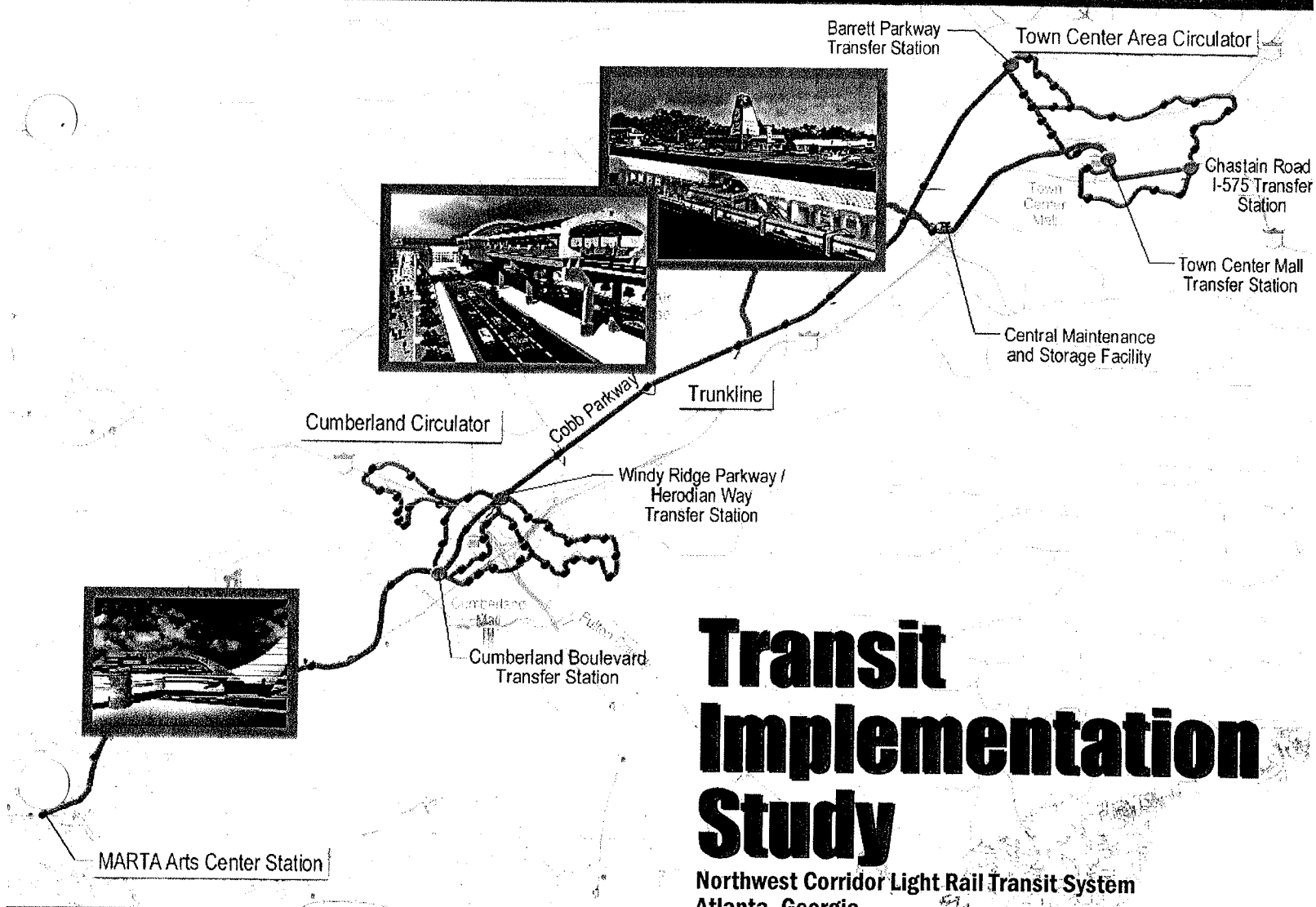

Transit Implementation Study

Northwest Corridor Light Rail Transit System
Atlanta, Georgia

Appendices

Submitted to
Cobb County Department of Transportation
Cumberland Community Improvement District
Town Center Area Community Improvement District

Submitted by
Bechtel Infrastructure Corporation
Mayes, Sudderth & Etheredge, Inc.

BECHTEL MSE

February 2001

EXECUTIVE SUMMARY

VOLUME I

VOLUME II

APPENDICES

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Appendix

Appendix 1
Transit Implementation Study
Population and Employment Forecasts

The Bechtel/MSE Team performed land use inventories for both the Cumberland and Town Center areas to identify the existing and future levels of development. The detailed information collected was then used to generate population and employment data for those areas. This appendix describes the inventory and forecasting methodologies, and summarizes their results.

A1.1 DEVELOPMENT INVENTORIES

Inventories of existing development, planned future development, and potential development on vacant parcels not currently master-planned were compiled

A1.1.1 Inventory Methodology

The inventories were compiled in the manner described below.

- **Existing Development**. The team surveyed existing property owners, researched available tax records and real estate industry resources, and conducted detailed field surveys. All of the existing buildings in the areas were identified; information was obtained on the size and current use of the buildings.
- **Future Development**. The team surveyed existing property owners and developers, and researched the Cobb County Comprehensive Plan and Zoning Map. In most cases, future development information was taken directly from developers' existing development master plans (while inclusion in a developer's master plan does not guarantee that a specific project will be built, it is a strong indication of the development potential of a parcel).
- **Vacant Parcels Not Currently Master Planned for Development.** The future development potential was estimated after considering their classification as Regional Activity Centers (RACs) in the County Comprehensive Plan, the current zoning, and the uses and intensity of development on adjacent parcels and within the surrounding areas.

A1.1.2 Inventory Results

Complete listings of all of the developments inventoried in the Cumberland and Town Center Area areas are shown in Tables A1-1 and A1-2, located at the end of this Appendix. The inventories use six development categories:

I Existing buildings for which physical properties (sq-ft, # of rooms, etc.) were provided by the developer or obtained from a published source.

II Existing buildings that are considered small generators of employment for purposes of the Study.

III Future development, based on current master plans of developers.

IV Existing buildings for which physical properties (sq-ft, # of rooms, etc.) were estimated by the Bechtel-MSE Team.

V Future development potential of vacant land not addressed in current master plans.

VI Estimated additional development potential of areas within the zone that were not inventoried as part of our work.

A1.2 POPULATION AND EMPLOYMENT FORECASTING

Population and employment were identified for the year 2000 and forecast for the year 2025.

A1.2.1 Forecasting Methodology

The existing (year 2000) and future (year 2025) population and employment potential of the areas was determined based on the results of the land use inventory.

- Population was estimated by applying estimating factors to the number of apartments and single-family units located in the area.
- Employment was estimated by applying estimating factors from the Institute of Transportation Engineers (ITE) to the commercial building square-footage values gathered in the inventory. The estimating factors varied, based on the type of commercial use in the building.
    - Employment estimates were only calculated for the larger commercial structures and complexes.
    - Employment from small generators, such as fast food restaurants and small retail establishments, was not included in the employment calculations.
- The estimates did not assume any efforts to densify the development in the transit corridor, nor any efforts to redevelop existing properties with low-intensity uses

A1.2.2 Forecast Results

The *Transit Implementation Study* forecasts, based on the land use inventory, show existing population levels similar to the Atlanta Regional Commission (ARC) forecasts. However, the forecasts show greater future population levels in both the Cumberland and Town Center areas than do the ARC forecasts. The forecasts also show significantly greater existing and future employment in the two areas. Table A1-3 provides a comparison of the existing and future population and employment projections.

Table A1-3
Comparison of ARC and Transit Implementation Study Population and Employment Forecasts for Cumberland and Town Center Area

Area	Population			Employment		
	ARC Forecast	Study Forecast	Difference	ARC Forecast	Study Forecast	Difference
Year 2000						
Cumberland	34,684	33,759	(925)	67,692	70,565	2,873
Town Center Area	7,570	8,408	838	23,474	32,815	9,341
Year 2025						
Cumberland	35,791	45,846	10,055	79,005	140,138	61,133
Town Center Area	12,742	15,874	3,132	38,753	55,582	16,829

Table A1-1
Land Use Inventory Cumberland Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
I	Office	Windy Ridge Pkwy/Powers Ferry Rd	551	In	2500 Building	2500 Windy Ridge Pkwy	313,848			Wildwood Office Park	1032			ITE Occupancy Ratio
I	Office	Windy Ridge Pkwy/Powers Ferry Rd	551	In	Indus International	3301 Windy Ridge Pkwy	105,654			Wildwood Office Park	347			ITE Occupancy Ratio
II	Bank	Windy Ridge Pkwy/Powers Ferry Rd	551	In	Wachovia	1929 Powers Ferry								
III	Office	Windy Ridge Pkwy/Powers Ferry Rd	551	In	Wildwood - Parcel F-15	Windy Ridge Pkwy	145,000			Wildwood Future Buildout	477			ITE Occupancy Ratio
III	Office	Windy Ridge Pkwy/Powers Ferry Rd	551	In	Wildwood - Parcel F-16	Windy Ridge Pkwy	250,000			Wildwood Future Buildout	822			ITE Occupancy Ratio
I	Hotel	0	552	Out	Clarion Suites	4900 Circle 75 Pkwy			58	Front Desk	14			Revised ITE Occupancy Ratio
I	Apartment	0	552	In	Calibre Brooke	100 Calibre Brook Way		173		Front Desk		400		Revised ITE Occupancy Ratio/ Front Desk
I	Office	0	552	In	Corporate Forum	4501 Circle 75 Pkwy SE	153,441			CoStar	356			CoStar
I	Hotel	0	552	Out	Country Inn and Suites	2221 Corporate Plaza			78	Front Desk	19			Revised ITE Occupancy Ratio
I	Hotel	0	552	Out	Master's Inn	Windy Hill Rd			87	Front Desk	21			Revised ITE Occupancy Ratio
I	Hotel	0	552	Out	Red Roof Inn	Windy Hill Rd			136	Front Desk	34			Revised ITE Occupancy Ratio
II	Restaurant	0	552	Out	Three Dollar Café	Windy Hill Rd								
II	Retail	0	552		Ethan Allen	Cumberland Blvd								
II	Retail	0	552		Target	Spring Rd								
II	Fitness	0	552		Bailey's	Spring Rd								
II	Restaurant	0	552	Out	Waffle House/Wendy's/Texaco	Windy Hill Rd								
IV	Office	0	552	Out	GLM Incorporated	Windy Hill Rd	5,500				18			ITE Occupancy Ratio
I	Office	Interstate North Pkwy/I-75 Dr	553	In	Assurant Group/Fortis	260 Interstate North Pkwy	266,460			Burruss Institute	876			ITE Occupancy Ratio
I	Office	Interstate North Pkwy/I-75 Dr	553	In	HSD Horton Associates	180 Interstate North Pkwy	1,062,550			Burruss Institute	3496			ITE Occupancy Ratio
I	Hotel	Interstate North Pkwy/I-75 Dr	553	In	The Marriott HMC Acquisition Properties Inc	200 Interstate North Pkwy	240,761		299	Burruss Institute(299 rooms)	74			Revised ITE Occupancy Ratio
I	Office	Windy Ridge Pkwy/Parkwood Dr	553	In	CMD Reality Investment Fund II LP	280 Interstate N Pkwy	127,194			Burruss Institute	418			ITE Occupancy Ratio
III	Office	Interstate North Pkwy/I-75 Dr	553	In	Trizec Hahn	220 Interstate North Circle	150,000			Cobb Chamber of Commerce	493			ITE Occupancy Ratio
V	Office	Interstate North Pkwy/Interstate North Pkwy	553	In	Possible Office Space		300,000				987			ITE Occupancy Ratio
I	Office	Galleria 500	554	In	100 Building	100 Galleria Pkwy	410,571			Dorey's	661			CoStar
I	Office	Galleria Dr	554	In	200 Building	200 Galleria Pkwy SE	432,698			CoStar	1073			CoStar
I	Office	Galleria Dr	554	In	300 Galleria Parkway	300 Galleria Pkwy	433,366			Dorey's	1434			ITE Occupancy Ratio
I	Office	Galleria 500	554	In	400 Building	400 Galleria Pkwy SE	440,000			CoStar	75			CoStar
II	Day Care	Galleria Dr	554	In	KinderCare	Galleria Pkwy								
II	Bank	Galleria 500	554	In	Riverside Bank	Akers Mill								
III	Office	Galleria 500	554	In	500 Building	500 Galleria Pkwy	650,000			Connie Engel/CKP	2139			ITE Occupancy Ratio
III	Office	Galleria 500	554	In	600 Building	600 Galleria Pkwy	490,000			Connie Engel/CKP	1500			Connie Engel/CKP
III	Hotel	Galleria 500	554	In	Hotel	Galleria Pkwy				Connie Engel/CKP	63			ITE Occupancy Ratio

Table A1-1
Land Use Inventory Cumberland Area

I	Apt	0	555	In	Gables Mill	100 Akers Mill		438		Front Desk	22	876		ITE Occupancy Ratio
I	Apt	0	555	In	Highlands	2525 Ward St		152		1998 Cobb County Data Report	8	304		ITE Occupancy Ratio
I	Apt	0	555	Out	Riverbend Club	6640 Akers Mill		594		1998 Cobb County Data Report	30	1188		ITE Occupancy Ratio
I	Apt	0	555	In	Veranda	2383 Akers Mill		400		Front Desk	20	800		ITE Occupancy Ratio
I	Apt	Overton North	555	In	Palisades	2550 Akers Mill		370		1998 Cobb County Data Report	19	740		ITE Occupancy Ratio
I	Office	0	556	Out	1900 Bldg	1900 The Exchange	18,665			CoStar	59			CoStar
I	Office	0	556	Out	1940 Bldg	1940 The Exchange	19,632			CoStar	39			CoStar
I	Office	0	556	Out	American Heart Association	Terrell Mill	12,872			CoStar	40			CoStar
I	Office	0	556	Out	Bank of America Office	2501 Windy Hill Rd	21,425			Dorey's	70			ITE Occupancy Ratio
I	Hotel	0	556	In	Courtyard Marriott	2045 South Park Place			127	Front Desk	31			Revised ITE Occupancy Ratio
I	Office	0	556	Out	Crown Office Suites	1870 The Exchange	31,389			Dorey's	103			ITE Occupancy Ratio
I	Office	0	556	Out	Fratelli	1665 Terrell Mill	15,073			CoStar	32			CoStar
I	Office	0	556	Out	Georgia Hospital Association	1675 Terrell Mill	23,000			Lynn at leasing office	75			ITE Occupancy Ratio
I	Office	0	556	Out	Greenberg Farrow	The Exchange	50,844			CoStar	125			CoStar
I	Hotel	0	556	In	Hilton Hotel	2055 S Park Pl	140,945		222	Burruss Institute/ Front Desk	55			Revised ITE Occupancy Ratio
I	Office	0	556	Out	Hooter's Headquarters	The Exchange	19,000			CoStar	45			CoStar
I	Office	0	556	Out	InfoCure	1765 The Exchange	90,212			CoStar	234			CoStar
I	Office	0	556	Out	Lake Point Office Space	1700 The Exchange	37,171			Dorey's	122			ITE Occupancy Ratio
I	Apt	0	556	In	Magnolia Lake	2401 Windy Hill	482 units			Front Desk	24	964		Revised ITE Occupancy Ratio
I	Office	0	556	Out	Meridian	1995 North Park Place NW	100,932			CoStar	57			CoStar
I	Office	0	556	Out	Office Buildings	1770 The Exchange	30,108			CoStar	52			CoStar
I	Office	0	556	In	Promina Health System	2000 South Park Place NW	108,264			CoStar	350			CoStar
I	Office	0	556	In	Randstad	2015 North Park Place NW	67,539			CoStar	151			CoStar
I	Office	0	556	Out	The Courtyard Bldg	1760 The Exchange	24,600			CoStar	83			CoStar
I	Office	0	556	Out	Triangle Bldg	1775 The Exchange	97,708			CoStar	280			CoStar
I	Office	0	556	Out	Water Point Lakside Office Park	1800-1830 The Exchange	101,938			Dorey's	335			ITE Occupancy Ratio
I	814	0	556	Out	Windy Hill Crossings	Windy Hill/Cobb Pkwy	32,000			Dorey's	58		1301	ITE Occupancy Ratio
I	814	0	556	Out	Windy Hill Village Shopping Center	2359 Windy Hill	100,890			Dorey's	183		4103	ITE Occupancy Ratio
II	Office	0	556	In	Academy for Automobile Pros.	North Park Place								
II	Office	0	556	In	Accounting Office	Windy Hill Rd								
II	Doctor	0	556	In	Allergy and Asthma Clinic	North Park Place								
II	Restaurant	0	556	In	Chick-Fil-A	Windy Hill Rd								
II	Gas/Service	0	556	In	Citgo	Windy Hill Rd								
II	Restaurant	0	556	In	Popeye's	Windy Hill Rd								
II	Retail	0	556	In	Shane Company	Windy Hill								
II	Bank	0	556	Out	SunTrust Bank	The Exchange								
II	Bank	0	556	In	Wachovia	Windy Hill Rd								
IV	Office	0	556	Out	Abrams	North Park Place	63,000				207			ITE Occupancy Ratio
IV	Office	0	556	Out	American Safety Insurance Group	1845 The Exchange	11,500			Rebecca is calling back	37			7-916-1908
IV	Office	0	556	Out	Mallard Cove	The Exchange	14,000				46			ITE Occupancy Ratio
IV	Office	0	556	In	North Park Place	Windy Hill Rd	15,000				49			ITE Occupancy Ratio
I	Apt	0	557	In	Chimney Hill	2855 Windy Hill		326		1998 Cobb County Data Report	17	652		ITE Occupancy Ratio
I	Hotel	0	557	Out	Econo Lodge	I-75/Windy Hill			100	Front Desk	25			Revised ITE Occupancy Ratio
I	Office	0	557	Out	The Insurance House	1902, 1904 Leland Dr	33,500			CoStar	155			CoStar
I	Apt	0	557	In	Woodchase Village	1751 Terrell Mill		416		1998 Cobb County Data Report	21	832		ITE Occupancy Ratio
I	Hotel	0	557	In	Extended Stay	I-75/Windy Hill			100	Estimate	25			Revised ITE Occupancy Ratio
I	Hotel	0	557	In	Ramada Inn	I-75/Windy Hill			100	estimate	25			Revised ITE Occupancy Ratio
II	Gas/Service	0	557	In	Ammoco	Windy Hill								
II	Gas/Service	0	557	In	BP	Windy Hill								

Table A1-1
Land Use Inventory Cumberland Area

II	Gas/Service	0	557	Out	Wise Moving and Storage									
I	Apt	0	567	Out	Post Bridge	1658 Terrell Mill		354		1998 Cobb County Data Report		708		ITE Occupancy Ratio
I	Apt	0	567	Out	Post Mill	1550 Terrell Mill		398		1998 Cobb County Data Report		796		ITE Occupancy Ratio
IV	Apt	0	567	Out	Lincoln Mill	Terrell Mill		450				900		ITE Occupancy Ratio
IV	Apt	0	567	Out	Salem Ridge	Terrell Mill		200				400		ITE Occupancy Ratio
IV	Apt	0	567	Out	Terrell Trace	Terrell Mill		300				600		ITE Occupancy Ratio
VI		0	567	Out	Outside Survey Limits	Adjustment for Unsurveyed Development				ARC SE Data Files	1836	112		
IV	Apt	Spring Hill Pkwy/Crestline Lane	611	Out	Vinings Run	Spring Hill Pkwy		400			20	800		ITE Occupancy Ratio
V	Apt	Spring Hill Pkwy/Cumberland Ct	611	Out	Possible HDR			54			4	108		
I	Office	Bert Adams Rd/Cumberland Pkwy	612	In	Paces West	2727 Paces Ferry	641,263			Dorey's	2109			ITE Occupancy Ratio
I	Office	Bert Adams Rd/Cumberland Pkwy	612	In	2500 Cumberland Office Park	2500 Cumberland Pkwy	142,905			Dorey's	470			ITE Occupancy Ratio
I	Office	Bert Adams Rd/Cumberland Pkwy	612	In	Paces Cumberland	2675 Paces Ferry Rd	68,260			Dorey's	224			ITE Occupancy Ratio
I	Office	Overlook I/II	612	In	2840 Cumberland Office Park	2840 Mt Wilkinson Pkwy	80,754			Dorey's	256			ITE Occupancy Ratio
I	Office	Overlook I/II	612	In	Overlook I	2849 Paces Ferry	140,000			Dorey's	600			Malaika Warner
I	Office	Overlook I/II	612	In	Overlook II	2838 Paces Ferry	254,876			Dorey's	352			CID Survey
I	Hotel	Overlook I/II	612	Out	Wyndham Gardens Hotel	2857 Paces Ferry		159		Front Desk	39			Revised ITE Occupancy Ratio
II	Gas/Service	Paces Ferry Rd/Cumberland Pkwy	612	In	BP	Paces Ferry								
I	Hotel	Circle 75/900 Building	613	In	Sheraton Suites	2844 Cobb Pkwy			278	Front Desk	69			Revised ITE Occupancy Ratio
I	Retail	Cumberland Mall/CCT Bus Transfer	613	In	Cumberland Mall	1400 Cumberland Mall	600,000			Dorey's	375		24,402	Sue Carpenter 7-435-2206
I	Retail	Cumberland Mall/Galleria Trunkline	613	In	Cumberland Mall	1400 Cumberland Mall	600,000			Dorey's	375		24,402	Sue Carpenter 7-435-2206
II	Gas/Service	Cumberland Blvd/Stillhouse Rd	613	In	Auto Center	Akers Mill								
II	Gas/Service	Cumberland Mall/CCT Bus Transfer	613	In	Delta/Firestone	Cumberland Blvd								
V	Retail	Cumberland Mall/CCT Bus Transfer	613	In	Cumberland Mall	1400 Cumberland Mall							4,250	
V	Retail	Cumberland Mall/Galleria Trunkline	613	In	Cumberland Mall	1400 Cumberland Mall							4,250	
I	Apt	Overlook III	615	Out	The Lakes at Vinings	2800 Paces Ferry Rd		467		1998 Cobb County Data Report		934		ITE Occupancy Ratio

Table A1-1
Land Use Inventory Cumberland Area

I	814	Overlook III	615	Out	The Station at Vinings, Phase II	2810 Paces Ferry Rd	33,100			Dorey's	60		1346	ITE Occupancy Ratio
I	Apt	Overlook III	615	Out	Vinings Landing	100 Lakes Dr		200		1998 Cobb County Data Report		400		ITE Occupancy Ratio
I	815	Paces Ferry/Cumberland Pkwy	615	In	Home Depot, retail	2450 Cumberland Pkwy	138,976			Burruss Institute	212		5652	ITE Occupancy Ratio
I	814	Paces Ferry/Cumberland Pkwy	615	In	Paces Ferry Retail Center	2640 Paces Ferry	16,000			Dorey's	29		650	ITE Occupancy Ratio
II	Gas/Service	Paces Ferry/Cumberland Pkwy	615	In	Goodyear	Paces Ferry								
II	Grocer	Paces Ferry/Cumberland Pkwy	615	In	Publix	Cumberland Blvd								
III	Office	Paces Ferry/Cumberland Pkwy	615	Out	Paces West - Phase III	Paces Ferry Rd	360,000			Cobb Chamber of Commerce	1,184			ITE Occupancy Ratio
IV	Apt	Paces Ferry/Cumberland Pkwy	615	Out	The Timbers at Vinings	Boulevard Hills		250				500		ITE Occupancy Ratio
I	Hotel	Paces Ferry Rd/Home Depot	1006	In	Fairfield Inn	2450 Paces Ferry			119	Front Desk	29			Revised ITE Occupancy Ratio
I	Office	Paces Ferry Rd/Home Depot	1006	In	Paces Summit	Paces Ferry	120,000			Dorey's	394			ITE Occupancy Ratio
III	Office	Paces Ferry Rd/Home Depot	1006	In	Vinings Medical Office Building	Paces Ferry Rd	40,000			Cobb Chamber of Commerce	131			ITE Occupancy Ratio
V	Office	Paces Ferry Rd/Home Depot	1006	In	Possible Office Space	Paces Ferry	120,000				394			ITE Occupancy Ratio
I	Company Head Quarters	Paces Ferry Rd/Home Depot	1007	In	Home Depot, Inc.	2455 Paces Ferry	1,801,578			Burruss Institute	3,400			CID Survey
I	Hotel	Paces Ferry Rd/Home Depot	1007	In	La Quinta	2415 Paces Ferry			140	Front Desk	35			Revised ITE Occupancy Ratio
III	Office	Paces Ferry Rd/Home Depot	1007	In	Home Depot Expansion	2455 Paces Ferry	1,200,000			Home Depot	5,100			Home Depot
VI		Paces Ferry Rd/Home Depot	1008	Out	Unsurveyed Area use ARC Data						-	446		ARC Modeling Data
VI		0	1009	Out	Unsurveyed Area use ARC Data						-	1,942		ARC Modeling Data
VI		Paces Ferry Rd/Home Depot	1009	Out	Unsurveyed Area use ARC Data						-	216		ARC Modeling Data
I	Apt	Spring Hill Pkwy/Cumberland Ct	1010	In	The Park at Vinings	Spring Hill Pkwy		484		1998 Cobb County Data Report	25	968		ITE Occupancy Ratio
III	Apt	Spring Hill Pkwy/Crestline Lane	1011	In	Post Spring Phase I			450		Post Spring	23	900		ITE Occupancy Ratio
III	Apt	Spring Hill Pkwy/Cumberland Ct	1012	In	Post Spring Phase II			268		Post Spring	14	536		ITE Occupancy Ratio
I	Hotel	Cumberland Blvd/Stonewall Dr	1013	In	Hampton Inn	2775 Cumberland Pkwy			128	Front Desk	32			Revised ITE Occupancy Ratio

Table A1-1
Land Use Inventory Cumberland Area

II	Bank	Cumberland Blvd/Stonewall Dr	1013	In	SunTrust Bank	Cumberland Pkwy								
V	Office	Cumberland Blvd/Stonewall Dr	1013	In	Possible Office Space		150,000				493			ITE Occupancy Ratio
IV	Apt	Stonewall Dr/Cumberland Blvd	1014	In	Stonewall	Cumberland Pkwy		200			10	400		ITE Occupancy Ratio
VI	Apt	Stonewall Dr/Cumberland Blvd	1014	In	Outside Survey Limits	Adjustment for Unsurveyed Development Based on ARC projections		100				200		Field Estimate
I	Apt	Cumberland Blvd/Stonewall Dr	1015	In	Post Crest	50 Adams Lake Blvd		410		Front Desk	21	820		ITE Occupancy Ratio
I	Office	Mt Wilkinson Pkwy/Cumberland Club Dr	1015	In	2700 Cumberland Office Park	2700 Cumberland Pkwy	98,627			Dorey's	324			ITE Occupancy Ratio
I	Office	Mt Wilkinson Pkwy/Cumberland Club Dr	1015	In	3290 Office	3290 Cumberland Pkwy	23,600			CoStar	51			CoStar
I	Apt	Mt Wilkinson Pkwy/Cumberland Club Dr	1015	In	Cumberland Pines	3339 Seven Pines Ct		216		1998 Cobb County Data Report	11	432		ITE Occupancy Ratio
I	Apt	Mt Wilkinson Pkwy/Cumberland Club Dr	1015	In	Stone Ridge at Vinings	3000 Cumberland Club Dr		440		1998 Cobb County Data Report	22	880		ITE Occupancy Ratio
V	Office	Mt Wilkinson Pkwy/Cumberland Club Dr	1015	In	Possible Office Space		250,000				822			ITE Occupancy Ratio
I	Office	Mt Wilkinson Pkwy/Cumberland Club Dr	1016	In	2600 Cumberland Office Park (ILD Telecommunications)	2600 Cumberland Pkwy	33,120			Dorey's	108			ITE Occupancy Ratio
I	Office	Mt Wilkinson Pkwy/Cumberland Club Dr	1016	In	2690 Cumberland Office Park (Sandwell)	2690 Cumberland Pkwy	91,773			Dorey's	262			CoStar
I	Office	Mt Wilkinson Pkwy/Cumberland Club Dr	1016	In	2580 Cumberland Office Park (GTE Supplies)	2580 Cumberland Pkwy	74,448			Dorey's	174			CoStar
I	Office	Mt Wilkinson Pkwy/Cumberland Club Dr	1017	In	2625 Cumberland Office Park	2625 Cumberland Pkwy	78,317			Dorey's	257			ITE Occupancy Ratio
I	Office	Mt Wilkinson Pkwy/Cumberland Club Dr	1017	In	2675 Cumberland Office Park	2675 Cumberland Pkwy	28,778			Dorey's	94			ITE Occupancy Ratio
I	Office	Bert Adams Rd/Cumberland Pkwy	1017	In	2555 Cumberland Office Park	2555 Cumberland Pkwy	32,657			Dorey's	110			ITE Occupancy Ratio
I	Office	Bert Adams Rd/Cumberland Pkwy	1017	In	2575 Cumberland Office Park	2575 Cumberland Pkwy	12,673			Dorey's	41			ITE Occupancy Ratio
I	Office	Bert Adams Rd/Cumberland Pkwy	1017	In	Kaiser Foundation	2525 Cumberland Pkwy	80,551			Burruss Institute	265			ITE Occupancy Ratio

Table A1-1
Land Use Inventory Cumberland Area

II	Gas/Service	Bert Adams Rd/Cumberland Pkwy	1017	In	Texaco	Paces Ferry								
I	Apt	Cumberland Club Dr/Bert Adams Rd	1018	In	The Woods at Overlook	100 Pinhurst Dr		680		Front Desk	34	1360		ITE Occupancy Ratio
I	Apt	Cumberland Club Dr/Bert Adams Rd	1018	In	Vinings Peak	Wilkinson Pkwy		280		Front Desk	14	560		ITE Occupancy Ratio
III	Office	Overlook IV	1018	In	Pinnacle Office Building	Mt Wilkinson Pkwy	300,000			Cobb Chamber of Commerce	987			ITE Occupancy Ratio
IV	Apt	Cumberland Club Dr/Bert Adams Rd	1018	In	Woodlake	Wilkinson Pkwy		150			8	300		ITE Occupancy Ratio
IV	Apt	Cumberland Club Dr/Bert Adams Rd	1018	In	Woodview	Wilkinson Pkwy		100			5	200		ITE Occupancy Ratio
I	Office	Overlook III	1019	In	Overlook III	2859 Paces Ferry	432,312			Dorey's	1092			CID Survey
I	Apt	Cumberland Blvd/Spring Rd	1020	Out	Cumberland Bridge	2560 Spring Rd		270		1998 Cobb County Data Report	14	540		ITE Occupancy Ratio
I	814	Cumberland Blvd/Spring Rd	1021	Out	Emerson Center	2800 New Spring Rd	17,733			Dorey's	32		721	ITE Occupancy Ratio
I	Office	Cumberland Blvd/Spring Rd	1021	Out	Emerson Center Office Park	2814 Spring Rd	73,134			CoStar	151			CoStar
I	Hotel	Cumberland Blvd/Spring Rd	1021	Out	Holiday Inn Express	2855 Spring Hill Pkwy			144	Front Desk	129			ITE Occupancy Ratio
I	Office	Cumberland Blvd/Spring Rd	1021	Out	Office Bldg	Spring Rd	11,000			Leasing Sign	36			ITE Occupancy Ratio
I	Hotel	Cumberland Blvd/Spring Rd	1021	Out	Sumner Suites	1000 Curtis Dr			125	Front Desk	31			Revised ITE Occupancy Ratio
I	814	Cumberland Blvd/Spring Rd	1021	Out	The Shops at Cumberland Place	Hargrove Rd	33,200			Dorey's	60		1350	ITE Occupancy Ratio
II	Restaurant	Cumberland Blvd/Spring Rd	1021	Out	Applebee's	Spring Rd								
II	Restaurant	Cumberland Blvd/Spring Rd	1021	Out	Carrabas	Cumberland Blvd								
II	Gas/Service	Cumberland Blvd/Spring Rd	1021	Out	Chevron	Spring Rd								
II	Restaurant	Cumberland Blvd/Spring Rd	1021	Out	Hardee's	Spring Rd								
II	Restaurant	Cumberland Blvd/Spring Rd	1021	Out	Pizza Hut	Spring Rd								
II	Restaurant	Cumberland Blvd/Spring Rd	1021	Out	Steak N' Ale	Cobb Pkwy								
II	Restaurant	Cumberland Blvd/Spring Rd	1021	Out	Wendy's	Spring Rd								
II	Retail	Cumberland Blvd/Spring Rd	1021	Out	Strip Mall	Cobb Pkwy								
I	Hotel	Cumberland Blvd/Stillhouse Rd	1022	In	Courtyard Marriott	3000 Cumberland Circle			182	Front Desk	45			Revised ITE Occupancy Ratio
I	Office	Cumberland Blvd/Stillhouse Rd	1022	In	Cumberland Center II	3100 Cumberland Circle	439,806			CoStar	1770			CoStar
I	Apartment	0	1023	Out	Essex House	102 Essex Ave		211				422		ITE Occupancy Ratio

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I	Apartment	0	1023	Out	Glenridge Pointe			211		ARC ?		422		ITE Occupancy Ratio
III	Office	Cumberland Blvd/Stillhouse Rd	1024	In	Cumberland Center III	Cumberland Circle NW	370,000			Cobb Chamber of Commerce	1217			ITE Occupancy Ratio
V	Office	Cumberland Blvd/Stillhouse Rd	1024	In	Possible Office Space		500,000				2,550			ITE Occupancy Ratio
I	Office	Cumberland Blvd Transfer	1025	In	Riverwood - Cheval LP	3350 Riverwood Pkwy	500,000			Andrew Johnson	1400			Cobb Convention and Visitors Bureau
III	Hotel	Cumberland Blvd Transfer	1025	In	Hotel			200						
V	Office	Cumberland Blvd Transfer	1025	Out	Possible Office Space		500,000				1645			ITE Occupancy Ratio
I	Office	Cumberland Blvd/Stillhouse Rd	1026	In	3333 Cumberland Circle (Wachovia)	3333 Riverwood Parkway	100,100			CoStar	370			CoStar
I	Office	Cumberland Blvd/Stillhouse Rd	1026	In	Cumberland Center IV	3225 Cumberland Circle SE	223,500			Pope and Land Leasing	374			CoStar
I	814	Cumberland Blvd/Stillhouse Rd	1026	In	Cumberland Festival	2980 Cobb Pkwy	126,903			Burruss Institute	230		5161	ITE Occupancy Ratio
I	Office	Cumberland Blvd/Stillhouse Rd	1026	In	Sprint, Cumberland Center I	3065 Cumberland Pkwy	185,000			Dorey's	2048			Cobb Chamber of Commerce Major Firm Directory
I	814	Cumberland Blvd/Stillhouse Rd	1026	In	The Crossings at Akers Mill	Akers Mill	10,132			Dorey's	18		412	ITE Occupancy Ratio
II	Bank	Cumberland Blvd/Stillhouse Rd	1026	In	Bank of America	Akers Mill								
II	Retail	Cumberland Blvd/Stillhouse Rd	1026	In	Barnes and Noble	Cobb Pkwy								
II	Restaurant	Cumberland Blvd/Stillhouse Rd	1026	In	Johnny Rockets	Cobb Pkwy								
II	Restaurant	Cumberland Blvd/Stillhouse Rd	1026	In	Olde Mill	Cobb Pkwy								
IV	Office	Cumberland Blvd/Stillhouse Rd	1026	In	First Union Office	3351 Cumberland Circle	27,500			Ann Lewis calling back 800-501 7767	90			ITE Occupancy Ratio
II	Restaurant	Cumberland Blvd Transfer	1027	In	Copeland's/Don Pablo	Cobb Pkwy								
IV	Office	Cumberland Blvd Transfer	1027	In	AT+T	Riverwood/Cobb Pkwy	125,000				1600			Cobb Chamber of Commerce Major Firm Directory
IV	Retail	Cumberland Blvd Transfer	1027	In	Parkway Pointe	Cobb Pkwy	142,500				259		5795	ITE Occupancy Ratio
I	Office	Riverwood Pkwy/Cumberland Galleria Pkwy	1028	In	75 Galleria	75 Cobb Galleria	113,000			Alan Joel Partners Leasing	661			CoStar

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V	Office	Riverwood Pkwy/Cumberland Galleria Pkwy	1028	In	Possible Office Space		570,000				1875			ITE Occupancy Ratio
I	Office	Cumberland Mall/Galleria Trunkline Station	1029	In	700 Building	700 Galleria Pkwy	240,000			Tad Liethead	789			ITE Occupancy Ratio
II	Retail	Cumberland Mall/Galleria Trunkline Station	1029	In	Men's Wearhouse	Cobb Pkwy								
III	Office	Cumberland Mall/Galleria Trunkline Station	1029	In	800 Building	800 Galleria Pkwy	240,000			Connie Engel/CKP	800			Connie Engel/CKP
I	Convention Center	Cumberland Mall/Galleria Trunkline	1030	In	Galleria Convention Center	2 Galleria Pkwy	637,453			Burruss Institute	60			
I	814	Cumberland Mall/Galleria Trunkline	1030	In	Galleria Mall	1 Galleria Pkwy	110,000			Tad Liethead	100		2236	ITE Occupancy Ratio
I	814	Galleria Dr	1030	In	Galleria Mall	1 Galleria Pkwy	110,000			Tad Liethead	100		2236	ITE Occupancy Ratio
I	Hotel	Galleria Dr	1030	In	Renaissance Waverly Hotel	2450 Galleria Pkwy	568,119			Burruss Institute	72			Revised ITE Occupancy Ratio
III	Hotel	Overton South	1031	In	Area I Hotel	Cumberland Blvd			420	Overton Park Project Description	800			Overton Park Project Description
III	Office	Overton South	1031	In	Area I Office	Cumberland Blvd	350,000			Overton Park Project Description	1750			Overton Park Project Description
III	Retail	Overton South	1031	In	Area I Retail	Cumberland Blvd	7,500			Overton Park Project Description	300		305	Overton Park Project Description
III	Retail	Overton South	1031	In	Area I Retail	Cumberland Blvd	7,500			Overton Park Project Description	300		305	Overton Park Project Description
III	Office	Overton Central	1032	In	Area II Office	Cumberland Blvd	350,000			Overton Park Project Description	1750			Overton Park Project Description
III	Retail	Overton Central	1032	In	Area II Retail	Cumberland Blvd	7,500			Overton Park Project Description	150		305	Overton Park Project Description
III	Residential	Overton Central	1032	In	Area III Residential	Cumberland Blvd		400		Overton Park Project Description		800		Overton Park Project Description
III	Residential	Overton Central	1032	In	Area III Residential	Cumberland Blvd		200		Overton Park Project Description		400		Overton Park Project Description
III	Residential	Overton Central	1032	In	Area III Residential	Cumberland Blvd		200		Overton Park Project Description		400		Overton Park Project Description
III	Retail	Overton Central	1032	In	Area III Retail	Cumberland Blvd	7,500			Overton Park Project Description	150		305	Overton Park Project Description
I	Office	Overton North	1033	In	One Tower Creek/ATM	3101 Tower Creek Pkwy	96,180			Dorey's	316			ITE Occupancy Ratio
III	Hotel or Office	Overton North	1033	In	Area IV Hotel (350 rooms)or Office	Cumberland Blvd	350,000			Overton Park Project Description	1750			Overton Park Project Description
III	Office	Overton North	1033	In	Area IV Office	Cumberland Blvd	400,000			Overton Park Project Description	2000			Overton Park Project Description
III	Retail	Overton North	1033	In	Area IV Retail	Cumberland Blvd	7,500			Overton Park Project Description	150		305	Overton Park Project Description
I	Office	Interstate North Pkwy/North Circle	1034	In	290 Bldg - Sports Life	290 Interstate North Pkwy	37,250			Dorey's	20			CoStar

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I	Office	Interstate North Pkwy/North Circle	1034	In	294 Building	294 Interstate North Pkwy	13,205			Dorey's	27			CoStar
I	Office	Interstate North Pkwy/North Circle	1034	In	296 Building	296 Interstate North Pkwy	8,500			Dorey's	23			CoStar
I	Office	Interstate North Pkwy/North Circle	1034	In	380 Building	380 Interstate N pkwy	90,493			Trizec Hahn Properties	560			Front Desk
I	Company Head Quarters	Interstate North Pkwy/North Circle	1034	In	Weather Channel	300 Interstate N Pkwy	335,504			Burruss Institute	1104			ITE Occupancy Ratio
I	Office	Windy Ridge Pkwy/Interstate North Pkwy	1034	In	320 Building	320 Interstate N pkwy	113,540			Trizec Hahn Properties	300			Front Desk
I	Office	Windy Ridge Pkwy/Interstate North Pkwy	1034	In	340 Building	340 Interstate N pkwy	90,481			Trizec Hahn Properties	297			ITE Occupancy Ratio
I	Office	Windy Ridge Pkwy/Interstate North Pkwy	1034	In	360 Building	360 Interstate N pkwy	145,732			Trizec Hahn Properties	562			Front Desk
I	Office	Windy Ridge Pkwy/Interstate North Pkwy	1035	In	210 Bldg	210 Interstate North Pkwy	134,251			CoStar	315			CoStar
I	Office	Windy Ridge Pkwy/Interstate North Pkwy	1035	In	Cobb Chamber of Commerce	240 Interstate North Pkwy	18,000			CoStar	35			CoStar
V	Office	Windy Ridge Pkwy/Interstate North Pkwy	1035	In	Possible Office Space		200,000				658			ITE Occupancy Ratio
V	Office	Windy Ridge Pkwy/Interstate North Pkwy	1035	In	Possible Office Space		200,000				658			ITE Occupancy Ratio
I	814	2300 Wildwood	1036	In	Parkwood (Shopping Center)	2014 Powers Ferry Rd	20,469			Dorey's	37		832	ITE Occupancy Ratio
I	Hotel	Windy Hill Rd/Interstate North Pkwy East	1036	In	Sierra Suites	2010 Powers Ferry			88	Front Desk	22			Revised ITE Occupancy Ratio
I	Office	Windy Ridge/Parkwood Dr	1036	In	1300 Parkwood	1300 Parkwood Circle	193,156			Dorey's	600			CID Survey - Mary Waples
I	Office	Windy Ridge/Parkwood Dr	1036	In	1600 Parkwood	1600 Parkwood Circle	151,311			Dorey's	497			ITE Occupancy Ratio
I	Hotel	Windy Ridge/Parkwood Dr	1036	In	Hawthorne Suites	1500 Parkwood Circle			280	Front Desk	70			Revised ITE Occupancy Ratio
I	Apt	Windy Ridge/Parkwood Dr	1036	In	Post Parkwood	1250 Parkwood Circle		125		Front Desk		250		ITE Occupancy Ratio
I	Office	Windy Ridge/Parkwood Dr	1036	In	TA/Western LLC	1000 Parkwood Circle	210,880			Dorey's	693			ITE Occupancy Ratio

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V	Office	Windy Ridge/Parkwood Dr	1036	In	Possible Office Space		307,800				1012			ITE Occupancy Ratio
I	Office	Windy Hill Rd/Interstate North Pkwy East	1037	In	Interstate Northwest Office Park	120 Interstate North Pkwy	275,114			Dorey's	905			ITE Occupancy Ratio
I	814	Windy Hill Rd/Interstate North Pkwy East	1037	In	The Terrace at Windy Hill	3000 Windy Hill	75,427			Dorey's	137		3067	ITE Occupancy Ratio
I	Office	Windy Hill Rd/Interstate North Pkwy East	1037	In	USAA	104 Interstate Northwest Pkwy	9,200			CoStar	24			CoStar
II	Bank	Windy Hill Rd/Interstate North Pkwy East	1037	In	Bank of America	Powers Ferry								
II	Restaurant	Interstate North Pkwy/I-75 Dr	1038	In	Pappadeaux	Windy Hill								
II	Restaurant	Interstate North Pkwy/I-75 Dr	1038	In	Pappasito's	Windy Hill								
IV	Hotel	Interstate North Pkwy/I-75 Dr	1038	In	Wellesly Inn and Hotel	Windy Hill			100		25			ITE Occupancy Ratio
IV	Retail	Windy Hill Rd/Interstate North Pkwy East	1038	In	Windy Hill Sporting Club	Windy Hill	50,000				164		2033	ITE Occupancy Ratio
I	815	Powers Ferry Rd/Wood Hollow Dr	1039	In	Daewoo	2000 Powers Ferry	79,316			Burruss Institute	121		3225	ITE Occupancy Ratio
I	814	Powers Ferry Rd/Wood Hollow Dr	1039	In	Windy Hill Prominade	2000 Powers Ferry	73,000			Dorey's	132		2968	ITE Occupancy Ratio
I	Office	Windy Hill Rd/Interstate North Pkwy East	1039	In	Corporate Spectrum	1950 Spectrum Circle	248,250			Burruss Institute	816			ITE Occupancy Ratio
I	Hotel	Windy Hill Rd/Interstate North Pkwy East	1039	In	Hyatt Regency Suites	2999 Windy Hill	232,108		200	Burruss Institute	50			Revised ITE Occupancy Ratio
II	Retail	Riverwood Pkwy/Cumberland Galleria Pkwy	1039	Out	Carither's Flower Shop	Powers Ferry								
II	Restaurant	Wildwood Pkwy/Powers Ferry Rd	1039	In	Applebee's	Powers Ferry								
IV	Office	Powers Ferry Rd/Wood Hollow Dr	1039	In	Southern Bell Company	Powers Ferry	50,000				164			ITE Occupancy Ratio

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IV	Apt	Wildwood Pkwy/Powers Ferry Rd	1039	In	The Woods	Powers Ferry		450			21	900		ITE Occupancy Ratio
I	814	0	1040	Out	Terrell Mill Junction	1475 Terrell Mill	25,252			Dorey's	45		1026	ITE Occupancy Ratio
I	814	0	1040	Out	Terrell Mill Village	Terrell Mill	62,891			Dorey's	114		2557	ITE Occupancy Ratio
I	Office	Wildwood Pkwy/Powers Ferry Rd	1040	Out	Governor's Ridge Office Park	1640 Powers Ferry	194,767			Dorey's	640			ITE Occupancy Ratio
IV	Apt	Wildwood Pkwy/Powers Ferry Rd	1040	In	Terrell Ridge	Terrell Mill		200			10	400		ITE Occupancy Ratio
IV	Apt	Wildwood Pkwy/Powers Ferry Rd	1040	In	Turnberry Ridge	Terrell Mill		200			10	400		ITE Occupancy Ratio
II	Doctor	Wildwood Pkwy/Powers Ferry Rd	1041	Out	Dentist Office	Powers Ferry								
II	Bank	Wildwood Pkwy/Powers Ferry Rd	1041	In	First Union	Powers Ferry								
III	Office	Wildwood Pkwy/Powers Ferry Rd	1041	In	Wildwood - Parcel F-3	Windy Ridge Pkwy	675,000			Wildwood Future Buildout	2221			ITE Occupancy Ratio
III	Office	Wildwood Pkwy/Powers Ferry Rd	1041	In	Wildwood - Parcel F-2	Windy Ridge Pkwy	390,000			Wildwood Future Buildout	1283			ITE Occupancy Ratio
I	Office	Powers Ferry Rd/Wood Hollow Dr	1042	Out	1899 Bldg	1899 Powers Ferry	92,305			Dorey's	201			CoStar
I	Office	Powers Ferry Rd/Wood Hollow Dr	1042	In	1905 Building	1905 Powers Ferry	35,208			Wildwood Office Park	115			ITE Occupancy Ratio
I	Office	Powers Ferry Rd/Wood Hollow Dr	1042	Out	Powers Ridge Office Park	1827 Powers Ferry	45,956			CoStar	163			CoStar
III	Office	Powers Ferry Rd/Wood Hollow Dr	1042	In	Increase above exist 1905 Wildwood - Parcel F-17	Windy Ridge Pkwy	65,000			Wildwood Future Buildout	214			ITE Occupancy Ratio
III	Office	2300 Wildwood	1042	In	Wildwood - Parcel F-18	Windy Ridge Pkwy	900,000			Wildwood Future Buildout	2961			ITE Occupancy Ratio
III	Office	Powers Ferry Rd/Wood Hollow Dr	1042	In	Wildwood - Parcel F-12	Windy Ridge Pkwy	560,000			Wildwood Future Buildout	1842			ITE Occupancy Ratio
II	Restaurant	2300 Wildwood	1043	In	Cooker	1935 Powers Ferry								
II	Restaurant	2300 Wildwood	1043	In	Friday's	1925 Powers Ferry								
II	Restaurant	2300 Wildwood	1043	In	La Madeline	1931 Powers Ferry								
II	Restaurant	2300 Wildwood	1043	In	Nathaniel's	1949 Powers Ferry								
II	Restaurant	Windy Ridge Pkwy/Interstate North Pkwy	1043	In	Houston's	1955 Powers Ferry								
I	Office	0	1044	Out	Powers Ferry Office Building	2141 Powers Ferry	39,290			Kristi Storey	129			ITE Occupancy Ratio
I	Apt	0	1044	Both	The River Apartment Homes	2075 Powers Ferry		276		1998 Cobb County Data Report	14	552		ITE Occupancy Ratio

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I	Apt	Windy Ridge Pkwy/Powers Ferry Rd	1044	In	The Harbor	2051 Powers Ferry		184		1998 Cobb County Data Report	9	368		ITE Occupancy Ratio
I	Apt	Windy Ridge Pkwy/Powers Ferry Rd	1044	In	The Landings	2025 Powers Ferry		248		1998 Cobb County Data Report	13	496		ITE Occupancy Ratio
II	Gas/Service	0	1044	Out	Citgo/Subway	Powers Ferry								
IV	Apt	0	1044	Out	Homestead Village	Powers Ferry			30	7-303-0063	7	30		ITE Occupancy Ratio
I	Office	2300 Wildwood	1045	In	2300 Building	2300 Windy Ridge Pkwy	634,179			Wildwood Office Park	8000			CID Survey
I	Office	3100 Wildwood	1045	In	IBM Corp.	3100 Windy Ridge Pkwy	187,053			Wildwood Office Park	615			ITE Occupancy Ratio
I	Office	3200 Wildwood	1046	In	3200 Building	3200 Wildwood Plaza	680,394			Wildwood Office Park	2238			ITE Occupancy Ratio
I	Office	4200 Wildwood	1046	In	GA Pacific	4100 Windy Ridge Pkwy	100,000			Wildwood Leasing	525			Cobb Chamber of Commerce Major Firm Directory
I	Office	4200 Wildwood	1046	In	GA Pacific	4300 Windy Ridge Pkwy	150,000			Wildwood Leasing	525			Cobb Chamber of Commerce Major Firm Directory
I	Office	4200 Wildwood	1046	In	GE Exchange	4200 Windy Ridge Pkwy	250,000			Dorey's	200			Cobb Chamber of Commerce Major Firm Directory
III	Office	3200 Wildwood	1046	In	Wildwood - Parcel F-1	Windy Ridge Pkwy	310,000			Wildwood Future Buildout	1019			ITE Occupancy Ratio
III	Office	3200 Wildwood	1046	In	Wildwood - Parcel F-5	Windy Ridge Pkwy	245,000			Wildwood Future Buildout	806			ITE Occupancy Ratio
III	Office	4200 Wildwood	1046	In	Wildwood - Parcel F-11	Windy Ridge Pkwy	110units			Wildwood Future Buildout		440		
III	Office	4200 Wildwood	1046	In	Wildwood - Parcel F-6	Windy Ridge Pkwy	530,000			Wildwood Future Buildout	1743			ITE Occupancy Ratio
III	Office	4200 Wildwood	1046	In	Wildwood - Parcel F-7	Windy Ridge Pkwy	320,000			Wildwood Future Buildout	1052			ITE Occupancy Ratio
VI		0	1047	Out	Unsurveyed Area use ARC Data						-	1,112		ARC Modeling Data
VI		Wildwood Pkwy/Powers Ferry Rd	1047	Out	Unsurveyed Area use ARC Data						-	124		ARC Modeling Data
VI		0	1049	In	Unsurveyed Area use ARC Data						230	1,051		ARC Modeling Data
VI		Paces Ferry/Cumberland Pkwy	1049	In	Unsurveyed Area use ARC Data						70	117		ARC Modeling Data
I	Hotel	0	1050	In	Best Western	4500 Circle 75 Pkwy			157	Front Desk	39			Revised ITE Occupancy Ratio
IV	Hotel	0	1050	In	Days Inn	Circle 75 Pkwy			50		12			ITE Occupancy Ratio
I	814	Herodian Way Transfer Station	1051	Out	Cumberland Square North	2407 Cobb Pkwy	92,440			Costar	168		3759	ITE Occupancy Ratio
I	Office	Herodian Way/Circle 75	1051	Out	Atrium	2400 Herodian Way	152,892			CoStar	494			CoStar
I	Apt	Herodian Way/Circle 75	1051	In	Waterford Place	295 E Belle Isle Rd		180		Front Desk	9	360		ITE Occupancy Ratio
II	Doctor	Herodian Way Transfer Station	1051	Out	Chiropractic Office	Herodian Way								
II	Doctor	Herodian Way Transfer Station	1051	Out	Eye Associates	Herodian Way								
II	Gas/Service	Herodian Way/Circle 75	1051		Space Plus	Herodian Way								
I	Apt	Herodian Way Transfer Station	1052	Out	Windsor Lake	2611 Viking Dr		416		1998 Cobb County Data Report	21	832		
I	Office	Herodian Way/Circle 75	1052	In	Genuine Parts CO	2999 Circle 75	208,078			Burruss Institute	684			ITE Occupancy Ratio
III	Office	Herodian Way/Circle 75	1052	In	Franklin Property Co.	Circle 75 Pkwy	100,000			Cobb Chamber of Commerce	329			ITE Occupancy Ratio
III	Hotel	Herodian Way/Circle 75	1052	In	Hotel	Circle 75 Pkwy			600	HOK	150			Revised ITE Occupancy Ratio
III	Office	Herodian Way/Circle 75	1052	In	Office	Circle 75 Pkwy	312,000			HOK	1026			ITE Occupancy Ratio

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III	Office	Herodian Way/Circle 75	1052		Office	Herodian Way	312,000			HOK	1026			ITE Occupancy Ratio
III	Office	Herodian Way/Circle 75	1052		Office	Herodian Way	312,000			HOK	1026			ITE Occupancy Ratio
III	Office	Herodian Way/Circle 75	1052		Office	Herodian Way	312,000			HOK	1026			ITE Occupancy Ratio
III	Office	Herodian Way/Circle 75	1052		Office	Herodian Way	182,000			HOK	598			ITE Occupancy Ratio
III	Office	Herodian Way/Circle 75	1052		Office	Herodian Way	312,000			HOK	1026			ITE Occupancy Ratio
V	Office	Windy Ridge Pkwy/Circle 75	1052		Office	Cirlce 75	243,000			HOK	799			ITE Occupancy Ratio
I	Hotel	Windy Ridge Transfer	1053	Out	Double Tree Suites	2780 Whitley Rd			155	Front Desk	38			Revised ITE Occupancy Ratio
II	Restaurant	Windy Ridge Transfer	1053	Out	Dunkin' Donuts	Cobb Pkwy								
II	Restaurant	Windy Ridge Transfer	1053	Out	Jade Palace	Cobb Pkwy								
II	Gas/Service	Windy Ridge Transfer	1053	Out	Just Brakes	Cobb Pkwy								
IV	Office	Windy Ridge Transfer	1053	Out	Office Buildings	Cumberland Blvd	25,000				82			ITE Occupancy Ratio
I	Hotel	Windy Ridge Transfer	1054	Out	Residence Inn	2771 Hargrove Rd			130	Front Desk	32			Revised ITE Occupancy Ratio
II	Restaurant	Windy Ridge Transfer	1054	Out	Arby's	Cobb Pkwy								
II	Retail	Cumberland Blvd/Spring Rd	1054	Out	Golf Shop	Spring Rd								
II	Gas/Service	Cumberland Blvd/Spring Rd	1054	Out	QT	Spring Rd								
I	Retail	Cumberland Blvd/Spring Rd	1054	Out	Service Merchandise	Spring Rd								
II	Restaurant	Windy Ridge Transfer	1056	Out	Doc's Restaurant	Cumberland Blvd								
II	Restaurant	Cumberland Blvd/Spring Rd	1054		Sonny's	Spring Rd								
II	Gas/Service	Cumberland Blvd/Spring Rd	1054		Storage	Cumberland Blvd								
II	Retail	Windy Ridge Transfer	1054		Kuppenheimer	Cumberland Blvd								
II	Church	Cumberland Blvd/Spring Rd	1055	Out	Bethel Baptist	Spring Rd								
II	Retail	Cumberland Blvd/Spring Rd	1055	Out	Boot Factory	Cumberland Blvd								
II	Gas/Service	Cumberland Blvd/Spring Rd	1055	Out	Laundry Store	Spring Rd								
II	Restaurant	Cumberland Blvd/Spring Rd	1055	Out	McDonald's	Spring Rd								
II	Restaurant	Cumberland Blvd/Spring Rd	1055	Out	Piccadilly's	Spring Rd								
IV	Office	Windy Ridge Transfer	1055		AT+T	Cumberland Blvd	18,300				60			ITE Occupancy Ratio
I	814	Windy Ridge Transfer	1056	Out	Hargrove Plaza	2620 Hargrove Rd	8,000			Dorey's	14		325	ITE Occupancy Ratio

