NORTHEAST CORRIDOR MOBILITY STUDY

Mayors' Meeting

Metro Courthouse

July 1, 2010

AGENDA

NORTHEAST CORRIDOR MOBILITY STUDY

1. **Introduction and Update**

2. **Results of detailed screening**
   a. Capital costs
   b. Operating costs
   c. Ridership

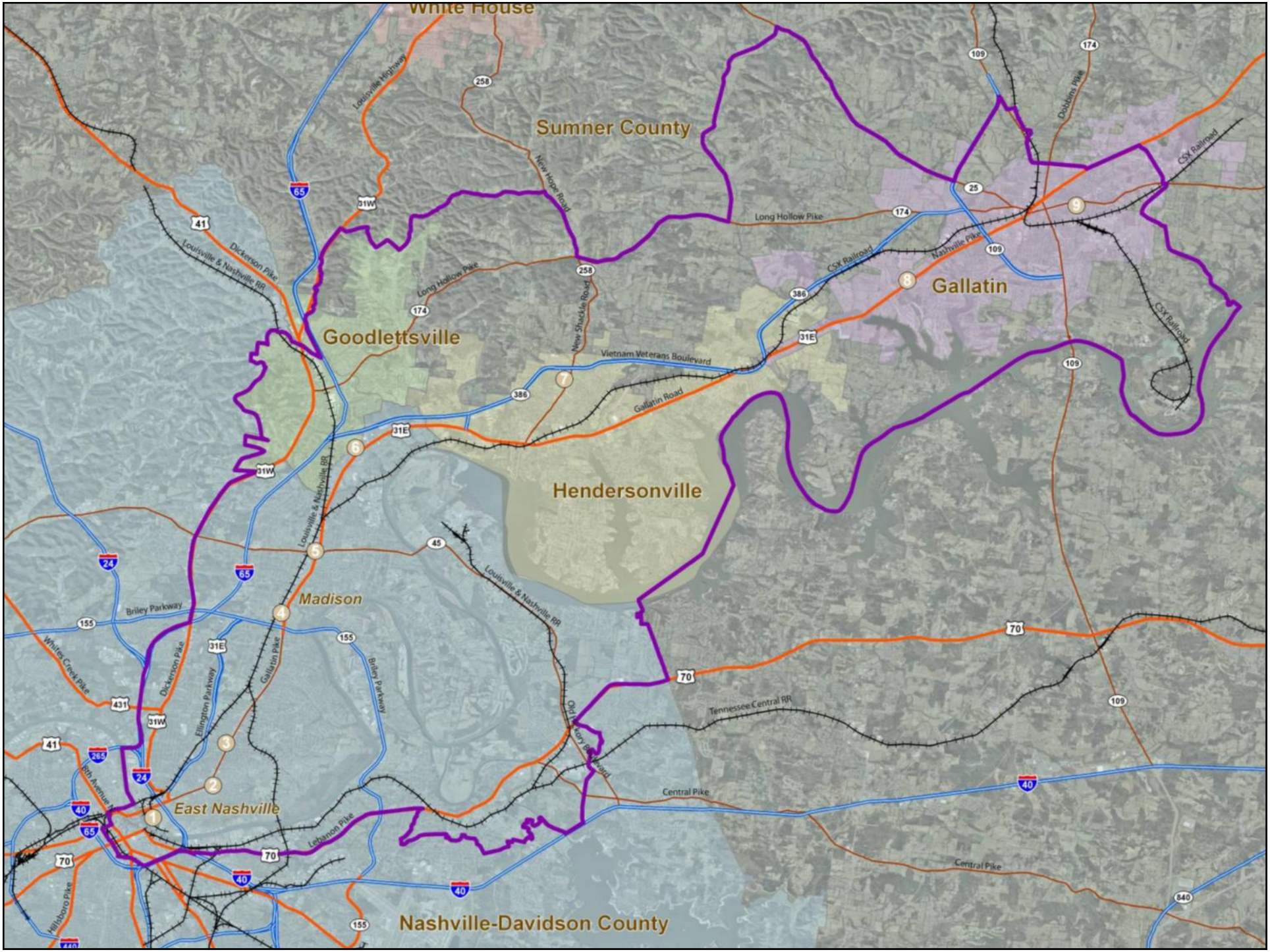
3. **Discussion, reaction, recommendation and validation of preferred alternative by Steering Committee**

4. **Looking to the future**
   a. Population and employment alternative growth scenario
   b. Urban design
   c. Consider breaking into segments

GUIDING PRINCIPLES

NORTHEAST CORRIDOR MOBILITY STUDY

Expand and promote alternative transportation options to reduce congestion, protect air quality, and facilitate desired walkable development patterns


White House
Sumner County
Goodlettsville
Gallatin
Hendersonville
Madison
East Nashville
Nashville-Davidson County
Louisville Highway
New Hope Road
Long Hollow Pike
New Shackle Road
Vietnam Veterans Boulevard
Gallatin Road
Dickerson Pike
Louisville & Nashville RR
CSX Railroad
Nashville Pike
Dobbins Pike
Briley Parkway
Whites Creek Pike
Ellington Parkway
Gallatin Pike
Old Hickory Boulevard
Tennessee Central RR
Central Pike
Lebanon Pike
Hillsboro Pike
8th Avenue S
65
41
31W
258
174
109
25
386
31E
45
24
155
431
265
70
40
840

EVALUATION OF ALTERNATIVES

NORTHEAST CORRIDOR MOBILITY STUDY

- Quantitative & qualitative analysis
- Follows project Purpose and Need
  - Goals
  - Criteria
- GIS analysis for quantitative criteria
- From 10 alternatives down to 3 for detailed evaluation
- Completed the detailed evaluation of 3 alternatives

TRAVEL DEMAND MODEL

NORTHEAST CORRIDOR MOBILITY STUDY

- Cooperative Effort with MPO Staff
- Data Sources include:
  1. Music City Star Survey
  2. MTA Bus On-Board Survey
  3. MPO Coding of Network
  4. Regional Model
- Completed. Results used for Detailed Screening

NORTHEAST CORRIDOR MOBILITY STUDY

DETAILED SCREENING

Three Alternatives

TRANSPORTATION ALTERNATIVES

NORTHEAST CORRIDOR MOBILITY STUDY

- **Alignments:**
  - Gallatin Pike (US 31E)/ Ellington Parkway/ I-65/ Vietnam Vets
  - Ellington Parkway/ I-65/ Vietnam Vets
  - CSX Rail Line

- **Modes:**
  - Bus Rapid Transit (BRT)
  - Light Rail Transit (LRT)
  - Commuter Rail (CRT)

BUS RAPID TRANSIT (BRT)

NORTHEAST CORRIDOR MOBILITY STUDY

- **Bus Rapid Transit (BRT)**: Gallatin Pike (US 31E)/ Ellington Parkway/ I-65/ Vietnam Vets
  - Two Alignments:
    - Corridor A: Gallatin Pike from Downtown Nashville to SR 386 Conn., transitioning to SR 386/Vietnam Vets Pkwy and then local streets in Gallatin
    - Corridor B: Ellington Pkwy, continuing along I-65 and SR 386/ Vietnam Vets Pkwy and then local streets in Gallatin

BUS RAPID TRANSIT (BRT)

NORTHEAST CORRIDOR MOBILITY STUDY

- **Corridor A stops:**
  - Music City Central
  - 7th Street
  - Eastland Avenue
  - Trinity
  - Briley Parkway
  - Madison
  - Conference Drive
  - SR 386 Connector
  - New Shackle Island
  - Saundersville
  - Harris/Greenlea
  - Maple
  - Downtown Gallatin
  - Sumner Regional Medical Center (RMC)

