design speeds; however, due to the interstate designation on the bridges, the design speed should not be lower than 50 mph.
- The City reiterated their desire to open up the 14-acre tract of land on the east side of Patton Avenue for redevelopment by removing the Patton Avenue off ramp and moving the interchange further east.
 - The project team explained that while moving the interchange east could work geometrically, it would not allow enough room before the next intersection at Clingman, which is currently operating at a poor LOS. Introducing additional traffic to this intersection will further degrade this condition. This could also cause additional impacts to the historic Haywood UMC church on Patton. Taking out the off-ramp would cause traffic issues and congestion on the other side of the interchange as well as on Patton Avenue.
 - The design team has modified the C/A in this area to allow for additional space as much as possible with the current designs to maximize the amount of developable land, and will continue to work with the City during final design to determine how best to achieve the City's goals where possible. It was noted that for the City to use this land they would need to request a change of access to NCDOT and any additional ROW they would want to use for development would need to follow the ROW disposal procedure with NCDOT. This is typically done after the project is complete.

MEETING SUMMARY



To: Project File

From: Celia Miars
AECOM

Date: September 17, 2018

RE: **I-2513 Cost Estimate Review Meeting**
NCDOT STIP Project I-2513 (I-26 Connector)

The project team, Federal Highway Administration (FHWA), and NCDOT representatives held the Cost Estimate Review (CER) Workshop for the I-26 Connector Project at NCDOT Century Center on Tuesday, September 11 through Thursday, September 13, 2018. Meeting attendees for each day are documented on the attached meeting attendance spreadsheet. Michael Smith and Chuck Luedders with FHWA facilitated the meeting. The purpose of the CER is to verify the accuracy and reasonableness of the project cost estimate and project schedule. A CER is required for projects over \$500 million in total project expense.

Chuck presented the CER Introduction presentation to discuss the process of the CER. The current total project cost estimate is \$1.212 billion with an estimated construction completion of March 2025. This CER will produce a final report that will document the review findings. FHWA uses the results as the official cost estimate for the project.

Joanna Rocco gave a presentation of the project which included a project history and status update, a review of the preferred alternative selected in May 2016, an overview of the next steps of the project, and the current project schedule.

Donna Keener gave an overview of the State Estimate Process. Quantities for each section of the project were prepared by the project team and submitted to NCDOT prior to the meeting to complete the project estimate. The quantities are based on current prices and were completed mid-August. It was noted the level of design is currently at approximately 25 percent. At this stage, the bridge structures have not been designed, however, they have been evaluated for structure types, beam types, and girder types. It was noted the construction of new structures is approximately one-third of the entire construction cost estimate, which does not include the cost to remove existing structures. The structures quantities were priced with a bridge deicing system, which was eliminated from the project cost.

Michael Smith began the discussion regarding potential risks and opportunities for each subject matter and risks included in the risk register. On Tuesday and Wednesday of the meeting, subject matter experts for each discipline joined the meeting to discuss specific risks and opportunities. They made recommendations for revising risk probability, cost increase probability, and schedule delay probability where necessary for the following topics:

- Structures
- Retaining walls
- Railroad coordination
- Sound barriers

MEETING SUMMARY

September 17, 2018

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- Earthwork
- Drainage
- Pavement
- Roadway
- Geotechnical
- Roadside Environmental (Erosion Control & Landscaping)
- Traffic control
- Signing
- Lighting
- Traffic signals and ITS
- Environmental/permitting/mitigation
- Utilities (wet and dry)
- Right of way

Chuck Luedders facilitated the closeout presentation on Thursday, September 13, 2018. The presentation included a review of the project purpose and identified the preliminary findings of the CER (which includes a probability range for the cost estimate and schedule that represents the projects current stage of progress). Below is a summary of preliminary findings from the CER.

- The cost of delaying the project one year would equate to approximately \$41 million dollars.
- Two, potentially three, endangered species could affect scheduling.
- The tight urban area with restrictive right of way could affect utility relocation.
- NCDOT processes help will control the cost spread.
- The current year total cost estimate is approximately \$1.213 million (includes \$136.9 million in contingencies).
- The year of expenditures total cost estimate ranges from approximately \$1.237 billion (30 percentile) and \$1.284 billion (70 percentile).
- The project completion is anticipated for April 2025.
- Major cost threats include the French Broad River Bridge Construction, utility relocation, high material costs (steel), increased square feet of retaining walls, and the increased cost of retaining walls.
- Major cost opportunities include design build innovation and efficiencies and innovative bridge construction.
- Major schedule threats include the French Broad River bridge construction and utility relocation.
- Major schedule opportunities include innovative traffic management strategies, design build innovation and efficiencies, and innovative bridge construction.

The following recommendations were made:

- Use the CER results for the Initial Financial Plan (IFP)
- Document any cost/schedule changes from now until the IFP
- Submit the project management plan to FHWA for approval
- Use the CER results as a resource in publicly presenting the project's estimated cost
- Utilize the risk register as a tool to manage the project's cost and schedule risks
- Use FHWA's Schedule Estimating Guidance as a resource in setting the project's baseline completion date in the IFP.

The next steps of the CER are to finalize the CER report prepared by FHWA. FHWA will use the results as the official cost estimate for the project. It was noted the CER is a snapshot of the current estimate.

All findings from the CER will be documented in the CER report and distributed to meeting attendees for review.

**I-26 Connector
Asheville, North Carolina
FHWA Cost Estimate Review
September 2018**



Final Report

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I-26 CONNECTOR - ASHEVILLE

September 2018 Cost Estimate Review Workshop



Project Description:

Approximately 7 miles in length, the proposed I-26 Connector Project reconstructs I-26 from south of the I-40 interchange through Asheville to north of I-240. The project reconstructs portions of I-40 and I-240 including bridges over the French Broad River.

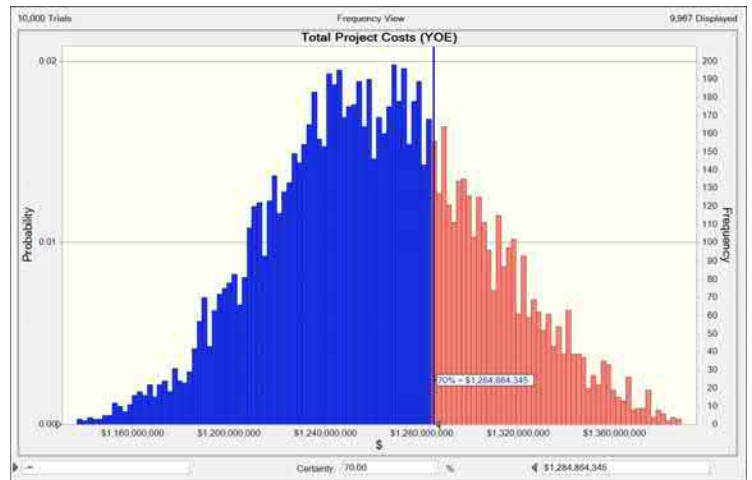
Project Benefits:

- To improve the capacity deficiencies of existing I-240 west of Asheville to accommodate the existing and forecasted (2033 design year) traffic.
- To reduce traffic delays and congestion along the I-240 crossing of the French Broad River.
- To increase the remaining useful service of the existing Captain Jeff Bowen Bridges (Patton Avenue).

Financial Fine Print

The Monte Carlo simulation forecasted a range of total project costs for the I-26 Connector Project ranging from \$1.10 billion to \$1.42 billion in Year of Expenditure (YOE) costs. The 70th percentile Total Project Cost is \$1.28 billion (YOE).

Cost Range:



Project Schedule Range:

Construction Expected 2020 to 2026

Key Project Risks:

- The NEPA document is not completed.
- Duke Energy transmission line relocation affects project schedule.
- Rising steel costs may affect project cost.
- Two endangered species inhabit the project site. They may cause schedule delay and increase the cost.

What's Changed

This is the initial CER for this Project.

Level of

Project Design:

Section A – 25%
Section B – 25%
Section C – 25%

September 2018

EXECUTIVE SUMMARY

A review team consisting of the North Carolina Department of Transportation (NCDOT), their consultants and the Federal Highway Administration conducted a Cost Estimate Review (CER) workshop to review the cost and schedule estimates for the I-26 Connector Project. The workshop was held at the NCDOT Century Center located at 1020 Birch Ridge Road in Raleigh, North Carolina on September 11-13, 2018. Due to Hurricane Florence, the modeler and facilitator from FHWA participated remotely. FHWA's Division Major Projects' Engineer participated locally in the workshop.

Project Description

NCDOT is developing this project to upgrade the I-26 corridor through the City of Asheville. The project provides improved system linkage in Western North Carolina, increases the capacity of I-26 and reduces congestion on I-240 over the French Broad River. The Project is split into three sections to accomplish these goals.

Section A includes expanding the existing I-240 four-lane roadway from the I-26/I-240 interchange to the I-240 interchange at Patton Avenue. Included are upgrades to the interchanges at Brevard, Amboy and Haywood Roads. It also extends Amboy Road across I-240 to Brevard Road, opposite Shelburne Road.

Section B places the interstate on new alignment north of Patton Avenue to cross the French Broad River. This allows Patton Avenue to become a local street, allowing access for bicycles and pedestrians along the roadway.

Section C upgrades interchanges at Smokey Park Highway (U.S. 19/23/74A), as well as I-26/I-240 and Brevard Road. It maintains the existing two-level configuration of the I-26/I-40/I-240 interchange and adds additional through lanes, as well as a new loop from I-240 West to I-40 East and a ramp from I-40 West to I-240 East.

Pre-CER Project Cost and Schedule

Prior to the start of the review, the project team submitted a total cost estimate for the I-26 Connector Project of \$1.213 billion in 2018 dollars for the combination of the three sections. The estimated completion date for the project was designated as April 2025. All sections are funded with construction expected to be performed concurrently. There is the possibility that all three sections will be combined into one project.

CER Estimate Adjustments

During the cost estimate review, three adjustments were made to the base estimate based on input from the Subject Matter Experts. These adjustments removed the bridge de-icing systems from the project, increased the unit price for the erosion control and doubled the amount for the wetlands and stream mitigation work. Details of these adjustments are shown below:

- Estimate Adjustments

- Eliminate de-icing system all bridges (\$62,500,000.00)
- Increase Erosion Control cost from \$25K to \$30K per acre \$4,040,000.00
- Double the mitigation factor for Wetlands and Streams \$2,020,000.00
- Total Adjustments (\$56,440,000.00)

These adjustments reduced the base estimate from \$1.213 billion to \$1.156 billion

Cost Estimate Review Results

Based on the revised base estimate and the CER risk-based probabilistic approach, the Monte Carlo simulation forecasted a range of total project costs for the I-26 Connector Project ranging from \$1.100 billion to \$1.422 billion in Year of Expenditure (YOE) costs. The 70th percentile Total Project Cost is \$1.285 billion (YOE). The 70th percentile anticipated completion date for the entire project based on the assumptions used is April 5, 2026. This indicates the schedule risks as input into the analysis foresees a 1 ½ year delay in project completion.

Risk Register

Several outstanding issues affect either the project cost or schedule. The most critical of these are bulleted below:

- The NEPA process is not completed. Delay in approval affects the project cost and schedule. A delay of one year increases the cost \$41 million due to inflation.
- Utility relocations, especially the transmission line, affect both cost and schedule. This issue provided the largest risk impact for both cost and schedule.
- The numerous retaining walls add risk to the project. These walls account for nearly 10% of the project cost. Risks are shown for both a size increase and a higher bid price.
- Steel prices are volatile possibly affecting bids.

Review Recommendations

- Use the results from this CER in the Initial Financial Plan.
- Document any cost/schedule changes from now until the submittal of the Initial Financial Plan.
- A Project Management Plan is required for all Major Projects. It must be submitted and approved prior to Federal Funds being approved for project construction.
- Use the CER results as a resource in the NEPA document and for public information. It is often better to use a range of costs rather than a single number.
- Utilize the risk register as a tool to manage the Project's cost and schedule risks.

CHAPTER 1 – REVIEW PROCESS

INTRODUCTION

The review team consisted of the North Carolina Department of Transportation (NCDOT) personnel, their consultants and representatives of the Federal Highway Administration. This team conducted a Cost Estimate Review (CER) workshop to review the cost and schedule estimates for the I-26 Connector Project. The workshop was held at the North Carolina DOT headquarters located at 1020 Birch Ridge Road in Raleigh, North Carolina on September 11-13, 2018. Due to Hurricane Florence, the Monte Carlo modeler and the facilitator from FHWA participated remotely. FHWA's Division Major Projects' Engineer was present with the NCDOT Design Team.

The I-26 Connector Project is designed in three sections. Section A includes expanding the existing I-240 four-lane roadway from the I-26/I-240 interchange to the I-240 interchange at Patton Avenue. Section B places the interstate on a new location north of the Captain Jeff Bowen bridges and connects with U.S. 19/23/70 in north Asheville. Section C upgrades the interchanges at Smokey Park Highway (U.S. 19/23/74A), I-26/I-240 and Brevard Road. All three sections may be constructed concurrently according to current plans.

This chapter provides a general overview of the cost estimate review process along with a discussion of the objective of the review and the methodology used.

REVIEW OBJECTIVE

The cost estimate review conducted an unbiased risk-based review to verify the reasonableness of the current total cost estimate to complete the Project in year of expenditure dollars. Probability ranges for the cost estimate indicating best and worst-case scenarios were presented that represent the current stage of Project design. The review team also reviewed the proposed Project schedule to determine potential schedule impacts on the Project cost. This process provides the NCDOT with information outlining the future cost of the Project to ensure adequate cash flow and details the impacts inflation and delays have on Project costs.

BASIS OF REVIEW

The Moving Ahead for Progress in the 21st Century Act (MAP-21) requires a financial plan for all Federal-aid projects with an estimated total cost of \$500 million or more to be approved by the U.S. Department of Transportation Secretary (i.e. FHWA) based on reasonable assumptions. The \$500 million threshold includes all project costs, such as engineering, construction, ROW, utilities, construction engineering and inflation. The FHWA interprets 'reasonable assumptions' to be a

risk-based analysis. The cost estimate review provides this risk-based assessment and is used in the approval of the financial plan. This is an independent review, but does not use an independent FHWA estimate. The review team used the estimate provided by the NCDOT project team.

REVIEW TEAM

The review team was developed with the intent of having individuals with a strong knowledge of the Project and/or of major project work and expertise in specific disciplines of the Project. This team participated together throughout the workshop. Subject matter experts with specific expertise relative to the project briefed the review team on portions of the Project or estimate development process. The review team also discussed the development of the Project cost estimate quantities, unit prices, assumptions, opportunities and threats. A sign-in sheet documents the attendees for this review and is provided in the Appendices.

The review team was comprised of members of the following organizations:

- NCDOT
- NCDOT Consultants
 - AECOM
 - HNTB
- FHWA
 - North Carolina Division Office
 - Resource Center (remotely)
 - Headquarters – Office of Infrastructure (remotely)

DOCUMENTS REVIEWED

Documents provided by NCDOT and reviewed prior to and during the workshop included:

- Project Cost Estimate
- Project Schedule
- Project overview presentation
- Risk Register
- Draft Environmental Impact Statement (From Project Website)
- Public Hearing Maps with Functional Design Plans

METHODOLOGY

The methodology for this cost estimate review is outlined as follows:

- Verify accuracy of cost estimate.
 - Understand project scope and cost estimate development process.

- Discuss assumptions for contingencies and projected inflation rates.
- Review major cost elements.
- Identify threats and opportunities (Risk Register).
- Model uncertainties.
 - Establish base estimate variability.
 - Determine probability of occurrence and schedule and cost impacts for significant project threats and opportunities.
 - These are based on the experience of the review team and the subject matter experts. The team agrees on the impact of the risk and the probability of it happening and insert these factors into the model.
 - Model anticipated market conditions at the time of letting.
- Perform Monte Carlo simulation to model variability and risks and generate the likely range of project cost and schedule.
- Communicate results.
 - Report methodology and results in a close-out presentation.
 - Document review in a final report (this report) that will be used to inform the public and develop the financial plan.

The following discussion provides more detail about the concepts utilized during the review.

Verify Accuracy of Cost Estimate

The review team was provided an overview of the estimation process used to develop the project's estimate. This overview included understanding the scope of the project, stage of design and assumptions used to develop the estimate.

Model Uncertainties

In general, uncertainties in the estimate can be described as those relating to base variability, market risks and cost and schedule risk events. Each of these are discussed and modeled to reflect the total uncertainty.

Base variability is a measure of uncertainty applied to the base estimate that represents the inherent randomness associated with the estimating process. Base variability is a function of the project's current level of design and the process used to develop the estimate. This may be demonstrated by the fact that two estimators using the same data sources and following the same general estimate development guidance will generate different estimates. Additionally, the lack of details about the project and assumptions that should be used to develop the estimate would cause more uncertainty and variability in the estimate. This base variation is a function of the system (i.e. assumptions and data sources used to define the estimate). Base variability is applied to the base estimate exclusive of risks. Contingencies that include risks are removed from

the base estimate to avoid double counting risks identified in the risk register. Allowances and expected construction change order costs typically remain in the base estimate.

Market conditions at the time of advertisement, bid and award are modeled to reflect the future competitive bidding environment. Three scenarios are evaluated including worse than planned, as-planned and better than planned. Each scenario is assigned a likelihood of occurrence and a range of associated costs. In addition to market conditions, inflationary risk is also modeled and used to project current year dollars to year of expenditure.

A **risk register** is developed by interviewing the project team and its consultants to define the components of contingency and establish both cost and schedule risks. The risk register includes the event risk name, a description of the event and a probability measure of the likelihood the event will occur, as well as a probability distribution of costs if the event were to occur. The register also identifies if the risk event is a threat or opportunity for cost and or schedule. **Risk threats** increase the cost and or schedule while **opportunities** decrease the cost and or schedule. A very important feature of the risk register is to establish the relationship of risk events. For example, some risks are mutually inclusive or mutually exclusive. **Mutually inclusive** means the risk event can only occur if the prior risk event occurs. Conversely, for a risk event to be **mutually exclusive** means that it can only occur if the prior risk event does not occur. Risk events can also be **independent** in which case the probability of occurrence is not dependent on any other risk event. Correlation determines how one risk event will sample during the simulation relative to another risk event. Correlation should only be established when there is reason to suspect that a relationship exists and needs to be accounted for in the simulation.

After models are developed for market conditions, base variability and risk events, the review team utilized a Monte Carlo simulation to generate a probability based estimate of Year-of-Expenditure (YOE) Total Project Costs. A **simulation** is essentially a rigorous extension of a “what-if” statements or sensitivity analysis, which uses randomly selected sets of values from the probability distributions representing uncertainty to calculate separate and discrete results. A single iteration within a simulation is the process of sampling from all input distributions and performing a single calculation to produce a deterministic result. It is important that each iteration represent a scenario or outcome that is logically possible. It is for this reason that the simulation outcomes be reviewed to ensure accuracy. The process of sampling from a probability distribution is repeated until the specified number of computer iterations is completed or until the simulation process converges. Simulation **convergence** is that point at which additional iterations do not significantly change the shape of the output distribution. The results of the simulation are arrayed in the form of a distribution covering all possible outcomes. The key benefit of this process is that the probability is associated with projected cost and schedule.

Communicate Results

The last part of the review is to communicate the review results by providing a closeout presentation and final report. At the end of the review the review team provides a closeout presentation that summarizes the review findings. The presentation identifies the review objectives and agenda, discusses the methodology and highlights the results of the review, including the pre/post workshop estimate results and any estimate adjustments made during the review. The closeout presentation identifies any significant cost and schedule risks and provides a brief overview of recommendations by the review team. The close-out presentation for this review was held on October 1, 2018 by webinar due to Hurricane Florence affecting the original close-out scheduled for September 13th. A copy of the close-out presentation is included as an appendix with this report.

The estimate review is a snapshot in time and as additional information becomes available, it is expected that the estimate will change and be updated. The final report communicates all findings of the review to the project sponsor and FHWA Division and serves as the official document for the cost estimate review. As noted earlier, the review results are used in the approval process for the financial plan. Cost estimate review reports are maintained by the FHWA Office of Infrastructure's Major Projects Team in Washington, D.C.

CHAPTER 2– REVIEW SUMMARY

PROJECT BACKGROUND

The North Carolina Department of Transportation’s (NCDOT) I-26 Connector Project is approximately 7 miles in length. It improves I-26 in Asheville, North Carolina from south of the I-40 interchange to the US-19/23/70 interchange in northwest Asheville.

The proposed project involves three sections:

- Section A includes expanding the existing I-240 four-lane roadway from the I-26/I-240 interchange to the I-240 interchange at Patton Avenue. There would be upgrades to the interchanges at Brevard, Amboy and Haywood Roads. It would also extend Amboy Road across I-240 to Brevard Road, opposite Shelburne Road.
- Section B places the interstate on a new location, from the Patton Avenue interchange across the French Broad River just north of the Captain Jeff Bowen bridges, and connects with U.S. 19/23/70. It would allow Patton Avenue to become a local street, removing the interstate traffic from the bridges. This opens this section of Patton Avenue to access for bicycles and pedestrians along the roadway returning its function to a city street.
- Section C upgrades the interchanges at Smokey Park Highway (U.S. 19/23/74A), at I-26/I-240 and Brevard Road. It maintains the existing two-level configuration of the I-26/I-40/I-240 interchange and adds additional through lanes, as well as a new loop from I-240 West to I-40 East and a ramp from I-40 West to I-240 East.

The I-26 Connector Project provides a median-divided, fully controlled-access freeway accessible only via interchanges. To reduce the required right-of-way, there would be a barrier median dividing opposing directions of travel.

Once complete, the freeway becomes part of the I-26 Interstate that extends from Charleston, South Carolina to Kingsport, Tennessee.

Figure 1 illustrates the location of all three sections within the I-26 corridor and its connections with the other interstate highways in the Asheville area.

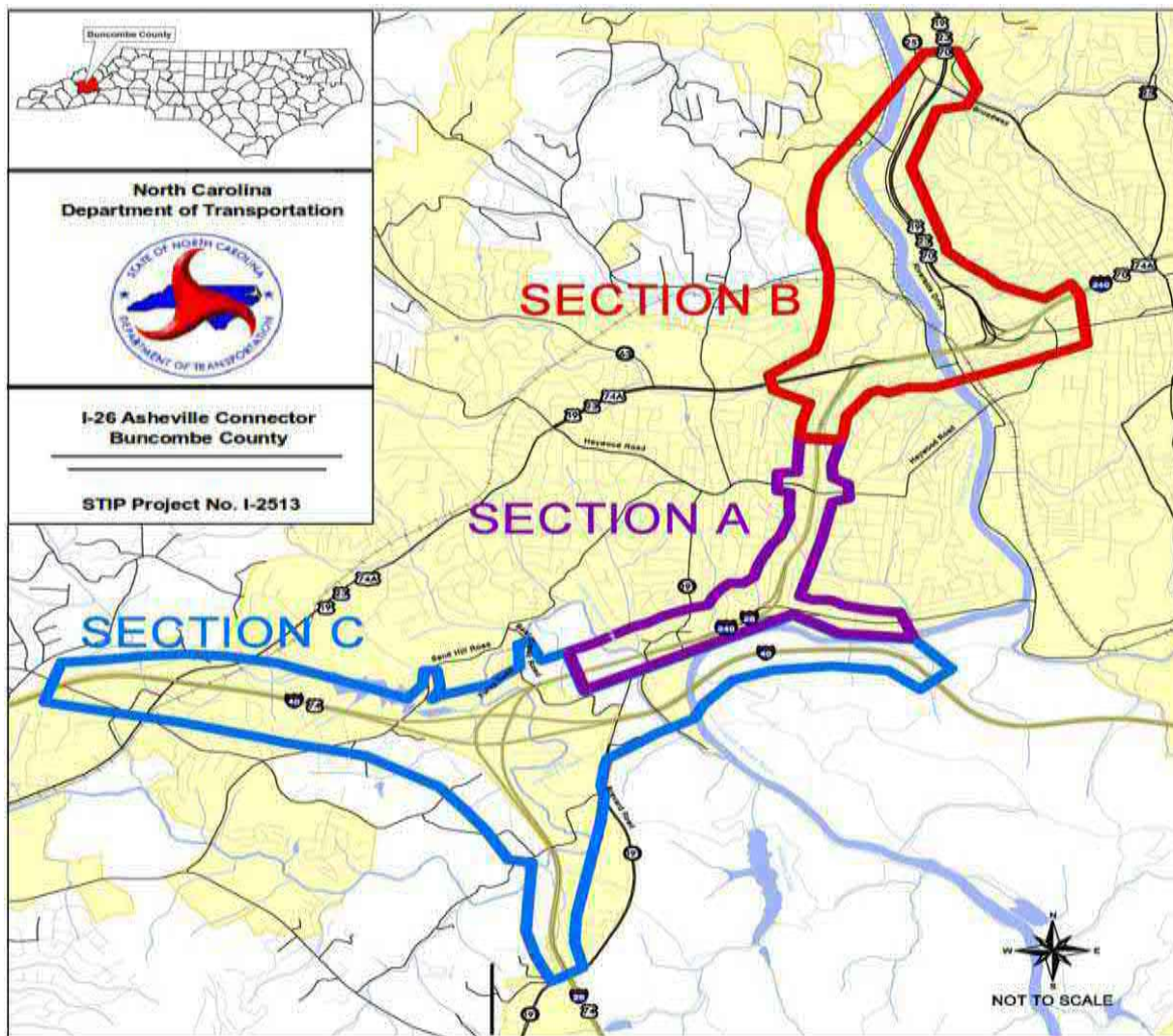


Figure 1 – I-26 Connector Project location in west Asheville.

ENVIRONMENTAL PROCESS

The environmental document for the I-26 Connection is an Environmental Impact Statement. A Record of Decision is expected in early 2019. Currently, a Draft Environmental Impact Statement is available from NCDOT's Project Website. Approval of the Environmental Impact Statement is the controlling factor for initiation of many project activities. Delays in completing this document delays the Project an equivalent amount of time.

PROJECT PROCUREMENT

NCDOT plans to use a Design-Build procurement for the I-26 Connector Project. Design for all three sections is at 25% in anticipation of this procurement. It is possible that all three sections will be procured under one contract.

PROJECT SCHEDULE

The I-26 Connector Project is divided into three Sections. Sections A and C are assumed to be awarded as one Design-Build contract with construction beginning in February 2020. Section B, the most expensive of the three sections, is scheduled as a separate Design-Build contract that follows the other two sections and start in July of 2020. NCDOT is considering placing all three sections into one contract. This would eliminate any possible conflicts between separate Contractors. Each construction phase is scheduled to last four-years. Figure 2 below taken from the State’s estimate provides an overview of the duration of each phase separated by Section.

