AIR QUALITY REPORT

US 70 Kinston Bypass

Lenoir, Jones, and Craven Counties

WBS Element No. 34460
STIP Project No. R-2553

Prepared for:

North Carolina Department of Transportation
Environmental Analysis Unit
Traffic Noise and Air Quality Group

Submitted by:

AECOM

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1. Introduction

The North Carolina Department of Transportation (NCDOT) proposes to construct a multi-lane freeway on new location in Lenoir, Jones, and Craven counties, North Carolina. As it is currently defined, the Kinston Bypass, which is listed as NCDOT STIP Project R-2553, would consist of a four-lane, median divided freeway from US 70 near LaGrange in Lenoir County to US 70 near Dover, on the Jones and Craven County line. The proposed project is located in Lenoir, Jones, and Craven Counties, as shown in Figure 1. The primary purpose of the proposed project is to improve regional mobility, connectivity, and capacity for US 70 between LaGrange and Dover in a manner that meets the intent of the North Carolina Strategic Highway Corridors Plan. The need to be addressed by the proposed project is a fully control of access freeway between LaGrange and Dover which meets capacity demands and improves travel time. An Environmental Impact Statement is being prepared for this project in compliance with National Environmental Policy Act.

12 alternatives are being considered in detail for the R-2553 project:

Alternative 1 UE (Upgrade Existing US 70)

This alternative assumes that US 70 will maintain the current alignment, except it will be upgraded to freeway standards. This means that all at-grade intersections will be removed and access to US 70 would occur through new interchanges. Further, any existing at-grade railroad crossings would be removed or converted to a grade separation. This alternative would also include improvements to US 70 required to achieve a design speed of 70 mph.

Alternative 1 UE SB (Upgrade Existing US 70 including a Shallow Southern Bypass)

In this alternative, US 70 will maintain the existing alignment until just east of the C.F. Harvey Parkway interchange at US 70. The alignment will then break off to the south on new location and run parallel to existing US 70 for approximately 6.5 miles. East of NC 58, the new alignment will merge back with the existing US 70 alignment until the end of the planned freeway design. Like Alternative 1 UE, major street crossings would receive access to US 70 through interchanges, and the design speed for the alternative would be 70 mph.

Alternative 11

In this alternative, US 70 will maintain its existing alignment until the C.F. Harvey Parkway interchange at US 70. A southern leg will then be added to the interchange to the south, and the Kinston Bypass will follow this southern leg on new location. Near the existing NC 11 and NC 55 intersection, the alignment will maintain an eastern route to the south of Kinston. This alignment rejoins current US 70 at Dover.

Alternative 12

In this alternative, US 70 will maintain its existing alignment until the C.F. Harvey Parkway interchange at US 70. A southern leg will then be added to the interchange to the south, and the Kinston Bypass will follow this southern leg on new location. Near the existing NC 11 and NC 55 intersection, the alignment will maintain an eastern route to the south of Kinston. This alignment is identical to Alternative 11 except that it rejoins current US 70 several miles to the west of Dover, just across the Jones County line. This alternative is the northernmost alignment of the southern bypass alternatives.

Alternative 31

In this alternative, US 70 will maintain its existing alignment until just west of the C.F. Harvey Parkway interchange at US 70. The alignment breaks off on new location to the south and east, and will maintain an eastern route to the south of Kinston, following a similar path as Alternative 11. A southern leg will also be added to the C.F. Harvey Parkway interchange at US 70, which will be an extension of C.F. Harvey Parkway to the Kinston Bypass. Like Alternative 11, this alignment rejoins current US 70 east of Kinston at Dover.

Alternative 32

In this alternative, US 70 will maintain its existing alignment until just west of the C.F. Harvey Parkway interchange at US 70. The alignment breaks off on new location to the south and east, and will maintain an eastern route to the south of Kinston, following a similar path as Alternative 12. Similar to Alternative 31, a southern leg will also be added to the C.F. Harvey Parkway interchange at US 70, which will be an extension of C.F. Harvey Parkway to the Kinston Bypass. Like Alternative 12, this alignment rejoins current US 70 several miles to the west of Dover, just across the Jones County line.

Alternative 35

In this alternative, US 70 breaks off on new location from its current alignment several miles west of the C.F. Harvey Parkway interchange at US 70. The alignment heads to the south and then to the east, coming close to the Duplin County line. From there, this alternative then heads to the north and east, reconnecting with existing US 70 just across the Jones County line.

Alternative 36

In this alternative, US 70 breaks off on new location from its current alignment several miles west of the C.F. Harvey Parkway interchange at US 70. The alignment heads to the south and then to the east, coming close to the Duplin County line similar to Alternative 35. This alternative then heads to the north and east, and reconnects with existing US 70 at Dover. This alignment is the southernmost alternative of the various southern bypass alternatives.

Alternative 51

In this alternative, US 70 breaks off on new location from its current alignment several miles west of the C.F. Harvey Parkway interchange at US 70. The alignment heads to the south and east, and then directly east, where it takes the same route as Alternative 11 until it reconnects with existing US 70 at Dover.

Alternative 52

In this alternative, similar to Alternative 51, US 70 breaks off on new location from its current alignment several miles west of the C.F. Harvey Parkway interchange at US 70. The alignment heads to the south and east, and then directly east, where it takes the same route as Alternative 12 eastward until it reconnects with existing US 70 several miles west of Dover, just across the Jones County line.

Alternative 63

In this alternative, US 70 will maintain its existing alignment until just west of the C.F. Harvey Parkway interchange at US 70. The alignment breaks off on new location to the south and east towards the existing NC 11 and NC 55 intersection, and will maintain an eastern route to the south of Kinston, following a similar path as Alternative 11. A southern leg will also be added to the C.F. Harvey Parkway interchange at US 70 which will be an extension of C.F. Harvey Parkway to the Kinston Bypass. The difference between this alternative and Alternative 31 is that this alignment will require a slightly longer southern extension of C.F. Harvey Parkway. The alignment then follows the same route as Alternative 11, rejoining current US 70 east of Kinston at Dover.

Alternative 65

In this alternative, similar to Alternative 63, US 70 will maintain its existing alignment until just west of the C.F. Harvey Parkway interchange at US 70. The alignment breaks off on new location to the south and east towards the existing NC 11 and NC 55 intersection, and will maintain an eastern route to the south of Kinston, following a similar path as Alternative 12. A southern leg will also be added to the C.F. Harvey Parkway interchange at US 70 which will be an extension of C.F. Harvey Parkway to the Kinston Bypass. The difference between this alternative and Alternative 32 is that this alignment will require a slightly longer southern extension of C.F. Harvey Parkway. The alignment then follows the same route as Alternative 12, rejoining current US 70 several miles west of Dover, just across the Jones County line.

The build alternatives are shown in Figures 2 and 3.

