

**Regional Planning Commission of Greater
Birmingham**

Commuter Rail Study

**Birmingham/Huntington Park/Hoover/
Helena/Pelham/Alabaster/
South Alabaster/Calera**

Advanced Planning, Programming, and Logical
Engineering (APPLE)

RPC Project No. 1289.29

Dynamic Civil Solutions and
Whitman, Requardt and Associates, LLP
August 2019

Table of Contents

1	Executive Summary.....	1
1.1.	The Corridor	1
1.2.	Corridor Railroads	3
1.3.	Commuter Rail Concepts	3
1.4.	Commuter Rail Opportunities	4
2	Existing Conditions	5
2.1	Corridor Population, Growth and Development	5
2.2	Existing and Projected Traffic.....	6
2.2.1	I-65 Corridor Feasibility Study MAGIC 65	6
2.2.2	I-65/US31 Mobility Matters Plan	8
2.2.3	Regional Transportation Plan 2040 Regional Planning Commission of Greater Birmingham	10
2.3	Commute Trip Analysis	11
2.4	Current Railroad Operations.....	13
2.4.1	CSX Railroad.....	13
2.4.2	NS and Amtrak	17
2.4.3	Birmingham Railroad Park Interlocking	17
3	Concept Development.....	19
3.1	Railroad Alternatives.....	19
3.1.1.	Railroad requirements for shared use	19
3.1.2.	Shared use.....	19
3.1.3.	Independent operation	19
3.2	Operating Plan.....	22
3.3	Potential Stations.....	24
3.3.1	Birmingham – 18 th Street Station.....	24
3.3.2	Huntington Park Station	26
3.3.3	Hoover Station.....	27
3.3.4	Helena Station	30
3.3.5	Pelham Station	31
3.3.6	Alabaster Station.....	32
3.3.7	South Alabaster Station	34
3.3.8	Calera Station.....	35
3.3.9	Other Sites not selected.....	36

3.4	Transit Oriented Development Opportunities	37
3.4.1	Birmingham Station TOD	38
3.4.2	Huntington Park Station TOD	39
3.4.3	Hoover Station TOD	40
3.4.4	Helena Station TOD	41
3.4.5	Pelham Station TOD	42
3.4.6	Alabaster Station TOD	43
3.4.7	South Alabaster Station TOD	44
3.4.8	Calera Station TOD	45
3.5	Ridership Estimates	46
3.5.1	Zone Analysis	48
3.5.2	Traffic Impact	49
3.6	Planning Level Cost Estimates	51
3.6.1	Capital cost estimates	51
3.6.2	Operating cost estimates	52
3.7	Summary of Stakeholder Meeting	53
3.8	Commuter Bus Alternative	54

List of Appendices

Appendix A: Commuter Data Matrix of 38 Zones from US Census LEHD Data	60
Appendix B: Conceptual Commuter Railroad Capital Cost Estimate	63
Appendix C: Conceptual Commuter Railroad Operating Cost Estimate	70
Appendix D: FTA Transit Database Costing of other Commuter Railroads	71

List of Tables

Table 1 Alabama Population 2000-2010	6
Table 2 Alabama Population 2020-2040	6
Table 3 Proposed Transit Improvements	8
Table 4 RTP Strategies for Addressing Challenges	10
Table 5 LEHD Zones – Potential Birmingham Commuter Rail Trips	12
Table 6 Lineville Subdivision Characteristics	16
Table 7 Running Time CSX Rail and Improved Rail	22
Table 8 Commuter Rail Travel Time Savings	22
Table 9 Example Schedule Inbound and Outbound	23
Table 10 Questions to Consider at Each Rail Station:	37
Table 11 All Possible Birmingham Commute trips that might be Attracted to Commuter Rail	47
Table 12 Highway Commute Times in Minutes by Time of Day	47
Table 13 Estimated Ridership by Station	49
Table 14 Planning Level Capital Cost Estimates for Birmingham and Calera Commuter Rail	51

Table 15 Commuter Rail Operating Cost Estimate.....	52
Table 16 Commuter Bus Route Summary	54
Table 17 Hoover/Huntington Park Example Commuter Bus Schedule	55
Table 18 Helena Example Commuter Bus Schedule	56
Table 19 Calera/Alabaster/Pelham Example Commuter Bus Schedule.....	57
Table 20 Birmingham Commuter Bus Capital Costs	58
Table 21 Birmingham Commuter Bus Operating Capital Costs	59

List of Figures

Figure 1 Corridor Map	2
Figure 2 County Map.....	5
Figure 3 MAGIC 65 Corridor	7
Figure 4 Mobility Matters Corridor.....	9
Figure 5 Birmingham Area LEHD Travel Zones	11
Figure 6 Primary CSX Corridors	14
Figure 7 CSX Traffic Density Map	15
Figure 8 CSX Double-Stack Container Routes.....	17
Figure 9 CSX and NS Rail Crossing Interlocking in Downtown Birmingham	18
Figure 10 Configuration Birmingham to Alabaster	20
Figure 11 Configuration Alabaster to Calera.....	21
Figure 12 Proposed Birmingham Station	24
Figure 13 Birmingham Station Looking West.....	25
Figure 14 Access to Downtown and MAX Transit Vis 18 th Street.....	25
Figure 15 Proposed Huntington Park Station	26
Figure 16 Proposed Hoover Station.....	27
Figure 17 From Hoover Station Looking North from John Hawkins Pkwy.....	28
Figure 18 View From Hoover Station to Northwest	28
Figure 19 Proposed Hoover Station.....	29
Figure 20 Helena Station Area.....	30
Figure 21 Proposed Helena Station.....	30
Figure 22 Pelham Station Site Looking West	31
Figure 23 Proposed Pelham Station	31
Figure 24 Alabaster Station View Facing West.....	32
Figure 25 Alabaster Station View Facing North.....	32
Figure 26 Proposed Alabaster Station	33
Figure 27 Alabaster South View Looking East.....	34
Figure 28 Proposed Alabaster South Station.....	34
Figure 29 Calera Station View Looking South	35
Figure 30 Proposed Calera Station.....	35
Figure 31 Birmingham Commuter Rail Station TOD.....	38
Figure 32 Huntington Park Commuter Rail Station TOD	39
Figure 33 Hoover Commuter Rail Station TOD	40
Figure 34 Helena Commuter Rail Station TOD.....	41
Figure 35 Pelham Commuter Rail Station TOD.....	42
Figure 36 Alabaster Commuter Rail Station TOD.....	43
Figure 37 South Alabaster Commuter Rail Station TOD	44

Figure 38 Calera Commuter Rail Station TOD	45
Figure 39 Birmingham Travel Zones.....	46
Figure 40 Morning Commuter Travel Times by Station Location	48
Figure 41 Enlargement of Zones from Figure 2-12.....	49

1 EXECUTIVE SUMMARY

This study is to identify the feasibility of a passenger rail service extending from Birmingham 34 miles south to Calera. The study identifies and develops potential alignment, eight station stops, operating plan, commute time savings, ridership estimate, stakeholder support, potential Transit Oriented Development (TOD) at stations and order of magnitude cost estimate.

1.1. The Corridor

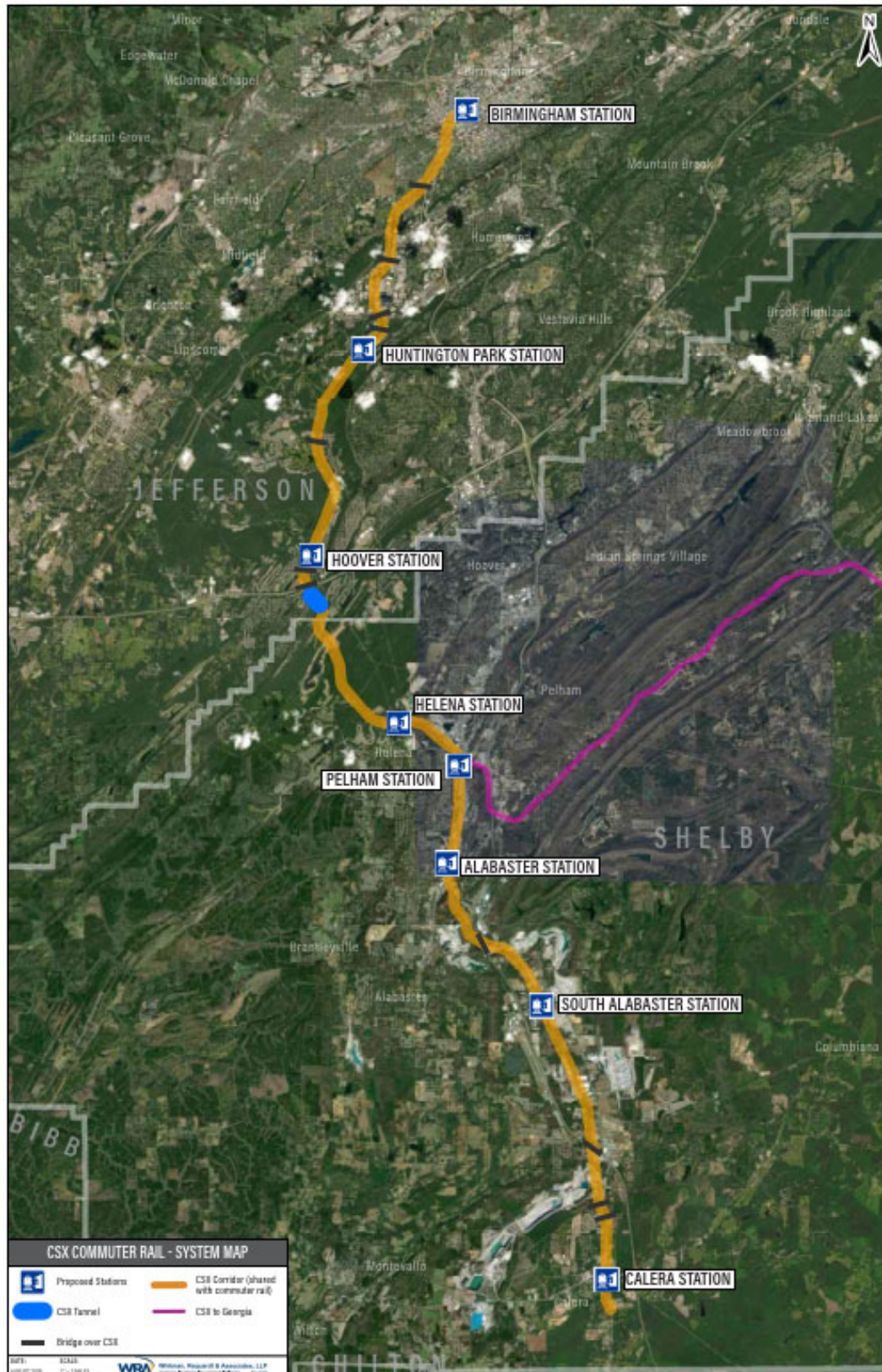
The 34-mile alignment extends from downtown Birmingham south parallel to Interstate 65 (I-65) and Route 31, travels through Jefferson and Shelby Counties terminating in Calera (Figure 1). I-65 and RT 31 are major roadways connecting two metropolitan areas of Birmingham and Montgomery. Traffic in and around the Birmingham metropolitan area on I-65 and RT 31 have been increasing over the decades.

Challenges facing the region require a multi-pronged approach to alleviate the traffic and congestion problem. Over the years suburban development patterns creating sprawl has added to the current daily traffic delays and increased congestion. Left unaddressed, long commute times and lost productivity could lead to disinvestment with existing and future businesses. Increasing highway capacity may only worsen suburban sprawl.

Alabama's population over a ten-year period from 2000 to 2010, increased by 7.5% and is projected to expand by 500,000 residents in 2040. The Birmingham metropolitan area comprised of Jefferson, Walker, Cullman, Blount, St. Clair, Shelby and Bibb counties is ranked 50th by size in the United States. Shelby County a suburb of Birmingham is projected to have a significant population growth of 41.7% over a 30-year period.

The City of Birmingham has retained a healthy employment base and in recent years has seen redevelopment in Downtown and University of Alabama Birmingham (UAB) / Five Points South areas. The majority of commuter trips originate from the surrounding suburban areas and terminate in downtown Birmingham. Housing and new development remains in the surrounding counties. The Birmingham Metro Area's economy is supported by education, medical services, technology-based business, mining and agriculture.

Figure 1 Corridor Map



1.2. Corridor Railroads

Birmingham is a major railroad crossroads with the busy crossing of about 80 daily CSX and Norfolk Southern Railway (NS) trains just west of Railroad Park at 13th Street. Amtrak operates two trains a day (one each direction) on the primary NS corridor. Both railroad lines carry train traffic far above average.

1.3. Commuter Rail Concepts

Commuter rail started as metropolitan area trains running on tracks shared with freight trains. Following interstate highway construction, most commuter rail lines became government supported or were discontinued. Following railroad deregulation in 1980, freight railroads consolidated rail traffic on key routes, so secondary routes became available for sharing with new commuter routes, or following discontinuance of freight service, the rights-of-way could be applied to dedicated passenger railroad lines such as light rail (vehicles powered by overhead catenary). Heavy Rail refers to grade separated and fenced dedicated passenger railroad lines with power provided from a third rail.

Commuter rail is regulated by the Federal Railroad Administration and must be compatible with freight operations and regulations. In contrast, Light and Heavy Rail are regulated by the Federal Transit Administration and use significantly different equipment.

Commuter rail is usually locomotive drawn coaches of high seating capacity (often 132 or more seats) sometimes provided with bi-level cars. Stations spacing is usually 3 to 6 miles apart, providing higher average speeds than heavy rail and much faster than light rail which is slowed by more frequent stops. Even though top speeds may be as high as 70 to 80 mph between stations, commuter rail overall average speeds are 30 to 40 mph when factoring in stops where trains must decelerate to stop, load passengers and reaccelerate.

To expedite operation, most commuter operations are push/pull (not turning the train). The rear passenger car has a control cab, so the locomotive can push the train inbound in the morning and pull the train outbound in the evening.

Sharing tracks with a freight railroad offers multiple challenges including track time and delays, conflicts with railroad industrial sidings, safety, passenger boarding and Americans with Disability Act (ADA) requirements, rail access payments, and shared maintenance. Over the past 20 years, Norfolk Southern (NS) and CSX have become increasingly resistant to sharing capacity with commuter rail. These railroads now require compensation agreements to study alternatives, reimbursement for all engineering and project development costs, full payment including high corridor factors for the value of railroad assets taken by the project, construction of flyover bridges at all industrial sidings, additional tracks through passenger stations, 26-foot track separation so parallel railroads can be independently maintained, "but for the presence of passenger rail" liability indemnification, and 500 million+ dollar insurance policies. Because of the difficulty and costs of working with NS and CSX, commuter rail projects are most typically undertaken on short-line railroads or on separate railroad rights of way purchased from NS and CSX.

ADA requirements and freight rail safety present significant challenges at passenger stations. The ADA with limited exceptions requires level boarding with a minimal gap between the platform and the commuter rail car. To meet ADA requirements, passenger stations must be on a straight (tangent) section of track. With level boarding requirements, the platform height is determined by the passenger car floor elevation. For bi-level cars a lower platform height is possible. Because freight loads may be wider than passenger cars, additional tracks are required through commuter rail stations shared with freight.

Commuter rail riders travel longer distances than other metropolitan rail modes. New-start operations since 1987 have average trip lengths of 14 to 46 miles. Fares are also higher with average revenue of \$2.20 to \$9.04 per trip.

Commuter rail is more suitable to the Birmingham I-65 South Corridor than Light or Heavy Rail, because the demand is focused at peak period travel and the distances traveled are high, so higher capacity trainsets work well to match demand.

1.4. Commuter Rail Opportunities

Since railroad deregulation of 1980, 13 cities have started commuter rail:

- Sounder in Seattle,
- Altamont Corridor Express in California,
- Rail Runner Express in Albuquerque,
- Music City Star in Nashville,
- Northstar Line in Minneapolis,
- Coaster in San Diego/Oceanside,
- FrontRunner in Salt Lake City,
- Trinity Rail Express in Dallas,
- TEXRail in Fort Worth,
- SunRail in Orlando,
- Metrolink in Los Angeles,
- Capital MetroRail in Austin, and
- Tri-Rail in Miami/Pompano Beach.

The greatest challenge in initiating a commuter rail service is often is sourcing the continuing operating support to run the service rather than the obtaining capital cost to construct. Fare revenues cover from 6% to 57% of operating expenses of the services listed above. Each one of these commuter rail start-ups had to find a continuing revenue stream. Many have formed regional authorities with either taxing powers, or agreements by participating counties to contribute set amounts. Often, but not always, the State has agreed to fund a share of the costs. In SunRail, the State of Florida covers the operating expense shortfall for the first handful of years while ridership rises to a normalized state, after which the responsibility will shift to the local entities.

Types of taxes levied include regional or county general sales taxes. In 2014, Clayton County, Georgia passed a 1% sales tax for transit and joined MARTA. Planning is underway for a Lovejoy and Atlanta commuter rail service. Minnesota has a motor vehicle sales tax of which a portion is devoted to supporting transit. Finding a source of operating funds is vital to starting commuter rail.

2 EXISTING CONDITIONS

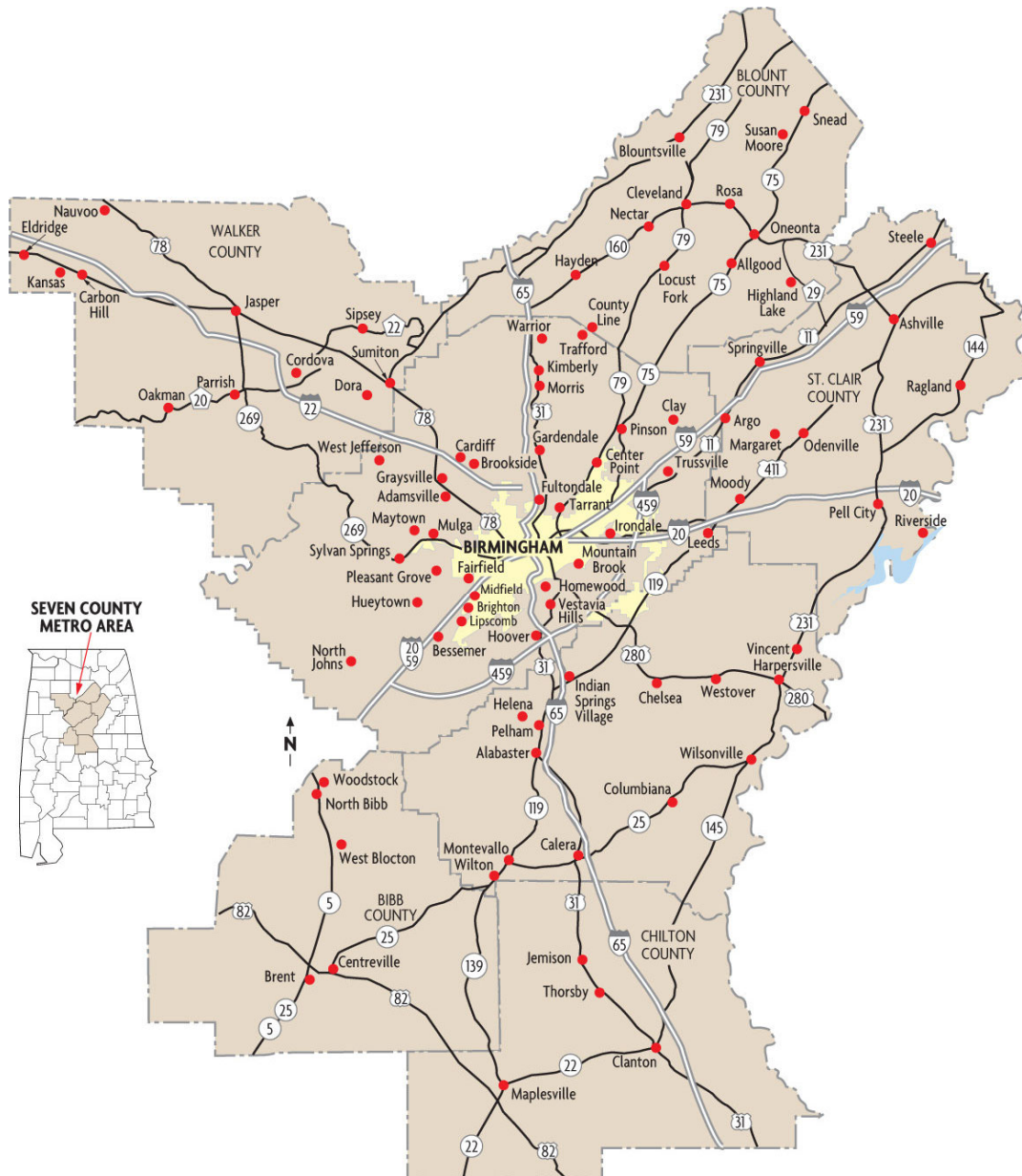
The existing and expected future conditions within the 37-mile corridor have been examined including population, traffic and development characteristics.

2.1 Corridor Population, Growth and Development

The Commuter Rail Study corridor northern most point is in downtown Birmingham and extends south to the town of Calera. The commuter rail alignment roughly parallels I65 and RT 31, and travels through Jefferson and Shelby Counties. The furthestmost station is located in Shelby County, which borders Chilton County in Calera (Figure 2).

Population in Alabama as a whole increased in the ten-year period from 2000 to 2010 by 7.5% and is projected to increase another 11.3% by 2040. The Birmingham metropolitan area comprised of Jefferson, Walker, Cullman, Blount, St. Clair, Shelby and Bibb Counties is ranked 50th in the United States by population (Table 1).

Figure 2 County Map



Four counties near the commuter rail alignment stations are Jefferson, Shelby, Bibb and Chilton. These Counties are presumed to generate the majority of potential commuter rail ridership. Three of the four counties Jefferson, Shelby, and Chilton have projected population increase, while Bibb County's population is projected to decrease slightly. Shelby County a suburb of Birmingham is projected to have a signification population growth of 41.7% over a 30-year period. The population increase in Shelby County is due to growing employment opportunities, education and access to entertainment and amenities. Jefferson County population is projected to change very little by 2040. The City of Birmingham has managed to retain the current employment base. Housing and new development remains in the surrounding counties and continues to generate commuter trips to downtown Birmingham. The Birmingham metro area economy is supported by education, medical services, technology-based business, mining and agriculture.

Table 1 Alabama Population 2000-2010

County	Census 2000	Census 2010
Alabama	4,447,100	4,779,736
Bibb	20,826	22,915
Chilton	39,593	43,643
Jefferson	662,047	658,466
Shelby	143,293	195,085

Table 2 Alabama Population 2020-2040

County	2020	2025	2030	2035	2040	2018 Series Change '10-'40	
						Number	%
Alabama	4,940,253	5,030,870	5,124,380	5,220,527	5,319,305	539,569	11.3
Bibb	22,354	22,174	22,023	21,932	21,885	-1,030	-4.5
Chilton	44,308	44,793	45,388	46,119	46,953	3,310	7.6
Jefferson	662,458	663,999	665,244	666,345	667,433	8,967	1.4
Shelby	224,628	239,859	253,485	265,330	276,373	81,288	41.7

Note: These projections are driven by population change between Census 2000 and Census 2010, taking into account 2017 population estimates. Data on births and deaths for 2000 to 2010 as well as more recent data from the Alabama Department of Public Health are used to derive birth and death rates for the state and each county.

Source: U.S. Census Bureau and Center for Business and Economic Research, The University of Alabama, April 2018.

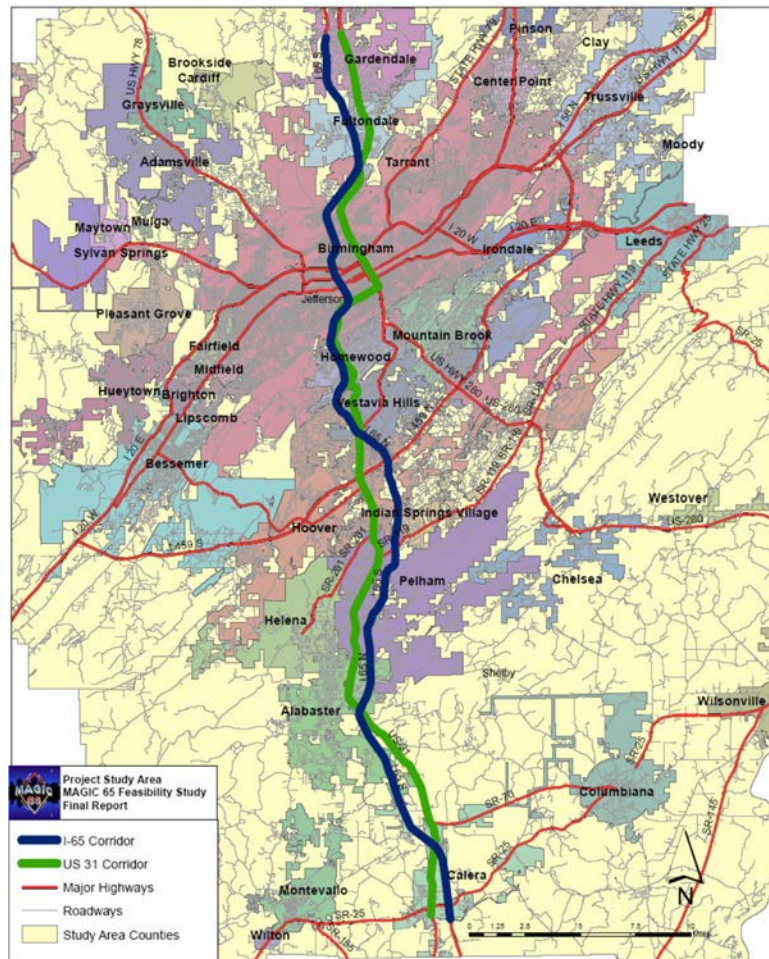
2.2 Existing and Projected Traffic

Previous studies addressing growing traffic and congestion in the Birmingham metropolitan area and potential solutions were reviewed. The region has experienced growing employment and population base in parallel with increasing Vehicle Miles Traveled. Development patterns and limited transportation alternatives have been identified as ongoing issues in the region.

