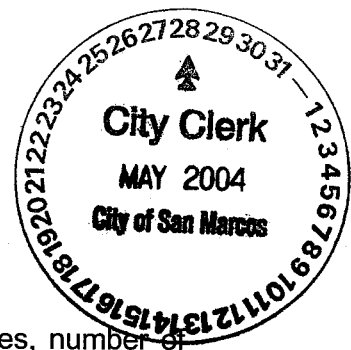


USING GIS TO MANAGE AN ELECTION

**Connie Schmidt, Election Commissioner
Johnson County, Kansas**



Every election is comprised of different components – number and type of races, number of candidates, questions, and number of eligible voters. For all election administrators, the challenge of conducting a successful election is further compounded by the ability to secure accessible voting locations, recruit and train election workers, and distribute adequate ballots and/or voting machines to serve the voters in a timely fashion.

In Johnson County, the election office addresses election management challenges by developing what we call a “voting area map”. The map is used for assignment of polling places to voting areas, stocking of supply suitcases, and election worker recruitment. A master blueprint is developed for the entire election cycle – usually one year. Individual blueprints are developed for each election and a separate blueprint is developed for each presidential election.

While the blueprint itself provides a tabular view of a given election, a Geographical Information System (GIS) tool utilizes the blueprint to produce a visual representation used to enhance planning, assessment and resource designation processes. Modern GIS tools typically operate using a personal computer and replace hand drawn maps and manual calculation. Consequently, many of the planning steps involved in election management may be automated using GIS.

VOTING AREA MAP

The voting area map represents an overall look at all precincts with polling place locations and assignments scheduled for a given election. The map is developed very early in the election cycle by gathering voter registration data by precinct to formulate and project expected voter turnout as well as election resources. This information becomes integrated into GIS by joining the numerical data with a spatial representation of voting precincts, Figure 1.

The GIS tool allows voting precincts to be consolidated into voting areas through analysis of available polling place locations and expected voter turnout. Polling places are selected from a variety of facility types. Johnson County makes use of the following types

- Churches
- Schools
- County Buildings and Libraries
- Government buildings such as city hall
- Residential facilities such as assisted living and nursing homes
- Private corporations such as restaurants, offices, country clubs, sport facilities

Each polling place location undergoes evaluation, rating and coding for suitability. Compliance with American’s with Disabilities Act and general voter convenience with respect to location and previous assignment are given strong consideration. The evaluation process encompasses the following additional criteria

- Physically visiting and inspecting each location
- Gathering photographs of parking, entryways and interior facilities
- Determining machine, parking and ultimately voter capacity
- Requirements for accessibility to people with disabilities
- Availability of a location

Polling places are spatially located within GIS by two dimensional coordinate points overlaying precincts. Coordinate points typically are latitude/longitude values representing the position of a street address for a polling place in space. After rating locations based on evaluation, coding of polling places assists in the assignment of locations to voting areas. With this information available in GIS, precincts can be grouped together forming consolidated voting areas displayed on the map where polling place locations and other resources are assigned, Figure 2.

The voting area map, Figure 3 is developed several months prior to each election. Each voting area is color coded to scale the projected number expected to vote. The map is monitored on a daily basis during advance/early voting to track the expected to vote number prior to Election Day. In this fashion, areas with high projected turnout are colored to be highly visible and may be targeted for adjustment in resources as necessary. The map provides an opportunity to assign experienced election workers to polling places with large numbers of expected to vote at the polls.

The map is also important as it relates to the number of voting machines assigned to each location...not only how many to assign, but whether the room is large enough to hold the machines and if there are adequate electrical outlets for all of the machines. By monitoring the advance voters by precinct and the expected to vote numbers by polling place, and by assigning portable voting booths and supplemental paper ballots, long lines on Election Day may be avoided.