STIP Project	Cost Stage	Start	End
I-2513A	Construction	2/5/2020	2/5/2024
	Landscaping	10/31/2024	3/30/2025
	ROW	8/3/2020	8/3/2022
	Utilities	8/3/2020	11/3/2021
	Env. Mitigation	2/5/2020	2/5/2020
	Admin.	2/5/2020	3/30/2025
	Priors	6/30/2002	7/31/2018
	TOTALS		
I-2513B	Construction	7/5/2020	10/5/2024
	Landscaping	10/31/2024	3/30/2025
	ROW	1/1/2021	1/1/2023
	Utilities	1/1/2021	4/1/2022
	Env. Mitigation	7/5/2020	7/5/2020
	Admin.	7/5/2020	3/30/2025
	Priors	6/30/2002	7/31/2018
	TOTALS		
I-2513C	Construction	2/5/2020	2/5/2024
	Landscaping	10/31/2024	3/30/2025
	ROW	1/1/2021	8/3/2022
	Utilities	1/1/2021	3/30/2025
	Env. Mitigation	2/5/2020	2/5/2020
	Admin.	7/5/2020	3/30/2025
	Priors	6/30/2002	7/31/2018
	TOTALS		

Figure 2 – I-26 Connector anticipated Project Schedule

COST ESTIMATE

NCDOT’s project team submitted updated total project estimates for the I-26 Connector Project prior to the Cost Estimate Review. The following table summarizes the Project costs as submitted.

	I-26 Connector Project Overview	
Project Sections	Current Year Cost	Year of Expenditure Cost
Section A (I-2513A)	\$238,733,822	\$264,725,962
Section B (I-2513B)	\$710,227,987	\$799,396,962
Section C (I-2513C)	\$263,918,291	\$292,152,962
Total Cost	\$1,212,888,100	1,356,275,886
Total Project Completion Date		April 2025

Figure 3 – Pre-CER Cost Estimate and Completion Date for I-26 Connector

Several adjustments were made to the cost estimate during the Cost Estimate Review. These adjustments are listed below. This review focuses only on capital costs and does not include financing or operations and maintenance costs.

I-26 Connector Cost Estimate Adjustments

- Eliminate de-icing systems from all bridges. (Reduction of \$65,200,000)
- Increase Erosion Control Cost from \$25K to \$30K/acre. (Increase of \$4,040,000)
- Added twice mitigation factor to wetlands and streams. (Increase of \$2,020,000)

These adjustments reduced the base estimate by \$56,440,000 to \$1,156,303,660. The main contributor to the reduction was the removal of the deicing from the bridges. The following table provides a breakdown of the base estimated costs used in the Monte Carlo simulation.

STIP Project	Cost Stage	Cost Estimate with Contingency
I-2513A	Construction	\$ 152,903,122
	Landscaping	\$ 1,529,032
	ROW	\$ 44,502,173
	Utilities	\$ 2,036,054
	Env. Mitigation	\$ 650,574
	Admin.	\$ 28,789,080
	Priors	\$ 7,678,629
	TOTALS	\$ 238,088,664
I-2513B	Construction	\$ 448,192,830
	Landscaping	\$ 4,481,929
	ROW	\$ 95,374,368
	Utilities	\$ 13,576,433
	Env. Mitigation	\$ 1,840,299
	Admin.	\$ 81,755,027
	Priors	\$ 7,678,629
	TOTALS	\$ 652,899,515
I-2513C	Construction	\$ 200,570,259
	Landscaping	\$ 2,005,703
	ROW	\$ 12,422,846
	Utilities	\$ 4,463,648
	Env. Mitigation	\$ 1,549,022
	Admin.	\$ 36,625,374
	Priors	\$ 7,678,629
	TOTALS	\$ 265,315,481
I-2513 (ALL)+\$G\$40	Construction	\$ 801,666,211
	Landscaping	\$ 8,016,664
	ROW	\$ 152,299,387
	Utilities	\$ 20,076,135
	Env. Mitigation	\$ 4,039,895
	Admin.	\$ 147,169,482
	Priors	\$ 23,035,886
	TOTALS	\$ 1,156,303,660

Figure 4 – Cost Estimate after Adjustments during the CER Workshop

REVIEW OBSERVATIONS

Significant review observations include:

- Modeler and facilitator had to participate remotely due to Hurricane Florence. This also delayed the close-out presentation to October 1, 2018.

- The tight urban area with restrictive right-of-way affects utility relocation costs, especially the Duke Energy transmission lines.
- The project has two endangered species with a possible listing of a third in the future. This restricts construction activities in certain areas and may affect the project schedule.
- The NEPA document is not yet complete. Any delays in approval of the NEPA decision could affect the project schedule. The cost of one year's delay to the project is calculated at \$41 million due to the inflation inputs in the Monte Carlo simulation.
- NCDOT's process help control the project cost spread. The risk-based simulation only derived a \$323 million spread between the 0% and 100% confidence levels.

REVIEW RECOMMENDATIONS

The following recommendations are provided based on this Cost Estimate Review:

- Plan to use these CER results for the Initial Financial Plan (IFP), which is required before FHWA construction authorization.
- Document any cost and schedule changes between this CER and the IFP.
- Submittal and approval of a Project Management Plan (PMP) are required prior to FHWA approving the Initial Financial Plan.
- Update the project estimate to reflect adjustments made during this review.
- Use the CER results as a resource in publicly presenting the project's estimated total cost and schedule as a range of cost and completion dates.
- Utilize the risk register resulting from this CER as a tool to continue managing the project's cost and schedule risks.
- Use FHWA's Schedule Estimating Guidance as a resource, in addition to these CER results, in setting the project's baseline schedule completion date in the IFP. This resource is found at the following link.

https://www.fhwa.dot.gov/majorprojects/schedule_estimating/

CHAPTER 3 – COST ANALYSIS (MONTE CARLO SIMULATION)

RISK INTRODUCTION

Cost estimates, especially those for Major Projects, contain a degree of uncertainty due to unknowns and risks associated with the level of design completed. For this reason, it is logical to use a probabilistic approach and express the estimate as a range rather than a point value. During the cost estimate review, uncertainties in the project estimate such as base variability, inflation, market conditions and risk events were modeled to reflect the opinions of the subject matter experts interviewed. Then a Monte-Carlo simulation was used to incorporate the uncertainties into forecast curves that represent a range of costs and completion dates for the Project. As noted earlier, the CER focuses only on capital costs, and does not include financing or Operations and Maintenance costs.

The following results are from the CER Monte Carlo simulation forecast for all segments of the I-26 Connector Project in Asheville, North Carolina. The results are based on the probability assumptions that were identified and modeled during the CER workshop.

PROBABILITY ASSUMPTIONS

The assumptions discussed below describe how the review team modeled the risk events, base variability, inflation and market conditions that served as inputs for the results shown in this section of the report. As discussed in Chapter 1, the Monte Carlo analysis selects random inputs from these distributions to determine discrete values for a given number of iterations. The model runs the simulation through 10,000 iterations and ranks the results to determine the likely range of cost and schedule for the project.

In a traditional cost estimate, risks are often accounted for using estimates of contingency. This contingency is intended to cover cost associated with risks events that may be realized during the project. The review team determined that some of the contingency amounts in the pre-CER estimate were allowances for non-risk events. Therefore, these allowances were kept in the base estimate.

Prior to the review, a risk register was created by the Project team identifying specific risk events for the Project. This risk register was used as the starting point for the risks that were identified for inclusion in the Monte Carlo model and simulation.

The purpose of the risk register is to identify significant cost and schedule risks in the estimate. The Team identified and discussed risks to the project in terms of threats and opportunities. For

purposes of this review, a threat is a risk event that can add to the cost and/or schedule of the project and an opportunity is an event that can reduce the cost and/or shorten the schedule.

Risk events are quantified by likelihood of the occurrence and impact if it occurs. For example, Figure 5 shows the binomial distribution used to model a 75% likelihood of occurrence.



Figure 5 - Example of Binomial Distribution for a Project Risk's Likelihood of Occurrence

Figure 6 shows the triangular distribution used to define how the cost impact is modeled in the simulation. In this example, the impact varies from \$0 to \$25 million with the most likely impact of \$12.5 million.

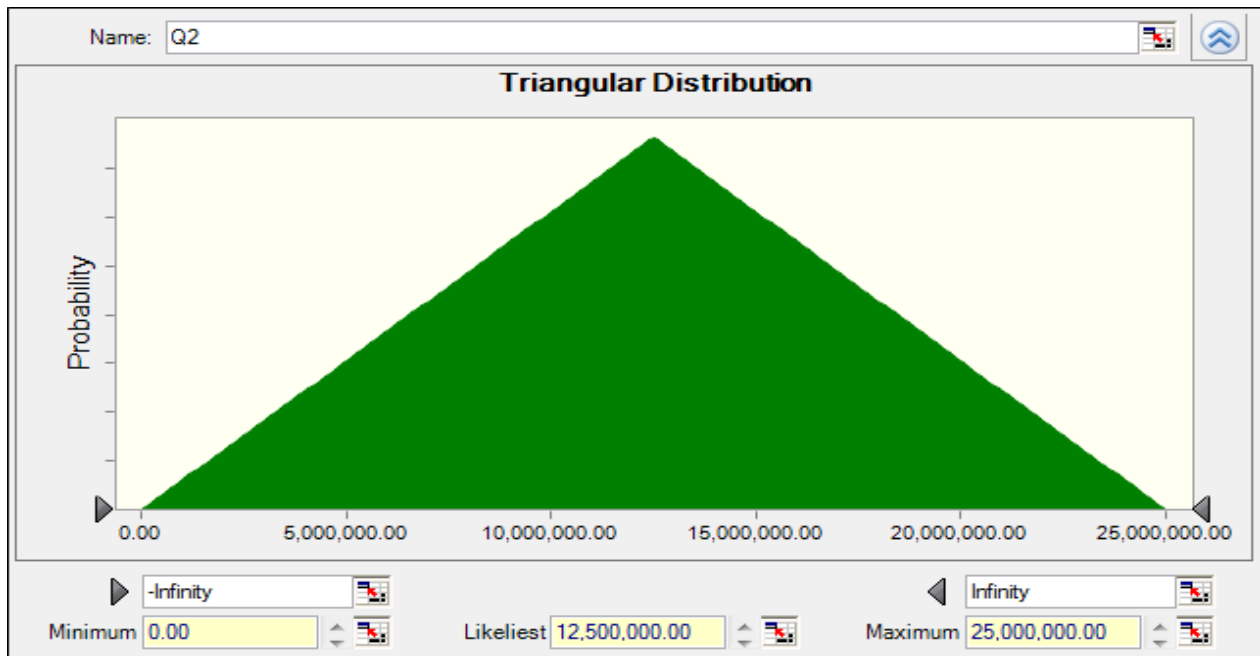


Figure 6 - Example of Triangular Distribution for a Project Risk's Cost Impact

RISK REGISTER

Figure 7 provides a listing of risks that the review team recognized for affecting for the I-26 Connector Project. These were developed from the Risk Register provided by NCDOT and from discussions with the Subject Matter Experts during the review. Each of these risks have corresponding probabilities and impacts implemented by the probability assumptions explained in the previous section.

Event Risk Name	Probability	Cost Threat Opportunity	Min Cost (\$)	Most Likely Cost (\$)	Max Cost (\$)
French Broad River Bridge Construction	80%	Threat	\$5,000,000	\$10,000,000	\$20,000,000
Complex traffic control during construction	80%	Threat	\$2,000,000	\$3,000,000	\$4,000,000
Unexpected geotechnical issues	40%	Threat	\$1,000,000	\$2,000,000	\$5,000,000
Addition of aesthetic treatments to walls and bridges	20%	Threat	\$0	\$2,500,000	\$5,000,000
Innovative Traffic Management Strategy	85%	Opportunity	\$0	\$1,000,000	\$2,000,000
Design Build Innovation and Efficiencies	100%	Opportunity	\$8,500,000	\$20,000,000	\$34,000,000
Innovative Bridge Construction	50%	Opportunity	\$15,000,000	\$20,000,000	\$25,000,000

Utility relocation	90%	Threat	\$10,000,000	\$25,000,000	\$50,000,000
Railroad agreements / Construction by Others	90%	Threat	\$1,000,000	\$2,000,000	\$3,000,000
High Material Costs (Steel)	80%	Threat	\$5,000,000	\$12,000,000	\$15,000,000
Causeway elevation at FBR	90%	Threat	\$0	\$500,000	\$1,000,000
Pilot Bridge De-Icing System	20%	Threat	\$0	\$5,000,000	\$10,000,000
Increase quantity noise walls	70%	Threat	\$0	\$5,000,000	\$10,000,000
Decrease in quantity of noise wall	50%	Opportunity	\$0	\$2,000,000	\$5,000,000
Increase aesthetic treatments	80%	Threat	\$1,500,000	\$3,000,000	\$5,000,000
Increase Sq. Ft. Retaining Walls	70%	Threat	\$0	\$10,800,000	\$21,600,000
Increase cost of retaining walls	100%	Threat	\$0	\$0	\$14,400,000
New culvert (i.e. avoid bats)	70%	Threat	\$1,000,000	\$2,000,000	\$2,000,000
Potential for construction claims	50%	Threat	\$5,000,000	\$7,500,000	\$10,000,000

Figure 7 – I-26 Connector Risk Threats/Opportunities

OTHER FACTORS AFFECTING PROJECT COSTS

Base Variability

Base variability captures the variability and uncertainty inherently associated with the cost estimating process. NCDOT initially placed this value at 5% for duration variability. This was raised to 10% later in the CER based on the 25% level of design and feedback from the project team and subject matter experts. We were seeing a very tight variability curve based on an initial trial run of the Monte Carlo simulation. Base variation values used in the review are shown as follow:

Phase/Segment Assignment	Base Cost Variability (%)	Duration Variability (%)
ROW+UT+EM-I-2513A	15%	10%
Agn+CN+LS-I-2513A	10%	10%
ROW+UT+EM-I-2513B	20%	10%
Agn+CN+LS-I-2513B	10%	10%
ROW+UT+EM-I-2513C	15%	10%
Agn+CN+LS-I-2513C	10%	10%

Figure 8 – Base Variation Values Used

Market Conditions

The primary reason for modeling market conditions is to reflect the uncertainty associated with the bidding environment at the time of advertisement. These discussions consider the potential number of bidders on project contracts. Other factors considered were labor and material

availability and the influence of other large infrastructure projects scheduled to be constructed in the same timeframe in the Asheville area.

The CER team discussed the market conditions and came up with the market conditions shown below. The probability denotes the likelihood of occurrence, and the impact denotes the magnitude as a percent of the planned value for better than planned (less costly than the planned value) and worse than planned (costlier than the planned value). Figure 9 provides the simulation inputs for measuring market conditions.

Phase/Segment Assignment	Probability Better than Plan	Probability Worse than Plan	Percent Offset from As-Planned Better (%)	Percent Offset from As-Planned Worse (%)
ROW+UT+EM-I-2513A	0%	40%	0%	10%
Agn+CN+LS-I-2513A	33%	33%	0%	0%
ROW+UT+EM-I-2513B	0%	70%	0%	30%
Agn+CN+LS-I-2513B	33%	33%	0%	10%
ROW+UT+EM-I-2513C	0%	0%	0%	0%
Agn+CN+LS-I-2513C	33%	33%	0%	0%

Figure 9 – Simulation Inputs for Market Conditions

Inflation

Per NCDOT recommendations the following inflation rates were modeled: 2.5% inflation was used for Preliminary Engineering. A 4.0% annual inflation rate was used for right-of-way in response to trends in the Asheville Metro area. A 3.0% annual inflation rate was used for the utility relocation and construction.

FORECAST TOTAL COSTS FOR THE I-26 CONNECTOR PROJECT

Figure 10 shows the results of the simulation for the I-26 Connector Project in current year dollars. This simulation incorporates the risks from the risk register and the other factors including base variability, market conditions and inflation.

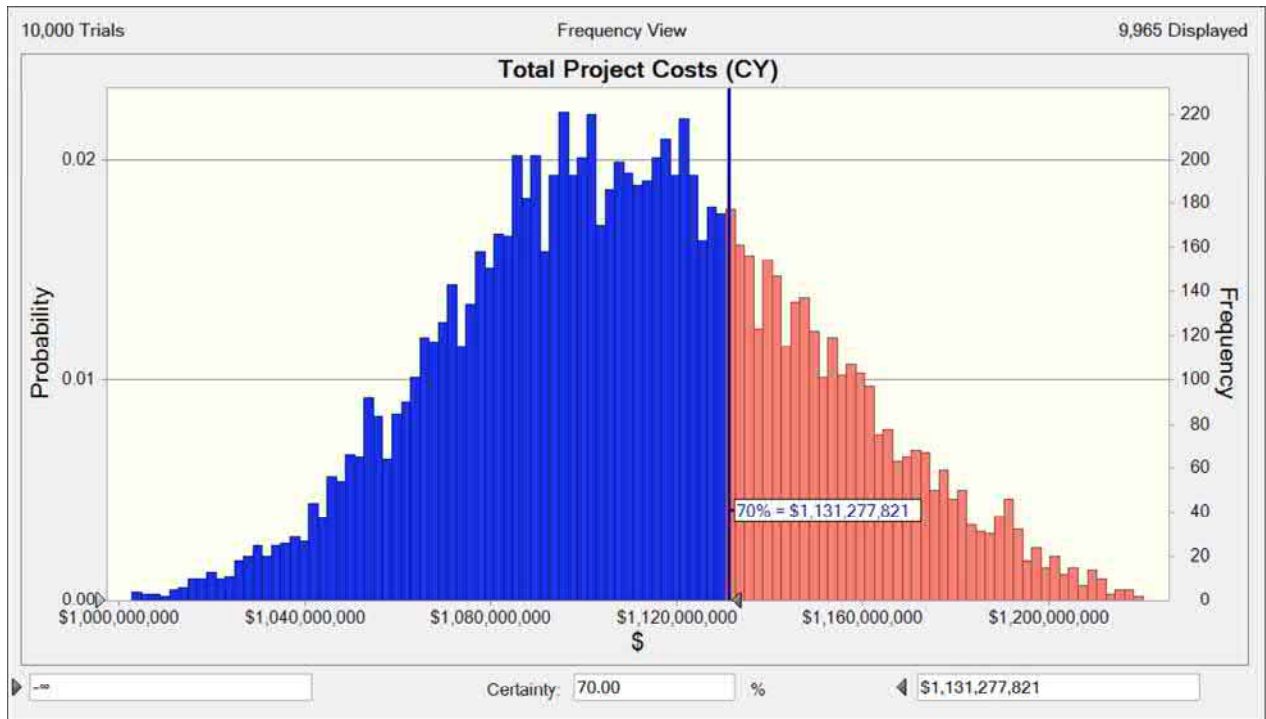


Figure 10 – Monte Carlo Forecast for the I-26 Connector Project Total Cost in CY Dollars (Includes Prior Expenditures)

Figure 11 modifies this with the inclusion of inflation resulting in year of expenditure (YOE) dollars. The 70th percentile level of confidence is the value highlighted. FHWA requires this value as the basis for setting the project's baseline cost in the Initial Financial Plan, thereby providing some risk reserve/contingency to be included in the project's budget.

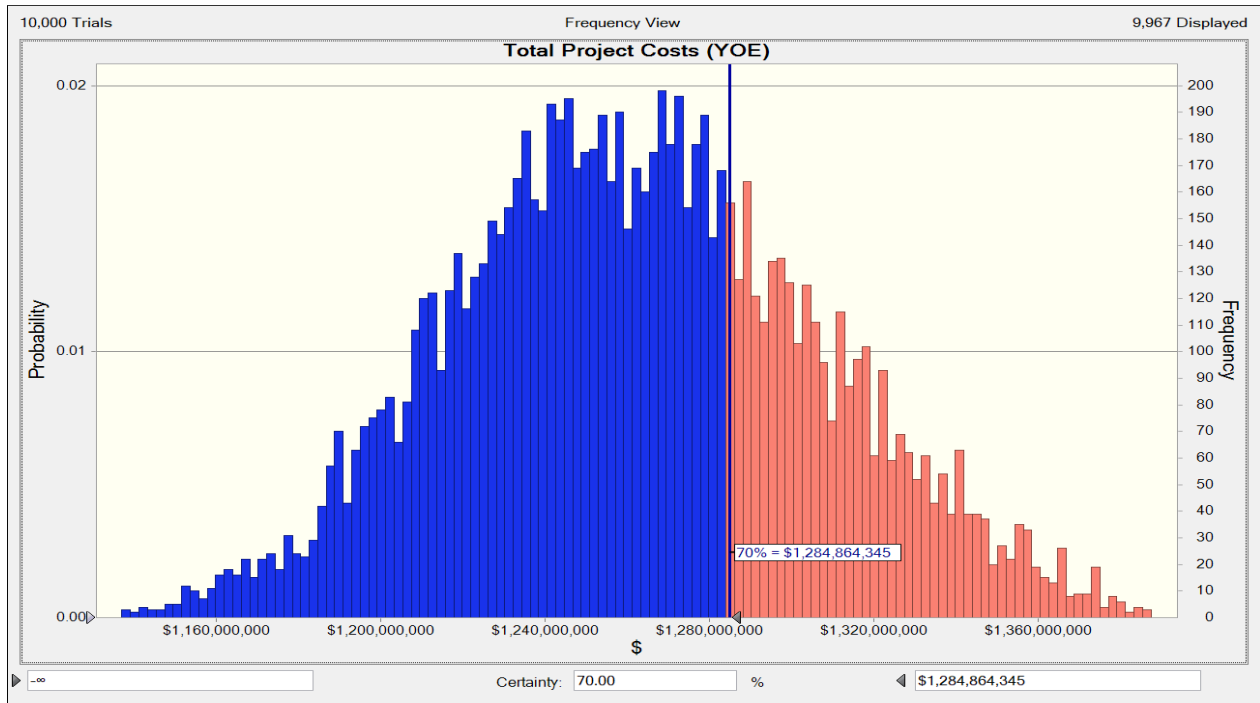


Figure 11 – Monte Carlo Forecast for the I-26 Connector Project Total Cost in YOE Dollars (Includes Prior Expenditures)

The following figure reduces Figure 11 to a table to show the entire range of results from the Monte Carlo simulation. This table provides anticipated costs based on the probabilities and impacts the Review Team agreed upon for the analysis. It indicates that the cost could be as low as \$1.10 billion if all opportunities are realized and no threats occur and as high as \$1.42 billion if all the threats, even those with low probability, are realized at their maximum impact.

Percentiles:	Forecast Values
0%	\$1,099,888,361
10%	\$1,205,998,268
20%	\$1,223,898,427
30%	\$1,237,256,155
40%	\$1,248,936,054
50%	\$1,260,801,659
60%	\$1,272,687,519
70%	\$1,284,864,345
80%	\$1,300,331,123
90%	\$1,321,416,627
100%	\$1,422,628,428

Figure 12 - Percentile Rankings of the I-26 Connector Project Total Cost in YOE Dollars (Includes Prior Expenditures)

FHWA policy states that CER results need to be reviewed and/or updated if more than one year passes between the date of the CER workshop and the date that the project proceeds to advertisement/letting or if the scope of work for the funded portion of the project significantly change. The need for a CER update will be assessed and coordinated between FHWA and NCDOT in concert with the IFP development and the project advertisement/letting schedule.

FORECAST PROJECT DELAY

The NEPA document for the I-26 Connector Project is scheduled for approval in early 2019. A delay in the approval of this document or litigation contesting the document can cause project delay. The following simulation provides the Year of Expenditure cost if the Project is delayed one year. The cost of a year's delay to the project is nearly \$41 million. This is determined by the difference between the 70% cost without the delay (\$1.285 billion) versus the 70% cost with the delay included in the calculation (\$1.326 billion). Figure 13 provides the Monte Carlo simulation for a one year's delay.

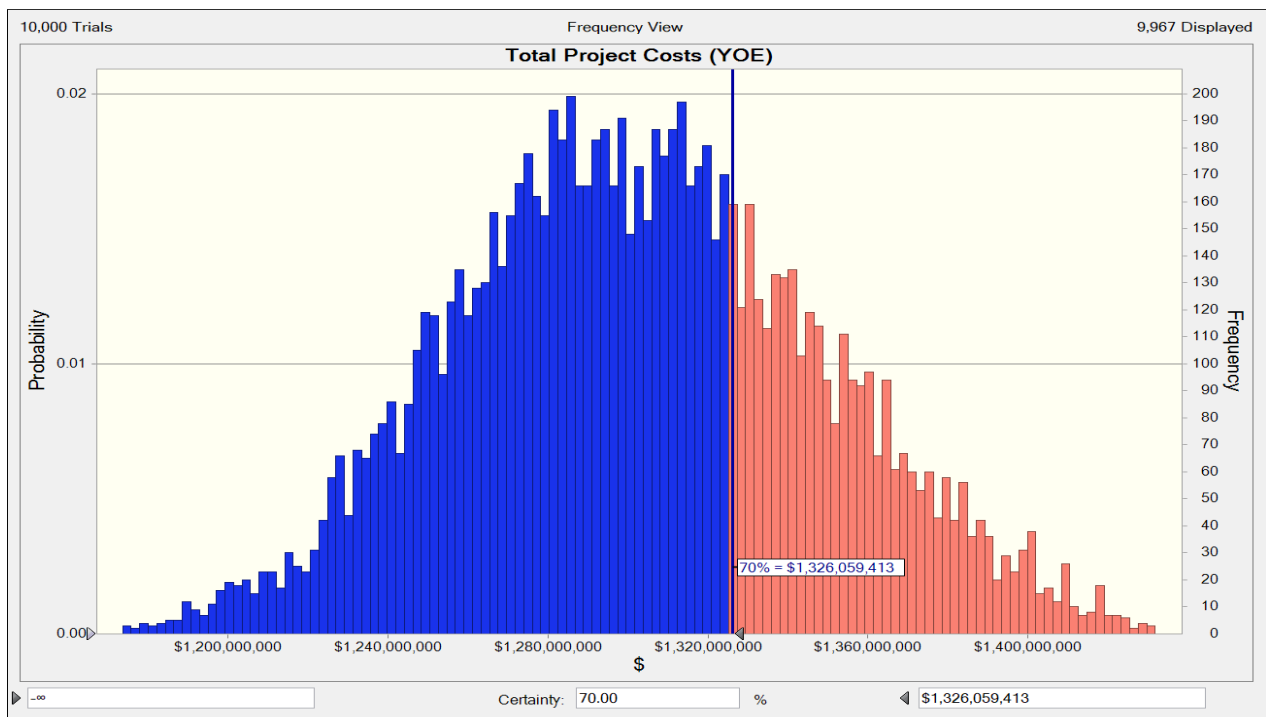


Figure 13 – Monte Carlo Forecast One Year's Delay to the I-26 Connector Project In Year of Expenditure Dollars

SCHEDULE ANALYSIS

A project's schedule has risks with duration variabilities like the variabilities that affect the project's base cost. Figure 14 includes the major schedule threats recognized by the review team. Many of the major risks center around the relocation of utilities, especially the Duke Energy

transmission line. The relocation of these utilities could affect the schedule of the Project, outside the control of the Contractor, which could affect the cost of the Project.

