NORTH CAROLINA
Turnpike Authority




Gaston East-West Connector (Garden Parkway)

Administrative Action Record of Decision

February 2012

Lead Agencies: US Department of Transportation
Federal Highway Administration
North Carolina Turnpike Authority

Cooperating Agency: US Army Corps of Engineers

Submitted Pursuant to the National Environmental Policy Act
23 CFR 771.119 and 42 USC 4332(2)(c)

Gaston East-West Connector
I-85 to I-485 and NC 160
Gaston and Mecklenburg Counties

Federal Aid Project Number STP-1213(6)
State Project Number 8.2812501
WBS Element 34922.1.TA.1
STIP Project Number U-3321

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RECORD OF DECISION

This document records the decision of the Federal Highway Administration (FHWA) with regard to the Selected Alternative for the Gaston East-West Connector (Garden Parkway) project in Gaston and Mecklenburg Counties, North Carolina. In making this decision, the agency considered the information and analyses documented in the Draft Environmental Impact Statement (EIS) (April 24, 2009), the Final EIS (December 21, 2010), this Record of Decision, and comments received from agencies and the public.

1. DECISION

The FHWA and the North Carolina Turnpike Authority (NCTA) (a division of the NC Department of Transportation (NCDOT)) have identified the Selected Alternative for the Gaston East-West Connector in Gaston and Mecklenburg Counties, North Carolina. The Selected Alternative identified and discussed in this Record of Decision (ROD) is the Preferred Alternative identified in the Final EIS. The Selected Alternative is shown in **Figure 1**.

The proposed action includes constructing a new location controlled-access toll road from I-85 west of Gastonia in Gaston County to I-485 near the Charlotte-Douglas International Airport in Mecklenburg County, a distance of approximately 22 miles. The proposed action is included in the approved NCDOT's *State Transportation Improvement Program* (STIP) as Project U-3321. The project is also known locally as the Garden Parkway.

The purpose of the proposed action is to improve east-west transportation mobility in the area around the City of Gastonia, between Gastonia and the Charlotte metropolitan area, and particularly to establish direct access between the rapidly growing area of southeast Gaston County and western Mecklenburg County.

Detailed Study Alternative 9 was identified by the lead agencies as the Recommended Alternative in the Draft EIS (April 24, 2009). Based upon public comments received on the Draft EIS and in coordination with environmental resource and regulatory agencies, Alternative 9 was confirmed as the project's Preferred Alternative, as documented in the Final EIS (December 21, 2010). Alternative 9 was selected because it has, in balance, lower overall impacts in comparison to the other alternatives considered. The Final EIS includes details of the decision-making process and reasons for selecting Alternative 9 as the Preferred Alternative. A complete description of the Preferred Alternative and its anticipated impacts is also included in the Final EIS.

In accordance with the National Environmental Policy Act (NEPA) and the requirements set forth by the Council on Environmental Quality (CEQ) (40 CFR 1505.2), this ROD:

1. Identifies the Selected Alternative for the Gaston East-West Connector (STIP Project U-3321);
2. Summarizes all alternatives considered by the FHWA and the factors included in the evaluation process;
3. Describes the measures adopted to avoid and/or minimize environmental harm;
4. Identifies monitoring and enforcement programs for the implementation of mitigation measures; and
5. Responds to comments received on the Final EIS.

2. ALTERNATIVES CONSIDERED

This chapter describes the development of the preliminary alternatives and methodologies used in the identification of the Selected Alternative. This chapter also describes the Selected Alternative and documents the anticipated impacts associated with it.

2.1 RANGE OF ALTERNATIVES

Alternatives Screening Process. Alternatives were evaluated as part of a multi-step screening process which is documented in the *Addendum to the Final Alternatives Development and Evaluation Report for the Gaston East-West Connector* (PBS&J, October 2008), Chapter 2 of the Draft EIS and Section 1.2 of the Final EIS.

The Alternative Screening Process flowchart presented below shows the alternatives evaluation process and general timeframes for when the different screenings occurred.

In the First Screening – Project Concepts, six alternative concepts, listed below, were evaluated in an iterative process to determine if they were reasonable and practicable, based upon their ability to meet the project's purpose and need, potential impacts, and their financial feasibility. After the project became a candidate toll facility and 2030 traffic forecasts were completed, applicable project concepts were reevaluated considering tolling options.

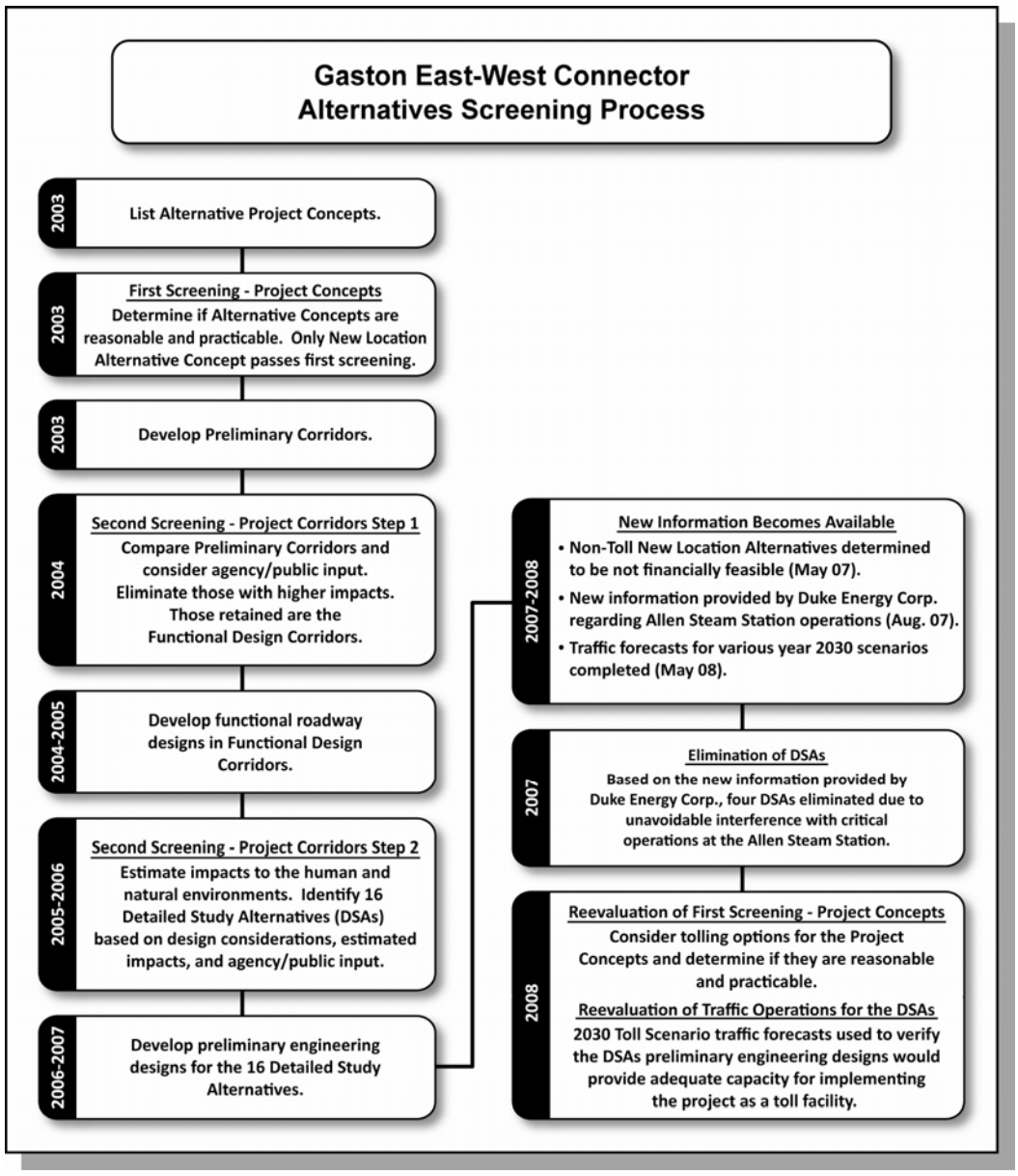
The six alternative concepts included:

- No-Build Alternative
- Transportation System Management (TSM) Alternatives
- Transportation Demand Management (TDM) Alternatives
- Mass Transit Alternatives and Multi-Modal Alternatives
- Improve Existing Roadways Alternatives
- New Location Alternatives

In the First Screening (Draft EIS Section 2.2), each alternative concept was developed to the point needed to decide whether to retain or eliminate the alternative concept from detailed study. The Improve Existing Roadways Alternatives and the New Location Alternatives scenarios were developed in more detail than the other concepts. For these two concepts, traffic forecasts and traffic operations analyses were prepared. Impacts to the human and natural environments also were considered as part of the First Screening in the evaluation of the Improve Existing Roadways Alternatives.

In the Second Screening – Project Corridors (Draft EIS Section 2.3), the alternative concept that made it through the First Screening process (the New Location Alternative) was further refined and evaluated to determine the specific Detailed Study Alternatives (DSA). In the Second Screening, approximately 116 miles of Preliminary Corridor Segments were developed for the New Location Alternatives. The Preliminary Corridors were then evaluated and compared in order to narrow that group down to the Functional Design Corridors. There were 90 endpoint-to-endpoint alternatives (from I-85 to I-485) that were created from the Functional Design Corridors. Functional roadway designs were prepared for this set of alternative corridor segments. Functional designs included horizontal alignments, construction limit estimates, right of way limits, and interchange configurations, and were prepared using mapping based on

aerial photography and Geographic Information System (GIS) information. Impacts to the human and natural environments were estimated based upon the functional roadway designs. Sixteen DSAs were identified based upon design considerations, estimated impacts, and agency/public input.



Preliminary engineering designs were then prepared for the DSAs (Draft EIS Section 2.4). The preliminary engineering designs include more detail than the functional roadway designs. The impacts documented in the Draft EIS are based upon the preliminary engineering designs for the DSAs.

As shown in the flowchart, the DSAs were reevaluated in 2008 based on new information provided by Duke Energy Corporation regarding operations at the Allen Steam Station (Draft EIS Section 2.3.4.2). The preliminary engineering designs also were reevaluated to verify they would provide adequate capacity for implementing the project as a toll facility (Draft EIS

Section 2.4.4.2). The new information from Duke Energy Corporation regarding the Allen Steam Station operational requirements resulted in four DSAs eliminated due to unavoidable interference with critical operations at the steam station. Therefore, twelve DSAs were evaluated in detail in the Draft EIS.

Detailed Study Alternatives. As noted above, twelve endpoint-to-endpoint new location DSAs were studied in detail in the Draft EIS based upon the first and second screenings. These DSAs are presented in the Final EIS in Table 1-2 and Figure 1-4a-b. In addition to the twelve new location DSAs, the No-Build Alternative was retained for comparison purposes.

Each DSA was a controlled-access toll facility consisting of six lanes with a grassed median and paved inside and outside shoulders, and a minimum right of way of 300 feet. At the time the Draft EIS was prepared, each DSA included 11 to 12 interchanges. The lengths of the DSAs are similar, ranging from 21.4 miles to 23.7 miles.

DSA 9 was identified as the Recommended Alternative in the Draft EIS, and the Preferred Alternative in the Final EIS.

2.2 BASIS FOR CHOOSING THE SELECTED ALTERNATIVE

Detailed Study Alternative 9 was identified by the FHWA, NCTA, and NCDOT as the Recommended Alternative in the Draft EIS (Section 2.5). The FHWA and NCTA (now a division of NCDOT) confirmed the Recommended Alternative as the Preferred Alternative in the Final EIS (Section 2.2), and as the Selected Alternative and environmentally preferable alternative in this ROD because it represents the best overall balanced minimization of all impacts analyzed.

The following list, summarized from Section 2.2 of the Final EIS, describes the basis for choosing the Preferred Alternative as the Selected Alternative and as the environmentally preferable alternative. Updates made following the Final EIS also are noted.

Cost and Design Considerations

- DSA 9 is one of the shortest alternatives.
- DSA 9 had the second-lowest median total cost.

  Note: Updated costs for the Preferred (Selected) Alternative are presented in the Final EIS (Section 2.3.4) and in ***Section 2.3*** *of this ROD.*

Human Environment Considerations

- DSA 9 is one of the four DSAs with the fewest numbers of residential relocations.
- Although DSA 9 is higher in the range of business relocations, it would avoid impacts to Carolina Specialty Transport (provides transportations services to special needs groups) that would occur under DSAs 58, 64, 68, 76, 77 and 81.
- DSA 9 is in the middle of the range of total neighborhood impacts.
- DSA 9 would have no direct impacts to schools (DSAs 5, 23, and 27 also avoid direct impacts to schools).

- DSA 9 is one of eight DSAs (DSAs 5, 9, 23, 27, 64, 68, 77, 81) that would not require relocation of known cemeteries.
- At Linwood Road, DSA 9 is one of three alternatives (DSAs 4, 5, and 9) that would avoid impacting either the Karyae Park YMCA Outdoor Family Center or the Pisgah Associate Reformed Presbyterian Church (part of the church property is also an historic site eligible for listing on the National Register of Historic Places).
- DSA 9 is one of the three alternatives (DSAs 4, 5, and 9) farthest from Crowders Mountain State Park.
- DSA 9 would avoid right-of-way requirements from Daniel Stowe Botanical Garden (DSAs 4, 22, 27, 58, 68, 76, and 81 also avoid these right-of-way requirements).
- DSA 9 would avoid the relocation of Ramoth AME Zion Church and cemetery, which is part of the Garrison Road/Dixie River Road community (DSAs 4, 22, 27, 58, 68, 76, and 81 also avoid this church).
- DSA 9 is one of the eight alternatives (DSAs 4, 9, 22, 27, 58, 68, 76, and 81) with the least amount of right of way required from Berewick Regional Park in Mecklenburg County.

  Note: Design refinements for the Preferred Alternative modified the I-485 interchange design and shifted it northward, resulting in no encroachment on Berewick Regional Park.

Physical Environment Considerations

- DSA 9 is in the middle range of estimated numbers of receptors impacted by traffic noise.

  Note: As described in Section 2.5.2.1 of the Final EIS, updated 2035 traffic forecasts and design refinements for the Preferred Alternative resulted in an updated estimate of a greater number of receptors impacted by traffic noise (38 additional receptors). Similar results would be likely for the other DSAs. Another update to the noise analysis was conducted for the Selected Alternative, as described in ***Section 3.2*** *of this ROD. The update was to evaluate the alternative considering new regulations in 23 CFR Part 772 (effective July 13, 2011) and an updated NCDOT Traffic Noise Abatement Policy (also effective July 13, 2011). The evaluation results would be similar for each DSA and the update did not affect the selection of the Preferred Alternative.*

- DSA 9 is one of the alternatives (DSAs 4, 5, 9, 22, 23, and 27) that would impact the least acreage of land in Voluntary Agricultural Districts. Based on the qualitative *Indirect and Cumulative Effects Assessment* (Louis Berger Group, March 2009), DSA 9 also is one of the DSAs that is expected to have the least indirect and cumulative effects to farmlands.
- DSA 9 is one of the alternatives with the fewest power transmission line crossings.

Cultural Resources Considerations

- DSA 9 is one of six alternatives (DSAs 4, 5, 9, 22, 23, and 27) that would not require right of way from the Wolfe Family Dairy Farm historic site. Selection of DSA 9 makes it more likely that, if the US 321 Bypass is constructed at some future time, the project would also avoid the Wolfe Family Dairy Farm historic site.

- DSA 9 is one of four alternatives (DSAs 5, 9, 23, and 27) with low to moderate potential to contain archaeological sites requiring preservation in place or complex/costly mitigation.

  Note: Based on the Intensive Archaeological Survey conducted for the Preferred Alternative (Coastal Carolina Research, February 2010), the Office of State Archaeology concurred that there were no archaeological resources on or eligible for listing on the National Register of Historic Places within the Area of Potential Effect. This study is summarized in the Final EIS (Section 2.5.3.2).

Natural Resources Considerations

- DSA 9 is one of eight alternatives (DSAs 4, 9, 22, 27, 58, 68, 76, and 81) that would cross the South Fork Catawba River and the Catawba River where the rivers have been more affected by siltation and they are less navigable, and water-based recreation would be affected less than with DSAs that cross farther south.
- DSA 9 would impact the least amount of Upland Forested Natural Communities.
- DSA 9 is one of the alternatives (DSAs 4, 9, 22, and 76) having the lowest potential to indirectly affect upland wildlife species due to habitat fragmentation.
- DSA 9 is lower in the range of impacts to ponds.
- DSA 9 is lower in the range of impacts to wetlands
- DSA 9 is lower in the range of impacts to perennial streams.
- DSA 9 would have the fewest number of stream crossings.
- DSA 9 is one of eight alternatives (DSAs 5, 9, 23, 27, 64, 68, 77, and 81) that has a biological conclusion of No Effect relating to the federally endangered Schweinitz's sunflower.

2.3 DESCRIPTION OF THE SELECTED ALTERNATIVE

The Selected Alternative, shown in **Figure 1**, is a controlled-access median-divided toll facility extending from I-85 west of Gastonia in Gaston County to I-485 near the Charlotte-Douglas International Airport in Mecklenburg County. The eastern terminus ties into NC 160 (West Boulevard) just east of I-485. The total length of the Selected Alternative mainline is approximately 21.9 miles.

DSA 9 originally included eleven interchanges. The interchange at Bud Wilson Road (SR 2423) was eliminated as part of the Preferred Alternative, as discussed in Final EIS Section 2.3.1.6. The Robinson Road interchange and the NC 274 (Union Road) interchange would provide similar access.

From west to east, the ten interchanges along the Selected Alternative would be located at:

- I-85
- US 29-74
- Linwood Rd/Hudson Blvd (SR 1133)
- US 321
- Robinson Rd (SR 2416)
- NC 274 (Union Rd)
- NC 279 (South New Hope Rd)
- NC 273 (Southpoint Rd)
- Dixie River Rd (SR 1155)
- I-485

The Selected Alternative includes mainline bridge crossings of Blackwood Creek, an unnamed tributary to Crowders Creek (Stream S146) located just east of US 321, Catawba Creek, South Fork Catawba River, and Catawba River.

The Selected Alternative includes four twelve-foot travel lanes, with a grassed median and paved inside and outside shoulders. The design speed is 70 miles per hour (mph), which would accommodate a posted speed limit of 65 mph. The minimum right of way would be approximately 280 feet, with additional right of way required for interchanges, service roads, and improvements to intersecting roads. In addition, between NC 273 (Southpoint Road) and I-485, there would be an auxiliary lane in each direction.

The project is being developed as a design-build project. Through this process, the design and design criteria will be re-evaluated to determine if any cost savings could be realized. Any changes to these criteria will be implemented only if they will result in a net reduction in costs or impacts without loss of service.

The cost estimate for the Preferred Alternative was presented in the Final EIS in Table 2-3, and is reproduced in this ROD in **Table 1**. The cost estimate is based on the Preferred Alternative refined preliminary design, as described in the Final EIS in Sections 2.3.1 and 2.3.2. The estimate is in year-of-expenditure dollars, as described in the table notes. The cost estimate is provided as a range of probable project costs for construction, right-of-way acquisition, and environmental mitigation (mitigation of impacts to streams and wetlands). The Total Cost range provided represents the 80 percent confidence interval, which means there is an 80 percent chance that the total project cost will be within this range. There is a 70 percent chance that the project cost will be less than or equal to $943 million.

TABLE 1: Cost Estimate for the Selected Alternative

	Approximate Length (miles)	Probable Range of Costs Through Year of Expenditure (millions $)*				Project Cost (70% chance costs will be less)
		Construction	Environmental Mitigation	ROW & Utility	Total Cost	
Selected Alternative	21.9	713 to 743	25 to 28	175 to 189	913 to 960	943

Source: HNTB, June 22, 2010.

Notes: * Assumptions and notes regarding costs:

1. Construction cost includes construction, utilities, engineering, and administrative costs.
2. Year of expenditure costs were modeled using a range of possible inflation rates.
3. Future construction costs were modeled to mid-point of construction using inflation rates ranging from 2.5% to 4%, with 3% being most likely.
4. Future right-of-way costs were modeled to anticipated year of acquisition using inflation rates ranging from 0% to 4%, with 2% being most likely.
5. Future administrative costs were modeled to anticipated year of expenditure using inflation rates ranging from 2.5% to 4.5%, with 4% being most likely.
6. Ranges of costs are based on cost projections in which the lowest 10% and highest 10% were discarded.
7. Year of expenditure costs assume an award date of December 2010 and an opening in December 2014.
8. Environmental mitigation costs are based on NCEEP fee schedule dated July 1, 2009 for estimated impacts to streams and wetlands and assume mitigation for impacts to all wetlands, all perennial streams, and intermittent streams with a NCDENR-DWQ stream rating greater than or equal to 26.
9. Right-of-way costs were provided by Carolina Land Acquisitions in July 2008.

