



CHAPTER V

Demand Analysis

INTRODUCTION

A key step in developing and evaluating transit plans is a careful analysis of the mobility needs of various segments of the population and the potential ridership of transit services. Transit demand analysis is the basic determination of demand for public transportation in a given area. There are several factors that affect demand, not all of which can be forecasted. However, as demand estimation is an important task in developing any transportation plan, several methods of estimation have been developed in the transit field. The analysis makes intensive use of the demographic data and trends discussed previously.

This chapter presents an analysis of the demand for transit services in the Dubuque County area based upon standard estimation techniques. The transit demand identified in this section will be utilized in the identification of transit service alternatives and the evaluation of the various alternatives. Three methods are used to estimate the transit trip demand in Dubuque County area.

- Fixed-Route Model
- ADA Eligibility Model
- Greatest Transit Needs Index

The first two models specifically focus on developing a sense of demand for existing services, while the third model highlights the areas with the greatest need for transit services. It is critical to develop a forecasting tool for future development in the area. A *stop-level fixed-route demand model* has been developed specific to the Dubuque area, and the analysis is presented in the following text.

FIXED-ROUTE MODEL

The fixed-route demand model has been developed to evaluate scheduled service alternatives for the Dubuque area. The model uses data from other communities that are applicable in Dubuque.

Approach

The model format is based on household vehicle ownership, average walking distance to bus stops, and frequency of operation. The basic approach is described in the paper, “*Demand Estimating Model for Transit Route and System Planning in Small Urban Areas*,” Transportation Research Board, 730, 1979. This model incorporates factors for walking distance, the distance traveled on the bus, and the frequency of service or headway. The calibrated fixed-route model for KeyLine Transit is presented in Table V-1. This model reflects the existing population based on the 2008 population estimates and the 2009 ridership.

The percentage of households with transit access is determined by the number of households within a quarter-mile of the scheduled transit service. Census block groups located entirely within a quarter-mile show 100 percent transit access.

The model has been calibrated to existing ridership levels by using data from the 2009 boarding and alighting counts. This model will then be used to provide estimates of transit ridership if Dubuque decides to alter its transit services, or to estimate ridership for future developments. This fixed-route model can be used to estimate ridership for the alternate service concepts. The alternate concepts can be incorporated into the model by changing the percentage of households served by transit, the walking distance, and frequency of service. This model will be applied to each of the service alternatives.

As shown in Table V-1, the model generated 879 daily trips and approximately 274,374 annual trips—consistent with KeyLine Transit’s current ridership. This model does not include those trips that would need to still ride the paratransit service due to the FTA’s ADA requirements.

**Table V-1
Fixed-Route Demand Model - Existing**

Census Tract	Block Group	Total # of Hhlds 2008	# of Hhlds with		% of Hhlds with Transit Access	Hhlds Served by Transit		Basic Transit Trip Rates		Walk Distance (ft)	Walk Factor		Headway (min)	Headway Factor		Daily Transit Trips		Daily Trip # of
			0 Auto	1 or more Auto		0 Auto	1 or more Auto	0 Auto	1 or more Auto		0 Auto	1 or more Auto		0 Auto	1 or more Auto	0 Auto	1 or more Auto	
1	1	435	106	330	80%	85	264	0.6	0.1	1,800	0.7	0.9	60	0.6	0.9	21.3	26	48
1	2	308	89	219	100%	89	219	0.3	0.1	500	1.3	1.2	60	0.6	0.9	16.7	13	30
1	3	343	139	204	100%	139	204	0.3	0.1	500	1.3	1.2	60	0.6	0.9	26.1	11	38
1	4	475	249	226	100%	249	226	0.9	0.2	500	1.3	1.2	60	0.6	0.9	173.9	44	218
3	1	547	33	514	100%	33	514	0.0	0.0	500	1.3	1.2	60	0.6	0.9	1.2	6	7
3	3	320	29	291	100%	29	291	0.1	0.0	500	1.3	1.2	60	0.6	0.9	1.5	4	6
4	1	426	27	399	100%	27	399	0.0	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0
4	2	516	43	473	100%	43	473	0.0	0.0	500	1.3	1.2	60	0.6	0.9	1.2	4	5
4	4	645	120	524	70%	84	367	0.1	0.0	1,400	0.9	1.1	60	0.6	0.9	3.9	6	10
5	1	344	26	318	95%	25	302	0.0	0.0	500	1.3	1.2	60	0.6	0.9	0.4	1	2
5	2	454	48	406	100%	48	406	0.0	0.0	500	1.3	1.2	60	0.6	0.9	1.0	2	3
5	3	317	49	268	100%	49	268	0.1	0.0	500	1.3	1.2	60	0.6	0.9	3.9	6	10
5	4	289	103	186	100%	103	186	0.2	0.0	500	1.3	1.2	60	0.6	0.9	14.6	7	21
5	5	395	53	341	100%	53	341	0.1	0.0	500	1.3	1.2	60	0.6	0.9	4.9	9	14
6	1	375	37	338	100%	37	338	0.1	0.0	1,000	1.0	1.1	60	0.6	0.9	2.1	6	8
6	2	580	133	447	100%	133	447	0.0	0.0	500	1.3	1.2	60	0.6	0.9	2.8	3	6
6	3	382	23	359	80%	18	287	0.6	0.1	1,000	1.0	1.1	60	0.6	0.9	6.1	31	37
7.01	1	369	45	324	100%	45	324	0.0	0.0	700	1.3	1.2	60	0.6	0.9	0.4	1	1
7.01	2	323	26	297	100%	26	297	0.0	0.0	800	1.3	1.2	60	0.6	0.9	0.9	3	4
7.01	3	416	10	406	100%	10	406	0.1	0.0	500	1.3	1.2	60	0.6	0.9	1.0	11	12
7.02	1	297	33	264	100%	33	264	0.0	0.0	700	1.3	1.2	60	0.6	0.9	1.2	3	4
7.02	2	309	17	292	100%	17	292	0.3	0.1	1,000	1.0	1.1	60	0.6	0.9	2.7	15	18
7.02	4	532	50	481	100%	50	481	0.5	0.1	700	1.3	1.2	60	0.6	0.9	19.3	53	72
7.02	5	257	22	235	100%	22	235	0.0	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0
8.01	1	194	12	182	70%	8	127	0.1	0.0	1,000	1.0	1.1	60	0.6	0.9	0.4	2	3
8.01	2	632	20	612	20%	4	122	0.0	0.0	1,000	1.0	1.1	60	0.6	0.9	0.1	1	1
8.01	3	405	6	399	100%	6	399	0.0	0.0	1,000	1.0	1.1	60	0.6	0.9	0.1	1	2
8.01	4	341	28	313	100%	28	313	0.1	0.0	1,000	1.0	1.1	60	0.6	0.9	1.8	6	8
8.01	5	225	12	213	100%	12	213	0.0	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0
8.02	1	335	26	309	60%	16	185	0.0	0.0	1,000	1.0	1.1	60	0.6	0.9	0.4	1	2
8.02	2	516	12	504	0%	0	0	0.1	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0
8.02	3	404	5	399	10%	1	40	0.2	0.0	2,500	0.2	0.0	60	0.6	0.9	0.0	0	0
9	1	278	28	250	100%	28	250	0.0	0.0	500	1.3	1.2	60	0.6	0.9	0.4	1	1
9	2	330	6	323	100%	6	323	0.0	0.0	1,400	0.9	1.1	60	0.6	0.9	0.0	0	0
9	3	489	0	489	100%	0	489	0.3	0.1	1,000	1.0	1.1	60	0.6	0.9	0.0	33	33
9	4	426	15	411	100%	15	411	0.1	0.0	1,200	0.9	1.1	60	0.6	0.9	0.8	7	8
11.01	1	582	0	582	40%	0	233	0.4	0.1	1,200	0.9	1.1	60	0.6	0.9	0.0	17	17
11.01	2	516	20	496	50%	10	248	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	1.4	11	12
11.01	3	311	0	311	100%	0	311	0.1	0.0	900	1.3	1.2	60	0.6	0.9	0.0	7	7
11.02	1	290	0	290	100%	0	290	0.0	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	2	2
11.02	2	407	45	362	100%	45	362	1.0	0.2	800	1.3	1.2	60	0.6	0.9	33.3	77	110
11.02	3	384	9	375	70%	7	262	0.5	0.1	1,000	1.0	1.1	60	0.6	0.9	2.0	26	28
11.02	4	291	0	291	95%	0	276	0.5	0.1	1,000	1.0	1.1	60	0.6	0.9	0.0	25	25
11.02	5	379	2	377	5%	0	19	171.0	36.0	6,000	0.1	0.0	60	0.6	0.9	1.1	9	10
11.02	6	469	36	433	40%	14	173	7.2	1.5	3,500	0.2	0.0	60	0.6	0.9	12.3	7	19

