BRAWLEY SCHOOL ROAD (SR 1100) IMPROVEMENTS
IREDELL COUNTY
W.B.S. NO. 34554.1.FD1
STIP PROJECT R-3833C

Administrative Action
State Environmental Assessment/
Finding of No Significant Impact

Submitted Pursuant to the North Carolina Environmental Policy Act
(NC G.S 113A 1-13)

Prepared for:
North Carolina Department of Transportation
Division 12

Prepared by:

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Raleigh, NC

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5/31/2018
Date of Approval

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Date of Approval

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PROJECT COMMITMENTS

BRAWLEY SCHOOL ROAD (SR 1100) IMPROVEMENTS
IREDELL COUNTY
W.B.S. NO. 34554.1.FD1
STIP PROJECT R-3833C

NCDOT Division 12

- One (1) noise wall was found to meet NCDOT's criteria for feasibility and reasonableness and qualifies for further consideration and possible inclusion in the project. A more detailed analysis is recommended once final design plans are available. The final decision on installation of the noise barrier will be made upon completion of the project final design, compliance with NCDOT Policy, and the public involvement process.

- Due to the proximity of streams with a Best Usage Classification of CA (Critical Area) and the Catawba River Buffer Rules (Lake Norman), sedimentation and erosion control measures shall adhere to the Design Standards in Sensitive Watersheds (15A NCAC 4B .0124) per standard NCDOT practice.

- Due to the presence of fly ash fill material on the State Employees Credit Union site, (located at he intersection of Brawley School Road and US 21) NCDOT will send any fly ash material removed during the construction of the project to a permitted disposal facility.

CONTENTS

Figures

Appendices

I. DESCRIPTION OF PROPOSED ACTION

The North Carolina Department of Transportation (NCDOT) proposes to improve the existing 1.1-mile section of State Route (SR) 1100 (Brawley School Road) from just east of the intersection of Brawley School Road and Talbert Road to just east of the intersection of Brawley School Road and US 21 in Mooresville. The project also includes improvements to a 0.8-mile section of US 21 from just north of Dry Dock Loop/ Vandalia Road to Abberly Green Boulevard.

Northbound US 21 at Brawley School Road

The proposed improvements integrate a range of cross-sections to accommodate future traffic volumes. The four-lane typical sections, combined with the variable median widths, turn lanes, and U-turn bulbs require a proposed right-of-way width of 103 feet. The proposed project would include 14-foot outside travel lanes to accommodate bicycles and two 5-foot wide sidewalks for pedestrian traffic. Figure 1 shows the project corridor.

The proposed project is included in the 2015-2025 State Transportation Improvement Program (STIP) as Project No. R-3833C. Right-of-way acquisition and construction for the project are scheduled for 2018 and 2020, respectively.

This project was previously included as part of STIP Project R-3833. An Environmental Assessment for the R-3833 project was completed in 2003, followed by a Finding of No Significant Impact in 2005. The R-3833 project corridor extended approximately 5.9 miles, from SR 1177 (Chuckwood Road) to US 21 and included a proposed interchange at I-77. The R-3833 project corridor was divided into three sections: A, B, and C. STIP Projects R-3833A and R-3833B extended from Chuckwood Road to I-77, and were completed and constructed in 2012 and 2013, respectively. Due to the age of the original R-3833 environmental documents, a re-evaluation of Section C (R-3833C) was warranted.

This combined State Environmental Assessment/Finding of No Significant Impact (SEA/FONSI) was prepared in accordance with the North Carolina State Environmental Policy Act (SEPA) of 1971.

II. PURPOSE AND NEED FOR THE PROPOSED PROJECT

The purpose of the proposed project is to improve the level-of-service (LOS), travel conditions, and sight distance issues along this section of Brawley School Road.

Many of the intersections in the project corridor currently operate at an unacceptable level-of-service (LOS). Table 1 shows Traffic conditions exceeding LOS D (E and F) are deemed unacceptable. Most of the intersections that failed are unsignalized; however, the signalized intersection at US 21 and Brawley School Road operates at LOS F in the existing year during both peak hours. These undesirable LOS conditions represent substantial travel delay, increased accident potential, and inefficient motor vehicle operation. Table 1 shows the intersection LOS and delay along Brawley School Road within the project corridor based on Base year (2015) traffic volumes and No-Build traffic volumes for the design year (2040). As discussed above, without

improvements, most intersection along the corridor will be operating at a failing LOS in 2040 which will contribute to congestion along the corridor.

Table1. Overall Intersection Delay and Level of Service (LOSs)

LOS/Delay Summary		2015		2040			
Intersection	Traffic Control	Existing		No Build		Build	
		AM	PM	AM	PM	AM	PM
Brawley School Rd @ I-77	S	C (24.8)	C (24.0)	C (27.0)	E (68.4)	D (40.4)	D (39.9)
Brawley School Rd @ Talbert Rd / Sunfish Dr	S	C (28.4)	D (43.1)	E (69.8)	F (88.4)	C (31.2)	B (18.2)
Brawley School Rd @ Winghaven St	U	F (82.3)	F (68.4)	F (161.2)	F (168.2)	F (108.0)	F (97.9)
Brawley School Rd @ Citation Dr/Secretariat Ln	U	C (21.6)	D (27.0)	F (257.8)	F (191.3)	F (78.7)	F (82.0)
Brawley School Rd @ Roundkeep Ln/Commerce Park Rd	U	E (41.5)	F (##)	F (##)	F (##)	E (44.5)	E (35.4)
US 21 @ Brawley School Rd/Wilson Ave	S	F (174.9)	F (173.8)	F (230.5)	F (221.6)	C (20.3)	B (14.2)
US 21 @ Commerce Park Rd	U	F (157.2)	F (174.3)	F (##)	F (156.5)	C (21.3)	B (11.4)
Brawley School Rd @ Balmy Ln	S	--	--	--	--	B (10.7)	B (12.5)
US 21 NB U-turn	S	--	--	--	--	B (16.0)	B (16.2)
US 21 SB U-turn	S	--	--	--	--	B (15.0)	C (21.1)

NOTES: U – Unsignalized Intersection; S – Signalized Intersection; X (XX) – LOS (Delay in seconds); ## - Delay exceeds 300 seconds. Unsignalized intersection delay and level of service shown are for the approach with the worst delay at the intersection.

III. EXISTING CONDITIONS

Eastbound on Brawley School Road at US 21

Brawley School Road is classified as a major collector and predominately consists of two through-lanes, with turn-lanes, throughout the project corridor. Currently, there are no bicycle and pedestrian facilities along Brawley School Road. Wilson Avenue and US 21 are classified as minor collector and minor arterial facility types respectively.

Brawley School Road serves a large residential population and is a primary commuter route for thousands of Mooresville-area residents making it one of the busiest east-west corridors connecting Mooresville residents to recreational activities at Lake Norman. This area is rapidly urbanizing, with continued commercial retail and residential growth expected.

In 2015, Brawley School Road had an annual daily traffic (ADT) count of approximately 18,500 vehicles per day(vpd) within the project corridor. The traffic volumes along Brawley School Road are expected to increase to 28,200 vpd by 2040. The posted speed limit along Brawley School Road is 45 miles per hour. There are no schools identified along the project corridor; however,

there are multiple schools located west of I-77 on Brawley School Road and east of US 21 on Wilson Avenue. There are several school busses making approximately two- three trips per day using Brawley School Road. Mooresville Fire Station 5 is also in the project corridor, located southwest of the Brawley School Road/US 21 intersection. NCDOT will maintain ongoing coordination with Iredell County Emergency Services to make the necessary temporary reassignments to primary response units prior to construction.

IV. OTHER PROPOSED HIGHWAY IMPROVEMENTS IN THE PROJECT CORRIDOR

Several roadway improvement projects included in the 2018-2027 STIP are located in the vicinity of the project study area. Table 2 provides a brief description of these projects, along with their current schedules.

Table 2. Other STIP Projects in the Area

STIP Project No.	Description	Right of Way Scheduled to Begin	Construction Scheduled to Begin
U-6037	US 21 from NC 150(Plaza Drive) to SR 1245 (Medical Park Road). Widen to 4-Lanes Divided.	2019	2019
R-2307	NC 150 From Harvel Road to US 21	2017	2019
U-5816	Midnight/Oates Road from SR 1474 (Bluefield Road) to US 21 (Charlotte Highway) Widen to three-lanes with overpass over I-77.	2019	2021
U-5817	Extend SR 1246 (Fairview Road) over I-77 to connect with SR 1206 (Alcove Road).	2019	2021
R-5100	Williamson Road (SR 1109) Widening	2019	2021

Source: North Carolina Department of Transportation, State Transportation Improvement Program (NCBOT Amended STIP – July 2016)

V. ALTERNATIVES CONSIDERED

No-Build Alternative – The No- Build Alternative includes only maintenance activities to ensure the safety and continued operation of the existing highway. The no-build-alternative would be constructed within existing right-of-way and would avoid any adverse environmental impacts or residential relocations. Adverse social and economic impacts could occur; however, since future traffic volumes may result in a greater breakdown of traffic service along this section of Brawley School Road. The no-build alternative would not meet the purpose and need of the project which include improving the LOS for local, regional, and statewide traffic along the Brawley School Road corridor, and enhancing the ability of Brawley School Road to serve the regional transportation function in accordance with the Strategic Highway Corridors Plan vision. The no-build-alternative would not be consistent with adopted local, regional, and state transportation plans.

Although the no-build alternative does not meet the purpose and need for this project, or alleviate transportation needs, it provides a baseline comparison against impacts associated with the build alternative.

Build Alternative – The build alternative was developed using a 'best-fit' approach to address geometric deficiencies along Brawley School Road. The best-fit alignment incorporates a

combination of symmetrical and asymmetrical widening and avoids and/or minimizes impacts to the human and natural environments. Several intersection treatments were evaluated along Brawley School Road. The build alternative meets the purpose and need for this project by providing increased capacity and improved LOS.

Proposed improvements include widening existing Brawley School Road to a divided 23-foot raised median facility, with 12-foot lanes, turn lanes, 5-foot bicycle lanes and 5-foot sidewalks. Traffic signals will be provided at intersections warranting them. The proposed improvements are shown in Figure 2A. As shown in Figure 2B, US 21 would be reconfigured as a 'Michigan Left' intersection. This design would redirect left-turning drivers to use the proposed U-turn bulbs on US 21. The Michigan Left intersection design will provide improved progression and reduced delay for drivers on all approaches. Proposed typical sections (Figures 3A and 3B) for roads intersecting Brawley School Road are variable width, curb and gutter that will tie in with the existing roadway.

Access at St. Therese Catholic Church would be modified to allow the westbound left-turn movement to enter the eastern driveway. Eastbound right-turn movements would be allowed at both the eastern and western driveway entrances. Eastbound exiting movements would be able to utilize both driveways, however, westbound exiting movements would turn right out of the western driveway to access an unsignalized U-turn bulb west of the church.

The traffic signal at the intersection of Brawley and Talbert would be modified to accommodate the widened roadway. Balmy Lane will be reconnected to Brawley School road at a proposed signalized intersection.

VI. ESTIMATED COSTS

The estimated costs, based on 2017 prices, are as follows:

Table 3. Cost Estimates

	Preferred Alternative
Total Construction	$28,794,228
Right-of-way	$10,088,500
Utilities	$2,905,728
Stream Mitigation	$94,000
Total Project Cost	**$28,794,228**

VII. ENVIRONMENTAL EFFECTS OF PROPOSED ACTION

A. NATURAL RESOURCES

Field work was conducted between September 14 and 16, 2016 and field verification meetings for jurisdictional areas were held on November 18, 2016 for the natural resources technical report (NRTR).

(1) Water Resources – Water resources in the study area are part of the Catawba River Basin [U.S. Geological Survey (USGS) Hydrologic Unit 03050101]. Three streams were identified in the study area. There are no High Quality Waters (HQWs), Outstanding Resource Waters (ORWs), 303d-listed impaired streams, trout waters, primary nursery areas, or anadromous fish waters within the study area. Additionally, there are no HQWs, ORWs, or 303d-listed impaired streams (for sediment/turbidity) within one mile downstream of the study area. Lake Norman is a water supply lake and it, and its tributaries, are designated as Water Supply-IV, Class B, Critical Area waters.

Stream SA at culvert under Brawley School Road

The project study area falls within the Catawba River Basin and is therefore protected under the provisions of the Catawba River Buffer Rules administered by NCDWR. These rules apply to a 50-foot wide riparian buffer along the Catawba River mainstem below Lake James and along the mainstem lakes in the Catawba River Basin, excluding wetlands. The Catawba River mainstem and the mainstem lake shorelines are not located within the project study area and **no** riparian buffers rules apply.

Three jurisdictional streams were identified within the study area. The location of these streams is shown in Figure 5. The physical characteristics and water quality designations of each jurisdictional stream are shown below in Table 4. All jurisdictional streams in the study area have been designated as warm water streams for the purposes of stream mitigation.

Table 4. Jurisdictional Characteristics of Water Resources in Project Corridor

Map ID	Length within Project Corridor (linear feet)	Classification	Compensatory Mitigation Required	River Basin Buffer
SA	382	Perennial	Yes	None
SB	175	Intermittent	Yes	None
SC	597	Perennial	Yes	None

Note: All waters within the project corridor are classified as WS-IV, CA, and B

(2) Wetlands – There are no jurisdictional wetlands within the project corridor.

(3) Biotic Resources – Terrestrial communities were classified using "NC WAM User Manual, Version 4.1" and "Classification of the Natural Communities of North Carolina, Third Approximation". Four terrestrial communities were identified in the project corridor: maintained/disturbed, dry oak hickory forest, mesic mixed hardwood forest, and successional forest (pine/cedar). Figure 6 shows terrestrial communities found within the project corridor.

(4) Aquatic Communities – Aquatic communities in the project corridor consist of both perennial and intermittent piedmont streams. Perennial streams in the project corridor could support bluehead chub, redlip shiner, northern dusky salamander, and redbreast sunfish. Intermittent streams in the project corridor would likely support aquatic communities of spring peeper, crayfish, and various benthic macroinvertebrates. The proposed project includes replacing existing culverts at two stream crossings. The proposed updates will remove the existing corrugated metal arched pipe culverts and replace it with reinforced concrete box culverts using staged construction.

(5) Federally Protected Species – As of April 28, 2017, the United States Fish and Wildlife Service (USFWS) lists three federally protected species for Iredell County (Table 5). Following is a brief description of each species' habitat requirements, as well as the Biological Conclusion rendered based on field observation and survey results in the study area. Habitat requirements for each species are based on best available information from the USFWS.

Table 5. Federally protected species listed for Iredell County

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
Hexastylis naniflora	Dwarf-flowered heartleaf	T	No	No effect
Myotis septentrionalis	Northern long-eared bat	E	Yes	*
Clemmys muhlenbergii	Bog turtle	T(S/A)	No	Not required

E – Endangered
T – Threatened
T(S/A) – Threatened due to similarity of appearance
*-May Affect, Not Likely to Adversely Affect. NLEB is exempt due to consistency with the 4(d) rule.

Dwarf-flowered heartleaf
Biological Conclusion: No effect
Suitable habitat for the dwarf-flowered heartleaf does not exist within the study area. Additionally, a review of the NCNHP database, revealed no known occurrences of this species within 1.0 mile of the project study area.

Northern long-eared bat
Biological Conclusion: May Affect Not Likely to Adversely Affect
A review of the NC Natural Heritage Program Database (June 8, 2017) indicates no known occurrence of NLEB within 1.0 miles of the study area. A review of USFWS GIS data indicates no confirmed hibernation or maternity sites have been located in Iredell County as of June 1, 2016. NCDOT has determined that the proposed action does not require separate consultation on the grounds that the proposed action is consistent with the final Section 4(d) rule, codified at 50 C.F.R. § 17.40(o) and effective February 16, 2016. NCDOT may presume its determination is informed by best available information and consider Section 7 responsibilities fulfilled for NLEB.

Bog turtle
Biological Conclusion: Not required
Suitable habitat for the bog turtle does not exist in the study area as there are no wetlands within the study area. A review of NCNHP Natural Heritage Element Occurrences (NHEO) (April 2017 dataset) indicates no known occurrences of bog turtle within 1.0 miles of the study area.

Bald Eagle and Golden Eagle Protection Act
Habitat for the bald eagle primarily consist of mature forest in proximity to larger bodies of open water for foraging. Large dominant trees are utilized for nesting sites, typically within 1.0 mile of open water.
A desktop-GIS assessment of the project study area, as well as the area within a 1.13-mile radius (1.0 mile plus 660 feet) of the project limits, was performed in September 2016 using 2015 color aerials. There are water bodies large enough and sufficiently open to be considered potential feeding sources within 1.13 miles of the project limits. No nests were observed within 660 feet beyond the project study area. As of April 2017, the bald eagle is not listed by the USFWS for Iredell County.

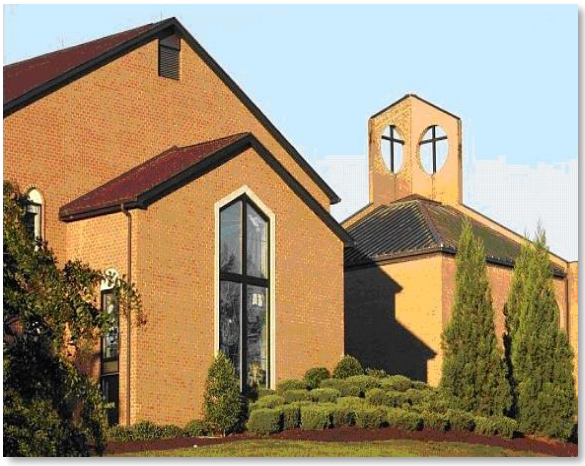
Table 6. Environmental Justice Data

Category	Project Corridor	County Average	State Average
Minority Population	30%	37%	36%
Low Income Population	27%	39%	38%
Linguistically Isolated Population	2%	3%	3%

Source: USEPA EJSCREEN: Environmental Justice Screening and Mapping Tool. Accessed September 2017

B. COMMUNITY IMPACTS AND LAND USE

(1) Land Use –The project corridor is urban in nature which consists primarily of low density, residential development and scattered, low density, commercial development. A commercial node, located in the southeast quadrant of the project corridor includes a tutoring center, barber shop, and several office buildings. A commercial area that includes a shopping center, restaurants, a retail store, and laundry mart is in the northeast quadrant of the project corridor. There are few areas along the corridor that are relatively undeveloped consisting of forest areas. The area is currently zoned as Residential Office (R2, R5) along Brawley School Road, and Highway Business (HB) along US-21. The activities associated with the proposed corridor widening are compatible with the area's zoning designation. The project would not induce land use changes.



St. Therese Catholic Church

St. Therese Catholic Church is located approximately 1080 feet east of Talbert Road. A paved extension of SR 1100 (Brawley School Road) provides access to the church entrance. The project would make minor alignment shifts to both the church entrances. The proposed design would have no impact on the parking lot but utilizes temporary construction easement along the edge of the church adjacent to Brawley School Road.

The State Employee Credit Union is located at the intersection of Brawley School Road and US-21. The project would re-configure the parking lot which would result in loss of some parking spaces.

(2) Environmental Justice & Title VI Evaluation – Table 6 shows the Environmental Justice data for the project corridor. While low-income and minority populations are present in the project corridor, the percentage is lower than the County average. Except for mobile home parks located northwest of US-21, there are no specific neighborhoods or other concentrations of low-income populations in the project corridor. There are no specific neighborhoods or other concentrations of minority populations in the project corridor. Relocations associated with the proposed project would not affect the mobile home park or any other identified low-income or minority populations. There are no disproportionately high or adverse impacts to minority populations. Benefits and burdens resulting from the project are anticipated to be equitably distributed throughout the community.

NCDOT adheres to Title VI of the Civil Rights Act, which provides that no person in the United States shall, on the grounds of race, color, or national origin, be excluded in participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

C. CULTURAL RESOURCES

The NCDOT Human Environment Section, under the provisions of a Programmatic Agreement with FHWA, NCDOT, HPO, OSA and the Advisory Council on Historic Preservation (effective July 1, 2009), reviewed the proposed project and determined no historic structures are in the project corridor and the project would have no impacts to archaeological resources. No surveys for historic architectural or archaeological resources are required (supporting documentation is provided in Appendix A).

D. PUBLIC LANDS AND SCENIC, RECREATIONAL, AND STATE NATURAL AREAS.

The Mooresville Municipal Golf Course is located in the southeast region of the project corridor. The northwest parcel is currently being developed into residential real estate. There would not be any impacts to the recreational facility, easement would run 500 feet adjacent to East Wilson Road, away from the Golf Course.

E. AIR QUALITY

A project-level air quality analysis was prepared for this project. A copy of the unabridged version of the full technical report entitled *Air Quality Report, SR 1100 (Brawley School Road) and US 21 Widening* dated October 9, 2017 is included in Appendix B. Iredell County is in a Partial County-8-Hour Ozone Maintenance Area. Iredell County is within the Charlotte maintenance area for the 2008 ozone (O3) standard as defined by the EPA. This area was designated marginal nonattainment under the 2008 eight-hour ozone standard on July 20, 2012. Due to improved regional air quality, the region was re-designated as a maintenance area on August 27, 2015. Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Iredell County.

The Charlotte Region Transportation Planning Organization 2040 Metropolitan Transportation Plan (MTP) and the 2016 - 2025 Transportation Improvement Program (TIP) conform to the intent of the SIP. The USDOT made a conformity determination on the MTP on 4/20/2016 and the TIP on 4/20/2016. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51and 93. There are no significant changes in the project's design concept or scope, as used in the conformity analyses. The project is not anticipated to create any adverse effects on the air quality of the area. This evaluation, as presented in the Air Quality Report, completes the assessment requirements for air quality of the 1990 Clean Air Act Amendments and the SEPA process.

F. NOISE ANALYSIS

In accordance with Title 23 Code of Federal Regulations Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise (Title 23 CFR 772) and the North Carolina Department of Transportation Traffic Noise Policy, each Type I highway project must be analyzed for predicted traffic noise impacts. In general, Type I projects are proposed State or Federal highway projects for construction of a highway or interchange on new location, improvements of an existing highway which substantially change the horizontal or vertical alignment or add new through lanes, or projects that involve new construction or substantial alteration of transportation facilities such as weigh stations, rest stops, ride-share lots or toll plazas.

Traffic noise impacts are determined through implementing the current Traffic Noise Model (TNM®) approved by the Federal Highway Administration (FHWA) and following procedures detailed in Title 23 CFR 772, the NCDOT Traffic Noise Policy and the NCDOT Traffic Noise Manual.

When traffic noise impacts are predicted, examination and evaluation of alternative noise abatement measures must be considered for reducing or eliminating these impacts. Construction noise impacts may occur if noise-sensitive receptors are in close proximity to project construction activities. All reasonable efforts should be made to minimize exposure of noise sensitive areas to construction noise impacts.

