

TABLE OF CONTENTS

OPERATIONAL ANALYSIS OF LCT FIXED ROUTE SERVICES 1

DESCRIPTION 1

DEMOGRAPHICS AND TRANSIT PROPENSITY 1

Population Density..... 1

Demographic Data..... 6

Transit Propensity..... 6

ROUTE PRODUCTIVITY 11

TRANSFER ANALYSIS 13

GENERAL ISSUES AND CONCERNS 16

LCT FIXED ROUTE SERVICE EVALUATION 17

Route 1 17

Route 2 18

Route 3 18

Route 11 19

Route 21 21

Route 31 21

Route 33 21

Route 41 23

Route 51 23

Route 52 25

Route 53 25

Route 70 25

SUMMARY OF RECOMMENDATIONS 26

Tier I Service Reduction..... 26

Tier II Service Reduction 26

SYSTEMWIDE RECOMMENDATIONS 29

PROPOSED DOWNTOWN ELYRIA TRANSIT CENTER 29

ADA COMPLEMENTARY PARATRANSIT 32

OPERATIONAL ANALYSIS OF LCT FIXED ROUTE SERVICES

DESCRIPTION

LCT operates 12 fixed routes in the Lorain/Elyria urban area. Most of these routes are based at a transfer point located on Griswold Road near the Westfield Mall. This is the system hub and is located near the geographic center of the service area, as well as near the largest trip generator in the system. Ten of the twelve routes arrive and depart at this transfer point each hour. A second hub is located in downtown Lorain on West 5th Street in front of the Meridian Plaza. Four routes arrive and depart this location each hour.

The system also makes connections to the Greater Cleveland RTA system at two locations. The first is on Lorain Road near the Lorain County/Cuyahoga County Boundary, and is the end of the line for two RTA bus routes. Another LCT route operates to the Westlake park-and-ride lot near I-90 where passengers can transfer to several routes including downtown Cleveland express buses. LCT also provides service to Cleveland Hopkins International Airport from Oberlin and a park-and-ride lot in Elyria. The base fare is \$1.25. Exhibit 1 shows the routes in the LCT fixed route system. Exhibit 2 contains the operating profile of these routes.

DEMOGRAPHICS AND TRANSIT PROPENSITY

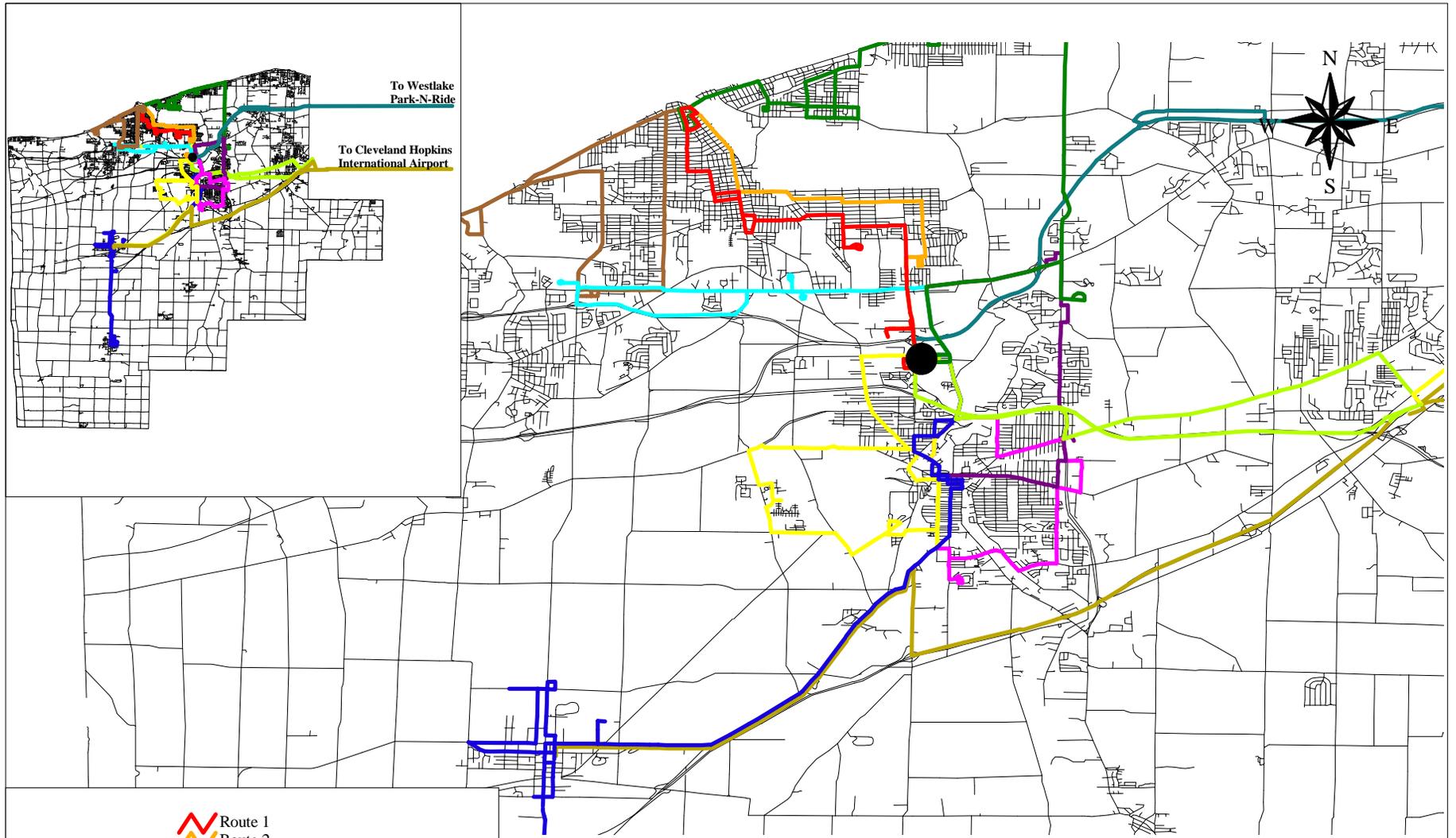
The analysis of area population and demographics was done for several reasons. First, this information can be used to assess the appropriateness of fixed route service in Lorain County as compared to demand response and other transit modes. Second, this data can be used to determine where transit service is needed most, and finally, where LCT may be over serving. Each of the relevant population and demographic data is mapped and described below.

Population Density

Exhibit 3 displays the population density for each block group in Lorain County expressed in terms of total population per square mile. There are five categories of population density. The lowest, which is under 1,500 persons per square mile, are areas that generally do not support fixed route transit service. The second lowest category, which is between 1,500 and 2,500 persons per square mile, represent the minimal level of population density that will support fixed route service. The subsequent three highest categories are areas that should, with some exceptions, be provided transit service.

Description

Demographics and Transit Propensity



-  Route 1
-  Route 2
-  Route 3
-  Route 11
-  Route 21
-  Route 31
-  Route 33
-  Route 41
-  Route 51
-  Route 52
-  Route 53
-  Route 70



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**Exhibit 1:
LCT System Map**

**Lorain County Transit
Operational Analysis**

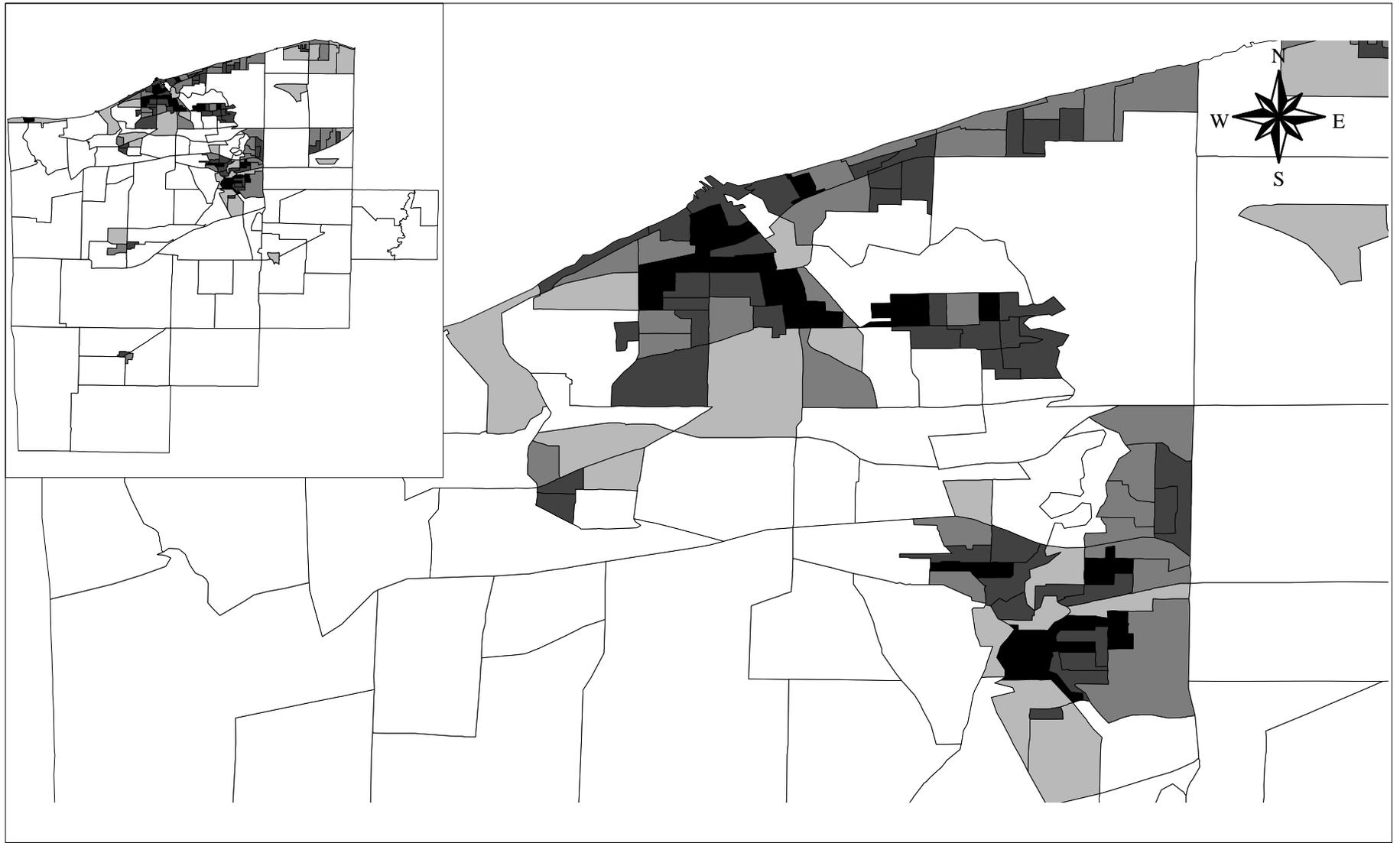
Exhibit 2: Route Profile

Route	Service Span			Vehicle Required				
	Weekday	Sat.	Sun.	PK	MD	Eve.	Sat.	Sun.
1-Lorain/Elyria via Washington	5:00a-9:58p	8:00a-4:58p	8:00a-4:58p	1	1	1	1	1
2-Lorain/Elyria via Broadway	5:00a-9:58p	8:00a-4:58p	8:00a-4:58p	2	2	1	1	1
3-Sheffield Lake/Abbe Road	5:30a-8:25p	8:30a-5:25p	--	2	2	2	2	--
11-North Ridgeville/Center Rdg.	6:30a-7:25p	8:30a-4:25p	--	1	1	--	1	--
21-Oberlin/Wellington	4:47a-9:23p	7:47a-3:23p	7:47a-3:23p	2	2	2	2	2
31-N. Ridge/Cooper Foster Park	5:00a-9:28p	9:00a-4:54p	9:00a-4:54p	1	1	1	1	1
33-Airport Express				1	1	1	1	1
41-W. Erie/Oberlin Avenue	5:00a-9:22p	8:00a-4:54p	8:00a-4:54p	2	2	2	2	2
51-East Elyria/Broad Street Loop	5:30a-9:25p	8:30a-4:25p	8:30a-4:25p	1	1	1	1	1
52-East Elyria/Abbe Road Loop	5:30a-10:25p	8:30a-4:25p	8:30a-4:25p	1	1	1	1	1
53-West Elyria/West Ridge Loop	5:30a-10:25p	8:30a-4:25p	-	1	1	1	1	--
70-Westlake Express	5:32a-8:00a 4:35p-7:23p	--	--	1	--	--	--	--
TOTAL				16	15	13	14	10