(This page intentionally left blank.)

**Table V-1
Fixed-Route Demand Model - Existing**

Census Tract	Block Group	Total # of Hhlds 2008	# of Hhlds with		% of Hhlds with Transit Access	Hhlds Served by Transit		Basic Transit Trip Rates		Walk Distance (ft)	Walk Factor		Headway (min)	Headway Factor		Daily Transit Trips		Daily Trip # of		
			0 Auto	1 or more Auto		0 Auto	1 or more Auto	0 Auto	1 or more Auto		0 Auto	1 or more Auto		0 Auto	1 or more Auto	0 Auto	1 or more Auto			
12.01	1	806	73	733	70%	51	513	0.1	0.0	700	1.3	1.2	60	0.6	0.9	3.9	11	15		
12.01	2	401	35	366	100%	35	366	0.0	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
12.01	3	244	15	229	100%	15	229	0.0	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
12.01	4	385	35	351	95%	33	333	0.0	0.0	800	1.3	1.2	60	0.6	0.9	0.0	0	0		
12.02	1	398	46	352	100%	46	352	0.0	0.0	800	1.3	1.2	60	0.6	0.9	0.1	0	0		
12.02	3	558	103	455	100%	103	455	0.0	0.0	800	1.3	1.2	60	0.6	0.9	0.1	0	0		
12.03	2	459	37	423	95%	35	402	0.0	0.0	1,200	0.9	1.1	60	0.6	0.9	0.0	0	0		
12.03	3	456	8	448	100%	8	448	0.0	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
12.03	4	544	29	515	98%	29	505	0.0	0.0	800	1.3	1.2	60	0.6	0.9	0.0	0	0		
12.03	5	891	8	882	80%	7	706	0.0	0.0	1,200	0.9	1.1	60	0.6	0.9	0.0	0	0		
101.01	1	358	0	358	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
101.01	2	511	17	494	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
101.02	1	813	22	791	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
101.02	2	451	0	451	10%	0	45	0.2	0.0	6,000	0.1	0.0	60	0.6	0.9	0.0	0	0		
101.02	3	483	14	470	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
101.02	4	298	7	291	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
101.02	5	347	6	341	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
101.03	1	295	0	295	5%	0	15	0.2	0.0	5,000	0.1	0.0	60	0.6	0.9	0.0	0	0		
101.03	2	535	15	520	5%	1	26	0.2	0.0	3,000	0.2	0.0	60	0.6	0.9	0.0	0	0		
101.03	3	272	15	257	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
102	1	370	36	335	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
102	2	303	0	303	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
102	3	719	5	714	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
102	4	511	18	493	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
102	5	534	21	513	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
103	1	180	0	180	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
103	2	250	2	248	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
103	3	242	4	238	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
103	4	395	16	379	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
104	1	396	13	383	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
104	2	336	15	321	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
104	3	292	12	280	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
104	4	450	18	432	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
105	1	466	4	461	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
105	2	502	45	457	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
105	3	429	13	416	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
105	4	371	6	365	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
106	1	573	26	547	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
106	2	270	8	262	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
106	3	305	2	302	0%	0	0	0.2	0.0	1,000	1.0	1.1	60	0.6	0.9	0.0	0	0		
Subtotal		35,255	2,540	32,716		2,010	17,273											Estimated Weekday Ridership		879

Source: LSC, 2008.

(This page intentionally left blank.)

ADA ELIGIBILITY MODEL

LSC prepared demand estimates for the demand-response ridership based on a methodology developed by the Federal Transit Administration (FTA). Factors used in this methodology include demographics, eligibility criteria, service area, availability of other services, socioeconomic characteristics, service characteristics, and fares. The methodology does not include program-related trips.

Paratransit trips are frequently designated as:

- **Program-related:** Program-related trips occur only to support specific programs, and the demand is directly related to the number of participants in the program.
- **Non-program-related trips:** Non-program trips are represented most by those individuals traveling for work, school, or other personal reasons.

Low and high demand estimates are produced with this methodology and are shown in Table V-2. The demand estimates have been calculated by census block group and show the current demand for paratransit services in the Dubuque County area. The annual trips for Dubuque County's certified paratransit population ranges from approximately 38,000 to 47,000 annual trips.

(This page intentionally left blank.)