The source of this traffic noise information is *Traffic Noise Report, SR 1100 (Brawley School Road) and US 21 Widening* (Stantec, June 2018).

Traffic Noise Impacts and Noise Contours

The maximum number of receptors in each project for the build alternative predicted to become impacted by future traffic noise is shown in the table below. Table 7 includes those receptors expected to experience traffic noise impacts by either approaching or exceeding the FHWA Noise Abatement Criteria or by a substantial increase in exterior noise levels as defined in the NCDOT Traffic Noise Policy.

Table 7. Predicted Traffic Noise Impacts*

Alternative	**Traffic Noise Impacts**			
	Residential (NAC B)	Places of Worship/Schools, Parks, etc. (NAC C & D)	Businesses (NAC E)	Total
Build 1	20	1	0	21

*Per TNM 2.5 and in accordance with 23 CFR Part 772

Traffic Noise Abatement Measures

Measures for reducing or eliminating the traffic noise impacts were considered for all impacted receptors in each alternative. The primary noise abatement measures evaluated for highway projects include highway alignment changes, traffic system management measures, establishment of buffer zones, noise barriers and noise insulation (NAC D only). For each of these measures, benefits versus allowable abatement measure quantity (reasonableness), engineering feasibility, effectiveness and practicability and other factors were included in the noise abatement considerations.

Substantially changing the highway alignment to minimize noise impacts is not considered to be a viable option for this project due to engineering and/or environmental factors. Traffic system management measures are not considered viable for noise abatement due to the negative impact they would have on the capacity and level of service of the proposed roadway. Costs to acquire buffer zones for impacted receptors will exceed the NCDOT base dollar value of $22,500 per benefited receptor plus an incremental increase as defined in the NCDOT Traffic Noise Manual, causing this abatement measure to be unreasonable.

Noise Barriers

Noise barriers include two basic types: earthen berms and noise walls. These structures act to diffract, absorb and reflect highway traffic noise. For this project, earthen berms are not found to be a viable abatement measure because the additional right of way, materials and construction costs are estimated to exceed the NCDOT maximum allowable base quantity of 4,200 cubic yards per benefited receptor plus an incremental increase as defined in the NCDOT Traffic Noise Policy.

A noise barrier evaluation was conducted for this project utilizing the Traffic Noise Model (TNM 2.5) software developed by the FHWA. Table 8 summarizes the results of the evaluation. The potential barrier location evaluated with TNM is north of Brawley School Road between Citation Drive and Roundkeep Lane in Noise Study Area (NSA) 2. Based upon criteria defined in the NCDOT Traffic Noise Policy, this barrier is preliminarily justified and is recommended for construction, contingent upon completion of the project design and the public involvement process.

Table 8. Preliminary Noise Barrier Evaluation Results

Alternative (Noise Barrier Location)	Length (linear feet)	Square Footage	Number of Benefited Receptors	Square Feet per Benefited Receptor / Allowable Square Feet per Benefited Receptor	Preliminarily Recommended for Construction [1]
Build Alternative (Noise Study Area 2 – North of Brawley School Road between Citation Drive and Roundkeep Lane)	1,005	14,089	21	671/1,500	Yes

[1]The recommendation for barrier construction is preliminary and subject to change, pending completion of final design and the public involvement process.

Summary

A traffic noise evaluation was performed that preliminarily identified one noise barrier that meets feasible and reasonable criteria found in the NCDOT Traffic Noise Policy. A more detailed analysis will be completed during project final design. Noise barriers found to be feasible and reasonable during the preliminary noise analysis may not be found to be feasible and reasonable during the final design noise analysis due to changes in proposed project alignment and other design considerations, surrounding land use development, or utility conflicts, among other factors. Conversely, noise barriers that were not considered feasible and reasonable may meet the established criteria and be recommended for construction. This evaluation was conducted in accordance with the highway traffic noise requirements of Title 23 CFR Part 772.

In accordance with NCDOT Traffic Noise Policy, the Federal/State governments are not responsible for providing noise abatement measures for new development for which building permits are issued after the Date of Public Knowledge. The Date of Public Knowledge of the proposed highway project will be the approval date of the Categorical Exclusion (CE).

G. FLOODPLAINS

The proposed project is not located in a flood hazard zone.

H. HAZARDOUS MATERIAL SITES/UNDERGROUND STORAGE TANKS

According to NC One Map GIS data, there is a registered underground storage tank (UST), currently a Gas Station, approximately 262 feet east of Round Keep Lane and 690 feet west of US-21. The proposed design will avoid the USTs by widening the proposed design further south onto the State Employees Credit Union property.

I. UTILITIES

Due to the suburban and urban setting of the project corridor, several utilities are present within the project corridor. The project would require construction beyond the limits of the current roadway and fill slopes. The Utility Estimate Worksheet is provided in Appendix E.

J. INDIRECT AND CUMULATIVE IMPACTS

The proposed project is not expected to have a notable indirect effect on future land use. Any direct natural environmental impacts by the project would be addressed by avoidance, minimization, or mitigation. Developers are required to follow local, state, and federal guideline and permitting regulations.

K. FARMLAND

North Carolina Executive Order Number 96 requires all state agencies to consider the impacts of land acquisition and construction projects on prime farmland soils, as designed by the U.S. Natural Resources Conservation Service (NRCS). The proposed project was evaluated in accordance with the Farmland Protection Policy Act (FPPA). Because the project is in a location defined as an 'urbanized area' on a USGS census mapping, it is exempt under the Farmland Protection Policy Act (FPPA) [7 CFR 658.2(a)]. The proposed project complies with the FPPA and does not require the submittal of a Farmland Conversion Impact Rating Form.

L. Summary of Environmental Impacts

Table 9 summarizes impacts associated with the Preferred Alternative.

Table 9. Summary of Impacts

Resource	Applicability/Resources in Project Study Area
General Project Information	
Length of project (approximate in miles)	1.1
Crossing or Intersecting roadways (#)	4
Cultural Resources	
NRHP (and eligible sites, districts, other properties) (#)	None
Human Environment	
Community Resources (#)	1– Church 1- Day Care
Public Parks/Section 4(f) Properties (#)	Mooresville Municipal Golf Course
Greenways, Game Lands, Land and Water Conservation Fund Properties, Bicycle Routes, etc. (#)	None
Residential Properties (# potentially affected)	8
Business Properties (# potentially affected)	4
High % Special Populations (Low-income, Minority)	None Observed
Natural Environment	
Streams (# of stream crossings)	1 major crossing - Potential parallel impacts
Floodplain crossing	0
Wetlands (est. acres)	0
Ponds (est. acres connected to jurisdictional waters)	0 (Pond was located North of Mooresville Golf Course)
Critical Water Supply Watersheds	None
Riparian Buffer Rules apply	NA (Catawba River Basin)
Outstanding Resource Waters / High Quality Resource Waters	0
303(d) Listed Streams	0

Resource	Applicability/Resources in Project Study Area
Identified Critical Habitat/ESA Spp. (# known)	No Critical Habitat Iredell County Federally-listed species: Dwarf-flowered heartleaf, Northern Long-eared bat
Physical Environment	
Hazardous Materials (# suspected/known sites)	USTs - 1
Fly Ash	1 area – 60,000 cubic yards used as structural fill on State Employees Credit Union site
Utilities	Urban corridor – all utilities present
Active agriculture (Voluntary Agricultural District)	None
FEMA Buyout Properties	None

NOTES:
1) Impact quantities are based on construction limits plus an additional 25 feet. Impacts to wetland forest communities are shown separately.
2) The Relocation Report is located in Appendix C.
3) Right-of-Way (ROW) and Utility cost estimates are included in Appendix D.

VIII. PUBLIC INVOLVEMENT

A Local Officials Meeting and Public Meeting for the proposed project were held on October 3, 2017 at Saint Therese Catholic Church. The postcard notice, handout and comment form are included in Appendix E.

Local Officials Meeting: The Local Officials Meeting began at 2:00 PM with approximately eleven attendants. The local officials' invitation letter and mailing list can be found in Appendix E.

Public Meeting: A total of 990 postcard notices were mailed informing the public of the purpose, date, and location of the Public Meeting. One hundred twelve (112) people that attended the public meeting. The public meeting, held from 4:00 PM until 7:00 PM, was presented in an informal, open-house format with no formal presentation. During conversations with the project team, attendees provided verbal comments generally related to access and property acquisition (Right-of-Way).

Four comment forms were received during the Public Meeting and additional comment forms were received via e-mail or through the mail after the public meeting. Written comment summaries and responses are provided in Appendix E.

St. Therese Catholic Church Traffic Operations Meeting: The project team met with several of the church staff and parishioners of St. Therese on January 23, 2018. The meeting was intended to address concerns regarding access into and out of the church parking lot before and after services and special events. During the public meeting and in the written comments received from parishioners, the project team received multiple comments regarding access to the church. Because of this feedback, NCDOT conducted a weekend traffic count and subsequent traffic analysis at the church driveways and along Brawley School Road for the existing and proposed build conditions.

The analysis showed that traffic will operate at LOS C or better at the two church driveways without the assistance of off-duty police officers once the project is opened to traffic. However, LOS will reach a level of F towards the end of the design period in 2040. Therefore, NCDOT recommended that the church could pursue alternatives such as the utilization of off-duty police officers in the future at their western driveway and /or at the U-turn bulb on Brawley School Road. Meeting materials are provided in Appendix E.

IX. STATE AND FEDERAL PERMITS REQUIRED

The proposed project would require an Erosion and Sediment Control Plan (15A NCAC 2H .1000) subject to review and approval by the NC Department of Environment Quality (NCDEQ).

A Regional General Permit (RGP) 31 will likely be applicable. The USACE holds the final discretion as to what permit will be required to authorize project construction. If a Section 404 permit is required, then a Section 401 Water Quality Certification (WQC) from the NCDWR will be needed. Other federal, state, or local permits, approvals, or authorizations may also be required.

X. COORDINATION AND AGENCY COMMENTS

NCDOT has sought input from the following agencies as a part of the project development: US Army Corps of Engineers, US Environmental Protection Agency, NC Department of Environmental Quality, US Fish & Wildlife Service, N.C Wildlife Resource Commission, NC Division of Parks & Recreation, and the North Carolina State Historic Preservation Office.

XI. BASIS FOR FINDING OF NO SIGNIFICANT IMPACT

Based upon a study of the proposed project documented in this assessment and upon comments received from federal, state, and local agencies, it is the finding of the NCDOT that this project would not have significant adverse impacts upon the human or natural environment. The project, as proposed, is consistent with local, regional, and statewide planning efforts and would not disrupt the communities adjacent to it. Per this evaluation, a Finding of No Significant Impact is applicable to this project. Therefore, a state environmental impact statement is not required.

The following person may be contacted for additional information regarding this proposal and statement:

Mark Stafford, PE
Division Engineer
Highway Division 12
1710 E. Marion St. (US 74 Business)
Shelby, North Carolina 28151-0047
Telephone (919) 552-4203

XI. REFERENCES

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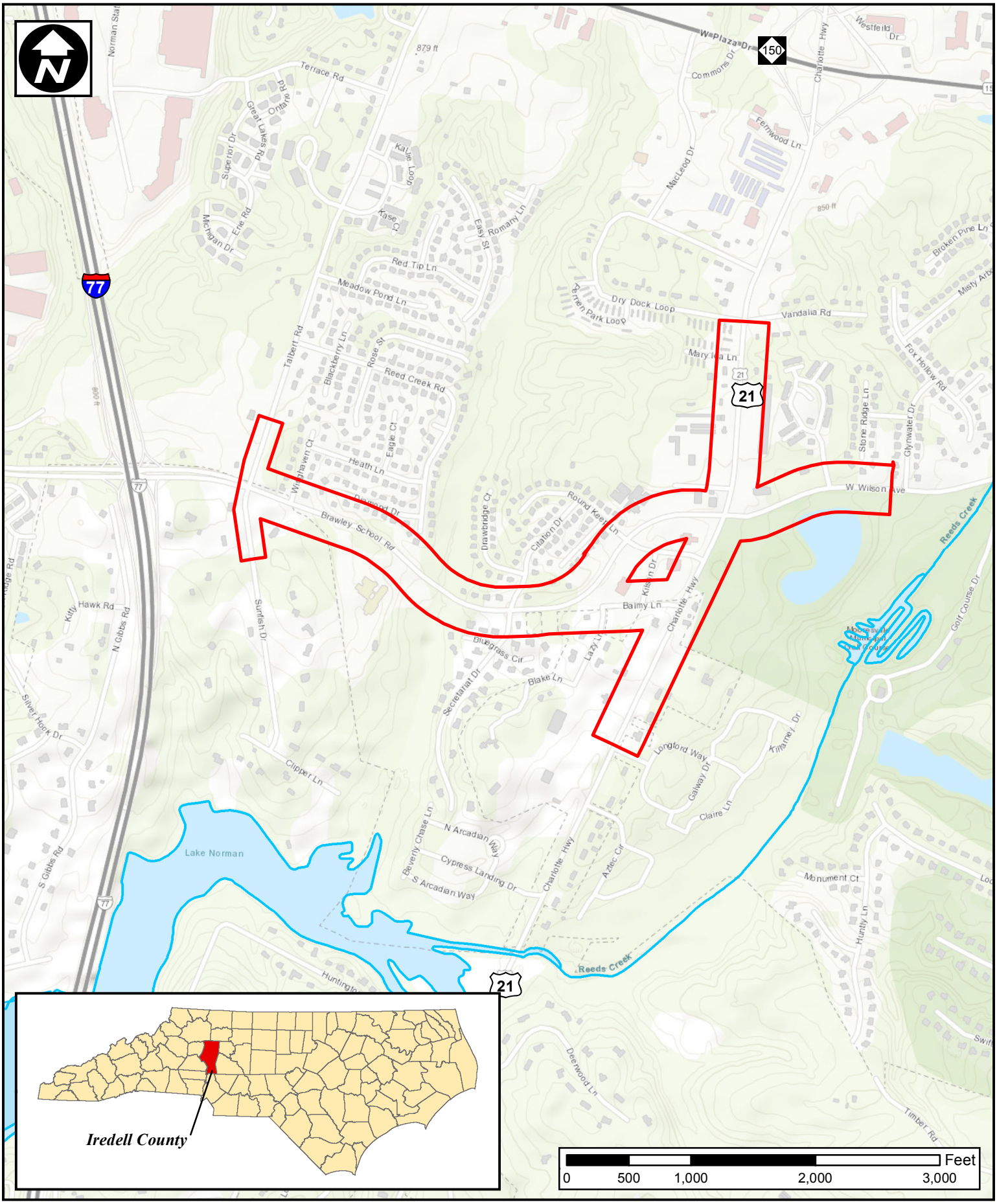
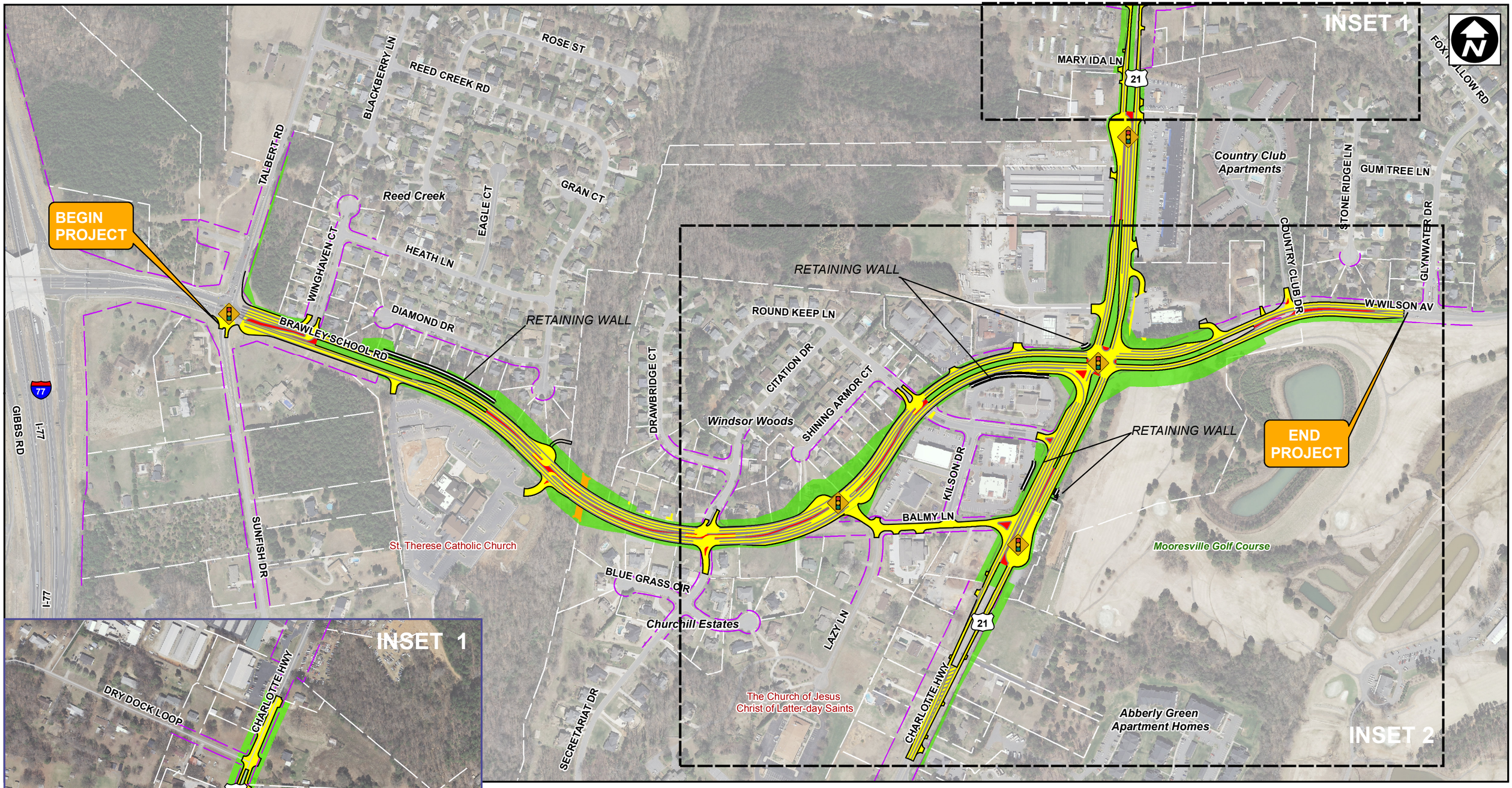
FIGURES



North Carolina Department of Transportation
Division of Highway
Divsion 12

SR 1100 (Brawley School Road)
Widen to Multi-Lanes from I-77 to US 21
Iredell County
STIP R-3833C

Figure 1
Vicinity Map



LEGEND

- Proposed Traffic Signal
- Existing Property Line
- NCDOT Right of Way
- Proposed Right of Way
- Proposed Concrete Island
- Proposed Roadway
- Proposed Roadway Culvert
- Proposed Retaining Wall

0 100 200 400 600 Feet

1 inch = 400 feet

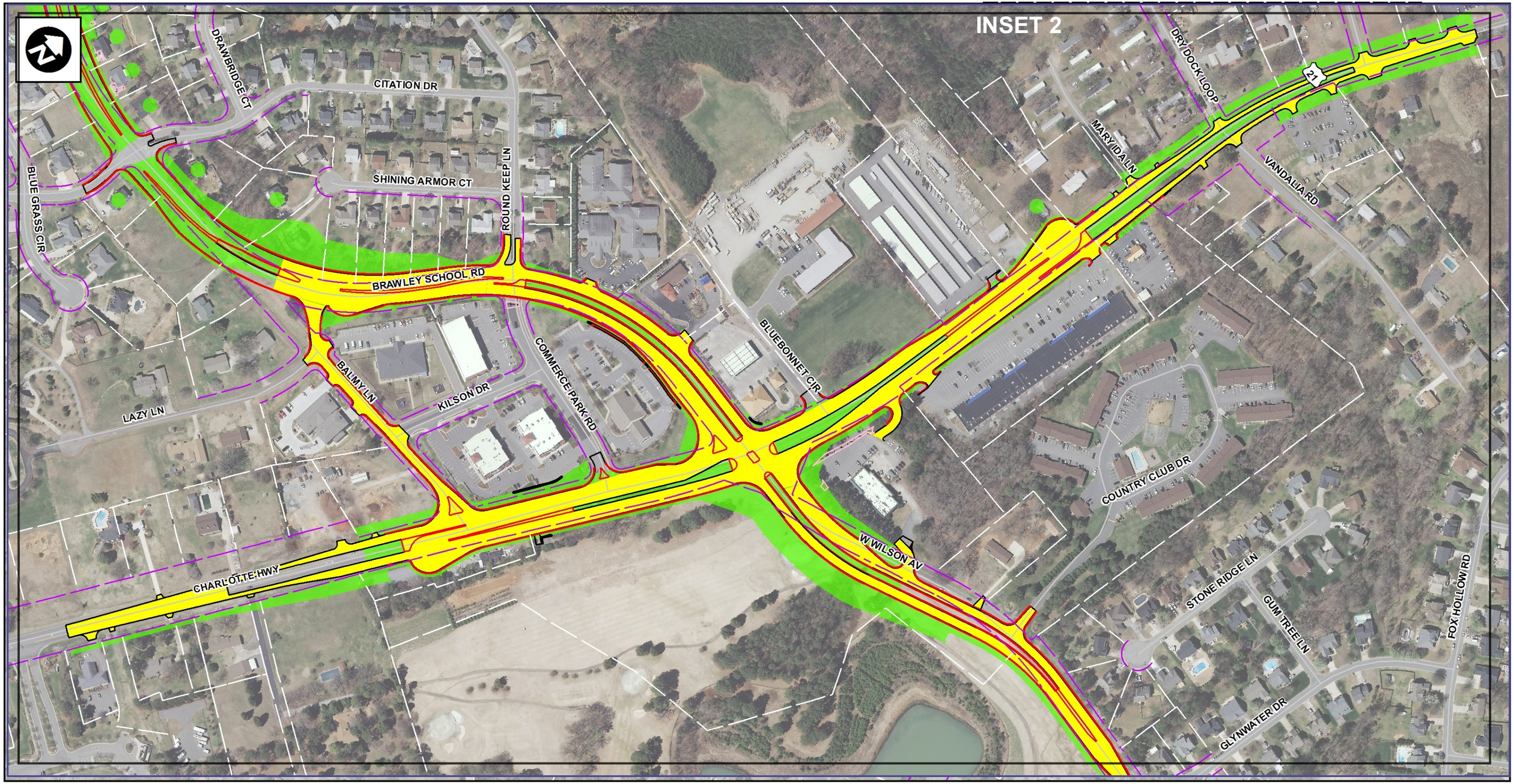
SR 1100 (Brawley School Road)
Widen to Multi-Lanes from I-77 to just west of US 21
Iredell County
STIP R-3833C

Proposed Improvements

Date
April 2018

North Carolina Department of Transportation
Division of Highway
Divsion 12

Figure 2A



LEGEND

- Existing Property Line
- NCDOT Right of Way
- Proposed Right of Way
- Proposed Concrete Island
- Proposed Roadway
- Proposed Roadway Culvert
- Proposed Retaining Wall

1 inch = 400 feet

Feet
0 100 200 400 600

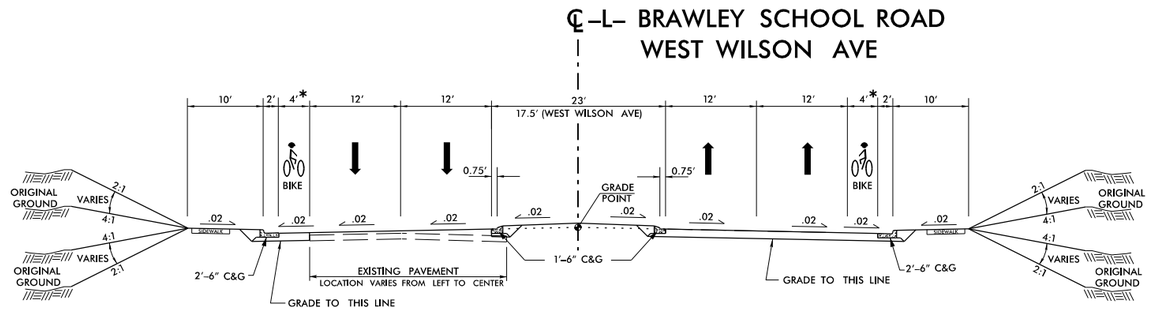
SR 1100 (Brawley School Road)
Widen to Multi-Lanes from I-77 to just west of US 21
Iredell County
STIP R-3833C
Proposed Improvements

Date
October 2017

North Carolina Department of Transportation
Division of Highway
Divsion 12

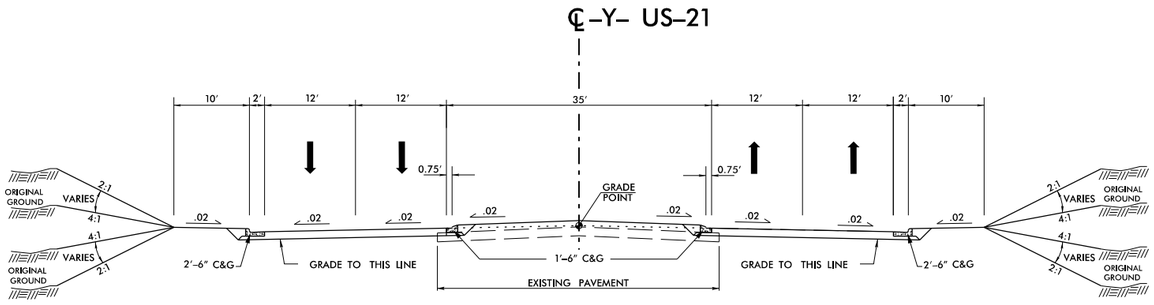
Figure 2B

R–3833C



TYPICAL SECTION NO. 1

FROM TALBERT ROAD TO WEST WILSON AVE
*NO BIKE LANES OR SIDEWALK ON WEST WILSON AVE



TYPICAL SECTION NO. 2

FROM SOUTH OF DRY DOCK LOOP TO ABBERLY GREEN BLVD.