3. ERRATA AND UPDATES TO THE FINAL EIS

Errata/corrections to the Final EIS are listed in **Section 3.1**. There are four updates to the environmental analysis of the proposed action since the Final EIS. These updated studies are listed below and summarized in **Sections 3.2-3.5**

- **Traffic Noise (Section 3.2)**. The FHWA promulgated new regulations in 23 CFR 772, and the NCDOT approved a new NCDOT Traffic Noise Abatement Policy, both effective July 13, 2011. A *Traffic Noise Technical Memorandum Addendum #2 for Administrative Action Environmental Impact Statement Gaston East-West Connector* (Atkins, July 2011) was prepared to evaluate the noise analysis results based on the new regulations and noise policy. Recommended preliminary feasible and reasonable noise barriers did not change from those documented in the Final EIS.
- **Conceptual Mitigation Plan (Section 3.3)**. There are updates to the project's *Conceptual Mitigation Plan* (PBS&J, June 2010) regarding on-site and off-site mitigation components for impacts to Waters of the US (wetlands and streams).
- **Protected Plant Species (Section 3.4)**. Updated surveys for protected plant species were conducted for the Preferred Alternative, and documented in a memorandum titled *2010 Plant Surveys in Gaston and Mecklenburg Counties for the Gaston East-West Connector (STIP U-3321)* (PBS&J, October 22, 2010). The updated surveys did not find any populations of the surveyed plant species within the Selected Alternative corridor.
- **Indirect and Cumulative Effects (Section 3.5)**. The study area for the quantitative indirect and cumulative effects analysis (ICE study area) was modified to add the Fites Creek-Catawba River subwatershed, and the technical memorandum was updated - *Gaston East-West Connector Revised Final Quantitative Indirect and Cumulative Effects Analysis* (Louis Berger Group, July 2011). Overall conclusions regarding indirect and cumulative effects did not change.

As demonstrated in the sections below, neither the errata nor the environmental analysis updates result in new or different significant environmental impacts that would change the conclusions.

3.1 FINAL EIS ERRATA

Section PC – Project Commitments. The following project commitment should have been carried over from the Draft EIS Special Project Commitments section and included in the Final EIS in Table PC-1: Special Project Commitments. This commitment also is included as Item 21 in **Table A-1** in **Appendix A** (Special Project Commitments) of the ROD.

21	Wildlife	6.3.6.2	All DSAs	NCTA will coordinate with the US Fish and Wildlife Service, US Environmental Protection Agency, and the NC Wildlife Resources Commission on the feasibility and the design of a wildlife passage at Stream S156. Stream S156 is located between Forbes Road to the west and Robinson Road to the east.	Final Design

In the Final EIS Table PC-1, commitment Item 16 states "NCTA will ensure that full access is maintained to the Harrison Family Dairy Farm." This commitment has been revised in **Table A-1** in **Appendix A** of this ROD to match the conditions for a No Adverse Effect determination established during coordination with the State Historic Preservation Office regarding project effects on historic resources (Draft EIS Appendix A-2). The commitment is now phrased: "NCTA will ensure that full access is maintained to the existing driveway at the Harrison Family Dairy Farm."

The following commitment should have been included under Visual Resources: If preliminary Barrier 1-1 is determined in final design to be feasible and reasonable, additional landscaping should be provided in this area to reduce potential visual impacts. This has been added as a special project commitment to Item 13 (Visual Resources) in **Table A-1** in **Appendix A**. Additional details are provided in **Section 4.2** under the Visual Resources subheading.

The commitment under Archaeological Resources (Commitment Item 17 in **Table A-1** in **Appendix A**) regarding abandoned mines was revised for clarification.

Section 1.3.4.4 – Jurisdictional Issues and Section 2.5.4.4 – Water Resources in Federal Jurisdiction. The buffer impacts under the Catawba River Buffer Rules were calculated incorrectly for the area surrounding Catawba Creek where Detailed Study Alternatives 5, 9 (Preferred Alternative), 23, 27, 64, 68, 77, and 81 cross the creek.

It was correctly noted in the Draft EIS and Final EIS that Catawba Creek in this area is part of Lake Wylie and is subject to the Catawba Creek Buffer Rules. However, the buffer impacts were calculated using the streambank limits, and should have been calculated using the Lake Wylie boundary (569.4 MSL). At Catawba Creek, the stream bank and the Lake Wylie boundary are not the same in many locations.

Table 2 provides updated information on impacts to Catawba River Buffers from each Detailed Study Alternative. This is an update to Draft EIS Table 6-6, also referred to in Final EIS Section 1.3.4.4. As discussed in the Draft EIS Section 6.4.5.4 and the Final EIS Section 1.3.4.4, DSAs 5, 9, 23, 27, 64, 68, 77, and 81 would be designated as uses that are allowable with mitigation because they would cumulatively impact more than one-third acre of buffer. This conclusion does not change with the corrected buffer impact values.

Table 3 summarizes the updated Catawba River buffer impacts from the Selected Alternative based on the refined preliminary design. The total buffer impacts of 39,920 square feet (0.91 acre) are more than the threshold of one-third acre that requires mitigation. During final design, the amount of buffer area required would be recalculated, and mitigation provided if applicable through the permitting process.

TABLE 2: Impacts to Catawba River Buffers from the Detailed Study Alternatives Preliminary Designs

Resource	Detailed Study Alternative											
	4	5	9	22	23	27	58	64	68	76	77	81
Catawba River												
Zone 1 (sq ft)	490	3,940	490	490	3,940	490	490	3,940	490	490	3,940	490
Zone 2 (sq ft)	3,655	3,675	3,655	3,655	3,675	3,655	3,655	3,675	3,655	3,655	3,675	3,655
South Fork Catawba River												
Zone 1 (sq ft)	0	5,205	9,910	0	5,205	9,910	0	5,205	9,910	0	5,205	9,910
Zone 2 (sq ft)	0	6,110	6,560	0	6,110	6,560	0	6,110	6,560	0	6,110	6,560
Catawba Creek (VALUES CORRECTED FOR DSAs 5, 9, 23, 27, 64, 68, 77, AND 81)												
Zone 1 (sq ft)	0	6,517	17,278	0	6,517	17,278	0	6,517	17,278	0	6,517	17,278
Zone 2 (sq ft)	0	6,980	11,666	0	6,980	11,666	0	6,980	11,666	0	6,980	11,666
Total Buffer Impacts												
Zone 1 (sq ft)	490	15,662	27,678	490	15,662	27,678	490	15,662	27,678	490	15,662	27,678
Zone 2 (sq ft)	3,655	16,765	21,881	3,655	16,765	21,881	3,655	16,765	21,881	3,655	16,765	21,881
Zones 1 & 2	4,145	32,427	49,559	4,145	32,427	49,559	4,145	32,427	49,559	4,145	32,427	49,559

Source: *Preliminary Engineering Designs* (PBS&J, January 2008).

Notes: Catawba River – All buffer impacts occur on the east side for Corridor Segments K3C and K4A. South Fork Catawba River – All buffer impacts occur on the west side for Corridor Segments K3A and K4A. No impacts with Corridor Segment K2A. Catawba Creek – buffer impacts occur on the west and east sides for Corridor Segment K1B. East side only for Corridor Segments K3A.

TABLE 3: Impacts to Catawba River Buffers from the Selected Alternative Refined Preliminary Design

Resource	Stream Bank	Buffer Zone	Impact (sq ft) of Refined Preliminary Design
Catawba River	East	Zone 1	3,200
		Zone 2	4,680
	West	Zone 1	0
		Zone 2	0
South Fork Catawba River	East	Zone 1	0
		Zone 2	0
	West	Zone 1	440
		Zone 2	4,175
Catawba Creek	East	Zone 1	16,415
		Zone 2	11,010
	West	Zone 1	0
		Zone 2	0
ALL CROSSINGS	East & West	Zone 1	20,055
	East & West	Zone 2	19,865
	Grand Total		39,920

Source: Preferred Alternative Refined Preliminary Design, PBS&J, 2010.

Section 2.5.1.2 – Right-of-Way Acquisition and Relocations – Insert Box. The insert box states there are three non-profits relocated by the Preferred Alternative. This number should be four non-profits, as stated in the text of this section.

Section 2.5.1.5 – Community Resources and Services – Table 2-6. The Preferred Alternative Segment noted for the Mt. Pleasant Baptist Church Cemetery is listed as Segment JX4. It should be Segment K3A.

Section 2.5.2.1 – Noise – Table 2-8. The total number of benefited receptors should add to 167 (not 175). Undeveloped residential lots and an industrial business mistakenly labeled as a residence were incorrectly included in the number of benefited receptors for Preliminary Barriers 4-1 (3 undeveloped lots), 17-2 (2 undeveloped lots), 17-3 (1 undeveloped lot), and 29-2 (1 undeveloped lot and an industrial business). With or without the undeveloped lots and mislabeled receptor, the barriers would be reasonable according to the criteria in the 2004 NCDOT *Noise Abatement Policy*. The noise analysis has been updated, as summarized in **Section 3.2**.

3.2 UPDATED TRAFFIC NOISE ANALYSIS

The Final EIS Section 2.5.2.1 summarizes the results of the traffic noise analysis update performed for the Preferred Alternative (*Traffic Noise Technical Memorandum Addendum for Administrative Action Environmental Impact Statement Gaston East-West Connector,* PBS&J, April 29, 2010).

Since the Final EIS was published in December 2010, the FHWA updated their noise standards in 23 CFR Part 772 and NCDOT updated their *Traffic Noise Abatement Policy*. These updates became effective on July 13, 2011.

A second addendum to the traffic noise study was prepared to evaluate the noise analyses completed to date in light of the new 2011 FHWA standards and 2011 NCDOT *Traffic Noise Abatement Policy*, and to determine if changes in the standards and policy would affect the decision on the Selected Alternative. The report, titled *Traffic Noise Technical Memorandum Addendum #2 for Administrative Action Environmental Impact Statement Gaston East-West Connector* (Atkins, July 2011)(referred to in this ROD as *Traffic Noise Addendum #2*), is incorporated by reference and available for download on the project Web site (www.ncdot.org/projects/gardenparkway).

3.2.1 FHWA NOISE STANDARD AND NCDOT TRAFFIC NOISE ABATEMENT POLICY

FHWA developed *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 CFR Part 772) to provide procedures for noise studies and noise abatement measures to help protect the public's health, welfare and livability, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to Title 23 of the Code of Federal Regulations (23 CFR). The latest final rule updating 23 CFR Part 772 is effective July 13, 2011. This latest noise standard includes updates to the FHWA Noise Abatement Criteria (NAC) Activity Categories, which are presented in **Table 4**.

TABLE 4: FHWA Noise Abatement Criteria

Activity Category	Activity Criteria[1] Leq (h)[2]	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[3]	67 (exterior)	Residential.
C[3]	67 (exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (interior)	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[3]	72 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F.
F	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	Undeveloped lands that are not permitted.

Source: 23 CFR Part 772.11

1. The Leq(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.
2. The equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period, with Leq(h) being the hourly value of Leq.
3. Includes undeveloped lands permitted for this activity category. Permitted means "a definite commitment to develop land with an approved specific design of land use activities as evidenced by the issuance of a building permit." (23 CFR 772.5)

In the *Traffic Noise Addendum #2*, the information included in Final EIS Table 2-7 (2035 Noise Contours and Impact Summary – Preferred Alternative) was updated with the new Activity Categories.

The FHWA noise standard calls for each state highway agency to develop their own set of guidelines that satisfy the requirements of 23 CFR 772. The NCDOT revised its year 2004 *Traffic Noise Abatement Policy* in its 2011 *Traffic Noise Abatement Policy* to comply with these federal requirements.

In accordance with the standards and policies, noise abatement measures must be considered when future noise levels either approach or exceed the Activity Category criteria levels, or if there are substantial increases over the ambient noise levels. NCDOT definitions for "substantial increases" are presented in **Table 5**. These definitions have not changed between the 2004 and 2011 versions of the NCDOT *Traffic Noise Abatement Policy*.

TABLE 5: NCDOT Definition of Substantial Increase in Noise Levels

Existing Average Noise Level dBA Leq(hour)	Increase (in decibels) from Existing Noise Levels to Future Noise Levels Defined as a Substantial Increase
≤ 50	15 or more
51	14 or more
52	13 or more
53	12 or more
54	11 or more
≥ 55	10 or more

Source: NCDOT *Traffic Noise Abatement Policy*, 2011.

Notable updates to the NCDOT *Traffic Noise Abatement Policy* include changes in reasonableness criteria used to evaluate noise barriers and the inclusion of quantity averaging when evaluating reasonableness. Quantity averaging allows for groups of noise sensitive receptors that are exposed to common noise environments to be considered together when evaluating noise barrier reasonableness. These new criteria were used to evaluate the preliminary noise barriers recommended for the Selected Alternative, as described in detail in *Traffic Noise Addendum #2*.

3.2.2 UPDATED ACTIVITY CATEGORIES AND POTENTIAL NOISE IMPACTS

Table 6 shows the maximum extent of the 72 and 67 dBA Leq 2035 peak hour traffic noise level contours for the Selected Alternative, along with the approximate numbers of potentially impacted receptors based on the 2035 noise contours and the updated Activity Categories. The values in **Table 6** were used as a screening tool to compare Detailed Study Alternatives.

As part of the update, receptors locations labeled as 'undeveloped' in the previous traffic noise studies were reviewed in June 2011 using the Gaston County on-line GIS system (Gaston County Web site: www.co.gaston.nc.us) to determine their current building status. All of the residential lots previously identified as 'undeveloped' remain 'undeveloped' and were not counted in the impact calculations.

As shown in **Table 6**, there are approximately 275 Category B receptors (residences) potentially impacted by project-generated traffic noise, and six Category C receptors (one church, one equestrian stable, and the Belmont Optimist Club recreation fields (privately owned and equivalent to 4 receptors).

If other Detailed Study Alternatives were updated with new Activity Categories for nearby receptors, the results would be similar. Most of the potentially impacted receptors along all the Detailed Study Alternatives are residences, with scattered other land uses.

This information should assist local authorities in exercising land use control over the remaining undeveloped lands adjacent to the roadway within the local jurisdiction. For example, with proper information on noise, the local authorities can prevent further development of incompatible activities and land uses with the predicted noise levels of an adjacent highway.

TABLE 6: 2035 Noise Contours and Impact Summary for the Selected Alternative

Mainline Segment	Leq Noise Levels (dBA)[1]			Maximum Contour Distances (ft)[2]		Approximate Number of Potentially Impacted Receptors By Activity Category[3]				
	50 ft	100 ft	200 ft	72 dBA	67 dBA	A	B	C	E	F
I-85 to US 29-74	75	72	67	130	245	0	45	1[4]	0	0
US 29-74 to Linwood Rd	76	73	69	150	270	0	11	0	0	0
Linwood Rd to US 321	75	72	68	140	260	0	52	0	0	0
US 321 to Robinson Rd	77	74	70	170	290	0	38	1[5]	0	0
Robinson Rd to NC 274	78	75	71	190	305	0	30	0	0	0
NC 274 to NC 279	77	74	70	180	300	0	6	0	0	0
NC 279 to NC 273	78	76	71	215	330	0	51	0	0	0
NC 273 to Dixie River Rd	80	77	73	260	400	0	41	4[6]	0	0
Dixie River Rd to I-485	80	77	73	260	390	0	1	0	0	0
East of I-485	76	73	68	145	260	0	0	0	0	0
					TOTALS	0	275	6	0	0

1- Distance from center of nearest travel lanes.
2 -Distance from the roadway centerline.
3 – Definitions of Activity Categories are provided in Table 1.
4 – Broomfield United Methodist Church, Shannon Bradley Rd, Gastonia
5 – Garrison Stables at 4177 Gordon Rd, Gastonia
6 – Duke Power/Optimist Club Sports Fields (privately owned), Boat Club Rd, Belmont. Equal to 4 equivalent receptors.

3.2.3 REEVALUATION OF PRELIMINARY NOISE BARRIERS

The noise sensitive receptors predicted to be potentially impacted based on the 2035 traffic noise contours (along the Preferred Alternative (DSA 9) that were not considered isolated sites (generally areas with three or less receptors) were modeled in detail using FHWA's most recent traffic noise model, Traffic Noise Model® (TNM), Version 2.5, released 2004, and the refined preliminary design for the Preferred Alternative. The results are documented in the *original Traffic Noise Technical Memorandum* (PBS&J, July 2008), with updates documented in the *Traffic Noise Addendum* (PBS&J, April 2010).

The areas where detailed TNM models were developed are called Barrier Evaluation Areas (BEAs). Where the detailed TNM models indicated there would be receptors impacted by future traffic noise, noise barriers were developed. Barriers were modeled in eleven of the thirteen BEAs and were optimized in locations, heights, and lengths to achieve as much or more than the noise reduction requirements and goals for as many receptors as practicable.

The reasonableness of barriers within each BEA was originally evaluated using the criteria in the 2004 NCDOT *Traffic Noise Abatement Policy*. The outputs of the detailed TNM models for each BEA were reevaluated using the new reasonableness criteria in the 2011 NCDOT *Traffic Noise Abatement Policy*, as documented in the *Traffic Noise Addendum #2*.

In summary, the updated reevaluation did not result in changes to the preliminary recommendations for feasible and reasonable noise barriers documented in the project's Final EIS (December 2010). **Table 7** lists the preliminary feasible and reasonable noise barriers for

the Selected Alternative. **Figure 2** shows an overview of the preliminary feasible and reasonable noise barriers.

TABLE 7: Preliminary Feasible and Reasonable Noise Barriers for the Selected Alternative

Prelim. Barriers[1]	Segment	Description	Average dBA Reduction for Benefited Receptors	Number of Benefited Receptors	Barrier		Barrier Area (Sq ft)	Sq Ft Per Receptor Allowable Sq Ft per Receptor[3]
					Length (ft)	Height (ft)[2]		
1-1	H2A	North of US 29-74, westbound side of alignment. Brookhaven and Spring Valley subdivisions.	9	34	2,640	12	31,680	932/ 3,130
4-1	H3	East of Linwood Springs Golf Course, at Linwood Rd, on westbound side of alignment. Lakewood Forest subdivision.	10	13	1,605	20	32,100	2,469/ 3 130
7-1	H3	South of Linwood Rd on the westbound side of alignment. Stablegate Farms subdivision.	8	11	1,500	16	24,000	2,182/ 3,165
12-1&2	J4A	North of Crowders Creek Rd north of New Haven Dr, westbound side of alignment. Falls Estates subdivision.	8	11	2,375	10/12	28,098	2,810/ 3,095
17-1	J4A	East of US321, westbound side of alignment. Charleston subdivision.	7	8	1,092	12/ 14	14,984	1,873/ 3,095
17-2	J2C	East of US321, westbound side of alignment. Forbes Cove subdivision.	8	8	1,558	10/ 12/ 16/ 14	21,124	2,641/ 3,200
17-3	J2C	East of US321, westbound side of alignment. Wesley Acres subdivision.	7	15	2,306	12/ 14/ 12/ 10	26,240	1,749/ 3,165
17-4	J2C	West of Robinson Rd, eastbound side of alignment. Pam Dr subdivision.	7	16	1,949	10/ 12/ 14/ 12	24,552	1,535/ 3,095
29-1	K3A	Northwest of NC273/Gaston interchange westbound side of alignment. Brook Forest subdivision.	6 (8 receptrs ≥7)	31	3,760	14/16/ 18/20/ 18/16/ 14	59,534	1,920/ 3,165
29-2	K3B	Northeast of NC273/Gaston interchange westbound side of alignment.	7	20	2,460	20/18	44,892	2,245/ 3,165

Source: *Traffic Noise Technical Memorandum #2 for the Gaston East-West Connector* (Atkins, July 2011).
Notes:
1. The determination of feasibility and reasonableness is preliminary and subject to change based on final design, building permits issued as of the Date of Public Knowledge, and the public involvement process.
2. Barrier height varies as indicated. For example, "18/16/14" means that barrier has an 18-ft section, 16-ft section, and 14-ft section.
3. Allowable square footage based on reasonableness criteria in the NCDOT *Traffic Noise Abatement Policy* (July 13, 2011)

Ten barriers (Barrier 12-1 and Barrier 12-2 listed in Final EIS Table 2-8 were combined) with a total length of 21,245 feet have been identified as preliminarily feasible and reasonable for the Selected Alternative. These barriers are projected to benefit a total of 167 Category B receptors (this count excludes undeveloped lots).