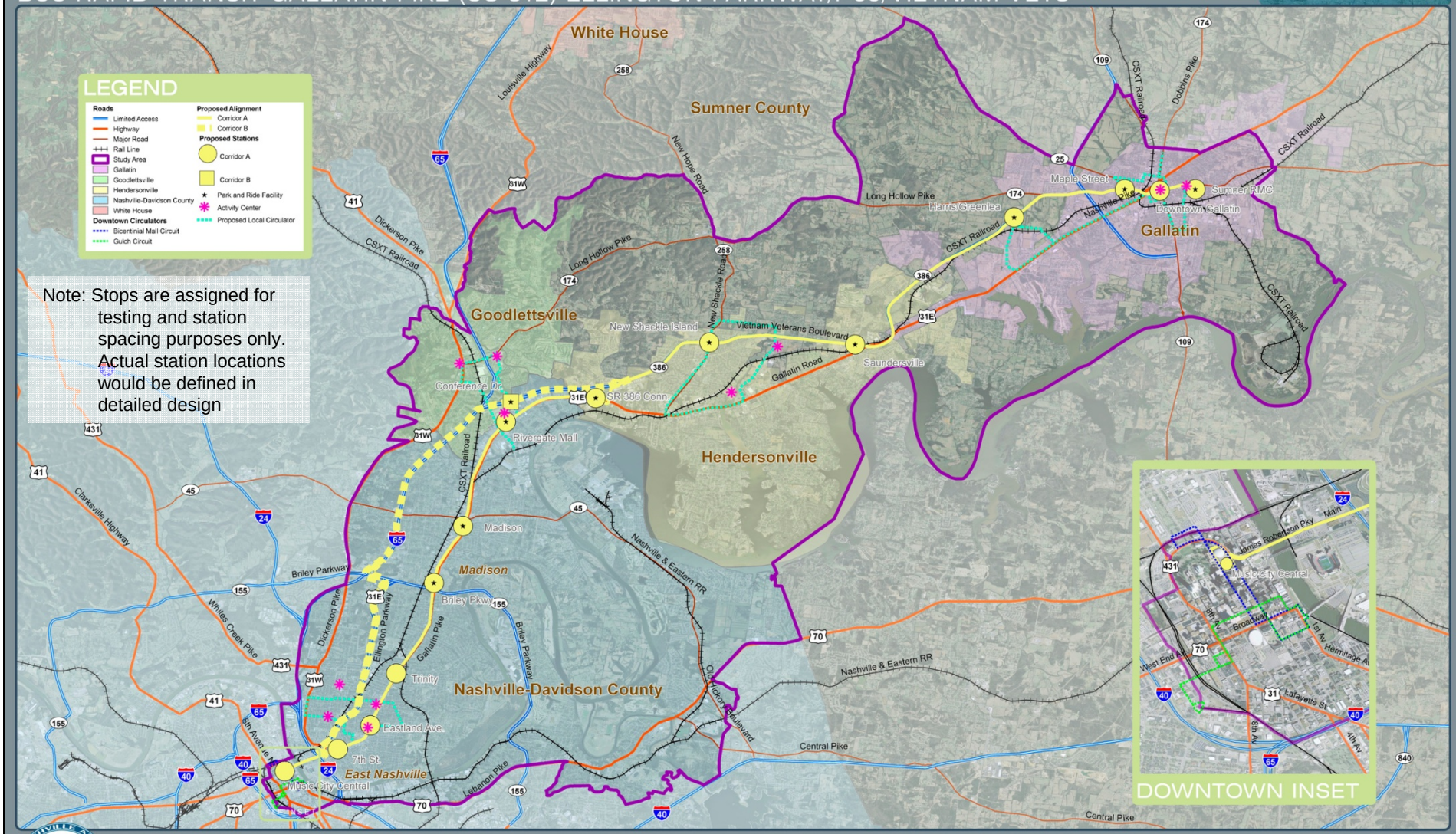
- **Corridor B stops:**
  - Music City Central
  - Conference Drive
  - New Shackle Island
  - Saundersville
  - Harris/Greenlea
  - Maple
  - Downtown Gallatin
  - Sumner Regional Medical Center (RMC)

Note: Stops are assigned for testing and station spacing purposes only. Actual station locations would be defined in detailed design.

STUDY AREA ARTERIAL CORRIDOR

NORTHEAST CORRIDOR Mobility Study

BUS RAPID TRANSIT GALLATIN PIKE (US 31E) ELLINGTON PARKWAY/I-65/VIETNAM VETS



NORTHEAST CORRIDOR MOBILITY STUDY

FEBRUARY 2010

EDAW | AECOM

LIGHT RAIL TRANSIT (LRT)

NORTHEAST CORRIDOR MOBILITY STUDY

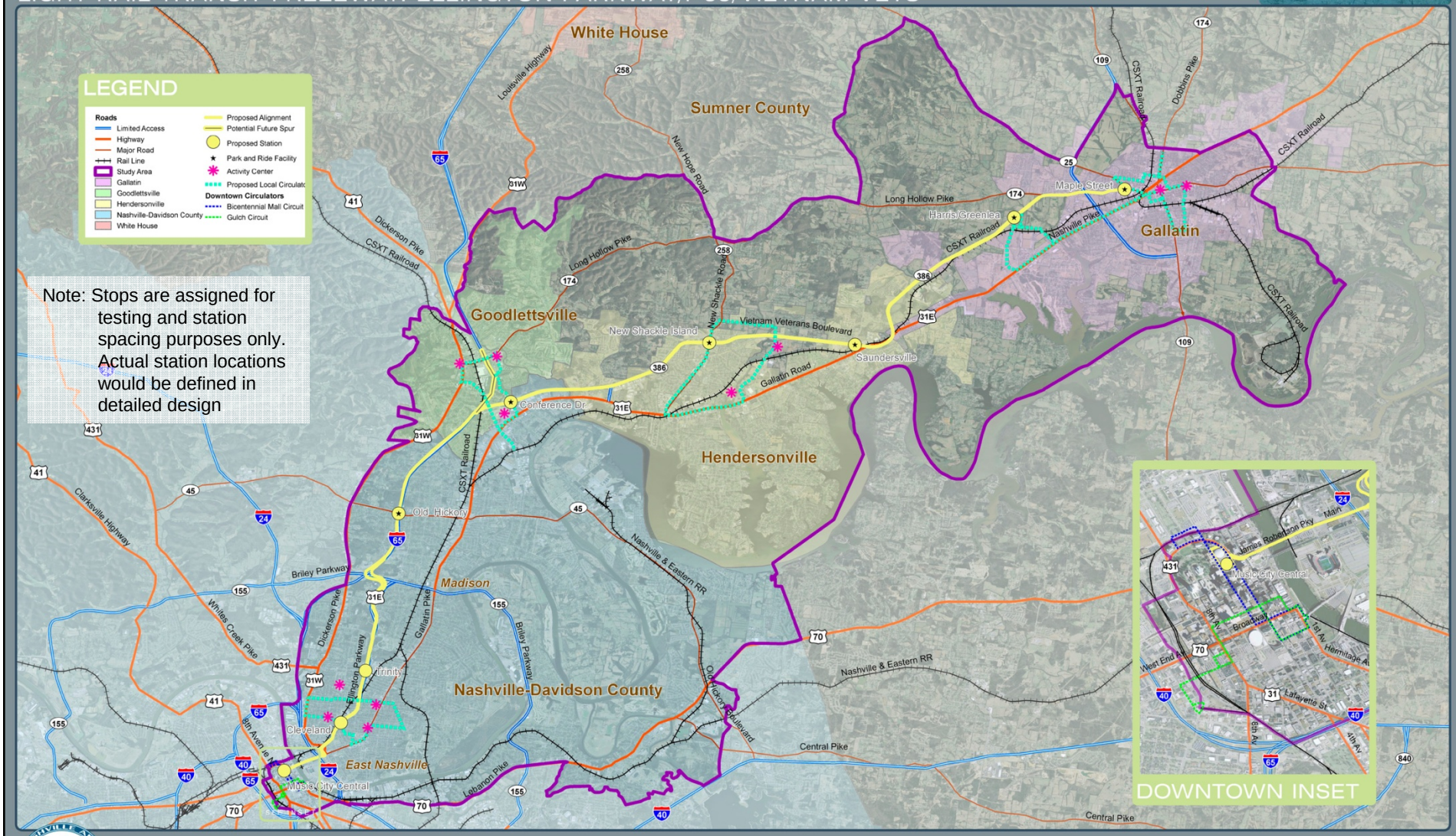
- **Light Rail Transit (LRT)**: Ellington Parkway/ I-65/ Vietnam Vets
  - **Stops:**
    - Music City Central
    - Cleveland
    - Trinity
    - Old Hickory
    - Conference Drive
    - New Shackle Island
    - Saundersville
    - Harris/Greenlea
    - Maple

Note: Stops are assigned for testing and station spacing purposes only. Actual station locations would be defined in detailed design.

STUDY AREA FREEWAY CORRIDOR

NORTHEAST CORRIDOR Mobility Study

LIGHT RAIL TRANSIT FREEEWAY: ELLINGTON PARKWAY/I-65/VIETNAM VETS



NORTHEAST CORRIDOR MOBILITY STUDY

FEBRUARY 2010

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COMMUTER RAIL (CRT)

