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VIA E-MAIL AND FEDEX

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RE: Mid-Currituck Bridge NEPA Review

Dear Mr. Werner and Mr. Sullivan:

On behalf of No MCB-Concerned Citizens and Visitors Opposed to the Mid-Currituck Bridge and the North Carolina Wildlife Federation, the Southern Environmental Law Center (“SELC”) submits the attached comments requesting that the North Carolina Department of Transportation (“NCDOT”) and the Federal Highway Administration (“FHWA”) (collectively, the “Transportation Agencies”) prepare a Supplemental Environmental Impact Statement (“Supplemental EIS”) pursuant to the National Environmental Policy Act (“NEPA”) for the Mid-Currituck Bridge (the “Bridge”).

More than seven years have passed since the Transportation Agencies completed the Final Environmental Impact Statement (“FEIS”) for the Bridge in January 2012 and much has changed in the meantime. In December 21, 2016, comments on the draft reevaluation of the FEIS (the “Draft Reevaluation”), we reviewed new information and changed circumstances that had developed as of that date. We will not recapitulate that discussion in this letter, but it is incorporated by reference and included as Attachment 1.

The purpose of this letter is twofold. First, we highlight the significant amount of new information and changed circumstances that are included in the private “reevaluation” and not presented to the public, and necessitate the preparation of a Supplemental EIS with full public disclosure and opportunity for comment.

Second, having now seen the contents of the Reevaluation and the Record of Decision (“ROD”) published on March 8, 2019, we highlight additional significant information that has not yet been considered by the Transportation Agencies. Many changes have occurred since the FEIS was published in 2012 (which relied on studies and data from even earlier) that demand publication of a Supplemental EIS. New, dire climate change predictions anticipate accelerating sea level rise and intensifying severe weather events and call into question the wisdom of spending hundreds of millions of tax-payer dollars on a project that will spur development in the low-lying Outer Banks, place more North Carolinians in the path of hurricanes, flooding, and rising seas, and interfere with our State’s ability to manage sustainable coastal retreat.

Governor Cooper’s recent Executive Order 80 mandates that NCDOT consider climate change in evaluating the Bridge and alternative concepts, but NCDOT has not done so. This failure affects not only the environmental analysis, but the financial feasibility of the project. Fundamental assumptions underlying NCDOT’s previous traffic and revenue studies and basic financial plans are rendered implausible due to the combined effects of sea level rise and subsidence in the Outer Banks. The Transportation Agencies’ attempt to push forward with the expensive Bridge in reliance on outdated data and assumptions, and in direct contravention of Executive Order 80, is both illegal and bad public policy.

I. CHANGED CIRCUMSTANCES REQUIRE A SUPPLEMENTAL EIS

NEPA requires agencies to take a hard look at the environmental consequences of their proposed projects even after an EIS has been prepared. *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 374 (1989). NEPA requires preparation of a Supplemental EIS when “(1) [c]hanges to the proposed action would result in significant environmental impacts that were not evaluated in the EIS;” or when “(2) [n]ew information or circumstances relevant to environmental concerns and bearing on the proposed action or its impacts would result in significant environmental impacts not evaluated in the EIS.” 40 C.F.R. § 1502.9(c)(1). When new information creates a “seriously different picture of the project from what was previously envisioned” a Supplemental EIS is required to allow the public and other government agencies time to react and comment. *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 443 (4th Cir. 1996) (quoting *Hickory Neighborhood Defense League v. Skinner*, 893 F.2d 58, 63 (4th Cir. 1990); *Fayetteville Area Chamber of Commerce v. Volpe*, 515 F.2d 1021, 1026 (4th Cir. 1975).

The Transportation Agencies’ failure to consider less expensive and less destructive alternatives, especially in light of recent data on climate change and sea level rise, new state policies that prioritize resiliency and climate adaptation, and updated traffic forecasts and demographic realities, demands the publication of a Supplemental EIS. *See Louisiana Wildlife Federation, Inc. v. York*, 761 F.2d 1044 (5th Cir 2009) (holding that a significant change to the assumption of baseline conditions “present[ed] a seriously different picture of the environmental impact of the proposed project from what was previously envisioned, it [wa]s significant new information and [wa]s sufficient to require an agency to supplement an original EIS”).

II. THE PUBLIC MUST HAVE AN OPPORTUNITY TO REVIEW AND COMMENT ON CHANGED CIRCUMSTANCES DOCUMENTED IN THE ROD, REEVALUATION, AND REEVALUATION STUDY REPORT

The Transportation Agencies have not issued any public documentation reviewing the proposed Bridge since the 2012 FEIS. The ROD, Reevaluation of the Environmental Impact Study Report (“Reevaluation Study Report”) and Final Reevaluation of the Final Environmental Impact Statement (“Reevaluation”), issued seven years later, contain a multitude of new information that has never been made available to the public for review and comment as required by NEPA. NEPA “require[s] ... agencies to take a hard look at environmental consequences of a proposed action and to provide for broad dissemination of relevant environmental information.” *N.C. Wildlife Federation v. NCDOT*, 677 F.3d 596, 601 (4th Cir. 2012) (quoting *Robertson v. Method Valley Citizens Council*, 490 U.S. 332, 350 (1989) (quotation marks and citation omitted)). The broad dissemination of information mandated by NEPA is intended to allow the public to react to the effects of a proposed action at a meaningful time. *Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 371 (1989).

Each of the changes enumerated below standing alone would create a “seriously different picture of the project from what was previously envisioned[.]” *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d at 443, and therefore must be carefully considered in the context of a public NEPA-mandated alternatives analysis. *See, e.g., id.* (“[w]ithout [accurate baseline] data, an agency cannot carefully consider information about significant environment impacts . . . resulting in an arbitrary and capricious decision.”) (quoting *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1085 (9th Cir. 2011)). Together, these changes establish an overwhelming need for a Supplemental EIS. To comply with NEPA, the Transportation Agencies must prepare and make available to the public a Supplemental EIS that addresses each of the new developments.

A. Changes to Cost

The ROD notes several changes to the design and cost of the Selected Alternative and ER2 which the public should have the opportunity to review and comment on. The FEIS estimated that the Selected Alternative would cost \$502.4-\$594.1 million, but the ROD estimates that the Selected Alternative would cost \$429.1 to \$605.4 million.¹ In contrast, ER2, which the FEIS estimated would cost \$416.1 to \$523.4 million is now estimated at just \$277.9 to \$288.1 million.² The cost of the Selected Alternative has only become less certain since 2012, while the cost of ER2 has significantly declined and become more certain. The public must have an opportunity to consider and comment on these new cost estimates, which demonstrate that ER2 is far less costly and more economically feasible than the proposed Bridge.

These public changes in costs alone demand a Supplemental EIS and an informed public discussion about the merits of each alternative. That is exactly what NEPA is all about.

¹ Reevaluation Study Report at 1-15.

² *Id.*

B. Changes to Environmental Impacts

The Reevaluation Study Report also indicates that the environmental impacts associated with ER2 have decreased significantly—impervious surface decreased from 89 to 33.7 acres, wetlands impacts decreased from 12.6 acres to 8.5 acres, and noise sensitive receptors decreased from 157 to 65.³ Some of the environmental impacts associated with the proposed Bridge also decreased, but not nearly as significantly, and wetland clearing actually increased from 25.5 to 32.9 acres.⁴

There have also been some changes to existing environmental features which may influence the project and its impacts. For example, the Re-Evaluation Study Report observes that “the eastern shoreline of Currituck Sound within the impact area. . . has eroded in some places (approximately 45 feet in one spot south of the bridge terminus.”⁵ The Agencies’ only analysis of this dramatic change is that “impact to Currituck Sound water habitat has increased marginally.”⁶ Similarly, in the FEIS, NCDOT had proposed to use the Balance Farm Wetlands Mitigation Site to mitigate wetland impacts from the bridge, but this site no longer has relevant credits available.⁷

The combination of ER2’s drastic reduction in environmental impacts and the lower reductions associated with the Selected Alternatives triggers the need for a Supplemental EIS.

C. Newly Protected Species and Habitat

Much has also changed with regard to species listed as threatened or endangered under the Endangered Species Act. First, critical habitat was designated for two species previously considered in the Transportation Agencies’ consultation processes—the loggerhead sea turtle and the Atlantic sturgeon. *See Critical Habitat for the Northwest Atlantic Ocean Loggerhead Sea Turtle Distinct Population Segment*, 79 Fed. Reg. 39,856 (July 10, 2014); *Designation of Critical Habitat for the Endangered Distinct Population Segments of Atlantic Sturgeon*, 82 Fed. Reg. 39160, (Aug. 17, 2017) Second, both the rufa red knot and the northern long-eared bat have been listed as threatened since the FEIS was published. *See Threatened Species Status for the Rufa Red Knot*, 79 Fed. Reg. 73,706 (Dec. 11, 2014); *4(d) Rule for the Northern Long-Eared Bat*, 81 Fed. Reg. 1,900 (Jan. 14, 2016)

While NCDOT states it completed informal consultation on the rufa red knot, the only evidence of that consultation is a two-page, June 2015 letter from the U.S. Fish and Wildlife Service buried in an appendix to the Reevaluation Study Report.⁸ The letter concurs with

³ *Id.* at 1-22-23.

⁴ *Id.* at 1-22. Impervious surfaces for the Selected Alternative decreased from 71.5 acres to 64.3 acres, acres of wetlands decreased from 8.3 to 4.2 acres.

⁵ *Id.* at 4-20.

⁶ *Id.*

⁷ *Id.* at 4-28.

⁸ Reevaluation Study Report Appendix A, A-2 – A-3.

NCDOT's findings about the rufa red knot as conveyed in a memorandum to the Service, but that memorandum is not included in any of the re-evaluation or ROD materials. Moreover, none of these steps were taken in public with opportunity for comment prior to a final decision as NEPA requires. As for the northern long-eared bat, that same Service letter points to a 2015 programmatic biological opinion as satisfying consultation requirements, however, that letter explicitly states that the biological opinion expires May 3, 2020—well before the proposed bridge is scheduled to be constructed. Further, it appears that since the Service's 2015 letter, the programmatic biological opinion was revised in 2018 after the 4(d) rule for the species was finalized. Additionally, an April 12, 2016 U.S. Fish and Wildlife Service map shows that the bridge project area contains known northern long-eared bat winter roost trees, and directs agencies that “[i]f your project falls within the red areas identified in CURRITUCK County, please contact the USFWS Raleigh Field Office.”⁹

Moreover, the Transportation Agencies should have considered new information about accelerating sea level rise, as discussed in detail below, and its impacts on the listed species in relation to the proposed bridge. For example, while the Bridge may not have negative impacts on listed species under *current* conditions, in a few decades the circumstances may be different with rising seas and migrating marshes. All of this information about newly listed species and newly designated critical habitat, as well as other wildlife impacts, should have been provided for public review in a Supplemental EIS.

D. Updated Traffic Forecasts

The ROD reveals that the Transportation Agencies have “reconsidered development and traffic growth assumptions used in the FEIS traffic forecasts[,]” and used these new forecasts to compare the No-Build Alternative and ER2 to the Selected Alternative.¹⁰ The new traffic study determined that the design year (2040) traffic forecasts are *significantly lower* than the design year (2035) forecasts used in defining the Selected Alternative in the FEIS.¹¹ Rather than present this new information to the public, the Transportation Agencies unilaterally determined that “the lower forecasts allow the travel benefits offered by the Selected Alternative to be achieved with fewer improvements,”¹² and revised the Selected Alternative and ER2 without providing any opportunity for public input or participation in that conclusion.¹³

The ROD and Reevaluation Study Report rely on new traffic forecasts to compare the Selected Alternative to a No-Build Scenario and ER2.¹⁴ The new traffic forecasts reveal that the FEIS substantially overestimated future vehicle traffic and therefore misrepresented one of the

⁹ See U.S. FISH & WILDLIFE SERV., Map, Northern Long-Eared Bat Consultation Areas: Currituck County (Apr. 12, 2016), Attachment 2.

¹⁰ ROD at 7.

¹¹ Reevaluation Study Report at 1-6.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*; ROD at 7.