2.2.1 I-65 Corridor Feasibility Study MAGIC 65

The 2007 I-65 Corridor Feasibility Study, MAGIC 65 identified transportation improvements along a 45-mile corridor. The study area extends from Shelby County to Birmingham center city. MAGIC 65 study is the initial phase of a multi-phase study. It represents a feasibility study of transit and/or highway improvements to consider as viable options for the corridor. The options that were screened for feasibility included High Occupancy Vehicle (HOV) lanes, Express Bus lanes, High Occupancy (HOT) lanes, Bus Rapid Transit (BRT), Managed lanes and Truck-only lanes. Recommended feasibility actions for the immediate, near future and long term were identified as HOV lanes and BRT on I-65 and BRT on US 31 (Figure 3).

Figure 3 MAGIC 65 Corridor



I-65 Corridor Feasibility Study Final Report (February 16, 2007) p. 1-2.
Retrieved from <http://rpcgb.org/wp-content/uploads/2017/10/MAGIC-65-Final-Report.pdf>

2.2.2 I-65/US31 Mobility Matters Plan

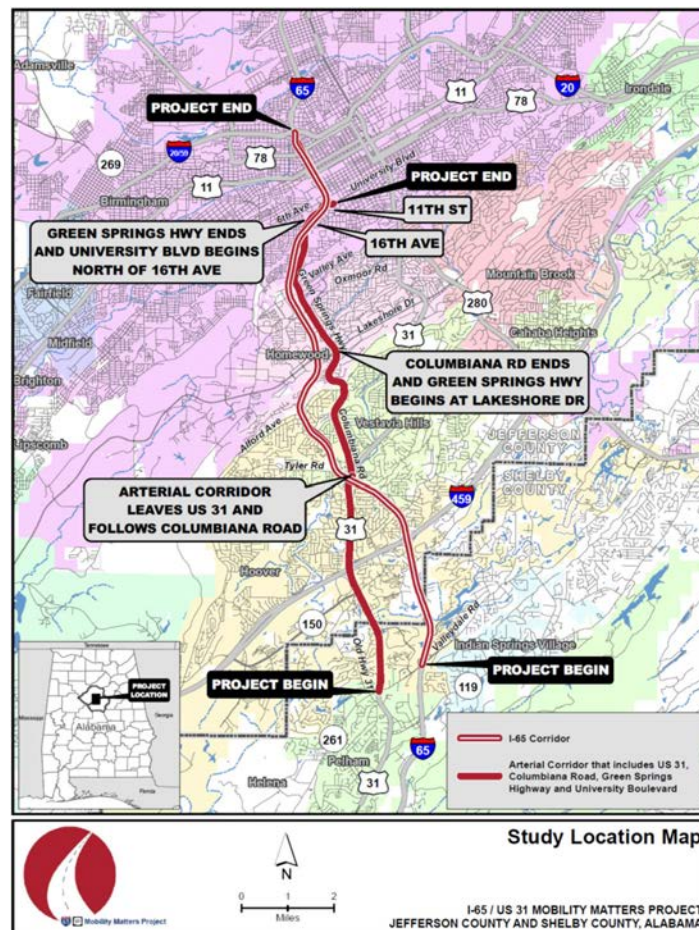
Key findings from the MAGIC 65 study, were incorporated into the I-65 / US31 Mobility Matters Plan, June 2013; Regional Planning Commission of Greater Birmingham. The study continued analyzing options along the corridor and proposed a combination of highway improvements and transit services to address congestion. The corridor extends from Birmingham south along I-65 and US31 to Pelham, connecting suburban Shelby County with business and commercial districts in the metropolitan Birmingham area. The corridor is approximately 13 miles in length. Traffic is currently congested in the corridor and projected to get worse in the following years. Commuters are experiencing significant delays using I-65 and other routes within in the corridor. Based on travel demand models, 2035 traffic will grow at an average rate of 1.7% per year between 2010 and 2035. It is noted the low growth rate is due to the limited capacity on I-65 / US31 and the fully developed Birmingham metropolitan area. There is the potential for residential and commercial growth opportunities in the suburbs further south along the corridor.

The transit study included a structured analysis, set goals and objectives that were ranked (Table 3). The Locally Preferred Alternative selected is I-65 HOV Lanes and Premium Transit Alternative (Figure 4).

Table 3 Proposed Transit Improvements

Transit Improvement	Quantity
Premium transit routes	7
Premium Transit Stops/Stations	67
Transit Super Stops	2
Park and Ride Lots	5
Queue Jump Lane Installations	11
Traffic Signal Priority Installations	43
Premium Transit Buses	65
Peak Waiting Time	10 minutes
Interface with planned Blazer Express transit	
Transit will use HOV lanes	

Figure 4 Mobility Matters Corridor



Mobility Matters, Post-Tier 2 Alternatives Evaluation (June 2012).
 Retrieved from <http://rpcgb.org/wp-content/uploads/2016/09/Post-Tier-2-Alt-Evaluation-Final-Report-062712.pdf>

2.2.3 Regional Transportation Plan 2040 Regional Planning Commission of Greater Birmingham

The Regional Planning Commission of Greater Birmingham in its long-range plan, identifies challenges facing the region. The Regional Transportation Plan (RTP) recognizes if the issues are left unresolved could lead to lost economic investment and dissuade potential businesses and residents from locating in the region. Long commute distances due to suburban sprawl development patterns and limited transportation alternatives, are common. Vehicle miles traveled have been rising for decades along with employment and population increases in the region. Growing highway congestion may have economic consequences if not addressed. The Regional Transportation Plan (RTP) noted increasing highway capacity will only generate more displaced development patterns and sprawl which is not desirable.

The RTP identifies specific strategies for addressing challenges in the region. Table 4 is a summary of the RTP strategies.

Table 4 RTP Strategies for Addressing Challenges

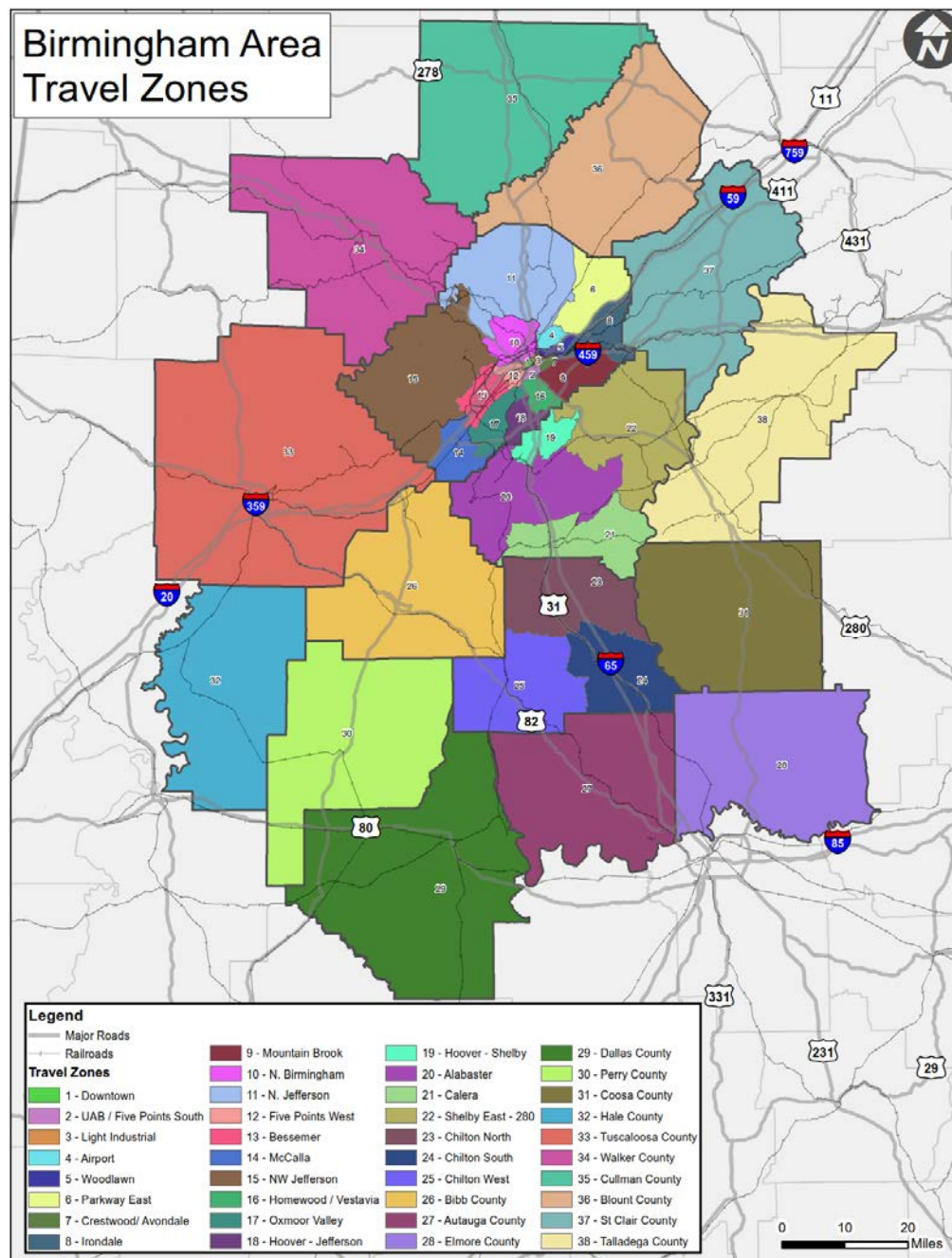
Strategy	Element
Placemaking	<ul style="list-style-type: none"> - Preserve Open Space - Increase transportation choices - Forster attractive living options
Public Transportation	<ul style="list-style-type: none"> - Improve local transit service - Make incremental improvements - Increase access to services
Bicycle & Pedestrian Travel	<ul style="list-style-type: none"> - Integrate performance measures and prioritize - Educate professional community, elected officials and public - Enhance facility design - Design for safety - Create non-motorized travel options - Strategically plan and invest - Expand the Active Transportation Program
Improve Efficiency	<ul style="list-style-type: none"> - Incorporate RTP Transportation System Management and Operations (TSMO) elements - Improve Incident and emergency procedures - Develop bottleneck elimination plan - Establish corridor management program - Integrate safety into operations - Improve system level partnership - Advance demand management - Improve transit technologies
Infrastructure Preservation, Modernization and Expansion	<ul style="list-style-type: none"> - Use allocated funds to preserve and maintain system - Smart Expansion and Fix It First guide future projects - 2040 Visionary Plan Capacity Projects and Regional Transportation Plan - Infrastructure maintenance fund, set aside
Improve Freight System	<ul style="list-style-type: none"> - Identify and prioritize major freight routes - Capitalize on existing freight network - Close gap in freight network - Integrate freight considerations into land use decisions

The RTP highlights several funding mechanisms in addition to the Transportation Improvement Program, to accelerate project delivery of projects which are funded. In addition to explore new funding opportunities and short-term policy which should be acted upon and begin to tackle long term organizational changes.

2.3 Commute Trip Analysis

To develop a conceptual ridership estimate, WRA used US Census data known as Longitudinal Employer-Household Dynamics (LEHD) for the Birmingham area. The data was compiled into zones as shown Figure 5.

Figure 5 Birmingham Area LEHD Travel Zones



From a matrix of all daily commuter trips between zones, WRA then analyzed zones where commuters could use the proposed commuter rail (Table5). The cells highlighted in dark green have the greatest potential for commuter rail ridership. A complete matrix of all 38 zones and 582,123 daily commute trips in Birmingham is provided in Appendix A.

Table 5 LEHD Zones – Potential Birmingham Commuter Rail Trips

		Zone - To ►			
		1	2	3	12
No.	Zone - From ▼	Downtown	UAB/Five Points South	Light Industrial	Five Points West
14	McCalla	649	420	207	252
16	Homewood / Vestavia	2,560	2,024	595	705
17	Oxmoor Valley	946	716	206	321
18	Hoover - Jefferson	2,609	1,986	663	827
19	Hoover - Shelby	1,223	999	386	377
20	Alabaster	2,002	1,670	634	535
21	Calera	269	220	126	100
23	Chilton North	163	97	116	74
24	Chilton South	154	63	77	45
25	Chilton West	27	17	35	18
26	Bibb County	58	47	29	41
27	Autauga County	111	59	48	41
28	Elmore County	156	83	69	56
29	Dallas County	101	62	30	45
	Subtotal	11,028	8,463	3,221	3,437

Further analysis and discussion is located in Section 2.5 Commuter Ridership.

2.4 Current Railroad Operations

Birmingham is a major railroad crossroads with the busy crossing of about 80 daily CSX and Norfolk Southern Railway (NS) trains just west of Railroad Park at 13th Street. Amtrak operates two trains a day (one each direction) on the primary NS corridor. Both railroad lines carry train traffic far above average.

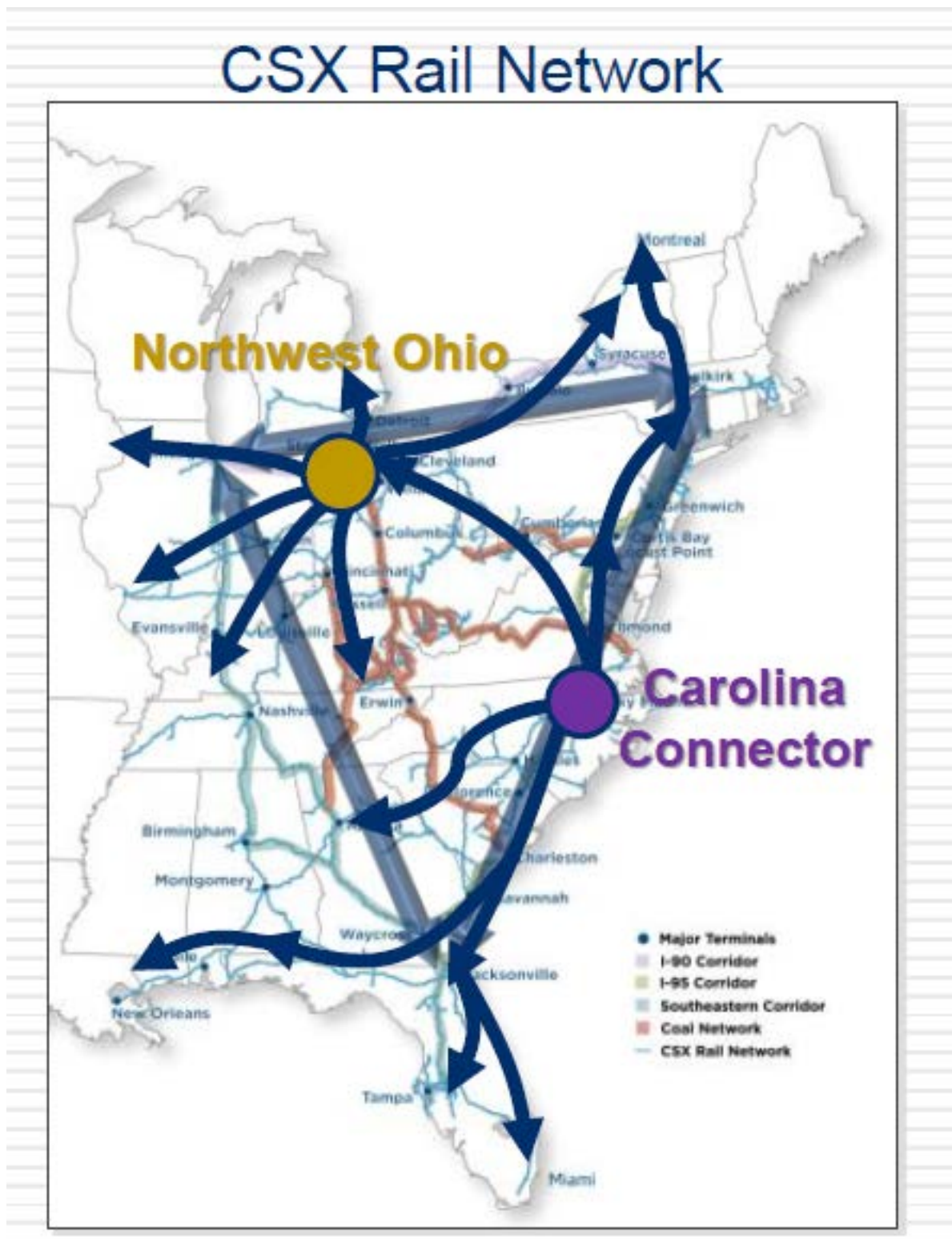
2.4.1 CSX Railroad

Birmingham is on one of the three most important CSX routes that form a triangle. Birmingham is on the Southeastern Corridor between the Midwest (Chicago) and Florida (Figure 6). South of Nashville, the corridor splits with one leg via Atlanta and the other via Birmingham. CSX routes about twice as much through traffic via Birmingham as via Atlanta, in part because of significant local coal traffic to a huge power plant north at Cartersville on the Atlanta line. The CSX Chattanooga and Atlanta line is owned by the State of Georgia which renewed the lease last year for another 50 years.

There are about 60 or more million gross tons (MGT) arriving Birmingham on CSX from the north (Figure 7) and 65-70 MGT south out of Birmingham to Helena (until last year at Parkwood/Homewood) where the CSX line splits into two routes: the Lineville Subdivision towards Florida carrying about 45 million gross tons or 23 trains per day (Table 6) and the S&NA subdivision towards Mobile and New Orleans carrying about 20-30 MGT and about 15 trains per day.

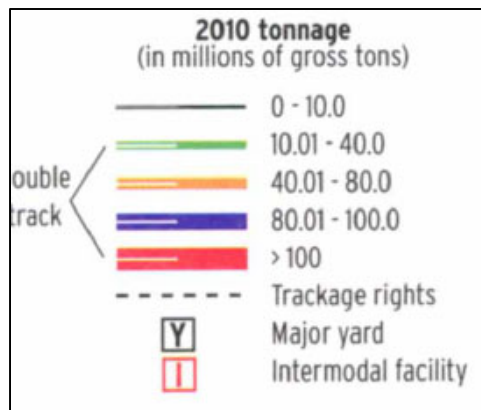
Originally, these two lines were separate railroads that crossed at Hoover (Parkwood on the railroad) with the Lineville Subdivision continuing west to Bessemer before entering Birmingham. Railroad rationalization following deregulation in 1980, resulted in merger in 1982 and abandonment of the Hoover and Bessemer segment in 1988 with all traffic moving on the S&NA Subdivision (S&NA refers to the original railroad name of South & North Alabama Railroad as constructed with land grants).

Figure 6 Primary CSX Corridors



Source: CSX presentation at 2016 Baird's Industrial Conference

Figure 7 CSX Traffic Density Map



Source: Trains Magazine 2011

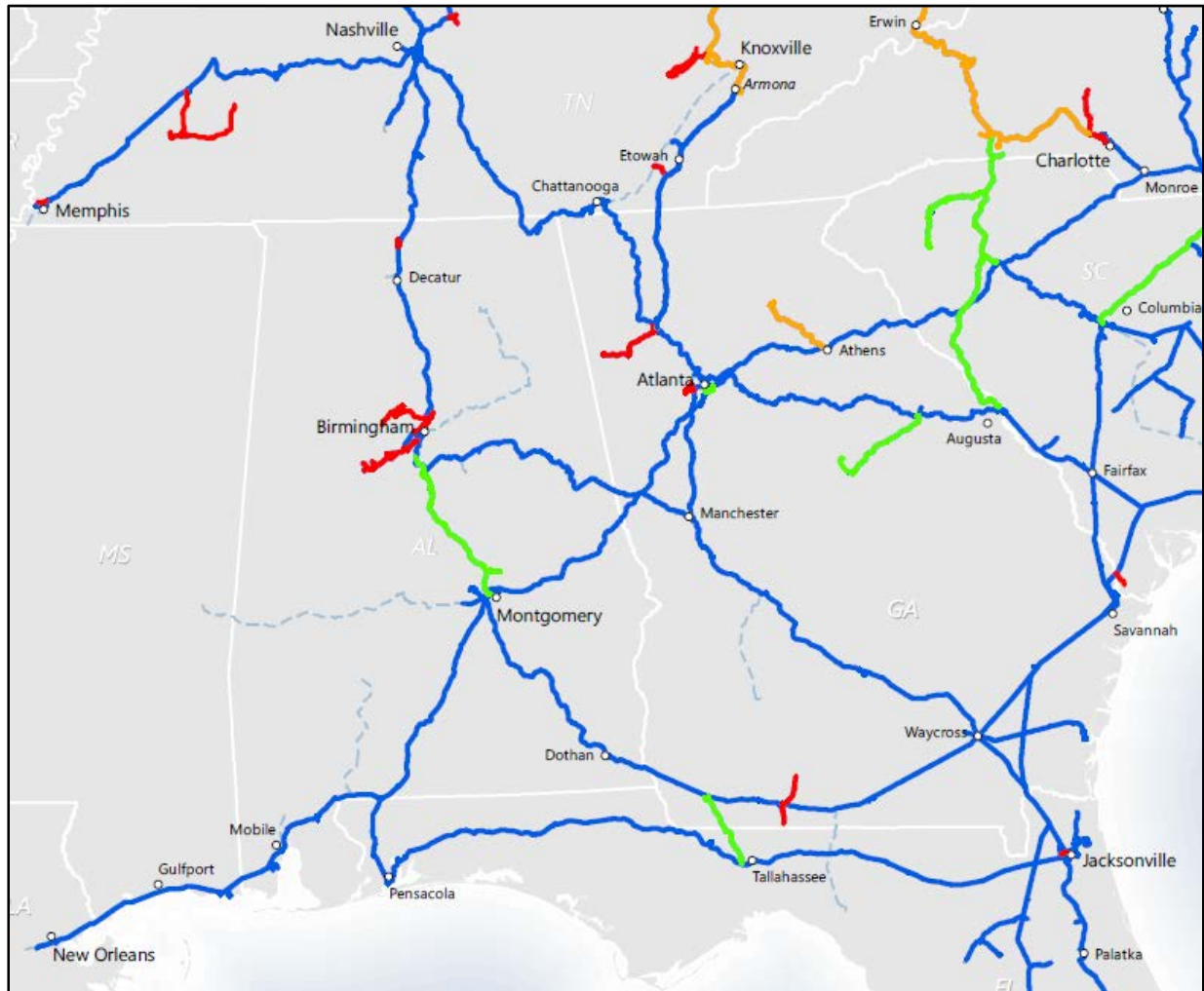
Table 6 Lineville Subdivision Characteristics

SUBDIVISION:	Lineville Subdivision
Division	Atlanta Division
Owner	CSXT
Operator	CSXT
Line Heritage	Atlanta, Birmingham & Coast (AB&C)
Subdivision Route / Mileage	Parkwood, Alabama – Manchester, Georgia; 179.4 miles
FRA Track Class	Class 4
Number of Main Tracks	One main track with sidings
Maximum Authorized Speed Freight	50 mph
Maximum Authorized Speed Passenger	NA
Wayside Signals	Automatic Block Signals (ABS) with Control Point Signals (CPS) at some siding switches
Operational Authority	Track Warrant Control (TWC) / Direct Traffic Control (DTC)
Maximum Allowable Gross Weight	286,000 lbs. (Cartersville - Stilesboro segment only)
Clearances	Double stack compliant (20'2" ATR)
Current Traffic Density (2011 data range)	39.75-47.25 MGT
Average Number of Trains per Day (2013)	22.8 (Parkwood-Lagrange); 19.1 (Lagrange-Manchester)
Commodities Transported	Intermodal, automotive, and general merchandise freight traffic (part of CSXT's Southeastern Corridor)

Source: 2015 Georgia State Rail Plan

Last year, CSX built new connections between the two subdivisions about 5 miles south of Hoover (Parkwood connection) in the Helena/Pelham area. This enables the heavy traffic of both lines to be operated as a double track railroad. It also enables traffic from Mobile and New Orleans to bypass the Parkwood tunnel which could not accommodate full double-stacked container cars at a height of 20 feet 2 inches. When CSX eliminates any other restrictions between Montgomery and Birmingham, it will enable a new double-stack container route. In Figure 8, Blue lines indicate unrestricted double-stack container capacity (20'2"), Orange lines indicate only shorter Ocean containers may be handled (18'2"), Green lines fall between, but really indicate suitability for tri-level auto carriers may be operated (19'2") and Red lines indicate no double-stack cars. Rarely will double-stack equipment be operated on lines with clearances less than 20'2" as often only one container per well may be handled, effectively doubling rail costs per container.

Figure 8 CSX Double-Stack Container Routes



2.4.2 NS and Amtrak

Just east of Birmingham, NS key Northeast/New Jersey and Midwest/Ohio corridors join and flow westerly through the center of Birmingham towards New Orleans and Mobile. In 2015, this was, in railroad parlance, about 65 million gross tons of trains and cargo. All loadings pass through central Birmingham, including intermodal containers, chemicals, plastic pellets, paper, lumber, manufactured products and coal. This would total 35-45 daily trains.

In addition, the Amtrak Crescent route between New York and New Orleans stops at the new Birmingham Intermodal Facility. To or from the east, the Amtrak train must cross the busy CSX mainline to access the facility. To or from the west, no crossing is needed to access NS.

Amtrak passengers boarding or alighting at Birmingham totaled 39,381 in 2018, or about ¾ of all Alabama station passengers.

2.4.3 Birmingham Railroad Park Interlocking

- Nearly 80 trains each day operate through this location with a maximum speed of 20 mph by CSX (three main tracks) and 30 mph for NS (two main tracks). At this level of traffic, this specialty trackwork requires renewal every 3 to 5 years, creating more delays to train traffic. To thread commuter trains through this would often require bringing both NS and CSX freight trains to a standstill, albeit only temporary (Figure 9).

