TRAFFIC SEPARATION STUDY

NORFOLK SOUTHERN 'O' LINE CHARLOTTE TO MOORESVILLE



FINAL REPORT



Prepared for



Charlotte Area Transit System Metropolitan Transit Commission Real Contractions

North Carolina Department of Transportation Rail Division

Prepared by



April 2004

TRAFFIC SEPARATION STUDY

NORFOLK SOUTHERN 'O' LINE CHARLOTTE TO MOORESVILLE

FINAL REPORT

Prepared For

CHARLOTTE AREA TRANSIT SYSTEM METROPOLITAN TRANSIT COMMISSION

&

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

David Carol North Corridor Project Manager Charlotte Area Transit System Development Division

Paul Worley, CPM Assistant Director for Engineering & Safety NCDOT Rail Division Engineering & Safety Branch

Robert N. Pressley, PE Senior Project Manager Gannett Fleming, Inc.

Prepared By

Gannett Fleming, Inc. Charlotte, NC

April 2004

Gannett Fleming



2. 2

Table of Contents

LIST OF TABLES	V
LIST OF FIGURES	VI
EXECUTIVE SUMMARY	1
I. FINDINGS	1
II. RECOMMENDATIONS	2
A. Public Crossing Recommendations WITH Rail Passenger Service	2
B. Public Crossing Recommendations WITHOUT Rail Passenger Service	3
II. RECOMMENDATIONS A. Public Crossing Recommendations WITH Rail Passenger Service B. Public Crossing Recommendations WITHOUT Rail Passenger Service C. Private Crossing Recommendations WITH Rail Passenger Service	4
III. ESTIMATED COSTS	4
A. Charlotte - \$2,757,650.00.	5
B. Huntersville - \$2,783,500.00.	5
C. Cornelius - \$1,841,500.00.	5
D. Davidson - \$310,000.00. E. Iredell County - \$1.168.000.00.	5
	5
F. Mooresville - \$523,000.00. G. Estimated Costs WITHOUT Passenger Service	5
TRAFFIC SEPARATION STUDY	6
I. PURPOSE OF THE STUDY	6
II. PREAMBLE	7
III. AGENCY PARTICIPATION AND ASSISTANCE	8
IV. THE 'O' LINE CORRIDOR	9
V. EVALUATION CRITERIA	12
A. Accident History	13
B. Truck Traffic	12
C. Sight Obstructions	14
D. Summary of Crossing Protection Devices	15
E. Crossings With The Highest Traffic Volume	16
F. Humped Crossings	17
G. Queue Distance	18
VI RATING CRITERIA	20
VI. RATING CRITERIA A. Safety Devices	20 20
A. Safety Devices	20

В	. Traffic Volume	20
С	Accident History	20
D	School Route	21
E.	Emergency Response Route	21
F.	Humped Crossing	21
G	. Sight Obstruction	21
Η	Queue Distance	22
VII		าา
VII. A	MENU OF AVAILABLE TRANSPORTATION SYSTEM ENHANCEMENTS Grade Separation Structures	22 22
B		22
C C	Crossing Protection Devices Enhanced Crossing Protection Devices	23 24
D	Enhanced Crossing Protection Devices Crossing Closure/Crossing Consolidation	2
E.		23 25
F.		23 25
1.		23
VIII	I.SAFETY AND MOBILITY ISSUES	27
Α	. Vehicles Queuing Across Railroad Tracks	27
В	. Traffic Signal Preemption	27
С	. Humped Crossings	27
D	. Grade Crossing Condition	27
E.	. Vehicles Driving Around Automatic Gates	28
F.		28
G	. Roadway Improvements	28
Н	. Roadway Grade Separation	29
I.	Other Mobility Factors	29
J.	I horoughtare Plan Considerations	30
K		31
IV	RECOMMENDATIONS AND ESTIMATED COSTS	32
A B		33 38
Б С		38 41
D	Other Becommended Street Improvements	41 43
E.		43 48
E.	. Other Long -Term Recommendations	40
Х.	RECOMMENDATIONS WITHOUT PASSENGER SERVICE	49
PRI	VATE CROSSINGS	52
XI.	CROSSING SUMMARY	52
XII.	PRIVATE CROSSING RECOMMENDATIONS	52
XIII	I.COSTS SUMMARY	60
Α		60
B	. Huntersville-All Crossings - $52,783,500.00$.	61
С	. Cornelius-All Crossings - \$1,841,500.00.	61
D	Davidson-All Crossings - \$310,000.00.	61
E.	. Iredell County-All Crossings - \$1,168,000.00.	61



F.	Mooresville-All Crossings - \$523,000.00.	61
XIV.	COSTS SUMMARY BY IMPLEMENTATION SCHEDULE	62
XV. S	UMMARY	62

List of Tables

TABLE 1	10
TABLE 2	15
TABLE 3	17
TABLE 4	18
TABLE 5	19
TABLE 6	42
TABLE 7	44
TABLE 8	66
TABLE 9	68
TABLE 10	

List of Figures

FIGURE 1 – SPRATT STREET, CHARLOTTE (BEGIN STUDY)	9
FIGURE 2 – PRIVATE CROSSING	10
FIGURE 3 – RURAL PUBLIC CROSSING	10
FIGURE 4 – END OF THE LINE, STATESVILLE AVENUE CROSSING, MOORESVIL	LE11
FIGURE 5 – TRUCK ROUTE	14
FIGURE 6 – SIGHT OBSTRUCTION – PRIVATE CROSSING	15
FIGURE 7 – SIGHT OBSTRUCTION –PUBLIC CROSSING	15
FIGURE 8 – RURAL CROSSING WITH GATES, FLASHING SIGNALS & BELL	16
FIGURE 9 – GATED PRIVATE CROSSING - IREDELL CO.	
FIGURE 10 – HUMPED PUBLIC CROSSING - CHARLOTTE.	17
FIGURE 11 – HUMPED PRIVATE CROSSING	18
FIGURE 12 – VEHICLES QUEUED OVER THE CROSSING – NC 73	19
FIGURE 13 – INADEQUATE QUEUE DISTANCE - MOORESVILLE	
FIGURE 14 – SCHOOL ROUTE	21
FIGURE 15 – LONG GATE ARM	24
FIGURE 16 - MT. MOURNE VFD (NOW LOCATED AT LANGTREE ROAD & 115)	30
FIGURE 17 – PROPOSED HAMBRIGHT ROAD EXTENSION	38
FIGURE 18 - CALDWELL STATION - TO BE RELOCATED (PROPOSED)	40
FIGURE 19 – CORRIDOR SOUTH OF HUNTERSVILLE	56
FIGURE 20 – CORRIDOR SOUTH OF CORNELIUS	
FIGURE 21 – CORRIDOR SOUTH OF MOORESVILLE	58
FIGURE 22 – PROPOSED TIMBER ROAD EXTENSION AT MP O-26.6	60
FIGURE 23 – PROJECT ROUTE MAP	65

EXECUTIVE SUMMARY

TRAFFIC SEPARATION STUDY NORFOLK SOUTHERN RAILROAD 'O' Line CORRIDOR CHARLOTTE TO MOORESVILLE

This report has been updated to reflect changes in field conditions at the grade crossings that have occurred since the Final Draft was issued in December 2001.

I. FINDINGS

In the preparation of this Traffic Separation Study, 109 grade crossings of the Norfolk Southern (NS) Railroad 'O' Line between Spratt Street in Charlotte and Statesville Avenue in Mooresville were evaluated for conformity to grade crossing safety standards, physical attributes, needed roadway improvements and the possibility of either crossing closure or consolidation. Of the 109 crossings, 67 are public streets and 42 are privately owned crossings accessing mostly residential, farming or industrial operations. The 67 public crossings were evaluated using the North Carolina Department of Transportation (NCDOT) approved Evaluation Criteria. The evaluation of the crossings resulted in the following findings:

- 1. There is a grade crossing, either public or private, approximately every 0.3 miles along the 30 miles of railroad involved in the study.
- 2. Of the 42 private crossings, NS has a written agreement with either a current or former property owner for 11 of the crossings.
- 3. 31 of the public crossings have some type of automatic warning devices (flashers or gates and flashers).
- 4. Only 10 of the private crossings have any type of warning devices (crossbucks), however, four (4) are gated. *(The crossbucks at one crossing have recently been replaced by gates and flashers).*
- 5. There have not been a significant number of accidents at grade crossings along the 'O' Line in the last 10 years. This is primarily due to low volume of rail traffic (one train per weekday or less).
- 6. Sight obstructions, either foliage or buildings or both, exist at many crossings, both public and private.
- 7. Only four (4) crossing roadways have traffic volume in excess of 10,000 vehicles per day.
- 8. Due to the paralleling roadways, many of the crossings have inadequate distance to store vehicles between the track and the parallel road.



- 9. Ten of the public crossings have a severe enough humped condition to warrant corrective action. Most of the private crossings are humped to some degree.
- 10. There are no private crossings located within Davidson and Mooresville.
- 11. Implementation of all closure/consolidation recommendations contained in this report will result in a reduction in the total number of crossings from 109 to 69 or 2.3 crossings per mile of track versus 3.6 crossings per mile of track at present.

II. **RECOMMENDATIONS**

The above-described FINDINGS and the complete analysis of the corridor, have resulted in a set of recommendations for improving grade crossing safety that assume the introduction of rail passenger service along the 'O' Line. There are, however, improvements, modifications or closures that should be implemented whether or not passenger service is introduced into the corridor.

A. Public Crossing Recommendations WITH Rail Passenger Service

- 1. 19 public crossings are recommended for closure:
 - a) Charlotte 7
 - b) Huntersville 5
 - c) Cornelius -2
 - d) Davidson 1
 - e) Iredell County 0
 - f) Mooresville 4
- 2. Five (5) new public crossings are recommended:
 - a) Hambright Road Extension Huntersville
 - b) Damson Drive Extension Huntersville
 - c) Stumptown Road Extension Huntersville
 - d) Relocated Caldwell Station Crossing Huntersville
 - e) Catawba Avenue Extension Cornelius
- 3. 36 crossings are recommended to receive new or revised automatic warning devices:
 - a) Charlotte 14
 - b) Huntersville 7 (2 projects recently completed)
 - c) Cornelius 2
 - d) Davidson 3
 - e) Iredell County 4 (2 projects recently completed)
 - f) Mooresville 6 (2 projects recently completed)
- 4. 12 crossings require roadway improvements:
 - a) Charlotte 8
 - b) Huntersville 1



- c) Cornelius 2
- d) Davidson 0
- e) Iredell County 1
- f) Mooresville 0

B. Public Crossing Recommendations WITHOUT Rail Passenger Service

Should it be determined that it is not feasible to introduce rail passenger service into the 'O' Line corridor, there are certain safety enhancements, roadway improvements or crossing closures that still should be implemented. These are further described as follows:

- 1. Atando Avenue/Charlotte add gates to automatic warning devices.
- 2. Toal Street/Charlotte close crossing.
- 3. I-85 Service Road North add gates to automatic warning devices.
- Maple Street and Gibbon Road/Charlotte close Maple Street. Relocate automatic warning devices from Maple Street to Gibbon Road. Construct roadway improvements on Gibbon Road and signalize the intersection of Gibbon Road and W. Sugar Creek Road.
- 5. Nevin Road/Charlotte add roadway modifications and gates to automatic warning devices.
- 6. David Cox Road/Charlotte install traffic signal at David Cox Road and NC 115.
- 7. Eastfield Road/Charlotte add gates to automatic warning devices and widen roadway approaches.
- 8. Dellwood Road/Huntersville close crossing.
- 9. Sam Furr Road (NC 73)/Huntersville add gates to automatic warning devices, widen westbound approach, extend the left-turn lane and add a median separator.
- 10. Caldwell Station Road and Mayes Road/Huntersville close both crossings; construct new Caldwell Station crossing and install automatic warning devices.
- 11. Bailey Road/Cornelius add roadway improvements and automatic warning devices.
- 12. Zion Street/Cornelius close at such time as Catawba Avenue is extended.
- 13. Delburg Street/Davidson close crossing.

- 14. Langtree Road/Iredell County relocate crossing to line up with Hobbs Road. Raise profile of NC 115 and add left-turn lanes in north and southbound directions at new intersection. Relocate automatic warning devices.
- 15. Doster Avenue, Mills Avenue, Catawba Avenue & Walnut Avenue/Mooresville close crossings.

C. Private Crossing Recommendations WITH Rail Passenger Service

The following recommendations for private crossings are all based upon the introduction of rail passenger service into the 'O' Line corridor. There are no recommendations for private crossings without passenger service. As a general rule, however, governmental agencies with appropriate jurisdiction should attempt to close and consolidate private crossings through the land development process. The recommendations follow:

- 1. Private crossings located in or near Charlotte 10
 - a) One crossing is now closed and fenced and should so remain.
 - b) Close two (2) crossings.
 - c) Clear sight obstructions at two (2) crossings.
 - d) Install or modify warning devices at five (5) crossings.
- 2. Private crossing located in or near Huntersville 15
 - a) Close and/or connect four (4) crossings to new Hambright Road public crossing.
 - b) Close and/or connect four (4) crossings to new Damson Drive public crossing.
 - c) Close and connect five (5) crossings to new Stumptown Road Extension public crossing.
 - d) Close and connect two (2) crossings to Sam Furr Road.
- 3. Private crossings located in or near Cornelius 7
 - a) Close and connect five (5) crossings to Bailey Road.
 - b) Close and connect one (1) crossing to proposed Zion Street Extension.
 - c) Install or modify warning devices at one (1) crossing.
- 4. Private crossings located in Iredell County 10
 - a) No improvements to three (3) crossings.
 - b) Install or enhance warning devices at five (5) crossings.
 - c) Close and connect two (2) crossings to Foursquare Road.

III. ESTIMATED COSTS

To implement the above recommendations involving all crossings, both public and private, is estimated to cost a grand total of **\$9,383,650.00.** SAY **\$9,400,000.00**.

These estimated costs are further broken down as follows:

A. Charlotte - \$2,757,650.00.

- a) Public crossings \$2,739,000.00.
- b) Private crossings \$18,650.00.

B. Huntersville - \$2,783,500.00.

- a) Public crossings \$1,925,000.00.
- b) Private crossings \$858,500.00.

C. Cornelius - \$1,841,500.00.

- a) Public crossings \$1,296,500.00.
- b) Private crossings \$545,000.00.

D. Davidson - \$310,000.00.

- a) Public crossings \$310,000.00.
- b) No Private crossings

E. Iredell County - \$1,168,000.00.

- a) Public crossings \$1,045,000.00.
- b) Private crossings \$123,000.00.

F. Mooresville - \$523,000.00.

- a) Public crossings \$523,000.00.
- b) No Private crossings

G. Estimated Costs <u>WITHOUT</u> Passenger Service

The estimated cost to implement all recommendations without passenger service being implemented is \$2,859,500.00. <u>SAY \$2,900,000.00.</u>

TRAFFIC SEPARATION STUDY NORFOLK SOUTHERN RAILROAD 'O' Line CORRIDOR CHARLOTTE TO MOORESVILLE

PREPARED FOR

METROPOLITAN TRANSIT COMMISSION THE CHARLOTTE AREA TRANSIT SYSTEM

AND

THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

APRIL 2004

I. PURPOSE OF THE STUDY

The **City of Charlotte** and the towns of **Huntersville**, **Cornelius**, **Davidson and Mooresville** and the **North Carolina Department of Transportation (NCDOT) Rail Division** entered into cooperative agreements in the Fall of 2000, to evaluate all grade crossings, including private crossings, of the **Norfolk Southern Railroad 'O' Line** which extends from just south of 9th Street in Charlotte to Statesville Avenue in Mooresville, a distance of approximately 30 miles. The purpose of the evaluation is to determine if any of the crossings are candidates for crossing safety device upgrades, closure, consolidation or grade separation. If none of these types of modifications are warranted, then are there other improvements that might be needed to enhance public safety. The study evaluated and reports on 109 at-grade crossings of the railroad of which 67 are public and 42 are private.

For purposes of this study, the railroad will be referred to as the **'O'** Line which is the designation given to the line by Norfolk Southern. The railroad operating company will be referred to as **NS**.

The genesis for this study is the Metropolitan Transit Commission/Charlotte Area Transit System's (MTC/CATS) proposal to initiate rail passenger service along the railroad from Charlotte to Mooresville. CATS has recently completed a Major Investment Study (MIS) of the North Corridor. Should the 'O' Line corridor be selected for passenger service, such service could be up and running as early as 2007.

The TSS for the 'O' Line was originally programmed by the Rail Division of the NCDOT, however, due to manpower limitations, the Division was unable to initiate the

study. Due to other identified potential needs in the corridor, CATS agreed to manage the study and, thus, the TSS was initiated earlier than it would have been had it been done under the auspices of the NCDOT.

II. PREAMBLE

The 'O' Line passes through seven (7) political jurisdictions including the City of Charlotte and the Towns of Huntersville, Cornelius, Davidson and Mooresville as well as the counties of Mecklenburg and Iredell. Two (2) NCDOT Transportation Divisions are also involved in the study with Charlotte, Huntersville, Cornelius, Davidson and Mecklenburg County all in the 10th Division while Mooresville and Iredell County are in the 12th Division.

Highway/railway at-grade crossing crashes are the number one cause of death in the railroad industry. In 1999 there were 3,090 train-vehicle crashes with 402 deaths nationwide. In 2002, North Carolina had 78 crashes at public crossings that caused 2 fatalities and 20 injuries. Nineteen (19) crashes occurred at private crossings in North Carolina resulting in eight (8) fatalities and nine (9) injuries. One of the private crossing fatalities occurred just north of the end of this study in Mooresville.

Deaths and injuries at grade crossings have steadily declined in this country since 1978 due to an aggressive safety program by the United States Department of Transportation, the various state Departments of Transportation and the railroad companies. These efforts have included improved automatic warning devices, roadway improvements, elimination of sight obstructions, construction of crossing separation structures, and closure of some crossings.

The NCDOT, through its **Rail Division**, has a substantial program in place to improve rail-crossing safety. The program is endorsed and supported by the USDOT, Federal **Railroad Administration** and **Federal Highway Administration**, and the various railroad-operating companies. To be successful, however, requires the support of local government and the citizens of North Carolina. These series of studies, undertaken through a cooperative agreement between state and local government, are part of a continuing effort to enhance the safety of motorists, rail passengers and train crews in North Carolina.

This study includes a comprehensive effort to address grade crossing safety at private crossings. Private crossings exist as a result of an agreement between the railroad company and usually, the property owner of record at the crossing. In some cases, written and recorded agreements exist between the two parties. In other cases, however, the crossing may have been installed under the terms of a non-recorded agreement or installed by the owner/user without railroad permission. Some private crossings may precede construction of the railroad or have been constructed by the railroad to serve industrial clients. (The correct term for a private crossing is Private Vehicular Access or PVA, however; for simplicity, they will be referred to in this report as "private crossings").

III. AGENCY PARTICIPATION AND ASSISTANCE

In the preparation of this report, the Gannett Fleming staff received significant assistance, participation and guidance from the CATS staff as well as the staffs from all participating municipalities, the staff of the NCDOT, both Rail and Highway Divisions, and the staff of Norfolk Southern. Also, the NCDOT was only able to fund that portion of the project pertaining to public crossings. CATS provided funding for evaluation of the private crossings.

Those staff members contributing to this study are listed as follows:

1. Charlotte

John Muth, PE – Deputy Director for Planning/CATS David Carol – North Corridor Project Manager/CATS Tim Gibbs – Transportation Planner/CATS Bill Finger, PE – Assistant Director/CDOT Joe McLelland – Transportation Planner/CDOT Bill Dillard, PE – Systems Manager/CDOT

2. Huntersville

Bill Coxe – Transportation Planner Stuart Mullen – Acting Planning Director Kelly Case Neal – Principal Planner

3. Cornelius

Tim Brown – Assistant Town Manager Karen Floyd – Planning Director

4. Davidson

Leamon Brice – Town Manager Warren Burgess – Planning Director

5. Mooresville

Erskine Smith – Assistant Town Manager Frankie White – Public Works Director Tim Brown – Planning Director

6. NCDOT Rail Division

Paul Worley – Assistant Director for Engineering & Safety Allan Paul – Assistant Director for Operations Arthur Petteway, PE – Senior Project Engineer Drew Thomas, PE – Crossing Safety Engineering Manager Ric Cruz – Crossing Project Engineer

NCDOT Division of Highways Mark Stafford, PE – District Engineer, 12th Division, District 2

Tom Thrower – Traffic Engineer, 10th Division

8. Norfolk Southern Railway

David Bost – 'O' Line Trainmaster Danny Gilbert – Manager Safety-Grade Crossing East Mike Wheeler – NS Atlanta

IV. THE 'O' LINE CORRIDOR

The Norfolk Southern (NS) Railroad 'O' Line runs from downtown Charlotte to Mooresville, a distance of approximately 30 miles. The line branches from the NS mainline south of 9th Street near the ADM milling operations and the 4th Ward neighborhood; proceeds northerly to parallel N. Graham Street; turns to parallel Sugar Creek Road in the Derita community; turns to parallel Gibbon Road to its intersection with Old Statesville Road (NC 115); and then parallels NC 115 to Statesville Avenue in Mooresville. The line passes through Huntersville, Cornelius, and Davidson, the Mt. Mourne community in southern Iredell County and then into Mooresville. Freight train operations along the single track today are minimal. South of the Atando Junction (Milepost O-3.0) there are no train operations today. North of Atando, NS operates one freight train per weekday north to the Florida Steel operations near Milepost O-9.5. On occasion, this train may also serve Huntersville, Cornelius and Davidson. From Milepost O-19 to Mooresville, NS operates one train on Tuesday and Thursday out of Barber

Junction, which is northeast of Mooresville. Freight trains currently operate at approximately 10 miles per hour.

This report has evaluated 109 crossings of the railroad. Of the 109 crossings in Table 1 below, 67 have been determined to be public streets or highways, and 42 have been classified as private driveways or streets. On the average, there are 3.8 grade crossings per mile of railroad track.