Transportation Agencies' main justifications for selecting the proposed Bridge.¹⁵ For example, the FEIS forecast predicted that in 2035 annual average daily traffic on the proposed Bridge would be 12,600 vehicles.¹⁶ The updated forecast projects that by 2040, the new design year, annual average daily traffic on the proposed Bridge would be only 7,700 vehicles.¹⁷ In other words, the annual average daily traffic on the proposed Bridge has decreased by 39% percent from the FEIS traffic forecast.¹⁸

Similarly, the FEIS forecast projected that in 2035 the average daily summer weekday traffic on the Bridge would reach 14,500 vehicles, but the updated forecast reduces that number to 8,600 vehicles.¹⁹ This constitutes a 41% reduction in the summer weekday traffic forecast. The Transportation Agencies failed to reveal this new traffic study to the public prior to issuing the ROD, and have therefore failed to give the public the opportunity to comment on a major change in the traffic forecasts that have formed the core of the Transportation Agencies' conclusion that the proposed Bridge is necessary to meet the purpose and need of the project. This violates NEPA.

E. Updated Hurricane Evacuation Modeling

The Reevaluation Study Report also notes several changes related to hurricane clearance times since the 2012 FEIS.²⁰ Most significantly, the National Hurricane Center has changed its warning and watch timeframes in advance of tropical systems from 24 and 36 hours, respectively, to 36 and 48 hours, respectively.²¹ The hurricane clearance modeling in the FEIS was based on an 18-hour goal set by the North Carolina General Assembly. The Reevaluation considers a 30-hour (36 hours minus 6 hours of pre-hazard time) goal as well as the 18-hour goal.²² The FEIS projected that in 2035 both the Selected Alternative and ER2 would achieve hurricane clearance within 27 hours with a US 158 reversed center turn lane and 22 hours if a third outbound lane was added to US 158. The Reevaluation Study Report goes on to project that in 2040 *ER2 would outperform the Selected Alternative in achieving hurricane clearance times.*²³ The table below illustrates the Transportation Agencies' new findings regarding hurricane clearance times for each alternative:

¹⁵ Reevaluation Study Report at 2-10 – 2-14.

¹⁶ *Id.* at 12-11.

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ *Id.* at 2-16.

²¹ *Id.* at 2-17.

²² *Id.* at 3-8.

²³ *Id.* at 3-13 tbl. 3-6, 3-14 tbl. 3-7; 3-30 – 3-32.

Fig. 1: Comparison of FEIS Hurricane Clearance Estimates and Reevaluation Hurricane Clearance Estimates

	2040 Forecast with constrained development (VA border open)	2040 Forecast with unconstrained development (VA border open)	2040 Forecast with constrained development (VA border closed)	2040 Forecast with unconstrained development (VA border closed)
No-Build Alternative	34.4	37.2	40.3	43.2
ER2	30.7	32.3	41.1	43.2
Selected Alternative (Mid-Currituck Bridge)	32.3	32.3	43.2	43.2

²⁴ The Transportation Agencies obfuscate the fact that ER2 outperforms the Selected Alternative, stating that “either ER2 or the Selected Alternative would substantially improve clearance times.”²⁵ A draft version of the Reevaluation Study Report was more candid, stating that “ER2 would result in lower clearance time than the Preferred Alternative [.]”²⁶ This statement is not present in the final version of the Report.

In sum, despite relying heavily on the hurricane clearance times in the FEIS to support its selection of the Selected Alternative, the Transportation Agencies are now ignoring the fact that updated hurricane clearance models favor selection of ER2. Worse, the Transportation Agencies have not provided the public with any opportunity to review or comment on these very significant changes and continue to perpetuate the myth that a Bridge is the sole means by which to safely evacuate the Outer Banks during a hurricane.²⁷ In fact, they appear to be purposefully

²⁴ *Id.* 3-13 tbl. 3-6, 3-14 tbl. 3-7; 3-30 – 3-32.

²⁵ *Id.* 3-32. The Reevaluation Study Report also concludes that by reversing the center turn lane of US 158 further reductions in clearance time could be achieved for both the Selected Alternative and ER2 (29.1 hours for the Selected Alternative and 28.9 hours or 29.9 hours for ER2 respectively), but goes on to state that reversing the center turn lane is only practical for the Selected Alternative based on the number of miles of center turn lane that would need to be reversed. NCDOT does not explain why reversing the center turn lane for 5 miles is practical but 27 miles is not.

²⁶ Draft FEIS Reevaluation Study Report at 3-40 (Jan. 29, 2018), Attachment 3.

²⁷ See Mid-Currituck Bridge: NCDOT and Turnpike Authority obtain federal approval, *The Coastland Times* (Mar. 10, 2019) <https://www.thecoastlandtimes.com/2019/03/10/mid-currituck-bridge-ncdot-and-turnpike-authority-obtain-federal-approval/>, Attachment 4.

obscuring the truth. These fundamental changes, which call into question the need for the proposed Bridge and undermine the Transportation Agencies' assertion that the Selected Alternative most closely fits the stated purpose and need, must be made available to the public through the preparation of a Supplemental EIS.

F. Decreasing Rates of Development

The Reevaluation Study Report acknowledges that multiple indicators of growth and development have slowed since the FEIS was issued in 2012.²⁸ To account for these changes, the Agencies have developed updated traffic forecasts based on updated data regarding development and traffic growth.²⁹ The Reevaluation Study Report also notes several other developments since the FEIS that could impact growth rates, including the repeal of local ordinances limiting the number of bedrooms in a house.³⁰

Through public records requests, SELC obtained access to internal memoranda drafted by NCDOT contractors that reveal that there has been a significant slow-down in growth rates in the project area since the Bridge project was originally conceived.³¹ The overall annual increase in housing units fell to 0.82 percent per year from 2007 to 2014 compared to a rate of 1.41 percent per year from 2001 to 2007.³² This data corresponds to almost a 100% reduction in development during the last seven years. Though the Reevaluation Report acknowledges that the project area is experiencing slower growth rates in terms of development than assumed in previous forecasts, the specific findings from this memorandum do not appear in the ROD or Reevaluation Report.³³ More troubling, a draft of the Reevaluation Study Report reveals that NCDOT made edits to obscure the plain truth and present the data in a way that promoted the Preferred Alternative.³⁴

None of this information has been made available to the public prior to a final decision about the Bridge.

²⁸ Reevaluation Study Report 2-10.

²⁹ *Id.*

³⁰ *Id.* 4-53.

³¹ Memorandum from Mike Surasky, PE, PTOE and John Page, CEP, AICP, Potential Traffic Capacity Constraints on Development to Support Updated Indirect and Cumulative Effects (ICE) Analysis for the R-2576 Mid-Currituck Bridge Final Environmental Impact Statement (FEIS) at 2, (June 20, 2018) (hereinafter "June 2018 Traffic Memo"), Attachment 5.

³² *Id.*

³³ Reevaluation Study Report 2-7.

³⁴ Draft Reevaluation Study Report at 3-19, (Nov. 13, 2017), Comment from JHarris 12/5/2017 11:55:30 AM. ("Keep in mind that we do not need full development to for the Preferred Alternative to look better in terms of congested VMT than the other alternatives."), Attachment 6.

G. Redefined Alternatives

The Transportation Agencies failed to give the public an opportunity to review and comment on the redefinition of the different alternatives.

The No-Build Alternative was redefined based on new projects scheduled in the 2018-2027 STIP which will implicate background traffic conditions.³⁵ Since these new transportation projects are likely to intensify cumulative impacts associated with the proposed Bridge, the change requires the preparation of a Supplemental EIS. Likewise, inclusion of the H20BX waterpark and other recent developments in Currituck County in the Reevaluation Report should have been subject to public review and comment.³⁶

The designs for the proposed Bridge and ER2 have also been redefined. The Selected Alternative differs from the FEIS design in several ways: (1) the interchange between US 158 and the mainland approach road has been revised to eliminate the need for a median acceleration lane at US 158, (2) most of the improvements to NC 12 south of the Outer Banks bridge terminus were eliminated, (3) a mainland bridge approach road over Maple Swamp has been added, and (4) the toll bridge would use 8-foot shoulders instead of 10-foot shoulders.³⁷ Redefined ER differs from the FEIS design ER2 in that (1) there are fewer proposed improvements on NC 12, (2) the US 158 and NC 12 interchange has been revised, (3) US 158 between Wright Memorial Bridge and Grissom Street east has been widened to a six-lane superstreet, (4) a third outbound evacuation lane on 158 between NC 168 and the Wright Memorial Bridge has been added, and (5) widening NC 12 to three lanes between US 158 and the existing three-lane section in Duck.³⁸ The public has not had an opportunity to review or comment on any of these changes or to debate the merits of the very different set of alternatives.

An agency's assessment of alternatives to the proposed action must "sharply define the issues and provide a clear basis for the choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14. By redefining the alternatives and issuing a ROD without any public input on the redefined alternatives, the Transportation Agencies have violated NEPA.

Furthermore, the Transportation Agencies changed their modeling approach from the FEIS by modeling constrained and unconstrained development in the Reevaluation Study Report for the No-Build and ER2 scenarios.³⁹ While we welcome this change, under NEPA the Agencies should have presented their updated modeling to the public for review and comment. A draft version of the Reevaluation Study Report reveals that NCDOT's consultants did not always make clear whether constrained or unconstrained development was being used, thus prompting concerns that some of the comparisons were "apples and oranges."⁴⁰

³⁵ ROD at 11; Reevaluation Study Report 1-6.

³⁶ *See id.* 4-55.

³⁷ *Id.* 1-9.

³⁸ *Id.* 1-13.

³⁹ FEIS 2-45; Reevaluation Study Report 3-34.

⁴⁰ Draft Re-Evaluation Study Report (Nov. 13, 2017), at 3-19, Comment from CScheffler, Attachment 6.

H. Financing Challenges

The Reevaluation Study Report states that according to the North Carolina Turnpike Authority (“NCTA”) preliminary Plan of Finance, the total estimated cost of the Bridge is \$531.08 million and that the Bridge will be funded through a combination of TIFIA Loans, toll revenue bonds, GARVEE Bond, state matching funds, and prior expenditures.⁴¹ The Reevaluation Study Report, however, fails to note that according to a more detailed Plan of Finance document from June 2018, there is still a \$17 million funding gap.⁴² None of the Transportation Agencies’ NEPA documents mention this shortfall or articulate a plan for closing the funding gap. Moreover, these numbers do not match up with the listed project cost of \$632,823,478 in the Turnpike Authority’s 2018 Infra Grant proposal.⁴³

Furthermore, as noted later in this letter, many of the assumptions underlying toll revenue calculations—such as the expectation that the Bridge will be accessible and legally permitted to toll vehicles up until 2070—are questionable in light of sea level rise projections. State law mandates that NCDOT “maintain an existing, alternate, comparable nontoll route corresponding to each Turnpike Project[.]” N.C. Gen. Stat § 136-89.197, yet the ROD states that,

under all sea level rise scenarios considered, the entire barrier island would be inundated at the Dare/Currituck County line, creating a breach in the island and making a Mid-Currituck County line, creating a breach in the island and making a Mid-Currituck Bridge the only way off the Currituck County Outer Banks.⁴⁴

If this breach occurs and the proposed Bridge becomes the only way off the Currituck County Outer Banks, it can no longer legally operate as a toll bridge. The PFM Plan of Finance anticipates toll revenue through 2073, well after current sea level rise models anticipate inundation of much of Currituck County’s coastline.⁴⁵ Whatever plan of finance is ultimately finalized for the Bridge, it cannot rely on toll revenue that NCTA will not have legal authority to

⁴¹ Reevaluation Study Report 1-17.

⁴² NCTA, Mid-Currituck Bridge Plan of Finance by PFM (June 28, 2018) (hereinafter “PFM Plan of Finance”), Attachment 7. This Plan of Finance appears to rely on a Traffic and Revenue forecast from May 2018 performed by Stantec. SELC repeatedly asked NCTA if any traffic and revenue studies had been performed and asked to see the documents as they became available, and was repeatedly told that no such studies were available. Email from Kym Hunter, SELC, to Bobby Lewis, NCDOT (June 19, 2018) Attachment 8; Email from Kym Hunter, SELC, to Beau Memory, NCDOT (Apr. 9, 2018), Attachment 9; Email from Kym Hunter, SELC, to Beau Memory, NCDOT (Oct. 19, 2017), Attachment 10. NCDOT’s reticence to discuss the traffic and revenue study is again apparent in comments on the Draft FEIS Reevaluation, where a commenter states, “I would rather not reference the investment grade traffic and revenue study here.” Draft FEIS Re-evaluation at 2-17 (Nov. 13, 2017), Attachment 6.