NORTHEAST CORRIDOR MOBILITY STUDY

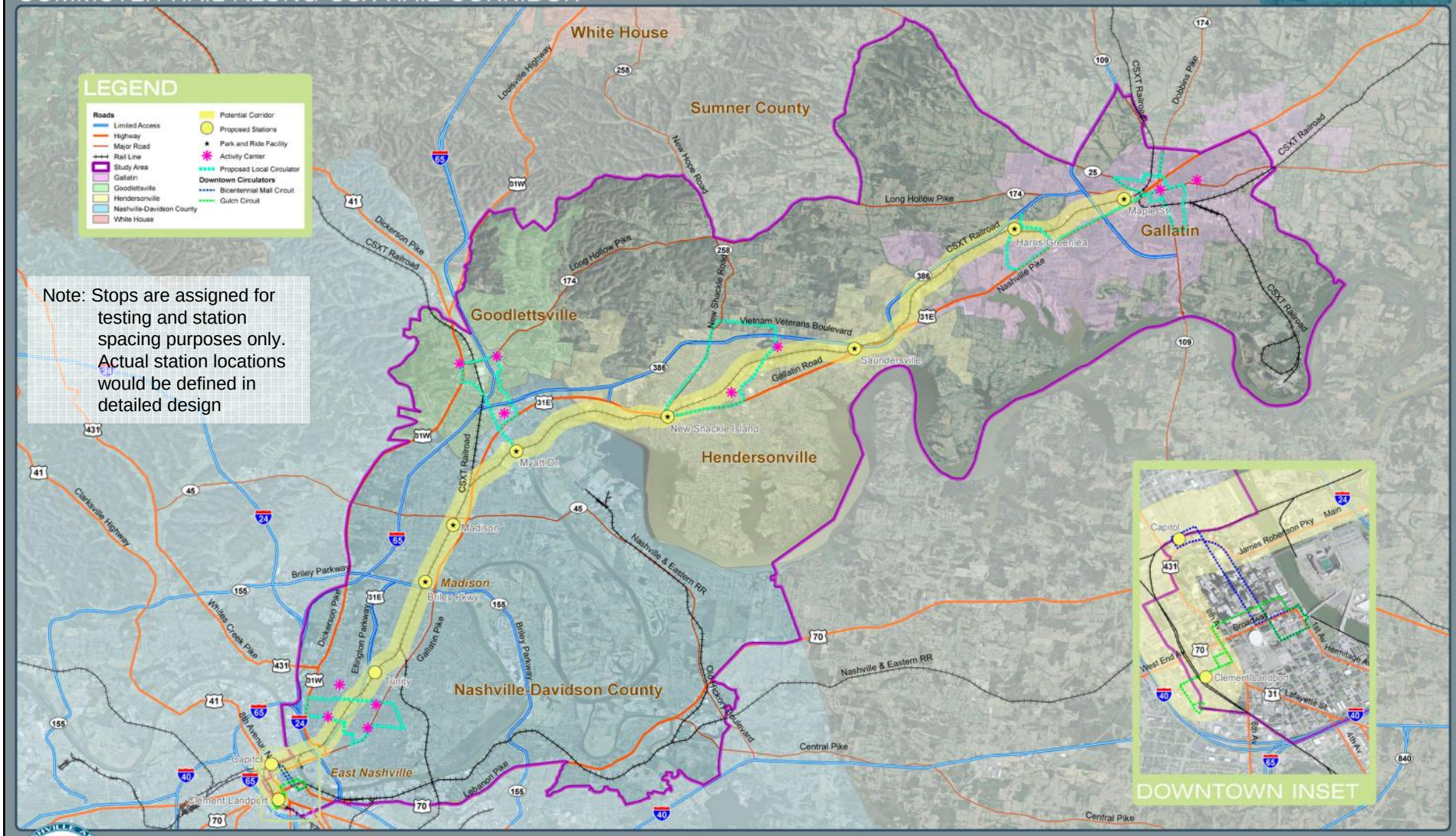
- **Commuter Rail (CRT):** CSX Rail Line Corridor
  - **Stops:**
    - Clement Landport
    - Capital
    - Trinity
    - Briley Parkway
    - Madison
    - Myatt Drive
    - New Shackle Island
    - Saundersville
    - Harris/Greenlea
    - Maple

Note: Stops are assigned for testing and station spacing purposes only. Actual station locations would be defined in detailed design.

STUDY AREA COMMUTER RAILROAD CORRIDOR

NORTHEAST CORRIDOR Mobility Study

COMMUTER RAIL ALONG CSX RAIL CORRIDOR



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NORTHEAST CORRIDOR MOBILITY STUDY

DETAILED SCREENING

Capital Costs

BUS RAPID TRANSIT (BRT)

BUS RAPID TRANSIT (BRT)

DETAILED SCREENING – Capital Costs

NORTHEAST CORRIDOR MOBILITY STUDY

- **Bus Rapid Transit (BRT):**

- Capital Improvements
  - 60’ Articulated Hybrids
  - Mixed traffic downtown to Interstate Drive
  - Dedicated Lanes on Gallatin Pike to SR 386 Connector
  - HOV Lanes on Ellington Pkwy, I-65, SR 386
  - Island Platforms
  - Does not include Circulator Buses

- $373 million (2010 dollars)

- $550 million (inflated costs to open in 2020)

DETAILED SCREENING – Capital Costs

NORTHEAST CORRIDOR MOBILITY STUDY

BRT Alternative - Opinion of Probable Capital Cost

Capital Cost Component	Units	2010 Unit Cost	Quantitiy	2010 Component Cost	Notes
Typical 6-lane section with center HOV lanes in both direction (widen outside)	mile	$5,491,000	2.36	$12,959,000	
Typical 6-lanesection with center HOV lanes in both direction (widen to center)	mile	$6,146,000	9.13	$56,113,000	
Typical two lane ramp with HOV/exclusive lane (widen outside)	mile	$2,457,000	1.84	$4,521,000	
Typical 8-lane section with exclusive lanes, open drainage (widen outside)	mile	$2,969,000	0.55	$1,633,000	
Typical 7-lane section with exclusive lanes, open drainage (widen outside)	mile	$4,867,000	0.28	$1,363,000	
Typical 6-lane section with exclusive lanes, open drainage (widen outside)(existing 4 lane)	mile	$4,903,000	0.4	$1,961,000	
Typical 6-lane section with exclusive lanes, open drainage (widen outside)(existing 5 lane)	mile	$3,943,000	3.83	$15,102,000	
Typical 6-lane section with exclusive lanes, closed drainage (widen outside)(existing 4 lane)	mile	$6,114,000	0.28	$1,712,000	
Typical 6-lane section with exclusive lanes, closed drainage (widen outside)(existing 5 lane)	mile	$5,367,000	4.97	$26,674,000	
Typical 7-lane section with exclusive lanes, closed drainage (widen outside)	mile	$5,715,000	1.03	$5,886,000	
Typical 6-lane section with exclusive lanes, closed drainage & on-street parking (widen outside)	mile	$6,287,000	0.85	$5,344,000	

DETAILED SCREENING – Capital Costs

NORTHEAST CORRIDOR MOBILITY STUDY

Resurfacing of BRT Lanes (for portions in mixed traffic)	mile	$195,000	3.92	$764,000	
Major Utility Relocation	lump sum	$200,000	1	$200,000	For major utility work - in addition to the per mile utility cost
Highway bridge widening/lengthening	s.f	$200	126,900	$25,380,000	
Railroad bridge widening/lengthening	s.f.	$260	10,000	$2,600,000	
Railroad track adjustment	s.f.	$500,000	2	$1,000,000	
Highway Bridge Replacement	each	$200	157,250	$31,450,000	
Freeway widening for BRT Center Station	each	$6,215,000	4	$24,860,000	cost for widening and tapers at stations
Park-n-ride lot construction	site	$4,613,000	4	$18,452,000	
Freeway Center Station	each	$5,220,000	4	$20,880,000	
Reconstruction/ Restriping of Ramps	each	$70,000	17	$1,190,000	
Center Platform Station on Arterial	each	$1,270,000	10	$12,700,000	pair of platforms on far side of intersection
Pedestrian and bike access	station	$65,000	14	$910,000	
40-ft hybrid bus	each	$694,000	0	$0	specialized BRT hybrid including smart card fare collection equipment with percentage for spare parts
60-ft articulated hybrid bus	each	$950,000	22	$20,900,000	specialized BRT hybrid including smart card fare collection equipment with percentage for spare parts
Maintenance Facility	bus	$460,000	22	$10,120,000	per bus including equipment
Signalized Intersection Modification	each	$50,000	46	$2,300,000	includes transit signal priority

Subtotal		**$306,974,000**	
Engineering for transit items		$17,000,000	roadway items above include engineering
Unallocated Contingency	15%	$66,026,000	
Total		**$373,000,000**	
	Route Miles:	29.4	
	Cost per Mile:	$12,700,000	

Average cost for BRT in dedicated lanes is between $10M and $17M per mile. This project has a portion running in mixed traffic and fewer stations per mile (~1 station every 2 miles versus an average of 2 stations every mile) than the average, so a cost per mile toward the lower end of the range is appropriate.