Event Risk Name	Probability	Min Schedule (Mo)	Most Likely Schedule (Mo)	Max Schedule (Mo)	Schedule Threat/ Opportunity
French Broad River Bridge Construction	80%	6.0	8.0	12.0	Threat
Unwilling sellers / condemnations	80%	0.0	0.0	3.0	Threat
Unexpected geotechnical issues	40%	0.0	1.0	2.0	Threat
Local stakeholder's involvement	20%	0.0	1.0	2.0	Threat
Innovative Traffic Management Strategy	85%	0.0	3.0	6.0	Opportunity
Design Build Innovation and Efficiencies	100%	0.0	3.0	6.0	Opportunity
Innovative Bridge Construction	50%	0.0	3.0	6.0	Opportunity
Utility relocation Segment A	75%	3.0	4.0	5.0	Threat
Utility relocation Duke Energy Transmission Line	90%	6.0	12.0	18.0	Threat
Utility relocation Segment B	90%	3.0	6.0	12.0	Threat
Railroad agreements / Construction by Others	90%	0.0	2.0	4.0	Threat
Causeway elevation at FBR	90%	0.0	1.0	2.0	Threat
Environmental Agreements	10%	0.0	1.0	2.0	Threat

Figure 14 – Schedule Risks for the I-26 Connector Project

Figure 15 shows the schedule forecast for the I-26 Connector Project. These results include the schedule threats and opportunities included in the risk table above. This projected completion date for the project is a 1 year later than the April 2025 completion date shown in NCDOT's base estimate. This is due to the high probability and extensive delays given to the utility relocation and multiple projects being constructed simultaneously with various constraints due to endangered species. Use of the risk table provides information on where mitigation efforts are most beneficial.

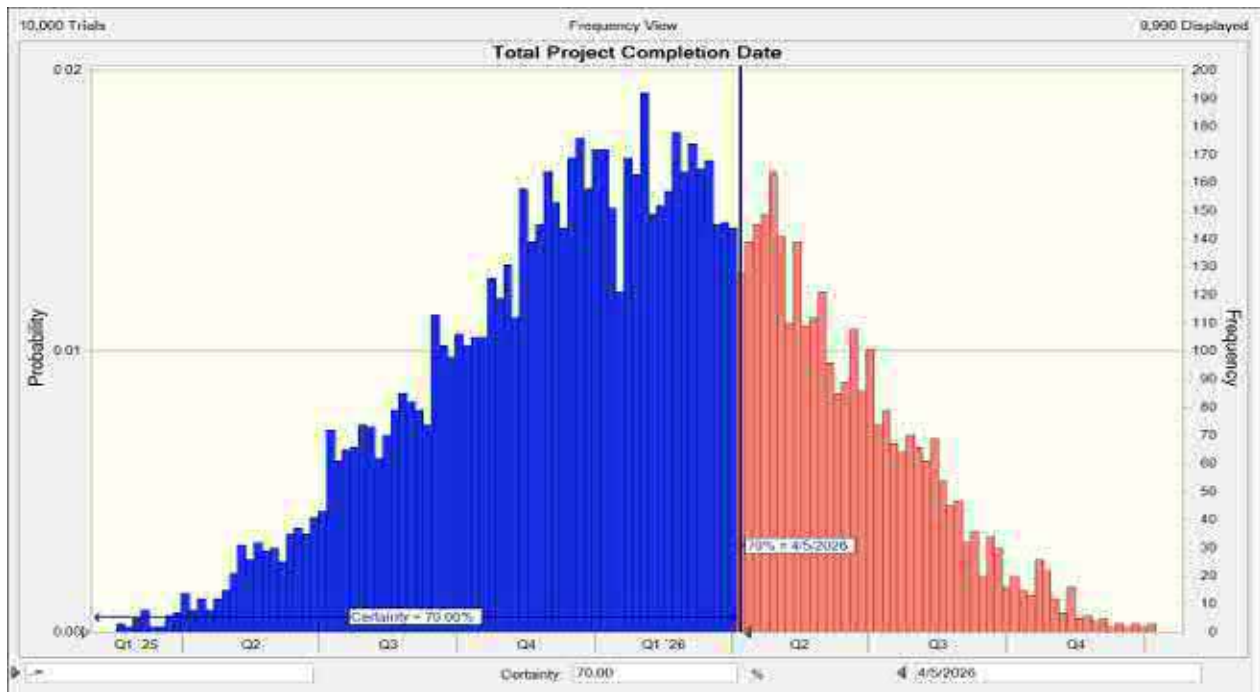


Figure 15 – Monte Carlo Schedule Forecast for the I-26 Connector Project

CONCLUSION

Based on the assumptions and risks discussed during this review, the range of total project cost for the I-26 Connector Project varies between approximately \$1.099 billion and \$1.423 billion in year of expenditure costs. The FHWA recommends presenting the total project costs as a range in the final environmental decision document and/or as part of the project information presented to the public during the remaining NEPA process.

The estimate at the 70% confidence level for the I-26 Connector Project is \$1.285 billion in year of expenditure cost. This is below the State submitted year of expenditure cost of \$1.356 billion coming into the CER process. The main difference is due to the removal of the de-icing systems from the bridges.

A major concern is the schedule. Our analysis indicates 1 year extension to the schedule is possible. The risk register is beneficial in focusing efforts on areas for mitigation of these schedule risks, especially since these risks also affect the project cost.

This estimate is a snapshot in time and it is expected that through further project development, the estimate will change.

APPENDICES

A – Cost Estimate Review Closing Presentation

B – Crystal Ball Probability Analysis

C – Cost Estimate Review Agenda

D – Cost Estimate Review Sign-In Sheets

Cost Estimate Review

FHWA Closeout Presentation

October 1, 2018

I-26 Connector

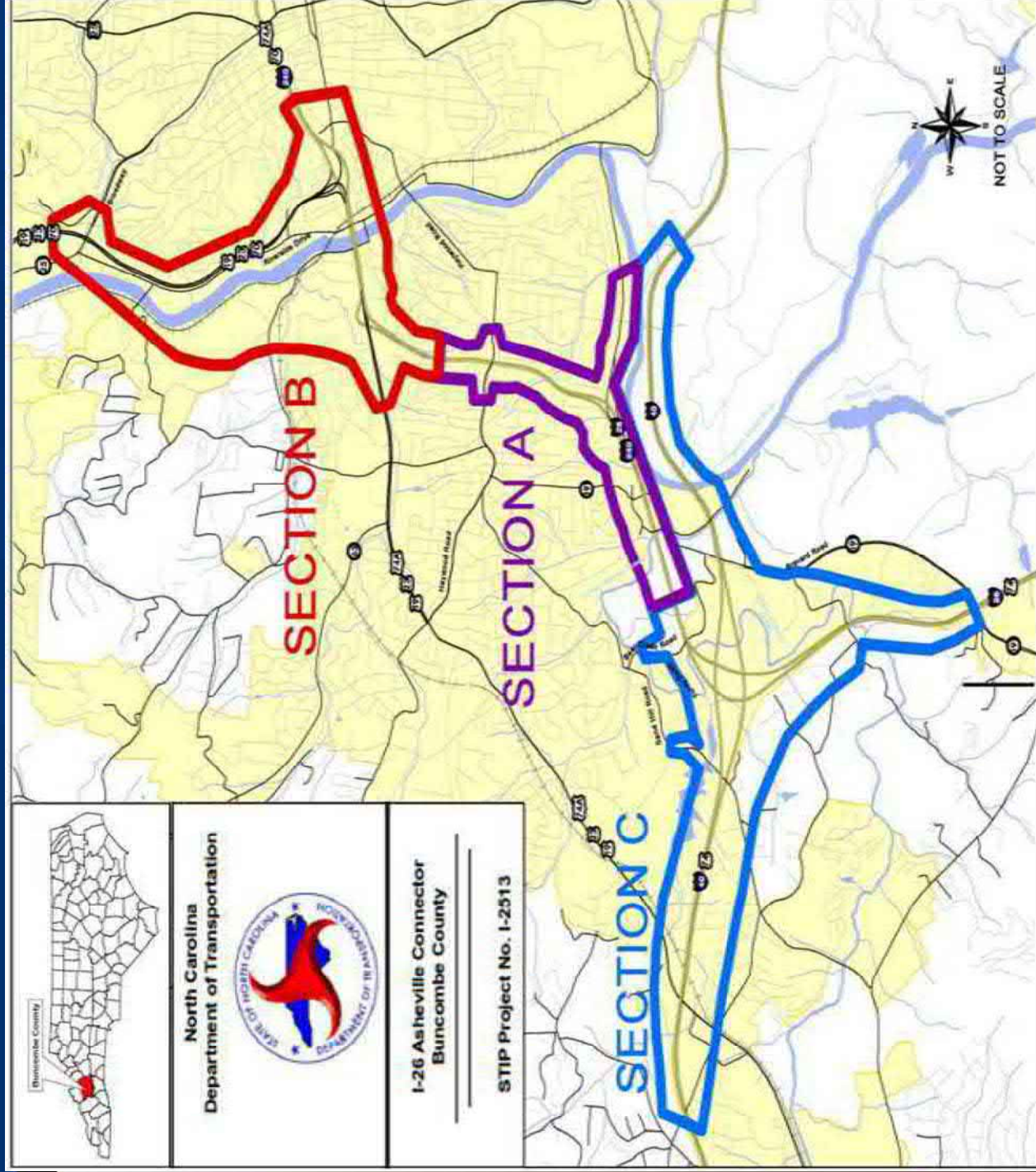
Asheville, North Carolina



Cost Estimate Review

FHWA Closeout Presentation

September 13, 2018



**Project
Limits**

Purpose and Need

3

- **Upgrade the interstate corridor**
- **To improve the capacity deficiencies of I-240**
- **To reduce traffic delays and congestion on I-240**
- **To increase the remaining useful service of the Patton Avenue Bridges**



Proposed Improvements:

Section A: Includes expanding the existing I-240 four-lane roadway from the I-26/I-240 interchange to the I-240 interchange at Patton Avenue.

Section B: Places the interstate on a new location north of the Captain Jeff Bowen bridges, and connect with U.S. 19/23/70.

Section C: Upgrades the interchanges at Smokey Park Highway (U.S. 19/23/74A), I-26/I-240 and Brevard Road.



Background Information

5

- Project broken into three sections being designed concurrently.
- Design – Build procurement expected for the project.
- NEPA Record of Decision expected in 2019.
- Procurement scheduled for 2020.
- Strong possibility all three sections constructed concurrently.
- Currently a four-year construction schedule is planned.



Cost Estimate Review Objective

6

Conduct an unbiased risk-based review to verify the accuracy and reasonableness of the current total cost estimate and project schedule to complete the

I-26 Connector Project – Asheville.

Develop a probability range for the cost estimate and schedule that represents the project's current stage of design.



Policy Directives

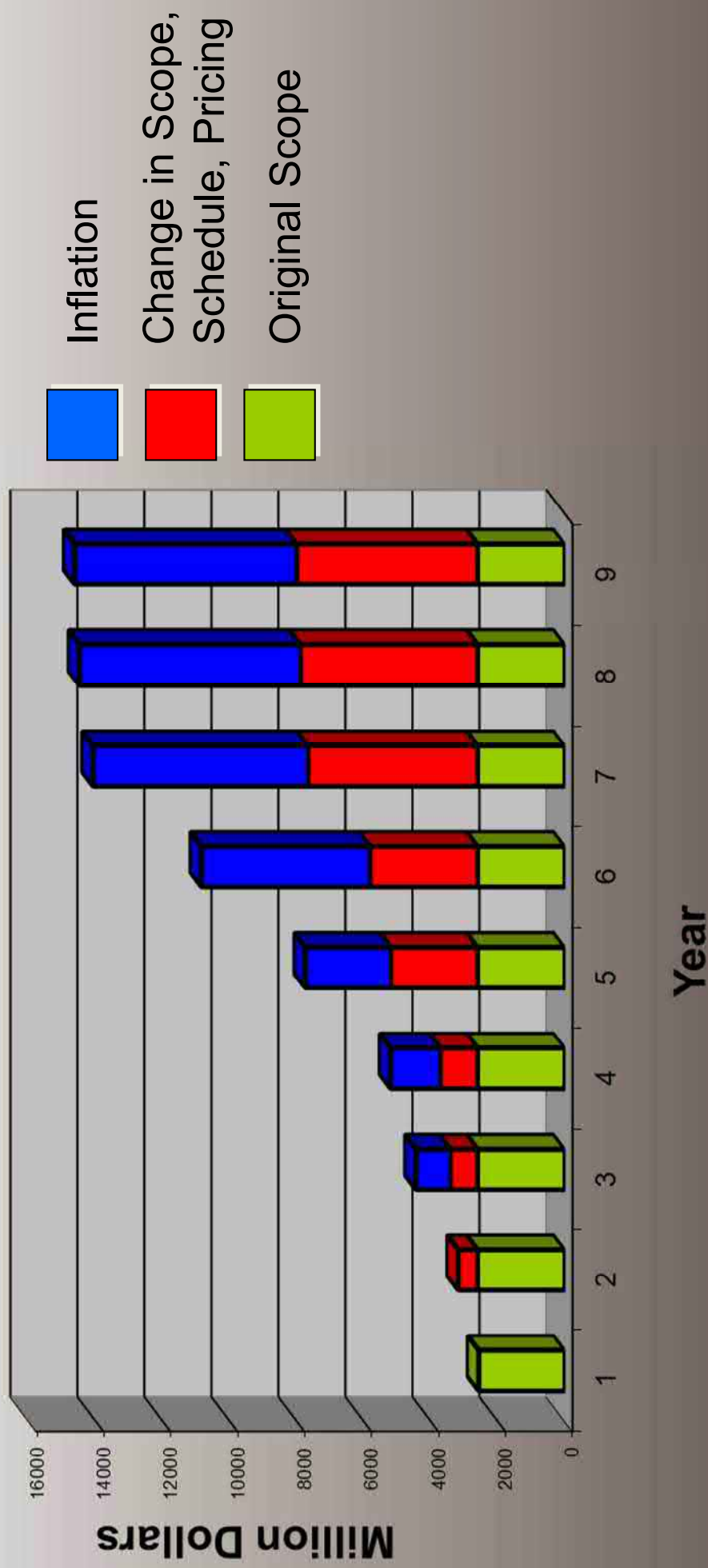
7

- First enacted by TEA-21
- Title 23 U.S.C §106(h)(3)(B)
 - ...based on reasonable assumptions, as determined by the Secretary, of future increases in the cost to complete the project...”
 - Secretary = FHWA
 - Reasonable assumptions = Risk based probabilistic approach

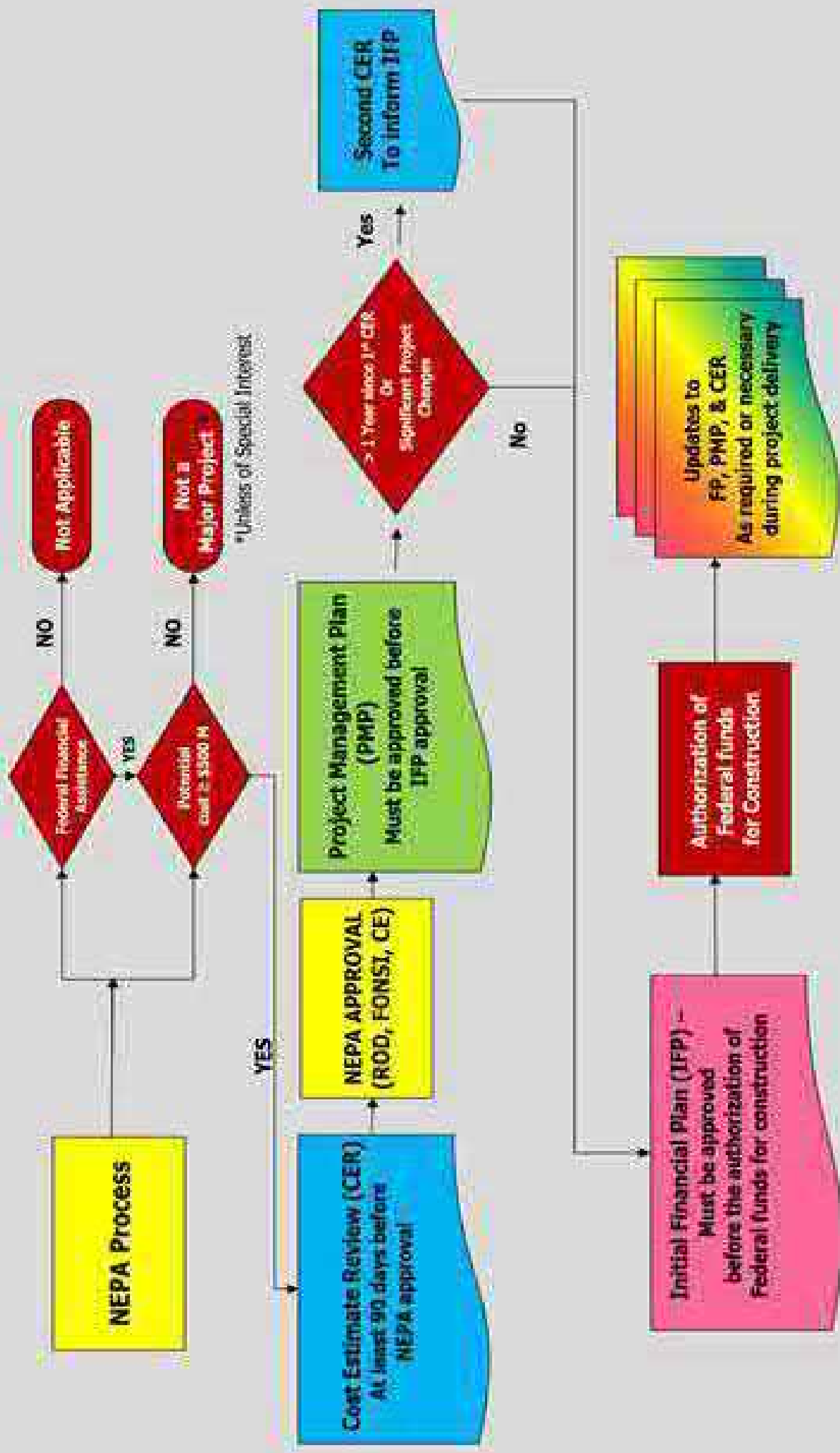


Evolution of Cost for Example Major Project

Cost Estimate



Basic Major Project Process



FHWA Office of Program Administration

Website:

<https://www.fhwa.dot.gov/majorprojects/>

Major Project Financial Plan Guidance, December 2014

- *FHWA Major Project Guidance*, January 2007
- *Major Project Program Cost Estimating Guidance*, January 2007
- *Project Management Plan Guidance*, Updated in 2017
- *Active Major Project Monthly Status (FOIS Output)*



Review Participants

11

- NCDOT
- NCDOT Consultants
 - AECOM
 - HNTB
- FHWA
 - Division Office – North Carolina
 - CER Cadre Team – FHWA HQ



CER Logistics

12

- September 11-13, 2018

NCDOT Century Center – Building B

PDEA Large Conference Room

1020 Birch Ridge Road

Raleigh, NC 27610



Pre-Review Webinar

13

Friday, August 17, 2018

- Introduction to FHWA CER process
- CER Logistics/ Agenda
- Project background
- Overview of Project Estimate and Schedule
- Risk Items



Review Agenda 1st Day

14

Tuesday, September 11, 2018

- 10:00 a.m. – CER Introduction
- 10:45 a.m. – Project Overview by Project Personnel
- 11:15 a.m. – Overview of State Estimation Process
- 12:00 p.m. – Lunch
- 1:00 p.m. – Base Variability & Market Conditions
- 2:00 p.m. – Soft Costs (administrative, inflation, allowances)
- 2:30 p.m. – Contingency/Risk Register Items
- 3:30 p.m. – Structures, Retaining Walls, Railroad Coordination and Sound Barriers
- 5:00 p.m. – Adjourn



Review Agenda 2nd Day

Wednesday, September 12, 2018

15

- 8:00 a.m. – Recap of First Day
- 8:30 a.m. – Earthwork, Drainage, Pavement, Roadway & Geotechnical
- 9:30 a.m. – Roadside Environmental (Erosion Control & Landscaping)
- 10:00 a.m. – Traffic Control, Signing & Lighting
- 10:30 a.m. – Traffic Signal & ITS
- 11:00 a.m. – Environmental/Permitting/Mitigation
- 12:00 p.m. – Lunch
- 1:00 p.m. – Utilities (wet & dry)
- 1:30 p.m. – Right of Way
- 2:30 p.m. – Revisit estimate items as necessary
- 3:30 p.m. – Review and finalize risk register details and aggregate minor risks
- 5:00 p.m. – Adjourn

Basis of Review

16

- Review based on estimates provided by the Team in advance with revisions made during the review
- Review to determine the reasonableness of assumptions used in the estimate
- Not an **independent FHWA estimate**
 - Did not verify quantities and unit prices
 - We did have Subject Matter Experts review the estimate
 - Goal is to verify accuracy and reasonableness of estimate

Risk-based Probabilistic Approach



Review Methodology

17

Verify

- Major cost elements
- Allowances/contingencies
- Adjust estimate as necessary

Model

- Base variability
- Market conditions and inflation
- Risk events (cost, schedule, probability, impact, relationships)
- Monte Carlo simulation

Communicate

- Closeout Presentation
- Final report
- Issuance of NEPA Decision Document
- Approval of finance plan



Review Observations

18

- Modeler and facilitator had to participate remotely due to Hurricane Florence.
- Tight urban area with restrictive right-of-way affects utility relocation costs.
- Two, and maybe three, endangered species affect scheduling.
- Cost of delaying the project one year is \$41 million.
- NCDOT's processes help control the project cost spread.
 - Only \$323 million spread between 0% and 100%.