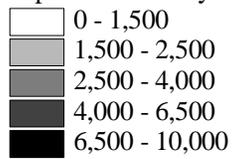
Exhibit 2: (continued)

Route	Frequency					Revenue Hours			Revenue Miles		
	PK	MD	Eve.	Sat.	Sun.	Wday	Sat.	Sun.	Wday	Sat.	Sun.
1-Lorain/Elyria via Washington	60	60	60	60	60	17.0	8.9	8.9	302.6	160.2	160.2
2-Lorain/Elyria via Broadway	30	30	60	60	60	30.5	8.9	8.9	542.9	160.2	160.2
3-Sheffield Lake/Abbe Road	60	60	60	60	--	28.8	17.8	--	574.2	356.4	--
11-North Ridgeville/Center Rdg.	60	60	--	60	--	12.9	7.9	--	312.0	192.0	--
21-Oberlin/Wellington	60	60	60	60	60	27.8	11.3	11.3	640.8	265.4	265.4
31-N. Ridge/Cooper Foster Park	60	60	60	60	60	15.8	8.9	8.9	257.4	124.8	124.8
33-Airport Express	70	70	--	80	80	8.8	9.9	9.9	258.3	258.3	258.3
41-W. Erie/Oberlin Avenue	60	60	60	60	60	31.2	17.8	17.8	480.0	270.0	270.0
51-East Elyria/Broad Street Loop	60	60	60	60	60	15.9	7.9	7.9	233.6	116.8	116.8
52-East Elyria/Abbe Road Loop	60	60	60	60	60	16.9	7.9	7.9	272.0	128.0	128.0
53-West Elyria/West Ridge Loop	60	60	60	60	--	16.9	7.9	--	272.0	128.0	--
70-Westlake Express	60	--	--	--	--	3.8	--	--	96.6	--	--
TOTAL						226.3	115.1	81.5	4242.4	2160.1	1483.7

Note: Revenue hours include layover time for all routes.



Population Density Per Square Mile



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**Exhibit 3:
Lorain County Population Density**

**Lorain County Transit
Operational Analysis**

This shows that fixed route service is currently provided in most areas of Lorain County with population densities of over 1,500 persons per square mile. The one exception is the Avon Lake area where there are several higher density block groups. However, LCT currently provides the Avon/Avon Lake Community Circulator, which is a demand response service for the general public.

Demographic Data

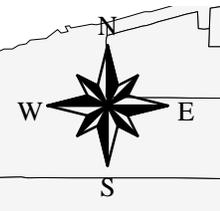
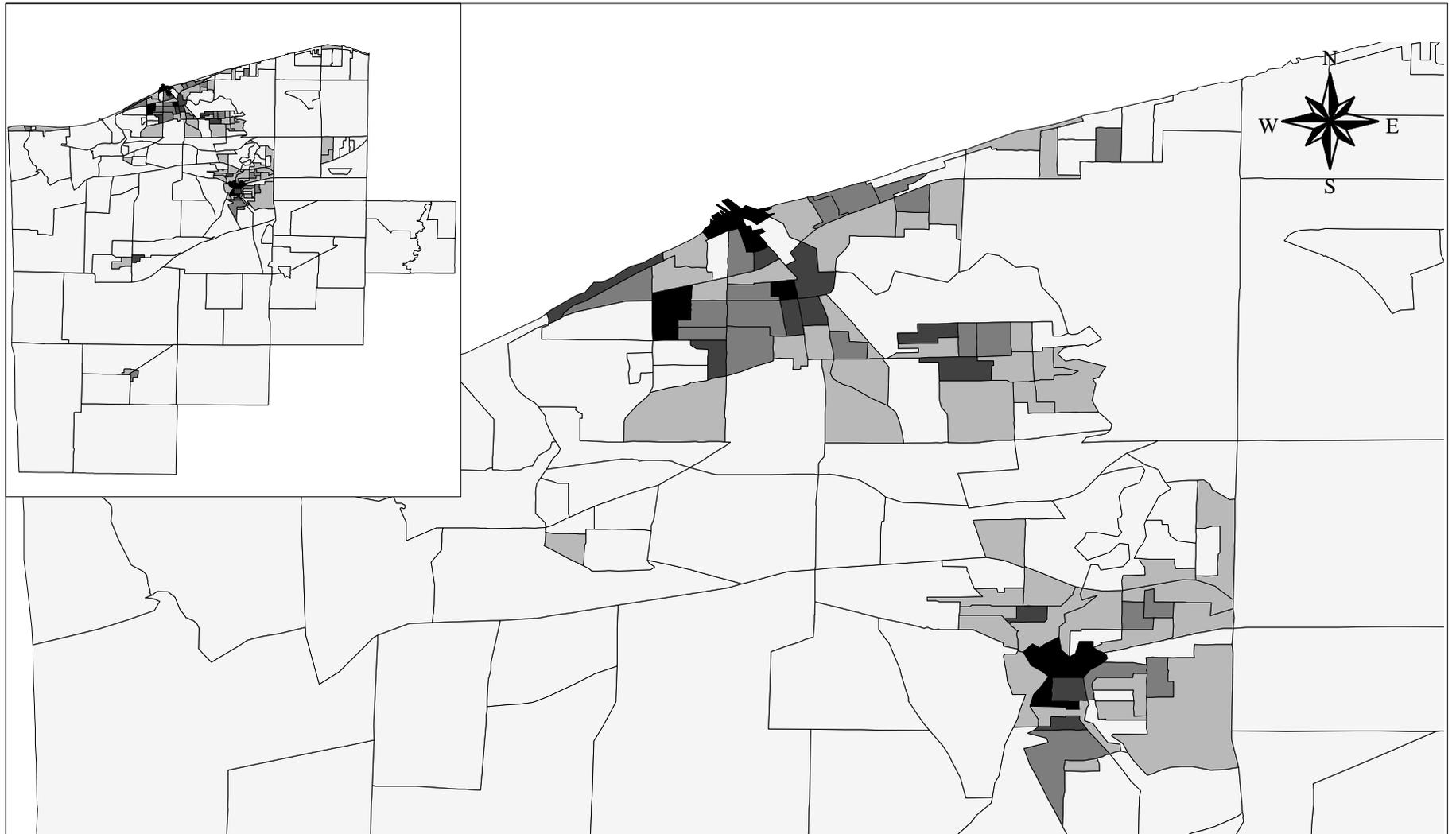
Three types of demographic data were collected at the U.S. Census block group level. They include zero-vehicle households, households beneath the poverty level and the population over 65 years of age. These were used to gauge relative demand for transit service, which is described in the following section. Exhibits 4, 5 and 6 respectively show the density levels for each of the three demographic factors. The highest concentrations of zero-vehicle households are located in Lorain around downtown, along Broadway, and east of Leavitt Road; and in Elyria near the downtown area. The highest concentrations of household beneath the poverty level are along Broadway, Leavitt Road and 36th Street in Lorain, and near downtown Elyria. The highest concentrations of the over-65 population are along Oberlin Avenue in Lorain and West Avenue in Elyria.

Transit Propensity

In order to project which locations a transit system should serve, a calculation to determine transit propensity can be used. Transit propensity is a measure of the potential demand for transit service, were it available, taking into account demographic characteristics. This transit potential model was based upon the paper, “*Demand Estimating Model for Transit Route and System Planning in Small Urban Areas*,” Transportation Research Board, 730, 1979. The end result is an estimate of the relative propensity for transit for each census block group.

To calculate transit propensity, the previously described U.S. Census 2000 data were gathered at the block group level for the entire county. As described, the data included: total population, land area in square miles, population density, number of persons age 65 and older, number of households below the poverty level, and the number of occupied housing units with zero vehicles available. These data were entered into the model to determine the relative transit trip demand per square mile. The map in Exhibit 7 shows the transit propensity for the county’s block groups

The areas with the highest transit propensity exist in downtown Lorain, and along Oberlin Avenue, Cooper Foster Road, and Broadway in Lorain;



7

Zero-Vehicle Occupied Housing Units Per Sq. Mi.

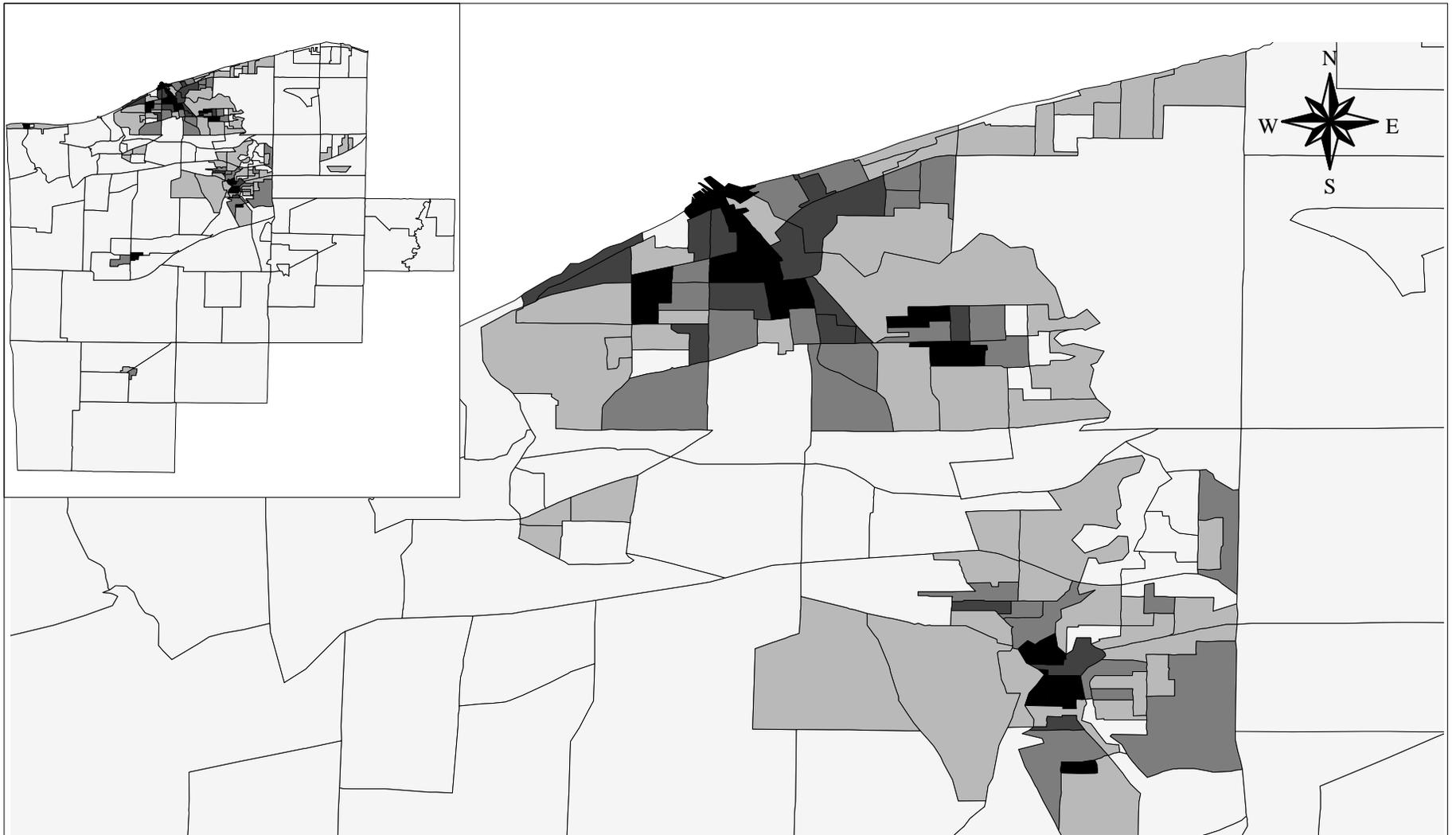
- 0 - 60
- 60 - 180
- 180 - 320
- 320 - 600
- 600 - 1,100