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I	814	Herodian Way Transfer	1056	Out	Heritage Pavilion	Hargrove Rd	264,500			Dorey's	481		10757	ITE Occupancy Ratio
I	Apt	Windy Ridge Transfer	1056	Out	Walton Grove	2550 Hargrove Rd		450		1998 Cobb County Data Report		900		
II	Gas/Service	Herodian Way Transfer	1056	Out	Citgo	Herodian Way								
III	Retail	Herodian Way Transfer	1056	Out	Computer City	Herodian Way								
IV	814	Herodian Way Transfer	1056	Out	The Prominade	Cobb Pkwy	106,000				192		4311	ITE Occupancy Ratio
I	814	0	1057	Out	North Park Pavilion	2468 Windy Hill Rd	12,622			Dorey's	22		513	ITE Occupancy Ratio
I	Hospital	0	1057	Out	Wellstar Health System	2000 S Park Pl	108,000			Burruss Institute	327			ITE Occupancy Ratio
I	Office	0	1057	Out	Windy Hill North Office Park	2470 Windy Hill Rd	99,000			Dorey's	325			ITE Occupancy Ratio
IV	Office	0	1057	Out	Windy Hill Professional Laboratory	2480 Windy Hill Rd	50,000			5 story	164			ITE Occupancy Ratio
I	Office	Circle 75 Station	1058	In	1100 Building	1100 Circle 1100	256,000			Tray Parish - Leasing Agent	398			CoStar
I	Office	Circle 75 Station	1058	In	900 Building	900 Circle 75	340,000			Tray Parish - Leasing Agent	884			CoStar
I	Hotel	Circle 75 Station	1058	In	Hampton Suites Hotel	2733 Circle 75			106	Front Desk	26			Revised ITE Occupancy Ratio
I	Office	Circle 75 Station	1058	In	Saul B F Real Estate	1000 Circle 75	94,080			Burruss Institute	309			ITE Occupancy Ratio
II	Retail	Circle 75 Station	1058	In	Learning Store	Cobb Pkwy								
I	GOB	0	1100	In	MCI Telecommunications Corp	420 Interstate North Pkwy	87,174			Burruss Institute	286			ITE Occupancy Ratio
I	Office	0	1100	Out	Shadowford Office Park	Powers Ferry	200,248			CoStar	465			Costar
I	Office	Interstate North Pkwy/North Circle	1100	In	Platinum Tower	400 Interstate North Pkwy	305,480			CoStar	966			CoStar
I	Apt	Interstate North Pkwy/North Circle	1100	In	Riverside House Apartments	3013 Shadowood Pkwy		224		1998 Cobb County Data Report	11	448		ITE Occupancy Ratio
I	Office	Windy Ridge Pkwy/Powers Ferry Rd	1100	In	Powers Ferry Business Park	2030 Powers Ferry	259,765			Dorey's	854			ITE Occupancy Ratio
I	Office	Windy Ridge Pkwy/Powers Ferry Rd	1100	In	Powers Ferry Woods Office Park	2022 Powers Ferry	71,600			CoStar	202			CoStar
I	Apt	Windy Ridge/Parkwood Dr	1100	In	Post Ridge	Windy Ridge Pkwy		434		1998 Cobb County Data Report	22	868		ITE Occupancy Ratio
I	Apt	Windy Ridge/Parkwood Dr	1100	In	Wildwood Gables	Windy Ridge Pkwy		546		1998 Cobb County Data Report	28	1098		ITE Occupancy Ratio
IV	Office	0	1100	In	Global Imports - BMW	440 Interstate North Pkwy	84,500				278			ITE Occupancy Ratio
IV	Retail	0	1100	Out	SM/Mellow Mushroom	2150 Powers Ferry	15,000				27			ITE Occupancy Ratio
IV	Office	Interstate North Pkwy/North Circle	1100	In	Clear Communications Corp	Interstate North Pkwy	37,500				123			ITE Occupancy Ratio
V	Hotel	Circle 75/900 Building	1101	In	Hotel	Circle 75			600		150			Revised ITE Occupancy Ratio
V	Hotel	Circle 75/900 Building	1101	In	Hotel	Circle 75			600		150			Revised ITE Occupancy Ratio
V	Office	Circle 75/900 Building	1101	In	Office	Circle 75	576,000				1895			ITE Occupancy Ratio
V	Health Club	Windy Ridge Pkwy/Circle 75	1101	In	Health Club	Cirlce 75	67,000			HOK				
V	Hotel	Windy Ridge Pkwy/Circle 75	1101	In	Hotel	Cirlce 75			600	HOK	150			Revised ITE Occupancy Ratio

Table A1-1
Land Use Inventory Cumberland Area

V	Office	Windy Ridge Pkwy/Circle 75	1101	In	Office	Cirlce 75	336,000			HOK	1105			ITE Occupancy Ratio
V	Office	Windy Ridge Pkwy/Circle 75	1101	In	Office	Cirlce 75	336,000			HOK	1105			ITE Occupancy Ratio
V	Office	Windy Ridge Pkwy/Circle 75	1101	In	Office	Cirlce 75	336,000			HOK	1105			ITE Occupancy Ratio
V	Office	Windy Ridge Pkwy/Circle 75	1101	In	Office	Cirlce 75	149,000			HOK	490			ITE Occupancy Ratio
I	814	Riverwood Pkwy/Cumberland Galleria Pkwy	1102	In	Akers Mill Square	Cobb Pkwy	397,776			Dorey's	723		16177	ITE Occupancy Ratio
I	Hotel	Galleria 500	1102	In	Embassy Suites	2815 Akers Mill			271	Front Desk	67			Revised ITE Occupancy Ratio
I	815	Riverwood Pkwy/Cumberland Galleria Pkwy	1102	In	Sports Authority	2963 Cobb Pkwy	84,420			Burruss Institute	129		3433	ITE Occupancy Ratio
II	Restaurant	Riverwood Pkwy/Cumberland Galleria Pkwy	1102	In	Honey Baked Ham	Cobb Pkwy								
II	Restaurant	Riverwood Pkwy/Cumberland Galleria Pkwy	1102	In	Hooter's	Cobb Pkwy								
II	Retail	Galleria 500	1102	In	Ultimate Graphics	Akers Mill								
II	Retail	Riverwood Pkwy/Cumberland Galleria Pkwy	1102	In	Flack's	Cobb Pkwy								
II	Retail	Riverwood Pkwy/Cumberland Galleria Pkwy	1102	In	JoAnn Etc.	Galleria Pkwy								
II	Restaurant	Riverwood Pkwy/Cumberland Galleria Pkwy	1102	In	Buffalo's	Cobb Pkwy								
II	Restaurant	Riverwood Pkwy/Cumberland Galleria Pkwy	1102	In	Chick-Fil-A	Cobb Pkwy								
II	Restaurant	Riverwood Pkwy/Cumberland Galleria Pkwy	1102	In	Mexican Restaurant	Cobb Pkwy								
	Retail	Riverwood Pkwy/Cumberland Galleria Pkwy	1102	In	Toys R Us	Riverwood Pkwy								
I	814	0	1103	In	Vinings Junction	4355 Cobb Pkwy	24,000			Dorey's	43		976	ITE Occupancy Ratio
I	Apt	Cumberland Blvd Transfer	1103	In	Post Woods	3200 Post Woods Dr			494	1998 Cobb County Data Report	25	988		ITE Occupancy Ratio

Table A1-1
Land Use Inventory Cumberland Area

I	Apt	Cumberland Blvd Transfer	1103	In	River Parkway	4545 River Pkwy			427	Front Desk	22	854		ITE Occupancy Ratio
I	814	0	1104	In	Riverview Village	3300 Cobb Pkwy	73,426			Dorey's	133		2986	ITE Occupancy Ratio
I	814	Cumberland Blvd Transfer	1104	In	Riverview Village II	3220 Cobb Pkwy	15,630			Dorey's	28		635	ITE Occupancy Ratio
III	Office	Cumberland Blvd Transfer	1104	In	City View I	Cumberland Blvd	260,000			Pope and Land Leasing	855			ITE Occupancy Ratio
III	Office	Cumberland Blvd Transfer	1104	In	City View II	Cumberland Blvd	400,000			Pope and Land Leasing	1316			ITE Occupancy Ratio
III	Office	Cumberland Blvd Transfer	1104	In	Office Building	Cumberland Blvd	580,000			Pope and Land Leasing	1908			ITE Occupancy Ratio
I	Apt	Cumberland Blvd/Spring Rd	1106	Out	Homestead Village	3103 Spring Rd		130				260		ITE Occupancy Ratio
II	Restaurant	Cumberland Blvd/Spring Rd	1106	Out	Chuck E. Cheese	Cumberland Blvd								
II	Church	Cumberland Blvd/Spring Rd	1106	Out	Church	Sports Ave								
II	Restaurant	Cumberland Blvd/Spring Rd	1106	Out	Po' Folks	Spring Rd								
VI		0	1107	Out	Unsurveyed Area use ARC Data						-	1,093		ARC Modeling Data
VI		Paces Ferry Rd/Home Depot	1107	Out	Unsurveyed Area use ARC Data						-	193		ARC Modeling Data
VI		0	1109	In	Unsurveyed Area use ARC Data						406	527		ARC Modeling Data
VI		0	1109	Out	Unsurveyed Area use ARC Data						407	528		ARC Modeling Data
						Totals:	41,332,291	15,634	7,731	-	135,000	41,347	149,372	

Category	Description
I	This category consists of existing buildings with physical properties (sq-ft, # of rooms, etc.) that were provided by the developer or obtained from a published source
II	This category consists of existing buildings that are considered small generators of employment for purposes of the CCTIS
III	This category consists of future development information based on current master plans of the developers
IV	This category consists of existing buildings with physical properties (sq-ft, # of rooms, etc.) that were estimated by the Bechtel-MSE team
V	This category consists of the future development potential of vacant land not addressed in Category III. The development potential was estimated considering the designation of the property in the Sub Area Classification Maps included in the Appendix of the Cobb County Comprehensive Plan
VI	This category includes an estimate of the additional development potential of areas within the zone that were not inventoried as part of our work. These estimates consider the ARC projections for the area

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
I	Industrial	Chastain Rd/I-575 Transfer	509	In	100 Chastain Center	100 Chastain Center Blvd	37,800			Dorey's	75			ITE Occupancy Ratio
I	Industrial	Chastain Rd/I-575 Transfer	509	Out	200 Chastain Center	200 Chastain Center Blvd	50,110			Dorey's	100			ITE Occupancy Ratio
I	Industrial	Chastain Rd/I-575 Transfer	509	In	300 Chastain Center	300 Chastain Center Blvd	38,940			Dorey's	77			ITE Occupancy Ratio
I	Industrial	Chastain Rd/I-575 Transfer	509	In	400 Chastain Center	400 Chastain Center Blvd	60,438			Dorey's	120			ITE Occupancy Ratio
I	Industrial	Chastain Rd/I-575 Transfer	509	In	500 Chastain Center	500 Chastain Center Blvd	78,248			Dorey's	156			ITE Occupancy Ratio
I	Industrial	Chastain Rd/I-575 Transfer	509	Out	60 Chastain Center	60 Chastain Center Blvd	38,073			Dorey's	76			ITE Occupancy Ratio
I	Apt	Town Park Dr/Town Park Commons	509	In	The Mill	575 Chastain Rd		240		Leasing Office	12	480		
I	Industrial	0	510	In	100 Barrett Distribution Center	2155 Barrett Park Dr	73,480			Dorey's	146			ITE Occupancy Ratio
I	Industrial	0	510	In	200 Barrett Distribution Center	2155 Barrett Park Dr	217,910			Dorey's	435			ITE Occupancy Ratio
I	Industrial	0	510	In	Barrett Distribution Center	1640 Airport Rd	138,400			Dorey's	276			ITE Occupancy Ratio
I	Industrial	0	510	In	Barrett Distribution Center	1650 Airport Rd	118,690			Dorey's	237			ITE Occupancy Ratio
I	Industrial	0	510	In	Barrett Distribution Center	2140 Barrett Park Dr	75,200			Dorey's	150			ITE Occupancy Ratio
I	Industrial	0	510	In	Barrett Distribution Center	2145 Barrett Park Dr	64,800			Dorey's	129			ITE Occupancy Ratio
I	Office	0	510	Out	Hewlett Packard	2124 Barrett Park Dr	103,850			R. Cass	372			R. Cass
I	Office	0	510	Out	Hewlett Packard	2120 Barrett Park Dr	48,534			R. Cass	315			R. Cass
I	Office	0	510	Out	Hewlett Packard	2145 Barrett Park Dr	13,600			R. Cass	78			R. Cass
I	814	0	510	In	Kennesaw Crossing	2322 Greers Chapel Rd	104,623			Burruss Institute	190		4,255	ITE Occupancy Ratio
I	Office	0	510	In	Roberts Business Center	1590 N Roberts Rd	182,432			Burruss Institute	600			ITE Occupancy Ratio
I	815	Town Center Mall Transfer	511	In	Pike Nurseries	Mall Blvd	45,000			Lanie Shipp	68		1,830	ITE Occupancy Ratio
I	814	Town Center Mall Transfer	511	In	Town Center Mall	400 Barrett Pkwy	1,300,000			CID Survey	4,000		49,500	T.E. (Skip) Spann, CID Survey
II	Restaurant	Busbee Pkwy/Town Center Dr	511	In	Red Lobster	Mall Blvd								
II	Restaurant	Town Center Mall Transfer	511	In	The Varsity	Mall Blvd								
IV	815	Busbee Pkwy/Town Center Dr	511	In	Busy Body/Just for Feet	Mall Blvd	17,900				27		727	ITE Occupancy Ratio
IV	815	Busbee Pkwy/Town Center Dr	511	In	Kids R Us	Mall Blvd	18,900				28		768	ITE Occupancy Ratio
IV	Theatre	Town Center Mall Transfer	511	In	Regals Theatre	Mall Blvd	28,000							
V	Retail	Town Center Mall Transfer	511	In	Retail	Mall Blvd	70,000				104			ITE Occupancy Ratio
V	Retail	Town Center Mall Transfer	511	In	Retail	Mall Blvd	105,000				156			ITE Occupancy Ratio
V	Retail	Town Center Mall Transfer	511	In	Retail	Mall Blvd	105,000				156			ITE Occupancy Ratio
V	Retail	Town Center Mall Transfer	511	In	Retail	Mall Blvd	35,000				52			ITE Occupancy Ratio
I	814	Chastain Meadows Pkwy/Barrett Pkwy	512	In	Home Center Village	Barrett Pkwy	110,734			Dorey's	201		4,503	ITE Occupancy Ratio

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
I	814	Chastain Meadows Pkwy/Barrett Pkwy	512	Out	Town Center Prado	Barrett Pkwy	280,000			Dorey's	509		11,387	ITE Occupancy Ratio
II	Recreational	Chastain Meadows Pkwy/Barrett Pkwy	512	In	Blockbuster	Barrett Pkwy								
II	Restaurant	Chastain Meadows Pkwy/Barrett Pkwy	512	Out	Burger King	Barrett Pkwy								
II	Recreational	Chastain Meadows Pkwy/Barrett Pkwy	512	Out	Crunch Fitness	Barrett Pkwy								
II	Gas/Service	Chastain Meadows Pkwy/Barrett Pkwy	512	In	Express Oil	Barrett Pkwy								
II	Restaurant	Chastain Meadows Pkwy/Barrett Pkwy	512	Out	Waffle House	Barrett Pkwy								
IV	815	Chastain Meadows Pkwy/Barrett Pkwy	512	In	Georgia Backyardl	Barrett Pkwy	22,500			Lee calling back - 7-409-9000	34		915	ITE Occupancy Ratio
IV	815	Chastain Meadows Pkwy/Barrett Pkwy	512	In	Pier One	Barrett Pkwy	12,000			Call Cindy - 7-422-5664	18		488	ITE Occupancy Ratio
V	Office	Chastain Meadows Pkwy/Barrett Pkwy	512	In	Possible Office Building	Chastain Meadows Pkwy	200,000				658			ITE Occupancy Ratio
V	Office	Chastain Meadows Pkwy/Barrett Pkwy	512	In	Possible Office Building	Chastain Meadows Pkwy	200,000				658			ITE Occupancy Ratio
VI		Chastain Meadows Pkwy/Barrett Pkwy	512	Out	Outside Survey Limits	Adjustment for Unsurveyed Development Based on ARC Projections						100		
I	School	KSU	513	In	Kennesaw State University	1000 Chastain Rd	1,082,853			Burruss Institute	1,023		13,000	1998 Cobb County Data Report
II	Gas/Service	Barrett Lakes Blvd/Chastain Rd	513	In	Texaco	Chastain Rd								
V	School	KSU	513	In	Kennesaw State University	1000 Chastain Rd					1,000		14,300	
VI		0	513	Out	Outside Survey Limits	Adjustment for Unsurveyed Development Based on ARC Projections					271	448		
I	815	Barrett Pkwy Transfer	521	Out	Leather Creations	Barrett Pkwy	12,000			Lanie Shipp	18		488	ITE Occupancy Ratio
III	814	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41	111,800			Ridenour	203		4,546	ITE Occupancy Ratio
III	Apt	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41		350		Ridenour		750		ITE Occupancy Ratio
III	Assisted Living	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41	45,000			Ridenour				ITE Occupancy Ratio
III	Bed & Breakfast	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41	15,000			Ridenour				ITE Occupancy Ratio
III	Civic	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41	9,000			Ridenour				ITE Occupancy Ratio
III	Condos	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41		124		Ridenour		248		ITE Occupancy Ratio
III	Day Care	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41	10,000			Ridenour				ITE Occupancy Ratio
III	Hotel	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41	65,000			Ridenour				ITE Occupancy Ratio
III	Office	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41	499,000			Ridenour	1,641			ITE Occupancy Ratio
III	Single Family	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41		64		Ridenour		192		ITE Occupancy Ratio
III	Town Houses	Barrett Pkwy Transfer	521	Out	Ridenour Development	Barrett/US 41		80		Ridenour		160		ITE Occupancy Ratio
I	Apt	0	576	In	Sterling Highlands II	1000 Barrett Lakes Blvd		400		1998 Cobb County Data Report	20	800		
VI		0	576	Out	Outside Survey Limits	Adjustment for Unsurveyed Development Based on ARC Projections						480		
II	Restaurant	Barrett Lakes Blvd/Barrett Pkwy	1059	In	Roadhouse	Barrett Pkwy								
II	Restaurant	Roberts Blvd/Barrett Pkwy	1059	In	Hops	Barrett Pkwy								

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
IV	815	Roberts Blvd/Barrett Pkwy	1059	In	Ethan Allen	Barrett Pkwy	15,000				22		610	ITE Occupancy Ratio
IV	815	Roberts Blvd/Barrett Pkwy	1059	In	Mattress Firm	Barrett Pkwy	17,550				26		713	ITE Occupancy Ratio
IV	815	Roberts Blvd/Barrett Pkwy	1059	In	Rooms to Go	Barrett Pkwy	22,100				32		898	ITE Occupancy Ratio
I	Office	0	1060	In	Two Barrett Lakes Center	1825 Barrett Lakes Blvd.	122,000			M. Zimmerman	1,000			M. Zimmerman
I	Office	Roberts Blvd/Barrett Pkwy	1060	In	Barrett Lakes Center	1701 Barrett Lakes	120,000			M. Zimmerman	1,000			M. Zimmerman
I	Office	Roberts Blvd/Barrett Pkwy	1060	In	Four Barrett Lakes	1940 Lodge Rd	80,000			M. Zimmerman	500			M. Zimmerman
III	Office	Barrett Lakes Blvd/Barrett Pkwy	1060	In	Three Barrett Lakes Center	Barrett Lakes	150,000			Dorey's	493			ITE Occupancy Ratio
III	Office	Barrett Lakes Blvd/Barrett Pkwy	1060	In	Five Barrett Lakes Center	Barrett Lakes	150,000			Dorey's	493			ITE Occupancy Ratio
III	Office	Barrett Lakes Blvd/Barrett Pkwy	1060	In	Six Barrett Lakes Center	Barrett Lakes	150,000			Dorey's	493			ITE Occupancy Ratio
I	Apt	0	1061	In	Amli at Barrett Lakes	1950 Barrett Lakes Blvd		446		Front Desk	22	992		
III	Apt	0	1061	In	L. Thompson Development			300		L Thompson	15	600		
III	Townhouse	0	1061	In	L. Thompson Development			137		L Thompson		274		
III	SFD	0	1061	In	L. Thompson Development			267		L Thompson		1,068		
V	Apt	0	1061	In	Possible Apartment Complex	Barrett Pkwy		70			14	140		
I	814	Barrett Lakes Blvd/Barrett Pkwy	1063	In	Gallyans - Faison-Herring LLC	691 Barrett Pkwy	72,554			Burruss Institute	132		2,950	ITE Occupancy Ratio
I	814	Barrett Lakes Blvd/Barrett Pkwy	1063	In	JC Penny	Barrett Pkwy	42,728			CID Survey	77		1,737	ITE Occupancy Ratio
II	Restaurant	Barrett Pkwy/Home Center Dr	1063	In	Steak N Shake	Barrett Pkwy								
II	Restaurant	Barrett Pkwy/Home Center Dr	1063	In	Bahama Breeze	Barrett Pkwy								
II	Retail	Barrett Pkwy/Home Center Dr	1063	In	Jared Jewelry	Barrett Pkwy								
IV	815	Barrett Lakes Blvd/Barrett Pkwy	1063	In	La-Z-Boy	Barrett Pkwy	13,775				21		560	ITE Occupancy Ratio
IV	815	Barrett Lakes Blvd/Barrett Pkwy	1063	In	Office Depot	Barrett Pkwy	27,000				41		1,098	ITE Occupancy Ratio
IV	815	Barrett Pkwy/Home Center Dr	1063	In	Haverty's	Barrett Pkwy	41,800				63		1,700	ITE Occupancy Ratio
IV	815	Barrett Pkwy/Home Center Dr	1063	In	Sears Homelife	Barrett Pkwy	30,600				46		1,244	ITE Occupancy Ratio
I	814	Town Center Dr/Mall Blvd	1064	In	Town Center Plaza	Barrett Pkwy	220,969			Dorey's	402		8,986	ITE Occupancy Ratio
II	Restaurant	Busbee Pkwy/Town Center Dr	1064	Out	Olive Garden	Barrett Pkwy								
II	Gas/Service	Town Center Dr/Mall Blvd	1064	In	Big 10 Tires	Barrett Pkwy								
II	Restaurant	Town Center Dr/Mall Blvd	1064	Out	McDonald's	Barrett Pkwy								
II	Retail	Town Center Dr/Mall Blvd	1064	In	Men's Wearhouse	Barrett Pkwy								

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
II	Restaurant	Town Center Dr/Mall Blvd	1064	In	Three Dollar Café	Barrett Pkwy								
I	Hotel	0	1065	Out	Red Roof Inn	520 Roberts Ct			136	Front Desk	34			Revised ITE Occupancy Ratio
I	Hotel	Busbee Pkwy/Town Center Dr	1065	In	Econo Lodge	2625 Busbee Pkwy			60	Front Desk	15			Revised ITE Occupancy Ratio
I	Hotel	Busbee Pkwy/Town Center Dr	1065	In	Holiday Inn Express	Busbee Pkwy			147	Front Desk	36			Revised ITE Occupancy Ratio
I	814	Busbee Pkwy/Town Center Dr	1065	In	Town Center Oaks	2615 Busbee Pkwy	52,455			Dorey's	95		2,133	ITE Occupancy Ratio
II	Bank	Busbee Pkwy/Town Center Dr	1065	Out	Bank	Roberts Ct								
II	Gas/Service	Busbee Pkwy/Town Center Dr	1065	In	Gas Station	Barrett Pkwy								
II	Restaurant	Busbee Pkwy/Town Center Dr	1065	In	Grady's	Barrett Pkwy								
II	Restaurant	Busbee Pkwy/Town Center Dr	1065	Out	Waffle House	Roberts Ct								
I	814	Busbee Pkwy/Town Center Dr	1066	In	The Esplanade	Mall Blvd	37,995			Dorey's	69		1,545	ITE Occupancy Ratio
I	814	Town Center Dr/Mall Blvd	1066	In	Mainstreet at Town Center	440 Barrett Pkwy	113,291			Dorey's	206		4,607	ITE Occupancy Ratio
II	Bank	Busbee Pkwy/Town Center Dr	1066	In	Bank of America	Mall Blvd								
II	Restaurant	Busbee Pkwy/Town Center Dr	1066	In	Shoney's	Mall Blvd								
II	Restaurant	Town Center Dr/Mall Blvd	1066	In	Fuddruckers	Mall Blvd								
II	Bank	Busbee Pkwy/Town Center Dr	1066	In	Sun Trust Bank	Mall Blvd								
I	814	Town Center Dr/Mall Blvd	1067	In	Kuppenheimer Plaza	390 Barrett Pkwy	25,000			Dorey's	45		1,016	ITE Occupancy Ratio
II	Restaurant	Town Center Dr/Mall Blvd	1067	In	Applebee's	Mall Blvd								
II	Bank	Town Center Dr/Mall Blvd	1067	In	Bank (Closed)	Mall Blvd								
II	Gas/Service	Town Center Dr/Mall Blvd	1067	In	Firestone	Mall Blvd								
II	Gas/Service	Town Center Dr/Mall Blvd	1067	In	Midas	Mall Blvd								
V	Retail	Town Center Dr/Mall Blvd	1067	In	Retail	Mall Blvd	70,000				104			ITE Occupancy Ratio
II	Gas/Service	Chastain Meadows Pkwy/Barrett Pkwy	1068	Out	Chevron	Barrett Pkwy								
II	Recreational	Chastain Meadows Pkwy/Barrett Pkwy	1068	Out	Mountasia	Barrett Pkwy								
I	Apt	0	1069	Out	Cameron at Barrett Lakes Apt	Barrett Pkwy		332		Lanie Shipp	17	664		ITE Occupancy Ratio
II	Bank	Chastain Meadows Pkwy/Barrett Pkwy	1069	Out	Premier Bank	Barrett Pkwy								
II	Recreational	Chastain Meadows Pkwy/Barrett Pkwy	1069	In	Sherlock's	Barrett Pkwy								
IV	814	0	1069	In	SM	2543 Barrett Pkwy	18,750				34		762	ITE Occupancy Ratio

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
VI		0	1069	Out	Outside Survey Limits	Adjustment for Unsurveyed Development Based on ARC Projections						560		
I	Industrial	Chastain Meadows Pkwy/Big Shanty Rd	1070	In	Suzuki	Big Shanty Rd	123,000			Lanie Shipp	246			ITE Occupancy Ratio
V	Office	Chastain Meadows Pkwy/Big Shanty Rd	1070	In	Possible Office Building	Chastain Meadows Pkwy	125,000				411			ITE Occupancy Ratio
V	Office	Chastain Meadows Pkwy/Big Shanty Rd	1070	In	Possible Office Building	Chastain Meadows Pkwy	125,000				411			ITE Occupancy Ratio
V	Office	Chastain Meadows Pkwy/Big Shanty Rd	1070	In	Possible Office Building	Chastain Meadows Pkwy	125,000				411			ITE Occupancy Ratio
VI		Chastain Meadows Pkwy/Big Shanty Rd	1070	Out	Outside Survey Limits	Adjustment for Unsurveyed Development Based on ARC Projections						630		
I	815	0	1071	In	Garden Ridge	2875 Busbee Pkwy	142,484			Burruss Institute	218		5,794	ITE Occupancy Ratio
I	815	0	1071	In	Wal-Mart	Busbee Pkwy	134,740			Lanie Shipp	206		5,479	ITE Occupancy Ratio
II	Hospital	0	1071	In	Kids Care	Busbee Pkwy								
II	Recreational	0	1071	In	Speed Zone	Busbee Pkwy								
II	Recreational	Town Center Mall Transfer	1071	In	Australian Body Works	Busbee Pkwy								
I	Hotel	0	1072	In	Extended Stay	3000 Busbee Pkwy			104	Front Desk	23			Revised ITE Occupancy Ratio
II	Office	0	1072	In	Dept. of Labor	Big Shanty Rd	35,000				114			ITE Occupancy Ratio
II	Gas/Service	0	1072	In	Good Year	Busbee Pkwy								
II	Church	0	1072	In	Grace Baptist	Big Shanty Rd								
III	?	0	1072	In	Suburban lodge	Busbee Pkwy			120		27			Revised ITE Occupancy Ratio
III	?	0	1072	In	Building	Busbee Pkwy	40,000				131			ITE Occupancy Ratio
I	Apt	0	1073	In	Milstead Village	3355 Busbee Pkwy		310		Leasing Office	16	620		ITE Occupancy Ratio
II	Recreational	0	1073	In	Gold's Gym	Busbee Pkwy								
II	Retail	0	1073	In	Studio Plus	3316 Busbee Dr								
I	Hotel	0	1074	In	Best Western	3375 Busbee Pkwy			113	Front Desk	28			Revised ITE Occupancy Ratio
I	School	0	1074	In	KSU Center	Busbee Drive	162,000			Lanie Shipp	1,125		43,000	Lanie Shipp
II	Restaurant	0	1074	In	Cracker Barrell	Chastain Rd								
II	Recreational	0	1074	In	Ice Forum	Busbee Pkwy								
I	Office	Town Park Dr/Busbee Pkwy	1075	In	Kaiser Permenete	Busbee Drive	47,432			P. O'Lette	90			P. O'Lette
II	Gas/Service	Town Park Dr/Busbee Pkwy	1075	In	Chevron	Townpark Lane								
II	Restaurant	Town Park Dr/Busbee Pkwy	1075	In	Los Reyes	Townpark Lane								
II	Bank	Town Park Dr/Busbee Pkwy	1075	In	Westside Bank	670 Chastain Rd								
V	814	Town Park Dr/Busbee Pkwy	1075	In	Possible Retail building	TownPark Lane	35,000				63		1,423	ITE Occupancy Ratio
I	Apt	Town Green Blvd/Town Crossing	1076	In	Townpark Crossing	725 Towne Green Blvd		310		1998 Cobb County Data Report	16	620		
I	Hotel	Town Park Dr/Busbee Pkwy	1076	In	Fairfield Inn	3425 Busbee Dr			87	Front Desk	21			Revised ITE Occupancy Ratio
I	Hotel	Town Park Dr/Busbee Pkwy	1076	In	Residents Inn	3443 Busbee Dr			120	Front Desk	30			Revised ITE Occupancy Ratio
V	Office	Town Park Dr/Busbee Pkwy	1076	In	Possible Office Building	Busbee Dr	300,000				987			ITE Occupancy Ratio
V	Office	Town Park Dr/Town Park Commons	1077	In	Possible Office Building	TownPark Lane	300,000				987			ITE Occupancy Ratio

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
I	Office	Town Park Dr/Town Park Commons	1078	In	Townpark Commons	125, 175, 225, 500 Townpark Dr	340,171			Dorey's	1,119			ITE Occupancy Ratio
I	Office	Town Park Dr/Town Park Commons	1078	In	TownPark Ravine One	245 TownPark Dr	133,000			Kerry O'Brien	475			Kerry O'Brien
III	Office	Town Park Dr/Busbee Pkwy	1078	In	Town Park Plaza	Chastain Rd	55,000			K. O'Brien	180			ITE Occupancy Ratio
III	Office	Town Park Dr/Busbee Pkwy	1078	In	TownPark Ravine Three	TownPark Drive	30,000			K. O'Brien	475			K. O'Brien
III	Office	Town Park Dr/Busbee Pkwy	1078	In	TownPark Ravine Two	TownPark Lane	133,000			K. O'Brien	475			K. O'Brien
I	Office	Town Park Dr/Town Park Commons	1079	Out	112 TownPark Drive	112 Townpark Dr	64,152			Dorey's	211			ITE Occupancy Ratio
I	Office	Town Park Dr/Town Park Commons	1079	Out	114 TownPark Drive	114 TownPark Dr	81,000			Kerry O'Brien	240			Kerry O'Brien
I	Office	Town Park Dr/Town Park Commons	1079	In	Municipal Gas Authority of Georgia	104 Town Park Dr	18,000			Lanie Shipp	48			Lanie Shipp
I	Office	Town Park Dr/Town Park Commons	1079	Out	State Farm Insurance	108 Town Park Dr	16,000			Bruce at Local HQ - 7-418-5000	52			ITE Occupancy Ratio
V	Office	Town Park Dr/Town Park Commons	1079	In	Possible Office Building	TownPark Lane	300,000				987			ITE Occupancy Ratio
I	Apt	Town Green Blvd/Town Crossing	1081	Out	Greenhouse Apt	3800 Frey Rd		489		1998 Cobb County Data Report	24	978		
I	Hotel	Barrett Lakes Blvd/Chastain Rd	1082	In	Country Inn Suites	3192 Barrett Lakes Blvd			46	Front Desk	11			Revised ITE Occupancy Ratio
I	Hotel	Barrett Lakes Blvd/Chastain Rd	1082	In	Sun Suites	3174 Barrett Lakes Blvd			107	Front Desk	24			Revised ITE Occupancy Ratio
II	Gas/Service	Barrett Lakes Blvd/Chastain Rd	1082	In	Ammoco	Barrett Lakes Blvd								
II	Restaurant	Barrett Lakes Blvd/Chastain Rd	1082	In	Del Taco	Barrett Lakes Blvd								
II	Bank	Busbee Pkwy/Town Center Dr	1082	In	South Trust	Mall Blvd								
V	Industrial	Barrett Lakes Blvd/Duncan Rd	1083	In	Future Industrial	Barrett Lakes Blvd	70,000			Front Desk	140			Revised ITE Occupancy Ratio
V	Industrial	Barrett Lakes Blvd/Duncan Rd	1084	In	Possible Industrial Building		350,000				700			ITE Occupancy Ratio
II	Retail	Barrett Lakes Blvd/Cobb Place Blvd	1085	In	Diamond Collectibles	Barrett Lakes Blvd								
V	Industrial	Barrett Lakes Blvd/Cobb Place Blvd	1085	In	Possible Industrial Building		250,000				500			ITE Occupancy Ratio
V	Industrial	Barrett Lakes Blvd/Duncan Rd	1085	In	Possible Industrial Building		350,000				700			ITE Occupancy Ratio
I	Office	Barrett Lakes Blvd/Cobb Place Blvd	1086	In	Packard/Aftermarket Specialties Cobb Place Distribution Center	980 Cobb Place Blvd	303,200			Dorey's	997			ITE Occupancy Ratio
I	Office	Barrett Lakes Blvd/Vaughn Rd	1086	In	100 Barrett Business Center	2015 Vaughn Rd	30,964			Dorey's	213			ITE Occupancy Ratio
I	Office	Barrett Lakes Blvd/Vaughn Rd	1086	In	300 Barrett Business Center	2015 Vaughn Rd	33,500			Leasing Sign	110			ITE Occupancy Ratio
III	Office	Barrett Lakes Blvd/Vaughn Rd	1086	In	200 Barrett Business Center	2015 Vaughn Rd	36,400			Dorey's	119			ITE Occupancy Ratio

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
III	Office	Barrett Lakes Blvd/Vaughn Rd	1086	In	400 Barrett Business Center	2015 Vaughn Rd	47,903			M. Zimmerman	157			ITE Occupancy Ratio
III	Office	Barrett Lakes Blvd/Vaughn Rd	1086	In	500 Barrett Business Center	2015 Vaughn Rd	53,200			M. Zimmerman	175			ITE Occupancy Ratio
III	Office	Barrett Lakes Blvd/Vaughn Rd	1086	In	600 Barrett Business Center	2015 Vaughn Rd	53,200			M. Zimmerman	175			ITE Occupancy Ratio
I	Industrial	0	1087	In	2105 Building	2105 Barrett Park Dr	34,000			Dorey's	68			ITE Occupancy Ratio
I	Office	0	1087	In	Microkinetics	2117 Barrett Park Dr	10,000			Lanie Shipp	22			Lanie Shipp
I	Industrial	0	1087	In	PFE International	1965 Vaughn Rd	46,808			Dorey's	93			ITE Occupancy Ratio
I	Office	Vaughn Rd/Roberts Blvd	1087	In	Barrett Court	1925 Roberts Blvd	31,840			Dorey's	104			ITE Occupancy Ratio
I	Office	Vaughn Rd/Roberts Blvd	1087	In	Cryolife	1655 Roberts Blvd	100,000			Lanie Shipp	329			ITE Occupancy Ratio
I	Office	Vaughn Rd/Roberts Blvd	1087	In	Meridian Medical Group	1915 Roberts Blvd	1,100			Lanie Shipp	36			ITE Occupancy Ratio
II	Restaurant	Vaughn Rd/Roberts Blvd	1087	In	Arby's	1911 Vaughn Rd								
II	Restaurant	Vaughn Rd/Roberts Blvd	1087	In	KFC	Vaughn Rd								
II	Day Care	Vaughn Rd/Roberts Blvd	1087	In	La Petite Child Care	Vaughn Rd								
II	Restaurant	Vaughn Rd/Roberts Blvd	1087	Out	Wendy's	1905 Vaughn Rd								
III	Office	Vaughn Rd/Roberts Blvd	1087	In	Cryolife	Roberts Blvd.	105,000			Tony Schrieber	500			Tony Schrieber
IV	Office	0	1087	In	2115 Building	2115 Barrett Park Dr	15,250				50			ITE Occupancy Ratio
IV	Office	0	1087	In	Amli Residential	1945 Vaughn Rd	13,500				44			ITE Occupancy Ratio
V	Office	Vaughn Rd/Roberts Blvd	1087	In	Possible Office Building		50,000				164			ITE Occupancy Ratio
V	Office	Vaughn Rd/Roberts Blvd	1087	In	Possible Office Building		50,000				164			ITE Occupancy Ratio
V	Office	Vaughn Rd/Roberts Blvd	1087	In	Possible Office Building		75,000				246			ITE Occupancy Ratio
I	Office	Barrett Lakes Blvd/Roberts Blvd	1088	In	Athlete's Foot Headquarters	2102 Roberts Rd - 1950 Vaughn Rd	161,518			Burruss Institute	190			Lanie Shipp
I	Office	Barrett Lakes Blvd/Roberts Blvd	1088	In	Baily Park	Cobb Place Blvd	197,987			Dorey's	651			ITE Occupancy Ratio
I	Office	Barrett Lakes Blvd/Vaughn Rd	1088	In	Barrett Summit	1990 Vaughn Rd	50,000			M. Zimmerman	164			ITE Occupancy Ratio
IV	Office	Vaughn Rd/Roberts Blvd	1088	In	ESI, Inc. of Tennessee	1250 Roberts Blvd	28,500				93			ITE Occupancy Ratio
V	Office	Barrett Lakes Blvd/Roberts Blvd	1088	In	Possible Office Building		50,000				164			ITE Occupancy Ratio
V	Office	Barrett Lakes Blvd/Vaughn Rd	1088	In	Possible Office Building		50,000				164			ITE Occupancy Ratio
I	Office	Barrett Lakes Blvd/Cobb Place Blvd	1089	In	Averitt Properties Inc	2684 Barrett Lakes Blvd	48,050			Burruss Institute	158			ITE Occupancy Ratio
II	Retail	0	1089	In	Rafferty's	Cobb Place Blvd								
II	Retail	Barrett Lakes Blvd/Cobb Place Blvd	1089	In	Goody's	Cobb Place Blvd								

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
II	Restaurant	Barrett Lakes Blvd/Cobb Place Blvd	1089	In	Joe's Crab Shack	Cobb Place Blvd								
II	Retail	Barrett Lakes Blvd/Cobb Place Blvd	1089	In	School Box	Cobb Place Blvd								
I	814	Barrett Pkwy/Cobb Place Blvd	1090	In	Barrett Place Strip Mall	860 Cobb Place Blvd	168,253			Burruss Institute	306		6,842	ITE Occupancy Ratio
I	814	Barrett Pkwy/Cobb Place Blvd	1090	Out	Cobb Place	800 Barrett Pkwy	320,000			Lanie Shipp	582		13,014	ITE Occupancy Ratio
II	Recreational	0	1090	In	AMC Theatre	Cobb Place Ln								
II	Restaurant	Barrett Pkwy/Cobb Place Blvd	1090	Out	Chuck E Cheese	Barrett Pkwy								
II	Restaurant	Barrett Pkwy/Cobb Place Blvd	1090	In	Fridays	Barrett Pkwy								
II	Restaurant	Barrett Pkwy/Cobb Place Blvd	1090	In	Golden Corral/Chili's	Barrett Pkwy								
II	Retail	Busbee Pkwy/Town Center Dr	1090	In	Golf Smith	Cobb Place Ln								
I	814	Barrett Lakes Pkwy/Auto Park Dr	1091	In	Barrett Pavilion	100 Cobb Place Blvd	542,790			Dorey's	987		22,075	ITE Occupancy Ratio
II	Gas/Service	Barrett Pkwy/Cobb Place Blvd	1091	In	NTB	Barrett Pkwy								
II	Restaurant	Barrett Pkwy/Cobb Place Blvd	1091	In	Outback	Barrett Pkwy								
II	Bank	Barrett Pkwy/Cobb Place Blvd	1091	In	Wachovia	Barrett Lakes Blvd								
V	Office	Barrett Lakes Blvd/Barrett Pkwy	1091	In	Possible Office Building		75,000				246			ITE Occupancy Ratio
I	Distribution	Barrett Lakes Blvd/Cobb Place Blvd	1092	In	Dormier Special Products/Thin Tech.	1155 Roberts Blvd	65,000			Dorey's	65			Lanie Shipp
I	Office	Barrett Lakes Blvd/Roberts Blvd	1092	In	Automated Logic	1150 Roberts Blvd	80,000			W.H. Denney Jr., CID Survey	200			W.H. Denney Jr., CID Survey
I	Office	Barrett Lakes Blvd/Vaughn Rd	1092	In	Cobb Place Condominiums	975 Cobb Place Blvd	180,000			Lanie Shipp	592			ITE Occupancy Ratio
I	Office	Barrett Lakes Blvd/Vaughn Rd	1092	In	Emerald Crest Office	1025 Cobb Place Blvd	34,148			Dorey's	112			ITE Occupancy Ratio
I	Car Dealer	Barrett Lakes Pkwy/Auto Park Dr	1092	In	Car Dealership	Barrett Lakes Blvd					40			
I	Car Dealer	Barrett Lakes Pkwy/Auto Park Dr	1092	Out	Car Dealership	Barrett Lakes Blvd					40			
I	Car Dealer	Barrett Lakes Pkwy/Auto Park Dr	1092	Out	Car Dealership	Barrett Lakes Blvd					40			
II	Lumber	Barrett Lakes Blvd/Cobb Place Blvd	1092	In	Bland Lumber Yard	Barrett Lakes Blvd								
IV	Office	Barrett Lakes Blvd/Cobb Place Blvd	1092	In	Office Building	Cobb Place Blvd	19,200				63			ITE Occupancy Ratio
V	Office	Barrett Lakes Blvd/Vaughn Rd	1092	In	Possible Office Building		45,000				148			ITE Occupancy Ratio
V	Office	Barrett Lakes Blvd/Vaughn Rd	1092	In	Possible Office Building		180,000				591			ITE Occupancy Ratio
I	Industrial	Barrett Lakes Blvd/Roberts Blvd	1093	In	Dornier Building at Barrett	1155 Roberts Blvd	65,000			Dorey's	130			ITE Occupancy Ratio

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
II	Bank	Barrett Pkwy Transfer	1093	In	SunTrust Bank	Barrett Pkwy								
II	Restaurant	Roberts Blvd/Barrett Pkwy	1093	In	Carrabbas	Barrett Pkwy								
II	Retail	Roberts Blvd/Barrett Pkwy	1093	In	Progressive Lighting	Barrett Pkwy								
V	Office	Barrett Lakes Blvd/Roberts Blvd	1093	In	Possible Office Building		65,000				213			ITE Occupancy Ratio
V	Office	Roberts Blvd/Barrett Pkwy	1093	In	Possible Office Building	Barrett Pkwy	65,000				213			ITE Occupancy Ratio
V	814	Roberts Blvd/Barrett Pkwy	1093	In	Possible Retail Building	Barrett Pkwy	35,000				63		1,423	ITE Occupancy Ratio
I	Office	Barrett Lakes Blvd/Roberts Blvd	1094	In	Barrett Office Center	1201 Roberts Blvd	45,170			Dorey's	148			ITE Occupancy Ratio
I	814	Barrett Pkwy Transfer	1094	In	Barrett Crossing Strip Mall	1200 Barrett Pkwy/US 41	172,479			Dorey's	567		7,012	ITE Occupancy Ratio
I	Hotel	Barrett Pkwy Transfer	1094	In	Town Suite Marriott	1074 Cobb Place Blvd			83	Front Desk	20			Revised ITE Occupancy Ratio
I	Office	Vaughn Rd/Roberts Blvd	1094	In	Barrett Office Center II	1255 Roberts Blvd	43,750			Dorey's	143			ITE Occupancy Ratio
II	Restaurant	Barrett Pkwy Transfer	1094	Out	Burger King	Barrett Pkwy								
II	Gas/Service	Barrett Pkwy Transfer	1094	Out	Goodyear	Barrett Pkwy								
II	Restaurant	Barrett Pkwy Transfer	1094	In	Taco Bell	Cobb Pkwy								
II	Bank	Barrett Pkwy Transfer	1094	In	Westside Bank	Barrett Pkwy								
V	Office	Barrett Lakes Blvd/Roberts Blvd	1094	In	Possible Office Building		45,000				148			ITE Occupancy Ratio
V	Office	Vaughn Rd/Roberts Blvd	1094	In	Possible Office Building		45,000				148			ITE Occupancy Ratio
VI		Barrett Pkwy Transfer	1095	Out	Outside Survey Limits	Adjustment for Unsurveyed Data					1217	415		
VI		0	1095	Out	Outside Survey Limits	Adjustment for Unsurveyed Data					1216	414		
I	Car Dealer	Barrett Lakes Blvd/Barrett Pkwy	1096	In	Car Dealership	Barrett Pkwy					40			
I	Car Dealer	Barrett Lakes Blvd/Barrett Pkwy	1096	In	Car Dealership	Barrett Pkwy					40			
I	Car Dealer	Roberts Blvd/Barrett Pkwy	1096	In	Car Dealership	Barrett Pkwy					40			
V	814	Roberts Blvd/Barrett Pkwy	1096	In	Possible Retail Building	Barrett Pkwy	170,000				309		6,913	ITE Occupancy Ratio
I	815	0	1172	In	Home Depot	449 Roberts Ct	102,746			Burruss Institute	157		4,178	ITE Occupancy Ratio
I	814	Busbee Pkwy/Town Center Dr	1172	Out	Strip Mall	501 Roberts Ct	21,000			Lanie Shipp	48		854	ITE Occupancy Ratio
I	815	Busbee Pkwy/Town Center Dr	1172	Out	Toys R Us	168 Roberts Ct	61,735			Burruss Institute	94		2,510	ITE Occupancy Ratio
V	815	Busbee Pkwy/Town Center Dr	1172	In	Retail	Roberts Ct - Extension	250,000			Burruss Institute	385		2,510	ITE Occupancy Ratio
I	Office	Chastain Meadows Pkwy/Big Shanty Rd	1173	In	Chastain Meadows/Circuit City	225 Chastain Meadows Crt	183,000			CID Survey	1,166			CID Survey
I	Office	Chastain Rd/Chastain Meadows Pkwy	1173	Out	Chastain Meadows	3380 Chastain Meadows Pkwy	143,346			Dorey's	471			ITE Occupancy Ratio
I	Office	Chastain Rd/Chastain Meadows Pkwy	1173	In	Chastain Place	95 Chastain Rd	226,014			Burruss Institute	743			ITE Occupancy Ratio
III	Office	Chastain Meadows Pkwy/Big Shanty Rd	1173	In	222 Chastain Meadows Ct	222 Chastain Meadows Ct	133,000			K. O'Brien	320			K. O'Brien

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
III		Chastain Meadows Pkwy/Big Shanty Rd	1173	In	Build to Suit	Chastain Meadows Ct	195,000			K. O'Brien	500			K. O'Brien
III	Office	Chastain Meadows Pkwy/Big Shanty Rd	1173	In	Building C	222 Chastain Meadows Ct	55,702			Cobb Chamber of Commerce	183			ITE Occupancy Ratio
III	Office	Chastain Meadows Pkwy/Big Shanty Rd	1173	In	Office Distribution Center	Chastain Meadows Pkwy	100,000			K. O'Brien	300			K. O'Brien
V	Office	Chastain Meadows Pkwy/Big Shanty Rd	1173	In	Possible Office Building	Chastain Meadows Pkwy	250,000				822			ITE Occupancy Ratio
V	Office	Chastain Rd/Chastain Meadows Pkwy	1173	In	Possible Office Building	Chastain Meadows	250,000				822			ITE Occupancy Ratio
V	Office	Chastain Rd/Chastain Meadows Pkwy	1173	In	Possible Office Building	Chastain Meadows	250,000				822			ITE Occupancy Ratio
I	Office	0	1175	Out	Flooring America	Townpark Dr	150,000			Lanie Shipp	493			ITE Occupancy Ratio
I	Industrial	Town Green Blvd/Town Crossing	1175	In	300 Cabot Industrial Park	300 Townpark Dr	121,000			Kerry O'Brien	242			ITE Occupancy Ratio
I	Apt	Town Green Blvd/Town Crossing	1175	Out	Clarinbridge	3770 Busbee Pkwy		306		Front Desk	15	612		
I	Apt	Town Green Blvd/Town Crossing	1175	Out	Poplar Place	900 Towne Green Blvd		324		1998 Cobb County Data Report	16	648		
I	Apt	Town Green Blvd/Town Crossing	1175	Out	The Enclave	3780 Towne Crossing		326		1998 Cobb County Data Report	16	652		
VI		Town Green Blvd/Town Crossing	1175	Out	Outside of Survey Limits	Adjustment for Unsurveyed Development Based on ARC Projections						905		
VI		0	1175	Out	Outside of Survey Limits	Adjustment for Unsurveyed Development Based on ARC Projections						447		
VI		Chastain Rd/Chastain Meadows Pkwy	1176	Out	Outside Survey Limits	Adjustment for Unsurveyed Data					77	548		
VI		0	1176	Out	Outside Survey Limits	Adjustment for Unsurveyed Data					77	548		
I	Office	0	1182	In	Barco	3240 Town Point Dr	72,000			Tom Trocheck	103			Tom Trocheck
I	Office	0	1182	In	Chastain Distribution Center	1305 Chastain Dr	116,500			Dorey's	233			ITE Occupancy Ratio
I	Office	0	1182	In	Heidelberg USA Inc	1000 Gutenberg Dr	150,000			Burruss Institute	400			CID survey
I	Office	0	1182	In	RTF Properties	3330 Town Point Dr	88,000			Dorey's	282			ITE Occupancy Ratio
I	Office	0	1182	In	Town Point II	3350 Town Point Dr	76,800			Dorey's	252			ITE Occupancy Ratio
I	Distribution	Barrett Lakes Blvd/Chastain Rd	1182	In	3400 Town Point Dr	3400 Town Point Dr	66,000			Dorey's	132			ITE Occupancy Ratio
I	Office	Barrett Lakes Blvd/Chastain Rd	1182	In	Town Point Office Center	3391 Town Point Pkwy	92,000			Dorey's	302			ITE Occupancy Ratio
II	Gas/Service	Barrett Lakes Blvd/Chastain Rd	1182	In	Shell	Chastain Rd								
II	Restaurant	Barrett Lakes Blvd/Chastain Rd	1182	In	Wendy's	Chastain Rd								
IV	Office	0	1182	In	Pacesetter Steel Services	3300 Town Point Dr	36,000				118			ITE Occupancy Ratio
V	Office	Barrett Lakes Blvd/Chastain Rd	1182	In	Possible Office Building		200,000				658			ITE Occupancy Ratio
V	Office	Barrett Lakes Blvd/Chastain Rd	1182	In	Possible Office Building		200,000				658			ITE Occupancy Ratio
I	815	Roberts Blvd/Barrett Pkwy	1183	In	Circuit City	1185 Barrett Pkwy	182,971			Burruss Institute	278		7,441	ITE Occupancy Ratio
II	Church	Roberts Blvd/Barrett Pkwy	1183	In	Greers Chapel Baptist	Greers Chapel Rd								

Table A1-2
Land Use Inventory Town Center Area

Category	Primary Use	Station Position (1/4 mile)	TAZ	CID In/Out	Building	Address	Sq. Ft.	Apts. Units	Hotel Rooms	Source	Employee Count	Population	Visitor Count	Source
II	Restaurant	Roberts Blvd/Barrett Pkwy	1183	In	Sweet Tomatoes	Barrett Pkwy								
IV	815	Barrett Pkwy Transfer	1183	In	Car Max	Barrett Pkwy	28,800				44		1,171	ITE Occupancy Ratio
IV	815	Roberts Blvd/Barrett Pkwy	1183	In	Babies R Us	Barrett Pkwy	38,000				58		1,545	ITE Occupancy Ratio
IV	815	Roberts Blvd/Barrett Pkwy	1183	In	Hi-Fi Buys	Barrett Pkwy	16,000				24		650	ITE Occupancy Ratio
V	Office	Barrett Pkwy Transfer	1183	In	Future Office	Cobb Pkwy	120,000				393			ITE Occupancy Ratio
I	815	Barrett Pkwy/Cobb Place Blvd	1184	In	Costco Wholesale	645 Barrett Pkwy	147,132			Burruss Institute	225		5,983	ITE Occupancy Ratio
I	Hotel	Barrett Pkwy/Cobb Place Blvd	1184	In	Town Center Hotel Partnership Holiday Inn Express	2485 Busbee Pkwy - Barrett	67,051			Burruss Institute(147 rooms)	36			Revised ITE Occupancy Ratio
II	Gas/Service	Barrett Pkwy/Cobb Place Blvd	1184	In	BP	Barrett Pkwy								
II	Restaurant	Barrett Pkwy/Cobb Place Blvd	1184	In	Macaroni's Grill	Barrett Pkwy								
IV	815	Barrett Pkwy/Cobb Place Blvd	1184	In	US Play	Barrett Pkwy	95,000				145		3,863	ITE Occupancy Ratio
V	814	Barrett Pkwy/Cobb Place Blvd	1184	In	Possible Retail Building	Barrett Pkwy	75,000				136		3,050	ITE Occupancy Ratio
V	814	Barrett Pkwy/Cobb Place Blvd	1184	In	Possible Retail Building	Barrett Pkwy	75,000				136		3,050	ITE Occupancy Ratio
I	Industrial	Barrett Lakes Blvd/Duncan Rd	1185	In	2700 Chapel Creek Industrial Park	2700 Barrett Lakes Blvd	337,950			Dorey's	470			Ronald S. Vanorov, CID Survey
I	Industrial	Barrett Lakes Blvd/Duncan Rd	1185	In	2750 Chapel Creek Industrial Park (JVC)	2750 Barrett Lakes Blvd	248,694			Dorey's	497			ITE Occupancy Ratio
I	Industrial	Barrett Lakes Blvd/Duncan Rd	1185	In	2850 Chapel Creek Industrial Park	2850 Barrett Lakes Blvd	212,500			Dorey's	425			ITE Occupancy Ratio
						Totals:	20,695,012	4,875	1,123	-	59,649	15,993	287,046	

Category	Description
I	This category consists of existing buildings with physical properties (sq-ft, # of rooms, etc.) that were provided by the developer or obtained from a published source
II	This category consists of existing buildings that are considered small generators of employment for purposes of the CCTIS
III	This category consists of future development information based on current master plans of the developers
IV	This category consists of existing buildings with physical properties (sq-ft, # of rooms, etc.) that were estimated by the Bechtel-MSE team
V	This category consists of future development potential of vacant land not addressed in Category III. The development potential was estimated considering the designation of the property in the Sub Area Classification Maps included in the Appendix of the Cobb County Comprehensive Plan
VI	This category includes an estimate of the additional development potential of areas within the zone that were not inventoried as part of our work. These estimates consider the ARC projections for the area

Appendix 2

Placement of Trunkline along Cobb Parkway

The study explored various possible Trunkline alignments along Cobb Parkway. This appendix presents a description of those potential alignments, a recommendation of the preferred alignment, and explanation of the criteria and basis for the recommendation. The alignment covers the 10-mile core portion of Cobb Parkway from the southerly point, where the Trunkline begins at Cumberland Boulevard, to a point south of the Canton Road Connector/SR5, where the line separates in two directions. There, one alignment continues to the northeast along the north side of the Canton Road Connector; the other alignment continues northwest along Cobb Parkway to Barrett Parkway.

A basic premise for the work was that, regardless of whether a fixed guideway transit line is built along Cobb Parkway, the existing roadway will be widened in accordance with plans of the Georgia Department of Transportation (GDOT). These plans call for providing four lanes in each direction with a 20-foot median between intersections and a 32-foot median in the vicinity of intersections with major cross streets, to provide for double left-turn lanes on the near side of these intersections. The existing highway right-of-way (ROW) along this north-south arterial roadway is 150 feet wide; much of this width is not currently used for highway purposes, and there appears to be considerable encroachment on the highway ROW by adjacent land users.

A2.1 DESCRIPTION OF OPTIONS

Three alignment options for the Trunkline appear possible along Cobb Parkway. The physical characteristics of each Trunkline alignment option are summarized below. The Options are illustrated schematically in Figure A2-1.