Review Baseline (pre-review)

19

Total Cost (2018\$): \$1.213 billion
(includes \$136.9 million in contingencies)

Total Cost (YOE): \$1.356 billion
(includes \$143.3 million inflation)

Total Project Completion Date: Apr 2025



CER Estimate Adjustments

Pre-Review Estimate (CY) Incl Cont and Prior Cost	\$	1,212,880,100.00
Estimate Adjustments:		
Eliminate de-icing system all bridges	\$	(62,500,000.00)
Increase Erosion Control Cost from \$25K to \$30K/acre.	\$	4,040,000.00
Added twice mitigation factor to wetlands and streams	\$	2,020,000.00
Total Adjustments	\$	(56,440,000.00)
Percentage Based Adjustments	\$	(136,440.00)
Post Review (CY) Incl Cont, Priors, Adjustments	\$	1,156,303,660.00



Monte Carlo Inputs

21

Inflation:

Construction	3.0%
Landscaping	3.0%
Right of Way	4.0%
Utilities	3.0%
Administrative	3.0%
Environmental	4.0%



Monte Carlo Inputs

22

Base Variation:

Phase/Segment Assignment	Base Cost Variability (%)	Duration Variability (%)
ROW+UT+EM-I-2513A	15%	10%
Agn+CN+LS-I-2513A	10%	10%
ROW+UT+EM-I-2513B	20%	10%
Agn+CN+LS-I-2513B	10%	10%
ROW+UT+EM-I-2513C	15%	10%
Agn+CN+LS-I-2513C	10%	10%

Monte Carlo Inputs

Market Conditions

Phase/Segment Assignment	Prob BtP	Prob WtP	%Offset BtP	%Offset WtP
ROW+UT+EM-I-2513A	0%	40%	0%	10%
Agn+CN+LS-I-2513A	33%	33%	0%	0%
ROW+UT+EM-I-2513B	0%	70%	0%	30%
Agn+CN+LS-I-2513B	33%	33%	0%	10%
ROW+UT+EM-I-2513C	0%	0%	0%	0%
Agn+CN+LS-I-2513C	33%	33%	0%	0%



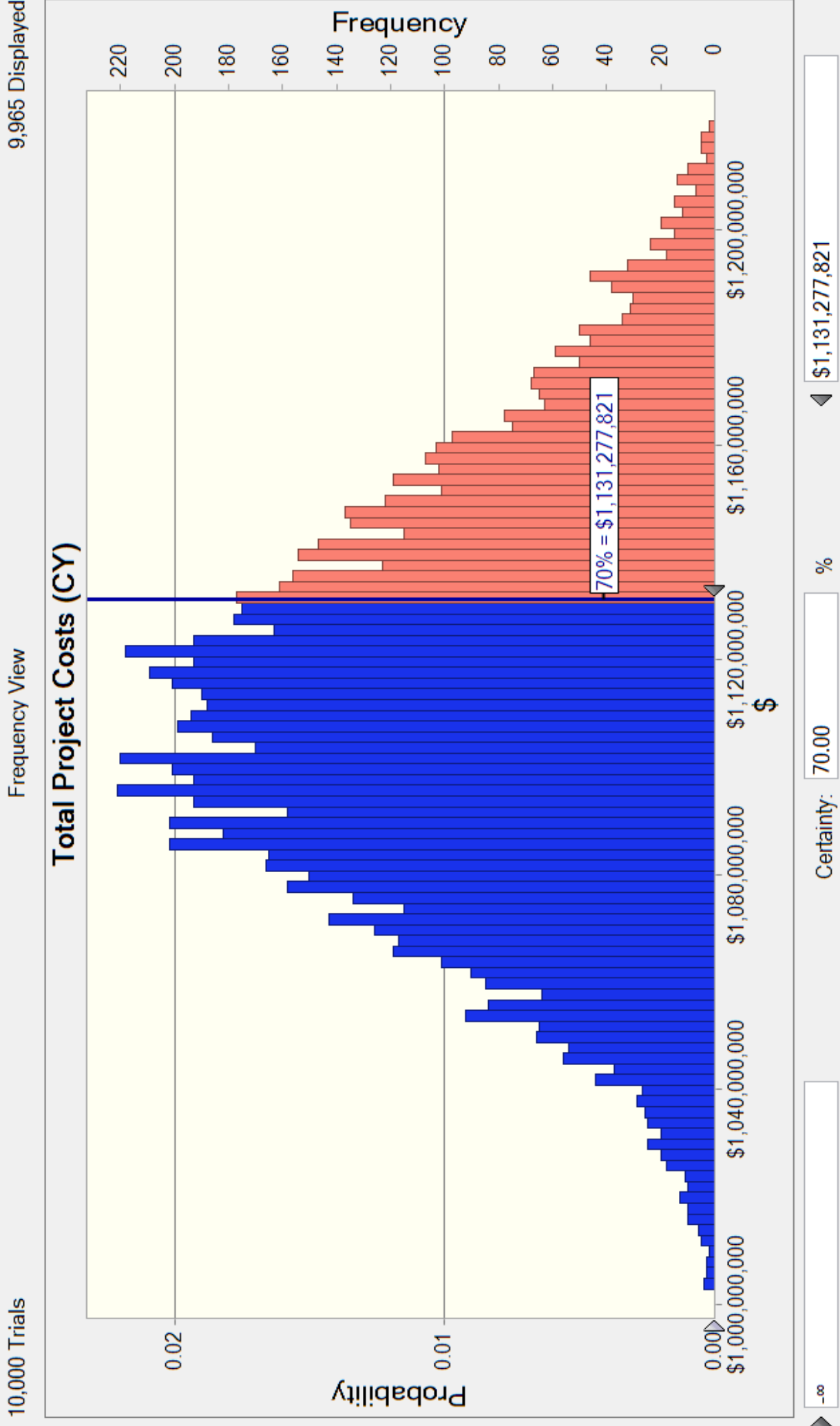
Project's Major Cost Risks

Event Risk Name	Probability	Cost Threat / Opportunity	Min Cost (\$)	Most Likely Cost (\$)	Max Cost (\$)
French Broad River Bridge Construction	80%	Threat	\$5,000,000	\$10,000,000	\$20,000,000
Design Build Innovation and Efficiencies	100%	Opportunity	\$8,500,000	\$20,000,000	\$34,000,000
Innovative Bridge Construction	50%	Opportunity	\$15,000,000	\$20,000,000	\$25,000,000
Utility relocation	90%	Threat	\$10,000,000	\$25,000,000	\$50,000,000
High Material Costs (Steel)	80%	Threat	\$5,000,000	\$12,000,000	\$15,000,000
Increase Sq. Ft. Retaining Walls	70%	Threat	\$0	\$10,800,000	\$21,600,000
Increase cost of retaining walls	100%	Threat	\$0	\$0	\$14,400,000

Project's Major Schedule Risks

Event Risk Name	Probability	Schedule Threat / Opportunity	Min Schedule (mo)	Most Likely Schedule (mo)	Max Schedule (mo)
French Broad River Bridge Construction	80%	Threat	6	8	12
Innovative Traffic Management Strategy	85%	Opportunity	0	3	6
Design Build Innovation and Efficiencies	100%	Opportunity	0	3	6
Innovative Bridge Construction	50%	Opportunity	0	3	6
Utility relocation	90%	Threat	6	12	18
Utility relocation	90%	Threat	3	6	12

Total Project Cost (CY)

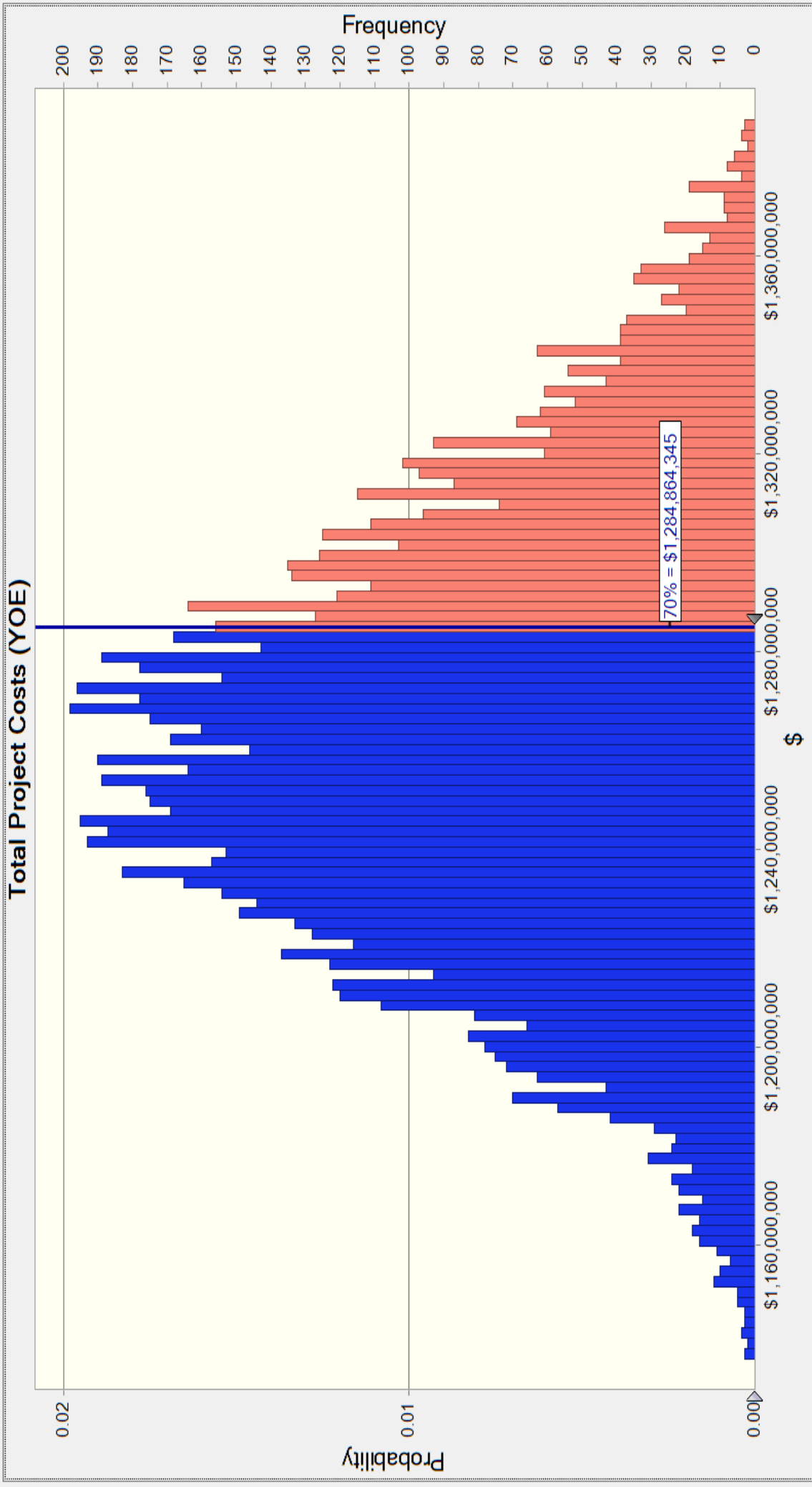


Total Project Cost (YOE)

10,000 Trials

Frequency View

9,967 Displayed



-∞

Certainty: 70.00

%

\$1,284,864,345

Total Project Cost (YOE)

Percentiles:	Forecast Values
0%	\$1,099,888,361
10%	\$1,205,998,268
20%	\$1,223,898,427
30%	\$1,237,256,155
40%	\$1,248,936,054
50%	\$1,260,801,659
60%	\$1,272,687,519
70%	\$1,284,864,345
80%	\$1,300,331,123
90%	\$1,321,416,627
100%	\$1,422,628,428

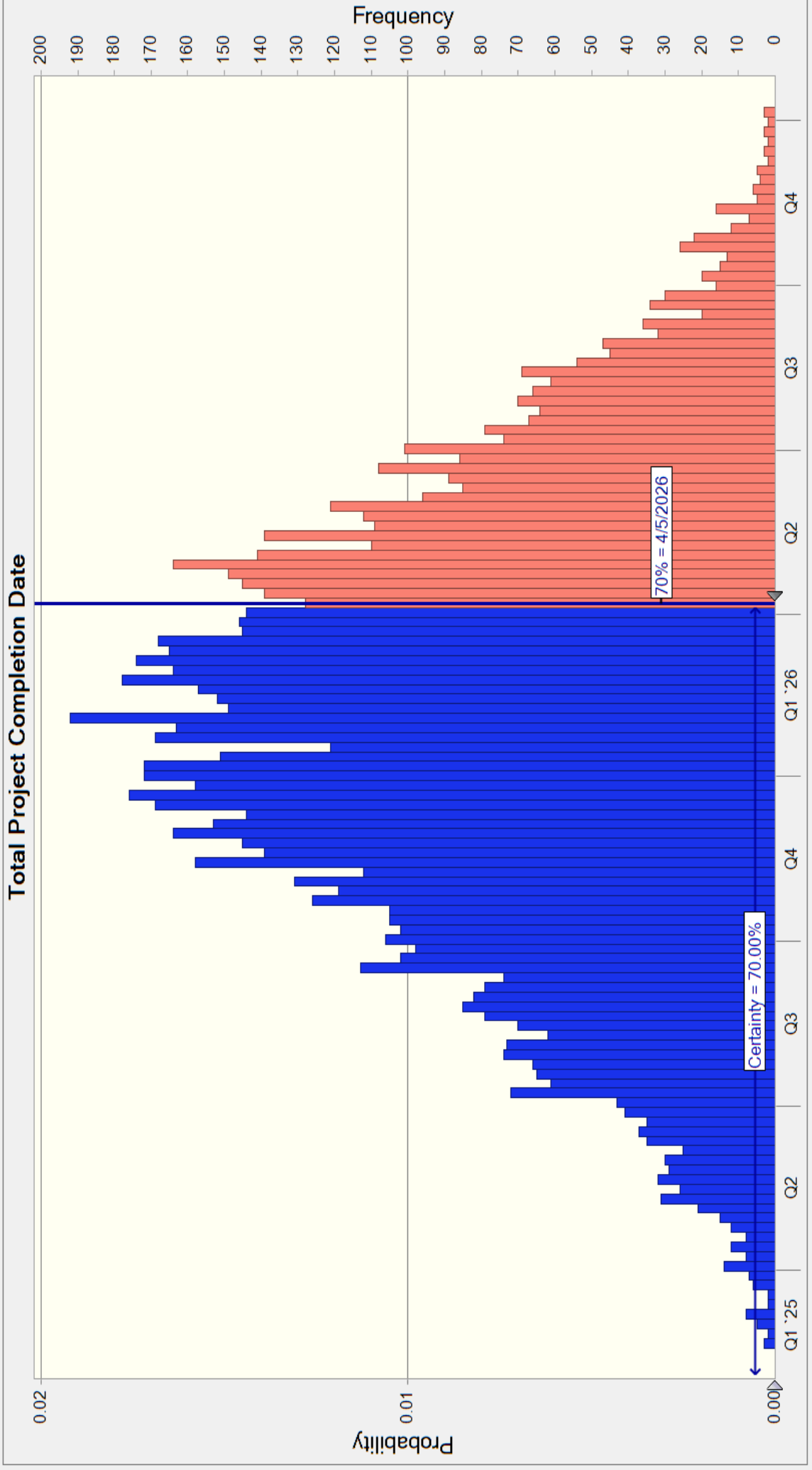


Total Project Schedule Forecast

10,000 Trials

Frequency View

9,990 Displayed



- A Monte-Carlo simulation was run to forecast the cost of one year's delay in letting the project.
- YOE Cost with One-year's delay = \$1.326 million
- One-year delay adds = **\$41 million**

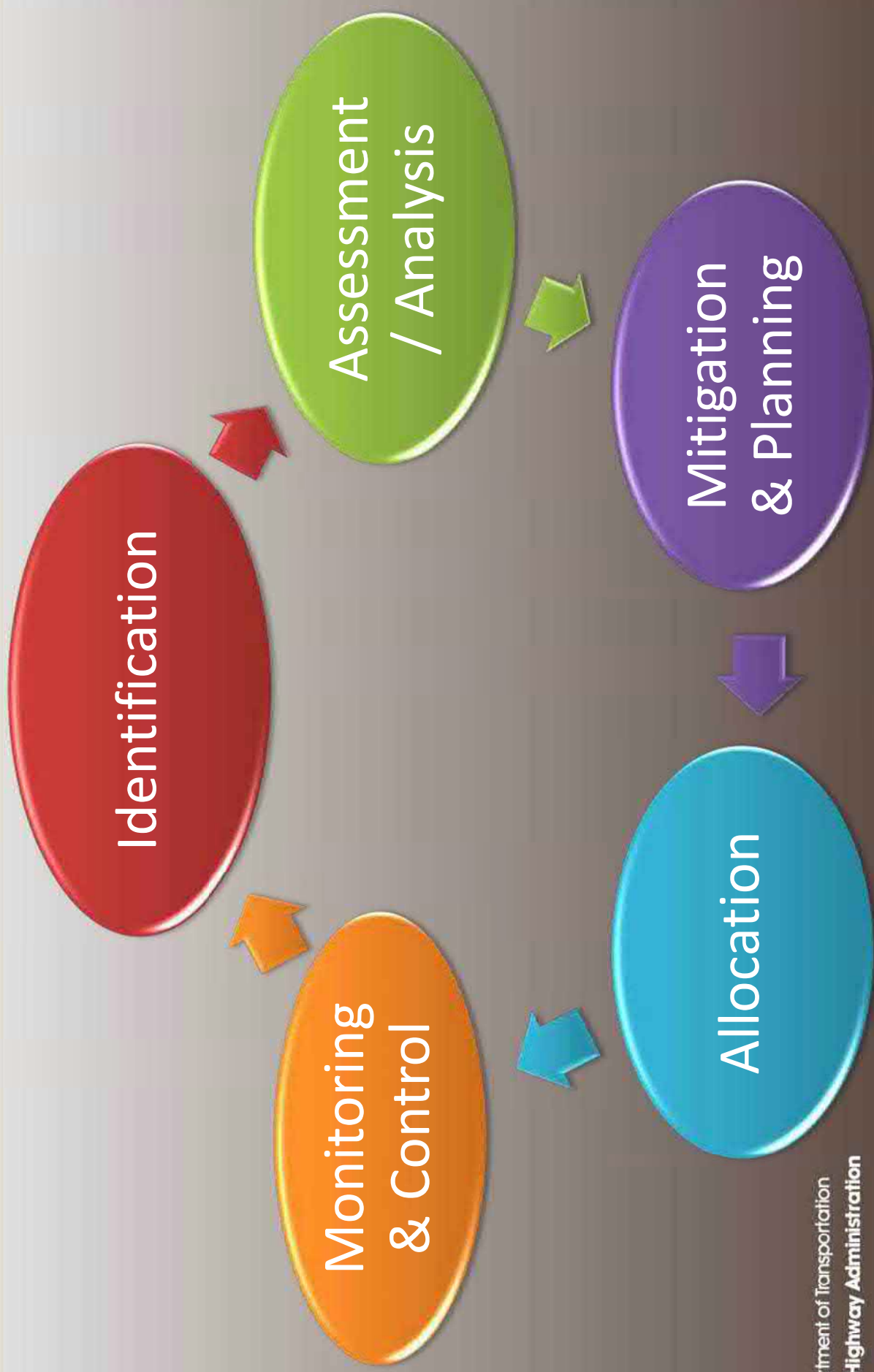


Recommendations

- Use these CER results for the Initial Financial Plan (IFP).
- Document any cost/schedule changes from now until the IFP.
- PMP will have to be submitted and approved by FHWA.
- Use the CER results as a resource in publicly presenting the project's estimated cost.
- Utilize the risk register as a tool to manage the project's cost and schedule risks.
- Use FHWA's Schedule Estimating Guidance as a resource in setting the project's baseline completion date in the IFP.
- https://www.fhwa.dot.gov/majorprojects/schedule_estimating/

Risk Management Process

32



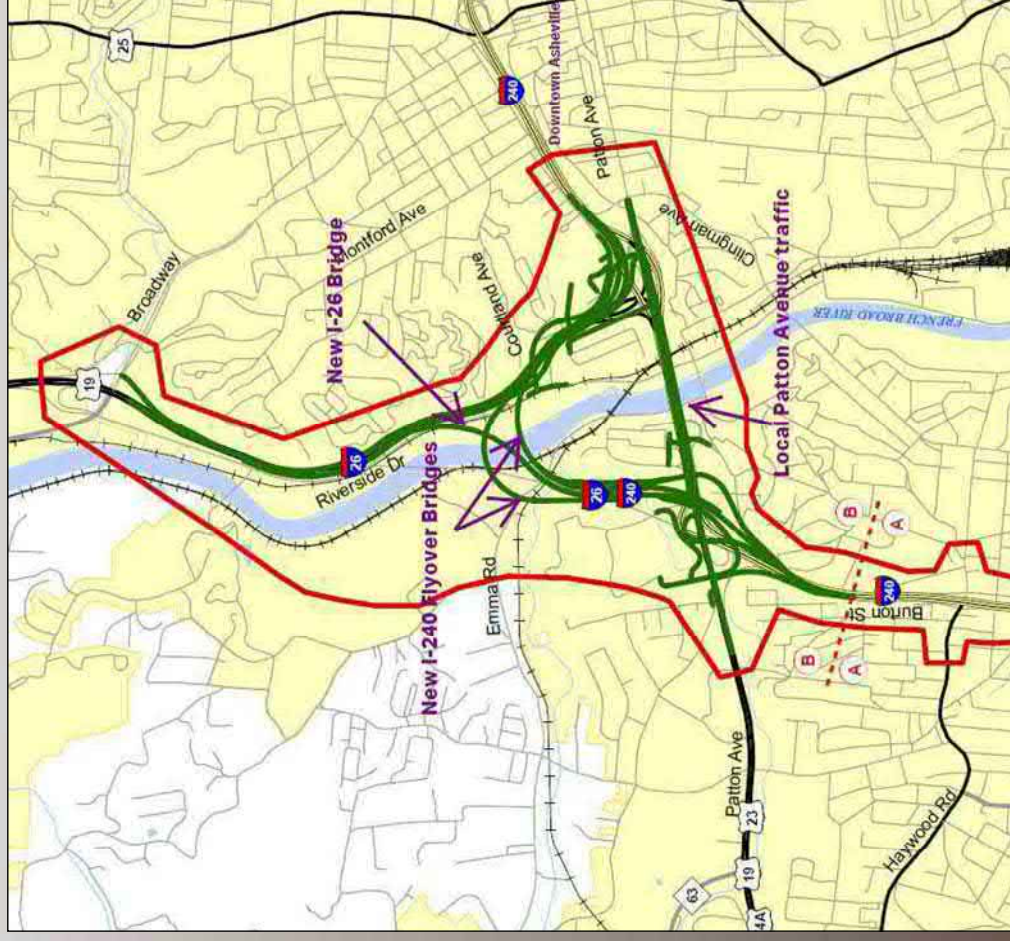
CER Next Steps

- FHWA will prepare a final report documenting review findings.
 - Draft report for review within 30 days
 - Draft report will be e-mailed to Division Office
 - Division Office will review the draft and forward it to the Project Team
 - Final report issued within 30 days after receipt of comments
 - Final report forwarded to the Division Office for distribution to the Project Team
- FHWA uses the results as the official cost estimate for the project (NEPA, IFP, reporting)
- Estimate review is a snapshot of the current estimate



I-26 Connector - Asheville

Questions?



Crystal Ball Report - Full

Simulation started on 9/12/2018 at 3:17 PM

Simulation stopped on 9/12/2018 at 3:31 PM

Run preferences:

Number of trials run	10,000
Latin Hypercube (size)	500
Seed	123

Run statistics:

Total running time (se	862.60
Trials/second (averag	12
Random numbers per	0

Crystal Ball data:

Assumptions	0
Correlations	0
Correlation matrices	0
Decision variables	0
Forecasts	6

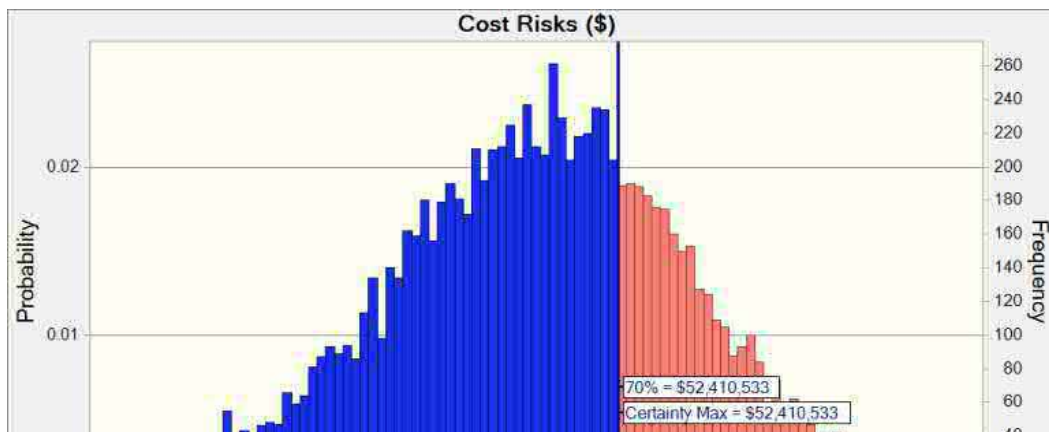
Forecasts

Worksheet: [Model_CER I 26 Connector Day 2 PM.xlsx]YOE

Forecast: Cost Risks (\$)

Summary:

Certainty level is 70.00%
Certainty range is from $-\infty$ to \$52,410,533
Entire range is from \$(35,915,985) to \$104,868,729
Base case is \$59,766,667
After 10,000 trials, the std. error of the mean is \$201,657





Statistics:	Forecast values
Trials	10,000
Base Case	\$59,766,667
Mean	\$41,439,616
Median	\$42,180,434
Mode	---
Standard Deviation	\$20,165,690
Variance	\$406,655,065,486,471
Skewness	-0.1760
Kurtosis	2.90
Coeff. of Variation	0.4866
Minimum	\$(35,915,985)
Maximum	\$104,868,729
Range Width	\$140,784,713
Mean Std. Error	\$201,657

Forecast: Cost Risks (\$) (cont'd)

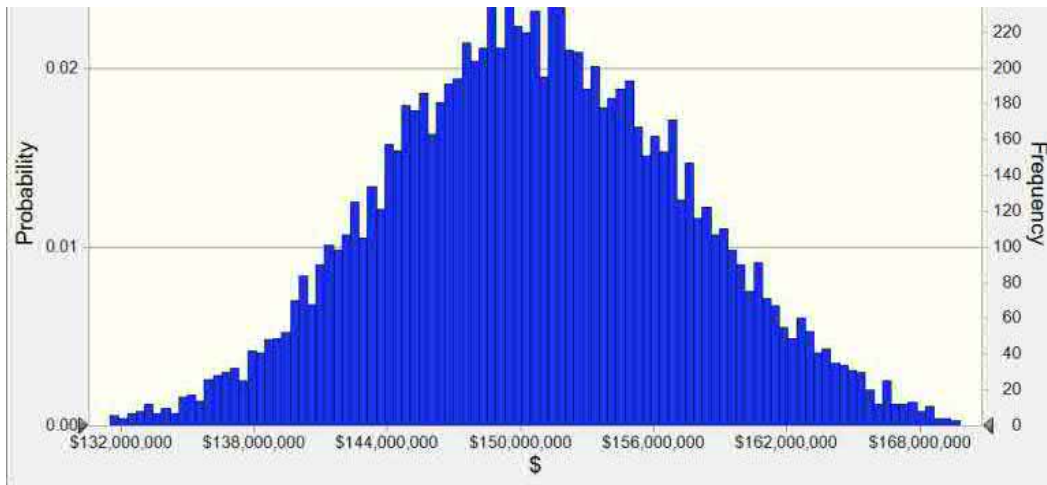
Percentiles:	Forecast values
0%	\$(35,915,985)
10%	\$14,690,160
20%	\$24,690,210
30%	\$31,163,268
40%	\$36,949,473
50%	\$42,178,568
60%	\$47,223,432
70%	\$52,410,533
80%	\$58,579,328
90%	\$67,002,378
100%	\$104,868,729

Forecast: Inflation

Summary:

Entire range is from \$128,331,896 to \$172,830,457
 Base case is \$153,484,212
 After 10,000 trials, the std. error of the mean is \$68,378





Statistics:	Forecast values
Trials	10,000
Base Case	\$153,484,212
Mean	\$150,651,241
Median	\$150,535,527
Mode	---
Standard Deviation	\$6,837,804
Variance	\$46,755,560,640,444
Skewness	0.0248
Kurtosis	2.84
Coeff. of Variation	0.0454
Minimum	\$128,331,896
Maximum	\$172,830,457
Range Width	\$44,498,561
Mean Std. Error	\$68,378

Forecast: Inflation (cont'd)

Percentiles:	Forecast values
0%	\$128,331,896
10%	\$141,881,685
20%	\$144,858,244
30%	\$146,986,934
40%	\$148,835,609
50%	\$150,534,877
60%	\$152,252,545
70%	\$154,274,659
80%	\$156,523,464
90%	\$159,583,814
100%	\$172,830,457

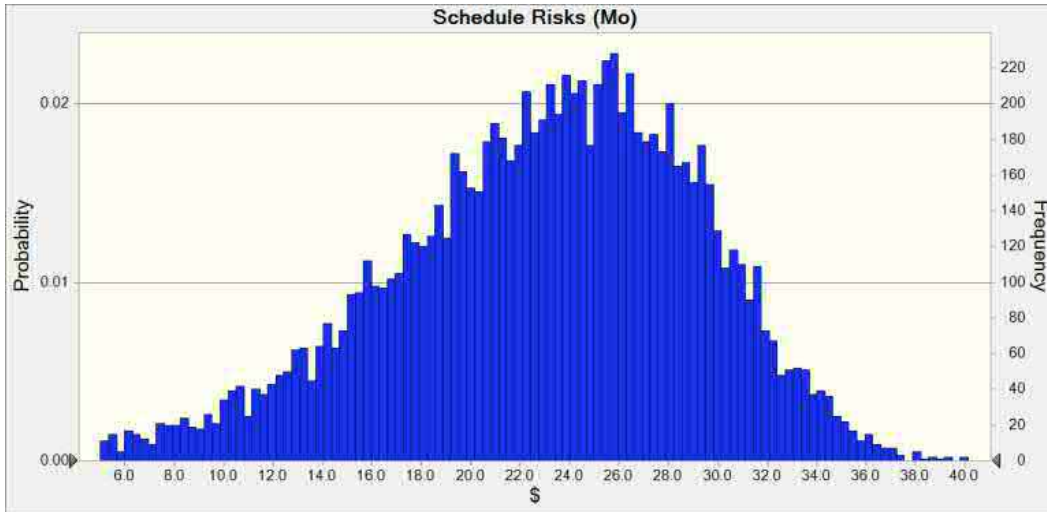
Forecast: Schedule Risks (Mo)