SR 1100 (Brawley School Road)
Widen to Multi-Lanes from I-77 to just west of US 21
Iredell County
STIP R-3833C

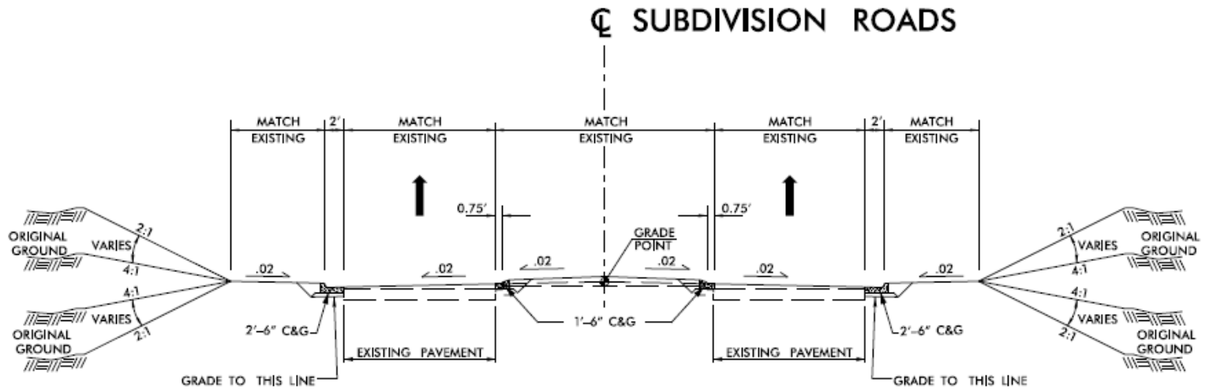
North Carolina Department of Transportation
Division of Highway
Divsion 12

Figure 3A
Typical Section

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

R–3833C



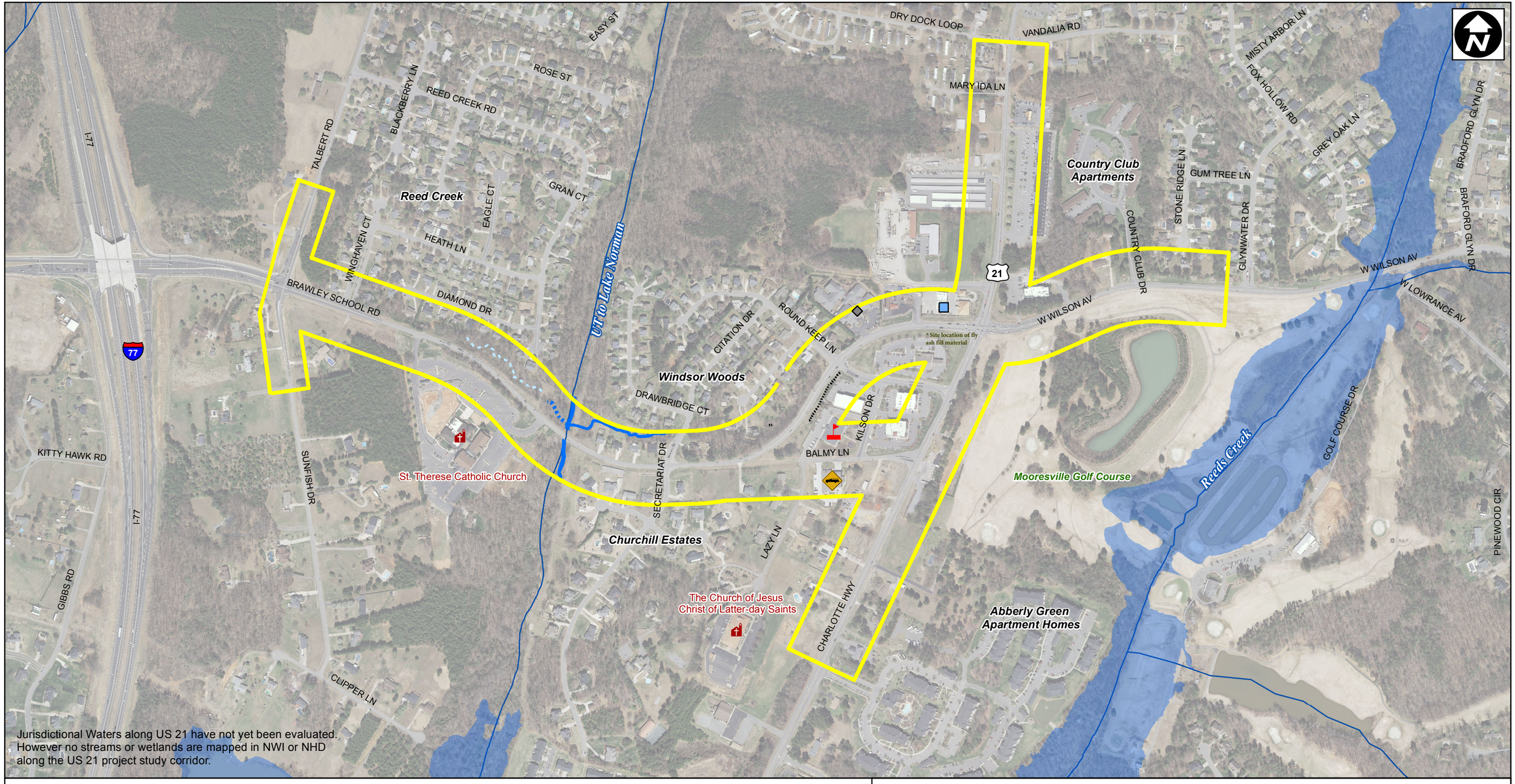
TYPICAL SECTION NO. 3

FROM TALBERT ROAD TO US–21

SR 1100 (Brawley School Road)
Widen to Multi-Lanes from I-77 to just west of US 21
Iredell County
STIP R-3833C

North Carolina Department of Transportation
Division of Highway
Divsion 12

Figure 3B
Typical Section



- Flood Zone AE (100-Year Floodplain)
- Jurisdictional perennial stream
- Jurisdictional intermittent stream
- Ephemeral Stream (non-jurisdictional)
- Ditch (non-jurisdictional)
- NHD Streams
- Study Area
- Registered UST Tank
- Mooresville Fire Station 5
- Church
- Summit Place Assisted Living Memory Care
- Tutor Time Child Care

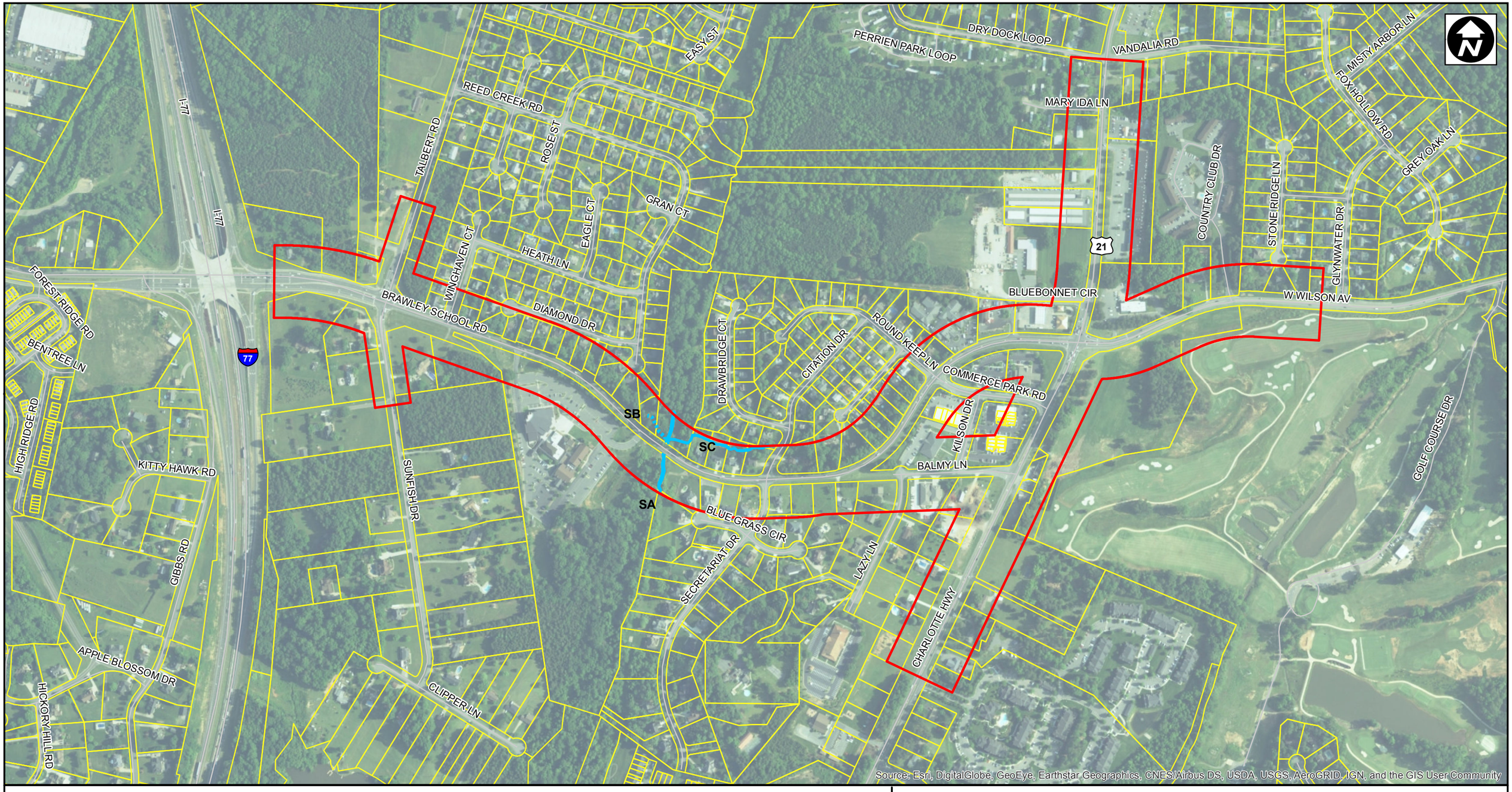
1 inch = 500 feet

0 250 500 1,000 Feet

SR 1100 (Brawley School Road) Widen to Multi-Lanes from I-77 to US 21 Iredell County
STIP R-3833C

Environmental Features

Date		Figure
4/2017	North Carolina Department of Transportation Division of Highway Divsion 12	4



Natural Resource Survey Study Area

Parcel

Jurisdictional perennial stream Jurisdictional

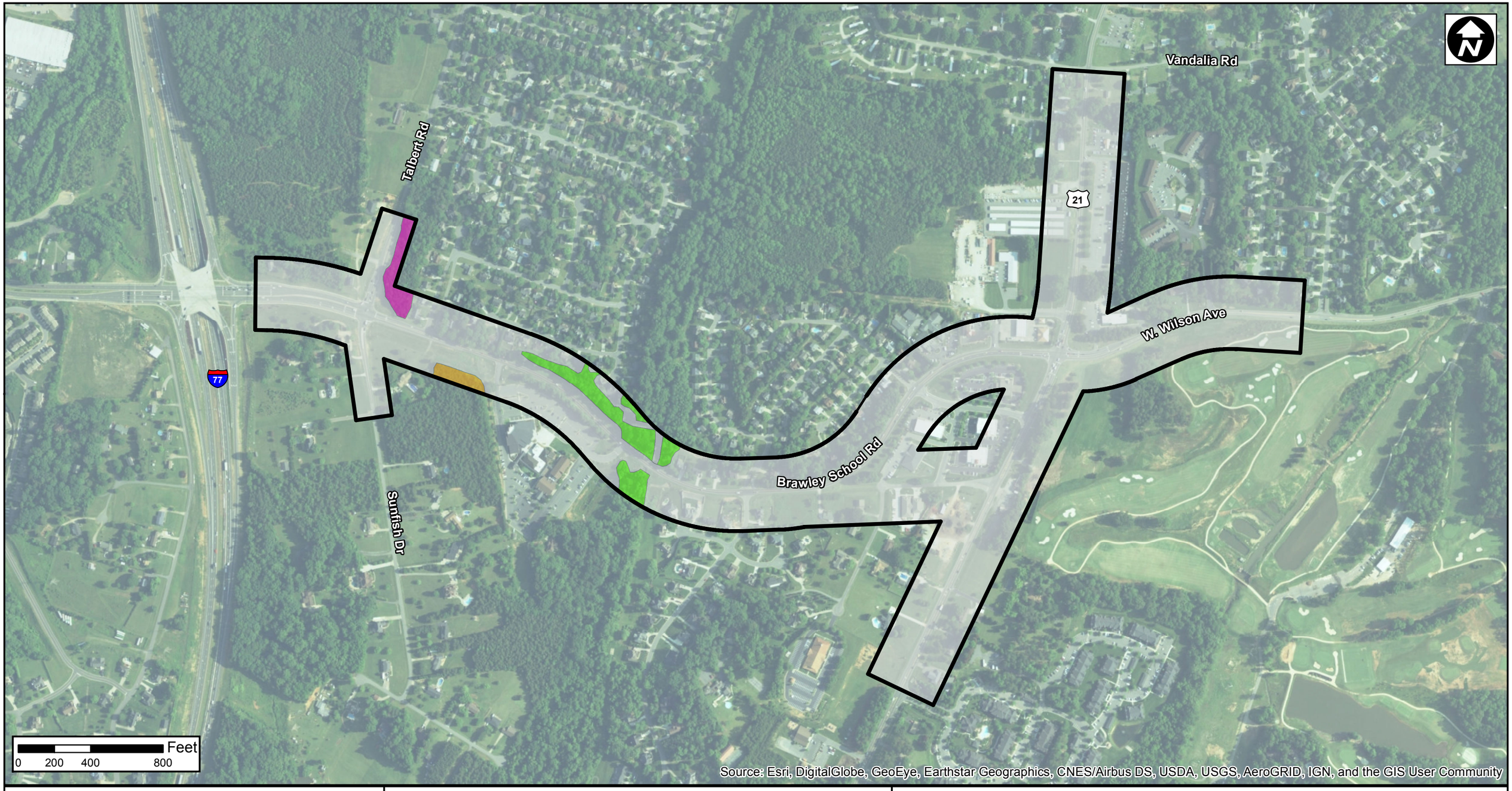
intermittent stream

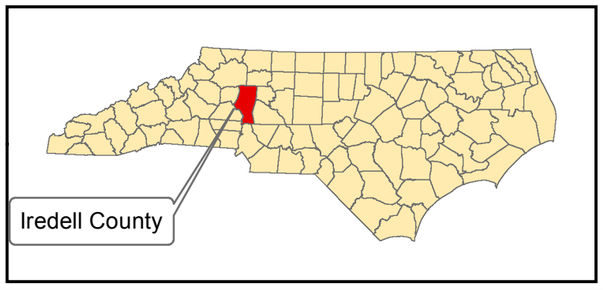
Feet
0 250 500 1,000
1 inch = 500 feet

SR 1100 (Brawley School Road)
Widen to Multi-Lanes from I-77 to US 21
Iredell County
STIP R-3833C

Jurisdictional Features

Date		Figure
6/2017	North Carolina Department of Transportation Division of Highway Divsion 12	**5**





Natural Resource Survey Study Area

Natural Communities

- Dry Oak-Hickory Forest
- Maintained-Disturbed
- Mesic Mixed Hardwood Forest
- Successional Forest (Pine/Cedar)

1 inch = 500 feet

SR 1100 (Brawley School Road)
Widen to Multi-Lanes from I-77 to US 21
Iredell County
STIP R-3833C

Terrestrial Communities Map

Date		Figure
6/2017	North Carolina Department of Transportation Division of Highway Divsion 12	6

APPENDIX A

Cultural Resources

Project Tracking No. (Internal Use)

17-03-0005

HISTORIC ARCHITECTURE AND LANDSCAPES NO SURVEY REQUIRED FORM

This form only pertains to Historic Architecture and Landscapes for this project. It is not valid for Archaeological Resources. You must consult separately with the Archaeology Group.

PROJECT INFORMATION

Project No:	R-3833C	***County***:	Iredell
WBS No.:	34554.1.FD1	***Document Type***:	
Fed. Aid No:		***Funding***:	X State Federal
Federal Permit(s):	X Yes No	***Permit Type(s)***:	NWP 14
Project Description: Widen SR 1100 (Brawley School Road) to multi-lanes from I-77 to US 21(Charlotte Highway) in Mooresville (no off-site detour specified in review request).			

SUMMARY OF HISTORIC ARCHITECTURE AND LANDSCAPES REVIEW

DESCRIPTION OF REVIEW ACTIVITIES, RESULTS, AND CONCLUSIONS: HPOWeb reviewed on 4 April 2017 and yielded no NR, SL, DE, SS, or LD properties in the Area of Potential Effects (APE). Iredell County current GIS mapping, aerial photography, and tax information indicated a developed APE with mostly residential and some commercial resources dating predominantly from the 1980s to the 2000s (viewed 4 April 2017). Several resources date from around 1935 to the early 1960s, but many are altered and none are exceptional examples of their types. The Town of Mooresville Golf Club lies adjacent to the eastern end of the project area. While recently renovated and rebuilt (2015), its front nine originated in 1949 as Moor Park, a course designed by Donald Mills and established for the employees of Burlington Mills. Should the project extend into the golf club property, please notify NCDOT-Historic Architecture as it may then be necessary to consider impacts to a possibly NR-eligible resource. Constructed in 2011, Bridge No. 70 on SR 1100 (Brawley School Road) over I-77 is not eligible for the National Register as it is neither technologically nor aesthetically significant. Google Maps "Street View" confirmed the absence of critical historic architectural and landscape resources in the APE (viewed 4 April 2017).

No architectural survey is required for the project as currently defined.

***WHY THE AVAILABLE INFORMATION PROVIDES A RELIABLE BASIS FOR REASONABLY PREDICTING THAT THERE ARE NO UNIDENTIFIED SIGNIFICANT HISTORIC ARCHITECTURAL OR LANDSCAPE RESOURCES IN THE PROJECT AREA*:** APE equates with the current study area. From the center of the US 21 and SR 1100 (Brawley School Road) intersection it extends 900 feet E, 1300 feet N, and 1650 feet S; from the center of the Talbert Road/Sunfish Drive and SR 1100 intersection it extends 725 feet W, 525 feet N, and 550 feet S. The APE also extends 225 feet to either side of all centerlines. The comprehensive county architectural survey (1976-1977) and later studies, including that conducted by NCDOT-Historic Architecture in 2000 for the R-3833 project, include no properties in the APE (Ruth Little-Stokes, *An Inventory of Historic Architecture: Iredell County* ([City of Statesville,NC]: City of Statesville, et al., 1978)). County GIS/tax materials and other visuals support the absence of significant architectural and landscape resources in the APE subject to GS 121-12(a) and Section 106 compliance. No National Register-listed properties are located within the APE.

Should any aspect of the design change, please notify NCDOT Historic Architecture as additional review may be necessary.