⁴³ INFRA GRANT 2018 Application: Mid-Currituck Bridge (R-2576) (Nov. 2017) at introductory table, Attachment 11.

⁴⁴ ROD 19.

⁴⁵ See Attachment 12 (sea level rise maps).

collect if the Wright Memorial Bridge becomes inaccessible. Importantly, NCDOT must honor its statement that “if the investment grade toll and revenue study would demonstrate that the [Bridge] would generate insufficient toll revenue to be financed, the bridge project planning would be terminated.”⁴⁶

Given the failure of recently-constructed toll roads, such as the Monroe Expressway, to generate as much revenue in tolls as predicted in financing plans,⁴⁷ it is critical that the public have an opportunity to review and comment on the financing plan for the proposed Bridge. If the Bridge is not financially feasible, it is essential to look at other alternatives, including ER2.

III. NEW INFORMATION REGARDING CLIMATE CHANGE

Since the FEIS was issued in 2012, there have been numerous new developments in climate change science and policy. Studies on climate change and its impacts issued by national and international governments and their scientific bodies have become increasingly grim, and have called for urgent action to avert global catastrophe. The Governor of North Carolina has heeded these warnings, and issued an Executive Order that requires NCDOT to do its part in combatting climate change and promoting resiliency across the state. None of these new developments have been documented in the Transportation Agencies’ Reevaluation Report, Reevaluation Study Report, or ROD, and NEPA requires preparation of a Supplemental EIS to ensure that the public has the opportunity to provide comments on the impacts of climate change related to the proposed Bridge.

A. Climate reports and studies

Recent studies indicate that the crisis of climate change is far more severe and immediate than previously anticipated. The U.S. Global Change Research Program’s Fourth National Climate Assessment (“the Assessment”), the authoritative assessment of the science on climate change, with a focus on the United States,⁴⁸ reached several disturbing conclusions regarding climate change. Average surface air temperature has increased by 1 degree Celsius (1.8 degrees Fahrenheit) during the century, making this period the warmest in the history of modern civilization.⁴⁹ Human activities, especially emissions of greenhouse gases (“GHGs”) are the

⁴⁶ FEIS Draft Reevaluation, App. D: Response to Non Governmental Organization Comments Received During Reevaluation Preparation D-16, Attachment 13.

⁴⁷ Steve Harrison, For Charlotte Area’s First Toll Road, There are Few Cars (Jan. 17, 2019), <https://www.wfae.org/post/charlotte-areas-first-toll-road-there-are-few-cars#stream/0>, Attachment 14.

⁴⁸ U.S. Global Change Research Program, Fourth National Climate Assessment Vol. I (2017) https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf (hereinafter National Climate Assessment Vol. I), Attachment 15; U.S. Global Change Research Program, Fourth National Climate Assessment Vol. II (2018) https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf (hereinafter National Climate Assessment Vol. II), Attachment 16.

⁴⁹ National Climate Assessment Vol. 1, 10, Attachment 15.

dominant cause of the observed warming.⁵⁰ This increase in global temperatures has caused a 7 to 9 inch increase in global average sea level rise since 1900, with almost half of this rise (3 inches) occurring since 1993.⁵¹ Global sea level rise has accelerated the incidence of daily tidal flooding in more than 25 Atlantic and Gulf Coast cities.⁵² Global average sea levels are expected to continue to rise, by at least several inches *in the next fifteen years*, and by 1 to 4 feet by 2100, but an 8 foot rise by 2100 cannot be ruled out.⁵³ Sea level rise will be higher than the global average on the East and Gulf Coasts of the United States.⁵⁴ Heavy rainfall is increasing in intensity across the United States, and will continue to increase.⁵⁵

In October 2018, the United Nations Intergovernmental Panel on Climate Change (“IPCC”) released a landmark report also concluding that the impacts of climate change have already begun to take hold, and that absent aggressive action global temperatures will increase over 1.5 degrees Celsius (2.7 degrees Fahrenheit) above pre-industrial levels between 2030 and 2052.⁵⁶ Previous IPCC reports had focused on predicting the effects of a 2 degree Celsius (3.6 degree Fahrenheit), but this new report demonstrates that even a 1.5 degree Celsius increase in global temperatures will have dire consequences, including significant sea level rise, coastal flooding, droughts, extreme storms, ocean acidification, etc.⁵⁷

The Ninth Edition to the United Nations Environment Emissions Gap Report (“Emissions Gap Report”) was released in November 2018 following the publication of the 2018 IPCC Climate Report. While the 2018 IPCC Report provided additional compelling science regarding the effects of climate change on the natural and human environment, the Emissions Gaps Report “assess[ed] the latest scientific studies on current and estimated future greenhouse gas emissions and compar[ed] them with the emission levels permissible for the world to progress on a least-cost pathway to achieve the goals of the Paris Agreement.”⁵⁸ In other words, the Emissions Gap Report compared observed and projected future emissions levels to the emissions levels necessary in order to prevent global warming from exceeding 2 or 1.5 degrees Celsius above preindustrial levels. The 2018 Emissions Gap Report reached several new conclusions. The kind of “unprecedented action we urgently need” to keep global warming below a 2 degree or 1.5 degree threshold is not happening.⁵⁹ Global CO₂ emissions, which had remained stagnant for

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *Id.*

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ Intergovernmental Panel on Climate Change, Global Warming of 1.5° C (“2018 IPCC Report”), Attachment 17.

⁵⁷ *Id.*; Coral Davenport, *Major Climate Report Describes a Strong Risk of Crisis as Early as 2040*, N.Y. TIMES (Oct. 7, 2018), <https://www.nytimes.com/2018/10/07/climate/ipcc-climate-report-2040.html>, Attachment 18.

⁵⁸ United Nations Environment Programme, *Emmissions Gap Report 2018*, at xiv, Attachment 19.

⁵⁹ *Id.* at xiii.

several years, increased in 2017.⁶⁰ In 2018, global oil use increased for the fifth year in a row and worldwide carbon emissions increased by 2.7 percent.⁶¹ Gains from increased deployment of electric vehicles have been eliminated by increases in personal vehicle ownership and vehicle miles travelled.⁶² Little, if any progress is being made towards averting a climate change catastrophe. Even if all nations live up to their current Paris Climate Agreement commitments—which is highly unlikely—global warming will likely increase by around 3 degrees Celsius by 2100.⁶³ A temperature increase of this magnitude would be catastrophic, especially for small islands and coastal areas, which are particularly vulnerable to sea level rise and extreme storms.⁶⁴

The conclusions in these reports with respect to global warming, sea level rise, extreme weather events, and global failure to address the impending climate change crisis must be meaningfully considered as the Transportation Agencies evaluate whether to invest millions of North Carolinian taxpayer dollars into a Bridge located in an area of the state which is extremely vulnerable to the effects of climate change. The findings documented in each of these reports are new and relevant information that must be considered in a Supplemental EIS. The Transportation Agencies must consider how the effects of climate change, including sea level rise, temperature increases, and increasingly frequent severe weather events, impact the proposed Bridge’s viability. Furthermore, the Transportation Agencies must re-evaluate the environmental impacts of each alternative and disclose the Statement of Purpose and Need in light of the effects of climate change.

B. Executive Order 80

On October 29, 2018, North Carolina Governor Roy Cooper issued Executive Order No. 80 (“the Executive Order”), which commits the state of North Carolina to address climate change.⁶⁵ The Executive Order requires cabinet agencies, including NCDOT, to comply with several general directives in assessing and addressing climate change.⁶⁶ Specifically, NCDOT must “evaluate the impacts of climate change on agency programs and operations and integrate climate change mitigation and adaptation practices into their programs and operations.”⁶⁷ NCDOT is also required to “integrate climate adaptation and resiliency into [its] policies, programs, and operations [.]”⁶⁸

⁶⁰ *Id.*

⁶¹ See Le Quéré C. *et al.*, Global Carbon Budget 2018, *Earth System Science Data* (2018), Attachment 20.

⁶² See Kendra Pierre-Louis, *Greenhouse Gas Emissions Accelerate Like a ‘Speeding Freight Train’ in 2018*, N.Y. TIMES (Dec. 5, 2018) <https://www.nytimes.com/2018/12/05/climate/greenhouse-gas-emissions-2018.html>, Attachment 21.

⁶³ UN Gap Report at xiv, Attachment 19.

⁶⁴ *Id.*

⁶⁵ Executive Order 80 (Oct. 29, 2018), Attachment 22.

⁶⁶ *Id.* ¶ 2.

⁶⁷ *Id.*

⁶⁸ *Id.* ¶ 9.

In the United States, the transportation sector and electricity sector are the two leading contributors of greenhouse gas (“GHGs”) emissions.⁶⁹ In North Carolina, the transportation sector is the second leading contributor to GHG emissions, and poised to quickly become the first.⁷⁰ Therefore “integrat[ing] climate change mitigation and adaptation” into NCDOT’s operations requires a meaningful evaluation of the indirect impacts that projects like the Bridge will have on sprawl, development, and transportation choices. Locking in carbon-intensive infrastructure like the Bridge, which will accelerate development and sprawl and re-entrench a culture reliant on personal vehicles, will make it increasingly difficult to reduce emissions in the future.⁷¹

Furthermore, the Executive Order requires that NCDOT “evaluate the impacts of climate change” upon the proposed Bridge, and “integrate climate adaptation and resiliency” into its evaluation of alternatives under NEPA. Since the Bridge would be located in an area of the state that is particularly vulnerable to climate change, conformance with these requirements is critical.

Despite significant evidence that climate change will seriously impact the project, NCDOT has failed to reevaluate the project based on up-to-date data regarding global warming, sea level rise, and coastal flooding, and there is no mention of the Executive Order or recent climate studies in the Reevaluation documents or in the Record of Decision. NEPA requires that agencies discuss “possible conflicts between the proposed action and Federal, regional, State, and local land use plans, policies and controls for the area involved.” 40 C.F.R. § 1502.16. NCDOT’s failure to evaluate the impacts of climate change upon the Bridge through consideration of current climate change reports and data is at odds with the Executive Order and violates NEPA. The Agency must prepare a Supplemental EIS that considers the Bridge and alternative concepts in light of the directives in the Executive Order regarding mitigation and adaptation. In addition, the Supplemental EIS should evaluate the viability of the proposed Bridge and alternative concepts in light of up-to-date climate change science.

IV. UPDATED SEA LEVEL RISE PROJECTIONS

One significant consequence of global warming is the exposure of small islands, low-lying coastal areas, and deltas to many risks associated with sea level rise, including saltwater intrusion, flooding, and damage to infrastructure.⁷² Currituck Sound is particularly vulnerable to sea level rise.⁷³ As one member of the North Carolina Coastal Resources Commission Science

⁶⁹ EPA, Fast Facts on Transportation Greenhouse Gas Emissions, (last updated Aug. 27, 2018) <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>, Attachment 23.

⁷⁰ NC DEQ, NC Greenhouse Gas Inventory 5 (Jan. 2019) available at, <https://files.nc.gov/ncdeq/climate-change/ghg-inventory/GHG-Inventory-Report-FINAL.pdf>, Attachment 24.

⁷¹ See UN Gap Report at 21-22, Attachment 19.

⁷² 2018 IPCC Report at 10, Attachment 17.

⁷³ Dave Dewitt, *The Changing Carolina Coast: Managing the Threat of Rising Water*, WUNC 91.5 (Jun 1, 2015), <http://www.wunc.org/post/changing-carolina-coast-managing-threat-rising-water>, Attachment 25; Sarah Kaplan, *Ruined crops, salty soil: How rising seas are poisoning North Carolina’s farmland*, WASH. POST (Mar. 1, 2019), <https://www.washingtonpost.com/national/ruined-crops-salty-soil-how->

Panel stated, “shorelines are receding...and people are building dikes[,] and highways are going under water.”⁷⁴ Yet none of the Transportation Agencies’ documents analyze or disclose the possibility that the Bridge will ultimately be made inaccessible from the mainland within its life time.