Summary:

Entire range is from -2.9 to 40.1

Base case is 28.7

After 10,000 trials, the std. error of the mean is 0.1



Statistics:

Forecast values

Trials	10,000
Base Case	28.7
Mean	22.9
Median	23.5
Mode	---
Standard Deviation	6.4
Variance	40.6
Skewness	-0.5218
Kurtosis	3.22
Coeff. of Variation	0.2787
Minimum	-2.9
Maximum	40.1
Range Width	43.1
Mean Std. Error	0.1

Forecast: Schedule Risks (Mo) (cont'd)

Percentiles:

Forecast values

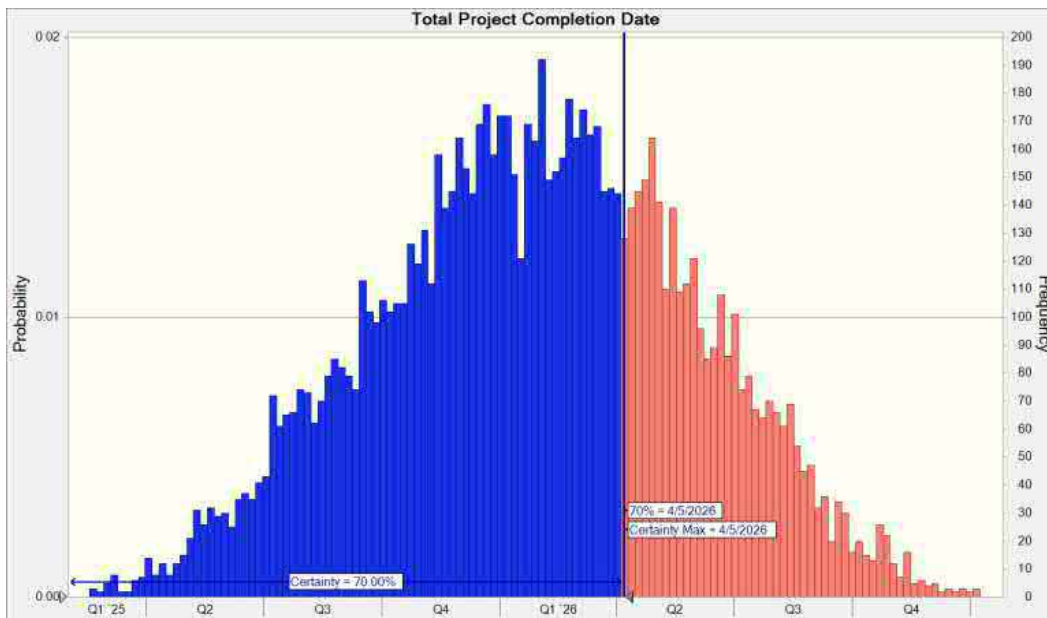
0%	-2.9
10%	14.3
20%	17.7
30%	20.0
40%	21.8

50%	23.5
60%	25.1
70%	26.6
80%	28.3
90%	30.5
100%	40.1

Forecast: Total Project Completion Date

Summary:

Certainty level is 70.00%
 Certainty range is from $-\infty$ to 4/5/2026
 Entire range is from 1/24/2025 to 1/24/2027
 Base case is 3/30/2026
 After 10,000 trials, the std. error of the mean is 1.23



Statistics:

Forecast values

Trials	10,000
Base Case	3/30/2026
Mean	1/26/2026
Median	1/29/2026
Mode	---
Standard Deviation	123.26
Variance	15,192.79
Skewness	-0.0606
Kurtosis	2.61
Coeff. of Variation	0.0027

Minimum	1/24/2025
Maximum	1/24/2027
Range Width	729.63
Mean Std. Error	1.23

Forecast: Total Project Completion Date (cont'd)

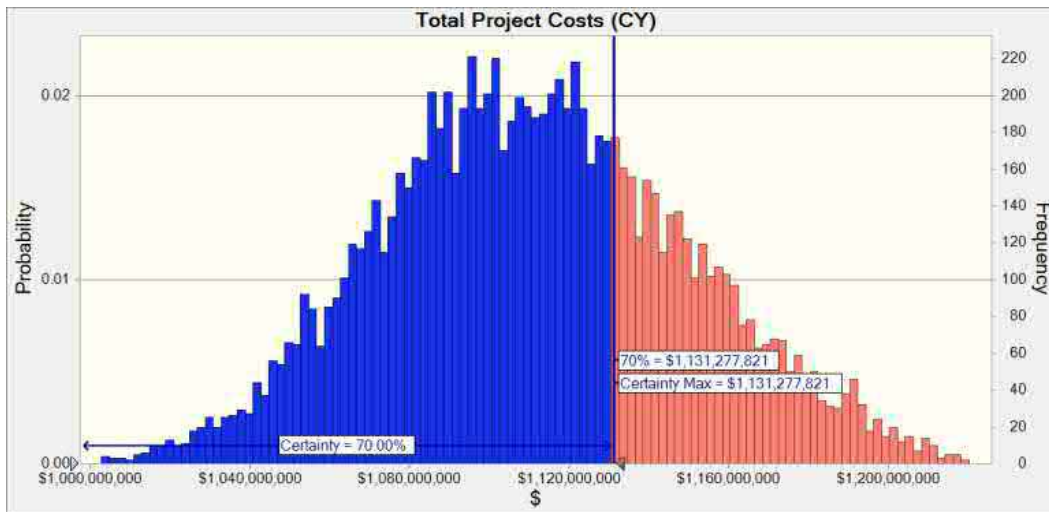
Percentiles:	Forecast values
0%	1/24/2025
10%	8/13/2025
20%	10/11/2025
30%	11/22/2025
40%	12/26/2025
50%	1/29/2026
60%	3/2/2026
70%	4/5/2026
80%	5/13/2026
90%	7/6/2026
100%	1/24/2027

Forecast: Total Project Costs (CY)

Includes base costs, prior costs, fixed costs, and risks

Summary:

- Certainty level is 70.00%
- Certainty range is from $-\infty$ to \$1,131,277,821
- Entire range is from \$971,223,202 to \$1,254,980,265
- Base case is \$1,114,936,165
- After 10,000 trials, the std. error of the mean is \$388,423



Statistics:	Forecast values
Trials	10,000
Base Case	\$1,114,936,165
Mean	\$1,111,581,432
Median	\$1,110,408,411
Mode	---
Standard Deviation	\$38,842,262
Variance	\$1,508,721,332,696,390
Skewness	0.1469
Kurtosis	2.83
Coeff. of Variation	0.0349
Minimum	\$971,223,202
Maximum	\$1,254,980,265
Range Width	\$283,757,063
Mean Std. Error	\$388,423

Forecast: Total Project Costs (CY) (cont'd)

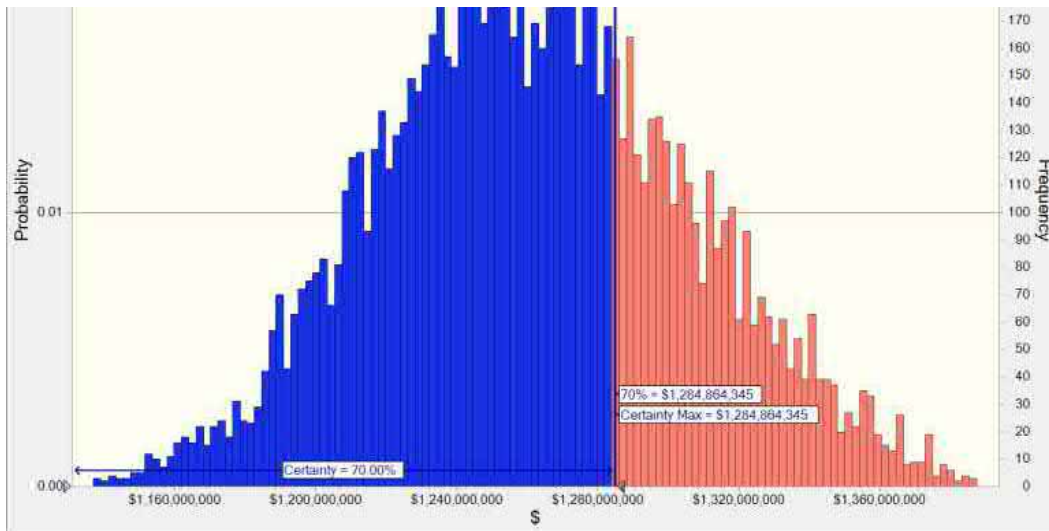
Percentiles:	Forecast values
0%	\$971,223,202
10%	\$1,062,416,552
20%	\$1,078,399,321
30%	\$1,089,758,889
40%	\$1,100,088,068
50%	\$1,110,401,775
60%	\$1,120,484,516
70%	\$1,131,277,821
80%	\$1,145,027,667
90%	\$1,162,830,301
100%	\$1,254,980,265

Forecast: Total Project Costs (YOE)

Summary:

Certainty level is 70.00%
 Certainty range is from $-\infty$ to \$1,284,864,345
 Entire range is from \$1,099,888,361 to \$1,422,628,428
 Base case is \$1,268,420,377
 After 10,000 trials, the std. error of the mean is \$446,514





Statistics:

Statistics:	Forecast values
Trials	10,000
Base Case	\$1,268,420,377
Mean	\$1,262,232,673
Median	\$1,260,802,593
Mode	---
Standard Deviation	\$44,651,416
Variance	\$1,993,748,973,904,500
Skewness	0.1404
Kurtosis	2.82
Coeff. of Variation	0.0354
Minimum	\$1,099,888,361
Maximum	\$1,422,628,428
Range Width	\$322,740,067
Mean Std. Error	\$446,514

Forecast: Total Project Costs (YOE) (cont'd)

Percentiles:

Percentiles:	Forecast values
0%	\$1,099,888,361
10%	\$1,205,998,268
20%	\$1,223,898,427
30%	\$1,237,256,155
40%	\$1,248,936,054
50%	\$1,260,801,659
60%	\$1,272,687,519
70%	\$1,284,864,345
80%	\$1,300,331,123
90%	\$1,321,416,627
100%	\$1,422,628,428

End of Forecasts

Crystal Ball Report - Full

Simulation started on 9/12/2018 at 3:45 PM

Simulation stopped on 9/12/2018 at 4:00 PM

Run preferences:

Number of trials run	10,000
Latin Hypercube (size)	500
Seed	123

Run statistics:

Total running time (se	876.48
Trials/second (averag	11
Random numbers per	0

Crystal Ball data:

Assumptions	0
Correlations	0
Correlation matrices	0
Decision variables	0
Forecasts	6

User macros executed:

Model_CER I 26 Connector Day 2_1 Yr Delay
PM.xlsb!ThisWorkbook.CBAAfterSimulation

Forecasts

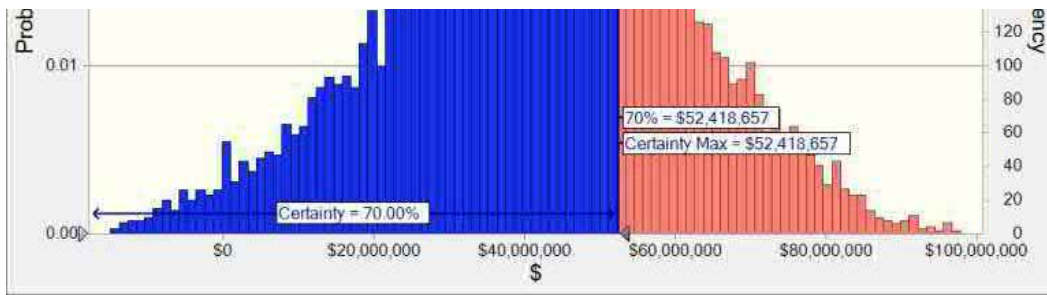
Worksheet: [Model_CER I 26 Connector Day 2_1 Yr Delay PM.xlsb]YOE

Forecast: Cost Risks (\$)

Summary:

Certainty level is 70.00%
Certainty range is from $-\infty$ to \$52,418,657
Entire range is from \$(35,915,985) to \$104,868,729
Base case is \$59,766,667
After 10,000 trials, the std. error of the mean is \$201,687





Statistics:	Forecast values
Trials	10,000
Base Case	\$59,766,667
Mean	\$41,447,802
Median	\$42,184,221
Mode	\$6,391,111
Standard Deviation	\$20,168,728
Variance	\$406,777,576,584,207
Skewness	-0.1760
Kurtosis	2.90
Coeff. of Variation	0.4866
Minimum	\$(35,915,985)
Maximum	\$104,868,729
Range Width	\$140,784,713
Mean Std. Error	\$201,687

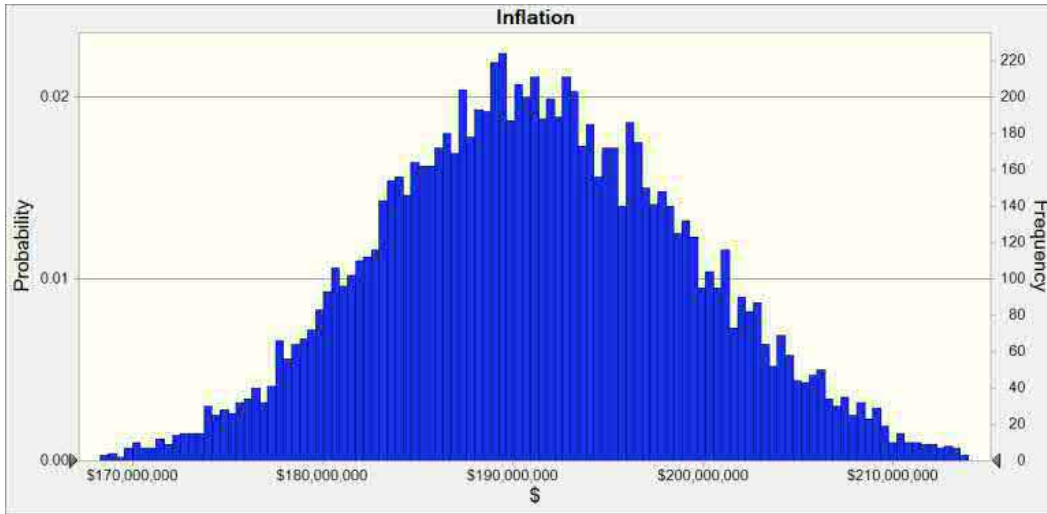
Forecast: Cost Risks (\$) (cont'd)

Percentiles:	Forecast values
0%	\$(35,915,985)
10%	\$14,696,147
20%	\$24,690,210
30%	\$31,154,405
40%	\$36,960,229
50%	\$42,182,809
60%	\$47,224,862
70%	\$52,418,657
80%	\$58,593,747
90%	\$67,031,504
100%	\$104,868,729

Forecast: Inflation

Summary:

Entire range is from \$163,730,645 to \$217,620,884
 Base case is \$194,068,676
 After 10,000 trials, the std. error of the mean is \$81,420



Statistics:	Forecast values
Trials	10,000
Base Case	\$194,068,676
Mean	\$191,125,547
Median	\$190,939,979
Mode	\$184,976,022
Standard Deviation	\$8,142,012
Variance	\$66,292,352,018,579
Skewness	0.0501
Kurtosis	2.84
Coeff. of Variation	0.0426
Minimum	\$163,730,645
Maximum	\$217,620,884
Range Width	\$53,890,239
Mean Std. Error	\$81,420

Forecast: Inflation (cont'd)

Percentiles:	Forecast values
0%	\$163,730,645
10%	\$180,738,755
20%	\$184,147,560
30%	\$186,714,731
40%	\$188,912,605
50%	\$190,938,265
60%	\$193,052,081
70%	\$195,417,259
80%	\$198,080,862
90%	\$201,860,395

100%

\$217,620,884

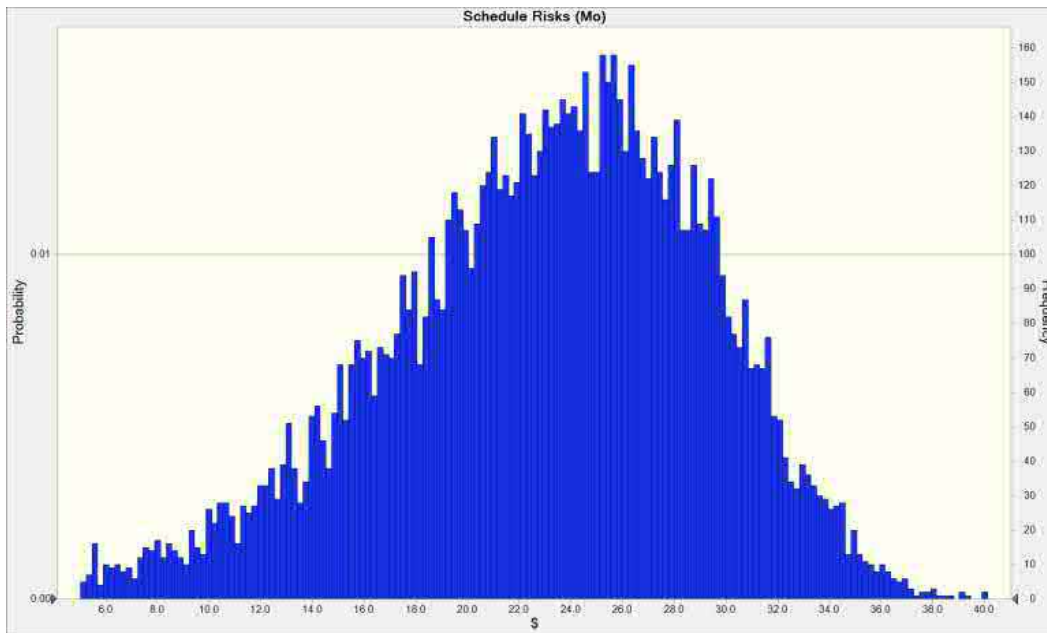
Forecast: Schedule Risks (Mo)

Summary:

Entire range is from -2.9 to 40.1

Base case is 28.7

After 10,000 trials, the std. error of the mean is 0.1



Statistics:

Forecast values

Trials	10,000
Base Case	28.7
Mean	22.9
Median	23.5
Mode	5.5
Standard Deviation	6.4
Variance	40.6
Skewness	-0.5227
Kurtosis	3.22
Coeff. of Variation	0.2788
Minimum	-2.9
Maximum	40.1
Range Width	43.1
Mean Std. Error	0.1

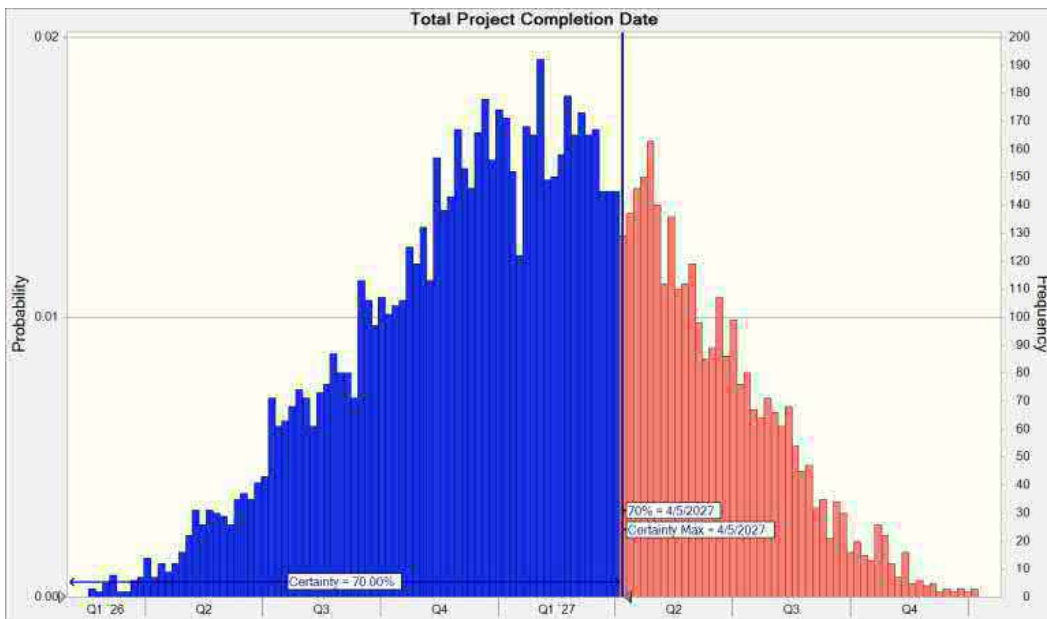
Forecast: Schedule Risks (Mo) (cont'd)

Percentiles:	Forecast values
0%	-2.9
10%	14.3
20%	17.7
30%	20.0
40%	21.8
50%	23.5
60%	25.1
70%	26.6
80%	28.3
90%	30.5
100%	40.1

Forecast: Total Project Completion Date

Summary:

- Certainty level is 70.00%
- Certainty range is from $-\infty$ to 4/5/2027
- Entire range is from 1/24/2026 to 1/24/2028
- Base case is 3/30/2027
- After 10,000 trials, the std. error of the mean is 1.23



Statistics:	Forecast values
Trials	10,000
Base Case	3/30/2027
Mean	1/26/2027

Median	1/29/2027
Mode	4/26/2026
Standard Deviation	123.28
Variance	15,198.26
Skewness	-0.0610
Kurtosis	2.61
Coeff. of Variation	0.0027
Minimum	1/24/2026
Maximum	1/24/2028
Range Width	729.63
Mean Std. Error	1.23

Forecast: Total Project Completion Date (cont'd)

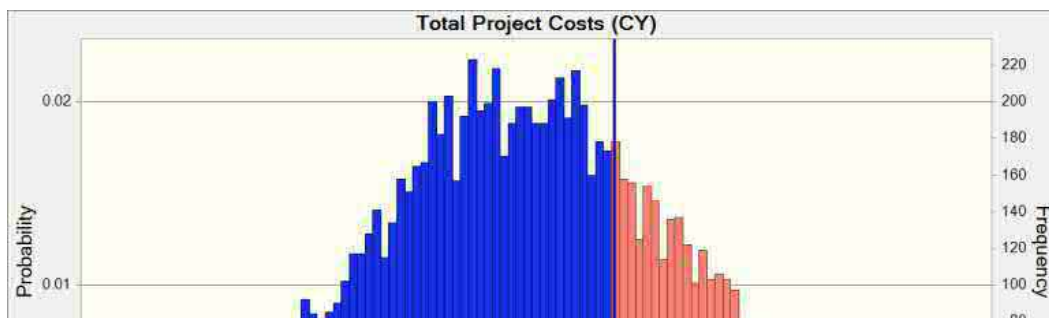
Percentiles:	Forecast values
0%	1/24/2026
10%	8/13/2026
20%	10/11/2026
30%	11/22/2026
40%	12/26/2026
50%	1/29/2027
60%	3/2/2027
70%	4/5/2027
80%	5/13/2027
90%	7/6/2027
100%	1/24/2028

Forecast: Total Project Costs (CY)

Includes base costs, prior costs, fixed costs, and risks

Summary:

- Certainty level is 70.00%
- Certainty range is from $-\infty$ to \$1,131,283,180
- Entire range is from \$971,223,202 to \$1,254,980,265
- Base case is \$1,114,936,165
- After 10,000 trials, the std. error of the mean is \$388,458





Statistics:	Forecast values
Trials	10,000
Base Case	\$1,114,936,165
Mean	\$1,111,598,110
Median	\$1,110,423,234
Mode	\$1,094,721,503
Standard Deviation	\$38,845,838
Variance	\$1,508,999,105,349,250
Skewness	0.1463
Kurtosis	2.83
Coeff. of Variation	0.0349
Minimum	\$971,223,202
Maximum	\$1,254,980,265
Range Width	\$283,757,063
Mean Std. Error	\$388,458

Forecast: Total Project Costs (CY) (cont'd)

Percentiles:	Forecast values
0%	\$971,223,202
10%	\$1,062,416,552
20%	\$1,078,417,219
30%	\$1,089,811,431
40%	\$1,100,107,697
50%	\$1,110,416,948
60%	\$1,120,514,902
70%	\$1,131,283,180
80%	\$1,145,052,969
90%	\$1,162,835,774
100%	\$1,254,980,265

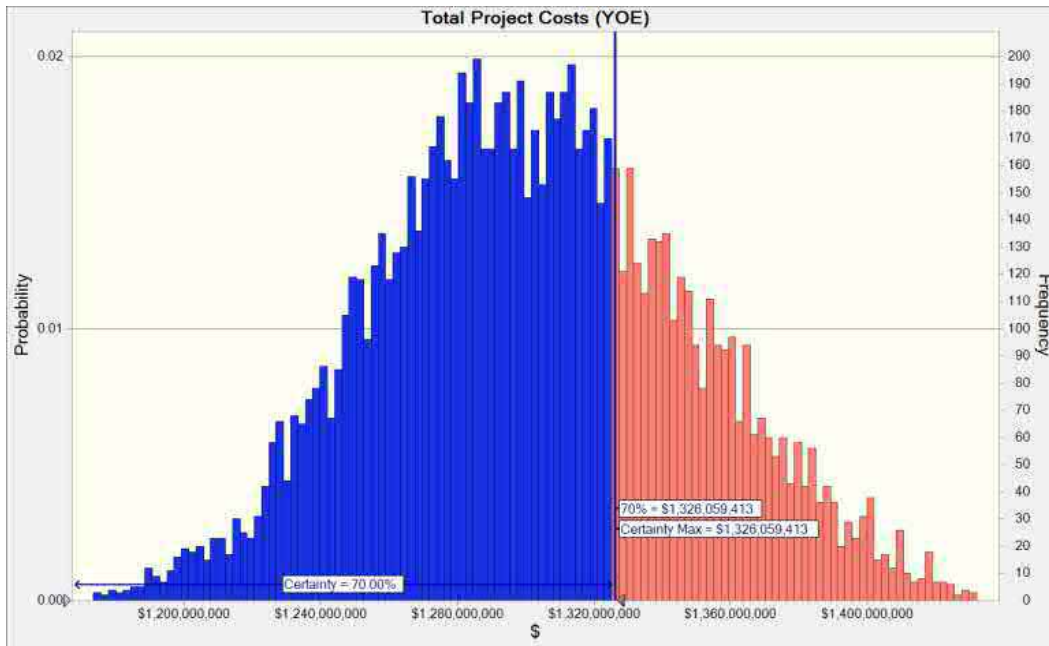
Forecast: Total Project Costs (YOE)