SUPPORT DOCUMENTATION

X Map(s) ☐Previous Survey Info. ☐Photos ☐Correspondence ☐Design Plans

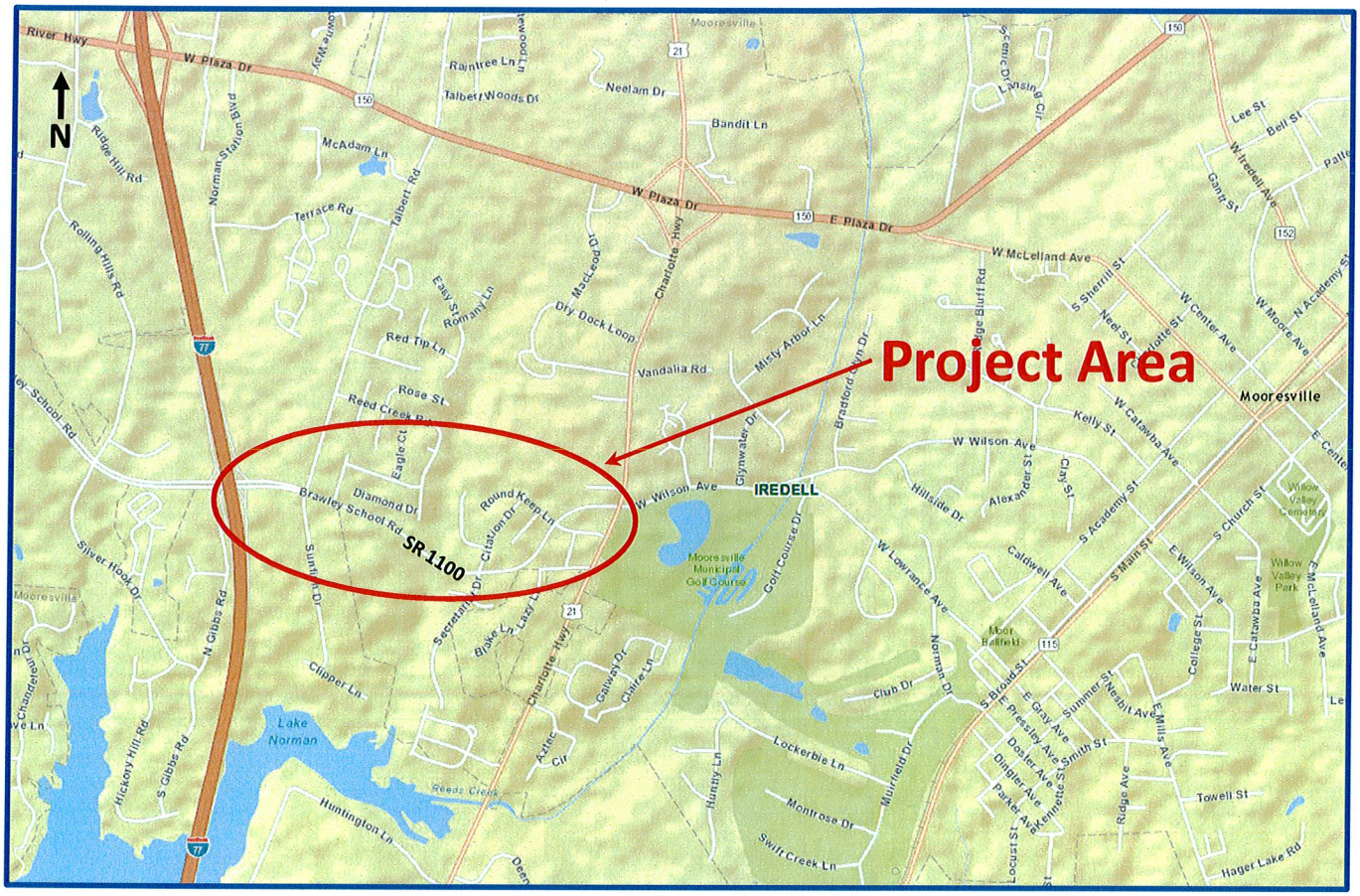
FINDING BY NCDOT ARCHITECTURAL HISTORIAN

Historic Architecture and Landscapes -- **NO SURVEY REQUIRED**

Vanessa C. Patrick — 6 April 2017

NCDOT Architectural Historian — Date

R-3833C, Iredell County
WBS No. 34554.1.FD1
Tracking No. 17-03-0005



R-3833C SR 1100 (Brawley School Road) Widening Iredell County

WBS No. 34554.1.FD1 Base map: HPOWeb, nts

NCDOT – Historic Architecture
April 2017
Tracking No. 17-03-0005

Project Tracking No.:

17-03-0005

NO ARCHAEOLOGICAL SURVEY REQUIRED FORM

This form only pertains to ARCHAEOLOGICAL RESOURCES for this project. It is not valid for Historic Architecture and Landscapes. You must consult separately with the Historic Architecture and Landscapes Group.

PROJECT INFORMATION

Project No:	**R-3833**	*County:*	**Iredell**
WBS No:	**34554.1.FD1**	*Document:*	**MCC**
F.A. No:	**N/A**	*Funding:*	☒ State ☐ Federal

Federal Permit Required? ☒ Yes ☐ No *Permit Type:* **usace**

Project Description: NCDOT proposes to widen SR 1100 (Brawley School Road) to multi-lanes from I-77 to US 21 in Iredell County. The roadway would be widened to include additional lanes, a median and possibly bike lanes and sidewalks. The total length, which includes intersection improvements at US 21, is estimated at 1.97 miles. While the width varies, a typical range of 100-200 feet includs most segments and includes easements and cut or fill lines that otherwise extend beyond the ROW. For purposes of this archaeological review, the Area of Potential Effects (APE) covers the entire length of the project and width of final construction limits.

This is a state funded project, however, federal permitting is expected from USACE. Therefore, Section 106 of the National Historic Preservation Act applies for this federal undertaking.

SUMMARY OF CULTURAL RESOURCES REVIEW

Brief description of review activities, results of review, and conclusions:

Conceptual design mapping and design was available which, combined with verbal description, provided the basis to establish the APE. The project was viewed on topographic and aerial mapping (Figures 1 and 2). The project area is developed with modern infrastructure, driveways and parcels. Much of the APE is assumed to be modified, disturbing the soils and archaeological context.

The Office of State Archaeology was visited to review archaeological mapping and to reference any known archaeological surveys. Archaeological reviews in the nearby vicinity have been considered. Of particular interest is ER 00-9912 which covers the same TIP # R-3833 which is described as "Improvements to SR 1101, Bawley School Road, from SR 1177 [River Loop Road] to US 21 with Interchange at I-77." This review concluded that no archaeological investigation was warranted based the eroded nature of the soils, then recent archaeological surveys in the immediate vicinity, and a nearby site consisting of a single flake, 31Id285 which was not eligible for the National Register of Historic Places (see attached memo from HPO to NCDOT dated August 23, 2000). Several other environmental reviews are noted nearby the project area, including NCDOT survey of Gibbs Road immediately west of the current APE during which no archaeological sites were identified (ER 00-99121, Glover April 2008).

Brief Explanation of why the available information provides a reliable basis for reasonably predicting that there are no unidentified historic properties in the APE:

The scale of new expansion in a develeoped, disturbed context over generally eroded soils suggest that intact, signficant archaeological sites would not be encountered by the construction of the undertaking, a large road widening project. Background checks did not reveal any recorded significant archaeological sites in the immediately proximity of the project. Rather, the APE for the expansion of SR 1100, Brawley School Road, has already been reviewed by the NC HPO and OSA resulting in a recommendation that no archaeological survey is warranted. We concur with the recommendation, noting that development and soil disturbances has increased in the area over the past nearly two decades. No archaeological survey is recommended for this road widening project. Should archaeological remains be encountered during construction, contact this office for further unanticipated discovery guidance.

SUPPORT DOCUMENTATION

See attached: ☒ Map(s) ☐ Previous Survey Info ☐ Photos ☒ Correspondence
☐ Photocopy of County Survey Notes Other:

FINDING BY NCDOT ARCHAEOLOGIST

NO ARCHAEOLOGY SURVEY REQUIRED

4/11/2018

NCDOT ARCHAEOLOGIST Date

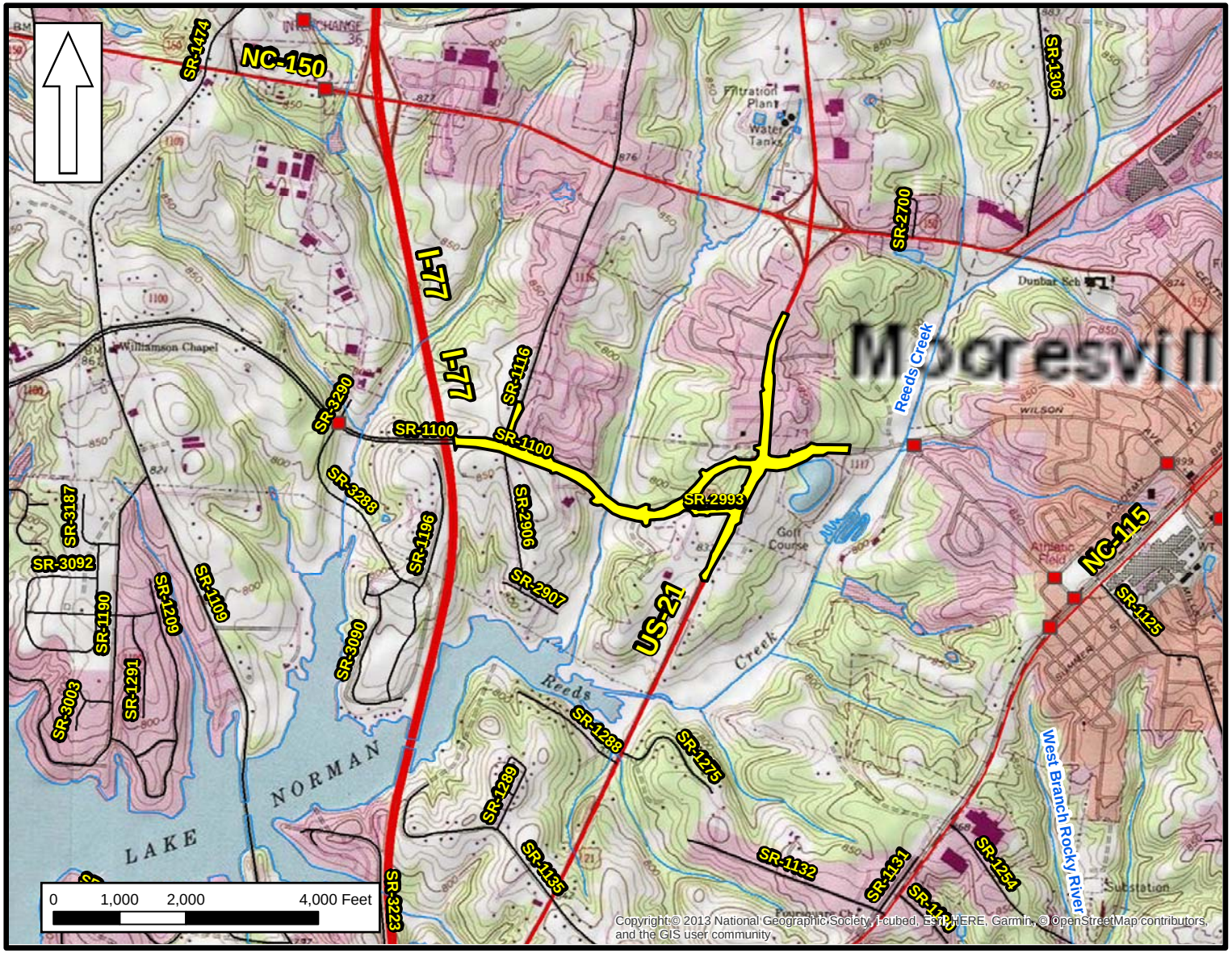


Figure 1. Vicinity of TIP # R-3833C, SR 1100 Brawley School Road on USGS topographic mapping (Mooresville).

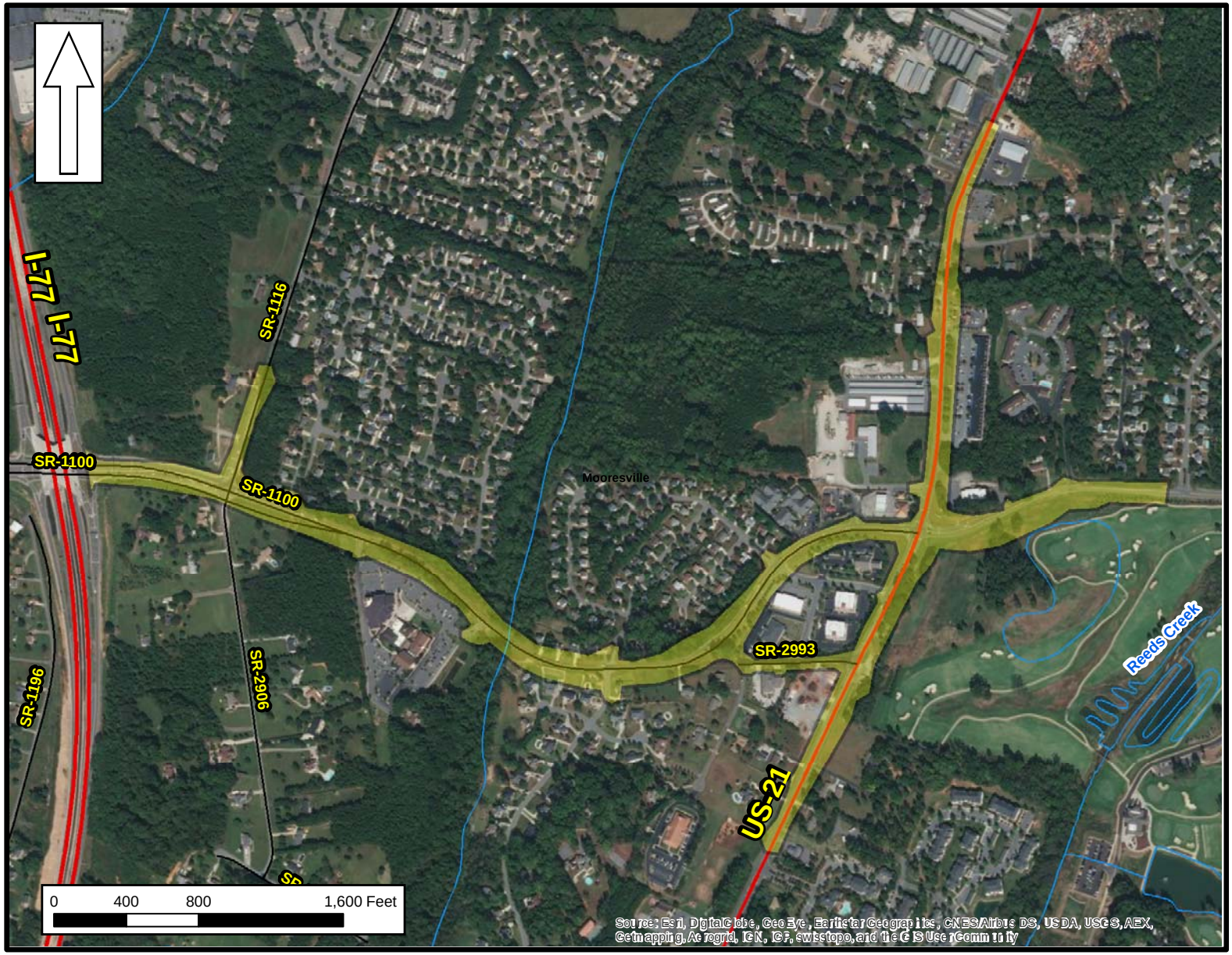


Figure 2. Recent aerial mapping showing the APE of the TIP # R-3833C project which proposes widening SR 1100, Brawley School Road. Previous reviews for the project by HPO/OSA recommended no survey based on eroson and other factors.

North Carolina Department of Cultural Resources

State Historic Preservation Office

David L. S. Brook, Administrator

James B. Hunt Jr., Governor
Betty Ray McCain, Secretary

Division of Archives and History
Jeffrey J. Crow, Director

August 23, 2000

MEMORANDUM

To: William D. Gilmore, P.E., Manager
Project Development and Environmental Analysis Branch

From: David Brook
Deputy State Historic Preservation Officer

Re: Improvements to SR 1101, Brawley School Road, from SR 1177 to US 21 with interchange at I-77, Iredell County, Federal Aid No. STP-150(11), State Project No. 8.1823301, TIP No. R-3833, ER 00-9912

We have received information from the State Clearinghouse concerning the above project and offer the following comments.

On May 24, 2000, April Montgomery of our office attended a scoping meeting for the above project. At that time we identified several eligible properties in the Mayhew vicinity and request that a historic architectural structures report be completed for the project. It is our understanding that NCDOT's architectural history section is currently working on this report and will submit that to us in the near future.

After the Meeting of the Minds for the subject project our office received the site forms and report for a project previously conducted in the subject project area. A number of archeological sites were reported in the area but most are not eligible for the National Register. The closest site, 31ID285, a single flake, was assessed as not eligible. The Iredell County Soil Survey mapped most of these soils as eroded in the 1960s. The probability is low that eligible sites are located in the proposed project area.

We, therefore, recommend that no archaeological investigation be conducted in connection with this project.

We look forward to further consultation on this project.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

	Location	Mailing Address	Telephone/Fax
ADMINISTRATION	507 N. Blount St., Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919) 733-4763 • 733-8653
ARCHAEOLOGY	421 N. Blount St., Raleigh NC	4619 Mail Service Center, Raleigh NC 27699-4619	(919) 733-7342 • 715-2671
RESTORATION	515 N. Blount St., Raleigh NC	4613 Mail Service Center, Raleigh NC 27699-4613	(919) 733-6547 • 715-4801
SURVEY & PLANNING	515 N. Blount St., Raleigh NC	4618 Mail Service Center, Raleigh NC 27699-4618	(919) 733-6545 • 715-4801

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919/733-4763.

DB:kgc

cc: Mr. Nicholas L. Graf, FHwA
Mary Pope Furr, NCDOT
Tom Padgett, NCDOT

APPENDIX B

Air Quality Analysis Report

AIR QUALITY REPORT

SR 1100 (Brawley School Road) and US 21 Widening

Mooresville, Iredell County

WBS Element No. 34554.1.1
STIP Project No. R-3833C

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

Submitted by:
Stantec Consulting Services, Inc.

October 2017

SR 1100 (Brawley School Road) and US 21 Widening

Mooresville, Iredell County

WBS Element No. 34554.1.1
STIP Project No. R-3833C

Prepared for:

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

Mary M. Martin
Air Quality Analyst
Stantec Consulting Services, Inc.

Accepted By:

NCDOT Environmental Analysis Unit,
Traffic Noise & Air Quality Group

October 9, 2017
Date

Table of Contents

List of Tables

List of Figures

1. Introduction

The North Carolina Department of Transportation (NCDOT) proposes widening SR 1100 (Brawley School Road) from just east of I-77 to 1000' east of US 21 and widening US 21 approximately 2300' north and 1950' south of Brawley School Road. The roadway cross section will go from a two-lane facility to a four-lane divided section with a 23' to 35' raised median. The total approximate length of the project is 1.9 miles. The proposed project is in Mooresville in Iredell County, as shown in Figure 2.

The proposed project is needed to relieve traffic congestion and improve the Level of Service (LOS) on Brawley School Road and US 21. Due to its location and geography, Brawley School Road is the sole route home for thousands of Mooresville and Mooresville-area residents, as well as one of the busiest east-west corridors connecting downtown Mooresville and Lake Norman. Over time, especially the recent decade, this major thoroughfare has been the most rapidly urbanizing area of Mooresville. The primary purpose of the proposed project is to provide improved travel conditions and safety by widening Brawley School Road and US 21 to four-lane facilities, as well as a Michigan left configuration at Brawley School Road and US 21, with U-turn movements on US-21 as shown in Figure 3.

A State Environmental Assessment (SEA) and a Finding of No Significant Impact (FONSI) are being prepared for the project. Funding will be provided through the State Highway Trust Fund. The project is listed in the 2018–2027 State Transportation Improvement Program (STIP) as Project No. R-3833C.

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 μg/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 μg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15.0 μg/m^3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 μg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 μg/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 September 14, 2017.

3. Attainment Status

The project is in Iredell County, which is within the Charlotte maintenance area for the 2008 ozone (O_3) standard as defined by the EPA. This area was designated marginal nonattainment under the 2008 eight-hour ozone standard on July 20, 2012 and due to improved air quality in the region was re-designated as a maintenance area on August 27, 2015. Section 176(c) of the CAAA requires that transportation plans, programs, and projects conform to the intent of the

state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Iredell County. The Charlotte Region Transportation Planning Organization 2040 Metropolitan Transportation Plan and the 2016-2025 Transportation Improvement Program (TIP) conform to the intent of the SIP. The USDOT made a conformity determination on the MTP on April 20, 2016 and the TIP on April 20, 2016. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51and 93. There are no significant changes in the project's design concept or scope, as used in the conformity analyses.

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.

[1] https://www.epa.gov/iris

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

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 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 Figure 1, 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

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

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 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:

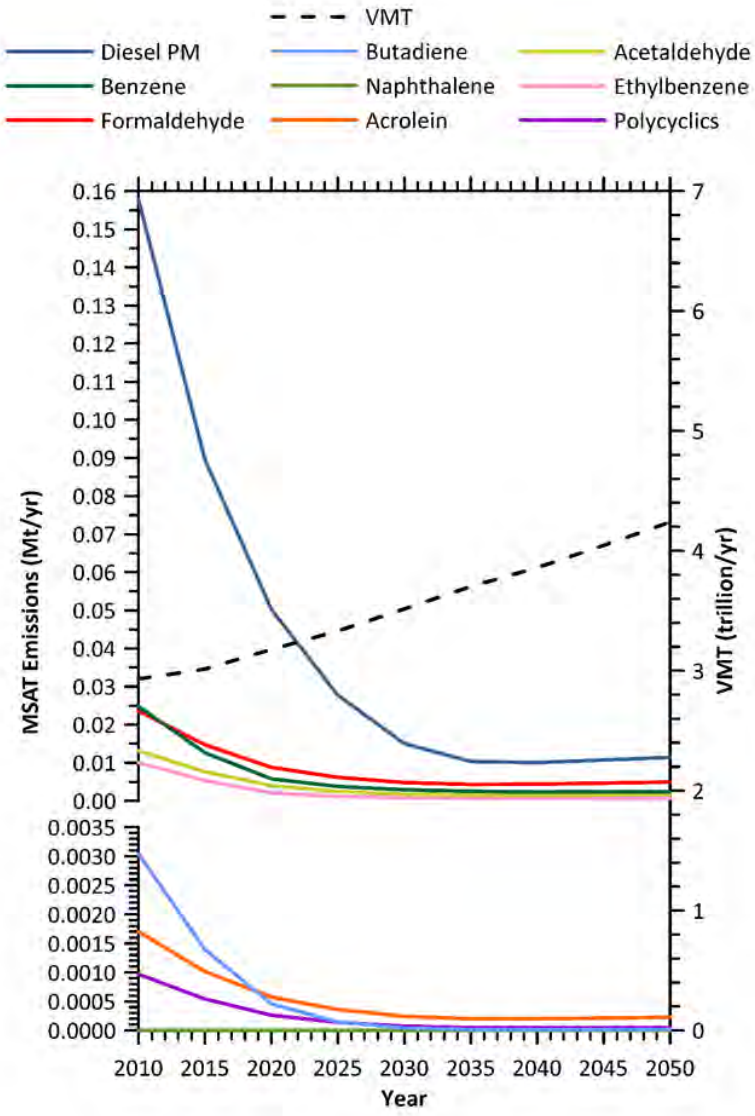
(1) No analysis for projects with no potential for meaningful MSAT effects;

(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.