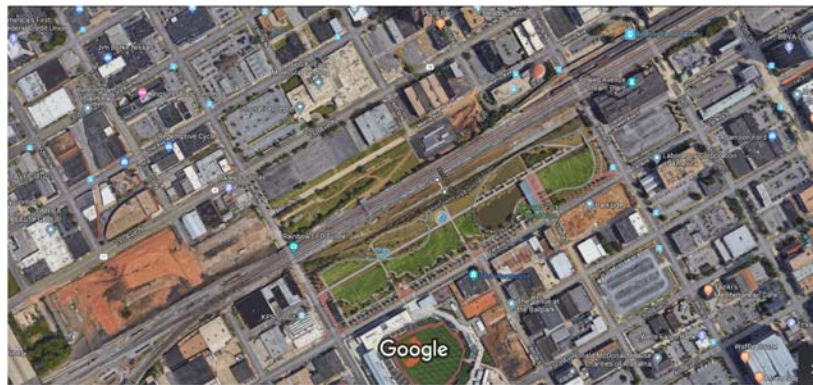
Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

If commuter trains were to operate into the new Birmingham Intermodal Facility at the site of former Union Station would:

- Result in frequent delays to commuters
- Require renovation and upgrading of track, turnouts and signaling at the intermodal facility as current operating speed is 10 mph,
- Likely cause CSX to refuse to discuss access to its tracks.

Between the existing tracks and Railroad Park, there is an 80-foot strip of railroad right-of-way. This location, ending at 18th Street is adequate to install two station tracks and a large center platform. A station at this site would eliminate the conflicts and delays at the 13th Street Railroad Crossing.

Figure 9 CSX and NS Rail Crossing Interlocking in Downtown Birmingham



3 CONCEPT DEVELOPMENT

3.1 Railroad Alternatives

3.1.1. Railroad requirements for shared use

Following railroad deregulation in 1980, freight traffic was consolidated on primary lines leaving lesser traffic on other rail lines. The availability of such lines led to an expansion in commuter rail around the country as in Los Angeles; Northern Virginia; Altamont, California; Dallas-Fort Worth; San Diego; and Miami. In all these locations, commuter rail shared tracks with freight trains.

By 2000, increased freight traffic made railroads more concerned about possibly selling off any remaining capacity, and the legal litigation following a wreck in Chase, Maryland where despite written agreements to the contrary (requiring each operator to assume its own costs), a freight railroad was held liable for the 16 deaths by reason of gross negligence caused by a train crew under the influence of marijuana. The freight railroad response was to require any passenger operator to carry \$1/2 billion in insurance.

An example of how railroad thinking has changed through the years is how NS has priced its Atlanta-Macon secondary (parallel) 103-mile main line. In the 1980's it offered it to the State of Georgia for about \$40 million and retaining freight train rights. By 2001, the price had risen to \$300 million (including \$100 million in new upgrades). In 2015, when approached again, shared use by freight and commuter trains was no longer an option NS would accept; however, NS offered to sell a 40-foot strip of right-of-way upon which to construct a new passenger rail line, provided that no new trackage be within 26 feet (track centers) of any NS line and that no industry tracks could be crossed at grade.

3.1.2. Shared use

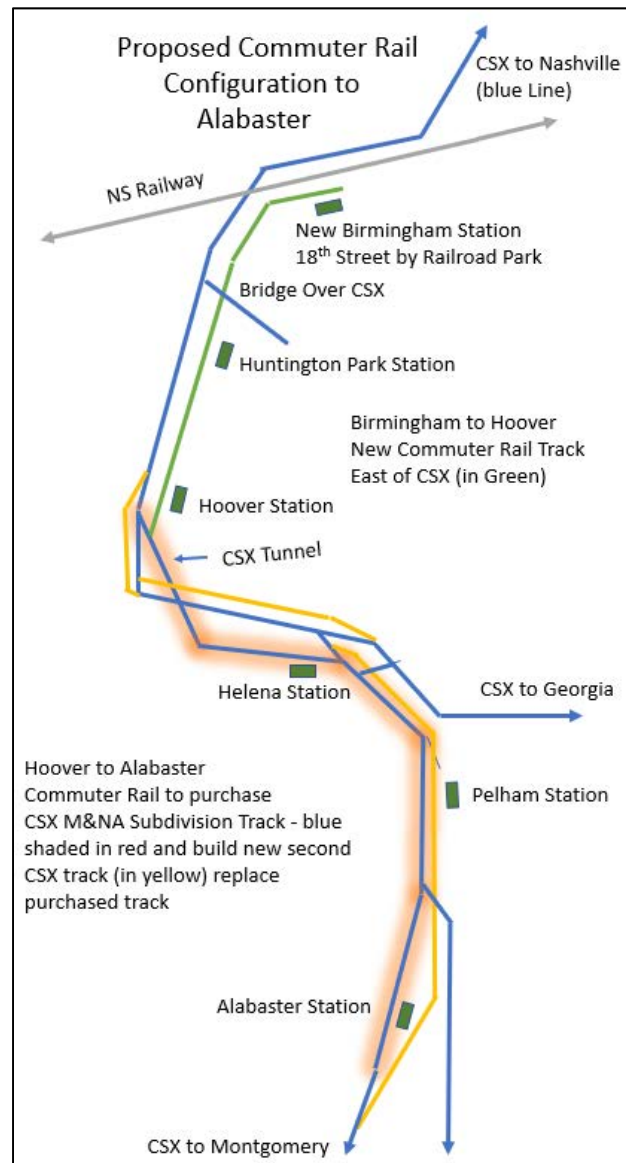
Shared use was standard 30 years ago, but for new construction shared use is now limited to only existing arrangements or locations where rail freight traffic is negligible and where operations could preferably be time separated, so trains cannot collide. Commuter Rail shared use is not appropriate on the CSX line between Birmingham, Alabaster and Calera.

3.1.3. Independent operation

This conceptual analysis assumed that a strip of the CSX right-of-way could be obtained and used to construct a new track at least 26 feet from the current CSX track and provide an independent operation where commuter and freight trains would not conflict with each other. Typical railroad rights-of-way are 100 feet wide (though there are many exceptions) and would usually permit construction of a track 24 feet from the edge of right-of-way and 26 feet from an existing freight track in the center of the right-of-way between Birmingham and Hoover (Parkwood).

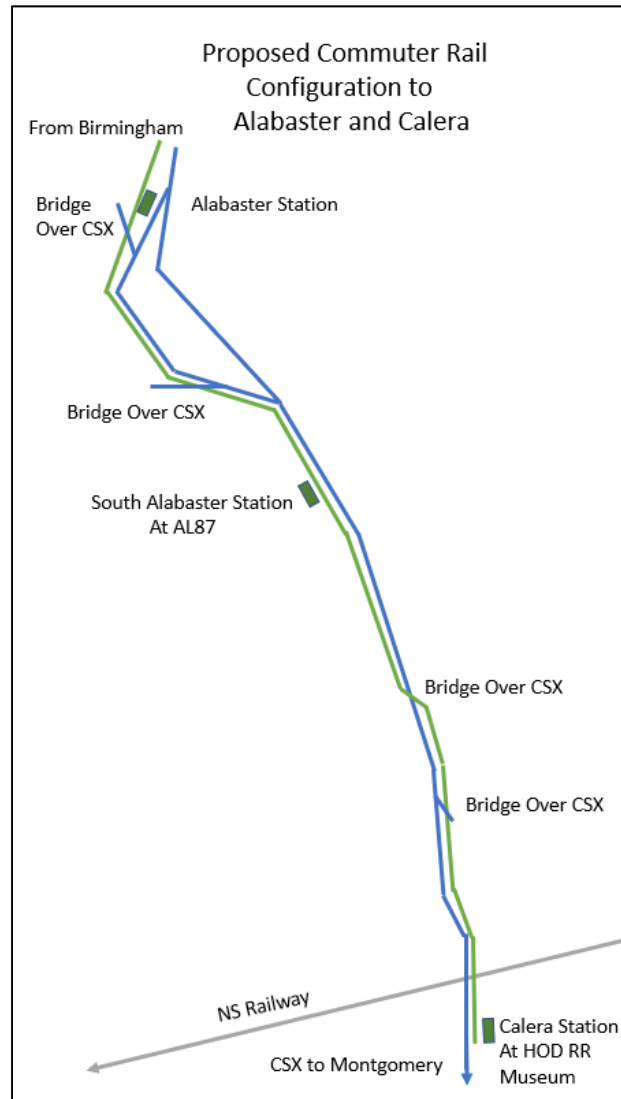
Between Hoover (Parkwood) and Helena, CSX has two widely separated parallel lines, one of which (the S&NA Subdivision) has a restrictive freight issue (cannot accommodate domestic double-stack containers through the Parkwood Tunnel). In this segment, the concept would be to purchase the S&NA line and construct a new track for CSX parallel to the existing Lineville Subdivision. Between Helena and Alabaster, the concept would be to purchase the existing CSX S&NA track and construct a new track for CSX 26 feet away (Figure 10). The north segment ends at 2nd Place NW in Alabaster because south of this point will require an expensive flyover over CSX main track. In addition, land for end-of-the-line parking at Alabaster City Hall is insufficient. If the industry track issues could be resolved with CSX, the next logical end-of-line parking lot would be near Highway 119 (Montevallo Road). Also, 2nd Place NW has adequate land to provide a location to park the trains at night (layover yard) as well as daytime commuter car parking. Extending the line from Alabaster to Calera (See Figure 11) will require four bridges over CSX as part of constructing a parallel new Commuter Rail track.

Figure 10 Configuration Birmingham to Alabaster



The concept portrayed in Figure 10 shows existing CSX Main Lines in Blue with line sale to the commuter entity indicated in shaded tan. New construction replacement tracks to CSX are yellow with new construction by the commuter entity in green.

Figure 11 Configuration Alabaster to Calera



3.2 Operating Plan

The conceptual operating plan is for four commuter trains inbound from Alabaster to Birmingham in the morning and four returning in the evening with intermediate stops at Pelham, Helena and Hoover. With an independent single-track operation including passing sidings at Hoover and Helena, the first train would return and also serve as the fourth train, enabling operation with three train sets and three train crews. At current CSX freight track speeds, Commuter train running time would be 47 minutes from Alabaster to Birmingham and 37 minutes from Helena (Table 7). With an independent track and operation, speeds could be increased resulting in 40 minutes from Birmingham to Alabaster and 28 minutes from Birmingham to Helena. Freight train operations require balanced super elevation on curves to minimize rail wear from heavy trains. A dedicated passenger railroad would install higher (more) super elevation and thus could operate at higher speeds. These improved rail travel times show significant travel time savings over peak period highway travel times (Table 8).

Table 7 Running Time CSX Rail and Improved Rail

Station	Miles	Current CSX Speed (minutes)	Improved Commuter Rail (minutes)
Birmingham (18th Street)	0.0	0	0
Huntington Park (Shades Creek Circle)	6.8	17	10
Hoover (John Hawkins Parkway)	12.6	28	21
Helena (Railroad Avenue)	17.7	37	28
Pelham (Pevine Creek)	19.8	42	33
Alabaster (2nd Place NW)	22.2	47	37
South Alabaster (AL87)	27.1	55	44
Calera (RR Museum)	33.7	66	53

Table 8 Commuter Rail Travel Time Savings

Station	Miles	Highway Time 4/16/2019 7:38 am (minutes)	Commuter Rail Improved (minutes)	Commuter Rail vs. Highway Saving (minutes)
Calera (RR Museum)	0	60	53	7
South Alabaster (AL87)	6.6	54	44	10
Alabaster (2nd Place NW)	11.5	53	37	16
Pelham (Pevine Creek)	13.9	43	33	10
Helena (Railroad Avenue)	16.0	46	28	18
Hoover (John Hawkins Parkway)	21.1	33	21	12
Huntington Park (Shades Creek Circle)	26.9	19	10	9
Birmingham (18th Street)	33.7	0	0	0

An example of what a four-train frequency schedule might look like is shown in Table 9 providing 15 minutes to walk or ride a shuttle to work after detraining. With an independent operation, an option would be to have trainsets operate back and forth all day long. Generally, ridership is low midday with only a handful or so of commuters riding those trains, so cost effectiveness is low; however, often these are riders that would otherwise not ride the other direction at peak period if midday service was not available.

Commuter Rail Study
 Birmingham/Hoover/Helena/Pelham/Alabaster
 Regional Planning Commission of Greater Birmingham

Table 9 Example Schedule Inbound and Outbound

Inbound	Miles	Train 1	Train 2	Train 3	Train 1	Train 2	Min.
Calera (RR Museum)	0	5:42 AM	6:52 AM	7:17 AM	7:57 AM	5:07 PM	0
South Alabaster (AL87)	6.6	5:51 AM	7:01 AM	7:26 AM	8:06 AM	5:16 PM	9
Alabaster (2nd Place NW)	11.5	5:58 AM	7:08 AM	7:33 AM	8:13 AM	5:23 PM	16
Pelham (Pevine Creek)	13.9	6:02 AM	7:12 AM	7:37 AM	8:17 AM	5:31 PM	20
Helena (Railroad Avenue)	16.0	6:07 AM	7:17 AM	7:42 AM	8:22 AM	5:36 PM	25
Hoover (John Hawkins Parkway)	21.1	6:14 AM	7:24 AM	7:49 AM	8:29 AM	5:50 PM	32
Huntington Park (Shades Creek Circle)	26.9	6:25 AM	7:35 AM	8:00 AM	8:40 AM	6:01 PM	43
Birmingham (18th Street)	33.7	6:35 AM	7:45 AM	8:10 AM	8:50 AM	6:11 PM	53
Outbound							
Birmingham (18th Street)	0.0	6:40 AM	4:10 PM	4:50 PM	5:15 PM	6:20 PM	0
Huntington Park (Shades Creek Circle)	6.8	6:50 AM	4:20 PM	5:00 PM	5:25 PM	6:30 PM	10
Hoover (John Hawkins Parkway)	12.6	7:01 AM	4:31 PM	5:11 PM	5:36 PM	6:41 PM	21
Helena (Railroad Avenue)	17.7	7:12 AM	4:38 PM	5:18 PM	5:43 PM	6:48 PM	28
Pelham (Pevine Creek)	19.8	7:22 AM	4:43 PM	5:23 PM	5:48 PM	6:53 PM	33
Alabaster (2nd Place NW)	22.2	7:26 AM	4:47 PM	5:27 PM	5:52 PM	6:57 PM	37
South Alabaster (AL87)	27.1	7:40 AM	4:54 PM	5:34 PM	5:59 PM	7:04 PM	44
Calera (RR Museum)	33.7	7:49 AM	5:03 PM	5:43 PM	6:08 PM	7:13 PM	53
Note: PM times are shown in bold							

3.3 Potential Stations

3.3.1 Birmingham – 18th Street Station

The proposed Birmingham location is in the empty rail corridor just north of Railroad Park with access from 18th Street and easy underpass walk to the Birmingham Intermodal Terminal (Figures 12-14). This location avoids the congestion and delays incurred by crossing both CSX and NS main lines to reach the Intermodal Station.

Figure 12 Proposed Birmingham Station

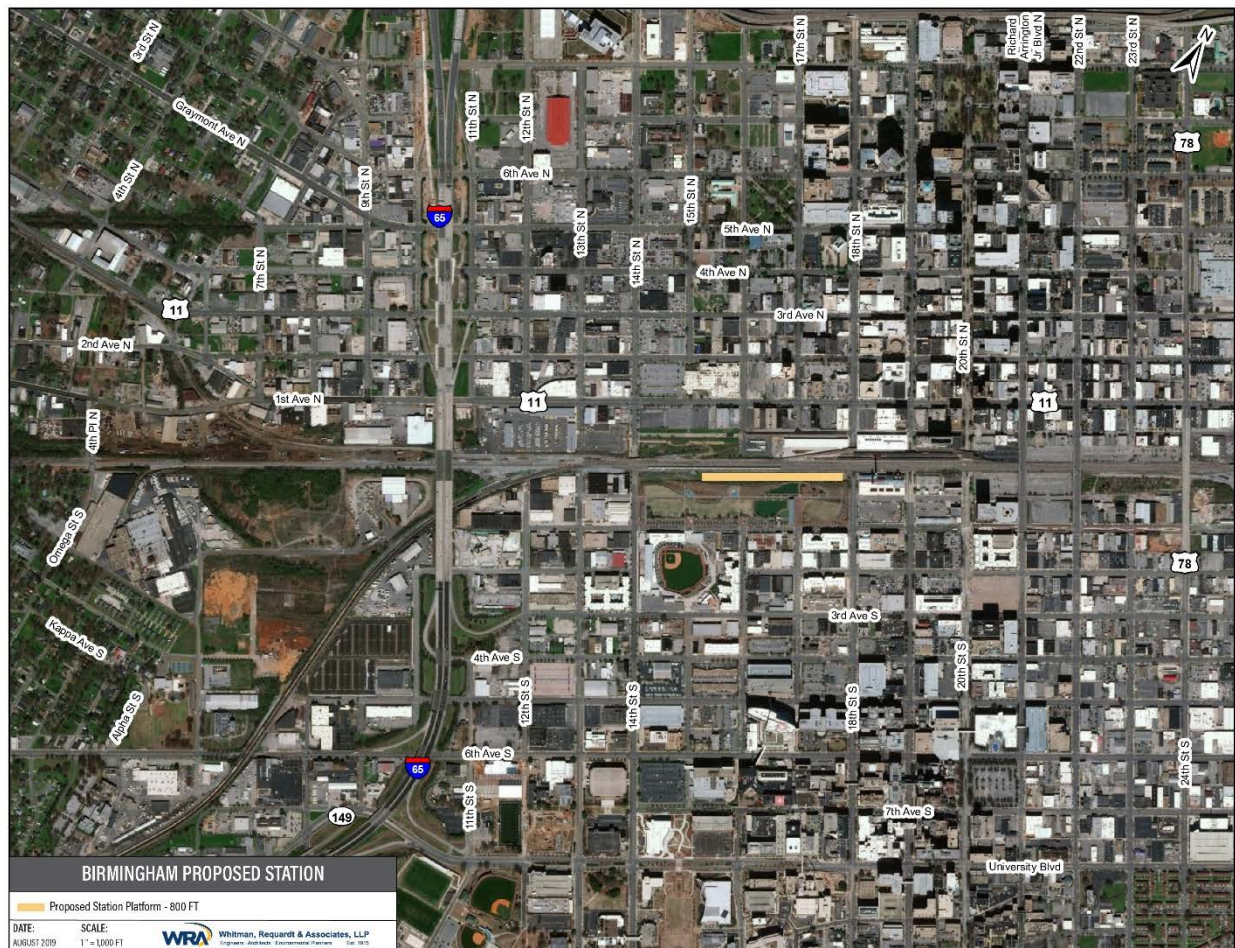


Figure 13 Birmingham Station Looking West



Figure 14 Access to Downtown and MAX Transit Via 18th Street

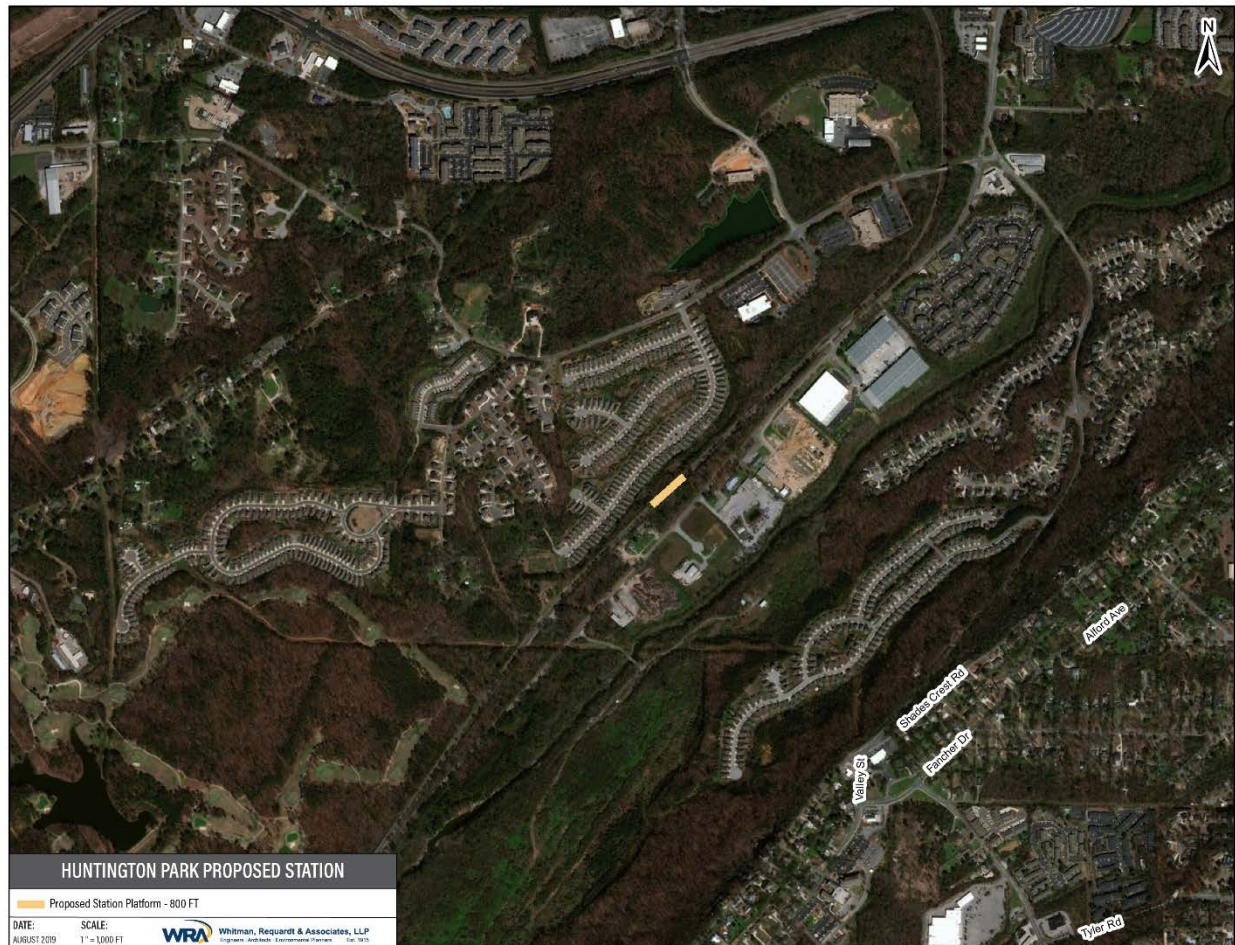


Five suburban stations are good conceptual candidates between Birmingham and Alabaster. These are Huntington Park, Hoover, Helena, Pelham and Alabaster. Extending service to Calera would add two more stations: South Alabaster and Calera.

3.3.2 Huntington Park Station

Huntington Park at about 2867 Shannon Oxmoor Road is 6.6 miles from Birmingham (Figure 15). This is south of Lakeshore parkway. Access from Hoover would be via W. Oxmoor Road. There are several possibilities in this vicinity for commuter parking.