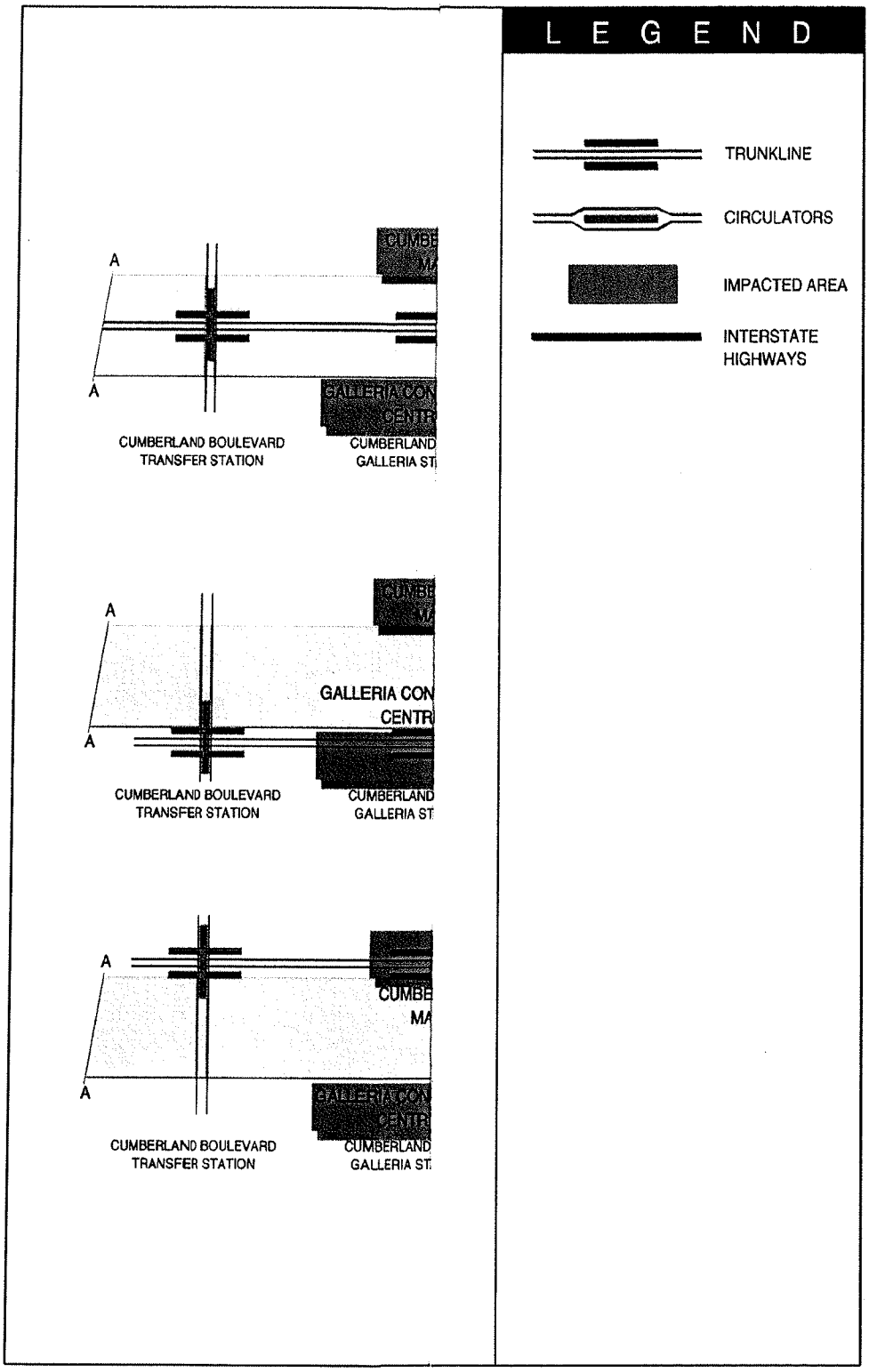
A2.1.1 Option 1 – Median Throughout

In this option, the alignment is mostly elevated in the median of Cobb Parkway, with a few short cut-and-cover underground sections where the road grade is steeper than desired and where it is desirable to have the transit line pass under intersecting east-west cross-county roads.

The use of elevated structure does not require any additional median width, except at street intersections with left turn lanes (assuming an underground alignment is not used at these locations). Where there are elevated structures at intersections, depending on the Cobb Parkway ROW width and lane configuration, some additional ROW may be required. The transition portions (from aerial to grade or from grade to cut-and-cover) require a minimum median width of 26 feet, which also may require additional ROW.

The elevated structures span over street intersections to keep the intersections clear without interrupting the flow of traffic from either road. All intersections remain open except the Trade Center (a short street that functions as a driveway), which is interrupted by an at-grade section of the trackway. Left-turn traffic into this driveway will U-turn about 300 feet away, to return to Trade Center Drive.

There are no special structures in the median alignment, except for a few long spans at certain intersections. This alignment has no impact on adjacent properties, except where additional ROW is needed.



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?-1 ALIGNMENT OPTIONS

Transit Implementation Study

A2.1.2 Option 2 – One Side Throughout.

The Trunkline could be located on either the east side or the west side of Cobb Parkway, but an additional ROW strip at least 30 feet wide is required throughout. The prevailing condition on either side is the presence of businesses, commercial establishments, and parking lots. In many locations, an elevated structure will obstruct from view the businesses that are located higher than street level. In addition, on either side of the Parkway, the line encounters situations where special structures and major reconstruction are necessary. In some cases, the adjacent ground level is much lower or higher than Cobb Parkway, which requires additional earthwork or longer columns with larger foundations. Other significant features that are considered to be obstacles are identified by location in the following paragraphs.

East Side of Cobb Parkway.
The Trunkline would encounter the following current land uses:

- *The Galleria/Convention Center.* This building, connected with the Cumberland Mall by a foot bridge over Cobb Parkway, extends to the edge of the road. If the transit line, with a major passenger station, is located here, one option is to remove and rebuild part of the Galleria, which may not be acceptable for such an edifice. The other is to place the Trunkline underground, which would be very costly. In either case, the station would not serve the Cumberland Mall (located on the west side of Cobb Parkway) as conveniently as an elevated median location.
- *Interstate-285 On and Off Ramps.* Crossing I-285 on the east side of Cobb Parkway would create an undesirable visibility and sight clearance condition for street traffic.
- *The KFC "Big Chicken" Restaurant at Roswell Road.* With its head towering 45 feet above Cobb Parkway, this is considered to be a significant landmark structure. The transit line is proposed to be underground at this location. Should the Trunkline be routed on the east side of Cobb Parkway, special arrangements would have to be made to save this protected structure. It could be relocated temporarily during construction, then replaced; it could be partially demolished and rebuilt; or it could be underpinned. In all cases, the construction would be costly.

West Side of Cobb Parkway.
The Trunkline would encounter the following existing land uses:

- *Monument at the West End of the Cumberland Mall/Galleria Footbridge.* The transit line could pass through at grade or on elevated structure on this side, if relocating the monument is permitted. The existing footbridge could remain and its west end could be blended with the passenger station. However, the transit line would occupy a large area of the Cumberland Mall parking lot. It is doubtful that this would be acceptable to owners of the all, particularly if an at-grade alignment were proposed.
- *Interstate-285 On and Off Ramps.* The problem here is similar to the east side, with the *visibility and sight clearance conditions.*
- *Georgia Memorial Park Cemetery at Terrell Mill Road.* This cemetery stretches for about half a mile between Windy Hill Road and Airport Industrial Park Road. To infringe on what is considered a sacred place with an elevated transit structure would be

undesirable. A possible solution would be to place the Trunkline underground in this area, which is proposed with Option 1.

- *Dobbins Air Force Reserve Base.* The eastern boundary is immediately adjacent to the west side of Cobb Parkway for a distance of approximately 3,000 feet. It is questionable whether the military authorities would permit an intrusion of the Trunkline into their property, particularly at the southern end, where an elevated structure would be close to the end of a runway with a flight path crossing Cobb Parkway.
- *About 3,000 Feet of Woodlands between Delk Road and Barclay Circle.* Locating the transit line on the west side of Cobb Parkway, whether elevated, at-grade, or underground, would take a substantial area of the woodlands, which could result in strong objections on environmental grounds.

Locating the passenger stations on the side of Cobb Parkway would have a negative impact on pedestrian and vehicular accessibility, and impact the adjacent properties because of additional construction.

As described above, the line features are similar between the east side and the west side.

A2.1.3 Option 3 – A Combination of Either or Both Sides and th e Median.

To avoid the obstacles presented by an alignment restricted to one side of Cobb Parkway or the other, or located exclusively in the median, the alignment of the Trunkline could be shifted between the median and the east side or the west side of Cobb Parkway where necessary or desirable. Such weaving could occur in at least six places. It would add to the capital construction costs and would also have an impact on operations because of the unnecessary curves in the alignment and the longer travel distances. Two scenarios are described below.

1. Commencing at Cumberland Boulevard with an east side alignment, the Trunkline turns into the median before it reaches the Galleria and remains in the median past I-285. It then returns to the east side, avoiding the Georgia Memorial Park Cemetery and Dobbins Air Force Reserve Base. Before the line reaches Roswell Road, it transitions to either the median or to the west side of Cobb Parkway, to avoid the Big Chicken landmark. Once it clears the landmark, it returns to the east side until past the Canton Road Connector to Barrett Parkway.

2. With a west side alignment, also commencing at Cumberland Boulevard, the Trunkline shifts to the median before it reaches the Cumberland Mall/Galleria footbridge, to clear the memorial monument and minimize the impact on the Cumberland Mall parking lot. It stays in the median past I-285, then returns to the west side. Just before the line reaches Windy Hill Road, it shifts to the median or to the east side of Cobb Parkway, to avoid the Georgia Memorial Park. Once past Airport Industrial Park Road, it returns to the west side, providing that it is possible to encroach on the boundary of Dobbins Air Force Reserve Base. This shift is repeated again along the woodlands stretch between Delk Road and Barkley Circle.

   In addition to these shifts, it may be economically beneficial to shift the Trunkline alignment to the median or the other side of Cobb Parkway at specific locations because of difficult construction conditions that may be encountered.

A2.2 Evaluation Categories and Discussion

Ten categories of basic features were determined for comparing the alignment options. They include the extent of any need for additional ROW; roadway capacity and the impact on Cobb Parkway traffic; turning movements at intersections, both ease of turning and safety; sighting of, and access to, adjacent properties; pedestrian safety; station locations and convenience of access, with respect to adjacent business and rider points of origin; aesthetics; land use and development; capital costs in relation to the alignment designated as base case; operational impact in relation to the base case.

These categories are discussed below and summarized in Table A2-1 at the end of this section.

A2.2.1 Right of Way

It is assumed that the present Cobb Parkway ROW is a constant 150 feet, from the Cumberland area to Barrett Parkway. The median alignment requires minimal additional ROW near the line transitions from elevated to underground and vice-versa. However, a side alignment requires substantial land takes.

A2.2.2 Roadway Capacity

The current Cobb Parkway configuration is six through-lanes from Cumberland Boulevard to the Canton Connector, and four lanes north of the Canton Connector. The Georgia Department of Transportation plans to widen Cobb Parkway to eight lanes, with a 20 foot median. The median will be increased to 32 feet at major intersections, to accommodate multiple left turn lanes There will be some impact on the road capacity in the median alignment option, due to the presence of structures in the median and to the addition of traffic and pedestrian control signals. The impact on the roadway capacity in the side alignment options is less, because the only factor is the added traffic and pedestrian control signals.

A2.2.3 Turning Movements at Intersections

In the median alignment option, there is some impact on turning movements in certain locations. The presence of columns in the median may impede sight distances for left turns from Cobb Parkway into cross streets. In the side alignment options, the structures spanning the cross streets are set back such that they will not impede visibility; there is no impact on turning movements from the cross streets into Cobb Parkway.

A2.2.4 Sighting of, and Access to, Adjacent Properties

With the median alignment, the elevated structure columns and the transition structures will impede the sighting/viewing of commercial properties on the opposite side of Cobb Parkway. However, with the side alignment option, the presence of columns and structures will impede the viewing of the properties on the same side as the line.

A2.2.5 Pedestrian Safety

There will be a substantial increase in pedestrian traffic at station locations, particularly during peak hours, jeopardizing pedestrian safety. Mitigation of the pedestrian hazards will require footbridges at all elevated station locations and underground passageways at underground stations. In addition, pedestrian-activated control signals should be added for crossing side streets as well as Cobb Parkway. These measures will apply to the median alignment and the side alignment options.

A2.2.6 Station Locations and Convenience of Access

Station locations are a significant aspect of the system. Basically, the general location of a station is determined by the transportation model, which also determines the need for parking at the that station. A transit station has an impact on the local environment, stemming from features such as parking facilities, bus stops, kiss/ride provisions, access to the station, and whether the station is elevated, at grade, or underground.

Median alignment station locations provide equal access to parking, on both sides of the road. In addition, a median station location does not favor commercial establishments on one side over the other. Access to the station by passengers, including persons with disabilities, is as convenient from either side.

A side passenger station is farther from parking facilities, when located on the opposite side of the roadway. Also, it favors the commercial establishments on its side over the other. A long pedestrian bridge will be required to accommodate passengers accessing/egressing from the opposite side. Convenient access can be provided for bus transferees and kiss/ride patrons.

A2.2.7 Aesthetics

A transit line structure in a median maintains a balanced view of the roadway and its surroundings. With the Georgia Department of Transportation plans to widen Cobb Parkway to four lanes in each direction with a wide median, the Trunkline position and configuration will be coordinated with GDOT. The elevated structure and its columns will cast a shadow on the parkway.

A side alignment, although located off the main roadway, creates an unbalanced overall view of the roadway and the surroundings. The elevated structure obstructs the view of transit-side businesses from the road and casts shadows on private property. This may not sit very well with roadside businesses that try to make their appearances pleasant and appealing to passersby.

If the transit line shifts from one side to the median or the other side, as in Option 3, a structure crossing Cobb Parkway, whether to the middle or to the other side, will not be appealing or pleasant in appearance. Impacts described for Options 2 and 3 will also apply.

A2.2.8 Land Use and Development

Intensification of commercial development is a known eventual result of the introduction of transit systems and stations. Stations located in the median will promote balanced development on either side of Cobb Parkway. On the other hand, the side stations of the elevated guideway will create a visual and physical barrier to the adjacent properties and thus reduce land values and impede development. Development on the opposite side will not be as intense, because of remoteness from stations.

A2.2.9 Capital Costs

Taking Option 1 – Median Throughout as the base case for cost estimating purposes, Option 2 – One Side Throughout will be much higher in cost, because of the features described in A2.1.2. Attempting to maintain the alignment on the east side throughout will be a challenge, particularly at the Galleria/Convention Center, where the choice may be either a tunnel under the facility or demolishing part of the center to make room for the Trunkline. A similar argument applies to the west side of Cobb Parkway, particularly at the Georgia Memorial Park Cemetery and Dobbins Air Base. Excluding the additional ROW cost for the side alignment, the difference in station costs between the median and side alignments is presumed to be minimal. Numbers of elevators, escalators, stairs, and lengths of footbridges and underpasses are about the same. Option 3 – Combination of Either or Both Sides and the Median will have a higher cost because full width ROW will be required along most of the live and additional construction at Cobb Parkway crossings.

A2.2.10 Operational Impact

Operation in Options 1 and 2 (straight alignments) throughout is the same. In Option 3 (combination alignment), there is minor additional travel time resulting from crossing the Parkway back and forth.

A2.3 EVALUATION OF THE OPTIONS

A comparative summary of the evaluation of all the above categories for each of the options is shown in Table A2-1, which briefly describes the impact and a weighted comparative score of each category.

A2.4 CONCLUSION

Based on the above, Option 1 – Median Throughout, is the most favored.

Table A2-1
Comparison of Cobb Parkway Alignment Options

Ratings: Least Favored ① ⑦ Most favored

Criteria	Option 1 Median Throughout	Rating	Option 2 One Side Throughout	Rating	Option 3 Combination of Either Side and Median	Rating
Right-of-Way	Minimum additional ROW required	7	Full width ROW required	1	Additional ROW required where line is outside Cobb Parkway	2
Roadway Capacity	Very little impact if number of lanes is not reduced	6	No impact	7	No impact	7
Turning Movements at Intersections	Minimum impact in some locations. Columns may impede visibility for left turns in some locations	7	Columns across side streets may impede visibility for right turns	4	Some impact as in Option 2 with side alignment.	5
Sighting of and Access to Adjacent Properties	Columns and structures will slightly impede sighting of properties on opposite side of street	6	Columns and structures will slightly impede sighting of properties on same side of street.	6	Comment on Alt. 1 applies to median portions and comment on Alt. 2 applies to side alignment portions	6
Pedestrian Safety	Higher risk for pedestrians at surface crossings due to higher pedestrian traffic and sight distance restriction by columns and structures	2	No impact	7	See comment on Alt. 1 for median portions of alignment.	3
Station Locations and Convenience of Access	Closest to parking from either side of Parkway	7	Farthest from parking if parking is on opposite side of Parkway	5	Same comments on Alt. 1 and Alt. 2 on comparable portions of the alignment	6
Aesthetics	Maintains balanced view of roadway and surroundings. Structures will cast shadows and impede sunlight on the roadway	7	Creates unbalanced view of roadway and surroundings. Reduces visibility of transit side businesses from roadway	6	Comments on Alt. 1 and Alt. 2 apply to comparable portions of the alignment. In addition, view of the aerial structure crossing over Cobb Parkway may not be pleasing	5
Land Use and Development	No impact. Balanced development on both sides of the Parkway	7	More development on the station side of Parkway	5	More development on the station side of Parkway	5
Capital costs	Least cost because little additional ROW is required	7	Highest cost because full width ROW is required outside existing public ROW and special construction in some locations	2	Higher cost because full width ROW is required along most of the line, and additional construction at Cobb Parkway crossings	4
Operations	Basic. Straight alignment throughout	7	Basic. Straight alignment throughout	7	Minor additional travel time due to additional route length resulting from crossing the Parkway back and forth	6
	Totals	**63**		**50**		**49**

Appendix 3
Patronage Forecasting Model

A number of technical planning tools were used to develop travel demand forecasts and inputs to the transportation impact analysis. This study used the Atlanta Regional Commission (ARC) regional travel demand and demographic models and the Cobb County Transportation Model (CCTM) as primary resources. Then, building on these resources, specific technical methods were applied to prepare the forecast and to arrive at the results. This Appendix 3 provides a general overview of ARC model and the CCTM as a frame of reference, and describes the adaptation of them to this Study's use.

A3.1 DESCRIPTION OF TRAVEL DEMAND FORECAST MODELS

The Atlanta Regional Commission (ARC), Regional Transportation Plan (RTP) development process is a planning requirement to assure the Atlanta region's share of federal funding for transportation and air quality programs.

To prepare the RTP, and for ongoing analysis of transportation demand and air quality issues, the ARC develops and implements a regional travel demand modeling system. The CCTM is a focused application of the ARC model.

A3.1.1 ARC Travel Demand and Demographic Models

The ARC regional travel-demand-modeling system includes the traditional four-step travel-demand-modeling process: trip generation, trip distribution, mode (choice) split, and network assignment. In addition, ARC prepares regional forecasts of socioeconomic variables, including population, households, and employment, using a regional demographic forecasting model. The demographic forecasts are a primary input to the trip generation phase, the first step in the travel demand models. The outputs from the model include forecasts of highway demand that are used in regional emissions analysis, a requirement for air quality conformity documentation.

The ARC travel demand model is a comprehensive representation of the Atlanta Region's roadway and transit systems (both current and assumed future-year systems). These networks closely match the RTP for each five-year increment, from 2000 through 2025.

Outputs from the ARC travel demand model forecasts include travel time, roadway speeds, transit ridership, and highway traffic volumes. The ARC travel demand model is particularly useful for testing of alternative transportation network and service scenarios. For the RTP regional planning process, the ARC travel demand model was used as a primary forecasting tool to evaluate and test alternative strategies, and to evaluate transportation investments against performance goals.

A3.1.2 Cobb County Transportation Model

The CCTM, prepared for the Cobb County Department of Transportation (CCDOT), is an application of the ARC regional model. Refinements have increased the level of detail within Cobb County, and increased the CCTM capability to address local transportation issues. In the travel-demand-modeling vernacular, the CCTM is considered a "focused" application of the ARC model.

Both the ARC model and the CCTM divide the region and county into geographic areas called Transportation Analysis Zones (TAZ). In the CCTM used for this study, the number of TAZ within Cobb County is significantly greater than represented in the ARC model (see Table A3-1). This allows for better detailing of the roadways and transit services within Cobb County that represent future network assumptions. As a result, the CCTM is used for transportation system and project planning, addressing transportation infrastructure within Cobb County.

The overall modeling steps and inputs to apply the ARC and CCTM models are basically the same. The Cobb County staff coordinates with ARC concerning ongoing technical modeling issues, and assures that the two models are generally consistent.

The use of the CCTM to develop travel demand and transit ridership forecasts for this Study is consistent with the procedures recommended by the FTA.

The CCTM was created in 1997 and used in the development of the Draft Cobb County Comprehensive Transportation Plan (DCCCTP) during 1998 and 1999. The CCTM was used to prepare travel demand forecasts for the proposed transit systems, which serve as the beginning point of reference to forecasts prepared in this study.

Table A3-1 summarizes the travel demand models used in this study. It shows a general overview of the major elements of the ARC model and how they are used or modified in this study's application of the CCTM.

A3.2 PREPARATION OF YEAR 2025 TRANSIT FORECASTS

Preparation of travel demand forecasts in this Study, using the CCTM, represents cooperation and coordination between ARC staff, the CCDOT staff, and the Bechtel/MSE Team. The forecast results are the best, and most reliable to date, for the proposed transit systems.

A3.2.1 Consistency with ARC and RTP Forecasts

The steps taken to prepare the CCTM for this Study advanced in parallel with the work underway on the RTP update. Efforts were made to assure consistency in network assumptions, modeling inputs, and procedures used in preparation of the 2025 alternatives.

Three areas of consistency were sought in coordination with ARC to ensure that:

1. The ARC model RTP regional network, outside Cobb County, is identical to the CCTM model network in the Build, TSM, and No-Build Alternatives
2. Socioeconomic forecasts for year 2025 are consistent with the RTP
3. Model input parameters and procedures are consistent with the ARC modeling

Important input parameters include fare matrices, transit path-building parameters, network speeds, and percent of zone within walk access to transit. These inputs directly affect the mode choice model results.

Table A3-1
Transportation Modeling for the Transit Implementation Study

Original Model Element	Adapted ARC Regional Model	Adapted Cobb County Transportation Model
Network Representation Consistency with the RTP Scenario 4, highway and transit systems and new planned projects, for entire regional network, representing year 2025	▪ All freeways, highways, primary arterials and county roads. ▪ MARTA rail and bus, CCT bus and proposed rail systems, other county bus, HOV lanes with express bus, and commuter rail.	▪ Entire ARC network with more detail added within Cobb County. ▪ Refined specificity of Cobb Rail system in terms of number of stations, locations and access modes. ▪ Expanded CCT bus system to countywide coverage ▪ Three (3) alternative Year 2025 networks
Growth Projections Applying ARC land use projections of population, employment and households for year 2025	▪ Growth projections for 948 transportation analysis zones (TAZs) comprising the entire region. ▪ Cobb County represented by 147 TAZs.	▪ Growth projections for 1212 transportation analysis zones (TAZs) comprising the entire region. ▪ Cobb County represented in greater detail, by 257 TAZs.
Trip Generation, Trip Distribution	▪ Trip rates by household and employment stratification, activity type ▪ Basic Gravity Model theory	▪ Apply ARC trip generation, trip distribution models same as ARC
Mode Choice, Network Assignment Process The ARC mode choice model is a basic logit model calculating the probable share of total travel demand for all zone to zone trips, among three competing modes: 1) transit, 2) one or single occupant private vehicles, and 3) group or multiple occupant private vehicles. Key inputs include zonal socioeconomic characteristics, network accessibility measurements, and travel cost assumptions. Costs for competing modes highway versus transit are based on skimming the network paths within the modeling system, and calculating the total travel time (cost). Equilibrium highway and transit minimum path network assignment procedures are applied.	Key Inputs to ARC Mode Choice Model: ▪ Households by income class ▪ Transit walk time ▪ Transit Initial Waiting Time ▪ Transit Transfer Waiting Time ▪ Transit Running Time for Rail ▪ Transit Running Time for other transit ▪ Transit Fare ▪ Highway running time for One Mode ▪ Highway running time for Group Mode ▪ Highway Terminal time for One Mode ▪ Highway Terminal time for Group Mode ▪ Parking Cost for One Mode ▪ Parking Cost for Group Mode ▪ % zone households within walk accessibility (.4 miles)	▪ Use the ARC mode choice model with refined networks and zonal input files for Cobb County. ▪ Percent of walk access updated for study per ARC regional plan updates and new service assumptions in Cobb County. ▪ Network coding of walk connectors to rail stations re-coded within corridor along the rail lines ▪ Network path building and assignment procedures consistent with ARC parameters.

A3.2.2 Socioeconomic Forecasts – Year 2025

In early November 1999, ARC provided the Team with year 2025 demographic forecasts, based on the ARC regional demographic forecast model. The demographic forecast model takes into account the future transportation network as one of many inputs in a "top-down" allocation of regional growth. Areas of the region that have a functional transportation system and reasonable accessibility to activity centers share an advantage, and will grow faster than other areas lacking these conditions. The results of the ARC demographic model are projections of population, households and employment by category, summarized for all transportation analysis zones in the Atlanta region.

The data received from ARC was distributed in Cobb County from the ARC zone definition to the more-focused CCTM zones. Therefore, the socioeconomic projections used in the CCTM are consistent with the data reported in the final draft RTP.

The socioeconomic forecasts are a primary input to the travel demand forecasts. It should be understood that transportation demand grows in direct proportion to the increase in population, households, and employment.

The forecasted growth potential of the North I-75 Corridor and of Cobb County assumes the building of new transportation systems, including transit systems and the addition of a High Occupancy Vehicle (HOV) lane in each direction on I-75 throughout Cobb County. Without these new transportation systems, growth in the corridor and in Cobb County could be significantly constrained

A3.2.3 Application of Increased Employment, Population, and Household Estimates

As detailed in Section 2, Volume 1 of this Final Report, the ARC population and employment projections underestimate the growth in the Cumberland and Town Center areas. As part of the final patronage forecasts for the project, the socioeconomic files used in the model were adjusted, in an attempt to more accurately reflect the development potential of the areas.

Three options for adjusting the employment growth in the Cumberland and Town Center areas, and the remainder of the County were considered. They included:

- **Option #1**. The employment projections developed from the land use inventory would be directly applied to the Cumberland and Town Center areas, County, and Region, with no further adjustments. This would result in increases to the employment totals projected by ARC for Cobb County and the Region.
- **Option #2**. The employment projections would be directly applied to the Cumberland and Town Center areas, however, sufficient employment would be removed from the remainder of the County to maintain the ARC total employment projections for the County and Region.
- **Option #3**, the selected option. This option applied the employment projections derived from the land use inventory to the Cumberland and Town Center areas, and included more modest reductions in employment in the remainder of the County. This option resulted in more modest increases to the employment for the County and the Region than

Option #1, and less severe reductions in employment in the remainder of the County than Option #2. A net increase of 40,805 jobs was added to the County and region for the development of the final patronage forecasts. Table A3-2 provides a breakdown of the employment changes for the various subareas of the County.

Table A3-2
Analysis of Adjustments to Employment Data for Patronage Forecasting

	Original ARC Employment Projections			Final Model Projections		Difference in Projections	
Cobb County	2000 Employment	2025 Employment	Annual % Change	2025 Employment	Annual % Change	2025 Employment	% Difference
Marietta	78,632	105,282	1.17%	91,524	0.61%	-13,758	-15.0%
Smyrna	26,511	39,694	1.63%	34,932	1.11%	-4,762	-13.6%
South Cobb	22,872	34,047	1.60%	29,519	1.03%	-4,528	-15.3%
Austell	3,439	7,874	3.37%	6,827	2.78%	-1,047	-15.3%
Powder Springs	3,886	8,641	3.25%	7,492	2.66%	-1,149	-15.3%
West Cobb	8,788	21,188	3.58%	20,227	3.39%	-961	-4.8%
Acworth	5,518	14,492	3.94%	12,565	3.35%	-1,927	-15.3%
Kennesaw	9,596	14,860	1.76%	13,381	1.34%	-1,479	-11.1%
Town Center	23,474	38,753	2.03%	55,582	3.51%	16,829	30.3%
East Cobb	37,154	56,721	1.71%	49,177	1.13%	-7,544	-15.3%
Cumberland	67,692	79,005	0.62%	140,138	2.95%	61,133	43.6%
Cobb Subtotal	287,562	420,558	1.53%	461,364	1.91%	40,806	8.8%

Source: Data taken from socioeconomic data files provided by ARC in November 1999 for use in Patronage forecasting efforts.

The land use inventory showed slight increases in the population and households in the Cumberland and Town Center areas. Because they were small, the increases in population and households were directly applied to the Cumberland and Town Center areas. This resulted in a 2.0% increase (14,158 people) in the projected population of the County, and a 2.7% increase (8,160 households) in the projected number of households in the County in 2025. Tables A3-3 and A3-4 detail the adjustments to the population data and the household data, respectively.

A3.2.4 Refinement of Zonal Structure

The Cobb County Model was developed during the preparation of the Draft Cobb County Comprehensive Plan. In general, the model built upon the ARC model, with refinements in the zonal structure, highway network, and transit network. The 147 traffic analysis zones (TAZs) within Cobb County in the ARC Model were divided into 257 zones in the Cobb County model.

As part of the final model runs for this study, the zonal system in the Cumberland and Town Center areas were further refined to allow more accurate modeling of the circulators. The zones in these areas were divided and an additional 93 zones (TAZs 1006 to 1098) were created. Additional refinements were made to the highway and transit networks, as necessary, to incorporate the zonal changes. Table A3-5 shows the old zone designation from the Cobb model and the corresponding new zones. In addition, 12 maps at the end of this section show the locations and boundaries of the new zones.

Table A3-3
Analysis of Adjustments to Population Data for Patronage Forecasting

	Original ARC Population Projections			Final Model Projections		Difference in Projections	
Cobb County	2000 Population	2025 Population	Annual % Change	2025 Population	Annual % Change	2025 Population	% Difference
Marietta	77,578	93,824	0.76%	93,824	0.76%	0	0.0%
Smyrna	55,135	77,700	1.38%	77,700	1.38%	0	0.0%
South Cobb	64,416	93,197	1.49%	93,197	1.49%	0	0.0%
Austell	16,230	33,092	2.89%	33,092	2.89%	0	0.0%
Powder Springs	22,495	39,945	2.32%	39,945	2.32%	0	0.0%
West Cobb	66,700	96,331	1.48%	97,303	1.52%	971	1.0%
Acworth	12,673	22,226	2.27%	22,226	2.27%	0	0.0%
Kennesaw	37,103	44,330	0.71%	44,330	0.71%	0	0.0%
Town Center	7,570	12,742	2.10%	15,874	3.01%	3,132	24.6%
East Cobb	147,709	162,080	0.37%	162,080	0.37%	0	0.0%
Cumberland	34,684	35,791	0.13%	45,846	1.12%	10,055	28.1%
Cobb Subtotal	542,292	711,258	1.09%	725,416	1.17%	14,158	2.0%

Source: Data taken from socioeconomic data files provided by ARC in November 1999 for use in Patronage forecasting efforts.

Table A3-4
Analysis of Adjustments to Household Data for Patronage Forecasting

	Original ARC Household Projections			Final Model Projections		Difference in Projections	
Cobb County	2000 Households	2025 Households	Annual % Change	2025 Households	Annual % Change	2025 Households	% Difference
Marietta	35,929	44,936	0.90%	44,936	0.90%	0	0.0%
Smyrna	25,442	36,736	1.48%	36,736	1.48%	0	0.0%
South Cobb	25,010	38,062	1.69%	38,062	1.69%	0	0.0%
Austell	6,296	13,462	3.09%	13,462	3.09%	0	0.0%
Powder Springs	7,983	14,986	2.55%	14,986	2.55%	0	0.0%
West Cobb	23,360	35,794	1.72%	36,213	1.77%	419	1.2%
Acworth	4,977	9,184	2.48%	9,184	2.48%	0	0.0%
Kennesaw	13,651	17,006	0.88%	17,006	0.88%	0	0.0%
Town Center	3,483	6,359	2.44%	7,516	3.12%	1,157	18.2%
East Cobb	51,126	59,358	0.60%	59,358	0.60%	0	0.0%
Cumberland	19,555	21,041	0.29%	27,625	1.39%	6,584	31.3%
Cobb Subtotal	216,811	296,924	1.27%	305,084	1.38%	8,160	2.7%

Source: Data taken from socioeconomic data files provided by ARC in November 1999 for use in Patronage forecasting efforts.

Table A3-5
Equivalency Table, Original Cobb Zones to Refined Cobb Zones

Cumberland Galleria Area				Town Center Area			
Old TAZ	New TAZ	Old TAZ	New TAZ	Old TAZ	New TAZ	Old TAZ	New TAZ
551	551	612	612	509	509	1182	1082
551	1041	612	1013	509	1071	1182	1083
551	1042	612	1014	509	1072	1182	1084
551	1043	612	1015	509	1073	1182	1182
551	1044	612	1016	509	1074	1183	1059
551	1045	612	1017	510	510	1183	1183
551	1046	612	1018	510	1085	1184	1063
551	1047	612	1019	510	1086	1184	1184
551	1048	613	613	510	1087	1185	1089
552	552	613	1022	510	1088	1185	1090
552	1050	615	615	510	1092	1185	1091
552	1051	615	1049	510	1093	1185	1185
552	1052	616	616	510	1094	1186	1097
552	1057	1100	1034	510	1096	1186	1186
553	553	1100	1100	511	511	1187	1095
553	1035	1101	1053	511	1065	1187	1187
553	1036	1101	1058	511	1066		
553	1037	1101	1101	511	1067		
553	1038	1102	1027	512	512		
554	554	1102	1028	512	1070		
554	1029	1102	1102	521	521		
554	1030	1104	1023	521	1098		
555	555	1104	1024	576	576		
555	1031	1104	1025	576	1060		
555	1032	1104	1026	576	1061		
555	1033	1104	1104	576	1062		
557	557	1106	1020	579	579		
557	1039	1106	1021	579	1068		
557	1040	1106	1106	579	1069		
567	567	1107	1006	1172	1064		
608	608	1107	1107	1172	1172		
608	1054			1173	1173		
608	1055			1175	1075		
608	1056			1175	1076		
611	611			1175	1077		
611	1007			1175	1078		
611	1008			1175	1079		
611	1009			1175	1081		
611	1010			1175	1175		
611	1011			1176	1080		
611	1012			1176	1176		

A3.2.5 Edits to TRANPLAN Data Files Used in Model

The TRANPLAN modeling software used to develop the patronage forecasts utilizes several data files containing socioeconomic data for each TAZ. The files were edited to allow the use of the increased employment, population, and household projections, and the refinement of the zonal structure.

The employment, population, and households in each of the new zones were determined directly from land use inventory results. In a few instances, the zones included existing developments that were not cataloged as part of the inventory. These developments were, typically, single-family units located outside the catchment area of the transit system. The employment, population, and households associated with the development were estimated from available mapping, field work, and a review of the ARC data values. Once the total employment, population, and households in each new zone were determined, the data files were edited accordingly.

Some of the files used in the model require more specific data than was generated in the land use inventory. The socioeconomic data file used in the model requires employment to be broken down by sector (such as manufacturing, service, retail, etc.). In the edited data file, this data was calculated by determining the ratio of the sector employment (such as retail employment) to the total employment, from the ARC data for the original parent zone, and then applying this ratio to the new total employment. Similarly, the household data file requires the households to be broken down by income. In the edited data file, this data was calculated by determining the ratio of the number of households in an income range to the total number of households, from the ARC data for the original parent zone, and then applying that ratio to the new total number of households.

A3.2.6 Forecasts Using ARC Data and Refined Zonal System

An additional set of patronage forecasts was developed using the ARC employment, population, and household projections and the refined zonal system. In this forecast, the model data files were edited to disaggregate the ARC data to the new zone structure. The data was disaggregated from the parent ARC zone to the new zones, based on ratios determined from the land use inventory. As an example, if a new zone had 23 percent of the total employment of its parent zone based on the results of the land use inventory, then the zone was allocated 23 percent of the ARC total projected employment for the parent zone, in this forecast.

A3.2.7 Network Coding for the Build, Transportation System Management (TSM), and No Build Alternatives

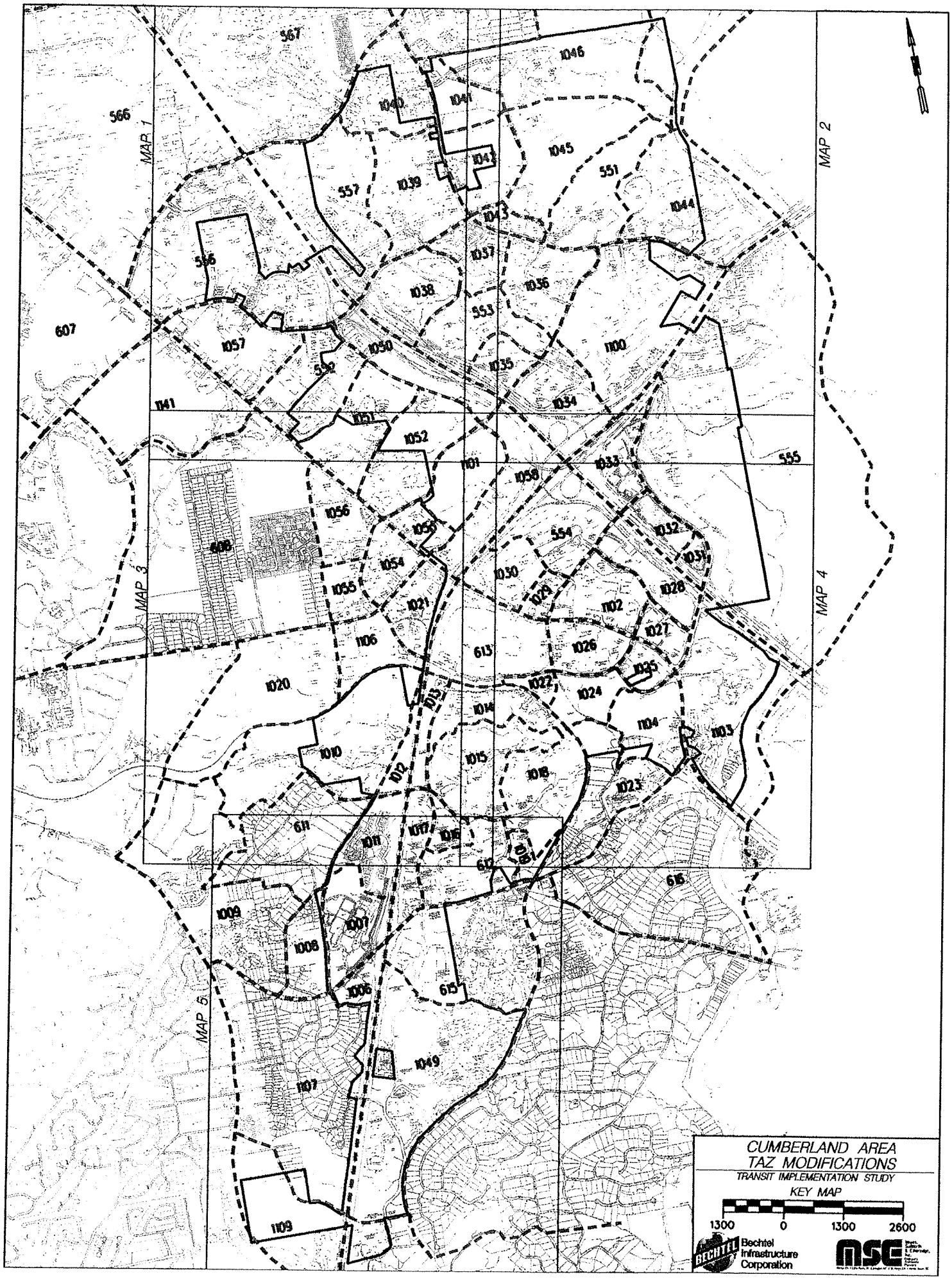
Three alternatives were studied: Build, TSM, and No-Build. The transportation modeling for the study of these alternatives involved intensive network preparation. To the extent possible within the transportation modeling software capabilities, each alternative network was "coded" to reflect the service characteristics, drive and walk access connectivity, transfer stations, and objective travel times along the transit services. Each alternative started from the same background regional network and only varies within Cobb County.

For each alternative, the same regional and local highway network was used (consistent with the RTP) as an input to each transit forecast. The mode choice sub-model compares the relative travel time and accessibility of highway versus transit networks to predict each mode's share of zone-to-zone trips.

A3.2.8 Post Processing Forecast Results

The analysis of the travel demand forecasts include a significant effort in post-processing of the forecast outputs. The basic outputs of a travel demand forecast include mode-specific trip-tables, travel time and distance matrices, and "loaded" network indicating the number of vehicles and transit riders on each segment of the transportation network.

The post-processing includes peak and daily summaries, district level summaries of transit trips and mode share, systemwide and selected-link outputs, and summaries of the highway system.

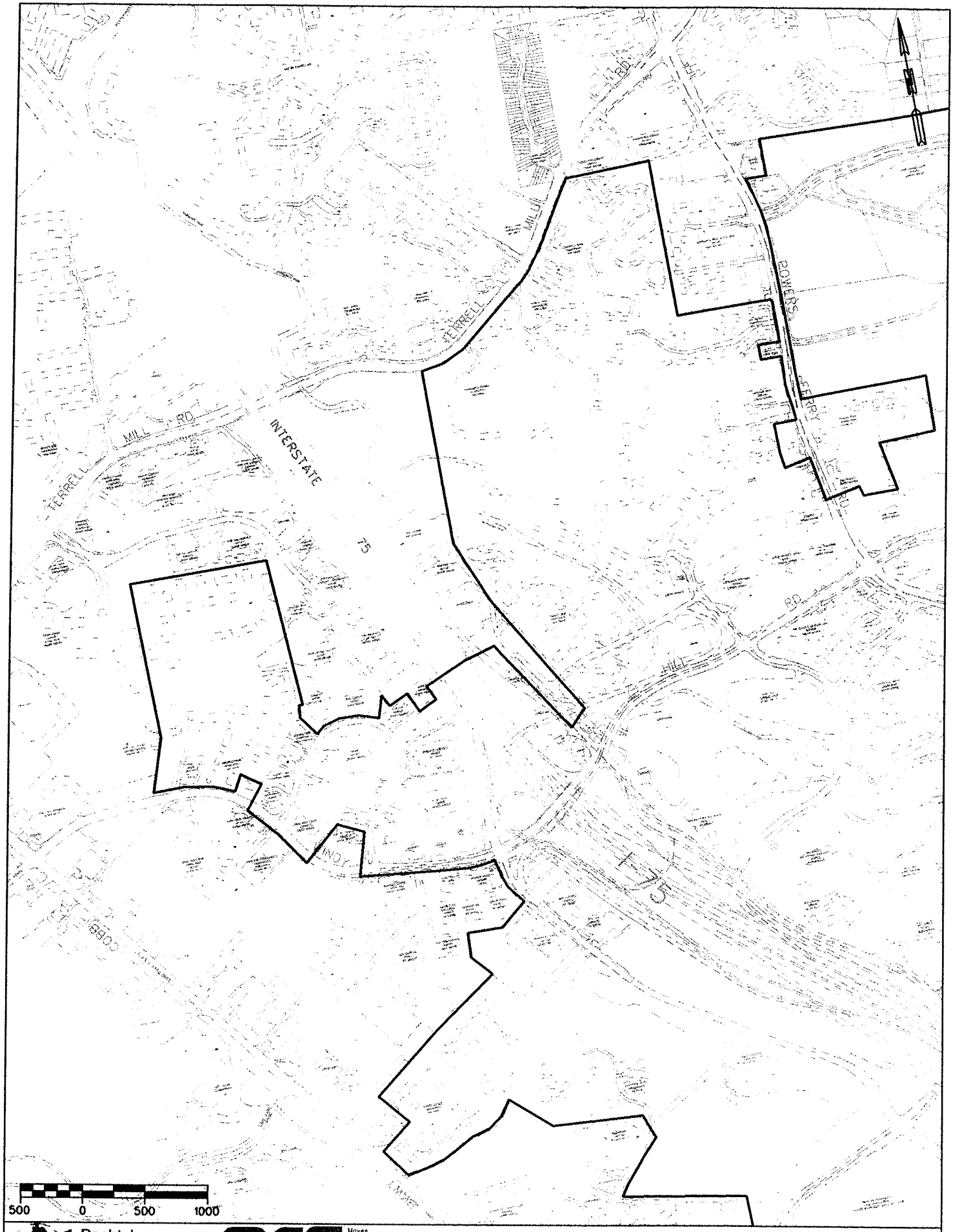


CUMBERLAND AREA
TAZ MODIFICATIONS
TRANSIT IMPLEMENTATION STUDY
KEY MAP

1300 0 1300 2600

Bechtel Infrastructure Corporation

MSE



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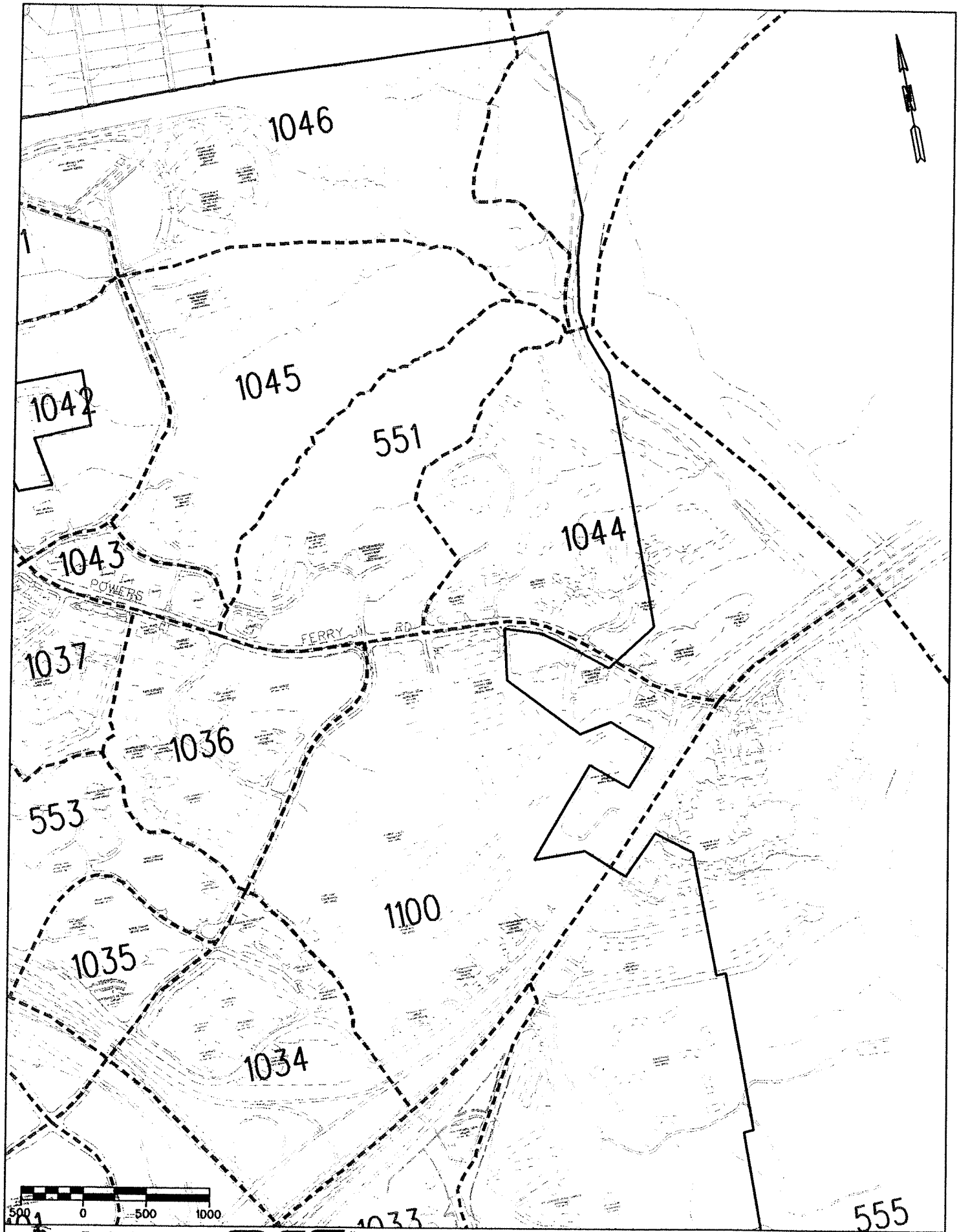
Engineers
Architects
Planners
Atlanta, GA / Little Rock, AR / Lexington, KY / St. Marys, GA / Myrtle Beach, SC

MAP 1

CUMBERLAND AREA TAZ MODIFICATIONS

TRANSIT IMPLEMENTATION STUDY



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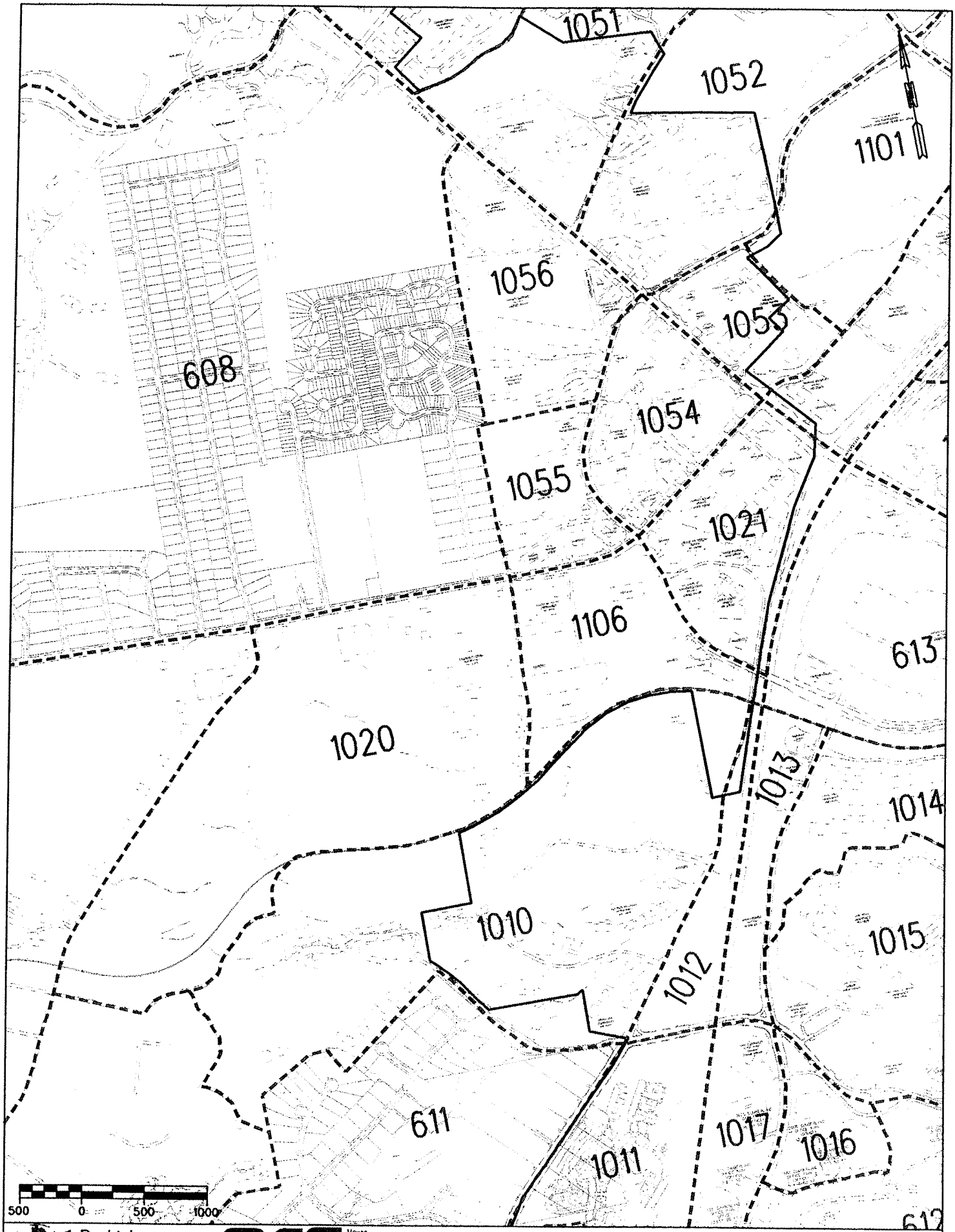
MAP 2

CUMBERLAND AREA TAZ MODIFICATIONS

TRANSIT IMPLEMENTATION STUDY



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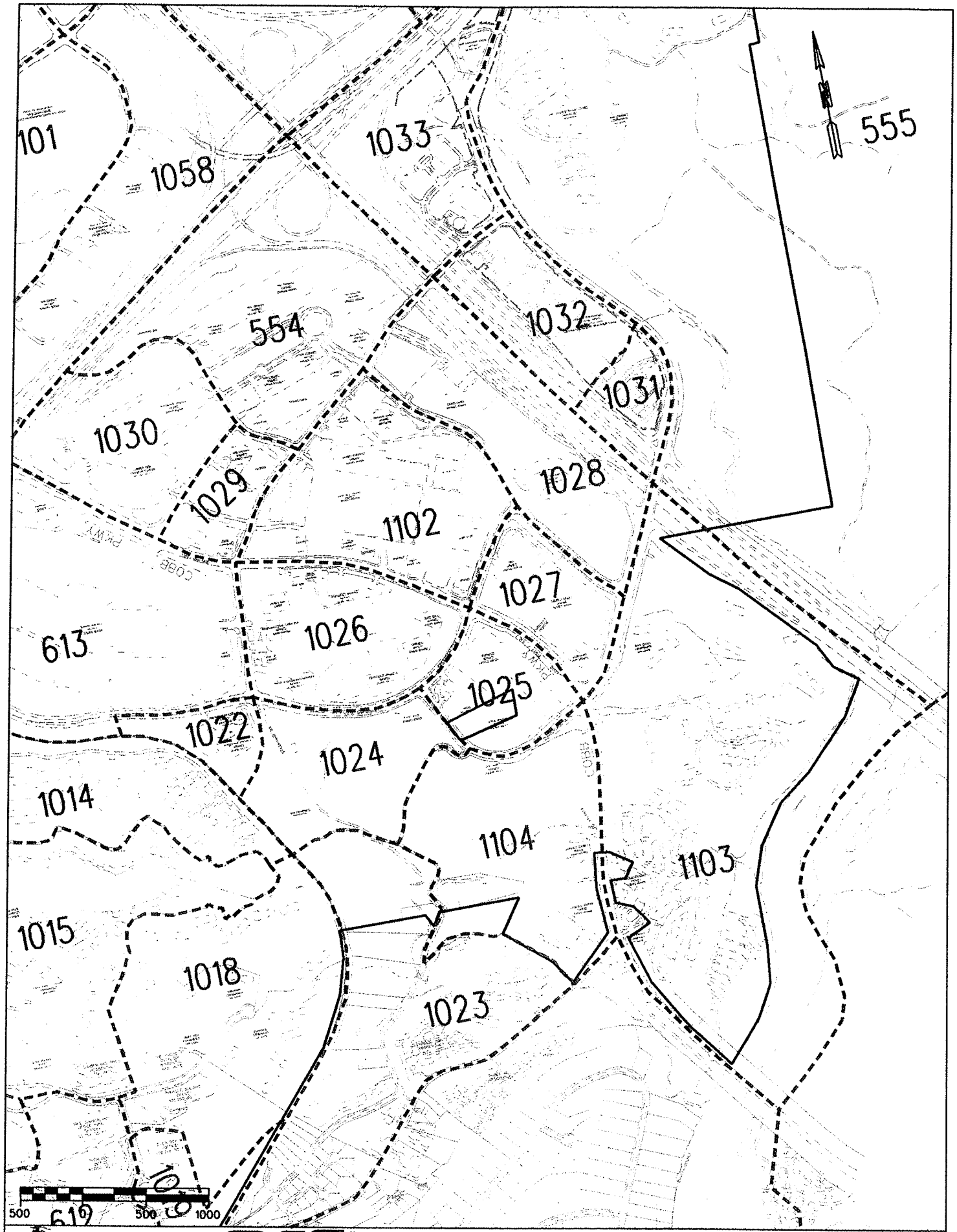
MAP 3

CUMBERLAND AREA TAZ MODIFICATIONS
TRANSIT IMPLEMENTATION STUDY



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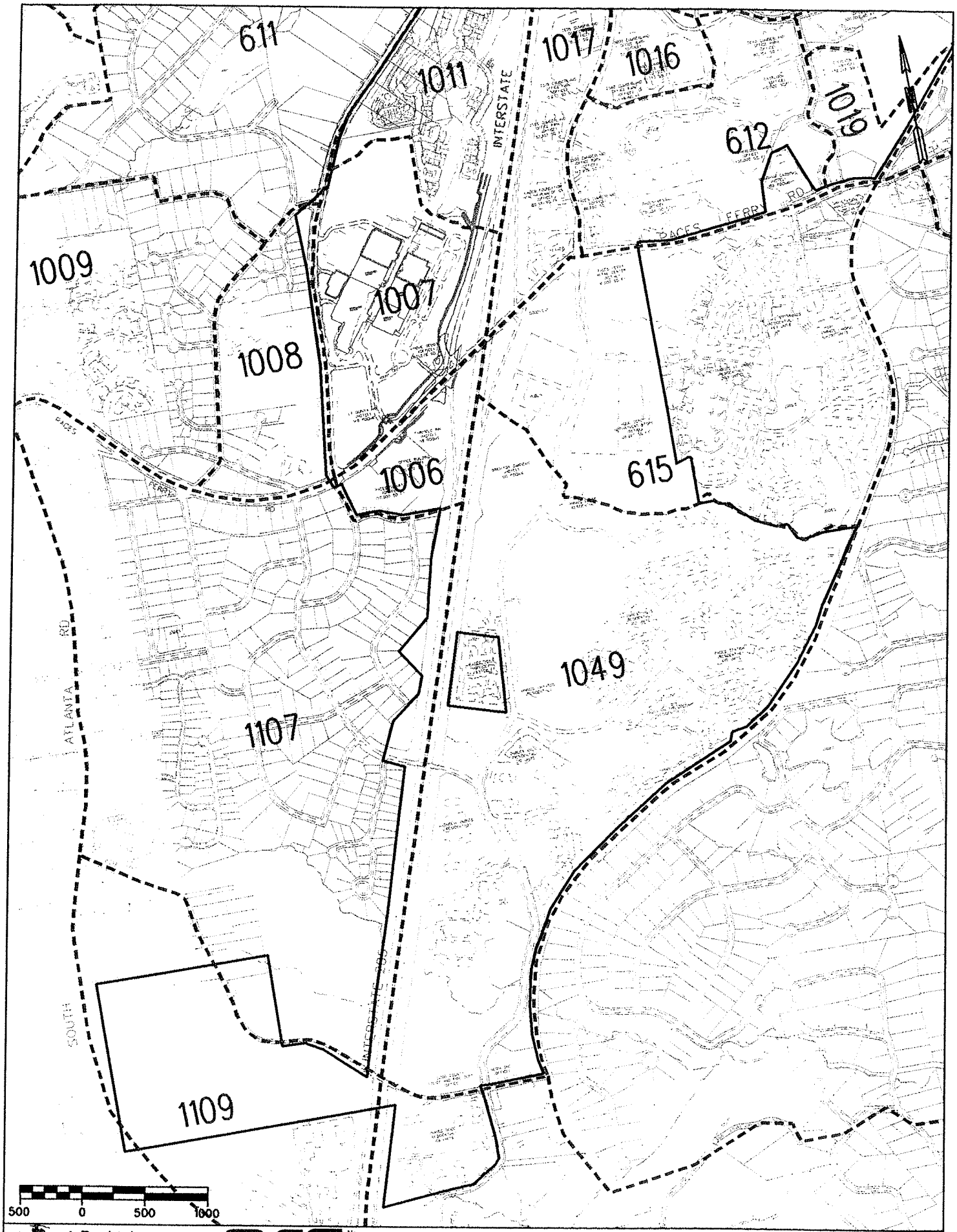
MAP 4