While the Transportation Agencies acknowledged the reality of sea level rise in their 2012 FEIS, they did so only fleetingly and in reliance upon significantly out-of-date data. The Transportation Agencies have not revisited the issue in any public document in the seven years since the FEIS was published. They have also omitted important new data regarding sea level rise projections from consideration even in their private reevaluation. NEPA is intended to prevent the government from acting “on incomplete information, only to regret its decision after it’s too late to correct.” *North Carolina Wildlife Federation v. NCDOT*, 677 F.3d. at 601. The Transportation Agencies’ analysis of sea level rise is woefully inadequate and unless revisited will lead to exactly the situation NEPA is intended to prevent. The Transportation Agencies must consider the more updated developments, which impact the viability of the Bridge and alternative concepts, in a public Supplemental EIS.

A. The Transportation Agencies rely on obsolete sea level rise data

In the FEIS, the Transportation Agencies’ only mention of sea level rise is its claim that the proposed Bridge “would be a useful asset in reducing the impact of sea level rise on the project area’s road system.”⁷⁵ The FEIS asserts that “under all sea level rise scenarios considered the entire barrier island would be inundated at the Dare/Currituck County line, creating a breach in the island and making a Mid-Currituck Bridge the only way off the Currituck County Outer Banks.”⁷⁶ This conclusion is based upon an ICF Report issued in 2007,⁷⁷ which relies on inundation levels from EPA studies published in the mid-1990s and the IPCC’s third assessment report published in 2001.⁷⁸ NCDOT’s 2011 Other Physical Features Technical Report, which discusses sea level rise more thoroughly, relied on this same obsolete data.⁷⁹ That is the last public discussion of sea level rise as it relates to the Bridge.

[rising-seas-are-poisoning-north-carolinas-farmland/2019/03/01/2e26b83e-28ce-11e9-8eef-0d74f4bf0295_story.html?utm_term=.92f51af3ee31](http://www.bv.transports.gov.qc.ca/mono/0965210.pdf), Attachment 26.

⁷⁴ *Id.*

⁷⁵ FEIS at xxvi, tbl. S-1, 2-56, 3-82-84; DEIS at 3-64-65.

⁷⁶ FEIS at xxvi, tbl. S-1.

⁷⁷ *Id.* at 3-82. NCDOT characterizes the report as being published in 2008, but the Report was actually published on December 12, 2007. ICF International, *The Potential Impacts of Global Sea Level Rise on Transportation Infrastructure: Phase 1 – Final Report: the District of Columbia, Maryland, North Carolina and Virginia* (2007) available at, <http://www.bv.transports.gov.qc.ca/mono/0965210.pdf> (hereinafter “ICF Report”), Attachment 27.

⁷⁸ ICF Report at 3, Attachment 27. The ICF Report’s introduction explicitly states that “given the uncertainty of the sea level rise data, it should not be used to predict sea levels at a particular location or point in time.”

⁷⁹ Other Physical Features Technical Report at 3-1 (relying on NOAA’s MHHW from 2000), App. A (relying on ICF report).

The Reevaluation Study Report references the 2016 North Carolina Sea Level Rise Assessment Report, which relies on sea level rise data from the IPCC's 2014 Synthesis Report.⁸⁰ As such, the conclusions in the ROD are predicated on data that is more up to date than the publicly considered information from the FEIS, but still far removed from the reality we face today. Furthermore, the Transportation Agencies relied on a global sea level rise projection that did not consider place-specific factors such as subsidence and ocean currents, and is therefore less accurate than subsequent localized sea level rise studies.⁸¹

Just like the FEIS that preceded it, the Reevaluation Study Report remains entirely arbitrary, inconsistent, and out of date.⁸² The most recent data considered by the Transportation Agencies, the 2014 IPCC data filtered through the 2016 North Carolina Sea Level Rise Assessment, is not actually analyzed or modeled in relation to the Bridge, but is used solely to justify continued reliance on the even older data from the FEIS.

For example, the Agencies note that the FEIS considered up to 1 meter (39.4 inches) of sea level rise on the Selected Alternative, and 2.4 to 23.2 inches of sea level rise in the project area by the year 2100.⁸³ The Agencies then conclude that because the 2016 NC SLR Assessment Report anticipated only up to 10.6 inches of SLR in Duck by 2045, the FEIS's outdated findings regarding sea level rise in 2100 remain valid.⁸⁴ This conclusion ignores the data from FHWA's own sister federal agency, NOAA, whose more updated, and localized models predict significantly more sea level rise by 2050, as discussed below. Moreover, the Transportation Agencies cannot justify their reliance on outdated data regarding sea level rise projections for the year 2100 based on only somewhat less outdated data regarding sea level rise projections for the year 2045. Beyond being unreasonable on its face, the Transportation Agencies' reliance on 2045 sea level projections to support older 2100 sea level projections is inappropriate because sea level rise is accelerating. Smaller variations in 2045 projections are likely indicative of changes of greater magnitude in the 2100 projections.

The Transportation Agencies further err when they focus their analysis of sea level rise on a likely future breach at the Currituck/Dare County line and then present this future breach as a reason the Bridge may be necessary, although such a purpose is not incorporated into the statement of purpose and need, or analyzed in any meaningful way.⁸⁵

The agencies have not meaningfully grappled with what it would mean to have a toll Bridge as the only means off and onto the island—yet toll revenue is essential for the financial

⁸⁰ Reevaluation Study Report at 1-20; North Carolina Sea Level Rise Assessment Report: 2015 Update to the 2010 Report and 2012 Addendum, iii (Mar. 31, 2014), Attachment 28; IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* 151 (2015), Attachment 29.

⁸¹ FEIS at 3-82; DEIS at 3-64.

⁸² P. 19, Tbl. 1.

⁸³ Reevaluation Study Report at 4-48.

⁸⁴ *Id.* at 4-48.

⁸⁵ Reevaluation Study Report at 1-20.

viability of the project. Indeed, under current law if the breach were to occur while the Bridge was still operation, the continued tolling of the Bridge would run afoul of N.C. Gen. Stat. § 136-89.197 which prohibits tolling roads unless there is a parallel alternative.

Moreover, while vaguely noting sea level rise as a reason the Bridge may be advantageous in the instance of a breach, the Transportation Agencies otherwise dismiss even the older outdated projections of sea level rise beyond 2040.⁸⁶ The Transportation Agencies' statement that they acknowledge risks and uncertainty in the future,⁸⁷ is not sufficient to satisfy NEPA's "hard look" requirement. *See e.g., Sierra Club, Ill. Chapter v. U.S. Dept. of Transp.*, 962 F.Supp 1037 (N.D. Ill. 1997) (Where there is incomplete or unavailable information, and that information is essential to make a reasoned choice about alternatives, NEPA requires agencies to make clear that a study was not undertaken and give reasons why study was not undertaken). This is particularly true now that science has advanced to a point where accelerated sea level rise projections are calculated with high levels of certainty.⁸⁸ *See Nat'l Audubon Society v. Dep't. of Navy*, 422 F.3d 174, 192 (2005) ("An agency's hard look should include neither researching in a cursory manner nor sweeping negative evidence under the rug.").

The analysis of sea level rise in the FEIS Reevaluation Study Report is also insufficient. First, as noted above, any significant new information should properly have been presented to the public in a Supplemental EIS in advance of a final agency decision. Second, the analysis is fundamentally flawed, as the public would have been able to point out had it had an opportunity to properly review and scrutinize. For example, where the Study Report does acknowledge vaguely that "some existing roads" will be impacted by Sea Level Rise, it brushes this fact off stating that "no components of the Selected Alternative would be affected by sea level rise" and ultimately concludes that "a Mid-Currituck Bridge would be a useful asset in reducing the impact of sea level rise on the project area's road system."⁸⁹ This reasoning is illogical and inadequate. It fails to acknowledge that whether or not the Bridge itself is impacted does not matter if the project becomes a "bridge to nowhere." Moreover, the analysis fails to examine how construction of the Bridge may encourage development in areas prone to sea level rise, resulting in additional damage and impeding managed retreat and marsh migration.

It is also important to note that, in addition to failing to include any analysis on how land use changes may interplay with sea level rise and coastal resilience, as Executive Order 80 demands, the documents also fail to consider the impact of storm surge when combined with sea level rise. NCDOT modelled the combination of sea level rise and storm surge for the year 2100 in its 2011 Other Physical Features Technical Report, but has failed to reassess these impacts based on updated sea level rise projections and storm surge data. In 2017, the U.S. Global Change Research Program, which comprises 13 Federal Agencies including NOAA, issued Volume 1 of the Fourth National Climate Assessment, which provides the most recent data regarding sea level rise in the Outer Banks.⁹⁰ NOAA's Technical Report on sea level rise

⁸⁶ *Id.* at 4-48.

⁸⁷ *Id.*

⁸⁸ 2018 IPCC Report at 206-07, Attachment 17.

⁸⁹ *Id.* at 4-37.

⁹⁰ *See* National Climate Assessment Vol. 1, Attachment 15.

supporting the Assessment represents the most comprehensive study of sea level rise in the United States to date and provides localized projection for each tide gauge.⁹¹ These projections are more fine-tuned than global estimations because they account for factors such as subsidence and ocean current, which significantly increase the rate of sea level rise along the Outer Banks relative to the global average.⁹² Because the Transportation Agencies anticipate that the “Bridge would stay in service up to 75 years”⁹³ and because NCTA’s most recent plan of finance relies on toll revenue from the Bridge through the year 2070,⁹⁴ it is necessary to consider the impact of both 2050 and 2100 sea level rise projections to the Bridge.

NOAA’s Technical Report evaluates a range of sea level rise scenarios:

Figure 2: NOAA’s sea level rise projections for Duck, NC

Duck, NC: NOAA 2017 projections	Sea level rise (in.) by 2050	Sea level rise (in.) by 2100
Low	11.4	20.4
Intermediate-Low	13.7	26.7
Intermediate	20.8	52.7
Intermediate-High	28.3	81.1
High	37	112.6
Extreme	42.1	137

⁹⁵ These new projections indicate that the 2100 “high” sea level rise scenario analyzed in the 2012 FEIS (23.2 inches)⁹⁶ is now considered the “low” end scenario by the Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Interagency Task Force, which includes NOAA, USGS, and EPA.⁹⁷ Moreover, the “low” scenario is only possible if emissions are drastically

⁹¹ NOAA Technical Report NOS CO-OPS 083, Global and Regional Sea Level Rise Scenarios for the United States 35 (Jan. 2017) (hereinafter “2017 NOAA Report”) https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf, Attachment 30.

⁹² Carter, L. et al., 2018: Southeast in Impacts, Risks, and Adaptation in the U.S.: Fourth National Climate Assessment, Vol. II, available at, https://nca2018.globalchange.gov/downloads/NCA4_Ch19_Southeast_Full.pdf, Attachment 31.

⁹³ FEIS at 3-83-84.

⁹⁴ PFM Plan of Finance, Attachment 7.

⁹⁵ Sweet, W.V. et al., Global and Regional Sea Level Rise Scenarios for the United States, NOAA Tech. Rep. NOS CO-OPS 83, available at, https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf (hereinafter “NOAA Technical Report”), Attachment 32.

⁹⁶ FEIS at 3-83.

⁹⁷ NOAA Technical Report at 33.

reduced within the next few years, an outcome which is increasingly unlikely given the recent 2018 Emissions Gap Report's findings. The latest research and trends indicate that the Intermediate-High scenario, which anticipates 28.3 inches of sea level rise by 2050 and 81.1 inches of sea level rise by 2100 in the Outer Banks, is the most likely scenario.⁹⁸ Given NOAA's 2017 Probabilities of exceeding each scenario⁹⁹ and the findings on ice sheet instability and glacial melt,¹⁰⁰ it would be unreasonable to assume sea level rise projections less than the Intermediate High Scenario.