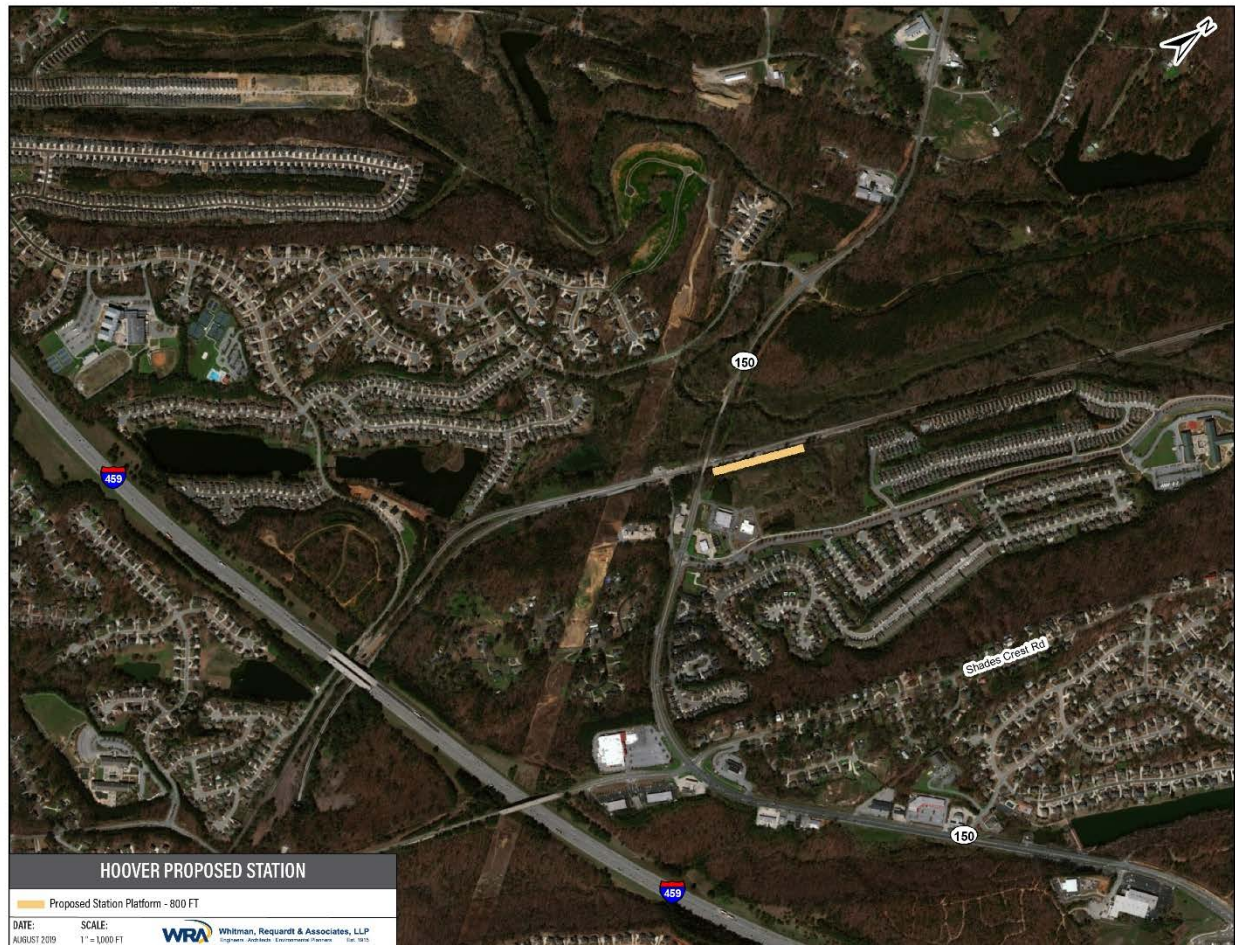
Figure 15 Proposed Huntington Park Station



3.3.3 Hoover Station

The proposed **Hoover Station** is at John Hawkins Parkway 12.6 miles from Birmingham (Figures 16-19). This site was also identified in the 2013 Birmingham to Montgomery Passenger Rail Feasibility Study (BMPRFS)

Figure 16 Proposed Hoover Station



Source: BMPRFS page 41

Figure 17 From Hoover Station Looking North from John Hawkins Pkwy

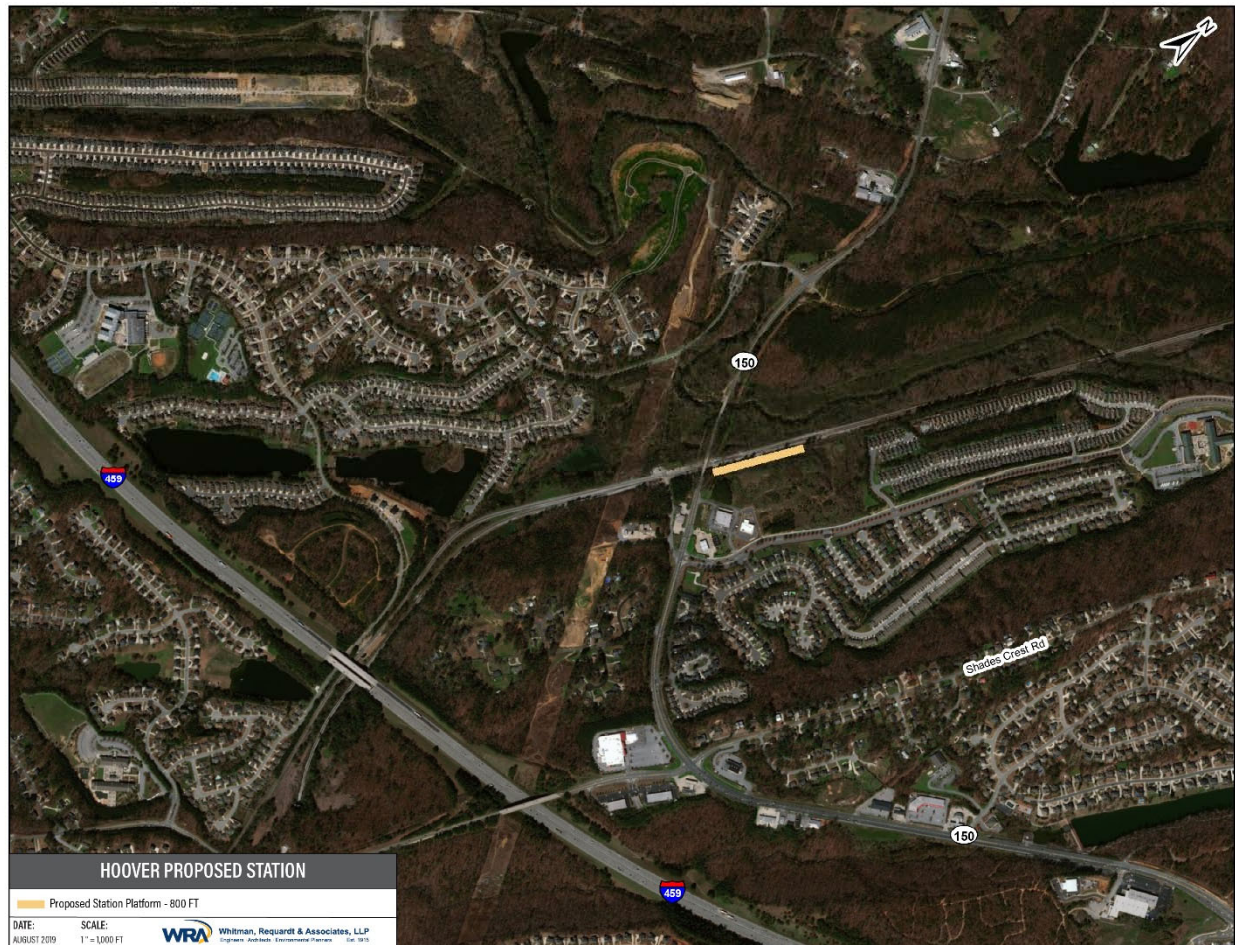


Figure 18 View From Hoover Station to Northwest



Property is 3.29 acres and is currently for sale.

Figure 19 Proposed Hoover Station



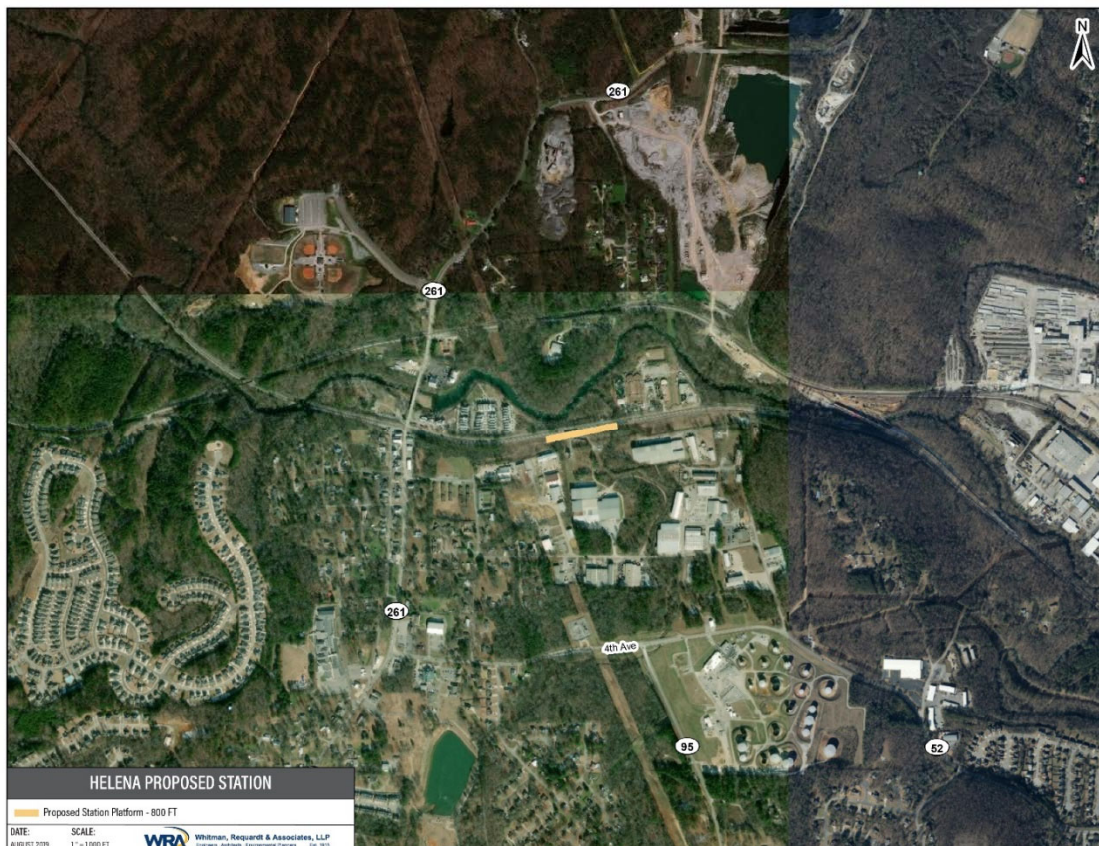
3.3.4 Helena Station

The proposed **Helena Station** is at Railroad Avenue to the east of Main Street. It is 17.7 miles from Birmingham. This site has available land for parking (Figures 20-21). View looking north.

Figure 20 Helena Station Area



Figure 21 Proposed Helena Station



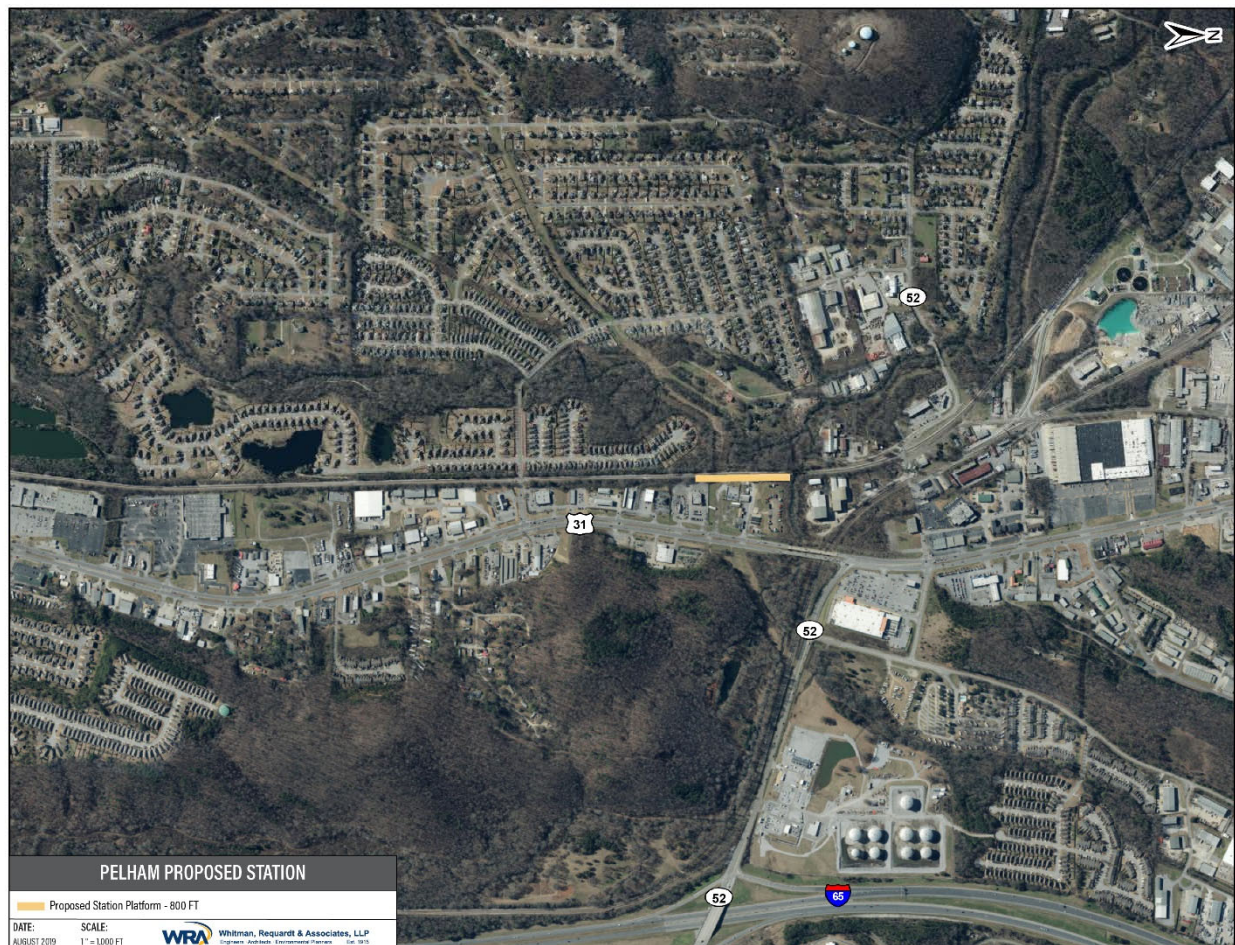
3.3.5 Pelham Station

The proposed **Pelham Station** is south of Peavine Creek by US 31. It is 19.8 miles from Birmingham (Figures 22-23). This site has available land for parking. View looking west.

Figure 22 Pelham Station Site Looking West



Figure 23 Proposed Pelham Station



3.3.6 Alabaster Station

The proposed **Alabaster Station** is at 2nd Place NW (behind the police department). It is 22.2 miles from Birmingham (Figures 24-26). This site has large acreage available for end of line parking and to provide parking for the three trains. View faces west.

Figure 24 Alabaster Station View Facing West



View faces north showing space for Station and parking of both autos and trains.

Figure 25 Alabaster Station View Facing North



Figure 26 Proposed Alabaster Station



3.3.7 South Alabaster Station

South Alabaster Station – If commuter rail were extended south to Calera, this site on AL87 located 27.1 miles from Birmingham could be the next station (Figures 27-28).

Figure 27 Alabaster South View Looking East



Figure 28 Proposed Alabaster South Station



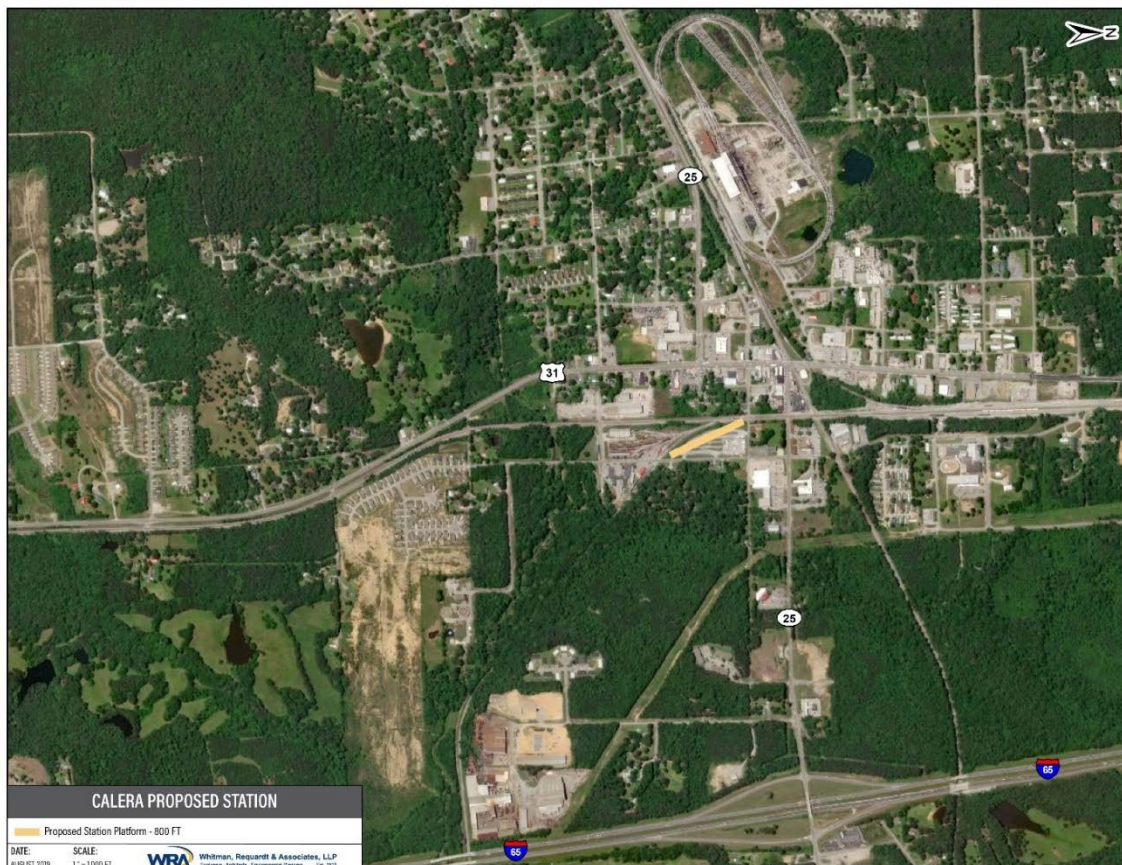
3.3.8 Calera Station

Calera Station – The proposed site is at the Heart of Dixie Railroad Museum 33.7 miles from Birmingham (Figures 29-30).

Figure 29 Calera Station View Looking South



Figure 30 Proposed Calera Station



3.3.9 Other Sites not selected

On February 25, 2019, Mike Kaczorowski of Regional Planning Commission of Greater Birmingham, Josh Johnson of Birmingham Jefferson County Transit Authority, Bolaji Kukoyi of Dynamic Civil Solutions and Crew Heimer of Whitman Requardt & Associates, LLP inspected station sites between Birmingham and Helena, recommending the above sites. The following sites were considered not suitable:

- Shannon – Shannon Road at Smith Circle. Close to town with adequate local road alternatives to I-65. Poor topography to construct parking.
- Ross Bridge - Ross Bridge Road at Haddon Drive. Consider only if no other site could be identified as the nearby John Hawkins Parkway site was superior. A long curve at this location requires a new track with a flat portion in the middle of the curve on which to locate a station platform. Extensive cut required for new track and extensive leveling required for parking.
- Helena – Main Street. Daytime commuter parking would hinder local businesses.
- Pelham – Midridge Lane at US 31 – plenty of land, but too far south of Pelham and too close to Alabaster.

The proposed BMPRFS Pelham station site at Industrial Road and US 31 did not have adequate space for parking.

3.4 Transit Oriented Development Opportunities

Transit-oriented development or TOD is a type of development pattern which encourages and supports a mixture of housing, office, retail or other amenities integrated into a walkable and bikeable neighborhood located within a half-mile of quality public transportation. The goal of TOD is to increase transit ridership and reduce the need to use a private car with amenities and transit options close by. Typically, high-density mixed development surrounds the central transit station within ¼ mile, and lower-density neighborhood development spreads out ½ mile from the transit station.

Characteristics of successful TOD include:

- Supports increased densities
- Integrates with surrounding development and neighborhoods
- Incorporated public and civic space
- Encourages walking and bicycling
- Integrates mutually compatible land uses
- Extends the hours of activity
- Enhances market and financial feasibility
- Improves security
- Balances ridership

While the introduction of mass transit by itself typically does not lead to economic vitality, a serious commitment to the deliberate connection between transit investment and land use decisions is critical. As seen in regions of the country that have favorable market conditions and supporting public policies, considerable development near transit stations has evolved.

Table 10 Questions to Consider at Each Rail Station:

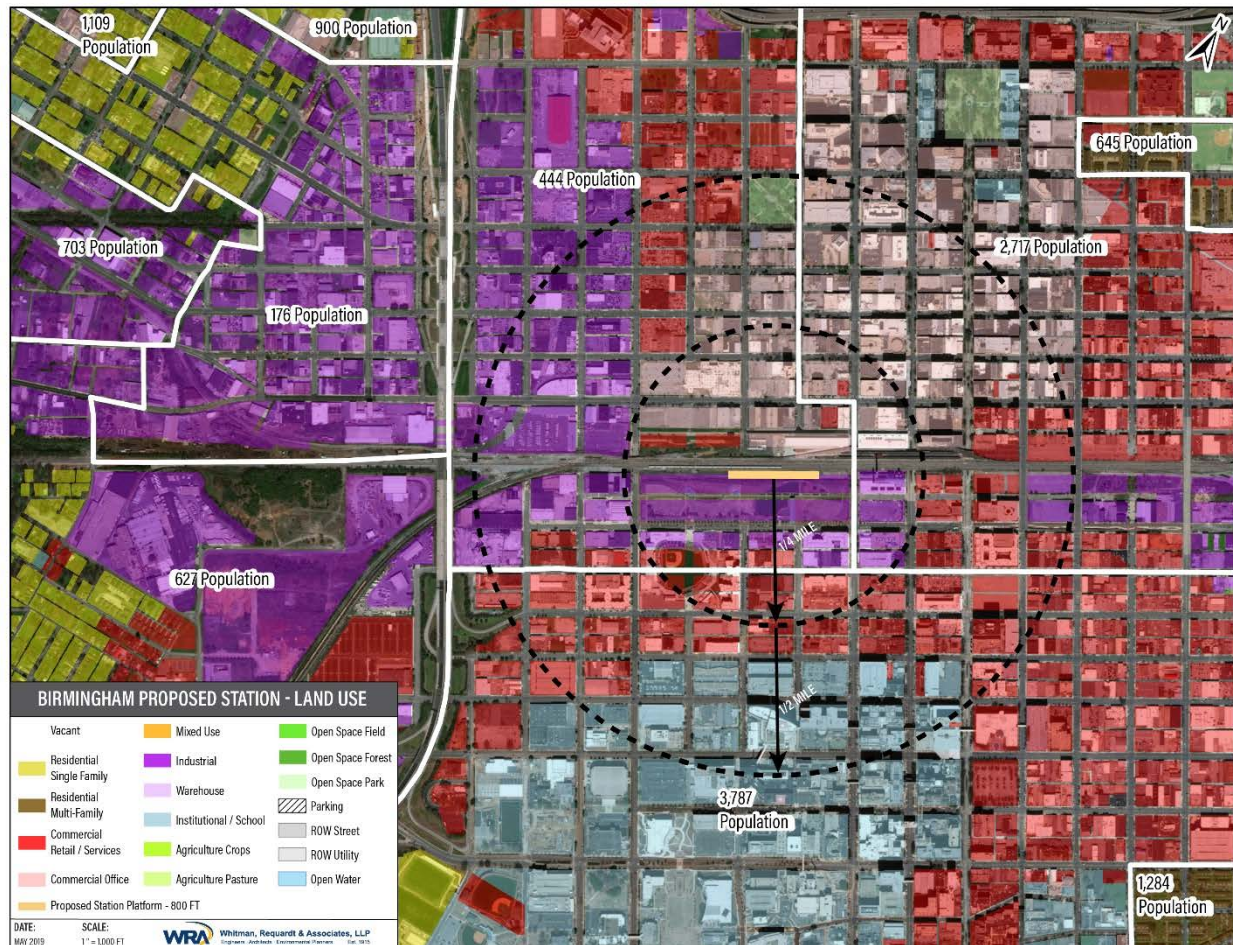
WHO	Can use CSX and NS right-of-way for development?	Are potential partners to support development?
WHAT	Is the prioritization for development at this station over the other stations?	Zoning needs to be changed to support development?
HOW	To go about setting policy across multiple sectors to support development?	To balance affordable housing and revenue?
WHY	Encourage TOD at this station?	Set performance measures and goals?

Connected development and higher densities with transportation options makes for efficient travel to desired destinations.

3.4.1 Birmingham Station TOD

The proposed Birmingham commuter rail station is in downtown Birmingham surrounded by mixed land use and relatively high densities. The land use within a half mile of the station includes industrial, commercial, office and University of Alabama. Walkability to and from the station supports TOD (Figure 31).

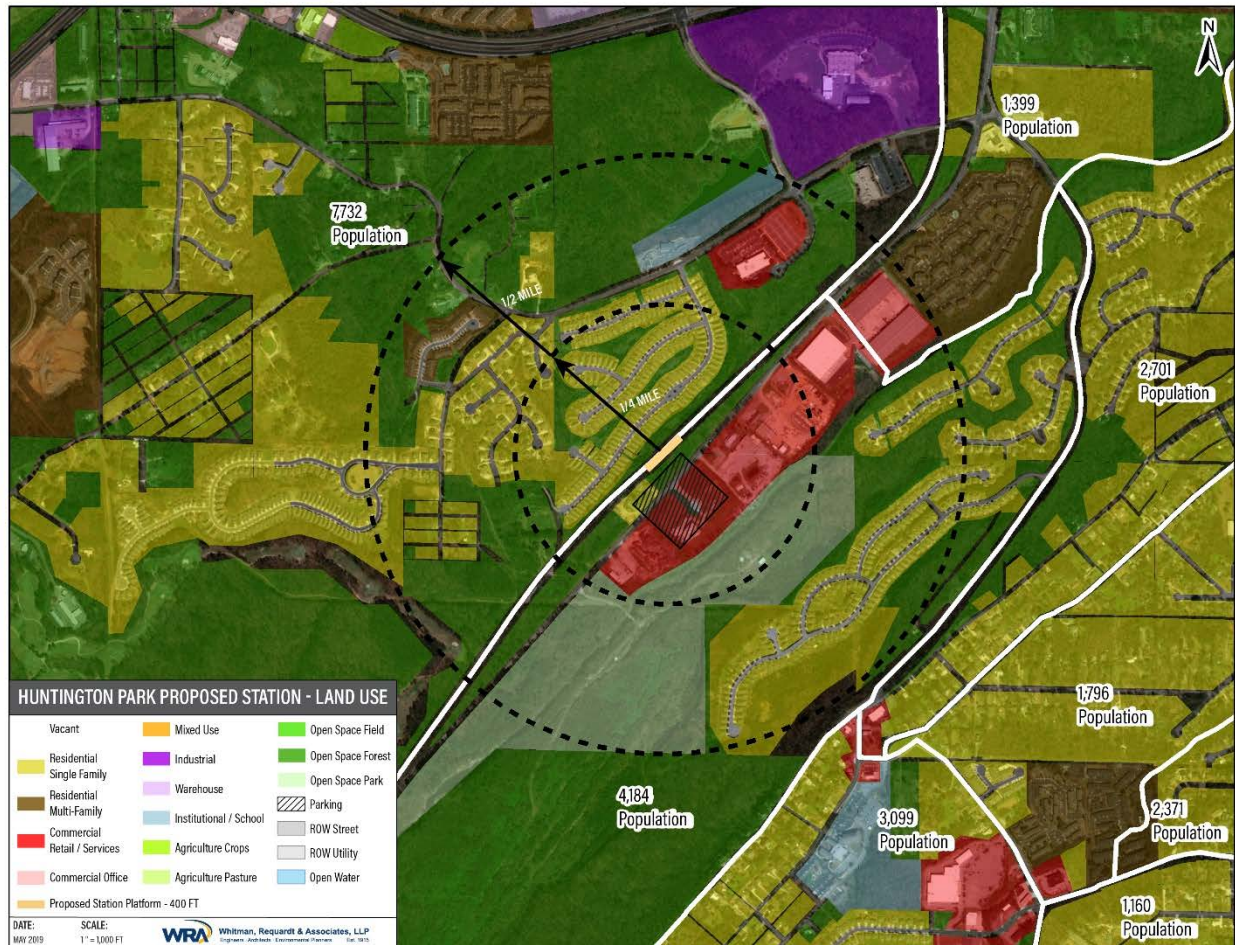
Figure 31 Birmingham Commuter Rail Station TOD



3.4.2 Huntington Park Station TOD

Commercial use and medium density residential land use is within a half mile radius of the proposed Huntington Park station. Open space and Shades Creek parallel the railroad alignment. Pedestrian access from the existing residential use to the station would have to be defined (Figure 32).