FIGURE 1 – SPRATT STREET, CHARLOTTE (BEGIN STUDY)

LOCATION	PUBLIC CROSSINGSS	PRIVATE CROSSINGS	TOTAL CROSSINGS
Charlotte	26	10	36
Huntersville	13	15	28
Cornelius	4	7	11
Davidson	5	0	5
Iredell County	6	10	16
Mooresville	13	0	13
TOTAL	67	42	109

Table 1

In Charlotte, the railroad passes through primarily industrial/commercial areas with an occasional residential property fronting on the track. South of Huntersville, the line passes through mostly rural/residential properties with the occasional commercial property abutting. Within Huntersville proper and north of town, the frontage is a combination of residential, commercial, industrial and rural. This same pattern is typical for Cornelius, with no heavy concentrations of residential property near the track, mostly just single units. The same pattern holds true for Davidson except north of the center of town where the line passes to the rear of both single and multifamily residential units. In southern Iredell County, the abutting property is mostly rural farmland with the occasional institutional or commercial property breaking up the pattern. There are some small residential clusters that receive access over the track. In Mooresville, the vast majority of abutting property is commercial, institutional or industrial.



FIGURE 2 – PRIVATE CROSSING

FIGURE 3 – RURAL PUBLIC CROSSING

One of the issues of significance involving the 'O' Line is the question of the railroad right-of-way. The railroad was constructed and opened in 1860-62 as the Atlantic, Tennessee and Ohio (AT and O, thus the <u>Atando</u> junction in Charlotte) of NC; however,



the line only ran from Charlotte to Statesville. When construction began prior to the Civil War, it was generally built on a 100-foot right-of-way. During the War, the Confederate government confiscated the line and the track was removed and utilized to construct the railroad that now runs from Greensboro to Danville, VA. Near the end of the War, according to legend, Union forces burned the courthouse in Statesville and the records of the railroad right-of-way were destroyed. Ultimately, the line was put back into service in 1871 and in 1896 it became part of J. P. Morgan and Associates' new Southern Railway System. In 1990, it became part of the Norfolk Southern Corporation.

The right-of-way has many encroachments today and some abutting properties are recorded to the centerline of the track. Mecklenburg County land records show a 100-foot right-of-way throughout the County. However, abutting property lines and street/highway rights-of-way frequently overlap the railroad right-of-way (this is usually the case when the railroad is on an easement, no matter how wide). The 100-foot right-of-way continues into southern Iredell County and Mooresville. In downtown Mooresville, both Broad Street and Main Street that flank the track, are located within the railroad right-of-way. In Mecklenburg County, significant portions of NC 115 are located within the railroad right-of-way.



FIGURE 4 – END OF THE LINE, STATESVILLE AVENUE CROSSING, MOORESVILLE

The right-of-way question is significant for two very important reasons:

- 1. One of the ways utilized to consolidate grade crossings is to construct a parallel roadway on one side or the other of the track itself. This task is made considerably easier if the roadway can be built inside an existing right-of-way. However, if the railroad is on an easement, the construction of a parallel roadway may impose an additional burden on the underlying fee property owner.
- 2. Should the MTC/CATS wish to expand the railroad infrastructure above and beyond the single track that exists today, such as building a parallel track and new stations, right-of-way will be imperative.

V. EVALUATION CRITERIA

All public crossings were evaluated using the NCDOT Rail Division approved criteria which consists of the following:

- Crossing Inventory All crossings were inventoried using the USDOT approved standard form for railroad grade crossings.
- Accident History Train/vehicle crashes are the single most important factor in evaluating grade crossings. This report utilizes the accident classification system developed and adopted by the Federal Highway Administration and in general use around the country. Under this system, accidents are classified as follows:
 - 1. K Killed
 - 2. Class A Injured and transported to hospital
 - 3. Class B Injured and treated on-scene
 - 4. Class C Complains of injury or pain but not treated
 - 5. PDO Property Damage Only (damage to vehicle or personal property)
- Automobile traffic existing and projected (where available).
- Train traffic existing and projected (where available).
- Truck traffic or designated truck route do large trucks routinely use the crossing? Is the roadway a designated truck route?
- Sight obstructions do buildings, foliage or other obstructions restrict either the motorist's or the train crew's ability to observe approaching traffic at the crossing?
- Humped crossing is the crossing roadway humped to the point of causing vehicles to either drag or become hung on the crossing?
- Queue distance is there sufficient distance between the track and a paralleling roadway to allow vehicles to safely queue between the track and the road?
- Hazardous materials crossing do vehicles delivering hazardous materials to nearby industries use the crossing?
- Roadway classification federal or state route, thoroughfare, collector, local access, etc.
- Adjacent land use industrial, commercial, residential, etc.
- School bus route is the crossing routinely used by school buses?
- Emergency responders route do fire and medic crews routinely use the crossing?
- Crossing protection safety devices crossbucks, gates and flashers, etc.
- Redundant crossing does another nearby crossing serve the same function?
- Feasibility of grade separation does the surrounding topography and land uses lend themselves to grade separating the roadway from the railroad?
- Roadway improvements will roadway improvements at or near the crossing improve grade crossing safety? Is it feasible to implement roadway improvements?
- Economic impact if crossing is closed will closing the crossing have a measurable economic impact on nearby land uses?



A spreadsheet, which follows at the end of this report on Page 64, contains evaluation results for many of the above-described criteria that are easily quantifiable or measurable. Those criteria that are more subjective are utilized in specific crossing recommendations.

While many of the above-described criteria were used in evaluating the private crossings, there are also many that are not applicable. Traffic volume at private crossings is typically not an issue unless the crossing serves a major industry. Accident records are available for private crossings from Federal Railroad Administration sources; however, these sources only list two accidents at private crossings on the 'O' Line over the last 10 years. Typically private crossings are neither school bus nor truck routes. When private crossings have any kind of safety devices, it is generally crossbucks - especially on light-density lines such as this one. Most of the private crossings on the 'O' Line have no warning devices.

A. Accident History

None of the crossings evaluated have had a significant accident history over the last 10 years. Much of this is due to the fact that the number of daily trains during this period of time has been small and train operating speeds have been low. The crossing with the most significant history is the I-85 Service Road North in Charlotte which has had six (6) vehicle/train crashes during this period of time. The most serious accident at the crossing resulted in a Class B injury (treated at the scene). The crossing with the next highest number of crashes is Maple Street in Charlotte that has had three (3) crashes during the same period of time and, again, the most serious resulted in a Class B injury. New automatic warning devices were installed at the Maple Street crossing earlier this year. However, an upgrade of the devices at the service road has not been programmed.

B. Truck Traffic

Heavy trucks are utilizing many of the public crossings today. This is especially true in industrial areas along N. Graham Street in Charlotte and along all of the major roads that cross the track throughout the study area. In Huntersville, Everett Keith Road and Holbrooks Road both serve demolition landfills. Also in Huntersville, McCord Road serves an industrial operation consisting of building supply distributors and concrete batch plants and nearby Sam Furr Road (NC 73) carries significant truck traffic. In Davidson, Griffith Street and Beatty Road, which are on the State System, are carrying most of the truck traffic. In Mooresville, McLelland Avenue (NC 152) and Iredell Street (NC 136) both carry measurable truck traffic.



FIGURE 5 – TRUCK ROUTE

As for the private crossings, the ones with any significant truck traffic are all located in Charlotte. The crossings serve Blythe Industries at Milepost 0-2.7, NC Equipment Company at Milepost 0-3.3 and the Bonded Warehouse operations at Milepost 0-5.2.

Long and heavy trucks are a special concern at those crossings that have inadequate queue distance. During field observations for this report, heavy trucks were observed on several occasions to pull onto the crossing while waiting to enter the flow of traffic on the paralleling roadway.

C. Sight Obstructions

There are many locations up and down the line where the ability of a train crew to observe a vehicle approaching a crossing or for the motorist to see an approaching train, is obscured. This is especially true for the private crossings where foliage has been planted in many cases to purposely block the view of the railroad. For many of the public crossings, an existing building blocks sight distance. This is especially true in the town centers.

The evaluation spreadsheet, which follows on Pages 67 & 68 in this report, identifies both public and private crossings with an observed sight obstruction.



FIGURE 6 – SIGHT OBSTRUCTION – PRIVATE CROSSING



FIGURE 7 – SIGHT OBSTRUCTION – PUBLIC CROSSING

D. Summary of Crossing Protection Devices

Of the 67 public crossings, 31 have some form of active warning devices (flashers or gates and flashers) with 15 crossings having both gates and flashers. In most cases, where there are flashers only, the flashers are mounted on a 4-inch post that cannot support the addition of a gate/counterweight system. For this reason, where gates need to be installed, GF's recommendation is to install a new gate and flasher system in accordance with NCDOT Rail Division standards. Of the 32 crossings with flashers, seven (7) have 8-inch lenses instead of the current standard 12-inch lenses. GF has not attempted to assign a salvage value to the flashers that will be replaced. In negotiations with Norfolk Southern, CATS may want to determine a value for any devices that may be returned to the railroad; however, NS will deem any flasher assemblies that are more than seven (7) years old of no salvage value. Any active warning devices on State System roadways will be disposed of at the discretion of the NCDOT.

Table 2 below, summarizes all crossings and the type of crossing protection safety devices in place. One of the private crossings has both a gate and crossbucks.

	GATES/FLASHERS	FLASHERS	CROSSBUCKS	GATED	NONE
Public	15	16	34	0	2
Private	1	0	9	4	29

Table 2SUMMARY OF CROSSING PROTECTION DEVICES



FIGURE 8 – RURAL CROSSING WITH GATES, FLASHING SIGNALS & BELL



FIGURE 9 – GATED PRIVATE CROSSING - IREDELL CO.

E. Crossings With The Highest Traffic Volume

The following table lists the 10 public crossings with the highest traffic volume based upon 24-hour automatic traffic counts taken between February and May 2001. Projected 2025 traffic volumes are listed where available.

PUBLIC CROSSINGS WITH HIGHEST TRAFFIC VOLUME					
CROSSING	NAME	LOCATION	SYSTEM	2001 ADT	2025 ADT
726 267Y	Sam Furr Rd.	Huntersville	NC 73	16,852	32,800
730 130L	Gibbon Rd.	Charlotte	Municipal	14,948	11,600
721 756S	Eastfield Rd.	Charlotte	State	12,200	17,300
715 362N	Statesville Av	Charlotte	State	11,200	31,600
721 677F	Iredell St.	Mooresville	NC 136	9,078	N/A
736 195A	Statesville Av	Mooresville	Municipal	8,005	N/A
721 682C	Wilson Ave.	Mooresville	Municipal	7,783	N/A
721 680N	McLelland A.	Mooresville	NC 152	6,991	N/A
621 679U	Center St.	Mooresville	Municipal	6,780	N/A
730 131T	Nevin Rd.	Charlotte	Municipal	6,216	14,800

Table 3PUBLIC CROSSINGS WITH HIGHEST TRAFFIC VOLUME

F. Humped Crossings



FIGURE 10 - HUMPED PUBLIC CROSSING - CHARLOTTE.

Humped crossings are those where there is a measurable difference in the grade of the railroad and the grade of the crossing roadway. In other words, a vehicle may have to travel up, over and down the other side in order to cross the railroad.

Humped crossings are significant in that when the hump is severe enough, vehicles, especially low-hanging trucks, may scrape or hang up on the crossing. When a vehicle hangs on the crossing, it can cause a crash with a train or it can disrupt railroad operations while the hung vehicle is cleared from the crossing.

Of the 67 public crossings evaluated in this report, 29 are humped to some degree. The crossings in Table 4 are humped enough to warrant corrective action.



FIGURE 11 – HUMPED PRIVATE CROSSING

Table 4 HUMPED PUBLIC CROSSINGS WARRANTING CORRCTIVE ACTION			E ACTION
CROSSING NO.	STREET NAME	LOCATION	SYSTEM
715 382A	Toal Street	Charlotte	Municipal
730 133G	Christenbury Road	Charlotte	Municipal
721 743R	Dellwood Road	Huntersville	Municipal
721 728N	Caldwell Sta. Road	Huntersville	State
721 727G	Mayes Road	Huntersville	State
721 723E	Bailey Road	Cornelius	State
721 700X	Langtree Road	Iredell Co.	State
721 687L	Doster Avenue	Mooresville	Municipal
721 682C	Wilson Avenue	Mooresville	Municipal
721680N	McLelland Ave.	Mooresville	State/NC 152

Most of the private crossings are humped to some degree. However, this is typically not a problem in that they are generally used for automobile and pick-up truck access as well as farming equipment, such as tractors. Those heavy industrial crossings are generally built to accommodate tractor/trailer trucks.

G. Queue Distance

Queue distance is defined as the storage distance between the crossing protection safety devices (where they exist), or the end of tie and the edge of pavement (or stop bar, as the case may be) of any paralleling roadway. In other words, if there is a roadway that

parallels the railroad track, is there enough distance between the track and the road to safely store the number of vehicles that typically queue at the crossing while waiting to enter the flow of traffic on the parallel road? Due to the fact that the 'O' Line closely parallels several highways, primarily Graham Street, Sugar Creek Road, Gibbon Road and NC 115 as well as Broad Street and Main Street in downtown Mooresville, many of the public crossings and most of the private crossings have inadequate queue distance. In many locations, the distance between the edge of track and the edge of pavement is inadequate for one vehicle to queue without a portion of the vehicle extending back over the track or protruding into the roadway. The table below lists the total number of public crossings in each location with inadequate queue distance.



FIGURE 12 – VEHICLES QUEUED OVER THE CROSSING – NC 73

FIGURE 13 – INADEQUATE QUEUE DISTANCE - MOORESVILLE

Table 5 PUBLIC CROSSINGS WITH LIMITED QUEUE DISTANCE		
LOCATION NUMBER OF CROSSINGS		
Charlotte	12	
Huntersville	6	
Cornelius	4	
Davidson	1	
Iredell County	0	
Mooresville	13	

VI. RATING CRITERIA

Due to the length of railroad involved in this study and the number of grade crossings that require some type of safety enhancements, an objective system of establishing priority is necessary. Accordingly, selected criteria from the approved Evaluation Criteria have been used and a matrix has been established resulting in a maximum 100-point ranking system for all public crossings. The criteria selected and the rating system established follows below. The ranking matrix is included on Page 69 in this report.

A. Safety Devices

The existence or non-existence of grade crossing protection devices shall receive from 0 to 20 points as follows:

- No devices present at crossing 20 points
- Crossbucks at crossing 15 points
- Flashers only at crossing 10 points
- Gates/flashers/bells at crossing 0 points.

B. Traffic Volume

The traffic volume at the grade crossing shall receive 0.5 to 20 points as follows:

- < 100 to 499 vehicles per day 0.5 points
- 500 to 999 vehicles per day 1 point
- 1000 or more vehicles per day 1 point/1000 vehicles rounded to nearest 1000 vehicles not to exceed 20 points.

C. Accident History

Accidents at grade crossings would typically be assigned the highest number of points in any kind of numerical ranking system. The 'O' Line grade crossings however, have an overall excellent accident history. This can be directly attributable to the low volume of railroad traffic and the many crossings with relatively low vehicle volumes. Accordingly, points for accidents are assigned from 0 to 10 as follows:

- 0 accidents in the last 10 years 0 points
- 1 accident in the last 10 years 5 points
- 2 or more accidents in the last 10 years 10 points



D. School Route



FIGURE 14 – SCHOOL ROUTE

Points are assigned if the crossing is or is not a school route as follows:

- Not a school route 0 points
- School route 5 points

E. Emergency Response Route

Points are assigned if the crossing is or is not an emergency response route as follows:

- Not an emergency response route 0 points
- Emergency response route 5 points

F. Humped Crossing

Points are assigned to humped crossings based upon the severity as determined by field assessment and engineering judgment. Points are assigned as follows:

- Severe hump 6 to 10 points
- Moderate hump 1 to 5 points

G. Sight Obstruction

Sight obstructions at grade crossings can impact either the motorist's or the train crews' ability to observe the approaching traffic at the crossing. Points are assigned for sight obstructions as follows:

- No obstruction 0 points
- Foliage obstruction 5 points
- Building or other man-made obstruction 10 points

H. Queue Distance

The clear distance between the railroad track and the edge of pavement or stop bar adjacent to a paralleling roadway is called the queue distance. This is the area where vehicles queue waiting to enter the flow of traffic on the parallel roadway. The queue distance is important because short queue distances may cause vehicles to back up onto the railroad track thus becoming a potential safety hazard. Points are assigned for queue distance as follows:

- 20 feet or less 20 points
- 21 to 40 feet 15 points
- 41 to 60 feet 5 points
- > 60 feet 0 points

MAXIMUM POINTS AVAILABLE = 100

VII. MENU OF AVAILABLE TRANSPORTATION SYSTEM ENHANCEMENTS

Over the years, Traffic, Roadway and Railway engineers have developed more sophisticated methods for treating safety issues at grade crossings over and above those traditionally used for most of the 20th Century. A listing and description of these methods follows:

A. Grade Separation Structures

Separating railroad traffic from vehicular traffic offers the greatest degree of public safety but it is also the costliest. Important factors used in determining the feasibility of constructing a separation structure are discussed below. This method is also discussed in **Section VIII. SAFETY AND MOBILITY ISSUES**, that follows this Section.

- Traffic volumes (both vehicle & train)
- Accident history
- Topography
- Construction impacts
- Costs

Traffic Volumes in the 15,000 to 20,000 vehicles per day (VPD) range and above are generally considered to be the threshold for consideration of a grade separation structure for local streets. Volumes of 30,000 VPD and more can be accommodated without significant delay provided train traffic is low.

The **NCDOT** uses an **"exposure index"** to determine whether or not a grade separation structure is warranted at either an existing or proposed railway/highway crossing. The exposure index is determined by multiplying the number of trains per day over the railroad by the number of vehicles per day in the design year on the roadway. In other

words, if a roadway project is being designed to handle traffic volumes forecast for the year 2020, the 2020 traffic volumes for both trains and automobiles would be used to calculate the exposure index. For a railroad with 5 trains per day and a roadway with 2,000 vehicles per day, the exposure index would be 10,000. The threshold for consideration for construction of either an overpass or an underpass is an exposure index of 15,000 in rural areas and 30,000 in urban areas.

Accident History is another of the factors used when considering grade separation structures. Even though traffic volumes for vehicles and trains may be low, if frequent collisions between railroad and highway traffic is occurring, then a separation structure may be warranted.

Topography, or the lay of the land, is another important consideration. Where the street, railroad and surrounding land are all at about the same elevation, the construction of grade separation structures is made considerably more difficult.

Construction Impacts are of considerable importance in that they may be of such a magnitude as to do greater harm to the community than if the present conditions remain.

Construction impacts can include acquisition and the subsequent relocation of families and businesses; destruction of the natural environment such as woodlands and wetlands; and, disruption of historical and archaeological sites. While the effects of some of the impacts may only be temporary, some can forever alter the character of a neighborhood or community.

Costs for grade separation structures can easily exceed several million dollars and must, therefore, receive careful consideration before proceeding with funding and construction.

B. Crossing Protection Devices Upgrade

One way to deal with safety issues at an at-grade railroad crossing is to upgrade the crossing protection devices.

Crossing protection devices include signs, signals, bells and flashing signals used to warn motorists of the pending crossing and, in the case of bells, signals and gates, alert the motorist to the train approaching the crossing. Passive devices, which include advancewarning signs, railroad crossbucks and standard stop signs, are generally used on low volume crossings with good site distance. Active devices, which include flashers, bells and gates, are used on higher volume crossings with greater accident potential or where existing conditions warrant more positive control. As far as positive control at the crossings, the devices rank from lowest to highest as follows:

- Unmarked
- Railroad crossbucks
- Standard stop signs (limited sight distance) & crossbucks
- Flashing signals and bells
- Flashing signals, bells & gates

C. Enhanced Crossing Protection Devices

The use of four-quadrant gates/flashers and barrier medians is another alternative on high volume rail corridors where more positive control of the grade crossing is warranted. The use of this type system is very effective where significant numbers of motorists are ignoring the existing devices. The installation consists of dual gates across the entire approach width, and a barrier median on each approach to prevent motorists from crossing the roadway centerline in an attempt to get around the gates. The NCDOT Rail Division has recently adopted a new barrier design that consists of a 4-foot wide by 5-inch high concrete median with reflective tubular markers mounted on the median. This design should require less maintenance than the all-plastic devices used on some crossings.

In tests completed at Sugar Creek Rd. in Charlotte in 1996 by the NCDOT in cooperation with Norfolk Southern (NS), violations dropped from almost 45 per week with standard gates and signals, to less than 2 per week with the advanced protection devices.

Other advanced crossing protection devices available for installation include:

- Long-gate arms (covers 2/3 of the approach roadway versus 1/2 for standard gates)
- Warning device revisions (upgrade from 8" to 12" lenses, add gates) Pavement marking revisions (supplemental RxR)
- Special signage ("Low Vehicles May Drag", "Do Not Stop On Track")



FIGURE 15 – LONG GATE ARM



Video enforcement is another technique that is being used to improve crossing safety. Under this program, video cameras are set up at certain crossings to record events as well as the vehicle and license plate of violators. This information is then provided to law enforcement officials for enforcement purposes.

D. Crossing Closure/Crossing Consolidation

The most effective way to deal with railroad/highway crossing safety issues is to close low-volume redundant crossings. Crossings that connect to the same street network and are within a quarter mile (+/- 1300 feet) of each other are considered to be redundant. Crossing consolidation is another way to treat crossings that may be relatively close to each other. Consolidation of two or more crossings into one can be accomplished by utilizing or building roads that parallel the tracks or by replacing several crossings with a grade separation structure or by constructing a new at-grade public crossing with automatic warning devices. Consolidation is particularly effective method where several crossings, either public or private, are relatively close together.

E. Street Improvements

Street improvements are an effective way to treat capacity and safety problems associated with a particular section of roadway, an intersection or a railroad crossing. These improvements can range from simply remarking the existing pavement to obtain a turn lane to total reconstruction of the roadway. In many cases, the more minor the improvement, the greater the benefits.