**Table V-2
2008 Estimated Paratransit Demand - Dubuque**

Census Tract	Census Block Group	Total 2008 Population	% of Mobility-Limited Population 2008 Est.	Mobility-Limited Population	ADA Eligibility Factor	Estimate of ADA Eligible Population	Certification Factor	Estimate of Certified Population	Trip Rates (1) per Eligible Person Per Month		Eligible Population Annual Trips		Certified Population Annual Trips	
									Low	High	Low	High	Low	High
									1	1	1,003	4%	41	60%
1	2	615	3%	21	60%	13	0.44	9	3.5	4.4	527	663	387	486
1	3	609	5%	33	60%	20	0.44	15	3.5	4.4	844	1,061	619	778
1	4	753	8%	61	60%	36	0.44	27	3.5	4.4	1,530	1,923	1,122	1,410
3	1	1,274	2%	28	60%	17	0.44	12	3.5	4.4	712	895	522	656
3	3	982	1%	10	60%	6	0.44	5	3.5	4.4	264	332	193	243
4	1	994	1%	8	60%	5	0.44	4	3.5	4.4	211	265	155	194
4	2	1,307	3%	39	60%	23	0.44	17	3.5	4.4	976	1,227	716	900
4	4	1,868	3%	57	60%	34	0.44	25	3.5	4.4	1,424	1,790	1,044	1,313
5	1	805	1%	7	60%	4	0.44	3	3.5	4.4	185	232	135	170
5	2	1,112	5%	61	60%	36	0.44	27	3.5	4.4	1,530	1,923	1,122	1,410
5	3	773	3%	21	60%	13	0.44	9	3.5	4.4	527	663	387	486
5	4	633	6%	41	60%	24	0.44	18	3.5	4.4	1,028	1,293	754	948
5	5	943	4%	33	60%	20	0.44	15	3.5	4.4	844	1,061	619	778
6	1	925	5%	48	60%	29	0.44	21	3.5	4.4	1,213	1,525	890	1,118
6	2	1,234	4%	46	60%	28	0.44	20	3.5	4.4	1,160	1,459	851	1,070
6	3	1,587	0%	6	60%	4	0.44	3	3.5	4.4	158	199	116	146
7.01	1	1,917	2%	44	60%	26	0.44	19	3.5	4.4	1,108	1,392	812	1,021
7.01	2	715	2%	18	60%	11	0.44	8	3.5	4.4	448	564	329	413
7.01	3	1,193	0%	0	60%	0	0.44	0	3.5	4.4	0	0	0	0
7.02	1	711	2%	15	60%	9	0.44	6	3.5	4.4	369	464	271	340
7.02	2	934	2%	23	60%	14	0.44	10	3.5	4.4	580	729	425	535
7.02	4	1,286	1%	13	60%	8	0.44	6	3.5	4.4	316	398	232	292
7.02	5	666	1%	5	60%	3	0.44	2	3.5	4.4	132	166	97	122
8.01	1	698	1%	9	60%	6	0.44	4	3.5	4.4	237	298	174	219
8.01	2	1,744	0%	0	60%	0	0.44	0	3.5	4.4	0	0	0	0
8.01	3	1,026	1%	5	60%	3	0.44	2	3.5	4.4	132	166	97	122
8.01	4	856	0%	0	60%	0	0.44	0	3.5	4.4	0	0	0	0
8.01	5	603	1%	5	60%	3	0.44	2	3.5	4.4	132	166	97	122
8.02	1	815	2%	20	60%	12	0.44	9	3.5	4.4	501	630	367	462
8.02	2	1,608	2%	33	60%	20	0.44	15	3.5	4.4	844	1,061	619	778
8.02	3	1,020	3%	28	60%	17	0.44	12	3.5	4.4	712	895	522	656
9	1	656	3%	19	60%	11	0.44	8	3.5	4.4	475	597	348	438
9	2	855	3%	28	60%	17	0.44	12	3.5	4.4	712	895	522	656
9	3	1,463	1%	14	60%	8	0.44	6	3.5	4.4	343	431	251	316
9	4	1,024	3%	31	60%	19	0.44	14	3.5	4.4	791	995	580	729
11.01	1	1,624	2%	36	60%	21	0.44	16	3.5	4.4	897	1,127	658	827
11.01	2	1,310	4%	57	60%	34	0.44	25	3.5	4.4	1,424	1,790	1,044	1,313
11.01	3	729	3%	23	60%	14	0.44	10	3.5	4.4	580	729	425	535
11.02	1	697	4%	27	60%	16	0.44	12	3.5	4.4	686	862	503	632
11.02	2	961	2%	20	60%	12	0.44	9	3.5	4.4	501	630	367	462
11.02	3	915	4%	36	60%	21	0.44	16	3.5	4.4	897	1,127	658	827
11.02	4	702	2%	12	60%	7	0.44	5	3.5	4.4	290	365	213	267
11.02	5	1,141	2%	28	60%	17	0.44	12	3.5	4.4	712	895	522	656
11.02	6	1,354	1%	18	60%	11	0.44	8	3.5	4.4	448	564	329	413
12.01	1	1,946	2%	30	60%	18	0.44	13	3.5	4.4	765	961	561	705
12.01	2	799	1%	9	60%	6	0.44	4	3.5	4.4	237	298	174	219
12.01	3	611	1%	7	60%	4	0.44	3	3.5	4.4	185	232	135	170
12.01	4	841	2%	19	60%	11	0.44	8	3.5	4.4	475	597	348	438

(This page intentionally left blank.)

**Table V-2
2008 Estimated Paratransit Demand - Dubuque**

Census Tract	Census Block Group	Total 2008 Population	% of Mobility-Limited Population 2008 Est.	Mobility-Limited Population	ADA Eligibility Factor	Estimate of ADA Eligible Population	Certification Factor	Estimate of Certified Population	Trip Rates (1) per Eligible Person Per Month		Eligible Population Annual Trips		Certified Population Annual Trips	
									Low	High	Low	High	Low	High
12.02	1	730	4%	27	60%	16	0.44	12	3.5	4.4	686	862	503	632
12.02	3	1,323	2%	27	60%	16	0.44	12	3.5	4.4	686	862	503	632
12.03	2	1,161	1%	8	60%	5	0.44	4	3.5	4.4	211	265	155	194
12.03	3	1,256	2%	28	60%	17	0.44	12	3.5	4.4	712	895	522	656
12.03	4	1,240	1%	16	60%	9	0.44	7	3.5	4.4	396	497	290	365
12.03	5	2,625	3%	66	60%	40	0.44	29	3.5	4.4	1,661	2,089	1,218	1,532
101.01	1	869	1%	12	60%	7	0.44	5	3.5	4.4	290	365	213	267
101.01	2	1,146	1%	12	60%	7	0.44	5	3.5	4.4	290	365	213	267
101.02	1	2,424	1%	32	60%	19	0.44	14	3.5	4.4	817	1,028	599	754
101.02	2	1,319	4%	50	60%	30	0.44	22	3.5	4.4	1,266	1,591	928	1,167
101.02	3	1,420	2%	25	60%	15	0.44	11	3.5	4.4	633	796	464	583
101.02	4	900	2%	15	60%	9	0.44	6	3.5	4.4	369	464	271	340
101.02	5	985	4%	38	60%	23	0.44	17	3.5	4.4	949	1,193	696	875
101.03	1	751	0%	0	60%	0	0.44	0	3.5	4.4	0	0	0	0
101.03	2	1,286	1%	14	60%	8	0.44	6	3.5	4.4	343	431	251	316
101.03	3	697	3%	23	60%	14	0.44	10	3.5	4.4	580	729	425	535
102	1	1,013	3%	29	60%	18	0.44	13	3.5	4.4	738	928	541	681
102	2	998	1%	14	60%	8	0.44	6	3.5	4.4	343	431	251	316
102	3	2,113	2%	37	60%	22	0.44	16	3.5	4.4	923	1,160	677	851
102	4	1,530	2%	35	60%	21	0.44	15	3.5	4.4	870	1,094	638	802
102	5	1,459	3%	46	60%	28	0.44	20	3.5	4.4	1,160	1,459	851	1,070
103	1	635	4%	28	60%	17	0.44	12	3.5	4.4	712	895	522	656
103	2	682	0%	0	60%	0	0.44	0	3.5	4.4	0	0	0	0
103	3	702	3%	19	60%	11	0.44	8	3.5	4.4	475	597	348	438
103	4	1,104	2%	21	60%	13	0.44	9	3.5	4.4	527	663	387	486
104	1	1,111	1%	10	60%	6	0.44	5	3.5	4.4	264	332	193	243
104	2	961	2%	19	60%	11	0.44	8	3.5	4.4	475	597	348	438
104	3	830	2%	13	60%	8	0.44	6	3.5	4.4	316	398	232	292
104	4	1,200	1%	12	60%	7	0.44	5	3.5	4.4	290	365	213	267
105	1	1,248	1%	13	60%	8	0.44	6	3.5	4.4	316	398	232	292
105	2	1,289	2%	29	60%	18	0.44	13	3.5	4.4	738	928	541	681
105	3	1,054	1%	9	60%	6	0.44	4	3.5	4.4	237	298	174	219
105	4	1,030	3%	33	60%	20	0.44	15	3.5	4.4	844	1,061	619	778
106	1	1,673	3%	45	60%	27	0.44	20	3.5	4.4	1,134	1,426	832	1,045
106	2	733	2%	17	60%	10	0.44	7	3.5	4.4	422	530	309	389
106	3	950	0%	1	60%	1	0.44	0	3.5	4.4	26	33	19	24
Total		93,285	2%	2,015		1,209		887			50,790	63,851	37,246	46,824