The map also provides useful information to the moving company that distributes voting machines to polling places. Table 1 provides additional information such as polling place name and address for reference. GIS may assist in automatically creating routes for delivery of machines to voting locations. Other data used to identify areas of interest or potential concern may also be analyzed using GIS.

It is true – it takes a community to conduct a successful election. Using GIS to manage an election has provided the Johnson County Election Office necessary internal control over what can best be described as a “moving target” – conducting an election. The power of visualization extends the efficiency of the process while helping maximize convenience to the voter.

2004 PRESIDENTIAL VOTING PRECINCTS

JOHNSON COUNTY, KANSAS

January 5, 2004

246513 Total Expected Voter Turnout (75%)
 - 73954 Estimated Advance Voters (30%)
 172559 Expected Election Day Voter Turnout

413 Voting Precincts

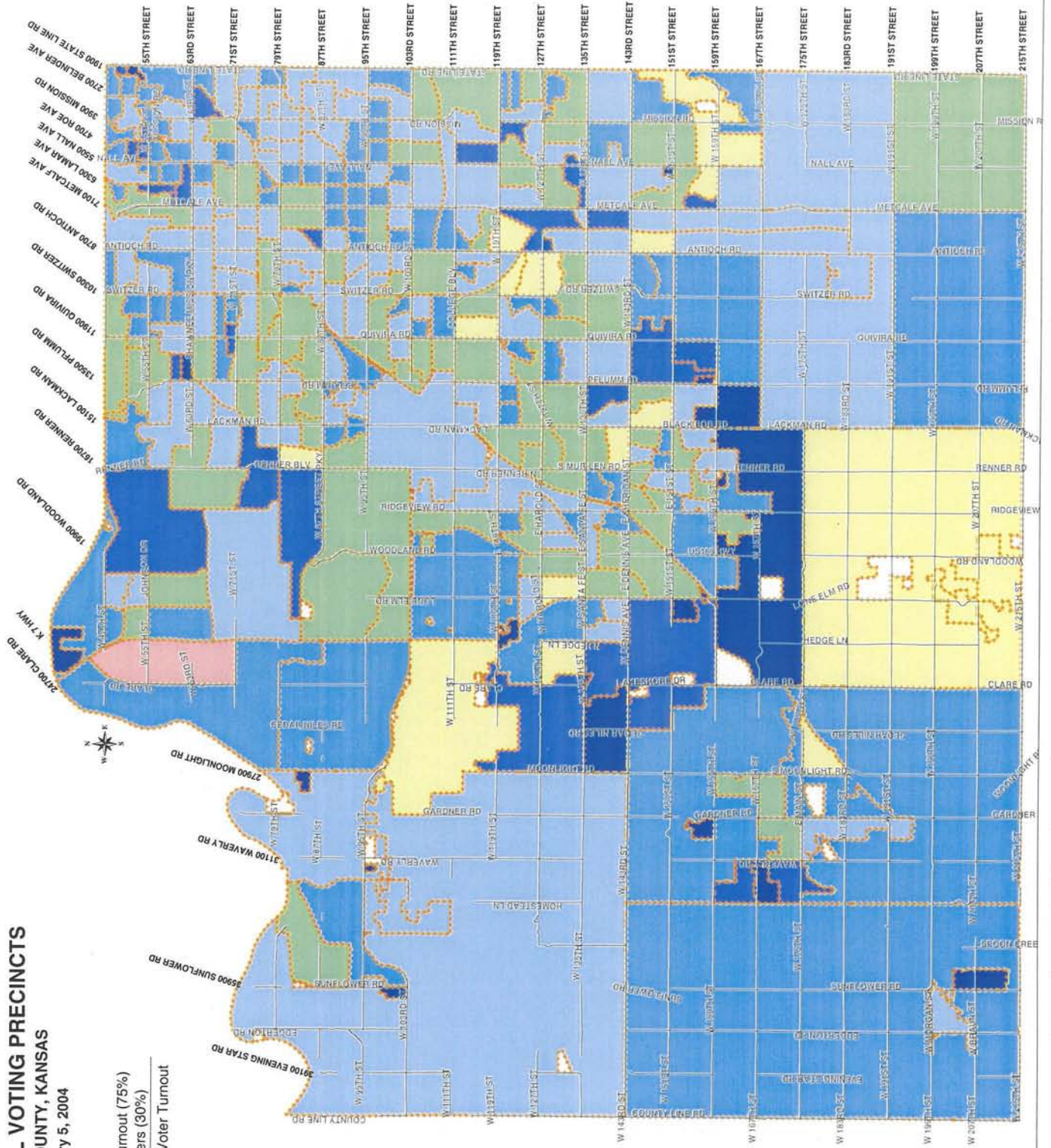
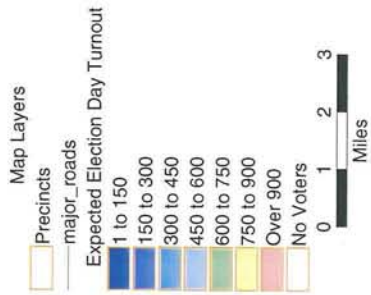