As such, the data used to support the FEIS likely underestimates sea level rise by the year 2100 in the Outer Banks by almost 400%, or 52.8 inches. Even the data referenced in the Reevaluation Study Report, which predicts 10.6 inches of sea level rise in the Outer Banks by 2045, underestimates sea level by almost 200% relative to NOAA's most recent projections, which predict 28.3 inches by 2050.¹⁰¹

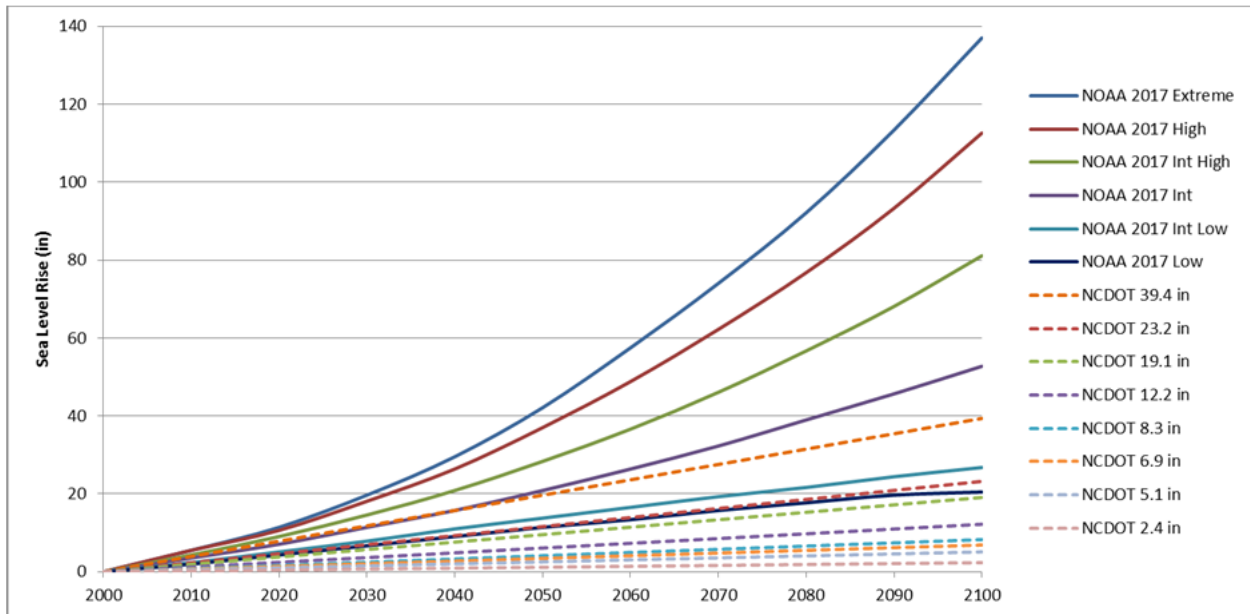
⁹⁸ *Id.*; North Carolina's Sea Level is Rising, <https://sealevelrise.org/states/north-carolina/> (last visited Mar. 11, 2019), Attachment 33.

⁹⁹ Sweet, W.V. et al, 2017: Sea level rise, *in* Climate Science Special Report: Fourth National Climate Assessment, Vol. 1, App. 1, Tbl. 12.4, Attachment 15.

¹⁰⁰ Ice Sheet Mass Balance Inter-Comparison Exercise (IMBIE) team, Mass balance of the Antarctic Ice Sheet from 1992 to 2017, *Nature* 558, 219-22 (2018), *available at*, <https://www.nature.com/articles/s41586-018-0179-y>. (finding that Antarctic ice melt is tracking close to the IPCC's worst case scenario), Attachment 34; Box, J., et al., 2018. Global sea level contribution from Arctic land ice: 1971-2017, *Environmental Research Letters* 13(12) (2018), *available at*, <https://iopscience.iop.org/article/10.1088/1748-9326/aaf2ed> (showing that the Greenland ice sheets are melting faster and in greater volume than expected), Attachment 35; Rignot, E., et al., Four decades of Antarctic Ice Sheet mass balance from 1979-2017, *PNAS* 116(4), 1095-1103 (2019) *available at*, <https://www.pnas.org/content/116/4/1095> (showing that the Antarctic ice sheets are melting faster and in greater volume than expected), Attachment 36; Cheng, L. et al., How fast are the oceans warming? *Science* 363 (6423), 128-29 (2019), *available at*, <http://science.sciencemag.org/content/363/6423/128> (oceans are warming more rapidly than predicted), Attachment 37; Milillo, P. et al., Heterogeneous retreat and ice melt of Thwaites Glacier, West Antarctica, *Science Advances* 5(1) (2019), *available at*, <http://advances.sciencemag.org/content/5/1/eaau3433/tab-pdf>. (finding that the Thwaites glacier is more unstable than previously thought, and the collapse of this ice mass alone could increase global sea levels by 2 feet), Attachment 38.

¹⁰¹ Reevaluation Study Report at 4-47.

Figure 3: Comparison of sea level rise scenarios showing NOAA 2017 projections for the Duck, NC gauge and NCDOT scenarios considered in the Mid-Currituck DEIS.



The FEIS claims that because the Bridge would likely be replaced before the year 2100, it “would never experience the highest sea level rise[,]”¹⁰² but updated projections indicate that the Bridge would likely experience 28.3 inches of sea level rise by 2050.¹⁰³ In other words, under the most likely sea level rise scenario, the Bridge is likely to experience significantly more sea level rise by 2050 than the FEIS anticipated it would experience by 2100 under the worst case scenario. This information paints a “seriously different picture” of the project, and pursuant to NEPA must be incorporated into a Supplemental EIS. The FEIS also states that “the only parts of the Selected Alternative that would be affected by 1-meter [39.4 inches] of sea level rise are roadway components on the mainland along US 158 in the Waterlily Road area. They would not, however, be affected within the context of a typical road design life (2035).”¹⁰⁴ The NOAA Technical Report, however, indicates that 39.4 inches of sea level rise will likely occur closer to 2050 than 2100. The accelerated effects of sea level rise will impact the Bridge well within typical road design life, the Bridge’s design life,¹⁰⁵ and within the time-frame that the PFM finance plan assumes toll revenue will be generated (2070).¹⁰⁶ Therefore, the Transportation Agencies must prepare a Supplemental EIS that considers updated sea level rise projections and the impacts sea level rise will have on operation and financing for the Bridge.

¹⁰² FEIS at 3-83.

¹⁰³ NOAA Technical Report at 35, Attachment 32.

¹⁰⁴ FEIS at 3-83; *see* Other Physical Features Technical Report at 3-5.

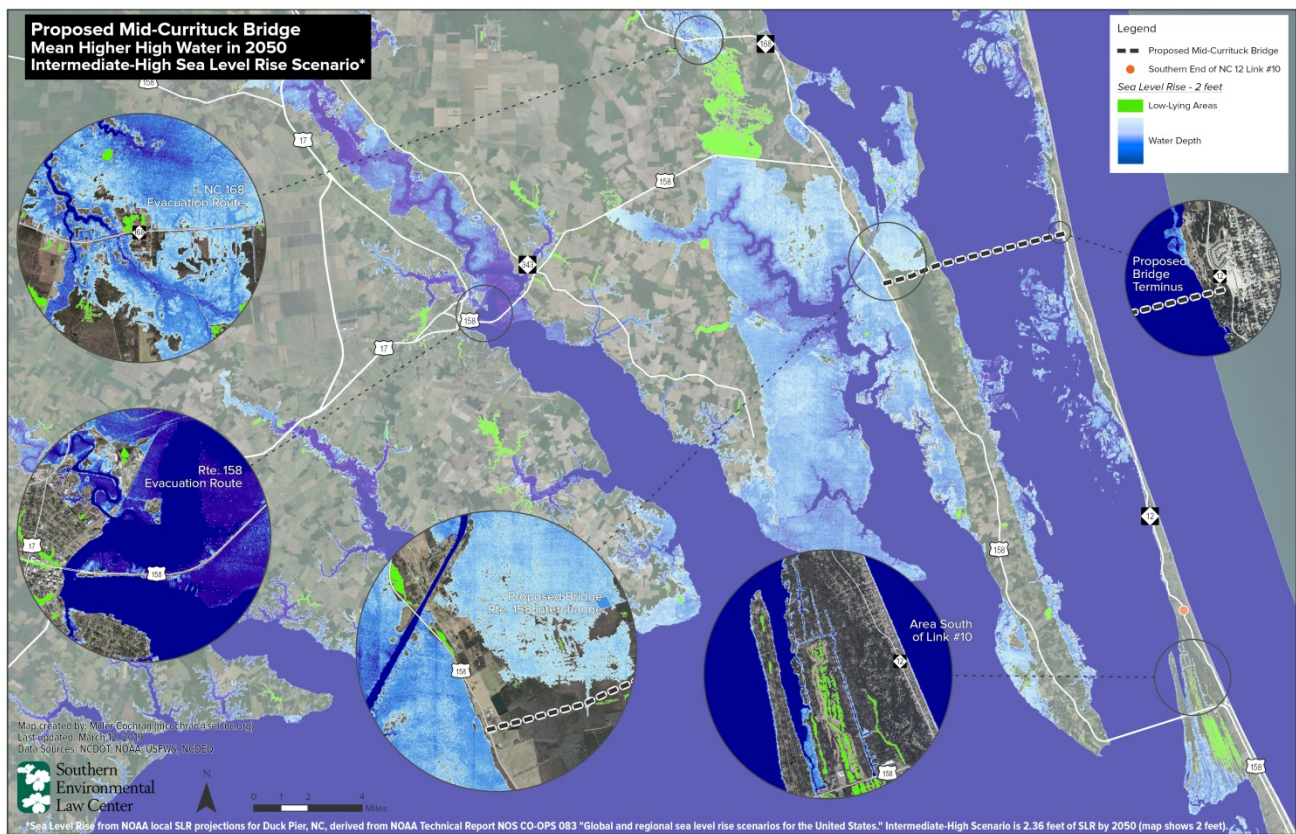
¹⁰⁵ Reevaluation Study Report at B-126.

¹⁰⁶ PFM Plan of Finance, Attachment 7.

B. Updated sea level projections call into question the project's viability

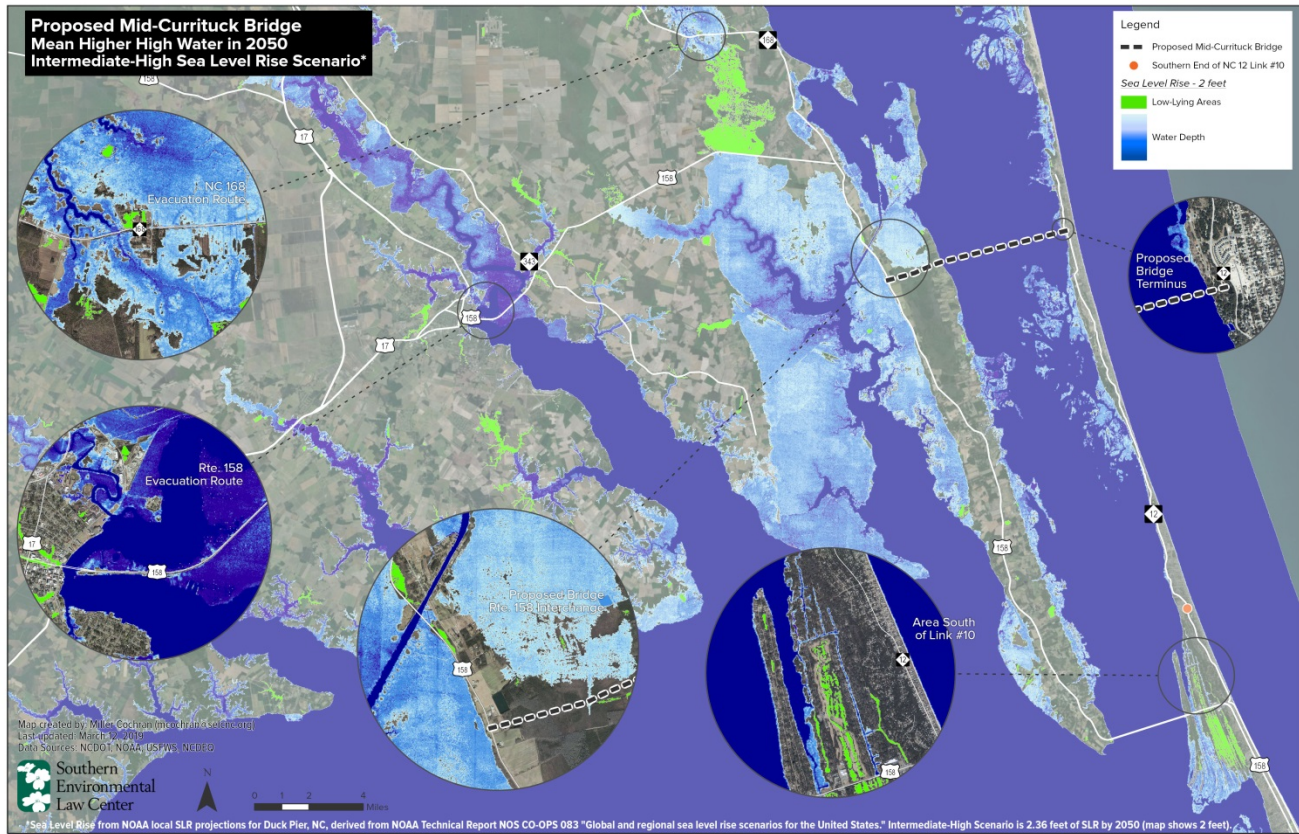
SELC has used the data in NOAA's 2017 4th National Climate Assessment to model the impacts of sea level rise on the Currituck Sound. These models call into question NCDOT's assertion that under all sea level scenarios "a Mid-Currituck Bridge would become the only route on and off the Currituck County Outer Banks."¹⁰⁷ As illustrated below, and in Attachment 12, under the most likely sea level rise scenario, Intermediate-High, the Bridge will not be a viable route on and off the Currituck County Outer Banks because (1) the base of the Bridge on the mainland will be inundated or extremely vulnerable to flooding; (2) US 158 will be inundated, rendering the Bridge inaccessible from the mainland; and (3) contrary to NCDOT's representations, US 158 and NC 12 will likely become inundated on a similar time frame.