A Design Noise Report will be prepared during final design of the Selected Alternative. The Design Noise Report will include the final design of the Selected Alternative and more detailed evaluation of feasibility and reasonableness. The recommendations included in **Table 7** may change. It is anticipated that both vertical and horizontal alignment adjustments will occur during final design of the Selected Alternative. More information will be available at the final design stage on drainage designs, utilities, and other elements that will be taken into account when evaluating feasibility and reasonableness. In addition, if the noise barrier (Barrier 1-1) recommended along the east side of the project at the Belfast Drive/Shannon Bradley Road/Broomfield community is determined in final design to be feasible and reasonable, additional landscaping should be provided in this area to reduce visual impacts to residences facing the noise barrier.

3.2.4 CONSTRUCTION NOISE

Regarding construction noise, the 2011 NCDOT *Traffic Noise Abatement Policy* specifies that NCDOT shall:

(a) Identify land uses or activities that may be affected by noise from construction of the project.

(b) Determine the measures that are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts to the community. This determination shall consider the benefits achieved and the overall adverse social, economic, and environmental effects and costs of the abatement measures.

(c) Consider construction techniques and scheduling to reduce construction noise impacts to nearby receptors and incorporate the needed abatement measures in the project plans and specifications.

Construction noise was addressed in Draft EIS Section 4.1.5.3. This discussion is expanded in this section to address the requirements of the 2011 NCDOT *Traffic Noise Abatement Policy*. This expanded discussion would apply to all Detailed Study Alternatives and does not result in new or different significant environmental effects.

The major construction elements of this project are expected to be earth removal, hauling, grading, bridge construction, and paving. During daytime hours, general construction noise impacts, such as temporary speech interference for passersby and those individuals living or working near the project, can be expected, particularly from paving operations, from the earth moving equipment during grading operations, and from pile driving activities for the bridge crossings. During evening and nighttime hours, steady-state construction noise such as from paving operations may be audible and may cause impacts to activities such as sleep. Sporadic evening and nighttime construction equipment noise such as from backup alarms, lift gate closures ("slamming" of dump truck gates), and very loud construction activities such as pile-drivers and impact hammers, etc, will be perceived as distinctly louder than the steady-state acoustic environment, and may cause impacts in noise-sensitive areas.

For this project, noise-sensitive areas that may experience construction noise that could temporarily interfere with daily activities include the residences in the noise-sensitive BEAs. In particular, pile-driving activities at the major bridge crossings over the South Fork Catawba River and Catawba River may impact residents in the low-density residential developments along these rivers.

However, overall, construction noise impacts are expected to be minimal, since the construction noise would be relatively short in duration at any given location. Furthermore, the transmission loss characteristics of surrounding wooded areas and other natural topographic and man-made features are considered sufficient to moderate many of the effects of intrusive construction noise. In localized areas where construction impacts may occur, construction noise control measures can be evaluated for feasibility and cost-effectiveness during the Final Design Noise Study or during construction activities. Potential localized measures that can be evaluated for inclusion in the plans and specifications include, but are not limited to, equipment exhaust muffler requirements, haul-road locations, elimination of "tail gate banging", ambient-sensitive backup alarms, construction noise complaint mechanisms/procedures, and community communication/outreach.

3.2.5 Conclusion Regarding Noise Impacts for the Selected Alternative

The results of the noise analysis update were considered to determine if these results would affect the decision on the Selected Alternative (DSA 9). As discussed below, the updated results do not affect the choice of the Selected Alternative.

The updated results did not substantially change the numbers of potentially impacted receptors, the barriers determined to be preliminarily feasible and reasonable, or the numbers of benefited receptors documented for the Preferred Alternative. The updates to the FHWA Activity Categories and some minor corrections resulted in a change of two in the number of potentially impacted receptors (from 283 receptors in the Final EIS to 281 receptors). The updated reevaluation did not result in changes to the preliminary recommendations for feasible and reasonable noise barriers documented for the Preferred Alternative in the project's Final EIS (December 2010) or in the numbers of benefited receptors (167). Between the Draft EIS and Final EIS, one preliminarily feasible and reasonable noise barrier for DSA 9 was removed from recommendation. This barrier, Barrier 33-1 at the I-485 interchange area, was determined no longer necessary when design refinements shifted the project alignment and interchange ramps northward, which resulted in reduced noise impacts to receptors in this area. This design change would have been incorporated into all DSAs that included Barrier 33-1 (DSAs 4, 9, 22, 27, 58, 68, 76, and 81).

If other Detailed Study Alternatives were updated with new Activity Categories for nearby receptors, noise contours based on updated 2035 traffic forecasts, and a refined preliminary design, the results would be similar and relative comparisons between the alternatives would not appreciably change.

Noise impacts did not play a major role in the selection of the Preferred Alternative. DSA 9 is in the middle range of estimated numbers of receptors impacted by traffic noise when compared with other DSAs. No DSA was eliminated from consideration as a result of noise impacts. Noise-sensitive land uses along all the DSAs are similar, with each DSA passing through rural, low-density residential areas as well as near and through denser suburban housing developments.

3.3 UPDATES TO THE CONCEPTUAL MITIGATION PLAN

The Final EIS Section 2.5.4.4 summarizes compensatory mitigation detailed in the project's *Conceptual Mitigation Plan* (PBS&J, June 2010). The *Conceptual Mitigation Plan* provides a summary of mitigation requirements and several potential off-site and on-site mitigation components that may ultimately comprise the mitigation package for impacts to Waters of the US (wetlands and streams) that will be developed for the permits required under Sections 404 and 401 of the Clean Water Act. Updates to the mitigation components that have occurred since the issuance of the Final EIS are described below. These updates would apply to all Detailed Study Alternatives and would not affect the selection of the Preferred Alternative.

A final mitigation plan will be prepared for inclusion in the applications for an Individual Permit under Section 404 of the Clean Water Act (Section 404 permit) and an individual Section 401 Water Quality Certification (Section 401 certification).

NC Ecosystem Enhancement Program (EEP). The EEP has agreed to provide compensatory stream and riparian wetland mitigation for the project as needed in accordance with the NC Department of Environment and Natural Resources' Ecosystem Enhancement Program In-Lieu Fee Instrument dated July 28, 2010 (see letter from EEP dated July 11, 2011 included in **Appendix B)**. EEP's Beaverdam Creek mitigation project was identified in the *Conceptual Mitigation Plan* as a potential adjacent mitigation site. EEP has committed all stream mitigation assets associated with the Beaverdam Creek mitigation site toward offsetting stream impacts associated with the project. These assets include an estimate 13,534 stream mitigation credits (13,014 restoration credits and 520 restoration equivalent credits).

On-Site Mitigation. In June 2011, the NCDOT purchased the Linwood Springs Golf Course to provide on-site mitigation for the Gaston East-West Connector. The golf course is located north of Linwood Road adjacent to the east side of the Selected Alternative corridor. The golf course property purchased encompasses two parcels totaling approximately 144 acres. Delineation of streams and wetlands on the site was completed in July 2011. Approximately 5,700 linear feet of Crowders Creek are located within the golf course property. Crowders Creek is a 303(d)-listed stream that is listed for impaired biological integrity resulting from urban runoff and storm sewers. The golf course property also contains several unnamed tributaries, open water ponds, and vegetated ditches that drain surface water to Crowders Creek. Eliminating the golf course use and associated fertilizer applications, and restoring the streams on the golf course property, will contribute to the improvement of water quality in the Crowders Creek watershed.

Other on-site mitigation opportunities described in the *Conceptual Mitigation Plan* (June 2010) include restoration, enhancement or preservation of streams or wetlands located on the following types of parcels: 1) landlocked parcels that may be purchased by NCDOT during right-of-way acquisition, 2) parcels adjacent to the Selected Alternative right of way with a portion of their area within the right of way but with the remainder having existing access, and 3) nearby parcels that are one parcel removed from the Selected Alternative right of way. A total of 43 sites with the potential to provide on-site mitigation were identified in the *Conceptual Mitigation Plan*.

In December 2010, land owners of properties located adjacent or nearby to the Preferred Alternative that were identified as having a potential mitigation opportunity were contacted by mail to determine their interest in participating in a voluntary mitigation program. Property owners that responded as potentially interested were contacted again by mail in July 2011 to

request access to perform field work on their land. This field work, currently in progress, is being done to determine the types and extents of mitigation opportunities. The results of these evaluations will be documented in the final mitigation plan to be included in the Section 404 permit and Section 401 certification.

3.4 UPDATED PROTECTED PLANT SPECIES SURVEYS

The Final EIS Section 2.5.4.5 summarizes the results of the surveys for protected plant species conducted up to the time of the Final EIS. Protected plant species listed by the US Fish and Wildlife Service for Gaston County and Mecklenburg County include the federally-endangered Schweinitz's sunflower (Gaston County and Mecklenburg County), federally-endangered Michaux's sumac (Mecklenburg County) and federally endangered smooth coneflower (Mecklenburg).

The Final EIS Section 2.5.4.5 also states: "The Preferred Alternative study corridor is planned to be resurveyed for endangered plant species prior to the issuance of the Record of Decision (ROD) and the results will be summarized in the ROD. Potential suitable habitat for the Schweinitz's sunflower (Gaston County and Mecklenburg County), Michaux's sumac (Mecklenburg County) and smooth coneflower (Mecklenburg) will be surveyed."

Previous Plant Surveys in 2005 and 2009. As a part of the Draft EIS preparation, the DSA corridors were surveyed in October 2005 for the federally-endangered Schweinitz's sunflower (*Helianthus schweinitzii*), Michaux's sumac (*Rhus michauxii*), and smooth coneflower (*Echinacea laevigata*), and federal Candidate species Georgia aster (*Symphotrichum georgianum*). These surveys are summarized in Section 6.5 of the Draft EIS and below.

During the 2005 surveys, no populations of the sunflower, sumac or coneflower were found within the DSA 9 corridor. A population of Schweinitz's sunflower was found on the north side of Corridor Segment K2A, south of Catawba Creek along the western side of Union New Hope Road. This population is not within the Selected Alternative.

During the 2005 surveys, a population of Georgia aster was identified in a powerline easement in Corridor Segment H2A. Corridor Segment H2A is a part of the Selected Alternative. The population is located approximately 2,000 feet northwest of the intersection of Shannon Bradley Road and Crescent Lane, south of I-85.

As part of the Final EIS preparation, development of the refined preliminary design for the Preferred Alternative subsequent to the original 2005 surveys resulted in some proposed right of way for cross-streets and service roads extending beyond the original study corridor boundaries. For the proposed right of way outside of the original study corridor boundaries, a 250-foot buffer was drawn for additional plant surveys.

On November 13, 17 and 18, 2009, detailed searches were conducted for Schweinitz's sunflower in the areas of the Preferred Alternative proposed right of way not originally surveyed in 2005. Surveys for Michaux's sumac and smooth coneflower in Mecklenburg County were not possible in mid-November due to a lack of vegetative indicators for the species. No populations of Schweinitz's were found in the additional areas surveyed in 2009.

Year 2010 Plant Surveys. Surveys for protected plant species were conducted throughout the Selected Alternative corridor in Gaston County and Mecklenburg County as listed below:

- Michaux's Sumac and Smooth Coneflower in Mecklenburg County. Surveys were conducted on July 28-30, 2010.
- Schweinitz's Sunflower and Georgia Aster in Gaston County. Surveys were conducted on September 20-24, 2010.
- Schweinitz's Sunflower and Georgia Aster in Mecklenburg County. Surveys were conducted on September 30 and October 1, 2010.

2010 Survey Results. No specimens of Michaux's sumac or smooth coneflower were found within the Mecklenburg County portion of the Selected Alternative study corridor.

No specimens of Schweinitz's sunflower were found within the Gaston County or Mecklenburg County portions of the Selected Alternative study corridor.

No populations of Georgia aster were found within the Gaston County or Mecklenburg County portions of the Selected Alternative study corridor. The population of Georgia aster identified in 2005 in Corridor Segment H2A, described above, is located in an area that has been mowed and the population is no longer present.

Biological Conclusions. The Biological Conclusions reported in the Final EIS for the Preferred Alternative were No Effect for Michaux's sumac, smooth coneflower, and Schweinitz's sunflower. The US Fish and Wildlife Service concurred with these biological conclusions in a letter dated June 12, 2009 included in Appendix B1 (letter a014) of the Final EIS. Since no specimens of these endangered plants were found within the Selected Alternative corridor during the surveys conducted in 2010, the biological conclusions remain No Effect.

3.5 UPDATED QUANTITATIVE INDIRECT AND CUMULATIVE EFFECTS ANALYSIS

A summary of the August 2010 *Gaston East-West Connector Quantitative Indirect and Cumulative Effects Analysis* (Louis Berger Group) Quantitative ICE Assessment prepared for the Preferred Alternative was provided in Final EIS Section 2.5.5.

Subsequent to the August 2010 version of the Quantitative ICE Assessment circulated with the Final EIS, the North Carolina Division of Water Quality (NCDWQ) requested by email (October 22, 2010) that the Fites Creek-Catawba River subwatershed (Hydrologic Unit Code [HUC] 030501011405) be added to the Indirect and Cumulative Effects Study Area (ICE Study Area). The Fites Creek-Catawba River subwatershed was initially excluded from the study area due to a lack of substantial changes in travel times for the majority of this area with the completion of the Gaston East-West Connector. However, adding the Fites Creek subwatershed to the study area is reasonable to capture the potential local-level land use effects in the vicinity of the interchange between the Gaston East-West Connector and NC 273. The southern end of the Fites Creek subwatershed is within 1/2 mile of the proposed interchange with NC 273. Study methods and assumptions remain the same as in the previous report.

The updated Quantitative ICE Assessment (*Gaston East-West Connector Revised Final Quantitative Indirect and Cumulative Effects Analysis*, Louis Berger Group, July 2011) for the Selected Alternative is incorporated by reference into this ROD and is available for download on the project Web site (www.ncdot.org/projects/gardenparkway).

A summary of the July 2011 Quantitative ICE Assessment update is provided below. It follows the headings in Section 2.5.5 of the Final EIS. Sections where no updates were necessary are noted.

3.5.1 Introduction and Background (Final EIS Section 2.5.5.1)

Scenarios Evaluated. *No change.*

Definitions. *No change.*

Study Process. *No change.*

Scope of Study. *No change.*

3.5.2 Study Area and Analysis Year (Final EIS Section 2.5.5.2)

Study Area. The Fites Creek-Catawba River subwatershed area, located along either side of the Catawba River north of Lake Wylie, was added to the ICE Study Area. The ICE Study Area, originally shown in Final EIS Figure 2-6, has been updated and is shown in **Figure 3**.

Analysis Year. *No change.*

3.5.3 Future No-Build Scenario Projects (Final EIS Section 2.5.5.3)

Table 2-14 in the Final EIS lists the transportation projects included in the No-Build Scenario. Due to the addition of the Fites Creek-Catawba River subwatershed into the ICE Study Area, one additional GUAMPO project has been added. This project, STIP Project U-3633, is the widening of NC 273 (South Main Street) from two lanes to four lanes from south of Catawba Drive to Highland Street at Rankin Avenue. This project is approximately one mile long and is scheduled in the GUAMPO 2035 LRTP as a project to be constructed by 2015.

3.5.4 Land Use Forecasting Methodology (Final EIS Section 2.5.5.4)

Household and Employment Forecasts. *No change.*

Gravity Model Methodology. *No change.*

Method for Estimating Existing Land Use. *No change.*

Method for Estimating Future Land Use. *No change.*

3.5.5 Methods for Assessing Notable Features / Resources (Final EIS Section 2.5.5.5)

Water Resources. *No change.*

Wildlife Habitat. *No change.*

Farmland. *No change.*

3.5.6 POTENTIAL INDIRECT AND CUMULATIVE EFFECTS TO LAND USE (FINAL EIS SECTION 2.5.5.6)

Analysis Limitations. *No change.*

Household and Employment Growth. Results of the updated gravity model assessment of shifts in the locations of household and employment growth for the expanded ICE Study Area (including the Fites Creek-Catawba River subwatershed) are shown in **Table 8** and on the following figures:

- **Figures 4 and 5** (updated Final EIS Figures 2-7 and 2-8). Household and employment growth by zone from 2005 to 2035 under the No-Build Scenario.
- **Figures 6 and 7** (updated Final EIS Figures 2-9 and 2-10). Household and employment growth by zone from 2005 to 2035 under the Build Scenario.
- **Figures 8 and 9** (updated Final EIS Figures 2-11 and 2-12). Change in household and employment from the 2035 No-Build Scenario to the 2035 Build Scenario.

Final EIS Table 2-15 and Final EIS Figures 2-7 through 2-12 show the household and employment growth results for the original ICE Study Area.

As shown in **Table 8**, up to 3,300 additional households and 300 fewer jobs are anticipated in the ICE Study Area as a result of the indirect development shifts associated with the project. This is not new growth, but rather represents households and employment that would have located elsewhere in the Metrolina region under the No-Build Scenario. At the regional scale, household and employment totals remain constant between the No-Build and Build conditions. The overall indirect effect of the project for the ICE Study Area as a whole is relatively small in comparison to the growth in households (47,500) and employment (37,400) expected between 2005 and 2035 under the No-Build Scenario. For households, the difference is a 2.9 percent increase from the No-Build Scenario to the Build Scenario. For employment, the projected difference between the No-Build Scenario and Build Scenario is 0.3 percent, or approximately no change.

The largest increase in households and employment attributed to the proposed project would be in the Catawba Creek subwatershed, while the largest percentage change from the No-Build Scenario to the Build Scenario is projected for the Beaverdam Creek subwatershed. Note that for the subwatersheds showing a "decrease" from the No-Build Scenario to the Build Scenario, this represents a decrease in future growth, not a decrease relative to existing conditions. For example, the forecasts for the Upper Crowders Creek subwatershed show 2035 employment under the Build Scenario as 900 jobs, or 6.3 percent less than the No-Build Scenario. However, even under the Build Scenario, the Upper Crowders Creek subwatershed is expected to experience growth in employment of 6,400 (a 90 percent increase) between 2005 and 2035.

Several of the zones with the largest household growth expected under the No-Build Scenario are adjacent to Lake Wylie or the South Fork Catawba River, a pattern consistent with recent trends and developments (**Figure 4**). The same general patterns in household growth would occur under the Build Scenario (**Figure 6**). Concentrations of substantial employment growth under both the No-Build Scenario and Build Scenario include the general areas around the Bessemer City industrial park and around the Charlotte-Douglas International Airport, which is located northeast of the proposed interchange between the Gaston East-West Connector and I-485 (**Figures 6 and 7**).

TABLE 8: Gravity Model Estimated Change in Households and Employment by Watershed – No-Build Scenario and Build Scenario

Watershed	2005	2035 No-Build Scenario	2035 Build Scenario	No-Build to Build Difference	Percent Difference
Households					
Beaverdam Creek-Catawba River	1,800	2,700	3,100	400	14.8%
Catawba Creek	15,000	22,000	23,800	1,800	8.2%
Duharts Creek-South Fork Catawba River	12,700	22,700	22,700	-100	-0.4%
Lake Wylie-Catawba River	2,600	6,600	6,700	200	3.0%
Lower Crowders Creek	6,600	11,200	12,500	1,300	11.6%
Mill Creek-Lake Wylie	3,100	6,800	7,200	400	5.9%
Paw Creek-Lake Wylie	7,300	11,800	11,700	0	0%
Upper Crowders Creek	11,300	18,800	18,500	-300	-1.6%
Fites Creek-Catawba River	6,400	11,700	11,200	-400	-3.4%
Total Households	**66,800**	**114,300**	**117,400**	**3,300**	**2.9%**
Employment					
Beaverdam Creek-Catawba River	1,700	2,500	2,900	300	12.0%
Catawba Creek	10,700	12,900	13,300	400	3.1%
Duharts Creek-South Fork Catawba River	21,400	27,500	27,400	-100	-0.4%
Lake Wylie-Catawba River	3,500	8,700	8,300	-400	-4.6%
Lower Crowders Creek	2,300	3,200	3,600	300	9.4%
Mill Creek-Lake Wylie	1,700	4,000	4,000	100	2.5%
Paw Creek-Lake Wylie	10,100	18,400	18,300	0	0%
Upper Crowders Creek	7,000	14,300	13,400	-900	-6.3%
Fites Creek-Catawba River	6,700	11,000	11,000	0	0.0%
Total Employment	**65,100**	**102,500**	**102,200**	**-300**	**-0.3%**

Source: Gaston East-West Connector Quantitative Indirect and Cumulative Effects Analysis, Louis Berger Group, Inc., July 2011.
Note: Results have been rounded to the nearest 100 households and 100 employees. Differences were calculated prior to rounding. Study area totals calculated based on rounded values.