Summary:

Certainty level is 70.00%
 Certainty range is from $-\infty$ to \$1,326,059,413
 Entire range is from \$1,134,953,847 to \$1,468,312,467

Base case is \$1,309,004,841

After 10,000 trials, the std. error of the mean is \$461,216



Statistics:	Forecast values
Trials	10,000
Base Case	\$1,309,004,841
Mean	\$1,302,725,238
Median	\$1,301,295,908
Mode	\$1,285,783,658
Standard Deviation	\$46,121,623
Variance	\$2,127,204,067,666,830
Skewness	0.1387
Kurtosis	2.82
Coeff. of Variation	0.0354
Minimum	\$1,134,953,847
Maximum	\$1,468,312,467
Range Width	\$333,358,619
Mean Std. Error	\$461,216

Forecast: Total Project Costs (YOE) (cont'd)

Percentiles:	Forecast values
0%	\$1,134,953,847
10%	\$1,244,543,752
20%	\$1,263,162,052
30%	\$1,276,898,604

40%	\$1,289,017,297
50%	\$1,301,283,271
60%	\$1,313,537,813
70%	\$1,326,059,413
80%	\$1,342,017,961
90%	\$1,363,950,814
100%	\$1,468,312,467

End of Forecasts



**FHWA / NCDOT
I-2513: I-26 Connector
Cost Estimate Review
Agenda**



Dates: September 11, 2018 – September 13, 2018

Location: NCDOT Century Center – Building B
PDEA Large Conference Room
1020 Birch Ridge Road
Raleigh, NC 27610

CER Facilitators: Charles Luedders, FHWA Major Projects Team
Michael Smith, FHWA Major Projects Team
Jim Martin, FHWA Major Projects Engineer, NC Division Office

Core NCDOT Team:

Steve Cannon, Div. 13 Project Dev. Engineer
Phil Culpepper, Estimating Management
Forrest Dungan, Estimating Management
Theresa Ellerby, Project Management Unit
Donna Keener, Design-Build Embedded Consultant
Karen Lovering, Estimating Management
Randy McKinney, Division 13 Const. Engineer
Brendan Merithew, Div. 13 Proj. Team Lead
Kevin Moore, Project Management Unit
Derrick Weaver, Environmental Policy Unit

Core Consultant Team:

Andrew Bell, AECOM
Neil Dean, AECOM
Celia Miars, AECOM
Joanna Rocco, AECOM
Eric Spalding, AECOM

Call in / Webinar information:

<https://connectdot.connectsolutions.com/michaelsmith>
Dial In: 877-336-1839
Access: 2006524

TUESDAY 09/11/18	TOPIC	INVITEES
10:00 a.m.	CER Introduction by FHWA	Chris Werner, Technical Services Director Virginia Mabry, Manager of the Project Management Unit
10:45 a.m.	Project Overview by Project Personnel	Mark Gibbs, Division Engineer, Div. 13 All Subject Matter Experts
11:15 a.m.	Overview State Estimation Process	Core Project Team
12:00 p.m.	Lunch	
1:00 p.m.	Base Variability & Market Conditions	
2:00 p.m.	Soft Costs (administrative, inflation, allowances)	Core Project Team
2:30 p.m.	Contingency/Risk Register Items	
3:30 p.m.	Structures, Retaining Walls, Railroad Coordination, and Sound Barriers	Kevin Fischer, Asst. State Structures Engineer David Stutts, Structures Project Engineer Cameron Cochran, Regional Bridge Const. Engr. Chris Medlin, Division Bridge Program Manager Missy Pair, Noise & Air Harry Lucas, Estimating Unit John Sloan, AECOM Structures Tom Hepler, AECOM Tracy Roberts, HNTB (Embedded Noise Consultant)
5:00 p.m.	Adjourn	



FHWA / NCDOT
I-2513: I-26 Connector
Cost Estimate Review
Agenda



WEDNESDAY 09/12/18	TOPIC	INVITEES
8:00 a.m.	Recap of Day 1	Core Project Team
8:30 a.m.	Earthwork, Drainage, Pavement, Roadway, Geotechnical	Brenda Moore, Roadway Roger Kluckman, Special Design Section Shane Clark, Western Region Geotechnical Engineer Matt Lauffer, Hydraulics Unit Meme Buscemi, AECOM Hydraulics
9:30 a.m.	Roadside Environmental (Erosion Control & Landscaping)	Mark Staley, Roadside Environmental Engineer Jeremy Goodwin, Erosion Control Jeff Lackey, Aesthetic Engineering Bob Kopetsky, Landscape Design
10:00 a.m.	Traffic Control, Signing, Lighting	Don Parker, Work Zone Traffic Control Roger Garrett, Work Zone Traffic Control Kelvin Jordan, Signing Jose Martinez, Signing Paul Chan, Lighting Tom Hepler, AECOM
10:30 a.m.	Traffic Signals and ITS	Tim Williams, Signal Design Nicholas Zinser, Signal Design Paul Marak, ITS Design Gregg Green, ITS Design
11:00 a.m.	Environmental/ Permitting/Mitigation	Marissa Cox, Biological Surveys Carla Dagnino, Env. Coordination & Permitting Jeff Hemphill, Env. Coordination & Permitting Roger Bryan, Div. 13 Environmental Supervisor Yates Allen, Div. 13 Environmental Specialist Heather Wallace, CALYX
12:00 p.m.	Lunch	
1:00 p.m.	Utilities (wet and dry)	Greg Sealy, Sr. Utility Coordinator Todd Lapham, Sr. Utility Coordinator Donna Jackson, Mott MacDonald (Embedded Utilities)
1:30 p.m.	Right of Way	Norman Medford, Area ROW Appraiser Sean Ward, ROW Appraiser James McGowan, State Appraiser Sarah White, ROW Unit Claire Tronel, AECOM ROW



FHWA / NCDOT
 I-2513: I-26 Connector
 Cost Estimate Review
 Agenda



2:30 p.m.	Revisit estimate items, i.e. soft costs – as necessary	Core Project Team
3:30 p.m.	Review and finalize risk register details, including descriptions and aggregate minor risks	
5:00 p.m.	Adjourn	
THURSDAY 09/13/18	TOPIC	INVITEES
8:00 a.m.	Findings and Report Preparation	None (FHWA)
8:30 a.m.	Presentation Dry Run	Core Project Team
9:30 a.m.	Closeout Presentation	Chris Werner, Technical Services Director Virginia Mabry, Manager of the Project Management Unit Mark Gibbs, Division Engineer, Div. 13
10:30 a.m.	Adjourn	

TUESDAY, September 11, 2018		TIME / TOPIC			
Name	Representing	Email Address / Phone Number	10:00 a.m.	10:45 a.m.	11:15 a.m.
Charles Luedders			✓		Overview State Estimation Process
Jim Martin	Fitwit	James.Martin@dot.gov	✓	✓	Project Overview by Project Personnel
Michael Smith			✓		
Andrew Bell	AECOM	andrew.bell@aecom.com / 919-239-7189	✓	✓	✓
Steve Cannon			✓		
Phillip Cuipepper	NCDOT: Estimating Management	p.cuipepper@ncdot.com / 919-707-6934	✓	✓	✓
Neil Dean	AECOM	neil.dean@aecom.com / 919-239-7155	✓	✓	✓
Forrest Dungan					
Theresa Ellerby	NCDOT	tellerby@ncdot.gov	✓		
Donna Keener	Design-Build	dkeener@ncdot.gov	✓	✓	✓
Karen Lovering					
Randy McKinney	NCDOT	rmckinney@ncdot.gov	✓	✓	✓
Brendan Merithew			✓		
Celia Milars	AECOM	celia.milars@aecom.com / 919-854-6255	✓	✓	✓
Kevin Moore	NCDOT-PMU	kmoores@ncdot.gov / 919-707-6287	✓	✓	✓
Joanna Rocco	AECOM	joanna.rocco@aecom.com / 919.239.7179	✓	✓	✓
Eric Spalding	AECOM	eric.spalding@aecom.com / 919-854-7751	✓	✓	✓
Derrick Weaver	NCDOT	DERICK.DWEBER@NC DOT.GOV / 919-707-6253	✓	✓	✓

PHONE ✓

✓

✓

✓

CORE PROJECT TEAM

TUESDAY, September 11, 2018

Name	Representing	Email Address / Phone Number	10:00 a.m.	10:45 a.m.	11:15 a.m.
			CER Introduction by FHWA	Project Overview by	Estimation Process
Yates Allen			✓		
Meme Buscemi			✓		
Paul Chan					
Shane Clark			✓		
Marissa Cox					
Carla Dagnino					
Karmen Deis					
Travis Feltes	HNTB	tfeltse@hntb.com / 919-710-5927	✓	✓	✓
Kevin Fischer			✓		✓
Roger Garrett			✓		
Mark Gibbs			✓		
Gregg Green					
Jeff Hemphill					
Tom Hepler					
Donna Jackson					
Kelvin Jordan					
Roger Kluckman					
Bob Kopetsky					
Jessica Kuse	HNTB	jkuse@hntb.com 919-424-0424	✓	✓	✓
Jeff Lackey					
Todd Lapham					
Matt Lauffer					

INVITEES / SUBJECT MATTER EXPERTS

✓
Peters

✓

✓

✓

✓

TUESDAY, September 11, 2018		TIME / TOPIC			
Name	Representing	1:00 p.m.	2:00 p.m.	2:30 p.m.	3:30 p.m.
		Base Variability & Market Conditions	Soft Costs (administrative, inflation, allowances)	Contingency/Risk Register Items	Structures, Retaining Walls, Railroad and Sound Barriers
Charles Luedders		✓	✓	✓	✓
Jim Martin		✓	✓	✓	✓
Michael Smith		✓	✓	✓	✓
Andrew Bell					✓
Steve Cannon					✓
Philip Cuipepper		✓	✓	✓	✓
Neil Dean		✓	✓	✓	✓
Forrest Dungan					
Theresa Ellerby		✓	✓	✓	✓
Donna Keener		✓	✓	✓	✓
Karen Lowering					
Randy McKinney		✓	✓	✓	✓
Brendan Merithew					
Celia Milars		✓	✓	✓	✓
Kevin Moore		✓	✓	✓	✓
Joanna Rocco		✓	✓	✓	✓
Eric Spalding		✓	✓	✓	✓
Derrick Weaver		✓	✓	✓	✓

Name	Representing	Email Address / Phone Number	1:00 p.m.	2:00 p.m.	2:30 p.m.	3:30 p.m.
			Base Variability & Market Conditions	Soft Costs (administrative, inflation, allowances)	Contingency/Risk Register Items	Structures, Retaining Walls, Railroad Coordination, and Sound Barriers
Cameron Cochran						✓
Travis Feltes						
Tom Hepler						
Kevin Fischer						✓
Jessica Kuse			✓	✓	✓	✓
Harry Lucas						✓
Chris Medlin						✓
Missy Pair						✓
Tracy Roberts						✓
John Sloan						✓
David Stutts						

Name	Representing	Email Address / Phone Number	8:00 a.m.	8:30 a.m.	9:30 a.m.	10:00 a.m.	10:30 a.m.	11:00 a.m.	1:00 p.m.	1:50 p.m.	2:30 p.m.	3:30 p.m.
			Recap of Day 1	Earthwork, Drainage, Pavement, Roadway, Geotechnical	Roadside Environmental (Erosion Control & Landscaping)	Traffic Control, Signaling, Lighting	Traffic Signals and ITS	Environmental / Permitting / Mitigation	Utilities (wet and dry)	Right of Way	Revisit estimate items, i.e. soft costs as necessary	Review and finalize risk register details
Yates Allen												
Roger Bryan				✓	✓			✓				
Meme Buscemi				✓								
Paul Chan						✓						
Shane Clark			✓	✓								
Marissa Cox								✓				
Carla Dagnino								✓				
Karmen Dais												
Travis Feltes					✓	✓	✓	✓	✓	✓	✓	✓
Roger Garrett												
Jeremy Goodwin					✓							
Gregg Green												
Jeff Hemphill								✓				
Tom Hepler												
Donna Jackson												
Kelvin Jordan												
Roger Kluckman			✓	✓								
Bob Kopetsky												
Jessica Kuse			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Jeff Lackey					✓							

FHWA / NCDOT
 STIP No. I-2513 (I-26 Connector)
 Cost Estimate Review
 Sign-In Sheet

THURSDAY, September 13, 2018			TIME / TOPIC
Name	Representing	Email Address / Phone Number	9:30 a.m. Presentation
Charles Luedders	FHWA		✓
Jim Martin	FHWA		✓
Michael Smith	FHWA		✓
Andrew Bell			
Steve Cannon			
Philip Culpepper	NCDOT Estimating		✓
Neil Dean	AECOM		
Forrest Dungan			
Theresa Ellerby	NCDOT-PMU		✓
Donna Keener	NCDOT D-B		✓
Karen Lovering	NCDOT Estimating Mgmt		✓
Randy McKinney			

FHWA

CORE PROJECT TEAM

THURSDAY, September 13, 2018

9:30 a.m.

Name

Representing

Email Address /
Phone Number

Presentation
Dry Run

Brendan Merithew

Celia Miars

Kevin Moore

Joanna Rocco

Eric Spalding

Derrick Weaver

Nidal Albadawi

Mark Gibbs

Jessica Kuse

Virginia Mabry

Chris Werner

Aecom

NC DOT

Aecom

AECOM

NC DOT

NC DOT

HNTB

eric.spalding@aecom.com

DWEAVER@NC DOT.GOV

nalbadawi@ncdot.gov

✓

✓

✓

✓

✓

✓

CORE PROJECT TEAM

INVITEES

MEETING SUMMARY



To: Project File

From: Celia Miars
AECOM

Date: October 5, 2018

RE: I-2513 Aesthetics Advisory Committee Meeting
NCDOT STIP Project I-2513 (I-26 Connector)

Meeting Attendees:

Ken Putnam – City of Asheville
Ted Figura – EWANA
Jason Gilliland – SDS
Joe Minicozzi – Urban3
Mike Zukosk – AAC
Woody Farmer
David Nutter
Susan Loftis

Jeff Lackey – NCDOT Roadside Environmental
Kyle Cooper - NCDOT Roadside Environmental
Derrick Weaver – NCDOT EPU
Theresa Ellerby – NCDOT PMU Neil Dean – AECOM
Celia Miars – AECOM
Joanna Rocco – AECOM
Eric Spalding – AECOM

The project team attended the first meeting of the Aesthetic Advisory Committee (AAC) on October 3, 2018 at the City of Asheville Municipal Building. The purpose of the meeting was to discuss the roles and responsibilities of the AAC and review NCDOT guidance regarding aesthetic treatments for NCDOT projects.

Ken Putnam began the meeting by stating the committee is currently soliciting for additional members, with an application deadline of November 5, 2018. Once all the committee members have been selected, the AAC will elect/appoint a chairperson.

Jeff Lackey gave a presentation discussing NCDOT's aesthetics policies and procedures. Several examples across the state were discussed. There are three levels of design for roadway project aesthetics and landscaping: standard, enhanced, and landmark. NCDOT will fund and design to a standard level of design. Municipalities can add capital to the project to increase the level of design to enhanced or landmark. In order to increase the level of design, a municipal agreement must be in place stating the municipality will maintain the area at a high level.

During the meeting, Joanna provided the AAC members with a weblink to the NCDOT Aesthetics Guidance Manual.

General discussion regarding the AAC's roles and points of interest within the I-26 Connector project study area followed. Meeting information and documents from previously formed community

MEETING SUMMARY

October 5, 2018

Page 2 of 2

committees regarding aesthetics for the project were discussed. It was noted all the committee members should review these materials.

The meeting concluded at 3:30 p.m. The next AAC meeting will take place once all members have been chosen.

MEETING SUMMARY



To: Meeting Attendees
Project File

From: Joanna Rocco
AECOM

Date: November 5, 2018

RE: **Biological Assessment and Bridge Construction Meeting**
NCDOT STIP Project I-2513 (I-26 Connector)
NCDOT Division 13 Conference Room, Asheville NC

Meeting Attendees:

Derrick Weaver, NCDOT – EPU	Jeff Ball, Wright Brothers Construction
Randy McKinney, NCDOT – Division 13	Tim Goodson, Tennoca Construction Company
Marissa Cox, NCDOT – Biological Surveys*	Heather Wallace, CALYX*
Matt Lauffer, NCDOT – Hydraulics*	Mary Frazer – Three Oaks Engineering*
Chris Manley, NCDOT – Biological Surveys*	Neil Dean, AECOM
Marissa Miller, NCDOT – Biological Surveys*	Claudia Lee, AECOM*
Mike Sanderson, NCDOT – Biological Surveys*	Celia Miars, AECOM
	Joanna Rocco, AECOM
	Eric Spalding, AECOM

*Joined meeting via telephone

The project team met on October 3, 2018 to discuss the Biological Assessment (BA) for the gray bat and Appalachian elktoe, two federally endangered species with biological conclusions of “May Affect – Likely to Adversely Affect” for the I-26 Connector project. The purpose of the meeting was to review project commitments that NCDOT may present to USFWS at a follow-up meeting later in the month regarding construction of the bridges over the French Broad River and Hominy Creek.

Discussion points from the meeting are summarized below:

- Marella is currently working on the Biological Opinion (BO) for I-4400/I-4700 and is waiting on additional information from the gray bat research study. It was noted she plans to have the BO issued prior to Thanksgiving.
- Hill Street Culvert System discussion:
 - Heather Wallace noted the detectors closest to the Hill Street culvert roost had high activity.

MEETING SUMMARY

November 5, 2018

Page 2 of 3

- The Hill Street culvert system is extensive at approximately 162 acres total in size. It is also 60 years old, and under 60 ft. of fill in some locations, so the likely recommendation will be to rehabilitate the culvert.
 - NCDOT Hydraulics recommends maintaining 8x8 culvert and relining it; culverts below Atkinson St. (metal pipes) would all be replaced; 48" pipe can be rerouted if needed.
 - It was noted a portion of the culvert system that joins the concrete box culvert upstream could create a larger roost site if it is replaced (84" CMP) with concrete.
 - It was noted noise will vibrate through the culvert system during rehabilitation and replacement. Marella would probably prefer that main pipe is disturbed the least amount possible.
 - It will be assumed the entire 8x8 RCBC and downstream arched pipes will need to be rehabilitated as a worst-case scenario when defining the conservation measures associated with the Hill Street culvert; the rehabilitation could be performed between October and April, with the moratorium applying to the main portion of the culvert only.
 - NCDOT Hydraulics will need to access the culvert to get a better understanding of deficiency of system, and this information will be needed for the BA. Due to the presence of bats, the end of November/early December would be the earliest time to access culvert - NCDOT will discuss with USFWS. NCDOT could potentially use robotic camera.
 - A commitment will be added in the BA that notes the staging area for the culvert will be replanted, and this area will not be used for staging outside of the area for the 8x8 RCBC and downstream arched pipes.
 - A commitment will be added in the BA to limit lighting and construction activities during nighttime of moratorium and within 50 feet of riverbank during moratorium with exception of any activity over 30 feet in air.
 - Any lighting during construction on bridge will be directed to work area and not towards water.
 - Acoustic detector Site 6, in the vicinity of the Emma Road community and opposite the culvert on the other side of the river, recorded gray bat activity, and may need to be included in the moratorium.
 - Matt suggested creating "alternate" roost sites for bats while the roost culvert is being disturbed. This could potentially create an alternate site with a base flow, located near the river, and provide other conditions that mimic the conditions in the Hill St. culvert. Division was ok with this idea. BSG noted that if bats use these structures, they cannot be removed, and must be maintained.
 - Work on the new FBR bridge should not be contingent on work on the culvert, and vice versa.
 - Would take 5 years to complete culvert replacement/refurbishment and new bridge over FBR with restrictions versus 4 years with no restrictions.
- Other bridges:
 - The 7 bridges on I-40 over Hominy Creek will likely be constructed at the same time since the maintenance of traffic will be the same for all.
 - It will likely take 2.5 to 3 years to complete replacement of all seven bridges in this area.
 - The number of piers needed and potential length of causeway for each crossing will be determined to give a worst-case scenario for each bridge.
 - Randy noted NCDOT can require the design-build team to send phasing plan for construction of bridges which could be provided to USFWS for their information (not for comment or approval).

MEETING SUMMARY

November 5, 2018

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- The project team should define the limits of the construction area along I-240/I-26 closest to the French Broad River and west of the Amboy Road interchange where we will not be able to commit to the 50 feet “no lighting” zone during the moratorium window.

Action Items:

- AECOM to poll meeting attendees and USFWS regarding date for next meeting. *Update: Meeting with USFWS will be held 11/14 in Asheville.*
- AECOM to prepare map of buffer area associated with new French Broad River bridge denoting area of no lighting between April 15 and October 1.
- AECOM to prepare table that indicates the number of piers needed and potential length of causeway for each crossing. *Update: table sent to project team on 10/12/18.*
- AECOM - meeting minutes
- AECOM - River User Safety Plan
- AECOM – hydraulic modeling to determine how flow in river will be affected by causeways of various sized. Related: Will there be any significant ponding or significant increases in flow that will extend outside the Action Area?
- Matt - send location info for culverts with spray lining in Raleigh to Marissa
- Matt - organize “tour” of culverts in/near Asheville with spray lining.
- Matt – check on delivery date for USGS proposal
- Randy - send SEC/clearing language that Marella liked to Marissa
- Heather - Update Conservation measures, continue work on BA
- Mary – continue work on BA
- Mary/Marissa – Track down appropriate NPDES language to use in place of DSSW
- Marissa – follow up with Marella regarding Action Area. Is she ok with our proposed limits?
- Derrick - discuss updates to CMs with Marella

MEETING SUMMARY



To: Project File

From: Claudia Lee
AECOM

Date: November 26, 2018

RE: I-2513 Bridge Construction and Biological Assessment Meeting - November 14, 2018
NCDOT STIP Project I-2513 (I-26 Connector)

Meeting Attendees:

Derrick Weaver – NCDOT EPU	Chris Manley* – NCDOT Biological Surveys
Theresa Ellerby – NCDOT PMU	Mike Sanderson* - NCDOT Biological Surveys
Matt Lauffer – NCDOT Hydraulics	Paul Chan* – NCDOT Lighting
Felix Davila – FHWA	Greg Hall* – NCDOT Lighting
Brian Yanchik* – FHWA	Mary Fraser* – Three Oaks Engineering
Marella Buncick – USFWS	Heather Wallace* – Calyx (NV5)
Claire Ellwanger – USFWS	Claudia Lee – AECOM
Cameron Cochran – NCDOT Div. 13	Neil Dean – AECOM
Randy McKinney – NCDOT Div. 13	Joanna Rocco – AECOM
Marissa Cox* – NCDOT Biological Surveys	Eric Spalding – AECOM

*Joined via telephone

A meeting was held at 1:00 PM on Wednesday, November 14, 2018 in the NCDOT Division 13 district maintenance office in Asheville, NC. The purpose of this meeting was to review the project commitments for the Biological Assessment, and to discuss bridge construction and lighting on the project. Attendees of the meeting are shown above. Joanna began the meeting by providing an update and current project status.

Paul Chan and Greg Hall gave an overview of NCDOT lighting design practices and preferences. NCDOT is currently undertaking a statewide project to upgrade lighting to LED and the project is expected to conclude in March. Greg indicated that 8 miles north of I-40 is currently lit with LEDs. The intention was to take what had recently been installed along the project corridor and reuse any lights for the I-2513 project. Shoulder-mounted lights may be removed because they are a maintenance hazard. High mast light poles are preferred in interchanges which flood the area with light. Light temperature is a consideration, as is the use of dimmable LEDs. The lighting plan should be reviewed for where 45' tall fixtures may be used instead of high mast lights as the gray bat is particularly light-averse. Marella suggested that the group should review the Bonner Bridge plan and the types of lighting used there as the goals are similar due to the presence of endangered sea turtles. Felix indicated that rainy conditions should be considered when designing the lighting.

MEETING SUMMARY

November 26, 2018

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Derrick reviewed the conservation measures and each were discussed and edited as necessary. Discussion included:

Measures to Avoid/Minimize Effects to Gray Bat during Hill St. Construction

- Added "Culvert will be monitored for bat activity before construction begins". Matt said that the video of the culvert will allow for identification of the areas where bats congregate and the locations needing repair. The underwater investigation team does not anticipate major changes.
- Marella reiterated the large number of invasive species in the Hill St. culvert area. Removal of invasive plant species would be a positive side effect. She requested to look into a way to gain control over the outlet of the culvert. Randy will begin a schedule for spray. Randy requests the outlet to be owned as right-of-way.
- Incorporate a staging area at both ends of the Hill St. culvert.
- Consider a conservation easement at the outlet end of the culvert.
- Shield lighting from Southern States property at the outlet end of the culvert.
- Stormwater at Riverside Drive is a concern; stormwater should not discharge into the Hill St. culvert.

Measures to Avoid/Minimize Effects to Gray Bat during Bridge Construction

- Randy anticipates 90% of the bridge construction to occur during the daytime. Cameron agreed and added that work can also occur outside of the 50' buffer zone to avoid lighting and noise issues to the gray bats.
- Marella noted the lighting at Southern States could be shielded on the back side of the property in order to avoid additional light. Marissa will look into this further.

Containment

Matt and Claudia will work to identify language to be added to the containment commitments that removes the fueling structures out of/above the floodplain. Concerns were raised about the ability of the contractor to easily identify the floodplain while in the field.

Derrick reiterated that any bridges over Hominy Creek will have bents on the edges, not in the middle, and will be avoided if possible. There may be bents on the bank.

Agency Coordination

Marissa will coordinate the commitment regarding arranging a meeting with the representatives of regulatory agencies prior to the due date for Technical and Price Proposals. The commitment about re-initiation of ESA Section 7 consultation will be rewritten to show checkpoints of design matching compliance. Other minor wording suggestions were made to require acknowledge of receipt of deliverables.

Hill St. Culvert

It was requested that there be specifics included in the contract to determine how long the bats will be disrupted, specifically regarding the number of days, phasing, and noise. Night work was posed as a workable solution for time delays. Marella will investigate additional potential bat box locations for relocation.