Figure 1. National MSAT Emission Trends 2010 - 2050 for Vehicles Operating on Roadways Using EPA's MOVES2014a Model



Source: EPA MOVES2014a.

(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-3833C 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 19,900 to 32,100 AADT on Brawley School Road and 27,500 to 32,000 AADT on US 21.

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*

[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.

for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives, found at:
https://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm.

The amount of MSAT emitted would be proportional to the vehicle miles travelled, or VMT, for both the Build alternative and the No-Build alternative, assuming other variables such as fleet mix are the same. The estimated VMT between the No-Build alternative and the Build alternative vary. The difference in VMT for Brawley School Road is an increase of 25.5% in the design year and a reduction of 6.8% for US 21 in the design year. Refer to Table 2. Because the VMT estimated for the No-Build alternative is less than for the Brawley School Road Build alternative and 6.8% more than for the US 21 Build alternative, it can be said that, overall, higher levels of MSAT are expected from the project.

Table 2. Vehicle Miles Traveled

Scenario	2040 Vehicle Miles Traveled (VMT)	Percent Change in VMT Compared to No-Build Alternative
No-Build	Brawley School Road – 2,4034	
	US 21 – 2,065	
Build	Brawley School Road – 30,160	+25.5%
	US 21 – 1,925	-6.8%

Source: STIP U-5816, U-5817, R-3833C, R-4757, R-5100, U-6037 Traffic Forecast for Multiple Projects, Iredell County, May 2017, Patriot Transportation Engineering

However, emissions will likely be lower than present levels in the design year because 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.

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 where the widening of Brawley School Road brings the roadway closer to existing buildings. However, even if these increases do occur, they will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations. The MSAT emissions along US 21 would decrease due to a decrease in VMT.

In sum, 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

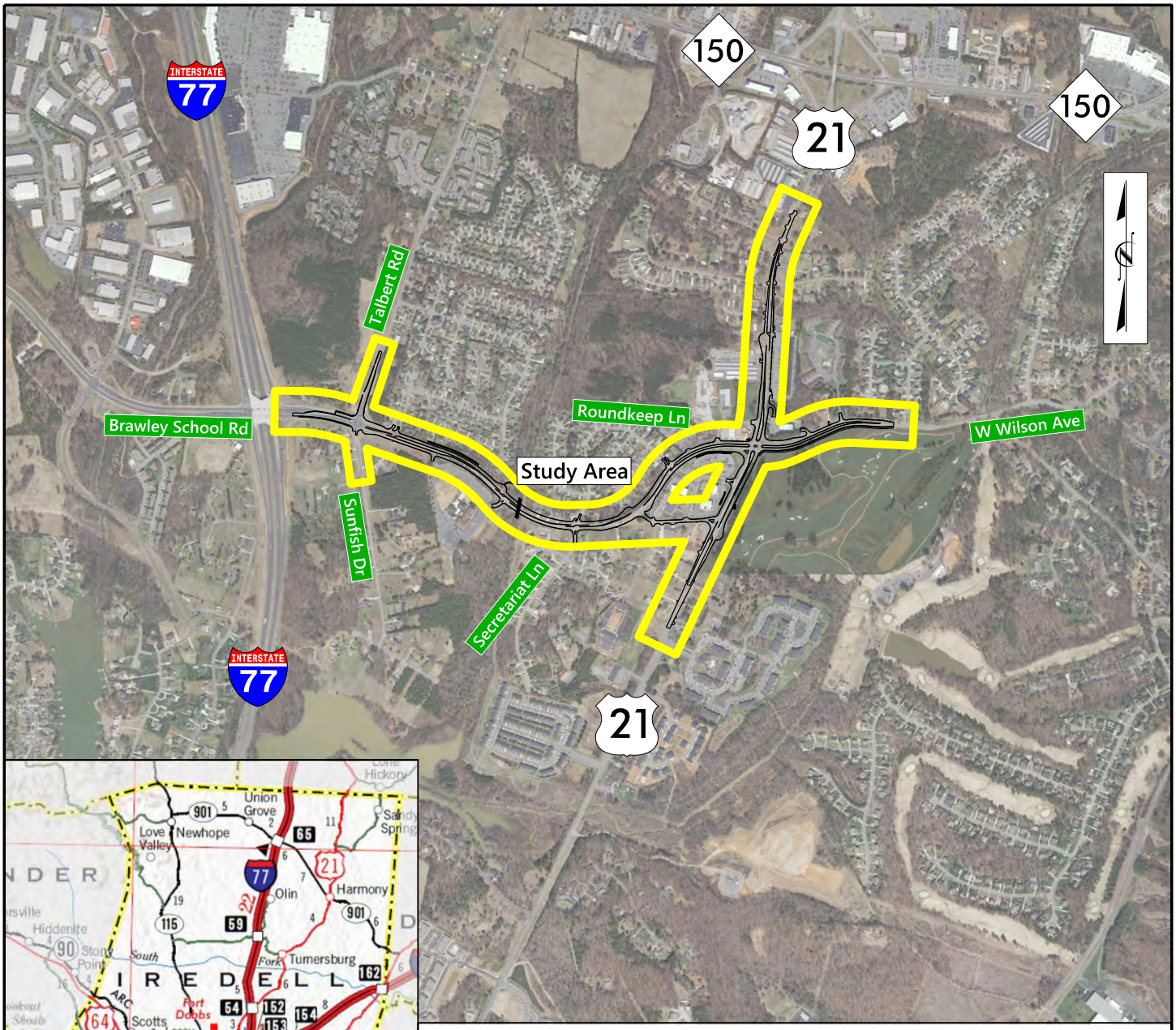
Air quality impacts resulting from roadway construction activities are typically not a concern when contractors utilize appropriate control measures. During construction of the proposed project, all materials resulting from clearing and grubbing, demolition or other operations will be removed from the 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

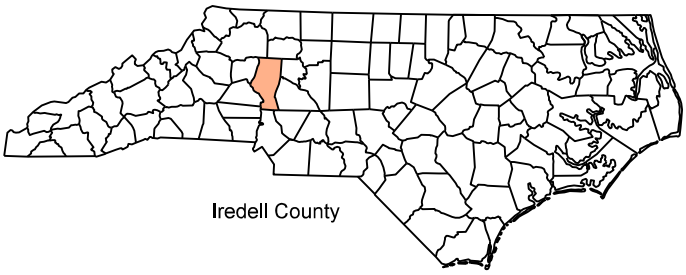
Vehicles are a major contributor to decreased air quality because they emit a variety of pollutants into the air. Changing traffic patterns are a primary concern when determining the impact of a new highway facility or the improvement of an existing highway facility. New highways or the widening of existing 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 in Iredell County, which is within the Charlotte maintenance area for the 2008 ozone (O_3) standard as defined by the EPA. The project is not anticipated to create any adverse effects on the air quality of the area. This evaluation completes the assessment requirements for air quality of the 1990 Clean Air Act Amendments and the SEPA process. No additional reports are necessary.



Note: Aerial photo from NC OneMap & Google Earth

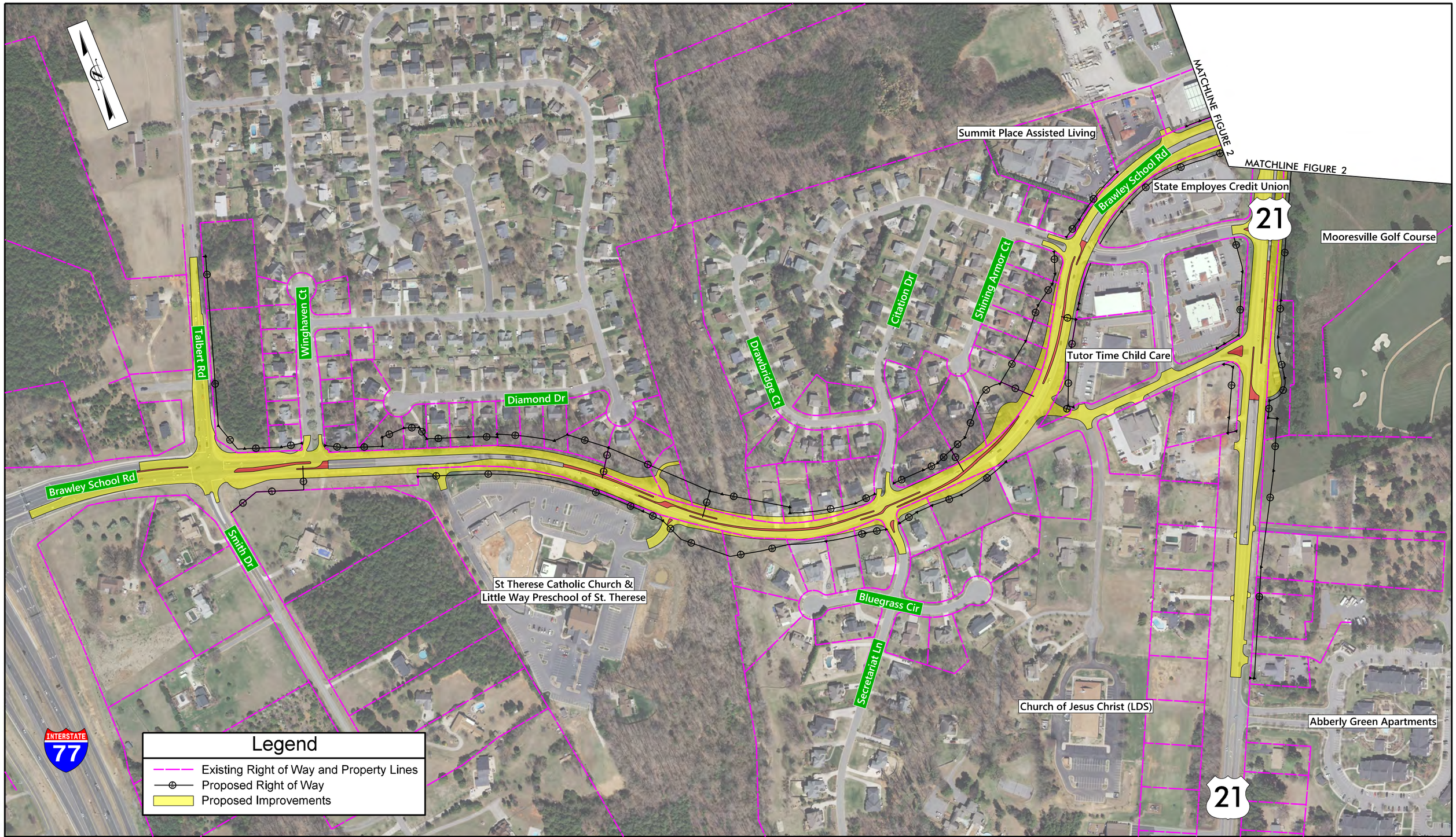
Project Location



Brawley School Road and US 21 Widening
STIP No. R-3833C
Iredell County, North Carolina

750 375 0 750 1500

Scale: 1" = 1500'
Project Vicinity
Figure 2



Brawley School Road and US 21 Widening
STIP No. R-3833C
Iredell County, North Carolina

150 75 0 150 300

Scale: 1" = 300'
Build Alternative
Figure 3

Legend

- Existing Right of Way and Property Lines
- Proposed Right of Way
- Proposed Improvements

Brawley School Road and US 21 Widening
STIP No. R-3833C
Iredell County, North Carolina

150 75 0 150 300

Scale: 1" = 300'
Build Alternative
Figure 4

APPENDIX C

Relocation Report

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

34554.1.3 E.I.S. ☐ CORRIDOR ☐

WBS ELEMENT:	34554.1.3	COUNTY	Iredell	Alternate 1 of 1 Alternate
T.I.P. No.:	R-3833C			
DESCRIPTION OF PROJECT:	SR 1100 Brawley School Rd./Wilson Rd. from Talbert Rd to 1000' East of US 21			

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	8	0	8	0
Businesses	1	3	4	0
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP
0	0	0	0	8

VALUE OF DWELLING

Owners		Tenants	
0-20M	0	$ 0-150	0
20-40M	0	150-250	0
40-70M	0	250-400	0
70-100M	0	400-600	0
100 UP	8	600 UP	0
TOTAL	8		0

DSS DWELLING AVAILABLE

For Sale		For Rent	
0-20M	0	$ 0-150	0
20-40M	0	150-250	0
40-70M	0	250-400	0
70-100M	0	400-600	0
100 UP	11*	600 UP	6*
	11		6

ANSWER ALL QUESTIONS

Yes	No	Explain all "YES" answers.	
	x	1.	Will special relocation services be necessary?
	x	2.	Will schools or churches be affected by displacement?
x		3.	Will business services still be available after project?
x		4.	Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	x	5.	Will relocation cause a housing shortage?
		6.	Source for available housing (list).
	x	7.	Will additional housing programs be needed?
x		8.	Should Last Resort Housing be considered?
	x	9.	Are there large, disabled, elderly, etc. families?
	x	10.	Will public housing be needed for project?
x		11.	Is public housing available?
x		12.	Is it felt there will be adequate DSS housing housing available during relocation period?
	x	13.	Will there be a problem of housing within financial means?
x		14.	Are suitable business sites available (list source).
		15.	Number months estimated to complete RELOCATION? **12-months**

REMARKS (Respond by Number)

3. Businesses will still be available.
4. Will any businesses be displaced? Yes
Gates Construction Co. Owner 25-30 employees
Remaining 3 shown are vacant and in poor repair.
6. Source for available housing:
Lake Norman Realty representatives and online websites.
8. As required by law.
11. Public housing is available in Iredell County.
12. there seems to be plenty of DSS housing in the area.
14. Are suitable business sites available?
Various vacant sites in area.
Online Realtor sites and conversations with Lake Norman Realty representatives.

SECU will have impacted parking but does not appear to be a relocatee.
Reports from Lake Norman Realty that over 1,000 listings and listings under contract in Morresville at this time.
11 Listings in 2 of the neighborhoods fronting on Brawley School Road.

***The 11 units for sale and 6 units for rent are in the immediate neighbordood. As stated previously, over 1,000 units are listed or under contract in the Morresville area.**

[signature]	5/21/2018	[signature]	05/21/2018
Ed Welborn Right of Way Agent	Date	Relocation Coordinator	Date

FRM15-E
Revised 7/7/14

APPENDIX D

ROW and Utility Cost Estimates

REQUEST FOR R/W COST ESTIMATE / RELOCATION EIS

COST ESTIMATE REQUEST ☒ **RELOCATION EIS REPORT** ☒

NEW REQUEST: ☒ **UPDATE REQUEST:** ☐ Update to ____ Estimate **REVISION REQUEST:** ☐ Revision to ____ Estimate Revision No.: ____

DATE RECEIVED: 03/09/18 **DATE ASSIGNED**: 03/09/18 **# of Alternates Requested**: 1

DATE DUE: 05/18/18 ext: 05/25/18

TIP No.: R-3833C	**DESCRIPTION:** SR 1100 Brawley School Rd / Wilson Rd from Talbert Rd to 1000' East of US 21

WBS ELEMENT: 34554.1.3 **COUNTY**: Iredell **DIV**: 12 **APPRAISAL OFFICE**: 4

REQUESTOR: Bryan Sowell **DEPT**: Div 12

TYPE OF PLANS: HEARING MAPS☐ | LOCATION MAP☐ | AERIAL☐ | VICINITY☐ | PRELIMINARY☐ | CONCEPTUAL☐

** Based on past project historical data, the land and damage figures have been adjusted to include condemnation and administrative increases that occur during settlement of all parcels.**

APPRAISER: Ed Welborn - Telics **COMPLETED**: 05/21/18 **# of Alternates Completed**: 1

TYPE OF ACCESS:	NONE:☐	LIMITED: ☐
	PARTIAL:☒	FULL: ☐

ESTIMATED NO. OF PARCELS:	**80**	
RESIDENTIAL RELOCATEES:	**8**	**$ 320,000**
BUSINESS RELOCATEES:	**4**	**$ 250,000**
GRAVES:	**-**	**$ -**
CHURCH / NON – PROFIT: -	**-**	**$ -**
MISC: -	**-**	**$ -**
SIGNS:	**23**	**$ 313,500**
LAND, IMPROVEMENTS, & DAMAGES:	**$ 8,725,000**	
ACQUISTION:	**$ 480,000**	
TOTAL ESTIMATED R/W COST:	**$ 10,088,500**	

** The estimated number of above relocatees includes those parcels where the proposed acquisition areas involve relocation of livable or business units only. **

NOTES: ____

UTILITY ESTIMATE WORKSHEET

TIP No: R-3833C
WBS Element No: 34554.1.3
State Project No:
Fed. Project No:
County: Iredell

Description:
- SR 1100 BRAWLEY SCHOOL ROAD/WILSON ROAD FROM TALBERT ROAD TO 1000' EAST OF US 21
- US 21 FROM 2300’ NORTH TO 1950’ SOUTH OF BRAWLEY SCHOOL ROAD

The proposed project will widen Brawley School Road and US 21’s two lane roads to a 4-lane raised 23’ median superstreet corridor with U-turn bulbs

Field Inspection • Evidence of Utilities

Gas: Yes	Electric: Yes	Telephone: Yes
Water: Yes	Sewer: Yes	Drainage: Yes

Anticipated Relocation

Gas: Yes	Electric: Yes	Telephone/Fiber Optic: Yes
Water: Yes	Sewer: Yes	CATV: Yes

Summary: **Single Alternate**
Requesting Party: **Stantec**
Estimate Date: **5/1/2018**

Relocation Totals		**Construction Total**		**Alternate Totals**	
Power Poles:	$2,239,086.40	Power Poles:		**Relocation Total**	**$2,382,161.40**
Power Items:		Power Items:		**Construction Total**	**$523,567.00**
Telephone Poles		Telephone Poles		**Alternate Total**	**$2,905,728.40**
Telephone Items		Telephone Items			
Gas Line:	$143,075.00	Gas Line:			
Gas Items:		Gas Items:			
Water Line:		Water Line:	$225,500.00		
Water Items:		Water Items:			
Sewer Line:		Sewer Line:	$264,470.00		
Sewer Items:		Sewer Items:	$ 33,597.00		
Misc.Items:		Misc.Items:			

Detail: Single Alternate

Power Poles

Type	Location	Number	Cost/ Pole	Total Cost
Distribution Pole single Phase		24	$14684.00	$352,416.00
Distribution Pole Three Phase		38	$18,240.00	$693,120.00
Distribution Line Single Phase		23,100 ft	$26.00/ft	$600,600.00
Distribution Line Three Phase		17,200 ft	$34.00/ft	$584,800.00
Clearing Per Acre		3.8 acres	$2,133.00/ac	$8,150.40
	Total:			$2,239,086.40

Telephone Poles

Type	Location	Number	Cost/ Pole	Total Cost
Three Cable Telephone Pole				
	Total:			

Gas Lines

Line Type	Location	Length	Cost per Ft.	Total Cost
8" Gas Line Per Linear Foot		975	$97.00	$94,575.00
4" Gas Line Per Linear Foot		500	$97.00	$48,500.00
	Total:			$143,075.00

Waterlines

Line Type	Location	Length	Cost per Ft.	Total Cost
16" PVC Water Line Per Linear Foot		500	$139.00	$69,500.00
12" PVC Water Line Per Linear Foot		500	$102..00	$51,000.00
8" PVC Water Line Per Linear Foot		500	$80.00	$40,000.00
16" Valve Per Each		5	$5,400.00	$27,000.00
12" Valve Per Each		10	$2400.00	$24,000.00
8" Valve Per Each		10	$1400.00	$14,000.00
	Total:			$225,500.00

Sewer Lines

Line Type	Location	Length	Cost per Ft	Total Cost
36" Encasement pipe Per Linear Foot		70	$162.00	$11,340.00
24" Encasement pipe Per Linear Foot		300	$118.00	$35,400.00
24" DIP Sewer Line Per Linear Foot		150	$145.00	$21,750.00
12" DIP Sewer Line Per Linear Foot		600	$66.00	$39,600.00
8" DIP Sewer Line Per Linear Foot		2900	$52.00	$150,800.00
DI Fitting Per Pound		1500	$3.72/#	$5,580.00
	Total:			$264,470.00

Sewer Items

Items	Location	Number	Unit Cost	Total Cost
Manholes(New)		9	$3,733.00	$33,597.00
	Total:			$33,597.00
			Alternate Total	**$2,905,728.40**

APPENDIX E

Public Involvement

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

September 25, 2017

RE: **Invitation to Local Official's Informational Meeting** for the SR-1100 (Brawley School Road Improvements) from just east of the I-77 interchange to just east of the intersection of Brawley School Road and U.S. 21 in Mooresville. STIP Project Number R-3833C.

The North Carolina Department of Transportation invites you to attend a Local Official's Informational Meeting tor the above referenced project. The meeting is scheduled as follows:

Date: *Tuesday, October 3, 2017*
Time: *2:00 p.m. - 3:00 p.m.*
Location: *Saint Therese Catholic Church, 217 Brawley School Road, Mooresville*

The North Carolina Department of Transportation (NCDOT) proposes to widen an existing 1.1-mile section of SR 1100 (Brawley School Road) from just east of the I-77 Interchange to just east of the intersection of Brawley School Road and U.S. 21 in Mooresville. The project also includes improvements along U.S. 21 from just north of Dry Dock Loop/Vandalia Road to Abberly Green Blvd.

The purpose of these meetings is to provide an opportunity to review and discuss the proposed designs with NCDOT and their representatives as well as to gather your comments regarding the proposed improvements. An informal, drop-in style open house will follow the Local Official's Informational Meeting from 4:00 p.m. until 7:00 pm.

Please contact the NCDOT Project Engineer, Mr. Bryon Sowell, if you and/or your representative(s) will attend the meeting. Mr. Sowell can be reached at bksowell@ncdot.gov or at (980) 552-4221. Thank you and we look forward to meeting with you.

Sincerely,
Bryan Sowell, PE, NCDOT Project Engineer

cc: Mark Stafford, PE, NCDOT Division 12 Engineer
Larry Carpenter, PE, NCDOT Division 12 Construction Engineer
Michael Poe, PE, NCDOT Division 12 Project Development Engineer
Jackie McSwain, NCDOT Division 12 Project Team Lead

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS, DIVISION 12
PO BOX 47
SHELBY, NC 28151-0047

Location:
1710 E. MARION STREET
SHELBY, NC 28151

Widening Improvements to SR-1100 (Brawley School Road): TIP Project R-3833C Iredell County, NC

PRSRT STD
U.S. POSTAGE
PAID
CITY, STATE

*********ECRWSSEDDM****

Postal Customer

The N.C. Department of Transportation will hold an informal public meeting for the following project: Widening improvements to Brawley School Road (TIP No. R-3833C). Project R-3833C proposes to widen Brawley School Road from just east of the I-77 Interchange to just east of the intersection of Brawley School Road and U.S. 21 in Mooresville. The project also includes improvements along U.S. 21 from just north of Dry Dock Loop/Vandalia Road to Abberly Green Blvd.