F. Traffic Signals

As traffic volumes increase within a roadway network or at a particular intersection, the addition of a traffic signal(s) to the system may be warranted. Traffic signals are not a "cure-all" for traffic problems. Signals have distinct advantages and disadvantages. They are:

Advantages

- 1. They can provide for the orderly movement of traffic.
- 2. Where proper physical layouts and control measures are used, they can increase the traffic-handling capacity of the intersection.
- 3. They can reduce the frequency of certain types of accidents, especially the rightangle type.
- 4. Under favorable conditions, they can be coordinated to provide for continuous or nearly continuous movement of traffic at a definite speed along a given route.
- 5. They can be used to interrupt heavy traffic at intervals to permit other traffic, vehicular or pedestrian, to cross.

Disadvantages



- 1. Excessive delay may be caused.
- 2. Disobedience of the signal indications is encouraged.
- 3. The use of less adequate routes may be induced in an attempt to avoid such signals.
- 4. Accident frequency (especially the rear-end type) can be significantly increased.

Because of these advantages/disadvantages, it became necessary to develop a series of "warrants" for signal installation. The warrants are prescribed in the Manual on Uniform Traffic Control Devices (MUTCD) and are:

Warrant 1 - Minimum vehicular volume

Warrant 2 - Interruption of continuous traffic

Warrant 3 - Minimum pedestrian volume

Warrant 4 - School crossings

- Warrant 5 Progressive movement
- Warrant 6 Accident experience

Warrant 7 - Systems

- Warrant 8 Combination of warrants
- Warrant 9 Four-hour volumes
- Warrant 10 Peak hour delay
- Warrant 11 Peak hour volume

Minimum criteria are established for each of the warrants and one or more must be met before installation of a new traffic signal can be considered.

Level of Service (LOS) analyses were conducted at several intersections along the project, both signalized and unsignalized, to determine if intersection performance might be compromising grade crossing safety. The LOS analyses were also used to determine if other grade crossings could be closed and to determine the intersection configuration for the proposed extension of Catawba Avenue in Cornelius. The following intersections were analyzed:

- N. Graham Street and Craighead Road Charlotte
- N. Graham Street and Starita Road Charlotte
- N. Graham Street and Cottonwood Street Charlotte
- N. Graham Street and I-85 Service Roads, North & South Charlotte
- W. Sugar Creek Road and Maple Street Charlotte
- W. Sugar Creek Road and Gibbon Road Charlotte
- Gibbon Road and Derita Avenue Charlotte
- NC 115 and David Cox Road Charlotte

• NC 115 (Main Street) and Catawba Avenue – Cornelius

The recommendations, as a result of these analyses, are contained in the section on **RECOMMENDATIONS AND ESTIMATED COSTS** that follows in this report.

VIII. SAFETY AND MOBILITY ISSUES

A. Vehicles Queuing Across Railroad Tracks

Queuing of vehicles across the tracks usually occurs due to the nearby presence of traffic signals, intersections or paralleling roadways.

Queuing is a significant problem along the 'O' Line in that the track parallels several major roadways in both Mecklenburg and Iredell counties. In Mooresville, main streets parallel the track on both sides for 10 of the 13 crossings.

B. Traffic Signal Preemption

Traffic signal preemption is a technique used by Traffic Engineers to prevent automobile traffic from turning onto a crossing when a train is approaching. Under this technique, the approaching train activates signs and signals. These activated signs/signals warn motorists of the approach and prohibit turns until the train has cleared the crossing.

The Manual on Uniform Traffic Control Devices requires that preemption of traffic signals occur when the signal is within 200 feet or less of the crossing. Along the 'O' Line, preempted signals are located in Charlotte and Mooresville only. There are no nearby signals affected in Huntersville, Cornelius, Davidson or Iredell County.

C. Humped Crossings

A "humped" crossing is one at which the elevation of the railroad is generally higher than that of the approaching roadway. This humped affect may cause cars and trucks to ascend on one approach to cross the track and descend on the other side. When the humping is severe enough, vehicles, especially low-hanging trucks, tend to drag over the crossing and can become hung such that the vehicle can go neither forward nor backward. Maintenance of the railroad tends to exacerbate the hump over time in that work on the track ballast generally raises the roadbed about three inches per occurrence. Over a ten-year period, the railroad will rise about one foot (1'). In cases where a vehicle becomes hung on the crossing, significant disruption can occur to railroad operations while the hung vehicle is cleared from the crossing.

D. Grade Crossing Condition

The condition of the grade crossing surface can affect both safety and mobility. A poorly maintained crossing surface can contribute to accidents that may or may not involve a train. Also, a crossing in poor condition may cause operating speeds over the crossing to be lowered, thereby, impacting roadway capacity.

For the most part, the public crossings of the 'O' Line that carry significant traffic volume are in good condition. Those that have poor ride quality are generally those that have a significant hump. These crossings are more difficult to maintain in that any improvement of the crossing generally leads to a worsening of the humped condition.

E. Vehicles Driving Around Automatic Gates

This occurs when motorists perceive that the automatic gates have lowered but a train is not approaching the crossing; when the motorist perceives that the train is far enough away from the crossing to allow for a safe crossing; when the gates fail in the lowered position (Fail Safe); or when impatience causes a driver or pedestrian to maneuver around the gates even when an approaching train is in sight.

Field tests have determined that one of the hardest things for a motorist to judge while stopped at a crossing is the speed of an approaching train. Because of its size and the motorists perspective, an approaching train may appear to be moving relatively slow when it is, in fact, approaching at a high rate of speed.

Installation of 4-quad gates (with or without barrier medians) has proved to be very effective in treating this safety issue. Occurrences of this type have been virtually eliminated along the NS mainline from Charlotte to Raleigh where such gate/signal systems have been installed as part of the Sealed Corridor initiative. On the 'O' Line, however, the installation of such equipment cannot be justified except in special circumstances, due to the low train volumes and operating speeds. During field observations for this report, there were no observed instances where a motorist drove around a lowered gate. Again, this is directly attributable to the volume of train operations.

F. Improved Signs and Markings

Installation and maintenance of required traffic control signs and markings is consistently an issue with state and municipal street and highway departments. And, to some extent, maintenance of the railroad signs, signals, and gates at crossings can be an issue with the railroad company.

For the most part, signs and markings are in place and well maintained on the public crossings of the 'O' Line.

G. Roadway Improvements

In order to make grade crossings safer, roadway improvements are frequently recommended. In many cases, not only does the crossing roadway require improvement, but a nearby paralleling roadway or intersection can be involved as well as the relocation of overhead wire lines.

Roadway improvements will be required at several locations along the 'O' Line as well as the construction of new public crossings in order to implement report

recommendations. These recommendations are more fully described in **Section IX** below.

H. Roadway Grade Separation

Providing a roadway grade separation can eliminate safety, queuing and delay problems at a railroad grade crossing. Highway grade separations can either be on a bridge over the railway or the roadway can cross beneath the rail line.

Highway overpasses require greater length for the same design speed. The total elevation difference is greater because the standard rail vertical clearance of 23 feet exceeds the typical highway clearance of 16 or 16-1/2 feet (even though the structure depth is usually greater for the rail bridge typically provided at an underpass). More importantly, the vertical curve in the middle of the facility, the "crest" curve on an overpass, is longer for a given design speed than the "sag" curve at an underpass, due to stopping sight distance requirements.

The visual and noise impacts associated with overpasses can make them undesirable for use in residential zones, downtown zones, or near historic structures.

The design, and ultimately the feasibility, of a highway grade separation is heavily influenced by property access considerations and the location and connectivity of roadways which parallel the tracks and connect to the cross street. Where an existing frontage road is immediately adjacent to the railroad, this facility must be bridged as well as the railroad. If necessary, a connection to the frontage road can be provided by directional ramps similar to freeway on-and-off ramps that provide access to the frontage road for traffic to-and-from points on the same side of the railway line as the frontage roadway.

No grade-separation projects are recommended for the 10-year horizon of this report. However, such projects may be warranted eventually at several of the existing or proposed grade crossings. For example, the proposed extensions of Verhoeff Drive and Hambright Road as well as existing Sam Furr Road/NC 73 may all warrant further consideration. The pressure to separate the more heavily used crossings will increase if passenger rail service is implemented on the 'O' Line. Also, the line traverses portions of Mecklenburg and Iredell counties that are now experiencing heavy development pressure. In north Mecklenburg County, traffic volumes have dramatically increased along Eastfield Road and Sam Furr Road. In south Iredell County, with the Lake Norman Regional Medical Facility and the Lowe's Home Improvement Centers Regional Headquarters, the volume along Fairview Road and Langtree Road will certainly increase.

I. Other Mobility Factors

Less than half of the 67 public crossings evaluated in this report are routinely used as public school bus routes while most all of them are used by fire and medic crews. With the exception of Charlotte and Mooresville, all of the towns involved in this study and the unincorporated area around Mt. Mourne in Iredell County, have volunteer fire
departments. Typically, the fire department, which may also house the rescue squad or the medic response crews, has one station located near the greatest concentration of development. As the communities around them have grown, the fire department and medic crews find themselves responding to emergencies on the side of the track opposite from the station location. For this reason, it is imperative that adequate and safe access for these crews be maintained.

On the other hand, access for police vehicles is generally not an issue in these studies in that most communities have several officers on duty at any given time. These officers are typically on duty on both sides of the railroad.



FIGURE 16 – MT. MOURNE VFD (NOW LOCATED AT LANGTREE ROAD & 115)

J. Thoroughfare Plan Considerations

In Mecklenburg County, future Thoroughfare Plan projects will impact the 'O' Line. The Mecklenburg-Union Thoroughfare Plan lists four (4) future projects that have been considered as part of this study. Planning documents have not been prepared for any of these projects at this time, so it is not known if grade separation structures may be recommended. *At such time as project planning documents are being prepared, consideration should be given to a grade separation project.*

- 1. West Sugar Creek Road is to be extended as a Minor Thoroughfare from north of the Derita community westerly connecting with NC 115 where it currently intersects with Henderson Road (crossing # 730 138R at Milepost O-8.5).
- 2. Hambright Road south of Huntersville is to be extended in an easterly direction as a Major Thoroughfare to connect with Ridge Road. This extension, should it occur, will cross the railroad at the present location of private crossing # 721 753W at Milepost O-12.6.



- 3. Verhoeff Drive south of Huntersville is to be extended easterly as a Minor Thoroughfare crossing NC 115 and the railroad to ultimately connect to Prosperity Church Road as a Minor Thoroughfare. This extension, should it occur, will cross the railroad at approximately Milepost O-13.7, which is south of the Holbrooks Road crossing.
- 4. North of Huntersville, Stumptown Road is to be extended easterly as a Minor Thoroughfare to connect with Ramah Church Road. This extension would occur near Milepost O-16 and between two private crossings.

The Mount Mourne Plan calls for a future parkway facility to connect NC 115 with US 21 between Fairview Road (MP O-25) and Crossrail Road (MP O-25.4). In developing the Plan, there was some discussion of this new facility passing beneath the railroad. In any event, should it come to fruition, the possibility of consolidating the two existing grade crossings into the new facility should be considered.

Also in Iredell County, Timber Road (SR 1254) is to be extended westerly connecting NC 115 to US 21. This extension, should it occur, would cross the railroad near the current private crossing # 721 691B located at Milepost O-26.6.

K. Transportation Improvement Program/Capital Improvement Program Considerations

The following TIP/CIP projects have been considered in the preparation of this report:

- 1. The City of Charlotte has completed intersection improvements at North Graham Street and Norris Avenue. The improvements extended over the Norris Avenue crossing # 715 377D/Milepost O-2.5.
- 2. The City of Charlotte has completed roadway and intersection improvements at North Graham Street and Atando Avenue. The improvements included the Atando Avenue crossing #715 380L/Milepost O-3.0. This project also included the extension of Asbury Avenue to connect to Statesville Avenue and ultimately I-77.
- The City of Charlotte is widening NC 115/Old Statesville Road from US 21 to north of Harris Boulevard. This project affects the crossings at Oak Drive (730 136C/Milepost O-8.1), Pete Brown Road (730 137J/Milepost O-8.3), Henderson Road (730 138R/Milepost O-8.5) and David Cox Road (730 140S/Milepost O-9.5).
- 4. The NCDOT has installed (Project No. Z-4010D) automatic gates and flashers to replace the crossbucks at the Oneida Road crossing (730 125P/Milepost O-4.5) in Charlotte.
- 5. The Town of Huntersville and the NCDOT have completed a project (U-2360T) to improve the intersection of NC 115 and NC 73/Sam Furr Road. The project added north and southbound left-turn lanes on NC 115; lengthened the eastbound left-turn lane on NC 73 and added right-turn-only lanes on all four approaches to

the intersection. No improvements were made to the westbound approach of NC 73 in order to avoid upgrading the railroad crossing (726 267Y/Milepost O-17.0).

- 6. The Town of Cornelius has constructed a regional park adjacent Bailey Road and NC 115. The park impacts the Bailey Road crossing (721 723E) at Milepost O-18.7. The park opened in late summer of 2002. It will ultimately have an aquatic center; however, no date for construction of the center has been established.
- 7. The Town of Cornelius plans to extend Catawba Avenue eastward across the 'O' Line just south of the Zion Street crossing (721 713Y/Milepost O-20.1). The proposed crossing will be at approximately Milepost O-20.
- 8. In Iredell County a potion of Fairview Road east of the railroad crossing (721 697S/Milepost O-25.0) has been relocated. The relocation moved the Fairview Road intersection with NC 115 north about 200 feet to accommodate proposed expansion of a nearby church. This relocation caused the road to cross the railroad at less than a 90-degree angle. *The crossbucks at this crossing have now been replaced with gates and flashers*.
- In the Town of Mooresville, the NCDOT has installed automatic warning devices (gates & flashers) at Oak Street (721 676Y/Milepost O-28.7, project # Z-4012H), McLelland Avenue (721 680N/Milepost 28.2, project # Z-4112C) and Patterson Street (721 674K/Milepost O-29.0)

IX. RECOMMENDATIONS AND ESTIMATED COSTS

The following recommendations for public grade crossings of the 'O' Line presume the introduction of rail passenger service consisting initially of seven (7) trains per day in addition to the current service being operated by NS. Further on in this report (section **XVII**), recommendations are included for projects that should be implemented even if rail passenger service on the 'O' Line does not occur.

The clock for the recommendations listed below does not start ticking until a decision has been made to implement passenger service along the 'O' Line. In other words, work on implementing the recommendations described as **Near-Term** should begin at least two years prior to the implementation of passenger service. **Mid-Term and Long-Term** recommendations can be completed after the introduction of passenger service.

- Near-Term 0-2 years these recommendations can typically be implemented without a significant expenditure of public funds. Crossing closures that do not require additional construction plans or acquisition of right-of-way typically fall into this category. Near-term projects generally do not have any, or at the most, minor associated environmental issues. Railroad and public agency approvals are required.
- **Mid-Term 3-5 years** recommendations that fall into this category are generally those that require some construction and acquisition of minor amounts of right-of-way. Typically environmental issues are not significant on projects in this

category requiring only the preparation of a Type II Categorical Exclusion Document. Projects typically involve the installation of new automatic warning devices as well as associated roadway improvements. Railroad and public agency approvals are required.

• Long-Term 6-10 years – recommendations that fall into this category generally consist of major construction projects requiring a significant investment of public funds. Construction plans and right-of-way acquisition and possibly the preparation of an Environmental Assessment accompany projects of this type. A grade-separation project typically is a long-term project requiring significant public agency and railroad review and approval.

A. Crossings Recommended for Closure

Of the 67 public crossings, 19 are recommended for closure. Some of the recommendations are dependent upon construction of new public crossings that will be further described below. The recommended closures are described as follows:

1. **Spratt Street/Milepost O-1.3/Charlotte** – a low-volume street serving a residential neighborhood that has adequate access from two adjacent thoroughfares. Closing Spratt will require some modifications to the existing street system west of the railroad in order to provide access and maneuvering areas for nearby residences. A graphic showing the street modifications is contained in the appendix. This is a <u>mid-term recommendation</u> in that the project may require the preparation of construction plans and possibly the acquisition of some minor amount of right-of-way. Spratt Street currently has no crossing protection safety devices of any type. However, given the low volume of traffic and the access alternatives, should passenger service be implemented prior to the construction of proposed roadway modifications, the crossing should be closed temporarily with barricades.

Estimated cost: \$50,000.

2. **Toal Street/Milepost O-3.1/Charlotte** – a low-volume roadway with a severe hump and inadequate queue distance at N. Graham Street. Adequate access to the industrial properties now served by the street can be provided via Atando Avenue and Asbury Avenue. Asbury Avenue parallels N. Graham Street and intersects Toal one block from Graham. Although some minor roadway work is required to implement this recommendation, it is a <u>near-term recommendation</u> due to the minor nature of the work.

Estimated Cost: \$7,500.

3. I-85 Service Road 5 (South)/Milepost O-4.0/Charlotte – the grade crossings at Starita Road/Milepost O-3.4, Cottonwood Street/Milepost O-3.8 and I-85 Service Road 5/Milepost O-4.0 were analyzed as a system to determine if one or more of the

crossings could be closed without impacting the Level of Service. This analysis is contained in the Appendix I of this report. Six (6) different options were evaluated and are described more fully in the Appendix. Based upon the analysis, it is recommended that the I-85 Service Road 5 be closed with modifications to signal timing/phasing at other nearby signalized intersections as described in **Alternate 3-B.** The service road from north of the UPS driveway to N. Graham Street should be removed, a guardrail installed and the area of pavement removal seeded and mulched. This is a <u>near-term recommendation</u>.

Estimated Cost: \$25,000.

4. **Maple Street/Milepost O-5.5/Charlotte** – the crossing at Maple Street was analyzed along with the nearby crossing of Gibbon Road/Milepost O-5.7. Based upon the analysis as described in Appendix I, it is recommended that the crossing at Maple Street be closed. This is a <u>near-term recommendation</u>.

Estimated Cost: \$7,500 (The automatic warning devices at Maple Street were installed in 2001; therefore, they will have significant salvage value).

5. Oak Drive/Milepost O-8.1/Charlotte – a low-volume dead-end roadway serving a small trailer park and a few scattered permanent residential units. A frontage road is proposed to be constructed parallel to the track on the west side connecting to Henderson Road at Milepost O-8.5, to allow for the recommended closure. The Henderson Road crossing is recommended for automatic warning devices and roadway improvements. This is a <u>mid-term recommendation</u> in that construction plans and right-of-way acquisition are required. A Type II CE environmental document will most likely be required. In the <u>near-term</u>, the crossing should receive supplemental stop signs.

Estimated Cost: \$500,000.

6. Pete Brown Road/Milepost O-8.3/Charlotte – a low-volume dead-end roadway serving two commercial operations and a few scattered residential units. A frontage road is proposed to be constructed parallel to the track on the west side connecting to Henderson Road at Milepost O-8.5 to allow for the recommended closure. The Henderson Road crossing is recommended for automatic warning devices and roadway improvements. This is a <u>mid-term recommendation</u> in that construction plans and right-of-way acquisition are required. A Type II CE environmental document will most likely be required.

In the <u>near-term</u>, the crossing will receive some improvements as part of the City's project to widen and improve Old Statesville Road/NC 115. This project should be monitored and if the sight obstructions and humped condition are not significantly mitigated, then supplemental stop signs should be installed at the crossing.

Estimated Cost: Included in 5 above.

7. Bob Beatty Road South/Milepost O-9.8/Charlotte – Bob Beatty Road crosses the 'O' Line at Milepost 9.8 and again at Milepost 10.2. The crossing at Milepost 9.8 is humped and has only 18 feet of queue distance while the northern crossing at Milepost 10.2 is not humped and has 45 feet of queue distance. Volume for both crossings is estimated at less than 200 vehicles per day. This is a <u>near-term</u> <u>recommendation</u> in that it only requires the actual removal of the crossing and some minor street repair.

Estimated Cost: \$4,000.

8. **Church Street South/Milepost O-13.8/Huntersville** – this crossing primarily serves an elder care health facility and a charter school that can be accessed from the Holbrooks Road crossing at Milepost O-14.0 via an existing parallel roadway. The crossing has a significant sight distance problem created by a building located in the northwest quadrant of the crossing. This is a <u>near-term recommendation</u>. The removal of the crossing will require no additional improvements other than minor street repair. However, the automatic warning devices at Holbrooks Road will require the addition of a long-gate arm on the westbound approach.

Estimated Cost: \$22,500.

9. Dellwood Road/Milepost O-14.5/Huntersville – this is a redundant crossing near downtown Huntersville in an area where there are parallel roads on both sides of the track. The Dellwood crossing is badly humped and has less than 15 feet of queue distance on either side of the track. The residential neighborhood east of the track can utilize the crossing at Gibson Park Drive/Milepost O-14.6, which is not humped and has a greater queue distance. Traffic volume at both crossings was counted at less than 700 vehicles per day. This is a <u>near-term recommendation</u> in that it only requires the removal of the crossing and minor street work.

Estimated Cost: \$2,500.

10. **4th Street/Milepost O-15.4/Huntersville** – this is a redundant crossing so close to Church Street North that both are measured at Milepost O-15.4. A transit station is proposed for Church Street requiring that the Church Street crossing remain open to access parking. A parallel roadway connecting 4th Street to Church Street is required to allow for the closure of 4th Street. This is a <u>mid-term recommendation</u>. However, the crossing has a significant sight obstruction caused by trees and other foliage as well as a house. And even though the crossing is flat, it has inadequate queue distance for the 1000+ vehicles per day that now use the crossing. Every effort should be made to close the crossing prior to the implementation of passenger

service. Should this not occur, the crossing should be made as safe as possible by the clearing of tree/foliage sight obstructions and the installation of supplemental stop signs in the <u>near-term</u>.

Estimated Cost: \$60,000.

11. **Caldwell Station Road/Milepost O-17.6/Huntersville** – this crossing has a very low traffic volume (estimated at < 100 vehicles per day), is badly humped and has no queue distance. It is recommended that it be closed and that a new crossing be constructed at Milepost 17.5 were greater queue distance can be achieved and the roadway and the railroad are at virtually the same elevation. Existing Caldwell Station Road would need to be extended to the new crossing. This is a <u>mid-term</u> recommendation requiring the preparation of plans, the acquisition of right-of-way, the preparation of an environmental document and the review and approval of public agencies and the railroad. In the <u>near-term</u>, the crossing should be closed and all traffic directed to Mayes Road.

Estimated Cost: \$7,500 to remove existing crossing only. (See B.4 below for costs associated with extending and improving Caldwell Station Road and constructing a new public crossing).