2. Air Quality Analysis

Air pollution originates from various sources. Emissions from industry and internal combustion engines are the most prevalent sources. The impact resulting from highway construction ranges from intensifying existing air pollution problems to improving the ambient air quality. Changing traffic patterns are a primary concern when determining the impact of a new highway facility or the improvement of an existing highway facility. Motor vehicles emit carbon monoxide (CO), nitrogen oxide (NO), hydrocarbons (HC), particulate matter, sulfur dioxide (SO_2), and lead (Pb) (listed in order of decreasing emission rate).

The Federal Clean Air Act of 1970 established the National Ambient Air Quality Standards (NAAQS). These were established in order to protect public health, safety, and welfare from known or anticipated effects of air pollutants. The NAAQS contain criteria for SO_2, particulate matter (PM_{10}, 10-micron and smaller, $PM_{2.5}$, 2.5 micron and smaller), CO, nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb). The National and North Carolina Ambient Air Quality Standards are presented in Table 1.

The primary pollutants from motor vehicles are unburned hydrocarbons (HC), Nitrogen oxides (NOx), CO, and particulates. HC and NOx can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as O_3 and NO_2. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind of the precursor sources. These pollutants are regional problems.

Table 1. National and North Carolina Ambient Air Quality Standards (NAAQS)

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 $\mu g/m^3$ (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 $\mu g/m^3$	annual mean, averaged over 3 years
		secondary	1 year	15.0 $\mu g/m^3$	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 $\mu g/m^3$	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.

(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)), A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require NAAQS.

Source: US EPA, https://www.epa.gov/criteria-air-pollutants/naaqs-table, accessed January 5, 2018.

3. Attainment Status

The proposed project is located in Lenoir, Jones, and Craven Counties, which has been determined to comply with the NAAQS. The proposed project is located in an attainment area; therefore, 40 CFR Parts 51 and 93 are not applicable. The proposed project is not anticipated to create any adverse effects on the air quality of this attainment area.

4. Carbon Monoxide

Carbon monoxide is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes approximately 56 percent of all carbon emissions nationally. State and federal guidance suggests using CO predictions as the primary indicator for vehicular induced pollution. CO is sensitive to variations in temperature; emissions are twice as high in winter months as compared to summer months. CO is also sensitive to vehicle speed; emissions decrease with an increase in speed (up to 50 mph), and then increase again at higher speeds. Idling and low speeds (less than 15 mph) can produce the highest CO levels. Recent trends in air quality indicate CO levels have dramatically improved. The decline in CO concentrations is primarily due to stricter controls on automobile exhaust resulting in cleaner cars. This drop is remarkable because it is occurring while the nation's population is growing rapidly yielding more traffic and urban sprawl.

CO regional and project-level conformity requirements in North Carolina have ended. Therefore, regional and project-level transportation conformity requirements no longer apply to CO in North Carolina. As such, project-level CO hot-spot analyses using MOVES2014 and CAL3QHC emission and dispersion models are no longer required in North Carolina as part of the NEPA/SEPA process.

5. Ozone & Oxides

Automobiles are regarded as sources of HC and NOx. HC and NOx emitted from cars are carried into the atmosphere where they react with sunlight to form O_3 and NO_2. Automotive emissions of HC and NOx are expected to decrease in the future due to the continued installation and maintenance of pollution control devices on new cars. However, regarding area-wide emissions, these technological improvements may be offset by the increasing number of cars on the transportation facilities of the area.

The photochemical reactions that form O_3 and NO_2 require several hours to occur. For this reason, the peak levels of ozone generally occur ten to twenty kilometers downwind of the source of HC emissions. Urban areas as a whole are regarded as sources of HC, not individual streets and highways. The emissions of all sources in an urban area mix in the atmosphere, and, in the presence of sunlight, this mixture reacts to form O_3, NO_2, and other photochemical oxidants. The best example of this type of air pollution is the smog that forms in Los Angeles, California.

6. Particulate Matter & Sulfur

Automobiles are not regarded as significant sources of particulate matter (PM) and SO_2. Nationwide, highway sources account for less than seven percent of PM emissions and less than two percent of SO_2 emissions. PM and SO_2 emissions are predominantly the result of non-highway sources (e.g., industrial, commercial, and agricultural). Because emissions of PM and

SO_2 from automobiles are very low, there is no reason to suspect that traffic on the proposed project will cause air quality standards for PM and SO_2 to exceed the NAAQS.

This project is within an attainment area for $PM_{2.5}$ and PM_{10} and does not include significant increases in diesel traffic. Therefore, no quantitative $PM_{2.5}$ or PM_{10} analysis is required.

7. Lead

Automobiles without catalytic converters can burn regular gasoline. The burning of regular gasoline emits lead as a result of regular gasoline containing tetraethyl lead, which is added by refineries to increase the octane rating of the fuel. Newer cars with catalytic converters burn unleaded gasoline, thereby eliminating lead emissions. Also, the United States Environmental Protection Agency (EPA) has required the reduction in the lead content of leaded gasoline. The overall average lead content of gasoline in 1974 was approximately 0.53 gram per liter. By 1989, this composite average had dropped to 0.003 gram per liter. The Clean Air Act Amendments of 1990 (CAAA) made the sale, supply, or transport of leaded gasoline or lead additives unlawful after December 31, 1995. Because of these reasons, it is not expected that traffic on the proposed project will cause the NAAQS for lead to be exceeded.

8. Mobile Source Air Toxics (MSAT)

8.1. Background

Controlling air toxic emissions became a national priority with the passage of the CAAA, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of EPA's Integrated Risk Information System (IRIS).[1] In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors from the 2011 National Air Toxics Assessment (NATA).[2] These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority MSAT, the list is subject to change and may be adjusted in consideration of future EPA rules.

8.2. Motor Vehicle Emissions Simulator (MOVES)

According to EPA, MOVES2014 is a major revision to MOVES2010 and improves upon it in many respects. MOVES2014 includes new data, new emissions standards, and new functional improvements and features. It incorporates substantial new data for emissions, fleet, and activity developed since the release of MOVES2010. These new emissions data are for light- and heavy- duty vehicles, exhaust and evaporative emissions, and fuel effects. MOVES2014 also adds updated vehicle sales, population, age distribution, and vehicle miles travelled (VMT) data.

MOVES2014 incorporates the effects of three new Federal emissions standard rules not included in MOVES2010. These new standards are all expected to impact MSAT emissions

[1] https://www.epa.gov/iris
[2] https://www.epa.gov/national-air-toxics-assessment

and include Tier 3 emissions and fuel standards starting in 2017 (79 FR 60344), heavy-duty greenhouse gas regulations that phase in during model years 2014-2018 (79 FR 60344), and the second phase of light duty greenhouse gas regulations that phase in during model years 2017-2025 (79 FR 60344). Since the release of MOVES2014, EPA has released MOVES2014a. In the November 2015 MOVES2014a Questions and Answers Guide,[3] EPA states that for on-road emissions, MOVES2014a adds new options requested by users for the input of local VMT, includes minor updates to the default fuel tables, and corrects an error in MOVES2014 brake wear emissions. The change in brake wear emissions results in small decreases in PM emissions, while emissions for other criteria pollutants remain essentially the same as MOVES2014.