CUMBERLAND AREA TAZ MODIFICATIONS

TRANSIT IMPLEMENTATION STUDY



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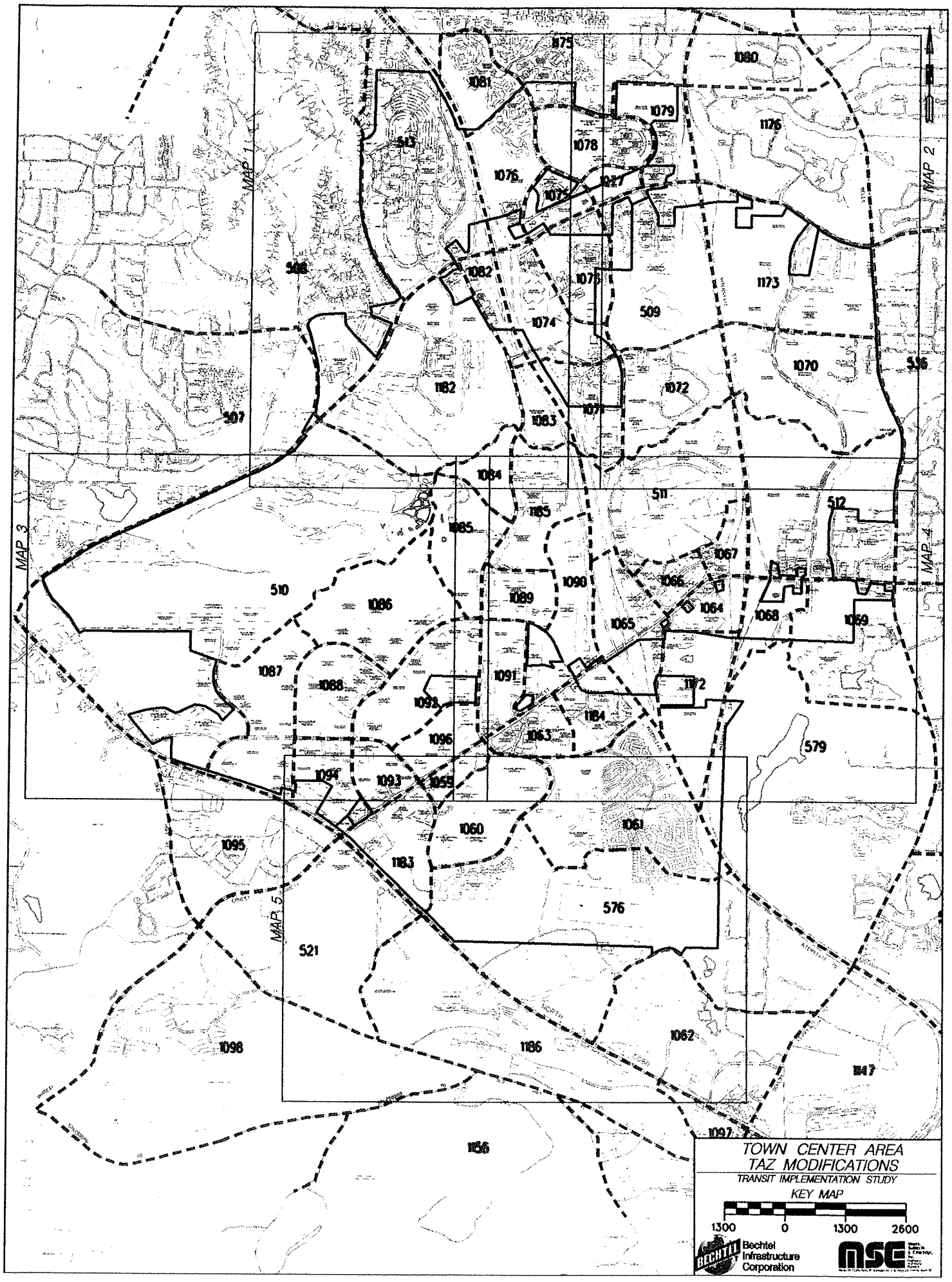
MAP 5

CUMBERLAND AREA TAZ MODIFICATIONS

TRANSIT IMPLEMENTATION STUDY

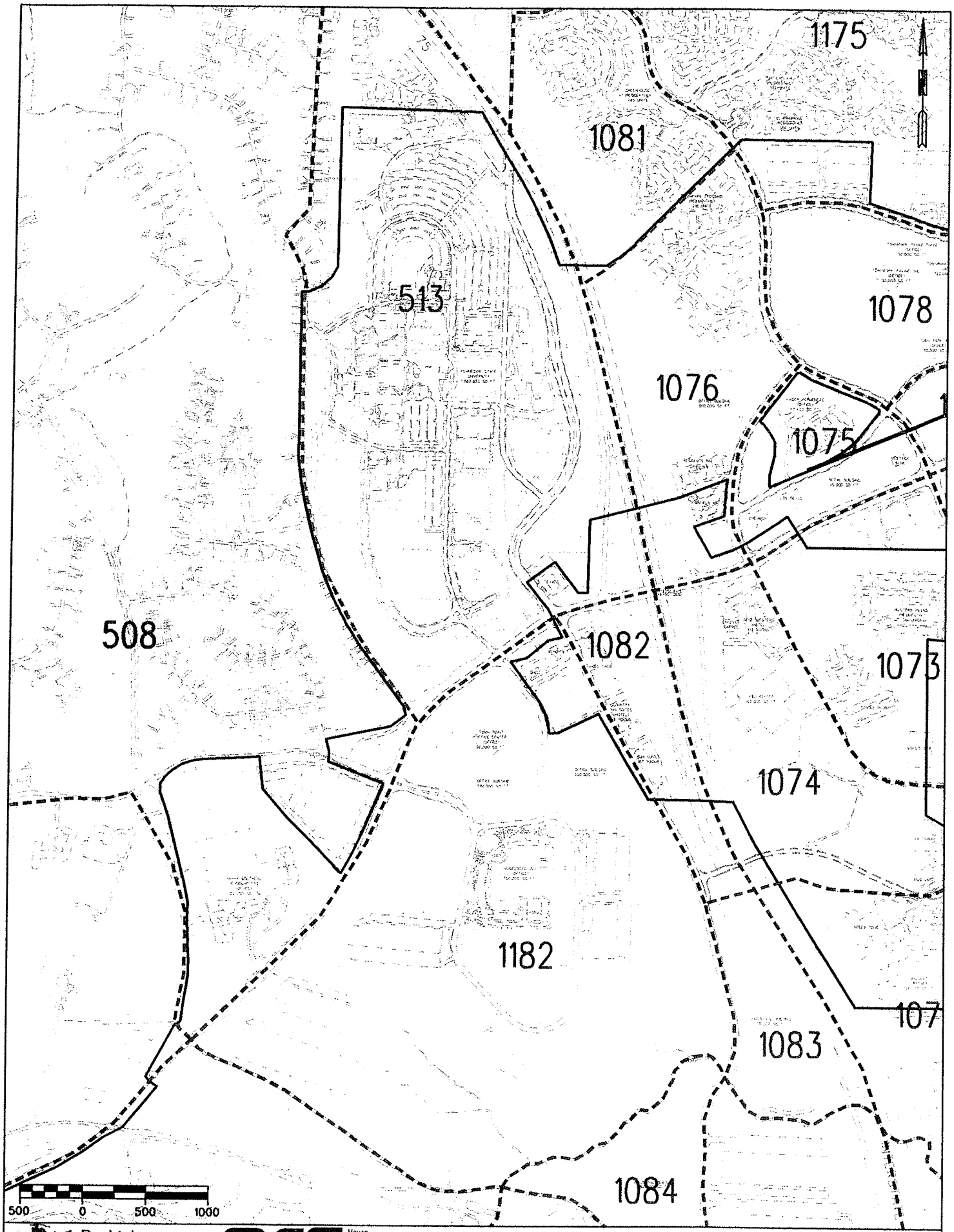


TOWN CENTER AREA
TAZ MODIFICATIONS
TRANSIT IMPLEMENTATION STUDY
KEY MAP

1300 0 1300 2600

Bechtel Infrastructure Corporation

MSE



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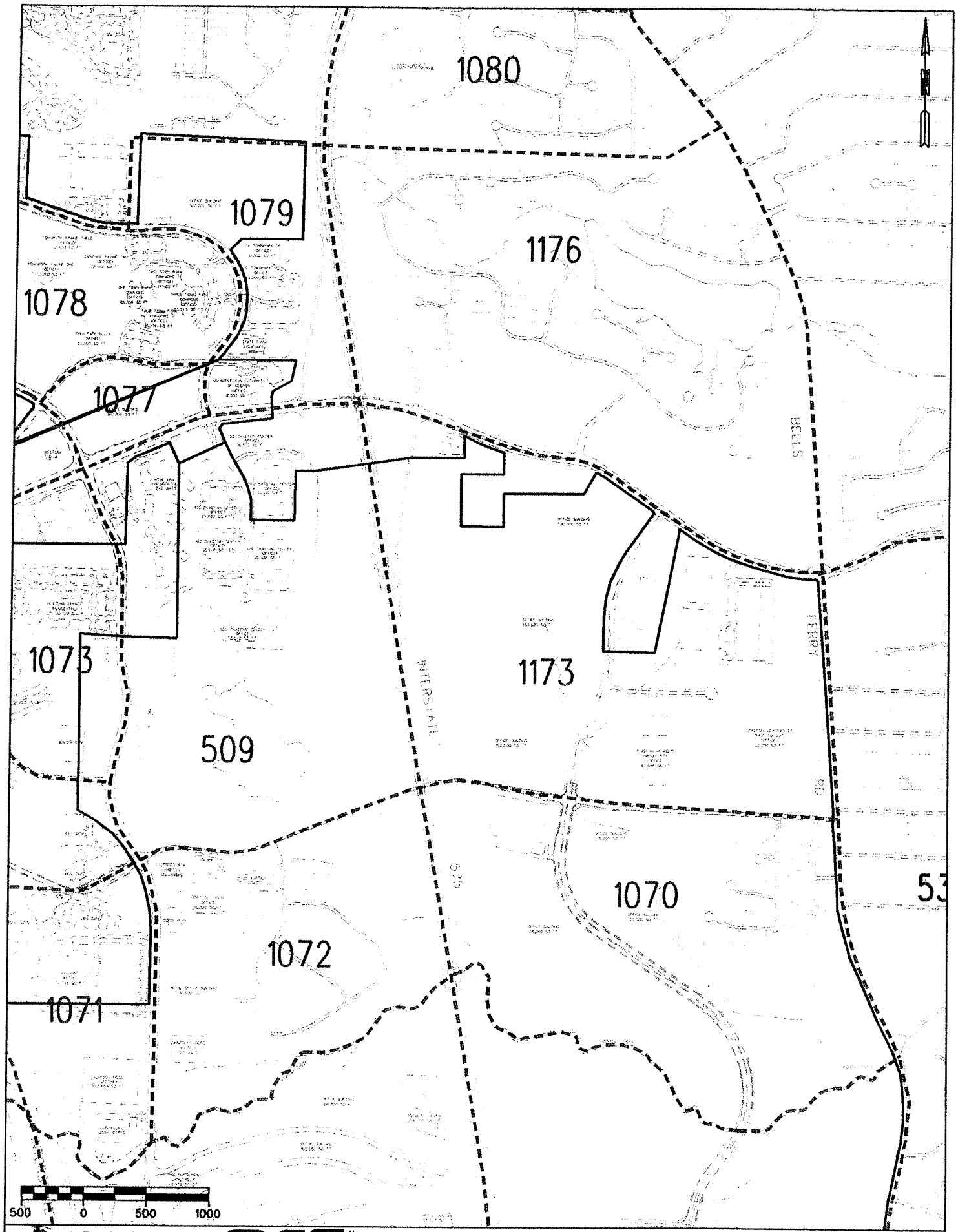
MAP 1

TOWN CENTER AREA TAZ MODIFICATIONS

TRANSIT IMPLEMENTATION STUDY



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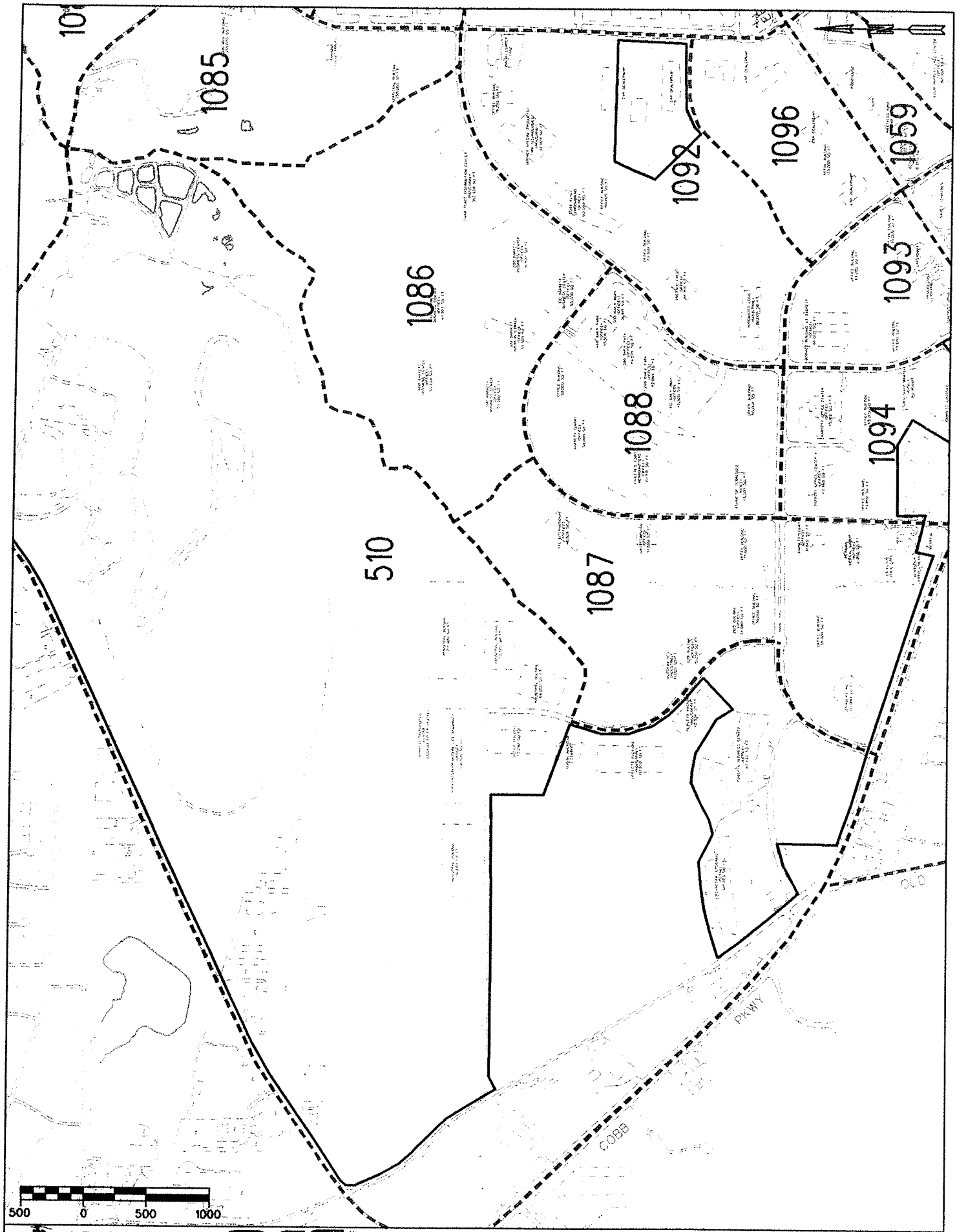
MAP 2

TOWN CENTER AREA TAZ MODIFICATIONS

TRANSIT IMPLEMENTATION STUDY



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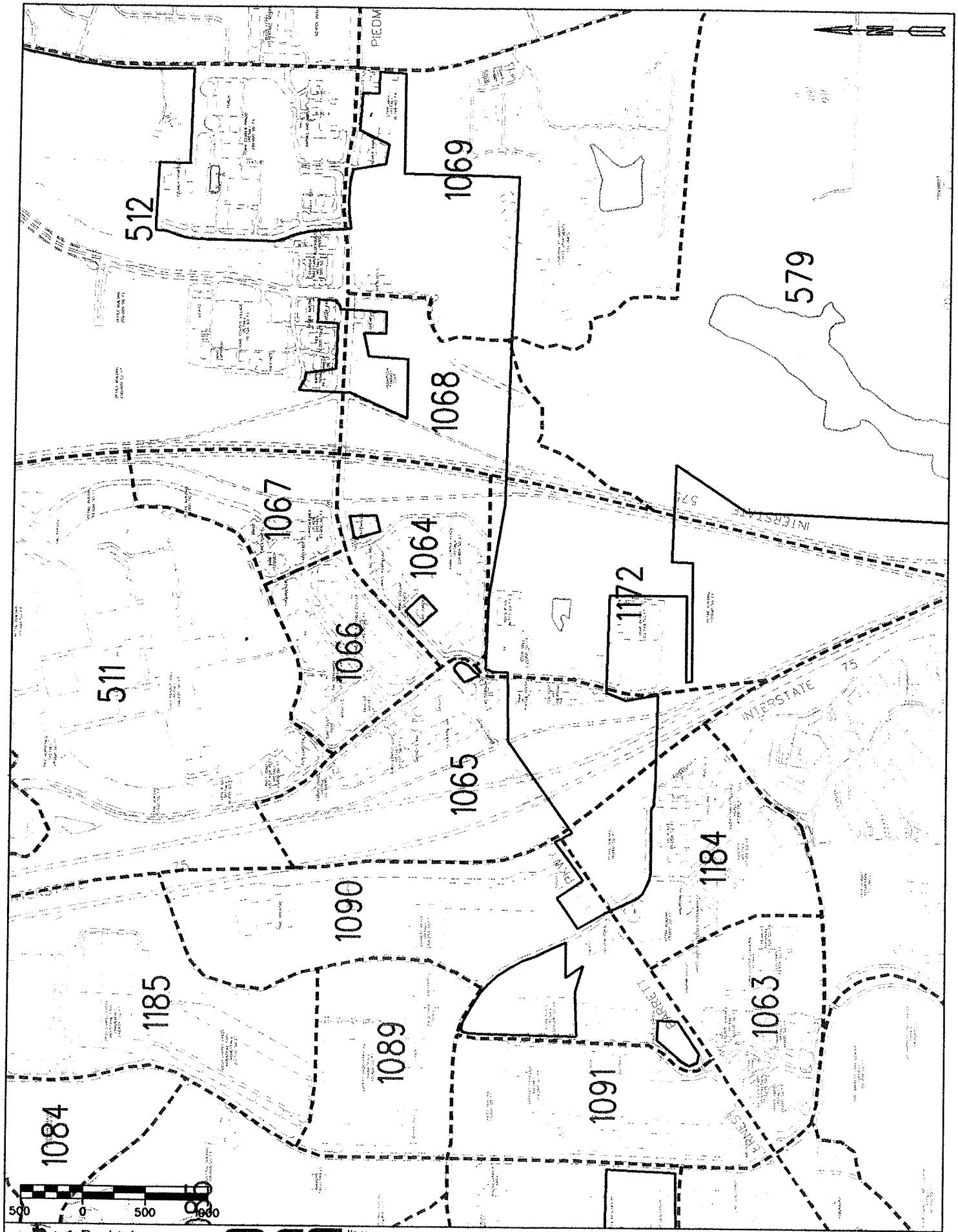
MAP 3

TOWN CENTER AREA TAZ MODIFICATIONS

TRANSIT IMPLEMENTATION STUDY



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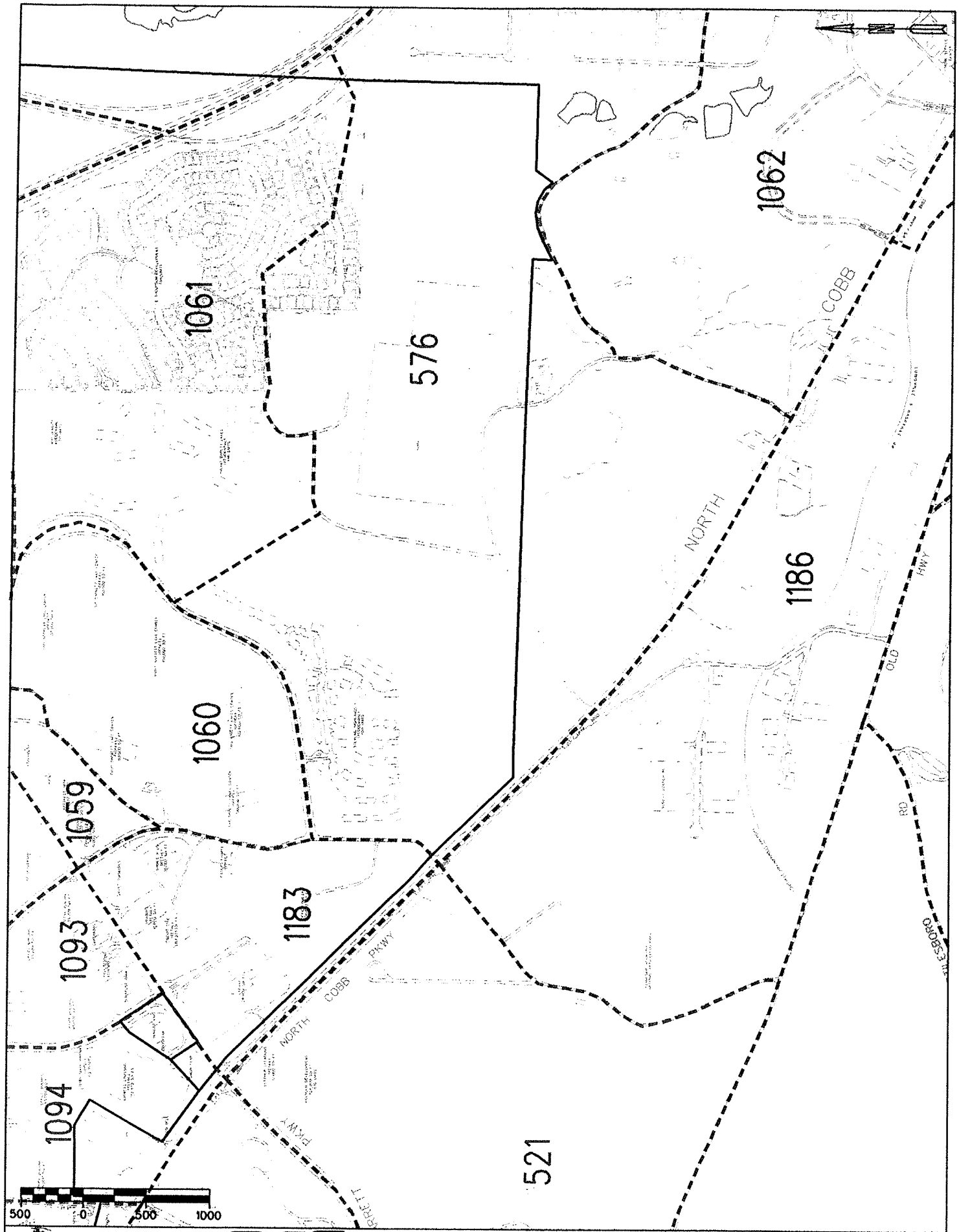
MAP 4

TOWN CENTER AREA TAZ MODIFICATIONS
TRANSIT IMPLEMENTATION STUDY



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MAP 5

TOWN CENTER AREA TAZ MODIFICATIONS

TRANSIT IMPLEMENTATION STUDY

Appendix 4
FTA Templates for Reporting of Criteria/Measures under New Starts Program

Appendix 4 FTA Templates for Reporting of Criteria/Measures Under New Starts Program

The following pages are taken from the Federal Transit Administration document -- Technical Guidance on Section 5309 New Starts Criteria (July 2000).

Figures, tables, and templates are presented here as a detailed summary of information required in submittal of a project for participation under the FTA New Starts program. Figures identify process, technical information, and procedures. Tables present explanations and input data for calculations and technical procedures required to prepare information placed in the required templates. The templates will be prepared in complete format during the federal Alternatives Analysis.

The federal "Alternatives Analysis" study is the next step in the implementation process for the Northwest Corridor LRT System.

Table A4-1 Required Information for New Starts Funding Eligibility

Reporting Item	Section * Where Discussed	Where * Found	Table/ Figure * Template
Figure A4-1 FTAQ Appreoach to New Starts Evaluation and Rating			
Figure A4-2 FTA New Starts Planning and Project Development Process			
General			
Project Description Worksheet	4.1	Appendix D	Template 4.1
Project Maps	4.1.1.1	***	***
Certification of Technical Assumptions	4.2.1.1	Appendix D	Table 4.2
Mobility Improvements			
Travel Time Savings Worksheet	5.1.1	Appendix D	Template5.1
Low Income Households Served Worksheet	5.1.2	Appendix D	Template 5.2
Environmental Benefits			
Change in Criteria Pollutant and Precursor Emissions Worksheet	5.2.2	Appendix D	Template 5.3
Change in Criteria Pollutant and Precursor Emissions Supplemental Worksheet	5.2.2	Appendix D	Template 5.4
Table of Energy Consumption Factors	5.2	Appendix D	Table 5.2
Table of Conversion Factors (BTU Consumption in CO_2)	5.2	Appendix D	Table 5.3
Change in Greenhouse Gas Emissions Worksheet	5.2.3	Appendix D	Template 5.5
Change in Regional Energy Consumption Worksheet	5.2.4	Appendix D	Template 5.6
Current Regional Air Quality Designation	5.2.5	***	***
Operating Efficiencies			
Change in Operating Cost per Passenger Mile Worksheet	5.3.2	Appendix D	Figure 5.7
Cost Effectiveness			
Incremental Cost per Incremental Passenger Worksheet	5.4.2	Appendix D	Figure 5.8
Incremental Cost per Incremental Passenger Supplemental Worksheet	5.4.2	Appendix D	Figure 5.9
Other Factors			
Other Factors, as appropriate	5.5.2	***	***
Transit Supportive Existing Land Use and Future Patterns			
Transit Supportive Existing Land Use and Future Patterns Subfactors Addressed in Each Measurement Factor	6.1	Appendix D	Table 6.1
Assessment of Transit-Supportive Land Use and Future Patterns: Guidance on Documentation and Information to be Submitted	6.1	Appendix D	Table 6.2
Assessment of Transit-Supportive Land Use and Future Patterns: Summary Information and Supporting Documentation Reporting Format	6.4.1.2	Appendix D	Template 6.1
Assessment of Transit-Supportive Existing Land Use and Future Patterns: Quantitative Data Reporting Format	6.4.1.3	Appendix D	Template 6.2
Sample Methodology for Estimating Station Area Population, Households, and Employment			Figure 6.1
Ratings Applied in Assessment of Land Use Criterion			Table 6.3
Suggested Outline: New Starts Project Finance Plan			Table 7.1
Examples of Financial Plan Supporting Documentation			Table 7.2
Additional Supporting Documentation	6.4.1	***	***
Local Financial Commitment			
Project Finance Worksheet	7.1	Appendix D	Template 7.1
Additional Supporting Documentation	7..2 – 7.3	***	***

* *Note: Section, Appendix, and Template numbers refer to numbers in the FTA Technical Guidance on Section 5309 New Starts Criteria (July 2000)*

**** Optional Items*

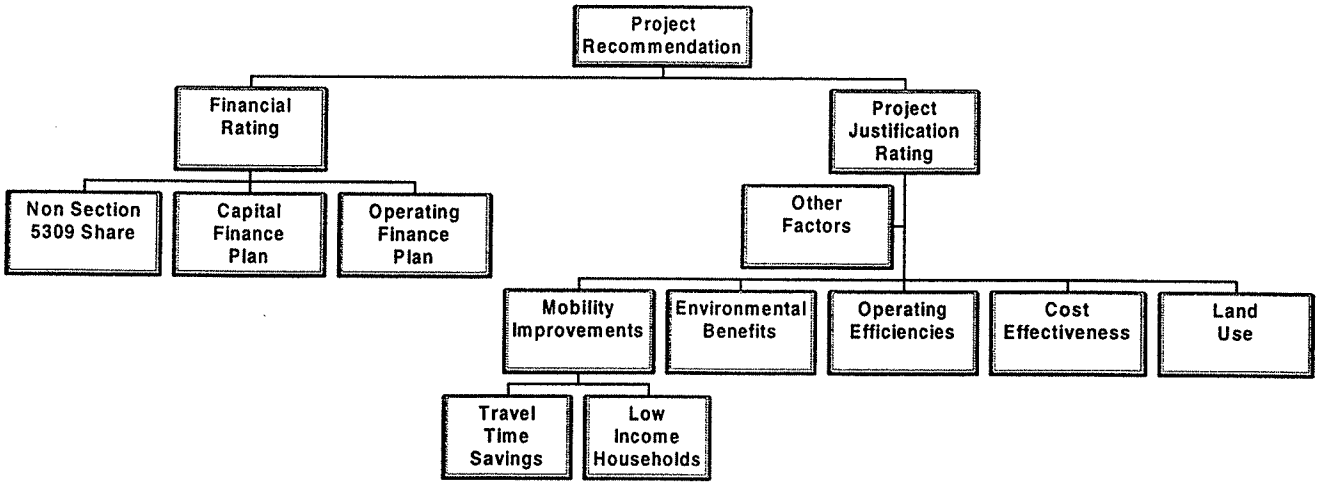


Figure A4-1 FTA Approach to New Starts Evaluation and Rating

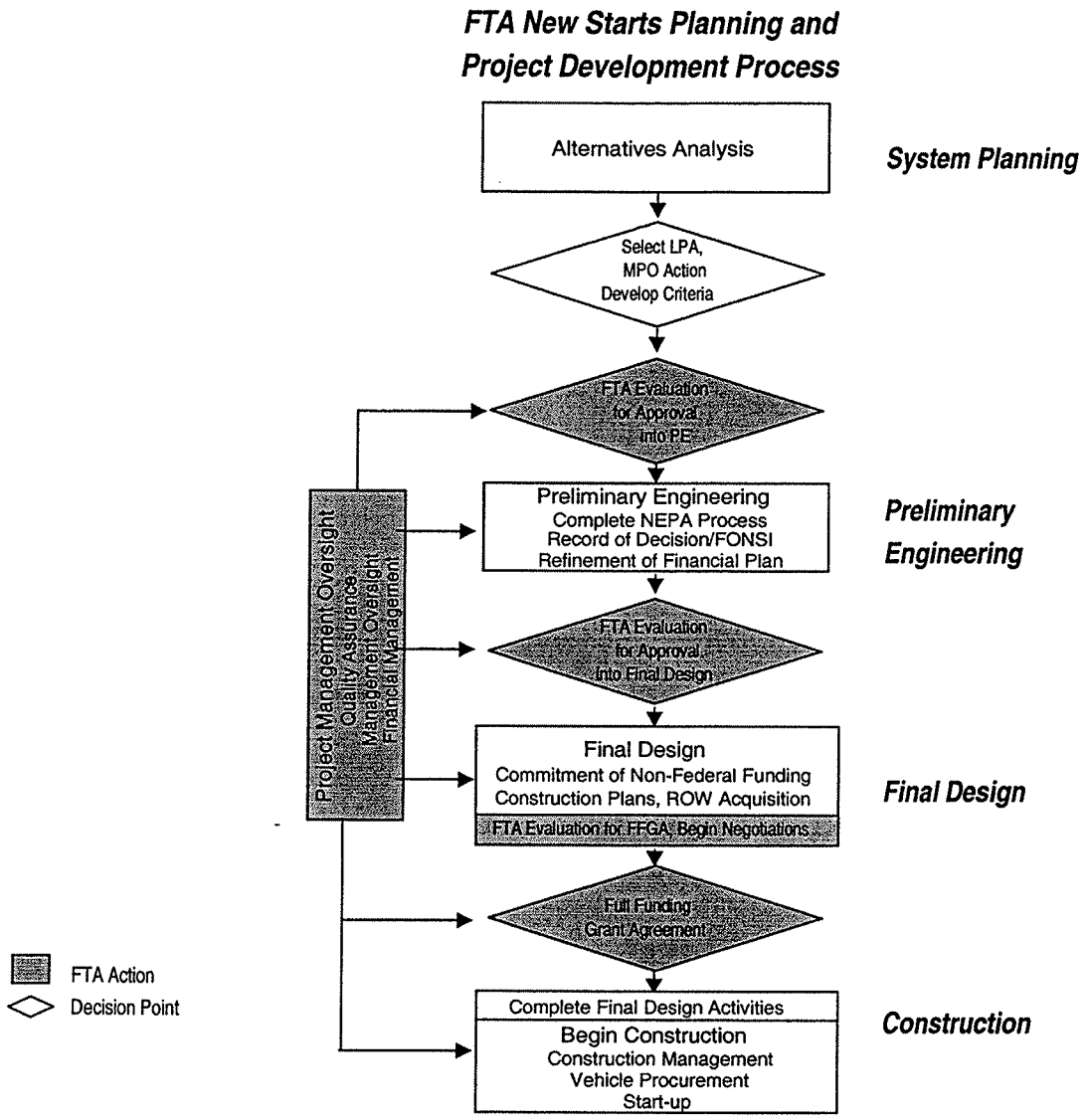


Figure A4-2 FTA New Starts Planning and Project Development Process

Template 4.1 Project Description

PROJECT DESCRIPTION (PAGE 1 OF 6)		
Name of Project		
Participating Agencies		
Lead Agency	Name	
	Contact Person	
	Address	
	Telephone Number	
	Fax Number	
	Email	
Metropolitan Planning Organization	Name	
	Contact Person	
	Address	
	Telephone Number	
	Fax Number	
	Email	
Transit Agency	Name	
	Contact Person	
	Address	
	Telephone Number	
	Fax Number	
	Email	
State Department of Transportation	Name	
	Contact Person	
	Address	
	Telephone Number	
	Fax Number	
	Email	
Other Relevant Agencies	Name	
	Contact Person	
	Address	
	Telephone Number	
	Fax Number	
	Email	

Template 4.1 Project Description (continued)

PROJECT DESCRIPTION (PAGE 2 OF 6)		
Corridor Definition	Length (miles)	
	Mode/Technology	
	Utilization of Existing Tracks/Right of Way	
	Number of Stations	
	Location of Stations	
	Stations with Park and Ride Lots identifying number of parking spaces	
	Stations with major transfer facilities to other modes	
	Number of vehicles/rolling stock	
Interim Segments/Phasing	Length (miles)	
	Mode/Technology	
	Utilization of Existing Tracks/Right of Way	
	Number of Stations	
	Location of Stations	
	Stations with Park and Ride Lots identifying number of parking spaces	
	Stations with major transfer facilities to other modes	
	Number of vehicles/rolling stock	
Type of Alignment by Segment *(number of miles)*	Above grade	
	Below grade	
	At grade	
	Exclusive	
	Mixed Traffic	
Current Status of Existing Right of Way	Ownership – who owns the right of way?	
	Current Use: active freight or passenger service?	
	Abandoned?	
Capital Cost Estimate	Current year dollars	
	Year of Expenditure	

Template 4.1 Project Description (continued)

PROJECT DESCRIPTION (PAGE 3 OF 6)			
Levels of Service	Headways		
	Weekday Peak		
	Weekday Offpeak		
	Weekday Evening		
	Weekend		
	Hours of Service		
	Weekday		
	Weekend		
Travel Demand Estimates	Project Boardings	Opening Year	Forecast Year
	Average Weekday		
	Peak Period		
	Midday		
	Evening		
	Weekend		
	Peak Hour		
	Pk Hr, Peak Direction		
	Peak Load		
	Annual		
	Transit System Linked Trips	Opening Year	Forecast Year
	Average Weekday		
	Annual		
	Annual New Riders		
Project Function	*Summarize or reference documentation addressing the following:*		
	Purpose and Need		
	Goals and Objectives		
	Relationship of project to regional transportation system including:		
	Intermodal access points		
	Impact of project on overall use of regional transportation system		
Corridor Travel Markets	Number of Riders	*Number*	*Percent*
	To Central Business District		
	To Suburban Employment/Activity Centers		
	Work Trips		
	Non work trips		

Template 4.1 Project Description (continued)

PROJECT DESCRIPTION (PAGE 4 OF 6)		
Project Milestones/ Schedule	*Key Milestones in Project Planning and Development*	
	Planning Milestones	*Date*
	Planning Studies Initiated	
	Planning Studies Completed	
	LPA selected	
	LPA included in the financially constrained long range plan	
	Proposed Implementation Schedule	*Anticipated Dates*
	Included in Financially Constrained TIP	
	Initiation of DEIS	
	Completion of DEIS	
	Initiation of FEIS	
	Completion of FEIS	
	FFGA	
	Start-up	
	Public Referenda	
Project Management		
Project Manager	Name	
	Address	
	Phone	
	Fax	
	Email	
Agency CEO	Name	
	Address	
	Phone	
	Fax	
	Email	
Key Staff: Overall New Starts Criteria	Name	
	Address	
	Phone	
	Fax	
	Email	
Key Staff: Ridership Forecasts	Name	
	Address	
	Phone	
	Fax	
	Email	

Template 4.1 Project Description (continued)

PROJECT DESCRIPTION (PAGE 5 OF 6)		
Project Management		
Key Staff: Cost Estimates	Name	
	Address	
	Phone	
	Fax	
	Email	
Key Staff: Environmental Documentation	Name	
	Address	
	Phone	
	Fax	
	Email	
Key Staff: Land Use Assessment	Name	
	Address	
	Phone	
	Fax	
	Email	
Key Staff: Financial Assessment	Name	
	Address	
	Phone	
	Fax	
	Email	
Key Staff: Project Maps	Name	
	Address	
	Phone	
	Fax	
	Email	
Contractors		
Current Prime Contractor	Name	
	Address	
	Phone	
	Fax	
	Email	

Template 4.1 Project Description (continued)

PROJECT DESCRIPTION (PAGE 6 OF 6)		
Prime Contractor: Project Manager	Name	
	Address	
	Phone	
	Fax	
	Email	
Current Subcontractors	Name	
	Address	
	Phone	
	Fax	
	Email	
Previous Planning Consultants	Name	
	Address	
	Phone	
	Fax	
	Email	
	Name	
	Address	
	Phone	
	Fax	
	Email	

Table 4.2
Certification of New Starts Criteria Assumptions.

LEAD AGENCY CERTIFICATION OF TECHNICAL ASSUMPTIONS IN THE DEVELOPMENT OF THE NEW STARTS CRITERIA SUBMISSION

The (*Name of Submitting Agency*), acting in the capacity as lead agency for (*Project Name*), the proposed New Starts project, understands that the Section 5309 New Starts criteria are used to evaluate the worthiness of proposed projects across the nation and that it is important that project sponsors address the criteria in a consistent manner.

As Chief Executive Officer of _(*Name of Submitting Agency*) I hereby certify that (*Name of Submitting Agency*) has followed FTA's Technical Guidance on Section 5309 New Starts Criteria in the preparation of this submission, including:

- Assuming identical highway and transit networks outside the corridor for the No Build, the TSM and the Build alternatives for the travel demand forecasts;
- Defining the build alternative as the project for which we are seeking FTA New Starts funding ;
- Developing ridership forecasts for the New Starts project that are based on the same set of growth forecasts and land use assumptions that are used to estimate ridership for the No Build and TSM alternatives;
- Allocating the population and employment growth on the basis of locally adopted land use plans;
- Analyzing the Build, TSM and No Build Alternatives within the same basic policy setting, i.e., the model assumptions, parameters, and inputs are the same for all alternatives except for changes in the transportation network or other data that are directly attributable to each alternative.
- Reporting the New Starts criteria and specific measures only for the Section 5309 New Starts transit investment and not for the complete build alternative.

Any methods and assumptions that differ from those described in this section have been discussed with and concurred in by FTA.

_____ _____

Chief Executive Officer Date

Template 5.1 Travel Time Savings

Sample Calculation and Documentation

	Steps 1-5		Step 6		
	Total Daily Change (hours)			Total Annual Change (millions of hours)	
	New Start vs. No-Build	New Start vs. TSM	Annual Factor	New Start vs. No-Build	New Start vs. TSM
Daily Travel Time (hrs.)					
Transit Existing Users	11,000	4,000	300	3.3	1.2
Transit New Riders	4,000	1,333	300	1.2	0.4
Auto/Commercial	1,000	333	300	0.3	0.1
Total Daily Travel Time				4.8	1.7

Template 5.2 Mobility Improvements: Low Income Households Sample Calculation and Reporting

Sample Calculation and Documentation

Census Tract	Number of Total Households	Number of Low-Income Households	Fraction of Tract within 1/2 mi. of New Start Boarding Points	Number of Total HH's within 1/2 Mile of Boarding Points	Number of Low-Inc. HH's within 1/2 Mile of Boarding Points
For each station on New Start Facility					
Station 1					
1001	5	2	1.00	5	2
1002.01	252	64	1.00	252	64
1002.03	61	2	0.83	51	2
1003	90	14	0.45	41	6
Subtotal	**408**	**82**		**348**	**74**
Station 2					
1025	156	26	1.00	156	26
1026	542	93	1.00	542	93
1027	338	67	0.50	169	34
Subtotal	**698**	**119**		**867**	**153**
Station 3, etc.					
1030.01	151	14	0.53	80	7
1030.02	267	49	0.40	107	20
1041	359	47	1.00	359	47
1042	88	11	0.65	57	7
Subtotal	**865**	**121**		**603**	**81**
Total for All Boarding Points	**1971**	**322**		**1818**	**308**
Note: Attach map showing census tracts and transit system	Source: U.S. Census Data: Total Households	Source: U.S. Census Data: Households with "income below poverty level"	Source: GIS or visual estimation	Calculation: Number of Total Households * Fraction within 1/2 mile	Calculation: Number of Low-Income Households * Fraction within 1/2 mile

Template 5.3 Environmental Benefits: Change in Criteria Pollutant and Precursor Emissions

Sample Calculation and Reporting

	Regional VMT/year (millions)			Emission Factor (g/mi)				Annual Emissions (tons)												Change in Emissions (tons per year)							
								No-Build				TSM				New Start				New Start vs. No-Build				New Start vs. TSM			
Vehicle Class	No-Build	TSM	New Start	CO	NOx	VOC	PM-10	CO	NOx	VOC	PM-10	CO	NOx	VOC	PM-10	CO	NOx	VOC	PM-10	CO	NOx	VOC	PM-10	CO	NOx	VOC	PM-10
Passenger Veh. (LDV/LDT)																											
Heavy-Duty Vehicle																											
Bus/Diesel																											
Bus/CNG																											
Bus/LPG																											
Bus/M85 or E85																											
Commuter Rail/ Diesel																											
Total																											

Note:
Private vehicle classes should be consistent with regional travel model -- examples are shown here.

Source:
- Private vehicles from regional travel demand model
- Bus and rail from system operating plans

Source:
- Private vehicles from MOBILE or EMFAC emission factor model
- Diesel bus from MOBILE HDDV emission factor
- Alt. fuel buses from diesel EF's and conversion factors given in text
- Rail: See supplemental worksheet

Calculation:
Annual Emissions = VMT * 1,000,000 * Emission Factor / 909,000 g/ton

Calculation:
Change in Emissions = New Start Emissions - No-Build Emissions

Calculation:
Change in Emissions = New Start Emissions - TSM Emissions

Template 5.4 Environmental Benefits: Change in Criteria Pollutant and Precursor Emissions

Sample Calculation and Reporting

Rail Diesel Locomotive Type	Emission Rate (g/gal)				Fuel Consumption	Operations		Total Annual Emissions (tons)			
	CO	NOx	VOC	PM-10	(gal/veh-mi)	total vehicle-miles (forecast year)	Percent of veh-mi. by locomotive type	CO	NOx	VOC	PM-10
Default (Pre-Standards)	10.4	31.2	281	7.07	0.719	4,225,000	100%	34.8	104.3	939.1	23.6
Other (1)							0%	0.0	0.0	0.0	0.0
Other (2)								0.0	0.0	0.0	0.0
etc.								0.0	0.0	0.0	0.0
Total								34.8	104.3	939.1	23.6

Table 5.2
Table of Energy Consumption Factors

Table of Energy Consumption Factors	
Passenger Vehicles (auto, van, light truck)	6,233 BTU/vehicle mile
Transit Bus (all vehicle types)	41,655 BTU/vehicle mile
Rail (light or heavy)	77,739 BTU/vehicle mile
Rail (commuter)	100,000 BTU/vehicle mile

Sources: Oak Ridge National Laboratory. Transportation Energy Book: Edition 16, 1996.

Table 5-3
Table of Conversion Factors (BTU consumption to CO_2)

Fuel Type	Conversion Factor (tons CO_2/million BTU)
Gasoline	0.0765
Diesel	0.0788
CNG	0.0585
LPG	0.0678
M85/E85	0.0765
Electricity	0.0665

Sources: Cambridge Systematics, Inc. based on data from the Energy Information Administration, U.S. Department of Energy. (See Appendix G.)

Template 5.5 Environmental Benefits: Change in Greenhouse Gas Emissions

Sample Calculation and Reporting

Fuel Type	Change in BTU/year		CO2 consumption (tons CO2/million BTU)	Change in CO2 Emissions/year	
	New Start vs. No-Build	New Start vs. TSM		New Start vs. No-Build	New Start vs. TSM
Gasoline	-3,104,034	-1,940,021	0.0765	-237,459	-148,412
Diesel	434,085	361,189	0.0788	34,184	28,444
CNG	58,317	43,738	0.0585	3,412	2,559
LPG			0.0678		
M85/E85			0.0765		
Electricity			0.0665		
Total				-199,863	-117,409

Source:
Section 5.2, Calculation of Change in BTU Consumption

Source:
Calculations by Cambridge Systematics, Inc. based on Energy Information Administration (1996) and Delucchi (1996).

Calculation:
Change in CO2/year = Change in BTU/year * Tons CO2/million BTU / 1,000,000

Template 5.6 Change in Regional Energy Consumption

Sample Calculation and Reporting

Veh. Class	Regional VMT/year			Change in VMT/year		Energy Consumption (BTU/veh-mi)	Change in BTU/year	
	No-Build	TSM	New Start	New Start vs. No-Build	New Start vs. TSM		New Start vs. No-Build	New Start vs. TSM
Passenger Veh. (LDV/LDT)	12,450	12,263	11,952	-498	-311	6,233	-3,104,034	-1,938,463
Heavy-Duty Vehicle	623	623	623	0	0	22,046	0	0
Bus/Diesel	35.0	36.8	42.0	7	5	41,655	291,585	216,606
Bus/CNG	7.0	7.4	8.4	1.4	1.0	41,655	58,317	41,655
Bus/LPG						41,655		
Bus/M85 or E85						41,655		
Bus/Electric						41,655		
Light or Heavy Rail/Electric						77,739		
Commuter Rail/ Diesel	4.2	4.2	5.7	1.50	1.50	100,000	150,000	150,000
Commuter Rail/ Electric						100,000		
Total							-2,604,132	-1,530,202

Note:
For dual-mode buses, allocate total VMT by percentage used for each fuel type (i.e. 50% diesel/ 50% electric)

Source:
- Passenger and HDV from Regional Travel Demand Model
- Bus and rail from system operating plans

Calculation:
- New Start vs. No-Build = New Start VMT/year - No-Build VMT/year
- New Start vs. TSM = New Start VMT/year - TSM VMT/year

Source:
Transportation Energy Data Book Edition 16 (Bus factors assumed same for alternative fuels as for diesel)
Note:
Transit agencies may provide their own estimates for transit vehicle BTU/mi factors. If so, documentation should be provided.

Calculation:
Change in BTU/year = Change in VMT/year * BTU/veh-mi

Figure 5.7 Operating Efficiencies: Change in Operating Cost per Passenger Mile

Sample Calculation and Reporting

		Alternative			Comparison		
Line	Factor	No-Build	TSM	New Start	New Start vs. No-Build	New Start vs. TSM	Source/Calculation
1	System Annual Operating Cost (millions)	$ 157.0	$ 165.0	$ 190.0			~~Source~~: Transit system operating costs, current and projected
2	System Annual Passenger-Miles (millions)	448	474	555			~~Source~~: Forecast system passenger-miles from regional travel model or other ridership projection model
3	Cost per Passenger-Mile	$ 0.35	$ 0.35	$ 0.34	$ (0.008)	$ (0.006)	~~Calculation~~: Annual Operating Cost / Annual Passenger-Miles (Line 1/ Line 2)

~~Calculation (Line 3):~~
- New Start vs. No-Build: subtract No-Build from New Start
- New Start vs. TSM: subtract TSM from New Start

Figure 5.8 Cost Effectiveness: Incremental Cost per Incremental Passenger

Sample Calculation and Reporting

		Alternative			Comparison		
Line	Factor	No-Build	TSM	New Start	New Start vs. No-Build	New Start vs. TSM	Source/Calculation
1	Annualized Capital Cost (current year dollars)	$0.0	$25.1	$38.6			Source: New Start or TSM capital cost estimate; annualized based on factors in Appendix G. Include documentation as shown on attached worksheet (Figure 4.16(a)).
2	Total Systemwide Annual Operating and Maintenance Cost (current year dollars)	$190.1	$198.4	$212.4			Source: Systemwide operating and maintenance cost estimates for no-build, TSM, and New Start alternatives (attach documentation).
3	Total Annualized Cost in Forecast Year (current year dollars)	$190.1	$223.5	$251.0			Calculation: Total Cost = Annualized Capital Cost + Annual Operating Cost (Line 1 + Line 2)
4	Total Annual Ridership (forecast year)	70	71	75			Source: Regional travel demand model (attach documentation of factors to annualize daily ridership, if applicable)
5	Incremental Annualized Cost				$60.9	$27.5	Calculation: Subtract Total Annualized Costs (Line 3) for: - No-Build from New Start alternative - No-Build from TSM alternative
6	Incremental Annual Ridership				5	4	Calculation: Subtract Total Annual Ridership (Line 4) for: - No-Build from New Start alternative - No-Build from TSM alternative
7	Cost-Effectiveness (Incremental Cost per New Rider)				$ 12.18	$ 6.88	Calculation: Divide Incremental Annual Cost (Line 5) by Incremental Annual Ridership (Line 6) for: -New Start vs. No-Build alternative -New Start vs. TSM alternative

Figure 5.9 Cost Effectiveness: Incremental Cost per Incremental Passenger Supplemental Worksheet

Sample Calculations and Reporting

Alternative:	New Start,			
Item	**Useful Life (Years)**	**Annualization Factor**	**Total Cost**	**Annualized Cost**
Right-of-way	100	0.070	$ 41.7	$ 2.92
Right-of-way preparation (major grading, etc.)	100	0.070	$ 32.5	$ 2.28
Structures	30	0.081	$ 231.0	$ 18.71
Trackwork	30	0.081	$ 40.4	$ 3.27
Signals, electrification	30	0.081	$ 52.6	$ 4.26
Pavement, parking lots, grade crossings	20	0.094	$ 23.7	$ 2.23
Rail vehicles	25	0.086	$ 57.9	$ 4.98
Buses	12	0.126		$ -
Contingencies	- item-specific			
Engineering, construction management	allocate proportionally among other items			
Total				$ 38.6
		~~Source~~ Based on 7 percent discount rate and assumed useful life of item	~~Source~~ New Start or TSM capital cost estimates	~~Calculation~~ Annual Cost = Total Cost * Annualization Factor

Table 6.1
Transit-Supportive Existing Land Use and Future Patterns
Subfactors Addressed in Assessment of Each Measurement Factor

1. **Existing Land Use**
- Existing corridor and station area development
- Existing corridor and station area development character
- Existing corridor and station area parking supply and existing regional parking policies

2. Containment of Sprawl
- Planned density and market trends for development within corridor and region
- Growth management policies

3. Transit-Supportive Corridor Policies
- Plans and policies to increase corridor and station area development
- Plans and policies to enhance transit-friendly character of corridor and station area development
- Parking policies

4. Supportive Zoning Regulations Near Transit Stations
- Zoning ordinances that support increased development density in transit station areas
- Zoning ordinances that enhance transit-oriented character of station area development
- Zoning allowances for reduced parking and traffic mitigation

5. Tools to Implement Land Use Policies
- Endorsement and participation of public agencies, organizations and the private sector in development and planning process
- Tools and actions to promote transit-oriented development
- Involvement of development community in supporting station area plans
- Public involvement in corridor and station area planning

6. Performance of Land Use Policies
- Demonstrated cases of development affected by transit-oriented policies
- Corridor development targets
- Station area development proposals and status

7. Other Land Use Considerations (Optional)
- Other unidentified or unusual circumstances, conditions, or constraints under which the transit agency operates and which influence local and regional land use policies, plans, and implementation Some *"Other Land Use Considerations"* may be: topography; brownfields redevelopment; central city redevelopment; designation as a Federal Enterprise Zone/Empowerment Community; type and condition of market (e.g., resort, seasonal, etc.); intermodal connections; unique project purposes; exceptional examples of historical,, environmental or community preservation and enhancements; or other factors

Table 6.2
Assessment of Transit-Supportive Existing Land Use and Future Patterns: Guidance on Documentation and Information to be Submitted

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion
1. Existing Land Use	
Existing corridor and station area development (population, employment, high trip generators)	▪ Corridor and station area population, housing units, and employment (Provide information in template form, Figure 6.2.) ▪ Listing and description of high trip generators (examples include colleges/universities, stadiums/ arenas, hospitals/medical centers, shopping centers, performing arts centers, and other significant trip generators)
Existing corridor and station area development character (land use mix, pedestrian facilities, pedestrian site planning)	▪ Description of character of existing land use mix and pedestrian environment in corridor and station areas ▪ Station area maps with uses ▪ Station area maps with pedestrian facilities identified and building footprints shown ▪ Ground-level or aerial photographs of station areas
Existing corridor and station area parking supply and existing regional parking policies	▪ Existing parking spaces per square footage of commercial development and/or per dwelling unit ▪ Parking spaces per employee in the CBD and/or other major employment centers ▪ Area within ½ mile of station area devoted to parking ▪ Description of regional parking policies/requirements[1]

1 Parking policies and practices discussed under measurement factor 3, Transit Supportive Corridor Policies, should be referenced here but not described in detail. Full information on these policies and practices should be provided in the discussion of measurement factor 3.

Table 6.2
Assessment of Transit-Supportive Existing Land Use and Future Patterns: Guidance on Documentation and Information to be Submitted (continued)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion
2. Containment of Sprawl	
Planned density and market trends for development within corridor and region	▪ Population and employment information in template form, Template 6.2 ▪ Descriptions of infill and redevelopment plans in corridor and station areas, policies to attract and focus development in corridor and station areas2 ▪ Regional and corridor economic conditions and market trends for development ▪ For areas with existing transit, describe development market trends in existing corridors and station areas ▪ Identify locations of major employment centers in the region, and expected growth in these centers
Growth management policies	▪ Regional, city, or county comprehensive growth management laws, ordinances, agreements, or plans ▪ Comprehensive plans or capital improvement plans that give priority to infill development, provide for opportunities for high density redevelopment, limit opportunity for low density suburban development, etc.

[2]Infill and redevelopment plans and policies discussed under factor 3, Transit Supportive Corridor Policies, factor 4, Supportive Zoning Regulations Near Transit Stations, and factor 5, Tools to Implement Land Use Policies, should be referenced here but not described in detail. Full information on these policies and actions should be provided in the discussions of factors 3, 4, and 5.

Table 6.2
Assessment of Transit-Supportive Existing Land Use and Future Patterns : Guidance on Documentation and Information to be Submitted (continued)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion
3. Transit Supportive Corridor Policies	
Plans and policies to increase corridor and station area development (density increases, infill development policies, targeted employment development policies)	▪ Adopted city, county, and regional plans and policies and private sector plans and initiatives that promote development in the transit corridor and station areas. Plans may include general plans, specific plans (subarea, station area, etc.), redevelopment project plans, or other district plans ▪ Examples of transit-supportive policies include: general policy statements in support of transit as a principal mode of transportation within the corridor; policies that support and promote the use of transit; policies/plans that provide for high density development within the corridor and station areas; and policies that support changes to zoning within the corridor and station areas.