12. **Mayes Road/Milepost O-17.9/Huntersville** – a badly humped crossing with inadequate queue distance. It is recommended that the crossing be closed and that existing Caldwell Station Road, which connects to Mayes Road east of the crossing, be upgraded (it is a gravel road at this time) and extended to the proposed crossing at Milepost O-17.5. This is a <u>mid-term recommendation</u> requiring the preparation of plans, the acquisition of right-of-way, the preparation of an environmental document and the review and approval of public agencies and the railroad. In the <u>near-term</u>, the crossing should receive supplemental stop signs and "Do Not Stop on Tracks" signing.

Estimated Cost: \$7,500 to remove existing crossing only. (See B.4 below for costs associated with extending and improving Caldwell Station Road and constructing a new public crossing).

13. Hickory Street (Zion St. South)/Milepost O-19.8/Cornelius – this is a low-volume crossing (< 700 vehicles per day) near downtown Cornelius that has a sight obstruction in the northwest quadrant of the crossing created by an existing building. The traffic can adequately be handled by the crossing at Smith Street/Milepost O-19.6, which is recommended for automatic warning devices and roadway improvements. This is a <u>mid-term recommendation</u> in that is should not be implemented until the recommended improvements at Smith Street are in-place.

Estimated Cost: \$2,500.

14. Zion Street North/Milepost O-20.1/Cornelius – this is a low-volume crossing (< 300 vehicles per day) that serves a small cluster of commercial operations and one industry. The crossing is humped and has less than adequate queue distance on either side of the crossing. The Town proposes to extend Catawba Avenue eastward to a new town center consisting of office, commercial and residential uses. The extension would cross the railroad at-grade at approximately Milepost O-20.0. It is recommended that Zion Street be closed at such time as the Catawba Avenue Extension project is completed. It is anticipated that this closure can be implemented mid-term.

Estimated Cost: \$4,000.

15. Delburg Street/Milepost O-21.7/Davidson – this is a low-volume street (est.< 200 vehicles per day) with sight obstructions created by both topography and buildings. Alternative access to the commercial properties west of the crossing is available via Watson Street. This is a <u>near-term recommendation</u> requiring only the removal of the crossing, minor street work and landscaping.

Estimated Cost: \$10,000.

16. **Doster Avenue/Milepost O-27.3/Mooresville** – this street has moderate traffic volume of almost 5000 vehicles per day at the crossing, however, it is badly humped and has less than 20 feet of queue distance on either side of the track. The Brawley Avenue crossing, which is 0.2 miles to the north and recommended for gates and flashers, will pick up most of the traffic from the Doster crossing that wishes to go south on NC 115. Northbound traffic will have several choices as to which crossing to utilize to access the east side of the track. This is a <u>near-term recommendation</u> requiring only the removal of the crossing and minor street work.

Estimated Cost: \$7,500.

17. **Mills Avenue/Milepost O-27.6/Mooresville** – a relatively low-volume (< 1500 vpd) and redundant crossing with a sight obstruction created by an existing building on the westbound approach and a queue distance on either side of the crossing of approximately 15 feet. Alternative crossings are available at Brawley Avenue, 0.1 mile to the south, and Wilson Avenue, 0.2 miles to the north. This is a <u>near-term</u> recommendation requiring only the removal of the crossing and minor street work.

Estimated Cost: \$7,500.

18. **Catawba Avenue/Milepost O-28.0/Mooresville** – a relatively low-volume (< 1900 vpd) and redundant crossing that is also humped and has queue distances of

approximately 15 feet on either side of the track. Alternative crossings are available at Wilson Avenue, 0.2 miles south, and at McLelland Avenue, 0.2 miles to the north. This is a <u>near-term recommendation</u> requiring only the removal of the crossing and minor street work.

Estimated Cost: \$4,000.

19. Walnut Street/Milepost O-28.9/Mooresville – a very low-volume (< 150 vpd) and redundant crossing that has approximately 15 feet of queue distance. Alternative crossings are available at Oak Street, 0.2 miles south, and Patterson Street, 0.1 mile to the north. This is a <u>near-term recommendation</u> requiring only the removal of the crossing and minor street work.

Estimated Cost: \$4,000.

B. New Public Crossings Recommended

In order to implement recommendations for both public and private crossing closure and consolidation, new public crossings will be required. The recommended new public crossings are:

 Hambright Road Extension/Milepost O-12.6/Huntersville – the Mecklenburg-Union Thoroughfare Plan calls for the extension of Hambright Road as a Major Thoroughfare easterly to connect to Ridge Road or possibly, Eastfield Road. The extension will cross the 'O' Line at the current location of private crossing number 721 753W at Milepost O-12.6. It is recommended that Hambright Road be extended easterly from NC 115 crossing the 'O' Line and extending approximately 100 feet east of the track. The extension should be constructed at least as a three-lane section with automatic warning devices and a median barrier. This is a <u>mid-term recommendation</u>.



FIGURE 17 – PROPOSED HAMBRIGHT ROAD EXTENSION

The extension of Hambright Road will allow for the closure of an additional private crossing south of the extension and two private crossings to the north. Access to the driveways served by the private crossings will be via a frontage road on the east side of the track connecting to the new Hambright crossing. **Estimated Cost: \$225,000.**

2. Damson Drive Extension/Milepost O-13.1/Huntersville – in order to consolidate and thus, eliminate, four (4) private crossings south of Huntersville, it is recommended that Damson Drive which intersects with NC 115 opposite private crossing number 721 748A, be extended easterly to cross the track at Milepost O-13.1. The extension should be constructed as a two-lane public crossing with automatic warning devices and should extend approximately 50 feet east of the track centerline. This is a <u>mid-term recommendation</u>.

The extension of Damson will eliminate the existing private crossing at the same location and will allow for the closure of two private crossings south of Damson and one private crossing to the north via the construction of a frontage road on the east side of the track.

Estimated Cost: \$175,000.

(Prior to constructing this crossing, a thorough examination of proposed land development activities and plans for the area should be undertaken to assure that the proper cross section for the extended Damson Drive is constructed).

3. Stumptown Road Extension/Milepost O-16.05/Huntersville – the Mecklenburg-Union Thoroughfare plan calls for the extension of Stumptown Road easterly as a Minor Thoroughfare connecting to Ramah Church Road approximately ³/₄ miles east of the Ramah Church Road crossing of the 'O' Line. The proposed extension would cross the 'O' just north of the private crossing at Milepost O-16.0 (crossing # 721 737M).

It is recommended that Stumptown Road be extended easterly from its intersection with NC 115 to at least 100 feet beyond the centerline of the track. The extended roadway should be three-lanes wide with automatic warning devices and a barrier median. This is a <u>mid-term recommendation</u> and will allow for the closure of one private crossing immediately to the south of the new crossing and four (4) private crossings to the north that are within 0.3 miles of the crossing. Access to the driveways served by the private crossings will be via a frontage road constructed on the east side of the track.

Estimated Cost: \$225,000.

(At such time as Stumptown Road is extended to connect with Ramah Church Road, the Ramah Church Road crossing of the 'O' should be reexamined for possible closure).

4. **Relocated Caldwell Station Road Crossing/Milepost 17.5/Huntersville** – it is recommended that the existing Caldwell Station Road crossing of the 'O' Line be relocated approximately 0.1 mile south of the existing crossing to Milepost O-17.5. A new crossing can be constructed at this location where the railroad and NC 115 are at the approximate same elevation, thus eliminating the humped condition of the present crossing. The proposed location is opposite a proposed new entrance into the Caldwell Station Subdivision on the west side of NC 115.

This recommendation also includes upgrading and extending Caldwell Station Road from Mayes Road to the new crossing and closing the Mayes Road crossing of the 'O' Line as well.



FIGURE 18 - CALDWELL STATION - TO BE RELOCATED (PROPOSED)

The new Caldwell Station Road crossing should be constructed as a three-lane section with automatic warning devices and a barrier median. Due to the fact that the land east of the railroad is mostly vacant or in farm uses, it is anticipated that the new crossing will also serve future development, thus the need for the barrier median. Efforts should be made during the design phase of the project to improve the queue distance between the track and NC 115 as well.

This is a <u>mid-term recommendation</u>, however, since both Caldwell Station and the Mayes Road crossings are public crossings protected only by crossbucks, all efforts should be expended to design and build the new crossing without the expenditure of funds for automatic warning devices at either existing crossing.

The estimated cost shown below includes the costs for the new crossing and the automatic warning devices as well as the costs associated with improving existing Caldwell Station Road and extending it to the new crossing.

Estimated Cost: \$535,000.

5. Catawba Avenue Extension/Milepost 20.0/Cornelius – the proposed Transit Oriented Development (TOD) project in Cornelius that would be served by the extension of Catawba Avenue eastward to cross the 'O' Line at Milepost O-20.0, is a mixture of land uses consisting of both retail and office and various types of residential units for sale and rental. The project as conceived is expected to generate upwards of 10,000 trips per day when fully developed. These trips would utilize the proposed Catawba Avenue crossing. East of the proposed TOD, the land today is mostly in rural/farm uses. The land use plan in this area anticipates that most of the farmland will be converted to residential uses by 2025. Based upon the analysis that was conducted, which is more fully described in Appendix I, we recommend that the crossing be constructed as a five-lane section (3 lanes westbound with right, through and left-turn lanes) and two eastbound departure lanes. The eastbound approach of Catawba Avenue to NC 115 should be re-striped to allow for through movements and the southbound approach on NC 115 should receive exclusive right and left-turn lanes. No improvements or modifications to the northbound approach on NC 115 are recommended.

Furthermore, the new crossing should receive automatic warning devices and a 4-foot concrete median divider to prevent vehicles from driving around lowered crossing gates. At such time as the new crossing is opened to traffic, the crossing at Zion Street/Milepost O-20.1 should be closed. This is a <u>mid-term</u> recommendation.

Estimated Cost: \$650,000.

C. Crossings Recommended for New or Improved Automatic Warning Devices

The table below lists those crossings not recommended for closure that should receive either new or improved automatic warning devices (gates or gates and flashers). With the exception of those crossings currently protected by cantilevered flashers, it is recommended that all crossings with existing flashers be upgraded with new gate and flasher assemblies. Field inventories have shown that the posts used for mounting of flashers only are 4-inch posts. A 5-inch post is required for mounting both gates and flashers due to the counter-weight system required for the gates.

The priority assigned to each crossing is based upon the Ranking Matrix shown on Page 68 that assigns points to eight (8) evaluation criteria. This system of ranking takes into account such factors as existing safety devices, sight distance, queue distance and humped conditions as opposed to the "Exposure Index" (EI) ranking system which simply multiplies train volume times street volume to come up with a number. Using the EI method on this project would place Sam Furr Road at the top of the priority list simply by multiplying 8 trains per day by 16,850 vehicles per day yielding an EI of 134,800. The fact that Sam Furr is a flat crossing, has existing cantilevered flashers with adequate sight distance on all approaches and has substantial queue distance would not be considered.

The first project shown in the table is already included in the NCDOT's Transportation Improvement Program to receive automatic warning devices.

The table does not include those crossings recommended for closure. For any crossing recommended for closure but not closed, an expenditure of \$100,000 or more will be required for installation of automatic warning devices. *The table have been updated to reflect field conditions as of April 2004.*

PUBLIC CROSSINGS RECOMMENDED FOR GATES OR GATES & FLASHERS												
Xing	Street Name	'O' Line	Location	ADT	Priority							
Number		Milepost										
721 680N	McLelland Ave.	28.2	Mooresville	6,991	Complete							
721 716U	Smith Street	19.6	Cornelius	1,007	1							
721 679U	Center Street	28.3	Mooresville	6,780	2							
721 723E	Bailey Road	18.7	Cornelius	Est. < 100	3							
715 385V	Cottonwood St.	3.8	Charlotte	5,202	4							
721 742J	Gibson Park Rd.	14.6	Huntersville	651	5							
721 740V	Church St. North	15.4	Huntersville	288	6							
910 618A	I-85 Ser. N (1)	4.2	Charlotte	3,043	7							
730 133G	Christenbury Rd.	7.1	Charlotte	2 092	8							
721 682C	Wilson Avenue	27.8	Mooresville	7,783	9							
715 377D	Norris Avenue	2.5	Charlotte	3,656	10							
721 707V	Beatty Road	22.3	Davidson	2,851	11							
721 678M	Moore Avenue	28.4	Mooresville	1,590	12							
721 755K	Everett Keith Rd.	11.6	Huntersville	497	13							
715 376W	Moretz Avenue	2.3	Charlotte	1,875	14							
726 267Y	Sam Furr Rd. (1)	17.0	Huntersville	16,852	15							
721 711K	Catawba Street	21.2	Davidson	1,415	16							
721 704A	Bridges Farm Rd.	23.2	Iredell Co	Est. < 100	17							
715 380L	Atando Avenue	3.0	Charlotte	4,600	18							
721 732D	McCord Road	16.6	Huntersville	4,984	19							
721 685X	Brawley Avenue	27.5	Mooresville	4,749	20							
721 741C	Hntrsvlle/Concord	14.9	Huntersville	4,400	Complete							
721 710D	Depot Street	21.5	Davidson	159	22							
715 374H	Woodward Ave.	2.0	Charlotte	3,941	23							
730 127D	Racine Avenue	5.0	Charlotte	518	24							
721 692H	Foursquare Road	26.3	Iredell Co	338	25							
721 738U	Ramah Ch. Road	15.6	Huntersville	2,010	Complete							
730 131T	Nevin Road (1)	6.0	Charlotte	6,400	27							
721 697S	Fairview Road	25.0	Iredell Co	2,817	Complete							

 Table 6

 PUBLIC CROSSINGS RECOMMENDED FOR GATES OR GATES & FLASHERS

PUBLIC CR	PUBLIC CROSSINGS RECOMMENDED FOR GATES OR GATES & FLASHERS												
Xing	Xing Street Name		Street Name 'O' Line Location										
Number		Milepost											
721 756S	Eastfield Road	11.2	Charlotte	12,200	29								
721 674K	Patterson Street	29.0	Mooresville	1,127	Complete								
721 696K	Crossrail Road	25.4	Iredell Co	581	31								
730 143M	Bob Beatty Rd. N.	10.2	Charlotte	Est. < 100	32								
721 759M	Hucks Road	10.5	Charlotte	1,757	33								
730 138R	Henderson Road	8.5	Charlotte	Est. < 100	34								
730 140S	David Cox Road	9.5	Charlotte	3,475	35								
721 621L	Statesville Ave.	29.2	Mooresville	8,005	36								

 Table 6

 PUBLIC CROSSINGS RECOMMENDED FOR CATES OR CATES & FLASHERS

(1) Existing Cantilevered Flashers

Estimated Cost: \$3,200,000.

Railroad grade crossing safety devices are improved nationwide under the USDOT's <u>Crossing Hazard Elimination Program</u>. Under this program, federal funds pay 90% of the costs associated with installation of automatic warning devices and the road maintenance agency (municipality or state in North Carolina) pays the remaining 10%. The installation of automatic warning devices at 32 remaining public crossings along the 'O' Line would simply overwhelm the North Carolina program. For example, there is only one (1) such project listed for all of Division 10 which includes Mecklenburg, Union, Cabarrus, Stanley and Anson counties in the 2004-2010 Transportation Improvement Program. The actual installation of the devices is typically done by the operating railroad, in this case, Norfolk Southern. Construction time is in the 6-9 month range per installation.

(Prior to implementing passenger service along the 'O' Line, automatic warning devices should be in place and operational at all public crossings. For this to occur, CATS, the NCDOT and the NS will have to negotiate a special arrangement to fund and install the devices).

This is a near-term recommendation.

D. Other Recommended Street Improvements

Additional roadway improvements will be needed in order to implement some of the various recommendations described above. The proposed improvements are described in more detail following the table.

<u>RECOMMENDED FUBLIC STREET IMPROVEMENTS</u>											
Xing No.	Street Name	Milepost	Location	Improvements							
715 361G	Spratt St	1.3	Charlotte	Cul-de-sac (1)							
715 362N	Statesville Ave.	1.35	Charlotte	Median Separator (2)							
715 374H	Woodward Ave.	2.0	Charlotte	Demolish Bride/Fill Cut (3)							
730 130L	Gibbon Rd	5.7	Charlotte	3-lane Crossing (4)							
730 131T	Nevin Rd.	6.0	Charlotte	Close Derita Ave. (5)							
730 138R	Henderson Rd.	8.5	Charlotte	Lengthen WB Approach (6)							
730 140S	David Cox Rd	9.5	Charlotte	Intersection w/NC 115 (7)							
721 759M	Hucks Rd	10.5	Charlotte	Widen/Add Turn Lane (8)							
721 756S	Eastfield Rd	11.2	Charlotte	Widen Xing/Shoulders (9)							
726 267Y	Sam Furr Rd	17.0	Huntersville	Widen/Add Turn Lane (10)							
721 723E	Bailey Rd	18.7	Cornelius	Intersection w/NC 115 (11)							
721 716U	Smith St	19.6	Cornelius	Relocate Church Drive (12)							
721 700X	Langtree Rd.	24.4	Iredell Co.	Relocate Xing/Const. New							
				Intersection w/ 115 (13)							
721 697S	Fairview Rd	25.0	Iredell Co	Widen/Med. Separator (14)							

Table 7RECOMMENDED PUBLIC STREET IMPROVEMENTS

(1) In order to close Spratt Street, access improvements for the residential property west of the crossing will be required. A cul-de-sac is recommended to access residential driveways. This is a <u>mid-term recommendation</u> and should not be implemented until such time as a determination is made concerning several houses located very near the existing track. It may be that the houses will have to be moved or demolished.

Estimated Cost: \$50,000.

(2) Statesville Avenue in Charlotte is a five-lane roadway with a wide (16 feet) center twoway left-turn lane. In order to prevent motorists from driving around lowered crossing gates, a median separator is recommended. The median separator should extend at least 100 feet on each side of the crossing along Statesville Avenue. This is a <u>near-term</u> recommendation.

Estimated Cost: \$15,000.

(3) **Woodward Avenue** in Charlotte overpasses a long-abandoned spur track off the 'O' Line that served a large industrial complex in times past. The bridge contributes to poor sight distance at the 'O' Line crossing that is just to the east of the bridge. It is recommended that the bridge be demolished and the large cut area beneath the bridge be filled and the roadway replaced. This is a <u>long-term recommendation</u>.

Estimated Cost: \$175,000. The cost for automatic warning devices is included in XVI. C. above.

(4) Gibbon Road in Charlotte is a two-lane crossing currently protected with gates and flashers. The crossing was evaluated along with the nearby intersections of Maple Street and Sugar Creek Road and Gibbon Road and Derita Avenue, to determine if other roadway or signalization improvements were warranted. Based upon this analysis, which is more fully described in Appendix I, Maple Street is recommended to be closed at the railroad, the intersection of Gibbon Road and West Sugar Creek Road is recommended to be signalized and Gibbon Road should be widened from West Sugar Creek Road to 500 feet west of Derita Avenue. Furthermore, it is recommended that the recently installed gates and flashers at the Maple Street crossing be relocated to the improved Gibbon Road Crossing. This is a <u>mid-term recommendation.</u>

Estimated Cost: \$300,000.

(5) Nevin Road in Charlotte in intersected by Derita Avenue just west of the railroad crossing. This situation causes conflicting turning movements and prevents northbound motorists on Derita Avenue from observing northbound trains approaching from their rear. It is recommended in the <u>mid-term</u>, that Derita Avenue be closed at Nevin Road.

Estimated Cost: \$30,000.

(6) Henderson Road in Charlotte is planned to serve as the westerly terminus of a Minor Thoroughfare extending from Sugar Creek Road. This report recommends that the Oak Drive and Pete Brown Road crossings south of Henderson be closed and connected to Henderson Road via a parallel roadway on the east side of the track. In addition to gates and flashers, roadway improvements including an improved crossing and an extended queue distance on the westbound approach should be constructed. The gates and flashers should be installed in the <u>near-term</u> while the roadway improvements are recommended <u>mid-term.</u>

Estimated Cost (roadway only): \$100,000.

(7) David Cox Road in Charlotte is a two-lane crossing protected by flashers. Field observations reveal that the crossing is impacted from traffic backing up from the Old Statesville Road/NC 115 intersection and causing traffic to queue over the track. Congestion at the crossing in the afternoon is also the result of train operations switching cars in and out of Florida Steel, which has a spur track that begins just south of the crossing. Additional analysis, which is more fully described in Appendix I, was conducted at this intersection to determine if other improvements might be warranted. Based upon this analysis, it is recommended that the intersection of David Cox Road and NC 115 be signalized. New gates and flashers as contained in Table 6 above, will also be required at the crossing. This is a <u>mid-term recommendation</u>.

Estimated Cost: \$40,000.



(This intersection was analyzed by Post, Buckley, Shue and Jernigan as part of the City of Charlotte's project to widen and improve Old Statesville Road [NC 115] from Statesville Avenue [US 21] to north of Harris Boulevard. PBS & J recommended left-turn lanes on all approaches as well as an additional through lane in each direction on NC 115. The City elected to eliminate this part of the project due to the right-of-way issues described above).

(8) Hucks Road is a narrow two-lane crossing protected by crossbucks. The queue distance to Old Statesville Road is approximately 200 feet. However, the area is experiencing significant development with farmland becoming residential. It is recommended that 4foot shoulders be added to the roadway from 100 feet east of the crossing to NC 115 in addition to gates and flashers as contained in Table 6 above. This is a <u>near-term</u> recommendation.

Estimated Cost: \$20,000.

(9) Eastfield Road is a rural two-lane crossing in a rapidly developing area with evidence of vehicles running off the shoulder near the crossing. Flashers currently protect the crossing. It is recommended that 4-foot paved shoulders be added for 100 feet on each side of the crossing in addition to gates and flashers as contained in Table 6 above. This is a <u>near-term recommendation</u>.

Estimated Cost: \$20,000.