LIGHT RAIL TRANSIT (LRT)

LIGHT RAIL TRANSIT (LRT)

NORTHEAST CORRIDOR MOBILITY STUDY

DETAILED SCREENING – Capital Costs

NORTHEAST CORRIDOR MOBILITY STUDY

- **Light Rail Transit (LRT)**: Ellington Parkway/ I-65/ Vietnam Vets
- Capital Improvements
  - Mixed traffic downtown (embedded track)
  - Exclusive Guideway along highway (ballast track)
  - Bridge widening and replacement
  - Yard and Shop
  - Stations and Park and Rides
- $1.9 billion (2010 dollars)
- $2.8 billion (inflated costs to open in 2020)

DETAILED SCREENING – Capital Costs

NORTHEAST CORRIDOR MOBILITY STUDY

LRT Alternative

Nashville NE Corridor Study

DRAFT - April 26, 2010

Capital Cost Component	Units	2010 Unit Cost	Quantity	2010 Component Cost	Notes
Embedded track	mile	$ 13,700,000	2.06	$ 28,211,000	Includes platform, tactile strip, more enclosed shelter, lighting, security camera, fare vending, next bus display, communications, landscaping, and higher grade surfaces/fixtures
Center platform station	pair	$ 4,390,000	14	$ 61,460,000	Same features as more substantial station stop except with bus bays for transfers
Ballasted track	mile	$ 7,360,000	23.85	$ 175,511,000	
Elevated track on structure	mile	$ 132,600,000	4.76	$ 631,734,000	
Park-and-Ride lot (surface lot)	space	$ 7,000	2,400	$ 16,800,000	
LRV	each	$ 3,500,000	22	$ 77,000,000	
Signal reconstruction	intersection	$ 250,000	14	$ 3,500,000	
At-grade crossing	crossing	$ 675,000	14	$ 9,450,000	
Maintenance facility and yard	LS	$ 22,000,000	1	$ 22,000,000	
Embankment	mile	$ 3,090,000	20.3	$ 62,633,000	
Retaining Walls	linear foot	$ 1,080	21,750	$ 23,490,000	
Utility Relocation	LS	$ 13,702,000	1	$ 13,702,000	5% of costs except ROW, vehicles, ballasted track in freeway ROW, and flyovers
Right of Way and Relocation	LS	$ 10,300,000	1	$ 10,300,000	at stations and park-and-ride lots
Sound Walls	linear foot	$ 370	8,100	$ 2,997,000	
Roadway Widening	mile	$ 4,618,000	0.93	$ 4,291,000	Coming into Gallatin, 24' widening (use cost for 6-lane section with closed drainage, widening to the outside)
Roadway Bridges	square feet	$ 200	196,000	$ 39,200,000	New roadway/ramp bridges over the LRT
		$ -		$ -	
Engineering, Construction, Testing, Start-up		28%		$ 328,493,000	30% of non-vehicle, non-ROW or 28% of total
Contingency		30%		$ 453,228,000	Includes traffic control, removals, contaminated soils, erosion control, sales tax on materials, etc.
			TOTAL:	**$ 1,964,000,000**	
			Miles:	30.7	
			Cost per Mile:	$ 64,000,000	

Typical range for LRT is from $50M to $100M/mile. The two most recent systems, in North Carolina and Virginia, have costs at or just over $50M/mile. The Hiawatha LRT in Minneapolis, which has some ballasted track, some embedded track, at least two substantial flyover structures, and a section of tunnel, had a cost of $99M/mile.

COMMUTER RAIL (CRT)

DETAILED SCREENING – Capital Costs

NORTHEAST CORRIDOR MOBILITY STUDY

- **Commuter Rail (CRT):** CSX Rail Line
- Capital Improvements
  - Single parallel track
  - Follows existing profile
  - Crossovers and/or turnouts every 2 miles
  - At-grade crossings
  - Yard and Shop
  - Does not include Circulator Buses
- $630 million (2010 dollars)
- $950 million (inflated costs to open in 2020)

DETAILED SCREENING – Capital Costs

Commuter Rail Alternative

Nashville NE Corridor Study

DRAFT - April 26, 2010

Capital Cost Component	Units	2010 Unit Cost	Quantity	2010 Component Cost	Notes
Basic Station	each	$ 4,300,000	9	$ 38,700,000	Includes waiting area, partial platform canopy, lighting, security camera, fare vending, train schedule display (visual), communications (including audible announcements), etc.
Platform	each	$ 310,000	0	$ -	Platforms included in Station Costs
Downtown Station	each	$ 6,450,000	1	$ 6,450,000	Estimate only - Assumes need for larger waiting area downtown (for the outbound commute) plus need for more extensive pedestrian facilities and facilities for connecting buses
Park-and-Ride Lot	space	$ 7,000	2,400	$ 16,800,000	Surface Lots (including drainage, entrance, exit, landscaping, pedestrian walkways - does not include signalization at exit if required)
Park-and-Ride Structure		N/A	0		Parking Structure
Track	mile	$ 1,650,000	27.13	$ 44,756,000	Track and subballast (single track)
Earth cut/fill	mile	$ 3,600,000	26.62	$ 95,835,000	
Right of Way and Relocation	LS	$ 5,000,000	1	$ 5,000,000	Estimate only, not including Yard ROW (which is in the Yard line item)
Locomotive	each	$ 4,230,000	8	$ 33,840,000	
Passenger Car	each	$ 2,210,000	16	$ 35,360,000	
Passenger Car - Cab End	each	$ 2,500,000	8	$ 20,000,000	
Retaining Wall	linear foot	$ 1,410	3,400	$ 4,794,000	Assumes sheet pile wall, maximum 15' in height
Signals	mile	$ 500,000	27.13	$ 13,563,000	
Special Track Work	mile	$ 830,000	27.13	$ 22,514,000	
At-grade Crossings	each	$ 675,000	9	$ 6,075,000	
Bridges and Viaducts	linear foot	$ 6,200	902	$ 5,592,000	Single track, non-complex
Bridges and Viaducts	linear foot	$ 11,200	1,760	$ 19,712,000	Single track, complex or river/stream crossing
Central control facility	LS	$ 3,500,000	1	$ 3,500,000	
Yard and Shop	LS	$ 22,000,000	1	$ 22,000,000	Storage for 8 train sets with light maintenance facility
Engineering, Construction, Testing, Start-up		30%		$ 90,090,000	30% of non-vehicle, non-ROW costs
Unallocated Contingency		30%		$ 145,419,000	Includes utility relocation, traffic control, flagging, sales tax on materials, etc.
			TOTAL:	**$ 630,000,000**	
			Miles:	27.1	
			Cost per Mile:	$ 23,200,000	

Typical range for Commuter Rail is from $10M/mile and higher. Lower range places passenger service on existing freight track.

NORTHEAST CORRIDOR MOBILITY STUDY

NORTHEAST CORRIDOR MOBILITY STUDY

DETAILED SCREENING

Operating Costs

DETAILED SCREENING – Operating Costs

NORTHEAST CORRIDOR MOBILITY STUDY

Peak Service	No-Build Freq. (Min)	BRT Freq. (Min)	LRT Freq. (Min)	CRT Freq. (Min)
Route 56: brt light to Rivergate	15	x	10	10
Route 26: local to Rivergate	30	x	x	x
Route 35x: to Goodlettsville	30	x	x	x
Route 92x: to Gallatin	45	x	x	x
BRT A-1: To Rivergate (via Gallatin Pk)	na	10	x	x
BRT A-2: To Gallatin (via Gallatin Pk/SR 386)	na	20	x	x
BRT B: To Gallatin (via Ellington Pkwy/I-65/SR 386)	na	20	x	x
LRT: to Gallatin	na	x	10	x
CRT: to Gallatin	x	x	x	20
Combined Service to Rivergate/Goodlettsville	**8**	**5**	**5**	**7**
Combined Service to Gallatin	**60**	**10**	**10**	**20**

- 6 am – 8 am (2 hrs) Morning Peak (Modeled)
- 6 am - 10 pm (16 hrs/day) Typical Span of Service for Operating Cost

DETAILED SCREENING – Operating Costs

Mode	Characteristic	Baseline	Build Alternatives		
			BRT	LRT	Commuter Rail
Bus	Add'l. Peak Buses	27	14	23	19
	Add'l. Fleet Buses	33	17	28	23
	Add'l. Ann. Rev. Bus-Hr's.	110,700	30,100	75,700	75,200
	Add'l. Ann. Rev. Bus-Mi's.	1,496,600	296,200	774,500	708,100
	Add'l. O&M Costs	**$10,588,300**	**$2,811,700**	**$6,753,000**	**$6,428,300**
	Avg. Cost/Rev. Bus-Hour	*$95.65*	*$93.41*	*$89.21*	*$85.48*
BRT	Peak Buses	*n/a*	22	*n/a*	*n/a*
	Fleet Buses	*n/a*	27	*n/a*	*n/a*
	Ann. Rev. Bus-Hr's.	*n/a*	104,000	*n/a*	*n/a*
	Ann. Rev. Bus-Mi's.	*n/a*	2,035,400	*n/a*	*n/a*
	O&M Costs	***n/a***	**$12,722,000**	***n/a***	***n/a***
	Avg. Cost/Rev. Bus-Hour	*n/a*	*$122.33*	*n/a*	*n/a*
LRT	Peak Cars	*n/a*	*n/a*	22	*n/a*
	Fleet Cars	*n/a*	*n/a*	27	*n/a*
	Ann. Rev. Car-Hr's.	*n/a*	*n/a*	89,100	*n/a*
	Ann. Rev. Trn-Hr's.	*n/a*	*n/a*	44,600	*n/a*
	Ann. Rev. Car-Mi's.	*n/a*	*n/a*	2,592,000	*n/a*
	O&M Costs	***n/a***	***n/a***	**$25,371,600**	***n/a***
	Avg. Cost/Rev. Train-Hour	*n/a*	*n/a*	*$568.87*	*n/a*
CRT	Peak Cars	*n/a*	*n/a*	*n/a*	14
	Fleet Cars	*n/a*	*n/a*	*n/a*	17
	Ann. Rev. Car-Hr's.	*n/a*	*n/a*	n/a	57,400
	Ann. Rev. Trn-Hr's.	*n/a*	*n/a*	*n/a*	28,800
	Ann. Rev. Car-Mi's.	*n/a*	*n/a*	*n/a*	1,238,600
	O&M Costs	***n/a***	***n/a***	***n/a***	**$24,288,134**
	Avg. Cost/Rev. Train-Hour	*n/a*	*n/a*	*n/a*	*$843.34*
Total O&M Cost - Change from No-Build		**$10,588,300**	**$15,533,700**	**$32,124,600**	**$30,716,434**
Change from Baseline		**n/a**	**$4,945,400**	**$21,536,300**	**$20,128,134**