Table 6.2
Assessment of Transit-Supportive Existing Land Use and Future Patterns - Guidance on Documentation and Information to be Submitted (continued)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion
3. Transit Supportive Corridor Policies	
Plans and policies to enhance transit-friendly character of corridor and station area development (increase land use mix, promotion of housing and transit-oriented retail, expand pedestrian facilities, pedestrian site planning)	▪ Elements of adopted city, county, and regional plans and policies that enhance the transit-friendly character of corridor and station area development. ▪ Policies to promote mixed-use projects ▪ Policies to promote housing and transit-oriented retail ▪ Policies that allow/promote vertical zoning within the corridor ▪ Requirements for sidewalks and other pedestrian facility development plans for station areas ▪ Street design guidelines or manuals (with special mention of pedestrian and transit-oriented street design) ▪ Façade improvement programs ▪ Capital improvement programs to enhance pedestrian-friendly design in station areas ▪ Funds to support transit-oriented plans ▪ Private sector plans and initiatives supportive of the public plans and policies listed above
Parking policies (allowances for reductions in parking requirements and traffic mitigation requirements for development near station areas, plans for park-and-ride lots, parking management)	▪ Policies to reduce parking requirements or cap parking in station areas ▪ Policies establishing maximum allowable parking for new development in areas served by transit ▪ Shared parking allowances ▪ Mandatory minimum cost for parking in areas served by transit ▪ Parking taxes

Table 6.2
Assessment of Transit-Supportive Existing Land Use and Future Patterns: Guidance on Documentation and Information to be Submitted (continued)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion
4. Supportive Zoning Regulations Near Transit Stations	
Zoning ordinances that support increased development density in transit station areas	▪ General zoning ordinances ▪ Recent changes to zoning to allow or encourage transit-supportive development ▪ Transit overlay zoning ▪ Zoning incentives for increased development in station areas (density bonuses, housing fund subsidies, regulation relaxation, expedited zoning review, etc.)
Zoning ordinances that enhance transit-oriented character of station area development (zoning support for housing and retail, pedestrian oriented urban design and site planning guidelines and regulations, requirements for pedestrian, bicycle, and transit facilities)	▪ Zoning regulations regarding placement of building footprints, pedestrian facilities, façade treatments, etc. ▪ Architectural design guidelines ▪ Urban / Street design guidelines (lighting, street furniture, sidewalk width, etc.)
Zoning allowances for reduced parking and traffic mitigation	▪ Zoning ordinances providing reduced parking requirements for development near transit stations ▪ Zoning requirements for traffic mitigation and promotion of transit use for the region and for station areas

Table 6.2
Assessment of Transit-Supportive Existing Land Use and Future Patterns: Guidance on Documentation and Information to be Submitted (continued)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion
5. Tools to Implement Land Use Policies	
Endorsement and participation of public agencies, organizations and the private sector in development and planning process	▪ Plans and actions of public agencies, local jurisdictions, and other organizations (including Chambers of Commerce, professional development groups, citizen coalitions, etc.), as well as the private/commercial sector, in support of transit development ▪ Inter-local agreements, resolutions, letters of endorsement from county, city, and state agencies ▪ Promotion and outreach activities in support of station-area planning, growth management, and transit-oriented development
Tools and actions to promote transit-oriented development	▪ Programs that promote or provide incentives for transit- oriented development such as tax increment financing zones, tax abatement programs, and transit-oriented loan support programs ▪ Other economic development and revitalization strategies for station areas or within the corridor
Involvement of development community in supporting station area plans	▪ Outreach, education, and involvement activities targeted at developers ▪ Transit-oriented market studies ▪ Joint development programs and proposals ▪ Other development proposals ▪ Letters of endorsement from the local business/development community
Public involvement in corridor and station-area planning	▪ Description of public involvement process ▪ Public outreach materials and brochures

Table 6.2
Assessment of Transit-Supportive Existing Land Use and Future Patterns: Guidance on Documentation and Information to be Submitted (continued)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion
6. Performance of Land Use Policies	
Demonstrated cases of developments affected by transit-oriented policies	▪ Descriptions of transit-oriented design changes ▪ Descriptions of development increases due to policies to support station area development
Corridor development targets	▪ Plans and targets for development or redevelopment within the corridor
Station area development proposals and status	▪ Descriptions and plans for new development, including joint development proposals, with square footage and uses described and expected date of completion

Table 6.2
Assessment of Transit-Supportive Existing Land Use and Future Patterns: Guidance on Documentation and Information to be Submitted (continued)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion
7. Other Land Use Considerations (Optional)	
Other unidentified or unusual circumstances, conditions, or constraints under which the transit agency operates and which influence local and regional land use policies, plans, and implementation	▪ Topography, brownfields redevelopment, central city redevelopment, designation as a Federal Enterprise Zone/Empowerment Community, type and condition of market (e.g., resort, seasonal, etc.), intermodal connections, unique project purpose, exceptional examples of historical, environmental or community preservation and enhancement, or other factors

Template 6.1 Assessment of Transit-Supportive Existing Land Use and Future Patterns

Summary Information and Supporting Documentation Reporting Format

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion (See Table 6-2.)
1. Existing Land Use	
Existing corridor and station area development	
Existing corridor and station area development character	
Existing corridor and station area parking supply and existing regional parking policies	

Template 6.1 Assessment of Transit-Supportive Existing Land Use and Future Patterns - Summary Information and Supporting Documentation Reporting Format (Con't.)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion (See Table 6.2)
2. Containment of Sprawl	
Planned density and market trends for development within corridor and region	
Growth management policies	

Template 6.1 Assessment of Transit-Supportive Existing Land Use and Future Patterns - Summary Information and Supporting Documentation Reporting Format (Con't.)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion (See Table 6.2)
3. Transit Supportive Corridor Policies	
Plans and policies to increase corridor and station area development	
Plans and policies to enhance corridor and transit-friendly character of station area development	
Parking policies	

Template 6.1 Assessment of Transit-Supportive Existing Land Use and Future Patterns - Summary Information and Supporting Documentation Reporting Format (Con't.)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion (See Table 6.2.)
4. Supportive Zoning Regulations Near Transit Stations	
Zoning ordinances that support increased development density in transit station areas	
Zoning ordinances that enhance transit-oriented character of station area development	
Zoning allowances for reduced parking and traffic mitigation	

Template 6.1 Assessment of Transit-Supportive Existing Land Use and Future Patterns - Summary Information and Supporting Documentation Reporting Format (Con't.)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion (See Table 6.2.)
5. Tools to Implement Land Use Policies	
Endorsement and participation of public agencies, organizations and the private sector in development and planning process	
Tools and actions to promote transit-oriented development	
Involvement of development community in supporting station area plans	
Public involvement in corridor and station-area planning	

Template 6.1 Assessment of Transit-Supportive Existing Land Use and Future Patterns - Summary Information and Supporting Documentation Reporting Format (Con't.)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion (See Table 6.2.)
6. Performance of Land Use Policies	
Demonstrated cases of developments affected by transit-oriented policies	
Corridor development targets	
Station area development proposals and status	

Template 6.1 Assessment of Transit-Supportive Existing Land Use and Future Patterns - Summary Information and Supporting Documentation Reporting Format (Con't.)

Information Requested	Reference to Local Documentation Supporting New Start Land Use Criterion (See Table 6.2.)
7. Other Land Use Considerations (Optional)	
Otherwise unidentified circumstances, conditions, or constraints under which the transit agency operates and which influence local and regional land use policies, plans, and implementation	

Template 6.2 Assessment of Transit-Supportive Existing Land Use and Future Patterns - Quantitative Data Reporting Format

Population and Employment Data – Metropolitan Area, CBD, and Corridor			
Data	Base Year 19__	Forecast Year 20__	Growth (%)
Metropolitan Area			
Total Population			
Total Employment			
Central Business District[3]			
Total Employment			
Employment – Percent of Metropolitan Area			
Employment Density (e.g., employees/acre)			
Total Development (sq. ft.)[4]			
Commercial – Office			
Commercial – Retail			
Other			
Corridor			
Total Population			
Total Employment			
Population – Percent of Metropolitan Area			
Employment – Percent of Metropolitan Area			
Corridor Area (indicate units)			
Population Density (indicate units)			
Employment Density (indicate units)			
Transit Ridership			
Average Weekday			
Annual			

[3] Optionally, employment for the largest activity center(s) served by the New Start project may be reported.
[4] Reporting of total CBD development is recommended but not required, since such data may not be readily available.

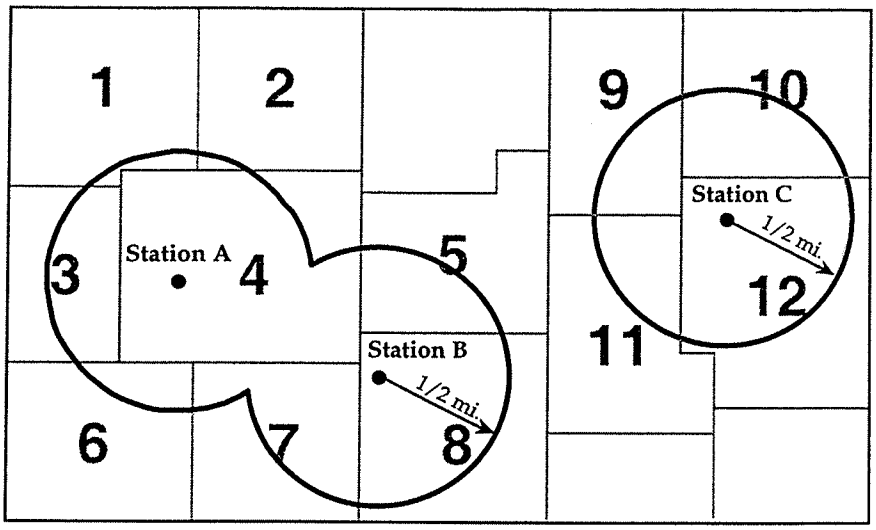
Template 6.2 Assessment of Transit-Supportive Existing Land Use and Future Patterns - Quantitative Data Reporting Format (Continued)

Population and Employment Data – Station Area (1/2-mile radius)[5]			
Data	Base Yr. 19__	Forecast Yr. 20__	Growth (%)
Total, All Station Areas			
Housing Units			
Population			
Employment[6]			
Development (sq. ft.)			
Commercial - Office			
Commercial - Retail			
Other			
Land Area (indicate units)			
Station Area 1[7]			
Housing Units			
Population			
Employment			
Development (sq. ft.)			
Commercial - Office			
Commercial - Retail			
Other			
Land Area (indicate units)[8]			
Station Area 2, etc.			
Housing Units			
Population			
Employment			
Development (sq. ft.)			
Commercial - Office			

5 See "Mobility Benefits" section for guidance on calculating station-area households and Figure 6.1 for a sample methodology for estimating station area population, households, and employment.
6 Reporting of station area employment is recommended but not required, since such data may not be readily available. As an alternative, data on square footage of commercial uses by type of use may be provided.
7 Reporting of data by individual station area is recommended but not required. Optionally, station-area data may be reported in alternative formats, such as a map or list showing employment by station area.
8 This is only necessary in the case of overlapping station areas, or other cases in which the data refer to an area other than a circle of ½-mile radius. See Figure 6.1 for additional guidance.

Figure 6.1 Sample Methodology for Estimating Station Area Population, Households, and Employment[13]

Sample Data



	Census Tract Total				Fraction of Tract within 1/2 Mile of Station	Within 1/2 Mile of Station			
	Land Area (sq. mi.)	Population	Households	Employment		Land Area (sq. mi.)	Population	Households	Employment
Stations A and B									
Tract 1	0.452	2,309	987	1,654	0.08	0.036	185	79	132
Tract 2	0.362	133	58	611	0.06	0.022	8	4	37
Tract 3	0.294	398	145	1,254	0.52	0.153	207	76	652
Tract 4	0.655	2,634	1,154	2,719	0.85	0.557	2,239	981	2,311
Tract 5	0.429	1,038	393	858	0.41	0.176	425	161	352
Tract 6	0.416	2,412	887	1,477	0.19	0.079	458	168	281
Tract 7	0.380	2,088	856	2,785	0.54	0.205	1,127	462	1,504
Tract 8	0.434	2,344	991	2,031	0.68	0.295	1.720	720	1,349
Subtotal	3.422	13,542	5,541	13,342		1.523	6,370	2,652	6,618
Station C									
Tract 9	0.355	1,816	722	610	0.24	0.085	436	173	146
Tract 10	0.462	70	31	1,569	0.40	0.185	28	12	628
Tract 11	0.504	2,645	1,156	760	0.33	0.166	873	381	251
Tract 12	0.540	2,573	1,010	1,873	0.65	0.351	1,730	687	67
Subtotal	1.860	7,192	2,966	3,041		0.787	3,066	1,254	1,091
Total	5.282	20,734	8,507	16,384		2.310	9,437	3,906	7,709

Table 6.3
Ratings Applied in Assessment of Land Use Criterion

ASSESSMENT OF TRANSIT SUPPORTIVE EXISTING LAND USE AND FUTURE PATTERNS		
1. Existing Land Use		
Phase of Project Development under Assessment	**Land Use Assessment Ratings**	
Preliminary Engineering and Final Design	HIGH	Current population and employment levels, presence of high trip generators and pedestrian-friendly development in the corridor are sufficient to support a major transit investment.
	MEDIUM	Current population and employment levels, presence of high trip generators and pedestrian-friendly development in the corridor are only marginally supportive of a major transit investment. Projected levels of growth must be realized.
	LOW	Current and projected population and employment levels, high trip generators and pedestrian-friendly development are not sufficient to support a major transit investment.
	Ratings based on assessment of the following: Existing corridor and station area development; Existing corridor and station area development character; and Existing corridor and station area parking supply and existing regional parking policies.	

Table 6.3
Ratings Applied in Assessment of Land Use Criterion (continued)

2. Containment of Sprawl		
Phase of Project Development under Assessment	**Land Use Assessment Ratings**	
Preliminary Engineering and Final Design	HIGH	Adopted and enforceable urban containment and growth management policies are in place. Existing and planned densities and market trends are strongly compatible with transit.
	MEDIUM	Significant progress has been made toward implementing urban containment and growth management policies. Existing and/or planned densities and market trends are moderately compatible with transit.
	LOW	Limited consideration has been given to implementing urban containment and growth management policies. Existing and/or planned densities and market trends are minimally or not supportive of transit.
	Ratings based on assessment of the following: Planned density and market trends for development within corridor and region; and Growth management policies.	

Table 6.3
Ratings Applied in Assessment of Land Use Criterion (continued)

3. Transit Supportive Corridor Policies		
Phase of Project Development under Assessment	**Land Use Assessment Ratings**	
Preliminary Engineering and Final Design	HIGH	A detailed corridor plan and related policies which encourage and facilitate transit supportive development have been adopted in the proposed major transit investment corridor. Private/institutional plans and initiatives are consistent with public plan and policies for transit supportive land use.
	MEDIUM	Significant progress has been made toward completing a corridor plan and implementing related policies which encourage and facilitate transit supportive development in the proposed major transit investment corridor. Private/institutional plans and initiatives may complement the public plan and policies.
	LOW	Limited progress , to date, toward preparing and adopting a corridor plan and implementing related policies which encourage and facilitate transit supportive development in the proposed major transit investment corridor. Private/institutional plans and initiatives supportive of transit supportive land use are absent.
	Ratings based on assessment of the following: Public plans and policies and private/institutional initiatives to increase station area development; Public plans and policies and private/institutional initiatives to enhance transit-friendly character of station area development; and Parking policies.	

Table 6.3
Ratings Applied in Assessment of Land Use Criterion (continued)

4. Supportive Zoning Regulations Near Transit Stations		
Phase of Project Development under Assessment	**Land Use Assessment Ratings**	
Preliminary Engineering	HIGH	Significant progress is being made toward preparing and adopting station area plans and related zoning.
	MEDIUM	Initial efforts have begun to prepare station area plans and relating zoning.
	LOW	Limited consideration has been given to preparing station area plans and related zoning.
Final Design	HIGH	Detailed station area plans and related local zoning and land use regulations have been adopted.
	MEDIUM	Significant progress is being made toward preparing and adopting station area plans and relating zoning.
	LOW	No more than initial efforts have begun to prepare station area plans and relating zoning.
	Ratings based on assessment of the following: Zoning ordinances that support increased development density in transit station areas; Zoning ordinances that enhance transit-oriented character of station area development; and Zoning allowances for reduced parking and traffic mitigation.	

Table 6.3
Ratings Applied in Assessment of Land Use Criterion (continued)

5. Tools to Implement Land Use Policies		
Phase of Project Development under Assessment	**Land Use Assessment Ratings**	
Preliminary Engineering	HIGH	Local capital improvement programs and development initiatives have been adopted to implement local land use policies and which leverage the Federal Investment in the proposed major transit corridor. Private/institutional initiatives are strongly supportive.
	MEDIUM	Efforts to prepare local capital improvement programs and development initiatives that support station area plans have begun. Private/institutional initiatives are moderately supportive.
	LOW	Limited consideration has been given to local capital improvement programs and development initiatives that support corridor and station area plans. Private/institutional initiatives are minimally or non-supportive.
Final Design	HIGH	Public infrastructure and other local investments, as well as private/institutional initiatives, are being undertaken in the corridor and station areas which implement the local land use policies and which leverage the Federal investment in the proposed major transit investment corridor.
	MEDIUM	Local public and private/institutional capital improvement programs and development initiatives have been adopted to implement local land use policies and to leverage the Federal investment in the proposed major transit corridor.
	LOW	No more than initial efforts to prepare local capital improvement programs and development initiatives which support corridor and station area plans have begun. Supportive private/institutional initiatives are in initial stages or absent,.
	Ratings based on assessment of the following: Endorsement and participation of public agencies, organizations and the private sector in development and planning process; Tools and actions to promote transit-oriented development; Involvement of development community in supporting station area plans and joint development efforts; and Public involvement in corridor and station area planning.	

Table 6.3
Ratings Applied in Assessment of Land Use Criterion (continued)

6. Performance of Land Use Policies		
Phase of Project Development under Assessment	**Land Use Assessment Ratings**	
Preliminary Engineering	HIGH	Moderate amount of transit supportive housing and employment development is occurring in the corridor.
	MEDIUM	Proposals for transit supportive housing and employment development in the corridor are being received.
	LOW	Limited progress, to date, toward achieving transit supportive development in the corridor.
Final Design	HIGH	Significant amount of transit supportive housing and employment development is occurring in the corridor.
	MEDIUM	Moderate amount of transit supportive housing and employment development is occurring in the corridor.
	LOW	Limited number of proposals for transit supportive housing and employment development in the corridor are being received.
	Ratings based on assessment of the following: Demonstrated cases of development affected by transit-oriented policies; Corridor development targets; and Station area development proposals and status.	

Table 7.1
Suggested Outline: New Starts Project Finance Plan

New Starts Project Finance Plan

Capital Cost Estimates and Supporting Documentation

- Cost Estimates for Major Project Components (e.g. vehicles, guideway, right-of-way, yard and shop, stations, contingencies, communications, etc.)
- Methodology for Cost Escalation, Year of Expenditure

Non Section 5309 New Starts Capital Funding Sources and Documentation

- Other Federal Funding Sources, Programming Documents (Transportation Improvement Programs, Long Range Plans, historic availability of funding)
- State Sources, Support Documentation, (Capital Improvement Programs, Legislative approval, historic availability of funding)
- Local Sources, Support Documentation (Capital Improvement Programs, Legislative approval, historic availability of funding)
- Private Sector Match, Support Documentation
- Previous local funding allocated to the project, supporting documentation
- Previous New Starts funds allocated in the Region, supporting documentation
- Innovative Finance Methods, supporting documentation

Operations and Maintenance Costs and Sources of Revenues

- Summary of current of System-wide Operations and Maintenance costs, major system components, support documentation (e.g., bus system operating costs)
- Estimated future System-wide Operations and Maintenance costs, major system components, support documentation (e.g. proposed rail and bus system)
- Estimated New Starts Transit Project Operations and Maintenance costs, major system components, support documentation (New Starts project only)

Sources of Operating Revenues

- Existing Sources of Operating Revenues, By Source, Supporting Documentation
- Proposed Future Sources of Operating Revenues, By Source, Support Documentation

Twenty Year Revenue Projections for Capital and Operating Finance

- Charts, Graphs, Tabular presentations showing anticipated revenue projections for all sources of funds (e.g. farebox recovery, federal, local, state sources)
- Chart, Graphs, Tabular presentations showing anticipated expenditure projections for project construction costs, project operating costs, and transit system-wide operating and maintenance costs (e.g. bus fleet recapitalization, labor costs, rail system costs, etc)
- Support Documentation of previous trends for the past five years for revenues and expenditures.

Regional Economic Trends

- Population and Employment Growth Estimates
- Economic and land development projections
- the regional demographic or business trends to support 20 year revenue forecasts.
- Brief Summary of Current and Projected Transit System Operating Characteristics.
- Current Bus Fleet Management Plan (bus fleet maintenance schedules, replacement schedules, service needs, service quality measures, etc.)

Table 7.2
Examples of Financial Plan Supporting Documentation

General Documentation

- Background information and description of the transit agency, including organizational structure and an outline of any other significant capital projects underway (e.g., annual A-128 audits, annual reports, current budget).
- Background information and description of the New Starts fixed guideway project, including project status (e.g., project pamphlets, planning and engineering reports used to select and define the project) based on format in Section 4.1 of this guidance.
- Information describing current and forecast economic conditions in the region (e.g., regional socioeconomic reports, regional planning estimates of socioeconomic growth used in the development of the financial and ridership estimates).

Financial Documentation

- Agency operating and capital cash flow analysis for the 20-year period (in year of expenditure dollars) as required by planning guidelines. The cash flow analysis should include expenses and revenues for the proposed project.
- A description of the types and amounts of funds (in year of expenditure dollars) for the transit system and proposed project (e.g., local, state, Federal, sales tax, bonds, flexible funding, innovative funding sources).
- Operating and maintenance cost estimates (in year of expenditure dollars) for the entire planned transit system, including the proposed project.
- Capital cost estimates (in year of expenditure dollars) for the proposed project, broken out by major cost categories, including contingencies.
- Description of innovative financing techniques (e.g., innovative funding sources or financing techniques to be used to support the project or to be implemented as part of a larger system-wide program).
- Capital and Operating Financing Plans, other related reports.
- Correspondence or other documentation indicating local source's "intent to commit" if no formal commitment or programming of local funding is yet in place.

Additional Documentation

- Regional Long Range Transportation Plan
- Regional Transportation Improvement Program (TIP)
- Major Investment Study (MIS) or Alternatives Analysis (AA), Environmental Impact Statement (EIS), if applicable
- Independent Audit Reports

Table 7.3
Ratings Applied in Assessment of Local Financial Commitment

ASSESSMENT OF LOCAL FINANCIAL COMMITMENT *		
1. Stability and Reliability of Capital Financing Plan		
Phase of Project Development	**Financial Assessment Ratings**	
Final Design	High	Sponsoring agency is considered to be in very sound financial condition. Non-Section 5309 New Starts Funds are committed and available to fund the project. The applicant has the fiscal capability to construct the project and has sufficient funds to cover the entire Non-Section 5309 New Starts share of the overall undertaking, including provision for contingent cost overruns, without exhausting such capacity.
	Medium-High	Sponsoring agency is considered to be in sound financial condition. Non-Section 5309 New Starts funds are committed to the project, yet funds may not be available. The applicant has the fiscal capacity to construct the project and has sufficient funds to cover the entire Non-Section 5309 New Starts share of the overall undertaking, including provision for contingent cost overruns.
	Medium	Sponsoring agency is considered to be in reasonably sound financial condition. The majority of Non-Section 5309 New Starts funds are committed to the project. However, a significant portion of the Non-Section 5309 New Starts funding either does not yet exist or exists but is not yet committed to the project. It is highly likely that sufficient funds will be committed to cover the entire Non-Section 5309 New Starts share of the overall undertaking, including provision for contingent cost overruns.
	Low-Medium	Sponsoring agency is in sound financial condition. The applicant may have identified potential sources of Non-Section 5309 New Starts funds to construct the project. However, the majority of Non-Section 5309 New Starts funds have not been committed to cover the Non-Section 5309 New Starts share of project costs, including the provision for contingent cost overruns, and assumes some local funding which does not yet exist.`
	Low	The sponsoring agency is not in sound financial condition. The applicant has not yet identified nor committed sufficient funding to cover the Non-Section 5309 New Starts share of project costs.

Table 7.3
Ratings Applied in Assessment of Local Financial Commitment (Cont.)

2. Stability and Reliability of Capital Financing Plan (continued)		
Phase of Project Development	**Financial Assessment Ratings**	
Preliminary Engineering	High	Sponsoring agency is considered to be in very sound financial condition. Non-Section 5309 New Starts funds are identified and committed to fund the project, but a portion of the funds may not be available. Sufficient funds to cover the Non-Section 5309 New Starts share of the overall undertaking, including provision for contingent cost overruns, have been committed.
	Medium-High	Sponsoring agency is considered to be in sound financial condition. The applicant has identified and committed sufficient funds to cover the majority of the Non-Section 5309 New Starts share of the overall undertaking, including provision for contingent cost overruns.
	Medium	Sponsoring agency is considered to be in reasonably sound financial condition. The applicant has adopted a realistic capital finance plan that adequately covers projected local capital costs. Some portion of funding to cover the Non-Section 5309 New Starts share of project costs has been committed, but a significant portion of local funding either does not yet exist or exists but is not yet committed to the project.
	Low-Medium	Sponsoring agency may be in sound financial condition, with some correctable deficiencies. The applicant has not yet adopted a realistic capital finance plan that adequately covers projected local capital costs. Non-Section 5309 New Starts funds are not committed and proposed new sources of funding are not available to fund the construction of the project.
	Low	Sponsoring agency is not considered to be in reasonably sound financial condition. The applicant has adopted a capital finance plan that FTA considers inadequate or infeasible. Non-Section 5309 New Starts funds have not been identified to finance construction of the project.

Table 7.3
Ratings Applied in Assessment of Local Financial Commitment (Cont.)

3. Stability and Reliability of Operating Financing Plan		
Phase of Project Development	**Financial Assessment Ratings**	
Final Design	High	Sponsoring agency is considered to be in very sound financial condition. Ample dedicated transit funding sources are committed and available and there is a good history of general appropriations from State or local government to provide a balanced budget for the transit system. Existing transit vehicles and facilities have been well maintained and replaced through continuing reinvestment in the system. The applicant has demonstrated the financial capacity to operate and maintain the proposed new starts project, other programmed projects, and the existing regional transit system.
	Medium-High	Sponsoring agency is considered to be in sound financial condition. Demonstrates that funding for operating an expanded transit system is committed. Existing transit facilities have been well maintained and replaced through continuing reinvestment in the system. Financial projections indicate adequate financial capacity to operate an expanded transit system.
	Medium	Sponsoring agency is considered to be in reasonably sound financial condition. The applicant has adopted a realistic operating finance plan that adequately covers projected operating costs for the existing and proposed transit system expansion. Demonstrates that funding for operating an expanded transit system is identified and will likely be committed. Existing facilities are adequately maintained. Financial projections indicate adequate financial capacity to operate an expanded transit system.
	Low-Medium	Sponsoring agency may be in sound financial condition, with some correctable deficiencies. The applicant has not yet adopted a realistic operating finance plan that adequately covers projected operating costs, and potential sources of operating funds have not been committed. Current sources of local funding are not sufficient to operate the proposed system expansion and operate and maintain the current transit system.
	Low	Sponsoring agency is not considered to be in reasonably sound financial condition. The applicant has adopted an operating finance plan that FTA considers inadequate or infeasible. Local funding does not generate sufficient revenue to operate and maintain the current transit system, and no new sources have been identified or committed to finance an expanded public transit system. Local transit system operating assistance is not reliable, resulting in deferred capital replacement and/or routine maintenance and/or service reductions.

Table 7.3
Ratings Applied in Assessment of Local Financial Commitment (Cont.)

4. Stability and Reliability of Operating Financing Plan (continued)		
Phase of Project Development	**Financial Assessment Ratings**	
Preliminary Engineering	High	Sponsoring agency is considered to be in very sound financial condition. Ample dedicated transit funding sources are committed and available and there is a good history of general appropriations from State or local government to provide a balanced budget for the transit system. Existing transit vehicles and facilities have been well maintained and replaced through continuing reinvestment in the system. The applicant has demonstrated the financial capacity to operate and maintain the proposed new starts project, other programmed projects, and the existing regional transit system.
	Medium-High	Sponsoring agency is considered to be in sound financial condition. Demonstrates that funding for operating an expanded transit system is committed. Existing transit facilities have been well maintained and replaced through continuing reinvestment in the system. Financial projections indicate adequate financial capacity to operate an expanded transit system.
	Medium	Sponsoring agency is considered to be in reasonably sound financial condition. The applicant has adopted a realistic operating finance plan that adequately covers projected operating costs for the existing and proposed transit system expansion. Demonstrates that funding for operating an expanded transit system is identified and will likely be committed. Existing facilities are adequately maintained. Financial projections indicate adequate financial capacity to operate an expanded transit system.
	Low-Medium	Sponsoring agency may be in sound financial condition, with some correctable deficiencies. The applicant has not yet adopted a realistic operating finance plan that adequately covers projected operating costs, and potential sources of operating funds have not been committed. Current sources of local funding are not sufficient to operate the proposed system expansion and operate and maintain the current transit system.
	Low	Sponsoring agency is not considered to be in reasonably sound financial condition. The applicant has adopted an operating finance plan that FTA considers inadequate or infeasible. Local funding does not generate sufficient revenue to operate and maintain the current transit system, and no new sources have been identified or committed to finance an expanded public transit system. Local transit system operating assistance is not reliable, resulting in deferred capital replacement and/or routine maintenance and/or service reductions.

Template 7.1 New Starts Finance Worksheet

Project Name		Date	
New Start Project Finance Description			
Total Capital Cost (Current Year $) (1)		Total Capital Cost (Year of Exp.) (2)	
Section 5309 New Starts Share (YOE)(3)		Percent of Total Cost (YOE) (4)	
Capital Cost Non Section 5309 New Starts Share (Year of Expenditure)			
Other Federal Sources (Non-5309 New Starts) (5)	Type of Funds (6)	Dollar Amount	% Total Capital Cost
1)			
2)			
3)			
4)			
State Sources (7)	Type of Funds (8)	Dollar Amount	% Total Capital Cost
1)			
2)			
3)			
4)			
5)			
Local Sources (9)	Type of Funds (10)	Dollar Amount	% Total Capital Cost
1)			
2)			
3)			
4)			
5)			
6)			
Private Sector/In-kind match/Other(11)	Type of Match/Funding (12)	Value (13)	% Total Capital Cost
1)			
2)			
3)			
TOTAL NON-SECTION 5309 SHARE			

Template 7.1 New Starts Finance Worksheet (Continued)

Project Name			
New Starts Project Financial Commitment			
Other Federal Sources (Non-5309 New Starts) (14)	**New/Existing (15)**	**Committed/Uncommitted (16)**	**Supporting Documents (17)**
1)			
2)			
3)			
4)			
State Sources (18)	**New/Existing**	**Committed/Uncommitted**	**Supporting Documents**
1)			
2)			
3)			
4)			
5)			
Local Sources (19)	**New/Existing**	**Committed/Uncommitted**	**Supporting Documents**
1)			
2)			
3)			
4)			
5)			
6)			
Private Sector/In-kind Match/Other (20)	**New/Existing**	**Committed/Uncommitted**	**Supporting Documents**
1)			
2)			
3)			
4)			
5)			

Template 7.1 New Starts Finance Worksheet (Continued)

Project Name		
Innovative Finance Methods (21)		
State/Local Funding Source (22)	Anticipated Funding Amount (23)	Supporting Documentation (24)

Operating and Maintenance Cost Worksheet			
Current Transit System Operating Characteristics (can be from National Transit Database) (25)			
Current Sources of Operating Funds (26)	Amount	Type of Funding Source (27)	Annual/Dedicated (28)
Farebox Revenues			
State Revenue Source A			
State Revenue Source B			
State Revenue Source C			
Local Revenue Source A			
Local Revenue Source B			
Local Revenue Source C			
Total			
Summary Data from the Proposed New Starts Project Operating Finance Plan (29)			
New Starts Project Average Annual Operating Cost, Forecast Year Dollar Amount (30)		Total Transit System Annual Operating Cost, Forecast Year Dollar Amount (31)	
Proposed Sources of Operating Funds (32)	Amount	Type of Funding Source	Annual/Dedicated
Farebox Revenues			
State Revenue Source A			
State Revenue Source B			
State Revenue Source C			
Local Revenue Source A			
Local Revenue Source B			
Local Revenue Source C			
Total			

Template 7.1 New Starts Finance Worksheet (Continued)

Project Name			
Transit System Operating Characteristics			
Current Systemwide Characteristics (33)	**Number/Value**	**Future Transit System with New Starts Project (34)**	Number/Value
Farebox Recovery Percent		Farebox Recovery Percent	
Number of Buses		Number of Buses	
Number of Rail Vehicles (type)		Number of Rail Vehicles	
Number of Rail Vehicles (type)		Number of Rail Vehicles	
Current Annual Passenger Boardings		Annual Boardings (Forecast)	
Daily Passenger Boardings		Daily Boardings (Forecast)	
Average Fare		Average Fare	
Average Age of Buses			
Average Age of Rail Vehicles			
Average Age of Rail Vehicles			

Template 7.1 New Starts Finance Worksheet (Continued)

Prior State or Local Expenditures for Project Planning/ROW/Overmatch(35)	Project or Funding Type (36)	Value (37)	% of Total Costs
1)			
2)			
3)			
4)			
5)			

Prior State or Local Expenditures for Project Planning/ROW/Overmatch(38)	Supporting Documentation (39)
1)	
2)	
3)	
4)	
5)	

Previous New Starts Investments in the Region (40)				
Project Name	Federal Funding Share		State/Local Funding Share	
	Amount	Percent	Amount	Percent

Template 7.1 New Starts Finance Worksheet (Continued)

Documentation Examples for Local Financial Commitment (for illustrative purposes only)	
State Capital Funding Sources	State Legislature Vote of Commitment Budget Documents Letters from Senior Legislators Implementation of Revenue Collection Capital Improvement Program Commitments Bond Underwriting Documentation Other Supporting Documentation Past Performance of Capital Funding Levels for transit
Local Capital Funding Sources	County Legislative Approval City Legislative Approval Implementation of Revenue Collection Capital Improvement Program Commitments Bond Underwriting Documentation Other Supporting Documentation Past Performance of Capital Funding Levels for transit
Operating Funding Sources	Past performance of farebox levels and other revenue sources by mode. Past performance of ridership levels by mode. Past performance of existing revenue sources. Support of previous initiatives to dedicate funding for transit
Annual/Dedicated Operating Funds	Indication of whether the source is subject to annual appropriation or is a source of revenue dedicated to funding transit operations.

Appendix 5
Funding and Financing Options

Table of Contents

This Appendix presents a menu of summary descriptions concerning the principle financial mechanisms theoretically available to support the Northwest Corridor Light Rail Transit System.[1] Many of these could be applied to either capital construction or operating subsidies. However, many of the federal grant programs apply generally to capital programs. In this regard, eligible expenses include things such as preventative maintenance and lease payments, so that some "operating" expenses can be eligible for "capital" funding.

The following listing is organized by four categories of funds:

- (1) System-Generated
- (2) Federal
- (3) State funds
- (4) Local

As regards System-Generated and Local funds, a distinction is made between public funds and private funds.

A further useful distinction in these funding sources is between "funding" (primary streams of revenues for direct application to expense or to support various leveraging schemes) and "financing" (which manipulate primary revenue streams in a way to make funds available when needed or to reduce the costs of borrowing). For example, in the case of 30-year bonds issued against revenues from a tax dedicated to transit use, the revenue stream from the tax pledged as security for the bonds would be the "funding." The bond proceeds, which concentrated the 30-year tax revenues into, say, four years to meet construction expense, would be the "financing."

While this distinction is not always clear-cut, it is useful to keep in mind. Many of the current so-called "innovative financing" techniques, while valuable in their own right, require underlying revenue streams to support them. The first and most difficult task facing a new transit undertaking is to establish a solid funding base.

A5.1 SYSTEM-GENERATED FUNDS

Virtually all transit systems generate internal revenues. Two principal types of funds account for the largest portion, and are common to many transit properties throughout the U.S. and the rest of the world: (1) revenues from fares, which typically are applied to operating expenses, and (2) revenue streams from taxes imposed by the transit agency (as authorized by State law). The most common such tax used by U.S. transit agencies is the sales and use tax. Typically, it is

[1] This appendix is drawn from a wide range of materials and professional experience. Among the most important are the following: City of New York, Department of City Planning, Transportation Division, *Innovative Transportation Financing* (August 1999); U.S. Department of Transportation, Federal Transit Administration, *Financing Techniques for Public Transit* (February 2000); U.S. Department of Transportation, FTA, *New Starts: An Introduction of FTA's Capital Investment Program* (undated); Georgia Senate Bill 57, *A bill to provide for the Georgia Regional Transportation Authority* August 31, 2000); U.S. Department of Transportation, *TIFIA Program Guide: Transportation Infrastructure Finance and Innovation Act* (June 1999); U.S. Department of Transportation, FHWA, *FHWA Joint Development Study* (October 28, 1996).

applied to both operating and capital costs, often with the capital portion leveraged by issuance of tax-exempt municipal bonds authorized in the agency's charter and issued directly by it.

A5.1.1 Public

Fares

Transit fares are typically used in the U.S. to offset only operating expenses and then, only a portion of these expenses. The percentage of operating expense recovered from fare proceeds is generally referred to as the "recovery ratio." In some cases, this percentage is fixed either by enabling legislation or governing board policy in the effort to require periodic fare increases designed to keep pace with expense inflation or to force cost cutting. In other cases, it is treated as a floating indicator, reflecting the results of other elements of an agency's fare policy. It is to be expected that the recovery ratio will increase somewhat over the first five to ten years of operating a new system as ridership ramps up to steady state.

Typically, the maximum fare charged for a linked trip (inclusive of all transfers) will be constrained by fares charged on other transit systems. In the case of the Northwest Corridor LRT System, for example, fares for the proposed transit system will be compared with the MARTA fare (currently $1.75). In addition, fare revenues are affected by:

- Structure of the fare (e.g., flat fare versus distance-based fare or different fares for peak and off-peak rides.
- Amount of fare avoidance tolerated. Depending on ticketing, transfer, and enforcement policy, some transit properties lose as much as 10 percent of potential fare revenue through avoidance.
- Transfer policy. The way transfers from one system element to another (e.g., MARTA to trunk line, trunk line to circulator, trunk line /circulator to local bus) are handled and enforced has a significant impact on fare revenues.
- Number and amounts of discounted fares. Typically, students, elderly, transit employees, law enforcement personnel, and others are given reduced-fare tickets. In some instances, the transit agency is reimbursed for the costs of such discounts when mandated by some other jurisdiction, e.g., student and elderly discounts mandated by State law.
- Discounting of the price of multiple ride tickets, to encourage ridership, e.g., weekly, 10-ride, monthly passes, etc.
- In the case of Northwest Corridor LRT, it is likely that circulator fares will be further discounted – or even made free – compared to trunk line fares.

Transit Agency Imposed Taxes

Many transit agencies have taxes and other revenue streams dedicated to transit use. Some have bonding authority. In the large transit properties of the U.S., 86 percent of such dedicated revenues for capital programs has come from sales taxes. Little came from property or motor vehicle related levies (some used tax on rental vehicles). The balance came from miscellaneous sources.

Excess of Subsidy for Capital

Although not common, it is possible that negotiated agreements as to dedicated revenue streams from state or local subsidies can yield "surpluses" against operating requirements, which can be used for capital. In the case of Metra, in Chicago, such "retained earnings," available for capital, run from $4 to $6 million per year. However, they could not be leveraged, even if Metra had bonding authority, which it does not, since the full amount is budgeted to operations.

Fare Surcharge for Capital

Although it is not common, transit agencies have, in some instances, levied a surcharge on fares, with the proceeds earmarked for capital. For example, Metra has a 5 percent capital surcharge that generates an annual revenue stream of around $9 million per year. Metra has no authority leverage this revenue stream, but if it could do so, as much as $111 million in one-time capital construction funds could be generated.

Transit Agency Bonds

Many of the larger transit properties in the U.S., with dedicated revenue streams from either taxes they impose or other dedicated revenues they receive from State or local sources, are authorized (usually under State law) to issue municipal bonds. These are tax-exempt bonds and usually yield a cost of borrowing that is significantly more economical than can be achieved by taxable private-sector borrowings.

Typically, this authority is limited by the amount of the bonds issued or outstanding (evergreen) at one time, the percentage of revenues that can be pledged, or coverage requirements (the ratio of debt service to revenues). Often, a referendum is required prior to any bond issue. Further, the market will effectively limit the amount of bonds that can be issued to amounts considered repayable by lenders. Usually, revenues pledged to retire bonds must be segregated "off the top" into secure accounts for payment of debt service.

COPs and Lease Backed Bonds

Certificates of Participation (COPs) are a type of leasing arrangement in which bonds are issued to finance the purchase of transit assets. COPs are tax-exempt bonds, issued by State entities, which are usually secured with a specified revenue source such as an equipment or facilities lease. A purpose-formed State entity issues tax-exempt bonds whose maturities match the lease term of assets purchased by the State entity with the proceeds from the bond issue. The State entity then leases the equipment to one or more transit systems. The resulting lease payments, most often made with a combination of formula grant funds and local matching share, are then "passed through" to the bondholders by the State entity. The combination of larger vehicle order size, COPs with varying maturities, and lease arrangements reduce and stabilize current capital costs significantly.

Several examples are provided by the California Transit Finance Corporation (CTFC), which provided funding for the bus purchases of several California grantees. One such example, the Sunline Transit Commission, replaced its entire fleet of diesel fuel buses with buses that operate on Compressed Natural Gas (CNG). The CFTC issued COPs, secured by a lease on the buses

that were purchased. Because the transaction involved 40 buses, the local gas utility provided a high-speed fueling facility with a favorable capital lease arrangement.

NOTE: FTA funds may not be used directly to generate interest income from arbitrage (i.e., making money from the difference between the Federal and local costs of borrowing). Typically, Federal funds are used to make lease payments. However, the COPs are secured by the leases, not by the pledge or encumbrance of Federal funds, so some investment of idle proceeds is permitted.

Air Rights

Properties owned by transit agencies, cities, or states which have unused air rights my be sold to private entities for development subject to zoning restrictions. Air rights may be developed on site or in special cases they may be transferred to other contiguous or (where zoning permits) discontiguous sites.

Air rights and the related Transfer of Development Rights have been employed throughout the country for various uses. In Boston, the John Hancock Building was developed by using air rights from the Massachusetts Turnpike and, in New York City, the Grand Central Terminal was preserved by transferring its development rights to a carefully planned receiving district.

Leasing ROW

Transit operators lease the space within their transportation corridors to telecommunications or other companies that use the area to install cabling or utility connections.

This produces a modest, but stable revenue stream. For example, Bi-State Development Agency in St. Louis contracted with WorldCom relative to a new 18-mile LRT link. In addition to a per-linear-foot-of-cable fee, WorldCom bought both its own and Bi-State's communication cables, paying for installation costs in excess of a set figure. In 1997, Bi-State received $125,800 in revenue, with increases expected in 1998 and 1999 as the result of scheduled rate increases. Further, Bi-State saved $206,000 in FTA capital grant costs, plus 20 percent local share for the cost of the cable and has no ongoing maintenance costs for its own communications system.

Station Concessions

Leasing of concession stands on transit property provides steady income as well as additional amenities and convenience for those using the transit system. This is a source of modest, but stable revenues, which can be leveraged. For example, the New York subway system has concessions in about 25 percent of its stations, which generate around $2.7 million per year.

Parking Strategies

There are a number of potential strategies to reduce parking subsidies and change commuting patterns (discourage people from driving) such as: charging for park and ride spots; restructuring employee parking benefits (providing transit checks, vouchers, or passes instead); structuring parking fees to levy higher fees on drivers arriving during peak hours to encourage transit use.

Such strategies can be initiated by building owners wishing to minimize space-consuming parking lots, neighborhoods wishing to regulate parking, transit operators, or parking companies looking for revenue.

In some instances, a modest profit can be generated to support transit development, in addition to the increased ridership resulting from mild disincentives to driving into congested areas. Although any such strategies would have to be evaluated very carefully as to possible negative impact on the retail sales orientation of the Circulators, a proactive approach may head off negative results from community initiatives and actually have a positive effect on traffic congestion.

Advertising

Traditionally a minor revenue source, some transit properties have aggressively expanded advertising opportunities. Advertising can take many forms, including placards located within trains; larger ads in enclosed shelters, stations, and platforms; broadcast time at stations equipped with video monitors; and shrink-wrapping and whole- or half-car advertising, which use the bulk of the vehicle's surface without interfering with passenger service.

Ads can serve as a useful source of information to riders and passersby. It has some potential to reduce maintenance/painting costs if applied to large surface areas of vehicles.

Other examples of commercial efforts include: WMATA and MTA sell advertising space on backs of fare cards and timetables; Metro-North has installed cell phones with calls costing $1.75 per minute to anywhere in the U.S.; Japan's high-speed Shinkansen Line has vendors selling food; and Vancouver BC express trains have one car serving coffee and muffins.

New York's MTA has annual advertising revenues of $33.5 million per year.

Interest Earnings

Although not a large source of income, aggressive investing of idle funds can generate significant revenues. Except within certain narrowly prescribed limits, it is not possible to bank and invest Federal funds at a profit; no such limitation applies to the local match for federal grants. Therefore, if the mix of funding sources is geared toward generating non-federal matching funds (typically more than 20 percent) in step with Federal funds, but advantage is taken of delayed match (see discussion below) so that 100 percent Federal funds are used for the first years of the project, the local funds could be invested at interest with significant savings/earnings.

A5.1.2 Private

Contractor Concessions in Consideration for PM/CM Award

It is not unusual for candidates for program management (PM) and/or construction management (CM) contracts to offer various financial incentives to their selection. The most common are:

- **Fee Deferral.** The contractor offers to defer its fee (but not, usually, direct expense) during the initial stages of the project, to advance project mobilization and reduce sponsor's financial requirements until federal and non-federal grants and other funding is in place. In some instances, this deferral is offset by "success fees" at successful attainment of certain milestones or by some "sweat equity" position in private development of project assets.
- **Credit Enhancements.** The contractor may offer to purchase credit enhancements to assist the project sponsor in borrowing bridge funds necessary to advance the project until longer-term funding is in place or revenue streams from developments begin to produce.
- **Arrange Short-Term-Financing.** The contractor may completely arrange short-term financing required to advance the project until longer-term funding and financing comes on line.
- **Equity Contribution.** In some rare instances, the contractor may enter into a public-private partnership with the sponsor and contribute equity funding to the undertaking.

Cross Border Lease

A cross-border lease is a mechanism that permits investors in a foreign country to own assets in the U.S., lease them to an American entity, and receive tax benefits under the laws of their own country.

The basic form of this transaction is for the transit operator to purchase rolling stock (such as railcars), then, simultaneously sell the rolling stock to a non-U.S. investor who, in turn, leases it back to the transit system. The foreign lessee generates tax benefits in its country of origin through investment tax credits and depreciation. These benefits are shared with the U.S. transit operator through reduced lease costs. Typically, cross-border lease transactions have generated net benefits for transit systems of between 1.5 percent and 4.5 percent of total transaction size. The most cost-effective cross-border leases have exceeded $50 million in transaction value, primarily because the substantial transaction cost usually requires a higher transaction value.

Lease with Maintenance

Under FTA procedures, the entire capital cost of vehicles and rolling stock is to be supported with Federal grant funds. This has been interpreted to mean that the "entire capital cost" includes preventative maintenance.

A New Orleans bus purchase is, perhaps, the best example of such an arrangement. To avoid approval by the State legislature of a multiyear contract, the New Orleans RTA entered into

renewable 1-year leases, which included maintenance for 175 buses. It is the intention to roll these leases over for 12 years, which is the life of the buses.

RTA was able to demonstrate to FTA that the arrangement was cost-effective and that it would retain effective control of the vehicles. A 7 percent average interest rate, coupled with $2 million maintenance savings in the first 3 years, made this cost-effective. Further, it capitalized what would normally be an operating cost and ineligible for Federal funding at 80 percent.

In Atlanta, the ARC Regional Plan envisions funding such preventative maintenance from Federal funds for approximately 25 percent of total operating costs. While it may not be required to fund this in conjunction with a lease agreement, that is a possibility.

Price Reduction

Vendor Price Discounts

It is not uncommon for vendors of equipment (rolling stock in particular) to discount initial price in return for considerations ensuring continuation of a long-term relationship. The most common arrangement is to use vendor price discounts as an inducement to purchase propriety equipment, repair or replacement of which cannot be supplied by any other vendor – thus ensuring long-term sales. Other arrangements involve long-term maintenance agreements, i.e. discounted sale price in return for an extended multiyear contract for repair and maintaining such vehicles.

Understandably, details on such arrangements are not readily available. Further, because of the amounts and complexity of these negotiated arrangements, it is difficult to present any general rules of thumb. In some instances they represent a genuinely good deal, in others the results can be disastrous (for example, when a maker of proprietary equipment prematurely goes out of business).

Turnkey Project

In a turnkey project, rather than using multiple providers for individual phases of a project (which can complicate communications, cause change orders, and delay construction), the sponsor hires one contractor to complete the entire project at a fixed price, in an attempt to control costs and delays. In this arrangement, the public sector bears the political, construction, and acquisition-related risks, while the private partner assumes the project and timing risks.

The Super Turnkey process is one in which the project engineers or project management consortium undertake to build, operate for a time, and transfer a facility to the purchaser. In a Build/Operate/Transfer (BOT) situation, purchasing, deliveries, scheduling, and other critical aspects of the project are directed by the same entity--a Turnkey Manager. As a result, construction delays, start-up difficulties, disagreements about change orders and project timing are minimized, resulting in lower project costs and reduced litigation.

One modification to this BOT process is where the consortium also arranges financing. This technique may be attractive for smaller grantees, who may not have the credit history to minimize their borrowing cost. The Turnkey Manager may assist with project financing by accepting delayed compensation (e.g., postponement of progress payments), credit enhancements

such as an insured line of credit, or even total project financing through the issuance of the consortium's own bonds. While these financing methods have costs associated with them, they may allow a new transit project to proceed in a timely manner, thus generating time and project savings well in excess of the financing cost.

In the Design/Build/Operate/Maintain (DBOM) permutation, the Turnkey Manager assumes, in addition to Super Turnkey functions, the responsibility for maintaining the system.

FTA currently has five turnkey demonstration projects: Baltimore Central Light Rail Extensions, Los Angeles Union Station Gateway, San Francisco Bay Area Rapid Transit Airport Extension, Hudson-Bergen Light Rail, and San Juan Tren Urbano. The Hudson-Bergen project and the San Juan projects are both DBOM projects.

It is interesting, to note that:

- For the Hudson-Bergen Project, the contract and financial plan were amended to substitute New Jersey Transit tax-exempt bonds for Turnkey Manager financing as originally anticipated. This move was estimated to save $43.2 million, due to the lower borrowing costs.
- The San Juan project is also recipient of a TIFIA loan (see discussion below) at rates even more attractive that available to the Puerto Rico Highway and Transportation Authority or the Turnkey Manager.

Commodity Swaps

Trading of goods or property among agencies or municipalities as part of the overall financing of the project, can save the costs of new land or equipment purchases.

Contract Incentive, Penalty Payments

Contractual clauses can set a scale of penalties and/or incentives to encourage prompt completion of a project. Typically, it is agreed that, should a contractor finish a project late, they will pay a set amount of money to the transportation provider; often, this is based on a graduated scale based on how overdue the project is. Similarly, it is also agreed that should a contractor finish a project early, they will receive a bonus based on a similar principle.

Progress Payments

Instead of paying a lump sum to contractors upon a project's completion/delivery (or achieving major milestones), a project sponsor pays for equipment, components, or facilities as they are bought or completed. For example, as a result of backlogs, traditional contract structures force manufacturers to obtain short-term loans to pay for rolling stock construction. The cost of borrowing is filtered down to the transit operators, as the additional cost is build into the purchase price by the manufacturers. Progress payments reduce the manufacturer's cost of borrowing by paying for components as they are completed. This is then reflected in a lower purchase price.

A5.2 FEDERAL FUNDS

A5.2.1 Public

New Starts Funding (§5309)

Up to 80 percent of capital costs of fixed guideway projects such as the proposed Northwest Corridor LRT are eligible. A limited amount of Federal funds is awarded competitively by FTA. Overmatch is one important FTA selection criteria. Generally, these funds are not available for operating expenses unless they have been capitalized, e.g., preventative maintenance or lease payments. (See discussion in text for other criteria.)

Urban Formula (§5307)

In addition, FTA funds are available under a complex formula to the State and Region and can be used for up to 80 percent of project capital costs. Such funds can be used to support Alternatives Analysis. Generally, these funds are not available for operating expenses unless they have been capitalized, e.g., preventative maintenance, lease payments, or capital cost of contracting.

Flexible Funds (Highway/CMAQ)

A variety of Highway funds and Air Quality funds can be re-programming to transit projects.

Flexible funding categories are those programs authorized under the Federal-aid highway program that are permitted to be used for either transit or highway projects. The funds may be used for any non-operating purpose eligible under the FTA Urbanized Area Formula Program (49 U.S.C. Section 5307), the Elderly and Persons with Disabilities Program (49 U.S.C. Section 5310) and the Non-urbanized Area Formula Program (49 U.S.C. Section 5311) (including preventive maintenance). Flexible fund programs include the Surface Transportation Program (STP), Donor State Bonus, Interstate Maintenance, Bridge Replacement and Rehabilitation, National Highway System, Substitute Highway, and the Congestion Mitigation and Air Quality Improvement (CMAQ) programs. Although these FHWA programs have intermodal flexibility, it is important to note that there are both programmatic and distributive limitations on the use of at least some portions of some programs. (As examples, 10 percent of Surface Transportation Program (STP) funds are set aside for safety projects, and there are funds in some programs available only to rural, and only to urbanized areas.)

The provisions of Title 23, U.S.Code, regarding the non-federal share apply to Title 23 funds used for transit projects. Thus, flexible funds transferred to FTA require the same non-federal matching share that such funds would have had if used for highway purposes and administered by the FHWA.

CMAQ funds are available for operating assistance at the 80 percent federal share, but such availability is limited to the introduction of new transit services and for up to a three-year period only.

Decisions concerning the eligibility of projects for flexible funding will be made at the regional or MPO level. In this regard, the current ARC Regional Plan assumes operating subsidies for the first three years of the Northwest Corridor LRT will be met by CMAQ funds and thereafter, 25 percent of those costs (for preventative maintenance) will be paid from flexed highway funds. No assumption appears to have been made regarding use of flexible funds to support capital costs.

Although it does not yet appear to have been suggested, it is possible to use a GARVEE borrowing (which pledges future Federal aid entitlements to pay for a bond issue, see discussion below), to reprogram additional highway funds which might be flexed to capital uses for the Northwest Corridor LRT.

Earmarked Projects

It is possible for substantial project funding to be earmarked by Congress, independent of the FTA process. In recent years, the use of this approach for large projects has decreased somewhat, in favor of smaller awards for study or the initial phases of projects. There is always a concentration of this sort of funding activity in connection with the political log-rolling that accompanies periodic reauthorization of the highway and transit legislation every five years, e.g., TEA-21. Because this re-authorization will occur prior to the commencement of construction on the Northwest Corridor Light Rail Transit System, this option should be kept in mind as a possibility.

Lease Payment

FTA funds may be used to lease, rather than purchase, transit equipment and facilities, so long as leasing is more cost-effective than direct purchase.

Most FTA capital funding can be used to repay the principal and imputed interest costs of a facilities or rolling stock lease. This capability also applies to the capital and interest cost of contracting for service, referred to as Capital Cost of Contracting.

Under a lease structure, provided the grantee demonstrated that a lease was more cost-effective than direct purchase, the equipment or facility could be purchased by a leasing company, and leased to the grantee. The grantee would make lease payments from a combination of Federal funds and local matching funds. The primary benefit of such a structure is that it allows the grantee to arrange its cash flow needs on a more level basis, even when an unusually large acquisition must be made. Secondary benefits include the ability to bank the local share, allowing it to earn interest pending its use for making lease payments, as well as the ability to reprogram some of the current formula grant funds to other pending projects.

Capital Cost of Contracting

FTA permits grantees to count a portion of the costs of a contract with a private operator for transit service operations as a capital cost eligible for FTA capital program funding. This policy generally applies to contracting for providing transit services where the use of facilities and equipment is provided as a part of a transit service contract.

Flexible Matching Arrangements

A state may meet the nonfederal matching requirement for a given project (typically 20 percent) with a variety of funding sources. Among the newly eligible sources of matching funds are private cash and in-kind, including right-of-way donations, and certain federal funds from non-transportation sources (e.g., Bureau of Land Management).

A number of flexible arrangements are available in matching the federal funds. They include the following.

- **Credit for Donated ROW.** Under certain conditions, the fair market value of land donated for project right-of-way can be treated as a "soft-match" against federal funds. Typically, the value of such donated funds are added to the "hard" project costs, the federal/non-federal share calculated, and then the donated value subtracted from the non-federal share. Tax considerations may apply to the company donating the land.

  This, it is possible for an 80 percent federal project to have significantly less than 20 percent non-federal cash involved. For example, the St. Louis Light Rail Project was constructed with no out-of-pocket local funding, due to donation of a bridge across the Mississippi River for the rail crossing.

- **Toll Revenue Credit.** Subject to maintenance-of-effort requirements, a state may apply the value of certain previous toll-funded expenditures toward the nonfederal match on certain projects.

  FTA procedures provide that toll revenues on public roads and bridges expended for capital investment may count as local match (soft match) for Federal grant funds in a specific year. This capability allows the local matching share that would otherwise be required to match a transit grant, to be used for other projects.

  This results from the recognition that different modes of transportation are interconnected. Capital expenditures to reduce congestion in a particular corridor benefit all modes in that corridor, be they automobiles, transit buses, or a rail system. Thus, if a community constructs a toll bridge, FTA allows the revenues from that toll bridge to be used as local match under the following specific circumstances:

  - The toll revenues must be used for transportation capital investment, not operating expenses.
  - The soft match in one year is counted as the amount of toll revenue used for transportation capital investment in that year. That is, there is no carryover.
  - Depending upon local conditions and requirements, a project's local (non-toll) match could be banked, or used as matching funds for a discretionary grant, or used to facilitate the early completion of other capital project, etc.

- **Credit for Acquired Lands.** Donated or lands uses for a transit project already owned by a project sponsor can be considered as a soft match contribution to the non-federal matching requirements.

- **Delayed Local Match.** FTA permits grantees to vary or defer the payment of the local share of transit projects as long as the overall federal contribution does not exceed the

federal-aid matching limit by the time the project has been completed.