(10) Sam Furr Road in Huntersville is designated as NC 73 and is a major thoroughfare providing connectivity between Lincolnton and the Concord/Kannapolis area. As a result, there is significant traffic on the road, including heavy trucks, as evidenced by field observations and traffic counts. Field observations indicate that traffic frequently backs up from the NC 115 intersection and queues over the track. As indicated in section VIII. K. 5 above, three legs of the intersection are being improved by the NCDOT under project U-2360T. It is recommended that the westbound approach be widened to provide a 200-foot left-turn lane with a 4-foot median separator. The implementation of this recommendation will require that the existing cantilevered flashers be relocated. As shown in Table 6 above, gates are also recommended for this crossing. This is a <u>mid-term recommendation</u>.

Estimated Cost: \$165,000.

(11) **Bailey Road** is a narrow two-lane road serving scattered residential units on large lots. The westbound approach to the crossing is on a substantial up-grade resulting in poor visibility for motorists to both the railroad and the intersection of NC 115. The queue distance at the crossing is approximately 25 feet. The Town of Cornelius has constructed a major park with a future aquatic center in the southeast quadrant of the crossing. It is

recommended that the crossing be improved to provide a left-turn lane to southbound NC 115 with a 4-foot median separator, that the remaining three legs of the intersection with NC 115 be improved to add left-turn lanes and that gates and flashers be installed at the crossing as contained in Table 6 above. Proposed frontage roads connecting to Bailey Road will allow five (5) private crossings north and south of Bailey to be closed. This is a <u>mid-term recommendation</u>, however, the park opened in the summer of 2002. The gates and flashers, as contained in Table 6 above, at a minimum, should be installed and operational prior to the introduction of rail passenger service.

Estimated Cost: \$400,000.

(For special events at the park with high attendance, such as a swim meets, pending crossing and intersection improvements, police officer control at the crossing may be warranted depending on the rail activity at the time).

(The NCDOT has improved the Bailey Road/NC 115 intersection; however, these improvements do not reduce the need for the above recommendation).

(12) **Smith Street** in Cornelius is a narrow crossing with only 25 feet of queue distance. It serves a mixture of institutional, commercial and residential properties but the traffic volume is relatively low. In addition to gates and flashers as contained in Table 6 above, it is recommended that the church driveway on the east side of the crossing be relocated further to the east to reduce turning movement conflicts at the crossing; that the crossing be widened; and that further engineering analysis determine the feasibility of adding a left-turn lane on southbound NC 115. This is a <u>near-term recommendation</u> in that the crossing should be widened and the church driveway relocated at the same time as the installation of gates and flashers occurs.

Estimated Cost: \$40,000.

(13) Langtree Road in Iredell County is a badly skewed and humped crossing that is offset approximately 100 feet to the north of the Hobbs Road intersection with NC 115. This offset results in conflicting left-turn maneuvers. It is recommended that Langtree Road be relocated to intersect NC 115 opposite Hobbs Road; that it cross the 'O' Line at 90 degrees; and that left-turn lanes into both Langtree and Hobbs roads be added on NC 115. This recommendation will also require that the profile of NC 115 be raised in order to reduce the hump at the grade crossing. Raising the profile of the road is feasible in this area due to the existing topography and the lack of development. The existing gates and flashers are to be relocated as part of this recommendation. This is a long-term recommendation. However, prior to implementing this recommendation, a more thorough analysis of long-range transportation facility needs in the area should be undertaken. Langtree has been proposed at one time as part of the Davidson/Cornelius Bypass but the Town of Mooresville's Thoroughfare Plan places it further south along NC 115. There is now a proposed interchange with I-77 to provide access into the

Lowe's facilities and to reduce the stress at Exits 33 and 36. All of these options should be examined before a commitment of transportation resources is made. *The Mount Mourn Volunteer Fire Department has recently moved into new facilities in the northeast quadrant of the NC 115/Hobbs Road intersection. The building elevation was set in anticipation of a grade change along NC 115.*

Estimated Cost: \$720,000.

(14) Fairview Road in Iredell County (Mt. Mourne) is experiencing traffic growth due to the recent opening of a regional medical center west of the crossing near I-77. Also, Lowe's Corp. has opened its headquarters on Fairview Road near I-77. The facility is still expanding with several thousand jobs being brought to the area.

The road east of the crossing has been relocated to accommodate expansion on an adjacent church, which owns the land on both sides of the road. This relocation has skewed a crossing that was previously at 90-degrees. The church also had a driveway that entered Fairview Road just east of the crossing. As a result of this study the driveway has been moved further to the east outside of railroad right-of-way. It is recommended that the crossing be widened and a median separator installed in addition to the gates and flashers contained in Table 6 above. This is a <u>near-term</u> recommendation.

The gates and flashers have been installed as of April 2004; however, the median separator was not installed as part of the project.

Estimated Cost: \$30,000.

E. Other Long -Term Recommendations

1. Racine Avenue in Charlotte

On the west side of the track, Racine Avenue extends southerly and parallel to the railroad from its crossing of the track at Milepost O-5.0. This parallel road could be extended further south to connect with Allan Road South, thus allowing the Racine Avenue crossing to be closed. The only problem with the proposed extension is the KDH Transportation Co., which fronts on Allan Road S., has fenced a portion of the railroad right-of-way for its operations. As rail passenger operations increase, this road extension and crossing closure may be warranted at some future date.

2. Christenbury Road in Charlotte

To correct the problem associated with the hump and inadequate queue distance at this crossing requires that a significant portion of the railroad be shifted eastward or else the grade of Gibbon Road will need to be raised. Shifting the track may involve as much as a mile of track and a cost that could reach \$1,000,000. Given

the low volume of traffic over the crossing, this amount of expenditure cannot be justified. Raising the grade of Gibbon Road is feasible; however, it will involve the construction of retaining walls adjacent developed property as well as the reconstruction of possibly two neighborhood street entrances to property west of Gibbon. It is recommended that the crossing continue to be monitored long-term, and that if adequate access to the area should develop that satisfies the concerns of the Charlotte Fire Department, which accesses the area from the Gibbon Road end, then the crossing should be closed.

3. Public Agency Oversight

All public agencies involved in the land development review and approval process should be diligent in their efforts to close and consolidate crossings, both public and private, as new development projects are proposed and constructed along the 'O' Line.

X. RECOMMENDATIONS WITHOUT PASSENGER SERVICE

Should it be decided that rail passenger service is not a viable option for the 'O' Line corridor, there are recommended closures and safety/roadway improvements to specified grade crossings that should be considered. These recommendations are further identified as follows:

1. Atando Avenue/Milepost O-3/Charlotte

Atando Avenue is scheduled to become a Minor Thoroughfare with the extension of Asbury Avenue (which connects to Atando) to Statesville Avenue and I-77. It is anticipated that Atando/Asbury will become a prime truck route carrying traffic between N. Tryon Street (US 29/NC 49) and I-77. Future traffic volumes are projected to reach 10,000 vehicles per day. It is recommended that the automatic warning devices (add gates and replace flashers) as described in IX. C above be installed. *The flashers were replaced under the recently completed project, however, gates were not installed*.

Estimated Cost: \$130,000.00 - Near-term.

2. Toal Street/Milepost O-3.1/Charlotte

The Toal Street crossing is severely humped, has less than 20 feet of queue distance and is protected by flashers only. The total traffic volume at the crossing is less than 1800 vehicles per day and adequate, alternative access is available. It is recommended that Toal Street be closed as described in **Section IX. A. 2 above**.

Estimated Cost: \$7,500.00 - Near-term.

3. I-85 Service Road North/Milepost O-4.2/Charlotte

This crossing has had six (6) recorded accidents over the last 10 years, the most of any crossing along the railroad. Gates should be added to the crossing to supplement the existing cantilevered flashers.

Estimated Cost: \$100,000.00 - Near-term

4. Maple Street/Milepost O-5.5 & Gibbon Road/Milepost O-5.7/Charlotte The level of service inadequacies for these two crossings warrants the implementation of the roadway and safety system modifications as described above under Section IX. A. 4. & D. (4).

Estimated Cost: \$307,500.00 - Mid-term.

5. Nevin Road/Milepost O-6.0/Charlotte

Nevin Road is projected to carry 14,800 vehicles per day in the future. It is recommended that the upgrade of the automatic warning devices to include new gates and flashers be programmed. Also, Derita Avenue, which intersects Nevin just west of the crossing, should be closed at Nevin Road.

Estimated Cost: \$100,000.00 – Add Gates <u>Near-term.</u> Estimated Cost: \$20,000.00 – Close Derita Avenue <u>Mid-term.</u>

6. Eastfield Road/Milepost O-11.2/Charlotte

Eastfield is projected to carry over 17,000 vehicles in the future. And as a matter of fact, the traffic count taken for this report showed a considerable jump in traffic volume in just one year. It is recommended that the automatic warning devices as described in **Section XVI. C** along with the widening of the crossing be programmed for implementation.

Estimated Cost: \$120,000.00 - Near-term.

7. Dellwood Road/Milepost O-14.5/Huntersville

This crossing is severely humped with the high likelihood of a vehicle becoming hung on the crossing. This crossing should be closed as recommended above in section IX. A. 9.

Estimated Cost: \$2,500.00 Near-term.

8. Sam Furr Road (NC 73)/Milepost O-17.0/Huntersville

Sam Furr Road currently carries almost 17,000 vehicles per day and is projected to carry over 32,000 in the future (2025). Traffic queues over the crossing frequently. The recommended improvements as described above in section IX. D. (10) should be implemented including the installation of crossing gates.

Estimated Cost: \$265,000.00 - Mid-term.

9. Caldwell Station Road/Milepost O-17.6 & Mayes Road/Milepost O-17.9/Huntersville

The existing Caldwell Station crossing is humped and has inadequate queue distance. The Mayes Road crossing is severely humped and has inadequate queue distance. The proposed new Caldwell Station Crossing at Milepost O-17.5 should be constructed and both of the existing crossings closed as described in section IX. A. 11& 12 and B. 4 above.

Estimated Cost: \$550,000.00 - Mid-term.

10. Bailey Road/Milepost O-18.7/Cornelius

Bailey Road is shown on the Mecklenburg/Union Thoroughfare plan as a Minor Thoroughfare projected to carry 12,000 vehicles per day in the future. The Town of Cornelius has opened a major park in the southeast quadrant of Bailey Road and the railroad with more facilities to be added. The crossing should be improved as recommended in section IX. D. (11).

Estimated Cost: \$500,000.00 - Mid-term.

11. Zion Street/Milepost O-20.1/Cornelius

At such time as Catawba Avenue is extended to cross the railroad at Milepost O-20 and as described above in section IX. B. 5, the Zion Street crossing should be closed.

Estimated Cost: \$4,000.00 - Mid-term.

12. Delburg Street/Milepost O-21.7/Davidson

This crossing has low traffic volume and has significant sight obstructions caused by foliage, topography and buildings. It is recommended that the crossing be closed as described above in section IX. A. 15.

Estimated Cost: \$10,000.00 - <u>Near-term.</u>

13. Langtree Road/Milepost O-24.4/Iredell County

Due to the severe conditions that exist at this crossing, the recommended improvements as described above in section IX. D. (13) should be implemented.

Estimated Cost: \$720,000.00 - Long-term.

14. Doster Avenue/Milepost O-27.3 – Mills Avenue/Milepost O-27.6 – Catawba Avenue/Milepost O-28 & Walnut Avenue/Milepost 28.9/Mooresville The Town of Mooresville has 13 grade crossings of the railroad occurring in just 1.9 miles of track, or a crossing every 0.15 miles. These four (4) crossings were recommended for closure either because of a severe humped condition, a sight distance problem or because of low traffic volume. It is recommended that all four crossings be closed as described above in section IX. A. 16-19.

Estimated Cost: \$23,000.00 - Near-term.

Total estimated costs to implement the recommendations for grade crossing improvements **without** rail passenger service is:

- <u>Near-term recommendations</u> \$493,000.00.
- <u>Mid-term recommendations</u> \$1,646,500.00.
- <u>Long-term recommendations</u> \$720,000.00.
- TOTAL ESTIMATED COST \$2,759,500.00.

PRIVATE CROSSINGS

XI. CROSSING SUMMARY

The 42 private crossings provide access to land uses as follows:

- 1. Residential 27
- 2. Industrial 9
- 3. Farm 6

Private crossings exist through an agreement, either written or otherwise, between the railroads, in this case Norfolk Southern, and the property owners. NS has indicated that documented agreements exist between the railroad and property owners at 11 of the 42 crossings. Furthermore, the railroad states that while these agreements exist in the railroad archives, very few, if any, have been recorded. It is safe to assume that most of the properties utilizing a private crossing have changed ownership several times during the 140+ years of the railroad's existence. Some of the driveways that are now crossings could have existed prior to the construction of the railroad.

XII. PRIVATE CROSSING RECOMMENDATIONS

In order to implement some of the recommendations described below, significant negotiations will have to occur between the owner of the railroad track/right-of-way and the property owner of record for each crossing. In other cases, where minor improvements or minor safety upgrades are warranted, such as clearing a foliage sight



obstruction or installing crossbucks or stop signs, the crossing owner may elect to initiate on his/her own accord. In cases where the consolidation of several private crossings at a new public crossing is warranted, a substantial expenditure of public funds will be required.

All costs associated with the recommendations are shown on the spreadsheet that follows at the end of this report on Pages 62 & 63. All recommendations assume passenger service.

1. Charlotte Crossings

The 10 private crossings in the Charlotte portion of the study serve mostly industrial land uses south of the Derita community. From Derita north, the crossings serve homes and farms.

a) **Crossing # (not available)/Milepost O-1.8** – this was an industrial crossing that was constructed at the same time as the surrounding industrial plants were constructed in the 1930's. The crossing is currently closed and fenced on both sides of the track. It is recommended that it be removed as part of the track upgrade project prior to the implementation of passenger service.

b) **Crossing # (not available)/Milepost O-2.7** – this crossing serves Blythe Industries Inc. operations on N. Graham Street. The crossing has a foliage sight obstruction that should be cleared prior to the implementation of passenger service. This is a <u>near-term</u> recommendation. This 37-acre parcel also has access to Asbury Avenue, which is being improved by the City of Charlotte, as previously described in this report. As a <u>mid-term</u> recommendation, the City should pursue closing this crossing and provide adequate alternative access to/from Asbury Avenue.

c) **Crossing #715 379S/Milepost O-2.7** – this crossing serves the loading dock of a mostly vacant chemical plant located adjacent N. Graham Street, Asbury and Atando Avenues. The crossing has a significant sight obstruction caused by the building. The property has access to Asbury Avenue. As a <u>mid-term</u> recommendation, the City should pursue closing this crossing and work with the property owner to make internal changes to allow loading dock access to Asbury Avenue.

d) **Crossing #715 386G/Milepost O-3.3** – this crossing serves NC Equipment Company, a supplier of heavy equipment to the construction industry. The crossing should receive, in the <u>near-term</u>, crossbucks and stop signs prior to the implementation of passenger service. This crossing is of greater concern than most in that slow-moving, low-boy trucks carrying very heavy equipment use the crossing routinely. With the implementation of passenger service, an educational effort will be required to train drivers of these trucks not to pull onto the track while waiting to enter the flow of traffic on N. Graham Street. In the <u>long-term</u>, the crossing should be monitored and should an accident problem develop,

alternative access or gates and flashers may be required to deal with the situation.

e) **Crossing #910 582U/Milepost O-5.2** – this crossing serves the Bonded Warehouse facilities off N. Graham Street. It has poor sight distance on all approaches due to heavy foliage along the railroad track. It is protected by crossbucks and stop signs. It is recommended in the <u>near-term</u> that the foliage be cleared in all four (4) quadrants of the crossing. Furthermore, it should be monitored <u>long-term</u> for any accident problems that may develop following the implementation of passenger service.

f) **Crossing #730 128K/Milepost O-5.3** – this crossing serves a singlefamily residential unit on just over two acres of land. The crossing is protected by crossbucks; however, supplemental stop signs are recommended in the <u>near-term</u> due to a sight obstruction caused by foliage along the track. The crossing should be monitored <u>long-term</u>, and should a safety problem develop, consideration should be given to purchasing the property and closing the crossing. (It is possible that this parcel may be purchased by the private sector and incorporated into a larger tract to the rear that accesses Maple Street).

g) **Crossing #904 214R/Milepost 6.5** – this crossing serves a singlefamily residential unit with access to Gibbon Road. It is recommended that it be closed <u>near-term</u>, and that a new driveway be constructed to connect the house to Starmount Avenue that connects to Christenbury Road.

h) **Crossing #730 134N/Milepost O-7.5** – this crossing currently provides access to four (4) tracts of land consisting of almost 60 acres currently being used for farm purposes. The crossing is badly humped and has very little queue distance between the track and Gibbon Road. In the <u>near-term</u>, the crossing should receive crossbucks and supplemental stop signs prior to the initiation of passenger service. In the <u>long-term</u>, the property should be monitored and if it comes under development, alternative access to the land should be explored.

i) **Crossing #721 758F/Milepost O-10.8** – this crossing currently serves a farming operation. The crossing is relatively flat and has adequate queue distance between the track and Arthur Davis Road. <u>Near-term</u>, it should receive crossbucks and supplemental stop signs prior to the initiation of passenger service. In the <u>long-term</u>, should the property come under development, alternative access to either Hucks Road or Eastfield Road should be explored.

j) **Crossing #721 757Y/Milepost O-11.1** - this crossing currently serves a farming operation. The crossing is relatively flat and has adequate queue distance between the track and Arthur Davis Road. <u>Near-term</u>, it should receive crossbucks and supplemental stop signs prior to the initiation of passenger service. In the <u>long-term</u>, should the property come under development, alternative access to either Hucks Road or Eastfield Road should be explored.

2. Huntersville Crossings

Of the 15 private crossings located in or near Huntersville, all serve as residential access except one, which serves a farm and one which accesses a residence and a Duke Power substation. An agreement for this latter crossing exists with Duke Power.

a) The eight (8) private crossings south of Huntersville between Everett Keith Road (Milepost O-11.6) and Church Street (Milepost O-13.8) can all be consolidated into two (2) new public crossings located at Hambright Road Extension/Milepost O-12.6 and Damson Drive Extension/Milepost O-13.1. The eight (8) crossings, beginning with #721 754D/Milepost O-12.4 and ending with #721 747T/Milepost O-13.3, all serve either residential or farming operations except one (#721 749G/Milepost O-13) which provides access to a Duke Power substation as well as a residential unit. Several of the crossings are humped and all of them have enough queue distance between the track and NC 115 for only one vehicle. It is recommended that the two new public crossings be constructed, that a parallel roadway be constructed on the east side of the track and that the six (6) remaining private crossings be removed (two of the private crossings are located where the new public roads would cross). This is a mid-term recommendation. All of the crossings should receive crossbucks and supplemental stop signs in the near-term prior to the implementation of passenger service.

b) Five (5) of the private crossings north of Huntersville can be consolidated into a new public crossing for Stumptown Road Extension located at Milepost O-16.05 and the construction of a parallel roadway on the eastside of the track. The five (5) crossings extend from **#721 737M/Milepost O-16 to #721 733K/Milepost O-16.3**. Four (4) of the crossings serve residential land uses while the fifth one serves an industry. All of the crossings are humped to some extent and most have a sight obstruction caused by either foliage or a building. Portions of the parallel roadway already exist. It is recommended <u>mid-term</u>, that Stumptown Road extension at Milepost O-16.05 be constructed, that the remainder of the parallel road be constructed on the east side of the track and that the five (5) crossings be removed. In the <u>near-term</u>, all crossings should receive crossbucks and supplemental stop signs coincident with the implementation of rail passenger service.



FIGURE 19 – CORRIDOR SOUTH OF HUNTERSVILLE

c) The two (2) remaining crossings (#721 730P/Milepost O-17.1 & #721 729V/Milepost O-17.3) are north of Sam Furr Road and both serve single-family residential units. Both are humped somewhat and #721 729V has queue distance for one vehicle at a time. It is recommended that a parallel roadway be constructed on the east side of the track connecting both driveways to Sam Furr Road and that the two crossings be closed. This is a <u>mid-term</u> recommendation. In the <u>near-term</u>, both crossings should receive crossbucks and supplemental stop signs coincident with the implementation of rail passenger service.

3. **Cornelius Crossings** – the seven (7) private crossings in or near Cornelius all serve residential properties.

a) Five (5) private crossings south of Cornelius can be closed and consolidated into the Bailey Road crossing #721 723E/Milepost O-18.7 by the construction of a parallel roadway on the east side of the track. The five (5) crossings, beginning with #721 726E/Milepost O-18.2 and ending with #721 721J/Milepost O-19, are somewhat humped and have queue distance for only one vehicle. Most of the crossings have a foliage sight obstruction. It is recommended in the <u>mid-term</u>, that a parallel roadway be constructed and extend north and south of the Bailey Road crossing to allow closure and consolidation of the crossings. As previously described in this report, the Town of Cornelius has plans to construct a park in the southeast quadrant of the crossing. The preliminary park plans anticipate a connecting roadway from Bailey Road through the park to connect to property south of the park along the railroad. These plans will need to be considered in determining the final alignment for the parallel roadway south of Bailey Road. In the <u>near-term</u>, crossbucks and

supplemental stop signs should be installed at all crossings prior to the implementation of passenger service.



FIGURE 20 - CORRIDOR SOUTH OF CORNELIUS

b) **Crossing #721 718H/Milepost O-19.3** – again a humped crossing with minimal queue distance and a sight obstruction caused by foliage. The crossing serves three (3) residential properties. Zion Street, which parallels the railroad on the east side of the track, extends to within 300 feet of the northernmost parcel served by the crossing. It is recommended that Zion Street be extended to serve all three properties and that the crossing be closed. This is a <u>mid-term</u> recommendation. In the <u>near-term</u>, crossbucks and supplemental stop signs should be installed at the crossing prior to the introduction of passenger service.

c) **Crossing #904 370C/Milepost O-20.5** – this is an isolated crossing serving a residential property that is 0.4 miles from the nearest public crossing. As far as private crossings go, this one is one of the better ones in that it is not humped and has adequate queue distance. However, it has a foliage sight obstruction. In the <u>near-term</u>, crossbucks and supplemental stop signs should be installed and the foliage cleared at the crossing prior to the introduction of passenger service. In the <u>long-term</u>, additional development north and east of the crossing may allow for this property to receive access from a public street and thereby, allow the crossing to be closed.