Figure 32 Huntington Park Commuter Rail Station TOD



3.4.3 Hoover Station TOD

Land use adjacent to the Hoover commuter rail station is primarily open space and agriculture with suburban development nearby (Figure 33). Minimum amount of existing mixed use, some commercial/retail. The challenge may occur in the form of pedestrian access from residential areas within and outside of the half mile radius to the train station. Easy walking non-vehicle access would need to be addressed.

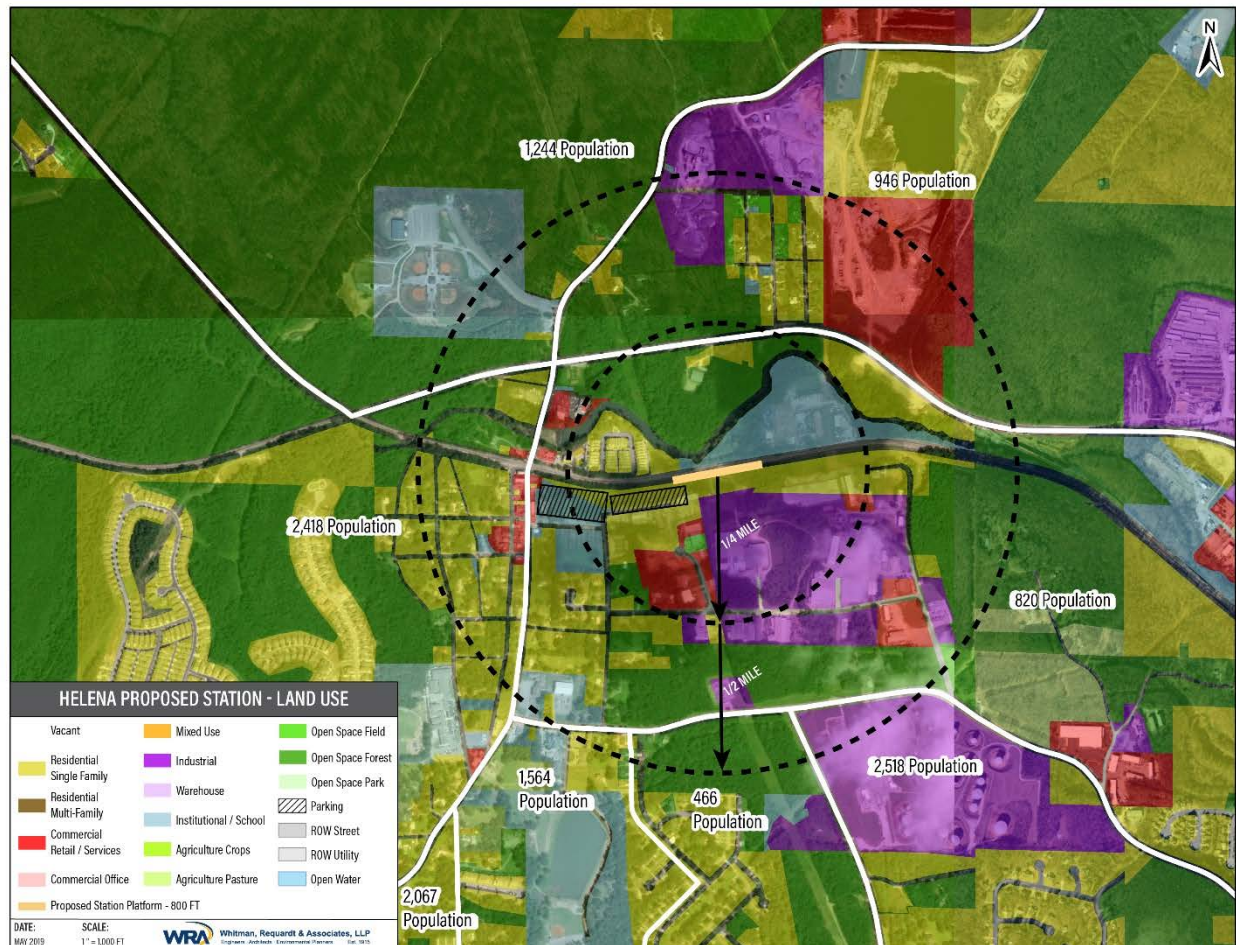
Figure 33 Hoover Commuter Rail Station TOD



3.4.4 Helena Station TOD

Within the half mile radius from the Helena station, land use is mixed, supporting commercial/retail, industrial, open space and residential (Figure 34). Although residential units are located adjacent to the station within the quarter mile radius, the population within the residential zones is relatively low. The walkability to and from the station would have to be addressed.

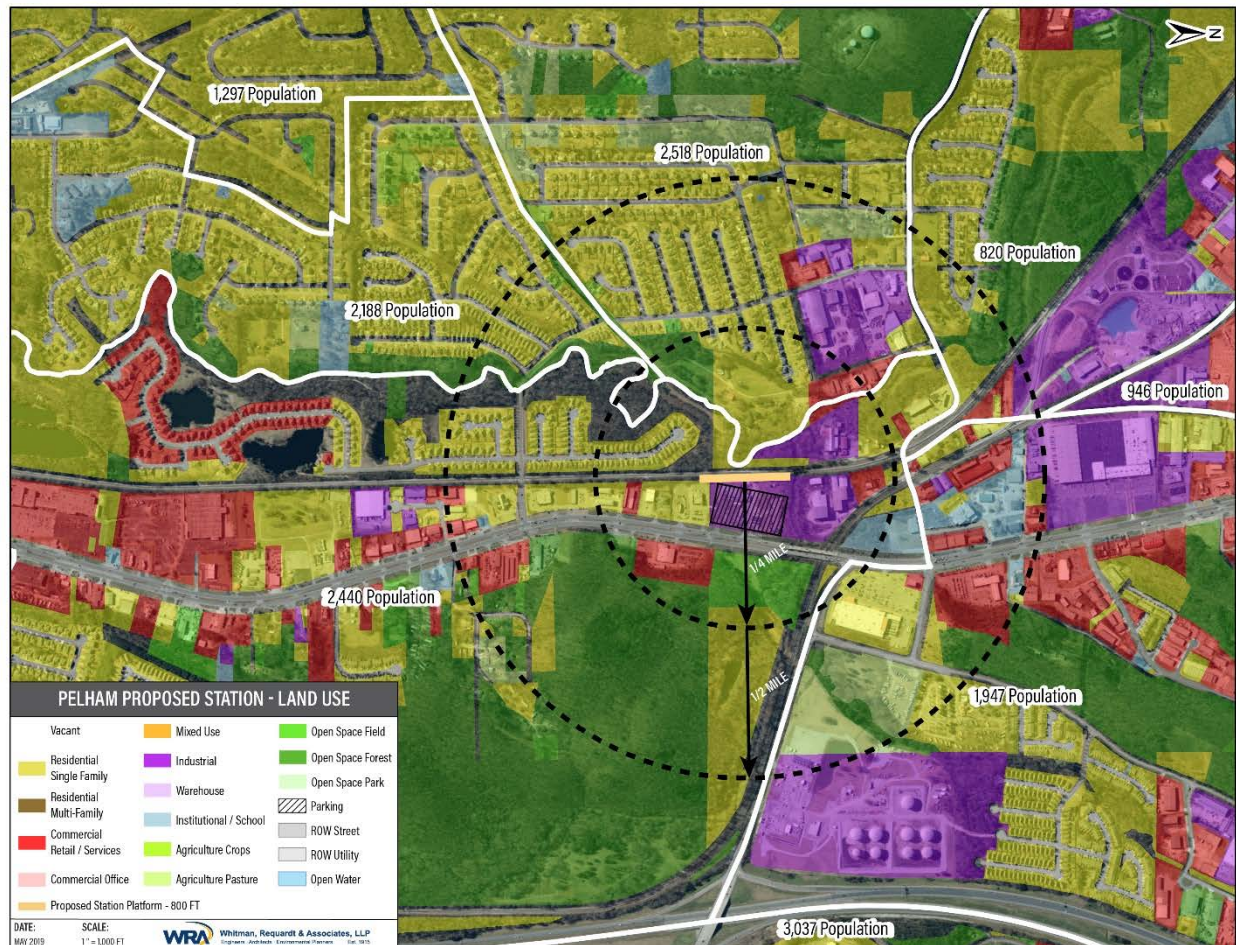
Figure 34 Helena Commuter Rail Station TOD



3.4.5 Pelham Station TOD

Land use within walking distance to the Pelham station is predominately low density commercial and industrial use (Figure 35). Single family residences medium density are located to the south west of the station. Pelham station is two miles north of the Alabaster station with similar low density retail and residential development.

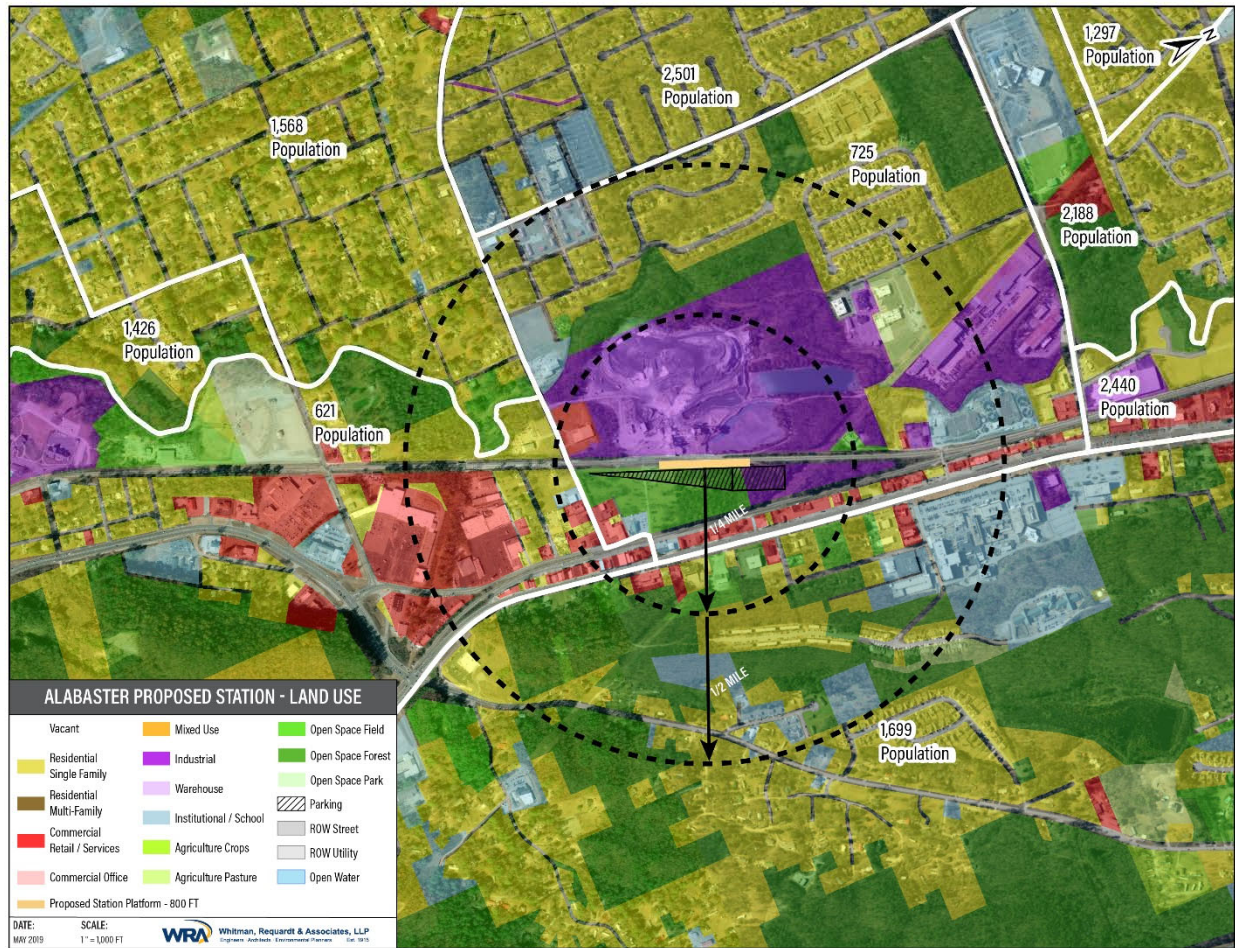
Figure 35 Pelham Commuter Rail Station TOD



3.4.6 Alabaster Station TOD

Adjacent to the Alabaster station is the Alabaster lime quarry creating a barrier to access the station from the west. Further west beyond the quarry is medium to low density residential development. On the east side of the station is commercial and institutional/medical use (Figure 36). Medical and institutional land use typically has a high employee to acre ratio. The quarry has a low employee to acre ratio which is less desirable. Residential land use beyond the half mile radius is low density.

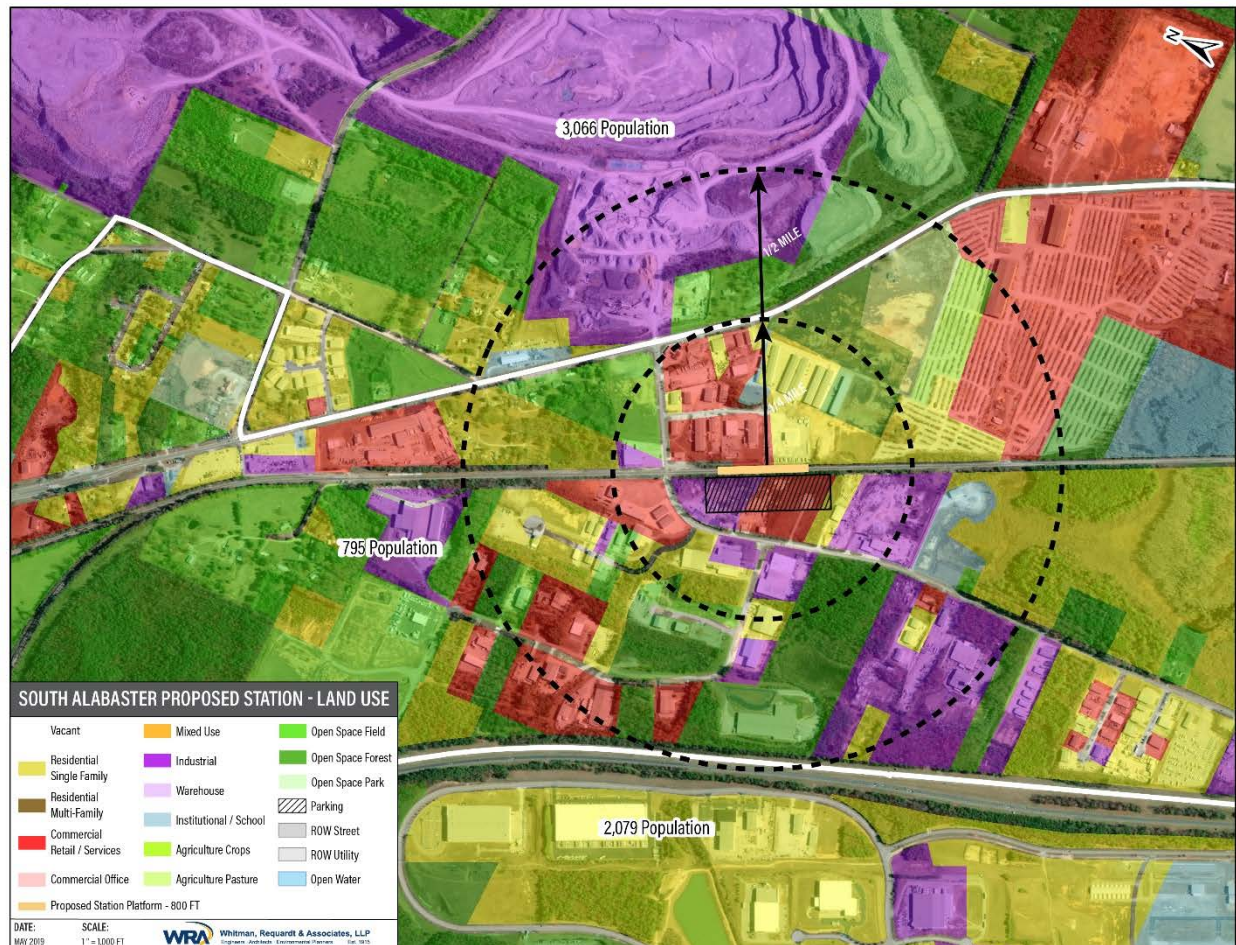
Figure 36 Alabaster Commuter Rail Station TOD



3.4.7 South Alabaster Station TOD

The South Alabaster station is located in a highly industrial and commercial use area. No residential land use is within the quarter mile radius. A small amount of residential land use and very low population is within a half mile radius of the station and beyond (Figure 37). A lime quarry is located to the east within the half mile radius of the station with a low employee to acre ratio.

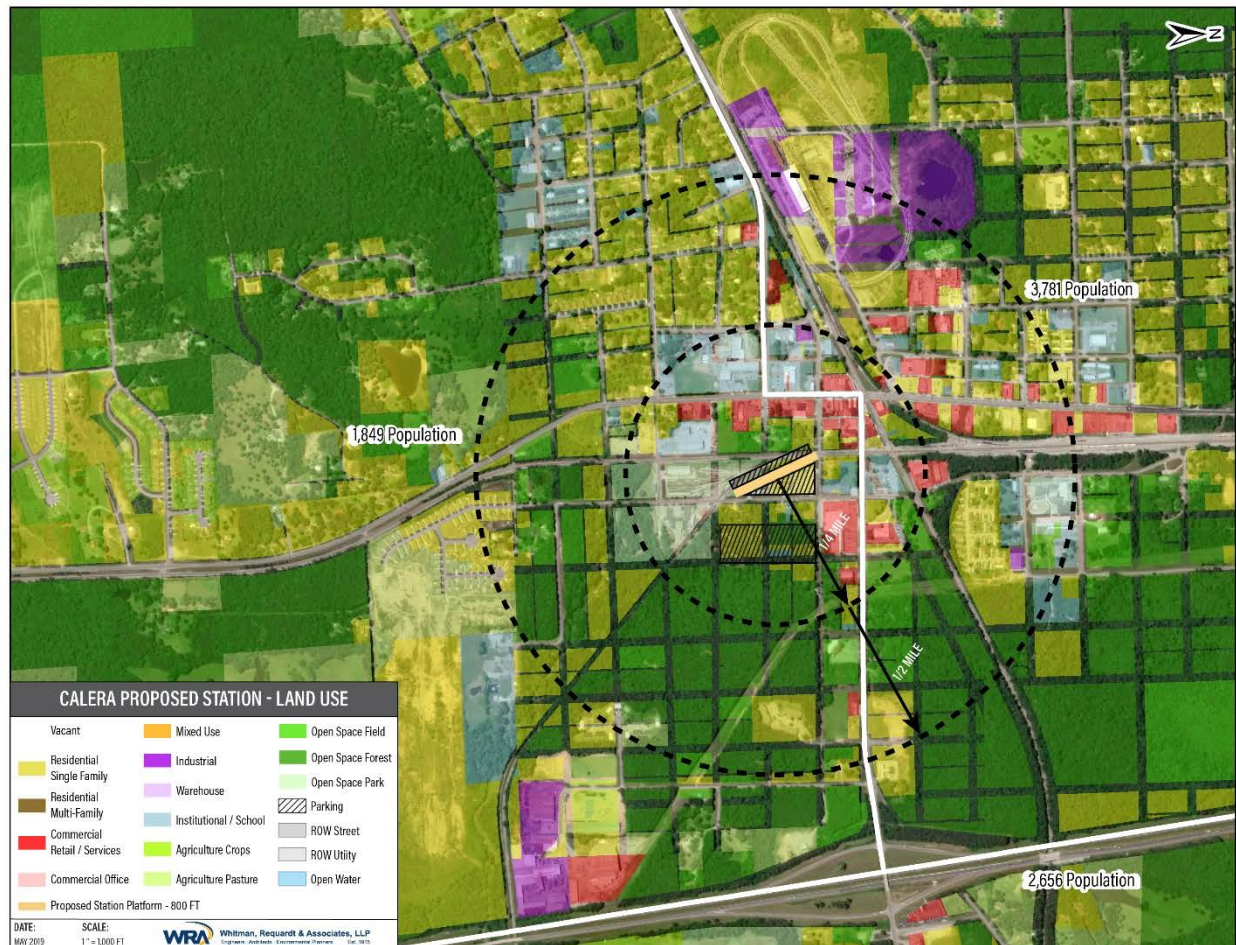
Figure 37 South Alabaster Commuter Rail Station TOD



3.4.8 Calera Station TOD

The area to the south and east of the proposed Calera rail station is predominately open space forest within a half mile of the station. Most of the land use in proximity of the station is commercial and institutional and are favorable employment uses (Figure 38). Residential population to the east of the station is low to medium density.

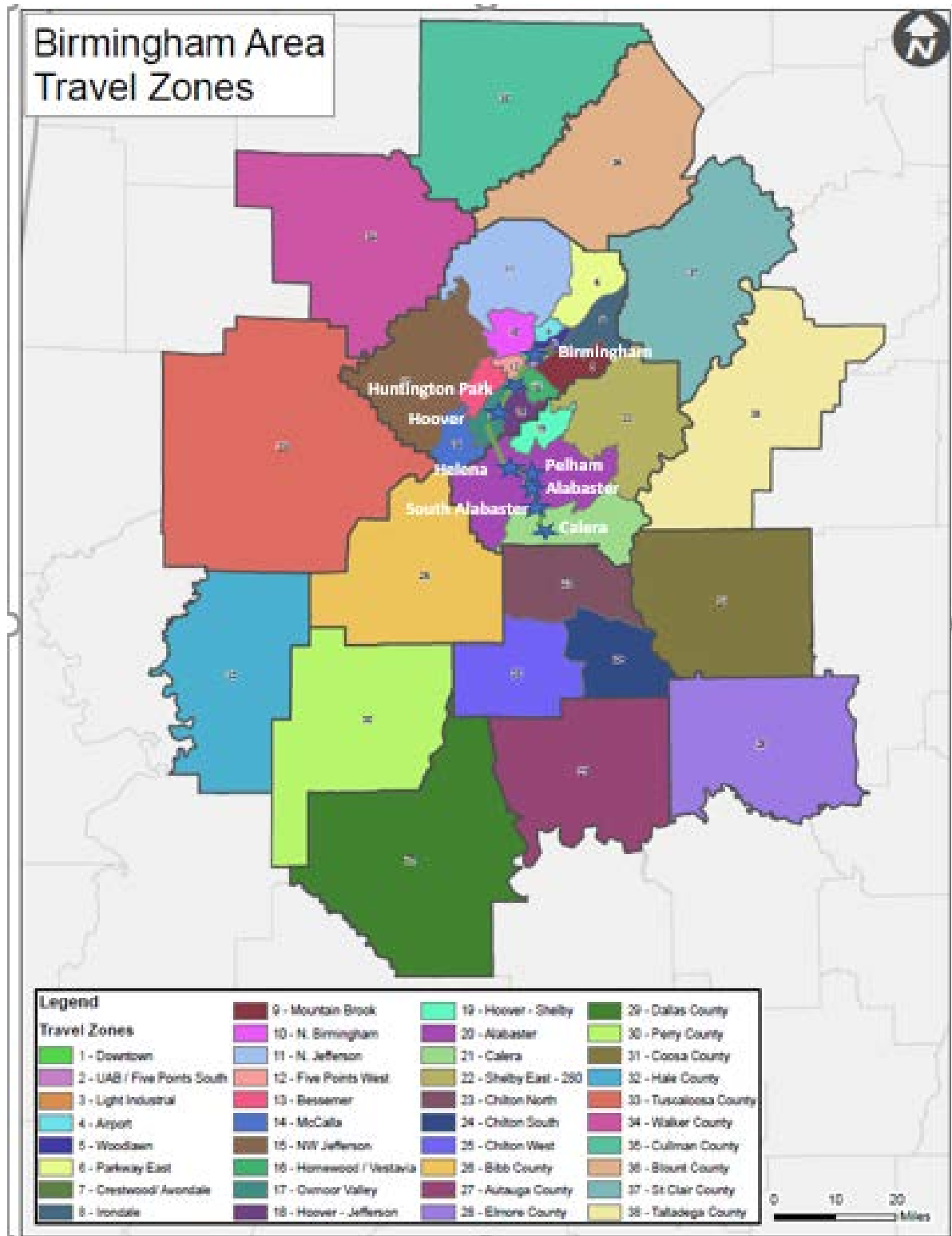
Figure 38 Calera Commuter Rail Station TOD



3.5 Ridership Estimates

All daily commute trips into Birmingham from the US Census LEHD program were tallied and divided into zones to which WRA has added the Commuter rail route and Stations (Figure 39).

Figure 39 Birmingham Travel Zones



Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

Key commuter rail zones (shown with dark green highlights) were identified in section 1.3 as shown in Table 11. The universe of trips that commuter rail could attract for divert from other modes is 26,149. A portion of this number represents expected commuter rail ridership.