Notes:

1. *Costs in 2010 dollars.*
2. *Bus costs based on an MTA cost model developed for the study, using 2008 NTD expenditures.*
3. *BRT ops/maint. costs determined with MTA bus cost model, but with additional costs added for vehicle, station and busway maintenance.*
4. *LRT costs based on a cost model developed based on similar national peers.*
5. *Commuter Rail costs based on a model developed for the study, using 2008 NTD expenditures for the Music City Star line.*

NORTHEAST CORRIDOR MOBILITY STUDY

DETAILED SCREENING

Ridership

DETAILED SCREENING – Ridership

NORTHEAST CORRIDOR MOBILITY STUDY

Nashville Northeast Corridor Alternative Analysis: Estimated Ridership and User Benefits

5/7/2010

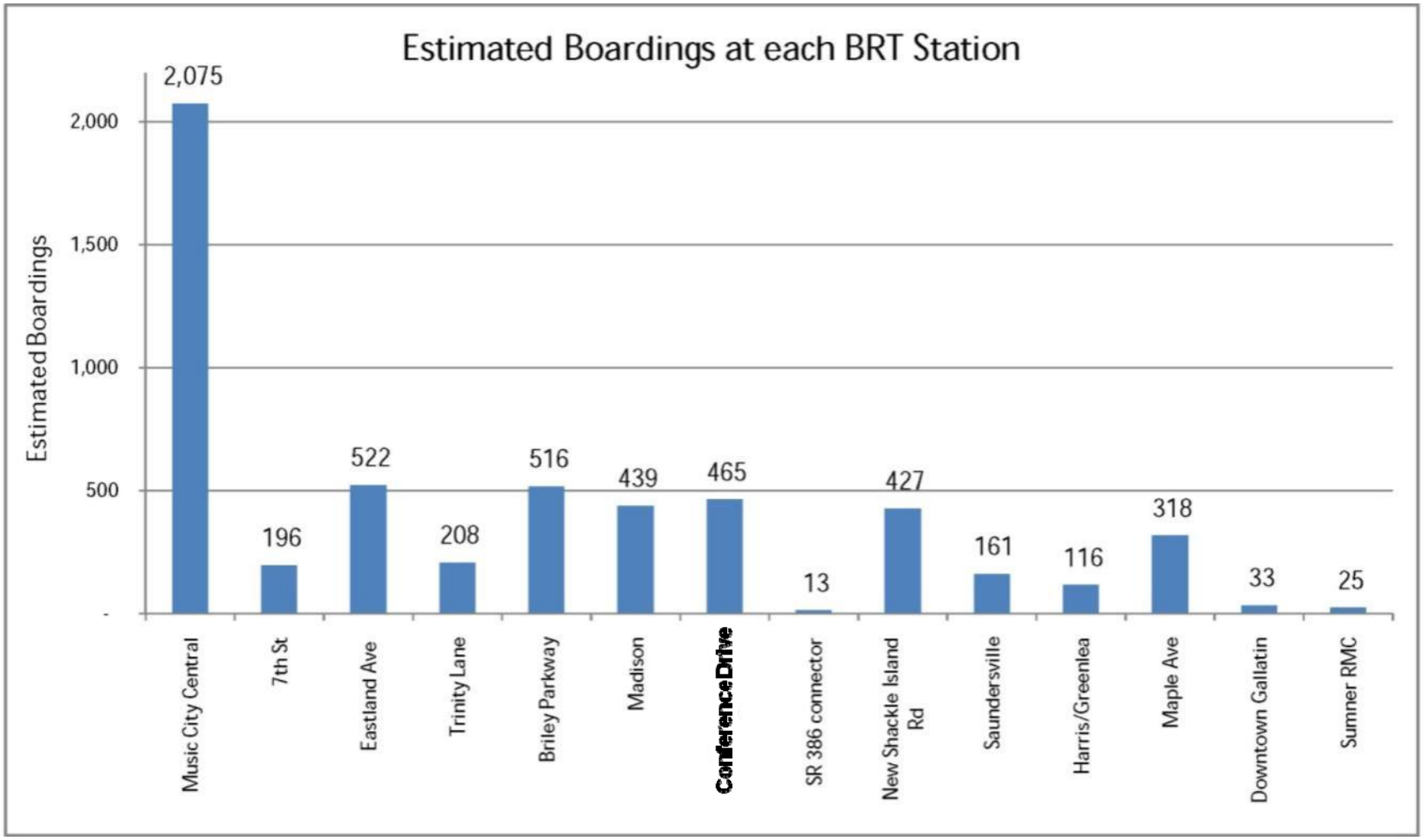
DRAFT

Route	Mode	Observed (2008)	Observed (Dec '09-Mar '10)	Estimated Boardings					
				2008_Base	No-Build	Baseline	BRT Build	LRT Build	CRT Build
Regional Total	*All*	*30,845*		*28,504*	*34,948*	*39,568*	*44,665*	*45,961*	*43,646*
West End Shuttle (serving Vanderbilt)	Circulators	-	-	429	614	585	495	503	576
Downtown Circulator: Blue Circuit		-	-	200	304	530	1,299	1,303	1,237
Downtown Circulator: Green Circuit		-	-	-	228	433	598	601	623
Northeast Nashville Circulator		-	-	-	-	1,195	2,505	2,510	3,353
Goodlettsville Circulator		-	-	-	-	591	963	1,033	952
Hendersonville Circulator		-	-	-	-	464	979	984	922
Gallatin Circulator		-	-	-	-	757	1,556	1,555	1,439
Route #35X: Rivergate Express	Express / Commuter Bus	243	252	203	167	-	-	-	-
Route #92X: Gallatin Express		-	107	234	272	1,020	-	-	-
Route #26: Gallatin Rd Local Bus	Local Bus	3,762	1,417	3,482	1,706	1,509	-	-	-
Route #56: Gallatin BRT	In-street BRT	-	1,704	-	1,834	2,609	-	2,672	3,392
BRT A-1: Rivergate via Gallatin Pk	"Full" BRT	-	-	-	-	-	2,338	-	-
BRT A-2: Gallatin via Gallatin Pk/SR 386		-	-	-	-	-	1,400	-	-
BRT B: Gallatin via Ellington Pkwy/I-65/SR 386		-	-	-	-	-	1,776	-	-
Light Rail	LRT	-	-	-	-	-	-	3,863	-
Commuter Rail	CRT	-	-	-	-	-	-	-	1,351
Corridor Total (#26, #56 and the project)		*3,762*	*3,121*	*3,482*	*3,540*	*4,118*	*5,514*	*6,535*	*4,743*
Music City Star (for comparison purposes)	CRT	860		826	1,246	1,236	1,222	1,234	1,175

Purpose	Daily User-Benefits in Hours (Alternative Compared to the No-Build)*					
HBW			971	1,493	1,708	1,183
HBO			735	1,291	1,587	1,456
NHB			398	800	876	638
Total			*2,104*	*3,584*	*4,171*	*3,277*