Transit systems may wish to delay the application of their local matching funding, particularly if they are trying to maximize the use of their locally available funds. This could occur because the funds are invested in a short-term security, for example, or otherwise encumbered. However, there may also be a situation where the grantee is seeking to arrange construction period financing or some other innovative financing mechanism that could be facilitated through an uneven expenditure of Federal and matching funds.

The FTA grants process generally is based on a level outflow for a specific project. For every 20 percent expended by the locality, 80 percent in Federal funds are expended. Little value can be added to such a cash stream through the assistance of private capital markets. However, if the Federal dollars are expended first, e.g., for 100 percent of the design, engineering, or environmental reviews, then the construction period can be financed with some private participation. In this instance local funds can be "banked", or pledged as additional security for construction period financing. This is all possible because there are no arbitrage concerns with the local funds as there might be with the Federal funds. The benefit of delayed local match is that it may help assure the smooth progress of a major transit infrastructure project without any increase in Federal outlays.

- **Program Level Match.** A region may bundle individual projects together for purposes of approval, administration, and matching requirements. In this way, certain projects may be wholly funded with Federal funds and others wholly funded with non-federal funds, as long as the overall federal contribution does not exceed the federal-aid matching limits across the full program of projects.

  To the extent available to transit programs, this may have applicability to circulators funded with mostly nonfederal funds and a higher proportion of federal funding in the trunkline.

Multiple Use Facility Funds

It is often possible to use funds allocated for other federal transportation programs of offset transit project construction costs. For example, portions of costs of grade separating transit from highway traffic may be paid for as part of some improvement to the highway rather than transit if sufficient programming foresight is exercised. CMAQ funds can also be used.

Metropolitan Planning

A minor source that can be used to support Alternatives Analysis. However, the present ARC Regional Plan does not assume the Northwest Corridor LRT Analysis will be funded from this source.

Minor Federal Funding Programs

More than 41 other Federal programs, including several all-new welfare-to-work funding sources, exist with possible application to transit. The types of support they provide include

capital assistance for vehicle and facility acquisition, operating assistance for transportation services, assistance with administrative costs, planning assistance and technical assistance.

Whether these funds are used for transportation services often depends on priorities set by federal agencies and the states. However, it is important that community transportation providers know what funding resources exist so that they may tap into them.

TIFIA

The Transportation Infrastructure Financing and Innovation Act (TIFIA) was authorized in TEA 21. It is a major new program intended to support large, nationally significant capital projects. TIFIA allows FTA to make loans, loan guarantees, and issue lines of credit, for up to one-third of the cost of such projects. The assumption behind the program is that such projects may have an associated revenue stream, such as tolls or local sales taxes, which would be used to repay debt issued by the project. In addition, such borrowings could be used to convert revenue streams from real estate development into construction capital financing—which has not been common in the past because of the reluctance of developers and lenders to commit to development projects in advance of completion of the transportation facility.

The concept for this program came from the line of credit that was issued by USDOT in support of the $2.3 billion Alameda Corridor Project (a rail project designed to lower the railroad below grade in order to avoid crossings, delays, and accidents). The Federal line of credit was used to secure up to $1.2 billion in Senior and Subordinated debt for the project. The debt will be repaid from a millage on rail freight containers that use the line.

TIFIA loans and guarantees are limited to projects of national significance that exceed $100 million. Loans may be repaid over as long as 40 years and the first repayment delayed until five years after substantial completion of construction. All surface modes of transportation are eligible for TIFIA loans, with the exception of airports and harbor facilities.

Pledge Future Apportionments to Pay Off Bonds (GARVEE)

A GARVEE is simply a debt instrument (short-term note or long-term bond) that uses a state's future federal-aid apportionments as the credit to support payment of principle and interest. Issuance costs and bond insurance premiums are also eligible for federal-aid reimbursement. With a GARVEE, the project can assemble capital up-front and construction can begin earlier than under a traditional financing. In recent years there have been a proliferation of GARVEE borrowings in support of highway projects, but there is no reason why the same principle could not be applied to transit.

Advance Construction

Advance construction permits a state to use its own resources to construct a project while preserving the project's eligibility for future federal-aid reimbursement. The state can then wait until the project is underway or completed before committing federal obligation authority, at which point the project is "converted" to federal aid. Under partial conversion of advance construction, conversion can occur gradually, according to the cash flow requirements. Thus, a

state can spread its consumption of federal obligation authority for a single project over several years.

A good example of this approach is Boston's MTBA (the T) successful use of this technique to construct A $235 million commuter rail maintenance facility:

1. MTBA gets an invoice from the contractor.
2. The T pays for the local share of the costs and submits receipts for reimbursement of the federal share.
3. The T issues short-term debt to cover costs, because each year's invoices are greater than the local and Federal shares.
4. The T issues long-term general obligation bonds twice a year to retire the short-term debt.
5. MTBA receives nearly $43 million annually of rail modernization funds. For 19 years, MTBA will use $16 million per year of this money (and the required $4 million local match) to pay for the Boston Engine Terminal reconstruction project. The remaining $27 million of the annual grant will be used to maintain the rest of the rail system. Even though the entire $235 million cost will be experienced in the first six years, MTBA will be able to pay for the project over 19 years.

A5.3 STATE FUNDS

A5.3.1 Public

GRTA Funding

Although largely untested as yet, the Georgia Regional Transportation Authority has broad powers to:

- Issue revenue bonds and other notes and financial instruments on its own or through Georgia Environmental Facilities Authority (GEFA).
- Issue bonds secured by a pool of obligations issued by local governments when proceeds of the local government obligations are applied to projects of GRTA.
- Issue guaranteed revenue bonds, backed by an appropriated debt service reserve set aside at the state level. Such bonds would be repaid by project revenue streams in the first instance.
- Revenue streams from special taxing districts activated by the legislation creating GRTA.
- Proceeds from the above can be used for loans, grants, or extension of credit in support of projects and leases.

State Government Contributions

State Government funding (for both operating and capital) is typically derived from GRF (pay-as-you-go or bonded) or dedicated Transportation/Transit Funds, can be single grants or continuing program based on formula or entitlements. Use of some motor-vehicle-related funds

blended with other State funds is fairly common, e.g., motor vehicle excise tax, sales tax on motor fuel, state sales tax. Lottery was sometimes used in the past. State Infrastructure Banks can loan revolving funds and guarantee/enhance transit project borrowings.

Central Equipment Agency

Some states have established a central agency to purchase equipment, especially rolling stock, in large lots at discount from the manufacturer. Although to date, this has generally been used to give smaller bus companies access to volume purchasing pricing, it is possible that Georgia could effectively apply it on a larger scale with respect to rolling stock in the Atlanta region. Also see next item.

State Revolving Loan Fund

States have the ability to use FTA grant funds to establish and operate Revolving Loan Funds in support of public and private non-profit transit operators. This mechanism allows the state, as recipient or by agreement with its sub-recipients, to aggregate federal funds, pool purchases of vehicles and either lease or sell these to the transit operators, or make loans to transit operators for vehicle and facilities acquisitions. The revolving loan fund allows pooled vehicle purchases that may help reduce acquisition costs. It provides a mechanism for the State to make loans (with interest) or leases to transit operators who might not be able to arrange such transactions on their own. And, it provides an ongoing source of local capital in support of the State's transit operators. The interest payments and lease payments returned to the State's revolving loan fund are considered to be "program income" in the context of the FTA grant program. These income streams are therefore not required to be returned to the U.S. Treasury, and may be used to make additional loans, leases, and grants to eligible transit grantees. The local grantees are able to use subsequent years' rural or urban grant funds to make loan or lease payments, including reasonable interest.

The Arkansas State DOT has requested authority and FTA funding to establish a State revolving loan fund, including Federal Highway Vanpool funds and local matching funds, to facilitate a state vehicle purchase and leasing program. Over $2.4 million in vehicle purchase activity may be supported with this fund over a 10-year period. This represents at least 125 vans for rural health and human services transportation service. The fund will reduce vehicle purchase costs by allowing more vehicles to be purchased at one time, and it will reduce transportation providers' capital costs by allowing them to lease these vehicles rather than purchasing them outright.

Reimbursable Loans

A state may lend funds to sponsors of projects that generate revenues (e.g., tolls or dedicated tax receipts). The state may then obtain "double reimbursement": (1) immediate federal-aid reimbursement for the lent funds, and (2) over time, principal and interest payments from the project sponsor. The state may use the repaid funds to support additional transportation projects or capitalize a revolving fund.

An example is State Highway 190 (George Bush Turnpike) in Dallas, Texas. In this project, the Texas DOT used a portion of its regular federal-aid highway funding to make a loan, rather than

a grant (Title 23, Section 129 loan). Basically, this $135 million loan as subordinate debt has three beneficial features:

1. A below market rate was obtained on this borrowing per se (almost a quarter of the total debt).
2. The subordinate status of this loan helped enhance the ratings on the principal senior debt.
3. As the loan is repaid with toll revenues, the repayments will transform a one-time grant of federal funds into a foundation for a self-sustaining revolving fund.

A5.4 LOCAL FUNDS

GRF operating subsidies and capital contributions from the governmental units served by the project are common. Many local governments have dedicated transit taxes. Like state programs, these can be bonded or pay-as-you-go. For large transit properties, 92 percent of local government dedicated contributions came from sales tax, 7 percent from property tax, with the balance from various sources. Relatively little came from motor vehicle related levies, although some have used motor vehicle excise tax, motor fuel sales tax, and toll road revenue bonds.

A5.4.1 Public

Dedicated City/County Revenues

It is relatively common for governmental entities (primarily cities and counties) with general taxing authority to either earmark specific tax revenues for transit purposes or to make a continuing appropriation of funds for such purposes. Sales tax is commonly used for this purpose.

For purposes of borrowing against such revenue streams, it is important that the funds be dedicated to project purposes in such a way as to avoid an appropriations risk, which could periodically interfere with debt service repayment during each budget cycle.

Tax Increment Financing

The issuance of bonds that are paid off with an increment in property taxes that result from the appreciation in value of real estate near the project (caused by infrastructure) or capital investment financed by the bonds. Used as a joint development or value capture technique. Also called a TIF district.

Negotiated Investment (Public Agencies)

It is sometimes possible to negotiate an agreement with universities, hospitals, or other major public institutions to receive a financial contribution (one-time or continuing) in return for some adjustment in routing, service, schedule, or ticket pricing which might not otherwise be included in a project.

Rail Stations Constructed by Local Governments

Sometimes, rail stations are built and maintained by local government units, providing a financial boost to the agency and at the same time giving the local community control over architecture and parking/traffic flow considerations not otherwise available to them.

Land Banking

The purchase or condemnation of land beyond what is needed for a transit system to be built. This land can then be sold or leased to a developer. Sometimes referred to as "land assembly."

A5.4.2 Private

Benefit Assessment District

A geographic area in which an assessment is levied on property (usually commercial) and the revenues earmarked for a specific use. Frequently, the district is drawn around a transit system. The tax is justified on grounds that real estate near a transit system will appreciate in value and so the system is entitled to this tax appreciation. Used as a value capture technique. Also called a special assessment district or transportation development district.

Public-Private Partnerships

Public-Private Partnerships (PPPs) are arrangements between government and private sector entities for the purpose of providing public infrastructure, community facilities, and related services—including transit. Such partnerships are characterized by sharing of investment, risk, responsibility, and reward between the partners. The reasons for such partnerships vary but generally involve the financing, design, construction, operation, and maintenance of such facilities and services.

The underlying logic for establishing partnerships is that both the public and the private sector have unique characteristics that provide them with advantages in specific aspects of service or project delivery. The most successful partnership arrangements draw on the strengths of both the public and private sector to establish complementary relationships.

The roles and responsibilities of the partners vary from project to project. For example, in some projects, the private partner will have significant involvement in all aspects of service delivery, in others, only a minor role.

While the roles and responsibilities of the private and public partners may differ on individual servicing initiatives, the overall role and responsibilities of government do not change. Public-Private Partnership is one of a number of ways of delivering public infrastructure and related services. It is not a substitute for strong and effective governance and decision making by government. In all cases, government remains responsible and accountable for delivering services and projects in a manner that protects and furthers the public interest.

Only one form of public-private partnership, known as Build-Own-Operate (BOO) can be described as coming close to privatization. All other forms require an ongoing partnership

between the private and public sectors. Even Build-Own-Operate involves a form of partnership in that the public sector can place conditions and regulations on the private partner. One of the key reasons for considering public-private partnership is the ability to introduce competition in the provisions of local government services, either between private firms or between the private and public sectors. Full privatization merely transforms a public monopoly to a private monopoly such that the benefits of public-private partnership are not realized.

The principle reasons for local government becoming involved in public-private partnerships are to benefit from increased efficiency, shorter implementation time, greater innovation, and ultimately better value in the delivery of services brought about by increased competition. The ability to finance a project so that debt is "off book" should not be the prime motivation for entering into a public-private partnership in that local government and the ultimate users of service are still responsible for servicing the debt in one way or another. The emphasis should be on structuring creative and cost-effective ways of delivering services, not on creative accounting.

Privatization of Routes and Services

Privatization transfers the ownership and/or operation of a transit facility to the public sector. The government may impose rate or service requirements as a condition of granting private monopoly rights to a private firm. A variety of alternative service delivery techniques can be employed to maximize efficiency and increase service quality. Some methods will be more appropriate than others depending on the service. In searching for ways of cutting costs and increasing delivery, a combination of the following techniques can be considered.

Contracting Out (also called "outsourcing")

The government competitively contracts with a private organization, for-profit or non-profit, to provide a service or part of a service.

Management Contracts

The operation of a facility is contracted out to a private company. Facilities where the management is frequently contracted out include airports, wastewater plants, arenas and convention centers.

Public-Private Competition (also called "managed competition," or "market testing")

When public services are opened up to competition, in-house public organizations are allowed to participate in the bidding process.

Franchise

A private firm is given the exclusive right to provide a service within a certain geographical area.

Internal Markets

Departments are allowed to purchase support services such as printing, maintenance, computer repair and training from in-house providers or outside suppliers. In-house providers of support services are required to operate as independent business units competing against outside

contractors for departments' business. Under such a system, market forces are brought to bear within an organization. Internal customers can reject the offerings of internal service providers if they don't like their quality or if they cost too much.

Vouchers

Government pays for the service; however, individuals are given redeemable certificates to purchase the service on the open market. These subsidize the consumer of the service, but services are provided by the private sector. In addition to providing greater freedom of choice, vouchers bring consumer pressure to bear, creating incentives for consumers to shop around for services and for service providers to supply high-quality, low-cost services.

Commercialization (also referred to as "service shedding")

Government stops providing a service and lets the private sector assume the function.

Self-Help (also referred to as "transfer to non-profit organization")

Community groups and neighborhood organizations take over a service or government asset such as a local park. The new providers of the service also are directly benefiting from the service. Governments increasingly are discovering that by turning some non-core services—such as zoos, museums, fairs, remote parks and some recreational programs—over to non-profit organizations, they are able to ensure that these institutions don't drain the budget.

Volunteers

Volunteers are used to provide all or part of a government service. Volunteer activities are conducted through a government volunteer program or through a non-profit organization.

Corporatization

Government organizations are reorganized along business lines. Typically they are required to pay taxes, raise capital on the market (with no government backing—explicit or implicit), and operate according to commercial principles. Government corporations focus on maximizing profits and achieving a favorable return on investment. They are freed from government procurement, personnel and budget systems.

Asset Sale or Long-Term Lease

Government sells or enters into long-term leases for assets such as airports, gas utilities or real estate to private firms, thus turning physical capital into financial capital. In a sale-leaseback arrangement, government sells the asset to a private sector entity and then leases it back. Another asset sale technique is the employee buyout. Existing public managers and employees take the public unit private, typically purchasing the company through an Employee Stock Ownership Plan (ESOP).

Private Infrastructure Development and Operation

The private sector builds, finances, and operates public infrastructure such as roads and airports, recovering costs through user charges. Several techniques commonly are used for privately building and operating infrastructure.

Build-Operate-Transfer (BOT) Arrangements

With build-operate-transfer (BOT) arrangements, the private sector designs, finances, builds, and operates the facility over the life of the contract. At the end of this period, ownership reverts to the government.

A variation of this is the *Build-Transfer-Operate (BTO)* model, under which title transfers to the government at the time construction is completed.

Finally, *with Build-Own-Operate (BOO)* arrangements, the private sector retains permanent ownership and operates the facility on contract.

Joint Development

There is a great deal of flexibility in FTA's treatment of Joint Development, particularly as this relates to transit supportive development, in FTA's "Livable Communities Initiative." Grantees can lease air rights above a transit station, or transfer the FTA interest in one property to another, to allow the private development or other use of the property. FTA funds cannot generally be used to support development of property that is not directly adjacent to the transit facility. However, if property can be subdivided, the FTA interest can be vested wholly in one part while the other would be considered 100 percent local share, for purposes such as leasing or mortgaging, which allows the transit system to actively support land use changes that increase transit use and program income. Joint development proposals will be reviewed and approved by FTA on a case-by-case basis.

Some major joint development projects include:

- Boston Central Artery Project
- Allied Junction Multi-Modal Station Development, N.J.
- Washington State and Seattle Air-Rights and Public/Private Financing
- San Diego Light Rail, Air Rights and Privatized Financing
- Pensacola Highway I-110 Project

Joint Development is an effort by a public agency and a private developer to undertake a construction project. Joint Developments are usually a voluntary joining of governmental entities with private for-profit organizations to undertake mutually beneficial development in connection with public infrastructure. A Joint Development agreement generally contains formal legally binding language between a public entity and a private individual. Projects may also be initiated through a co-development. A co-development is an informal working arrangement in which the public agency and the private developer work together to complete their individual

projects in a mutually beneficial way. The co-developers usually attempt to site and coordinate their projects based on a non-binding legal agreement.

Successful joint development requires planning, supportive zoning and a single point of contact for the project. Four conditions are necessary for successful joint development:

1. Healthy real estate market
2. An agency with an entrepreneurial outlook
3. Coordination of zoning/rezoning with local agencies
4. Realization that benefits of joint development transcend the generation of revenue

Both the Georgia Regional Transportation Authority and the ARC are warning that federal money for transportation projects could be cut off if counties don't support new rail and bus routes with land-use plans calling for dense development along the transit corridors.

The following is a listing of examples of MARTA's aggressive initiation of joint development plans.

- **Lindbergh, Medical Center And Sandy Springs**. MARTA is pushing development plans for its property near these stations to create millions of square feet of office space, thousands of residential units and shops offering a variety of goods and services.
- **Brookhaven.**_Planners identify this station as the best example of transit-oriented development along a MARTA line, although it's a low-rise version. Without a specific plan, developers have built offices, apartments, townhouses, stores and restaurants within walking distance.
- **Lenox.** Planners consider this the best example in metro Atlanta of efficient use of a heavy rail station by concentrating several types of high-rise development within walking distance. Residential high-rises mix with office towers and millions of square feet of shops and restaurants.
- **Ashby.** This station is at the center of a redeveloping area, where new apartments have replaced a housing project and the Atlanta Development Authority is helping create a mixed-use project that includes offices, townhouses and a retail village with a grocery store.
- **Indian Creek.** Planners point to the area surrounding this station as falling far short of its development potential. DeKalb County's land use policies identify it as an area for single-family development.

MARTA station development types include the following:

Commuter – Surrounded mostly by parking lots with little development nearby.

Neighborhood – Surrounded mostly by subdivisions.

Community center – Surrounded by a mixture of smaller-scale business and residential developments.

Dense mixed-use – Surrounded by office and residential high-rises and dense retail development.

Graphic is superimposed over a map of the MARTA system; station development types are described above.

The New Riders

When MARTA started opening rail stations 20 years ago, the agency expected development nearby to build its ridership. Now the agency is putting its own property up for lease to developers to build dense development near three of its rail stations. Here is the projected increase in ridership MARTA expects at each station as a result of its development efforts:

Station	2003	2010	2015
Lindbergh	5,500	11,700	13,700
Medical Center	6,700	9,400	10,400
Sandy Springs	1,700	3,500	4,000

Sources: Staff research, MARTA / ROB SMOAK / Staff

Value Capture Strategies

Value capture strategies involve use of the increased property, rental, occupancy, density, and other values created by the new transit facility to pay for construction or operations subsidy.

Includes Tax Increment Financing (TIF) strategies, as discussed elsewhere, designed to dedicate increased tax revenues resulting from transit improvement to servicing construction bonds.

Recent Federal programs such as TIFIA and State Infrastructure Banks that guarantee such borrowings, substantially enhance the value of this approach. GRTA funds could serve the same purpose.

63-20 Corporations

Project sponsors occasionally establish a financing conduit in the form of a nonprofit corporation. By virtue of its nonprofit status, the corporation is eligible to issue tax-exempt debt, and its position as an intermediary between private developer and public agency also permits entry into agreements for private development and operation of the project. The South Carolina Department of Transportation is employing this approach on a 16-mile tolled beltway segment, the Southern Connector. By means of a nonprofit corporation, SCDOT will realize the cost savings of a tax-exempt debt issue while deriving the benefits of private development and operation of this $200 million project.

Most experts agree that this so-called "63-20" nonprofit financing conduit is currently the best means of preserving projects' eligibility for tax-exempt financing while enabling public agencies to enjoy the efficiencies of sharing risks and responsibilities with private-sector partners. The

63-20 designation refers to the relevant Internal Revenue Service ruling that authorizes the financial arrangement.

Notwithstanding the benefits of a 63-20 arrangement, insertion of a nonprofit intermediary into the middle of an arrangement complicates the flow of funds and may have other disadvantages as well. There are three potential shortcomings:

- First, private developers are prohibited from making equity contributions to the project, and thus have no long-standing economic stake in the project.
- Second, payments to private operators may not be linked to net revenues generated by the project, a prohibition that rules out many kinds of performance-based incentives.
- Third, the need for public agencies to distance themselves from their private partners can potentially cause the private partners and even the nonprofit corporations to lack accountability.

Real Estate Oriented Revenues

Commercial utilization of ROW and other property acquired in connection with construction and operation of project. Includes:

- Joint Development and fees for connecting facilities to transit
- Selling development rights
- Development of Transit Villages
- Lease of airspace, ROW and other land, or facilities.

Real Estate Strategies

Density Bonus

The granting of specific zoning enhancements to a development allowing for greater floor to area ratio in return for some benefit to a public agency. Used as a joint development technique. See also incentive zoning.

Developer Extractions

A negotiated dedication of land or payment of a fee to a public agency from individual developers. Used as a joint development or value capture technique. See also impact fee.

Development Rights

Property rights for the development space above, below, or adjacent to transit/ highway facilities which are leased or sold. Property rights for the space above are also known as air rights. Used as a joint development technique.

Incentive Zoning

The awarding of a certain type of zoning to a developer in return for some benefit to a public agency. Used as a joint development technique. See also density bonus.

Impact Fee

A fee levied on property owners or developers who will benefit from a public improvement, including transit, who are also creating some type of traffic or land use impact. Usually, this is a one-time fee as opposed to an ongoing tax. See also developer extractions and benefit assessment district.

Transfer of Development Rights

The act of allowing the owner of a piece of property to grant the property's development potential (based on the property's zoning) to another piece of property. Also known as TDR.

Access Agreement

Fee paid by developer for the right to connect to a transit station, or the actual cost of a direct connection paid by a private entity.

Advertising Rights

Space available for advertising inside stations, on transit vehicles, on tickets and schedules, or elsewhere that advertisers would be willing to pay. Used as a value capture technique.

Cost Sharing

A developer or other entity shares in the cost of developing a public facility in exchange for certain benefits. This is used as a joint development technique.

Assessments and Fees

Assessments are taxes or fees on all properties within a special district which pay for all or a part of specific improvements made within that district. Assessments are levied as one-time or recurring liens by city councils or special assessment or improvement districts. Fees are used to segment a portion of the population that has a significant impact on transportation, or that benefits from transportation improvements. Impact fees on developers to mitigate the impact of their projects on transit services are an example.

Negotiated Investment (Private Agencies)

Negotiated Investments include private sector contributions or improvements exchanged for zoning changes, building permits, or other public requirements or a desire to see service initiated.

Private Donations and Investments

The current Northwest Corridor Project is a prime example: the CIDs want to move forward a project not yet sufficiently prioritized by providing leadership and financial participation to advance the project. Similar involvement in the Alternatives Analysis, construction, and operations phases may also be indicated.

Rail Stations Constructed by Private Entities

As discussed above in connection with local communities, it is possible to agree with private entities such as businesses and major employers for them to construct and maintain station facilities on property which they supply.

Appendix 6 Federal New Starts Funding 2001: Summary Ranking

This appendix includes tables presenting three separate sorts of the Spring 2001 New Start FTA Project Evaluations:

Table A6-1 *Primary Sort:* Overall Financial Rating; *Secondary Sort:* Total Capital Cost

Table A6-2 *Primary Sort:* Total Capital Cost

Table A6-3 *Primary Sort:* New Start Share of Total Project Cost; *Secondary Sort:* Overall Financial Rating

Appendix 6
Federal New Starts Funding 2001: Summary Ranking

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Table A6-2 *Primary Sort:* Total Capital Cost

Table A6-3 *Primary Sort:* New Start Share of Total Project Cost; *Secondary Sort:* Overall Financial Rating

Table A6-1 Federal New Starts Funding 2001: Summary Rankings

2001 New Start Ratings ($ are in millions)		2nd Sort					1st Sort		
Project	Status	Total Capital Cost (millions)	Basis of Cost Estimate	Total Sect. 5309 Funding Requested (millions)	Section 5309 Share	Overall Project Rating	Financial Rating	Capital Finance Rating	Operating Finance Rating
Portland (Interstate MAX LRT Extension)	Preliminary Engineering	$350.00	YOE	$257.50	73%	Highly Recommended	5 (High)	5 (High)	5 (High)
Orange County (The Centerline Orange County Rail Corridor)	Preliminary Engineering	$2,015.80	YOE	$1,009.10	50%	Recommended	4 (Medium-High)	4 (Medium-High)	4 (Medium-High)
Seattle (Central Link LRT MOS)	Preliminary Engineering	$1,500.00	YOE	$500.00	33%	Highly Recommended	4 (Medium-High)	5 (High)	3 (Medium)
Denver (Southeast Corridor LRT)	Preliminary Engineering	$882.50	YOE	$525.00	60%	Recommended	4 (Medium-High)	4 (Medium-High)	4 (Medium-High)
Austin (Austin Area LRT System)	Preliminary Engineering	$739.00	YOE	$369.50	50%	Recommended	4 (Medium-High)	4 (Medium-High)	3 (Medium)
Minneapolis (Hiawatha Corridor LRT)	Preliminary Engineering	$548.60	YOE	$274.30	50%	Recommended	4 (Medium-High)	4 (Medium-High)	3 (Medium)
San Francisco (Third Street Light Rail Project Phase 1)	Preliminary Engineering	$500.10	YOE	$0.00	0%	Recommended	4 (Medium-High)	4 (Medium-High)	3 (Medium)
Chicago (Douglas Branch Reconstruction)	Preliminary Engineering	$450.80	YOE	$320.10	71%	Highly Recommended	4 (Medium-High)	4 (Medium-High)	3 (Medium)
San Diego (Mission Valley East LRT Extension)	Final Design	$431.00	YOE	$330.00	77%	Highly Recommended	4 (Medium-High)	5 (High)	4 (Medium-High)
Pittsburgh (Stage II LRT Priority Program)	Final Design	$383.70	YOE	$100.20	26%	Recommended	4 (Medium-High)	4 (Medium-High)	4 (Medium-High)
Chicago (CTA Ravenswood Line Expansion)	Preliminary Engineering	$327.10	YOE	$245.50	75%	Highly Recommended	4 (Medium-High)	4 (Medium-High)	3 (Medium)
Houston (Downtown to Astrodome Corridor Light Rail)	Preliminary Engineering	$300.00	YOE	$64.90	22%	Recommended	4 (Medium-High)	4 (Medium-High)	4 (Medium-High)
San Diego (Oceanside Escondido Rail Project)	Preliminary Engineering	$253.50	YOE	$152.10	60%	Highly Recommended	4 (Medium-High)	4 (Medium-High)	4 (Medium-High)
Cleveland (Euclid Corridor Improvement Project)	Preliminary Engineering	$220.00	YOE	$135.00	61%	Recommended	4 (Medium-High)	4 (Medium-High)	4 (Medium-High)
Newark (Newark Rail Link, MOS-1)	Final Design	$207.70	YOE	$142.00	68%	Highly Recommended	4 (Medium-High)	4 (Medium-High)	4 (Medium-High)
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Chicago (Metra South West Corridor Commuter Rail)	Preliminary Engineering	$165.50	YOE	$103.90	63%	Highly Recommended	4 (Medium-High)	4 (Medium-High)	5 (High)
Baltimore (Central Corridor Light Rail Double Tracking)	Preliminary Engineering	$153.70	YOE	$120.00	78%	Recommended	4 (Medium-High)	5 (High)	4 (Medium-High)
San Diego (Mid Coast Corridor Project)	Preliminary Engineering	$123.00	YOE	$48.30	39%	Highly Recommended	4 (Medium-High)	4 (Medium-High)	4 (Medium-High)
Chicago (Metra Central Kane Corridor)	Preliminary Engineering	$93.00	YOE	$54.30	58%	Recommended	4 (Medium-High)	4 (Medium-High)	5 (High)
New York (Long Island Rail Road East Side Access Project)	Preliminary Engineering	$4,350.00	YOE	$2,175.00	50%	Recommended	3 (Medium)	3 (Medium)	4 (Medium-High)
Northern New Jersey (Hudson-Bergen MOS-2)	Final Design	$1,112.80	YOE	$721.60	65%	Recommended	3 (Medium)	3 (Medium)	3 (Medium)
Las Vegas (Resort Corridor Fixed Guideway MOS)	Preliminary Engineering	$568.00	YOE	$155.00	27%	Recommended	3 (Medium)	3 (Medium)	3 (Medium)
San Juan (Tren Urbano, Minillas Ext)	Preliminary Engineering	$478.30	YOE	$382.60	80%	Recommended	3 (Medium)	3 (Medium)	4 (Medium-High)
Washington DC/MD (Largo Extension)	Preliminary Engineering	$433.90	YOE	$260.30	60%	Recommended	3 (Medium)	3 (Medium)	4 (Medium-High)
Ft. Lauderdale (Tri-Rail Commuter Upgrade)	Final Design	$327.00	YOE	$110.50	34%	Recommended	3 (Medium)	3 (Medium)	3 (Medium)
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Salt Lake City (CBD to University LRT)	Preliminary Engineering	$105.80	YOE	$84.60	80%	Recommended	3 (Medium)	4 (Medium-High)	3 (Medium)
Miami (South Miami-Dade Busway Extension)	Preliminary Engineering	$87.80	YOE	$61.30	70%	Recommended	3 (Medium)	3 (Medium)	3 (Medium)
Hartford (New Britain-Hartford Busway)	Preliminary Engineering	$80.00	YOE	$51.60	65%	Recommended	3 (Medium)	3 (Medium)	3 (Medium)
Memphis (Medical Center Extension)	Preliminary Engineering	$69.10	YOE	$55.30	80%	Recommended	3 (Medium)	4 (Medium-High)	3 (Medium)
Tampa (Tampa Bay Regional Rail)	Preliminary Engineering	$953.80	YOE	$476.90	50%	Not Recommended	2 (Low-Medium)	2 (Low-Medium)	2 (Low-Medium)
Phoenix (East Valley Light Rail Transit)	Preliminary Engineering	$883.90	YOE	$441.90	50%	Not Recommended	2 (Low-Medium)	2 (Low-Medium)	1 (Low)
Cincinnati (I-71 Corridor)	Preliminary Engineering	$874.70	YOE	$431.20	49%	Not Recommended	2 (Low-Medium)	2 (Low-Medium)	1 (Low)
Raleigh (Phase I Triangle Regional Rail Project)	Preliminary Engineering	$284.00	YOE	$111.00	39%	Not Recommended	2 (Low-Medium)	2 (Low-Medium)	2 (Low-Medium)
Miami (East-West Multimodal Corridor)	Preliminary Engineering	$2,023.00	YOE	$808.00	40%	Not Recommended	1 (Low)	1 (Low)	1 (Low)
Miami (North Corridor)	Preliminary Engineering	$615.20	YOE	$430.60	70%	Not Recommended	1 (Low)	1 (Low)	1 (Low)
Norfolk (Norfolk - Virginia Beach Corridor LRT)	Preliminary Engineering	$524.60	YOE	$288.50	55%	Not Recommended	1 (Low)	1 (Low)	1 (Low)
Boston (South Boston Piers Transitway Phase II)	Preliminary Engineering	$363.70	1996	$291.00	80%	Not Recommended	1 (Low)	1 (Low)	2 (Low-Medium)
New Orleans (Canal Streetcar Spine)	Final Design	$139.40	YOE	$111.50	80%	Not Recommended	1 (Low)	1 (Low)	1 (Low)

NOTE: Projects not rated by FTA are excluded.

Table A6-2 2001 New Start Ratings by Total Capital Cost ($ in millions)

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Appendix 7

FTA New Starts Success/Failure Factors

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Successful projects are those that meet the following criteria: high overall finance rating; having Capital Costs greater than $475 million and a Medium-High Overall Finance Rating; having a Capital Cost greater than $475 million and a Medium Overall Finance Rating.

Unsuccessful projects were projects with a Capital Cost greater than $475 million and a Low Overall Finance Rating.

A7.1 Successful Projects

Successful Project	Capital Financial Plan	Operating Financial Plan	Principles of Success
Interstate MAX LRT Extension, Portland, OR The Tri-County Metropolitan Transportation District of Oregon (Tri-Met) is proposing a 5.6-mile extension of its Light Rail Transit (LRT) system known locally as the Metropolitan Area Express. The proposed Interstate Metropolitan Area Express (MAX) line will extend existing LRT service northward from the Rose Quarter Arena and the Oregon Convention Center, to North Portland neighborhoods, medical facilities, the Portland International Raceway, and the Metropolitan Exposition Center. Goals of the alignment include complementing regional land use plans by connecting established residential, commercial, entertainment, and other major activity centers, and providing a key transportation link in the region's welfare to work programs. The LRT extension is estimated to cost $350 million (escalated dollars) and carry	**Rating:** High **Non-Section 5309 Share of Total Project Costs:** 27% The Tri-Met financial plan proposes $257.5 million (73 percent) in Section 5309 New Start funds and $92.5 million (27 percent) in State, local, and Federal flexible funds for the project. Tri-Met notes that it is not requesting any Section 5309 New Starts funding for two simultaneous projects currently under development: the Airport Max Light Rail project and the Portland Streetcar. Local and private sources will cover $246.5 million of these project costs. The High rating reflects the solid financial condition of Tri-Met, the local lead transit agency, and the other local partners – Metro and the City of Portland. Unlike the previous South-North corridor proposal, this project does not require a referendum to approve a funding source. **Agency Capital Financial Condition:** Tri-Met is in good financial condition. Short-term bonds will be issued under the agency's existing bond indenture. The bond trust indenture has a rating of AA+ by Standard & Poor's and Aa3 by Moody's. **Capital Cost Estimates and Contingencies:** Capital cost estimates have decreased by 70 percent from last	**Rating:** High The High rating reflects the stability of operating funds, sufficient projected revenue growth, and adequate cash reserves. **Agency Operating Condition:** Tri-Met's operating condition is very strong. The agency's expense growth rate remains in balance with revenue growth rates, and Tri-Met has substantial working capital reserves on hand to cover any variations in a given year. **Operating Cost Estimates and Contingencies:** Annual operating costs for Interstate MAX are estimated at $7.2 million in 2005 dollars. Operating cost estimates appear reasonable Tri-Met maintains from 2 to 3 months working capital across the life of the cash flow – a substantial reserve for covering unanticipated cash flow or cost issues. **Existing and Committed Funding:** Over 68 percent of all Tri-Met's ongoing operating revenues are projected to come from its dedicated regional employer/municipal payroll tax revenue, which is assumed to	• Solid financial condition of sponsoring agency and the other local partners • No New Start funds in 2 related segments • Short-term capital funding in place • All non-New Start funds are committed and programmed • 68% of operating revenue comes from dedicated payroll tax with god growth • Innovative public-private partnership • Costs have reduced due to scope changes • Some new funding sources but bonds ratings are high

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18,100 average weekday boaridngs (8,400 new riders) by 2020.	year because the scope of the project has been reduced from the 12-mile South/North proposal to the current 5.6 mile Interstate MAX. Present cost estimates are reasonable for the scope of the project and inflation assumptions are in-line with regional trends. The agency has a logical contingency plan to modify the construction schedule to minimize additional interim borrowing if federal funding authorizations are insufficient. **Existing and Committed Funding:** All non-New Starts funding for the project is committed and programmed. Non-federal financing alternatives appear strong and well-considered. Financing strategies such as an interim local borrowing program (i.e., letters of credit, commercial paper, vendor financing, and a line of credit) and "flexing" Surface Transportation Program (STP) funds to the project are in place. Tri-Met and the City of Portland recently signed a detailed intergovernmental agreement that defines financing responsibilities, payment of project funds, administration of the project account, and other terms and conditions. The City will use tax increment financing, its General Fund, or its Transportation Fund to support its $30 million contribution. **New and Proposed Sources:** Tri-Met's contribution of short-term bonds is a new funding source, but will be issued under the agency's existing bond indenture and constitute 20 percent of non-Federal funding. This service is committed and programmed.	increase at an average annual rate of 7.4 percent. This projected growth is conservative compared to the historical increase of 9.6 percent. The projected farebox recovery ratio is 29 percent. **New and Proposed Sources:** All proposed operating revenues currently exist.	

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The Centerline Orange County Rail Corridor, Orange County, CA The Orange County Transportation Authority (OCTA) is developing a 26.6-mile rail corridor in central Orange County between Fullerton and Irvine. The proposed project will connect major activity centers within the corridor, including downtown Fullerton and the Fullerton Transportation Center, downtown Anaheim, the Anaheim Resort Area (including Disneyland, the Anaheim Convention Center, Edison Stadium and the Arrowhead Pond) downtown Santa Ana (and the county government center), John Wayne Airport, El Toro Marine Base (which is being converted to civilian use), and several hospitals and regional shopping, employment, cultural, and entertainment centers. OCTA is currently studying several alignment alternatives for a light rail transit system in the corridor, including minimum operable segment (MOS) options. This profile reflects an assumption of a 31-station 26.6 mile LRT system which is 97 percent at-grade and 3 percent elevated. Project costs are estimated at $2.015 billion (escalated dollars) with ridership estimated at 71,800 average weekday boardings.	**Rating:** Medium-High The OCTA financial plan proposes $1,009.1 million (50 percent) in Section 5309 New Start funds and an additional Federal contribution of $405.4 million (20 percent) in Federal flexible funds. The plan includes $421.9 million (21 percent) in State funding and $179.4 million (9 percent) in local funds. The Centerline Rail Corridor has received a Medium-High capital plan rating because 100 percent of proposed local funding for the project is committed from existing sources. **Agency Capital Financial Condition:** OCTA is in sound financial condition. The agency has sufficient capital resources from a ½ percent sales tax (Measure M) to finance a wide range of capital improvements. **Capital Cost Estimates and Contingencies:** OCTA is in the process of selecting the locally preferred alternative and is considering a minimum operating segment (MOS). Capital cost estimates and contingencies will likely be refined after selection of the preferred alternative. **Existing and Committed Funding:** The OCTA Board of Directors has committed $180 million in Measure M funds and sufficient CMAQ and State Transit Improvement Program (STIP) funding to finance the non-Section 5309 New Starts share of capital costs. **New and Proposed:** All of the proposed Non-Section 5309 share of projects costs are from existing funding sources.	**Rating:** Medium-High The Medium-High operating plan rating reflects the existing dedicated revenue stream for operating the Centerline Rail Corridor. **Agency Operating Condition:** OCTA is in sound operating financial condition. Measure M and other existing revenues provide the agency with sufficient resources to operate its existing bus system. **Operating Cost Estimates and Contingencies:** Annual O&M costs are estimated at $46.5 million. These estimates appear reasonable given the proposed size of the system. These costs will be refined after the locally preferred alternative is selected. **Existing and Committed Funding:** OCTA proposes that operation of the completed Rail Corridor would be funded with an interest-bearing operating fund comprised of Measure M ($250 million) and CMAQ ($49 million) funds. This resource is estimated to yield sufficient funds to operate the completed 26.6-mile system through FY 2030. OCTA has similar funding in place for both its bus and commuter rail operations **New and Proposed Funding Sources:** All of the funding proposed for operations and maintenance is from existing funding sources.	• Blends New Start and Flexible funds • 100% local share committed • Sponsoring agency established and financially sound • Dedicated capital and operating revenue streams • Operations funded from interest bearing accounts • All funds are from existing sources

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Central Link LRT (MOS), Seattle, WA Sound Transit (Central Puget Sound Regional Transit Authority) is planning a 23.5-mile Central Link light rail transit (LRT) project running north to south from Northgate, through downtown Seattle, Southeast Seattle and the cities of Tukwila and SeaTac, Washington. Link will consist of 23 stations, four new park-and-ride lots, and one existing lot. The system would operate on existing and new right-of-way (ROW), including the existing 1.6 mile Downtown Seattle Transit Tunnel. Sound Transit estimates a total of 156,400 daily riders on the 23.5-mile system in 2020. Capital costs for the entire project are $3.1 billion (escalated dollars), with annual operating costs estimated at $62.5 million (escalated dollars). Sound Transit proposes to implement the system in several minimum operable segments (MOS). The MOS being proposed for Federal funding under TEA-21 will extend 7.2 miles from NE 45th Street station southward to the South Lander Street station. This alignment includes 4.5 miles of wholly new and exclusive ROW, 1.3 miles of exclusive transit ROW in the existing Downtown Seattle Transit Tunnel, and 1.4 miles of ROW reconfigured from an existing	**Rating:** High Sound Transit proposes $500.0 million (33 percent) in Section 5309 funds, and $1.0 billion (67 percent) in local funds for the project. Local sources will consist of a sales and use tax, motor vehicle excise tax, and local issue bonds. The High rating reflects the solid financial condition of Sound Transit and the agency's dedicated local revenue sources. **Agency Capital Financial Condition:** The financial condition of Sound Transit is strong. In 1996, voters approved a $3.9 billion Sound Move regional transit plan to be supported by two dedicated local tax sources. The taxes continue in perpetuity with no sunset provisions and are dedicated solely to Sound Transit projects. Sound Transit intends to bond against these revenues to implement the Sound Move program and has received an A1 rating from Moody's Investor Service. **Capital Cost Estimates and Contingencies:** Cost estimates have increased from last year, for both the MOS and the entire project, because of increased right-of-way costs and mitigation components. Adequate provisions exist to cover unanticipated cost overruns. The agency applies adequate cost contingencies to all capital items. Furthermore, it maintains two capital reserve funds which are a bond reserve fund equal to one year's debt servicing and an operating reserve fund equal to two months of operating expenditures. The agency's ultimate contingency is its untapped debt capacity. Sound Transit could issue additional bonds without violating its debt policy or legislated constraints on capacity. **Existing and Committed Funding:** All non-New Starts funding exists and is committed. Sound Transit has access to two strong local tax sources for its exclusive	**Rating:** Medium The Medium rating reflects Sound Transit's stable and reliable operating revenues, but acknowledges some concern with the operating condition of other transit providers in the region. Agency Operating Condition: In recent years Sound Transit has experienced a zero operating balance (operating costs equal operating revenues), a 20 to 25 percent farebox recovery ratio, and consistent ridership levels. According to the financial plan, operation of the MOS, as well as the full project, will not detract from other Sound Transit project initiatives (e.g., commuter rail, express bus). **Operating Cost Estimates and Contingencies:** Operating costs are estimated at $62.5 million and appear reasonable. If economic growth slows or financial difficulties occur, sales tax revenues may be used to secure additional debt funding. **Existing and Committed Funding:** The financial plan uses the same tax revenue sources to fund operations as are used to fund capital expenditures. These dedicated local sources are anticipated to provide 86 percent of all operating revenues when service is open in 2007. Sound Transit assumes a farebox recovery ratio of 55 percent for the overall Link project. Analysis by the agency actually projects a recovery ratio of 66 percent, but the more conservative estimate is used for the financial plan.	• Solid financial condition of sponsoring agency • Dedicated existing capital and operating funding • Bonds utilized • Some concern with operating funds of other transit providers • Adequate provisions to cover contingencies • No new funding sources needed • Part of $3.9 billion regional funding plan • Maintains capital reserve funds • Contingency reserve = untapped debt capacity

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busway south of Downtown. Sound Transit estimates average weekday boardings of 87,200 for the MOS in 2020. The estimated cost of this segment is $1,500 million (escalated dollars). The Link LRT system is one element of Sound Transit's voter-approved ten year, $3.9 billion ($1995) Sound Move regional transit plan, which also includes implementation of a 2-mile LRT line in downtown Tacoma; an 82-mile Sounder commuter rail system operating between Lakewood and Everett; 20 new regional express bus routes; 14 High Occupancy Vehicle (HOV) direct access ramps (providing access to over 100 miles of existing HOV lanes); 14 new park and ride lots and 9 transit centers; and other service improvements.	use – a Sales and Use Tax and a Motor Vehicle Excise Tax (MVET) --- which will contribute $475 million to the project. These sources are separate from sources that fund other transit services in the Seattle area. Growth in tax revenues from these sources has outpaced inflation. The 0.4 percent Sales and Use Tax and the 0.3 percent MVET have existed since the inception of Sound Move in 1996. These sources help Sound Transit contribute a strong local match and to issue and service long-term debt ($524 million in bonds) as part of the local match. **New and Proposed Sources:** All proposed capital revenue sources currently exist. No new sources are needed.	Initiative 695 (I-695), which voters adopted in November 1999 adds a degree of uncertainty about the operation of services provided by other providers in the Central Puget Sound region. I-695 replaces the state motor vehicle excise tax (SMVET) with a flat tax and requires voter approval for any increase in taxes, fees, or charges. This legislation becomes effective January 2000. Although the Initiative did not repeal Sound Transit's ability to impose a MVET, a separate source with a similar name that was approved in 1996 by voters, it could result in a 30 percent decrease in funding for regional operations unless new revenue sources are found. The entire Sound Move project relies on strong partnerships with local transit agencies, which may be affected by the loss of the SMVET. While local transit agencies are developing strategies to address projected revenue reductions, changes in service levels for these operators could indirectly impact the proposed service plans and projected ridership levels for Sound Transit services. **New and Proposed Sources:** All proposed operating revenue sources for the Link LRT currently exist. No new sources are needed.	

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Southeast Corridor LRT, Denver, CO The Regional Transportation District (RTD) and Colorado Department of Transportation (CDOT) are proposing the Southeast Corridor project, a 19.0-mile light rail transit (LRT) system extending from the existing LRT station at I-25 and Broadway in Denver along I-25 to Lincoln Avenue and I-25 in Douglas County, with a LRT spur line along I-225 to Parker Road in Arapahoe County. The double track system is proposed to operate on an exclusive, grade-separated right-of-way and connect with the existing 5.3-mile Central Corridor light rail line in downtown Denver at the existing Broadway station. At I-25 and Broadway, the Southeast Corridor would also connect with RTD's Southwest Corridor light rail line that is currently under construction. The capital cost estimate of the fixed-guideway element is $882.5 million in escalated dollars, including right-of-way acquisition, final design, construction, and acquisition of rolling stock. Annual operating costs in 2020 are estimated at $35.3 million. Ridership is estimated at 38,100 average weekday boardings, 12,900 of which are new riders.	**Rating:** Medium-High **Proposed Non-Section 5309 Share of Total Project Costs:** 40% RTD proposes that $525.0 million (60 percent) in Section 5309 New Start funds and $357.5 million (40 percent) in local funds be applied to the project. **Stability and Reliability of Capital Financing Plan:** The Medium-High rating reflects the strong financial condition of RTD and the dedicated bond revenues to support the project's capital cost. **Agency Capital Financing Condition:** The RTD is in solid financial condition. The agency relies on dedicated sales tax revenue to support capital and operation needs. Because of the area's growth, the sales tax revenue has been a stable and reliable funding source. The tax rate of 0.6 percent generates nearly $200 million in annual revenue. RTD will begin operation of new LRT lines in 2000 (Southwest Corridor) and 2001 (Central Platte Valley) and is still expected to adequately fund construction of the Southeast Corridor project. **Capital Cost Estimates and Contingencies:** Capital cost estimates for the project have increased 84 percent since its major investment study. Project cost escalation is primarily a result of further engineering and the addition of four stations to the proposed system. Despite cost increases, RTD has reduced its New Starts share of project costs from 80 percent to 60 percent. Available working capital exceeds $100 million through most of the project developmental period and reaches $390 million at the conclusion of the twenty-year period. This provision has been included in the cash-flow analysis for unexpected cost overruns or revenue shortfalls. **Existing and Committed Funding:** Following the November 1999 referendum, all but $30 million (over 90	**Rating:** Medium-High **Stability and Reliability of Operating Finance Plan:** The Medium-High rating reflects the RTD's strong dedicated operating revenue stream. **Agency Operating Condition:** RTD's operating financial condition is good. In recent years, the agency has experienced positive operating surpluses, an increased farebox recovery of 23 percent (compared to 17 percent five years ago) a consistent 4 percent annual increase in ridership levels during a six-year period, and increased retained earnings of over $375 million. **Operating Cost Estimates and Contingencies:** Annual operating costs are estimated at $35.3 million in escalated dollars. Operating and maintenance costs and inflation assumptions are reasonable for the project's size and scope. **Existing and Committed Funding:** RTD proposes funding operations through a combination of the system-generated revenue and regional sales tax revenues. The RTD sales tax mechanism has been in-place and generated revenue for RTD projects for many years. The historical growth rates of the past five years have been at about 7.6 percent while the revenue projections used a more conservative 5.6 percent growth rate. **New and Proposed Sources:** All proposed operating revenue sources currently exist. No new sources are needed.	• Strong condition of sponsoring agency and dedicated funding (except for $30 million private contribution) • Positive operating surpluses for existing services • Decreased earlier federal share while capital capital costs increased from prior • Ability to absorb contingencies

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	percent) of non-New Starts funds are now committed to the Southeast corridor project. The commercial paper bond revenues authorized by the vote are expected to be sufficient to cover the local share of project capital costs. RTD and CDOT will donate right-of-way and prior improvements as in-kind contributions. **New and Proposed Sources:** The RTD is proposing that as-yet-undetermined local and developer contributions will account for $30 million in estimated project costs.		
Austin Light Rail Corridors, Austin, Texas The Austin Capital Metropolitan Transportation Authority (Metro) is proposing to develop a light rail transit (LRT) system in the North/South Central Corridor with phased implementation in the Southeast Corridor. The initial phase of the locally preferred alternative for light rail development includes 20.0 miles serving a total of 26 stations. This phase includes an 18-mile LRT system, operating along the existing railroad right-of-way owned by Capital Metro from McNeil Road to Lamar at Airport in north Austin, then operating on-street through downtown Austin to Ben White Boulevard in south Austin. The initial phase also includes a 2.0 mile LRT line serving 5 stations from the Central Business District to 5th and Pleasant Valley in east Austin. The	**Rating:** Medium-High **Proposed Non-Section 5309 Share of Total Project Costs:** 50% The financial plan for the 14.6 mile MOS includes $369.5 million (50 percent of total project costs) in Section 5309 New Starts funding, $103.7 million (14 percent) in existing cash reserves accumulated from the 1% local sales tax revenues, and $265.8 million (36 percent) from future dedicated local sales tax revenues. **Agency Capital Financial Condition:** The Austin Capital Metropolitan Transportation Authority is in sound financial condition. Capital Metro receives a one cent set-aside from the local sales tax, generating approximately $100 million in revenues annually which can be used for capital as well as operating expenses. The Board of Directors and Capital Metro management have been working aggressively to reduce the amount of this annual revenue used to fund local operations and to increase the amount reserved for capital projects. The amount used for current operations was reduced to 74% in FY 1998 and to 67% in FY 1999. Cash reserves are estimated to exceed $100 million by the end of FY 2000. **Capital Cost Estimates and Contingencies:** Capital cost estimates, averaging approximately $51 million per	**Rating:** Medium **Agency Operating Condition:** The agency plans to continue to use two-thirds of the dedicated sales tax revenue, totaling approximately $100 million annually, for current operations and to place the remaining one third in reserve for future capital projects. Capital Metro is attempting to cut its existing system operating costs by redesigning the route network, developing new service policy guidelines and a five-year service plan in 2000. Capital Metro's current fare recovery ratio is only 12%, in part due to low fares. The Agency is trying to increase the ratio to 20% by changes in the pass program and more enforcement of fare evasion. Capital Metro is attempting to cut its existing system operating costs by redesigning the route network, developing new service policy guidelines and a five year service plan in 2000. **Operating Cost Estimates and Contingencies:** Annual operating costs for the 14.6 mile MOS are estimated at $23.4	• Dedicated sales tax revenues already in place and tested • Established agency • Financial plan demonstrates ongoing operations can be continued • Solid reserves provided for • No capital debt (all PAYG) except short-term

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20-mile initial phase is estimated to cost $1,085.8 million (in escalated dollars). Capital Metro is further proposing a phased implementation of the Austin Area LRT System with development of a 14.6 mile Minimum Operable Segment (MOS) from McNeil Road in north Austin to the CBD. The MOS is planned to provide direct access to the University of Texas, the State Capitol Complex and the Austin CBD. Service is proposed to operate at 10-minute frequencies during peak periods, and 20-minute frequencies during the off-peak. The 14.6 mile MOS is estimated to cost $739.0 million (in escalated dollars) and to serve 37,400 average weekday boardings by the year 2025.	mile for the MOS, appear reasonable at this time. However, preliminary engineering is needed to produce more specific cost estimates. **Existing and Committed Funding:** Capital Metro proposes that $369.5 million (in escalated dollars) will be available as the local capital funding share for the MOS by leveraging its existing revenue base of sales tax revenues and passenger fare revenues. The financing plan includes $103.7 million in cash reserves from sales tax proceeds and an additional $265.8 million in anticipated sales tax revenues, reflecting approximately one-third of annual sales tax proceeds which are dedicated to capital project development. The current financing plan does not assume the issuance of debt, except the potential of a small amount of short term debt to meet cash flow requirements during the construction period. Assuming the current 1% dedicated sales tax revenue remains in place, the local funding source appears solid and reasonable to meet projected capital financing requirements. The projected annual growth rate in sales tax revenues is 4% to 5%, compared to a 15% annual growth rate in the 1995-1999 period. The Capital Metro Board action in October 1999 indicated strong policy support for commitment of local sales tax funds to the proposed financing plan. Specific programming of funds is planned as soon as voter preferences have been affirmed through a referendum. The Capital Metro Board has approved the funding necessary to proceed with preliminary engineering and the preparation of an environmental impact statement. **New and Proposed Sources:** Only existing sources are proposed for the construction of the MOS. No new or proposed sources are needed.	million in 2015 (YOE dollars), reflecting 10-minute peak and 20-minute off-peak service frequencies. Operating cost estimates appear reasonable at this time. More detailed operating plans are to be developed in preliminary engineering. **Existing and Committed Funding:** All of the project's proposed sources of operating funding are existing, leveraged from passenger fare revenues and the approximately two-thirds of the annual sales tax revenues directed to operating expenses. A 30-year cash flow analysis illustrates that ongoing system transit and paratransit operations, system capital replacment needs, as well as LRT operations for the MOS can be financed with currently available sources. **New and Proposed Sources:** All proposed operating revenue sources currently exist. No new or proposed sources are needed.	