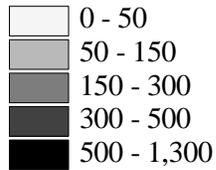
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**Exhibit 4: Lorain County
Zero-Vehicle Occupied Housing Units**

**Lorain County Transit
Operational Analysis**



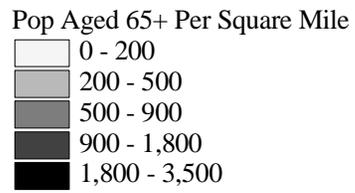
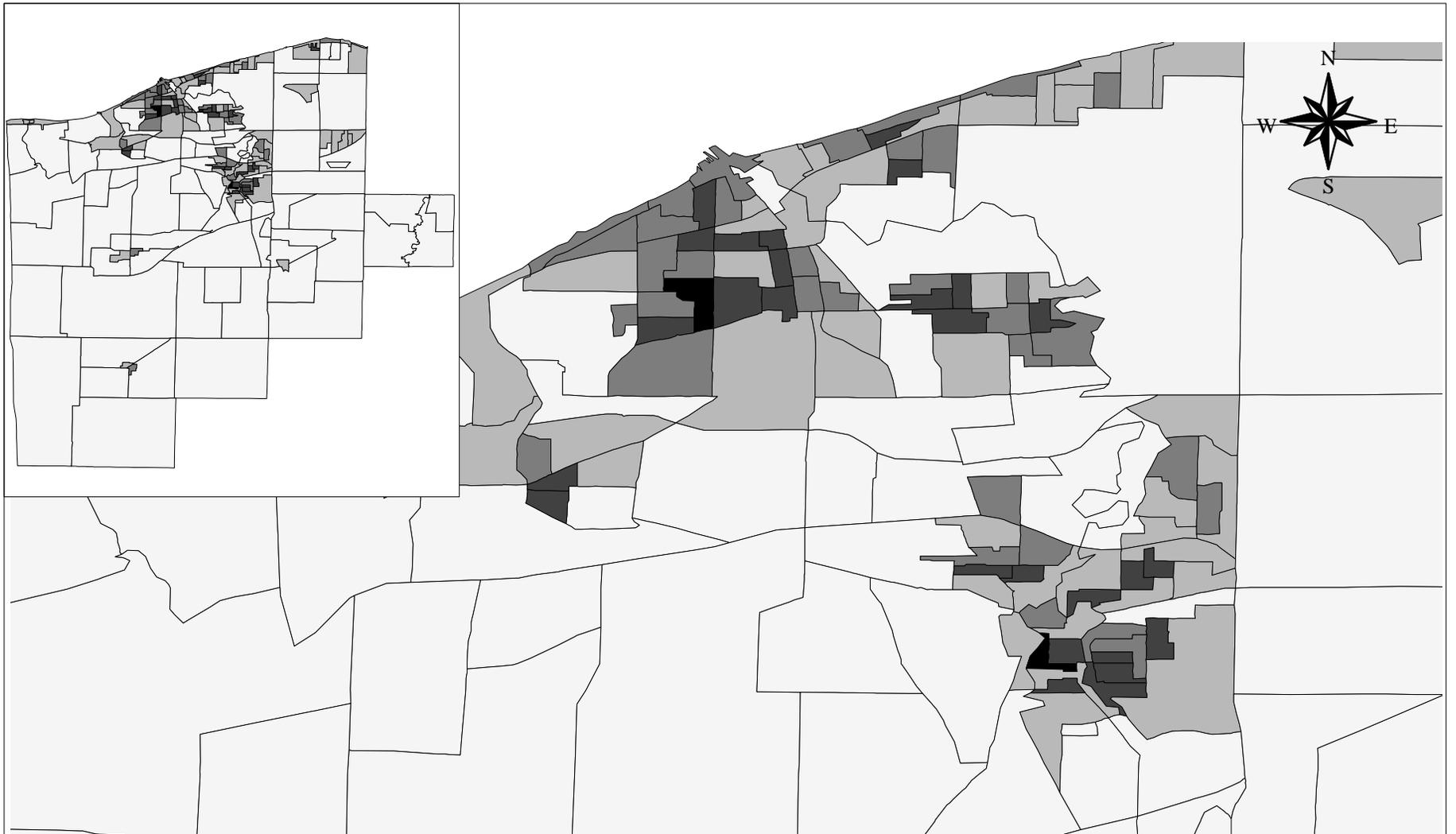
Households Beneath Poverty Level Per Sq. Mi.



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**Exhibit 5: Lorain County
Households Beneath Poverty Level**

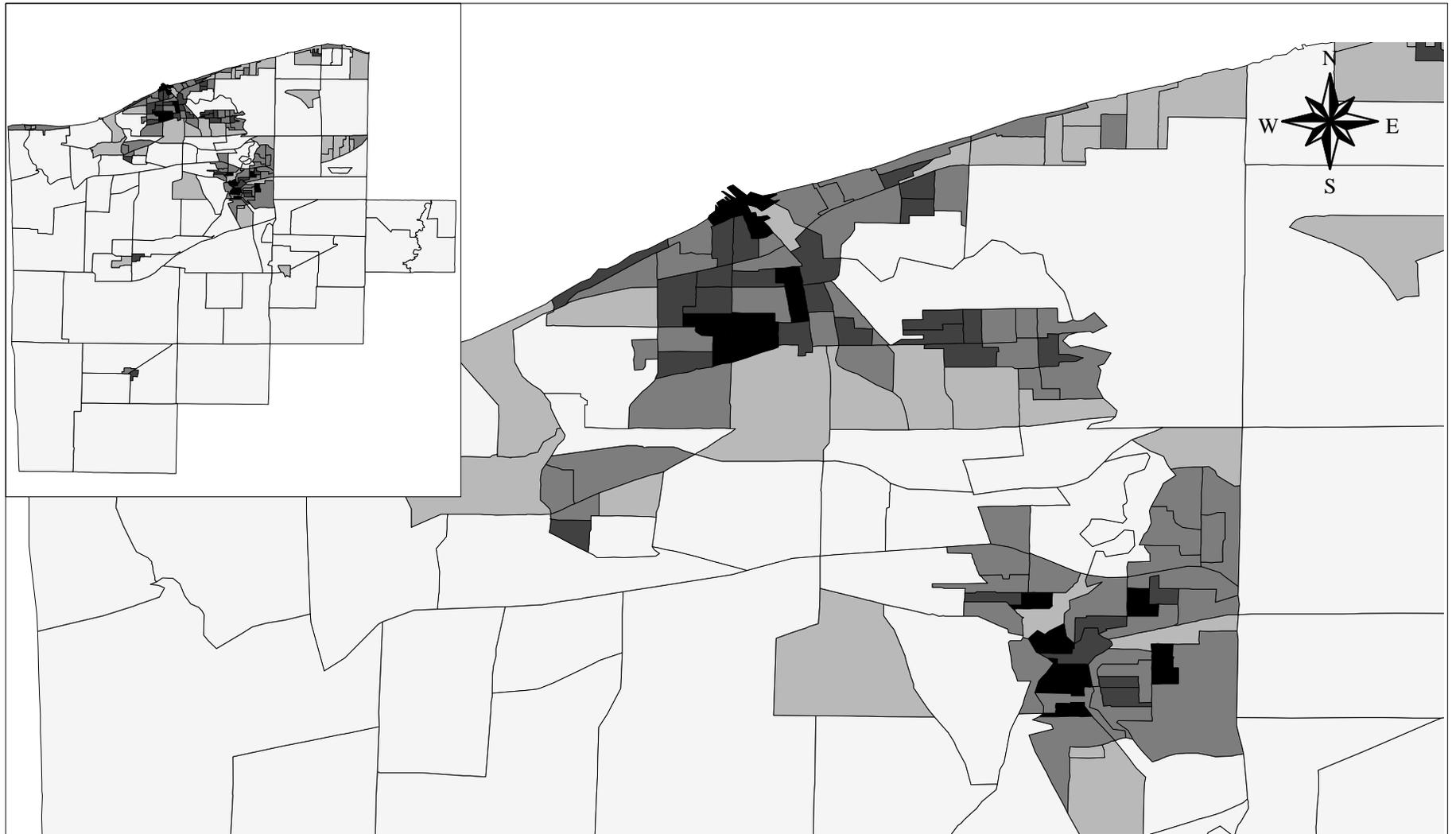
**Lorain County Transit
Operational Analysis**



RLS & Associates, Inc.

**Exhibit 6: Lorain County
Elderly Population Density**

**Lorain County Transit
Operational Analysis**



Transit Propensity Per Square Mile

-  0 - 3,000
-  3,000 - 7,000
-  7,000 - 15,000
-  15,000 - 25,000
-  25,000 - 80,000



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**Exhibit 7:
Lorain County Transit Propensity**

**Lorain County Transit
Operational Analysis**

in the West Avenue, Gulf Road, and areas surrounding downtown Elyria. All block groups in the top three transit propensity categories are served by LCT routes with the exception of some limited areas in Avon Lake, which is currently served by demand response community circulator service.

ROUTE PRODUCTIVITY

LCT fixed route ridership has been growing at a significant rate over the past three years since the current set of routes began operating. On most routes, ridership has doubled over a comparable month in 2001, and tripled over the September 2000, the first month of operation. In April 2004, ridership totaled 64,910. Accounting for transfers, round trips, and passenger frequency, this equates to about 1,500 different people.

Ridership productivity in terms of passengers per vehicle revenue hour is shown in Exhibit 8. On weekdays, the most productive route in the system is Route 31, which averages 18.7 passengers per revenue hour. Route 2 is second highest at 18.4 passengers per revenue hour. Both of these routes operate mostly in the City of Lorain with a connection to the LCT Transfer Point on Griswold Road. Route 31 serves a number of offices and shopping centers off Leavitt, North Ridge and Cooper Foster Roads, while Route 2 operates to downtown Lorain. The third most productive route is Route 52, which operates through Elyria and serves the Westfield Mall and the Midway Market Square shopping center. Routes that fall below 10 passengers per revenue hour, or 75 percent of the system average, include Routes 3 – Sheffield Lake/Abbe Road, 11- North Ridgeville, 33 – Airport Express, and 70 – Westlake Express.