Table 11 All Possible Birmingham Commute trips that might be Attracted to Commuter Rail

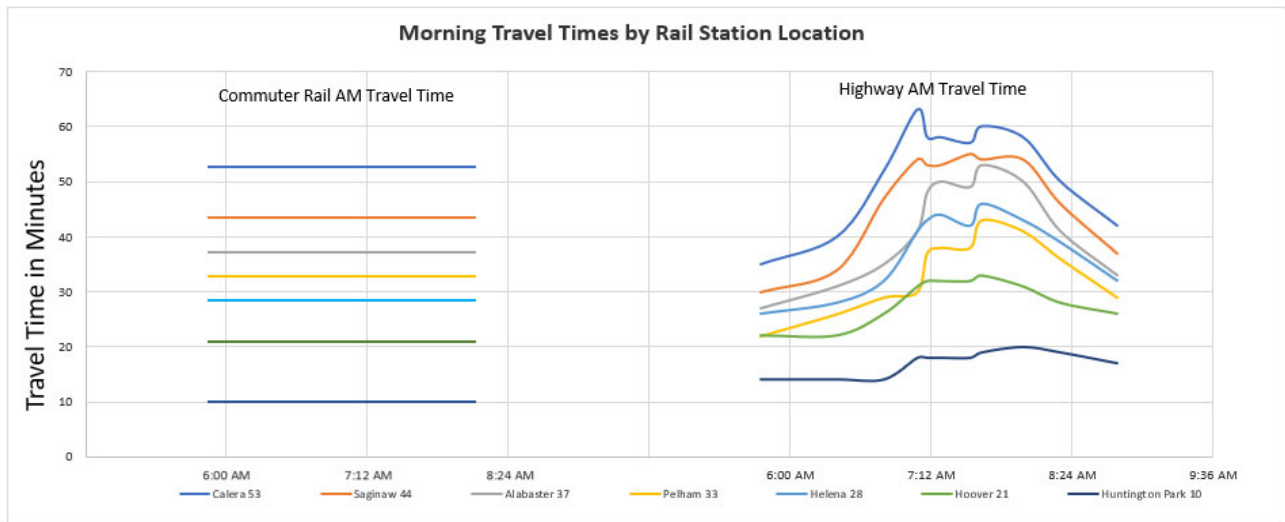
No.	Zone - From ▼	Zone - To ►			
		1 Downtown	2 UAB/Five Points South	3 Light Industrial	12 Five Points West
14	McCalla	649	420	207	252
16	Homewood / Vestavia	2,560	2,024	595	705
17	Oxmoor Valley	946	716	206	321
18	Hoover - Jefferson	2,609	1,986	663	827
19	Hoover - Shelby	1,223	999	386	377
20	Alabaster	2,002	1,670	634	535
21	Calera	269	220	126	100
23	Chilton North	163	97	116	74
24	Chilton South	154	63	77	45
25	Chilton West	27	17	35	18
26	Bibb County	58	47	29	41
27	Autauga County	111	59	48	41
28	Elmore County	156	83	69	56
29	Dallas County	101	62	30	45
	Subtotal	11,028	8,463	3,221	3,437

Next WRA looked at rail commuter time compared to highway commuter time using google maps time from proposed stations to downtown Birmingham (Table 12 and Figure 41).

Table 12 Highway Commute Times in Minutes by Time of Day

Date	Time	Calera	South Alabaster	Alabaster	Pelham	Helena	Hoover	Huntington Park
17-Apr	5:45 AM	35	30	27	22	26	22	14
17-Apr	6:24 AM	40	34	31	26	28	22	14
16-Apr	6:48 AM	52	47	35	29	32	26	14
17-Apr	7:05 AM	63	54	41	30	41	31	18
16-Apr	7:10 AM	58	53	48	37	43	32	18
16-Apr	7:17 AM	58	53	50	38	44	32	18
17-Apr	7:32 AM	57	55	49	38	42	32	18
16-Apr	7:38 AM	60	54	53	43	46	33	19
16-Apr	7:59 AM	58	54	50	41	43	31	20
16-Apr	8:18 AM	50	46	41	36	39	28	19
10-Apr	8:47 AM	42	37	33	29	32	26	17
Rail Commute		53	44	37	33	28	21	10

Figure 40 Morning Commuter Travel Times by Station Location



Commuter Rail Travel Times in minutes are next to the Station Name in the Legend

Source: Google Maps on April 16 and April 17, 2019

Notice that Pelham, Alabaster, South Alabaster and Calera stations have normal highway commute times significantly faster than rail commute times, but between 7:00 am and 8:30 am, rail commute times are less than highway commute times. At 7:30, highway commute times are about 20 minutes longer than free flow times, and 4 to 12 minutes longer than commuter rail. This confirms that the need for a highway alternative exists primarily during peak period traffic and not during off-peak, which makes commuter rail or commuter bus better alternatives than other rail or bus.

Helena station has competitive rail and highway times during off-peak traffic at 26-28 minutes by highway versus 28 minutes by rail. During peak period, highway times lengthen to as much as 46 minutes or 64% longer than by rail.

Hoover station has similar characteristics to Helena with off-peak highway travel times of 22 or more minutes versus rail of 21 minutes and highway time 57% longer than rail at about 7:30 am.

Huntington Park station is always faster by rail to downtown: 10 minutes by rail versus 14 to 20 minutes travel time by highway.

Rail times do not reflect the double transfer penalties of driving to a rail station, parking and the downtown transfer from train to walking or a shuttle bus.

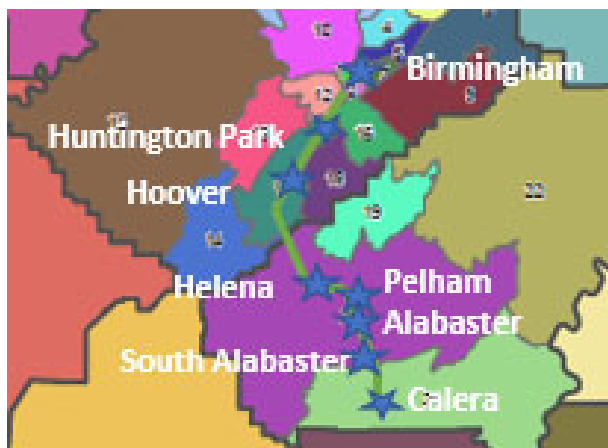
3.5.1 Zone Analysis

From examination of running times, Zones 20 (Alabaster) and 21 (Calera) to Zone 1 (Downtown) and zone 2 (UAB/Five Points south) are where commuter rail best competes with highway. These total 4,161 trips most attracted to rail, and WRA estimates that 389 commuters to Birmingham would be attracted to commuter rail.

A slightly lesser portion from Zone 23, 24, 25, 27 and 28 (all south of Calera) would be attracted as once one has driven to and on an interstate highway, one is slightly less likely to change to rail. WRA estimates that 75 of the 930 commuters in these zones would be attracted to commuter rail.

Zone 17 (Oxmoor Valley) is also highly attracted to rail its 1,662 commuters providing 134 rail commuters (Figure 5).

Figure 41 Enlargement of Zones from Figure 5



Zones 14 (McCalla [near Hoover], 16 Homewood/Vestavia, 18 Hoover-Jefferson, 19 (Hoover-Shelby), 26 (Bibb County) and Dallas County do not have direct and convenient access to rail stations from much of the zone area. WRA estimates that of the 12,738 commuters in these areas, only 291 will be attracted to commuter rail.

Finally, there will be a few commuters originating in the previous zones that are able to make the last mile transfer to destinations in zones 3 (Light Industrial) and 12 (Five Points West). Of the 6,658 commuters in this matrix of cells, WRA estimates 27 will be attracted to commuter rail.

Totaling all these commuter rail flows, provide 917 morning rail riders, or a total of 1,834 unlinked commuter rail trips per day when adding the return trips originating in Birmingham in the afternoon. WRA did not add trips between stations other than Birmingham, because outlying stations lack distributions systems to take commuters the last mile, and because generally outlying parking is free which also limits the attractiveness of commuter rail.

WRA then assessed which station those commuters would access in the morning when inbound to Birmingham (Table 13). Huntington Park has the most commuters with half of Zone 17 (Oxmoor Valley) rail commuters, and most of zones 16 (Homewood), 17 (Hoover Jefferson), 18 (Hoover-Jefferson) and 19 (Hoover Shelby) boarding at this station.

Table 13 Estimated Ridership by Station

Station	Estimated Commuters
Calera (RR Museum) - morning	100
South Alabaster (AL87) - morning	19
Alabaster (2nd Place NW) - morning	121
Pelham (Pevine Creek) - morning	134
Helena (Railroad Avenue) - morning	118
Hoover (John Hawkins Parkway) - morning	108
Huntington Park (Shades Creek Circle) - morning	317
Birmingham (18th Street) - afternoon	917
Total	1,834

3.5.2 Traffic Impact

Interstate highway capacity is at its peak at about 30 mph and about 2,400 vehicles per hour per lane, but is also at its most unstable – any incident and all traffic comes to a stop, then starts up again. This dramatically reduces capacity to move vehicles per hour. Thus the diversion of 917 commuters to commuter rail is equivalent to adding nearly ¼ of a lane to I-65 during peak congestion between 6:30 am to 8:30 am. With the recent widening of I-65, future widening will be more expensive – perhaps in the \$10 to \$20 million per lane mile range. If one assumes that 20 lane miles inbound and 20 lane miles outbound would be required, and taking one-quarter of that, commuter rail would save \$100 million to \$200 million of equivalent highway construction.

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

Anticipated commuter rail ridership would be low compared to current I-65 traffic. If we assume/approximate 2,000 commuters per lane, times 3 lanes, times 2 hours, current I-65 capacity is around 12,000 and about 7.6 percent would be diverted. Probably the largest benefit would be a reduction in the frequency of highway flow break down to stop and go traffic. This might save highway commuters a minute or more of commute time and hence the 11,000 plus riders not diverted to commuter rail would realize time savings in excess of the time saving benefit of those taking commuter rail.

3.6 Planning Level Cost Estimates

3.6.1 Capital cost estimates

WRA planning level estimates are that a Birmingham and Alabaster commuter rail service would cost \$561 million to construct. To extend that service to Calera would cost an additional \$343 million for a total of \$904 million (Table 2-7). Additional Detail is in Appendix B.

Table 14 Planning Level Capital Cost Estimates for Birmingham and Calera Commuter Rail

	North Segment Birmingham Alabaster	South Segment Alabaster Calera	Birmingham Calera
<i>Capital Costs on CSX Right-of-Way (in millions)</i>			
Trackage	54	3	57
Signals	5	0	5
Highway Crossings	2	0	2
Bridges	17	0	17
Professional Services	27	1	28
Contingencies	31	1	33
Total in Million	\$136	\$5	\$141
<i>Capital Costs on Commuter Railroad Right-of-Way (in millions)</i>			
Trackage	65	61	126
Signals	42	22	64
Highway Crossings	3	3	6
Bridges	37	123	160
Stations	18	6	24
Layover & Running Repair Location - Alabaster	16	0	16
Land	31	15	45
Equipment	54	0	54
Professional Services	63	68	131
Contingencies	82	89	171
Total in Million	\$411	\$386	\$797
Grand Total in Million (CSX plus Commuter Rail)	\$548	\$391	\$939

Source: WRA estimates.

Cost estimation was based upon Figures 10 and 11, in section 2.1.2 with a new commuter rail track constructed east of CSX on CSX right-of-way between Birmingham and Hoover stations. This includes a bridge over one CSX industry lead and CSX track rearrangements under the I-65 bridge. Between Hoover and Alabaster Stations, the commuter entity would purchase the existing CSX track of the S&NA subdivision and construct a new second track for CSX. Between Hoover and Helena, that new CSX main track would be along its Lineville Subdivision providing CSX with a new second track now restricted in height as is the S&NA subdivision line through Parkwood Tunnel. Between Helena and Alabaster the new CSX track would be east of the commuter (former CSX) track. At Alabaster, end of the north segment, the commuter entity would construct a nighttime layover yard and a light-duty maintenance facility.

Extending commuter rail to Calera (south segment) would include a new commuter track on the west side of the existing CSX main track to just north of the I-65 crossing and then a new track on the east side of the current CSX track. Altogether four bridges over CSX tracks would be built on this segment. At Calera, the commuter line would cross the NS mainline at grade because the commuter line could not get down to grade before the Calera Station at the Heart of Dixie Railroad Museum. If NS were not to be crossed at grade, the Calera Station must move north of the NS crossing.

3.6.2 Operating cost estimates

WRA estimates operating costs at \$9.2 million to Alabaster and \$11.2 million to Calera. With anticipated fare revenue (from a mature year 5) at \$1.2 to \$1.6 million, the annual required support would be \$8.1 million to Alabaster or \$9.7 million if operated to Calera (Table 15). Additional detail may be found in Appendix C.

Table 15 Commuter Rail Operating Cost Estimate

	Originate Alabaster Cost	Originate Calera Cost
Agency Mgmt. and Customer Service	\$805,000	\$805,000
Other Agency Costs	\$2,730,000	\$3,230,000
Contract - Train Operations	\$1,814,000	\$1,814,000
Contract - Equipment Maintenance	\$1,673,000	\$2,152,000
Facilities Maintenance	\$2,244,000	\$3,213,000
GRAND TOTAL OPERATING COSTS	\$9,266,000	\$11,214,000
Anticipated Fare Revenue	\$1,178,000	\$1,556,000
Annual Operating Support	\$8,088,000	\$9,568,000

Source: WRA estimates.

WRA did examine FTA Transit Database information and applying average annual vehicle revenue-mile and annual revenue vehicle-hour costs suggested operating costs in the range of \$3.6 to \$5.4 million (Appendix D). This understates actual operating costs because it scales down costs that should not be scaled down. The proposed Birmingham commuter rail has much shorter commuter distances than all but the Nashville Music City Star and Capital MTA (Austin). Operating a trainset only 22 miles (or 34 miles) instead of 50 miles will not realize savings proportional to the distance savings of 32 to 56 percent. Also, Birmingham trains would be shorter with an average of 2.8 cars per train while most of the comparables operate significantly longer trains, which again do not provide large savings when operating shorter trains. Nashville MTA has remarkable low operating costs of \$4.3 million annually while all other comparable services have a range of \$15.2 to \$222 million (Metrolink, comprising 7 lines). Nashville MTA operates over a shortline railroad and carries far less insurance than any other database commuter rail line, as well as realizing other operating savings. Capital MTA is not comparable as it operates frequent diesel-powered railcars with annual operating expenses of \$21.7 million. WRA thus did a build-up model of operating expenses which may be found in Appendix C.

3.7 Summary of Stakeholder Meeting

This space is reserved for a stakeholder meeting summary

3.8 Commuter Bus Alternative

An interim commuter bus service could build ridership for future commuter rail. After constructing parking lots at the site of the six of the seven future commuter rail stations, three routes could be started. Assuming the use of 57 seat commuter coaches, services would be as follows

- (1) Hoover-Huntington Park- UAB- Birmingham Intermodal – Downtown Birmingham: 4 buses in the am.
- (2) Helena-UAB – Birmingham Intermodal – Downtown Birmingham: 2 buses in the am.
- (3) Calera/Alabaster-Pelham-UAB-Birmingham Intermodal – Downtown Birmingham: 4 buses in the am.

Similar frequencies would be provided in the pm peak period. This was the successful approach used by DART between Irving and Dallas, Texas whereby ridership was built up before rail service was implemented.

Because of congestion on I-65, commuter bus service would have longer transit times than commuter rail resulting in lower ridership than commuter rail estimates. However, arriving buses would also serve as a downtown distributor with stops at UAB, Intermodal Facility, City Hall, Alabama Power Headquarters, FBI and Social Security, which opportunities would increase ridership. To compare with rail, the commuter bus system was sized to handle the same number of riders as the commuter rail system. South Alabaster station commuters were assumed to board at Pelham (Table 2-9).

WRA estimates that the cost to implement this service would be about \$49 million with annual operating costs of \$1.4 million.

Example schedules for the three routes follow in Tables 2-10, 2-11 and 2-12. Four buses would originate at Hoover and also stop at Huntington Park where another 5 buses would originate for a total of 9 trips with three buses turning back to make two peak trips. Three buses would originate at Helena with one turning back to also cover the last peak trip. Three buses would originate at Calera, skip Alabaster to save time, stop at Pelham and continue to UAB and downtown Birmingham. Three more buses would start at Alabaster and also stop at Pelham and two buses would originate at Pelham.

Table 16 Commuter Bus Route Summary

Commuter Bus Route	Boardings	Bus Trips	% Seats Filled	Number of Buses Required
<i>Huntington Park Route</i>				
Hoover Station	108	4		
Huntington Park Station	317	5		
Total Boardings	425	9	83%	6
<i>Helena Route</i>				
Helena Station	118	3	69%	2
<i>Calera/Alabaster/Pelham Route</i>				
Calera Station	100	3		
Alabaster Station	121	3		
Pelham Station	153	2		
Total Boardings	374	8	82%	6
Total Boardings	917	20	80%	14

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

Table 17 Hoover/Huntington Park Example Commuter Bus Schedule

Inbound	Miles	Bus 1	Bus 2	Bus 3	Bus 4	Bus 5	Bus 6	Bus 1	Bus 2	Bus 3	Bus 1	Bus 2	Bus 3	Minutes
Hoover	0	6:00 AM	----- ----	----- ----	----- ----	7:10 AM	----- ----	7:40 AM	----- ----	8:15 AM	----- ----	4:47 PM	----- ----	0
Huntington Park	7.5	6:12 AM	6:27 AM	6:47 AM	7:07 AM	7:22 AM	7:37 AM	7:52 AM	8:12 AM	8:27 AM	4:18 PM	4:58 PM	5:13 PM	12
UAB	14.7	6:31 AM	6:46 AM	7:06 AM	7:26 AM	7:41 AM	7:56 AM	8:11 AM	8:31 AM	8:46 AM	4:33 PM	5:13 PM	5:28 PM	31
Birmingham Intermodal Facility (MAX)	15.3	6:35 AM	6:50 AM	7:10 AM	7:30 AM	7:45 AM	8:00 AM	8:15 AM	8:35 AM	8:50 AM	4:37 PM	5:17 PM	5:32 PM	35
Birmingham City Hall	16.0	6:41 AM	6:56 AM	7:16 AM	7:36 AM	7:51 AM	8:06 AM	8:21 AM	8:41 AM	8:56 AM	4:43 PM	5:23 PM	5:38 PM	41
Birmingham Alabama Power	16.3	6:43 AM	6:58 AM	7:18 AM	7:38 AM	7:53 AM	8:08 AM	8:23 AM	8:43 AM	8:58 AM	4:45 PM	5:25 PM	5:40 PM	43
Birmingham FBI	17.1	6:46 AM	7:01 AM	7:21 AM	7:41 AM	7:56 AM	8:11 AM	8:26 AM	8:46 AM	9:01 AM	4:48 PM	5:28 PM	5:43 PM	46
Birmingham Social Security	17.7	6:49 AM	7:04 AM	7:24 AM	7:44 AM	7:59 AM	8:14 AM	8:29 AM	8:49 AM	9:04 AM	4:51 PM	5:31 PM	5:46 PM	49
Outbound	Miles	Bus 1	Bus 2	Bus 3	Bus 1	Bus 2	Bus 3	Bus 4	Bus 5	Bus 1	Bus 6	Bus 2	Bus 3	Minutes
Birmingham Social Security	0.0	6:52 AM	7:10 AM	7:27 AM	3:36 PM	3:56 PM	4:21 PM	4:36 PM	4:51 PM	5:01 PM	5:26 PM	5:51 PM	6:06 PM	0
Birmingham FBI	0.6	6:55 AM	7:13 AM	7:30 AM	3:39 PM	3:59 PM	4:24 PM	4:39 PM	4:54 PM	5:04 PM	5:29 PM	5:54 PM	6:09 PM	3
Birmingham Alabama Power	1.4	6:58 AM	7:16 AM	7:33 AM	3:42 PM	4:02 PM	4:27 PM	4:42 PM	4:57 PM	5:07 PM	5:32 PM	5:57 PM	6:12 PM	6
Birmingham City Hall	1.7	7:00 AM	7:18 AM	7:35 AM	3:44 PM	4:04 PM	4:29 PM	4:44 PM	4:59 PM	5:09 PM	5:34 PM	5:59 PM	6:14 PM	8
Birmingham Intermodal Facility (MAX)	2.4	7:06 AM	7:24 AM	7:44 AM	3:50 PM	4:10 PM	4:35 PM	4:50 PM	5:05 PM	5:15 PM	5:40 PM	6:05 PM	6:20 PM	14
UAB	3.0	7:10 AM	7:28 AM	7:48 AM	3:54 PM	4:14 PM	4:39 PM	4:54 PM	5:09 PM	5:19 PM	5:44 PM	6:09 PM	6:24 PM	18
Huntington Park	10.2	7:25 AM	7:43 AM	8:03 AM	4:13 PM	4:33 PM	4:58 PM	5:13 PM	5:28 PM	5:38 PM	6:03 PM	6:28 PM	6:43 PM	37
Hoover	17.7	7:36 AM	----- ----	8:14 AM	----- ----	4:45 PM	----- ----	5:25 PM	----- ----	5:50 PM	----- ----	----- ----	6:55 PM	49

Table 18 Helena Example Commuter Bus Schedule

Inbound	Miles	Bus 1	Bus 2	Bus 1	Bus 1	Minutes
Helena	0	5:49 AM	6:54 AM	8:04 AM	5:05 PM	0
UAB	19.1	6:31 AM	7:36 AM	8:46 AM	5:32 PM	42
Birmingham Intermodal Facility (MAX)	19.7	6:35 AM	7:40 AM	8:50 AM	5:36 PM	46
Birmingham City Hall	20.4	6:41 AM	7:46 AM	8:56 AM	5:42 PM	52
Birmingham Alabama Power	20.7	6:43 AM	7:48 AM	8:58 AM	5:44 PM	54
Birmingham FBI	21.5	6:46 AM	7:51 AM	9:01 AM	5:47 PM	57
Birmingham Social Security	22.1	6:49 AM	7:54 AM	9:04 AM	5:50 PM	60
Outbound	Miles	Bus 1	Bus 1	Bus 2	Bus 1	Minutes
Birmingham Social Security	0.0	7:00 AM	3:56 PM	5:01 PM	6:06 PM	0
Birmingham FBI	0.6	7:03 AM	3:59 PM	5:04 PM	6:09 PM	3
Birmingham Alabama Power	1.4	7:06 AM	4:02 PM	5:07 PM	6:12 PM	6
Birmingham City Hall	1.7	7:08 AM	4:04 PM	5:09 PM	6:14 PM	8
Birmingham Intermodal Facility (MAX)	2.4	7:14 AM	4:10 PM	5:15 PM	6:20 PM	14
UAB	3.0	7:18 AM	4:14 PM	5:19 PM	6:24 PM	18
Helena	22.1	7:45 AM	4:56 PM	6:01 PM	7:06 PM	60

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

Table 19 Calera/Alabaster/Pelham Example Commuter Bus Schedule

Inbound	Miles	Bus 1	Bus 2	Bus 3	Bus 4	Bus 5	Bus 1	Bus 6	Bus 2	Bus 1	Bus 4	Min.
Calera (RR Museum)	0	5:41 AM	-----	-----	6:41 AM	-----	-----	7:41 AM	-----	-----	-----	0
Alabaster (2nd Place NW)	12.0	-----	6:10 AM	-----	-----	7:10 AM	-----	-----	8:10 AM	-----	-----	14
Pelham	15.2	6:06 AM	6:21 AM	6:46 AM	7:06 AM	7:21 AM	7:46 AM	8:06 AM	8:21 AM	4:40 PM	5:35 PM	25
UAB	34.0	6:31 AM	6:46 AM	7:11 AM	7:31 AM	7:46 AM	8:11 AM	8:31 AM	8:46 AM	5:05 PM	6:00 PM	50
Birmingham Intermodal Facility (MAX)	34.6	6:35 AM	6:50 AM	7:15 AM	7:35 AM	7:50 AM	8:15 AM	8:35 AM	8:50 AM	5:09 PM	6:04 PM	54
Birmingham City Hall	35.3	6:41 AM	6:56 AM	7:21 AM	7:41 AM	7:56 AM	8:21 AM	8:41 AM	8:56 AM	5:15 PM	6:10 PM	60
Birmingham Alabama Power	35.6	6:43 AM	6:58 AM	7:23 AM	7:43 AM	7:58 AM	8:23 AM	8:43 AM	8:58 AM	5:17 PM	6:12 PM	62
Birmingham FBI	36.4	6:46 AM	7:01 AM	7:26 AM	7:46 AM	8:01 AM	8:26 AM	8:46 AM	9:01 AM	5:20 PM	6:15 PM	65
Birmingham Social Security	37.0	6:49 AM	7:04 AM	7:29 AM	7:49 AM	8:04 AM	8:29 AM	8:49 AM	9:04 AM	5:23 PM	6:18 PM	68
Outbound	Miles	Bus 1	Bus 2	Bus 1	Bus 2	Bus 3	Bus 4	Bus 5	Bus 1	Bus 6	Bus 4	Min.
Birmingham Social Security	0.0	6:55 AM	7:10 AM	3:51 PM	4:06 PM	4:31 PM	4:46 PM	5:01 PM	5:36 PM	5:56 PM	6:26 PM	0
Birmingham FBI	0.6	6:58 AM	7:13 AM	3:54 PM	4:09 PM	4:34 PM	4:49 PM	5:04 PM	5:39 PM	5:59 PM	6:29 PM	3
Birmingham Alabama Power	1.4	7:01 AM	7:16 AM	3:57 PM	4:12 PM	4:37 PM	4:52 PM	5:07 PM	5:42 PM	6:02 PM	6:32 PM	6
Birmingham City Hall	1.7	7:03 AM	7:18 AM	3:59 PM	4:14 PM	4:39 PM	4:54 PM	5:09 PM	5:44 PM	6:04 PM	6:34 PM	8
Birmingham Intermodal Facility (MAX)	2.4	7:09 AM	7:24 AM	4:05 PM	4:20 PM	4:45 PM	5:00 PM	5:15 PM	5:50 PM	6:10 PM	6:40 PM	14
UAB	3.0	7:13 AM	7:28 AM	4:09 PM	4:24 PM	4:49 PM	5:04 PM	5:19 PM	5:54 PM	6:14 PM	6:44 PM	18
Pelham	21.8	7:38 AM	7:53 AM	4:34 PM	4:49 PM	5:14 PM	5:29 PM	5:44 PM	6:19 PM	6:39 PM	7:09 PM	43
Alabaster (2nd Place NW)	25.0	-----	8:02 AM	-----	-----	5:25 PM	-----	-----	6:30 PM	-----	7:20 PM	54
Calera (RR Museum)	37.0	-----	-----	-----	5:14 PM	-----	-----	5:58 PM	-----	6:53 PM	-----	68

The capital cost to put the commuter bus system in operation – rail stations less rail platforms plus bus shelters plus buses and maintenance facility additions would be \$49 million in 2019 dollars (Table 2-13).