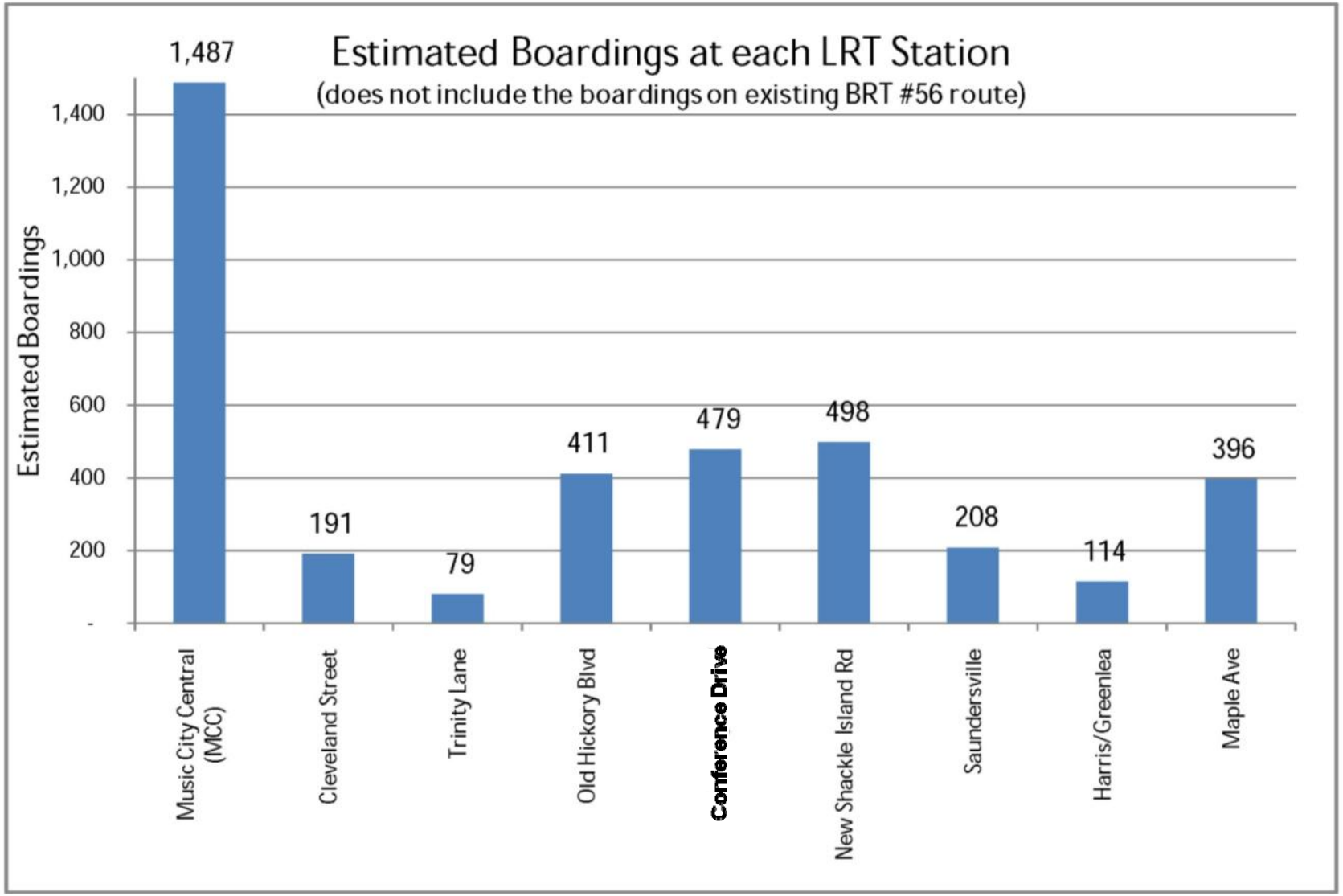
* includes user benefits due to headway differences between the Build and the No Build alternatives

DETAILED SCREENING – Ridership



Note: Stops are assigned for testing and station spacing purposes only. Actual station locations would be defined in detailed design.

DETAILED SCREENING – Ridership



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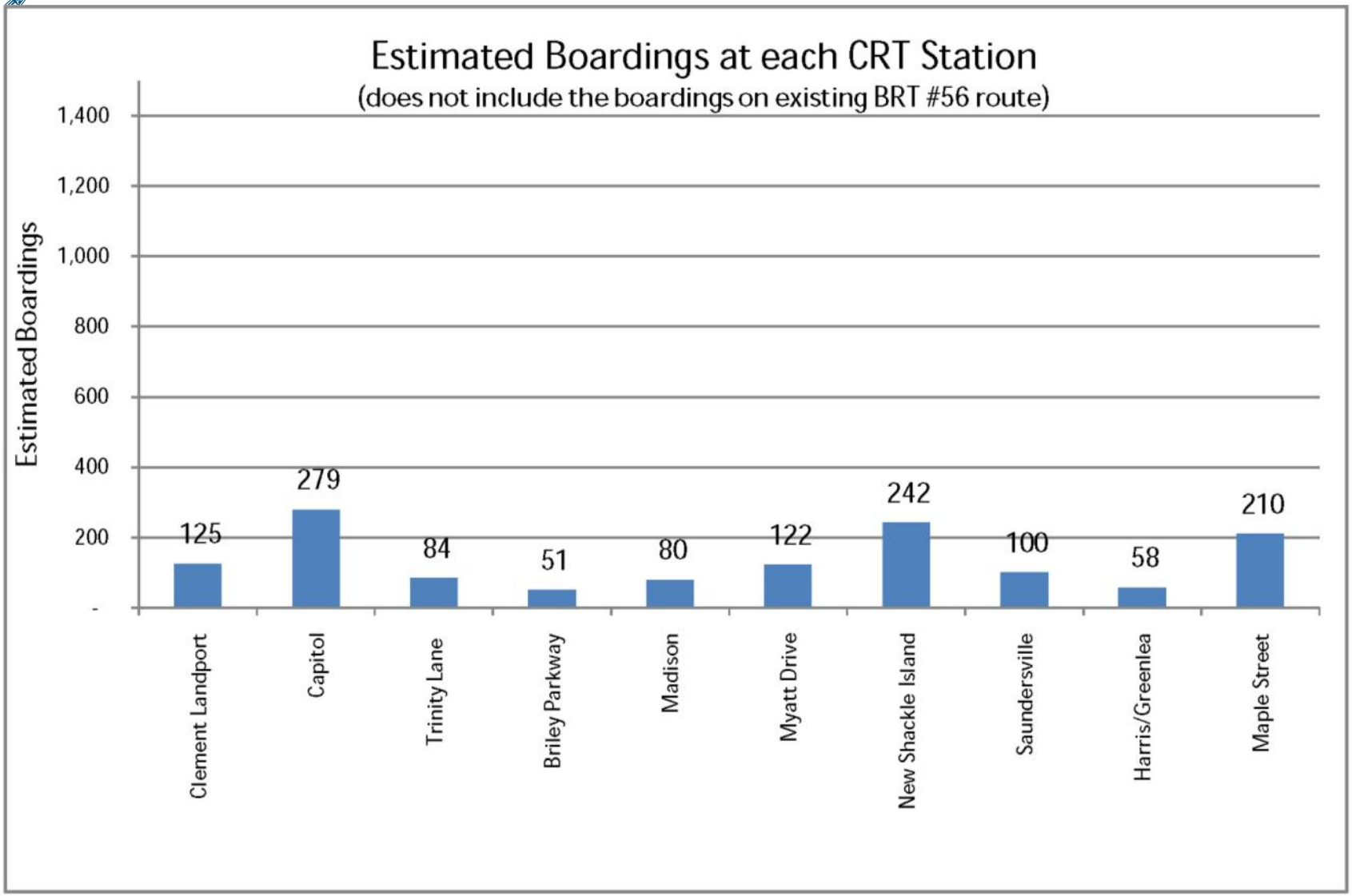
DETAILED SCREENING – Ridership



Note: Stops are assigned for testing and station spacing purposes only. Actual station locations would be defined in detailed design.

DETAILED SCREENING SUMMARY

NORTHEAST CORRIDOR MOBILITY STUDY

Alternative Characteristics and Statistics	No-Build	BRT	LRT	CRT
Average Weekday Project Ridership (2035)	3,540	5,514	6,535	4,743
Annual Ridership (2035 w/ Annualizaton Factor of 311)	1,100,940	1,714,854	2,032,385	1,475,073
Total Order of Magnitude Capital Cost (2010 $)	$0	$373,000,000	$1,964,000,000	$630,000,000
Annualized Capital Cost (2010 $) Assuming 7% Annualization	$0	$26,110,000	$137,480,000	$44,100,000
Miles		29.4	30.7	27.1
Cost per Mile		$12,687,075	$63,973,941	$23,247,232
Annual Operating Cost (2010 $)	$0	$12,722,000	$25,371,600	$24,288,134
Total Annual Cost (2010 $ Capital + Operating)	$0	$38,832,000	$162,851,600	$68,388,134
Average Weekday user Benefits	0	3,584	4,171	3,277
Average Annual User Benefits (2035 w/ Annualization Factor of 31	0	1,114,624	1,297,181	1,019,147
Cost Efficiency (NOT FTA Cost Effectiveness)	**NA**	**$34.84**	**$125.54**	**$67.10**
Average Annual Cost per Annual Boarding	NA	**$22.64**	**$80.13**	**$46.36**

Notes:

Does not include new feeder bus routes and associated costs

Actual project costs to be determined by final scope and year(s) of construction

DISCUSSION OF RESULTS OF DETAILED SCREENING

DISCUSSION OF RESULTS

NORTHEAST CORRIDOR MOBILITY STUDY

- Comparison of Capital Costs to other Transit Systems.
- Concept of Operating Segments
- Ridership Projections - Travel Demand Model Limitations
  1. Build transit network
  2. Build transit paths
  3. Mode choice
  4. Transit alignment
- Future Assumptions for Consideration