Relative to the No-Build Scenario, the Build Scenario would generally increase growth in the zones along the Selected Alternative alignment in southern Gaston County and also in northern York County (**Figures 8 and 9**). These areas would experience an increase in relative accessibility that would, with all other factors held constant, make these zones more attractive for development as a result of the project. Areas along the I-85 corridor would not experience as large of an accessibility improvement and, as a result, show less growth under the Build Scenario than under the No-Build Scenario. The gravity model formulation shifts households and employment towards those areas with the greatest accessibility (travel time) improvements.

Land Use Change. Based on the projected changes in households and employment described previously, the indirect land use effect of the project is an approximately 1.3 percent increase in the total area of residential land and a 0.3 percent decrease in employment-related land in the ICE Study Area. The largest absolute difference in land conversion between the No-Build and

Build Scenarios is projected for the Catawba Creek subwatershed. **Table 9** (updated from Table 2-16 in the Final EIS) presents the residential and employment related land use change estimates by watershed based on the gravity model output.

TABLE 9: Estimated Land Conversion by Watershed – No-Build Scenario and Build Scenario

Watershed	Total Area (Acres)	Existing Residential/ Employment Land (Acres)	2005-2035 No Build Land Conversion (Acres)	2005-2035 Build Land Conversion (Acres)	No Build to Build Difference (Acres Rounded to Nearest 100)	Percent Change in Total Residential/ Employment Land, No Build to Build
Estimated Residential Land Conversion						
Beaverdam Creek-Catawba River	12,200	5,200	300	400	100	1.8%
Catawba Creek	20,700	10,500	2,300	2,900	600	4.7%
Duharts Creek-South Fork Catawba River	25,300	9,700	3,400	3,300	0	-0.8%
Lake Wylie-Catawba River	10,500	3,000	1,300	1,400	100	2.3%
Lower Crowders Creek	36,700	16,700	1,500	2,000	400	2.7%
Mill Creek-Lake Wylie	15,000	6,800	1,200	1,400	100	2.5%
Paw Creek-Lake Wylie	11,900	4,100	1,500	1,500	0	0%
Upper Crowders Creek	26,500	10,800	2,500	2,400	-100	-0.8%
Fites Creek-Catawba	11,000	3,200	1,800	1,600	-100	-4.0%
Total	**169,800**	**70,000**	**15,800**	**16,900**	**1,100**	**1.3%**
Estimated Employment-Related Land Conversion						
Beaverdam Creek-Catawba River	12,200	700	200	300	100	11.1%
Catawba Creek	20,700	2,700	600	800	100	6.1%
Duharts Creek-South Fork Catawba River	25,300	3,600	1,700	1,700	0	0%
Lake Wylie-Catawba River	10,500	1,800	1,500	1,400	-100	-3.0%
Lower Crowders Creek	36,700	1,300	300	400	100	6.3%
Mill Creek-Lake Wylie	15,000	300	700	700	0	0%
Paw Creek-Lake Wylie	11,900	3,300	2,400	2,400	0	0%
Upper Crowders Creek	26,500	3,100	2,100	1,800	-300	-5.8%
Fites Creek-Catawba	11,000	2,100	1,200	1,200	0	0.0%
Total	**169,800**	**18,900**	**10,700**	**10,700**	**-100**	**-0.3%**

Source: Gaston East-West Connector Quantitative Indirect and Cumulative Effects Analysis, Louis Berger Group, Inc., July 2011.
Note: Results have been rounded to the nearest 100 acres. Differences were calculated prior to rounding. Study area totals calculated based on rounded values.

It should be noted that the estimates of existing condition residential-related and employment-related land acreages are based on parcel data. The changes in acreages for these land use types estimated for 2035 under either the No-Build Scenario or Build Scenario did not account for the possibility that some larger parcels already classified as residential or employment related could

be subdivided to accommodate some portion of the projected growth, and therefore acreage changes would be less.

Consistency with Local Plans. *No change.*

3.5.7 Potential Indirect and Cumulative Effects to Water Resources (Final EIS Section 2.5.5.7)

Existing Water Quality. *No change.*

Stormwater Management Policies. *No change.*

Riparian Buffer Policies. *No change.*

Existing Percent Impervious Cover. Based on 2007 conditions, approximately 12.8 percent of the ICE Study Area consists of impervious surface cover. Beaverdam Creek, Upper Crowders Creek, and Lower Crowders Creek subwatersheds on the western side of the ICE Study Area consist of less than 10 percent impervious surface cover. The Paw Creek and Lake Wylie-Catawba River subwatersheds on the eastern side of the ICE Study Area exhibit the highest percent impervious cover at over 20 percent. The remaining watersheds in the study area have a percent impervious cover within the range of 10 to 20 percent.

Impacts from Other Actions (No-Build Scenario). **Table 10** (updated from Final EIS Table 2-17) lists the change in impervious surface cover by watershed, including the change from 2007 to the 2035 No-Build Scenario.

TABLE10: Estimated Change in Impervious Cover by Watershed

Watershed	Total Watershed Area (Acres)	2007 Impervious Cover (Acres)	2035 No Build Impervious Cover (Acres)	2035 Build Impervious Cover (Acres)*	2007 Percent Impervious Cover	2035 No Build Percent Impervious Cover	2035 Build Percent Impervious Cover*
Beaverdam Creek	12,200	700	1,000	1,100	5.7%	8.2%	9.0%
Catawba Creek	20,700	3,700	4,800	5,200	17.9%	23.2%	25.1%
Duharts Creek-South Fork Catawba River	25,300	4,600	6,900	6,900	18.2%	27.3%	27.3%
Lake Wylie-Catawba River	10,500	2,200	3,600	3,700	21.0%	34.3%	35.2%
Lower Crowders Creek	36,700	2,100	2,800	3,100	5.7%	7.6%	8.4%
Mill Creek-Lake Wylie	15,000	1,600	2,400	2,500	10.7%	16.0%	16.7%
Paw Creek-Lake Wylie	11,900	3,300	5,400	5,400	27.7%	45.4%	45.4%
Upper Crowders Creek	26,500	1,600	3,800	3,700	6.0%	14.3%	14.0%
Fites Creek-Catawba	11,000	2,000	3,400	3,400	18.2%	30.9%	30.9%
Study Area Total	**169,800**	**21,800**	**34,100**	**35,000**	**12.8%**	**20.1%**	**20.6%**

Source: *Gaston East-West Connector Quantitative Indirect and Cumulative Effects Analysis*, Louis Berger Group, Inc., July 2011.
Note: Results have been rounded to the nearest 100 acres. Study area totals calculated based on rounded values.
* Includes cumulative effect of past actions (existing conditions), the impacts of reasonably foreseeable actions by others (future household and employment growth and other transportation projects), the indirect effects of the project and the direct increase in impervious surface cover resulting from the project.

Future development under the No-Build Scenario is expected to increase impervious surface cover by over 12,000 acres compared to existing conditions for the ICE Study Area as a whole. Approximately 100 acres of the No-Build Scenario increase in impervious cover is attributed to other specific transportation projects, with the majority associated with household and employment growth. Overall, impervious surface cover in the ICE Study Area is projected to increase 7.3 percent, from 12.8 percent under existing (2007) conditions to 20.1 percent under the No-Build Scenario. Several watersheds would exceed thresholds that suggest the potential for stream and water quality impacts as a result of development under the No-Build Scenario. The percent impervious surface cover in the Upper Crowders Creek subwatershed would increase from 6.0 percent to 14.3 percent. Four subwatersheds which currently have less than 25 percent impervious cover would approach or exceed 25 percent impervious cover under the No-Build Scenario: Catawba Creek, Duharts Creek-South Fork Catawba River, Lake Wylie-Catawba River, and Fites Creek-Catawba River.

The level of development projected for the ICE Study Area suggests some unavoidable degradation of water resource quality is likely in the areas with the greatest growth. However, the impact per acre of new impervious surface is expected to be substantially less than for past development due to new stormwater permitting requirements. The enforcement of riparian buffer policies in the ICE Study Area is also likely to have a beneficial offsetting effect in counteracting some of the stormwater impacts of future growth. Improvements to the management of point source pollutant discharges (including wastewater treatment plants) are also expected to continue in the future.

Direct Impacts from the Preferred (Selected) Alternative. The Selected Alternative would add approximately 600 acres of impervious surface cover to the ICE Study Area, with the largest increase (approximately 200 acres) in the Upper Crowders Creek subwatershed. As discussed in the Final EIS Section 2.5.4.2, the final design of the Selected Alternative would incorporate stormwater treatment measures to reduce the potential for impacts to the affected watersheds.

Indirect Effects. *No change, but reproduced here for continuity with this section.* The changes in the distribution of households and employment resulting from the Preferred (Selected) Alternative could add approximately 300 acres of impervious surface cover to the ICE Study Area, or a one percent increase over the No-Build Scenario. The largest indirect increases in impervious surface cover are projected for the Catawba Creek subwatershed and the Lower Crowders Creek subwatershed. Two subwatersheds are projected to have a slight indirect decrease in impervious surface cover compared to the No-Build Scenario as a result of the Preferred (Selected) Alternative, Lake Wylie-Catawba River and Upper Crowders Creek. As noted in the discussion of the No-Build Scenario, although some impacts would still occur, the incremental water quality impacts of these shifts in growth would be less than past growth due to the stormwater control and riparian buffer policies in the study area.

Cumulative Effects. The cumulative effect of past actions (e.g. existing impervious cover), other actions (the No-Build Scenario) and the direct and indirect effects of the Selected Alternative is predicted to be 35,000 acres of impervious surface cover (20.6 percent of the ICE Study Area compared to 20.1 percent under the No-Build Scenario). The incremental direct effect (600 acres) and indirect effect (300 acres) of the Selected Alternative accounts for 900 acres, or about 6.8 percent, of the cumulative increase in impervious surface cover from existing conditions. One subwatershed with impervious surface cover currently less than 10 percent would be at or exceed 10 percent in the Build Scenario - Upper Crowders Creek.

As noted in the discussion of the No-Build Scenario, although some unavoidable decreases in water resource quality are expected, the incremental water quality impacts of future growth would be less than past growth due to the stormwater water and riparian buffer policies in the ICE Study Area.

While impervious surface cover provides a useful metric for assessing potential cumulative effects, it is not possible to conclude from an analysis of impervious surface cover alone whether or not violations of water quality standards would occur at specific downstream locations. As part of the application for a Section 401 Water Quality Certification for the proposed project, additional modeling of pollutant loadings in accordance with NCDENR Division of Water Quality's policy document entitled *Cumulative Impacts and the 401 Water Quality Certification and Isolated Wetlands Program* (NCDWQ, 2004) is anticipated to be required. To issue a Water Quality Certification, NCDWQ is required to determine that a project "does not result in cumulative impacts, based upon past or reasonably anticipated future impacts that cause or will cause a violation of downstream water quality standards." The water quality modeling will account for the effect of stormwater treatment practices and provide the basis for determining whether or not violations of water quality standards would occur. If violations are predicted, mitigation would be proposed to address the issue.

3.5.8 POTENTIAL INDIRECT AND CUMULATIVE EFFECTS TO WILDLIFE HABITAT (FINAL EIS SECTION 2.5.5.8)

Existing Habitat Fragmentation. The quantity and quality of upland wildlife habitats in the study area have been impacted by past development. Including urban trees, approximately 59 percent of the ICE Study Area is covered by tree cover as of 2007. At a subwatershed level, the highest percentage of tree cover occurs in the Upper and Lower Crowders Creek subwatersheds (approximately 65 percent), while the lowest percentage occurs in the heavily developed Paw Creek-Lake Wylie subwatershed (38 percent).

Figure 10 illustrates the forest interior habitat patches, defined based on the 300-foot edge effect zone explained in Final EIS Section 2.5.5.5. **Table 11** (updated from Table 2-18 in the Final EIS) shows that the majority of the forest interior habitat patches in the ICE Study Area are small, and there are only nine interior habitat patches greater than 500 acres in size. The largest habitat patches are located in and around Crowders Mountain State Park. Some of the large habitat patches in this area actually extend beyond the boundaries of the ICE Study Area. As expected, there are no large interior habitat patches remaining in the most heavily developed portions of the ICE Study Area, such as Gastonia.

TABLE 11: Forest Interior Habitat Patches in ICE Study Area

Total Acres	Forest Interior Habitat (Acres)	Percent Forest Interior Habitat	Count of Forest Interior Habitats by Patch Size (Acres)					Mean Interior Patch Size* (Acres)
			Less than 20	21 to 100	101 to 200	201-500	Greater than 500	
169,763	28,248	16.6%	12,085	151	44	22	9	36.3

*Excluding interior patches of less than one acre.

Impacts from Other Actions (No-Build Scenario). Under the No-Build Scenario, approximately 10,300 to 23,100 acres of tree cover could be lost as a result of projected future development, reducing the total percent forest cover in the ICE Study Area to approximately 52.5 to 45.0 percent. The loss of tree cover under the No-Build Scenario would reduce the quality and quantity of upland wildlife habitat in the ICE Study Area and increase habitat fragmentation, although the degree of fragmentation cannot be reasonably quantified. Planning strategies to minimize potential impacts to wildlife habitat include encouraging higher density development in appropriate locations and preserving contiguous habitat blocks that provide the highest quality habitat.

Direct Impacts from the Preferred (Selected) Alternative. *No change, but reproduced here for continuity with this section.* The Preferred (Selected) Alternative refined preliminary design would directly impact approximately 1,000 acres of tree cover, 300 acres of which would occur in the Upper Crowders Creek subwatershed. The Preferred (Selected) Alternative would directly impact 290 acres of forested interior habitat and result in indirect edge effects, potentially reducing the quality of an additional 480 acres of forest interior habitat within approximately 300 feet of the right of way. The *Gaston East-West Connector Quantitative Revised Final Indirect and Cumulative Effects Analysis* provides more detailed information, including maps, regarding the impacts of the Preferred (Selected) Alternative on forest interior habitat patches of 20 or more acres in size. There is a high degree of existing fragmentation in the Gaston East-West Connector corridor, and the project would incrementally increase this fragmentation.

The habitat fragmentation impacts of the Preferred (Selected) Alternative would inhibit the movement of some wildlife species across the roadway and potentially increase wildlife road mortality. As discussed in Final EIS Section 2.5.4.3, a wildlife passage structure will be studied at the crossing of Stream S156 (located between Forbes Road to the west and Robinson Road to the east) during final design of the Preferred (Selected) Alternative.

Indirect Effects. Depending on the specific locations chosen for future development, the changes in the development patterns associated with the Selected Alternative could increase tree cover loss by approximately 100 to 1,300 acres. The greatest potential for indirect effects on forest cover is within the Catawba Creek subwatershed.

Cumulative Effects. **Table 12** (updated Final EIS Table 2-19) lists the projected change in tree cover by subwatershed under a low impact estimate and a high impact estimate, as described in Final EIS Section 2.5.5.5. The cumulative effect of past actions (e.g. existing tree cover), other actions (the No-Build Scenario) and the direct and indirect effects of the Selected Alternative is predicted to result in remaining forest cover in 2035 in the ICE Study Area of approximately 88,300 acres (low estimate of loss) to 74,100 acres ((high estimate of loss). This represents a cumulative loss of forest cover of approximately 25,400 to 11,200 acres over existing conditions, or a percent decrease of 36 to 11 percent.

TABLE 12: Estimated Change in Forest Cover by Watershed

Watershed	Total Watershed Area (Acres)	2007 Forest Cover (Acres)	2035 No Build Forest Cover (Acres)	2035 Build Direct Change in Forest Cover (Acres)	2035 Build Indirect Change in Forest Cover (Acres)	2035 Build Forest Cover (Acres)	Change in Percent Forest Cover No-Build to Build
Low Estimate of Tree Cover Loss							
Beaverdam Creek	12,200	6,500	6,500	0	0	6,500	0%
Catawba Creek	20,700	12,100	11,500	-100	-300	11,000	-2.5%
Duharts Creek-South Fork Catawba River	25,300	15,400	12,800	-100	0	12,700	-0.4%
Lake Wylie-Catawba River	10,500	6,000	4,200	-200	100	4,100	-1.0%
Lower Crowders Creek	36,700	23,800	23,700	-200	-100	23,400	-0.8%
Mill Creek-Lake Wylie	15,000	8,800	8,000	-100	0	8,000	0%
Paw Creek-Lake Wylie	11,900	4,500	3,100	0	0	3,100	0%
Upper Crowders Creek	26,500	17,400	16,000	-300	300	16,000	0%
Fites Creek-Catawba	11,000	5,000	3,400	0	100	3,500	0.9%
Study Area Total - Low	**169,800**	**99,500**	**89,200**	**-1,000**	**100**	**88,300**	**-0.5%**
High Estimate of Tree Cover Loss							
Beaverdam Creek	12,200	6,500	5,900	0	-200	5,700	-1.7%
Catawba Creek	20,700	12,100	9,300	-100	-700	8,500	-3.8%
Duharts Creek-South Fork Catawba River	25,300	15,400	10,600	-100	0	10,400	-0.8%
Lake Wylie-Catawba River	10,500	6,000	3,700	-200	0	3,500	-1.9%
Lower Crowders Creek	36,700	23,800	22,000	-200	-400	21,400	-1.6%
Mill Creek-Lake Wylie	15,000	8,800	6,900	-100	-200	6,700	-1.3%
Paw Creek-Lake Wylie	11,900	4,500	2,200	0	0	2,200	0%
Upper Crowders Creek	26,500	17,400	13,300	-300	100	13,100	-0.8%
Fites Creek-Catawba	11,000	5,000	2,500	0	100	2,600	0.9%
Study Area Total - High	**169,800**	**99,500**	**76,400**	**-1,000**	**-1,300**	**74,100**	**-1.4%**

Source: *Gaston East-West Connector Quantitative Indirect and Cumulative Effects Analysis*, Louis Berger Group, Inc., July 2011.
Note: Negative values indicate loss of forest cover, positive values indicate gain.
Results have been rounded to the nearest 100 acres. Differences were calculated prior to rounding. Study area totals calculated based on rounded values.

The actual impacts would depend on the specific location of each new development, although the actual number will likely be closer to the low estimate. The incremental effect of the Selected Alternative accounts for approximately 900 to 2,300 acres of the cumulative loss of forest cover over existing conditions. As discussed previously, the planning strategies to minimize potential impacts to wildlife habitat include encouraging higher density development in appropriate locations and preserving contiguous habitat blocks that provide the highest quality habitat.

3.5.9 MITIGATION (FINAL EIS SECTION 2.5.5.9)

No change.

3.5.10 CONCLUSION (FINAL EIS SECTION 2.5.5.10)

Table 13 provides a summary of the estimated indirect and cumulative effects in the ICE Study Area for the 2035 No-Build Scenario and 2035 Build Scenario.

TABLE 13: Summary of Estimated Indirect and Cumulative Effects in the ICE Study Area

Effect	Existing Condition	2035 No-Build Scenario	2035 Build Scenario	Difference No-Build to Build
Households (Number)	66,800	114,300	117,400	3,300
Employment (Number)	65,100	102,500	102,200	-300
Residential Land Conversion (Acres)	70,000	85,800	86,900	1,100
Employment-Related Land Conversion (Acres)	18,900	29,600	29,600	-100
Impervious Surface Cover (Acres)	21,800	34,100	35,000	900
Forest Cover – Low Impact Estimate (Acres)	99,500	89,200	88,300	100
Forest Cover – High Impact Estimate (Acres)	99,500	76,400	74,100	-1,300

Note: Existing conditions are for the year 2005 for Households, Employment, Residential Land Conversion, and Employment-Related Land conversion. Existing conditions are for the year 2007 for Impervious Surface Cover and Forest Cover.

The land use forecasting conducted for this quantitative ICE study shows that the potential for indirect land use effects is greatest in southern Gaston County and northern York County. These areas would experience the largest increase in accessibility with the project. Up to 3,300 additional households and 300 fewer jobs are anticipated in the ICE Study Area as a result of the indirect development shifts associated with the project. This is not new growth, but rather represents households and employment that would have located elsewhere in the Metrolina region under the No-Build Scenario. At the regional scale, household and employment totals remain constant between the No-Build and Build conditions.

The overall indirect effect of the project for the ICE Study Area as a whole is relatively small in comparison to the growth in households (47,500) and employment (37,400) expected between 2005 and 2035 under the No- Build Scenario. For households, the difference is a 2.9 percent increase from the No-Build Scenario to the Build Scenario. For employment, the projected difference between the No-Build Scenario and Build Scenario is 0.3 percent, or approximately no change. Note that for areas showing a "decrease" from the No-Build Scenario to the Build Scenario in households or employment, this represents a decrease in future growth, not a decrease relative to existing conditions.

The land use forecasting results are consistent with Gaston County's land use plan, but may be inconsistent with York County's plan for rural residential and agricultural uses in the northern portion of the county. Local land use regulations will be key in shaping the location and form of development in the ICE Study Area.