Using EPA's MOVES2014a model, as shown in the chart below, FHWA estimates that even if VMT increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

Diesel PM is the dominant component of MSAT emissions, making up 50 to 70 percent of all priority MSAT pollutants by mass, depending on calendar year. Users of MOVES2014a will notice some differences in emissions compared with MOVES2010b. MOVES2014a is based on updated data on some emissions and pollutant processes compared to MOVES2010b, and also reflects the latest Federal emissions standards in place at the time of its release. In addition, MOVES2014a emissions forecasts are based on lower VMT projections than MOVES2010b, consistent with recent trends suggesting reduced nationwide VMT growth compared to historical trends.

8.3. MSAT Research

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of National Environmental Policy Act (NEPA).

Nonetheless, air toxics concerns continue to arise on highway projects during the National Environmental Policy Act (NEPA) process. Even as the science emerges, the public and other agencies expect FHWA to address MSAT impacts in its environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

8.4. NEPA Context

The NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the Federal Government be interpreted and administered in accordance with its environmental protection goals, and that Federal agencies use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment (42 U.S.C. 4332). In addition to evaluating the potential environmental effects, FHWA must also take into account the need for safe and efficient transportation in reaching a decision that is in the best overall

[3] https://www.epa.gov/moves/moves2014a-latest-version-motor-vehicle-emission-simulator-moves

public interest (23 U.S.C. 109(h)). The FHWA policies and procedures for implementing NEPA are contained in regulation at 23 CFR Part 771.

8.5. Consideration of MSAT in NEPA Documents

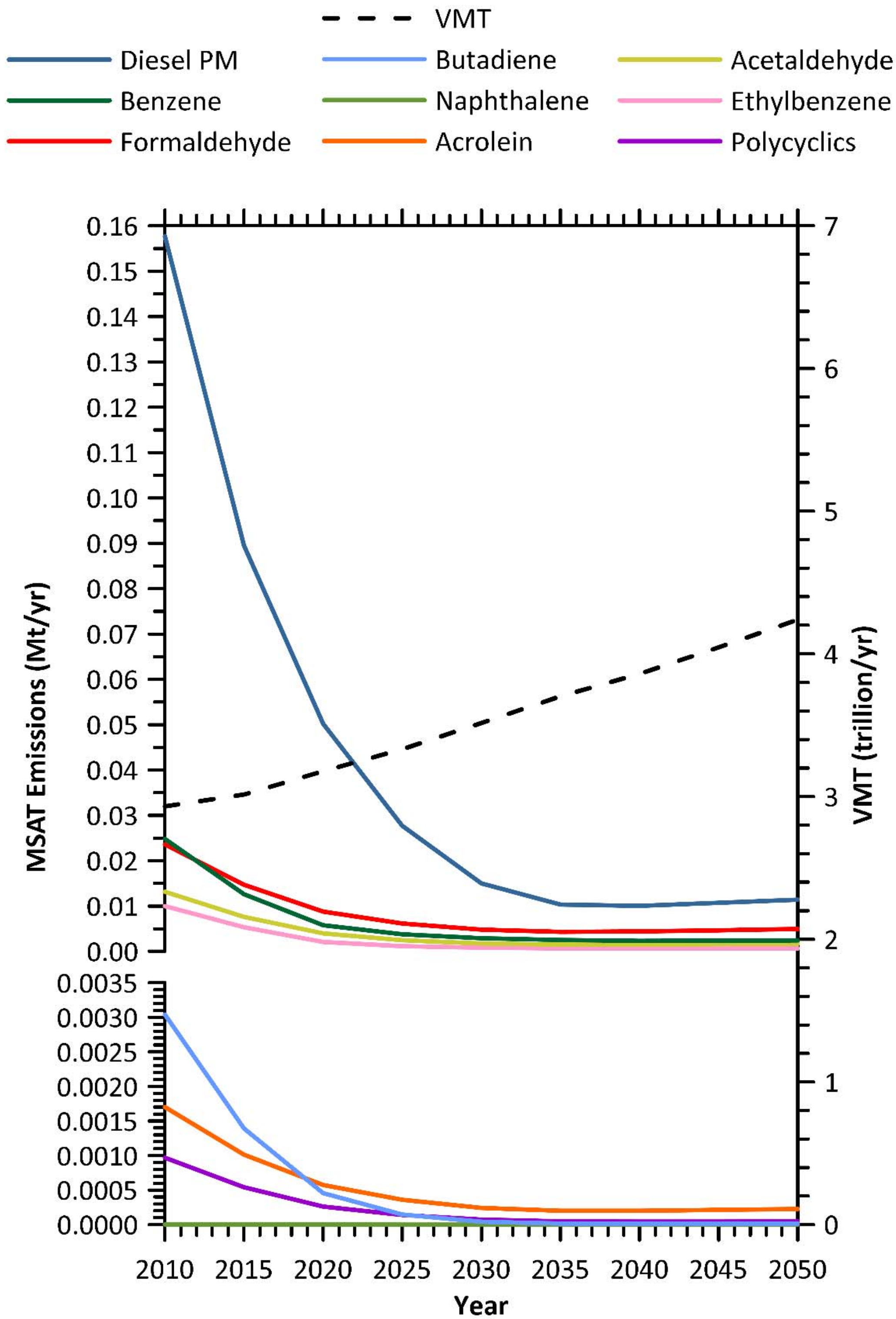
The FHWA developed a tiered approach with three categories for analyzing MSAT in NEPA documents, depending on specific project circumstances:

(1) No analysis for projects with no potential for meaningful MSAT effects;

(2) Qualitative analysis for projects with low potential MSAT effects; or

(3) Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

For projects warranting MSAT analysis, all nine priority MSAT should be considered.



Source: EPA MOVES2014a.

National MSAT Emission Trends 2010 - 2050 for Vehicles Operating on Roadways Using EPA's MOVES2014a Model

(1) Projects with No Meaningful Potential MSAT Effects, or Exempt Projects.

The types of projects included in this category are:

- Projects qualifying as a categorical exclusion under 23 CFR 771.117;
- Projects exempt under the Clean Air Act conformity rule under 40 CFR 93.126; and
- Other projects with no meaningful impacts on traffic volumes or vehicle mix.

For projects that are categorically excluded under 23 CFR 771.117, or are exempt from conformity requirements under the Clean Air Act pursuant to 40 CFR 93.126, no analysis or discussion of MSAT is necessary. Documentation sufficient to demonstrate that the project qualifies as a categorical exclusion and/or exempt project will suffice. For other projects with no or negligible traffic impacts, regardless of the class of NEPA environmental document, no MSAT analysis is recommended. However, the project record should document the basis for the determination of no meaningful potential impacts with a brief description of the factors considered.