COMPARABLE LIGHT RAIL CAPITAL COSTS

NORTHEAST CORRIDOR MOBILITY STUDY

City	Name	Length (Miles)	Cost	Cost/Mile	Year Built	Phases
Denver	Southwest Corridor	8.7	$ 213 M	$ 93 M	2000	
Denver	Central Platte Valley Corridor	1.8	$ 58 M	$ 32 M	2002	
Los Angeles	Gold Line to Pasadena	13.7	$ 1.01 B	$ 74 M	2003	Multiple
Minneapolis	Hiawatha Line	12.0	$ 819 M	$ 68 M	2004	
Houston	Metro Rail	7.5	$ 371 M	$ 49 M	2004	Future phases planned
New Jersey	Hudson-Bergen	20.6	$ 2.2B	$ 107 M	2006	Multiple
Denver	T-REX	19.0	$ 879 M	$ 47.2 M	2006	
Charlotte	Lynx	9.6	$ 483 M	$ 50 M	2007	Future phases planned
Phoenix	METRO	20.0	$ 1.9 B	$ 70 M	2008	Future phases planned
Seattle	Central Link	15.6	$ 2.4 B	$ 154 M	2009	Multiple
Los Angeles	Eastside Goldline	6.0	$ 900 M	$ 150 M	2009	Multiple

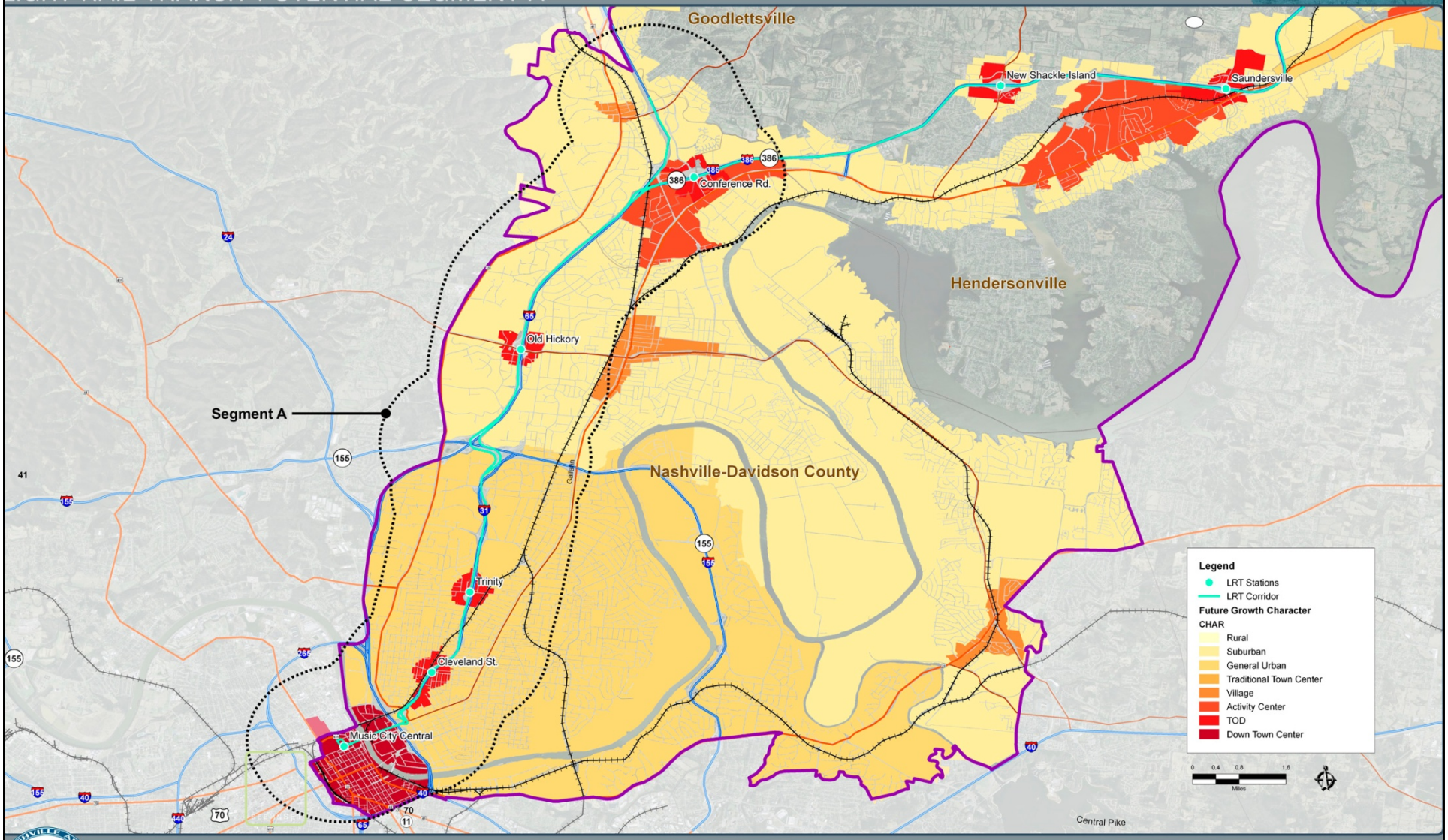
SEGMENTS

- For preferred alternative
- Consider shorter segments for a portion of the corridor