The purpose of this meeting is for NCDOT representatives to provide information and answer questions regarding this project. No formal presentation will be made but interested citizens can attend any time between the hours of 4 PM to 7 PM. Written comments or questions can be submitted at the meeting or via mail/e-mail by November 3, 2017.

NCDOT will provide auxiliary aids and services under the Americans with Disabilities Act for disabled persons who wish to participate in this meeting. Anyone requiring special services should contact; Jamille Robbins, Human Environment Section, via e-mail at jarobbins@ncdot.gov or by phone (919) 707-6085 as early as possible so that arrangements can be made.

Open-House Public Meeting

Tuesday October 3, 2017

Open House Public Meeting

4 p.m. to 7 p.m.

St. Therese Catholic Church
Multi Purpose Room in the Parish Life Center
217 Brawley School Road
Mooresville, NC 28117

Aquellas personas que hablan español y no hablan inglés, o tienen limitaciones para leer, hablar o entender inglés, podrían recibir servicios de interpretación si los solicitan llamando al 1-800-481-6494.

NCDOT Mission: Connecting people, products and places safely and efficiently, with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina.

Important Information.

Please read!

Questions? Comments?
Concerns?
Please Contact Us!

Widening Improvements to SR-1100 (Brawley School Road): TIP Project R-3833C Iredell County, NC

Please visit our Web Site for the latest project information:

http://www.ncdot.gov/projects/publicmeetings

Project Managers

Andrea Dvorak-Grantz, AICP
Stantec Consulting
801 Jones Franklin Road, Suite 300
Raleigh, NC 27606
Phone: (919) 851– 6866
E-mail: andrea.dvorakgrantz@stantec.com

Bryan Sowell, PE
NCDOT Division 12
Project Engineer
P O box 47
Shelby, NC 28151-0047
Phone: (980) 674– 4221
E-mail: bksowell@ncdot.gov

Comments will be accepted until

November 3, 2017.

STIP Project No. R-3833C

Proposed Widening Improvements to SR-1100 (Brawley School Road)

October 3, 2017

Iredell County

Purpose of this Public Meeting

Today's meeting is an important step in the North Carolina Department of Transportation's (NCDOT) procedure for making you, the public, a part of the project development process. The purpose of the meeting is to:

- Present preliminary designs for the project
- Provide information and answer questions
- Obtain public input on the location and design of the recommended improvements

Copies of the meeting map have been made available for public review at the following locations:

- NCDOT Division 12 Office, located at 1710 E. Marion St. (US 74 Business), Shelby, NC 28151
- NCDOT District 2 Office, located at 124 Prison Camp Road, Statesville, NC 28625
- The Town of Mooresville, located at 413 N Main St, Mooresville, NC 28115

STIP Project R-3833C Project Schedule

Preliminary Designs.....Complete

Right of Way Acquisition.....Fall 2018

Construction .....Fall 2020

Your Input Is Important

Public involvement is an important part of the project development process. The North Carolina Department of Transportation (NCDOT) encourages citizen involvement on transportation projects, and will consider your suggestions and address your concerns. Today's meeting is another important step in NCDOT's efforts to keep you, the public, involved. Comments should be submitted by **November 3, 2017.**

Comments or questions can be submitted to:

Project Managers

Bryan Sowell, PE
NCDOT Division 12
Project Engineer
P O box 47
Shelby, NC 28151-0047
Phone: (980) 552– 4221
E-mail: bksowell@ncdot.gov

Andrea Dvorak-Grantz, AICP
Stantec Consulting
801 Jones Franklin Road, Suite 300
Raleigh, NC 27606
Phone: (919) 851– 6866
E-mail:
andrea.dvorakgrantz@stantec.com

Next Steps

After the comment period ends on November 3, 2017, the project team will meet to review the comments received and determine which, if any, modifications will be made to the recommended build alternative. You can request a copy of the meeting summary by indicating on the attached comment sheet.

The summary of the public comments will be included in the final environmental document, a State Environmental Assessment/Finding of No Significant Impact (SEA/FONSI). The SEA/FONSI will include a reevaluation of the resources in the project study area (human and natural environment) and updated preliminary designs. The SEA/FONSI will be distributed to state environmental resource and regulatory agencies for comment.

STIP Project No. R-3833C

Proposed Widening Improvements to SR-1100 (Brawley School Road)

October 3, 2017

Iredell County

Project Description

The North Carolina Department of Transportation (NCDOT) proposes to widen an existing 1.1-mile section of SR 1100 (Brawley School Road) from just east of the I-77 Interchange to just east of the intersection of Brawley School Road and U.S. 21 in Mooresville. The project also includes improvements along U.S. 21 from just north of Dry Dock Loop/Vandalia Road to Abberly Green Blvd.

The proposed project is included in the 2018-2027 State Transportation Improvement Program (STIP) as R-3833C. Right of way acquisition and construction for the project are proposed for fiscal years 2018 and 2020, respectively.

Background and Details

Brawley School Road, located in a rapidly urbanizing area of Mooresville, serves as one of the busiest east-west corridors, connecting downtown Mooresville and Lake Norman. The purpose and need for the project is to reduce congestion and improve safety along the facility.

This section of Brawley School Road, R-3833C, is part of the overall R-3833 project which included the widening of Brawley School Road from S.R. 1177 (Chuckwood Road) to U.S. 21. Two of the three sections, Section A and Section B, have been built. Due to the time lapse between the signing of the original Environmental Assessment (December 2003), a new analysis of Section C was initiated.

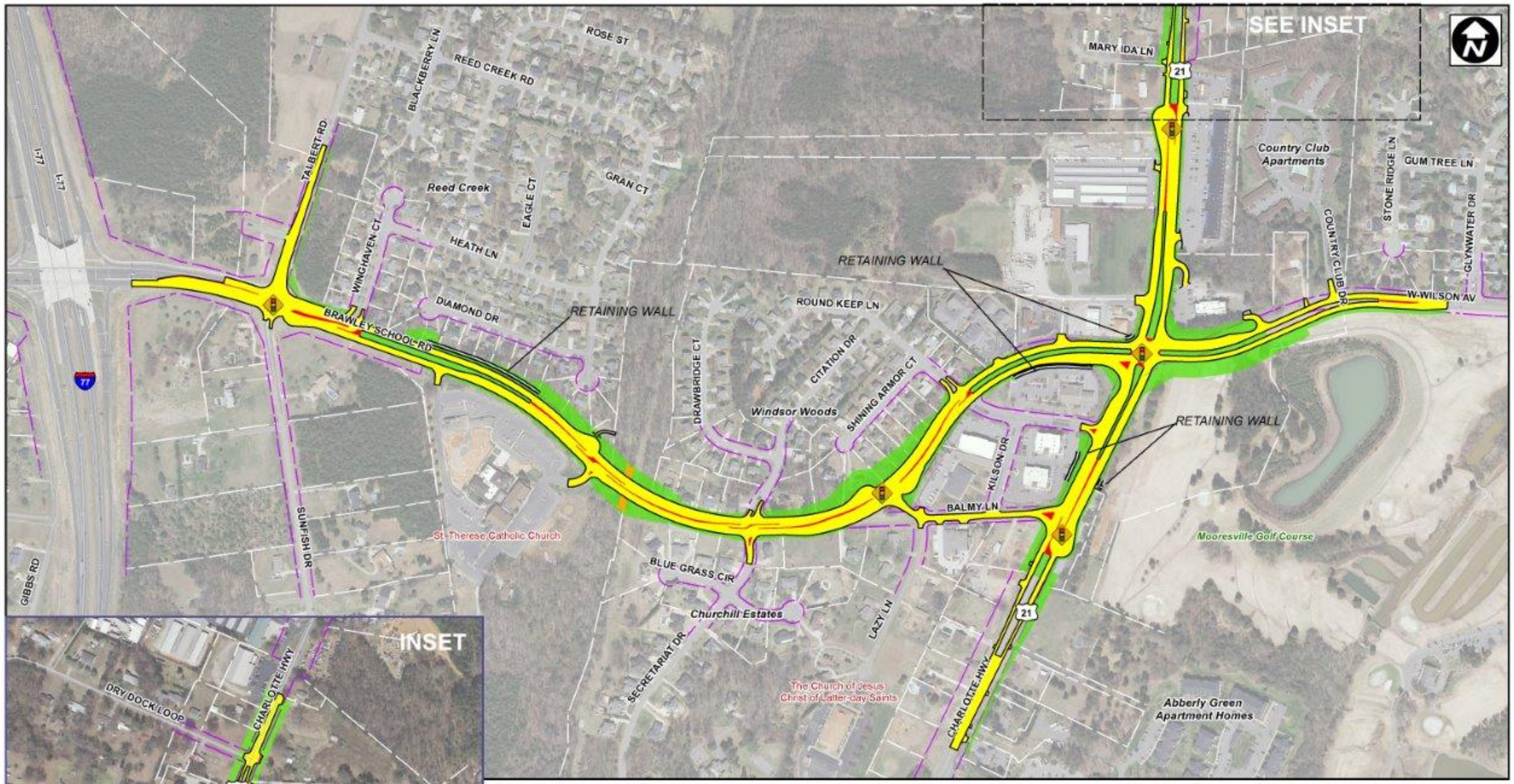
The proposed build alternative includes widening existing Brawley School Road, which is currently a two-lane undivided roadway with grass shoulders, to a four-lane, raised median divided facility with curb and gutter. Provisions for sidewalks are accommodated within the existing right-of-way (ROW), and includes 4-foot bike lanes on each side of the roadway.

Along U.S. 21, the existing two-lane undivided roadway will be converted to a four-lane raised median divided facility with curb and gutter. Provisions for sidewalks are accommodated within the existing ROW. Due to the substantial traffic volumes, the intersection at Brawley School Road and U.S. 21 incorporates an innovative design using redirected left turn lanes for both the Brawley School Road and U.S. 21 approaches since a traditional 8-phase intersection would not be able to handle future volumes.

Project Impact Summary

Relocations*	Residential	6
	Business	2
Proximity Impacts to Properties	Residential	6
	Business	1
Stream Impacts (linear feet)		477
Wetland Impacts (acres)		0
Endangered Species		0

*Right-of-Way impacts may be reduced/minimized during final design.



LEGEND

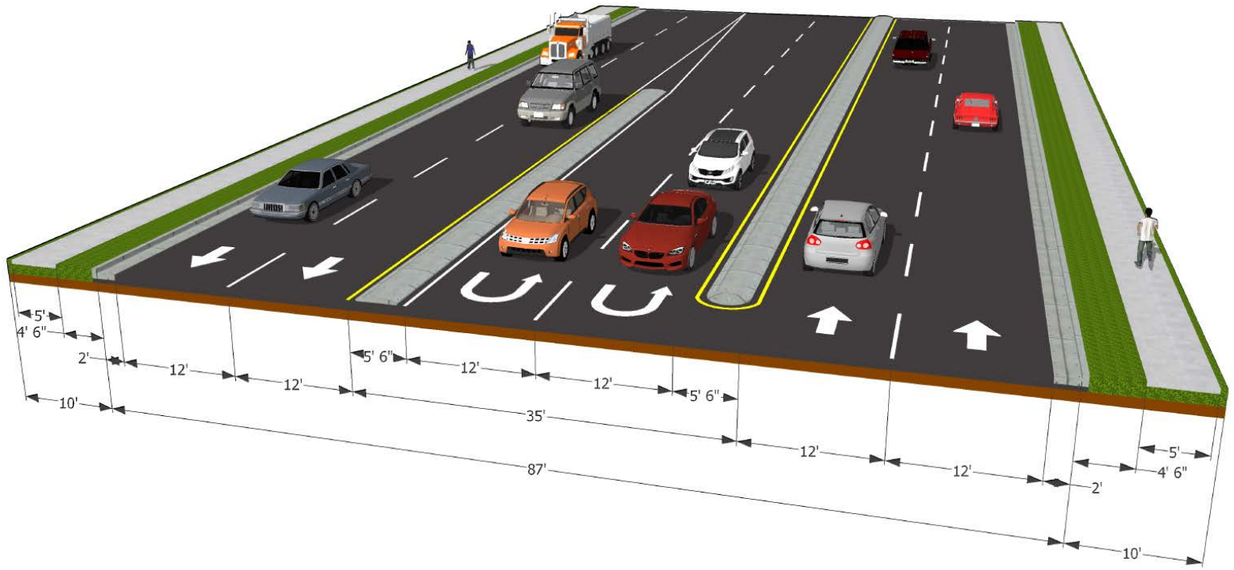
- Existing Property Line
- NCDOT Right of Way
- Proposed Right of Way
- Proposed Traffic Signal
- Proposed Concrete Island
- Proposed Roadway
- Proposed Roadway Culvert
- Proposed Retaining Wall

Feet
0 100 200 400 600
1 inch = 400 feet

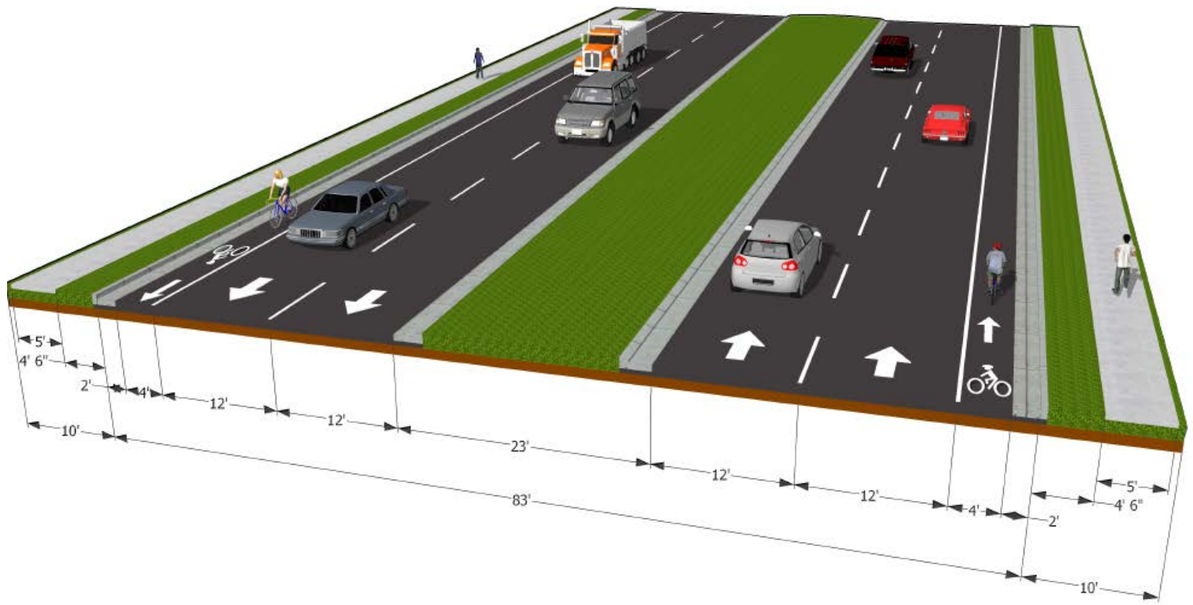
SR 1100 (Brawley School Road)
Widen to Multi-Lanes from I-77 to just west of US 21
Iredell County
R-3833C

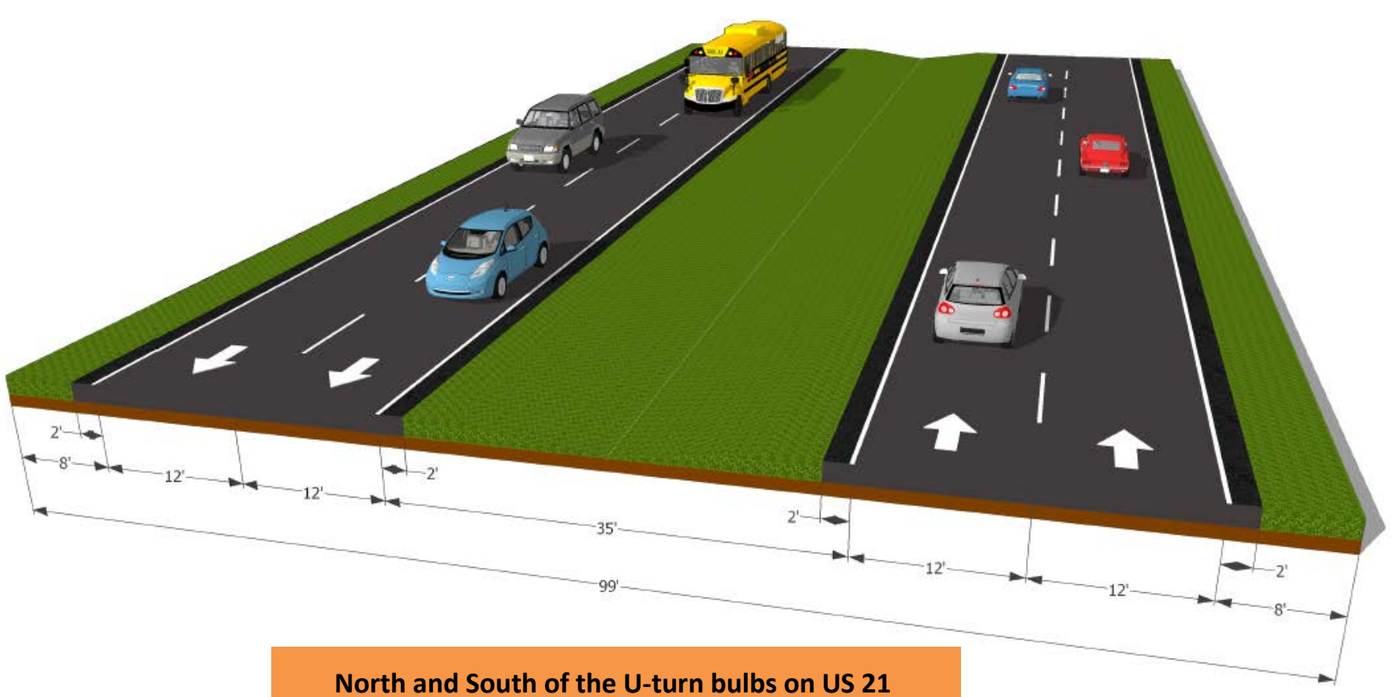
Date		Figure
October 2017	North Carolina Department of Transportation Highway Divsion 12	1

US 21 within the redirected left intersection area



Brawley School Road from I-77 to just past US 21





North and South of the U-turn bulbs on US 21

STIP Project No. R-3833C

Proposed Widening Improvements to SR-1100 (Brawley School Road)

October 3, 2017 — *Iredell County*

TITLE VI PUBLIC INVOLVEMENT FORM

*Completing this form is **completely** voluntary. You are not required to provide the information requested in order to participate in this meeting.*

Meeting Type: Public Meeting **Location: Saint Therese Catholic Church, 217 Brawley School Road, Mooresville, NC 28117**	**Date: October 3, 2017**
STIP No.: R-3833C proposes to widen Brawley School Road from just east of the I-77 Interchange to just east of the intersection of Brawley School Road and U.S. 21 in Mooresville.	

In accordance with Title VI of the Civil Rights Act of 1964 and related authorities, the North Carolina Department of Transportation (NCDOT) assures that no person(s) shall be excluded from participation in, denied the benefits of, or subjected to discrimination under any of the Department's programs, policies, or activities, based on their race, color, national origin, disability, age, income, or gender.

Completing this form helps meet our data collection and public involvement obligations under Title VI and NEPA, and will improve how we serve the public. Please place the completed form in the designated box on the sign-in table, hand it to an NCDOT official or mail it to the PDEA-Human Environment Section, 1598 Mail Service Center, Raleigh, NC 27699-1598. All forms will remain on file at the NCDOT as part of the public record.

Zip Code: _____

Street Name:
(i.e. Main Street) _____

Total Household Income:

- ☐ Less than $12,000
- ☐ $12,000 – $19,999
- ☐ $20,000 – $30,999
- ☐ $31,000 – $46,999
- ☐ $47,000 – $69,999
- ☐ $70,000 – $93,999
- ☐ $94,000 – $117,999
- ☐ $118,000 or greater

Gender: ☐ Male ☐ Female

Age:

- ☐ Less than 18
- ☐ 18-29
- ☐ 30-44
- ☐ 45-64
- ☐ 65 and older

Have a Disability: ☐ **Yes** ☐ **No**

Race/Ethnicity:

- ☐ White
- ☐ Black/African American
- ☐ American Indian/Alaskan Native
- ☐ Native Hawaiian/Pacific Islander
- ☐ Asian
- ☐ Hispanic/Latino
- ☐ Other (please specify): _____

National Origin: (if born outside the U.S.)

- ☐ Mexican
- ☐ Central American: _____
- ☐ South American: _____
- ☐ Puerto Rican
- ☐ Chinese
- ☐ Vietnamese
- ☐ Korean
- ☐ Other (please specify): _____

How did you hear about this meeting? (newspaper advertisement, flyer, and/or mailing) _____

For more information regarding Title VI or this request, please contact the NCDOT Title VI Section at (919) 508-1830 or toll free at 1-800-508-1886, or by email at sddickens@ncdot.gov.

Thank you for your participation!