Figure 4: Intermediate-High 2050 Mean Higher High Water



¹⁰⁷ Other Physical Features Technical Report at 3-5.

Figure 5: Intermediate-High 2100 Mean Higher High Water



While the Transportation Agencies correctly identified in the FEIS that sea level rise would inundate multiple roads in the project area, including US 158 and NC 12, they incorrectly anticipated that inundation would occur by 2100,¹⁰⁸ when current sea level rise data indicates that it is likely to occur by 2050.

Moreover, NCDOT’s Other Physical Features Technical Report features several conclusions regarding sea level rise’s impact on the Bridge and surrounding roads that are no longer accurate in light of updated sea level rise data. For example, the Other Physical Features Technical Report states that “US 158 on the Currituck County mainland south of a Mid-Currituck Bridge would not be inundated under any sea level rise scenario.”¹⁰⁹ As illustrated above, however, US 158 on the Currituck County mainland south of the Mid-Currituck Bridge would in fact be inundated due to sea level rise alone by 2100.

Similarly, the Other Physical Features Technical Report also states that US 158 North of a Mid-Currituck Bridge and South of NC 168 would experience 0.5 to 1.0 miles of inundation by 2100.¹¹⁰ As illustrated above, this stretch of road would face substantially more inundation due

¹⁰⁸ FEIS at 3-83.

¹⁰⁹ *Id.*

¹¹⁰ *Id.*; see FEIS at 3-83.

to sea level rise by 2050. Furthermore, the Other Physical Features Technical Report does not even address how the serious inundation of NC 168 North of the Bridge, and US 158 West of the Bridge by 2050 as illustrated above, would impact the Bridge's accessibility.

The Transportation Agencies cannot rely on outdated sea level rise data to support construction of the Bridge while simultaneously ignoring more recent and robust sea level rise data indicating that the Bridge will not be a viable means of reaching the Outer Banks. The Transportation Agencies must prepare a Supplemental EIS that takes into account this updated sea level rise data and incorporates the new data into the alternatives analysis.

C. Updated sea level rise projections undermine fundamental assumptions regarding the need for the proposed bridge

Furthermore, public records reveal that NCDOT's Updated Indirect and Cumulative Effects ("ICE") analysis fails to account for the impacts of sea level rise upon development patterns in the Outer Banks. Indeed, in the Re-Evaluation Study Report's section about ICE, NCDOT asserts that "[a]ccelerated sea level rise characteristics have not changed since the preparation of the FEIS"¹¹¹—which is untrue, as thoroughly described above. While NCDOT contractors acknowledge that "[g]iven the physical constraints of the Atlantic Ocean and the Currituck Sound, as well as that most of the area is already subdivided or has in place plans that specify certain maximum development levels, there is a physical limit to the amount of development that can occur on the Outer Banks[.]"¹¹² they fail to recognize that the combination of rising sea levels and subsidence is already eliminating development opportunities, and existing developments, in the Outer Banks, and will continue to do so in the future.¹¹³

For example, in developing their updated ICE analysis, NCDOT assumes that all zones south of the 13th Avenue/Sea Oats Trail intersection with NC 12 would be developed to maximum buildout by 2040.¹¹⁴ The maximum buildout potential was not altered from the original 2012 analysis.¹¹⁵ However, sea level rise projections indicate that a substantial amount of the land south of the 13th Avenue/Sea Oats Trail intersection will be flooded or extremely prone to flooding by 2040. Therefore NCDOT's 100% buildout rate cannot be accurate. This inaccuracy calls into question many underlying assumptions regarding population numbers, evacuation needs, congestion levels, etc. As illustrated in Figures 3 and 4, and Attachments 12, sea level rise projections anticipate significant portions of the Outer Banks, including the area south of the 13th Avenue/Sea Oats Trail intersection will be submerged by 2040.

¹¹¹ Reevaluation Study Report at 4-57.

¹¹² June 2018 Traffic Memo at 5, Attachment 5.

¹¹³ Sarah Gibbens, *This Seaside Community is Getting Swallowed by the Ocean*, Nat. Geo. (July 2, 2018), <https://www.nationalgeographic.com/environment/2018/07/climate-change-outer-banks-environment/>, Attachment 39.

¹¹⁴ June 2018 Traffic Memo at 6, Attachment 5.

¹¹⁵ *Id.* at 5.

More broadly, the Transportation Agencies fail to account for the impact of sea level rise on the project area as a whole. Recent reports estimate that by 2030, 12% of Currituck County's usable land will be chronically flooded by tides alone (defined as tidal flooding taking place 26 times per year).¹¹⁶ This same report estimates that 75% of Currituck County's usable land will be chronically flooded by the year 2100. Chronic flooding on this scale is sure to impact development in Currituck County, and will likely significantly alter traffic patterns and toll revenue projections. Sea level rise will continue to have substantial impacts on development patterns in the Outer Banks, and the Transportation Agencies must account for these impacts when considering the need for and viability of the Bridge project. The Transportation Agencies must prepare a Supplemental EIS that accounts for the impact of sea level rise on development in the project area.

D. The Transportation Agencies fail to consider how the proposed Bridge restricts marsh migration, exacerbating future flooding

The Transportation Agencies have not considered marsh migration in any of their NEPA documents to date. Coastal marshes supply innumerable benefits to the environment and communities including wildlife habitat, flood protection, fish nurseries, water purification, erosion control, food supply, carbon storage, and recreational opportunities to name a few.¹¹⁷ Tidal wetlands provide habitat for over 75% of the region's fishery species at some point in their lifecycle.¹¹⁸ Most importantly, in relation to the area affected by the Bridge, tidal marshes act as a natural defense that buffer the shoreline from storm surge by reducing wave energy and storm velocity.¹¹⁹ During storms, marshes protect upland areas and private property from flooding and erosion.¹²⁰ Damage to these systems could not only worsen the impact of coastal hazards on the proposed Bridge, but also expose the surrounding area to increased storm impacts.¹²¹

The future of the marshes and the ecosystem services they provide are at risk as sea levels continue to rise, as the plants making up this habitat have adapted to live at very specific water levels and can drown from higher water. Without man-made barriers, however, these marsh systems naturally respond to rising seas by gradually migrating inland along with the

¹¹⁶ Union of Concerned Scientists, When Rising Seas Hit Home (July 2017), *available at*, <https://www.ucsusa.org/global-warming/global-warming-impacts/when-rising-seas-hit-home-chronic-inundation-from-sea-level-rise>, Attachment 40.

¹¹⁷ Northeast Regional Ocean Council, Make Way for Marshes (2015), *available at* <https://www.northeastoceancouncil.org/committees/coastal-hazards-resilience/resilient-shorelines/make-way-for-marshes/>, Attachment 41.

¹¹⁸ South Carolina Department of Natural Resources, Guide to the Salt Marshes and Tidal Creeks of the Southeastern United States 23 (2016), *available at* http://www.scseagrant.org/pdf_files/Salt-Marsh-Tidal-Creek-Guide.pdf, Attachment 42.

¹¹⁹ *Id.* at 22.

¹²⁰ Christine C. Shepard et al., The Protective Role of Coastal Marshes: A Systematic Review and Meta-analysis, PLoS One (2011) *available at*, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3223169/>, Attachment 43.

¹²¹ Iris Möller et al., Wave Attenuation over coastal salt marshes during storm surge conditions, Nature Geoscience 7, 727-731 (2014) *available at*, <https://www.nature.com/articles/ngeo2251>, Attachment 44.

water. Through a process of plant colonization, the marsh grasses send out new shoots from their roots and shift into the new tidal area. As the marsh grasses and other plants shift, the lowest lying patches of marsh grass become open water. Evidence of marsh migration can already be observed up and down the North Carolina coast along natural shorelines as marsh grass replaces trees.¹²²

As sea levels rise, the low-lying forested wetlands within Maple Swamp can provide valuable marsh migration space for the tidal marshes of Currituck Sound. Based on an elevation analysis, the Maple Swamp was identified as marsh migration space with sea level rise rates as low as 1 to 2 feet.¹²³ This space is necessary to ensure the survival of the tidal marshland and the ecosystem services it provides to the region's fisheries, and the long-term health of the marsh system could be jeopardized if this space is cut off. Development along the shoreline including roads and bulkheads in potential marsh migration spaces cuts off the marsh's evacuation route, and over time can result in the loss of the marshland and its benefits.¹²⁴ The proposed Bridge would likely induce development on the Currituck mainland,¹²⁵ which will increase the amount of impervious surfaces along the coast and limit the spaces marshes can migrate into, further degrading this important ecosystem and the many ecosystem services it provides. As discussed later in this letter, numerous local government officials have expressed support for the proposed Bridge based on the project's ability to drive economic development in Currituck County.¹²⁶ Due to the value the tidal marshes provide to the character and functioning of Currituck Sound, and the removal of tidal marshlands' capacity to exacerbate storm surges and associated flooding, the Transportation Agencies must consider marsh migration impacts in a Supplemental EIS.

V. NEW INFORMATION REGARDING STORM SURGE AND HURRICANE EVACUATION

As discussed in great detail in our previous letter, the Transportation Agencies continue to characterize the Bridge as necessary to reduce hurricane clearance time despite decades of

¹²² Smart, L. 2017. Unraveling Mysteries of Ghost Forests. North Carolina Sea Grant, *available at* <https://ncseagrant.ncsu.edu/coastwatch/previous-issues/2017-2/holiday-2017/unraveling-mysteries-of-ghost-forests/>, Attachment 45.

¹²³ The Nature Conservancy. 2017. Resilient Coastal Sites for Conservation in the Northeast and Mid-Atlantic, *available at*, <https://conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/climate/CoastalResilience/Pages/default.aspx>, Attachment 46.

¹²⁴ Northeast Regional Ocean Council. 2015. Make Way for Marshes, *available at* <https://www.northeastoceancouncil.org/irgmmi/cottees/coastal-hazards-resilience/resilient-shorelines/make-way-for-marshes/>, Attachment 41; *see also* https://www.apcc.org/saltmarshrestoration/cape_cod_marsh_%20migration_report_2015.pdf, Attachment 47.

¹²⁵ *See* Letter from Kym Hunter and Colin Shive to Tracy Roberts, NCDOT, and John F. Sullivan III, P.E., FHWA 51-52 (Dec. 21, 2016), Attachment 1.

¹²⁶ *See infra* notes 127-18 and accompanying text.

comments from state and federal agencies indicating that the Bridge would do no such thing.¹²⁷ Despite significant evidence to the contrary, including the Transportation Agencies' Reevaluation Study Report which finds that ER2 would facilitate hurricane evacuations more quickly than the proposed Bridge, the Transportation Agencies persist in mischaracterizing the Bridge as the sole viable means of ensuring safe evacuation from the Outer Banks in the event of a hurricane.