In terms of environmental impacts, over 12,300 acres of impervious surface is expected to be added to the ICE Study Area by 2035 under the No-Build Scenario. Between 10,300 and 23,100 acres of tree cover could be lost under the No-Build condition.

The proposed project would directly and indirectly affect the environment. The total incremental effect of the Build Scenario on impervious surface cover (direct and indirect) is an addition of 900 acres to the increase in impervious surface cover projected under the No-Build Scenario. The total incremental effect of the project on tree cover is estimated to be a loss of 900 to 2,300 acres over the No-Build Scenario.

Numerous planning strategies are available to reduce the impacts of future growth on water resources and wildlife habitat, including zoning/comprehensive planning, growth management, riparian buffers, stream restoration, and land acquisition.

4. SUMMARY OF IMPACTS AND MEASURES TO MINIMIZE HARM

4.1 SUMMARY OF IMPACTS

Impacts for the Preferred Alternative (now the Selected Alternative) are discussed in detail in Section 2.5 of the Final EIS and are based on the refined preliminary design. The impacts are summarized in **Table 14**. These impacts take into account minimization measures incorporated into the project through the Final EIS phase. The measures to minimize harm implemented throughout the EIS process and those planned to be implemented during final design and construction are discussed in **Section 4.2**.

TABLE 14: Summary of Impacts from the Selected Alternative

Environmental Resource/Issue		Impact/Effect
HUMAN ENVIRONMENT		
Land Use and Transportation Plans		The Selected Alternative is consistent with local plans.
Relocations		344 – Residences 38 – Businesses 1 – Farm 4 – Non-Profits
Neighborhoods		24 neighborhoods affected: 4 – no relocations but right-of-way encroachment and/or change in access 12 – relocation of homes on edge of neighborhood 7 – relocation of homes in midst of neighborhood 1 – total displacement of neighborhood
Environmental Justice		No disproportionately high and adverse impact on minority or low-income populations.
Community Resources and Services	Churches and Cemeteries	• 2 church relocations - St Titus AME Zion and Charity Independent Baptist • 1 church property impacted – Broomfield Methodist Church (right of way needed from back of property, including an outbuilding) • 1 cemetery property impacted – Mt Pleasant Baptist Church cemetery (impacted area does not contain gravesites)
	Schools	Potential temporary impact to school bus routes during construction.
	Fire Stations	Potential temporary impact to response times during construction.
	Community Centers	Relocation of the Dixie Community Center would be required.

TABLE 14: Summary of Impacts from the Selected Alternative

Environmental Resource/Issue		Impact/Effect
	Parks and Recreation Areas	• Berewick Regional Park (publicly owned) – no impact from refined preliminary design. • Carolina Speedway (privately owned) – 7.7 acres of the northern and western sides needed for right of way. The Speedway will still be able to operate. • Duke Energy/Belmont Optimist Club Recreational Fields (privately owned) – No direct impact from refined preliminary design. New access road to be constructed as part of the project.
Community Safety	Emergency Response	Long-term positive impact on response times by providing east-west connectivity in southern Gaston County.
	Pedestrians/Bicycles	Sidewalks and established bicycle routes will be accommodated where appropriate.
	Maintenance of Traffic	Pedestrian and vehicular traffic would require temporary detours during construction.
	Fog	Dense fog may occur at times along the Catawba River and South Fork Catawba River. Fog-related safety issues would be evaluated on a case-by-case basis after construction and measures installed where warranted.
PHYSICAL ENVIRONMENT		
Noise		Approximately 281 receptors impacted by noise before mitigation. Approximately 115 noise-impacted receptors and an additional 52 noise-sensitive receptors would benefit from ten preliminary feasible and reasonable noise barriers.
Air Quality	Transportation Conformity	After the May 3, 2010 conformity determination made by the USDOT, the Gaston Urban Area Metropolitan Planning Organization (GUAMPO) prepared an amendment to the *2035 Long Range Transportation Plan (LRTP)* and *2009-2015 Transportation Improvement Program (TIP)* so that the project design concept and scope included in the LRTP and TIP is consistent with the Preferred Alternative (Selected Alternative). GUAMPO made a conformity determination on the amended *2035 LRTP* and *2009-2015 TIP* on August 24, 2010. USDOT issued a conformity determination on the amendments on October 5, 2010.
	Mobile Source Air Toxics (MSAT)	It is expected that there would be higher MSAT emissions in the immediate project area, relative to the No-Build Alternative, due to increased VMT. For the Selected Alternative, MSAT levels could be slightly higher in some locations than others, but current tools and science are not adequate to quantify them or the risks to human health. However, on a regional basis, USEPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.
	Construction Air Quality	Provided local ordinances for open burning and dust are followed, significant air quality impacts due to construction of the Selected Alternative are not anticipated.

TABLE 14: Summary of Impacts from the Selected Alternative

Environmental Resource/Issue		Impact/Effect
	Greenhouse Gases and Climate Change	Because a national strategy to address greenhouse gas emissions from transportation – and all other sectors – is still being developed, FHWA believes that it is premature to implement policies that attempt to incorporate consideration of greenhouse gas emissions into transportation planning. From a NEPA perspective, it is analytically problematic to conduct a project-level cumulative effects analysis of greenhouse gas emissions on a problem that is global in nature. It is technically unfeasible to accurately model how negligible increases or decreases of CO2 emissions at a project scale would add or subtract to the carbon emissions from around the world. Given the level of uncertainty involved, the results of such an analysis would not be likely to inform decision-making at the project level, while adding considerable administrative burdens to the NEPA process.
Farmland		• Impacts of 588 acres of prime farmland soils and 274 acres of statewide important farmland soils. There are no farmland soils classified as unique or locally important within the refined preliminary design right of way for the Selected Alternative. • Impacts to ten properties designated as Voluntary Agricultural Districts (VADs) for a total impact of approximately 49 acres.
Utilities and Infrastructure	Electric Power Generation and Transmission	14 major electrical power transmission lines owned by Duke Energy crossed. Modifications and relocations of transmission lines and towers are not expected to adversely impact the transmission lines or consumer electrical service in the area.
	Natural Gas	2 natural gas transmission easements crossed (Plantation Pipeline Company and Colonial Pipeline Company). Each easement contains 2 natural gas transmission pipelines. Numerous natural gas distribution lines crossed. Disruption of service is not anticipated.
	Telecommunications	Numerous telecommunication lines expected to be crossed.
	Water Service	Major public water line along Southpoint Rd crossed, as well as other water lines. Private wells located within the right of way would be capped and abandoned. Disruption of service is not anticipated.
	Sewer Service	No impacts to sewage treatment facilities or public sewer service. Potential relocation or reconfiguration of other sewer lines or septic systems.
	Railroads	• 2 Norfolk Southern rail lines crossed - one on east side of NC 274 (Bessemer City Road) and one on east side of US 321. • 2 rail spur lines crossed – one serving the Duke Energy Allen Steam Station and one serving the Charlotte-Douglas International Airport intermodal facility.
Visual Resources		Boaters and riverfront residents on South Fork Catawba River and Catawba River would experience a substantial change in views within the vicinity of the proposed bridges. Residences along Belfast Drive directly across from preliminary noise barrier Barrier 1-1 may experience visual impacts related to view and potential graffiti.
Hazardous Materials		28 potentially contaminated parcels within Selected Alternative corridor. Two sites have a "moderate to high" impact rating.

TABLE 14: Summary of Impacts from the Selected Alternative

Environmental Resource/Issue		Impact/Effect
Floodplains and Floodway		• 10 floodway crossings • 13 100-year floodplain crossings • 1 longitudinal encroachment of 1,400 feet (approximately 5 acres) along eastern edge of Crowders Creek.
CULTURAL ENVIRONMENT		
Historic Architectural Resources		2 sites on or eligible for listing on the National Register of Historic Places with an effect determination of No Adverse Effect.
Archaeological Resources		No significant archaeological sites impacted.
Section 4(f) Resources		No Section 4(f) impacts based on refined preliminary design.
Section 6(f) Resources		No Section 6(f) resources in the project study area.
NATURAL ENVIRONMENT		
Soils and Mineral Resources		• Soils underlain by the Selected Alternative are rated by the US Department of Agriculture Natural Resource Conservation Service as "somewhat limited" or "very limited" for road construction. • There is the potential for abandoned mine shafts in the Selected Alternative corridor.
Water Resources	Water Quality	• Short-term impacts may result from soil erosion and sedimentation. • Long-term impacts may result from highway stormwater runoff.
	Water-Based Recreation	No impacts to water-based recreation are anticipated.
	Catawba-Wateree Hydro Project	The Selected Alternative's crossings of the Catawba River, South Fork Catawba River, and Catawba Creek are within the Lake Wylie project boundaries of Duke Energy's Catawba-Wateree Hydro Project.
Natural Communities and Wildlife	Terrestrial Communities	Impacted acres from the refined preliminary design right of way: • Agricultural land – 152 acres • Clearcut land – 20 acres • Hardwood forest – 195 acres • Pine hardwood forest – 445 acres • Pine forest – 152 acres • Successional land – 111 acres • Open water – 19 acres • Disturbed land – 537 acres
	Aquatic Communities	Temporary and permanent impacts to aquatic organisms could result from increased erosion and sedimentation.
	Important Natural Areas	No impacts to important natural areas.
	Invasive Plant Species	Construction activities have the potential to provide opportunities for invasive plant species.
Water Resources in Federal Jurisdiction	Jurisdictional Wetlands, Streams, and Ponds (Note: Impacts calculated with a 25-ft buffer around the refined preliminary design construction limits)	• Intermittent Streams – 7,383 linear ft (lf) • Perennial Streams – 29,033 lf • Total Streams – 36,416 lf • Wetlands – 7.0 acres • Total Number of Wetlands - 48 • Ponds – 4.5 acres

TABLE 14: Summary of Impacts from the Selected Alternative

Environmental Resource/Issue		Impact/Effect
	Catawba River Buffers	Catawba River Buffers impacted along Catawba River, South Fork Catawba River, and Catawba Creek total 39,920 square feet, which is more than the one-third acre threshold that requires mitigation. Catawba River – Zone 1 total – 3,200 sq ft Zone 2 total – 4,680 sq ft South Fork Catawba River – Zone 1 total – 440 sq ft Zone 2 total – 4,175 sq ft Catawba Creek – Zone 1 total – 16,415 sq ft Zone 2 total - 11,010 sq ft
Federally Protected Species		• Carolina heelsplitter – No Effect • Michaux's sumac – No Effect • Smooth coneflower – No Effect • Schweinitz's sunflower – No Effect
INDIRECT AND CUMULATIVE EFFECTS		
Household and Employment Growth		Up to 3,300 additional households and 300 fewer jobs are anticipated in the Indirect and Cumulative Effects (ICE) Study Area as a result of the indirect development shifts associated with the project. The overall indirect effect of the project for the ICE Study Area as a whole is relatively small in comparison to the growth in households (47,500) and employment (37,400) expected between 2005 and 2035 under the No-Build Scenario. For households, the difference between the No-Build and Build Scenarios is a 2.9 percent increase. For employment, the difference is 0.3 percent, or approximately no change.
Land Use Change		The indirect land use effect of the project is an approximately 1.3 percent increase in the total area of residential land and a 0.3 percent decrease in employment-related land in the ICE Study Area between the No-Build Scenario and Build Scenario.
Impervious Surface Cover		The percent impervious surface in the ICE Study Area predicted for 2035 is 20.1 percent under the No-Build Scenario and 20.6 percent under the Build Scenario, an increase of 0.5 percent (approximately 900 acres).
Forest Cover		The incremental effect of the Build Scenario would account for approximately 900 to 2,300 acres of additional loss of forest cover over existing conditions compared to the No-Build Scenario.

4.2 MEASURES TO MINIMIZE HARM

All practicable means to minimize environmental harm have been incorporated into the decision process and coordinated with environmental resource and regulatory agencies. Avoidance and minimization measures were incorporated throughout the project planning and design process to minimize impacts to human, physical, cultural and natural resources. A complete discussion of these measures can be found in Sections 2.3 and 2.5 of the Final EIS, and special project commitments are listed in Appendix A. As with the project development process to date, further minimization of impacts will be a consideration during the final design process. Measures to minimize impacts from the Selected Alternative are summarized below.

RELOCATIONS

The Selected Alternative was one of the DSAs with the fewest numbers of residential relocations. The Selected Alternative refined preliminary design is estimated to result in the relocation of 344 residences, 38 businesses, one farm and four non-profits. The refined preliminary design reduced the project's footprint, resulting in four fewer residential relocations than reported in the Draft EIS for the Recommended Alternative.

In addition, based on a small group meeting held with owners and operators of Bruce's Iron and Metal located on US 321 (Final EIS Section 3.1.3), the NCTA will, during final design, evaluate ways to minimize costs and impacts on this site. This scrap metal recycling facility has special operational requirements and it is likely that relocation will not be feasible.

The NCTA will follow the state and federal regulations and NCDOT policies for right-of-way acquisition and relocation. The policies ensure that comparable replacement housing is available for relocatees prior to construction of state and/or federally assisted projects. Furthermore, the NCTA will use three NCDOT programs to minimize the inconvenience of relocation: Relocation Assistance, Relocation Moving Payments, and Relocation Replacement Housing Payments or Rent Supplement. The relocation program for the Selected Alternative will be conducted in accordance with the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646) and the North Carolina Relocation Assistance Act (NCGS 133-5 through 133-18).

NEIGHBORHOODS

As described in Section 2.3 of the Final EIS, the Selected Alternative includes design refinements based on public input that minimize disruptions to communities in the study area. These design refinements include:

- Modify Access to Matthews Acres Subdivision. Provide new access to Matthews Acres Subdivision through a more direct connection with Shannon Bradley Road.
- Compress the Robinson Road Interchange. This design refinement minimizes impacts to properties north of the interchange. Also, Pam Drive will be reconnected to Robinson Road, maintaining the existing access to the Pam Drive neighborhood.
- Relocate Boat Club Road Connection North of Mainline to NC 273 (Southpoint Road). This refinement results in a shorter service road for properties north of the Selected Alternative mainline and east of NC 273 (Southpoint Road).

COMMUNITY RESOURCES AND FACILITIES

Compared to other DSAs, the Selected Alternative avoids direct impacts to schools, the Karyae Park YMCA Outdoor Family Center, the Pisgah Associate Reformed Presbyterian Church, the Ramoth AME Zion Church and cemetery, and the Daniel Stowe Botanical Garden.

Schools and Fire Stations. Implementation of the Selected Alternative may require re-routing of existing emergency service or school bus routes during construction. NCTA will coordinate with the Gaston County Fire Marshal to ensure continuation of services during construction. NCTA will share information with the Gaston County Public Schools and Mecklenburg County Public Schools so the school system can minimize impacts to bus routes during construction.

Churches and Cemeteries. The Selected Alternative will relocate the St. Titus AME Zion Church and the Charity Independent Baptist Church, and will require right of way from Broomfield Methodist Church and the Mt Pleasant Baptist Church Cemetery. As described above, NCDOT will follow state and federal regulations and NCDOT policies for right-of-way acquisition and relocation and will also follow applicable state and local regulations and requirements for relocating or mitigating impacts to cemeteries.

During the intensive archaeological survey for the Preferred Alternative, gravesites with headstones were discovered south of the Mt. Pleasant Baptist Church Cemetery's present-day parcel boundaries. This cemetery is located in the northwest quadrant of the project's interchange with NC 273 (Southpoint Road). The refined preliminary design reconfigured this quadrant of the interchange from a loop and ramp to a compressed ramp. This modification avoids the historic boundary of the cemetery where the gravesites were found and reduces the right of way needed from the present-day cemetery property. No known gravesites will be impacted.

Community Centers. The Selected Alternative may displace the Dixie Community Center. If final design results in a direct taking, NCTA will conduct additional coordination with the Garrison Road Community Center non-profit organization and provide mitigation for the loss of this facility. The organization leases the facility, which is owned by St. John's Baptist Church of Charlotte. The non-profit organization would be eligible for all the benefits for non-residential relocatees under the NCDOT's relocation assistance program. Benefits would include, but not be limited to, advisory services to identify replacement sites, moving costs, and reestablishment expenses.

Parks and Recreation Areas. As described in Section 2.3 of the Final EIS, the Selected Alternative includes design refinements that minimize impacts to parks and recreation areas. These design refinements include:

- Compress the NC 274 (Union Road) Interchange. This design modification minimizes impacts to the Carolina Speedway (privately-owned), and avoids the speedway's pit area, which is important to event operations.
- Realign Mainline at the Duke Energy/Belmont Optimist Club Recreation Fields. This modification avoids encroaching on these recreational fields.
- Reconfigure the I-485 Interchange. This modification avoids encroaching on the Berewick Regional Park.

There is also the potential for the Selected Alternative to cross future greenways. During final design of the Selected Alternative, NCTA will coordinate with local jurisdictions and the Catawba Lands Conservancy to identify needed accommodations for any existing and funded greenways that cross the Selected Alternative.

PUBLIC SAFETY

The Selected Alternative will have a long-term positive impact on emergency response times within the project study area. The Selected Alternative is likely to quicken some response times for services by decreasing travel times, and by providing improved east-west connectivity in southern Gaston County.

NOISE

The preliminary feasible and reasonable noise barriers did not change between the Final EIS and ROD, except that Barriers 12-1 and 12-2 were combined. The ten barriers identified as preliminarily feasible and reasonable have a total length of 21,245 feet. These barriers are projected to benefit a total of 167 Category B receptors (this count excludes undeveloped lots).

A Design Noise Report will be prepared during final design of the Selected Alternative. The Design Noise Report will include the final design of the Selected Alternative and more detailed evaluation of feasibility and reasonableness.

AIR QUALITY

Provided that local ordinances for open burning and dust are followed, as described below, significant air quality impacts due to construction of the proposed project are not anticipated. The proposed project would be constructed in segments, limiting the overall construction activity occurring at any one location.

Open Burning. During construction of the Selected Alternative, all materials resulting from clearing and grubbing, demolition, or other operations will be removed from the project site, burned, or otherwise disposed of by the contractor. Any burning will be accomplished in accordance with applicable laws, local ordinances, and regulations of the North Carolina State Implementation Plan (SIP) for air quality in compliance with 15A NCAC 02D.1903. For construction in Mecklenburg County, open burning (if allowed) will require a permit from the Mecklenburg County LUESA Department of Air Quality, in accordance with the MCAPCO Section 1.5106.

Dust. Measures will be taken to reduce dust generated by construction when the control of dust is necessary for the protection and comfort of motorists and area residents. These dust-suppression measures may include watering unpaved work areas, temporary and permanent seeding and mulching, covering stockpiled materials, and using covered haul trucks.

FARMLAND

The Selected Alternative refined preliminary design would impact ten properties designated as Voluntary Agricultural Districts (VADs). The NCTA will comply with the *Gaston County Voluntary Agricultural District Ordinance* (Gaston County Web site: www.co.gaston.nc.us/ordinances/VADordinance2004-07-22.pdf) and will work with Gaston County regarding public hearings related to land condemnation proceedings against the VAD parcels prior to right-of-way acquisition.

UTILITIES AND INFRASTRUCTURE

The Selected Alternative will require some adjustment, relocation, or modification to existing public utilities in the project area. All utility providers will be contacted and coordinated with to ensure that the proposed design and construction of the project would not substantially disrupt service.

The Selected Alternative crosses two Norfolk Southern rail lines and two spur lines. During final design, NCTA will coordinate with the NCDOT Rail Division and the rail line owners to ensure that the grade-separated crossings of rail lines incorporate the appropriate horizontal and vertical clearances, in accordance with current standards.

VISUAL RESOURCES

During final design of the Selected Alternative, NCTA will incorporate a landscaping and aesthetic plan into the project that would enhance views with the right of way. Also during final design, NCTA will investigate the feasibility and reasonableness of incorporating cost-effective treatments for the bridge sides, piers, and railings of the bridges over the Catawba River and South Fork Catawba River to enhance aesthetics.

Comments received from residents of the Broomfield community (residences around Shannon Bradley Road) at a small group meeting (July 14, 2009) expressed concern regarding graffiti and visual effects of the preliminary noise barrier proposed along the east side of the Preferred Alternative adjacent to Belfast Drive (Barrier 1-1). This noise barrier would directly face remaining residences located on the opposite side of Belfast Drive. If preliminary Barrier 1-1 is determined in final design to be feasible and reasonable, additional landscaping should be provided in this area to reduce potential visual impacts. This has been added as a special project commitment to Item 13 (Visual Resources) in **Table A-1** in **Appendix A**.

HAZARDOUS MATERIALS

The NCDOT Geotechnical Engineering Unit will provide soil and groundwater assessments on each of the properties listed in Table 2-10 of the Final EIS that will be acquired for right of way.