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

Table 20 Birmingham Commuter Bus Capital Costs

Stations	Quantity	Units	2019 Unit Cost	Total
Bus Platform and amenities	6	Each	\$150,000	\$900,000
Kiss & Ride Facility	6	Each	\$50,000	\$300,000
Construct Parking	1,100	Spaces	\$3,000	\$3,300,000
Construct Parking	400	Spaces	\$3,000	\$1,200,000
Station Access	6	Each	\$450,000	\$2,700,000
Automated ticket machines	12	Each	\$90,000	\$1,080,000
Landscaping and area improvements	6	Each	\$150,000	\$900,000
Stations General Voice and ATV Communications and Systems	1	Sum	\$1,800,000	\$1,800,000
Land - Huntington Park Station	4	Acres	\$250,000	\$1,000,000
Land - Hoover Station	3	Acres	\$250,000	\$750,000
Land - Helena Station	3	Acres	\$250,000	\$750,000
Land - Pelham Station	3	Acres	\$250,000	\$750,000
Land - Alabaster Station	10	Acres	\$250,000	\$2,500,000
Land - at Pelham Station (replace S. Alabaster Parking)	1.5	Acres	\$200,000	\$300,000
Land - Calera Station	3	Acres	\$200,000	\$600,000
Subtotal Stations				\$18,830,000
Expand Maintenance Facility				
Expand Current Bus Shop and Fueling Facility to add 17 buses				\$3,000,000
Vehicles				
Buses	14	Each	\$600,000	\$8,400,000
Spare Buses	3	Each	\$600,000	\$1,800,000
Support Vehicles - Equipment Maintenance & Supervisors	1	Each	\$80,000	\$80,000
Spare parts	5	Percent		\$510,000
Contingencies	10	Percent		\$1,080,000
Subtotal Equipment				\$11,870,000
Subtotal Excluding Vehicles				\$21,830,000
Professional Services				
Preliminary Engineering/Project Environmental	3	Percent		\$655,000
Final Design	5	Percent		\$1,093,000
Project Management for D&C	1	Percent		\$218,000
Construction Administration & Management	8	Percent		\$1,746,000
Mobilization	5	Percent		\$1,092,000
Professional Liability & Other Insurance	1	Percent		\$218,000
Legal/Permits/Review Fees	1	Percent		\$218,000
Surveys Testing Investigation	2	Percent		\$437,000
Utilities	3	Percent		\$655,000
Start-up Operations	1	Percent		\$218,000
Subtotal Professional Services	30			\$6,550,000
Allocated Contingencies	30	Percent		\$ 8,510,000
Grand Total Commuter Bus				\$48,760,000

WRA estimates the annual cost to operate commuter bus at \$1.4 million (Table 2-14). This applies the current annual revenue-hour cost of MAX to the number of proposed revenue hours operated. As this service would be to existing MAX operations, actual marginal costs may be lower.

Table 21 Birmingham Commuter Bus Operating Capital Costs

Origin	Minutes	Hours	Daily Trips	Daily Rev.-Hours
Calera	68	1.13	6	6.8
Alabaster	54	0.90	7	6.3
Pelham	43	0.72	7	5.0
Hoover	49	0.82	11	9.0
Huntington Park	37	0.62	13	8.0
Helena	60	1.00	8	8.0
Total Daily Revenue-Hours				43.1
Days Operated				254
Annual Revenue-Hours				10,952
From MAX 2017				
Bus Operating Expenses				\$29,877,670
Annual Vehicle Revenue Hours				233,606
Operating Expenses per Revenue Vehicle Hour				\$127.90
Commuter Bus Annual Revenue-Hours				10,952
Commuter Bus Annual Operating Cost				\$1,400,000

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

Appendix A: Commuter Data Matrix of 38 Zones from US Census LEHD Data

		1	2	3	4	5	6	7	8	9	10	11	12	13
		Downtown	UAB / Five Points South	Light Industrial	Airport	Woodlawn	Parkway East	Crestwood/ Avondale	Irondale	Mountain Brook	N. Birmingham	N. Jefferson	Five Points West	Bessemer
From	1 Downtown	311	114	43	14	22	14	9	31	92	31	16	37	35
	2 UAB / Five Points South	1,135	1,007	247	48	40	111	84	187	570	107	91	251	104
	3 Light Industrial	162	180	128	17	21	38	17	46	100	53	32	43	31
	4 Airport	407	337	117	239	121	210	59	220	262	292	275	163	185
	5 Woodlawn	846	658	342	203	412	410	167	478	624	330	297	278	252
	6 Parkway East	3,519	2,697	1,244	682	570	3,082	538	2,714	1,834	1,304	1,795	959	847
	7 Crestwood/ Avondale	840	622	276	47	66	120	147	161	471	76	99	245	75
	8 Irondale	1,139	1,044	527	175	138	829	206	2,149	925	307	365	281	189
	9 Mountain Brook	2,451	1,806	732	139	137	365	348	824	2,932	314	272	691	220
	10 N. Birmingham	1,877	1,403	577	294	195	439	148	461	690	1,433	713	808	701
	11 N. Jefferson	2,232	1,808	894	445	210	1,067	239	1,001	942	1,651	3,230	785	723
	12 Five Points West	1,602	1,358	469	220	177	300	148	388	727	818	332	1,171	850
	13 Bessemer	2,355	1,884	740	273	279	466	224	465	912	1,002	523	1,261	2,928
	14 McCalla	649	420	207	58	43	121	32	165	308	243	94	252	673
	15 NW Jefferson	1,663	1,136	678	151	109	362	158	410	567	780	678	722	1,763
	16 Homewood / Vestavia	2,560	2,024	595	115	113	307	233	482	1,803	338	250	705	308
	17 Oxmoor Valley	946	716	206	60	49	133	52	173	530	199	114	321	362
	18 Hoover - Jefferson	2,609	1,986	663	168	143	379	223	559	1,680	444	335	827	577
	19 Hoover - Shelby	1,223	999	386	74	57	231	97	357	986	270	170	377	268
	20 Alabaster	2,002	1,670	634	164	109	391	178	633	1,526	480	353	535	713
	21 Calera	269	220	126	35	30	84	24	151	223	122	96	100	132
	22 Shelby East - 280	1,799	1,480	581	147	144	469	243	883	1,865	418	330	446	343
	23 Chilton North	163	97	116	14	14	51	9	96	119	65	29	74	70
	24 Chilton South	154	63	77	18	11	71	13	62	96	73	25	45	51
	25 Chilton West	27	17	35	6	6	9	1	19	23	17	8	18	22
	26 Bibb County	58	47	29	13	5	15	1	25	37	34	17	41	227
	27 Autauga County	111	59	48	36	11	47	7	68	111	65	60	41	47
	28 Elmore County	156	83	69	49	20	73	4	111	123	82	90	56	57
	29 Dallas County	101	62	30	19	7	27	6	47	64	73	45	45	98
	30 Perry County	27	20	14	5	4	5	1	10	10	14	10	10	11
	31 Coosa County	31	23	12	14	3	26	6	20	25	34	15	16	26
	32 Hale County	52	27	12	9	3	16	0	15	18	23	10	29	44
	33 Tuscaloosa County	610	600	259	158	57	225	48	327	493	328	247	378	789
	34 Walker County	715	610	292	160	65	207	69	325	279	591	737	416	424
	35 Cullman County	357	484	295	111	72	259	65	303	289	431	528	179	243
	36 Blount County	788	873	512	228	120	740	152	990	391	720	1,639	382	288
	37 St Clair County	1,407	1,345	851	289	233	1,153	369	2,967	1,231	600	722	509	369
	38 Talladega County	424	403	174	144	50	296	55	361	287	202	192	201	206
	Subtotal	37,777	30,382	13,237	5,041	3,866	13,148	4,380	18,684	24,165	14,364	14,834	13,698	15,251
	Grand Total	582,123												

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

		14	15	16	17	18	19	20	21	22	23	24	25	26
		McCalla	NW Jefferson	Home wood / Vestavia	Oxmoor Valley	Hoover - Jeffer son	Hoover - Shelby	Alabaster	Calera	Shelby East - 280	Chilton North	Chilton South	Chilton West	Bibb County
From	1 Downtown	6	1	136	48	53	67	20	1	47	1	1	0	0
	2 UAB / Five Points South	63	12	833	257	333	247	101	14	248	1	8	1	4
	3 Light Industrial	15	11	143	61	37	48	9	2	62	0	0	0	1
	4 Airport	45	25	332	223	219	170	65	9	156	0	4	0	2
	5 Woodlawn	104	41	660	403	384	287	102	13	310	1	10	1	4
	6 Parkway East	311	191	2,477	1,510	1,322	1,278	524	59	1,225	4	26	0	19
	7 Crestwood/ Avondale	46	20	593	202	184	178	50	7	186	0	2	0	1
	8 Irondale	114	54	1,093	438	529	518	244	41	634	3	12	1	9
	9 Mountain Brook	107	70	2,984	704	753	964	302	69	1,004	4	22	1	12
	10 N. Birmingham	290	176	1,213	987	733	603	247	26	476	1	14	0	7
	11 N. Jefferson	255	402	1,655	1,061	764	839	332	45	610	5	19	1	9
	12 Five Points West	343	141	1,416	1,222	858	610	318	34	452	4	14	0	18
	13 Bessemer	1,396	450	2,210	2,070	1,528	1,242	537	79	761	8	38	0	63
	14 McCalla	732	148	522	623	552	519	236	67	247	0	6	0	35
	15 NW Jefferson	747	1,129	1,050	1,082	765	722	326	65	431	1	30	1	48
	16 Homewood / Vestavia	197	78	4,333	967	1,328	1,180	409	83	1,005	7	23	0	14
	17 Oxmoor Valley	269	98	1,106	979	929	719	266	48	445	5	11	0	22
	18 Hoover - Jefferson	413	119	3,562	1,704	3,643	2,175	803	141	1,509	0	31	0	14
	19 Hoover - Shelby	195	54	1,914	730	1,630	2,589	841	269	1,420	12	57	2	23
	20 Alabaster	497	148	2,750	1,664	2,557	4,718	5,551	1,383	2,225	79	172	10	87
	21 Calera	71	46	454	244	371	854	1,881	1,445	528	72	125	13	55
	22 Shelby East - 280	187	72	2,831	857	1,525	2,217	1,136	631	4,947	23	74	4	36
	23 Chilton North	39	17	206	108	185	457	878	560	189	683	754	65	68
	24 Chilton South	36	27	142	90	89	277	412	192	145	307	2,278	113	36
	25 Chilton West	16	9	35	33	39	67	147	65	51	96	405	327	70
	26 Bibb County	235	62	138	257	176	211	433	209	123	31	73	56	1,610
	27 Autauga County	29	16	126	168	163	148	102	59	108	37	412	52	20
	28 Elmore County	47	26	187	220	192	236	131	83	181	30	303	5	41
	29 Dallas County	42	28	166	117	130	127	86	43	94	15	131	129	66
	30 Perry County	17	4	24	28	24	16	60	5	16	1	23	5	112
	31 Coosa County	9	4	39	34	27	41	29	16	88	8	44	3	8
	32 Hale County	30	17	57	57	50	64	34	17	45	5	27	1	43
	33 Tuscaloosa County	870	338	793	925	855	882	663	161	471	10	180	0	357
	34 Walker County	195	643	624	397	316	338	204	72	333	20	39	2	51
	35 Cullman County	117	120	487	379	314	309	113	16	278	3	10	1	10
	36 Blount County	121	128	801	411	356	359	196	70	301	9	28	1	25
	37 St Clair County	212	138	1,492	731	806	978	377	126	1,066	7	51	2	36
	38 Talladega County	154	120	520	403	346	404	375	174	1,002	15	142	0	27
	Subtotal	8,572	5,183	40,104	22,394	25,065	27,658	18,540	6,399	23,419	1,508	5,599	797	3,063

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

		27	28	29	30	31	32	33	34	35	36	37	38
		Autauga County	Elmore County	Dallas County	Perry County	Coosa County	Hale County	Tuscaloosa County	Walker County	Cullman County	Blount County	St Clair County	Talladega County
From	1 Downtown	1	2	1	0	0	0	12	10	4	3	8	7
	2 UAB / Five Points South	9	9	9	1	0	0	130	34	20	11	48	45
	3 Light Industrial	3	2	2	0	0	1	23	2	8	4	7	9
	4 Airport	7	10	5	0	1	1	90	22	17	11	36	46
	5 Woodlawn	4	20	6	2	1	2	164	35	39	16	59	54
	6 Parkway East	33	54	21	3	3	4	652	257	249	221	651	294
	7 Crestwood/ Avondale	3	6	5	1	0	0	68	18	18	7	29	15
	8 Irondale	9	23	13	1	0	4	284	73	71	39	549	82
	9 Mountain Brook	11	33	16	4	1	0	376	84	67	27	186	97
	10 N. Birmingham	14	36	19	1	3	5	332	131	98	40	154	125
	11 N. Jefferson	19	41	20	4	2	4	443	394	228	274	273	175
	12 Five Points West	16	47	20	2	2	4	367	74	61	15	85	101
	13 Bessemer	27	80	52	5	1	4	868	183	121	47	146	207
	14 McCalla	5	22	8	4	0	2	525	39	34	16	35	40
	15 NW Jefferson	20	33	31	3	0	2	843	201	92	42	127	98
	16 Homewood / Vestavia	18	25	24	2	2	1	432	73	74	26	131	124
	17 Oxmoor Valley	14	12	20	2	1	1	334	63	48	11	48	46
	18 Hoover - Jefferson	16	39	10	2	3	2	523	88	76	23	154	167
	19 Hoover - Shelby	34	28	23	1	7	6	334	50	59	18	105	147
	20 Alabaster	42	82	55	9	13	7	878	119	109	37	266	348
	21 Calera	18	23	13	2	1	1	232	43	36	13	86	158
	22 Shelby East - 280	45	65	43	7	21	4	488	92	85	36	463	735
	23 Chilton North	79	74	36	0	3	2	88	10	11	7	74	84
	24 Chilton South	173	160	64	3	13	3	91	8	14	7	57	99
	25 Chilton West	95	47	69	2	0	0	32	3	3	0	19	35
	26 Bibb County	33	54	52	53	1	35	1,891	29	30	11	25	38
	27 Autauga County	4,735	1,739	480	10	9	4	246	36	21	8	56	120
	28 Elmore County	1,559	7,740	255	7	77	6	319	55	48	14	104	206
	29 Dallas County	304	155	7,710	182	4	65	644	57	41	18	53	65
	30 Perry County	21	34	319	1,065	0	140	402	17	8	4	7	19
	31 Coosa County	35	152	17	0	280	1	54	7	2	6	51	821
	32 Hale County	24	36	85	228	0	1,558	2,207	12	10	7	12	22
	33 Tuscaloosa County	102	114	151	111	1	472	58,559	363	160	57	216	200
	34 Walker County	22	44	22	2	5	5	783	10,015	676	135	237	217
	35 Cullman County	24	19	16	1	0	1	217	582	16,786	460	256	99
	36 Blount County	22	43	22	3	0	1	386	298	1,184	4,242	548	221
	37 St Clair County	32	66	34	6	8	2	593	278	382	313	7,434	1,837
	38 Talladega County	66	206	25	4	252	5	249	81	163	136	1,543	13,199
	Subtotal	7,694	11,375	9,773	1,733	715	2,355	75,159	13,936	21,153	6,362	14,338	20,402

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

Appendix B: Conceptual Commuter Railroad Capital Cost Estimate

North Segment Birmingham-Alabaster Commuter Rail Service Conceptual Estimate								
Capital Costs Page 1 of 4								
		Mile		Mile			2019	
	Location	Post	Location	Post	Quantity	Units	Unit Cost	Total (\$000)
Work performed by CSX Transportation								
Track Construction								
Grading for new main track under I-65		392.2		392.6	0.4	Mile	2,500,000	\$1,000
Grading for new freight lead		396.4		397.4	1.0	Mile	2,500,000	2,500
Grading for second main track	CP PARKWOOD	967.7	CP POND	960.7	7.0	Mile	2,500,000	17,500
Grading for second main track	CP HELENA (pond)	410.2	CP HARDY	412.6	2.4	Mile	2,500,000	6,000
Grading for second main track	CP HARDY	412.6	8th Avenue	413.4	0.8	Mile	2,500,000	2,000
Grading for new main track (25 foot centers)	8th Avenue	413.4	Buck Creek Bridge	414.2	0.8	Mile	2,500,000	2,000
Grading for replacement setout track (Parkwood)	tbd	0.0	tbd	0.1	0.1	Mile	2,500,000	250
Grading for replacement storage track (Hardy)	tbd	0.0	tbd	0.5	0.5	Mile	2,500,000	1,250
Grading for replacement storage track (Helena)	tbd	0.0	tbd	0.9	0.9	Mile	2,500,000	2,250
New Main Track under I-65		392.2		392.6	0.4	Mile	1,300,000	520
Shift trackage		392.2		392.6	8	Each	20,000	160
New Sidetrack for new freight lead		396.4		397.4	1.0	Mile	1,300,000	1,300
New Main Track	CP PARKWOOD	967.7	CP POND	960.7	7.0	Mile	1,300,000	9,100
New Main Track	CP HELENA (pond)	410.2	CP HARDY	412.6	2.4	Mile	1,300,000	3,120
New Main Track	CP HARDY	412.6	8th Avenue	413.4	0.8	Mile	1,300,000	1,040
New Main Track	8th Avenue	413.4	Buck Creek Bridge	414.2	0.8	Mile	1,300,000	1,040
New Storage Track at Parkwood	Parkwood	404.4	Parkwood	404.5	0.1	Mile	1,300,000	130
New- Relocate Hardy Storage Track	tbd	0.0	tbd	0.5	0.5	Mile	1,300,000	650
New- Relocate Helena Storage Track	tbd	0.0	tbd	0.9	0.9	Mile	1,300,000	1,170
New- Relocate Helena Storage Track	tbd	404.4	tbd	414.2	6	Each	20,000	120
#10 Hand Throw	I-65 OH	392.4		392.4	1	Each	80,000	80
#10 Hand Throw	Freight Lead	396.4		397.2	2	Each	80,000	160
#10 Hand Throw	Storage and setouts	404.4		404.4	5	Each	80,000	400
#10 Hand Throw	Alabaster	414.4	Industry track	414.4	1	Each	80,000	80
New Universal Crossover Helena #20		410.2		410.2	4	Each	130,000	520
Replacement storage Track Turnouts #10		tbd		tbd	1	Each	80,000	80
Subtotal Track - CSX Birmingham-Alabaster								54,420
Signals								
Electric Lock Switch	South Birmingham	392.4	I-65 OH	392.4	1	Each	110,000	110
Revise Parkwood Control Point	Parkwood	404.1		404.1	1	CP	600,000	600
New Helena/Pond Control Point	Helena	284.2		284.3	1	CP	1,400,000	1,400
Retire Hardy Control Point	Hardy	412.6		412.6	1	CP	100,000	100
Electric Lock Switch - Industry	Alabaster	414.4		414.4	1	Each	110,000	110
Intermediates		967.7		960.7	7.0	Miles	120,000	840
Intermediates		410.2		412.6	2.4	Miles	120,000	288
Intermediates		412.6		413.4	0.8	Miles	120,000	96
Communications		392.4		414.4	1	Sum	1,500,000	1,500
Subtotal Signals Atlanta-Macon								5,044
Highway Crossings								
Crossing signal upgrade and add track	Elvira Road (Xbucks)	964.3		964.3	1	Each	250,000	250
Crossing signal upgrade and add track	Helena Road	961.7		961.7	1	Each	250,000	250
Crossing signal upgrade and add track	Cunningham Drive	961.4		961.4	1	Each	250,000	250
Crossing signal upgrade and add track	County Road 52	411.1		411.1	1	Each	250,000	250
Crossing signal upgrade and add track	Stonehaven Trail	411.7		411.7	1	Each	250,000	250
Crossing signal upgrade and add track	Industrial Road	413.1		413.1	1	Each	250,000	250
Crossing signal upgrade and add track	8th Avenue NW	413.3		413.3	1	Each	250,000	250
Crossing signal upgrade and add track	2nd Place NW	413.8		413.8	1	Each	250,000	250
Crossing signal upgrade and add track	First Avenue	413.9		413.9	1	Each	250,000	250
Subtotal Highway Crossings								2,250

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

North Segment Birmingham-Alabaster Commuter Rail Service Conceptual Estimate								
Capital Costs Page 2 of 4								
		Mile		Mile			2019	
	<u>Location</u>	<u>Post</u>	<u>Location</u>	<u>Post</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total (\$000)</u>
<u>Bridges</u>								
Modify I-459 Overpass		967.3			1	Each	500,000	500
Modify Shades Crest Road		966.7			1	Each	2,000,000	2,000
New Bridge Catawba River		963.8			330	Feet	15,000	4,950
Modify Riverwood Parkway		963.4			1	Each	500,000	500
New Bridge Buck Creek and S&NA Line		962.1			265	Feet	15,000	3,975
New Bridge Buck Creek		410.5			135	Feet	15,000	2,025
New Bridge Peavine Creek		411.3			130	Feet	15,000	1,950
New Bridge - Ped Underpass at Pelham Station		411.4			40	Feet	15,000	600
<i>Subtotal Bridges</i>								16,500
Subtotal								78,214
<u>Professional Services</u>								
Preliminary Engineering/Project Environmental						3	Percent	2,346
Final Design						5	Percent	3,911
Project Management for D&C						1	Percent	782
Construction Administration & Management						8	Percent	6,257
Mobilization						5	Percent	3,911
Professional Liability & Other Insurance						1	Percent	782
Legal/Permits/Review Fees						1	Percent	782
Surveys Testing Investigation						2	Percent	1,564
Utilities						3	Percent	2,346
CSX Oversight and review						5	Percent	3,911
Start-up						0	Percent	0
<i>Subtotal Professional Services</i>						34		26,593
Subtotal excluding Land and Vehicles								104,807
<i>Allocated contingencies</i>					30	Percent		31,442
Grand Total CSX Construction Expenditures								\$136,249
Commuter Authority Capital Costs - Birmingham and Alabaster								
<u>Trackage</u>								
Grading for New main track (25 foot centers)	Birmingham	391.6	Parkwood	404.5	12.9	Mile	4,000,000	\$51,600
Grading for New Station Track	Birmingham	391.6		391.9	0.3	Mile	2,500,000	750
New Main Track	Birmingham	391.6	Parkwood	404.5	12.9	Mile	792,000	10,217
New Station Track	Birmingham	391.6		391.9	0.3	Each	150,000	45
#15 T.O. Birmingham		391.9		391.9	1	Each	105,000	105
#10 Turnout Birmingham (CSX crossover)		295.1		295.0	1	Each	80,000	80
#15 Turnouts Parkwood Station passing track		294.5		294.3	1	Each	105,000	105
#15 Turnouts Helena Station Passing Track		294.5		294.3	1	Each	105,000	105
Upgrade former CSX Main track		404.5		413.7	9	Mile	150,000	1,380
Remove and Replace Tunnel Track		405.2		405.4	1	Each	600,000	600
<i>Subtotal Track</i>								64,987
<u>Signals</u>								
Birmingham Station Control Point	Birmingham	391.9		391.9	1	CP	600,000	600
Electric Lock Switch	South Birmingham	392.4	I-65 OH	392.4	1	Each	110,000	110
Helena Siding Control Points	Helena	408.9		409.8	2	CP	600,000	1,200
Electric Lock Switch - Alabaster Layover Yard	Alabaster	413.6		413.6	1	Each	110,000	110
Intermediates	Birmingham	391.6	Parkwood	404.5	12.9	Mile	120,000	1,548
Intermediates	Parkwood	404.5	Helena	413.8	9.3	Miles	120,000	1,116
Positive Train Control	Birmingham	391.6	Helena	413.8	22.2	Miles	1,600,000	35,520
Communications	Birmingham	391.6	Helena	413.8	1	Sum	1,400,000	1,400
<i>Subtotal Signals Birmingham- Alabaster</i>								41,604