A. Large hurricanes are increasing in frequency and intensifying

North Carolina ranks second among states for the number of tropical storms and hurricanes that have affected its shores since 1851.¹²⁸ The geography of the Atlantic Coast leaves Eastern North Carolina especially exposed and prone to tropical storm and hurricane strikes.¹²⁹ Historically, hurricanes only impact the North Carolina shore every 5-7 years,¹³⁰ but climate change has significantly increased and continues to increase the frequency and magnitude of large hurricanes impacting the North Carolina coastline.¹³¹ In addition, as climate change alters wind circulation patterns, storms and other severe weather events are more commonly stalling and unleashing more damage as a result.¹³² For example, with Hurricane Matthew in 2016 and Hurricane Florence in 2016, North Carolina's coastal plain has been dealt two so-called 1,000-year storms in the last two years.¹³³

B. Existing transportation infrastructure is threatened by storm surge associated with tropical systems

A storm surge, the water that is pushed onto shore by a hurricane, is the most dangerous part of a hurricane for coastal communities.¹³⁴ A storm surge can be as rapid as several feet in

¹²⁷ Letter from Kym Hunter and Colin Shive, SELC, to Tracy Roberts, NCDOT, and John F. Sullivan, III, P.E., FHWS 4, 5, 6, 8, 14 (Dec. 21, 2016), Attachment 1; *see* FEIS at 1-3.

¹²⁸ Brian Donegan, North Carolina Second Only to Florida for U.S. Tropical Storms and Hurricanes (Sept. 11, 2018), *available at* <https://weather.com/storms/hurricane/news/2018-06-05-map-shows-how-many-tropical-storms-hurricanes-struck-each-state>, Attachment 48.

¹²⁹ Keim, B.D., Muller, R.A., Stone, G.W. 2004. Spatial and temporal variability of coastal storms in the North Atlantic Basin. *Marine Geology* 210, 7-15, Attachment 49.

¹³⁰ NOAA, Tropical Cyclone Climatology, (last visited Mar. 12, 2019), *available at* <https://www.nhc.noaa.gov/climo/>, Attachment 50.

¹³¹ Webser, P.J., Holland, G.J., Curry, J.A., Chang, H.R. 2005. Changes in tropical cyclone number duration and intensity in a warming environment. *Science* 309, 1844-1846, Attachment 51.

¹³² Mann, M.E. et al. Influence of Anthropogenic Climate Change on Planetary Wave Resonance and Extreme Weather, *Nature Scientific Reports*, (2017), Attachment 52.

¹³³ NOAA, Exceedance Probability Analysis for Selected Storm Events (last visited Mar. 12, 2019), *available at* http://www.nws.noaa.gov/oh/hdsc/aep_storm_analysis/, Attachment 53.

¹³⁴ NOAA National Hurricane Center, Storm Surge Overview (last visited Mar. 8, 2019) <https://www.nhc.noaa.gov/surge/>, Attachment 54; Sarah Gibbens, Why storm surges and flooding are the biggest hurricane hazards, *NAT. GEO.* (Oct. 9, 2018), *available at* <https://www.nationalgeographic.com/environment/2018/10/why-storm-surges-flooding-are-biggest-hurricane-hazards/>, Attachment 55.

just a few minutes and moves with the forward speed of the hurricane—typically 10-15 mph.¹³⁵ The large waves that generate the storm surge travel ahead of the storm.¹³⁶ This means that the “storm surge can begin to rise a day before the storm hits, cutting off escape routes when low-lying highways are flooded.”¹³⁷ According to the North Carolina Department of Public Safety, even a few inches of water are enough to float a car, so even slightly flooded or washed out roads are unsafe.¹³⁸

As discussed in the previous section, by 2050 the Bridge is unlikely to provide a safe means of egress even in the absence of a storm surge due to sea level rise. Even under current conditions, however, new storm surge data from NOAA indicates that the storm surge accompanying a hurricane making landfall in the Outer Banks has significant potential to strand evacuees, especially those leaving late, along the Currituck and Dare County coastline, regardless of whether the proposed Bridge is constructed. NCDOT identifies US 158 (Caratoke Highway) and NC 12 as the primary coastal highway evacuation routes off of the Currituck County Outer Banks.¹³⁹

FEMA’s hurricane clearance model assumes that evacuees will use US 158 or a combination of US 158 and 168 to evacuate when an evacuation order is given.¹⁴⁰ The proposed Bridge would connect NC 12 to US 158 at Aydlett, but any evacuation from the mainland of Currituck County would still be along US 158 and Routes 343 or 168. This means that the proposed Bridge will only be a viable evacuation route if US 158 and NC 168 North of the proposed Bridge US 158 interchange or NC 343 remain unflooded. Current storm surge modeling, recent observed storm surges, and studies indicating that storm surges have and will continue to increase in magnitude due to global warming demonstrate that this is not an accurate assumption.

Storm surge modeling based on recent NOAA data, illustrated below and included in greater detail at Attachment 57, indicates that under current conditions, which do not account for sea level rise, the storm surge associated with a Category Two or Three Hurricane would inundate portions of US 158, NC 168, and NC 343, rendering the Bridge inaccessible from the mainland, and therefore useless as a means of egress.

¹³⁵ Prepare for a Storm Surge, Weather Underground (last visited Mar. 8, 2019), *available at* <https://www.wunderground.com/prepare/storm-surge>, Attachment 56.

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ ReadyNC, Hurricanes (last visited Mar. 8, 2019), *available at* https://readync.org/EN/Informed_NatHaz_Hurricane.html, Attachment 58.

¹³⁹ Coastal Routes to I-95 (last visited Mar. 8, 2019), *available at* <https://www.ncdot.gov/travel-maps/maps/Documents/coastal-evacuation-routes.pdf>, Attachment 59.

¹⁴⁰ Reevaluation Study Report at 2-16.

Figure 6: Category 2 Hurricane Storm Surge

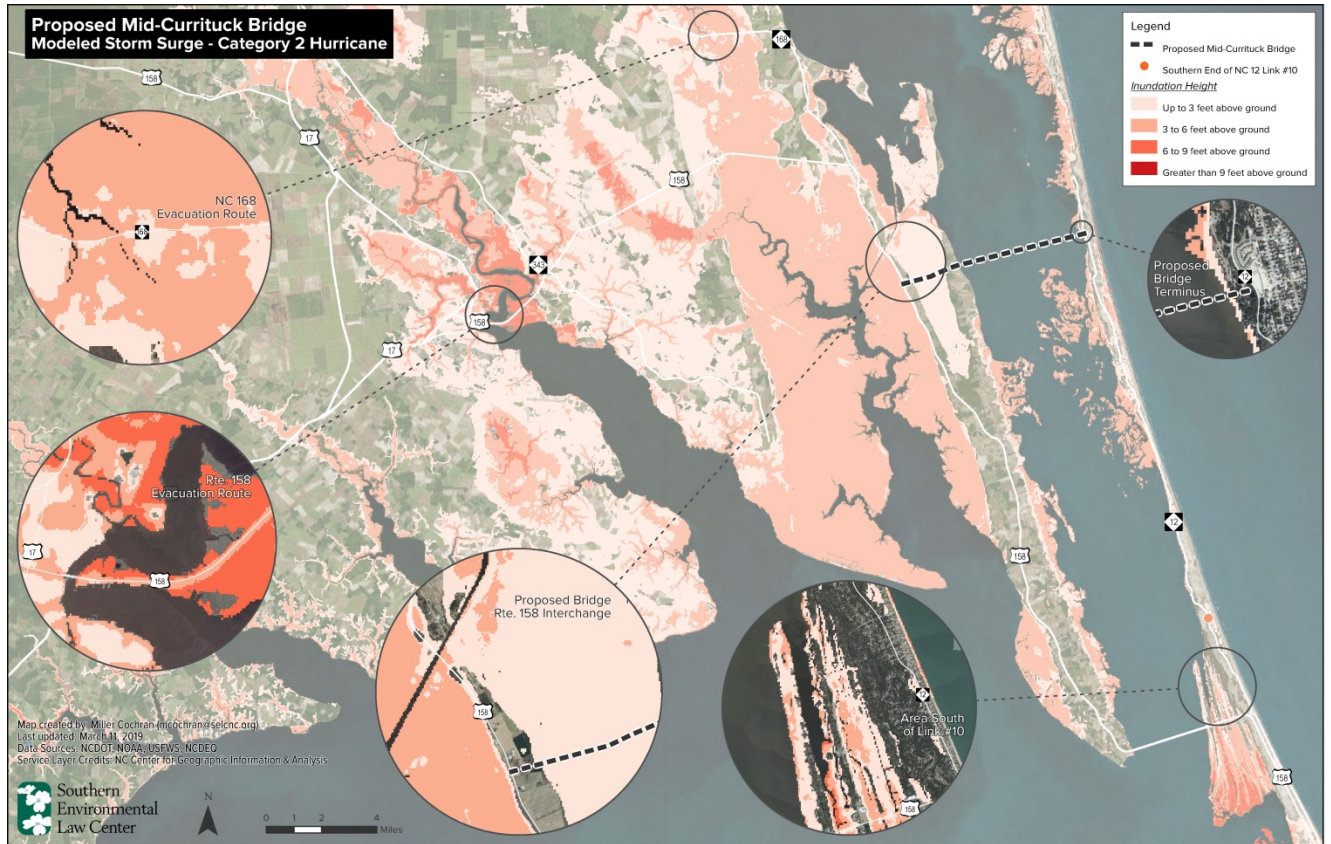
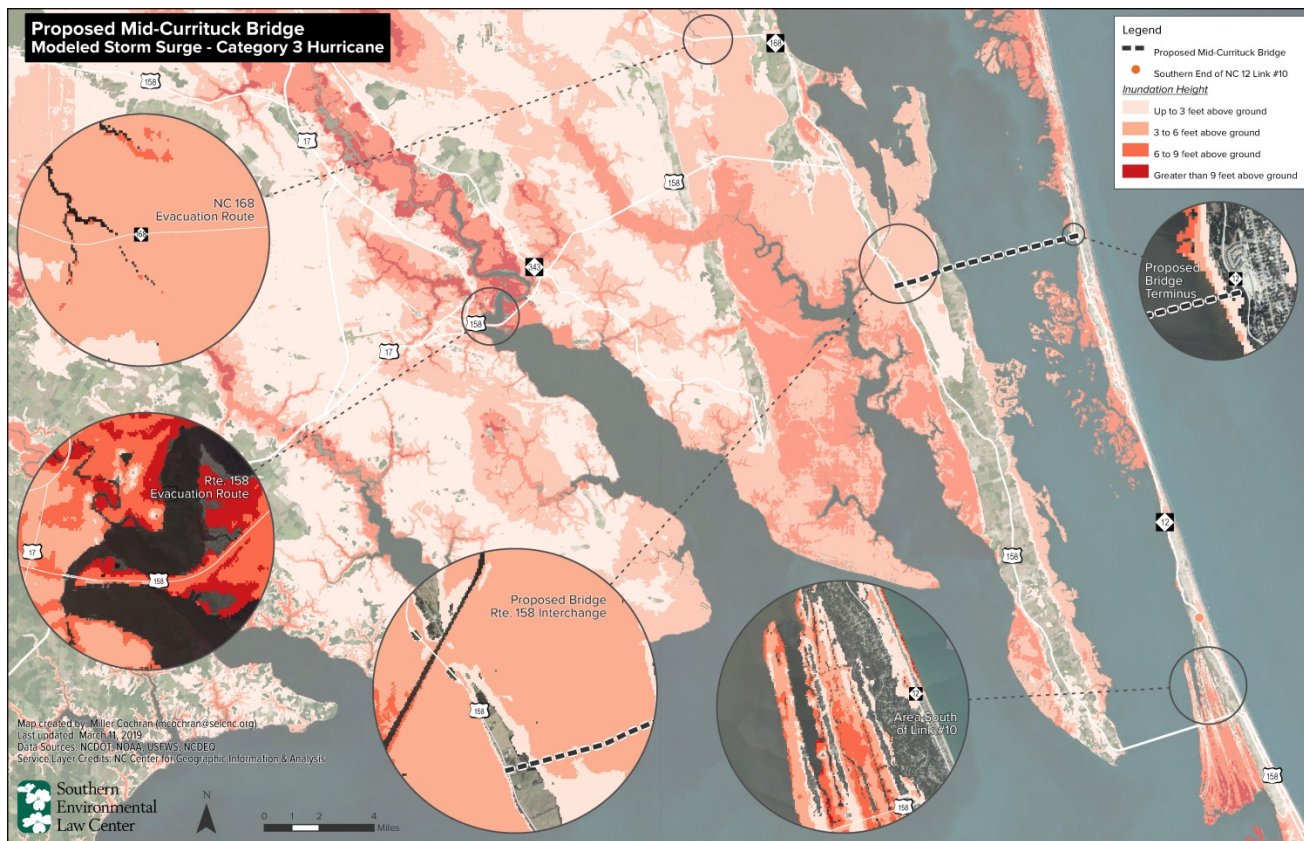