On Saturdays, Route 2 has the highest passengers per revenue hour at 25.1. Route 52 is second highest at 19.4 passengers per revenue hour. These are higher than the weekday level primarily due to the lower level of service that is provided by reducing the service hours and the frequency. Routes 3, 11 and 33 have the lowest productivity of all routes that run on Saturdays. On Sundays, the most productive routes are Routes 2 and 52, while the least productive is route 33.

The average passengers per revenue mile levels also appear in Exhibit 7. Similar to the passengers per revenue hour measures, routes 31, 2 and 52 have the highest number of passengers per revenue mile of all LCT routes. It is joined by route 53 as the only routes that are in the over 125 percent of system average category. Route 2 is the only route in the LCT system with 30-minute headways all day. All other routes have 60-minute headways or greater. The three routes with the lowest passengers per miles levels on weekdays are Routes 33, 70, and 11.

Exhibit 8

Route Ridership Productivity Rankings

Weeekday

Route	Passengers per hour
31-N. Ridge/Cooper Foster Park	18.7
2-Lorain/Elyria via Broadway	18.4
52-East Elyria/Abbe Road Loop	16.9
<i>125% of System Average</i>	<i>16.7</i>
53-West Elyria/West Ridge Loop	15.1
1-Lorain/Elyria via Washington	14.1
<i>System Average</i>	<i>13.4</i>
41-W. Erie/Oberlin Avenue	12.9
51-East Elyria/Broad Street Loop	12.6
21-Oberlin/Wellington	12.6
<i>75% of System Average</i>	<i>10.0</i>
3-Sheffield Lake/Abbe Road	9.1
11-North Ridgeville/Center Rdg.	6.8
33-Airport Express	4.8
70-Westlake Express	4.7

Saturday

Route	Passengers per hour
2-Lorain/Elyria via Broadway	25.1
52-East Elyria/Abbe Road Loop	19.4
1-Lorain/Elyria via Washington	14.8
31-N. Ridge/Cooper Foster Park	14.4
41-W. Erie/Oberlin Avenue	14.4
<i>125% of System Average</i>	<i>14.4</i>
53-West Elyria/West Ridge Loop	11.5
<i>System Average</i>	<i>11.5</i>
51-East Elyria/Broad Street Loop	10.6
21-Oberlin/Wellington	9.8
<i>75% of System Average</i>	<i>8.6</i>
3-Sheffield Lake/Abbe Road	5.1
11-North Ridgeville/Center Rdg.	4.9
33-Airport Express	1.7

Sunday

Route	Passengers per hour
2-Lorain/Elyria via Broadway	8.7
52-East Elyria/Abbe Road Loop	7.8
41-W. Erie/Oberlin Avenue	6.5
1-Lorain/Elyria via Washington	5.8
21-Oberlin/Wellington	5.8
<i>System Average</i>	<i>5.7</i>
51-East Elyria/Broad Street Loop	4.9
31-N. Ridge/Cooper Foster Park	4.4
<i>75% of System Average</i>	<i>4.2</i>
33-Airport Express	1.3

Route	Passengers per mile
31-N. Ridge/Cooper Foster Park	1.1
52-East Elyria/Abbe Road Loop	1.0
2-Lorain/Elyria via Broadway	1.0
53-West Elyria/West Ridge Loop	0.9
<i>125% of System Average</i>	<i>0.9</i>
51-East Elyria/Broad Street Loop	0.9
41-W. Erie/Oberlin Avenue	0.8
1-Lorain/Elyria via Washington	0.8
<i>System Average</i>	<i>0.7</i>
21-Oberlin/Wellington	0.5
<i>75% of System Average</i>	<i>0.5</i>
3-Sheffield Lake/Abbe Road	0.5
11-North Ridgeville/Center Rdg.	0.3
70-Westlake Express	0.2
33-Airport Express	0.1

Route	Passengers per mile
2-Lorain/Elyria via Broadway	1.4
52-East Elyria/Abbe Road Loop	1.2
31-N. Ridge/Cooper Foster Park	1.0
41-W. Erie/Oberlin Avenue	0.9
1-Lorain/Elyria via Washington	0.8
<i>125% of System Average</i>	<i>0.8</i>
53-West Elyria/West Ridge Loop	0.7
51-East Elyria/Broad Street Loop	0.7
<i>System Average</i>	<i>0.6</i>
<i>75% of System Average</i>	<i>0.5</i>
21-Oberlin/Wellington	0.4
3-Sheffield Lake/Abbe Road	0.3
11-North Ridgeville/Center Rdg.	0.2
33-Airport Express	0.1

Route	Passengers per mile
41-W. Erie/Oberlin Avenue	0.4
52-East Elyria/Abbe Road Loop	0.5
2-Lorain/Elyria via Broadway	0.5
51-East Elyria/Broad Street Loop	0.3
1-Lorain/Elyria via Washington	0.3
31-N. Ridge/Cooper Foster Park	0.3
<i>System Average</i>	<i>0.3</i>
21-Oberlin/Wellington	0.2
<i>75% of System Average</i>	<i>0.2</i>
33-Airport Express	0.1

On Saturdays, Routes 2 and 52 are the most productive in terms of passengers per revenue mile. Both of these are higher than any route on weekdays. The least productive routes are 33, 11 and 3 on Saturdays. On Sundays, the most productive routes are also Routes 2 and 52 with 0.5 passengers per revenue mile. The least productive routes are Route 3 and 21.

The ridership and productivity by time period is shown in Exhibit 9. As shown, weekday afternoons are the peak ridership time for most routes.

TRANSFER ANALYSIS

LCT's transfer rate was 33 percent in May 2004. Transfer slips were collected on all twelve LCT routes on May 18, 2004 and tabulated. Exhibit 10 shows the resulting transfer matrix that quantifies the route-to-route movement of passengers. Overall, it reveals a transfer pattern indicating passenger movements that are scattered throughout the service area. Routes 2, 41, and 31 issued the highest number of transfers at 124, 80, and 77 transfers respectively. Routes 2, 3, and 41 received the most transfers with 97, 89, and 74 respectively. Drivers collected a total of 650 transfer slips during this one weekday.

Some of the largest transfer volumes were between the following routes:

- ◆ Routes 31 and 41, where there were 27 transfers from Route 31 to Route 41 and 18 transfers from Route 41 to Route 31;
- ◆ Routes 2 and 41, where there were 21 transfers from Route 2 to Route 41, and 23 transfers from Route 41 to Route 2;
- ◆ Routes 3 and 41, where there were 12 transfers from Route 3 to Route 41, and 19 transfers from Route 41 to Route 3;
- ◆ Routes 2 and 21, where there were 17 transfers from Route 2 to Route 21, and 10 transfers from Route 21 to Route 2;

The routes with the highest percentage of their passengers who board with a transfer slip include Routes 70 and 11, which provide connections to Greater Cleveland RTA routes. Other routes with a high transfer rate include Routes 3, 51, 52, and 53.

The following conclusions can be drawn from the transfer data used in conjunction with other collected information:

- ◆ The relatively high percentage of transfers on Route 52 is primarily due to it being the only route to operate to one of the main entrances to the Westfield Mall and to circulate through Midway Market Square and other nearby shopping centers.
- ◆ A significant amount of transferring is occurring in locations other than Griswold Road transfer point. The volume of transfers on Route

Route Productivity

Transfer Analysis

Exhibit 9
Ridership by Time Period

		Boardings	Pass./ Hour	Pass./ Mile
Route 1	Wkday	241	14.2	0.8
	AM Peak	49	14.0	0.8
	Mid-day	87	14.5	0.8
	PM Peak	65	18.6	1.0
	Evening	40	10.0	0.6
	Saturday	132	14.8	0.8
	Sunday	52	5.8	0.3
Route 2	Wkday	560	18.4	1.0
	AM Peak	100	13.3	0.7
	Mid-day	260	21.7	1.2
	PM Peak	128	21.3	1.2
	Evening	72	14.4	0.8
	Saturday	223	25.1	1.4
	Sunday	77	8.7	0.5
Route 3	Wkday	262	9.1	0.5
	AM Peak	68	9.7	0.5
	Mid-day	122	10.2	0.5
	PM Peak	56	9.3	0.5
	Evening	16	4.0	0.2
	Saturday	91	5.1	0.3
	Sunday	--	--	--
Route 11	Wkday	88	6.8	0.3
	AM Peak	19	7.6	0.3
	Mid-day	43	7.2	0.3
	PM Peak	18	6.0	0.3
	Evening	8	5.3	0.2
	Saturday	39	4.9	0.2
	Sunday	--	--	--
Route 21	Wkday	350	12.6	0.5
	AM Peak	63	7.9	0.4
	Mid-day	160	12.3	0.6
	PM Peak	87	14.5	0.7
	Evening	40	8.0	0.4
	Saturday	111	9.8	0.4
	Sunday	65	5.8	0.2
Route 31	Wkday	296	18.7	1.1
	AM Peak	40	11.4	0.7
	Mid-day	150	25.0	1.6
	PM Peak	62	17.7	1.1
	Evening	44	11.0	0.7
	Saturday	128	14.4	1.0
	Sunday	39	4.4	0.3

		Boardings	Pass./ Hour	Pass./ Mile
Route 33	Wkday	29	4.8	0.1
	AM Peak	--	--	--
	Mid-day	11	2.2	0.1
	PM Peak	13	2.5	0.1
	Evening	5	7.5	0.2
	Saturday	17	1.7	0.1
	Sunday	13	1.3	0.1
Route 41	Wkday	404	12.9	0.8
	AM Peak	77	11.0	0.7
	Mid-day	200	18.2	1.2
	PM Peak	99	16.5	1.1
	Evening	60	8.6	0.6
	Saturday	256	14.4	0.9
	Sunday	115	6.5	0.4
Route 51	Wkday	201	12.6	0.9
	AM Peak	26	6.5	0.4
	Mid-day	99	16.5	1.1
	PM Peak	58	19.3	1.3
	Evening	18	6.0	0.4
	Saturday	84	10.6	0.7
	Sunday	39	4.9	0.3
Route 52	Wkday	285	16.9	1.0
	AM Peak	65	16.3	1.0
	Mid-day	122	20.3	1.3
	PM Peak	68	22.7	1.4
	Evening	54	13.5	0.8
	Saturday	153	19.4	1.2
	Sunday	62	7.8	0.5
Route 53	Wkday	256	15.1	0.9
	AM Peak	67	16.8	1.0
	Mid-day	107	17.8	1.1
	PM Peak	54	18.0	1.1
	Evening	28	7.0	0.4
	Saturday	91	11.5	0.7
	Sunday	--	--	--
Route 70	Wkday	18	4.7	0.2
	AM Peak	12	6.3	0.3
	Mid-day	--	--	--
	PM Peak	6	3.2	0.1
	Evening	--	--	--
	Saturday	--	--	--
	Sunday	--	--	--

**Exhibit 10
Transfer Matrix**

To From	1	2	3	11	21	31	33	41	51	52	53	70	Total
1	1	14	5	1	10	4		8	4	11	7		65
2	11	9	13	3	17	14		21	13	8	13		122
3	2	6	1	2	8	1		12	2	2	6		42
11	4	6	3		1	2			4	2	4		26
21	4	10	11	1	2	9			8	12	9		66
31	2	11	3		8	2		27	7	9	8		77
33													0
41	5	23	19			18		15					80
51	2	6	2	3	7	2			4	5	4		35
52	6		7	2	2	5				5	12		39
53	12	9	7	3	4	5			5	9			54
70			2		1					1	1		5
AL	1	3	1										5
AM					1			6			1		8
OB					1								1
RTA				15			2					8	25
Total	50	97	74	30	62	62	2	89	47	64	65	8	650
% of Rid.	20.7%	17.3%	28.2%	34.1%	17.7%	20.9%	6.9%	22.0%	23.4%	22.5%	25.4%	44.4%	

AL - Avon/Avon Lake Community Connector

AM - Amherst/South Amherst Community Connector

OB - Oberlin Community Connector

RTA - Greater Cleveland RTA route

Transfer Analysis

41 and other routes with stops at Meridian Plaza and the Super K-Mart Plaza evidences this.