4. **Iredell County** – of the 10 private crossings in Iredell County, five (5) are providing residential access, three (3) are providing access to industrial land uses and two (2) are providing access to farms. Two of the industrial crossings, Quality Street (721 699F) and Shu Lane (721 698Y), are providing access to more than one property.

a) **Crossing #721 706N/Milepost O-22.5** – this is a gated and locked crossing providing access to transmission pipeline regulating station. The crossing is somewhat humped but has adequate queue distance. No improvements or modifications are recommended.

b) **Crossing #721 706G/Milepost O-**23 – this is an isolated residential crossing that is only slightly humped and has adequate queue distance. In the <u>near-term</u>, crossbucks and supplemental stop signs should be installed at the crossing prior to the introduction of passenger service. In the <u>long-term</u>, new development connecting to Bridges Farm Road approximately 0.5 miles north, may allow the crossing to be closed.

c) Crossing #721 703T/Milepost O-23.4 – this crossing serves a farming operation, is somewhat humped but has adequate queue distance for its present use. In the <u>near-term</u>, crossbucks and supplemental stop signs should be installed at the crossing prior to the introduction of passenger service. In the <u>long-term</u>, new development connecting to Bridges Farm Road approximately 0.2 miles south, may allow the crossing to be closed.



FIGURE 21 – CORRIDOR SOUTH OF MOORESVILLE

d) **Crossing #721 702L/Milepost O-23.8** – this is a gated and locked crossing serving a farming operation. The crossing is somewhat humped but has adequate queue distance for its present operation. No improvements or modifications are recommended.

e) Crossing #321 701E/Milepost O-24 – this crossing serves a singlefamily residential structure. It is somewhat humped but has adequate queue distance for current operations. In the <u>near-term</u>, crossbucks and supplemental stop signs should be installed at the crossing prior to the introduction of passenger service. In the <u>long-term</u>, new development connecting to Langtree Road approximately 0.4 miles north, may allow the crossing to be closed.

f) Crossing #721 699F/Milepost O-24.6/Quality Lane – this crossing, which is adjacent the Mt. Mourne Volunteer Fire Department, serves several industrial properties on the west side of the track. The crossing is protected by one crossbuck, is generally flat and has adequate queue distance. However, a building and the water tower for the fire station obscure sight distance. In the <u>near-term</u>, it is recommended that an additional crossbuck be installed at the crossing along with supplemental stop signs. In the <u>long-term</u>, should additional industrial development take place west of the crossing, the installation of automatic warning devices may be warranted.

g) Crossing #721 698Y/Milepost O-24.7/Shu Lane (now East Campus Lane) – this crossing serves a large industrial complex on the west side of the track as well as the main campus of Lowe's Corporation corporate headquarters. It is flat and has good queue distance. *Shu Lane is now a driveway to a single family residence. A paved private roadway named East Campus Lane with gates and flashers installed at the grade crossing has been constructed. All costs associated with the grade crossing improvements were between Lowe's Corp. and NS.*

h) Crossing #721 694W/Milepost O-26.1 & #721 693P/Milepost O-26.1 – these crossings serve single-family residential properties and are so close together as to have essentially the same milepost designation. Both are humped but have adequate queue distance for current operations. Sight distance is somewhat obscured by heavy foliage. In the <u>near-term</u>, both crossings should receive crossbucks and supplemental stop signs. In the <u>mid-term</u>, both crossings should be connected to Four Square Road via a parallel roadway constructed on the west side of the track and extending north for approximately 0.2 miles.

i) Crossing #721 691B/Milepost O-26.6 – this is a gated crossing serving farming operations. The crossing is also protected by crossbucks, is relatively flat and has adequate queue distance. There are no recommended improvements at this time. In the <u>long-term</u>, the crossing will be replaced by a new public crossing as part of the extension of Timber Road westerly to connect NC 115 to US 21. (Timber Road currently intersects NC 115 opposite the crossing).



FIGURE 22 – PROPOSED TIMBER ROAD EXTENSION AT MP O-26.6

5. Davidson and Mooresville

There are no private crossings located either within or near the towns of Davidson and Mooresville.

XIII. COSTS SUMMARY

The estimated costs to implement the above recommendations are shown on the evaluation spreadsheet that follows on Pages 62 & 63. Costs are also summarized on Page 65. The costs as shown are in present day dollars. No attempt has been made to inflate costs to reflect future anticipated construction dates. The costs are further broken down to location and type of recommended modification or improvement as follows:

A. Charlotte-All Crossings - \$2,757,650.00.

Public Crossings - \$2,739,000.00.

- a) Close crossings \$619,000.00.
- b) Roadway improvements only \$190,000.00.
- c) Roadway & automatic warning devices \$800,000.00.
- d) Automatic warning devices \$1,050,000.00.
- e) Traffic Signals \$80,000.00.

Private Crossings - \$18,650.00.

- f) Close crossings \$7,500.00.
- g) Clear sight obstructions \$9,000.00.
- h) Enhance/install warning devices \$2,150.00.

B. Huntersville-All Crossings - \$2,783,500.00.

Public Crossings - \$1,925,000.00.

- a) Close crossings \$85,000.00.
- b) New public crossings \$1,160,000.00.
- c) Roadway & automatic warning devices \$265,000.00.
- d) Automatic warning devices \$415,000.00.

Private Crossings - \$858,500.00.

- e) Close and connect to new public crossings \$851,000.00.
- f) Near-term safety devices pending closure \$7,500.00

C. Cornelius-All Crossings - \$1,841,500.00.

Public Crossings - \$1,296,500.00.

- a) Close crossings \$6,500.00.
- b) New public crossing \$650,000.00.
- c) Roadway & automatic warning devices \$640,000.00.

Private Crossings - \$545,000.00.

- d) Close and connect to new/existing public crossings \$540,000.00
- e) Enhance warning devices \$500.00.
- f) Near-term safety devices pending closure \$4,500.00.

D. Davidson-All Crossings - \$310,000.00.

Public Crossings - \$310,000.00.

- a) Close crossings \$10,000.00.
- b) Automatic warning devices \$300,000.00.

E. Iredell County-All Crossings - \$1,168,000.00.

Public Crossings - \$1,045,000.00.

- a) Roadway & automatic warning devices \$845,000.00.
- b) Automatic warning devices \$200,000.00.

Private Crossings - \$123,000.00.

- c) Close and connect to public crossing \$120,000.00.
- d) Enhance warning devices \$2,000.00.
- e) Near-term safety devices pending closure \$1,000.00.

F. Mooresville-All Crossings - \$523,000.00.

Public Crossings - \$523,000.00.

- a) Close crossings \$23,000.00.
- b) Automatic warning devices \$500,000.00.

XIV. COSTS SUMMARY BY IMPLEMENTATION SCHEDULE

The above costs are further broken down and summarized into <u>near-term</u>, <u>mid-term</u> and <u>long-term</u> recommendations.

1. Cost of Near-term Recommendations

- a) Charlotte Public Crossings \$1,644,000.00.
- b) Charlotte Private Crossings \$16,150.00.
- c) Huntersville Public Crossings \$525,000.00.
- d) Huntersville Private Crossings \$7,500.00.
- e) Cornelius Public Crossings \$240,000.00.
- f) Cornelius Private Crossings \$5,000.00.
- g) Davidson Public Crossings \$310,000.00.
- h) Iredell County Public Crossings \$325,000.00.
- i) Iredell County Private Crossings \$3,000.00.
- j) Mooresville Public Crossings \$523,000.00
- k) TOTAL NEAR-TERM ESTIMATED COSTS = \$3,598,650.00.

2. Cost Mid-term Recommendations

- a) Charlotte Public Crossings \$920,000.00.
- b) Charlotte Private Crossings \$2,500.00.
- c) Huntersville Public Crossings \$1,400,000.00.
- d) Huntersville Private Crossings \$851,000.00.
- e) Cornelius Public Crossings \$1,056,500.00.
- f) Cornelius Private Crossings \$540,000.00.
- g) Iredell County Private Crossings \$120,000.00.
- h) TOTAL MID-TERM ESTIMATED COSTS = \$4,890,000.00.

3. Cost of Long-term Recommendations

- a) Charlotte Public Crossings \$175,000.00.
- b) Iredell County Public Crossings \$720,000.00.
- c) TOTAL LONG-TERM ESTIMATED COSTS = \$895,000.00.

XV. SUMMARY

The Norfolk Southern 'O' Line from Charlotte to Mooresville is a low-density freight line with minimal rail traffic today. The line is plagued with many grade crossings both public and private. The line also parallels several major roadways in the area that are located within the railroad right-of-way for most of the 30 miles between Charlotte and Mooresville.

For most of its existence, traffic along the 'O' Line has apparently been relatively light. And as a matter of fact, portions of the line south of the Atando Junction in Charlotte and north of Statesville Avenue in Mooresville have been out of service for about 30 years. For these reasons, the introduction of rail passenger service along the corridor will require a major change in attitude and awareness for those people who live in and around

and travel over the railroad. Passenger trains traveling at speeds much higher than what is being experienced today (45-50 mph vs. 10 mph) pose a much greater safety hazard for motorists crossing the railroad than do the slow moving freight trains of today. For example, a typical 'O' Line freight train moving at 10 miles per hour can stop in about one-quarter mile. A passenger train, similar to what CATS might operate, moving at 45 miles per hour requires about a mile to come to a stop.

There are locations along the track, south of Huntersville and in Iredell County, where visibility along the track for the train crew is excellent. However, the preponderance of crossings will require constant vigilance by the crew. By the same token, there are other locations where visibility for both train crews and motorists is obscured by either foliage or a building or both. In these areas, the distance required to stop the train to avoid a collision with a stopped or stalled vehicle on the crossing, will not be available. At many crossings today, large trucks frequently stop on the track.

The recommendations in this report are geared toward providing the highest reasonable level of public safety for both motorists and train crews. While the safest grade crossing is no grade crossing at all, the recommendations reflect the projected level of train operations, surrounding land uses and topography, the opportunities for closure and consolidation of crossings, the need for enhanced warning devices and the cost constraints that the community as a whole faces in making significant transportation mode decisions.

In order to raise public awareness, should passenger train operations commence at some time in the future along the 'O' Line, as a final consideration, this report recommends that a significant and on-going public information program be put in place to keep the community aware of the dangers posed by those grade crossings that remain.

REPORT PREPARED BY:

Robert N. Pressley, PE Senior Project Manager *Author, Principal Investigator and Photographer*

Richard D. Clifton, PE Traffic Engineering Manager *Traffic Analysis and Recommendations*

Travis L. Pollack, AICP Transportation Planner Investigator/Quality Control/Quality Assurance

Stuart W. Williams, PE Senior Project Engineer *Technical Advisor/Quality Control/Quality Assurance*

David S. Phalen CADD Technician *Graphics*



"O" LINE ROUTE - CHARLOTTE TO MOORESVILLE

PAGE 65

Traffic Separation Study NS 'O' Line Charlotte to Mooresville Recommendations with Passenger Service