Figure 7: Category 3 Hurricane Storm Surge



Among other things, these maps indicate that the interchange between the proposed Bridge and US 158 would likely flood during a storm surge. NCDOT’s Other Physical Features Technical Report admits that this interchange would be at-risk during a storm surge, and states that the interchange would be bridged to mitigate this risk.¹⁴¹ However, NCDOT relies on historical storm surge trends from 2000, which appear to deviate significantly from observed storm surges in recent years, and at least in one instance modeled storm surge at a mere 2.4 inches.¹⁴² This storm surge projection is not remotely comparable in magnitude to storm surges the Outer Banks are currently experiencing. For example, in September 2018, Hurricane Florence, a Category One Hurricane, caused Duck to experience a 1.8 foot storm surge even as the eye of the storm made landfall 180 miles away.¹⁴³ When Hurricane Michael passed through North Carolina as a tropical storm in October 2018, Kill Devil Hills, Manteo, and Kitty Hawk

¹⁴¹ Other Physical Features Technical Report at 1-10 (2011)

¹⁴² *Id.* at 3-2. NCDOT claims to model storm surge as the difference between MHHW and NOAA’s Highest observed water level (“HOWL”), but the Physical Features Technical Report does not discuss this calculation in any detail.

¹⁴³ NOAA National Weather Service, Tropical Storm Michael, Oct. 11-12, 2018 (last visited Mar. 8, 2019) <https://www.weather.gov/mhx/Michael2018>, Attachment 60.

experienced a storm surge ranging between 2 to 4 feet above ground.¹⁴⁴ Hurricane Michael also produced a two foot surge above mean high-high water (“MHHW”) in Duck.¹⁴⁵

These recent observed storm surges belie NCDOT’s outdated assumption that future storm surges will remain at historical year 2000 magnitudes. Furthermore, NCDOT explicitly did not consider “potential changes in storm intensity and resultant surge because of climate change.”¹⁴⁶ Since 2011, a growing scientific consensus has emerged that storm surges will worsen as storms continue to intensify due to climate change.¹⁴⁷ In fact, North Carolina’s coastal plain has been dealt two so-called 1,000 year storms in only two years (Matthew in 2016 and Florence in 2018).¹⁴⁸ Given NCDOT’s chronic underestimation of the magnitude of storm surges, and the observed increase in frequency and magnitude of severe flooding events, it is not at all apparent that NCDOT’s bridging plan will be sufficient to mitigate the risk to the NC 12/ US 158 interchange. NCDOT must prepare a Supplemental EIS that, among other things, reevaluates the effectiveness of the US 158 interchange bridging proposal based on updated storm surge projections.

Moreover, even if the NC 12/ US 158 interchange is sufficiently elevated to prevent flooding, the storm surge from a Category Two or Three Hurricane would likely inundate large portions of US 158 and NC 168 North of a Mid-Currituck Bridge US 158 interchange (highlighted in Fig. 5 and 6), eliminating those routes as means of egress immediately prior to a hurricane. NCDOT altogether failed to analyze the impacts of sea level rise on these parts of the evacuation routes, which projections show are most vulnerable to flooding. Reports from recent hurricanes corroborate the conclusion that it is these areas, further down the evacuation routes on NC 168 and US 158, which are most likely to flood or wash out during a severe weather event. During Hurricane Florence, US 158 in Dare County (South of the proposed Mid-Currituck Bridge US 158 interchange), which is one of the lower-risk areas according to storm-surge models, was closed for an extended period of time due to flooding and/or debris.¹⁴⁹ Hurricane Matthew also left many sections of US 158 covered in “deep standing water.”¹⁵⁰ This protracted

¹⁴⁴ Duck, NC tide gauge.

<https://tidesandcurrents.noaa.gov/waterlevels.html?id=8651370&units=standard&bdate=20181007&edate=20181017&timezone=GMT&datum=MHHW&interval=6&action>, Attachment 61.

¹⁴⁵ *Id.*

¹⁴⁶ Other Physical Features Technical Report at 3-2.

¹⁴⁷ 2018 IPCC Report at 225, Attachment 17; North Carolina’s Sea Level Is Rising, (last visited Mar. 12, 2019) <https://sealevelrise.org/states/north-carolina/>, Attachment 62.

¹⁴⁸ Exceedance Probability Analysis for Selected Storm Events (last visited Mar. 8, 2019) http://www.nws.noaa.gov/oh/hdsc/aep_storm_analysis/, Attachment 53.

¹⁴⁹ US Dep’t of Transp. Resources of Hurricane Florence (Sept. 16, 2018), <https://www.transportation.gov/briefing-room/us-department-transportation-resources-hurricane-florence>, Attachment 63.

¹⁵⁰ Dave Dewitt & Elizabeth Baier, Hurricane Matthew Leaves North Carolina with Major Flooding, WUNC 91.5 (Oct. 9, 2016), <http://www.wunc.org/post/hurricane-matthew-leaves-north-carolina-major-flooding>. Attachment 64.

flooding impacts evacuation routes in the short-term, but could also impact infrastructure integrity in the long run by necessitating more frequent repairs.¹⁵¹ The Transportation Agencies must, at the very least, factor the costs of repairing flood-damaged new transportation infrastructure in a Supplemental EIS.

Furthermore, none of the storm surge projections discussed here model how the combination of sea level rise *and* storm surge would impact the Currituck and Dare County coastlines. NCDOT attempted to model sea level rise plus storm surge in its outdated Other Physical Features Technical Report, but has made no efforts to quantify the combined impact of sea level rise and hurricane related flooding based on up-to-date data.

New storm surge projections combined with flooding data from recent hurricanes provides further evidence that the proposed Bridge will not substantially reduce hurricane evacuation times, because the existing roads the Bridge would connect to are extremely vulnerable to flooding due to the storm surge that precedes hurricane landfall. Even if the Bridge facilitates evacuation from the Outer Banks, storm surge flooding US 158 and surrounding roads could strand evacuees on the Currituck County coastline.

C. The proposed Bridge will drive increased development in Currituck County, placing more people and property in harm's way in the event of a hurricane

The long-term solution to ensuring safety during hurricanes, which will only become more frequent and intense as global warming progresses,¹⁵² is to limit development in the Outer Banks. The proposed Bridge will achieve the exact opposite result by accelerating development and thereby increasing the amount of infrastructure and people vulnerable to hurricanes.¹⁵³ The Transportation Agencies must prepare a Supplemental EIS that incorporates up-to-date storm surge modeling data and considers how increasing flooding risks associated with hurricanes will interact with increased development driven by the proposed Bridge.

Among Currituck County locals, it is well established that the proposed Bridge would increase development in Currituck County and the Outer Banks. For example, the Chair of the Currituck County Board of Commissioners recently stated that the Bridge would cause “a shift in the housing market” on the mainland of Currituck County and “allow for some areas where

¹⁵¹ See Ames Alexander, Florence damaged hundreds of NC roads and bridges. When will they be repaired? Charlotte Observer (Sept. 21, 2018), available at <https://www.charlotteobserver.com/news/weather/article218671150.html>, Attachment 65.

¹⁵² Easterling, D. R. et al., 2017: *Precipitation Change in the United States*, in Climate Science Special Report: Fourth National Climate Assessment, Vol. I, Attachment 15; Wuebbles, D. J. et al., Carter, L. et al., 2018: *Southeast*, in Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Vol. II, Attachment 16.

¹⁵³ See Michael Biesecker, Jonathan Drew, After Florence, sea level rise threat will remain for North Carolina shore, PBS (Sept. 13, 2018), available at <https://www.pbs.org/newshour/nation/after-florence-sea-level-rise-threat-will-remain-for-north-carolina-shore>, Attachment 66.

people who work and support [the Outer Banks] can live closer to where they work.”¹⁵⁴ Representative Bobby Hanig, who represents Currituck County, similarly stated that the proposed Bridge “is going to change what the landscape of Currituck looks like in the not-too-distant future.”¹⁵⁵ The Transportation Agencies have not analyzed these claims, and seemingly contradict them in their ICE analysis while embracing them in their INFRA grant application.¹⁵⁶ The increased development predicted by local government officials in Currituck County only places more people and their property in the path of hurricanes. Currituck County will face chronic flooding on 12% of its usable land by 2030 and 75% of its usable land by 2100.¹⁵⁷

Hurricane Florence and Hurricane Matthew caused \$17 billion and \$10 billion in damages respectively in North Carolina.¹⁵⁸ The risks to people and property associated with hurricanes are not going away, and will only increase as climate change accelerates. The Transportation Agencies must prepare a Supplemental EIS that evaluates how increased development in Currituck County would be impacted by the more frequent hurricanes, increased flooding, and higher storm surges the Eastern Coast of North Carolina will face in the not-so-distant future.

VI. CONCLUSION

A Supplemental EIS is required for the Mid-Currituck Bridge for two primary reasons. First, the ROD and the accompanying Reevaluation Study Report include substantial new information regarding, among other things, project costs, environmental impacts, traffic forecasts, hurricane evacuation modeling, development assumptions, design of alternatives, and financing plans, none of which was made public for review and comment as required by NEPA. Second, even if the process behind the new documents were sufficient, they are based on outdated data regarding sea level rise and storm surge modeling despite the availability of more recent, robust, and localized data that indicates that the accelerating effects of climate change will render the Bridge unusable within a few decades.

Rather than push forward an ill-conceived project which relies upon outdated demographic information and ever diminishing toll revenue projections to appear viable, the

¹⁵⁴ Will Michaels, *New Outer Banks Toll Bridge Has Federal Approval; Hurdles Remain* (Mar. 12, 2019), WUNC 91.5 available at <http://www.wunc.org/post/new-outer-banks-toll-bridge-has-federal-approval-hurdles-remain>, Attachment 67.

¹⁵⁵ Reggie Ponder, *Feds OK Mid-Currituck Bridge*, Daily Advance (Mar. 8, 2019), available at <http://www.dailyadvance.com/News/2019/03/08/Feds-OK-Mid-Currituck-Bridge.html>, Attachment 68.

¹⁵⁶ INFRA GRANT 2018 Application: Mid-Currituck Bridge (R-2576) (Nov. 2017) at 8 (concluding that with the bridge, “[t]he region’s recreational activities and vacations will draw more visitors, and its high quality of life will draw more residents, leading to greater economic opportunities for the region’s communities and workers.”), Attachment 11.

¹⁵⁷ Union of Concerned Scientists, *When Rising Seas Hit Home*, Attachment 40.

¹⁵⁸ Hurricane Florence Damage in North Carolina Reaches \$17B, *Insurance Journal* (Nov. 2, 2018), available at <https://www.insurancejournal.com/news/southeast/2018/11/02/506414.htm>, Attachment 69; North Carolina’s Sea Level Is Rising, (last visited Mar. 12, 2019), available at <https://sealevelrise.org/states/north-carolina/>, Attachment 62.

Transportation Agencies should act in accordance with Executive Order 80 and invest in sustainable, long-lasting transportation infrastructure that will remain resilient into the future. Therefore, we urge the Transportation Agencies to prepare a Supplemental EIS that re-evaluates the viability of the Bridge and its effectiveness alongside alternative solutions concepts in light of up-to-date climate change science and make this analysis available to the public to guide decisionmaking as NEPA requires.

As always, we are happy to meet with you at your convenience to discuss these issues further.

Sincerely,



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