- ◆ While there are some routes with higher transfer rates, nearly all routes have a significant portion of their ridership that are transferring, which indicates that major passenger destinations are scattered on several different routes.

GENERAL ISSUES AND CONCERNS

Based on the review of previously described data supplemented by an on-site field review of the LCT routes, the following systemwide issues were identified.

- ◆ The LCT system is designed with extensive use of one-way loops. The primary advantage of this approach is the ability to maximize coverage of bus routes throughout the service area. The primary disadvantage is generally with bus passenger travel times as compared to trips by auto. Examples of travel times by bus to or from some key trip destinations as compared to auto trip times are shown in Exhibit 11. Three of the four examples below are a result of the one-way loop design of at least one of the routes being used. While these are some of the greatest differences in travel times between these two modes, they illustrate some of the problems in using the LCT system.

**Exhibit 11
Travel Time Analysis**

From	To	Routes Used	LCT Travel Time	Auto Travel Time
Abbe/Chestnut Ridge	LCCC	52, 3	53	5
Lowell/Murray Ridge	LCJFS	53, 31	55	5
30 th /Broadway	Sheffield Center	1, 31	34	>5
Elyria Memorial Hosp.	30 th /Fulton	51, 2	65	15

- ◆ Many portions of LCT routes operate through low density and undeveloped portions of Lorain County. Some examples include Abbe Road, Leavitt Road, and Lowell Street.
- ◆ Overall ridership on the LCT system has been growing in recent years. However, many routes are still below industry standards for fixed route service.
- ◆ The fixed route system has been operating for about three and one half years. This is not enough time for routes to reach their full ridership potential. A conservative rule-of-thumb used in the transit industry is that after two years new routes reach 60 percent of their full ridership

**General Issues and
Concerns**

**General Issues and
Concerns**

potential. If supported by a well-designed marketing program, further increases in ridership can be expected.

- ◆ LCT's high transfer rate is likely a result of the location of the Griswold Road Transfer Point and a dispersed land use pattern with population densities and trip destinations scattered throughout the service area. This points to the need to provide speedy connections between routes at central locations for transferring in order to minimize travel times and maximize convenience.
- ◆ Several routes have on-demand deviations. Too many on-demand deviations can cause problems with a route's schedule adherence and on-time performance if adequate time is not built into their schedule. Currently route schedules are designed with no additional time for deviations. On-time performance is currently good overall.
- ◆ For nearly all routes, trips between 5:00 a.m. and 6:00 a.m. have very few, if any, riders.
- ◆ LCT has plans to develop a transit center in downtown Elyria. This will create a third hub for the LCT system, with the other two located in downtown Lorain and on Griswold Road near the Westfield Mall. When it is developed, there will be an opportunity to restructure the routes serving Elyria.

LCT FIXED ROUTE SERVICE EVALUATION

A route-by-route description and service recommendations is included below. Lorain County has determined that the objective of the Operational Analysis is to determine what service should be reduced or eliminated to achieve desired savings in operating costs. Therefore, recommendations are placed in two groups. The first group will result from an effort to streamline LCT service and will achieve a cost reduction of about \$200,000. The second group includes additional changes needed to achieve a reduction of \$500,000 in annual operating costs. In addition, a separate set of recommendations, included at the end of this report, is developed for when a new transit center is developed in downtown Elyria.

Route 1

Route 1 operates between the Transfer Center near Westfield Mall in Elyria and downtown Lorain. It operates mostly through residential areas in Lorain along Homewood Drive, East 34st, Oakdale, and Washington Avenue. Despite being closer to downtown Lorain, passenger trips from these neighborhoods are more oriented toward the transfer center and the Westfield Mall area.

This route operates parallel to Route 2. Both routes operate between the Transfer Center and downtown Lorain. Route 1 buses depart these locations at the same time as Route 2. Also, in some locations they are

**LCT Fixed Route
Service Evaluation**

only one or two blocks apart. Despite this, Route 1 ridership levels are above the LCT average.

Recommendations

- ◆ Eliminate the 5:00 a.m. southbound and the 5:30 a.m. northbound trips.

Route 2

Route 2 also operates between the Transfer Center near Westfield Mall in Elyria and downtown Lorain. It operates mostly through residential areas in Lorain along Palm, East 31st, East 30th and Broadway. Similar to Route 1, more passengers boarding in these residential areas travel to the Transfer Point/Meridian Mall area then downtown Lorain.

It is the only route in the LCT system that operates every 30 minutes. This higher level of service has resulted in the highest ridership level of all routes. According to the April 2004 passenger count, there are 560 weekday passenger boardings on this route. However, some early morning trips have very few riders.

Recommendations

- ◆ Eliminate the 5:30 a.m. southbound and the 6:00 northbound trips on Route 2.

Route 3

Route 3 is a relatively long route that operates between the Transfer Point and downtown Lorain. It runs through the east side of Elyria to the Lorain County Community College and along Abbe Road to Lorain. It also operates through the east side of Lorain to and from Meridian Plaza. Route 3 passengers are able to transfer to the Avon/Avon Lake Community Circulator at a parking lot located at Lake and Abbe Roads. Two buses are needed to maintain 60-minute headways on this route.

Route 3 is below 75 percent of the system average for passengers per vehicle hour and mile for both weekdays and Saturdays. It therefore should be considered for restructuring as part of a Tier II service reduction. Also, its earliest and latest trips carry very few passengers.

Recommendations

- ◆ Eliminate the 5:30 a.m. and 7:30 p.m. southbound trips, and the 7:30 p.m. northbound trip as part of the Tier I service reduction.

**LCT Fixed Route
Service Evaluation**

- ◆ The portion of Route 3 along Abbe Road should be eliminated and it should be restructured to form two separate routes, each with 60-minute headways. One route would operate between the Transfer Center and Lorain County Community College. The second route would run between Meridian Plaza and the Shoreway Shopping Center on Lake Road using a more direct alignment to allow a round trip running time of less than 30 minutes. The Shoreway Shopping Center would be the new transfer location for the Avon/Avon Lakes Community Circulator route. The proposed alignments of the two new routes are shown in Exhibit 12.
- ◆ Both of these new routes will need to be interlined with other routes in order to maintain 60-minute headways. In Lorain, Route 41 – West Erie should be redesigned into two routes. One route would operate between Meridian Plaza and Community Health Partners. This route should be interlined with the Shoreway Shopping Center portion of Route 3. In Elyria, Route 21 should be shortened and operate only to West Avenue. A separate route to Oberlin and Wellington would be created and operated every two hours. Proposed modifications to Routes 21 and 41 are further described in each of their descriptions.
- ◆ All of the above proposed changes are part of the Tier II service reduction group.

Route 11

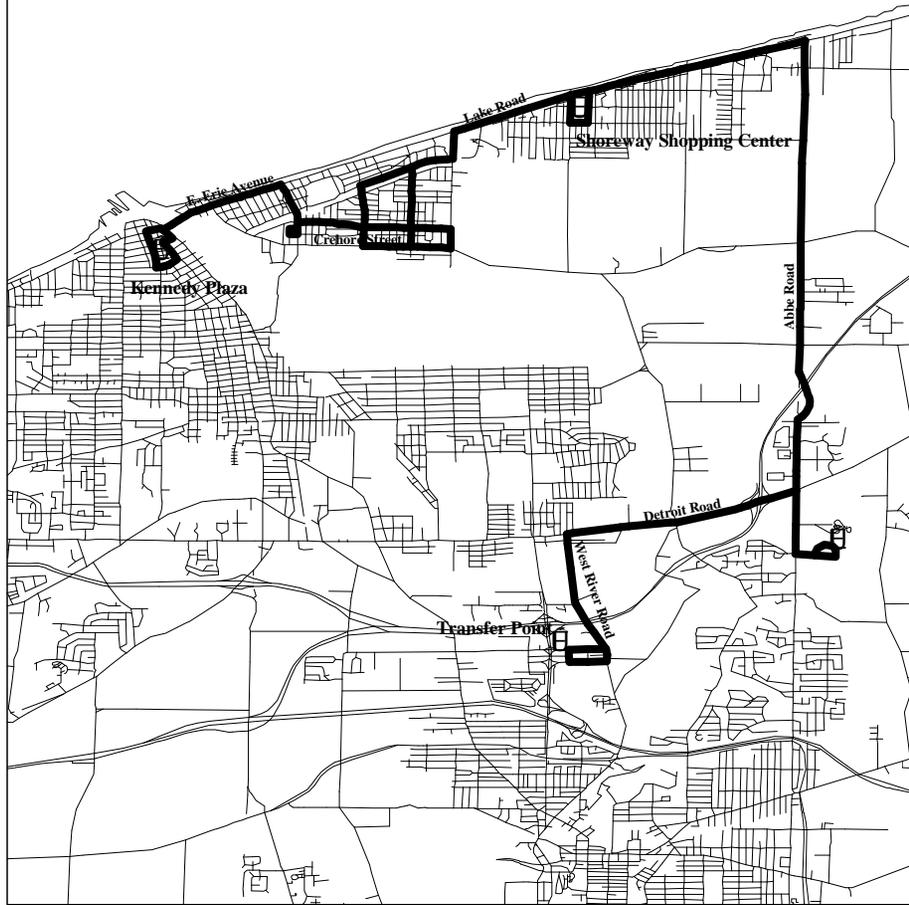
Route 11 operates between the Transfer Center and a Greater Cleveland RTA bus stop on Lorain Road. It runs in a one-way loop using West River Road, SR 57, and Center Ridge Road in the outbound direction, and I-80 for inbound trips. The connection with RTA routes is a bus stop that is served by RTA routes 63F and 75X. Route 63F is a peak hour only express route to downtown Cleveland, while Route 75X provides frequent peak-period service and also operates about every 60 minutes during the mid-day and evenings.

Route 11 is one of the poorest performing LCT routes being under 75 percent of the system average for passengers per vehicle hour and vehicle mile. On Saturdays it achieves only 4.9 passengers per vehicle hour. The operating days for this route should be reduced as part of a Tier I service reduction.