(2) Projects with Low Potential MSAT Effects

The types of projects included in this category are those that serve to improve operations of highway, transit, or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions. This category covers a broad range of projects.

FHWA anticipates that most highway projects that need an MSAT assessment will fall into this category. Examples of these types of projects are minor widening projects; new interchanges; replacing a signalized intersection on a surface street; and projects where design year traffic is projected to be less than 140,000 to 150,000 annual average daily traffic (AADT).

For these projects, a qualitative assessment of emissions projections should be conducted. This qualitative assessment should compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic and the associated changes in MSAT for the project alternatives, including no-build, based on VMT, vehicle mix, and speed. It should also discuss national trend data projecting substantial overall reductions in emissions due to stricter engine and fuel regulations issued by EPA. Because the emission effects of these projects typically are low, FHWA expects there would be no appreciable difference in overall MSAT emissions among the various alternatives.

In addition to the qualitative assessment, a NEPA document for this category of projects must include a discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts, in compliance with the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.22(b)). This discussion should explain how current scientific techniques, tools, and data are not sufficient to accurately estimate human health impacts that could result from a transportation project in a way that would be useful to decision-makers. Also in compliance with 40 CFR 150.22(b), this discussion should contain information regarding the health impacts of MSAT.

(3) Projects with Higher Potential MSAT Effects

This category includes projects that have the potential for meaningful differences in MSAT emissions among project alternatives. FHWA expects a limited number of projects to meet this two-pronged test. To fall into this category, a project should:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel PM in a single location, involving a significant number of diesel vehicles for new projects or accommodating with a significant increase in the number of diesel vehicles for expansion projects; or
- Create new capacity or add significant capacity to urban highways such as Interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000[4] or greater by the design year;

And also

- Be proposed to be located in proximity to populated areas.

Projects falling within this category should be more rigorously assessed for impacts. If a project falls within this category, the project sponsor should contact the Office of Natural Environment (HEPN) and the Office of Project Development and Environmental Review (HEPE) in FHWA Headquarters for assistance in developing a specific approach for assessing impacts. This approach would include a quantitative analysis to forecast local-specific emission trends of the priority MSAT for each alternative, to use as a basis of comparison. This analysis also may address the potential for cumulative impacts, where appropriate, based on local conditions. How and when cumulative impacts should be considered would be addressed as part of the assistance outlined above.

If the analysis for a project in this category indicates meaningful differences in levels of MSAT emissions among alternatives, mitigation options should be identified and considered.

The project sponsor should also consult with HEPN and HEPE if a project does not fall within any of the types of projects listed in Category (3) above, but may have the potential to substantially increase future MSAT emissions.

Project R-2553 falls under Category (2) because it does not qualify as a categorical exclusion under 23 CFR 771.117; is intended to improve the operations of the existing road network; and the 2040 Design Year traffic is not projected to meet or exceed the 140,000 to 150,000 AADT criterion. The project's Design Year traffic ranges from 10,400 to 47,000 AADT on US 70.

8.6. **Qualitative MSAT Analysis**

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*,

[4] Using EPA's MOVES2014a emissions model, FHWA determined that this range of AADT would result in emissions significantly lower than the Clean Air Act definition of a major hazardous air pollutant (HAP) source, i.e., 25 tons/yr. for all HAPs or 10 tons/yr. for any single HAP. Variations in conditions such as congestion or vehicle mix could warrant a different range for AADT.

found at:
https://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm.

For the detailed study alternatives prepared for the DEIS, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for the alternatives. Table 2 shows the VMT per detailed study alternative along both the existing US 70 corridor and the proposed US 70 Bypass alignments. While it is assumed that the traffic traveling through Kinston via the US 70 alignments would remain similar among all of the alternatives, the total daily VMT varies among the alternatives based on the local traffic that would utilize the new or upgraded facilities. Because the estimated VMT under all alternatives (build and no-build) are nearly the same, varying by less than 14 percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives.

Table 2. Vehicle Miles Traveled (per day)

Scenario	2040 Existing US 70 VMT	2040 US 70 Build VMT	Total VMT	Percent Change in VMT Compared to No-Build Alternative
No-Build	651,230		651,230	
Alternative 1 UE	0	656,620	656,620	0.8%
Alternative 1 UE SB	107,760	555,480	663,240	1.8%
Alternative 11	225,020	514,240	739,260	13.5%
Alternative 12	188,580	539,240	727,820	11.8%
Alternative 31	260,000	447,960	707,960	8.7%
Alternative 32	223,640	472,320	695,960	6.9%
Alternative 35	329,960	383,780	713,740	9.6%
Alternative 36	381,160	345,500	726,660	11.6%
Alternative 51	295,920	415,060	710,980	9.2%
Alternative 52	259,480	439,420	698,900	7.3%
Alternative 63	223,080	482,760	705,840	8.4%
Alternative 65	259,520	458,400	717,920	10.2%

Source: Traffic Forecast Technical Memorandum, Kinston Bypass Alternative Study, November 2016.

Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of the EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent from 2010 to 2050 (*Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*, Federal Highway Administration, October 18, 2016). Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the project study area are likely to be lower in the future in virtually all locations.

For each alternative there may be localized areas where VMT would increase, and other areas where VMT would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along the new location portions of the build alternatives, particularly for the new location portions of Alternative I UE SB near NC 11/55, US 258, and NC 58. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In sum, under all build alternatives in the design year it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No-Build Alternative, due to EPA's MSAT reduction programs.

8.7. Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, https://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). A number of HEI studies are summarized in Appendix D of FHWA's *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. Among the adverse health effects linked to MSAT compounds at high exposures are: cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects) or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA states that with respect to diesel engine exhaust, "[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk (https://www.epa.gov/iris)."

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable (https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD59852578000050C9DA/$file/07-1053-1120274.pdf).

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

8.8. MSAT Conclusion

What is known about MSAT is still evolving. As the science progresses, FHWA will continue to revise and update their guidance. FHWA is working with Stakeholders, EPA and others to better understand the strengths and weaknesses of developing analysis tools and the applicability on the project-level decision documentation process.

9. Construction Air Quality

Air quality impacts resulting from roadway construction activities are typically not a concern when contractors utilize appropriate control measures. During construction of the proposed project, all materials resulting from clearing and grubbing, demolition or other operations will be removed from the project, burned or otherwise disposed of by the Contractor. Any burning done will be done in accordance with applicable local laws and ordinances and regulations of the North Carolina State Implementation Plan (SIP) for air quality in compliance with 15A NCAC 2D.1903. Care will be taken to ensure burning will be done at the greatest distance practical from dwellings and not when atmospheric conditions are such as to create a hazard to the public. Operational agreements that reduce or redirect work or shift times to avoid community exposures can have positive benefits. Burning will be performed under constant surveillance.