Number	Crossing Number	Street Name	System	SR Number	Milepost	t Classification	Warning Devices	24-Hr. ADT	Proi 2025 ADT	Train Volume	Projected Train Vol.	10-Yr. Accidents*	School Route	Emergency Route	Humped	Sight Obs.	Queue Distance	RECOMMENDATIONS	Estimated Cost	NOTES
. tarno or	Begin Charlotte		Ojotom	of that bot	mopoor	Clacomoutori	Training Doriooo	211111101	10,2020,101		Trojocica Train Fon		Concorridute	Linergeney rioute	. Idinipod	olgin obo.		Recommenter	Lotimatod obot	10120
1	715 361G	Spratt Street	Municipal		1.3	Residential	None	972		0	7			Yes		Bldg/Fol	N/A	Close/Roadway Impvts.	\$ 50,000.00	
2	715 362N	Statesville Ave	State	2691	1.3	Maj. Thor.	Gates & Flashers	11,200	31,600	0	7		Yes	Yes		Building	N/A	Install Median Separator	\$ 15,000.00	
3		PVT (1830 Ind.Park)	Industrial Access		1.8		Gated			0	7							Closed		Currently Fenced
4	715 374H	Woodward Ave	Municipal		2	Industrial	Flashers	3,941		0	7			Yes	Yes	Building				Remove Bridge & Fill
5	715 376W	Moretz Ave	Municipal			Mixed	None	1,875		0	7			Yes		Building			\$ 100,000.00	
6	715 377D	Norris Ave	Municipal		-	Mixed	Crossbucks	3,656		0	7	1-PDO	Yes	Yes		Building		Install Gates & Flashers	\$ 100,000.00	Proj. Pending
7	745 0700	PVT (Blythe Ind.)	Industrial Access		2.7		Crossbucks			0	/					Foliage/Fence		Clear Sight Distance	\$ 1,500.00	
8	715 379S 715 380L	PVT (Closed Plant) Atando Ave	Industrial Access Municipal		2.7	Industrial	Crossbucks Flashers	4.600	10.000	1	8	1-PDO		Yes			14'	Close/Alt. Access Available	\$ 2,500.00 \$ 130.000.00	Proi. Pending
10	715 380L 715 382A	Toal Street	Municipal			Industrial	Flashers	1,765	10,000	1	8	1-injured		Yes	Yes	Bldg/Fol	14	Close	\$ 130,000.00 \$ 7,500.00	Floj. Fending
11	715 386G	PVT (NC Equip. Co.)	Industrial Access		3.3	industrial	Crossbucks	1,705		1	8	I-Injuicu		103	Yes	Didg/1 Of	15		\$ 500.00	
12	715 384N	Starita Road	Municipal		3.4	Industrial	Gates & Flashers	3,832		1	8			Yes		Foliage/Fence	21'		φ 000.00	
13	715 385V	Cottonwood St	Municipal		3.8	Industrial	Flashers	5,202		1	8			Yes	Yes	Buildings	6'	Add Gates	\$ 100,000.00	
14	910 617T	I-85 Service Rd (S)	State				Flashers	3,212		1	8	1-injured		Yes			12'	Close	\$ 50,000.00	
15	910 618A	I-85 Service Rd (N)	State		4.2	Industrial	Flashers	3,043		1	8	6-B		Yes		Foliage	12'	Add Gates	\$ 100,000.00	
16	730 125P	Oneida Rd	Municipal		4.5	Industrial	Gates & Flashers	2,512		1	8	1-C		Yes	Yes	Foliage	12'	No Improvements		Z-4010D Complete
17	730 126W	Allan Rd	Municipal		4.7	Mixed	Gates & Flashers	1,697		1	8	1-PDO		Yes	Yes	Fence	12'	No Improvements		
18	730 127D	Racine Ave	Municipal		5	Mixed	Crossbucks	518		1	8	1-B		Yes	Yes	Foliage	70'		\$ 100,000.00	
19	910 582U	PVT (Bonded Warehouse)			5.2	-	Crossbucks/Stop			1	8	(55.0								**Agreement 9/10/86
20 21	730 128K 730 129S	PVT Maple St	Residential Acc. Municipal		5.3 5.5	Commorcial	Crossbucks Gates & Flashers	3,038		1	8	1-PDO 3-B		Yes			10'	Install Stop Signs		Agreement 4/2/48 Z-3610C Complete
21	730 1295 730 130L	Gibbon Rd	Municipal		5.5	Commercial Commercial	Gates & Flashers Gates/Flashers***	3,038	11,600	1	8	<u>э-в</u>	Yes	Yes			33'	Rdwy Impvts/New G & F/Signal	\$ 7,500.00	
22	730 130L 730 131T	Nevin Rd	Municipal		6	Mixed	Flashers	6,216	14.800	1	8	1-PDO	Yes	Yes	Yes		00			Close Derita Ave @ Nevin
24	904 214R	PVT	Residential Acc.		6.5		None	0,210	,500	1	8									To Starmount Ave.
25	730 133G	Christenbury Rd	Municipal		7.1	Residential	Crossbucks	2,092		1	8				Yes		19'	· · · · · · · · · · · · · · · · · · ·		Long-Term/Track Shift
26	730 134N	PVT	Farm		7.5		None			1	8							Install Crossbucks/stop signs	\$ 500.00	Agreement 9/5/84
27	730 136C	Oak Dr	Municipal		-		Crossbucks	Est <200		1	8			Yes				Close/Connect to Henderson	\$ 500,000.00	Requires R/W
28	730 137J	Pete Brown Rd	Municipal			Mixed	Crossbucks	Est <200		1	8			Yes	Yes			Close/Connect to Henderson		
29	730 138R	Henderson Rd	Municipal	a		Future Min. Th.	Crossbucks	Est <100	15,000	1	8			Yes		Foliage	10			Extend Queue/East
30	730 140S	David Cox Rd	State	2485		Industrial/Res.	Flashers	3,475		1	8		Yes	Yes	Max			, and the second s	\$ 140,000.00	A second former AL Minor
31	730 142F	Bob Beatty S	State	2483	9.8	Commercial	Crossbucks	Est <100		1	8			Vee	Yes	Feliana	18'		\$ 4,000.00 \$ 100.000.00	Access from N. Xing
32 33	730 143M 721 759M	Bob Beatty N Hucks Rd	State State	2483 2481	10.2 10.5		Crossbucks Crossbucks	Est <100 1,757	9,500	1	8		Yes	Yes Yes	Yes	Foliage	45'			Add 4-foot Shoulders
34	721 758F	PVT	Farm Access	2401	10.3		None	1,757	9,500	1	8	1-PDO	165	163						Closed but not Removed
35	721 757Y	PVT	Farm Access		11.1		None			1	8	14 00						Install Crossbucks/stop signs		Agreement 7/8/71
36	721 756S	Eastfield Rd	State	2459		Rural/Residential	Flashers	12,200	17,300	1	8		Yes (27)	Yes				Install G & F/Roadway		Add 4-foot Shoulders
	End Charlotte	Begin Huntersville																		
	End ondrivito	Degin nuntersville																Est. Costs in Charlotte	\$ 2,757,650.00	
1	721 755K	Everett Keith Rd	State	2458		Ind/Residential	Crossbucks	497		1	8		Yes (6)	Yes	Yes		40'	Install Gates & Flashers	\$ 100,000.00	
2	721 755K 721 754D	Everett Keith Rd PVT	Residential Acc.	2458	12.4		None	497		1	8		Yes (6)	Yes	Yes		40'	Install Gates & Flashers Close/Connect to Hambright	\$ 100,000.00 \$ 120,000.00	
2 3	721 755K 721 754D 721 753W	Everett Keith Rd PVT PVT (Future Hambright)	Residential Acc. Future State	2458	12.4 12.6		None None	497	20,000	1	8 8 8 8		Yes (6)	Yes			40'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing	\$ 100,000.00 \$ 120,000.00	Agreement 1/22/51
2 3 4	721 755K 721 754D 721 753W 721 752P	Everett Keith Rd PVT PVT (Future Hambright) PVT	Residential Acc. Future State Residential Acc.	2458	12.4 12.6 12.7		None None None	497	20,000	1 1 	8 8 8 8 8		Yes (6)	Yes	Yes		40'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00	Agreement 1/22/51
2 3 4 5	721 755K 721 754D 721 753W 721 752P 721 751H	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT	Residential Acc. Future State Residential Acc. Farm Access	2458	12.4 12.6 12.7 12.8		None None None	497	20,000	1 1 1 1 1			Yes (6)	Yes	Yes Yes		40'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00	
2 3 4	721 755K 721 754D 721 753W 721 752P	Everett Keith Rd PVT PVT (Future Hambright) PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc.	2458	12.4 12.6 12.7		None None None	497	20,000	1			Yes (6)	Yes	Yes Yes Yes		40'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00	Agreement 1/22/51
2 3 4 5 6	721 755K 721 754D 721 753W 721 752P 721 752P 721 751H 721 750B	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT	Residential Acc. Future State Residential Acc. Farm Access	2458	12.4 12.6 12.7 12.8 12.9		None None None None None	497	20,000	1			Yes (6)	Yes	Yes Yes		40'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00	Agreement 1/22/51
2 3 4 5 6 7	721 755K 721 754D 721 753W 721 752P 721 751H 721 750B 721 749G	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access	2458	12.4 12.6 12.7 12.8 12.9 13		None None None None None	497	20,000	1	8 8 8 8		Yes (6)	Yes	Yes Yes Yes Yes		40'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00	Agreement 1/22/51 Agreement 4/26/79
2 3 4 5 6 7 8 9 10	721 755K 721 754D 721 754D 721 752P 721 751H 721 750B 721 749G 721 748A 721 747T 721 745E	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S)	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal		12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8	Institutional	None None None None None Crossbucks Crossbucks	Est <200	20,000	1 1 1 1	8 8 8 8		Yes (4)	Yes	Yes Yes Yes Yes Yes Yes	Building	40'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Install New Public Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 175,000.00 \$ 7,500.00	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks
2 3 4 5 6 7 8 9 10 11	721 755K 721 754D 721 754D 721 752P 721 751H 721 751H 721 749G 721 749G 721 749G 721 748A 721 747T 721 745E 721 744X	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT (Future Damson) PVT Church St. (S) Holbrooks Rd	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State	2458	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14	Institutional Ind/Residential	None None None None None Crossbucks Crossbucks Gates & Flashers	Est <200 N/A	20,000	1 1 1 1 1 1 1	8 8 8 8 8 8 8 8 8 8 8 8 8 8	2-PDO	Yes (4) Yes (10)	Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Building	40'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks
2 3 4 5 6 7 8 9 10 11 12	721 755K 721 754D 721 753W 721 752P 721 751H 721 750B 721 749G 721 749G 721 749A 721 747T 721 745E 721 744X 721 743R	Everett Keith Rd PVT PVT PVT PVT PVT PVT PVT PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal		12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5	Institutional Ind/Residential Residential	None None None None None Crossbucks Crossbucks Cates & Flashers Crossbucks	Est <200 N/A 641	20,000	1 1 1 1 1 1 1 1 1	8 8 8 8 8 8 8 8 8 8 8 8 8 8	2.PD0	Yes (4) Yes (10) Yes (4)	Yes Yes OK to Close	Yes Yes Yes Yes Yes Yes			Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Install New Public Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 2,500.00 \$ 2,500.00	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks
2 3 4 5 6 7 8 9 10 11 12 13	721 755K 721 754D 721 754D 721 752P 721 750B 721 750B 721 749G 721 749G 721 749A 721 747 721 745E 721 744X 721 743R 721 743R 721 742J	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal Municipal Municipal	2446	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6	Institutional Institutional Ind/Residential Residential Residential	None None None None None Crossbucks Crossbucks Gates & Flashers Crossbucks Crossbucks	Est <200 N/A 641 651		1 1 1 1 1 1 1 1 1 1	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		Yes (4) Yes (10)	Yes Yes OK to Close Yes	Yes Yes Yes Yes Yes Yes Yes	Bldg/Fol	40'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Install New Public Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Install Gates and Flashers	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 175,000.00 \$ 175,000.00 \$ 7,500.00 \$ 7,500.00 \$ 2,500.00 \$ 100,000.00	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach
2 3 4 5 6 7 8 9 10 11 12 13 14	721 755K 721 754D 721 754D 721 754P 721 751H 721 750B 721 749G 721 749G 721 749G 721 748A 721 747T 721 745E 721 744X 721 743R 721 742J 721 741C	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd.	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Municipal State Municipal State State		12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.1 13.8 14 14.5 14.6 14.9	Institutional In/Residential Residential Min. Thor.	None None None None None Crossbucks Crossbucks Crossbucks Crossbucks Flashers***	Est <200 N/A 641 651 4,400	20,000	1 1 1 1 1 1 1 1 1 1 1 1	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	2.PD0 1.PD0	Yes (4) Yes (10) Yes (4) Yes (4)	Yes Yes OK to Close Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Bldg/Fol Bldg/Fol	30'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Install Gates and Flashers Install Gates	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 2,500.00 \$ 15,000.00 \$ 2,500.00 \$ 10,000.00 \$ 10,000.00	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks
2 3 4 5 6 7 8 9 10 11 12 13 14 15	721 755K 721 754D 721 754D 721 752P 721 751H 721 750B 721 749G 721 749G 721 749G 721 749A 721 747T 721 745E 721 744X 721 744X 721 742J 721 741C 721 740V	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N)	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal State Municipal State Municipal	2446	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4	Institutional Ind/Residential Residential Residential Min. Thor. Residential	None None None None Crossbucks Crossbucks Crossbucks Crossbucks Crossbucks Flashers Flasherst*** Crossbucks	Est <200 N/A 641 651 4,400 288		1 1 1 1 1 1 1 1 1 1	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		Yes (4) Yes (10) Yes (4)	Yes Yes OK to Close Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Bldg/Fol Bldg/Fol Bldg/Fol	30' 20'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Install Gates and Flashers Install Gates Install Gates & Flashers	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 100,000.00	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach
2 3 4 5 6 7 7 8 9 10 11 11 12 13 14	721 755K 721 754D 721 754D 721 752P 721 751H 721 750B 721 749G 721 749G 721 749G 721 748A 721 747T 721 745E 721 744X 721 743R 721 743R 721 741C 721 740V 721 739B	Everett Keith Rd PVT PVT PVT PVT PVT PVT PVT PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Municipal State Municipal State State	2446	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.6 15.4	Institutional Ind/Residential Residential Residential Min. Thor. Residential	None None None None None Crossbucks Crossbucks Crossbucks Crossbucks Flashers***	Est <200 N/A 641 651 4,400 288 1,002		1 1 1 1 1 1 1 1 1 1 1 1	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		Yes (4) Yes (10) Yes (4) Yes (4) Yes (1)	Yes Yes OK to Close Yes Yes OK to Close	Yes Yes Yes Yes Yes Yes Yes Yes	Bldg/Fol Bldg/Fol Bldg/Fol Bldg/Fol	30'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Install Gates and Flashers Install Gates & Flashers Close/Connect to Church	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 100,000.00 \$ 1	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed
2 3 4 5 6 7 8 9 10 11 11 12 13 14 15 16	721 755K 721 754D 721 754D 721 752P 721 751H 721 750B 721 749G 721 749G 721 749G 721 749A 721 747T 721 745E 721 744X 721 744X 721 742J 721 741C 721 740V	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N)	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal State Municipal Municipal Municipal	2446	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.6 15.4	Institutional Ind/Residential Residential Residential Residential Residential Residential	None None None None None Crossbucks	Est <200 N/A 641 651 4,400 288		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		Yes (4) Yes (10) Yes (4) Yes (4)	Yes Yes OK to Close Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Bldg/Fol Bldg/Fol Bldg/Fol	30' 20'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Close Install Gates and Flashers Install Gates & Flashers Close/Connect to Church Install Gates & Flashers	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 100,000.00 \$ 2,000.00 \$ 100,000.00 \$ 2,000.00 \$ 2,000.00 \$ 2,000.00 \$ 2,000.00 \$ 2,000.00 \$ 2,000.00 \$ 2,000.00 \$ 1,000.00 \$ 2,000.00 \$ 2,000.00 \$ 1,000.00 \$ 2,000.00 \$ 2,000.00 \$ 1,000.00 \$ 2,000.00 \$ 1,000.00 \$ 1,0	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach
2 3 4 5 6 7 8 9 10 11 11 12 13 14 15 16 17	721 755K 721 754D 721 754D 721 752P 721 751H 721 750B 721 749G 721 749G 721 748A 721 744X 721 744E 721 744Z 721 744Z 721 744Z 721 742J 721 742U 721 742U 721 742U 721 742U	Everett Keith Rd Everett Keith Rd PVT PVT PVT PVT PVT PVT PVT PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Municipal Municipal State Municipal State Municipal State Municipal State State	2446	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.1 13.3 13.1 14.5 14.6 14.9 15.4 15.4 15.6 15.6 16	Institutional Ind/Residential Residential Residential Residential Residential Residential	None None None None None Crossbucks	Est <200 N/A 641 651 4,400 288 1,002		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		Yes (4) Yes (10) Yes (4) Yes (4) Yes (1)	Yes Yes OK to Close Yes Yes OK to Close	Yes Yes Yes Yes Yes Yes Yes Yes	Bldg/Fol Bldg/Fol Bldg/Fol Bldg/Fol	30' 20'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Install Gates and Flashers Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 100,000.00 \$ 2,000.00 \$ 100,000.00 \$ 2,000.00 \$ 2,000.00 \$ 2,000.00 \$ 2,000.00 \$ 2,000.00 \$ 2,000.00 \$ 2,000.00 \$ 1,000.00 \$ 2,000.00 \$ 2,000.00 \$ 1,000.00 \$ 2,000.00 \$ 2,000.00 \$ 1,000.00 \$ 2,000.00 \$ 1,000.00 \$ 1,0	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	721 755K 721 754D 721 754D 721 754P 721 751H 721 750B 721 749G 721 749G 721 749G 721 749G 721 748A 721 748A 721 745E 721 744X 721 745E 721 741C 721 740V 721 738U 721 738U 721 737M	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Municipal State Municipal State Municipal State Municipal State Residential Acc. Municipal State Residential Acc.	2446	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.1 13.3 13.1 14.5 14.6 14.9 15.4 15.4 15.6 15.6 16	Institutional Ind/Residential Residential Min. Thor. Residential Min. Thor. Min. Thor.	None None None None None Crossbucks	Est <200 N/A 641 651 4,400 288 1,002	21,600	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		Yes (4) Yes (10) Yes (4) Yes (4) Yes (1)	Yes Yes OK to Close Yes Yes OK to Close	Yes Yes Yes Yes Yes Yes Yes Yes	Bldg/Fol Bldg/Fol Bldg/Fol Bldg/Fol	30' 20'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Install Gates and Flashers Install Gates & Flashers Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown	\$ 100,000.00 \$ 120,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 10	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	721 755K 721 754D 721 754D 721 754P 721 751H 721 750B 721 749G 721 749G 721 749G 721 748A 721 747T 721 745E 721 745E 721 744X 721 742J 721 742J 721 741C 721 738U 721 738U 721 738U 721 736F 721 735Y	Everett Keith Rd PVT PVT Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Municipal State Municipal State Municipal State Municipal State Residential Acc. Future State Residential Acc. Residential Acc. Residential Acc.	2446	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4 15.6 16.0 16.05 16.1 16.1	Institutional Institutional Ind/Residential Residential Min. Thor. Residential Min. Thor. Min. Thor.	None None None None None Crossbucks Crossbucks Crossbucks Crossbucks Flashers*** Crossbucks Crossbucks Flashers*** Crossbucks None None	Est <200 N/A 641 651 4,400 288 1,002	21,600	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		Yes (4) Yes (10) Yes (4) Yes (4) Yes (1)	Yes Yes OK to Close Yes Yes OK to Close	Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bldg/Fol Bldg/Fol Bldg/Fol Bldg/Fol	30' 20'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Install Gates and Flashers Install Gates Install Gates Install Gates & Flashers Connect to Church Install Gates & Flashers Connect to Stumptown Install Future Crossing	\$ 100,000.00 \$ 120,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 10	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89
2 3 4 5 6 7 7 8 9 9 10 11 12 13 14 15 16 17 18 19 20 21 22	721 755K 721 754D 721 754D 721 754P 721 751H 721 750B 721 749G 721 749G 721 749G 721 749G 721 748A 721 747T 721 745E 721 744X 721 743R 721 741C 721 740V 721 739B 721 737M NEW 721 736F 721 735Y 721 734S	Everett Keith Rd PVT PVT PVT PVT PVT PVT PVT PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal Municipal Municipal State Municipal State Residential Acc. Future State Residential Acc. Residential Acc. Residential Acc.	2446	12.4 12.6 12.7 12.8 13.1 13.3 13.1 14.5 14.6 14.9 15.4 15.4 15.6 16.1 16.1 16.1 16.2	Institutional Ind/Residential Residential Residential Residential Residential Min. Thor. Residential Min. Thor.	None None None None None Crossbucks Crossbucks Crossbucks Crossbucks Flashers*** Crossbucks Crossbucks None None None None None None None None	Est <200 N/A 641 651 4,400 288 1,002	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		Yes (4) Yes (10) Yes (4) Yes (4) Yes (1)	Yes Yes OK to Close Yes Yes OK to Close	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bldg/Fol Bldg/Fol Bldg/Fol Bldg/Fol	30' 20'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Close Crossing Add Long Gate Arm Close Close Crossing Close Crossing Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Stumptown Connect to Stumptown	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 100,000.00 \$ 2,500.00 \$ 100,000.00 \$ 225,000.00 \$ 1,000.00 \$ 1,000.00 \$ 225,000.00 \$ 1,000.00 \$ 1,000.00	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	721 755K 721 754D 721 754D 721 754P 721 750B 721 750B 721 749G 721 749G 721 749G 721 749G 721 749G 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 749B 721 739B 721 739B 721 739F 721 736F 721 734S 721 734S 721 734S	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal State Municipal State Municipal State Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc.	2446	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4 15.6 16.05 16.1 16.0 16.1 16.2 16.3	Institutional Ind/Residential Residential Residential Residential Residential Min. Thor. Min. Thor.	None None None None None None Crossbucks Crossbucks Crossbucks Crossbucks Crossbucks Crossbucks Crossbucks Crossbucks Crossbucks None None None None Crossbucks Crossbucks None None Crossbucks	Est <200 N/A 641 651 4,400 288 1,002 2,010	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		Yes (4) Yes (10) Yes (4) Yes (4) Yes (1) Yes (13)	Yes Yes OK to Close Yes Yes OK to Close Yes	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Bidg/Fol Foliage	30' 20'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close Close Close Close Close Close Close Close Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Stumptown Connect to Stumptown Connect to Stumptown Connect to Stumptown	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 175,000.00 \$ 175,000.00 \$ 7,500.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 0,000.00 \$ 1,000.00 \$ 225,000.00 \$ 225,000.00	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89
2 3 4 5 6 7 8 9 9 10 11 12 13 14 15 15 16 17 18 19 20 21 22 22 23 24	721 755K 721 754D 721 754D 721 754D 721 759B 721 750B 721 750B 721 749G 721 749G 721 748A 721 747T 721 745E 721 744X 721 743R 721 742J 721 741C 721 740V 721 738U 721 738U 721 738U 721 736F 721 736F 721 736F 721 736S 721 738K 721 732D	Everett Keith Rd PVT PVT Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT PVT PVT McCord Road	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Municipal Municipal Municipal Municipal State Municipal Municipal State Residential Acc. Future State Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. State	2446 2448 2439 2439	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14.5 14.6 14.9 15.4 15.6 16.0 16.0 16.1 16.1 16.2 16.2	Institutional Ind/Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Min. Thor.	None None None None None Crossbucks None None None Crossbucks Flashers	Est <200 N/A 651 4,400 288 1,002 2,010	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (4) Yes (1) Yes (13)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Install Gates and Flashers Install Gates and Flashers Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Stumptown Connect to Stumptown Connect to Stumptown Connect to Stumptown Connect to Stumptown Connect to Stumptown Replace Flashers/Add Gates	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 225,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 20,000.00 \$ 225,000.00 \$ 100,000.00 \$ 20,000.00 \$ 225,000.00 \$ 20,000.00 \$ 20,000.00 \$ 20,000.00 \$ 20,000.00 \$ 100,000.00 \$ 20,000.00 \$ 20,000.00 \$ 100,000.00 \$ 20,000.00 \$ 20,000.00 \$ 225,000.00 \$ 100,000.00 \$ 20,000.00 \$ 100,000.00 \$ 100,000.00 \$ 100,000.00 \$ 20,000.00 \$ 100,000.00 \$	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 1/2/18/52
2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	721 755K 721 754D 721 754D 721 754P 721 751H 721 750B 721 749G 721 749G 721 749G 721 749G 721 748A 721 747T 721 745E 721 744X 721 744X 721 744X 721 744X 721 744X 721 741C 721 730B 721 738U 721 737M NEW 721 735Y 721 735Y 721 735K 721 735K	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT PVT PVT PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal State Municipal State Municipal State Residential Acc. Future State Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. State State	2446	12.4 12.6 12.7 12.8 13.1 13.3 13.8 14 14.5 14.6 15.4 15.4 15.4 15.6 16.1 16.1 16.1 16.1 16.2 16.3 16.3 16.3 16.1 17	Institutional Ind/Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Commer/Res. Maj. Thor.	None None None None None Crossbucks Flashers Flashers Flashers	Est <200 N/A 641 651 4,400 288 1,002 2,010	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		Yes (4) Yes (10) Yes (4) Yes (4) Yes (1) Yes (13)	Yes Yes OK to Close Yes Yes OK to Close Yes	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Bidg/Fol Foliage	30' 20' 22'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Close Crossing Add Long Gate Arm Close Install Gates and Flashers Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Stumptown Con	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 225,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 20,000.00 \$ 225,000.00 \$ 100,000.00 \$ 20,000.00 \$ 225,000.00 \$ 20,000.00 \$ 20,000.00 \$ 20,000.00 \$ 20,000.00 \$ 100,000.00 \$ 20,000.00 \$ 20,000.00 \$ 100,000.00 \$ 20,000.00 \$ 20,000.00 \$ 225,000.00 \$ 100,000.00 \$ 20,000.00 \$ 100,000.00 \$ 100,000.00 \$ 100,000.00 \$ 20,000.00 \$ 100,000.00 \$	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 21 22 23 24 25 26	721 755K 721 754D 721 754D 721 754P 721 750B 721 750B 721 750B 721 749G 721 749G 721 749G 721 749G 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 749B 721 739B 721 739B 721 736F 721 736F 721 734S 721 734S 721 734S 721 730P	Everett Keith Rd PVT PVT Futre Hambright) PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Residential Acc. Municipal State Municipal State Municipal State Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. State	2446 2448 2439 2439	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14 14.5 14.6 14.9 15.4 15.6 16.1 16.1 16.1 16.2 16.3 16.6 17 17.1	Institutional Ind/Residential Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor.	None None None None None Crossbucks Crossbucks Gates & Flashers Crossbucks Crossbucks Crossbucks Crossbucks Crossbucks Crossbucks None None None None Crossbucks Flashers Flashers Flashers Flashers Flashers Flashers None None None None None None None None	Est <200 N/A 651 4,400 288 1,002 2,010	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (4) Yes (1) Yes (13)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Close/Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 7,500.00 \$ 15,000.00 \$ 15,000.00 \$ 2,500.00 \$ 100,000.00 \$ 0,000.00 \$ 2250,000.00 \$ 2250,000.00 \$ 265,000.00	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 1/2/18/52
2 3 4 5 6 7 8 9 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	721 755K 721 754D 721 754D 721 753W 721 752P 721 750B 721 750B 721 749G 721 749G 721 749G 721 748A 721 747T 721 745E 721 744X 721 739B 721 739B 721 736F 721 736F 721 736F 721 733K 721 733K 721 733K 721 730P 721 730P 721 729V	Everett Keith Rd PVT PVT Future Hambright) PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT McCord Road NC 73/Sam Furr Road PVT PVT PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Municipal State Municipal Municipal State Municipal State Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. State Residential Acc.	2446 2448 2439 2439	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4 15.4 15.4 15.6 16.1 16.1 16.1 16.2 16.3 16.6 17 17.1 17.1	Institutional Ind/Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Min. Thor.	None None None None None Crossbucks Flashers Flashers Flashers	Est <200 N/A 651 4,400 288 1,002 2,010	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (4) Yes (1) Yes (13)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to Starptown Install Gates & Flashers Close/Connect to Stumptown Install Future Crossing Connect to Stumptown Connect to Stumptown Connect to Stumptown Connect to Stumptown Connect to Stumptown Replace Flashers/Add Gates Add Gates/Median Sep./Rdwy. Connect to Sam Furr	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 175,000.00 \$ 175,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 100,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 225,000.00 \$ 100,000.00 \$ 100	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 1/2/18/52
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 21 22 23 24 25 26 26 27 28	721 755K 721 754D 721 754D 721 754D 721 754P 721 751H 721 750B 721 749G 721 749G 721 749G 721 749G 721 748A 721 748A 721 748A 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744 721 739B 721 738U 721 738F 721 738F	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT PVT NcCord Road NC 73/Sam Furr Road PVT New Public Crossing	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Municipal Municipal Municipal Municipal State Municipal Municipal State Residential Acc. Future State State State State State Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. State	2446 2448 2439 2439 2427 NC 73	12.4 12.6 12.7 12.8 13.1 13.3 13.8 14 14.5 14.6 15.4 15.4 15.4 15.4 15.4 15.4 15.4 15.4	Institutional Institutional Ind/Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Commer/Res. Maj. Thor.	None None None None None None Crossbucks Flashers*** Crossbucks Flashers None None None None Flashers Flashers Flashers None None None None None None None None	Est <200 N/A 641 651 4,400 288 1,002 2,010 2,010 4,984 16,852	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (4) Yes (1) Yes (13)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22' 22' 240'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Close Crossing Add Long Gate Arm Close Close Crossing Add Long Gate Arm Close Close Crossing Close Crossing Add Long Gate Arm Close Close Connect to New Xing Close Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Stump	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 225,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 120,000.00 \$ 100,000.00 \$ 100	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 1/2/18/52
2 3 4 5 6 7 8 9 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	721 755K 721 754D 721 754D 721 753W 721 752P 721 750B 721 750B 721 749G 721 749G 721 749G 721 748A 721 747T 721 745E 721 744X 721 739B 721 739B 721 736F 721 736F 721 736F 721 733K 721 733K 721 733K 721 730P 721 730P 721 729V	Everett Keith Rd PVT PVT Future Hambright) PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT McCord Road NC 73/Sam Furr Road PVT PVT PVT	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Municipal State Municipal Municipal State Municipal State Residential Acc. Residential Acc. Residential Acc. Residential Acc. Residential Acc. State Residential Acc.	2446 2448 2439 2439	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4 15.4 15.4 15.4 15.6 16.1 16.1 16.1 16.1 16.2 16.3 16.6 17 17.1 17.3 17.5 17.6	Institutional Ind/Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Min. Thor.	None None None None None Crossbucks Crossbucks Gates & Flashers Crossbucks Crossbucks Crossbucks Crossbucks Crossbucks Crossbucks None None None None Crossbucks Flashers Flashers Flashers Flashers Flashers Flashers None None None None None None None None	Est <200 N/A 651 4,400 288 1,002 2,010	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (4) Yes (1) Yes (13)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close/Connect to New Xing Close Crossing Add Long Gate Arm Close Close Crossing Add Long Gate Arm Close Close/Connect to New Xing Close/Connect to New Xing Close/Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Sam Furr Install New Xing/Rdwy	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 175,000.00 \$ 175,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 100,000.00 \$ 100,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 225,000.00 \$ 100,000.00 \$ 100	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 1/2/18/52
2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 17 18 19 20 21 22 23 24 25 26 27 28 29	721 755K 721 754D 721 754D 721 754P 721 754P 721 751H 721 759B 721 749G 721 749G 721 749G 721 748A 721 748A 721 745E 721 744X 721 745E 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 739B 721 738U 721 738U 721 738F 721 735Y 721 735Y	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT PVT PVT NacCord Road NC 73/Sam Furr Road PVT PVT New Public Crossing Caldwell Sta. Road	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal State Municipal State Residential Acc. Future State Residential Acc. Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. Future State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. Residential Acc. State State State State State	2446 2448 2439 2439 2427 NC 73 2421	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4 15.4 15.4 15.4 15.6 16.1 16.1 16.1 16.1 16.2 16.3 16.6 17 17.1 17.3 17.5 17.6	Institutional Ind/Residential Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Min. Thor. Commer/Res. Maj. Thor.	None None None None None Crossbucks Riashers None None None None None None None Crossbucks Flashers Flashers Flashers None None Crossbucks Cros	Est <200 N/A 641 651 4,400 288 1,002 2,010 4,984 16,852 Est <100	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (1) Yes (13) Yes (3) Yes (17)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes Yes Yes No	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22' 22' 240' 240'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to Church Install Gates and Flashers Close/Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Sam Furr Connect to Sam Furr	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 175,000.00 \$ 175,000.00 \$ 7,500.00 \$ 15,000.00 \$ 100,000.00 \$ 100,000.00 \$ 225,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 265,000.00 \$ 120,000.00 \$ 120,000.00 \$ 265,000.00 \$ 120,000.00 \$ 120,000.00 \$ 100,000.00 \$ 100	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 1/2/18/52
2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 17 18 19 20 21 22 23 24 25 26 27 28 29	721 755K 721 754D 721 754D 721 754P 721 754P 721 751H 721 759B 721 749G 721 749G 721 749G 721 748A 721 748A 721 745E 721 744X 721 745E 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 739B 721 738U 721 738U 721 738F 721 735Y 721 735Y	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT PVT PVT NacCord Road NC 73/Sam Furr Road PVT PVT New Public Crossing Caldwell Sta. Road	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal State Municipal State Residential Acc. Future State Residential Acc. Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. Future State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. Residential Acc. State State State State State	2446 2448 2439 2439 2427 NC 73 2421	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4 15.4 15.4 15.4 15.6 16.1 16.1 16.1 16.1 16.2 16.3 16.6 17 17.1 17.3 17.5 17.6	Institutional Ind/Residential Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Min. Thor. Commer/Res. Maj. Thor.	None None None None None Crossbucks Riashers*** Crossbucks None None None None None None None Crossbucks Flashers Flashers Flashers None None Crossbucks C	Est <200 N/A 641 651 4,400 288 1,002 2,010 4,984 16,852 Est <100	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (1) Yes (13) Yes (3) Yes (17)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes Yes Yes No	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22' 22' 240' 240'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to Church Install Gates and Flashers Close/Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Sam Furr Connect to Sam Furr	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 175,000.00 \$ 175,000.00 \$ 7,500.00 \$ 15,000.00 \$ 100,000.00 \$ 100,000.00 \$ 225,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 265,000.00 \$ 120,000.00 \$ 120,000.00 \$ 265,000.00 \$ 120,000.00 \$ 120,000.00 \$ 100,000.00 \$ 100	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 12/18/52 200-foot Left-turn Lane
2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 17 18 19 20 21 22 23 24 25 26 27 28 29	721 755K 721 754D 721 754D 721 754P 721 754P 721 751H 721 759B 721 749G 721 749G 721 749G 721 748A 721 748A 721 745E 721 744X 721 745E 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 739B 721 738U 721 738U 721 738F 721 735Y 721 735Y	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT PVT PVT NacCord Road NC 73/Sam Furr Road PVT PVT New Public Crossing Caldwell Sta. Road	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal State Municipal State Residential Acc. Future State Residential Acc. Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. Future State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. Residential Acc. State State State State State	2446 2448 2439 2439 2427 NC 73 2421	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4 15.4 15.4 15.4 15.6 16.1 16.1 16.1 16.1 16.2 16.3 16.6 17 17.1 17.3 17.5 17.6	Institutional Ind/Residential Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Min. Thor. Commer/Res. Maj. Thor.	None None None None None Crossbucks Riashers*** Crossbucks None None None None None None None Crossbucks Flashers Flashers Flashers None None Crossbucks C	Est <200 N/A 641 651 4,400 288 1,002 2,010 4,984 16,852 Est <100	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (1) Yes (13) Yes (3) Yes (17)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes Yes Yes No	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22' 22' 240' 240'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Sam Furr Connect to Sam Furr Install New Xing/Rdwy Close/Connect to New Xing Near-term Safety Devices	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 00,000.00 \$ 00,000.00 \$ 225,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 100,0	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 12/18/52 200-foot Left-turn Lane
2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 25 26 27 28 29	721 755K 721 754D 721 754D 721 754P 721 754P 721 751H 721 759B 721 749G 721 749G 721 749G 721 748A 721 748A 721 745E 721 744X 721 745E 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 739B 721 738U 721 738U 721 738F 721 735Y 721 735Y	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT PVT PVT NacCord Road NC 73/Sam Furr Road PVT PVT New Public Crossing Caldwell Sta. Road	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal State Municipal State Residential Acc. Future State Residential Acc. Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. Future State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. Residential Acc. State State State State State	2446 2448 2439 2439 2427 NC 73 2421	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4 15.4 15.4 15.4 15.6 16.1 16.1 16.1 16.1 16.2 16.3 16.6 17 17.1 17.3 17.5 17.6	Institutional Ind/Residential Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Commer/Res. Maj. Thor. Residential	None None None None None Crossbucks Riashers*** Crossbucks None None None None None None None Crossbucks Flashers Flashers Flashers None None Crossbucks C	Est <200 N/A 641 651 4,400 288 1,002 2,010 4,984 16,852 Est <100	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (1) Yes (13) Yes (3) Yes (17)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes Yes Yes No	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22' 22' 240' 240'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to Church Install Gates and Flashers Close/Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Sam Furr Connect to Sam Furr	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 175,000.00 \$ 175,000.00 \$ 7,500.00 \$ 15,000.00 \$ 100,000.00 \$ 100,000.00 \$ 225,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 265,000.00 \$ 120,000.00 \$ 265,000.00 \$ 120,000.00 \$ 265,000.00 \$ 120,000.00 \$ 100,000.00 \$ 100	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 12/18/52 200-foot Left-turn Lane
2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 17 18 19 20 21 22 23 24 25 26 27 25 26 27 28 29	721 755K 721 754D 721 754D 721 754P 721 754P 721 751H 721 759B 721 749G 721 749G 721 749G 721 748A 721 748A 721 745E 721 744X 721 745E 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 744X 721 739B 721 738U 721 738U 721 738F 721 735Y 721 735Y	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT PVT PVT NacCord Road NC 73/Sam Furr Road PVT PVT New Public Crossing Caldwell Sta. Road	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal State Municipal State Residential Acc. Future State Residential Acc. Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. Future State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. Residential Acc. State State State State State	2446 2448 2439 2439 2427 NC 73 2421	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4 15.4 15.4 15.6 16.1 16.1 16.1 16.1 16.2 16.3 16.6 17 17.1 17.3 17.5 17.6	Institutional Ind/Residential Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Commer/Res. Maj. Thor. Residential	None None None None None Crossbucks Riashers*** Crossbucks None None None None None None None Crossbucks Flashers Flashers Flashers None None Crossbucks C	Est <200 N/A 641 651 4,400 288 1,002 2,010 4,984 16,852 Est <100	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (1) Yes (13) Yes (3) Yes (17)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes Yes Yes No	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22' 22' 240' 240'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Sam Furr Connect to Sam Furr Install New Xing/Rdwy Close/Connect to New Xing Near-term Safety Devices	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 00,000.00 \$ 00,000.00 \$ 225,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 100,000.00 \$ 225,000.00 \$ 100,000.00 \$ 100,0	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 12/18/52 200-foot Left-turn Lane
2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 17 18 19 20 21 22 23 24 25 26 27 28 29	721 755K 721 755W 721 754D 721 754D 721 754 721 750B 721 750B 721 749G 721 749G 721 749G 721 744X 721 749B 721 739B 721 739B 721 739B 721 739F 721 734S 721 734S 721 734S 721 730P 721 730P 721 729V NEW 721 728N 721 728N 721 728N	Everett Keith Rd PVT PVT (Future Hambright) PVT PVT PVT PVT PVT PVT Church St. (S) Holbrooks Rd Dellwood Rd Gibson Park Rd Hntrsville/Concord Rd. Church St. (N) 4th Street Ramah Ch. Road PVT Stumptown Rd. Ext. PVT PVT PVT PVT PVT PVT PVT PVT NacCord Road NC 73/Sam Furr Road PVT PVT New Public Crossing Caldwell Sta. Road	Residential Acc. Future State Residential Acc. Farm Access Residential Acc. Ind/Res Access Residential Acc. Residential Acc. Municipal State Municipal State Municipal State Residential Acc. Future State Residential Acc. Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. State Residential Acc. Future State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. State Residential Acc. Residential Acc. State Residential Acc. Residential Acc. State State State State State	2446 2448 2439 2439 2427 NC 73 2427 NC 73 2431 2433	12.4 12.6 12.7 12.8 12.9 13 13.1 13.3 13.8 14 14.5 14.6 14.9 15.4 15.4 15.4 15.6 16.1 16.1 16.1 16.1 16.2 16.3 16.6 17 17.1 17.3 17.5 17.6	Institutional Ind/Residential Residential Residential Residential Min. Thor. Residential Min. Thor. Min. Thor. Commer/Res. Maj. Thor. Residential	None None None None None Crossbucks Riashers*** Crossbucks None None None None None None None Crossbucks Flashers Flashers Flashers None None Crossbucks C	Est <200 N/A 641 651 4,400 288 1,002 2,010 4,984 16,852 Est <100	21,600		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	1-PDO	Yes (4) Yes (10) Yes (4) Yes (1) Yes (13) Yes (3) Yes (17)	Yes Yes OK to Close Yes Yes OK to Close Yes Yes Yes Yes No	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Bidg/Fol Bidg/Fol Bidg/Fol Foliage Bidg/Fol	30' 20' 22' 22' 240' 240'	Install Gates & Flashers Close/Connect to Hambright Install Future Crossing Close/Connect to Hambright Close/Connect to Hambright Close/Connect to New Xing Close/Connect to Church Install Gates & Flashers Close/Connect to Church Install Gates & Flashers Connect to Stumptown Connect to Sam Furr Connect to Sam Furr Install New Xing/Rdwy Close/Connect to New Xing Near-term Safety Devices	\$ 100,000.00 \$ 120,000.00 \$ 225,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 120,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 00,000.00 \$ 00,000.00 \$ 225,000.00 \$ 225,000.00 \$ 225,000.00 \$ 100,000.00 \$ 100,000.00 \$ 225,000.00 \$ 100,000.00 \$ 100,0	Agreement 1/22/51 Agreement 4/26/79 Agreement 4/19/61 Access via Holbrooks Westbound Approach Gates and Flasher Installed Gates and Flasher Installed Agreement 1/25/89 Agreement 12/18/52 200-foot Left-turn Lane