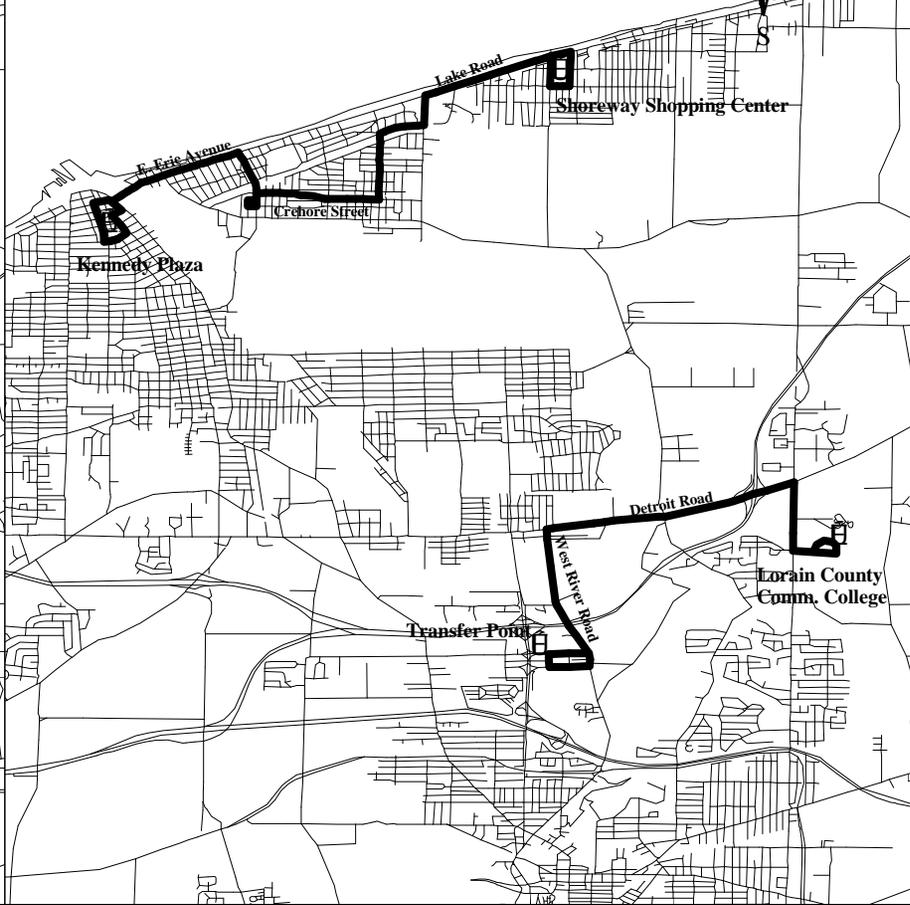
Recommendations

- ◆ In the Tier I service reduction, Saturday service for Route 11 should be eliminated.

Current Route 3



Proposed Route 3



Legend

-  Route Alignment
-  Points of Interest



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**Exhibit 12:
Current and Proposed Route 3**

**Lorain County Transit
Operational Analysis**

Route 21

Route 21 operates from the Transfer Center through Elyria to Oberlin. Service is provided to Oberlin hourly, with every other trip extended to Wellington. This route performs well under the system average, and should also be part of a Tier II service reduction. Its earliest trip is unproductive, and should be eliminated as part of the Tier I service reduction group.

Recommendations

- ◆ Eliminate the 4:47 a.m. northbound trip.
- ◆ As part of the Tier II group of service reductions, Route 21 should operate every two hours to Oberlin instead of every 60 minutes.
- ◆ As described in the Route 3 recommendations, operate only the Elyria portion of Route 21 as a separate route with 60-minute frequencies. Exhibit 13 shows the alignment of this new route.

Route 31

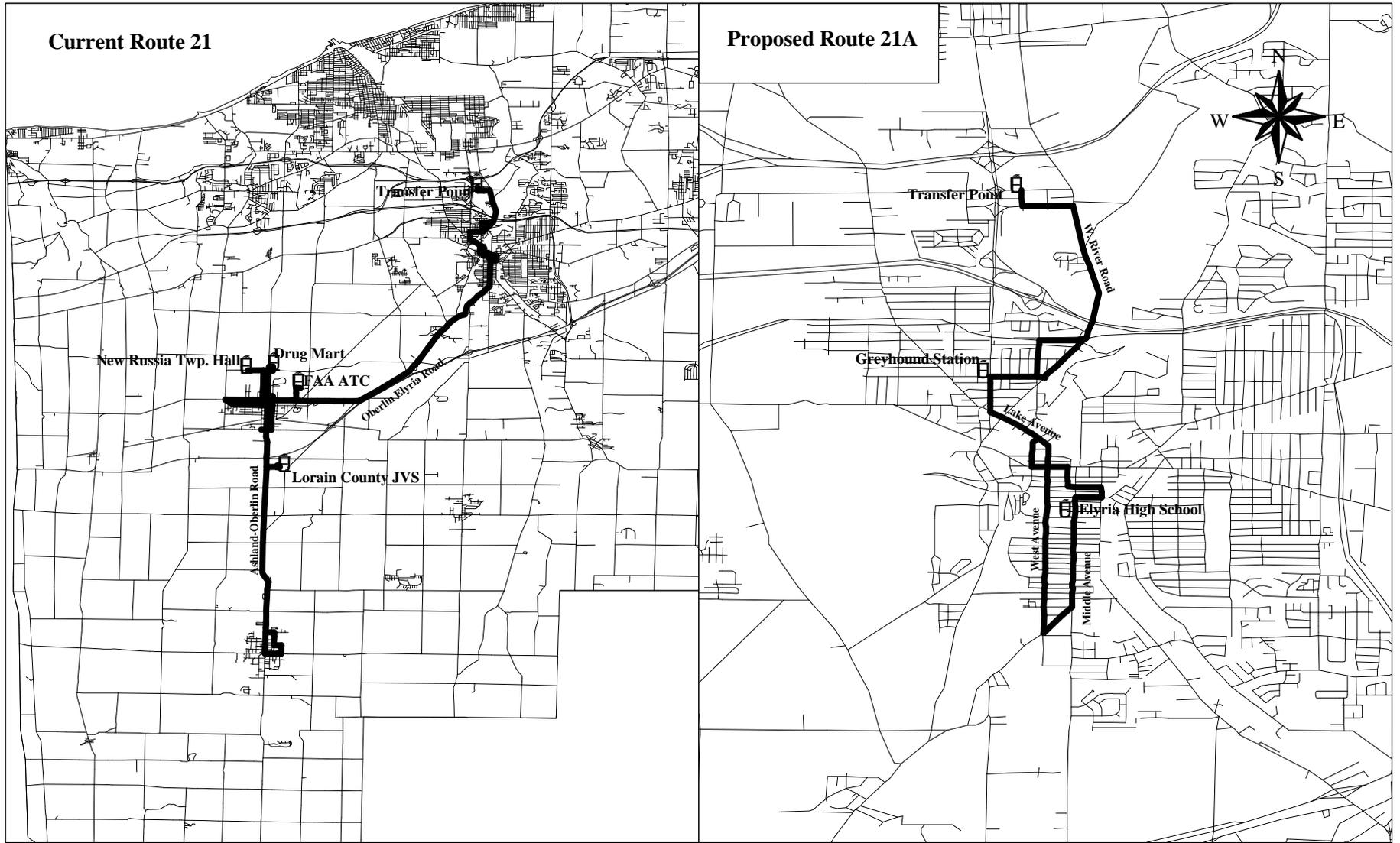
This route runs between the Transfer Center and a Super K-Mart shopping center on Leavitt Road in Amherst. It operates mostly along North Ridge Road and Cooper Foster Park Road in Amherst. It serves a number of trip generators along North Ridge Road and is one of the most productive routes in the system on weekdays, and it should maintain its current level of service on weekdays. But its ridership levels are considerably lower on Sundays, which are well below the system average. Its first weekday trip also carries few passengers.

Recommendations

- ◆ Eliminate Route 31 on Sundays.
- ◆ Eliminate the 5:00 a.m. eastbound and 5:30 a.m. westbound weekday trips.

Route 33

Route 33 operates nine trips between Oberlin and the Cleveland Hopkins International Airport on weekdays. On Saturdays and Sundays, nine trips are also provided. While there are some times when ridership is high, such as before and after semester breaks at Oberlin College, most trips carry few passengers. Its overall ridership productivity is one of the lowest in the system.



Legend



Route Alignment



Points of Interest



RLS & Associates, Inc.

**Exhibit 13:
Current and Proposed Route 21**

**Lorain County Transit
Operational Analysis**

Recommendations

Reduce the level of service on Route 33 to three daily trips on weekdays, Saturdays, and Sundays. Passenger counts indicate that these can be 10:00 a.m., 1:40 p.m. and 6:10 p.m. on weekdays, and 12:10 p.m., 4:10 p.m. and 9:30 p.m. on Saturdays and Sundays. Additional trip may be added as needed by Oberlin College through a purchase of service contract using a fully allocated rate.

Route 41

This route operates as a reversing loop between Meridian Plaza in downtown Lorain and the Super K-Mart shopping plaza on Leavitt Road in Lorain. Buses leave simultaneously from each location, with one operating in the clockwise and the other in the counterclockwise direction. Route 41 begins and ends at the Super K-Mart. As described in the Route 3 recommendations, Route 41 should be split into two bi-directional routes as part of the Tier II service reduction. Also, like several LCT routes, there are very few riders on the early morning trips.

Recommendations

- ◆ Eliminate the 5:00 a.m. weekday trip.
- ◆ In the Tier II service reduction, split Route 41 into two routes. The first route would run every 60 minutes between Meridian Plaza and Community Health Partners. It would be interlined with the portion of the proposed Route 3 that serves the Sheffield Lake area.
- ◆ The second route would operate between Meridian Plaza and the Super K-Mart Shopping Center on Leavitt Road. It would also operate every 60 minutes. Exhibit 14 shows the proposed changes to Route 41.

Route 51

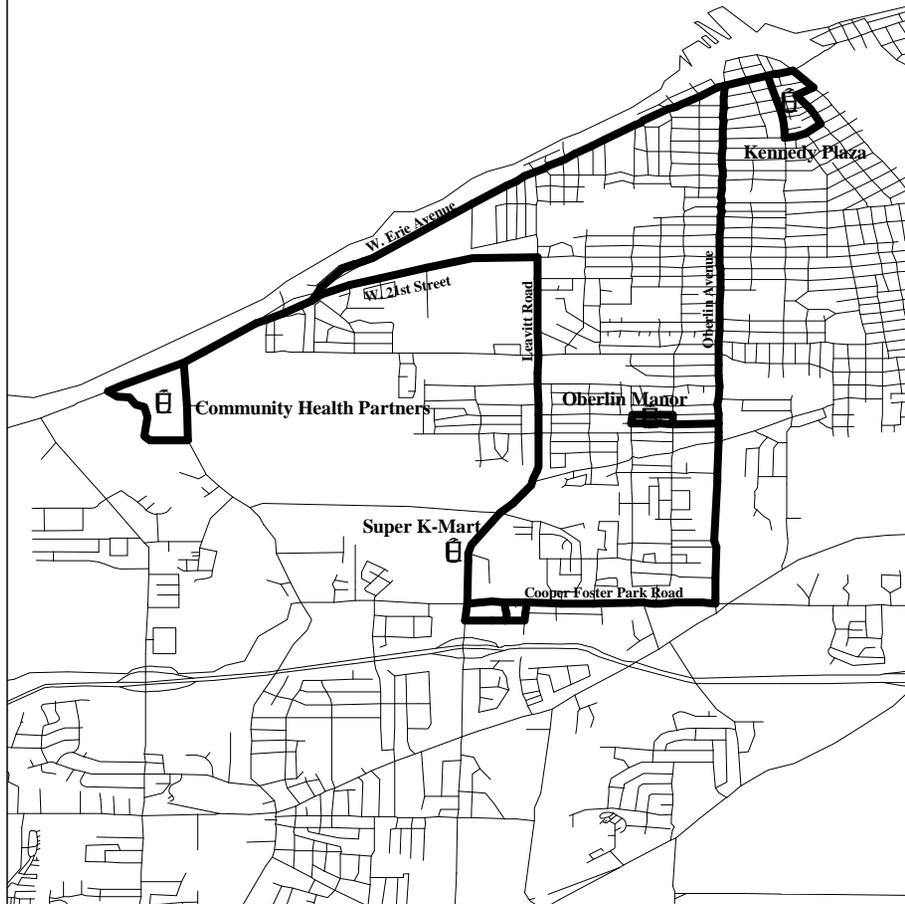
Route 51 is one of four routes that provide local circulation in Elyria. It runs in a counterclockwise direction from the transfer center on Griswold Road along West River Road to Elyria, Broad Street, Abbe Road and North Ridge Road. It serves downtown Elyria, Elyria Memorial Hospital, and Lorain County Community College.