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

North Segment Birmingham-Alabaster Commuter Rail Service Conceptual Estimate								
Capital Costs Page 3 of 4								
		Mile		Mile			2019	
	Location	Post	Location	Post	Quantity	Units	Unit Cost	Total (\$000)
<u>Highway Crossings</u>								
Crossing signal new and surface	17th Avenue	393.5		393.5	1	Each	250,000	250
Crossing signal new and surface	Cammack Road	398.9		398.9	1	Each	250,000	250
Crossing signal new and surface	Shannon Road	400.1		400.1	1	Each	250,000	250
Crossing signal upgrade		961.7		961.7	1	Each	250,000	250
Crossing signal upgrade		411.1		411.1	1	Each	250,000	250
Crossing signal upgrade		413.1		413.1	1	Each	250,000	250
Crossing signal upgrade		413.3		413.3	1	Each	250,000	250
Crossing signal upgrade		414.3		414.3	1	Each	250,000	250
Crossing signal upgrade		413.8		413.8	1	Each	250,000	250
Crossing signal upgrade		413.9		413.9	1	Each	250,000	250
<i>Subtotal Highway Crossings</i>								2,500
<u>Bridges</u>								
Modify I-65 Overpass		392.4			1	Each	500,000	500
Widen 6th Avenue Underpass		392.9			1	Each	500,000	500
Modify Green Springs Avenue Overpass		394.1			1	Each	500,000	500
Modify Montevallo Road Overpass		395.9			1	Each	500,000	500
Over pass over CSX freight lead		396.4			2,000	Feet	15,000	30,000
Modify Lakeshore Parkway Overpass		397.6			1	Each	900,000	900
Modify Wenonah Oxmoor Road Overpass		397.9			1	Each	900,000	900
Modify Ross Bridge Parkway overpass		401.2			1	Each	900,000	900
Shades Creek		403.5			135	Feet	15,000	2,025
Modify SR 150 Overpass (John Hawkins Parkway)		404.2			1	Each	500,000	500
<i>Subtotal Bridges</i>								37,225
<u>Stations</u>								
Platform and amenities					5	Each	1,200,000	6,000
Platform and amenities Birmingham					1	Each	2,400,000	2,400
Kiss & Ride Facility					5	Each	50,000	250
Construct Parking					1,100	Spaces	3,000	3,300
Station Access					5	Each	450,000	2,250
Automated ticket machines					14	Each	90,000	1,260
Head end power for daytime layover (Birmingham)					1	Each	300,000	300
Landscaping and area improvements					6	Each	150,000	900
Stations General Voice and ATV Communications and Systems					1	Sum	1,800,000	1,800
<i>Subtotal Stations</i>								18,460
<u>Layover & Running Repair Location - Alabaster</u>								
New grading - Layover Alabaster		0.0		0.5	0.60	Mile	158,400	95
Fencing		0.0		0.5	1,500	Each	30	45
Shop and Fueling Facility		0.0		0.5	1	Sum	13,600,000	13,600
New track - Layover Alabaster		0.0		0.5	0.80	Mile	1,300,000	1,040
#10 T.O.		0.0		0.5	3	Each	80,000	240
Fencing		294.0		294.5	4,000	Feet	25	100
Cleaning & Maintenance Facility		294.0		294.5	1	Sum	700,000	700
<i>Subtotal Alabaster Layover & Maintenance</i>								15,820

Commuter Rail Study
 Birmingham/Hoover/Helena/Pelham/Alabaster
 Regional Planning Commission of Greater Birmingham

North Segment Birmingham-Alabaster Commuter Rail Service Conceptual Estimate								
Capital Costs Page 4 of 4								
		Mile		Mile			2019	
	<u>Location</u>	<u>Post</u>	<u>Location</u>	<u>Post</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total (\$000)</u>
<u>Land</u>								
	Purchase Right-of-Way for Birmingham Station	391.6		392.1	5	Acres	400,000	2,000
	Purchase Right-of-Way at 17th Avenue	393.3		393.4	1	Each	600,000	600
	Purchase Right-of-Way for new freight lead	396.7		396.8	1	Each	300,000	300
	Purchase Right-of-Way north of Industrial Road	412.6		413.1	1	Each	500,000	500
	Purchase CSX Right-of-Way	391.6		413.1	21.5	Miles	1,000,000	21,500
	Land - Huntington Park Station				4	Acres	250,000	1,000
	Land - Hoover Station				3	Acres	250,000	750
	Land - Helena Station	207.0		207.0	3	Acres	250,000	750
	Land - Pelham Station	217.4		217.4	3	Acres	250,000	750
	Land - Alabaster Station	233.6		233.6	10	Acres	250,000	2,500
	<i>Subtotal Land</i>							30,650
<u>Equipment</u>								
	Engines (rebuilt)				3	Each	3,400,000	10,200
	Spare Engines (rebuilt)				2	Each	3,400,000	6,800
	Cab Cars - New				3	Each	3,100,000	9,300
	Spare Cab Cars - New				2	Each	3,100,000	6,200
	Coach Cars - New				3	Each	2,900,000	8,700
	Spare Coaches -New				2	Each	2,900,000	5,800
	Support Vehicles - Equipment Maintenance & Supervisors				2	Each	80,000	160
	Spare parts				5	Percent		2,358
	Contingencies				10	Percent		4,952
	<i>Subtotal Equipment</i>							54,470
	<i>Subtotal excluding Vehicles</i>							211,246
<u>Professional Services</u>								
	Preliminary Engineering/Project Environmental					3	Percent	6,337
	Final Design					5	Percent	10,562
	Project Management for D&C					1	Percent	2,112
	Construction Administration & Management					8	Percent	16,900
	Mobilization					5	Percent	10,562
	Professional Liability & Other Insurance					1	Percent	2,112
	Legal/Permits/Review Fees					1	Percent	2,112
	Surveys Testing Investigation					2	Percent	4,225
	Utilities					3	Percent	6,337
	CSX Oversight and review					0	Percent	0
	Start-up Operations					1	Percent	2,112
	<i>Subtotal Professional Services</i>					30		63,374
	<i>Subtotal excluding Vehicles</i>							274,620
	<i>Allocated contingencies</i>					30	Percent	82,386
	<i>Equipment</i>							54,470
	Grand Total Commuter Authority Construction							\$411,475
	CSX Construction Costs							136,249
	North Segment Grand Total Birmingham-Alabaster							\$547,724

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

South Segment Alabaster-Calera Commuter Rail Service Conceptual Estimate								
Capital Costs Page 1 of 2								
		Mile		Mile			2019	Total
	Location	Post	Location	Post	Quantity	Units	Unit Cost	(\$000)
Work performed by CSX Transportation								
Track Construction								
Grading - New main track 1st Ave. to 6th Ave.					0.7	Mile	2,500,000	\$1,750
Track - New main track 1st Ave. to 6th Ave					0.7	Mile	1,300,000	910
New- R Shift Main Track for new connections					1	Each	20,000	20
#10 Hand Throw to Commuter Railroad	Calera				1	Each	80,000	80
Subtotal Track - CSX								2,760
Signals								
Electric Lock Switch	Calera				1	Each	110,000	110
Subtotal Signals - CSX								110
Highway Crossings								
Crossing signal upgrade					0	Each	250,000	0
Subtotal Highway Crossings-CSX								0
Bridges								
New Bridge					0	Feet	15,000	0
Subtotal Bridges -CSX								0
Subtotal excluding Land and Vehicles								2,870
Professional Services								
Preliminary Engineering/Project Environmental						3	Percent	86
Final Design						5	Percent	144
Project Management for D&C						1	Percent	29
Construction Administration & Management						8	Percent	230
Mobilization						5	Percent	144
Professional Liability & Other Insurance						1	Percent	29
Legal/Permits/Review Fees						1	Percent	29
Surveys Testing Investigation						2	Percent	57
Utilities						3	Percent	86
CSX Oversight and review						5	Percent	144
Start-up						0	Percent	0
Subtotal Professional Services						34		976
Subtotal excluding Land and Vehicles								3,846
Allocated contingencies						30	Percent	1,154
Grand Total CSX Construction								\$5,000
Commuter Authority Capital Costs - Alabaster and Calera								
Trackage								
Grading for Main Track	Alabaster	414.1	Calera	425.4	11.3	Mile	4,000,000	45,200
Grading for New Station Track	Calera	425.2	Calera	425.4	0.2	Mile	2,500,000	500
New Main Track	Alabaster	414.1	Calera	425.4	11.3	Mile	1,300,000	14,690
New Station Track	Calera	425.2	Calera	425.4	0.2	Mile	1,300,000	260
#15 Turnout	Alabaster	414.1			1	Each	105,000	105
#15 Turnout	Calera	425.2			1	Each	105,000	105
#10 Turnout to CSX	Calera	424.8			1	Each	80,000	80
Install Crossing with NS	Calera	425.1			1	Each	200,000	200
Subtotal Track								61,140
Signals								
Install Crossing with NS	Calera	425.1			1	CP	2,000,000	2,000
Alabaster Station Control Point	Alabaster	414.1			1	CP	600,000	600
Electric Lock Switch	Calera	424.8			1	Each	110,000	110
Calera Station Control Point	Calera	425.2			1	CP	600,000	600
Intermediates	Alabaster	414.1	Calera	425.4	11.3	Mile	120,000	1,356
Positive Train Control	Alabaster	414.1	Calera	425.4	11.3	Miles	1,600,000	18,080
Communications					1	Sum	1,500,000	1,500
Subtotal Signals								22,246

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

South Segment Alabaster-Calera Commuter Rail Service Conceptual Estimate								
Capital Costs - Page 2/2								
			Mile		Mile			2019
								Unit
	Location	Post	Location	Post	Quantity	Units	Cost	Total
								(\$000)
<u>Highway Crossings</u>								
Crossing signal new and surface	1st Avenue West under new bridge				0	Each	250,000	0
Crossing signal new and surface	6th Avenue SW				1	Each	250,000	250
Crossing signal new and surface	11th avenue SW				1	Each	250,000	250
Crossing signal new and surface	Montevallo Road				1	Each	250,000	250
Crossing signal new and surface	Highway 119				1	Each	250,000	250
Crossing signal new and surface	Quarry Crossing				1	Each	250,000	250
Crossing signal new and surface	Fulton Springs Road				1	Each	250,000	250
Crossing signal new and surface	Shady Acres Road Crossing xbucks				1	Each	30,000	30
Crossing signal new and surface	Snow Drive				1	Each	250,000	250
Crossing signal new and surface	AL87				1	Each	250,000	250
Crossing signal new and surface	AL22				1	Each	250,000	250
Crossing signal new and surface	AL84				1	Each	250,000	250
Crossing signal new and surface	Main Street Calera				1	Each	250,000	250
Crossing signal new and surface	17th Avenue Calera				1	Each	250,000	250
Subtotal Highway Crossings								3,030
<u>Bridges</u>								
New Bridge over CSX (and 6th Avenue)	0.4 miles south of 1st ave				2,000	Feet	15,000	30,000
New Bridge over CSX	2.6 miles south of 1st ave				2,000	Each	15,000	30,000
Modify I-65 Bridge					1	Each	500,000	500
New Bridge over Buck Creek					110	Feet	1,000,000	1,000
Modify I-65 Bridge					1	Each	500,000	500
New Bridge over CSX	by Capitol Materials				2,000	Feet	15,000	30,000
New Bridge Over AL211					2,000	Feet	15,000	30,000
Modify US31 Bridge					1	Each	500,000	500
Subtotal Bridges								122,500
<u>Stations</u>								
Landscaping and area improvements					2	Each	150,000	300
Platform and amenities					2	Each	1,200,000	2,400
Construct Parking					400	Spaces	3,000	1,200
Kiss & Ride Facility					2	Each	50,000	100
Access					2	Each	450,000	900
Automated ticket machines					4	Each	90,000	360
Stations General Voice and ATV Communications and Systems					1	Sum	300,000	300
Subtotal Stations								5,560
<u>Land</u>								
Purchase Right-of-Way in Calera along 11th Street					1	Each	1,000,000	1,000
Purchase Right-of-Way in Calera along 10th Street					1	Each	1,000,000	1,000
Relocate 11th Street					1,430	Feet	400	572
Purchase CSX Right-of-Way	Alabaster	414.1	Calera	425.4	11.3	Miles	1,000,000	11,300
Land - South Alabaster Station					1.5	Acres	200,000	300
Land - Calera Station					3	Acres	200,000	600
Subtotal Land								14,772
Subtotal								229,248
<u>Professional Services</u>								
Preliminary Engineering/Project Environmental					3	Percent	6,877	
Final Design					5	Percent	11,462	
Project Management for D&C					1	Percent	2,292	
Construction Administration & Management					8	Percent	18,340	
Mobilization					5	Percent	11,462	
Professional Liability & Other Insurance					1	Percent	2,292	
Legal/Permits/Review Fees					1	Percent	2,292	
Surveys Testing Investigation					2	Percent	4,585	
Utilities					3	Percent	6,877	
CSX Oversight and review					0	Percent	0	
Start-up					0.5	Percent	1,146	
Subtotal Professional Services					29.5			67,628
Subtotal excluding Land and Vehicles								296,876
Allocated contingencies					30	Percent		89,063
Grand Total Commuter Authority								\$385,939
CSX Construction Costs								5,000
South Segment Grand Total Alabaster-Calera								\$390,939

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

	Quantity	Unit	2019\$ Unit Cost	Originate Alabaster Cost	Originate Calera Cost
<u>Agency Mgmt. and Customer Service</u>					
Director - Commuter Rail	1	Position	\$ 120,000	\$ 120,000	\$ 120,000
Transportation & Mechanical Liason	1	Position	100,000	100,000	100,000
Facilities Manager	1	Position	55,000	55,000	55,000
Marketing Manager	1	Position	70,000	70,000	70,000
Customer Service Representative/Call Center	2	Position	40,000	80,000	80,000
Finance Manager	1	Position	70,000	70,000	70,000
Accountant	1	Position	45,000	45,000	45,000
Support Staff	1	Position	35,000	35,000	35,000
State Fringe 40%				230,000	230,000
Subtotal Agency Positions	9			\$ 805,000	\$ 805,000
<u>Other Agency Costs</u>					
Marketing Costs - Advertising	1	Sum	\$ 150,000	\$ 150,000	\$ 150,000
Materials & Supplies & Utilities	1	Sum	50,000	50,000	50,000
Leases & Rentals	1	Sum	100,000	100,000	100,000
Audit and Legal Counsel	1	Sum	80,000	80,000	80,000
Insurance	1	Sum	500,000	-	500,000
Insurance 5MXno SIR	1	Sum	600,000	600,000	600,000
Insurance 500MX5M	1	Sum	1,750,000	1,750,000	1,750,000
Subtotal Other Agency Costs				\$ 2,730,000	\$ 3,230,000
<u>Contract - Train Operations</u>					
Train Crews (2 person)	3	Crew	\$ 158,000	\$ 474,000	\$ 474,000
Operations Manager	1	Position	95,000	95,000	95,000
Safety Manager	1	Position	70,000	70,000	70,000
Report Clerk	1	Position	45,000	45,000	45,000
Fringe Benefits	0.45	Percent	-	213,000	213,000
Corporate Overhead	0.50	Percent	-	449,000	449,000
Materials/Supplies/Rent	1	Sum	90,000	90,000	90,000
Daytime Lodging	1	Sum	76,200	76,200	76,200
Management Fee	10	Percent	-	151,000	151,000
Performance Incentive	10	Percent	-	151,000	151,000
Subtotal Contract - Train Operations				\$ 1,814,200	\$ 1,814,200
<u>Contract - Equipment Maintenance</u>					
Locomotives - Running Maintenance	56,388	Loco-Mile	\$ 11.00	\$ 620,000	0
Locomotives - Running Maintenance	85,598	Loco-Mile	11.00	0	\$ 942,000
Railcars - Running Maintenance	157,886	Car-Mile	3.00	474,000	0
Railcars - Running Maintenance	239,674	Car-Mile	3.00	0	719,000
Car Cleaning - floors, seats & windows	2	Positions	50,000	100,000	0
Car Cleaning - supplies	1	Sum	15,000	10,000	0
Diesel Fuel	82,973	Gallons	2.42	201,000	0
Diesel Fuel	120,227	Gallons	2.42	0	291,000
Layover - standby power for a/c & lights	1	Sum	44,000	44,000	0
Layover - facility repairs and supplies	1	Sum	24,000	24,000	0
Layover Facility and Utilities	1	Sum		200,000	200,000
Subtotal Contract Equipment Maintenance Cost				\$ 1,673,000	\$ 2,152,000
<u>Facilities Maintenance</u>					
Track, Bridge and Signal Maintenance	22.2	Miles	70,000	\$ 1,554,000	-
Track, Bridge and Signal Maintenance	33.7	Miles	70,000	-	\$ 2,359,000
Birmingham Maintenance & Security	1	Sum	150,000	150,000	150,000
Maintenance at Stations with Parking	1,100	Space	80	88,000	-
Maintenance at Stations with Parking	1,500	Space	80	-	120,000
Maintenance - Station Ticket Machines	14	Units	5,000	70,000	-
Maintenance - Station Ticket Machines	18	Units	5,000	-	90,000
Security at Stations with Parking	5	Stations	53,340	267,000	-
Security at Stations with Parking	7	Stations	53,340	-	373,000
Security Camera Lines and Maintenance	5	Stations	3,000	15,000	-
Security Camera Lines and Maintenance	7	Stations	3,000	-	21,000
Maintenance Birmingham Platform	1	Sum	100,000	50,000	50,000
Security at MMPT	1	Sum	50,000	50,000	50,000
Subtotal Contract - Stations & Other				\$ 2,244,000	\$ 3,213,000
GRAND TOTAL OPERATING COSTS				\$ 9,266,000	\$11,214,000
Riders Per Day				1,597	1,834
Revenue Per Rider				2.90	3.34
Anticipated Fare Revenue				\$ 1,178,000	\$ 1,556,000
Annual Operating Support				\$ 8,088,000	\$ 9,658,000

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

Appendix C: Conceptual Commuter Railroad Operating Cost Estimate

				2019\$	Originate Alabaster	Originate Calera
				Unit	Estimated	Estimated
	Quantity	Unit	Cost	Costs	Costs	Costs
<u>Agency Mgmt. and Customer Service</u>						
Director - Commuter Rail	1	Position	\$ 120,000	\$ 120,000	\$ 120,000	
Transportation & Mechanical Liason	1	Position	100,000	100,000	100,000	
Facilities Manager	1	Position	55,000	55,000	55,000	
Marketing Manager	1	Position	70,000	70,000	70,000	
Customer Service Representative/Call Center	2	Position	40,000	80,000	80,000	
Finance Manager	1	Position	70,000	70,000	70,000	
Accountant	1	Position	45,000	45,000	45,000	
Support Staff	1	Position	35,000	35,000	35,000	
State Fringe 40%				230,000	230,000	
Subtotal Agency Positions	9			\$ 805,000	\$ 805,000	
<u>Other Agency Costs</u>						
Marketing Costs - Advertising	1	Sum	\$ 150,000	\$ 150,000	\$ 150,000	
Materials & Supplies & Utilities	1	Sum	50,000	50,000	50,000	
Leases & Rentals	1	Sum	100,000	100,000	100,000	
Audit and Legal Counsel	1	Sum	80,000	80,000	80,000	
Insurance	1	Sum	500,000	-	500,000	
Insurance 5MXno SIR	1	Sum	600,000	600,000	600,000	
Insurance 500MX5M	1	Sum	1,750,000	1,750,000	1,750,000	
Subtotal Other Agency Costs				\$ 2,730,000	\$ 3,230,000	
<u>Contract - Train Operations</u>						
Train Crews (2 person)	3	Crew	\$ 158,000	\$ 474,000	\$ 474,000	
Operations Manager	1	Position	95,000	95,000	95,000	
Safety Manager	1	Position	70,000	70,000	70,000	
Report Clerk	1	Position	45,000	45,000	45,000	
Fringe Benefits	0.45	Percent	-	213,000	213,000	
Corporate Overhead	0.50	Percent	-	449,000	449,000	
Materials/Supplies/Rent	1	Sum	90,000	90,000	90,000	
Daytime Lodging	1	Sum	76,200	76,200	76,200	
Management Fee	10	Percent	-	151,000	151,000	
Performance Incentive	10	Percent	-	151,000	151,000	
Subtotal Contract - Train Operations				\$1,814,200	\$ 1,814,200	
<u>Contract - Equipment Maintenance</u>						
Locomotives - Running Maintenance	56,388	Loco-Mile	\$ 11.00	\$ 620,000	0	
Locomotives - Running Maintenance	85,598	Loco-Mile	11.00	0	\$ 942,000	
Railcars - Running Maintenance	157,886	Car-Mile	3.00	474,000	0	
Railcars - Running Maintenance	239,674	Car-Mile	3.00	0	719,000	
Car Cleaning - floors, seats & windows	2	Positions	50,000	100,000	0	
Car Cleaning - supplies	1	Sum	15,000	10,000	0	
Diesel Fuel	82,973	Gallons	2.42	201,000	0	
Diesel Fuel	120,227	Gallons	2.42	0	291,000	
Layover - standby power for a/c & lights	1	Sum	44,000	44,000	0	
Layover - facility repairs and supplies	1	Sum	24,000	24,000	0	
Layover Facility and Utilities	1	Sum		200,000	200,000	
Subtotal Contract Equipment Maintenance Cost				\$ 1,673,000	\$ 2,152,000	
<u>Facilities Maintenance</u>						
Track, Bridge and Signal Maintenance	22.2	Miles	70,000	\$ 1,554,000	-	
Track, Bridge and Signal Maintenance	33.7	Miles	70,000	-	\$ 2,359,000	
Birmingham Maintenance & Security	1	Sum	150,000	150,000	150,000	
Maintenance at Stations with Parking	1,100	Space	80	88,000	-	
Maintenance at Stations with Parking	1,500	Space	80	-	120,000	
Maintenance - Station Ticket Machines	14	Units	5,000	70,000	-	
Maintenance - Station Ticket Machines	18	Units	5,000	-	90,000	
Security at Stations with Parking	5	Stations	53,340	267,000	-	
Security at Stations with Parking	7	Stations	53,340	-	373,000	
Security Camera Lines and Maintenance	5	Stations	3,000	15,000	-	
Security Camera Lines and Maintenance	7	Stations	3,000	-	21,000	
Maintenance Birmingham Platform	1	Sum	100,000	50,000	50,000	
Security at MMPT	1	Sum	50,000	50,000	50,000	
Subtotal Contract - Stations & Other				\$ 2,244,000	\$ 3,213,000	
GRAND TOTAL OPERATING COSTS					\$ 9,270,000	\$ 11,210,000
Riders Per Day	1,596	1,820				
Revenue Per Rider	3.34	3.34				
Anticipated Revenue				\$ 1,350,000	\$ 1,540,000	
Annual Operating Support				\$ 7,920,000	\$ 9,670,000	

Commuter Rail Study
Birmingham/Hoover/Helena/Pelham/Alabaster
Regional Planning Commission of Greater Birmingham

Appendix D: FTA Transit Database Costing of other Commuter Railroads

2017 FTA Transit Database												
Service Name	Operator	Operating Expenses	Fare Revenues	Fare box Recovery	Annual Passenger Miles	Annual Unlinked Trips	Annual Vehicle Revenue-Miles	Annual Vehicle Revenue-hours	Route Miles	Operating Expense Vehicle-Rev-Mile	Operating Expense Vehicle-Rev-Hour	Revenue Per Unlinked Trip
<i>Selected comparables</i>												
Music City Star (Nashville)	RTA	4,252,660	918,392	22%	4,692,989	294,389	203,497	7,890	62.8	20.90	538.99	3.12
Northstar Line (Minneapolis)	Metro Transit	15,261,800	2,516,900	16%	19,441,485	793,798	556,323	14,482	77.9	27.43	1,053.85	3.17
Rail Runner Exp.(Albuquerque)	Rio Metro RTD	28,430,862	2,153,005	8%	38,021,616	835,561	1,366,739	35,706	193.1	20.80	796.25	2.58
Average		15,981,774	1,862,766	12%	20,718,697	641,249	708,853	19,359	111	22.55	825.53	2.90
<i>All Starts since 1987</i>												
Sounder (Seattle)	CPSRTA	45,502,162	15,042,598	33%	111,028,348	4,445,568	1,919,660	63,935	163.8	23.70	711.69	3.38
Altamont Corridor Express	ACE	21,584,107	8,899,220	41%	55,703,220	1,299,717	1,084,966	28,013	172.0	19.89	770.50	6.85
Rail Runner Exp.(Albuquerque)	Rio Metro RTD	28,430,862	2,153,005	8%	38,021,616	835,561	1,366,739	35,706	193.1	20.80	796.25	2.58
Music City Star (Nashville)	RTA	4,252,660	918,392	22%	4,692,989	294,389	203,497	7,890	62.8	20.90	538.99	3.12
Virginia Railway Express (DC)	VRE	73,979,660	42,280,660	57%	143,468,932	4,676,123	2,413,955	74,767	173.6	30.65	989.47	9.04
Northstar Line (Minneapolis)	Metro Transit	15,261,800	2,516,900	16%	19,441,485	793,798	556,323	14,482	77.9	27.43	1,053.85	3.17
Coaster (San Diego)	NCTD	18,049,952	5,882,922	33%	38,461,097	1,454,865	1,360,510	34,422	82.2	13.27	524.37	4.04
FrontRunner (Utah)	Utah TA	34,438,729	7,212,605	21%	122,257,990	4,854,099	5,349,524	154,744	174.5	6.44	222.55	1.49
Trinity Rail Express (Dallas)	DART	28,267,498	8,866,859	31%	41,313,641	2,097,999	1,630,259	72,469	72.3	17.34	390.06	4.23
SunRail (Orlando)	CFCR	34,108,383	1,983,617	6%	12,850,030	901,156	652,532	25,678	63.5	52.27	1,328.31	2.20
Metrolink (Los Angeles)	SCRRA	222,019,676	83,397,682	38%	419,663,422	14,396,198	13,133,012	359,520	824.4	16.91	617.54	5.79
Capital MetroRail (Austin)	Capital MTA	21,750,211	1,974,227	9%	13,034,972	824,704	301,021	12,725	64.2	72.25	1,709.25	2.39
Tri-Rail (Miami)	SFRTA	90,925,787	12,785,301	14%	118,514,347	4,261,113	3,525,108	121,880	142.2	25.79	746.03	3.00
Total		638,571,487	193,913,988	30%	1,138,452,089	41,135,290	33,497,106	1,006,231	2,267	19.06	634.62	3.94
Birmingham	To	To										
	Alabaster	Calera										
Annual Vehicle Miles	157,886	239,674										
Annual Vehicle Hours	4,386	6,282										
Annual Cost - Vehicle Miles	\$ 3,559,701	\$ 5,403,690	This approximation is not valid - see section 2.6.2									
Annual Cost - Vehicle Hours	\$ 3,620,569	\$ 5,186,220	This approximation is not valid - see section 2.6.3									