Figure 1. Countywide voting precincts displaying expected election day voter turnout.

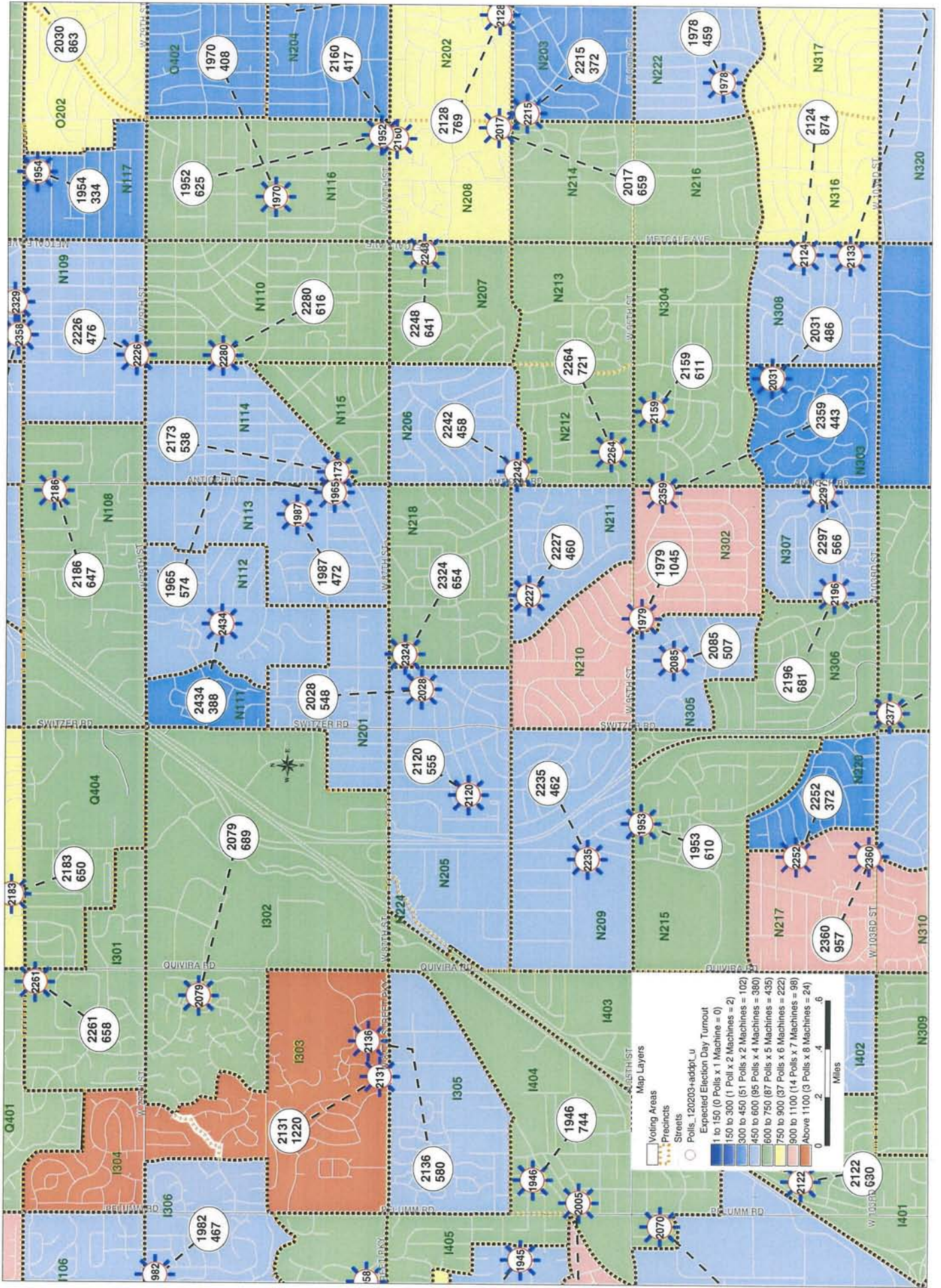


Figure 2. Voting areas with election day voter projections linked to assigned polling place locations. Individual precincts are labeled for reference.

2004 PRESIDENTIAL VOTING AREAS

JOHNSON COUNTY, KANSAS

January 5, 2004









246513 Total Expected Voter Turnout (75%)
 - 73954 Estimated Advance Voters (30%)
 172559 Expected Election Day Voter Turnout

288 Voting Areas
 1263 Voting Machines Required

Map Layers

-  Voting Areas
-  Precincts
-  major roads

Expected Election Day Turnout

-  1 to 150 (0 Polls x 1 Machine = 0)
-  150 to 300 (1 Poll x 2 Machines = 2)
-  300 to 450 (51 Polls x 2 Machines = 102)
-  450 to 600 (95 Polls x 4 Machines = 380)
-  600 to 750 (87 Polls x 5 Machines = 435)
-  750 to 900 (37 Polls x 6 Machines = 222)
-  900 to 1100 (14 Polls x 7 Machines = 98)
-  Over 1100 (3 Polls x 8 Machines = 24)