Its ridership productivity is around the system average. But on Sundays, it falls below the system average and produces only 4.9 passengers per revenue hour. Its ridership on trips before 6:00 a.m. is also low.

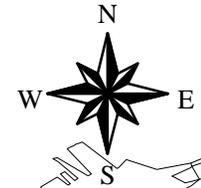
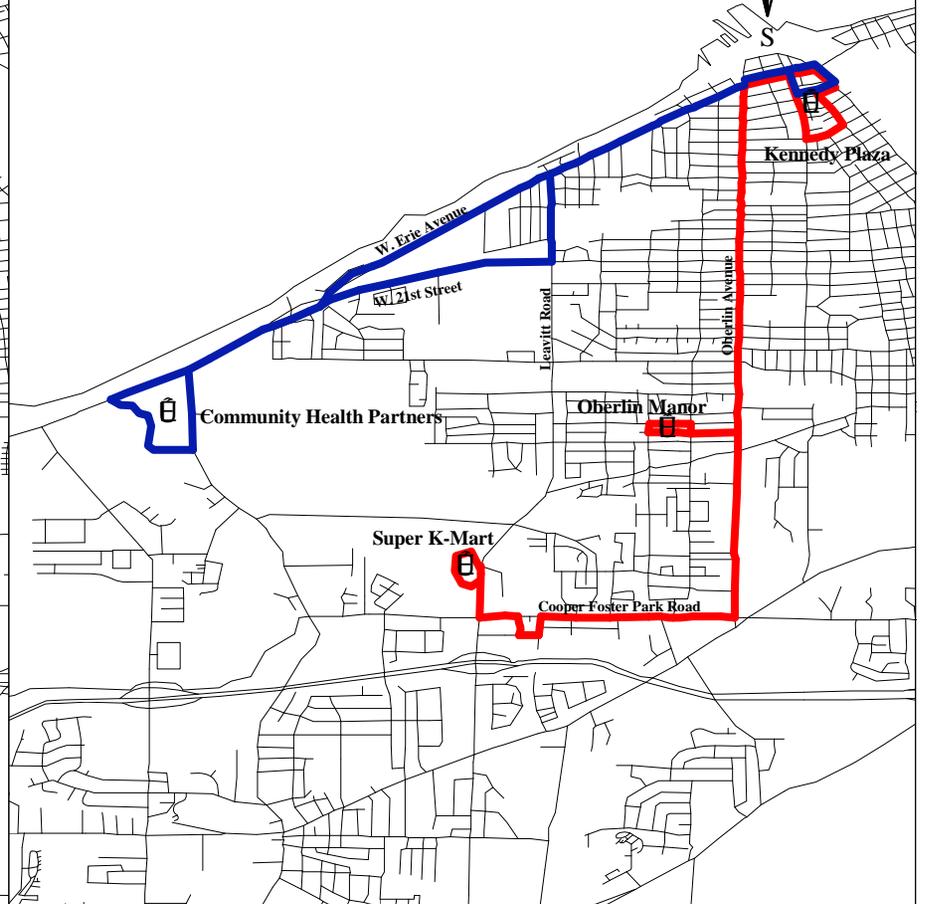
Recommendations

- ◆ Eliminate Route 51 on Sundays.

Current Route 41



Proposed Routes 41A and 41B



Legend

-  Route 41
-  Route 41A
-  Route 41B
-  Points of Interest



RLS & Associates, Inc.

**Exhibit 14:
Current and Proposed Route 41**

**Lorain County Transit
Operational Analysis**

Eliminate the 5:30 a.m. trip on Route 51.

Route 52

Route 52 is another route that provides local circulation through Elyria. It operates in a clockwise direction through the east side of Elyria using a number of streets including Gulf Road, Cleveland Street, Abbe Road, Fuller Street and West Avenue. It also is one of a few routes that operates through the Westfield Mall and Midway Market Square parking lots and has stops close to store entrances. Because of this, Route 52 receives a number of transfers to and from other routes at the Griswold Road transfer center, which tends to boost its ridership numbers. However, like most other LCT routes, ridership on the 5:30 a.m. trip is low.

Recommendations

- ◆ Eliminate the 5:30 a.m. trip on Route 52.

Route 53

Route 53 runs through the west side of Elyria. It operates past several County agency buildings on Murray Ridge and Infirmary Roads, and serves an apartment complex on Turner Boulevard and Academy Court and another along Garden and Allen Streets. Ridership from these locations result in above average ridership for Route 53. However, like most other LCT routes, ridership on the 5:30 a.m. trip is low.

Recommendations

- ◆ Eliminate the 5:30 a.m. trip on Route 53.

Route 70

Route 70 provides a peak-hour connection from the Griswold Road transfer center and a Park-and-Ride lot on Chester Road to the Westlake Park-and-Ride lot where transfer connections to RTA express buses to downtown Cleveland can be made. It carries about twelve people each day to this location.

Having people transfer once or twice on a longer distance trip to work results in a lengthy commute times. This will tend to limit the ridership potential on this route. Ideally, there should be a direct express bus from Lorain County to downtown Cleveland to serve this market, but LCT does not have the equipment nor is in a financial position to expand service.

Recommendations

- ◆ Improve marketing efforts and closely monitor the ridership on it. Unless it improves within one year, Route 70 should be eliminated. A possible substitute for Route 70 would be a vanpool.

SUMMARY OF RECOMMENDATIONS

Tier I Service Reduction

Exhibit 15 shows a profile of the routes with the changes proposed in the Tier I Service Reduction. The following are included in this group.

- ◆ The weekday starting time for LCT routes should be changed from 5:00 a.m. to 6:00 a.m. Early trips would be eliminated on Routes 1, 2, 3, 21, 31, 41, 51, 52, and 53.
- ◆ Eliminate evening trips on Route 3.
- ◆ Eliminate Saturday service on Route 11.
- ◆ Eliminate Sunday service on Routes 31 and 51.

The reduction in operating costs is assumed to be a direct reduction in the contracted level of service. Therefore, the amount of reduction in operating costs was calculated using the following formula:

$(\text{annual reduction in revenue vehicle hours}) * (\text{contractor rate of } \$37.12/\text{hour}) = \text{Operating Cost Reduction}$

Deadhead hours, which is the time spent by a bus between the garage and the location where revenue service is started, are assumed to remain essentially unchanged. It is recognized that for particular service changes deadhead hours may be reduced, but a conservative approach was employed so as not to overstate the estimated cost savings. The cost savings achieved under this option will be \$208,462.

Tier II Service Reduction

Exhibit 16 shows a profile of the routes with the changes proposed in the Tier II Service Reduction. The following are included in this group.

- ◆ All of the changes included in Tier I.
- ◆ Restructure Routes 3, 41, and 21 to eliminate unproductive portions of routes.
- ◆ Reduce service on Route 21 to every 120 minutes.
- ◆ Reduce service on Route 33 to three trips daily.

**Exhibit 15
Tier I Service Reduction**

Route	Service Span			Frequency					Revenue Hours			Revenue Miles		
	Weekday	Sat.	Sun.	PK	MD	Eve.	Sat.	Sun.	Wday	Sat.	Sun.	Wday	Sat.	Sun.
1-Lorain/Elyria via Washington	6:00a-9:58p	8:00a-4:58p	8:00a-4:58p	60	60	60	60	60	16.0	8.9	8.9	302.6	160.2	160.2
2-Lorain/Elyria via Broadway	5:00a-9:58p	8:00a-4:58p	8:00a-4:58p	30	30	60	60	60	29.5	8.9	8.9	542.9	160.2	160.2
3-Sheffield Lake/Abbe Road	6:30a-7:25p	8:30a-5:25p	--	60	60	60	60	--	25.8	17.8	--	574.2	356.4	--
11-North Ridgeville/Center Rdg.	6:30a-7:25p	8:30a-4:25p	--	60	60	--	60	--	12.9	7.9	--	312.0	192.0	--
21-Oberlin/Wellington	5:47a-9:23p	7:47a-3:23p	7:47a-3:23p	60	60	60	60	60	26.8	11.3	11.3	640.8	265.4	265.4
31-N. Ridge/Cooper Foster Park	6:00a-9:28p	9:00a-4:54p	--	60	60	60	60	--	14.8	8.9	--	257.4	124.8	--
33-Airport Express	10:00a-7:20p			70	70	--	80	80	4.1	4.1	4.1	258.3	258.3	258.3
41-W. Erie/Oberlin Avenue	6:00a-9:22p	8:00a-4:54p	8:00a-4:54p	60	60	60	60	60	30.2	17.8	17.8	480.0	270.0	270.0
51-East Elyria/Broad Street Loop	6:30a-9:25p	8:30a-4:25p	--	60	60	60	60	--	14.9	7.9	--	233.6	116.8	--
52-East Elyria/Abbe Road Loop	6:30a-10:25p	8:30a-4:25p	8:30a-4:25p	60	60	60	60	60	15.9	7.9	7.9	272.0	128.0	128.0
53-West Elyria/West Ridge Loop	6:30a-10:25p	8:30a-4:25p	--	60	60	60	60	--	15.9	7.9	--	272.0	128.0	--
70-Westlake Express	5:32a-8:00a 4:35p-7:23p	--	--	60	--	--	--	--	3.8	--	--	96.6	--	--
TOTAL									210.6	109.3	58.9	4242.4	2160.1	1242.1

Note: Revenue hours include layover time for all routes.