MEETING SUMMARY

November 26, 2018

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Derrick closed the meeting at 4:30 pm. The next meeting will be the public hearing on December 4th.

Action Items:

- Review the lighting plan and determine where the river should not be flooded with light
- Randy to schedule vegetation spray at outlet of Hill St. culvert
- Marella to identify other potential bat box locations near the Hill St. culvert
- Matt and Claudia to develop language for removing fueling from an easily field identified boundary
- Matt will get Marella statistics on catastrophic accidents with spills into the French Broad



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

MEMO TO: Post Hearing Meeting Attendees

FROM: Theresa Ellerby, CPM
Project Management Unit

DATE: February 27, 2019

SUBJECT: Project: 34165.1.2 (I-2513) Buncombe County
F.A. Number NHF-26-1(53)
Asheville – I-240 & New Route from I-26 to US 19-23-70
I-26 Connector

Post Hearing Meeting

The post hearing meeting was held in the Structures Design conference room at 1:00pm on January 11, 2019, to discuss the comments received from the Design Public Hearing. The Design Public Hearing was held on December 4, 2018 at the Renaissance Asheville Hotel located at 31 Woodfin Street in Asheville. Approximately 450 people were in attendance, with a total of 466 comments received during the comment period, which ended on January 4, 2019. The responses provided in this summary are applicable at the time this memorandum was drafted; however, updated information will be included in the FEIS and ROD as it becomes available.

EXECUTIVE SUMMARY:

- The I-26 Connector project is an interstate freeway project that would connect I-26 in southwestern Asheville to US 19-23-70 in northwest Asheville and have a total length of approximately 7 miles.
- The project would extend I-26 from I-40 to US 19-23-70 and would allow for the eventual designation of I-26 from Charleston, South Carolina, to Johnston City, Tennessee, should a remaining section (TIP Project A-0010A) from the north end of this project to Mars Hill, North Carolina be completed.
- The project would upgrade and widen I-240 from I-40 to Patton Avenue and then cross the French Broad River as a new freeway to US 19-23-70 slightly south of the Broadway interchange.
- The project is needed to upgrade the interstate corridor to meet current design standards for the interstate system, improve system linkage by connecting I-26 south of Asheville with US 19-23-70, address traffic capacity problems along the existing I-

240 corridor (future I-26), and increase the remaining useful service of the Captain Jeff Bowen Bridges.

STATISTICAL OVERVIEW OF COMMENTS:

Comments Received

- 466 public comments received
- 155 in the form of standard language form letters

Comment Types

- Form Letters: 155
- Emails: 133
- Comment Forms: 85
- Contact Us website: 45
- Transcript: 17
- Individual Letters: 17
- Hotline Calls: 2

Comment Subjects:

- | | |
|-------------------------------------|--|
| • Design: 304 | • Traffic: 20 |
| • Bicycle/Pedestrian:245 | • Access Concerns: 20 |
| • Community Impacts: 195 | • Project Costs: 18 |
| • Light/Air/Noise Pollution: 59 | • Impacts to Personal Property: 18 |
| • Project/Construction Schedule: 39 | • Business Impacts: 17 |
| • Safety: 31 | • Environmental Justice: 15 |
| • Environmental Impacts: 25 | • Construction Impacts: 8 |
| • Right-of-Way and Relocation: 22 | • Historic and Archaeological Resources: 6 |
| • Other: 22 | • Threatened and Endangered Species: 2 |
| • Alternative Choice: 22 | |

Special Interest Groups

Comments were received from the Aesthetics Advisory Committee, Asheville on Bikes, Citizens I-26 Connector Action (CICA), Council of Independent Business Owners, East West Asheville Neighborhood Association, WECAN, Montford Neighborhood Association, and Mountain True.

General Project Opinions

- 10 percent (49) expressed support for the project

- 23 percent (107) expressed opposition to the project
- 67 percent (310) expressed neutral opinions for the project, mostly suggesting design revisions to be made in various locations

GENERAL RESPONSE TO COMMENTS

Design

Comment Summary

Approximately 304 comments were received relating to design of the project, of which 155 comments were derived from a form letter. The form letter noted additional design revisions were still warranted to meet the community's vision. Several comments suggested specific design revisions, including:

- Number of lanes on I-240 in Section A, noting eight lanes were still shown in the public hearing maps
- Downgrading I-240 to a boulevard between eastern I-40 and Patton Avenue
- Utilizing design exceptions where possible in order to reduce the project footprint
- Reducing the number of lanes throughout the project, including the flyovers, I-240, Jeff Bowen Bridges, and Amboy Road
- Reducing shoulder widths throughout the project
- Reducing median widths throughout the project by utilizing concrete barriers
- Tightening the Haywood Road interchange
- Tightening the I-240/Patton Avenue interchange to the east of the Jeff Bowen Bridges
- Reducing the number of lanes on the split diamond interchange at Amboy Road and Brevard Road
- Incorporating the visions noted in the Sam Schwartz report
- Incorporating complete streets throughout the project
- Removing the flyover bridges and "stacking" I-26 traffic over the existing Jeff Bowen Bridges
- Utilizing the existing number of lanes and configuration of the Haywood Road Bridge
- Reducing the height of the flyover bridges
- Limiting the number of lanes on Riverside Drive to two lanes, with bicycle/pedestrian accommodations
- Reducing the speed limit throughout the project in order to reduce the footprint of the design

Response

- Number of lanes on I-240 in Section A, noting eight lanes were still shown in the public hearing maps

The typical section for I-240 in Section A includes six through lanes with auxiliary lanes between interchanges where necessary. This section only includes six basic freeway lanes.

- Reducing the number of lanes throughout the project, including the flyovers, I-240, Jeff Bowen Bridges, and Amboy Road

Lane configurations were determined by geometric constraints and traffic operations analyses, therefore, reducing the number of lanes throughout the project, including Amboy Road, the ramps of the split diamond interchange between Amboy Road and Brevard Road, the flyovers, I-240, and the Jeff Bowen Bridges is not feasible.

- Downgrading I-240 to a boulevard between eastern I-40 and Patton Avenue

Downgrading I-240 to a boulevard between eastern I-40 and Patton Avenue is outside of the purpose and need of the proposed project.

A double decker bridge was considered as part of the original ADC alternative. In order for geometries to work for the various interchanges, and to be designed to the same standards of the other Detailed Study Alternatives, the double decker bridge alternative was modified to what is now Alternative 4-B.

Furthermore, to construct an upper tier, Patton Avenue would need to be closed to traffic for the duration of construction. Construction costs would likely be extensive due to the highly specialized construction techniques required to implement this strategy and delays to the construction schedule would be extended substantially. Additionally, the existing westbound Patton Avenue bridge is listed on the SHPO National Register and this construction method would likely generate an adverse effect for this resource.

- Reducing shoulder widths throughout the project

Reducing shoulder widths throughout the project would trigger a design exception. Shoulder widths are currently designed in accordance with AASHTO and the NCDOT paved shoulder policy.

- Reducing median widths throughout the project by utilizing concrete barriers

Concrete barriers are utilized throughout Sections A and B in order to reduce median widths. Barriers are not needed in Section C due to the alternative selected, which is a bifurcated interchange configuration.

- Tightening the Haywood Road interchange

During the preliminary design process, multiple interchange configurations were studied in an effort to minimize the footprint at this location. These included an oval-about, the median u-turn diamond interchange, roundabouts at the ramp terminals, and a single point urban diamond interchange. Due to geometric constraints and the proximity of historic resources in the area, the proposed design was carried forward in an effort to minimize impacts to the project area.

- Tightening the I-240/Patton Avenue interchange to the east of the Jeff Bowen Bridges

During the preliminary design process, the project team investigated ways to tighten the horizontal curvature in the vicinity of the I-240/Patton Avenue interchange to the east of the Jeff Bowen Bridges. The current preliminary designs are using horizontal curves with the minimum allowable radius.

- Incorporating complete streets throughout the project

NCDOT is committed to Complete Streets improvements and has continued to coordinate efforts with the City of Asheville to incorporate these improvements into the project in compliance with design and cost-sharing guidelines.

- Reducing the height of the flyover bridges

During the preliminary design process, the heights of the flyover bridges were investigated in an effort to minimize impacts. Elevations are based on design criteria for minimum vertical clearances and minimum grades.

- Limiting the number of lanes on Riverside Drive to two lanes, with bicycle/pedestrian accommodations

NCDOT will continue to coordinate the typical section of Riverside Drive with the City of Asheville.

- Reducing the speed limit throughout the project in order to reduce the footprint of the design

The speed limit throughout the project has been minimized to meet existing speed limits of I-240 and design standards.

- Utilizing design exceptions where possible in order to reduce the project footprint

Through discussions with FHWA, it was noted FHWA has not adopted the 2018 AASHTO “A Policy on Geometric Design of Highways and Streets” at this time, therefore NCDOT is continuing to use the 2011 AASHTO “A Policy on Geometric Design of Highways and Streets” (Green Book) for the purposes of design standards. FHWA did not offer a timeline for when the new policy is expected to be adopted. NCDOT does not anticipate using any new standards for the I-26 Connector project at this time.

Design Exceptions are determined on a case by case basis and are normally justified and approved during the final design phase of the project. Approval authority for design exceptions depends upon the type of work and the highway system. In the case of this project, the Federal Highway Administration would be the approving authority. The FHWA has delegated this authority to the NCDOT, specifically the Roadway Design Unit.

Bicycle and Pedestrian Accommodations

Comment Summary

Approximately 245 comments were received regarding bicycle and pedestrian accommodations, of which 155 comments were included in a form letter. The form letter called for the reduction of vehicle lanes to include room for improved bicycle/pedestrian

infrastructure. Several comments noted the lack of bicycle/pedestrian features on the Design Public Hearing maps. General recommendations to incorporate NACTO design standards and standardized pavement markings were also received. The location of bicycle/pedestrian accommodations in relation to entrance/exit ramps was a topic of safety concern. The inclusion of traffic calming measures to benefit bicyclists/pedestrians, specifically on Haywood Road, was also noted as a way to increase safety. Additionally, several comments were received requesting bicycle/pedestrian accommodations be constructed and maintained before and during construction of the project, as opposed to after construction. Finally, the form letters and other comments identified several specific locations as areas to add facilities and/or connections to adjacent neighborhoods and communities.

Response

Bicycle and pedestrian accommodations shown on the 2018 Public Hearing maps are a part of the project designs and will be constructed as a part of the project. NCDOT is committed to Complete Streets improvements and has continued to coordinate efforts with the City of Asheville to incorporate these improvements into the project in compliance with design and cost-sharing guidelines. In areas where existing sidewalks are being disturbed, the designs show these sidewalks being replaced as a part of the proposed designs. In areas where the various plans propose future pedestrian accommodations, the designs have been developed to accommodate or not preclude these elements from being constructed by the various agencies.

In March 2016, NCDOT and the City of Asheville established the I-26 Connector Working Group, which initiated a series of meetings between members of the City of Asheville City Council, the Asheville Design Center, Buncombe County, FHWA, FBRMPO, NCDOT, and other stakeholders. The purpose of these working group meetings was to discuss methodologies for various technical aspects of the project, discuss FHWA and NCDOT policies that factor into designs of the various project alternatives, receive feedback from local officials and public citizens on various aspects of the project, discuss bicycle/pedestrian accommodations and betterment requests from the City of Asheville, among other topics. Initial discussions of additional bicycle and pedestrian accommodations originated in these meetings, and resulted in a list of betterments provided by the City of Asheville to NCDOT. NCDOT and the City of Asheville have agreed upon several areas where these additional facilities will be included as part of the project designs, and those that will require cost-sharing between NCDOT and the City. This coordination will continue throughout development of the project and into final design.

It is expected that incidental bicycle and pedestrian improvements will be included in the final design of the project, which will be coordinated with the City of Asheville, and will be designed using the AASHTO Guide for the Development of Bicycle Facilities.

The FEIS will include a discussion of existing and proposed facilities as part of the project, and demonstrate how their consistency with local and regional multi-modal plans.

During construction of the project, existing sidewalks and multi-use paths will remain accessible. Proposed bicycle and pedestrian facilities such as sidewalks, multi-use paths, shared bicycle lanes, etc. would be available for use as sections of the project are

completed. Due to grading activities and safety concerns, proposed facilities would not likely be constructed prior to roadway construction. However, construction phasing plans will be determined by the design build team.

Community Impacts/Environmental Justice Impacts

Comment Summary

Approximately 195 comments were received regarding community and/or environmental justice impacts accommodations, of which 155 comments were derived from a form letter. The form letter noted the project does not meet the community's vision for the future and additional design changes should occur, such as turning Patton Avenue into an urban, multi-use corridor and tightening up intersections throughout the project to reduce the amount of land used. Other comments received relating to community impacts noted the project was too large and did not fit within the context of Asheville. Additionally it was noted the project could create urban sprawl. Several requests were made to allow the City to develop the land underneath the flyover bridges as parks or for business development. Furthermore, comments requested the land along Patton Avenue be returned to the City for redevelopment.

Several comments received also discussed concern for the impacts to the Burton Street community, noting the community was impacted previously during construction of I-240. Additionally, comments regarding the lack of affordable housing for those that will be displaced within the Burton Street community were also received. Approximately 15 comments were received relating to Environmental Justice impacts.

Response

The project is being designed to address project future traffic capacity needs which include both local and regional growth in traffic, as well as the other identified needs in the purpose and need section of the FEIS. The scale of the project is appropriate to meet future traffic needs and to maintain adequate traffic operations. NCDOT will continue to further avoid and minimize impacts due to the project to the greatest extent practicable during final design and construction.

Regarding the development of land underneath the flyover bridges, in the past, agreements between the municipality and NCDOT have been in place to allow use if the use is a transportation use or a park. In some cases, such as underneath the Jeff Bowen Bridges, the City of Asheville is permitted access to the land through an encroachment agreement with the NCDOT. In this instance, the City would file for an encroachment to be approved after construction of the project.

As part of the I-2513 Community Impact Assessment Update (NCDOT 2018), an initial threshold screening and evaluation was conducted to determine the relative impact of the I-26 Connector Project on Environmental Justice populations. Through community screening, field studies, demographic research, and agency coordination and public engagement, it was concluded that no communities would experience a high burden, while only two communities would experience a moderate burden.

Burton Street neighborhood has been classified as an Environmental Justice population that has incurred recurring impacts. NCDOT, with the assistance of a subconsultant that specializes in environmental justice issues, is investigating ways to provide additional

mitigation opportunities to lessen the burden of the project on the Burton Street neighborhood. This is being addressed by the development of a community-driven Burton Street Neighborhood Plan, adopted by the City of Asheville on September 25, 2018. The plan includes a list of mitigation strategies to be implemented by NCDOT as part of the project. It has been estimated that affordable housing is available for those displaced within the project area, it is a goal of the Burton Street Neighborhood Plan to identify areas to improve the availability of these resources to Burton Street residents. The Burton Street Neighborhood Plan will be included in the FEIS.

Light/Air/Noise Pollution

Comment Summary

Approximately 59 comments were received regarding lighting, air, and noise impacts. Comments received related to air quality noted concerns from increased emissions due to increased traffic volumes. Comments received related to lighting and visual impacts requested an iconic bridge to be constructed as the new flyover bridges or to focus on improving the aesthetics of the Jeff Bowen Bridges. Incorporating aesthetic elements throughout the project was also identified in several comments as an important consideration to be incorporated. Additionally, the use of LED lights on the flyover bridges was suggested, as opposed to traditional lighting. Comments also requested 3D renderings of the project to better display the height of the bridges.

Comments related to noise expressed concerns from increased noise volumes to personal property and a decreased quality of life as a result. Several comments requested additional information regarding the noise analysis, the location of noise barriers throughout the study area, and the process of the noise analysis. Noise impacts during construction were also noted as a concern. Comments requested sound protection measures for Riverside Cemetery. Suggestions were given in several comments to include commitments in the RFP to incorporate “low noise” surface pavement specifications and prevent large trucks from engine braking, also known as “jake braking.” Several comments originated from the Montford community.

Response

One of the goals of local area plans highlighted in the DEIS and FEIS is to minimize air quality impacts. By providing free-flowing roadways, especially along the interstate, the air quality would be consistent with this goal, and would not exceed the air quality thresholds set forth under the Clean Air Act. The proposed project is located in an attainment area and is not anticipated to create any adverse effects on the air quality of this attainment area.

As previously noted, NCDOT is currently coordinating with the newly-formed Aesthetics Advisory Committee (AAC) to address aesthetic treatments that may be incorporated in the proposed project.

Proposed lighting is currently begin evaluated, and will include LED lighting that is focused towards the bridge to reduce impacts to the federally-endangered gray bat. NCDOT will participate in the discussions of the AAC throughout the final design and construction phases regarding lighting as well.

At the request of the public and the City of Asheville, NCDOT prepared a map of 360-degree photo simulations for the project, in addition to the project visualization shown at the Design Public Hearing. These photo simulations can assist in visualizing what the

proposed project might look like from various points of view throughout the study area. These can be viewed from the project website <https://www.ncdot.gov/projects/asheville-i-26-connector/Pages/photos-videos.aspx>.

Regarding noise impact concerns, a preliminary traffic noise analysis is currently underway, and the results are not yet available. The analysis is being updated due to the design revisions made to the preferred alternative, the availability of updated traffic data, and the publication of a new NCDOT Noise Policy. Once the analysis is complete, the report will be placed on the project website, and maps will be posted that show areas likely to get noise abatement based on that preliminary analysis. A newsletter will be mailed alerting people to the availability of those materials. During final design, a final design noise analysis will be performed; it is this analysis that will identify recommended noise wall locations. Residence and business property owners will be involved in making the final decisions on whether or not noise walls will be placed in areas that NCDOT has determined can be constructed as part of the project. Low noise surface pavement is not an abatement measure approved by FHWA. Therefore, NCDOT would not specify the use of a low noise surface pavement to be used for noise abatement; however, the NCDOT Division Office could include this type of specification in the RFP without classifying the pavement as a noise abatement measure. There is currently limited information regarding the lifespan of these pavement types. Pavement design will be investigated further during final design. Restrictions on the use of “jake braking” is enforced in some areas by local law enforcement, however, the request for sign installations would originate from the city.

Safety

Comment Summary

Approximately 31 comments were received regarding safety issues. Many comments related to safety specifically addressed bicycle/pedestrian safety. Others noted that removing access at Hanover Street from Haywood Road could increase crime in the surrounding residential area. There were also concerns regarding driver safety on the curved flyover bridges during times of rainfall, snowfall, and other inclement weather.

Response

The design of the preferred alternative is in accordance with AASHTO’s “A Policy on Design Standards – Interstate System” which states that “The highways of this system (Interstate System) must be designed to ensure safety, permanence, utility, and flexibility to provide for predicted traffic growth.” A goal for this project is to provide a safe facility that accommodates projected traffic. In the view of NCDOT and FHWA the design criteria for the proposed project is appropriate and any design revisions would need to adhere to these criteria. These criteria include the appropriate design standards for ensuring the facility is safe on bridges and flyovers during inclement weather. AASHTO has certain precautions that should be considered as final design is developed such as the levels of skid resistance on asphalt, minimization of snow melt and storage, visibility of fog, and other conditions encountered on bridges and flyovers in this area of the state.

Regarding the safety of bicyclists and pedestrians, the appropriate safety amenities have been included in the preliminary designs. All bicycle and pedestrian facilities will be designed according the North Carolina Complete Streets Policy and Design Guidelines,

AASHTO Guide for the Development of Bicycle Facilities, and the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities. A primary goal of planning, designing, and creating complete streets is to make it possible for motorists, pedestrians, bicyclists, and transit riders to all travel safely from their origins to their destinations.

Concerns regarding crime increases due to the proposed designs should be coordinated with local law enforcement.

Environmental Impacts (i.e. Loss of trees/vegetation)

Comment Summary

Approximately 25 comments were received relating to environmental impacts. Comments expressed concern over the loss of mature trees during construction (particularly at Community Baptist Church in the Burton Street Community and along Westover Drive in the Montford Community). Several comments requested mature trees that are impacted during construction be replaced, as well as vegetative buffers constructed in areas such as Riverside Drive, Riverside Cemetery, and Montford. Additional comments noted stability in the Montford area as a concern, requesting a study be undertaken to determine the negative effects of additional highway construction. Stormwater impacts due to increased impervious surface were also noted in several comments as a concern. It was suggested NCDOT coordinate with the City's Tree Commission, Stormwater Management Department, and Office of Sustainability.

Response

NCDOT will consider incorporating landscaping into the project design to minimize the loss of vegetation. NCDOT is currently coordinating with the newly-formed Aesthetics Advisory Committee (AAC) regarding various aspects of project aesthetics, including how to best incorporate some of the project features to be compatible with the surrounding natural environment. NCDOT will participate in the discussions of the AAC throughout the final design and construction phases.

In areas where removal of vegetation is necessary, it is understood this can negatively impact water quality due to project construction runoff. In accordance with the North Carolina Sedimentation and Pollution Control Act (15A NCAC 4B.0001.0027), an erosion and sedimentation control plan must be prepared for land disturbing activities that cover one or more acres to protect against runoff from a 10-year storm. Thus, prior to the start of project construction activities, an erosion and sedimentation control plan will be prepared in accordance with the NCDEQ publication Erosion and Sediment Control Planning and Design Manual (NCDNR 1993), and the NCDOT guidelines in Best Management Practices for Protection of Surface Waters (NCDOT 1997).

In August 2017, NCDOT requested the Geotechnical Unit to provide a subsurface investigation and inventory and preliminary geotechnical recommendation for the area near Montford. The recommendations were documented in a memo dated November 14, 2017 and did not determine unstable slopes during construction of the I-26 Connector.

Right-of-way/Relocations

Comment Summary

Approximately 22 comments were received related to the right-of-way and relocation process. It was noted the amount of time for relocation was not enough time for residents

and businesses to adequately prepare. As noted above under Community Impacts, several comments were received requesting NCDOT and the City of Asheville to work together to redevelop the property along Patton Avenue for mixed-use. Additionally, comments were received requesting the project footprint be reduced as much as possible to minimize impacts to residences and businesses. Several comments were received with questions regarding specific impacts to personal property. Specific comments received to date with regard to impacts to personal property have been responded to as received.

Response

NCDOT will investigate ways to further minimize impacts as much as possible during final design. Section 4.1.2.3 of the DEIS references the Consolidated Strategic Housing and Community Development Plan, which emphasizes the need for affordable housing, as well as the need for improvements that will aid in community development. The plan notes the lack of housing supply is prevalent across the entire region (Buncombe, Henderson, Madison, and Transylvania counties) and across all income levels. The trend indicating the need for affordable housing seems to be driven by social and community influences including neighborhood redevelopment and gentrification and is likely to continue regardless of the I-26 Connector Project.

Comments with specific requests to be contacted regarding impacts to their personal property have been responded to as received.

Regarding the redevelopment of the land to the east of the Jeff Bowen Bridges along Patton Avenue, the City of Asheville will need to coordinate with the NCDOT Right-of-way branch regarding the right-of-way disposal process.

After the final design has been approved, the proposed right-of-way limits will be staked in the ground. Affected property owners will be contacted by a Right-of-Way agent to arrange a meeting and discuss the next steps. The minimum time required for NCDOT to provide notification to impacted property owners regarding relocations is 90 days.

Alternative Choice

Comment Summary

Approximately 22 comments were received suggesting alternative choices to the preferred alternative. Alternatives suggested included:

- Tunneling under the French Broad River as opposed to constructing flyover bridges.
- Creating a bypass around Asheville, as opposed to through Asheville.
- Investigating the future of roadways considering the introduction of autonomous vehicles and electric cars.
- Investing in mass transit options.
- Designing bridges to include light rail, bus rapid transit, or bus on shoulder.
- Constructing park and ride lots.

Response

- Tunneling under the French Broad River as opposed to constructing flyover bridges.

NCDOT was requested to investigate the feasibility of constructing a tunnel in Section B under the French Broad River. A Tunnel Feasibility Evaluation Memorandum investigated the feasibility of a subsurface passage of the French Broad River by I-26 and the I-240 connection ramps in Section B. The full memorandum is included in Appendix A of the FEIS. Several major challenges were found with this option and it was determined not to be feasible. These challenges are discussed further in the FEIS.

- Creating a bypass around Asheville, as opposed to through Asheville.

The evaluation of a bypass alternative was evaluated in the Phase I Environmental Analysis and is included in Section 2.5.3.1 of the DEIS. It was determined that a bypass alternative would not meet the purpose and need for the proposed project and was eliminated from further study.

- Investing in mass transit options.

Mass transit alternatives were studied as a part of the alternatives evaluation process. The use of BRT along the freeway corridors within the project study area would not provide substantial benefit as the freeways are radial routes and the routes would likely need to run along the arterials to serve the urban core of Asheville.

- Investigating the future of roadways considering the introduction of autonomous vehicles and electric cars.

While autonomous and electric cars have been introduced to the highways, currently, there is not enough research to forecast the potential impact these vehicles will have on traffic volumes extending to the design year of the project, which is 2040. At this time, autonomous vehicles are not taken into consideration prompting changes to the current preliminary design.

- Designing bridges to include light rail, bus rapid transit, or bus on shoulder.

Constructing HOT or BOS lanes would likely increase the project footprint due to the need to still accommodate “free” lanes of traffic. It was determined mass transit alternatives would not meet the project purposes related to system linkage along the I-26 Corridor. Therefore, mass transit measures implemented alone were not considered reasonable and feasible for this project. Additional discussion is included in Section 2.4 of the FEIS.

- Constructing park and ride lots.

Adding Park and Ride facilities are outside of the scope of this project. The City of Asheville’s May 2018 Transit Master Plan proposes several areas where potential park and ride options could be located, as well as their plans for updating the current transit network.

Traffic

Comment Summary

Approximately 20 comments were received concerning traffic. Many proponents noted the project would alleviate traffic congestion along I-26. Acton Circle was identified as an area of concern due to traffic volumes from Monte Vista Road.

Response

In the I-2513 2040 Build Alternative capacity analysis, Acton Circle N at US 19-23-74A (Smokey Park Highway) was converted to allow all entering movements, but eastbound was converted to a right-out only configuration. Traffic attempting to make a left turn onto northbound US 19-23-74A (Smokey Park Highway), or go eastbound through onto the I-40 eastbound onramp was rerouted to Acton Circle S, approximately 0.40 mile south of Acton Circle N. However, Acton Circle S was outside of the original study area, and was not included in the I-2513 traffic forecast, and so the impact of this rerouted traffic was not studied.