During construction, measures will be taken to reduce the dust generated by construction, by wet suppression or equivalent, when the control of dust is necessary for the protection and comfort of motorists or area residents.

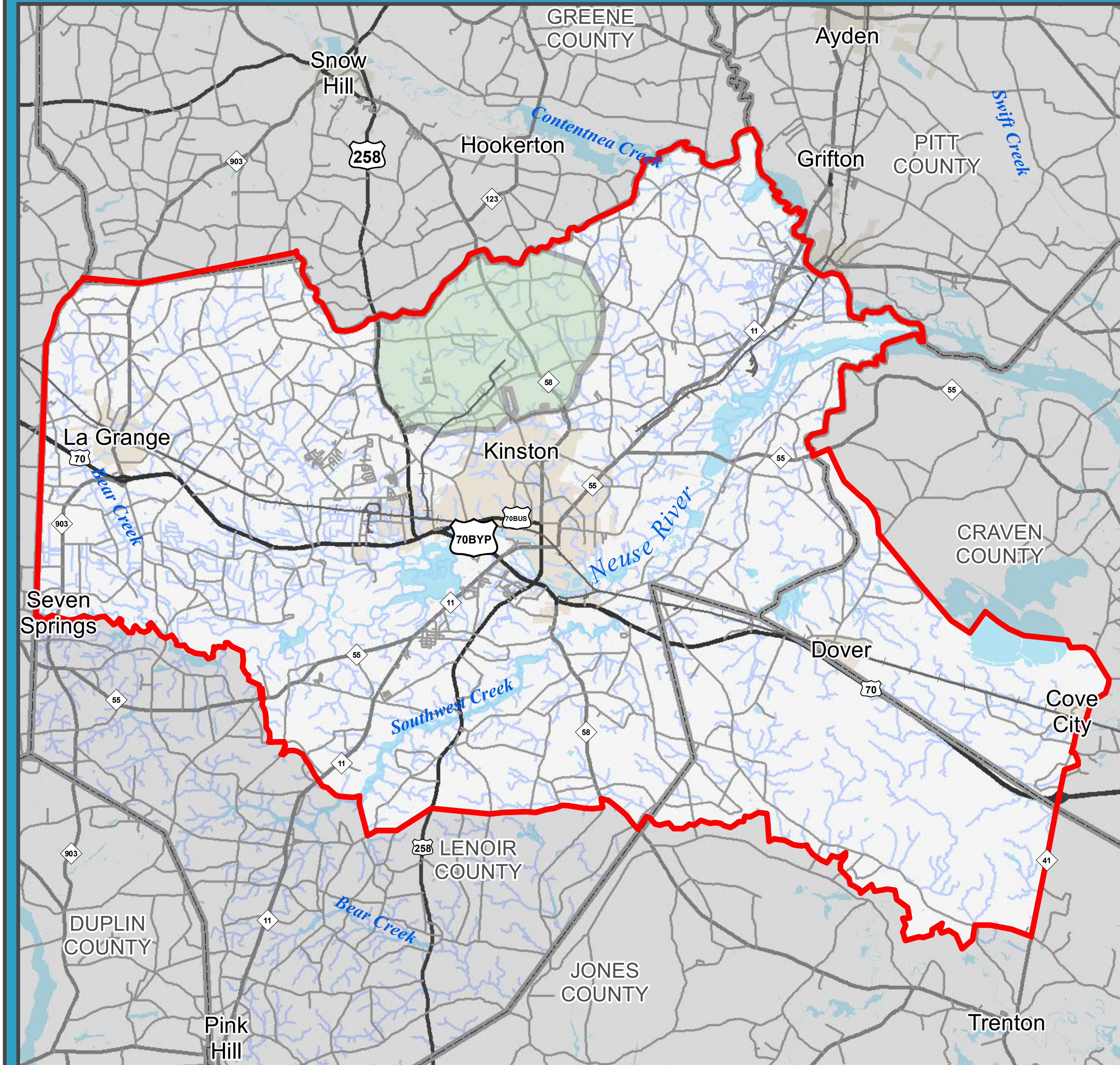
10. Summary

Vehicles are a major contributor to decreased air quality because they emit a variety of pollutants into the air. Changing traffic patterns are a primary concern when determining the impact of a new highway facility or the improvement of an existing highway facility. New highways or the widening of existing highways increase localized levels of vehicle emissions, but these increases could be offset due to increases in speeds from reductions in congestion and because vehicle emissions will decrease in areas where traffic shifts to the new roadway. Significant progress has been made in reducing criteria pollutant emissions from motor vehicles and improving air quality, even as vehicle travel has increased rapidly.

The proposed project is located in Lenoir, Jones, and Craven Counties, which comply with the NAAQS. The proposed project is located within an attainment area; therefore, 40 CFR Parts 51 and 93 are not applicable. Therefore, the project is not anticipated to create any adverse effects on the air quality of this attainment area. This evaluation completes the assessment requirements for air quality of the 1990 Clean Air Act Amendments and the NEPA process. No additional reports are necessary.

Kinston Bypass
STIP Project No. R-2553

Figure 1
Vicinity Map



Legend

- Study Area
- Railroad
- Global TransPark (GTP)
- County
- US Highway
- NC Highway
- Local Road
- Waterbody
- Stream/River
- Municipal Area

0 2.5 Miles

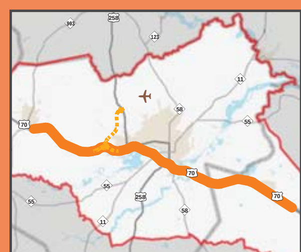
N

This map is for reference only.
Sources: CGIA, NCDOT, NCDENR, Craven County, NCDCM, NCEM, Lenoir County, Pitt County, Kinston Planning Department, NCOneMap, NCWRC, NCSHPO,EPA, USFWS, USDA, NRCS, DWQ, ESRI and URS.