(1) Source: Survey of 7 "exemplary" paratransit operators. Crain, Et al. "Working Paper 6: Service Needs Analysis, San Francisco Bay Area Regional Paratransit Plan," Jan. 1990.

(This page intentionally left blank.)

GREATEST TRANSIT NEEDS

The “greatest transit need” is defined as those areas in the Dubuque study area with the highest density of zero-vehicle households and elderly, disabled, and below-poverty populations. This information was used in the development of a transit service plan and the identification of appropriate service district boundaries.

Methodology

The data included in Chapter II were used to calculate the greatest transit need. The categories used for the calculation were zero-vehicle households, elderly population, disabled population, and below-poverty population. Using these categories, LSC developed a “transit need index” to determine the greatest transit need. The density of the population for each US Census block group within each category was calculated, placed in numerical order, and divided into six segments. Six segments were chosen in order to reflect a reasonable range. Each segment contained an approximately equal number of US Census block groups in order to provide equal representation.

The US Census block groups in the segment with the lowest densities were given a score of 1. The block groups in the segment with the next lowest densities were given a score of 2. This process continued for the remainder of the block groups. The blocks groups in the segment with the highest densities were given a score of 6. This scoring was completed for each of the categories (zero- vehicle households, elderly population, disabled population, and below-poverty population). After each of the block groups was scored for the four categories, the four scores were added up to achieve an overall score. Table V-3 presents the ranked scores for each US Census block group in Dubuque County. The scores range from 4 (lowest need) to 24 (highest need).

(This page intentionally left blank.)

**Table V-3
2008 Greatest Transit Need Scores by Census Block Group**

Census Tract	Census Block Group	Land Area (sq.mi.)	Zero-Vehicle Hhlds			Total # of Hhlds	Total Number of Elderly 60 & over			Mobility-Limited Population			Below-Poverty Population			Overall Score (4-24)	Final (1-6)	Total Population (Persons) #
			#	Density (persons per sq. mi.)	rank		#	Density (persons per sq. mi.)	rank	#	Density (persons per sq. mi.)	rank	#	Density (persons per sq. mi.)	rank			
1	1	2.623	106	40.29	4	435	104	39.50	2	41	15.56	3	171	65.03	3	12	3	1,003
1	2	0.052	89	1,710.56	6	308	66	1,267.83	5	21	402.49	6	134	2,575.91	6	23	6	615
1	3	0.117	139	1,189.57	6	343	61	518.76	4	33	286.21	6	226	1,931.93	6	22	6	609
1	4	0.177	249	1,407.11	6	475	245	1,383.46	6	61	342.91	6	180	1,016.90	6	24	6	753
3	1	0.170	33	196.98	5	547	223	1,311.15	6	28	166.20	5	49	289.32	5	21	5	1,274
3	3	0.096	29	305.22	6	320	238	2,474.45	6	10	109.01	5	49	512.33	5	22	6	982
4	1	0.165	27	164.90	5	426	348	2,111.95	6	8	50.74	4	206	1,249.41	6	21	5	994
4	2	0.193	43	222.31	5	516	220	1,138.64	5	39	200.62	6	40	206.04	4	20	5	1,307
4	4	1.055	120	114.07	5	645	1,032	978.02	5	57	53.56	4	223	211.28	4	18	4	1,868
5	1	0.120	26	218.01	5	344	192	1,595.85	6	7	61.04	4	94	784.85	5	20	5	805
5	2	0.110	48	437.61	6	454	178	1,617.26	6	61	551.77	6	120	1,094.03	6	24	6	1,112
5	3	0.054	49	910.81	6	317	71	1,317.77	6	21	387.58	6	72	1,337.15	6	24	6	773
5	4	0.061	103	1,681.20	6	289	76	1,252.32	5	41	669.05	6	202	3,310.94	6	23	6	633
5	5	0.103	53	518.15	6	395	127	1,229.34	5	33	325.11	6	178	1,727.17	6	23	6	943
6	1	0.141	37	259.76	5	375	107	757.01	4	48	341.40	6	117	831.23	5	20	5	925
6	2	0.110	133	1,208.19	6	580	197	1,788.50	6	46	418.58	6	227	2,064.38	6	24	6	1,234
6	3	0.464	23	49.62	4	382	176	378.89	3	6	13.53	3	42	90.21	3	13	3	1,587
7.01	1	0.272	45	165.43	5	369	172	630.95	4	44	161.59	5	225	827.17	5	19	5	1,917
7.01	2	0.077	26	339.76	6	323	44	570.80	4	18	231.04	6	181	2,351.14	6	22	6	715
7.01	3	0.144	10	72.67	4	416	159	1,104.60	5	0	0.00	1	130	901.12	6	16	4	1,193
7.02	1	0.061	33	548.96	6	297	63	1,029.31	5	15	240.17	6	16	257.33	4	21	5	711
7.02	2	0.213	17	78.61	4	309	235	1,105.42	5	23	108.09	5	199	933.46	6	20	5	934
7.02	4	0.151	50	332.65	6	532	163	1,081.11	5	13	83.16	4	177	1,171.21	6	21	5	1,286
7.02	5	0.119	22	184.67	5	257	164	1,380.63	6	5	43.97	4	20	167.08	4	19	5	666
8.01	1	1.286	12	8.95	3	194	434	337.70	3	9	7.32	2	196	152.17	4	12	3	698
8.01	2	1.182	20	16.82	3	632	326	276.22	3	0	0.00	1	77	65.51	3	10	2	1,744
8.01	3	0.304	6	20.65	3	405	188	619.62	4	5	17.21	3	44	144.58	4	14	3	1,026
8.01	4	0.243	28	116.27	5	341	213	878.51	4	0	0.00	1	133	546.92	5	15	4	856
8.01	5	0.108	12	106.58	4	225	82	755.78	4	5	48.45	4	12	106.58	3	15	4	603
8.02	1	0.681	26	38.42	4	335	155	227.42	3	20	29.20	3	35	50.71	3	13	3	815
8.02	2	0.894	12	12.88	3	516	86	95.98	3	33	37.46	3	41	45.65	3	12	3	1,608
8.02	3	1.047	5	5.00	3	404	303	289.85	3	28	26.99	3	18	16.99	2	11	3	1,020
9	1	0.085	28	332.41	6	278	130	1,526.60	6	19	221.60	6	25	295.47	5	23	6	656
9	2	0.171	6	36.72	4	330	138	807.79	4	28	165.23	5	65	379.42	5	18	4	855
9	3	0.337	0	0.00	1	489	295	875.67	4	14	40.37	3	109	322.94	5	13	3	1,463
9	4	0.199	15	73.62	4	426	257	1,293.62	6	31	157.76	5	53	268.19	4	19	5	1,024
11.01	1	0.486	0	0.00	1	582	188	387.58	3	36	73.21	4	27	55.98	3	11	3	1,624
11.01	2	0.454	20	43.79	4	516	416	917.38	5	57	124.47	5	26	57.62	3	17	4	1,310
11.01	3	0.141	0	0.00	1	311	251	1,781.21	6	23	163.28	5	25	178.12	4	16	4	729
11.02	1	0.126	0	0.00	1	290	127	1,004.94	5	27	215.94	6	35	274.07	5	17	4	697
11.02	2	0.187	45	240.63	5	407	128	682.72	4	20	106.32	5	117	626.76	5	19	5	961
11.02	3	0.277	9	34.00	4	384	239	861.35	4	36	128.45	5	37	132.22	4	17	4	915
11.02	4	0.180	0	0.00	1	291	195	1,081.34	5	12	63.95	4	50	279.06	5	15	4	702
11.02	5	2.964	2	0.71	2	379	137	46.25	2	28	9.53	3	32	10.94	2	9	2	1,141
11.02	6	2.489	36	14.29	3	469	276	110.99	3	18	7.15	2	82	32.79	2	10	2	1,354
12.01	1	0.707	73	103.61	4	806	631	892.53	4	30	42.92	4	181	256.06	4	16	4	1,946
12.01	2	0.222	35	155.56	5	401	364	1,640.40	6	9	42.42	4	18	80.13	3	18	4	799
12.01	3	0.127	15	115.36	5	244	109	856.94	4	7	57.68	4	30	238.96	4	17	4	611
12.01	4	0.196	35	176.19	5	385	241	1,227.99	5	19	96.10	5	46	234.92	4	19	5	841