FLOODWAYS AND FLOODPLAINS

The Selected Alternative will impact 100-year floodplains associated with Oates Branch, Bessemer Branch, Crowders Creek, Blackwood Creek, Stream S146 (unnamed tributary to Crowders Creek), Catawba Creek, South Fork Catawba River, Catawba River, Beaverdam Creek, and Legion Lake Stream.

The Selected Alternative involves a 1,400-foot longitudinal encroachment on the fringe of the Crowders Creek floodplain just north of New Haven Drive. With the exception of Crowders Creek, all of the stream crossings would be perpendicular or near to perpendicular, which would minimize impacts to the associated floodplains.

During final design of the Selected Alternative, a detailed hydrologic and hydraulic analysis would be performed for each crossing location to determine the actual size and configuration of each structure. Also, for all new location crossings on Federal Emergency Management Agency (FEMA)-regulated streams (streams where a floodway and/or floodplain has been identified), a Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR) would be prepared and submitted to the NC Floodplain Mapping Program or Mecklenburg County, as applicable, for approval.

In National Flood Insurance Program flood hazard areas, the final hydraulic designs for the Selected Alternative would be such that the floodway would carry the 100-year flood without a substantial increase in flood elevation. The effect of the project on floodwaters will be mitigated effectively through proper sizing and design of hydraulic structures.

CULTURAL RESOURCES

Historic Architectural Resources. There are eighteen historic architectural resources on or eligible for listing on the National Register of Historic Places (NRHP) within the project's Area of Potential Effect (APE). The Selected Alternative refined preliminary design has a No Effect

determination for sixteen of these properties. For two properties, the JBF Riddle House and the Harrison Family Dairy Farm, the determination is No Adverse Effect provided specified conditions are met (Draft EIS Appendix A-2 includes the Concurrence Form for Assessment of Effects). For the JBF Riddle House, the proposed improvements to Patrick Road, including the shoulder width and ditch slope must not result in taking of property either by fee simple or permanent easement. For the Harrison Family Dairy Farm, located on NC 274 (Union Road), full access to the existing driveway on this property must be maintained

Archaeological Resources. There are no archaeological sites identified within the Selected Alternative's Area of Potential Effect (APE) that are on or eligible for listing on the NRHP.

SECTION 4(f) AND 6(f) RESOURCES

The Selected Alternative refined preliminary design avoids impacts to 4(f) resources in the project study area.

There are no properties within the project study area that are subject to Section 6(f) of the Land and Water Conservation Fund Act.

SOILS AND MINERAL RESOURCES

The entire project study area is underlain by the soils rated by the US Department of Agriculture Natural Resource Conservation Service as "somewhat limited" or "very limited" for road construction. The expected soil limitations will be overcome through proper engineering design during the final design stage, which may include the incorporation of techniques such as soil modification, appropriate choice of fill material, use of non-corrosive subgrade materials, and design of drainage structures capable of conveying estimated peak flows.

There is the potential for abandoned mine shafts in the project area. If geotechnical studies or surveys conducted by NCTA discover abandoned mines in the project area in the course of the study or survey, this information will be provided to the contractor team. It is expected these abandoned mine shafts can be accommodated in the final design and construction of the Selected Alternative.

WATER QUALITY AND WATER RESOURCES

Water Quality. Prior to construction, an erosion and sedimentation plan will be developed for the Selected Alternative to minimize these effects in accordance with applicable rules, regulations and guidance, including the latest versions of the NCDENR publication *Erosion and Sediment Control Planning and Design Manual,* the NCDWQ's *Stormwater Best Management Practices Manual*, and NCDOT's *Best Management Practices for Protection of Surface Waters*. For all project areas, *Design Standards in Sensitive Watersheds* will be implemented to reduce the risk of sediment runoff . This has been included as a special project commitment, as listed in **Appendix A, Table A-1**.

Due to construction activities and the increase of impervious surface associated with the construction of a major highway, managing stormwater runoff is an important activity to reduce pollutant loads to adjacent streams. The NCTA will work with regulatory agencies to identify the best management practices (BMP) that will help ensure water quality is protected.

The *Standard Specifications for Roads and Structures* requires proper handling and use of construction materials (NCDOT, January 2002) (NCDOT Web site:

www.ncdot.org/doh/preconstruct/ps/specifications/dual/). The contractor will be responsible for taking every reasonable precaution throughout the construction of the project to prevent the pollution of any body of water. The contractor will also be responsible for preventing soil erosion and stream siltation.

Catawba-Wateree Hydro Project. The NCTA will continue to coordinate with Duke Energy Corporation to obtain the necessary Federal Energy Regulatory Commission (FERC) license modification. The process is expected to result in a FERC license revision to allow the transfer of land within the FERC project boundary to NCTA to construct the Gaston East-West Connector Selected Alternative's bridges over Lake Wylie (these are the bridges over the Catawba Creek, South Fork Catawba River, and Catawba River). This process must be complete prior to construction within the Lake Wylie boundaries.

NATURAL COMMUNITIES AND WILDLIFE

Terrestrial Communities. The impacts of habitat fragmentation could be reduced by providing connections between habitats on either side of the Gaston East-West Connector. In consultation with the NCWRC, USFWS, and USEPA, at a coordination meeting on April 8, 2008, the NCTA identified a location where wildlife passage structures could be provided to maintain habitat connectivity.

A wildlife passage structure will be studied at the crossing of Stream S156 during final design of the Selected Alternative. Stream S156 is located between Forbes Road to the west and Robinson Road to the east. Wildlife passages often include additional culverts placed adjacent to the culverts needed for water passage. During final design, the NCTA will coordinate with the NCWRC, USFWS, and USEPA on the feasibility and design of the wildlife passage at Stream S156, and on designing bridge crossings to be wildlife friendly where feasible.

Aquatic Communities. Impacts to aquatic communities and wildlife from erosion and sedimentation will be minimized through implementation of a stringent erosion-control schedule and the use of BMPs as described above under Water Quality.

Invasive Plant Species. The NCTA will comply with Executive Order 13112 – Invasive Species. Known invasive plant species will not be used in construction, revegetation, or landscaping. During construction of the Selected Alternative, BMPs will be implemented to reduce the potential for spreading invasive species.

WATER RESOURCES IN FEDERAL JURISDICTION

Catawba Buffer Rules. As discussed in Section 2.5.4.4 of the Final EIS, Lake Wylie spans the Project Study Area and could not be avoided for any of the DSAs (including the Selected Alternative). The refined preliminary design for the Selected Alternative would impact Catawba River buffers for the crossings of Lake Wylie (Lake Wylie includes segments of Catawba River, South Fork Catawba River and Catawba Creek). These crossings are subject to the Catawba River Buffer Rules (15A NCAC 02B.0243).

Based on the refined preliminary design for the Selected Alternative, the Selected Alternative would impact 20,055 square feet of Zone 1 buffers and 19,865 square feet of Zone 2 buffers. The total impacts to buffers would be 39,920 square feet (0.91 acre). This is more than the threshold of one-third acre that requires mitigation.

During final design, the amount of buffer area required will be recalculated. If impacts are greater than one-third acre, the Selected Alternative would be designated as a use that is allowable with mitigation because it would cumulatively impact more than one-third acre of buffer. A determination of 'no practical alternatives' is required from the NCDWQ, and approval of mitigation (15A NCAC 02B.0244).

The required area of mitigation shall be determined by the NCDWQ by applying a multiplier of 2.0 to impacts in Zone 1 of the riparian buffer and a multiplier of 1.5 to impacts in Zone 2. Mitigation shall be the same distance from the Catawba River as the proposed impact, and as close to the location of the impact as feasible. The NCDWQ will issue a mitigation determination that specifies the required area and location of mitigation (15A NCAC 02B.0244).

Mitigation may be met by payment of a compensatory mitigation fee to the Riparian Buffer Restoration Fund, donation or real property or of an interest in real property, or restoration or enhancement of a non-forested riparian buffer (15A NCAC 02B.0244).

If, during final design, the amount of buffer area required is recalculated to be less than one-third acre, this impact would still require, prior to construction, written authorization from the NCDWQ for disturbances to the buffer (15A NCAC 02B.0244).

Wetlands, Streams, and Ponds. The horizontal alignments of the preliminary designs for the DSAs were adjusted where possible to minimize or avoid impacts to streams, wetlands, and ponds. The presence of wetlands and streams, and the minimization or avoidance of impacts to these resources, were factors in considering interchange configurations.

To further address avoidance and minimization documented in the Draft EIS, the NCTA coordinated with environmental resource and regulatory agencies and agreed to include several bridges in the preliminary designs, beyond those required to convey floodwaters (Draft EIS Section 4.7.3), to avoid or minimize stream and wetland impacts. These bridge locations for the Selected Alternative include a bridge over Blackwood Creek (Stream S135) and the lengthening of the mainline bridge over Catawba Creek to span the main body of Wetland W248.

Impacts to wetlands and streams were further reduced through the design refinements, such as reduced number of lanes, reduced median width, and modifications to interchange forms, made to the Preferred Alternative, even with inclusion of service roads. Specifically, the refined preliminary design for the Selected Alternative resulted in an approximate 25 percent reduction in stream impacts (2.36 miles), an approximate 6 percent reduction in wetland impacts (0.4 acre), a slight increase in impacts to ponds (0.4 acre), and a slight decrease in Catawba River buffer impacts compared to the preliminary design for DSA 9 documented in the Draft EIS.

The design criteria and typical roadway cross section for the project were influenced by the type of facility required to fulfill the project's anticipated design year traffic forecasts as well as meet the purpose and need of the project. A 70-foot grassed median was originally assumed because the NCDOT Roadway Design Manual indicates that width is the standard median width for freeway facilities. After selection of the LEDPA and in order to further avoid and minimize impacts of the Preferred Alternative, the NCTA proposed a reduction in the median width to 50 feet. Agencies concurred as part of the NEPA/404 Merger Process Concurrence Point 4A (February 16, 2010) that the NCTA had demonstrated avoidance and minimization of project impacts.

The need for the proposed grassed median is based on a number of factors: compliance with NCDOT standards, safety, drainage and stormwater treatment, cost, and context sensitive

design. NCDOT's Roadway Design Manual states that the primary objective of highway design is to "design a safe, functional, aesthetically appearing facility which is adequate for the design traffic volumes, for the minimum life cycle costs." Although a 70-foot median is the preferred median width for freeway facilities as specified in the Roadway Design Manual, the NCTA has proposed the 50-foot median width for the proposed facility in order to avoid and minimize impacts while maintaining a safe, functional, aesthetically pleasing facility. A 50-foot median allows for drainage and stormwater treatment in the median via grass swales. Grass swales have been proven to filter pollutants as stormwater runoff moves through the vegetation, as well as reducing flow velocities, minimizing concentrated discharges and reducing peak runoff.

As discussed in Section 1.3.4.4 of the Final EIS, an Individual Permit under Section 404 of the Clean Water Act will be required from the US Army Corps of Engineers (USACE) for the Selected Alternative's impacts to Waters of the US, along with an individual Section 401 Water Quality Certification from the NC Division of Water Quality.

As part of the mitigation strategy for the anticipated impacts to Waters of the US, a *Conceptual Mitigation Plan* (PBS&J, June 2010) was prepared for the Preferred Alternative (Final EIS Section 2.5.4.4), and an update to the mitigation plan is summarized in **Section 3.3**. The *Conceptual Mitigation Plan* provides a summary of mitigation requirements and several potential off-site and on-site mitigation components that may ultimately comprise the mitigation package for impacts to Waters of the US.

Off-site mitigation will be provided by the North Carolina Ecosystem Enhancement Program (EEP) in accordance with the 2003 Memorandum of Agreement among the USACE, NCDOT, and NC Department of Environment and Natural Resources (with amendments dated June 2004 and March 2007). A letter documenting EEP's commitment to provide mitigation for this project is included in **Appendix B**. The NCTA and FHWA will work with the environmental resource and regulatory agencies during the permitting phase to further refine the mitigation plan for the project.

PROTECTED SPECIES

The Biological Conclusion for all federally protected species is No Effect for the Selected Alternative. These species include the Carolina heelsplitter (*Lasmigona decorata*) freshwater mussel, Michaux's sumac (*Rhus Michauxii*), smooth coneflower (*Echinacea laevigata*), and Schweinitz's sunflower (*Helianthus schweinitzii*).

5. SECTION 4(f) STATEMENT

The US Department of Transportation's Section 4(f) law (49 USC Section 303 and 23 CFR Part 774) states that federal funds may not be approved for projects that use land from a significant publicly-owned park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless it is determined that: (i) there is no feasible and prudent alternative to the use of land from such properties, and (ii) the action includes all possible planning to minimize harm to the property resulting from such use.

In the Selected Alternative corridor, there are two historic sites eligible for listing in the National Register of Historic Places (JBF Riddle House and Harrison Family Dairy Farm) and one public park, Berewick Regional Park.

As discussed in the Final EIS (Section 2.5.3.3), the Preferred Alternative (now the Selected Alternative) received determinations of No Adverse Effect for the two historic resources. There would be no land required from the JBF Riddle House or the Harrison Family Dairy Farm based on the refined preliminary design for the Selected Alternative. As long as the conditions are met to maintain the No Adverse Effects determinations, there would be no use of these resources and no Section 4(f) evaluation is required. The conditions are specified in Table 2-11 of the Final EIS and in **Section 4.1**.

The refined preliminary design for the Selected Alternative avoids taking right of way from Berewick Regional Park (Section 2.5.3.3 of the Final EIS) and no further action under Section 4(f) is required.

6. PROJECT COMMITMENTS

Project commitments are listed in **Appendix A** (the green sheets).

7. MONITORING AND ENFORCEMENT PROGRAM

Coordination will be maintained with all regulatory and resource agencies during final design, permitting, right-of-way acquisition, and construction to ensure that avoidance, minimization, and compensatory mitigation measures are implemented. The NCTA and FHWA will enforce all pertinent specifications and contract provisions in accordance with the intent of the Final EIS and the welfare of the public. Many of the avoidance, minimization, and compensatory mitigation measures included in this document are likely to be conditions of federal or state permits that are enforceable by regulatory agencies.

8. COMMENTS ON THE FINAL EIS

The Final EIS for the project was approved on December 21, 2010 and circulated to environmental resource and regulatory agencies and the public. Chapter 5 of the Final EIS includes a full list of agencies and organizations that received copies of the document. Comments on the Final EIS were received from federal and state agencies, the Southern Environmental Law Center, and a number of citizens. In addition, local governments and agencies submitted resolutions supporting the project. **Appendix C** includes all comments received and responses to the substantive comments.

The following federal and state resource agencies submitted comments:

- NC Department of Administration
- NC Department of Environment and Natural Resources (NCDENR) State Clearinghouse
- NCDENR Division of Water Quality
- NC Wildlife Resources Commission
- NCDENR Office of Conservation, Planning, and Community Affairs Natural Heritage Program
- NC Department of Cultural Resources, State Historic Preservation Office
- NCDENR Division of Environmental Health
- US Environmental Protection Agency – Region 4

9. CONCLUSION

The environmental record for the Gaston East-West Connector (NC State Transportation Improvement Program Project U-3321, Federal Aid Project STP-1213(6)) includes the previously referenced Draft EIS (April 24, 2009), the Final EIS (December 21, 2010) and supporting project documentation (**Appendix D**). These documents, incorporated here by reference, constitute the statements required by the National Environmental Policy Act and Title 23 of the United States Code (USC).

A Notice of Availability for the Final EIS was published in the Federal Register (Vol. 76, No. 14, p.3884) on January 21, 2011. The Final EIS is in conformance with applicable provisions of 23 CFR 771 and satisfactorily covers the anticipated environmental impacts including human, physical, cultural, and natural effects. Updates documented in this ROD did not result in new or different significant environmental impacts. All correspondence received between the Final EIS and the date this ROD was signed have been reviewed (see **Appendix C** for a copy of the comments on the Final EIS), and based on that review; the Federal Highway Administration finds that there were no new significant issues or impacts identified. Therefore, the Final EIS remains valid.

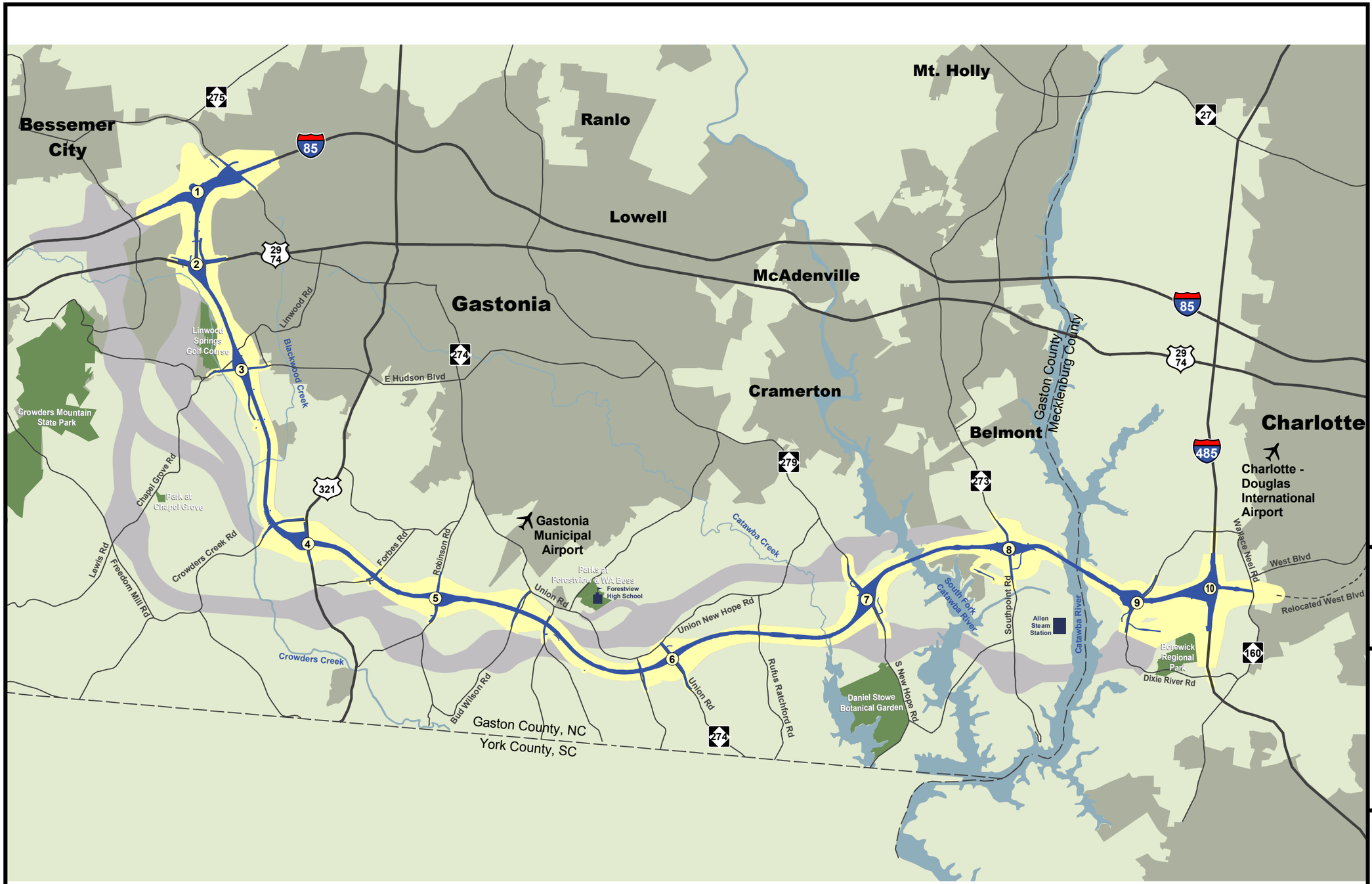
Based on the analysis and evaluation contained in this project's Final EIS and updates included in this ROD, and after careful consideration of all impacts and input from the public involvement process, it is my decision to adopt the Preferred Alternative, Detailed Study Alternative 9, as the proposed action for this project.

John F. Sullivan III

John F. Sullivan III, P.E., Division Administrator
Federal Highway Administration

2/29/2012

Date



POTENTIAL INTERCHANGE LOCATIONS

1. I-85
2. US 29-74
3. Linwood Road
4. US 321
5. Robinson Road
6. NC 274 (Union Road)
7. NC 279 (S. New Hope Rd)
8. NC 273 (Southpoint Road)
9. Dixie River Road
10. I-485

NOTE: PRELIMINARY ALIGNMENTS SUBJECT TO CHANGE

Legend

- Selected Alternative Right of Way
- Selected Alternative Study Corridor
- Other Detailed Study Corridors
- Parks and Recreation Areas
- Municipal Areas
- Rivers and Streams

Source: Gaston County and Mecklenburg County GIS
Map printed January 2011

N

0 0.5 1 Miles

NORTH CAROLINA Turnpike Authority

STIP PROJECT NO. U-3321

Gaston County and Mecklenburg County

RECORD OF DECISION
GASTON EAST-WEST CONNECTOR

SELECTED ALTERNATIVE

Figure 1

ROD_Fig1_SelectedAlternative.ai AKH 01.20.2011

Note: Noise barriers shown on this map are preliminary. The feasibility and reasonableness of potential noise barriers will be reassessed during final design.