**Exhibit 16
Tier II Service Reduction**

Route	Service Span			Frequency					Revenue Hours			Revenue Miles		
	Weekday	Sat.	Sun.	PK	MD	Eve.	Sat.	Sun.	Wday	Sat.	Sun.	Wday	Sat.	Sun.
1-Lorain/Elyria via Washington	6:00a-9:58p	8:00a-4:58p	8:00a-4:58p	60	60	60	60	60	16.0	8.9	8.9	302.6	160.2	160.2
2-Lorain/Elyria via Broadway	5:00a-9:58p	8:00a-4:58p	8:00a-4:58p	30	30	60	60	60	29.5	8.9	8.9	542.9	160.2	160.2
3a-Sheffield Lake	6:30a-7:00p	8:30a-5:25p	--	60	60	60	60	--	6.5	4.5	--	78.0	54.0	--
3b-Lorain County CC	6:30a-7:00p	8:30a-5:25p	--	60	60	60	60	--	6.5	4.5	--	78.0	54.0	--
11-North Ridgeville/Center Rdg.	6:30a-7:25p	8:30a-4:25p	--	60	60	--	60	--	12.9	7.9	--	312.0	192.0	--
21a-Oberlin/Wellington	5:47a-9:23p	7:47a-3:23p	7:47a-3:23p	120	120	120	120	120	13.9	5.7	5.7	320.4	137.7	137.7
21b-Middle Avenue	6:00a-6:30p	8:00-4:30p	8:00-4:30p	60	60	60	60	60	6.5	4.0	4.0	78.0	48.0	48.0
31-N. Ridge/Cooper Foster Park	6:00a-9:28p	9:00a-4:54p	--	60	60	60	60	--	14.8	8.9	--	257.4	124.8	--
33-Airport Express				70	70	--	80	80	4.1	4.1	4.1	258.3	258.3	258.3
41a-W. Erie	6:00a-6:30p	8:00a-4:54p	8:00a-4:54p	60	60	60	60	60	6.5	4.5	--	78.0	54.0	--
41b-Oberlin Avenue	6:00a-9:22p	8:00a-4:54p	8:00a-4:54p	60	60	60	60	60	15.8	8.9	8.9	240.0	135.0	135.0
51-East Elyria/Broad Street Loop	6:30a-9:25p	8:30a-4:25p	--	60	60	60	60	--	14.9	7.9	--	233.6	116.8	--
52-East Elyria/Abbe Road Loop	6:30a-10:25p	8:30a-4:25p	8:30a-4:25p	60	60	60	60	60	15.9	7.9	7.9	272.0	128.0	128.0
53-West Elyria/West Ridge Loop	6:30a-10:25p	8:30a-4:25p	--	60	60	60	60	--	15.9	7.9	--	272.0	128.0	--
70-Westlake Express	5:32a-8:00a 4:35p-7:23p	--	--	60	--	--	--	--	3.8	--	--	96.6	--	--
TOTAL									183.5	94.5	48.4	3419.8	1751.0	1027.4

Note: Revenue hours include layover time for all routes.

Using the same methodology as in the Tier I estimate, the operating cost savings achieved under this option are estimated to be \$516,154.

SYSTEMWIDE RECOMMENDATIONS

Some systemwide recommendations were developed to improve overall system performance. These include the following:

- ◆ LCT should convert from its system of flag stops to a signed bus stop policy. Currently there are a few signed bus stop locations, but the great majority of the routes utilize flag stops. Signed bus stops will greatly improve system safety and will offer an opportunity to significantly increase awareness of LCT fixed route service. Because of this, care should be taken to design the bus stop signs to be as appealing as possible. The LCT logo, colors, route designation, and schedule information should all be considered as elements of the bus stop sign. The on/off passenger count should be used to determine the optimum location of the bus stops.
- ◆ There are a number of on-demand deviations on routes. Too many of these can be disruptive to operations and can worsen on-time performance. It is recommended that no additional on-demand deviations be made, and that the ridership on existing deviations be monitored closely and eliminated if they are not being used.

PROPOSED DOWNTOWN ELYRIA TRANSIT CENTER

Lorain County has plans to construct an intermodal center in downtown Elyria as part of an overall urban renewal project. This is to be developed in a centrally located parcel of land north of Broad Street. It will function as a transit center and presents an opportunity for LCT to improve its service to the public. If it is developed with passenger amenities, LCT will have an area that passengers can comfortably wait for and transfer between buses. Route and schedule information can also be put on display for easy access to riders. There is a possibility that service convenience can be improved if certain changes are made to the LCT route system.

The following changes to LCT routes illustrate this concept. While the proposed Elyria Transit Center is not as close to the Westfield Mall/Midway Market Square commercial center as the current Griswold Road Transfer Point, which collectively is the largest destination for LCT passengers, most passengers currently transfer to Route 52 in order to gain access to the Mall's entrances. If a route with direct access to these shopping centers were provided at the proposed Elyria Transit Center, then there would be little or no increase in travel time for Elyria passengers with a destination in this area.

Systemwide Recommendations

Proposed Downtown Elyria Transit Center

**Proposed
Downtown Elyria
Transit Center**

These are assumed to build upon the Tier I service changes. Exhibit 17 shows how the Elyria routes can be restructured to take full advantage of this new hub.

◆ Restructure Route 51

Restructure Routes 51 to create two new routes that are based at the new Elyria Transit Center and do not operate to the current hub on Griswold Road near the Westfield Mall. The first would operate in both directions between the proposed Elyria Transit Center and Lorain County Community College using Cleveland Street instead of Broad Street. It would also not deviate to the Tops shopping center off Center Ridge Road. The modified Route 3 would serve its northern portion, including Sheffield Crossing shopping center. The second route would operate on Broad past the Elyria Memorial Hospital and along the southern portion of Abbe Road, which is currently serviced by Route 52.

◆ Restructure Route 52

This route would be redesigned into two routes that are also based at the new Elyria Transit Center. The first would operate the part of the current Route 52 through northern Elyria including Gulf Road and Poplar Street. The second would serve the current southern portion of this route including Fuller and Chestnut Ridge as well as East Avenue that currently is not served.

◆ Restructure Route 53

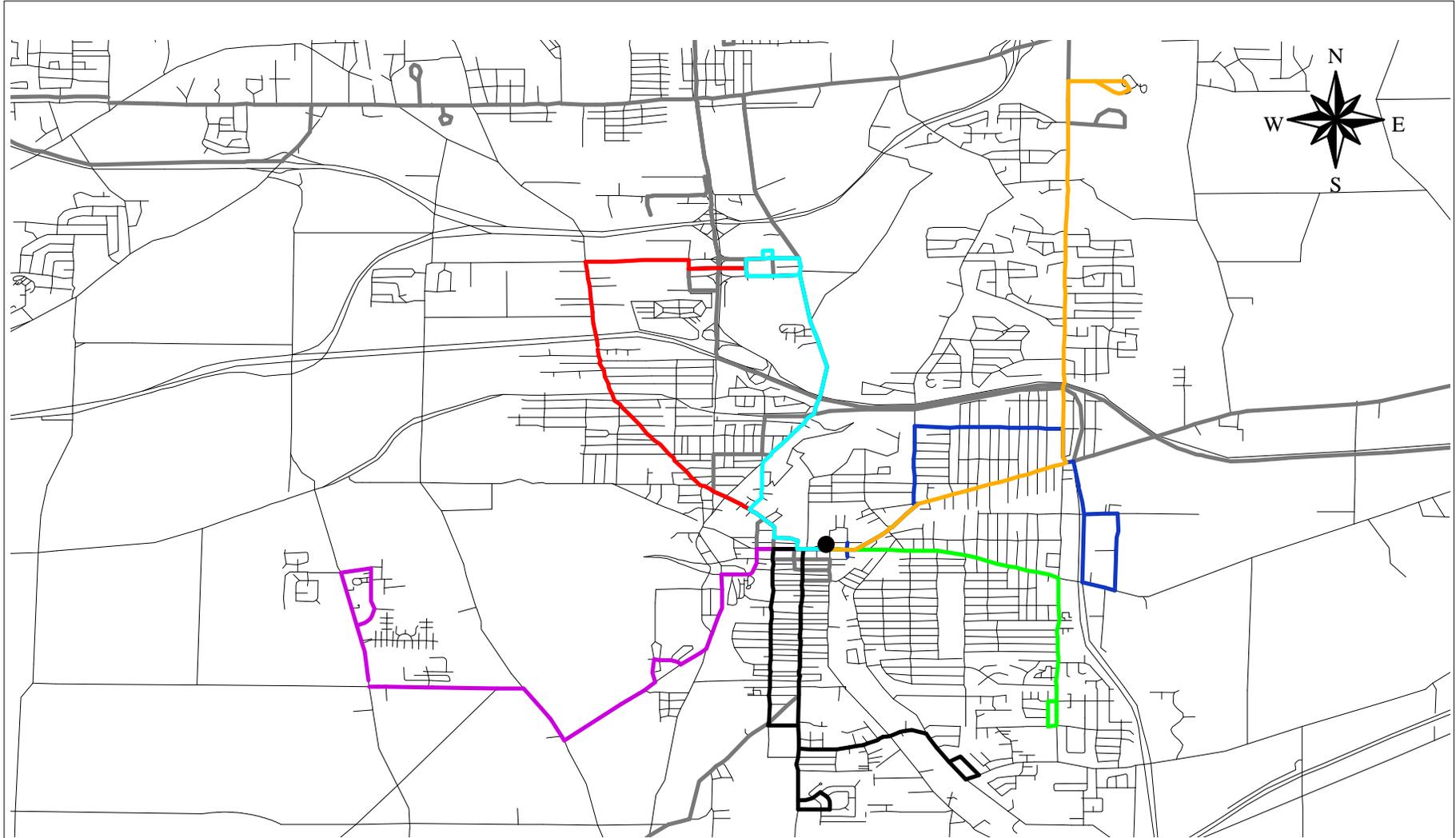
This route would be redesigned into two routes that are based at the new Elyria Transit Center. The first would run between the current Griswold Road Transfer Point and the new Elyria Transit Center using mostly Lake Avenue. The second route would operate between the Elyria Transit Center and the Academy Court apartment complex serving most of the southern part of the current Route 53.

◆ Extend Route 2

This route would be extended from the current hub to the new Elyria Transit Center. Since this route currently runs between the Lorain transfer location and the Griswold Road hub, this would be an important change as it would put all three LCT transfer centers on one route.

These concepts will need to be tested and further refined before they can be implemented. As a conceptual plan, the following assumptions have been made:

- ◆ The running times for the shorter bi-directional routes, that replace the large one-way loop routes, are 25 minutes round trip.
- ◆ Headways for each of these routes are 60 minutes, which requires that each route be interlined.



-  Route 2 Extension
-  Route 51A
-  Route 51B
-  Route 52A
-  Route 52B
-  Route 53A
-  Route 53B
-  Existing Routes



RLS & Associates, Inc.

**Exhibit 17:
LCT Routes Restructured
for Elyria Transit Center**

**Lorain County Transit
Operational Analysis**

**Proposed
Downtown Elyria
Transit Center**

- ◆ The running time for the Route 2 extension is a maximum of 15 minutes each way.
- ◆ There are two pulses each hour scheduled at the new Elyria Transit Center occurring at 15 and 45 minutes past the hour. This will allow Route 2 to meet the pulses there and at the Griswold Road Transfer Point.

Under these assumptions, a modest increase of one bus, or about 15 vehicle revenue hours daily, will be needed to implement the above changes.

ADA COMPLEMENTARY PARATRANSIT

LCT currently uses its countywide Dial-a-Ride service to fulfill its requirement to provide ADA Complementary Paratransit service within the fixed route service area. The portion of Dial-a-Ride ridership reported as ADA has increased significantly in recent years. In 2000, ridership averaged 894 trips per month. In 2003, monthly ridership averaged 1,481. Unlike fixed route service, the higher the ridership the greater costs are. Two common strategies that are used when addressing the growing demand for this type of transportation service are:

- ◆ Tighten Eligibility Standards – Restricting ADA paratransit service to only those who fall within the ADA statutory limits will normally result in a reduction of eligible passengers for systems like LCT who use a self-certification eligibility process. LCT should consider use of a third party contractor with expertise in evaluating ADA eligibility.
- ◆ Provide only in Locations Required by ADA – The ADA requires that service be provided only within $\frac{3}{4}$ mile of fixed routes. A strict adherence to this would reduce the service area of LCT's ADA paratransit and thereby reduce operating costs.

Considering that LCT's approach to providing ADA Complementary Paratransit service is unorthodox, there may be some service duplication. There is also likely to be instances where LCT goes well beyond what is required under the ADA regulations. A full review of LCT demand response services is warranted.