(This page intentionally left blank.)

**Table V-3
2008 Greatest Transit Need Scores by Census Block Group**

Census Tract	Census Block Group	Land Area (sq.mi.)	Zero-Vehicle Hhlds			Total # of Hhlds	Total Number of Elderly 60 & over			Mobility-Limited Population			Below-Poverty Population			Overall Score (4-24)	Final (1-6)	Total Population (Persons) #
			#	Density (persons per sq. mi.)	rank		#	Density (persons per sq. mi.)	rank	#	Density (persons per sq. mi.)	rank	#	Density (persons per sq. mi.)	rank			
12.02	1	0.605	46	76.11	4	398	210	347.67	3	27	44.97	4	50	83.03	3	14	3	730
12.02	3	0.203	103	505.19	6	558	572	2,819.78	6	27	134.03	5	94	463.95	5	22	6	1,323
12.03	2	0.192	37	190.76	5	459	247	1,286.28	6	8	43.60	4	19	98.11	3	18	4	1,161
12.03	3	0.234	8	35.78	4	456	235	1,006.21	5	28	120.75	5	77	330.93	5	19	5	1,256
12.03	4	0.984	29	29.78	4	544	149	151.01	3	16	15.95	3	114	115.92	4	14	3	1,240
12.03	5	1.293	8	6.47	3	891	296	229.04	3	66	50.99	4	38	29.14	2	12	3	2,625
101.01	1	1.304	0	0.00	1	358	167	128.40	3	12	8.83	3	23	17.66	2	9	2	869
101.01	2	2.068	17	8.10	3	511	217	104.75	3	12	5.57	2	112	54.14	3	11	3	1,146
101.02	1	7.540	22	2.91	3	813	209	27.76	2	32	4.30	2	98	13.05	2	9	2	2,424
101.02	2	10.800	0	0.00	1	451	183	16.96	2	50	4.65	2	52	4.84	2	7	2	1,319
101.02	3	21.394	14	0.64	2	483	134	6.26	1	25	1.17	2	88	4.11	2	7	2	1,420
101.02	4	18.119	7	0.40	2	298	138	7.62	1	15	0.81	1	26	1.44	1	5	1	900
101.02	5	20.308	6	0.31	2	347	172	8.45	2	38	1.86	2	32	1.60	1	7	2	985
101.03	1	4.338	0	0.00	1	295	150	34.50	2	0	0.00	1	10	2.41	1	5	1	751
101.03	2	0.938	15	15.62	3	535	298	317.95	3	14	14.50	3	59	62.48	3	12	3	1,286
101.03	3	1.321	15	11.09	3	272	70	53.08	2	23	17.43	3	58	43.57	3	11	3	697
102	1	20.262	36	1.76	2	370	201	9.92	2	29	1.45	2	53	2.63	1	7	2	1,013
102	2	43.422	0	0.00	1	303	90	2.07	1	14	0.31	1	13	0.29	1	4	1	998
102	3	30.542	5	0.17	1	719	217	7.09	1	37	1.20	2	111	3.63	2	6	1	2,113
102	4	4.314	18	4.12	3	511	216	49.97	2	35	8.00	2	86	19.89	2	9	2	1,530
102	5	5.703	21	3.67	3	534	248	43.49	2	46	8.07	2	76	13.40	2	9	2	1,459
103	1	38.351	0	0.00	1	180	140	3.66	1	28	0.74	1	72	1.88	1	4	1	635
103	2	46.577	2	0.04	1	250	90	1.93	1	0	0.00	1	31	0.67	1	4	1	682
103	3	46.900	4	0.09	1	242	106	2.25	1	19	0.40	1	75	1.61	1	4	1	702
103	4	13.418	16	1.17	2	395	100	7.49	1	21	1.56	2	92	6.86	2	7	2	1,104
104	1	45.642	13	0.28	2	396	211	4.63	1	10	0.23	1	81	1.77	1	5	1	1,111
104	2	32.752	15	0.45	2	336	183	5.59	1	19	0.58	1	73	2.24	1	5	1	961
104	3	30.333	12	0.38	2	292	129	4.24	1	13	0.41	1	23	0.76	1	5	1	830
104	4	36.830	18	0.48	2	450	298	8.10	2	12	0.31	1	107	2.90	2	7	2	1,200
105	1	6.095	4	0.69	2	466	213	35.03	2	13	2.06	2	39	6.35	2	8	2	1,248
105	2	1.838	45	24.48	3	502	165	89.96	3	29	15.94	3	33	18.22	2	11	3	1,289
105	3	0.808	13	15.54	3	429	315	389.83	4	9	11.66	3	118	146.35	4	14	3	1,054
105	4	5.122	6	1.23	2	371	179	34.94	2	33	6.54	2	13	2.45	1	7	2	1,030
106	1	28.411	26	0.92	2	573	248	8.73	2	45	1.58	2	71	2.50	1	7	2	1,673
106	2	25.526	8	0.33	2	270	159	6.23	1	17	0.66	1	6	0.25	1	5	1	733
106	3	43.132	2	0.05	1	305	128	2.96	1	1	0.02	1	31	0.73	1	4	1	950

STUDY AREA TOTAL: 2540 35,255 17,654 2,015 6,947 93,285

Source: US Census Bureau and LSC, 2008.