NCDOT - EAU
Human Environment Section
1598 Mail Service Center
Raleigh, NC 27699-1598

Attn: Tamara Makhlouf
NCDOT - EAU
Human Environment Section
1598 Mail Service Center
Raleigh, NC 27699-1598

STIP Project No. R-3833C

Proposed Widening Improvements to SR-1100 (Brawley School Road)

October 3, 2017

Iredell County

COMMENT SHEET

October 3, 2017

NAME:

_____

ADDRESS:

_____

EMAIL:

_____

COMMENTS and/or QUESTIONS:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Comments may be mailed or emailed by November 3, 2017:

Bryan Sowell, PE
NCDOT Division 12, Project Engineer
P O Box 47
Shelby, NC 28151-0047
bksowell@ncdot.gov

NCDOT Division 12
Project Engineer
P O Box 47
Shelby, NC 28151-0047

Bryan Sowell, PE
NCDOT Division 12
Project Engineer
P O Box 47
Shelby, NC 28151-0047

PUBLIC COMMENT	RESPONSE
St Therese Church Concerns/Comments	
Traffic Signal	
Why not have a traffic light that operates only on Sundays to allow access to exit 35 instead of turning right to a turnabout?	We understand your concern about the traffic accommodations in the church area and based on public comments from the meeting and emails like yours, NCDOT conducted a weekend traffic count on November 11, 2017 at the church's driveways and along Brawley School Road to conduct further traffic analysis for existing and proposed build conditions. The analysis report showed that traffic counts did not warrant a traffic light at the exit of ST. Therese Church. Representatives from NCDOT met with church staff and parishioners of St. Therese on January 23 to discuss the results of the traffic study and hear their concerns regarding access into and out of the church parking lot before and after services and special events.
Please put a stop light at the exit of St Therese Church so we can turn left to the entrance.	
There needs to be a traffic light at the upper parking lot with the ability to turn left and go west to exit 35 with access to I-77.	
We need a traffic light at U-turn bulb coming out of St. Therese Church.	
I am a member of St Therese Church and although I appreciate change and development, I am concerned about the new road (extension) on Brawley School Road and how it will affect traffic leaving the church, why not install a stop light it would keep everyone safe.	
No left turns out of the St. Therese property, on Brawley School Road, will have a very detrimental effect on the flow of traffic, a traffic light at the west entrance/exit would better address the traffic issues.	
My husband and I would like to see the lower (East) entrance open during this highway construction to prevent traffic congestion and we would like the plan to consider turn lanes (right and left) into the entrance for traffic entering and exiting west. A traffic signal at our east entrance /exit (to be activated on Sundays) will improve safety of all vehicles as well as pedestrians.	
The proposal does not make any sense, trying to turn right hoping to get into the left lane to make a U-turn is nonsensical; having two lanes of east-bound, 45 to 55 mph, is worse than one lane east-bound. Putting in a stop light used only for peak hours would be more beneficial and safe.	
I need a light at the St Therese parking lot, so I will not be late going to mass and home.	
I would like a stop light at the exit of St Therese Church parking lot to allow a left turn onto Brawley School Road.	
Please consider placing a traffic light at the lower entrance of St Therese Church, a turn lane will present tremendous safety problem.	
Your proposal appears to provide only and unsignalized U-turn lane that due to the heavy westbound traffic will resulting a long backlog of cars attempting to U-turn, if this is the only provision to travel West, at least there should be 2 long U-turn lanes with a traffic light to accommodate the traffic.	
To send all the parishioners to exit east would be almost impossible with traffic back-up, place a traffic signal at the already existing West exit to the Church parking lot or purchase the property on Sunfish to create an exit road to come from the rear of the Church parking lot to Sunfish and use of the already existing signal light.	
Proposed plans are not safe and do not consider the church traffic, please revise, and cancel the I-77 contracts.	
St Therese Church is a growing church with registered 4,179 registered families and weekly preschool with enrolment of 75. We welcome the upgrades to Brawley, but we have few concerns. We believe a significant majority of our traffic comes from the west, and exits to the west. When we are doing a turnover of the parking lot following Sunday mass, we do not believe that current plans sufficient capacity to handle our current load, let alone future growth. I you plan to do traffic study specifically aimed at the church, we strongly recommend it be done to include Sunday and evening traffic.	

There has to be an alternate plan that can continue to allow St Therese folks to leave parking lot and go wet/east, the current plan will cause traffic congestion and accidents.	
Construction Phasing	
Also, having only one driveway open during construction will be a nightmare with 500 cars coming and going out of one exit.	The drive will need to be closed temporarily to tie it to Brawley School Road which will need to be raised to achieve an acceptable design speed over the stream. This concern has been noted and contract language can be written to require the contractor to construct it as quickly as possible reducing the disruptions to the traffic for the church.
U-Turns	
I agree with the widening, but not with the current plan. It will not work coming out of St Therese with the number of cars needing to go west to I-77, the proposed plan cannot handle the volume.	We understand your concern about the traffic accommodations in the church area and based on public comments from the meeting and emails like yours, we reevaluated traffic conditions under the existing configuration and the proposed configuration and determine if additional improvements were required to the proposed design. Data from public comments such as yours and from the additional evaluations were discussed in a design team meeting to decide how to proceed. It was decided that the proposed design of left U-turn lanes exiting St. Therese will reduce vehicular congestion and lessen the waiting time for those motorists making the traffic movement. Compared to traditional intersections, the superstreet corridor design will handle traffic more efficiently and provides a higher level of safety for cars and pedestrians, using less lanes, at a low-cost. Motorist, including emergency vehicles, will move through the corridor efficiently as they spend less time traveling a minimal distance to use the U-turn bulbs in the proposed design than waiting at traditionally designed signalized or un-signalized intersections. NCDOT has made every effort to ensure safe and efficient church access and believes that it has provided a solution that will function safely and efficiently without the need for additional traffic control such as police officers until near the end of the design horizon period in 2040.
We like the overall plan, but only negative comment is that we believe the left U-turn lanes as one exits St Therese Church are woefully inadequate at both the east and west exit points. As absolute minimum, there should be double load lanes to make the left/ U-turn and head west on Brawley School Road at both Citation Dry/Secretariat Dr. and the lane for the west exit from the Church. The parish is growing at a very rapid rate which will only compound the problem going forward.	
The proposed U-turn will not accommodate the traffic flow from the church after services, you should rethink your entrance and exit plans for the church, what you have proposed is inadequate.	
Every Sunday 99% of the parishioners turn left leaving the church facility going to I-77, it would be a huge traffic problem by forcing everyone to turn only right and make a U-turn, please re consider the layout of the road going from I-77 past St. Therese.	
I cannot welcome the dramatic impact on safe and efficient exit from our church property in a westward direction on Brawley School that the proposed plan would bring.	
Widening Brawley School Road is a good, much needed improvement, however; not allowing left turns from St Therese Catholic Church is going to worsen the traffic problem.	
No left turns out of St Therese Church seems like it would back up traffic further along that section, when adding the projected Costco development traffic, especially on weekends it will create more of a traffic jam and not less.	
Putting limitations on entering and exiting the church campus will affect safety of all those involved in the church activities but also those drivers who are on Brawley School Road.	
We are parishioners of St Therese Catholic Church and reside west of interstate I-77. It would be extremely inconvenient and potentially dangerous if we could not make a left hand turn out of the church parking lot, the proposed plan would cause large back-up of vehicles at the place designated for a U-turn, which is quite inefficient and possibly hazardous.	
I have concerns about our ability to enter and exit our church during and after construction and the inability to turn left (west) after the plan is completed.	
We are concerned about not having easy and safe access to leaving St. Therese Church heading towards I-77.	
As concerned citizens and residents of Mooresville, we are opposed to your plan to only have a right turn out of St Therese Church, please come up with a better plan.	
We need a left turn to go west, St Therese Church is a 7 day a week church accommodating several events.	

With the additional oncoming lane, we foresee increased difficulties for people leaving up to make that turn, changes to roads are meant to improve traffic flow not worsen it as we foresee this doing for either direction.	
We need an entry to I-77 when entering and exiting the church.	
I am a member of St Trees Church and the proposed configuration of the Brawley School Road widening is going to cause an impossible traffic situation that will adversely affect traffic in both directions	
I live on Talbert and attend St Therese church, we are a large church and after mass majority of the traffic wants to head west, as it stands right now the police empties out traffic in about 15 minutes, with the proposed configuration if everyone must turn right this will cause traffic back-up and will take hours to go get out.	
Not being able to go left from I-77 when leaving church would be a disaster, the U-turns as proposed would be completely insufficient, especially for the after-mass volume.	
I support the project, but I am concerned on how this will impact my ability to attend mass and other occasions at the St. Therese Church.	
Thousands of people will be exiting the church facility and be forced to turn east, away from I-77 to go a quarter mile and make a U-turn; traffic will be backed-up out the parking exit and down Brawley school Road.	
The large majority of the people live to the west of the church, no signal light is located at this U-turn location yet you expect 200 cars to make a U-turn across two lanes of traffic and not cause accidents, please rethink this design, it needs a great deal of work.	
Concerned about right turn out of St Therese, would like the ability to turn left.	
We need a better option to leave the church.	
The proposed widening does not take into account the number of people entering/exiting St Therese Church, this plan will adversely affect my ability to come in with ease please consider a different plan.	
My husband and I are in our mid 80s and we are worried and out this widening project, we have trouble getting out of the parking lot now and also with the Costco coming next to us there has to be a better plan.	
I am 84 years old and I would greatly appreciate any consideration you could make for many of us traveling from West to Church and also using the left turn out of the parking lot to return home or travel to the YMCA.	
Additional Drive	
It is too bad access could not be built between Sunfish Drive and the St. Therese Church campus, that would take the objections to the lack of a left turn ability at either entry and exit. As proposed, we would lose the use of the left lane east bound soon after the church because of all the U-turning traffic at Balmy Lane/Brawley School Road, I see no improvement in this.	A new driveway as described could be pursued by St. Therese and would benefit entering and exiting the church.
As the widening proposal addresses right of way acquisition along Brawley School Road, I ask that you include right of way acquisition for ST. Therese by providing a roadway from our property to Sunfish to allow access/exit at the existing traffic signal.	NCDOT is not responsible to acquire private properties to address private traffic concerns.
New Traffic Study at St Therese Catholic Church	
A new traffic study needs to be done to include Sunday, and evening to understand the traffic flow to and from our parking lot.	We understand your concern about the traffic accommodations in the church area and based on public comments from the meeting and emails like yours, NCDOT conducted a weekend traffic count on November 11, 2017 at
Did any of the traffic studies include out flow of traffic to and from St Therese Church?	
I would like to invite NCDOT members to experience the congestion when hundreds of cars are trying to	

exit/enter the parking lot.	the church's driveways and along Brawley School Road to conduct further traffic analysis for existing and proposed build conditions. Representatives from NCDOT met with church staff and parishioners of St. Therese on January 23 to discuss the results of the traffic study and hear their concerns regarding access into and out of the church parking lot before and after services and special events.
We ask you to conduct a traffic study specifically focusing on traffic flow to/from St. Therese, particularly to include Sunday and evening road use.	
Property Impacts	
I own property on Charlotte Hwy at Dry Dock Loop, is there any way that you can provide me with the proposed improvements I am curious on how, if any of this will affect my business.	A Division 12 representative addressed this comment by sending an inset of the public meeting map and saying..."The area around Dry Dock Loop Rd. is shown in the inset. I have also attached the handout that was distributed at the public meeting. The handout contains a rendering of what the roadway will look like once completed. US 21 will be 4 lanes divided by a grass median up to the southernmost intersection with Dry Dock Loop Rd. and two lanes two way from there past the northernmost intersection with Dry Dock Loop Rd."
Looking at the diagram, NCDOT will be encroaching on the berm in the back of our house, will you beautify the berm, also with additional lanes, are you putting up a privacy sound wall for noise and protection form autos since we will be much lower and will my shrubs be replaced.	NCDOT will compensate for damages occurred during construction, however, NCDOT will not physically replace and shrubs/plant. Right -of-way agents will be in contact to discuss further detail. Noise impacts will be studied throughout the corridor and if the area is determined eligible for noise barrier, NCDOT will contact the community.
It is confusing to understand where the U-turn bulbs are on US- 21 and how it will affect our properties. NCDOT is showing taking our properties on the east side of US 21 while NCDOT has owned sufficient property on the west side of US 21, and you are not showing using any of this land. We oppose the taking of our property and potentially my brothers home located on the east side where his septic tank is located in the front yard where the map indicates as a section of the land possibly being taken.	The northern U-Turn Bulb will be located at 2774 Charlotte Highway across from the northern entrance to Marathea Plaza shopping center entrance. The southern U-Turn bulb will be located at 2861 Charlotte Highway across from Balmy Lane. Land owned by NCDOT on the west side of US 21 will be used when US 21 will be widened to a four-lane roadway. We understand your opposition to the acquisition of your property but the land is needed to provide for growing traffic in the area. You will be compensated by NCDOT for the land acquired and septic tank impacts.

Concerns: 1 - The possible loss of one egress point and the new property ingress and egress pattern. It is confusing and the current parking design and flow will not support the increase in parking lot traffic throughout. 2 - The possible loss of parking lot spaces due to right of way expansion. This will create parking lot congestion for tenants and patrons during peak operating hours. 3 - The increase in traffic congestion around the general area during the construction phase, which will have a negative on impact on tenants' business operations.	We understand your concerns and offer these comments: 1 - According to the preliminary designs, two of the three existing drives to your property will be maintained and traffic from the third drive will be simply rerouted to a safer connection down Wilson Road further away from the intersection. There will not be an increase in parking lot traffic due to this reconfiguration. 2 - The "current parking lot design" that you refer to could be greatly improved with the addition of striping allowing more cars to utilize the remaining area after the project is complete. 3 - There will be temporary traffic congestion during the construction of the project but the result will be a roadway that will allow customers to reach the tenant's business operations far into the future.
I own and live in at 174 Brawley School Road and the proposed sidewalk would come right up to my front door, I would appreciate any additional information that you can give me concerning my property	As we discussed at the Public Meeting, your house will not be encroached upon by the fill dirt required to build the road but it will be coming close to it. Since the Public Meeting however, it has been determined that your driveway will be covered with the fill dirt required to build the road and there will not be enough driveway left over to park your car afterward therefore NCDOT will be acquiring your home in order to build the road. You will be contacted by NCDOT right-of-way agents to determine compensation and reach a settlement.
Will this widening affect Brawley School Road at I-77 and Brawley School Road on Sunfish side, if so are they taking more property that the first they took? I am concerned about 299 Brawley School Road property.	Division 12 representative called and discussed the situation. Right-of way purchased on the R-3833B project will contain the proposed plans for R-3833C on the south side of Brawley School Road. However, additional right of way will need to be purchased on the north side of Brawley School Road east of Talbert.
US 21 Concerns/Comments	
I am not in favor of the "Michigan" left turn lanes at Hwy 21 and Brawley as they cause traffic back up for oncoming traffic and increases the likelihood of accidents.	Previous installations of Michigan left intersections have proven to be safer than traditional intersections due to the reduction of conflict points. NCDOT has calculated the length of storage needed for waiting cars and provided enough so that they do not back up into the through traffic.
How far north and south of the U-turn bulbs on US 21 will the divided highway go, and is that divided highway for US 21 part of this project of is there another project covering that work effort?	The divided highway will continue ~850 feet north and ~500 feet south of the U-turn bulbs under this project. However, this is an interim traffic pattern for the current project. The future US 21 widening project is anticipated to be a divided roadway with left and U-turns.

I reside at 125 Vandalia, a road off of US 21 that is included in this project. During heavy traffic, Vandalia Road residents typically only turn right, but adding a median will impede residents from turning left during slow traffic periods and it will also block us from turning onto our road when traveling south on US 21. In addition, the traffic volume on US 21 will greatly increase from motorists who have to drive past Vandalia to get to the U turn area, this will add to wait time at the stop light and increases traffic accidents.	We understand your concern and realize that the median will impede left turns into and out of Vandalia. A safer solution for your entrance and exit will be addressed with the future US 21 widening project. Traffic volumes on US will increase in the future but not due to the need to get to the U-Turn areas.
The proposed configuration will force me to go south on Hwy 21 to a light, make a U-turn, go through two more lights, make a U-turn and then a right into the "Gas Station". Travelers are creatures of habit and like simplified access to the places they shop. I have been using this gas station for many years and now I am less likely to use it because of your poorly thought out system of complex roads.	We realize that travelers are creatures of habit but in order to accommodate the growing traffic volumes in the area, the roadways must be reconfigured to handle the increased volumes. Although the proposed design might appear complex, Michigan left turns are proven to be safer than traditional intersections by providing reduction of conflict points. In addition, it reduces the number of different traffic light phases, significantly increasing traffic flow.
The existing intersection of US 21/ Brawley School Road seems to work fine and adding the U-turns will only increase hazards and add more confusion.	Although the existing intersection at Brawley School Road seems to be operating acceptably, traffic projection shows it failing below the acceptable level of service (LOS) by 2025. The proposed design will keep traffic functioning at the acceptable level of operation through 2040. Concerning hazards, Michigan left turns are proven to be safer than traditional intersections by providing reduction of conflict points and have proven to not be confusing once the drivers learn the new traffic pattern.
There are U-turns North, South, and West of the intersection of Brawley School and US 21, there is none East of the intersection, why was it omitted from the plan, also the subdivision and apartment complex would benefit from the addition of U-turn East of the intersection.	Based on this comment, an eastbound leftover was added into the apartment complex once it was confirmed that the addition of a U-turn bulb east of the intersection was not feasible.
Miscellaneous	
I would like to see drawing of the preliminary plans.	A Division 12 representative answered the comment by providing a web link for the handout and map of the public meeting.
Will the Brawley widening project and the Costco road improvement project be done together?	A Division 12 representative answered the comment by saying - At this time we do not know the time frame for the Costco site construction, once we do we will coordinate with them as much as possible.
When is the Environmental Document expected to be available? And are the public meeting documents available online?	A Division 12 representative provided a link for public meeting map and handout and informed them that they hoped to have the environmental document complete by the end of 2017.

I am against the I-77/Brawley School Road widening improvements, I think all the commercial development that has been happening in the area is irresponsible and I am against future developments until the current problems are resolved.	The proposed Brawley School widening improvements are intended to address the current traffic problems mentioned while providing for the approved commercial developments future traffic.
We ask you take care in handling our church signs and monuments near each church's entrance, as well as providing safety barriers between our parking lots and the construction area.	NCDOT will accommodate the utility relocation request. Adequate safety barriers will be provided during construction, however, coordination with St Therese Church members is recommended to further improve work zone safety.
I would like to receive the meeting summary (Maggie Callen 119 Chestnut Tree Rd Mooresville NC 28117)	NCDOT will meet with the design team to discuss public meeting comments. The finalized responses will be made available on the NCDOT website. If you are not able to access the information please contact the Division 12 project manger.
As a long-distance bicyclist, I see some problems with the merging of 4-lanes to 2-lanes most especially northbound on US 21, also are you going to mark the thru lane?	The distance used to merge 4 lanes to 2 lanes adheres to federal highway design guidelines. The merge will be eliminated when the US 21 widening project is constructed. The thru lane will be marked.
Lake Norman Regional Hospital is on the south side of the Brawley School Road intersection and anyone needing to go there will have to travel to the right and make a U-turn to get to the hospital, I feel this would be dangerous especially if it involves an emergency situation.	Although it may seem dangerous, Michigan left turns are proven to be safer than traditional intersections by providing reduction of conflict points. The intersection has been designed to allow emergency vehicles to turn directly left.
At the completion of construction will trees be planted to replace those outgrowing between the church parking lot and the roadway, if not will there be other protective barrier considered?	The trees will not be replaced as a part of this project.
Safety for our children during construction in/around the church is a concern.	The safety of the church's children is also a concern of NCDOT's. Precautions will be taken to delineate the work site from the church property but it is also suggested that the church publish warnings to the parishioners before and during the construction period especially focusing on the children's safety. Church signage will be carefully moved during the utility relocation phase of the project.
What are the plans to build barriers for safety at St Therese Church? Move signage?	
There appears to be no safety barrier between our parking lot and the construction zone to protect pedestrians, especially children who will want to see what is going on.	
I think the Faith Rd and Hwy 115 intersection should take priority over the Brawley School Road project. It was supposed to have been done, when will this be done?	NCDOT District Engineer in Statesville indicates that there is a project currently underway at NC 115/Faith Rd. that should start soon. There is also a resurfacing project on Faith Rd. that has been awarded, but the contractor has not started on it yet.

R-3833C Brawley School Road Widening

St. Therese Catholic Church Traffic Operations

Project: R-3833C Brawley School Road
Location: St Therese Catholic Church, Mooresville, NC
Date: January 23, 2018
Subject: St. Therese Catholic Church Traffic Operations

Summary

The project team for the R-3833C Brawley School Road project, consisting of engineers from NCDOT and Stantec Consulting, Inc., met with several of the church staff and parishioners of St. Therese on January 23 to discuss their concerns regarding access into and out of the church parking lot before and after services and special events.

A PowerPoint presentation was shown that provided some project background and design information, and then detailed data collection time periods and results, traffic capacity analysis, and the traffic simulation results. The analysis showed that traffic will operate at LOS C or better at the two driveways without the assistance of off-duty police officers once the project is opened to traffic with level of service reaching F towards the end of the design period in 2040. The NCDOT and Stantec recommend that at this point in the future, the church could pursue alternatives such as the utilization of off-duty police officers as they do now, but located at their western driveway and/or at the U-turn bulb.

At the end of the meeting, the church asked if we had any information or materials that we could share with them to help them communicate to their members that the proposed design will work. This document is a result of that request.

Background

At the public meeting last October and in the written comments the project team received during the public comment period, access to the church during services and holidays was a major concern. As a result of this feedback, NCDOT asked Stantec to get weekend traffic counts at the church driveways and along Brawley School Road and perform a traffic analysis for the existing conditions and the proposed build conditions. Stantec collected counts during the weekend of Nov. 11-12, 2017, and their traffic engineer was on site from 9AM – 1:30PM on Sunday, Nov. 12 to observe traffic operations since that is when the off-duty Mooresville police officers who direct traffic indicated was the highest traffic time period.

R-3833C Brawley School Road Widening – St. Therese Catholic Church Traffic Operations – Meeting Notes

Meeting Discussion Points

- Question: Has church growth been considered in its models?

  Response: The current parking is almost at capacity. Significant congregation growth and campus expansion would likely result in additional driveway permit requirements from the NCDOT and Town of Mooresville.

- Question: Why isn't' anything being done to help the amount of traffic on westbound Brawley School Road?

  Response: Westbound Brawley School Road is being widened from one lane to two which will provide additional roadway capacity.

- Question: How is making a right turn and then a U-turn in order to make a left turn better/safer than being able to turn left out of the parking lot? The simulation does not accurately reflect traffic patterns during services.

- Response: Separating these traffic movements at the intersection of the church driveway and Brawley School Road will reduce vehicular congestion and lessen the waiting time for those motorists making the traffic movement. Compared to traditional intersections, the superstreet corridor design will handle traffic more efficiently and provides a higher level of safety for cars and pedestrians, using less lanes, at a lower cost. Motorists, including emergency vehicles, will move through the corridor efficiently as they spend less time traveling a minimal distance to use the U-turn bulbs in the proposed design than waiting at traditionally designed signalized or un-signalized intersections. Regarding the traffic patterns displayed on the traffic simulation model, the simulation software has limitations with respect to presentation of a superstreet; however, all traffic is accurately and appropriately accounted for in terms of turning movements at each intersection in the simulation.

- Question: Can the entrance to the east drive be handled with a "flyover bridge"?

  Response: Costs prevent this option from being viable. These "costs" included reduction of church parking, environmental impacts, more homes being taken, and the extra expense of the bridge and earthen fill to build up the drive to pass over Brawley School Road.

- Question: Can the entrance to the east drive be handled with a tunnel under the road near where the culvert is currently located?

  Response: Again, costs prevent this from being a viable option. This would have severe impacts to the stream that empties directly into Lake Norman and would probably not be approved by

the environmental agencies if there were an option that had lesser impacts such as the one proposed at the public meeting. Extra costs associated with a tunnel would also include raising the existing road higher than what is proposed now resulting in loss of church parking, more homes being taken, difficulty of constructing under traffic, and extra expense for the tunnel structure.

- Question: Can the entrance to the east drive of the church be handled using a median barrier that could be removed for church services?

  Response: The exposure to danger while removing and replacing the barrier as well as the safety concerns of allowing a left turn out of the drive and across four lanes of traffic plus a median is too great for this option to be acceptable.