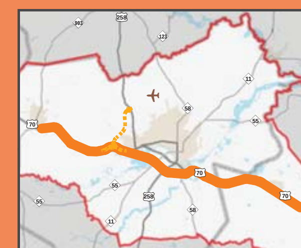
Kinston Bypass
STIP Project No.
R-2553

FIGURE 2: DETAILED STUDY ALTERNATIVES

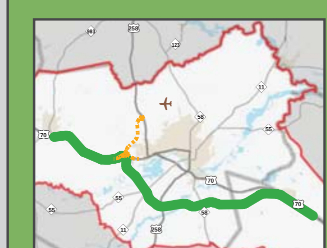
Upgrade Existing US 70 Alternative

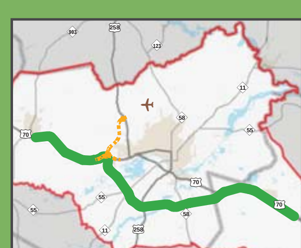

Alternative 1 UE

Upgrade Existing US 70 Shallow Bypass Alternative


Alternative 1 UE SB

Southern Bypass Alternatives


Alternative 11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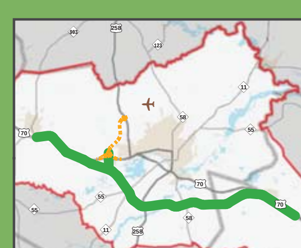
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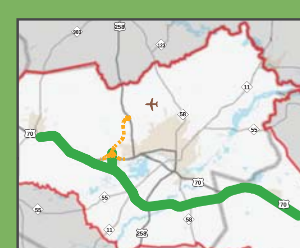
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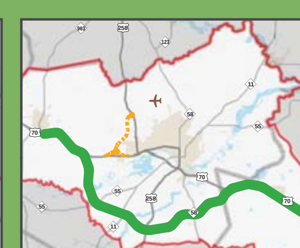
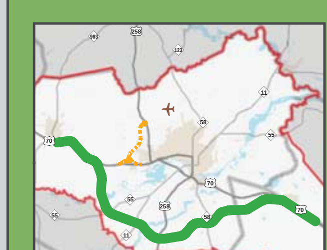

Alternative 35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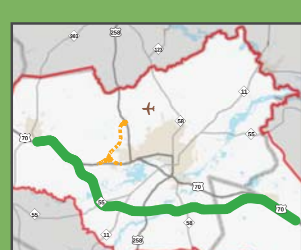
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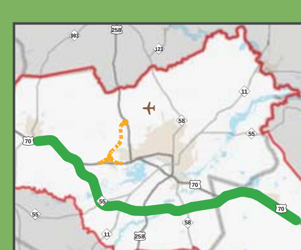
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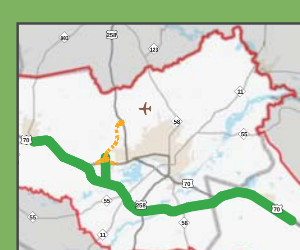
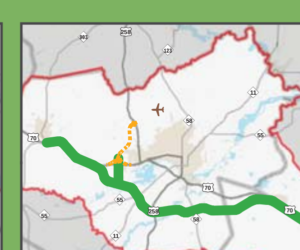
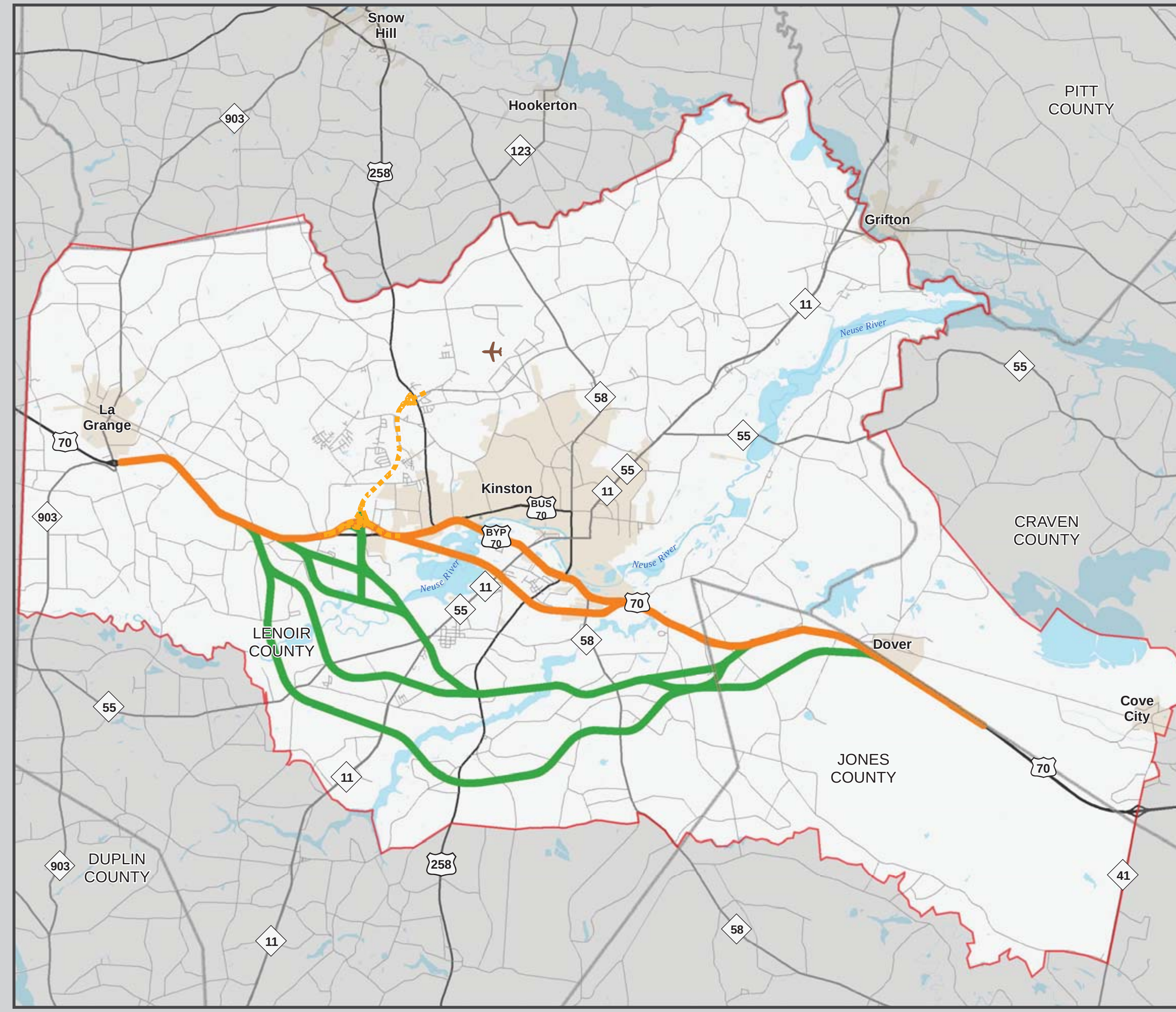