(This page intentionally left blank.)

Results

Figure V-1 presents Dubuque County's US Census block groups with the greatest transit need, along with the transit need index. Twenty-six block groups were determined to have the greatest transit needs based on the density of zero-vehicle households, elderly population, disabled population, and below-poverty population. Table V-4 presents information on these 26 block groups. As shown in Figure V-1, the greatest transit need is mainly in downtown Dubuque, along Central Avenue (US Highway 52) in the area near City Hall, the Carnegie-Stout Public Library, the Dubuque Courthouse, and the Dubuque Housing Department. The other areas of greatest transit need are scattered in the City of Dubuque, west of Emmaus Bible College and the area south of Dubuque Senior High School.

Census Tract	Census Block Group	Overall Score	Ranking
1	4	24	6
5	2	24	6
5	3	24	6
6	2	24	6
1	2	23	6
5	4	23	6
5	5	23	6
9	1	23	6
1	3	22	6
3	3	22	6
7.01	2	22	6
12.02	3	22	6
3	1	21	5
4	1	21	5
7.02	1	21	5
7.02	4	21	5
4	2	20	5
5	1	20	5
6	1	20	5
7.02	2	20	5
7.01	1	19	5
7.02	5	19	5
9	4	19	5
11.02	2	19	5
12.01	4	19	5
12.03	3	19	5