- Question: Will the eastern drive remain open throughout the project?

  Response: The drive will need to be closed temporarily to tie it to Brawley School Road which will need to be raised to achieve an acceptable design speed over the stream. This concern has been noted and contract language can be written to require the contractor to construct it as quickly as possible reducing the disruptions to the traffic for the church.

- Question: Will there be safety barriers between the church and the construction?

  Response: Precautions will be taken to delineate the work site from the church property but it was also suggested that the church publish warnings to the parishioners before and during the construction period especially focusing on the children's safety.

- Question: Is the timing of the signal at Brawley School Road / Talbert / Sunfish currently correct? The church posts a police officer at the signal to alter the current timing to allow exit from the church drives.

  Response: NCDOT will investigate and improve the timing if possible.

The NCDOT has made every effort to ensure safe & efficient church access and believes that it has provided a solution that will function safely and efficiently without the need for additional traffic control such as police officers until near the end of the design horizon period.

Additional Discussion Point

Although not discussed in the meeting at the church, it should be noted that current sight distance exiting the church drives is substandard but will be improved up to current design standards with the widening of the road and flattening of the ditch's back slopes, allowing parishioners to see much further down the road. This will result in a much safer exiting experience from both drives than is experienced now.

Attendees

Name	Organization	Email
Michael Poe	NCDOT	mlpoe@ncdot.gov
Jackie McSwain	NCDOT	jmcswain@ncdot.gov
Bryan Sowell	NCDOT	bksowell@ncdot.gov
Byron Engle	NCDOT	bengle@ncdot.gov
Melinda Drury	St. Therese	mdrury@sainttherese.net
Wesley Weaver	St. Therese	wweaver@sainttherese.net
Rick Fabrize	St. Therese	rlfabrize@aol.com
Ed Kane	St. Therese	NJSA2248@gmail.com
Rev Mark Lawlor	St. Therese, Pastor	mslawlor@charlottediocese.org
Bob Frohman	St. Therese	bobfrohman@ieee.org
Dean Sarvis	Stantec	dean.sarvis@stantec.com
Andrea Dvorak-Grantz	Stantec	andrea.dvorakgrantz@stantec.com
Kellie Reep	Stantec	kellie.reep@stantec.com

R-3833C Brawley School Road Widening – St. Therese Catholic Church Traffic Operations – Traffic Engineering Presentation

Data Collection

- Traffic count data was collected from 4:00pm to 7:00pm on Saturday, November 10 and from 7:00am to 7:00pm on Sunday, November 11, 2017.
- A traffic engineer was stationed in the field from 9:00am to 1:30pm on Sunday, November 11, 2017 to observe existing traffic operations and backups on a typical Sunday during the peak Mass times. Significant queuing was observed between approximately 11:10am and 11:25am on the western church driveway and along Brawley School Road. It was also noted that most parking spaces were occupied during the 10:00am Mass, indicating that there is limited capacity for additional growth of the church.

Traffic Analysis Methodology

- The traffic along Brawley School Road and on the church driveways was analyzed using a traffic analysis program called Synchro. Synchro is widely used in the field of traffic engineering. It estimates the average delay that a vehicle will experience waiting to make a desired movement either at a traffic signal or a stop sign as well as the length of the queue on a given approach. The average delay is summarized using what is called a Level of Service, or LOS. The tables below summarize the average delay and corresponding level of service for an intersection.

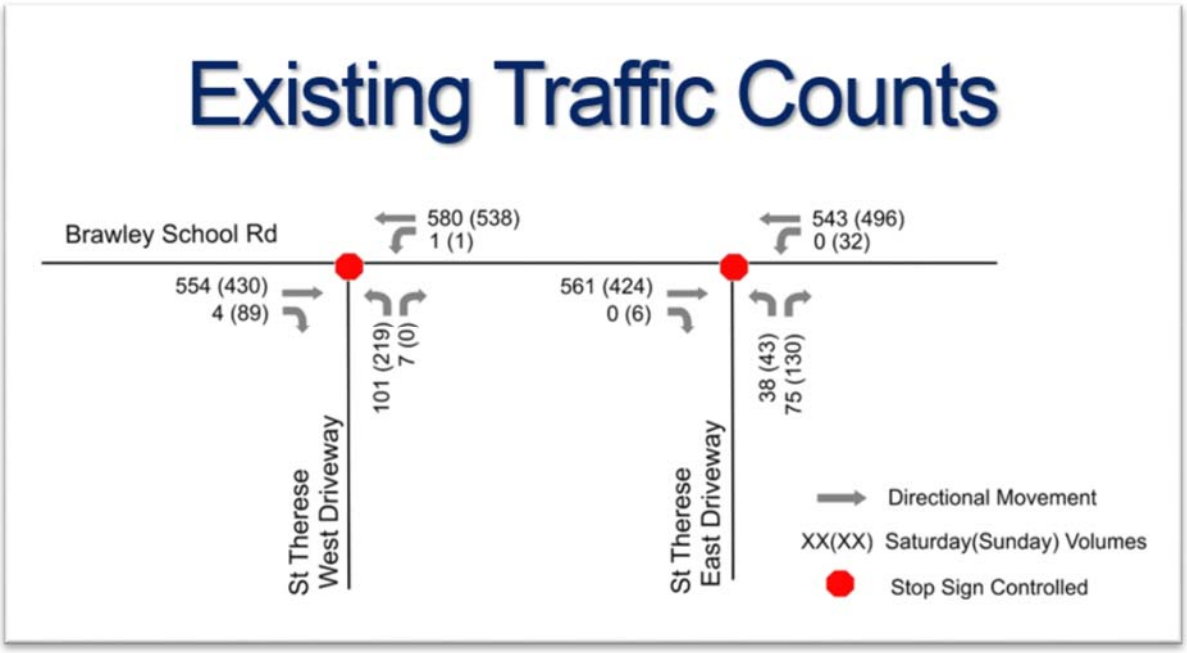
Level-of-Service Criteria Signalized Intersections	
Level-of-Service	**Stopped Delay per Vehicle (sec)**
A	≤ 10.0
B	>10.0 and ≤ 20.0
C	>20.0 and ≤ 35.0
D	>35.0 and ≤ 55.0
E	>55.0 and ≤ 80.0
F	>80.0

Level-of-Service Criteria Unsignalized Intersections	
Level-of-Service	**Stopped Delay per Vehicle (sec)**
A	≤ 10.0
B	>10.0 and ≤ 15
C	>15 and ≤ 25
D	>25 and ≤ 35
E	>35 and ≤ 50
F	>50

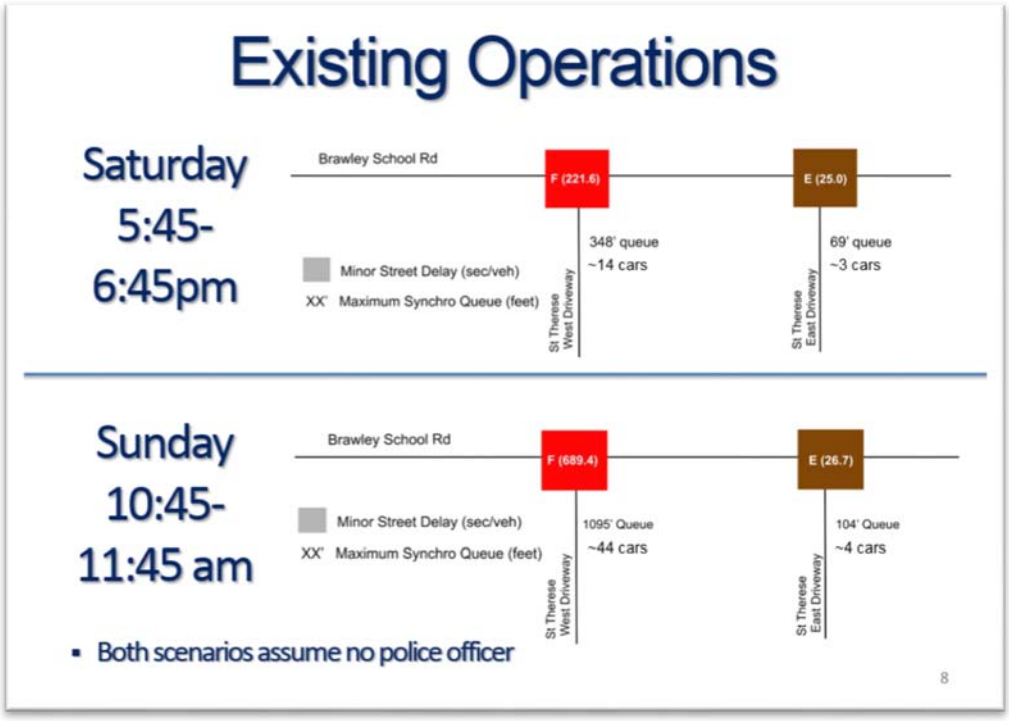
Existing (2017) Traffic Operations

Analysis of Existing Lane Configurations

- Traffic counts showed that the peak hours were Saturday from 5:45pm to 6:45pm and Sunday from 10:45am to 11:45am. Existing traffic counts are shown below. The first number is the volume during the peak hour on Saturday evening and the second number (in parentheses) is the peak hour volume on Sunday morning.

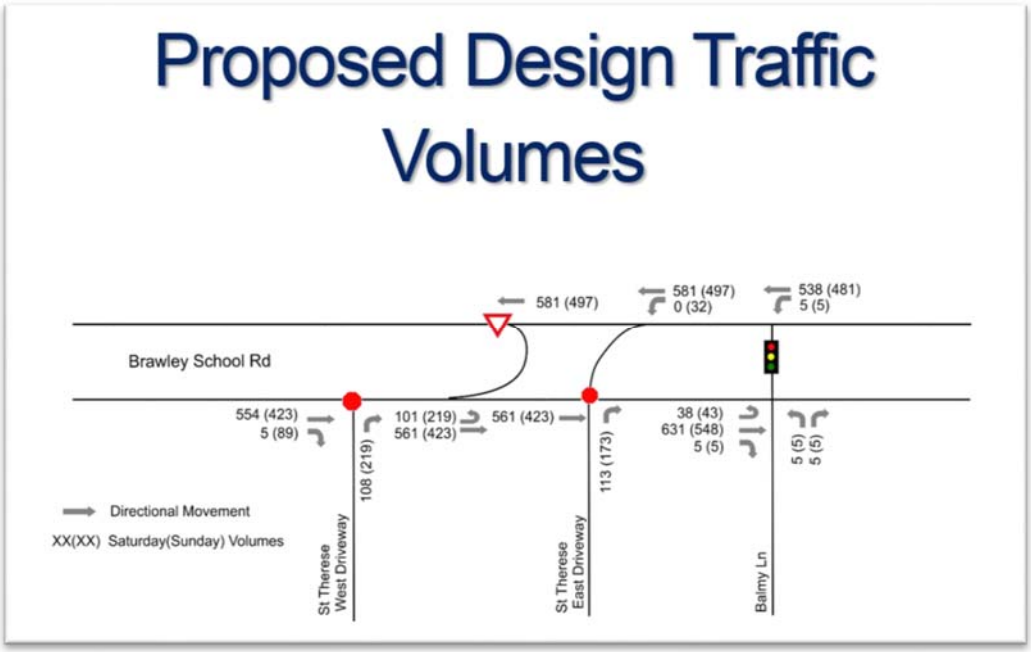


- All scenarios (including the proposed design) were analyzed using the assumption that no police officer was present to direct traffic.
- Analysis of existing operations shows that the western church driveway would experience significant delay on both Saturday and Sunday without the presence of a police officer. Average vehicle delays coming out of the church are estimated at 11.5 minutes long on Sunday. Queues into the church site at the western driveway were estimated to extend approximately 1100 feet, or roughly 44 cars long. The figure below shows a summary of the existing operations, with no police officer in place.



Analysis of Proposed Lane Configurations

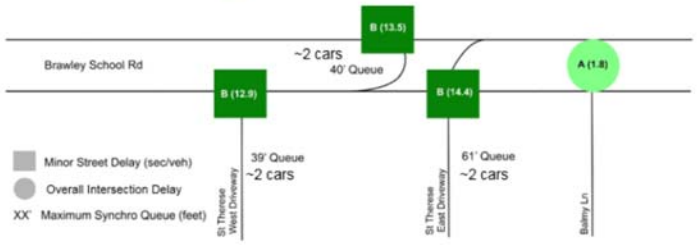
- Existing traffic volumes were re-routed using logical paths to evaluate operations with the proposed "Superstreet" in place. The volumes shown in the figure below were assumed in the analysis of the proposed design.



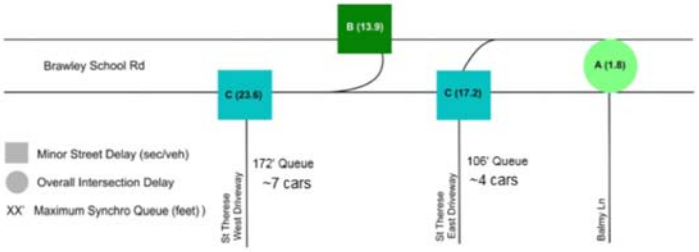
- Evaluation of the revised traffic pattern shows that delays are reduced significantly to less than 15 seconds at all locations on Saturday and less than 25 seconds at all locations on Sunday. Backups into the church driveway are estimated at a maximum of 172 feet, or roughly 7 cars.

Proposed Design Operations

Saturday 5:45-6:45pm



Sunday 10:45-11:45 am

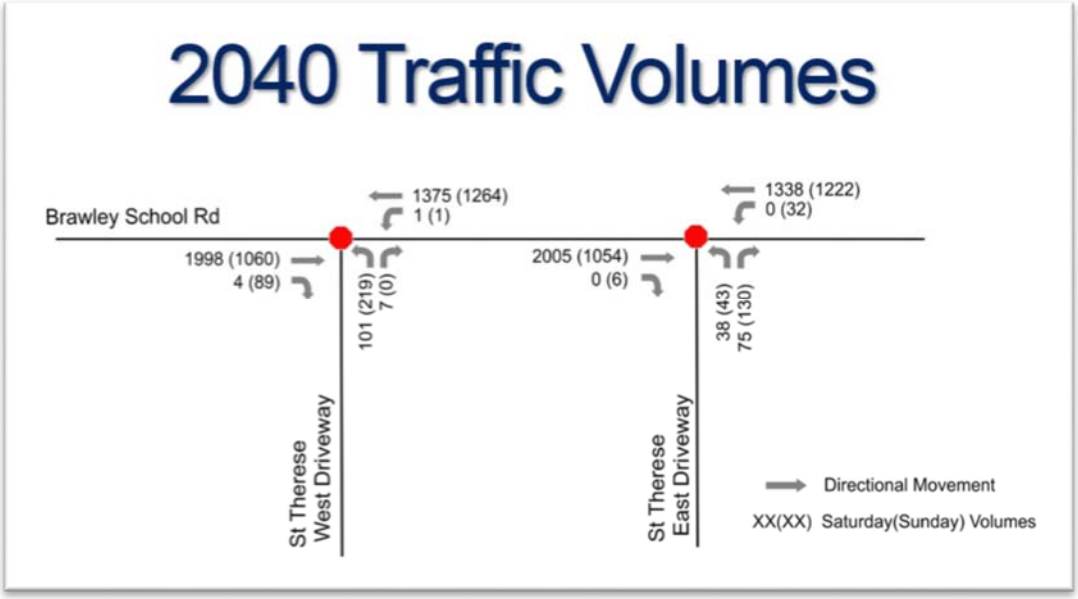


- Both scenarios assume no police officer

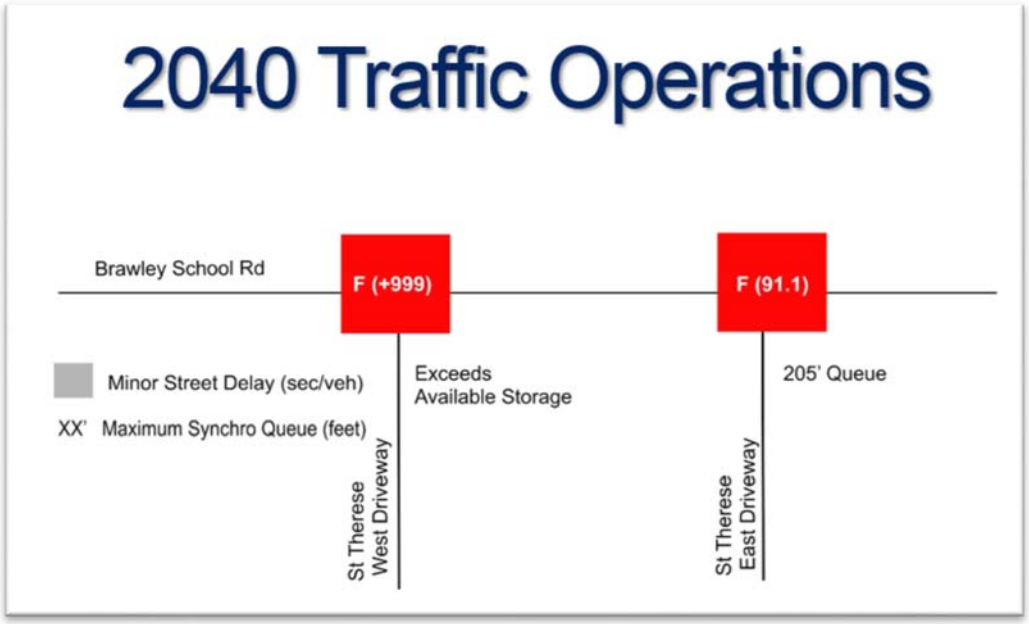
Future (2040) Traffic Operations

Analysis of Existing Lane Configurations

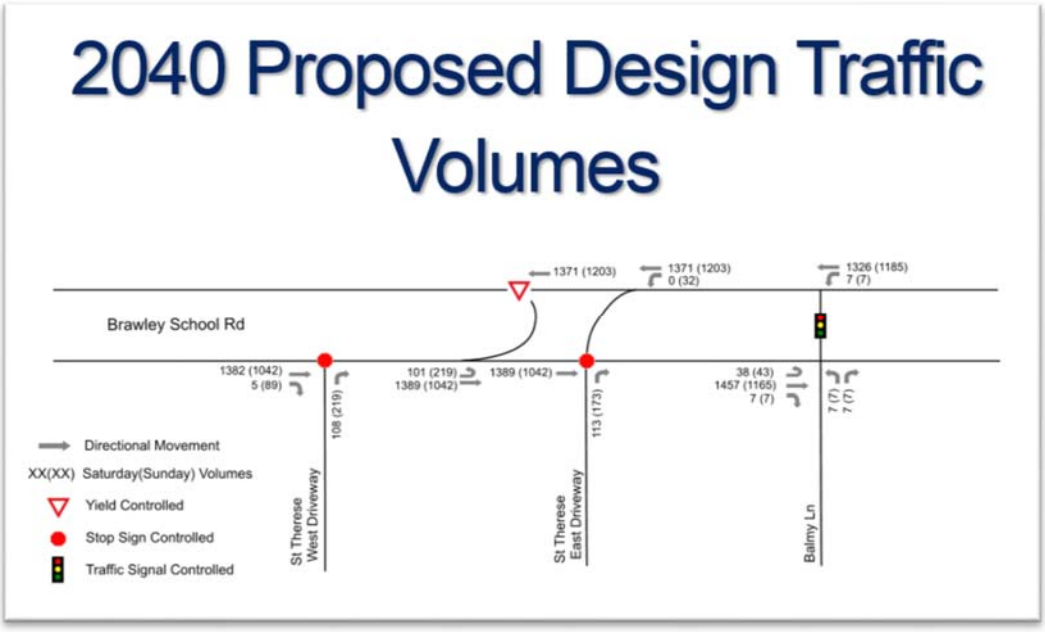
- Existing traffic counts along Brawley School Road were grown up to estimate projected volumes in the year 2040. The traffic volumes used in this analysis are shown below.



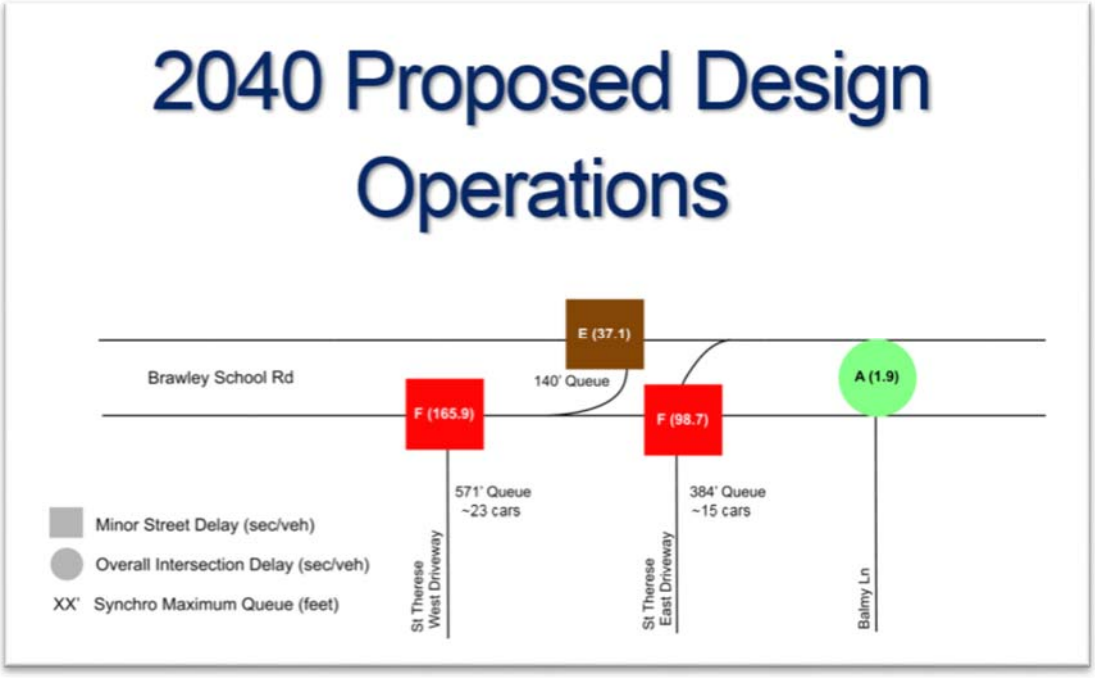
- Analysis of these volumes showed that delay on the church driveways will increase significantly over the next 23 years if nothing is done to improve operations. Delays and queuing on the western driveway were too high for the analysis software to estimate. The figure below shows a summary of the 2040 analysis.



- The volumes shown above were re-routed to evaluate future operations with the proposed "Superstreet" in place. The volumes shown below were assumed in the analysis of the proposed design.



- Evaluation of the proposed traffic pattern shows that both church driveways are expected to operate at a level of service F, but compared to the "do nothing" approach shown above, delays and queuing are reduced significantly. Queues at the western church driveway are expected to be 384 feet, or about 23 vehicles long.



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