Alternative 63


Alternative 65



Legend

N

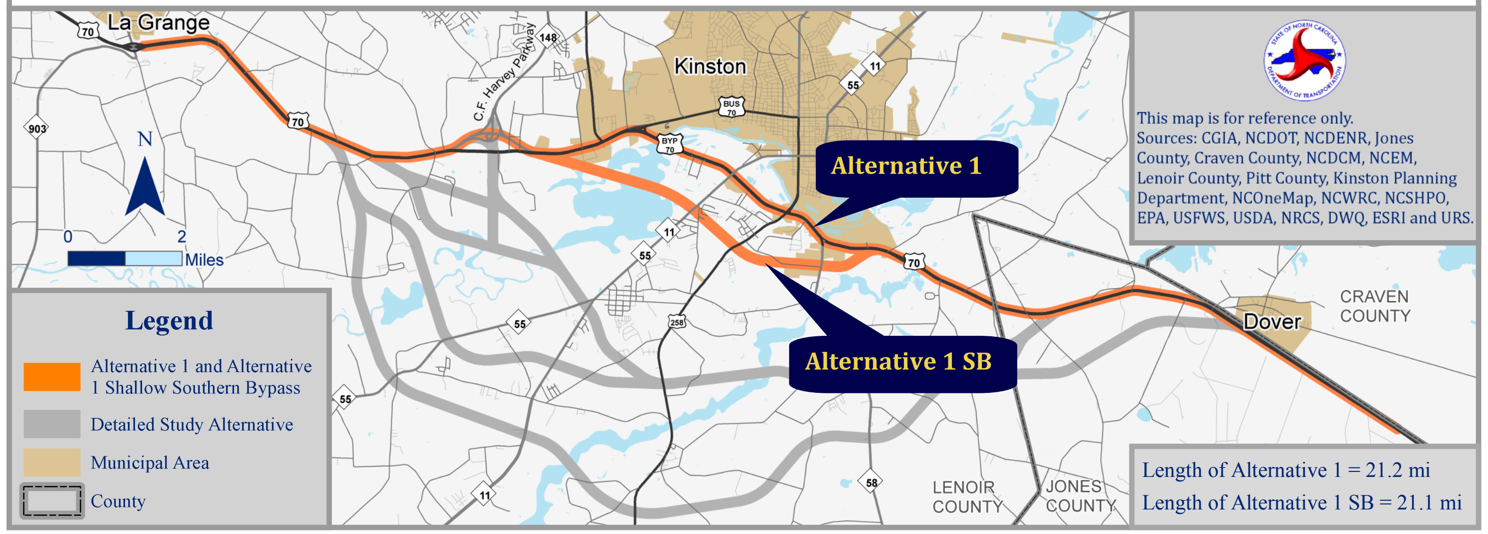
Not To Scale

- Kinston Jetport
- Upgrade Existing Detailed Study Alternative
- Southern Detailed Study Alternatives
- Study Area
- County
- Waterbody
- Municipal Area
- US Highway
- NC Highway
- Project R-2719A

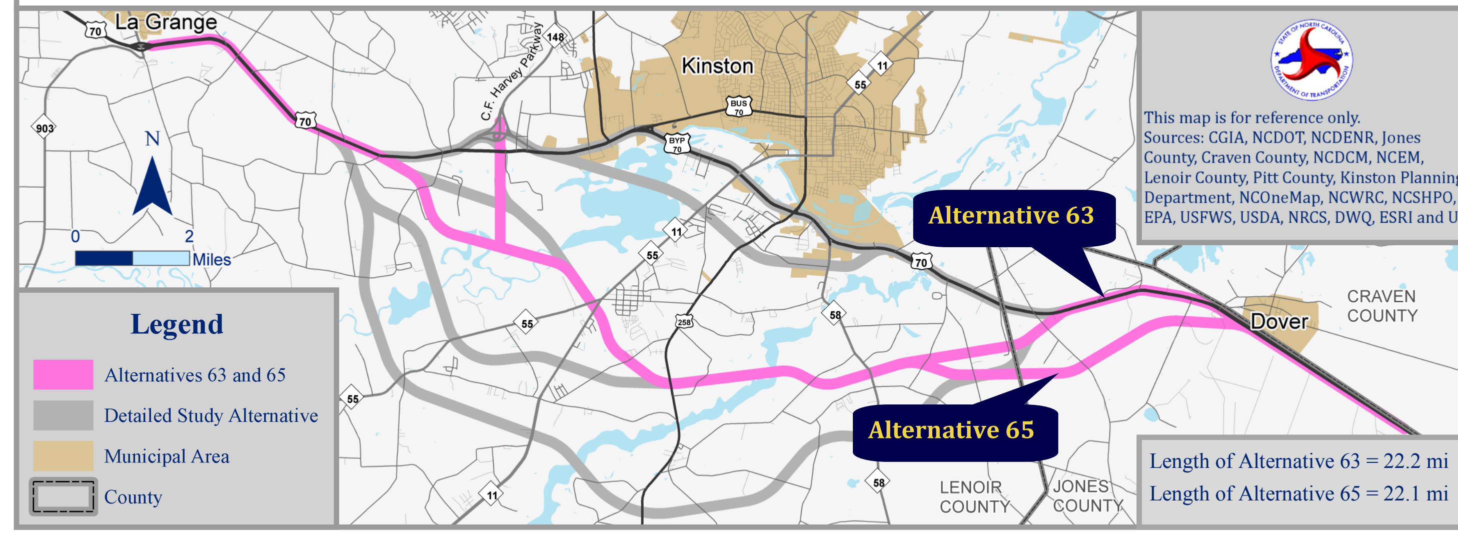
This map is for reference only. Sources:
CGIA, NCDOT, NCDENR, Craven County, NCDCM, NCEM, Lenoir County, Pitt County, Jones County,
Kinston Planning Department, NCOneMap, NCWRC, NCSHPO,EPA, USFWS, USDA, NRCS, DWQ, ESRI and AECOM.

Figure 3 — R-2553 Build Alternatives

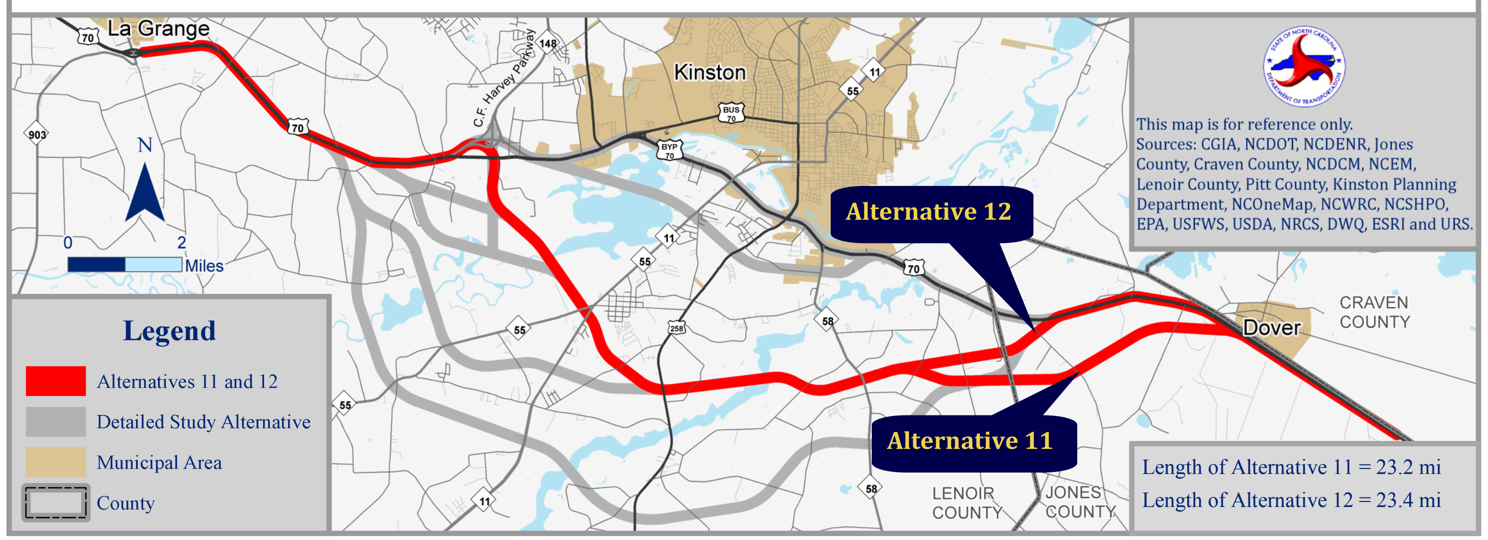
Orange Alignments—Alternatives 1 UE & 1 UE SB