Source: LSC, 2008

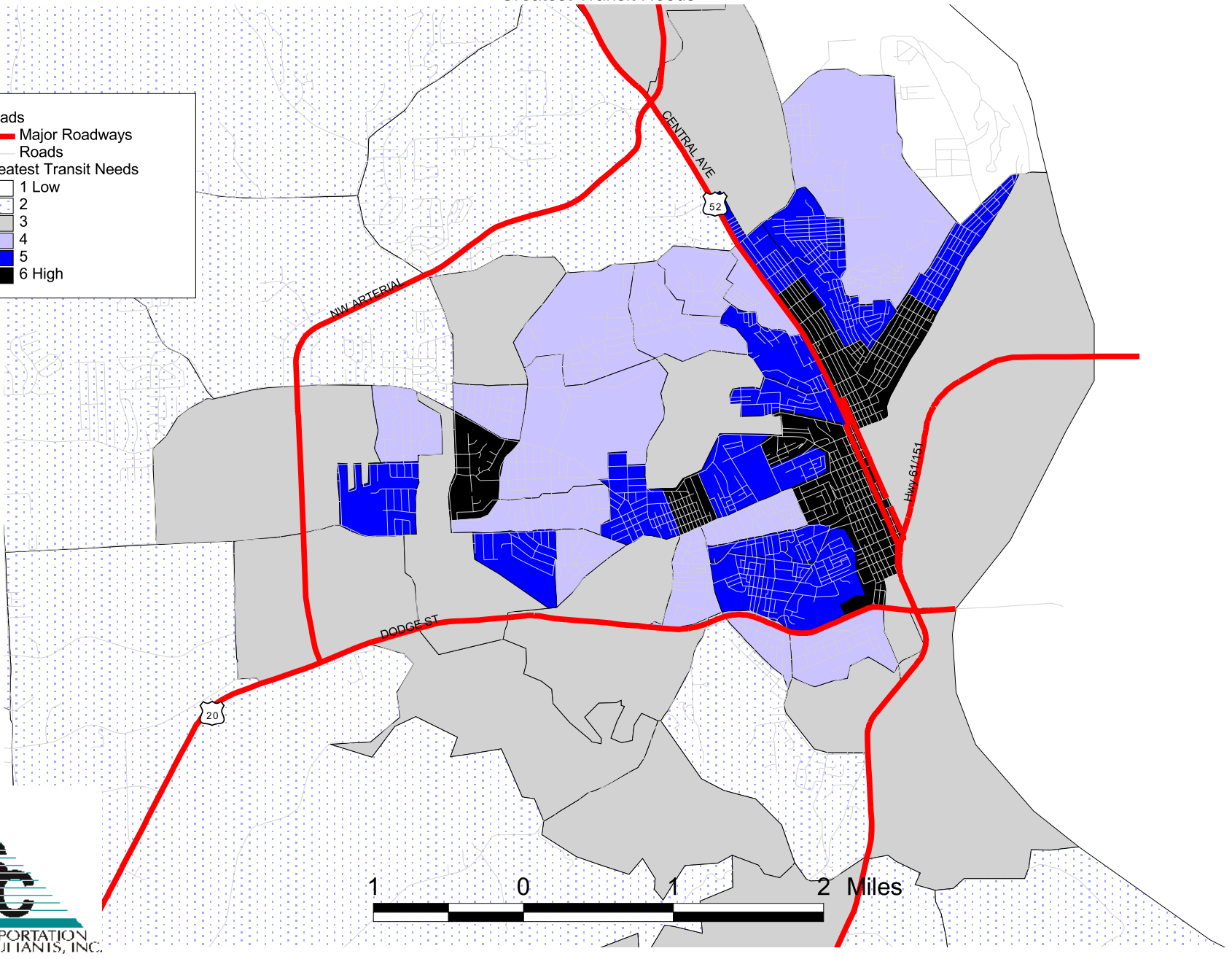
Figure V-1
Greatest Transit Needs

Roads

- Major Roadways
- Roads

Greatest Transit Needs

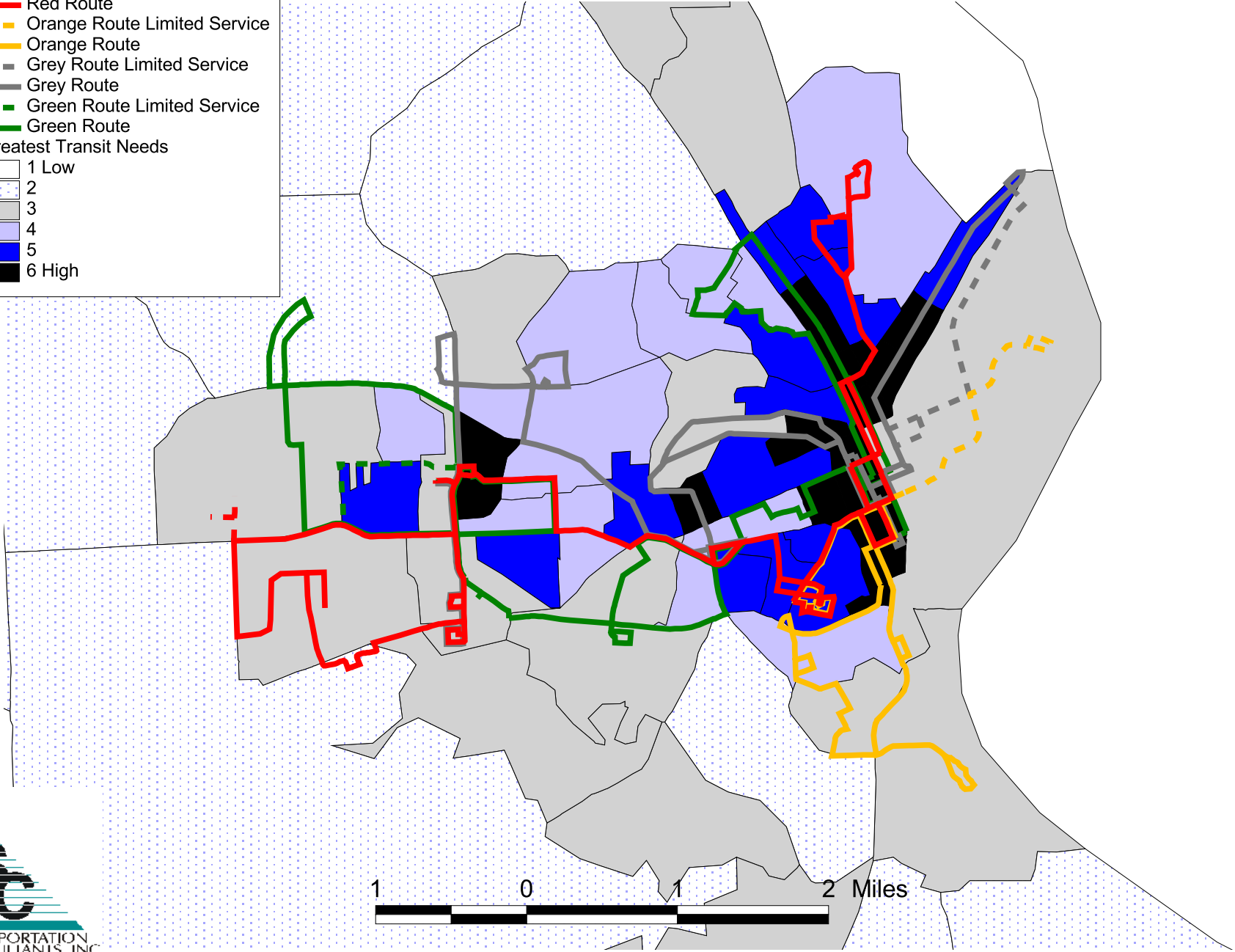
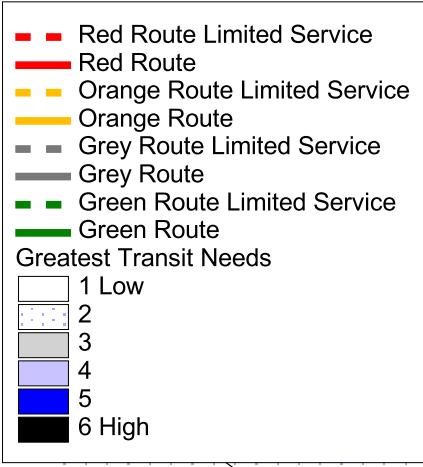
- 1 Low
- 2
- 3
- 4
- 5
- 6 High



By identifying those areas with a high need for public transportation, LSC was able to uncover a pattern for the areas with the highest propensity to use transit service. As LSC examines different future transit scenarios, Figure V-1 will be used in the analysis to ensure that areas with a high transit need would be adequately served. Those US Census block groups not scoring in the highest category, but still having a high score, could still be considered a high priority for transit service.

Figure V-2 shows the greatest transit needs overlaid with the existing KeyLine Transit routes in the study area. As illustrated, most of the areas with the greatest transit needs are served by KeyLine Transit routes.

Figure V-2
Greatest Transit Needs with Routes



DEMOGRAPHIC MAPS AND SERVICE AREA

The FTA Title VI demographic section of this report focuses on the three Title VI population groups:

- Low-income population
- Minority population
- Limited English proficiency

The map for each demographic category presents the specific population of the census block group as a percentage of the total population in that census block group for the year 2008. The threshold used to determine whether a census block group had predominately low-income or minority population was calculated based on the KeyLine Transit service area's overall low-income or minority population percentage. The threshold was calculated by dividing the low-income population in the KeyLine service area by the total population in the KeyLine service area. Hence, the KeyLine service area threshold is different for each demographic category. These demographic information maps are overlaid with the existing KeyLine Transit service area. The purpose is to identify the areas within the KeyLine Transit service area that have the highest percentage of traditionally under-represented groups—such as low-income, minority, and limited English proficiency populations—and whether they are geographically served.

Low-Income Population

Figure V-3 presents the region's low-income population as a percentage of the total population by US Census block groups with the existing KeyLine Transit service area overlaid for the 2008 estimated population. The low-income population—as defined by the FTA—is a person whose household income is at or below the Department of Health and Human Services' poverty guidelines. The low-income population used in the GIS maps includes those individuals who are living below the poverty line using the Census Bureau's poverty threshold. The Dubuque service area threshold calculated for low-income population was **7.4 percent** of the total population. These figures show that the areas with the greatest percentage of low-income population are in downtown Dubuque extending northwest and south along Central Avenue and areas scattered on the western portion of the city along US Highway 20 (Dodge Street). Areas of the city that have a high per-

centage of population that are deemed to be low-income are all served by multiple KeyLine Transit routes and stops.

Minority Population

Figure V-4 presents the region's minority population as a percentage of the total population by US Census block groups for the 2008 estimated population. The minority population includes minority race populations such as American Indian and Alaska Native, Asian, Black or African American populations, Hispanic/Latino, Native Hawaiian and Other Pacific Islander, and also includes white persons of Hispanic/Latino origin. The Dubuque service area threshold calculated for minority population was **3.3 percent** of the total population. This map shows that the areas with the highest percentage of minority population are predominantly in downtown Dubuque, as well as areas extending to the western portions of the city along Dodge Street. The areas with the highest percentages of minority population are served by KeyLine Transit.

Limited-English-Proficient Population

Figure V-5 depicts census block groups that have above average limited-English-proficient populations compared to the overall Dubuque service area for 2008. The limited-English-proficient population is defined as individuals for whom English is not their primary language spoken at home and who rated their own ability to speak English as "not well" or "not at all." The Dubuque service area threshold calculated for the limited-English-proficient population was **0.9 percent** of the total population. The proportion of individuals with limited English proficiency is in downtown Dubuque and scattered throughout the west and northwestern portions of the city where the proportion of the minority population is high. All limited-English-proficient populations have adequate geographic access to the transit system. The area in the western portion of the city also shows up as an area with predominantly limited-English-proficiency population. The very low population in this area and the low population density make it ineffective to serve with public transit.