BARRIER 1-1
BARRIER 4-1
BARRIER 7-1
BARRIER 12-1&2
BARRIER 17-1
BARRIER 17-2
BARRIER 17-3
BARRIER 17-4

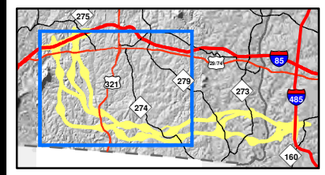
J4A
J4B
J2C
J2D
JX4
J1F
J1E
K1A
H3

Gastonia
Gastonia Municipal Airport
Crowders Creek
Catawba Creek
Robinson Rd
Union Rd
Union New Hope Rd
Bud Wilson Rd
New Haven Dr

Edward D. Sadler Jr.
T. Jeffers Park
Woodhill
York Chester
Pleasant Ridge
Forest Heights
Hunter Huss
Lingerfeldt
Ferguson Park
Gastonia Municipal Golf Course
Linwood Park
Southwest
Davis Park
H.H. Beam
Martha Rivers Park
Robinson
Grier
Sherwood
Holbrook
Gardner Park
Ashbrook
Crowders Mountain Golf Course
Linwood Springs Golf Course
Crowders Mountain State Park
Camp Rotary Girl Scout Camp
Chapel Grove
Gaston Country Club
W.A. Bess Park at W.A. Bess Elementary
Forestview Park at Forestview High School
Carolina Speedway

Legend

- Preliminary Noise Barriers - Reasonable
- Preferred Alternative Refined Centerline
- Segment Breaks
- Selected Alternative Refined DSA Corridor
- West Blvd Realignment (Construction by Others)
- Schools
- County Line
- Buildings
- Streets
- Hydrology
- Parks
- Private Recreation Facilities and Attractions
- K3A Segment Name



Source: Gaston County and Mecklenburg County
Map printed June 2011

N

0 0.375 0.75
Miles

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STIP PROJECT NO. U-3321

Gaston County and Mecklenburg County

GASTON EAST-WEST CONNECTOR

SELECTED ALTERNATIVE PRELIMINARY NOISE BARRIERS

Figure 2a

ROD_Fig2_SelAltPrelimNoiseBarriers.mxd AKH 06.23.2011

Note: Noise barriers shown on this map are preliminary. The feasibility and reasonableness of potential noise barriers will be reassessed during final design.

McAdenville

Cramerton

Belmont

CHARLOTTE-DOUGLAS INTERNATIONAL AIRPORT

BARRIER 29-1

BARRIER 29-2

K1A

J1F

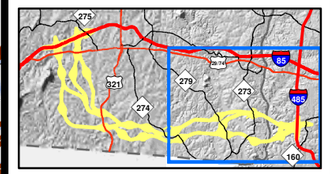
K3A

K3B

K3C

Legend

- Preliminary Noise Barriers - Reasonable
- Preferred Alternative Refined Centerline
- Segment Breaks
- Selected Alternative Refined DSA Corridor
- West Blvd Realignment (Construction by Others)
- Schools
- County Line
- Buildings
- Streets
- Hydrology
- Parks
- Private Recreation Facilities and Attractions
- K3A Segment Name



Source: Gaston County and Mecklenburg County
Map printed June 2011

N

0 0.375 0.75
Miles

NORTH CAROLINA Turnpike Authority

STIP PROJECT NO. U-3321

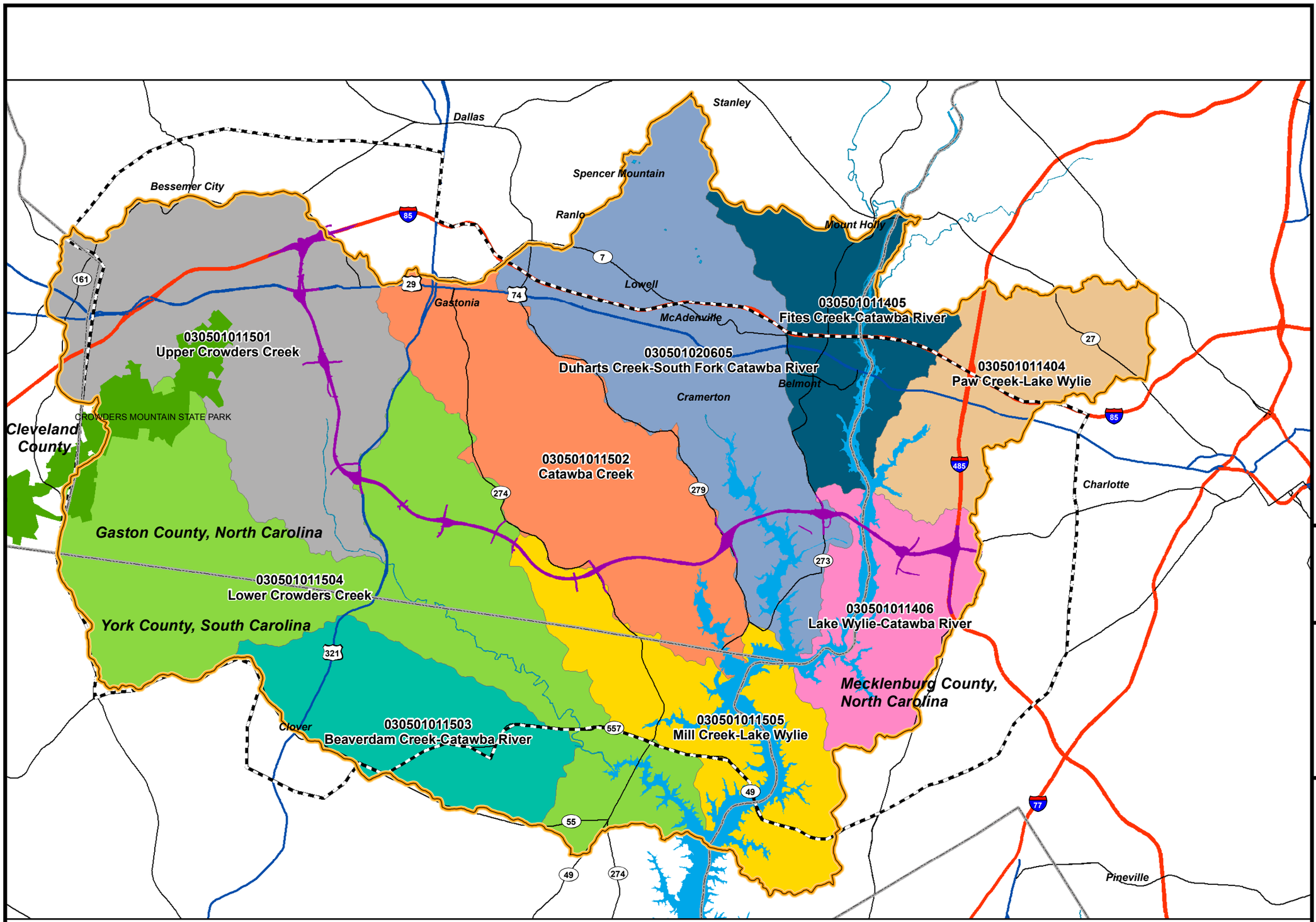
Gaston County and Mecklenburg County

GASTON EAST-WEST CONNECTOR

SELECTED ALTERNATIVE PRELIMINARY NOISE BARRIERS

Figure 2b

ROD_Fig2_SelAltPrelimNoiseBarriers.mxd AKH 06.23.2011



NOTE: PRELIMINARY ALIGNMENTS SUBJECT TO CHANGE

ROD_Fig3_ICEStudyArea.ai ARH 08.17.2011 (Orig from Louis Berger)

Legend

- 2011 Quantitative ICE Study Area Boundary
- 2009 Qualitative ICE Study Area
- Selected Alternative

Study Area HUC 12 Subwatersheds

- Beaverdam Creek-Catawba River
- Catawba Creek
- Duharts Creek- South Fork Catawba River
- Lake Wylie-Catawba River
- Lower Crowders Creek
- Mill Creek- Lake Wylie
- Paw Creek- Lake Wylie
- Upper Crowders Creek
- Fites Creek-Catawba River

Source: Gaston East-West Connector Revised Final Quantitative Indirect and Cumulative Effects Analysis, Louis Berger Group, July 2011

N

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NORTH CAROLINA Turnpike Authority

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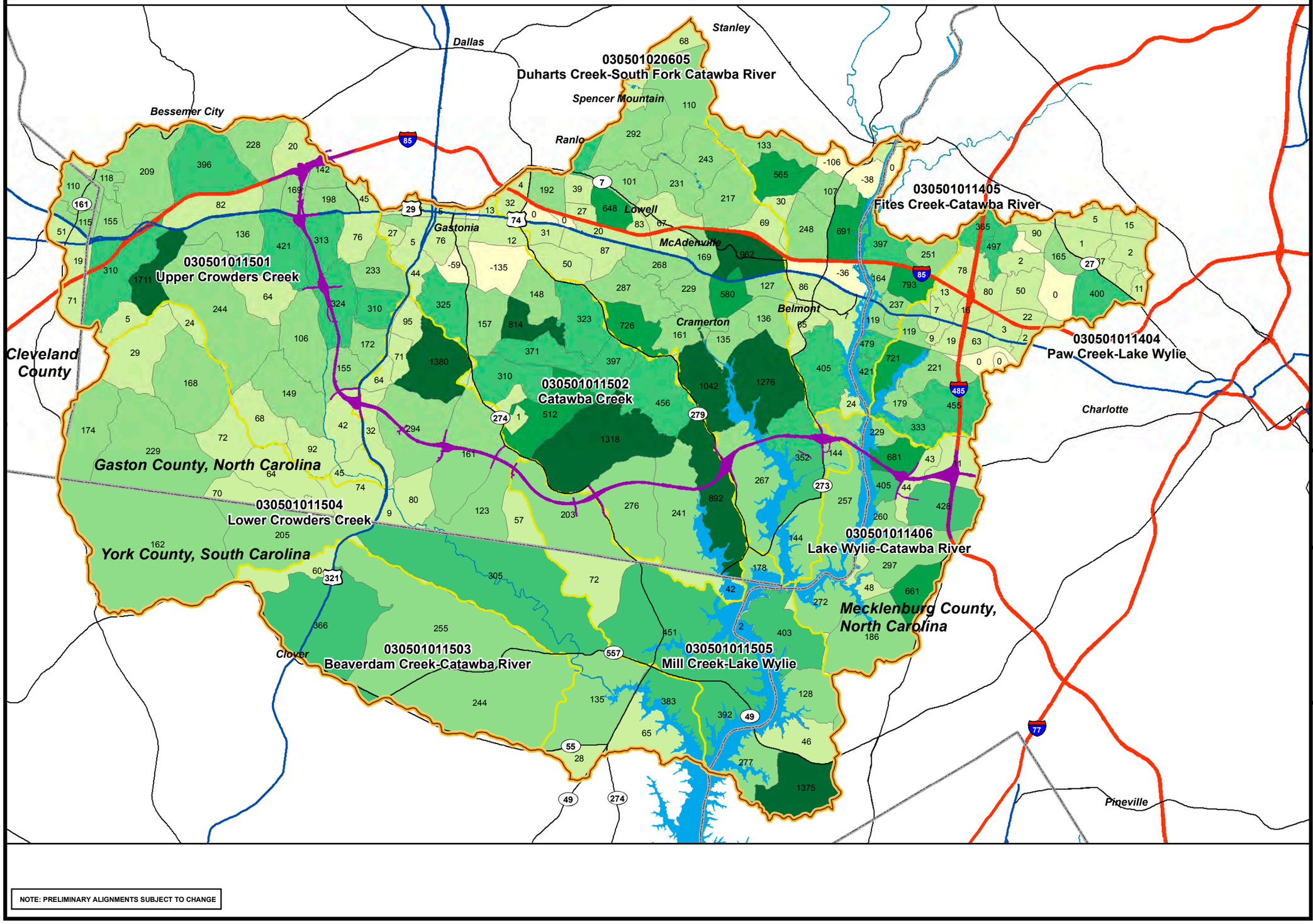
Gaston County and Mecklenburg County

RECORD OF DECISION GASTON EAST-WEST CONNECTOR

ICE STUDY AREA

Figure 3



Legend

- 2011 Quantitative ICE Study Area Boundary
- Study Area HUC 12 Subwatersheds
- Selected Alternative

Absolute Change in Households 2005 to 2035

- -135 to 0
- 1 to 100
- 101 to 300
- 301 to 500
- 501 to 800
- 801 to 1,711

Source: Gaston East-West Connector Revised Final Quantitative Indirect and Cumulative Effects Analysis, Louis Berger Group, July 2011

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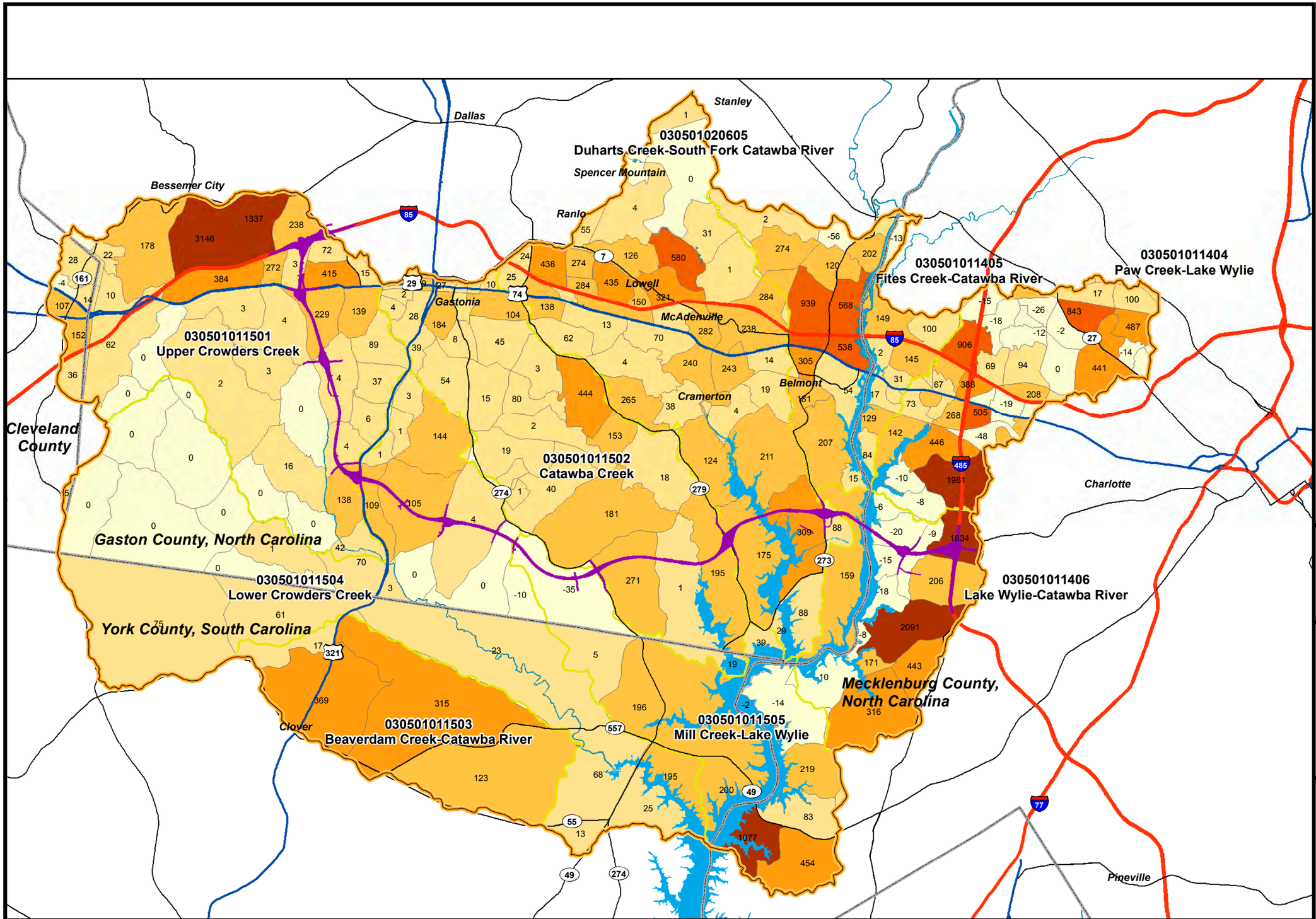
Gaston County and Mecklenburg County

RECORD OF DECISION
GASTON EAST-WEST CONNECTOR

ABSOLUTE CHANGE IN HOUSEHOLDS 2005-2035 NO-BUILD COMPARISON

Figure 4

ROD_Fig4_AbsoluteChangeHouseholds2005-2035NoBuildComp.ai AKH 08.17.2011 (Orig from Louis Berger)



Legend

- 2011 Quantitative ICE Study Area Boundary
- Study Area HUC 12 Subwatersheds
- Selected Alternative

Absolute Change in Employment 2005 to 2035

- -48 to 0
- 1 to 100
- 101 to 300
- 301 to 500
- 501 to 1,000
- 1,001 to 3,146

Source: Gaston East-West Connector Revised Final Quantitative Indirect and Cumulative Effects Analysis, Louis Berger Group, July 2011

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NORTH CAROLINA Turnpike Authority

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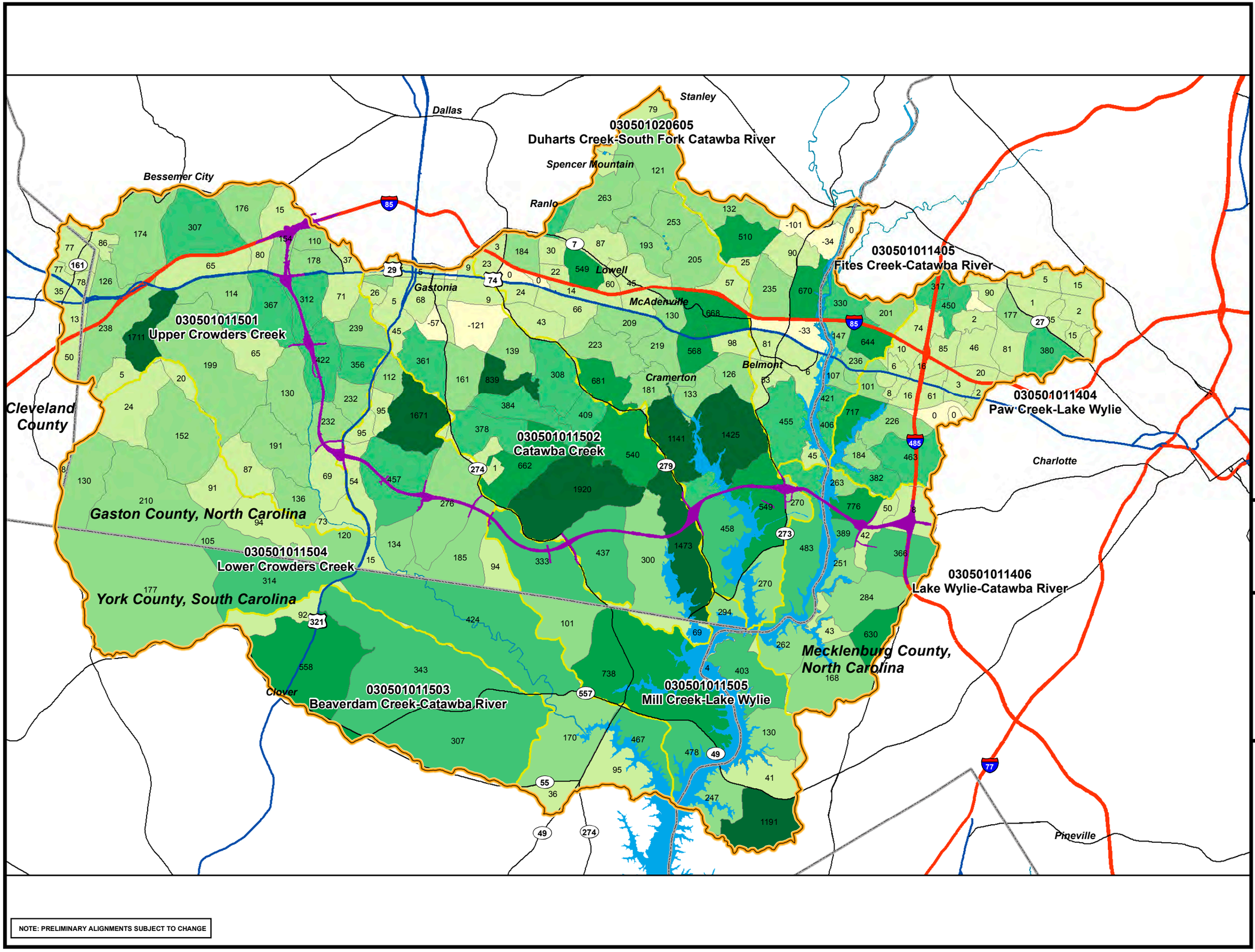
Gaston County and Mecklenburg County