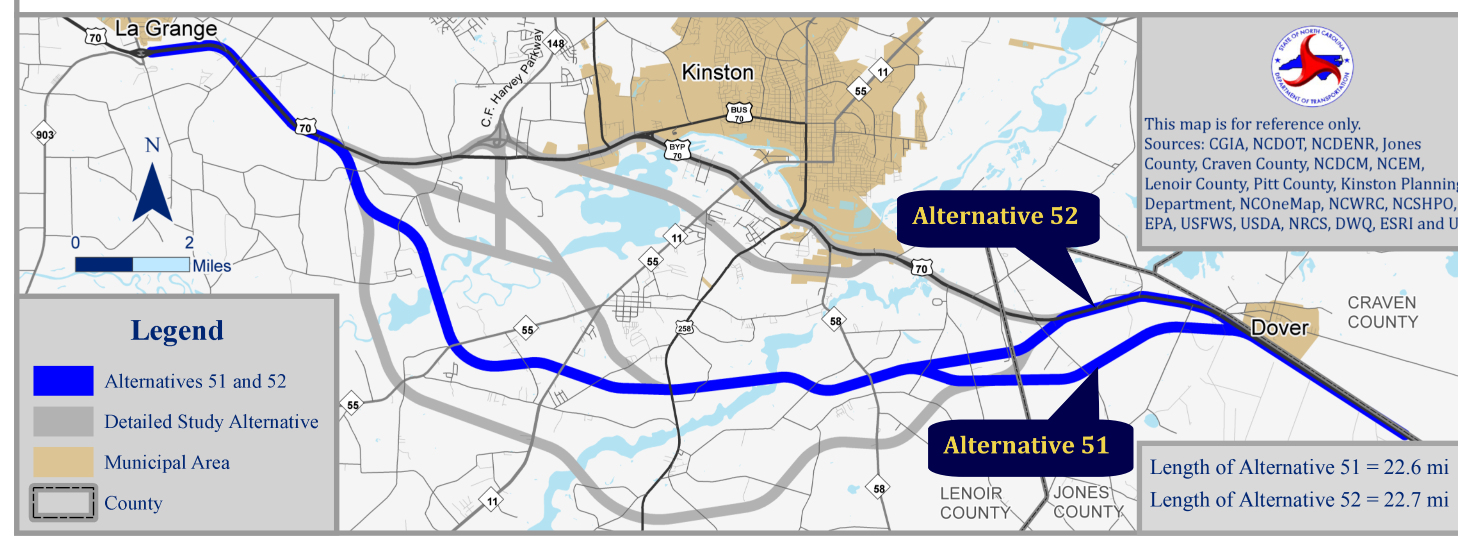
Pink Alignments—Alternatives 63 & 65



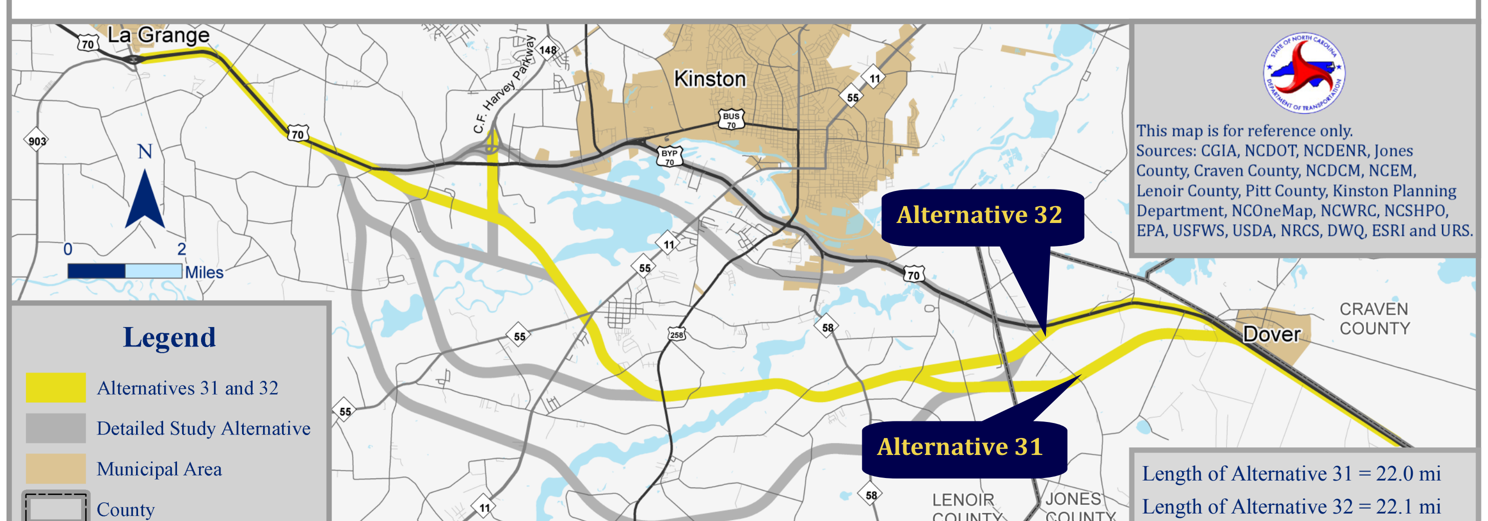
Red Alignments— Alternatives 11 & 12



Blue Alignments—Alternatives 51 & 52



Yellow Alignments—Alternatives 31 & 32



Purple Alignments—Alternatives 35 & 36