STUDY AREA POTENTIAL GROWTH SCENARIO

NORTHEAST CORRIDOR Mobility Study

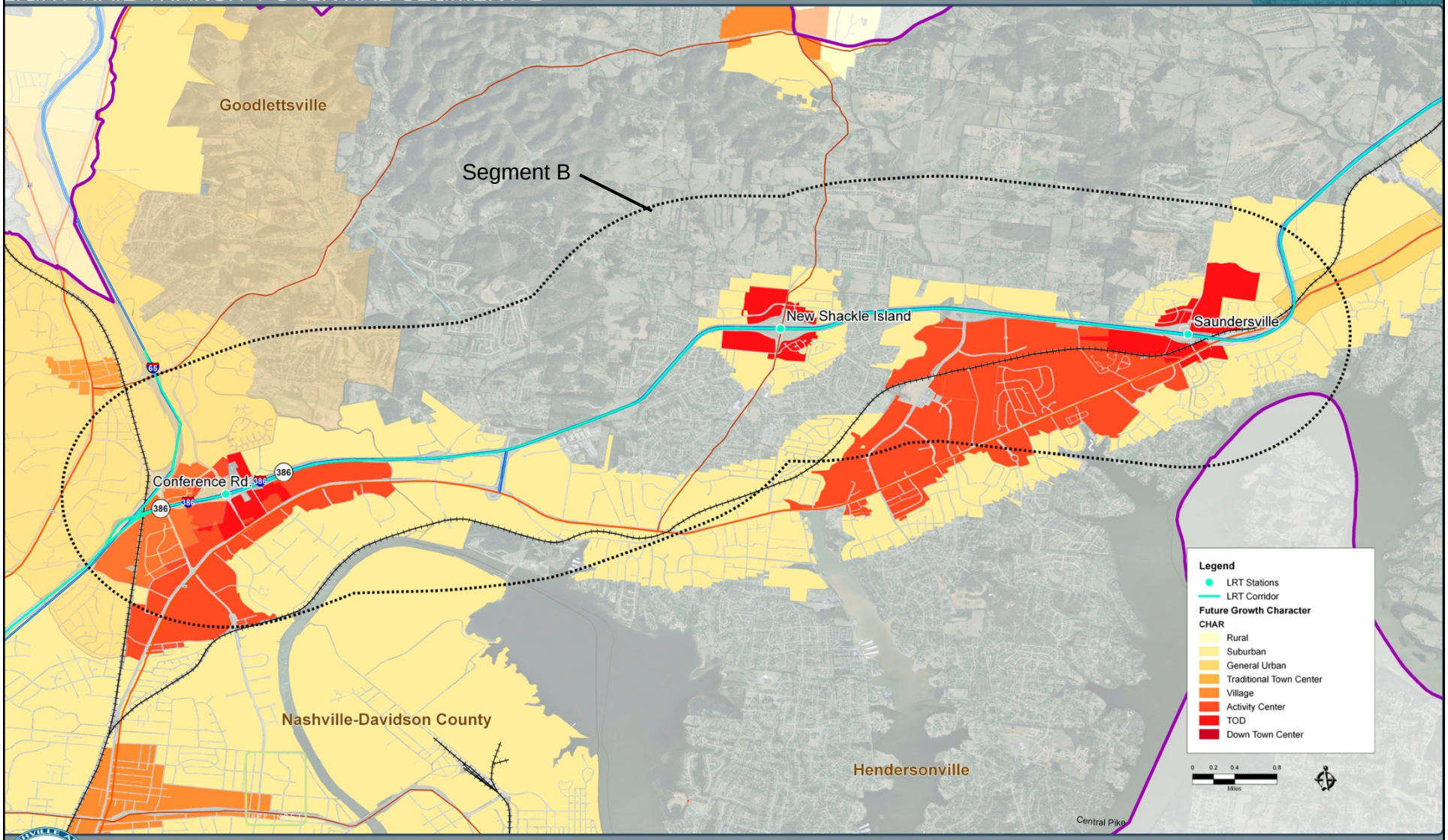
LIGHT RAIL TRANSIT POTENTIAL SEGMENT A



STUDY AREA POTENTIAL GROWTH SCENARIO

NORTHEAST CORRIDOR Mobility Study

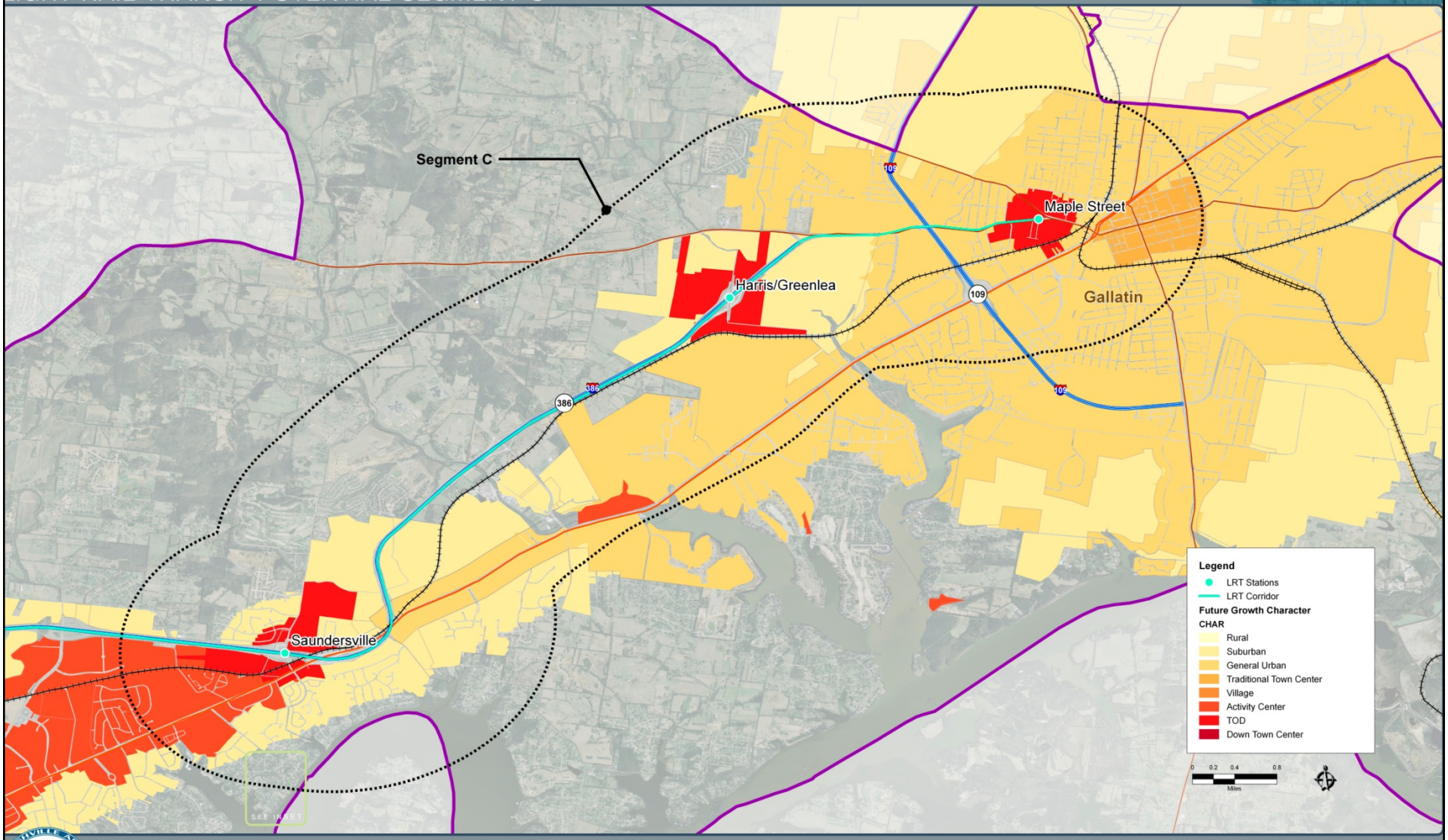
LIGHT RAIL TRANSIT POTENTIAL SEGMENT B



STUDY AREA POTENTIAL GROWTH SCENARIO

NORTHEAST CORRIDOR Mobility Study

LIGHT RAIL TRANSIT POTENTIAL SEGMENT C



DISCUSSION OF RESULTS

- Do the Mayors have a recommendation for the preferred alternative for the Northeast Corridor?

NEXT STEPS

- Population and employment preferred alternative
- Growth Scenario – Aggregate population and employment around preferred alternative
- GIS Modeling
- Land Uses and Density

LAND USE

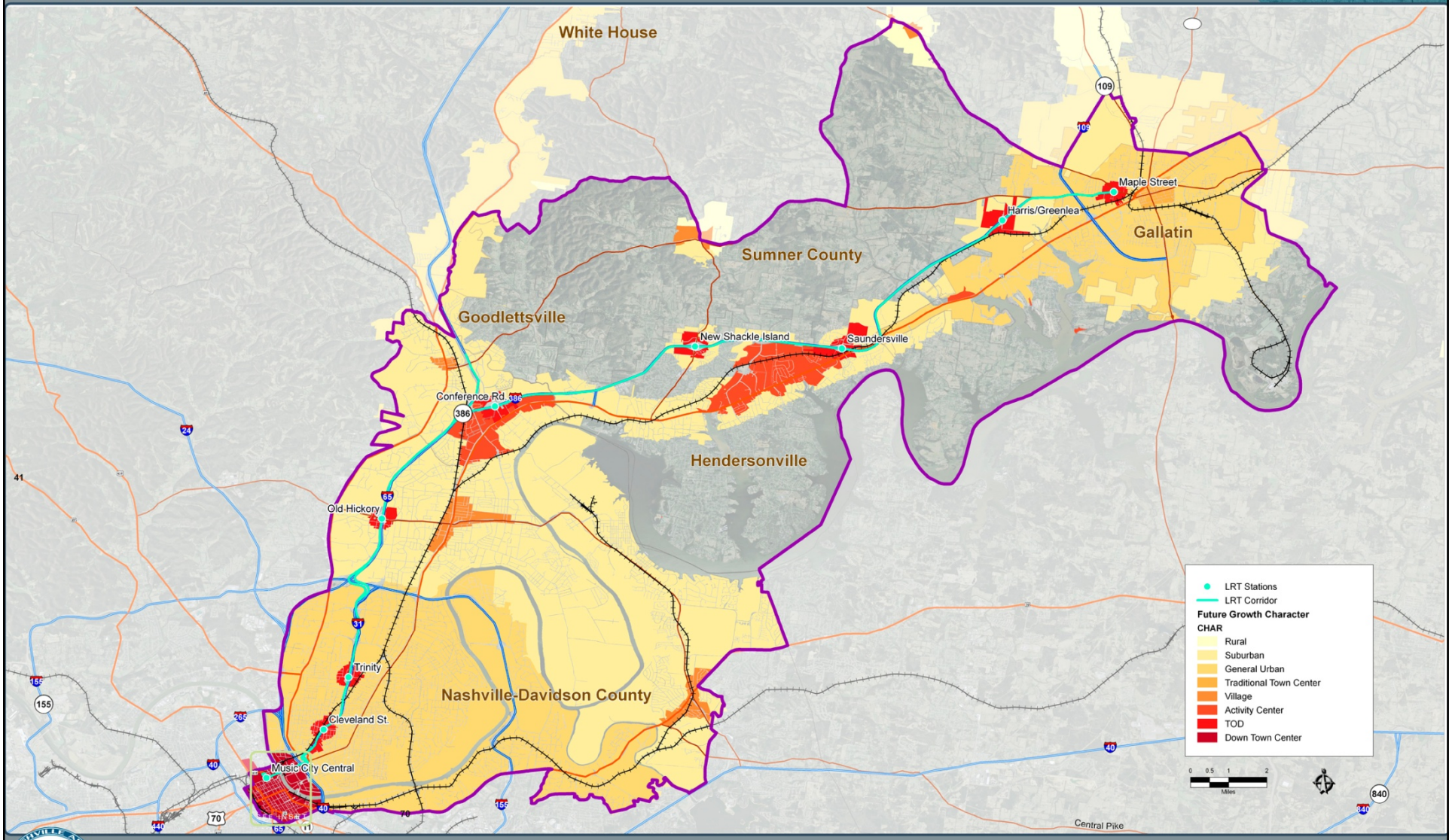
NORTHEAST CORRIDOR MOBILITY STUDY

- Integrate land use and transportation planning
- Investigate alternative land use patterns with the community
- Describe relationship between various development patterns and transportation options
- Identify potential transit nodes
- Build consensus around a vision and its implementation

STUDY AREA POTENTIAL GROWTH SCENARIO

NORTHEAST CORRIDOR Mobility Study

POTENTIAL TRANSIT SUPPORTIVE GROWTH



URBAN DESIGN PROTOTYPE AREAS

NORTHEAST CORRIDOR MOBILITY STUDY

- Four Areas Completed:

  1. Gallatin - Park and Ride Station
  2. Indian Lake Village Area – Suburban / New Development
  3. Madison/Inglewood Area – In-Town Redevelopment
  4. Downtown Nashville – Urban Street

URBAN DESIGN

- Develop design principles that support the vision
- Consider transit/pedestrian/auto interface
- Emphasize sustainable development patterns
- Provide implementation strategies

URBAN DESIGN

URBAN DESIGN

THANK YOU

NORTHEAST CORRIDOR MOBILITY STUDY

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