RECORD OF DECISION
GASTON EAST-WEST CONNECTOR

ABSOLUTE CHANGE IN EMPLOYMENT 2005-2035 NO-BUILD COMPARISON

Figure 5

ROD_Fig5_AbsoluteChangeEmployment2005-2035NoBuildComp.ai AKH 08.17.2011 (Orig from Louis Berger)



Legend

- 2011 Quantitative ICE Study Area Boundary
- Study Area HUC 12 Subwatersheds
- Selected Alternative

Absolute Change in Households 2005 to 2035

- -121 to 0
- 1 to 100
- 101 to 300
- 301 to 500
- 501 to 800
- 801 to 1,920

Source: Gaston East-West Connector Revised Final Quantitative Indirect and Cumulative Effects Analysis, Louis Berger Group, July 2011

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NORTH CAROLINA Turnpike Authority

STIP PROJECT NO. U-3321

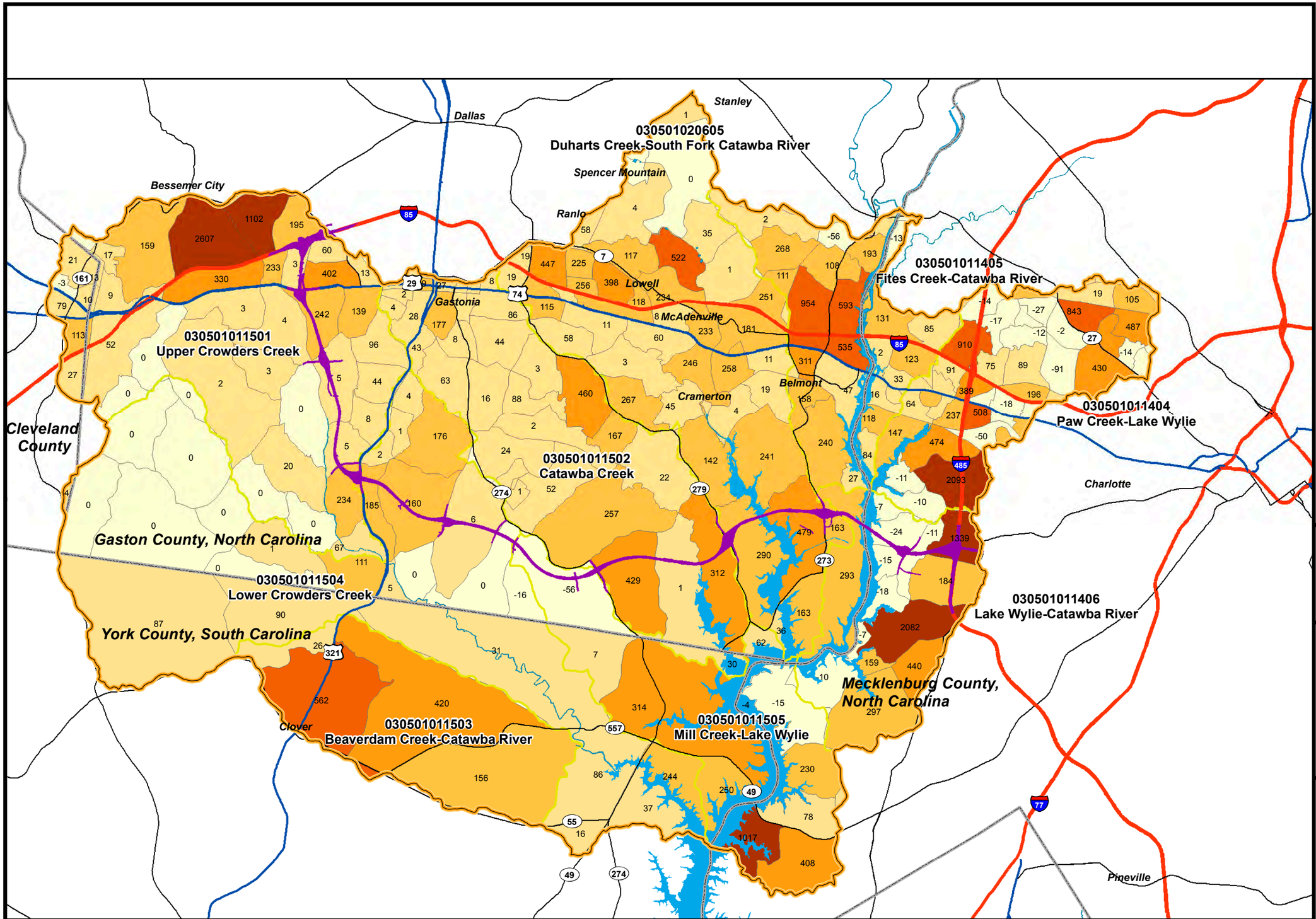
Gaston County and Mecklenburg County

RECORD OF DECISION
GASTON EAST-WEST CONNECTOR

ABSOLUTE CHANGE IN HOUSEHOLDS 2005-2035 BUILD COMPARISON

Figure 6

ROD_Fig6_AbsoluteChangeHouseholds2005-2035BuildComp.ai AKH 08.17.2011 (Orig from Louis Berger)



Legend

- 2011 Quantitative ICE Study Area Boundary
- Study Area HUC 12 Subwatersheds
- Selected Alternative

Absolute Change in Employment 2005 to 2035

- -91 to 0
- 1 to 100
- 101 to 300
- 301 to 500
- 501 to 1,000
- 1,001 to 2,607

Source: Gaston East-West Connector Revised Final Quantitative Indirect and Cumulative Effects Analysis, Louis Berger Group, July 2011

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NORTH CAROLINA Turnpike Authority

STIP PROJECT NO. U-3321

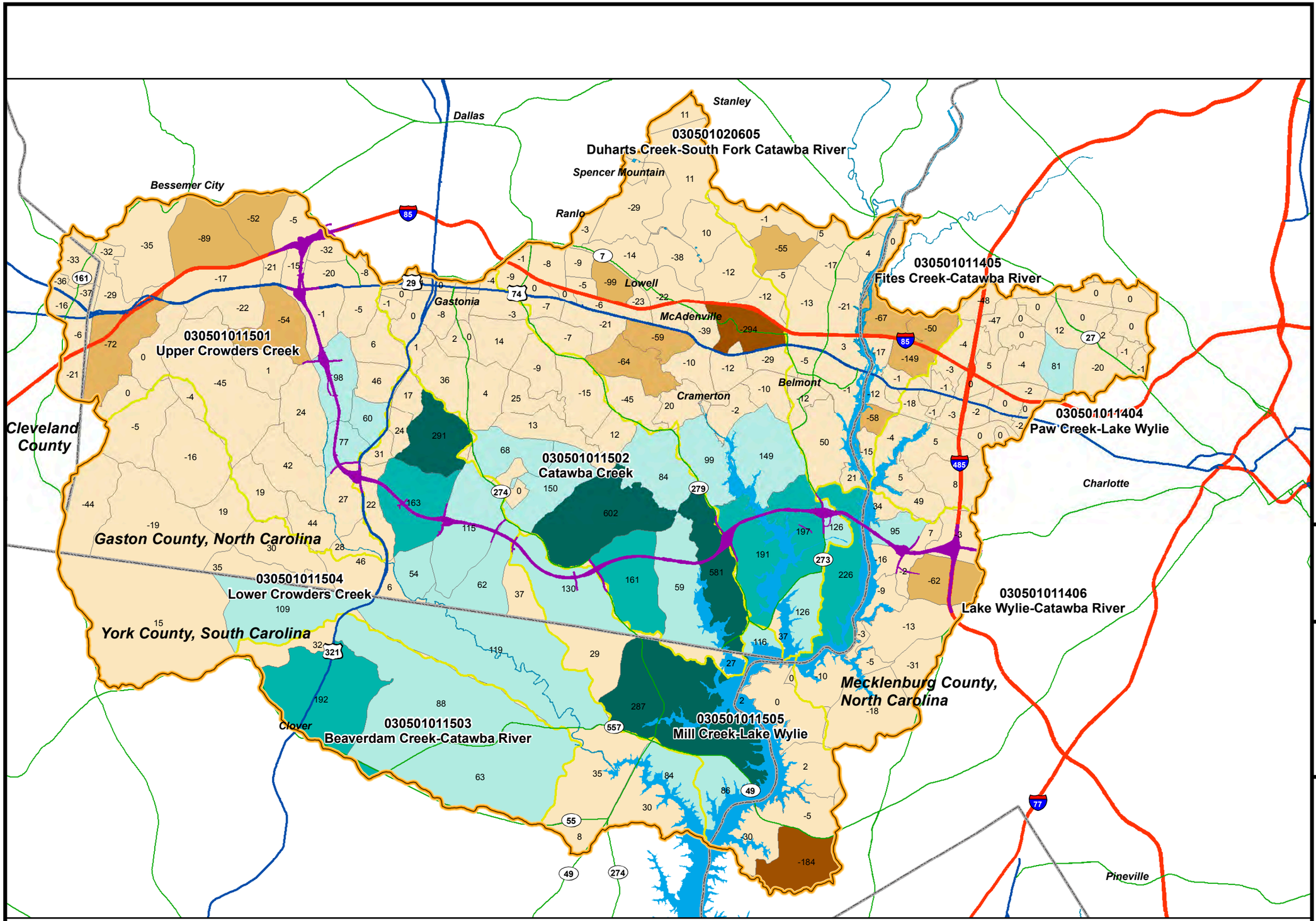
Gaston County and Mecklenburg County

RECORD OF DECISION
GASTON EAST-WEST CONNECTOR

ABSOLUTE CHANGE IN EMPLOYMENT 2005-2035 BUILD COMPARISON

Figure 7

ROD_Fig7_AbsoluteChangeEmployment2005-2035BuildComp.ai AKH 08.17.2011 (Orig from Louis Berger)



Legend

- 2011 Quantitative ICE Study Area Boundary
- Study Area HUC 12 Subwatersheds
- Selected Alternative

Absolute Change in Households No Build to Build

- -294 to -150
- -149 to -50
- -49 to 50
- 51 to 150
- 151 to 250
- 251 to 602

Source: Gaston East-West Connector Revised Final Quantitative Indirect and Cumulative Effects Analysis, Louis Berger Group, July 2011

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NORTH CAROLINA Turnpike Authority

STIP PROJECT NO. U-3321

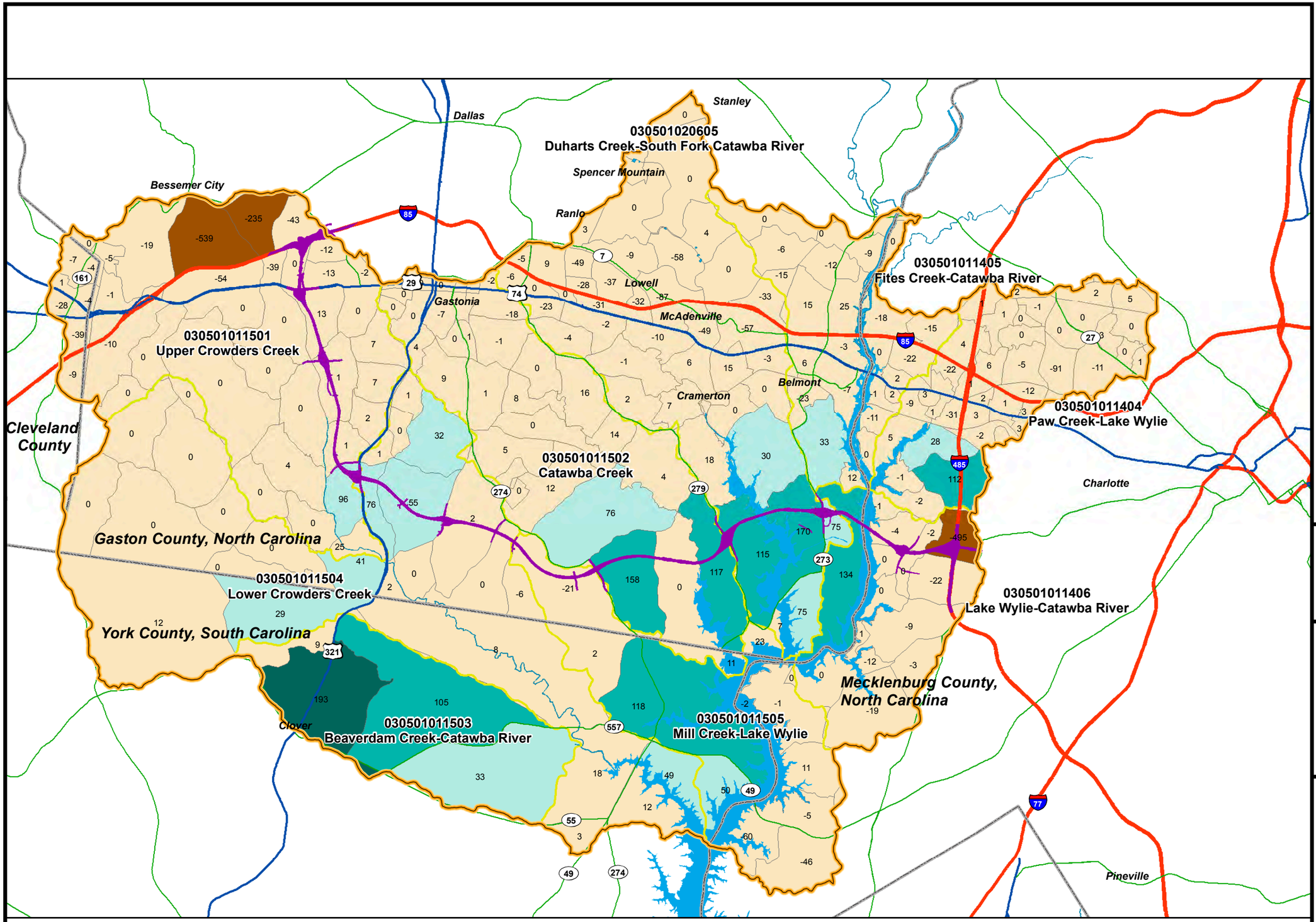
Gaston County and Mecklenburg County

RECORD OF DECISION GASTON EAST-WEST CONNECTOR

ABSOLUTE CHANGE IN HOUSEHOLDS 2035 NO-BUILD TO BUILD

Figure 8

ROD_Fig8_AbsoluteChangeHouseholds2035NoBuildToBuild.ai AKH 08.17.2011 (Orig from Louis Berger)



Legend

- 2011 Quantitative ICE Study Area Boundary
- Study Area HUC 12 Subwatersheds
- Selected Alternative

Absolute Change in Households No Build to Build

- -539 to -225
- -224 to -125
- -124 to -25
- 26 to 100
- 101 to 175
- 176 to 193

Source: Gaston East-West Connector Revised Final Quantitative Indirect and Cumulative Effects Analysis, Louis Berger Group, July 2011

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NORTH CAROLINA Turnpike Authority

STIP PROJECT NO. U-3321

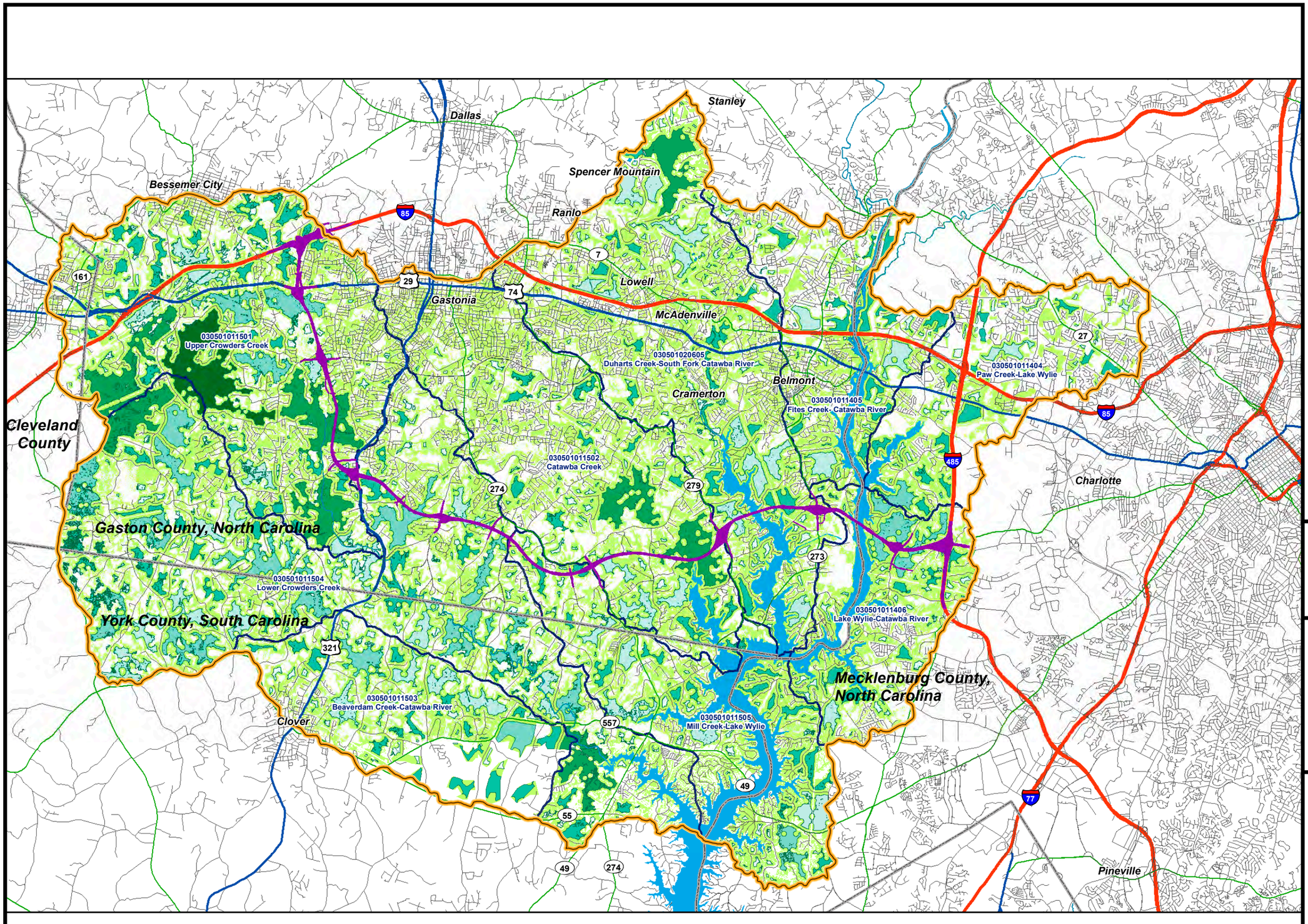
Gaston County and Mecklenburg County

RECORD OF DECISION GASTON EAST-WEST CONNECTOR

ABSOLUTE CHANGE IN EMPLOYMENT 2035 NO-BUILD TO BUILD

Figure 9

ROD_Fig9_AbsoluteChangeEmployment2035NoBuildToBuild.ai AKH 08.17.2011 (Orig from Louis Berger)



NOTE: PRELIMINARY ALIGNMENTS SUBJECT TO CHANGE

ROD_Fig10_TreeCover&ForestInteriorPatches.ai AKH 08.17.2011 (Orig from Louis Berger)

Legend

- 2011 Quantitative ICE Study Area Boundary
- Study Area HUC 12 Subwatersheds
- Selected Alternative
- 2007 Tree Cover

Forest Interior Habitat (Greater than 300 feet from edges)

- 1 to 20
- 21 to 100
- 101 to 200
- 201 to 500
- 501 to 1,000
- Greater than 1,000

Source: Gaston East-West Connector Revised Final Quantitative Indirect and Cumulative Effects Analysis, Louis Berger Group, July 2011

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STIP PROJECT NO. U-3321

Gaston County and Mecklenburg County

RECORD OF DECISION GASTON EAST-WEST CONNECTOR

TREE COVER AND FOREST INTERIOR PATCHES

Figure 10