Figure V-3
Low-Income Population Above the Threshold for 2008

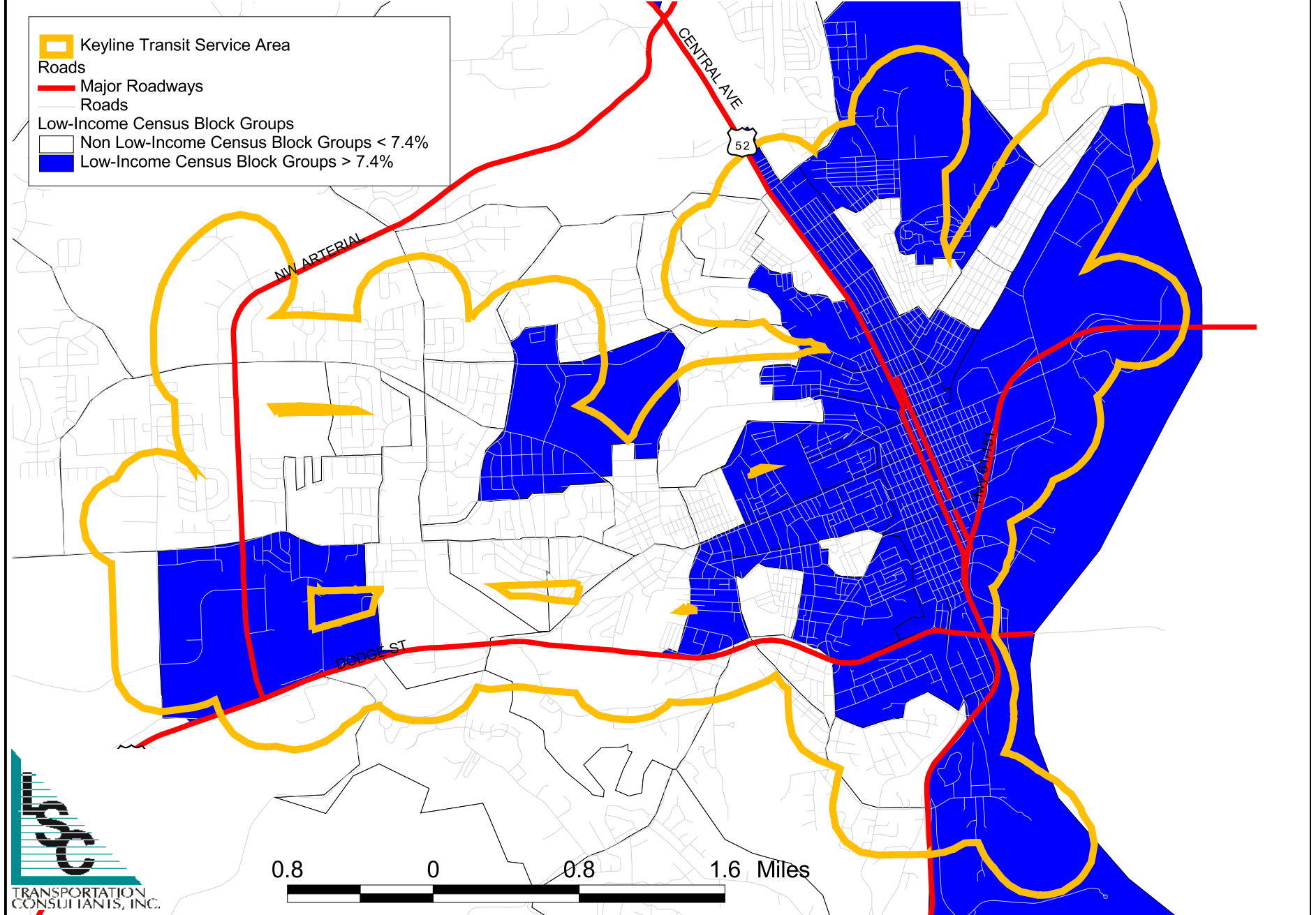


Figure V-4
Minority Population Above the Threshold for 2008

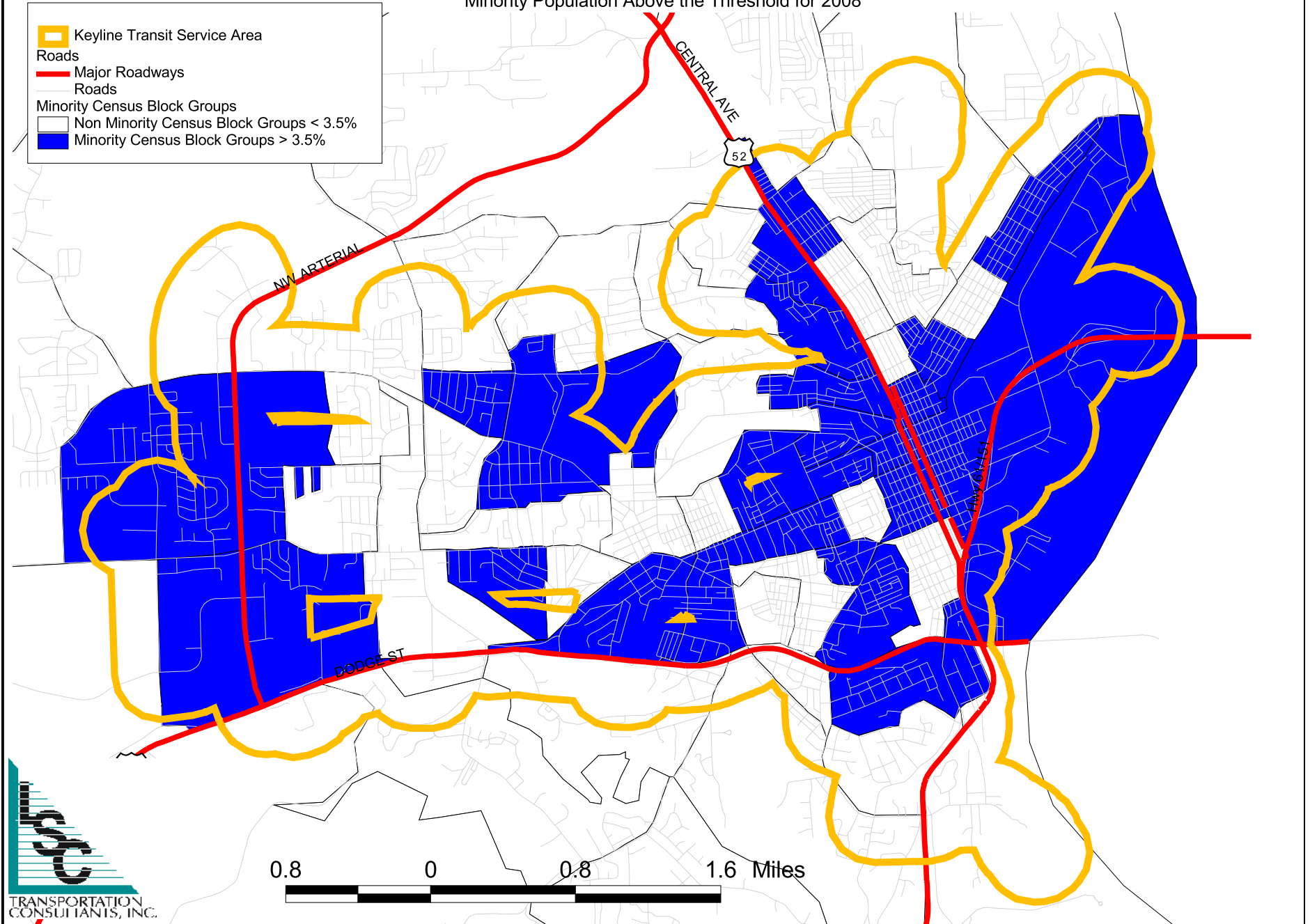


Figure V-5
Limited English Proficiency Population Above the Threshold for 2008