Number	Crossing Number	Street Name	Location	Land Use or Street Class	Warning Devices	24-Hr. ADT	10-Yr. Accidents	School Route	Emergency Route	Humped	Sight Obs.	Queue Distance	TOTAL
					None = 20 pts	0.5 - 20 pts	2 or more = 10 pts	Yes = 5 pts	Yes = 5 pts	Severe 6-10 pts	Bldg. = 15 pts	<20 ft = 20 pts	
					Xbuck=s15 pts		1 = 5 pts	No = 0 pts	No = 0 pts	Moderate 1-5 pts	Foliage = 5 pts	<40ft = 15 pts	
					Flashers = 10 pts Gates/Flshrs = 0 pts		0 = 0 pts					>40 <60 = 10 pts >60 ft = 0 pts	+
													-
1	721 683J	Mills Ave	Mooresville	Mixed	15	1	10		5		15	20	6
2	721 680N 721 716U	McLelland Ave Smith Rd	Mooresville Cornelius	Commercial Comm/Res/Inst.	10 15	7	10	5	5	8	15	20 20	6
4	721 7160	Center St	Mooresville	Comm/Res/Inst.	15	7		5	5	4	15 15	20	6
5	721 723E	Bailey Road	Cornelius	Rural/Res.	15	0.5		5	5	10	5	20	60
6	715 382A	Toal Street	Charlotte	Industrial	10	2			5	8	15	20	6
7	721 687L	Doster Ave (Norman)	Mooresville	Mixed	15	5			5	9	5	20	5
8	721 677F	Iredell St	Mooresville	Thoroughfare	0	9	5	5	5		15	20	5
9 10	715 385V 721 715M	Cottonwood St Hickory (Zion S) St	Charlotte Cornelius	Industrial Comm/Res/Inst.	10 15	5 0.7			5	3	15 15	20 15	56
11	721 715W	Gibson Park Rd	Huntersville	Residential	15	0.5		5	5	0	15	15	55
12	721 7423 721 740V	Church St. (N)	Huntersville	Residential	15	0.5		5	5		15	20	55
13	910 618A	I-85 Service Rd (N)	Charlotte	Industrial	10	3	10		5		5	20	5
14	730 142F	Bob Beatty S	Charlotte	Commercial	15	0.5			5	7	5	20	52
15	730 133G	Christenbury Rd	Charlotte	Residential	15	2			5	10		20	5
16 17	721 739B 721 682C	4th Street	Huntersville	Residential	15 10	1			5	0	15	<u>15</u> 20	5
17	721 682C	Wilson Ave Mayes Road	Mooresville Huntersville	Commercial Rural/Res.	10	8		5	5	8			5
19	721 700X	Langtree Road	Iredell Co.	Residential	0	5	10	5	5	10	5	10	5
20	715 377D	Norris Ave	Charlotte	Mixed	15	4	5	5	5		15		4
21	721 707V	Beatty Road	Davidson	Major Thoroughfare	15	3		5	5			20	4
22	721 681V	Catawba Ave	Mooresville	Mixed	15	2			5	6	17	20	4
23 24	721 676Y 721 678M	Oak St Moore Ave	Mooresville Mooresville	Commercial/Residential Commercial	0 10	2	5		5	5	15	20 20	4
24	721 078M	Everett Keith Rd	Huntersville	Ind/Residential	10	2 0.5		5	5	4	5	15	4
26	721 713Y	Zion Street (N)	Cornelius	Comm/Ind.	15	0.5		Ģ	5	4	5	15	44
27	721 745E	Church St. (S)	Huntersville	Institutional	15	0.5		5	5	3	15	-	43
28	715 376W	Moretz Ave	Charlotte	Mixed	20	2	0	0	5	0	15	0	4
29	726 267Y	NC 73/Sam Furr Road	Huntersville	Major Thoroughfare	10	17		5	5		5		4
30 31	730 125P 730 126W	Oneida Rd Allan Rd S	Charlotte Charlotte	Industrial Mixed	0	3	5	5	5	3 4	5 5	20 20	4
32	730 126W 721 711K	Catawba St.	Davidson	Residential	15	1		5	5	5	5	10	40
33	721 704A	Bridges Farm Rd	Iredell Co.	Rural/Res.	15	0.5			5	0	5	15	40
34	715 380L	Atando Ave	Charlotte	Industrial	10	5			5			20	4
35	730 130L	Gibbon Rd	Charlotte	Commercial	0	15		5	5			15	4
36	721 732D	McCord Road	Huntersville	Commer/Res.	10	5		5	5		15	22	4
37 38	721 685X 721 741C	Brawley Ave Hntrsville/Concord Rd.	Mooresville Huntersville	Mixed Minor Thoroughfare	10 10	5 4	5		5		15	20	4
39	721 710D	Depot St	Davidson	Comm/Ind.	15	0.5	5		5	3	15		38
40	910 617T	I-85 Service Rd (S)	Charlotte	Industrial	10	3			5			20	3
41	730 129S	Maple St	Charlotte	Commercial	0	3	10		5			20	3
42	715 374H	Woodward Ave	Charlotte	Industrial	10	4	0	0	5	3	15	0	3
43 44	730 127D 721 743R	Racine Ave Dellwood Rd	Charlotte Huntersville	Mixed Residential	15 15	0.5	5	5	5	5 10	5		35
44	721 743R 721 728N	Caldwell Station Road	Huntersville	Residential	15	0.5	0	5	5	10		20	35
46	721 708C	Delburg St	Davidson	Residential	15	0.5	Ū		5		15	20	35
47	721 692H	Foursquare Road	Iredell Co.	Residential	15	0.5		5	5			10	35
48	721 675S	Walnut St	Mooresville	Residential	15	0.5			5			15	35
49	721 738U	Ramah Ch. Road	Huntersville	Minor Thoroughfare	15	2	-	5	5	3	5		3
50 51	730 131T 721 697S	Nevin Rd Fairview Road	Charlotte Iredell Co.	Mixed Institutional	10 15	6	5	5	5	3	5		3
52	715 384N	Starita Road	Charlotte	Industrial	0	4		5	5	3	5	15	3
53	721 756S	Eastfield Rd	Charlotte	Rural/Residential	10	12		5	5	-			3
54	721 759M	Hucks Rd	Charlotte	Com/Ind/Res	15	2		5	5		5		3
55	721 674K	Patterson St	Mooresville	Industrial	15	1	5		5		5		3
56	721 696K	Crossrail Road	Iredell Co.	Residential	15	0.6		5	5		5	40	30
57 58	730 143M 715 361G	Bob Beatty N Spratt Street	Charlotte Charlotte	Commercial Residential	15 20	0.5	0	0	5 5	0	0	<u>10</u> 0	30
59	730 138R	Henderson Rd	Charlotte	Future Minor Thoroughfare	15	0.5	0	0	5	0	5	0	25
60	730 137J	Pete Brown Rd	Charlotte	Mixed	15	0.5			5	4			24
61	730 140S	David Cox Rd	Charlotte	Industrial/Residential	10	3		5	5				2
62	736 195A	Statesville Ave	Mooresville	Mixed	10	8			5				2
63	715 362N	Statesville Ave	Charlotte	Major Thoroughfare	0	11	0	5	5	0	0	0	2
64 65	721 744X 730 136C	Holbrooks Rd Oak Dr	Huntersville Charlotte	Industrial/Residential Mixed	0 15	1 0.5	10	5	5				2
66	730 136C 721 709J	Griffith St	Davidson	Major Thoroughfare	15	0.5		5	5				20
67	721 692H	Waterlynn Drive	Iredell Co.	Rural/Residential	0	3		5	5				1
					-	-	1		1	İ			1

TOTAL DOWITO	001415150
TOTAL POINTS	COMMENTS
66	RECOMMENDED FOR CLOSURE
65 64	Z-4112C PENDING
61	
60.5	
60	RECOMMENDED FOR CLOSURE
59	RECOMMENDED FOR CLOSURE
59	
58	
56.7 55.5	RECOMMENDED FOR CLOSURE
55.5	
53	
52.5	RECOMMENDED FOR CLOSURE
52	REBUILD ROAD AND TRACK
51	CLOSE/CONNECT TO CHURCH
51	
50	RELOCATE CROSSING
50 49	PENDING CITY RDWY. PROJECT
49 48	
48	RECOMMENDED FOR CLOSURE
47	Z-4012H COMPLETED
47	
44.5	
44.5	CLOSE WHEN CATAWBA OPENS
43.5	CLOSE/ACCESS VIA HOLBROOK
42 42	
41	Z-4010D COMPLETED
41	
40.5	
40.5	
40	
40 40	
40	
39	
38.5	
38	RECOMMENDED FOR CLOSURE
38	RECOMMENDED FOR CLOSURE
37	REMOVE BRIDGE/FILL CUT
35.5 35.5	RECOMMENDED FOR CLOSURE
35.5	RELOCATE CROSSING
35.5	RECOMMENDED FOR CLOSURE
35.5	
35.5	RECOMMENDED FOR CLOSURE
35	LONG-TERM CLOSURE
<u>34</u> 33	
32	1
32	1
32	
31	
30.6	
30.5	RECOMMENDED FOR CLOSURE
26 25.5	
23.5	CLOSE/CONNECT TO HENDERSON
23	
23	
21	
21	
20.5	CLOSE/CONNECT TO HENDERSON
<u>18</u> 13	+
13	

'O' Line Evaluation Cost Summary

Proj	ect	38448

								W/O PSNGR.					
	WITH PS	NGR. SERVICE	Ν	EAR-TERM	MID-TERM	LONG-TERM		SERVICE	1	IEAR-TERM	MID-TERM		ONG-TERM
		TOTAL COST	0	- 2 YEARS	3 - 5 YEARS	6 YEARS +	-	TOTAL COST) - 2 YEARS	3 - 5 YEARS		6 YEARS +
CHARLOTTE													
ALL CROSSINGS (36)	\$	2,757,650.00	\$	1,660,150.00	\$ 922,500.00	\$ 175,000.00	\$	785,000.00	\$	457,500.00	\$ 327,500.00)	
PUBLIC CROSSINGS (26)	\$	2,739,000.00	\$	1,644,000.00	\$ 920,000.00	\$ 175,000.00	\$	785,000.00	\$	457,500.00	\$ 327,500.00)	
PRIVATE CROSSINGS (10)	\$	18,650.00	\$	16,150.00	\$ 2,500.00								
HUNTERSVILLE													
ALL CROSSINGS (28)	\$	2,783,500.00	\$	532,500.00	\$ 2,251,000.00	\$ -	\$	817,500.00	\$	2,500.00	\$ 815,000.00)	
PUBLIC CROSSINGS (13)	\$	1,925,000.00	\$	525,000.00	\$ 1,400,000.00		\$	817,500.00	\$	2,500.00	\$ 815,000.00)	
PRIVATE CROSSINGS (15)	\$	858,500.00	\$	7,500.00	\$ 851,000.00								
CORNELIUS													
ALL CROSSINGS (11)	\$	1,841,500.00	-	245,000.00	1,596,500.00	\$ -	\$	504,000.00			\$ 504,000.00)	
PUBLIC CROSSINGS (4)	\$	1,296,500.00	-	240,000.00	1,056,500.00		\$	504,000.00			\$ 504,000.00)	
PRIVATE CROSSINGS (7)	\$	545,000.00	\$	5,000.00	\$ 540,000.00								
DAVIDSON													
ALL CROSSINGS (5)	\$	310,000.00		310,000.00	\$ -	\$ -	\$	10,000.00	\$	10,000.00			
PUBLIC CROSSINGS (5)	\$	310,000.00	\$	310,000.00			\$	10,000.00	\$	10,000.00			
PRIVATE CROSSINGS (0)	\$	-											
IREDELL COUNTY													
ALL CROSSINGS (16)	\$	1,168,000.00	\$	328,000.00	\$ 120,000.00	\$ 720,000.00	\$	720,000.00				\$	720,000.00
PUBLIC CROSSINGS (6)	\$	1,045,000.00	\$	325,000.00		\$ 720,000.00	\$	720,000.00				\$	720,000.00
PRIVATE CROSSINGS (10)	\$	123,000.00	\$	3,000.00	\$ 120,000.00								
MOORESVILLE													
ALL CROSSINGS (13)	\$	523,000.00		523,000.00	\$ -	\$ -	\$	23,000.00	\$	23,000.00			
PUBLIC CROSSINGS (13)	\$	523,000.00	\$	523,000.00			\$	23,000.00	\$	23,000.00			
PRIVATE CROSSINGS (0)	\$	-											
COST SUMMARY													
TOTAL (109)	\$	9,383,650.00	\$	3,598,650.00	\$ 4,890,000.00	\$ 895,000.00	\$	2,859,500.00					
Public Crossings (67)	\$	7,838,500.00	\$	3,567,000.00	\$ 3,376,500.00	\$ 895,000.00	\$	2,859,500.00	\$	493,000.00	\$ 1,646,500.00) \$	720,000.00
Private Crossings (42)	\$	1,545,150.00	\$	31,650.00	\$ 1,513,500.00	\$ -							