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Hiawatha Avenue LRT, Minneapolis-St. Paul, Minnesota Metro Transit and the Metropolitan Council (local metropolitan planning organization), in cooperation with the Minnesota Department of Transportation (MnDOT), Hennepin County and the Metropolitan Airports Commission (MAC), are proposing to design and construct an 11.5-mile Light Rail Transit (LRT) line along the Hiawatha Avenue Corridor. The proposed LRT will operate on the Hiawatha Avenue/Trunk Highway 55 Corridor linking downtown Minneapolis, the Minneapolis-St. Paul (MSP) International Airport, and the Mall of America (MOA) in Bloomington. The LRT is the transit component of a Locally Preferred Alternative which includes reconstruction of TH-55 as a four lane at-grade arterial between Franklin Avenue and 59th Street and construction of an interchange between TH-55 and TH-62 (Crosstown Highway). Current plans call for the north end of the LRT to begin in the Central Business District (CBD) and operate on the existing transit mall along 5th Street. The LRT is planned to exit the CBD near the Hubert Humphrey Metrodome, following the former Soo Line Railroad to Franklin Avenue, then parallel Hiawatha Avenue. The	**Rating:** Medium-High The Medium-High rating reflects the strong financial condition of Metro Transit and the high percentage (75 percent or $204.3 million) of funding committed at the State and local level to the proposed project. **Agency Capital Financial Condition:** The Metropolitan Council is in strong financial condition with an existing fund balance (1998) of $145 million. Metro Transit operates as a division of the Metropolitan Council of Governments, itself a component unit of the State of Minnesota. The Metropolitan Council has taxing capacity and acts as an administrator of both Federal and State funds. **Capital Cost Estimates and Contingencies:** Total capital cost estimates increased approximately 22 percent over the last year to reflect 1) costs in escalated dollars, 2) the redesign of several project elements, and 3) more detailed engineering studies. These costs are considered reasonable given the project's size and scope. **Existing and Committed Funding:** Approximately 75 percent ($204.3 million) of non-New Starts funding is existing and committed to the Hiawatha Avenue LRT. These sources represent contributions from the State of Minnesota ($117.3 million) and the Hennepin County Regional Railroad Authority ($87 million). Over the last two years, the Minnesota Legislature has set aside $117.3 million for the proposed LRT. The remaining 25 percent ($70 million) of local funding has been proposed by the Metropolitan Airports Commission (which is also a division of the Metropolitan Council) in the form of general airport revenues. However, the use of these funds must be approved by the Federal Aviation Administration. **New and Proposed Sources:** Only existing sources	**Rating:** Medium The Medium rating reflects the Metropolitan Council's healthy operating condition. Revenues to operate the proposed Hiawatha Avenue LRT appear strong. **Operating Cost Estimates and Contingencies:** Operating cost estimates appear reasonable. Project sponsors estimate annual operating and maintenance cost at $15 million for the Hiawatha Avenue light rail project. This will require an additional annual operating subsidy of $11.43 million (escalated dollars) representing an increase of 10 percent in operating assistance requirements. **Existing and Committed Funding:** All of the Hiawatha Avenue light rail project's operating funds currently exist and are considered committed. Funds to support operating costs will be derived from the following: real growth in existing property tax levies, real growth in state general appropriations/miscellaneous sources; periodic fare increases; and a three year temporary application of regional CMAQ funding. **New and Proposed Sources:** All proposed operating revenues currently exist. No new sources are needed.	• Strong condition of sponsoring agency • 75% of required non-New Start capital funds are committed • Required operating funds currently exist • Parent agency of sponsor has tax authority • Strong reserve balances

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project will include a 0.8-mile tunnel to be constructed under the MSP airport runways and taxiways with the construction of one station. The line is then planned to emerge from the tunnel on the West Side of the airport and continue south with four proposed stations in Bloomington, including a station in the vicinity of the Mall of America. The estimated capital cost for the 11.5-mile Hiawatha Avenue LRT, including 15 proposed stations, totals $548.6 million (escalated dollars). The project is expected to serve 24,600 average weekday boardings by the year 2020; 18,300 average weekday boardings are projected in the opening year.	are proposed for the construction of the Hiawatha Avenue light rail project.		
Third Street Light Rail Project Phase 1, San Francisco, CA The San Francisco Municipal Railway (MUNI) has proposed implementing a 7.1 mile light rail transit (LRT) line and maintenance facility in the heavily transit-dependent Third Street corridor in eastern San Francisco. The primary purposes of the Third Street Light Rail Project are to accommodate existing and forecasted transit ridership with greater reliability, comfort, and speed, and to facilitate economic development opportunities along the corridor. The proposed project	**Rating:** Medium-High **Proposed Non-Section 5309 New Starts Share of Total Project Costs:** 100% The current financial plan for the Phase I MOS project does not include Section 5309 New Starts funds. The plan proposes $51.1 million (10 %) in Federal Section 5309 Rail Modernization and Surface Transportation Program resources; $90.1 million (18 %) in State funding; $351.8 million (70 %) in local Proposition B revenues; and $8 million (2 %) in private contributions. MUNI is proposing the use of $512.3 million in New Starts funding for implementing Phase II of the project. The Medium-High rating reflects the high level of local capital funding committed to the Phase 1 project at this stage of development.	**Rating:** Medium The Medium rating reflects the City of San Francisco's increasing financial support for operation of the MUNI system. **Agency Operating Condition:** Little recent information on the agency's overall operating financial condition was provided by MUNI. In the past, FTA has found MUNI's condition to be adequate, and the City has been increasing its financial support for the agency. MUNI has significant experience operating an urban rail system. **Operating Cost Estimates and Contingencies:** Implementation of Phase 1 of the 3rd Street LRT would result in a net	• Strong sponsoring agency with committed capital and operating funds • No New Start in Phase I • Strong State contribution • $8 million private developer contribution to capital proposed

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would operate on the surface from the Caltrain Bayshore Station at the San Francisco County line to the south, connect to the existing LRT system in downtown San Francisco via Third Street, and extend into a subway terminating in Chinatown. The project would provide regional connections to BART and CalTrain at multimodal stations. Third Street Light Rail operations would include exclusive (subway) as well as semi-exclusive (street median) rights-of-way, using MUNI's existing high floor light rail vehicles. Capital costs for the complete Third Street Light Rail Project total $1.38 billion (escalated dollars), to be constructed in two phases. Phase 1, which is evaluated in this profile, is a 5.4 mile minimum operable segment (MOS), which would operate as a surface extension of the J-Church MUNI Metro line between the Market Street Subway and the Bayshore CalTrain Station. The estimated capital cost for the MOS is $500.1 million (escalated dollars). Phase 2, the New Central Subway, would extend the line underground to a terminal in Chinatown, and is estimated to cost $876.1 million (escalated dollars) to construct.	**Agency Capital Financial Condition:** The capital financial condition of MUNI is considered strong. Dedicated Proposition B sales tax revenues administered through the San Francisco County Transportation Authority are projected at $779 million through 2010 to address capital needs. Capital Cost Estimates and Contingencies: Capital costs for the Phase I project are reasonable and include adequate contingencies. **Existing and Committed Funding:** All proposed Proposition B funding --- covering 70 percent of project costs --- is committed to the Phase 1 project. $25 of existing State Transportation Improvement Program funding is also considered committed. **New and Proposed Sources:** MUNI is proposing the use of $30 million in revenues from a proposed State Rail Bond Program. The proposed program is currently a bill in the state legislature. MUNI is further proposing the use of $8 million of as yet identified developer contribution and/or other private revenue to complete the financing for the Phase 1 3rd Street LRT. These private funds would be used to purchase the 10 additional light rail vehicles required by 2015.	increase of $5.0 million to systemwide operating costs. This increase represents a one percent increase in MUNI's systemwide operating budget. **Existed and Committed Funding:** MUNI projects a 33 percent farebox recovery for the 3rd Street LRT. Local legislation passed in November 1999 (Proposition E) ensures that operating cost increases associated with current and expanded MUNI services will be met by a baseline budget adjustment (resulting in increased annual appropriations) from the San Francisco General Fund. Proposition E also transfers the administration of City parking revenues to a Municipal Transportation Agency, which is to include MUNI. These revenues are also available to fund MUNI system operations. **New and Proposed Sources:** No new sources of operating funding are being proposed by MUNI.	

Successful Project	Capital Financial Plan	Operating Financial Plan	Principles of Success
Long Island Rail Road Access to Manhattan's East Side (East Side Access), New York, New York The Metropolitan Transportation Authority (MTA) is the lead agency for the proposed Long Island Rail Road (LIRR) East Side Access project. The project would provide increased capacity for the commuter rail lines of the Long Island Rail Road and direct access between suburban Long Island and Queens and a new passenger terminal in Grand Central Terminal in east Midtown Manhattan, in addition to the current connection to Penn Station in Manhattan. The East Side Access (ESA) connection and increased LIRR capacity would be achieved by constructing a 4,600-foot tunnel from the LIRR Main Line in Sunnyside, Queens to the existing tunnel under the East River at 63rd Street. LIRR trains would use the lower level of this bi-level structure. A second 5,000-foot tunnel would carry LIRR trains from the 63rd Street Tunnel under Park Avenue and into a new LIRR terminal in the lower level of Grand Central Terminal (GCT). ESA will provide the LIRR will additional tunnel capacity across the East River. Increased capacity and headways would be introduced at most LIRR stations. For example, an additional 24 peak hour trains	**Rating:** Medium **Proposed non-Section 5309 Share of Total Project Costs:** 50% The financial strategy for the proposed LIRR ESA project includes $2,175 million (50 percent) in Section 5309 New Starts funds and $2,175 million (50 percent) in State and local funds. The Medium rating reflects the sound financial condition of MTA and the agency's positive dedicated revenue sources. The rating also acknowledges that, at this time, approximately 39 percent ($845 million) of the total proposed non-Section 5309 New Starts share of project costs is reasonably committed. **Agency Capital Financing Condition:** NY MTA is in strong financial condition. The MTA Board recently approved the agency's FY2000-FY2004 capital plan, which includes a proposed $17.46 billion in Federal, State and local funds for the overall agency. Federal sources are projected to account for approximately 30 percent of the agency's FY00-FY04 capital plan. Historically, these projections are consistent with the agency's reliance on Federal funding sources in prior years. It is important to note, however, that the FY00-FY04 capital plan has not yet been approved by the NY legislature. **Capital Cost Estimates and Contingencies:** Capital cost estimates increased approximately one percent ($61 million) over the last year as a result of cost escalation due to refined engineering studies. Contingencies on unit costs were added to reflect the early stage of design. Engineering and management costs were based on the actual value of contracts related to program management, environmental, tunnel engineering and systems engineering work. Real estate costs were based on current estimates of acquisitions,	**Rating:** Medium-High The Medium-High rating reflects NY MTA's (the largest transit authority in the country) healthy operating condition. Revenues to operate the proposed LIRR ESA project are considered strong. **Agency Operating Condition:** The operating condition of the NY MTA is considered strong. The 1998 MTA Annual Report indicated that fares and operating revenues covered approximately 50 percent of the agency's operations. Bridge and tunnel tolls covered an additional 15 percent. The remaining 35 percent were covered through normal Federal, State and local allocations. **Operating Cost Estimates and Contingencies:** Annual operating costs for the proposed project are estimated at $157.8 million (escalated dollars). This estimate is considered reasonable. Theestimated cost to operate the entire MTA transit, bridge and tunnel system in the year 2012 is $14.37 billion (escalated dollars). Thus, the proposed LIRR ESA project represents only one percent of the agency's overall operations. The FY00-FY04 system-wide capital plan identifies a $4.4 billion capital (expressed as debt service) and operating funding gap that is anticipated to be addressed via non-service related cost reductions, financing initiatives, and new government assistance and other resources. Based on past performance and planned resources, it is anticipated that funds will be secured to fill the projected gap. **Existing and Committed Funding:** All of	• Sound condition of sponsoring agency • 39% of non-federal funds are committed • Operations cost is only 1% of total agency cost which can be easily absorbed without detrimental impacts on existing operations • High projected recovery ratios

Successful Project	Capital Financial Plan	Operating Financial Plan	Principles of Success
would operate through the existing 63rd Street Tunnel to GCT. Ten new tracks and five platforms will be constructed for LIRR trains at GCT. In addition, a new LIRR station would be constructed at Sunnyside Yard to provide access between Long Island City and Penn Station in Manhattan. The East River tunnels in Manhattan are at capacity. ESA is anticipated to improve LIRR tunnel capacity constraints and enable the growth of the overall system. Total capital costs are approximately $4.35 billion (escalated dollars), including $3.56 billion for project management, design, construction and right-of-way, and $0.79 billion for rolling stock (over 225 new vehicles). Overall, more than 351,000 average weekday boardings to both Penn Station and GCT would benefit directly from the LIRR ESA project by the year 2020. These include approximately 162,000 daily boardings serving GCT, 161,000 daily boardings serving Penn Station and 5,500 daily boardings at the proposed Sunnyside Station.	temporary and permanent easements, building surveys and other activities. These costs are considered reasonable given the scope and size of the project. **Existing and Committed Funding:** At this time, 39 percent ($845 million) of the total non-Section 5309 New Starts share has been reasonably committed to the project, including $750 million via NY MTA's proposed FY00-FY04 capital plan. It is important to note that this plan has been approved by the MTA Board but not yet approved by the NY legislature. MTA will need to continue to allocate sufficient funds – in future capital plans – to cover the entire construction phase of the LIRR ESA project **New and Proposed Sources:** No new sources are proposed for the LIRR ESA project.	the proposed operating funds are existing and are considered stable and committed. The 20-year cash flow analysis provided by MTA forecasts that sufficient funds are available to build and operate the proposed ESA project. The MTA currently has a farebox recovery ratio of 60 percent before debt service and 50 percent after debt service. In addition, the agency has supported an average of 55 percent of its operations for the years 1983-1996 through passenger revenues and bridge and tunnel surpluses – the latter being a State mandate. The MTA also receives dedicated tax funding for operations from the Metropolitan Mass Transportation Operating Assistance Account which includes a ¼ percent sales and use tax, a legislatively allocated portion of the business privilege tax imposed on NY petroleum businesses and a portion of the taxes levied on certain transportation and transmission companies. **New and Proposed Sources:** All proposed operating revenue sources are existing.	

Successful Project	Capital Financial Plan	Operating Financial Plan	Principles of Success
Hudson-Bergen Waterfront Light Rail Transit System (MOS-2), Northern New Jersey The New Jersey Transit Corporation (NJ Transit) is proposing to construct a second Minimum Operable Segment (MOS-2) for the Hudson-Bergen Waterfront Light Rail Transit System (HBLRTS). The proposed MOS-2 would run 5.1 miles north from Hoboken Terminal to the Tonnelle Avenue Park-and-Ride lot in North Bergen and 1.0 mile south from 34th Street to 22nd Street in Bayonne. The total capital cost of MOS-2 is estimated at $1,112.8 million (escalated dollars), including borrowing costs. MOS-2, like the initial Minimum Operable Segment (MOS-1) now nearing completion, would be a design/build/operate/maintain project. With the completion of the second phase of the Hudson-Bergen LRT, NJ Transit expects the system to become self-sufficient and not require any additional operating subsidy. MOS-2 is anticipated to carry 34,900 average weekday boardings in 2010. The full Hudson-Bergen LRT, which includes a 4.7 mile long MOS-3, is a $2.0 billion (escalated dollars), 20.1-mile, 30 station at-grade LRT line from the Vince Lombardi Park-and-Ride lot in	**Rating:** Medium **Proposed Non-Section 5309 Share of Total Project Costs:** 35% The financial strategy for the second Minimum Operable Segment of the proposed Hudson-Bergen Light Rail Transit System includes $721.6 million (65 percent) in Section 5309 New Starts funding, $273.8 million (24 percent) in Section 5307 formula funds, $117.4 million (11 percent) in NJ Transportation Trust Fund annual allocations. The Medium rating reflects the sound financial condition of NJ Transit and the agency's strong, permanent source of capital funding. **Agency Capital Financial Condition:** NJT is in sound financial condition with the New Jersey Transportation Trust Fund (TTF) providing a stable and reliable source of capital funding. Over the past eleven years, 43 percent of the agency's capital funding has come from the TTF. An average annual growth rate of three percent in Federal formula funds and growth in TTF funds of less than one percent annually, is currently anticipated. **Capital Cost Estimates and Contingencies:** The 20-year cash flow projections submitted by NJ Transit incorporate moderate rates of growth in capital funding. The agency did not provide documentation to substantiate the reasonability of capital costs estimates, escalation rates or contingency factors related to HBLRTS (MOS-2) to FTA for evaluation. **Existing and Committed Funding:** $41.9 million in FY 1999 Section 5307 formula and NJ TTF funds has been appropriated by the State legislature to HBLRTS (MOS-2), with another $201.2 million programmed for the project in NJTransit's FY 2000 - FY 2004 capital plan. The use of Section 5307 funds as non-Federal share is	**Rating**: Medium The Medium rating reflects NJ Transit's healthy operating condition. The rating also acknowledges the absence of information specific to the operation of the proposed project, including an operating contingency plan. **Agency Operating Condition:** The operating condition of NJ Transit is considered strong. The agency is required by State law to maintain a balanced budget. In FY 1999, the agency's operations generated a surplus of $20.7 million in revenues from fares, State Operating Assistance and other sources. **Operating Cost Estimates and Contingencies:** Annual operating costs are estimated at $39.9 million (escalated dollars), which would represent less than 3 percent of NJTransit's total systemwide operating budget. NJTransit generates over 50 percent of systemwide operating revenues from the farebox. The agency did not provide operating cost contingencies specific to the HBLRTS MOS-2 project. **Existing and Committed Funding:** The 20-year cash flow analysis incorporates rates of growth in farebox revenues (average 3.5 percent) that slightly exceeds current trends. NJ Transit has not experienced a fare increase over the last nine years. Combined revenues from the other two principal sources of funding for the agency's operations – State Operating Assistance and	• Sound financial condition of sponsoring agency • Dedicated capital funds and committed funding • $20 million surplus in operations (including state subsidy) • Operations funded within context of present revenues • Strong state program • DBOM contract (FTA demonstration) • No operating subsidy projected to be necessary • Uses toll road receipts for soft match • Operating budget required by law to be balanced

Successful Project	Capital Financial Plan	Operating Financial Plan	Principles of Success
Bergen County to West Fifth Street in Bayonne in Hudson County. It is projected to serve 94,500 average weekday boardings in 2010. When completed, the project will pass through Port Imperial in Weehauken, Hoboken and Jersey City. The outer ends will provide 8,800 park-and-ride spaces. The core of the system	based on a provision of ISTEA (Section 1044 of Title 23 and continued under TEA-21) that allows states to count toll revenues collected and used on roadway facilities as a component of non-Federal matching funds. NJ Transit will program the remainder of non-New Starts funding in its next capital plan. **New and Proposed Sources:** No new funding sources are proposed for implementation of the HBLRTS (MOS-2).	Reimbursements – are projected to rise at just over 3 percent per year, slightly less than the rate of increase since 1990. These sources are existing and are considered adequate to operate the proposed HBLRTS MOS-2 project. **New and Proposed Sources:** No new operating revenue funding sources are proposed for the project.	
Las Vegas Resort Corridor Fixed Guideway MOS, Las Vegas, NV The Regional Transportation Commission (RTC) of Clark County, Nevada, is the lead local agency proposing the implementation of a fixed guideway transit system in the Las Vegas Resort Corridor. The proposed guideway investment is designed to improve mobility within the 18.4 mile corridor, which includes the regions' central business district, several gaming resorts, the University of Nevada at Las Vegas, McCarran International Airport, and three regional shopping centers. The RTC is studying several alignments along the corridor, including a 4.7 mile minimum operable segment (MOS) extending south from Cashman Field, through downtown Las Vegas, and terminating at the intersection of Convention Center Drive and Las Vegas Boulevard. The MOS is a double track, all-	**Rating:** Medium **Proposed Non-Section 5309 Share of Total Project Costs:** 73% The project's financial plan includes $155 million of Section 5309 New Starts funding (27 percent of total project costs), $108 million of FHWA flexible funding (19 percent), and $305 million in RTC Bonds (54 percent). The Medium capital rating reflects the RTC's stable local dedicated revenues for capital expansion and the level of committed funding for the proposed project **Agency Capital Financial Condition:** Based on current financial statements and the historical performance of RTC's locally dedicated sales tax, the capital health of the agency is healthy. **Capital Cost Estimates and Contingencies:** Capital cost estimates may be low given the proposed investment (elevated automated guideway system). Cost estimates assume a conservative 5 percent rate of cost inflation and reasonable contingencies. The project's cash flow demonstrates an annual average surplus equal to 2.2 % of systemwide operating and capital revenues, which would be available to absorb unexpected cost overruns or unanticipated funding shortfalls.	**Rating:** Medium The Medium rating reflects the RTC's strong operating revenues. **Agency Operating Condition:** In recent years, RTC's transit system has experienced declining operating surpluses but significant increases in ridership and productivity (in terms of riders per vehicle mile). The overall operating condition of the agency is considered good. **Operating Cost Estimates and Contingencies:** Annual operating costs are estimated at $13.5 million in 2006, escalating to $26.7 million by 2020 (a reasonable 5% rate of growth). These estimates are considered reasonable for an Automated Guideway Transit system operating under a broad range of service level assumptions. **Existed and Committed Funding:** RTC is projecting that project operating costs would be more than fully funded from farebox receipts. Current transit ridership in the corridor is high and rail ridership forecasts support RTC revenue estimates. RTC's dedicated sales tax revenue represents an	• Local dedicated funds and level of financial commitment • Strong operating revenues • Overall financial condition of agency is good • Proposed bond debt service is backstopped by dedicated tax • Proposed capital bonds financed by farebox surplus

Successful Project	Capital Financial Plan	Operating Financial Plan	Principles of Success
elevated, automated fixed guideway with 11 stations, including a major intermodal facility at the northern terminus with a 2,000 vehicle park and ride lot and a 30-bay bus terminal. The MOS is estimated to cost $568 million (escalated dollars) and carry over 63,000 weekday boardings in 2020. The MOS is being evaluated in this profile. RTC is also studying participation in a public/private partnership to develop a 7 mile system which would extend as far south as Tropicana Avenue. This alternative would offer a seamless connection between a 3.4 mile RTC-built guideway and a 3.6 mile facility constructed by the MGM-Hilton Limited Liability Corporation. Average weekday boardings on this 7 mile "seamless" service option is forecasted at 173,000 in 2020.	**Existing and Committed Funding:** The RTC is proposing the use of $108 million in Federal flexible funds to support project capital costs. As the region's MPO, local control of these funds lies with the RTC. The RTC is further proposing that $308 million of project costs are to be financed by revenue bonds secured by anticipated farebox revenue surpluses generated by the Resort Corridor project. If such surpluses do not materialize, RTC's local dedicated ¼ cent sales tax is sufficient to cover bond payments, although the RTC's bus expansion plans would be put at risk (existing bus operations would not be negatively impacted). **New and Proposed Sources:** No new funding sources are proposed for the MOS, although private resources would be utilized if the RTC were to pursue the 7 mile public/private seamless system alternative described earlier.	additional available operating funding source. **New and Proposed Sources:** No new sources are proposed to fund the proposed project's operation.	

Successful Project	Capital Financial Plan	Operating Financial Plan	Principles of Success
Minillas Extension, San Juan, Puerto Rico The Puerto Rico Department of Transportation and Public Works (PRDTPW), through its Highway and Transportation Authority (PRHTA), is proposing an extension of its heavy rail rapid transit system, known as Tren Urbano Phase I (currently under construction). The proposed investment would extend Tren Urbano Phase I approximately one mile under Ponce de Leon Avenue from its current terminus at Sagrado Carazon to the Minillas area of Santurce. Santurce is home to government offices of the Commonwealth, the Luis A. Ferre Fine Arts Centers, four major hospitals, and is one of the main commercial and residential districts on the Island. Capital costs of the Minillas extension are estimated at $478.3 million (escalated dollars). The extension forecast to carry 14,400 average weekday boardings in 2010.	**Rating:** Medium **Proposed Non-Section 5309 Share of Total Project Costs:** 20% The financing plan for the Minillas Extension is interrelated with funding for Phase I and the Commonwealth's highway program, and relies upon a combination of bond receipts, tax revenues, and legislative appropriations. PHRTA's financial plan assumes $382.6 million from Section 5309 New Start funds (80 percent) and local funding sources totaling $95.7 million (20 percent). The total Federal New Starts share of the entire Tren Urbano Phase I and the proposed Minillas Extension will equal $681.8 million, or roughly one-third of the total project cost. The Medium rating reflects that the Non-Section 5309 share of funds are committed to the project. However, because the capital cost estimates are based upon 30 percent engineering and the alignment is underground, there needs to be a high level of contingencies to account for potential cost increases. **Agency Capital Financial Condition:** The PHRTA is in sound financial condition. As the transportation department for Puerto Rico the PHRTA is responsible for the transportation system throughout the Commonwealth and receives revenue from both a dedicated fuels tax and the toll road system it administers. Because of extremely high levels of traffic congestion, toll road revenues have steadily increased and are projected to increase as more roads are constructed. The PRHTA was recently approved for a Transportation Infrastructure Finance and Innovation Act (TIFIA) loan commitment of $300 million for the construction of Phase I of the Tren Urbano system. This loan enables	**Rating:** Medium-High The Medium-High rating reflects the operating condition of the PHRTA and the dedication of funds for the on-going operations and maintenance of the Tren Urbano system. **Agency Operating Condition:** The PHRTA receives revenues from toll roads and dedicated fuels taxes, and is considered to be in sound financial condition. The Tren Urbano System, when constructed, is anticipated to carry heavy daily passenger loads and may provide an operating revenue surplus. **Operating Cost Estimates and Contingencies:** The first five years of Tren Urbano's operating and maintenance costs are included as part of the project's Design-Build contract. The operating cost for the Phase IA Minillas Extension was estimated by adding the incremental operating cost of one mile and two stations to the costs of operating the 10.7 mile Phase I operating and maintenance cost bid. **Existing and Committed Funding:** Funding for operating and maintenance are committed to the project as part of the Design-Build contract. Long term bonds may be issued to cover any other operating and maintenance costs. **New and Proposed:** No new revenue sources are proposed to fund project operation.	• Good operating condition of sponsoring agency • TIFIA allows reduction of bond issue abd lower debt service • D-BOM Demonstration

Successful Project	Capital Financial Plan	Operating Financial Plan	Principles of Success
	PHRTA to reduce the level of bonds issued for the project and thus reduce the overall debt service payments for the bonds. This enables the use of additional local financial resources to secure bonds to construct the Minillas Extension Phase IA. **Capital Cost Estimates and Contingencies:** The capital cost estimates for the Minillas Extension Phase IA, based upon 30 percent preliminary engineering, are consistent with the capital costs incurred for the Phase I of the Tren Urbano System, when compared by cost per square foot of construction. However, the Minillas Extension will be constructed mostly through a tunnel, so all site condition risks are not currently known. **Existing and Committed Funding:** The proposed Non-Section 5309 New Starts share of project costs is $95.7 million, or 20 percent of the total capital costs. Local funding will be generated from bond issuance. Funds to repay the bonds are committed to the project and are from the following revenue sources: a $0.16 per gallon gasoline tax; gross receipts from an annual per motor vehicle license fee, of which $15 is dedicated to PRHTA; all existing toll facility revenues; and investment earnings on deposits resulting from the issuance of bonds. **New and Proposed Sources:** No specific new funding sources are proposed. However, the Secretary of Transportation has the authority to focus all available capital financial resources to the Tren Urbano Minillas Extension and can generate additional revenues, if necessary, by increasing tolls on existing toll roads.		

A7.2 Unsuccessful Projects

Unsuccessful Project	Capital Financial Plan	Operating Financial Plan	Elements of Rejection
Miami East-West Corridor, Miami, FL The Miami-Dade Transit Agency has proposed to implement a set of multimodal improvements in the Route (SR 836) East-West corridor that would link the suburban area west of the Palmetto Expressway (SR 836) with the Miami International Airport (MIA), downtown Miami, and the Port of Miami seaport. The proposed improvements include an 11.2-mile minimum-operable-segment (MOS) of a heavy rail transit alignment that runs from just east of the Palmetto Expressway (SR 836) to the Port of Miami. An additional 0.7-mile branch is proposed from MIA to the Miami Intermodal Center (MIC). The heavy rail line includes 8.2 miles of aerial guideway and 3.6 miles of bored tunnel with ten stations (six aerial and four underground). The proposed project also includes two buffer-separated HOV lanes, one in each direction, in the median of SR 836 from NW 107th Avenue to the SR 836/SR 112 Interconnector/(MIC). Capital cost estimates for the project (transit and roadway improvements) total $2.023 billion (YOE dollars). The proposed rail line is expected to	**Rating:** Low **Proposed Non-Section 5309 Share of Total Project Costs:** 60% MDTA's financial plan assumes $808 million from Section 5309 New Start funds (40 percent) and local funding sources totaling $1.215 billion (60 percent). Local funding sources identified in the financial plan include $789 million (39 percent) in funds from the regional Long-Range Transportation Plan (LRTP), $108 million (5 percent) from toll road revenue bonds, $100 million (5 percent) from Port of Miami revenue bonds, $30 million (1 percent) from development rights, $11 million (0.5 percent) from cross-border leasing, and $177 million (9 percent) from the Local Option Gas Tax. The Low rating reflects the large share of uncommitted and/or unidentified local funding proposed for the project. **Agency Capital Financial Condition:** The overall financial condition of the MDTA is adequate. On July 29, 1999, a proposed 1 cent sales tax increase, primarily to help pay for new MDTA transit projects and transit operating expenses, was rejected by Miami-Dade County residents. The impact of the failure to pass the 1 % tax has significant financial implications for availability of MDTA capital funding. **Capital Cost Estimates and Contingencies:** The capital cost estimates appear reasonable for a project of the size and scope proposed by MDTA. **Existing and Committed Funding:** Little of the non-New Starts Share of the project funding is committed. MDTA's financial plan indicates that $1,025 million of non-Federal funding sources may	**Rating:** Low The Low operating plan rating reflects the lack of committed operating funding sources to the project. **Agency Operating Condition:** The MDTA is in good operating condition. In recent years, MDTA has experienced operating surpluses (on average), a 30 percent farebox recovery ratio and consistent ridership levels. Miami-Dade County has historically provided sufficient operating funds as required to operate the existing MDTA system. **Operating Cost Estimates and Contingencies:** Annual operating costs are estimated at $39.9 million. Project operating costs and inflation assumptions appear reasonable for a project of this size and scope. **Existing and Committed Funding:** No specific existing funding sources are identified within MDTA's financial plan to cover project operating costs. **New and Proposed Sources:** The source of operating funds for the East-West Corridor is proposed to come from operating surpluses generated from fares collected for a premium round-trip service for tourists traveling between the Miami International Airport and the Port of Miami. The actual revenues that will be generated by this premium service have yet to be determined, and no commitments are in place. The financial operating plan assumes that 54 percent	• Uncommitted/unidentified local funding • Previous rejection of sales tax revenue initiative • Many innovative funding options proposed

Unsuccessful Project	Capital Financial Plan	Operating Financial Plan	Elements of Rejection
carry 27,300 average weekday boardings on opening day and 31,400 average weekday boardings by the year 2020. On July 29, 1999, voters rejected a 1 cent sales tax increase to support proposed MDTA capital and operating needs, including the proposed East-West Corridor project. As a result of the failed referendum, Metro-Dade is currently evaluating considering other projects in place of the East-West Corridor. The scope of the resulting proposed investment may not be consistent with the information submitted for this profile.	be committed through legislation, resolution or other formal, binding agreement; however, exact sources have not been identified or confirmed. $796.6 million in current state and non-discretionary federal funding programs historically available to Miami-Dade County are being examined, as well are local fuel taxes and some federal sources. MDTA proposes to bond some funds included in the long range regional transportation plan as a source of funding for the project. $229 million in Miami-Dade Expressway Authority (MDI) toll revenues are committed by legislation but the tolls are not yet operational. **New and Proposed Sources:** MDTA proposes approximately $30 million in funds from the sale or lease of rail station development rights; however, the agency has yet to obtain a firm funding commitment of funding for this transaction. An estimated $100 million is proposed from the Port of Miami (towards capital costs associated with a premium Airport-Seaport rail service), although the Port has yet to commit to this funding level. MDTA continues to indicate a potential cost savings from cross-border leasing as a source of funds. The Miami-Dade County Board has not approved implementation of a local option gas tax (proposed to contribute $177.1 million) which would support construction of the project.	of cruise ship embarkations will select this service over the taxi and charter bus options, generating a farebox recovery ratio of 214 percent for this service. Surpluses from this premium service are anticipated to fully cover operating deficits on the East-West line.	
Miami North 27th Avenue, Miami, Florida The Miami-Dade Transit Agency (MDTA) has proposed to construct a heavy rail line along a 9.5-mile section of NW 27th Avenue between an existing Dr. Martin Luther King Jr. Metrorail station and the Broward County line. Park-n-ride lots would be provided to intercept commuters in the	**Rating:** Low MDTA's financial plan assumes $430.6 million from Section 5309 New Start funds (70 percent), $92.3 million (15 percent) in State funds, and $92.3 million (15 percent) in other local funds. The Low rating is due to the large share of uncommitted and/or unidentified local funding proposed for the project. **Agency Capital Financial Condition:** The overall financial condition of the MDTA is adequate. On	**Rating:** Low The Low operating plan rating reflects the lack of committed operating funding sources to the project. **Agency Operating Condition:** The MDTA is in good operating condition. In recent years, MDTA has experienced operating surpluses (on average), a 30 percent farebox recovery ratio and consistent ridership levels. Miami-Dade County has historically provided	• Overall financial condition is adequate • No funding in place

Unsuccessful Project	Capital Financial Plan	Operating Financial Plan	Elements of Rejection
corridor. The proposed heavy rail line along the Northwest 27th Avenue corridor would provide direct service to the Miami CBD and Medical Center as well as provide service to Miami Dade Community College - North Campus and the Pro Player Stadium. MDTA has estimated total project costs at $615.2 million (escalated); based on the assumed Federal/local share, the Section 5309 share is $430.6 million (escalated). On July 29, 1999, voters rejected a 1 cent sales tax increase to support proposed MDTA capital and operating needs, including the proposed North 27th Avenue rail project. As a result of the failed referendum, Metro-Dade is currently evaluating lower cost busway options for the North Corridor. The scope of the resulting proposed investment may not be consistent with the information submitted for this profile.	July 29, 1999, a proposed 1 cent sales tax increase, primarily to help pay for new MDTA transit projects and transit operating expenses, was rejected by Miami-Dade County residents. The impact of the failure to pass the 1% tax has significant financial implications for availability of MDTA Capital funding. **Capital Cost Estimates and Contingencies:** The capital cost estimates appear reasonable for a project of this size and scope. **Existing and Committed Funding:** MDTA has not secured any firm local funding commitments for the proposed North 27th Avenue rail project. A potential State funding source for 15 percent of total costs has been identified as supplemental appropriations of Florida's Public Transit Block Grant Program. MDTA currently receives its full allocation from this source, and intends to seek legislative action to raise the Block Grant spending cap to seek additional funds for the project. The Local Option Gas Tax (LOGT) is proposed to yield $70 million (15 percent). However, the LOGT has been rolled back from the five cents per gallon assumed in the project's financial plan to three cents per gallon, and may only provide $15 million (pay-as-you-go) to $30 million (via revenue bonds) towards the project. **New and Proposed Sources:** MDTA has proposed that Miami-Dade County fund a portion of the local match through general obligation bonds supported by the County's existing revenues. The bonds would be backed by the redevelopment benefits the project is assumed to provide within the North Corridor. This source has not been approved by the County.	sufficient operating funds as required to operate the existing MDTA system. **Operating Cost Estimates and Contingencies:** MDTA projects an annual operating cost of $15.1 million (YOE) in the year 2015 for the North 27th Avenue project. Cost estimates appear reasonable, although no contingency provisions have been identified. **Existing and Committed Funds:** MDTA has not identified specific sources or revenues to fund operation of the proposed project. **New and Proposed Sources:** MDTA has not identified specific sources or revenues to fund operation of the proposed project.	
Norfolk-Virginia Beach Corridor LRT, Norfolk, VA Hampton Roads Transit (HRT)	Rating: Low The HRT project financial plan proposes to use $288.5 million (55 percent of total project costs) in	**Rating:** Low The Low operating finance plan rating reflects substantial reliance on a	• Reliance of proposed tax not yet in place • Agency has no experience with projects of this type

Unsuccessful Project	Capital Financial Plan	Operating Financial Plan	Elements of Rejection
has planned a 13 station, 18.3-mile double track light rail transit (LRT) line from Downtown Virginia Beach (at the Pavilion) to Downtown Norfolk. (Hampton Roads Transit is the agency formed from the merger of Tidewater Regional Transit and Peninsula Transit, effective October 1, 1999; reference to HRT project planning and development connotes actions taken by either of the predecessor agencies.) The proposed LRT alignment generally follows an active Norfolk Southern Railroad right-of-way. This east-west corridor is intended to serve the growing market of commuters into Norfolk and Virginia Beach from outside those communities. Virginia Beach Boulevard and Route 44/I-264 are at or over capacity at many locations. In addition to capacity concerns, there are other important issues within the corridor, such as potential economic development opportunities and increased mobility for the residents of the Hampton Roads region. HRT estimates that the Norfolk - Virginia Beach Corridor LRT will cost $524.6 million (escalated dollars) to construct, with ridership estimated at 33,200 average weekday boardings and 11,600 daily new riders in the year 2018. The project is the first phase of a planned 30-mile light rail system in the Hampton Roads	Section 5309 New Start funds, $125.3 million (24 percent) in State funds, $81.3 million (15 percent) in local funds, and $29.4 million (6 percent) of Federal flexible and CMAQ funds. The Low capital finance plan rating reflects the uncertainty of proposed funding to construct the proposed project. **Agency Capital Financial Condition:** Total project capital needs are forecast to increase at an annual average rate of 10 percent between FY 1998 and FY 2017, reaching $171.9 million in one year during the height of construction. A proposed local gas tax is expected to provide for 23 percent of all ongoing system-wide capital needs beginning in FY 2001, in addition to providing 34 percent of the project's non-New Starts capital costs. Without experience in projects of this magnitude, HRT may be challenged to maintain such a high level of expenditure. **Capital Cost Estimates and Contingencies:** The project's $525 million cost estimate is reasonable given its size and design, and assuming normal inflation and escalation. Delaying the project has been identified as a strategy to cover potential funding shortfalls, as well as additional debt financing, increased fares, and non-farebox revenues, e.g., joint development and concessions. **Existing and Committed Funding:** No funding has been committed for the project. Approval of the Virginia General Assembly is required for use of any non-New Starts funding, i.e., state, local and Federal flexible and CMAQ funds. However, State financial support for the Norfolk-Virginia Beach Corridor LRT has not yet been pursued; HRT will work to attain a resolution of financial support, without indicating specific funding sources, during the January 2000 General Assembly. The Virginia Transportation Trust Fund is viewed as a reliable funding source if its use is designated for this project. Non-New Starts funds are Federal flexible and CMAQ monies requiring State approval and	proposed local gas tax, not yet adopted, and the lack of an average operating surplus (for TRT) to fund the project. **Agency Operating Financial Condition:** The former TRT has experienced zero operating balances, on average, in recent years while achieving a 35 percent farebox recovery ratio. TRT system-wide operating costs are expected to increase from $24.3 million to $90.1 million over the 20-year period FY 1998 to FY 2017. The 7.1 percent annual growth rate is reasonable given the planned operation of the LRT and ongoing bus expansion. Although TRT ridership has been increasing, LRT operating costs are estimated to comprise 20 percent of overall operating costs in outyears. Projected bus operations fare revenues are to provide approximately 24 percent of ongoing revenues; however, the expected growth rate is higher than historical growth. Over 24 percent of ongoing operating needs are to be funded through the proposed local gas tax. **Operating Cost Estimates and Contingencies:** Annual operations and maintenance costs are estimated at $12 million for the project, potentially low for its size. Contingencies include increased fares and non-farebox funding. **Existing and Committed Funding:** Only fare revenues are identified as an existing operations funding source. **New and Proposed Funding:** The proposed local gas tax would provide over 24 percent of all ongoing operating funds over the course of the twenty year cash flow.	• Financial outlook of the agency is uncertain • Delaying project offered as one way to cover capital cost contingencies

Unsuccessful Project	Capital Financial Plan	Operating Financial Plan	Elements of Rejection
region that includes a line to the Norfolk Naval Base and to the cities of Chesapeake and Portsmouth.	regional allocation. **New and Proposed Funding:** The proposed local taxing authority (5 percent on retail gas prices), yet to be adopted, is subject to referendum and State Legislature approval; the financial implications of the recent failed Virginia Beach referendum in support of light rail is undetermined. This dedicated funding source would account for 15 percent of total project costs, representing 35 percent of non-New Starts funding. Up to $107 million (45 percent of non-new Starts funds) in State funding would be financed through debt service on a bond, which would support both the bulk of the State's share and $60.5 million in local share of the project. The State and HRT would enter into a service contract for annual payments of $8.3 million by the State to support this bond; HRT intends to seek the annual appropriation to continue project development during the next General Assembly.		

Appendix 8
Calculation of Air Quality Benefits

In order to evaluate the impact of this project on the air quality conformity issues in the Atlanta region, an analysis was performed to determine the reduction in NOx, VOC, and CO resulting from the development of the project. The analysis quantified the impact of the project on the mobile source emissions in the region in the year 2025 using the methodology set forth in the Federal Transit Administration (FTA) Section 5309 New Starts criteria. The Build and No-Build alternatives were initially analyzed, and the results are presented in Section 10.3 of Volume I of report. In addition, the Preferred Initial Project, Constrained Initial Project, and the Cobb County Only Project were analyzed and the results are presented in Section 11.4 of Volume I.

In general, the analyses applied emissions factors for NOx, VOC, and CO to the total number of vehicle-miles-traveled (VMT) in the region, as determined from the travel demand model for each alternative. The total emissions from each alternative were compared to determine the reduction in emissions resulting from the development of the project.

The emission factors used in the analysis were provided to the Bechtel/MSE Team by the ARC. These factors were determined by ARC using the USEPA MOBILE5b emissions factor model, with additional off-model credits calculated in accordance with EPA guidelines. The emission factors are shown in Table A8-1 and vary significantly with variations in the speed of travel and by vehicle type.

Table A8-1
Air Quality Emission Factors

Speed Range (mph)	Average Speed (mph)	LDV/LDT Emmission Factors			HDDV Emission Factors		
		VOC (g/mi)	CO (g/mi)	Nox (g/mi)	VOC (g/mi)	CO (g/mi)	Nox (g/mi)
0 - 10	5.0	1.113	10.671	0.309	3.998	28.325	5.925
10 - 15	13.0	0.491	5.508	0.264	2.743	15.971	4.470
15 - 20	18.0	0.408	4.612	0.256	2.231	11.844	3.925
20 - 25	23.0	0.353	3.630	0.260	1.854	9.192	3.572
25 - 30	28.0	0.316	2.832	0.265	1.576	7.466	3.367
30 - 35	33.0	0.290	2.275	0.268	1.369	6.347	3.289
35 - 45	40.0	0.262	1.730	0.273	1.166	5.457	3.379
45 - 55	50.0	0.234	1.302	0.291	1.000	5.134	3.961
55 and up	63.0	0.233	2.255	0.394	0.933	6.266	6.022

All emission factors provided by ARC on October 24, 2000

The VMT in each alternative was broken down into the nine speed ranges and emission factors were used for each range of speed. The total emissions for each alternative was calculated by summing the values calculated for each speed range and vehicle classification. Tables A8-2, 3, 4, 5,and 6 show the emissions generated in the various alternatives.

Table A8-2
Build Alternative Air Quality Impact Analysis using FTA Methods

							LDV/LDT						HDDV						Total		
	Speed	Ave	Total	Split	LDV/LDT	HDDV	VOC		CO		Nox		VOC		CO		Nox		VOC	CO	Nox
Alternative	Range	Speed	VMT	Factor	VMT	VMT	Factor	Sub total	Factor	Sub total	Factor	Sub total	Factor	Sub total	Factor	Sub total	Factor	Sub total	Total	Total	Total
	(mph)	(mph)	(million-miles)	LDV/ HDDV	(million-miles)	(million-miles)	(g/mi)	(tons)	(g/mi)	(tons)	(g/mi)	(tons)	(g/mi)	(tons)	(g/mi)	(tons)	(g/mi)	(tons)	(tons)	(tons)	(tons)
Build Alternative	0 - 10	5	0.751	0.81	0.608	0.143	1.113	0.74	10.671	7.14	0.309	0.21	3.998	0.63	28.325	4.45	5.925	0.93	1.37	11.59	1.14
	10 - 15	13	19.054	0.81	15.434	3.620	0.491	8.34	5.508	93.52	0.264	4.48	2.743	10.92	15.971	63.61	4.470	17.80	19.26	157.13	22.28
	15 - 20	18	4.659	0.81	3.774	0.885	0.408	1.69	4.612	19.15	0.256	1.06	2.231	2.17	11.844	11.53	3.925	3.82	3.87	30.68	4.89
	20 - 25	23	11.193	0.81	9.066	2.127	0.353	3.52	3.630	36.21	0.260	2.59	1.854	4.34	9.192	21.51	3.572	8.36	7.86	57.71	10.95
	25 - 30	28	21.951	0.81	17.781	4.171	0.316	6.18	2.832	55.40	0.265	5.18	1.576	7.23	7.466	34.26	3.367	15.45	13.41	89.65	20.63
	30 - 35	33	32.018	0.81	25.935	6.083	0.290	8.27	2.275	64.91	0.268	7.65	1.369	9.16	6.347	42.48	3.289	22.01	17.44	107.39	29.66
	35 - 45	40	25.139	0.81	20.362	4.776	0.262	5.87	1.730	38.75	0.273	6.12	1.166	6.13	5.457	28.67	3.379	17.75	12.00	67.43	23.87
	45 - 55	50	14.216	0.81	11.515	2.701	0.234	2.96	1.302	16.49	0.291	3.69	1.000	2.97	5.134	15.25	3.961	11.77	5.94	31.75	15.46
	> 55	63	24.663	0.81	19.977	4.686	0.233	5.12	2.255	49.56	0.394	8.66	0.933	4.81	6.266	32.30	6.022	31.04	9.93	81.86	39.70
Total			**153.644**					**42.71**		**381.12**		**39.64**		**48.36**		**254.06**		**128.94**	**91.07**	**635.18**	**168.58**

Table A8-3
No Build Alternative Air Quality Impact Analysis using FTA Methods

							LDV/LDT						HDDV						Total		
	Speed	Ave	Total	Split	LDV/ LDT	HDDV	VOC		CO		Nox		VOC		CO		Nox		VOC	CO	Nox
Alternative	Range (mph)	Speed (mph)	VMT (million -miles)	Factor LDV/ HDDV	VMT (million -miles)	VMT (million- miles)	Factor (g/mi)	Sub total (tons)	Factor (g/mi)	Sub total (tons)	Factor (g/mi)	Sub total (tons)	Factor (g/mi)	Sub total (tons)	Factor (g/mi)	Sub total (tons)	Factor (g/mi)	Sub total (tons)	Total (tons)	Total (tons)	Total (tons)
No Build Alternative	0 - 10	5	0.753	0.81	0.610	0.143	1.113	0.75	10.671	7.16	0.309	0.21	3.998	0.63	28.325	4.46	5.925	0.93	1.38	11.62	1.14
	10 - 15	13	19.108	0.81	15.478	3.631	0.491	8.36	5.508	93.79	0.264	4.50	2.743	10.96	15.971	63.79	4.470	17.85	19.32	157.57	22.35
	15 - 20	18	4.673	0.81	3.785	0.888	0.408	1.70	4.612	19.20	0.256	1.07	2.231	2.18	11.844	11.57	3.925	3.83	3.88	30.77	4.90
	20 - 25	23	11.225	0.81	9.092	2.133	0.353	3.53	3.630	36.31	0.260	2.60	1.854	4.35	9.192	21.57	3.572	8.38	7.88	57.88	10.98
	25 - 30	28	22.014	0.81	17.831	4.183	0.316	6.20	2.832	55.55	0.265	5.20	1.576	7.25	7.466	34.35	3.367	15.49	13.45	89.91	20.69
	30 - 35	33	32.110	0.81	26.009	6.101	0.290	8.30	2.275	65.09	0.268	7.67	1.369	9.19	6.347	42.60	3.289	22.07	17.49	107.69	29.74
	35 - 45	40	25.210	0.81	20.420	4.790	0.262	5.89	1.730	38.86	0.273	6.13	1.166	6.14	5.457	28.76	3.379	17.81	12.03	67.62	23.94
	45 - 55	50	14.256	0.81	11.547	2.709	0.234	2.97	1.302	16.54	0.291	3.70	1.000	2.98	5.134	15.30	3.961	11.80	5.95	31.84	15.50
	> 55	63	24.734	0.81	20.034	4.699	0.233	5.14	2.255	49.70	0.394	8.68	0.933	4.82	6.266	32.39	6.022	31.13	9.96	82.09	39.82
Total			**154.083**					**42.83**		**382.21**		**39.75**		**48.50**		**254.78**		**129.31**	**91.33**	**636.99**	**169.06**

Table A8-4
Preferred Initial Project Air Quality Impact Analysis using FTA Methods

							LDV/LDT						HDDV						Total		
Alternative	Speed Range (mph)	Ave Speed (mph)	Total VMT (million-miles)	Split Factor LDV/HDDV	LDV/LDT VMT (million-miles)	HDDV VMT (million-miles)	VOC Factor (g/mi)	VOC Sub total (tons)	CO Factor (g/mi)	CO Sub total (tons)	Nox Factor (g/mi)	Nox Sub total (tons)	VOC Factor (g/mi)	VOC Sub total (tons)	CO Factor (g/mi)	CO Sub total (tons)	Nox Factor (g/mi)	Nox Subt otal (tons)	VOC Total (tons)	CO Total (tons)	Nox Total (tons)
Preferred Initial Project	0 - 10	5	0.770	0.81	0.624	0.146	1.113	0.76	10.671	7.32	0.309	0.21	3.998	0.64	28.325	4.56	5.925	0.95	1.41	11.88	1.17
	10 - 15	13	19.045	0.81	15.426	3.619	0.491	8.33	5.508	93.47	0.264	4.48	2.743	10.92	15.971	63.58	4.470	17.79	19.25	157.05	22.27
	15 - 20	18	4.716	0.81	3.820	0.896	0.408	1.71	4.612	19.38	0.256	1.08	2.231	2.20	11.844	11.68	3.925	3.87	3.91	31.06	4.95
	20 - 25	23	11.177	0.81	9.053	2.124	0.353	3.52	3.630	36.15	0.260	2.59	1.854	4.33	9.192	21.47	3.572	8.35	7.85	57.63	10.93
	25 - 30	28	22.034	0.81	17.847	4.186	0.316	6.20	2.832	55.60	0.265	5.20	1.576	7.26	7.466	34.38	3.367	15.51	13.46	89.99	20.71
	30 - 35	33	32.198	0.81	26.081	6.118	0.290	8.32	2.275	65.27	0.268	7.69	1.369	9.21	6.347	42.72	3.289	22.14	17.53	107.99	29.82
	35 - 45	40	25.147	0.81	20.369	4.778	0.262	5.87	1.730	38.77	0.273	6.12	1.166	6.13	5.457	28.68	3.379	17.76	12.00	67.45	23.88
	45 - 55	50	14.142	0.81	11.455	2.687	0.234	2.95	1.302	16.41	0.291	3.67	1.000	2.96	5.134	15.18	3.961	11.71	5.90	31.58	15.38
	> 55	63	24.616	0.81	19.939	4.677	0.233	5.11	2.255	49.46	0.394	8.64	0.933	4.80	6.266	32.24	6.022	30.98	9.91	81.70	39.63
Total			**153.845**					**42.78**		**381.84**		**39.68**		**48.45**		**254.49**		**129.06**	**91.23**	**636.33**	**168.73**

Table A8-5
Constrained Initial Project Air Quality Impact Analysis using FTA Methods

Alternative	Speed	Ave	Total	Split	LDV/ LDT	HDDV	LDV/LDT						HDDV						Total		
							VOC		CO		Nox		VOC		CO		Nox		VOC	CO	Nox
	Range	Speed	VMT	Factor	VMT	VMT	Factor	Sub total	Factor	Sub total	Factor	Sub total	Factor	Sub total	Factor	Sub total	Factor	Sub total	Total	Total	Total
	(mph)	(mph)	(million -miles)	LDV/ HDDV	(million- miles)	(million -miles)	(g/mi)	(tons)	(g/mi)	(tons)	(g/mi)	(tons)	(g/mi)	(tons)	(g/mi)	(tons)	(g/mi)	(tons)	(tons)	(tons)	(tons)
Constrained Initial Project	0 - 10	5	0.765	0.81	0.619	0.145	1.113	0.76	10.671	7.27	0.309	0.21	3.998	0.64	28.325	4.53	5.925	0.95	1.40	11.80	1.16
	10 - 15	13	19.093	0.81	15.466	3.628	0.491	8.35	5.508	93.71	0.264	4.49	2.743	10.95	15.971	63.74	4.470	17.84	19.30	157.45	22.33
	15 - 20	18	4.747	0.81	3.845	0.902	0.408	1.73	4.612	19.51	0.256	1.08	2.231	2.21	11.844	11.75	3.925	3.89	3.94	31.26	4.98
	20 - 25	23	11.206	0.81	9.077	2.129	0.353	3.52	3.630	36.25	0.260	2.60	1.854	4.34	9.192	21.53	3.572	8.37	7.87	57.78	10.96
	25 - 30	28	22.047	0.81	17.858	4.189	0.316	6.21	2.832	55.64	0.265	5.21	1.576	7.26	7.466	34.41	3.367	15.52	13.47	90.04	20.72
	30 - 35	33	32.046	0.81	25.958	6.089	0.290	8.28	2.275	64.97	0.268	7.65	1.369	9.17	6.347	42.51	3.289	22.03	17.45	107.48	29.68
	35 - 45	40	25.198	0.81	20.410	4.788	0.262	5.88	1.730	38.84	0.273	6.13	1.166	6.14	5.457	28.74	3.379	17.80	12.02	67.59	23.93
	45 - 55	50	14.209	0.81	11.510	2.700	0.234	2.96	1.302	16.49	0.291	3.68	1.000	2.97	5.134	15.25	3.961	11.76	5.93	31.73	15.45
	> 55	63	24.650	0.81	19.967	4.684	0.233	5.12	2.255	49.53	0.394	8.65	0.933	4.81	6.266	32.28	6.022	31.03	9.93	81.82	39.68
Total			**153.961**					**42.82**		**382.20**		**39.71**		**48.49**		**254.74**		**129.18**	**91.31**	**636.94**	**168.89**

Table A8-6
Cobb County Only Project Air Quality Impact Analysis using FTA Methods

Alternative	Speed Range (mph)	Ave Speed (mph)	Total VMT (million-miles)	Split Factor LDV/HDDV	LDV/LDT VMT (million-miles)	VMT (million-miles)	LDV/LDT VOC Factor (g/mi)	LDV/LDT VOC Sub total (tons)	LDV/LDT CO Factor (g/mi)	LDV/LDT CO Sub total (tons)	LDV/LDT Nox Factor (g/mi)	LDV/LDT Nox Sub total (tons)	HDDV VOC Factor (g/mi)	HDDV VOC Sub total (tons)	HDDV CO Factor (g/mi)	HDDV CO Sub total (tons)	HDDV Nox Factor (g/mi)	HDDV Nox Sub total (tons)	Total VOC Total (tons)	Total CO Total (tons)	Total Nox Total (tons)
Cobb County Only Project	0 - 10	5	0.765	0.81	0.620	0.145	1.113	0.76	10.671	7.28	0.309	0.21	3.998	0.64	28.325	4.53	5.925	0.95	1.40	11.81	1.16
	10 - 15	13	19.085	0.81	15.459	3.626	0.491	8.35	5.508	93.67	0.264	4.49	2.743	10.94	15.971	63.71	4.470	17.83	19.29	157.38	22.32
	15 - 20	18	4.668	0.81	3.781	0.887	0.408	1.70	4.612	19.18	0.256	1.06	2.231	2.18	11.844	11.56	3.925	3.83	3.87	30.74	4.89
	20 - 25	23	11.149	0.81	9.030	2.118	0.353	3.51	3.630	36.06	0.260	2.58	1.854	4.32	9.192	21.42	3.572	8.32	7.83	57.48	10.91
	25 - 30	28	22.269	0.81	18.038	4.231	0.316	6.27	2.832	56.20	0.265	5.26	1.576	7.34	7.466	34.75	3.367	15.67	13.61	90.95	20.93
	30 - 35	33	32.019	0.81	25.936	6.084	0.290	8.27	2.275	64.91	0.268	7.65	1.369	9.16	6.347	42.48	3.289	22.01	17.44	107.39	29.66
	35 - 45	40	25.181	0.81	20.396	4.784	0.262	5.88	1.730	38.82	0.273	6.13	1.166	6.14	5.457	28.72	3.379	17.78	12.02	67.54	23.91
	45 - 55	50	4.156	0.81	11.466	2.690	0.234	2.95	1.302	16.42	0.291	3.67	1.000	2.96	5.134	15.19	3.961	11.72	5.91	31.61	15.39
	> 55	63	24.645	0.81	19.962	4.682	0.233	5.12	2.255	49.52	0.394	8.65	0.933	4.81	6.266	32.28	6.022	31.02	9.92	81.80	39.67
Total			**153.936**					**42.81**		**382.06**		**39.70**		**48.48**		**254.64**		**129.14**	**91.28**	**636.70**	**168.84**

NOVA ENGINEERING and ENVIRONMENTAL, INC.

REPORT OF INITIAL GEOTECHNICAL AND GEOLOGIC ASSESSMENT

CONFIDENTIAL TRANSIT IMPLEMENTATION STUDY

COBB COUNTY, GEORGIA

Prepared For:

BECHTEL INFRASTRUCTURE CORPORATION
c/o Mayes, Sudderth & Etheredge, Inc.
Atlanta, Georgia
2217 Roswell Road
Suite C-100
Marietta, Georgia 30062

May 5, 2000

May 5, 2000

BECHTEL INFRASTRUCTURE CORPORATION
c/o Mayes Sudderth & Etheredge, Inc.
2217 Roswell Road, Suite C-100
Marietta, Georgia 30062

Attention: Mr. Douglas Tilden, AIA.
Deputy Project Manager

Subject: **Report of Initial Geotechnical and Geologic Assessment**
CONFIDENTIAL
TRANSIT IMPLEMENTATION STUDY
Cobb County, Georgia
NOVA Project Number 10482-G

Dear Mr. Tilden:

NOVA Engineering and Environmental, Inc. (NOVA) has completed their Initial Geotechnical and Geologic Assessment, authorized within Cobb County Georgia, for the route of a proposed light rail system. The work was performed in general accordance with NOVA Proposal 00672-G, dated February 15, 2000. This report briefly discusses our understanding of the project, describes the consulting services provided by NOVA, and presents supplemental findings, conclusions and recommendations.

We appreciate your selection of NOVA and the opportunity to be of service on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,

NOVA ENGINEERING AND ENVIRONMENTAL, INC.

Dennis P. Popham, P.G.
Senior Geologist

David A. Miller, P.E.
Principal Engineer

Walter K. Cook, P.E.
Principal Engineer

Copies submitted: Addressee (3)

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INTRODUCTION

PROJECT INFORMATION

The Cumberland Community Improvement District and the Town Center Area Community Improvement District (CIDs) are the sponsors of a *Transit Implementation Study* being conducted by Bechtel Infrastructure Corporation (Bechtel) and Mayes, Suddereth & Etheredge, Inc. (MSE). The goal of the study is to develop a conceptual design and implementation plan for a Northwest Corridor Light Rail Transit System that would connect Cobb County with Midtown Atlanta. The proposed system would have a trunkline that would originate in the Town Center Area of Kennesaw, follow I-75 and Cobb Parkway through Marietta to the Cumberland Mall/Galleria area, and continue to a southern terminal at the MARTA Arts Center Station in Midtown Atlanta, where passengers would be able to transfer to and from subway trains and buses. In addition, two LRT circulators within the Cumberland and Town Center Area CIDs would be included in the proposed system.