An adjacent project, I-4759 (I-40 at SR 1228) included both Acton Circle N and Acton Circle S in its traffic forecast. Therefore, the decision was made to analyze the traffic volume impacts at Acton Circle S from the modifications made by the I-2513 traffic capacity analysis. The recommended lane changes that improve operations at this intersection will be added to the final design and shall be considered a commitment in the Final Environmental Impact Statement.

Other intersections located outside of the project study area will be prioritized and studied separately.

Access Concerns

Comment Summary

Approximately 20 comments were received related to concerns about access changes. Specific locations noted in the comments include:

- Haywood Road and Michigan Avenue – suggestions to add a stoplight due to changes in access at adjacent roads
- Improved access behind Westgate Mall
- Concerns regarding the proposed closure of Bruce Road
- Concerns regarding removal of on-street parking along Haywood Road, specifically in front of the B&B Pharmacy

Response

At a meeting with the Asheville Primary School on August 16, 2018, the school requested a pedestrian signal in the vicinity of Haywood and Argyle Lane. Additionally, the City discussed investigating this pedestrian crossing as well as other signal improvements on Haywood with safety funding and not as a part of this project.

- Haywood Road and Michigan Avenue – suggestions to add a stoplight due to changes in access at adjacent roads

The new design will be removing exiting I-26 traffic from Hanover Street, which is expected to result in lower traffic volumes in the vicinity of Michigan Avenue and Hawyood Road. While outside of the scope of the I-2513 project, NCDOT will consider making Hanover Street a “T” end street to help ease turning movements.

- Improved access behind Westgate Mall

NCDOT is aware of the issues associated with truck access in this area and is currently reviewing potential options to improve access. These additional access changes will be included in final design.

- Concerns regarding the proposed closure of Bruce Road

Bruce Road will be closed as a result of the proposed improvements at Smokey Park Highway. Traffic will be rerouted to Monte Vista Road and Acton Circle. An additional benefit of the Bruce Road closure is the removal of a railroad crossing.

- Concerns regarding removal of on-street parking along Haywood Road, specifically in front of the B&B Pharmacy

NCDOT is committed to investigating design measures which minimize impacts along Haywood Road in an effort to replace on-street parking. NCDOT will also coordinate with the City to investigate the possibility of opening the space between parking lots to allow for additional parking.

Cost

Comment Summary

Approximately 18 comments were received noting the cost of the project as a concern. Comments related to this topic were both in favor and against the project. Those in favor of the project noted the process has taken too long and costs have inflated substantially. Comments opposed to the project noted the project is too costly and not warranted for the community. It was also noted that as opposed to allocating the funds to constructing the project, they should be allocated to maintenance of the existing facilities.

Response

The right-of-way, construction, and utility relocation costs presented at the Design Public Hearing are based on the preliminary design plans. The project has been included in the FBRMPO's Metropolitan Transportation Plan for several years as a fiscally constrained project.

The funds allocated for the project are to be used specifically for the proposed project. NCDOT maintenance funds are allocated from a separate source within NCDOT and cannot be transferred.

Business Impacts

Comment Summary

Approximately 17 comments were received regarding concerns over business and economic impacts. Several comments in regards to specific business impacts were received and were responded to as received. As noted in the section regarding access concerns, businesses along Haywood Road expressed concern due to the loss of on-street parking. Comments related to tourism impacts were also received, noting the scale of the project would deter tourists. Proponents of the project noted the project is needed to accommodate increased traffic volumes from tourists. Additionally, comments were received requesting the project footprint be reduced as much as possible to minimize impacts to businesses.

Response

NCDOT is committed to minimizing impacts to the number of business relocations due to the proposed project. The preliminary designs for the preferred alternative were refined to further take into consideration feasible engineering, safety, economics, public well-being, and the least amount of injury and inconvenience to the public. NCDOT will

continue to look for other opportunities to further avoid and minimize relocations due to the project to the greatest extent practicable during final design.

Since the approval of the DEIS and the selection of the LEDPA, preliminary designs have been refined based on updated traffic studies and public and resource agency comments on the 2015 DEIS, with minimization to residences and businesses. Various design changes were the result of periodic meetings with the City of Asheville, local organizations, adjacent neighborhoods, and historic property owners in order to better understand concerns and to obtain input on how the project could be refined to better fit within the context of Asheville while meeting local and regional needs.

Construction Impacts

Comment Summary

Approximately eight comments were received related to construction impacts. These included concerns about the length of time it would take to construct this project, noting that there are additional projects to the north and south that will likely be under construction at the same time. It was requested phasing occur to assuage several consecutive years of construction throughout the I-26 Corridor. Other concerns were related to the design build process discussed at the Public Hearing. Comments assumed this process would allow the contractor the freedom to continue to change the designs without additional public involvement. As mentioned in the bicycle/pedestrian section, comments also requested bicycle/pedestrian accommodations before and during the construction process, as opposed to constructing them after the roadway improvements.

Response

NCDOT will make every effort possible to continue coordination with the local municipalities the FBRMPO throughout the final design and construction of the project.

The design-build process allows NCDOT to hire a team of designers and contractors that are responsible for the design, right-of-way acquisition, and construction of the project. The team may begin construction on one portion of the project while they finish the design and right-of-way acquisition for another section. This typically results in faster completion. Additional benefits to a design-build project may include innovative solutions that save time, money, and/or reduce impacts and quicker resolution to problems that arise during design and construction. The process may provide additional alternatives or modification to the existing alternative which in turn may reduce costs or impacts. It is important to note, while the opportunity for flexibility in the design is present, the “green sheet” located at the beginning of the FEIS and included in the ROD identifies a list of commitments the design build team must adhere to. Impacts disclosed in the FEIS will not be increased without additional coordination with the agencies and the public. It is the goal of the final design and design build team to minimize impacts.

Other

Comment Summary

Other comments received noted the validity of the logical termini in regards to the projects located to the north and south of the I-26 Connector. It was also noted the environmental document should be prioritized. One comment suggested a health study to be completed for the project.

Response

The project segmentation referred to is in regards to three projects along I-26 and Future I-26 in western North Carolina:

- *NCDOT STIP Project I-4400/I-4700: Additional lanes on I-26 south of Asheville*
- *NCDOT STIP Project I-2513: I-26 Connector*
- *NCDOT STIP Project A-0010A: Upgrade US 19/23 to Interstate Standards*

FHWA and NCDOT have closely coordinated project decisions with the local, state, and federal resource agencies and continue to do so as each project progresses. While these projects are closely related, the project limits were established so that each has logical termini and independent utility. System-to-system (or interstate-to-interstate) interchanges are often used to identify project limits, or logical termini, which is the case for these projects. Given major decisions for these projects are coordinated, they are represented separately and analyzed as such due to their different purposes and needs, which allow for a more detailed look to be taken along each segment.

NCDOT typically considers health-related effects of transportation during its long-range planning efforts. Health may be considered during project design as well as during the NEPA review process. Several public health considerations, including access to goods and public services, noise, air quality, and safety, have been addressed in the DEIS and the FEIS and are important considerations that would continue to guide project development.

Cc: Post Hearing Meeting attendees (*attended by phone)

Felix Davila – FHWA
Derrick Weaver – NCDOT EPU
Theresa Ellerby – NCDOT PMU
Kevin Moore – NCDOT PMU
Xiudong Han – NCDOT RDU
Brenda Moore – NCDOT RDU
Douglas Kretchman – NCDOT RDU
Tatia White – NCDOT RDU
Missy Pair – NCDOT Noise
Jamille Robbins – NCDOT PICSViz
Greg Hall – NCDOT Roadway Lighting
Kevin Fischer – NCDOT SMU
Joe Hummer – NCDOT Traffic Management
Steve Cannon – NCDOT Division 13*
Chase Carver – NCDOT Division 13*
Randy McKinney – NCDOT Division 13*
Brendan Merrithew – NCDOT Division 13*
Simone Robinson – Public Participation Partners*
Neil Dean – AECOM
Drew Joyner – AECOM
Chris Lucia – AECOM*
Celia Miars – AECOM
Joanna Rocco – AECOM
Eric Spalding – AECOM

MEETING SUMMARY



To: Project File

From: Celia Miars
AECOM

Date: March 27, 2019

RE: I-2513 Working Group Meeting #11
NCDOT STIP Project I-2513 (I-26 Connector)

Meeting Attendees:

Michael Dawson – FHWA	Steve Cannon – NCDOT Division 13
Bruce Emory – Asheville Multimodal Transportation	Brendan Merithew – NCDOT Division 13
Julie Mayfield – City of Asheville	Theresa Ellerby – NCDOT, PMU
Todd Okolichany – City of Asheville	Derrick Weaver – NCDOT, EPU
Ken Putnam – City of Asheville	Neil Dean – AECOM
Gwen Wisler – City of Asheville	Celia Miars – AECOM
Alan McGuinn – Asheville Design Center	Joanna Rocco – AECOM
Lyuba Zuyeva – FBRMPO	Eric Spalding – AECOM
David Nutter – Aesthetic Advisory Committee	

The project team met with the I-2513 Working Group at 9:00 AM on February 21, 2019 in the Asheville Fire and Rescue Department's Police and Fire Training Room in Asheville, NC. The purpose of the meeting was to provide an update of the comments received at the December 2018 Public Hearing, review action items from the previous working group meeting held on July 31, 2018, discuss various design related topics, and provide an overview of the right-of-way acquisition and disposal process.

2018 Design Public Hearing Update

- NCDOT met on January 11, 2019 for the Post Hearing Meeting to discuss comments received at the 2018 Design Public Hearing. Joanna Rocco gave an update on the comments received from the public hearing:
 - The project team received approximately 466 public comments on the 2018 Design Public Hearing
 - 155 comments were considered form letters (they included the same language)
 - 150 emails/individual letters received
 - 85 comments on the provided comment forms
 - 45 comments from the NCDOT Contact Us website
 - 17 comments recorded at the Public Hearing
 - Below are the number of comments received by subject. It was noted the comment forms included the subjects design, bicycle/pedestrian, and community impacts.
 - Design: 304

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- Bicycle/Pedestrian:245
- Community Impacts: 195
- Light/Air/Noise Pollution: 59
- Project/Construction Schedule: 39
- Safety: 31
- Environmental Impacts: 25
- Right-of-Way and Relocation: 22
- Other: 22
- Alternative Choice: 22
- Traffic: 20
- Access Concerns: 20
- Project Costs: 18
- Impacts to Personal Property: 18
- Business Impacts: 17
- Environmental Justice: 15
- Construction Impacts: 8
- Historic and Archaeological Resources: 6
- Threatened and Endangered Species: 2

Review Working Group Meeting #10 Action Items (Working Group)

- Provide an update on the Aesthetics Advisory Committee (AAC) – The project team attended the AAC meeting on February 21, 2019 following the Working Group meeting.

Review Working Group Meeting #10 Action Items (NCDOT)

- NCDOT will correct the visualization link on the website and send out the link to the Working Group to review. *Update: Visualization links on website have been updated.*
- NCDOT will coordinate with Bruce Emory to meet to discuss the microsimulation and its results. *Update: The project team met with members of the City of Asheville and the FBRMPO to discuss additional questions and concerns regarding the preferred alternative designs and traffic analyses, including the microsimulation. Meeting summary is attached.*
- NCDOT will coordinate with Julie Mayfield to present additional cross sections and design information regarding the proposed height of the roadway and retaining wall at Riverside Cemetery. *Update: The project team discussed these designs during the 10/03/18 AAC meeting.*
- The project team will coordinate with the City to hold an additional meeting with representatives from the NCDOT Roadside Environmental Unit to discuss aesthetic options for the project. *Update: The project team presented to the AAC on 10/03/2018 to discuss the roles and responsibilities of the AAC and review NCDOT guidance regarding aesthetic treatments for NCDOT projects. The project team has also met with the AAC on 2/11/2019 and 3/19/2019.*

Designs

Discussions followed regarding design related requests from the public. These topics included investigating downgrading I-240 in order to reduce the footprint of the flyover bridges, the number of lanes in STIP A-0010A (the project immediately north of I-2513B), the feasibility of a tunnel option, and interchange revisions on Patton Avenue.

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Downgrading I-240

The design team was requested to investigate downgrading the design speed of I-240 from interstate standards to boulevard standards, therefore allowing tighter radii on the bridges and reducing the overall height and footprint. It was noted, if I-240 is downgraded from an interstate, the project would no longer receive federal funding for maintenance. This cost would be born by the division maintenance fund, which may not be enough or could exhaust funding for other projects. It was also noted the current design speed is lower than typical interstates (currently designed at 50 mph). Furthermore, if the roadway speed was lower than 50 mph, it would likely warrant additional lanes in Section A due to the local travel demand model results. For these reasons, I-240 will not be downgraded to lower than interstate standards, unless the French Broad River MPO has adjustments in their locally derived travel demand model.

A-0010A Number of Lanes

STIP Project No. A-0010A begins immediately north of I-2513B, tying into the project at Broadway. In I-2513B, designs include three lanes from I-26 north and two lanes from US 19/23 north that merge together before Broadway. At the Broadway interchange, one lane will leave I-26 northbound and four lanes will remain. Per the locally derived travel demand model, four lanes of traffic are needed to accommodate future traffic demands in the A-0010A project area. It was noted the same travel demand model and same traffic forecast were used for both projects.

Tunnel Feasibility

On February 20, 2019 the project team met with Susan Loftis and Brierly Associates to discuss the feasibility of a tunnel across the French Broad River to potentially eliminate the I-240 flyovers. It was noted a tunnel could be considered for reasons other than cost, however, in those cases, other options are likely not feasible and a tunnel is the only option. An initial assessment of the feasibility of a tunnel prepared by AECOM was discussed; it has been estimated construction of the bridges would be approximately \$225 million and a tunnel would cost approximately \$510 million. Furthermore, this cost includes only construction of the tunnel and does not include any necessary connections to be made, such as I-240 to Patton or to I-26. Flyover bridges for I-240 traffic would still be necessary. Several other cost implications associated with a tunnel include higher maintenance costs, necessary backup systems in place 24/7, security, and emergency management. It was noted the land above the tunnel would still be purchased by NCDOT due to underground land ownership laws in North Carolina.

Patton Avenue

On the west side of the Jeff Bowen Bridges, the current design at Patton Avenue and I-240/I-26 includes a tight urban diamond interchange. A discussion was held regarding whether or not a diverging diamond interchange (DDI) had ever been investigated as an appropriate configuration at this location. It was noted the design team had taken a preliminary look at a DDI from a traffic perspective only; however, this configuration was not carried forward due to the request from the City of Asheville to prepare a diamond interchange at the time, and due to bicycle and pedestrian constraints associated with a DDI. Julie Mayfield asked if in a DDI it was possible to have a completely separated multi-use transportation path. This option is feasible and would likely be placed in the middle of the interchange. Missouri is very progressive with DDI's and found that putting a greenway in the middle is safer because of the elimination of left turn crossings. AECOM will develop a sketch for pedestrian facilities and a DDI interchange at this location. The City will discuss with Asheville on Bikes if a DDI interchange would be preferred at this location.

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Members of the Working Group asked if the interchange at Patton Avenue and I-240 on the east side of the Jeff Bowen Bridges could be relocated to the Hill Street Connector or eliminate the exit ramp to allow for more land along Patton Avenue to be redeveloped in the future. The design team noted the exit ramp is needed for traffic capacity to reduce congestion along Patton Avenue. It was noted the best option at this stage in the project would be to leave the designs as is and allow the design build team to develop an innovative concept.

Riverside Drive Typical Section

The current typical section for Riverside Drive includes three eleven-foot lanes with curb and gutter. The City of Asheville is interested in having a smaller footprint along Riverside Drive. It was noted that a two lane typical section would require shoulder widths and would result in a 32-foot wide facility (compared to 33-foot wide with 3 lanes). The City of Asheville will discuss their preferred typical section for this section of the project.

Right-of-Way Acquisition and Disposal Process

Bob Haskett with NCDOT Division 13 Right-of-Way discussed the right-of-way surplus disposal process in detail. The City of Asheville has expressed interest in redeveloping land that will no longer be within NCDOT right-of-way after completion of the project. Typically requests to dispose of surplus right-of-way will come from the adjoining property owner. It was noted this process cannot begin until construction of the project is complete. The Working Group noted they are interested in planning ahead for how much land could potentially be rezoned for use by the City.

Miscellaneous

Derrick Weaver noted the timeline for developing a list of commitments, including betterments and AAC recommendations. Assuming the project will be let in July 2020 (earliest date), the project would be advertised in December 2019 and would be shortlisted by March 2020. Therefore, it would be ideal to have the commitments, cost-share agreements, and AAC recommendations by December 2019. Ken Putnam and Neil Dean will coordinate to finalize the list of betterments.

Action Items

- NCDOT will provide the Working Group with the Tunnel Feasibility Memo.
- AECOM will develop a sketch for pedestrian facilities and a DDI interchange on Patton Avenue west of the Jeff Bowen Bridges.
- The City will discuss with Asheville on Bikes if a DDI interchange would be acceptable on Patton Avenue west of the Jeff Bowen Bridges.
- The City of Asheville will discuss their preferred typical section for Riverside Drive.
- Ken Putnam and Neil Dean will coordinate to finalize the list of betterments.

MEETING SUMMARY



To: Project File

From: Celia Miars
AECOM

Date: March 22, 2019

RE: I-2513 Aesthetics Advisory Committee Meeting
NCDOT STIP Project I-2513 (I-26 Connector)

Meeting Attendees:

Ken Putnam – City of Asheville
Julie Mayfield – City of Asheville
Ted Figura – AAC
Jason Gilliland – SDS
Joe Minicozzi – AAC
Mike Zukosk – AAC
Woody Farmer – AAC

David Nutter – AAC
Susan Loftis – AAC
Jeff Lackey – NCDOT Roadside Environmental
Kyle Cooper - NCDOT Roadside Environmental
Celia Miars – AECOM
Eric Spalding – AECOM

Members of the project team attended the Aesthetic Advisory Committee (AAC) meeting on March 19, 2019 at the City of Asheville Municipal Building. This was a regularly scheduled AAC meeting in which NCDOT was present to provide additional information and guidance regarding aesthetic treatments for NCDOT projects.

Below are discussion items from the meeting:

- The AAC adopted the Organizational Principles included in the meeting packet (attached).
- The AAC expressed interest in creating “pocket parks” along the Patton Avenue multi-use path corridor. The City noted they have discussed other redevelopment opportunities along this corridor. The City and AAC will have a discussion in another setting regarding the area along the Patton Avenue corridor.
- The AAC had several questions regarding the December 2019 deadline for a list of aesthetic treatments to NCDOT. At the previous Working Group meeting and AAC meeting on February 21, 2019, NCDOT noted the I-26 Connector Project would be let for construction in July 2020. Therefore, the project would be advertised as early as December 2019 and short listed in March 2020. Given these dates, if the AAC requested aesthetic treatments to structures, such as retaining walls or bridges, these would need to be listed in the advertisement for the project. It was clarified, if the AAC new there were certain areas they plan to focus on for landscaping treatments, specific information regarding treatments did not need to be finalized by December 2019.
- It was noted for the NCDOT to move forward with including these aesthetic treatments in the advertisement for the Design Build contract, the City of Asheville must have a resolution for

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maintenance. A municipal agreement would be drafted closer to completion of construction. The AAC requested a standard format for the municipal agreement to review.

- The AAC requested examples of projects that have been completed by NCDOT in which a type of aesthetics committee was formed.
- Jeff Lackey addressed lessons learned from working with other aesthetic committees in North Carolina. He noted it is most successful when the committee appoints a single point of contact to coordinate with NCDOT. He also noted it is important for the committee to identify priority areas and potential enhancements early on to determine preliminary costs.
- The committee discussed the priority locations spreadsheet (attached). Jeff Lackey identified the enhancements that would need to be determined by December 2019. These included roadway geometrics, pavement design, multi-use path design, retaining walls, bridge abutments, etc. Other items on the spreadsheet that can be finalized later included landscaping, graphics, and artwork.
- The AAC had questions regarding the funding available to betterments from NCDOT. The landscaping budget is between 1 percent and 1.5 percent of the construction cost only, not the total project cost. It was clarified that reseeding was included as a part of the construction costs and not taken from the landscaping budget. There are three levels of landscaping; standard, enhanced, and landmark. NCDOT will pay for the standard level, however, costs associated with upgrades to meet an enhance or landmark level will be paid for by the city.
- It was noted retaining wall/noise wall enhancements beyond NCDOT standards is paid for by the City. Regarding the retaining wall at Riverside Cemetery, since this is a historic resource, mitigation opportunities are present for NCDOT to enhance the wall or provide other means of mitigation. Costs for these enhancements will not come from the landscaping budget. This will occur through coordination with the City of Asheville, who owns the cemetery.
- The AAC voted to create a Riverside Cemetery sub-committee to develop potential aesthetic enhancements to the wall.
- NCDOT will provide Ken Putnam with the latest information regarding noise wall patterns.
- Prior to the AAC submitting their list of enhancements to the City Council, the AAC will coordinate with NCDOT to discuss. The AAC decided that once NCDOT has reviewed and commented on the enhancements, the AAC would hold a public meeting to share with the public and receive feedback prior to presenting to City Council.

The meeting concluded at 4:30 p.m.

Action Items

- The AAC requested a standard format for the municipal agreement to review.
- The AAC requested examples of projects that have been completed by NCDOT in which a type of aesthetics committee was formed.
- NCDOT will provide Ken Putnam with the latest information regarding noise wall patterns.
- The AAC will identify a single point of contact to coordinate with NCDOT.

DRAFT

City of Asheville I-26 Connector Project Aesthetics Committee Organizing Principles

Adopted March , 2019

An Organizing Principle is a guiding idea that is used to direct an organization or an initiative. It is a core assumption and a central reference point against which all decisions or policies can be measured.

The City of Asheville I-26 Connector Project Aesthetics Committee (“the Committee”) hereby adopts this set of Organizing Principles to guide its work as stated in its Bylaws.

Organizing Principle #1 – The Key Project Design Goals adopted by the Asheville Community Coordinating Committee in 2000 are incorporated by reference as an Organizing Principle of the Committee to the extent that they are applicable to the decisions of the Committee. These goals are restated below:

1. Separation of local and interstate traffic
2. Matching scale of project to character of community
3. Reunification and connectivity of community
 - a. Provide well-defined pedestrian/bicycle facilities throughout the project corridor
 - b. Improve opportunities for reconnecting neighborhoods and Downtown with the French Broad Riverfront
 - c. Expand accessibility for Hillcrest Community
 - d. Create a better local street network (including linkages between West Asheville and Downtown, within Downtown and within West Asheville) to relieve interstate traffic pressure
4. Minimization of neighborhood and local business impacts
5. Use of updated traffic modeling software and data
6. Maintenance of compatibility with community’s design, vision and plans; incorporation of community-selected design features
7. Creation of full interstate movements between I-26 and I-40
8. Minimization of air quality and other environmental impacts
9. Emphasis on safety – during construction and in the final design and product.

Note: The Key Project Design Goals includes all sub-sections listed in Section 2 of the *Report of the Community Coordinating Committee for the Design of the I-26 Connector Through Asheville* although the sub-sections for Goal 3 are specifically listed here for emphasis.

It is explicitly recognized in adopting these goals as an Organizing Principle that it is not the charge of the Committee to actualize each of the above goals. However, recommendations of the Committee should be guided by and consistent with these goals.

Organizing Principle #2 – The Committee recognizes and respects the work done by those who have gone before and, to the maximum extent feasible, will obtain, examine, utilize and otherwise allow these pre-existing aesthetic design ideas, concepts, forms and prescriptions to inform the work of the Committee.

Organizing Principle #3 – Creating a Gateway experience for travelers along I-26 is a priority of the Committee. The aesthetic design of the I-26 Connector Project can and should make a positive statement about our City and community. The design of the bridges associated with the Project will be the most visible element of the Gateway experience and should be given a high level of attention by the Committee.

Organizing Principle #4 –The aesthetic impacts of the Project on residents, businesses and other users of land that is adjacent to or proximate to the Project are important for the Committee to consider. Also important are the aesthetic impacts of the Project on pedestrian and cyclist users of pathways associated with the Project. The Committee’s choices among design recommendations and allocations of aesthetic funding should consider those constituents who will be most affected by the Project.

Organizing Principle #5 – To the extent that there is no conflict with any other Organizing Principle, cost effective design solutions shall be recommended. Consideration shall be given both to the initial cost of aesthetic improvements and to their maintenance costs. Observation of this Organizing Principle shall not preclude the recommendation of more expensive design solutions that may be self-funding, in part or in whole; nor shall it preclude the adoption of more expensive design solutions which further the Key Project Design Goals as stated above.

Organizing Principle #6 – Relative to the purview of the Committee, the term “aesthetics” is to be defined as broadly as reasonably possible. Aesthetics may include, but not be limited to: visual impact, sound impact, light impact, spatial impact, environmental impact, and impact on community or social dynamics. Aesthetic considerations may be applied by the Committee in its recommendations to any design element of the Project not constrained by the Record of Decision of the Final Environmental Impact Statement for the Project. Aesthetic considerations may be applied by the Committee in its recommendations throughout the duration of the Project, unless and until the Committee is terminated by City Council.

Organizing Principle #7 – The Project’s aesthetic design should be context sensitive and reflect the character of the Asheville community and its neighborhoods, particularly those neighborhoods through which the Project passes. To this end, it is anticipated that the aesthetic recommendations of the Committee will be eclectic and will not shy away from implementing the adage, “Keep Asheville Weird.”

Organizing Principle #8 – The preservation and revitalization of the French Broad River waterfront—particularly in the area between Hill Street and Broadway, connecting the RADTIP project in the River Arts District to the Woodfin Greenway and Blueway--is an important goal to be furthered by the recommendations of the Committee. With regard to this section of the Project, the Wilma Dyckman Riverway Master Plan should be consulted and potential connections between the University of North Carolina Asheville and the waterfront should be observed.

Organizing Principle #9 – The work of the Committee requires the utilization of good urban design and smart growth principles and should be cognizant of potential redevelopment opportunities created by the Project. Therefore, the Committee will need to draw upon the design expertise of a professional with architectural expertise.

Organizing Principle #10 – Quality of life issues are paramount to the aesthetic design of the Project. Quality of life issues include but are not limited to: limiting the noise impact from the Project, conformance to the City's dark sky policy, and providing opportunities for transportation nodes to serve both vehicular and non-vehicular transportation modes.

Organizing Principle #11 – The Committee will work cooperatively with the recommendations of the Schwartz Report.