Bechtel and MSE have developed preliminary alignments for the portion of the proposed LRT system that will be located within Cobb County. NOVA Engineering and Environmental Services, Inc. (NOVA) was retained by Bechtel/MSE to perform an initial geotechnical and geological database investigation of the route of the proposed system north of the Chattahoochee River. The purpose of this investigation was to assist Bechtel and MSE with the conceptual design and budget estimate for this portion of the proposed system.

SCOPE OF WORK

NOVA's scope of work for this project was limited to a database search of readily accessible existing literature, and to assess known geotechnical and geologic conditions along the proposed alignment of each fixed guideway element for the proposed transit system.

More specifically, the NOVA work scope included the completion of the following tasks:

1. Review of the proposed system routing plans and elevations provided by Bechtel/MS&E.
2. Collection and review of available geotechnical information (including the professional experiences of NOVA personnel) along the route.
3. Preparation of a general geologic report for the route.
4. Preparation of a preliminary "overall" geotechnical assessment report.

As requested, Tasks 3 and 4 address overall site development constraints, general foundation support methods, typical area unit costs of related construction, and recommendations for future study.

PROJECT DESCRIPTION

The Cobb County portion of the proposed Northwest Corridor LRT System will be located in an area between the Town Center area of Kennesaw and the Cumberland Mall/Galleria (Platinum Triangle) area. The proposed LRT system would consist of three main elements: a Trunkline, a Cumberland Circulator and a Town Center Area Circulator. It is intended that the Trunkline will continue into Fulton County to the Arts Center in Midtown Atlanta, where passengers will be able to transfer to and from subway trains and buses operated by the Metropolitan Atlanta Rapid Transit Authority (MARTA). The design of the system will likely include at-grade, below grade (cut and cover or tunneling), and above grade (aerial) construction of its guideways and stations.

The Trunkline will have two northern terminals located in Kennesaw and extend south through Cobb County to the Chattahoochee River. Its main line will begin at Chastain Road and I-575 and be located in the median of I-575 as far as the Town Center Mall, pass under the mall parking lot, Barrett Parkway and I-75, continue via private right-of-way adjacent to I-75 and the Canton Road Connector/SR 5 to Cobb Parkway, then follow Cobb Parkway south through Marietta and Cumberland to Cumberland Boulevard, a distance of approximately 14.1 miles from Chastain Road. A branch approximately 3.2 miles long will begin at Barrett Parkway and run south along Cobb Parkway to the vicinity of the Canton Road Connector/SR 5, where it will merge with the main line extending south from Chastain Road/I-575. The Trunkline will have 13 stations within Cobb County, 11 on the main line and 2 on the branch.

On the southern end of the Cobb County portion of the Northwest Corridor LRT System, a light rail transit circulator will be constructed in stages, to serve major activity centers located in the densely developed Cumberland CID. The Cumberland Circulator will be 14.25 miles long, serve 37 stations located in all four quadrants of the I-75/I-285 Kennedy Interchange, and connect with the Trunkline in three locations. Major activity centers served will include Cobb Galleria Convention Centre, Cumberland Mall, Overlook/Mt. Davidson, Vinings/Paces Ferry, Home Depot Support Center, Overton, Wildwood, and Interstate North. The Cumberland Circulator will consist of a Central Loop and three segments referred to as the Home Depot Loop, the Wildwood Loop, and the Galleria Link that would branch from and then rejoin the Central Loop.

Another light rail transit circulator system (the Town Center Area Circulator) will be built on the northern end of the Trunkline. This Circulator will serve the Town Center Area CID, and connect with the Trunkline in three locations. It would be configured as a loop approximately 10.9 miles long, connecting the intersection of Barrett Parkway and Cobb Parkway with commercial developments along Barrett Parkway, the Town Center Mall, Chastain Meadows Parkway, Chastain Road, Town Park, Kennesaw State University (KSU), and Barrett Lakes Boulevard and returning via Cobb Place Boulevard to its origin at Barrett Parkway and Cobb Parkway. To facilitate the operation of a direct service between KSU and the Town Center Mall, a Barrett Lakes Connector approximately 0.6 miles long is proposed along Barrett Lakes Boulevard between Cobb Place and Barrett Parkway. When all stages of its development are completed, the Town Center Area Circulator would be approximately 11.5 miles long and serve 23 stations, including three where transfers to and from the Trunkline will be possible.

GEOLOGY

This section provides a an overview of the surface and near surface geologic conditions along the routes of the proposed transit system, and a general description of the geologic conditions that will likely be encountered along the proposed routes of the transit systems. The geologic information provided herein was gathered from the following resources:

1. *Geology of the Greater Atlanta Region.* Georgia Department of Natural Resources, Geologic Survey, Bulletin 96, McConnell and Abrams 1984 (revised 1993).
2. *Geologic Map of the Brevard Fault Zone near Atlanta, Georgia.* United States Department of the Interior, Geologic Survey, Miscellaneous Geologic Investigation, Map I-511, Higgins 1968.
3. *Geologic Map of Georgia.* Georgia Department of Natural Resources, Geologic Survey, 1976.
4. *Geologic Map of the Atlanta 30' x 60' Quadrangle, Georgia.* United States Department of the Interior, Geologic Survey, Open File Report 98-245, Higgins et al 1998.
5. *Ground Water in the Greater Atlanta Region, Georgia.* Georgia Department of Natural Resources, Geologic Survey, Circular 63, Cressler, Thurmond and Hester 1983.

REGIONAL GEOLOGIC SETTING

Nature of the Rock

Cobb County is located within the Piedmont Physiographic Province of Georgia. The Piedmont is a broad northeasterly trending province underlain by crystalline rocks up to 600 million years old. In general, the geology of the Piedmont in the Greater Atlanta Region consists of medium-grade metamorphic rocks that have been intruded by granitic rocks in some places. These crystalline rocks generally were formed before and during the building of the Appalachian Mountains, more than 200 million years ago. Since that time, they have undergone intense weathering, erosion, and some uplifting.

The metamorphic rocks were formed from earlier igneous and sedimentary rocks that were subjected to intense heat and pressure in the roots of the forming Appalachian Mountains. The nature of the various metamorphic rocks is as much a result of the heat and pressure of metamorphism as of the texture and mineralogy of their igneous and sedimentary precursors. Massive granites, when metamorphosed, became massive granitic gneisses. Layered volcanic rocks became layered amphibolites, chlorite schists, and metafelsites. Sedimentary rocks with their typical complex, intelayered sequences of sandstone, feldspalthic sandstone (arkose), and shale became equally complex, interlayered sequences of quartzite, arkosic gneiss, and mica schist. The general

effects of heat and pressure were to recrystallize the rocks by forming new minerals, removing matrix porosity, and creating a new crystal structure with interlocking mineral grains and preferred orientation of crystals, known as foliation, resulting in moderate to pronounced structural anisotropy.

The granitic rocks in the Atlanta area range from small lenses a few inches thick to massive bulbs that are miles across. These rocks have interlocking crystals with either minimal or very mild structural anisotropy.

The igneous and metamorphic rocks in the Atlanta area have undergone structural deformation resulting in faulting, folding, and fracturing. These structures can be divided into two main groups:

- Older structures associated with the building of the Appalachian Mountains, and
- Newer structures associated with erosion, weathering, and broad-scale regional uplifting.

The older structures consist mainly of welded thrust faults, high-angle (steeply dipping) fractures, shear zones, and folds. The more recent structures include exfoliation fractures related to elastic expansion as the weight of the overlying rock was removed by erosion. Exfoliation fractures mostly occur in the plane of rock foliation, but may also occur at an angle to the foliation or along pre-existing planes of weakness.

The main structural feature that will be encountered along the proposed transit system route is the Brevard Fault Zone (BFZ). The BFZ is a northeast-southwest trending distinct linear zone of ductile shearing that is traceable through Georgia from Alabama to South Carolina. In the Atlanta Region, the BFZ separates the rocks of the Northern Piedmont Region from those of the Southern Piedmont Region. The types of rocks present in the BFZ include mylonites, protomylonites, button schist, and phylonite.

Numerous interpretations have been proposed for the BFZ. Higgins (1966) interpreted the zone to be a reactivated backlimb thrust on the Blue Ridge thrust sheet. Others have interpreted it to be a strike slip fault (both right lateral and left lateral). The authors of Bulletin 96 have interpreted the zone as having had little or no post metamorphic vertical displacement. We stress that the Brevard Fault Zone is an ancient fault that has been inactive in recent geologic time.

Soil to Rock Transition

Residual soils in the region are primarily the product of in-situ chemical decomposition of the parent rock. The extent of the weathering is influenced by the mineral composition of the rock and defects such as fissures, faults and fractures. The residual profile can generally be divided into three zones:

- An upper zone near the ground surface consisting of red clays and clayey silts which have undergone the most advanced weathering

- An intermediate zone of less weathered micaceous sandy silts and silty sands, frequently described as "saprolite", whose mineralogy, texture and banded appearance reflects the structure of the original rock, and

- A transitional zone between soil and rock termed partially weathered rock (PWR). Partially weathered rock is defined locally by standard penetration resistances exceeding 100 blows per foot.

The boundaries between zones of soil, partially weathered rock and bedrock are erratic and poorly defined. Weathering is often more advanced next to fractures and joints that transmit water, and in mineral bands that are more susceptible to decomposition. Due to the variations in the rates of weathering, the weathering process often advances along the dip of the beds. Within the Brevard, the result is a series of differentially weathered, hard and soft layers. Boulders and rock lenses are sometimes encountered within the overlying PWR or soil matrix. Consequently, significant fluctuations in depths to materials requiring difficult excavation techniques may occur over short horizontal distances. In addition, the presence of the previously described "slickensides" can result in weak zones along ancient slippage planes.

Surface Drainage

The project area consists of rolling to dissected topography. Most of the areas along the proposed project alignment consist of well-drained slopes and uplands. A small percentage of the alignments cross over (or under) alluvial bottomlands. The streams along the southern portion of the project drain into the Chattahoochee River drainage basin, while those along the northern portion drain into the Etowah River (Lake Allatoona) drainage basin. Although smaller streams and drainage basins exist along the planned route, the proposed alignments do not cross any rivers or large impoundments.

Groundwater

Groundwater in the Piedmont typically occurs as an unconfined or semi-confined aquifer condition. The water table generally occurs at depths around 10 feet or less in lowland areas to depths of 40 to 50 feet in upland areas. Recharge is provided by the infiltration of rainfall and surface water through the soil overburden. More permeable zones in the soil matrix, as well as fractures, joints and discontinuities in the underlying bedrock can effect groundwater conditions. The groundwater table in the Piedmont is expected to be a subdued replica of the surface topography.

GEOLOGY OF THE PROPOSED ROUTE

The Georgia Geologic Survey's Bulletin 96 provides the most comprehensive geologic database for the Greater Atlanta Region (GAR). NOVA has used Bulletin 96 as the primarily resource for geologic information during this evaluation. The structural interpretations, formation names and geologic maps that are provided in Bulletin 96 are the most widely accepted interpretations of the geology and structure within the GAR. Figure 2 in the Appendix provides the proposed rail line alignment overlaid on the Geologic Map presented in Bulletin 96. As a supplement to the information provided in Bulletin 96, NOVA also reviewed the US Geologic Survey, Open File Report 98-245.

Based on our review of the regional geologic database information, we have prepared the following descriptions of the near surface structure and geology that should be expected along the proposed route of the transit system.

Structure and Stratigraphy

Structure: As previously stated, the main structural feature in the study area is the BFZ. The southern portion of the main branch line for the transit system in the area around Cumberland Mall and the Cobb Galleria, as well as most of the Cumberland Circulator will be located within the BFZ. The BFZ forms the boundary between rocks of the Atlanta Group to the southeast and rocks of the Sandy Springs Group to the northwest. Within the study area, the Chattahoochee River roughly follows the trace of the BFZ.

Higgins (1968) and Higgins et al (1998) mapped a northeast/southwest trending thrust fault (the Long Island Fault within the BFZ. Higgins also interpreted the structure within the portion of the BFZ in the study area to be an overturned anticline.

Another main structural feature in the vicinity of the study area is the Chattahoochee Fault. Within Cobb County, the trace of that fault is mapped as being roughly north/south. Bulletin 96 maps the Chattahoochee Fault as the northwestern boundary of the Sandy Springs Group. The fault is located a few miles northwest of the northern terminus of the transit system.

The structural relationships of the various Sandy Springs Group formations between the BFZ and the Chattahoochee Fault are complex. Higgins et al (1998) mapped the majority of the formation contacts as thrust faults. However, Bulletin 96 suggested that the contacts are gradational between metamorphosed sedimentary units and uncomformities where metamorphosed igneous intrusions are present.

Stratigraphy: The Powers Ferry Formation is the oldest unit in the Sandy Springs Group. In general, it is composed of intercalated gneiss, schist, and amphibolite. The Chattahoochee Palisades Quartzite overlies the Powers Ferry Formation. It is commonly exposed as a massive quartzite containing accessory mica and garnets. Gradationally above the Chattahoochee Palisades Quartzite is the Factory Shoals Formation. It is predominately composed of a light gray, garnet-biotite-oligoclase or muscovite-biotite-plagioclase metagraywacke that varies to a kyanite-quartz schist or staurolite-muscovite-quartz schist.

The Laura Lake Mafic Complex represents a pre-metamorphic igneous intrusion into the Powers Ferry Formation. The Laura Lake Mafic Complex is primarily composed of migmatic garnet amphibolite.

Proposed Transit System Route

The following is a brief discussion of the formations that have been mapped along the proposed route of the transit system. The discussion is provided from southeast to northwest, and is divided into:

- The southern portion of the system, including the Cumberland Circulator;
- The central portion of the system roughly from the Herodian Way Station to the station at the North 120 Loop; and,
- The northern portion of the route, including the Town Center Circulator.

Southern Portion: Rocks of the Powers Ferry Formation will likely be encountered from the southern terminus of the system through the Vinnings Area. The ridges to the north (Mt Wilkinson and the higher elevations around the Kennedy Interchange) are underlain by the Chattahoochee Palisades Quartzite. The areas along Intestate 285 are underlain by the Factory Shoals Formation. Outcrops of the Chattahoochee Palisades Quartzite and the Powers Ferry Formation are mapped from I-285 to the Herodian Way Station, and are visible at the southern

terminus of the transit line in the roadway cut at the intersection of Cumberland Boulevard and Cobb Parkway.

Central Portion: Rocks of the Powers Ferry Formation are mapped from the Herodian Station to the Station at Highway 41 and the North 120 Loop. The rock units are mapped as gneiss and schist. A narrow outcrop of the Chattahoochee Palisades Quartzite is mapped in the vicinity of the intersection of Highway 41 and Highway 120 (Roswell Road).

Northern Portion: The Laura Lake Mafic Complex has been mapped beneath the majority of the northern portion of the system. However, the areas around Kennesaw State University are mapped within an outcrop of the Powers Ferry Formation. Rock outcrops are visible in the road cut along the northwestern perimeter of Town Center Mall and in the streambed of Noonday Creek.

GEOTECHNICAL CONDITIONS

The following conclusions and recommendations are based on our understanding of the proposed construction, site observations, our interpretation of the published data reviewed during this assessment, our experience with similar subsurface conditions, and generally accepted geotechnical engineering principals and practices. We have provided a preliminary description of the geotechnical issues that we believe will impact the proposed construction. As the design advances, additional geotechnical study will become necessary.

SITE GRADING

Difficult Excavation

Southern Portion: Within the Brevard Fault Zone, very dense soils, partially weathered rock, and/or auger refusal materials are encountered at highly variable depths, often within a few feet of the ground surface. Within the Brevard, a series of differentially weathered, hard layers (typically Chattahoochee Palisades Quartzite) are interbedded with softer, more weathered layers, such as the Powers Ferry Formation and the Factory Shoals Formation. Typically, the rock surfaces dips downward from the northwest to the southeast, often at angles of 40° to 55°, along a southwest-northeast strike. The intense deformation and shearing associated with the ancient folding and faulting has also created planes of weakness within the rock which are susceptible to advanced weathering. Boulders and rock lenses are encountered within the overlying PWR or soil matrix. Consequently, significant fluctuations in depths to materials requiring difficult excavation techniques may occur over short horizontal distances.

Removal of fractured rock in the Brevard can be more difficult and expensive than removal of harder and more continuous rock in other locations in Atlanta. Our experience has indicated that the energy from blasting efforts sometimes dissipates in the softer seams, resulting in incomplete breaking of the adjacent more intact rock layers. The result can be large unwieldy rock pieces. Consequently, it is not unusual for the blaster to utilize multiple charges within a blast hole, with a tighter blast pattern spacing. In addition, because the rock surface is variable, pinnacles or lenses of rock are often encountered at unexpected locations. These rock ledges sometimes require removal as "trench" rock instead of "mass" rock. These factors can significantly increase the cost of rock removal.

We have provided photographs in the Appendix which illustrate rock outcrops observed at the southern terminus of the transit system at the intersection of Cumberland Boulevard and Cobb Parkway. We have also provided photographs of a recent construction project that required significant rock excavation in the BRZ.

Central Portion: The central portion of the proposed rail alignment is underlain by the Powers Ferry Formation, the oldest formation in the Sandy Springs Group. The Sandy Springs Group is the most extensive rock group in the northern Piedmont. Consequently, the Powers Ferry Formation is more "typical" of rock in the greater Atlanta area. While a variable depth to refusal should be anticipated, the weathering in the Powers Ferry Formation is usually deeper and less erratic than in the Brevard Fault Zone.

Northern Portion: The northern area of the study is underlain by the Laura Lake Mafic Complex, a metamorphic igneous intrusion. A significant feature of this plutonic formation is it's areal extent, as the Laura Lake Mafic Complex is the largest intrusive-extrusive formation in the Atlanta Piedmont and covers over 80 square miles. The result is a rock formation that can be more vertically continuous and laterally extensive than those in the southern and central portions of the transit alignment. However, although extensive, the higher quality of the rock allows for more expeditious removal, with the blasted rock sometimes suitable for use as aggregate after crushing (Town Center Mall construction). The Kennesaw quarry operation of Vulcan Materials is located in this formation near the northern terminus of the rail line.

Removal Techniques: In mass excavations for general sitework, dense soils and partially weathered rock can usually be removed by ripping with a single-tooth ripper attached to a large crawler tractor or by breaking it out with a large front-end loader. In confined excavations such as foundations, utility trenches, etc., removal of partially weathered rock typically requires use of large backhoes, pneumatic spades, or blasting. Refusal materials (rock) will normally require blasting for removal in all types of excavations.

The gradation of the material removed by ripping or blasting will probably be erratic, particularly in the Brevard Fault Zone. Reuse of these materials in fills will require additional effort and control, and are usually best suited for non-structural areas such as parking lots and driveways.

Costs for difficult excavation are highly variable and dependent on the quantity and quality of the material. Recent prices for difficult excavation on NOVA projects are as follows:

CLASSIFICATION	RANGE	TYPICAL
Ripping (PWR)	$5 to $8 per yd^3	$6 per yd^3
Mass Rock	$25 to $50 per yd^3	$35 per yd^3
Trench Rock	$45 to $110 per yd^3	$70 per yd^3
Off-Site Disposal	$8 to $15 per yd^3	$12 per yd^3

Soil

New Fill: The soils in the Piedmont reflect the degree of weathering and the attributes of the underlying parent metamorphic rock. Piedmont soils are usually non-plastic to low-plasticity (PI less than 30) Typically, a surficial horizon of finer grain soils composed of silty clays (CL) and clayey silts (ML) is encountered. The fine-grained components are not considered expansive. With increasing depth, the soils transition to sandy silts (ML) and silty sands SM) as the upper surface of rock is approached. Varying amounts of mica are present within the soil structure that can have a significant impact on the characteristics and performance of the soil.

The Standard Proctor Compaction Test (ASTM D-698) is commonly used as the test reference within the Atlanta area for control of soil fill placement. Although other test methods are sometimes referenced, it has been our experience that the Optimum Moisture Content determined by the Standard Proctor provides a target moisture content more compatible with the natural moisture contents of the soils, and allows productive and cost-efficient fill placement, particularly for the finer-grained and/or mica-laden soils.

Standard Proctor maximum dry densities (MDD) of Piedmont soils vary from <80 to >110 pounds per cubic foot (pcf), but are more typically range between 90 to 100 pcf. Optimum moisture contents vary from <15% to >35%, but more typically range between 20% to 30%.

The lighter weight materials are frequently highly micaceous silts that are difficult to compact and exhibit poor to moderate performance characteristics. These materials should be used in architectural areas or in the lower portions of parking and driveway areas. We normally recommend a MDD of 95 pcf or greater for structural applications, and compaction to 95% to 98% of the MDD depending on the intended area use.

Existing Fill: We note that much of the proposed construction will occur in areas that have already been developed. Consequently, we anticipate that construction will encounter previously placed fill materials. In many areas, this fill may have been placed with some compactive effort, similar to the recommendations described above. However, old undocumented fills are often erratic in content and consistency and may contain large amounts of unsuitable material. A known occurrence of uncontrolled dumping of deleterious material exists at the southeast corner of Bells Ferry Road and Cobb Parkway at the planned location of a rail station. This debris-laden fill contains asphalt, concrete and other unsuitable material (please refer to the photographs in the Appendix). Other areas of unsuitable old fill may be present.

Recent prices for earthwork on NOVA projects are as follows:

CLASSIFICATION	RANGE	TYPICAL
On-Site Fill Placement	**\$1.50 to \$3 per yd^3**	**\$2.50 per yd^3**
Undercutting Unsuitables	**\$5 to \$15 per yd^3**	**\$10 per yd^3**
Haul-in of New Fill	**\$4 to \$10 per yd^3**	**\$7.50 per yd^3**
Off-Site Disposal	**\$6 to \$15 per yd^3**	**\$8 per yd^3**

GROUNDWATER CONTROL

Groundwater in the higher portions of the Piedmont is often encountered at depths of 20 to 40 feet beneath the ground surface. Excavations along the rail alignment will result in cuts up to 50 feet deep. In addition, cuts are planned in low-lying areas where shallow groundwater is known to exist, such as adjacent to Noonday Creek in the northern portion of the rail alignment. Consequently, it will be necessary to provide both temporary and permanent dewatering of the groundwater in some areas.

Permeability of the soil matrix "typically" varies from $1(10^{-4})$ cm/sec to 1 (10^{-5}) cm/sec., although higher and lower permeabilities have been observed.

Groundwater also occurs within the fractures and joints of the metamorphic rock that underlies this site. Consequently, the water-yielding ability of the rock is highly dependent on the fracture pattern of the rock. Well yields in excess of 100 gallons per minute have been documented in the Piedmont. However, well surveys by Cressler, et al, indicate that 70% of the wells in the Atlanta area yield less than 20 gallons per minute, with the higher yielding wells being associated with shear zones. Contact zones between multi-layered rock units and fault zones have also been shown to provide higher yields. Consequently, dewatering in the fractured rock associated with the Brevard Fault Zone in the southern portion of the alignment may produce greater water volumes than the more intact rock associated with the Laura Lake Mafic Complex in the northern portion of the system.

Shallow dewatering of soil (<10 feet) in small excavations often uses a series of trenches, sumps and pumps. Dewatering of soil to greater depths, or in large area excavations where a system of trenches is not practical, frequently utilize a series of wellpoints. However, the effectiveness of the wellpoint system is limited by the distance between the initial groundwater elevation (phreatic surface) and any underlying zone of lower permeability. In areas of shallow rock, it is sometimes possible to modify the rock-blasting program and subsequently use a system of deep wells that extend into the blasted rock. The blasted rock layer then serves as a temporary drain during excavation.

Groundwater control systems are difficult to estimate due to the variability in the parameters that impact costs. The services of a dewatering contractor for a wellpoint system usually starts at approximately $25,000 and increases quickly.

SLOPES

Temporary slopes no steeper than 1.5(H):1.0(V) and permanent slopes no steeper than 2.0(H):1.0(V) in undisturbed residual soils, partially weathered rock, or structural fill are usually constructed, unless laboratory strength testing and slope stability analysis is performed.

Rock slopes as steep as vertical can be constructed, however, the actual slope is dependent on the rock quality and the orientation of the bedding planes. Rock bolting is sometimes necessary to stabilize the steeper slopes.

EXCAVATION BRACING

The excavations necessary to reach the proposed elevations will require cuts of up to 50 feet. Consequently, we anticipate that a temporary/permanent bracing system will be required at several locations.

In the Atlanta area, steel H-section soldier piles with timber or steel lagging are frequently used as a bracing alternative where a relatively flexible, pervious system is considered feasible for temporary bracing. The actual design of the temporary bracing system is usually the responsibility of the contractor.

Utilization as a permanent bracing system requires both protection from corrosion and degradation and construction of a permanent concrete wall against the timber/steel bracing. As an alternative, soil nailing has been used on several projects in Atlanta where a temporary/permanent wall system is desired. The exposed surface of the soil nail stabilized slope is normally covered with wire mesh and sprayed with a gunite facing as the excavation proceeds downward.

Where rock and partially weathered rock exist above the lower excavation levels, soldier piles require pre-drilling into the rock, or rock bolts, to reduce inward movement of the pile tips. Typically, the excavation is stepped at the soil-rock interface to provide a bench, with additional rock bolting of the exposed rock face as the excavation proceeds.

Recent prices for excavation bracing on NOVA projects are as follows:

CLASSIFICATION	RANGE	TYPICAL
Temporary Tie-Back Walls	**\$22 to \$28 per ft^2**	**\$25 per ft^2**
Permanent Tie-Back Walls	**\$30 to \$40 per ft^2**	**\$35 per ft^2**
Soil Nail	**\$30 to \$40 per ft^2**	**\$35 per ft^2**

CONVENTIONAL CAST-IN-PLACE WALLS

Laboratory analysis is necessary to determine actual soil shear strength properties. The angle of internal friction (effective stress) for Piedmont soils varies from $\phi'<20^\circ$ to $\phi'>35^\circ$, with moist soil weights ranging from $\gamma<100$ pcf to $\gamma>130$ pcf. In the absence of laboratory data, "typical" soil strength values of $\phi'=30^\circ$, with moist soil weights of $\gamma<120$ pcf, are frequently used to yield the earth pressure estimates shown below:

Earth Pressure	Equivalent Fluid Pressure Level Backfill	Equivalent Fluid Pressure 2(H):1(V) Sloping Backfill
Active (K_A)	40 pcf	60 pcf
At-Rest (K_O)	60 pcf	90 pcf
Passive (K_P)	150 pcf *	300 pcf *

* *Passive earth pressure is frequently used in retaining wall design to resist active earth pressures. Wall movements required to develop full passive earth pressures are significantly greater than movements necessary for active earth pressures. Consequently, this passive pressure value has been reduced by approximately 50% for wall design.*

A value of 0.35 is often assumed as the coefficient of friction (sliding resistance) between wall foundations and the underlying residual soils, with a value of 0.45 used for PWR or rock.

FOUNDATIONS

Spread Foundations

Typically, lightly loaded structures (<500 kips per column) can be supported by conventional shallow spread or continuous foundations bearing on undisturbed residual soils and/or compacted structural fill. Foundations are usually designed for a maximum allowable bearing pressure of 2500 to 4000 pounds per square foot (psf). Higher column loads may require support on dense residual soils (4 to 8 ksf), partially weathered rock (10 to 25 ksf) or intact rock (30 to 150 ksf) if spread or continuous foundations are utilized.

Actual bearing pressures are normally controlled by the amount of total and differential settlement acceptable to the designers. Piedmont soils often experience 60 to 80 % of the total consolidation concurrent with load application, with 60% to 80% of the remaining primary consolidation occurring within 60 days. Secondary consolidation is not a significant issue for most conventional structure-induced loads, but should be considered if consolidation is the result of large area loads such as deep extensive fills.

Frost penetration in the area seldom exceeds 12 inches, consequently, exterior footing bottoms are normally 18 inches (or greater) below exterior grades.

Deep Foundations

In the Atlanta area, the most commonly used deep foundation systems are currently either an augered cast-in-place pile system or drilled piers (caissons).

- 16-inch diameter auger-cast piles designed for a 120-ton capacity, or 18-inch diameter piles designed for 150-tons are often used. Auger-cast piles are best suited for the more deeply weathered zones, such as the Powers Ferry Formation or the Factory Shoals Formation.

- Drilled piers frequently use end-bearing pressures of 50 ksf to 150 ksf, with skin-friction capacities of 5 to 15 ksf in the rock. Both straight shaft and belled piers are used, although construction of bells in highly fractured rock beneath the groundwater table can be difficult. Drilled piers are most effectively used when high capacity rock is available close to the ground surface (<50 feet), such as the Laura Lake Mafic Complex.

Drilled piers are also appropriate in:

- Lower capacity rock (50 ksf), when the erratic and fractured nature of the refusal material is of concern and inspection of the bearing material is considered essential (such as in the Brevard Fault Zone), or

- In areas where deep zones of debris-laden fill restrict the installation of piles (such as the Bells Ferry/Cobb Parkway site).

Recent prices for foundation construction on NOVA projects are as follows:

CLASSIFICATION	RANGE	TYPICAL
Spread Foundations or Pile Caps	**$175 to $300 per yd^3**	**$225 per yd^3**
16-Inch Auger-Cast Pile	**$14 to $18 per linear foot**	**$16 per linear foot**
16-Inch Auger-Cast Pile	**$16 to $21 per linear foot**	**$18 per linear foot**
Drilled Piers (Caissons) – Soil	**$300 to $450 per yd^3**	**$350 per yd^3**
Drilled Piers (Caissons) – Rock	**$1200 to $1700 per yd^3**	**$1400 per yd^3**

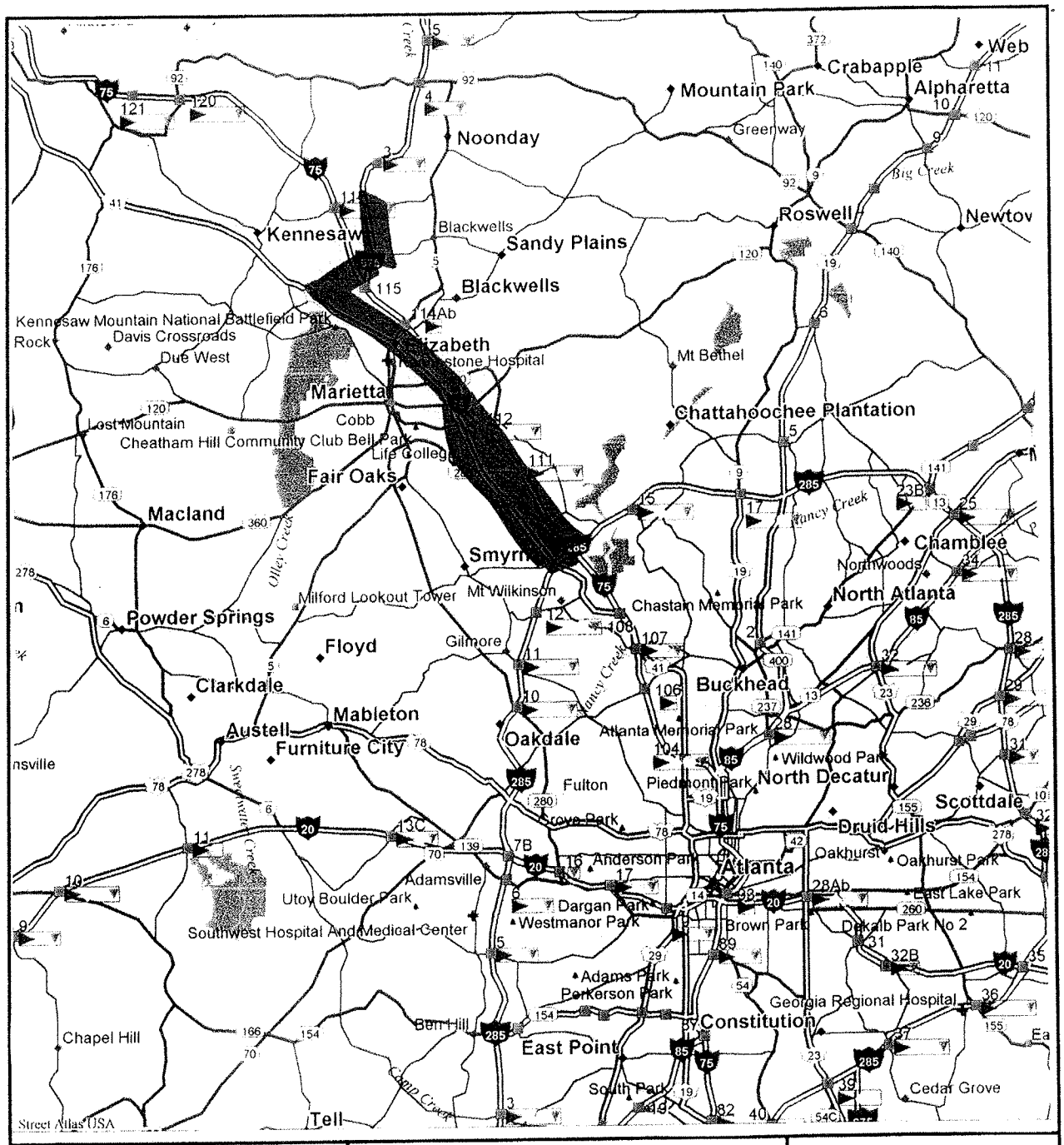
SEISMIC COEFFICIENTS

Building design in Cobb County references the Standard Building Code. An acceleration coefficient (A_a) of approximately 0.10 and a velocity related acceleration coefficient (A_v) of 0.10 are interpolated from the map provided in the 1994 version of the Standard Building Code (SBC).

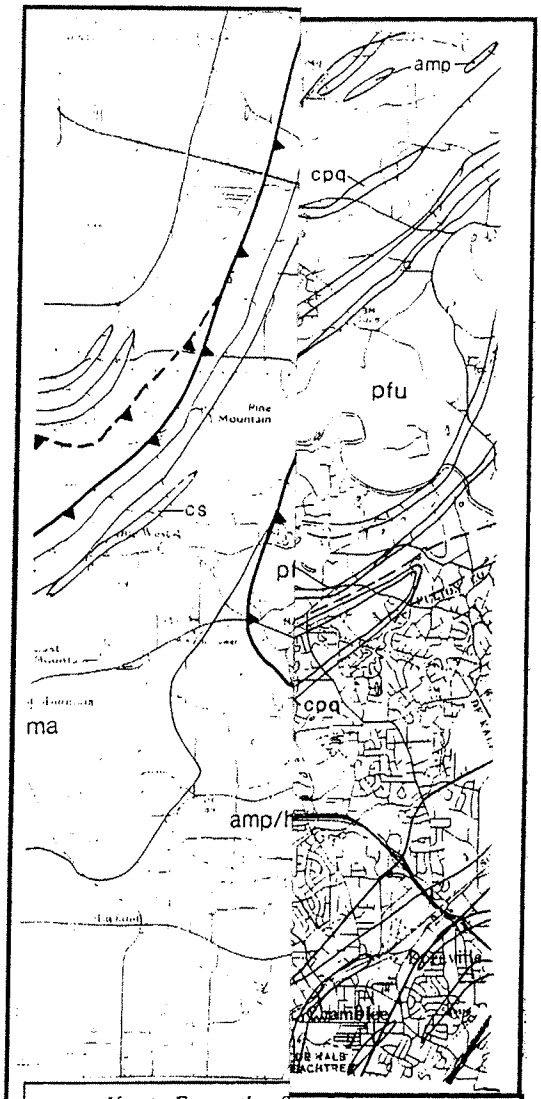
The SBC also allows the use of a site-specific model to determine appropriate values of A_a and A_v. Our recent experience indicates that modeling of Cobb County sites often results in coefficients less than 0.10, providing cost savings associated with the lower Seismic Performance Category (A versus B for Group I structures and B versus C for Group II structures).

The eastern United States is generally considered an area of low historical seismicity, with records that date back about 350 years. However, most damaging earthquakes in the east occurred prior to the establishment of reliable seismic instrument recording in the early 1900's. Seismic stations were not established in the Southeast until the 1960s. Consequently, earthquake data for the southeastern United States has been derived primarily from anecdotal seismic event descriptions.

In the Piedmont Geologic Province, the differences between site specific results and the SBC values can be explained by the use of region-specific bedrock motion model parameters in the site specific study rather than models generalized for the entire United States. Specifically, the primary cause is the difference in the magnitudes assigned to historic, pre-instrumented earthquakes. The modeling used in the studies on which the SBC maps were based typically utilized relationships between magnitudes and maximum observed intensities from earthquakes in the Western United States. The bedrock parameters used in the more recent site specific modeling are primarily derived by Seeber and Armbruster (1991) from felt areas, or maximum observed intensities using relations from Central and eastern United states earthquakes (Sibol and others, 1987). Consequently, the rates of the larger earthquake events are lower when compared to previous earthquake modeling for the southeast US.



Scale: Not to Scale **Date Drawn:** 5/4/00 **Drawn By:** DPP **Checked By:** DAM	**NOVA** **Engineering and Environmental, Inc.** 3640 Kennesaw North Ind. Pkwy., Suite E Kennesaw, GA 30144 (770) 425-0777	**Figure 1** **Cobb County Road Map** Cobb County, Georgia *NOVA Project Number 10482-E*



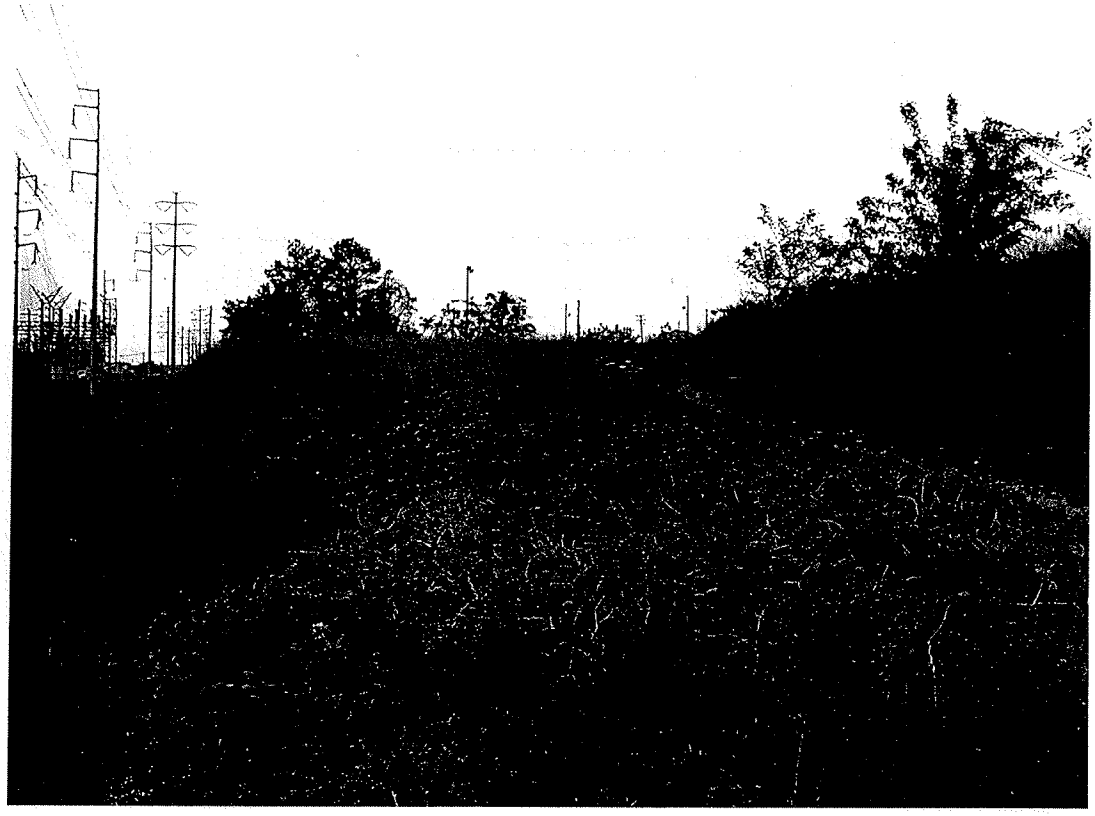
Key to Formation S

Cpq –Chattahoochee Palisac
FS – Factory Shoals Format
Pfu – Powers Ferry Formati
Pfs – Powers Ferry Formatic
Llu – Laura Lake Mafic Co
Llg – Laura Lake Mafic Cor
Lld – Laura Lake Mafic Cor

Map of

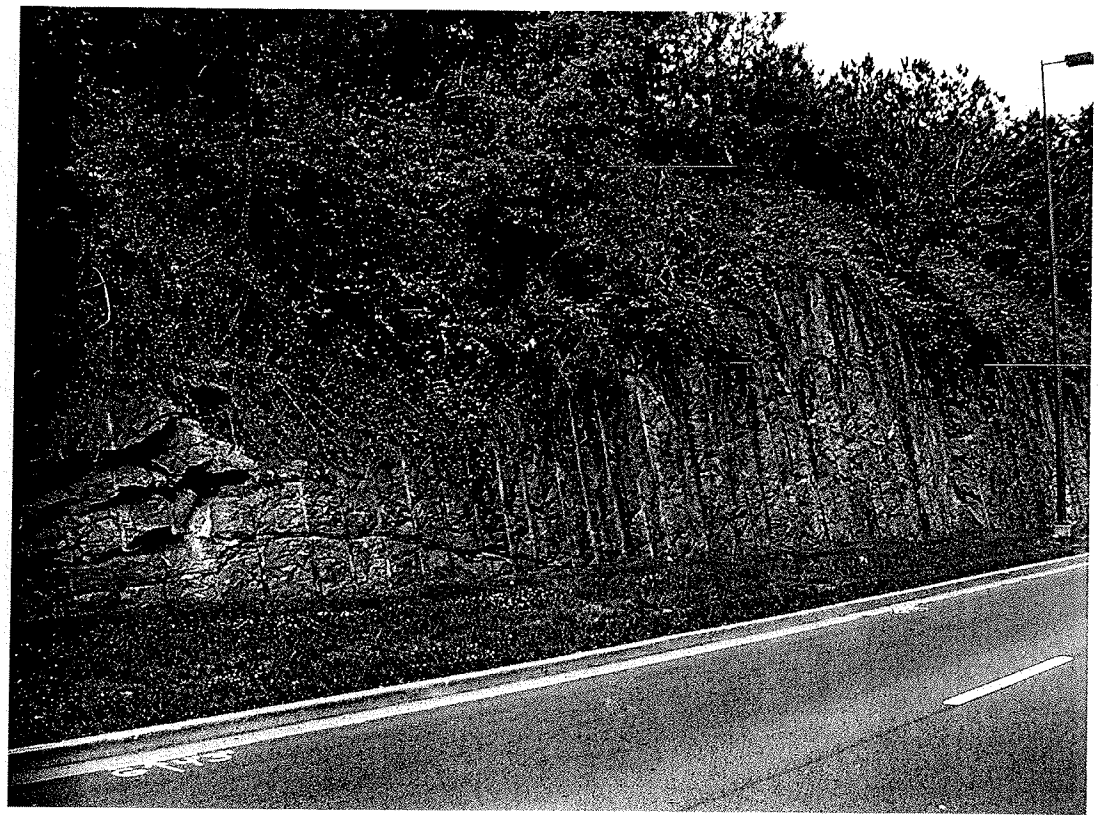
y

?-G

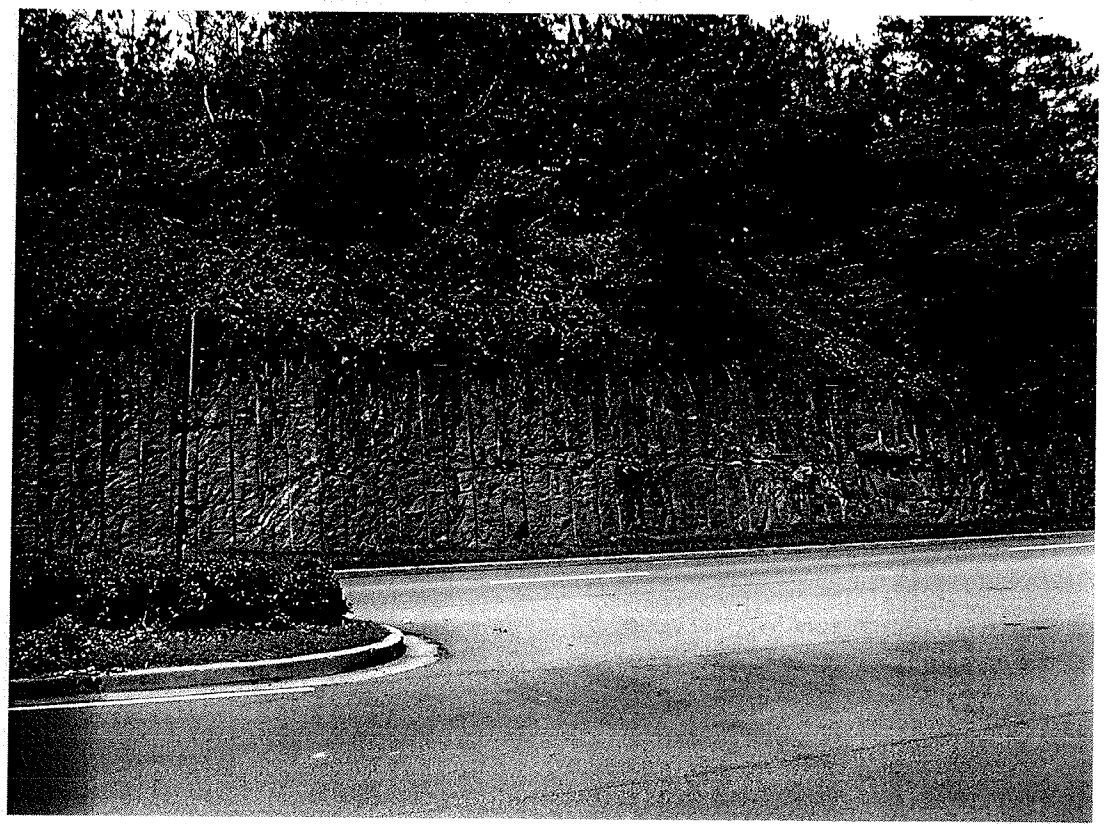


Debris-Laden Fill at Bells Ferry Road

Debris-Laden Fill at Bells Ferry Road

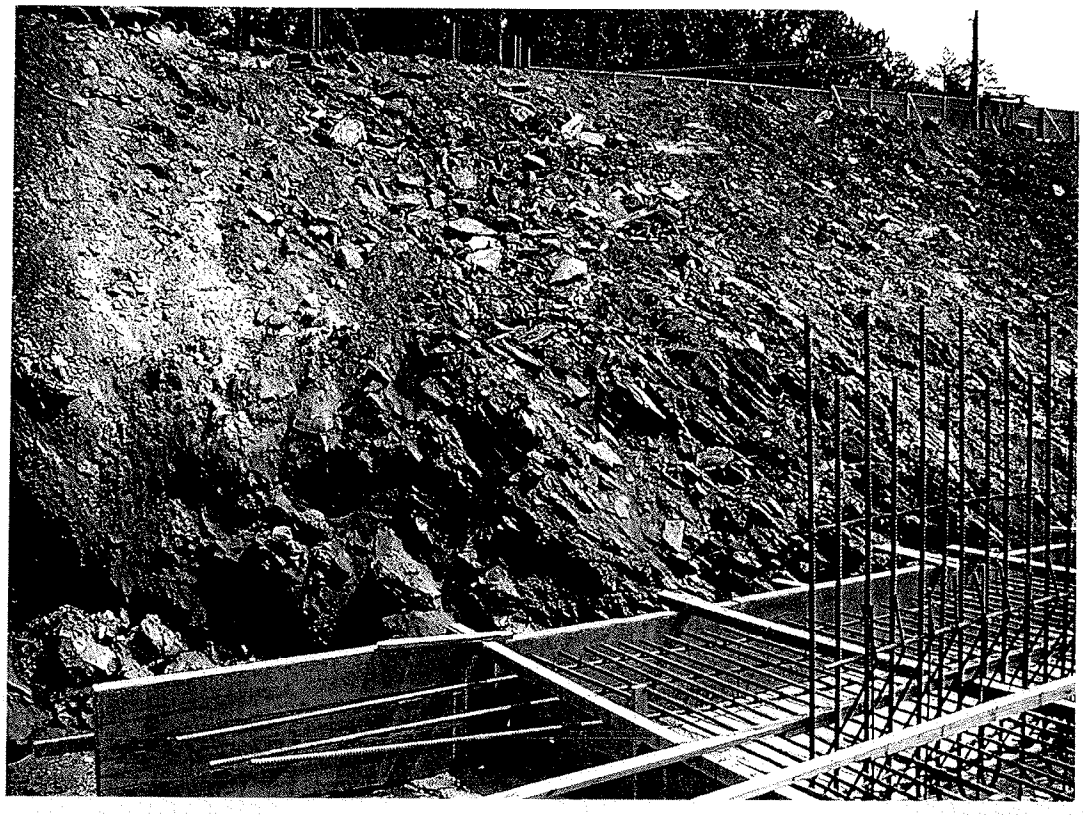


Rock in Road Cut Northwest of Town Center Mall

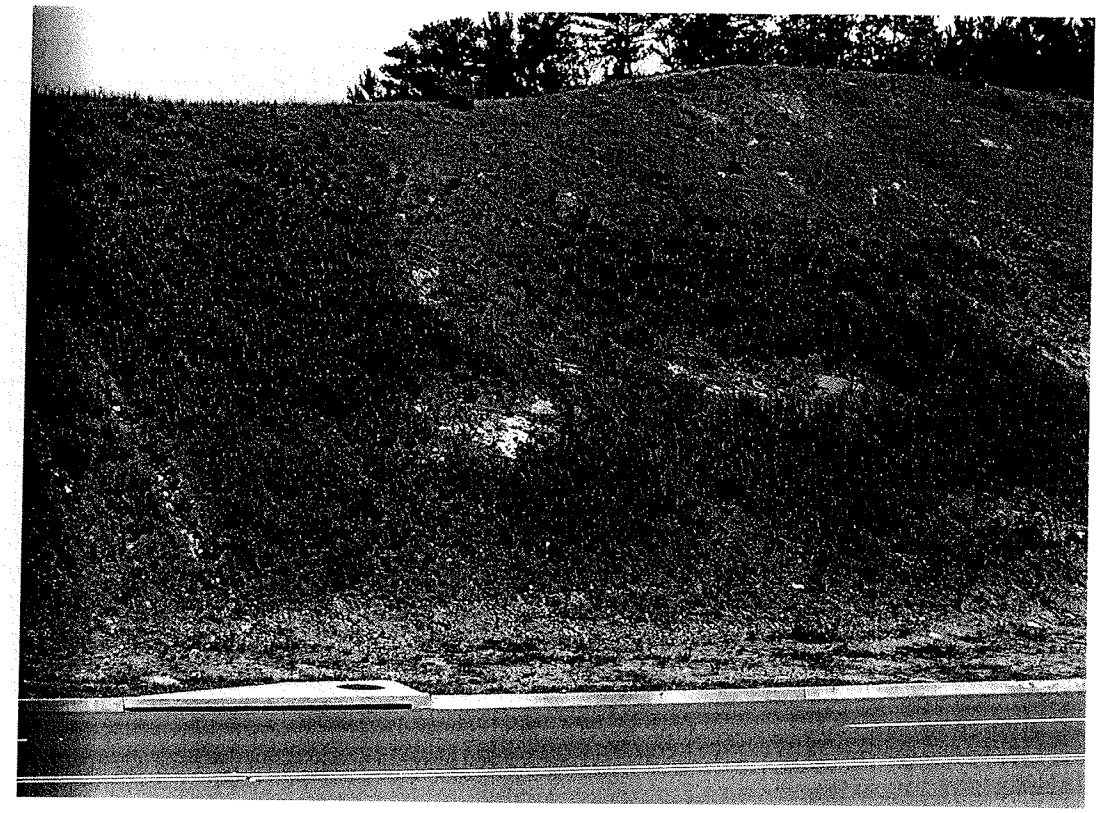


Rock in Road Cut Northwest of Town Center Mall

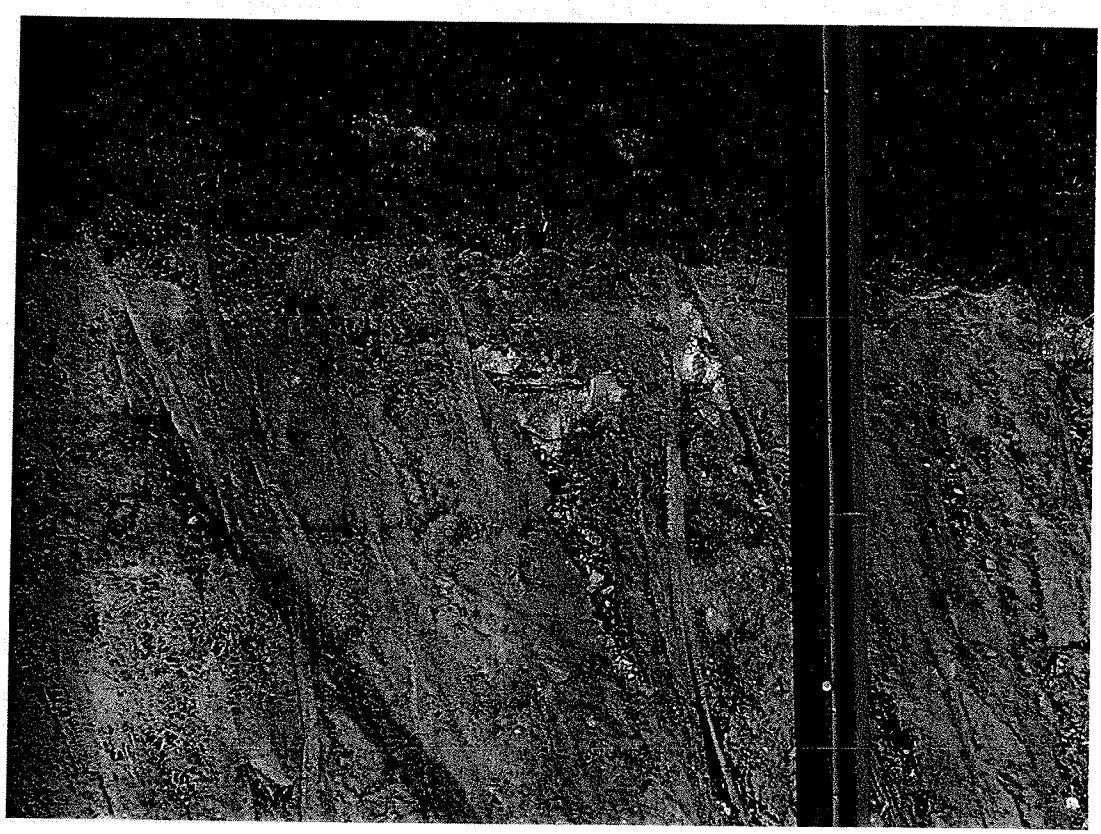
Rock in Excavation in Brevard Fault Zone



Rock in Excavation in Brevard Fault Zone

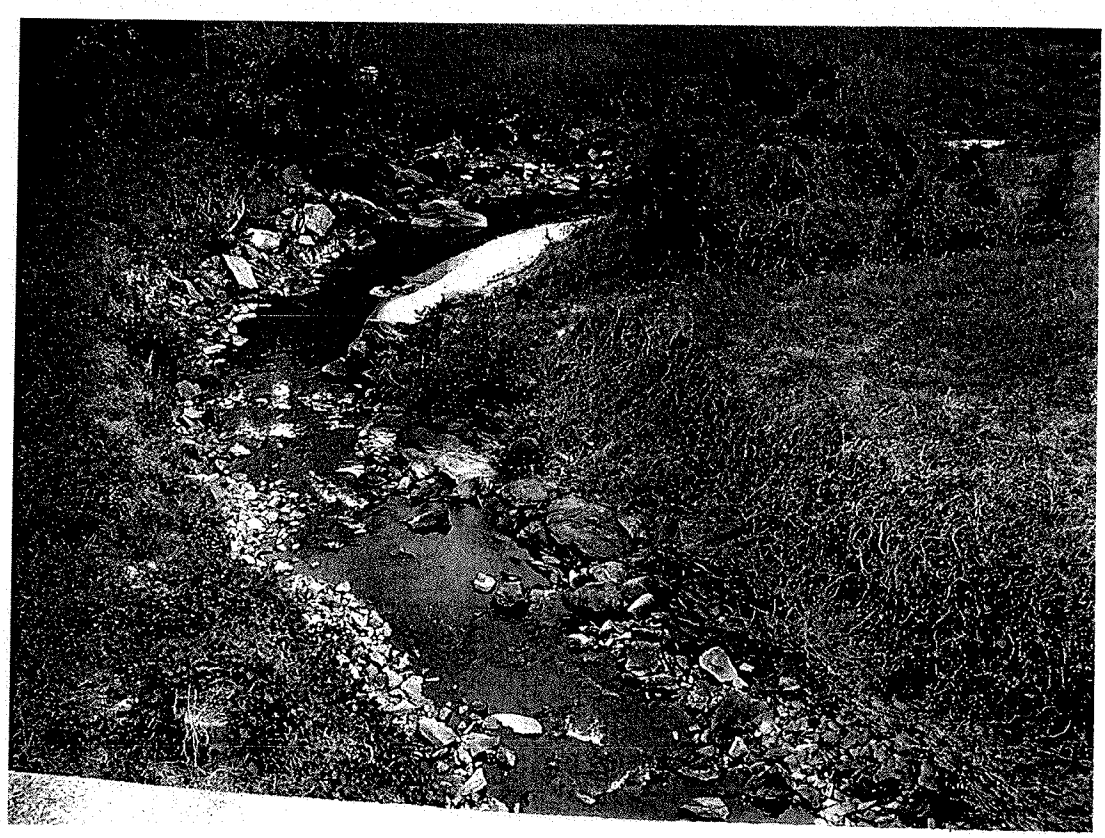


Rock in Slope at Intersection of Cumberland Boulevard and Cobb Parkway



Rock in Slope at Intersection of Cumberland Boulevard and Cobb Parkway

Rock at Construction Project East of Town Center Mall



Rock in Stream Bed of Noonday Creek at I-575

APPENDIX A9-A

APPENDIX A9-B