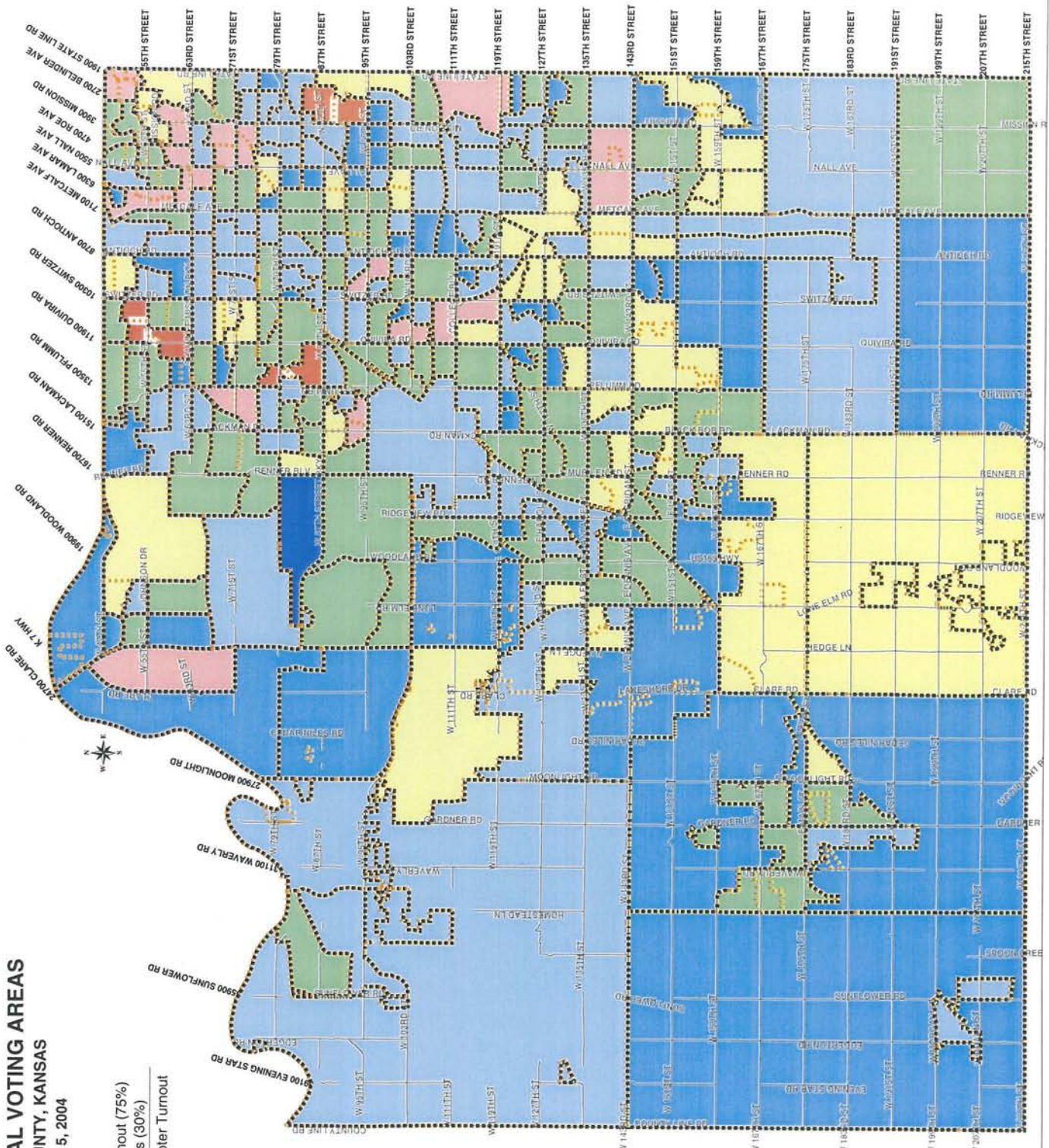


Figure 3. Voting precincts consolidated into designated voting areas.

POLLING PLACES BY ID NUMBER

PPID DESCRIPTION	CWP	ADDRESS	ETV %	CAP
1942 CRESTVIEW SCHOOL	J402	6101 CRAIG RD	560	124
1945 LAKEVIEW VILLAGE RETIREMENT COMMUNITY	I201	9100 PARK ST	462	77
1946 LENEXA UNITED METHODIST CHURCH	I404	9138 CAENEN LAKE RD	744	99
1949 MONTICELLO TRAILS MIDDLE SCHOOL	Q302	6100 MONTICELLO RD	325	54
1950 OLD MISSION UNITED METHODIST CHURCH	G200	5519 STATE PARK RD	782	104
1952 OVERLAND PARK COMMUNITY CENTER	N116	6300 W 87TH ST	625	104
1953 OAK PARK LIBRARY	N215	9500 BLUEJACKET ST	610	102
1954 OVERLAND PARK RETIREMENT PLACE	N117	6555 W 75TH ST	334	74
1956 OLATHE BIBLE CHURCH	D316	13700 W 151ST ST	647	43
1958 RISING STAR SCHOOL	I103	8600 CANDLELIGHT LN	739	82
1959 SECOND BAPTIST CHURCH	D204	331 N KANSAS AVE	651	145
1960 SHARON BAPTIST CHURCH	D406	13020 S BLACK BOB RD	702	78
1962 MISSION ROAD BIBLE CHURCH	O401	7820 MISSION RD	510	68
1965 ANTIOCH JUSTICE CENTER	N113	8500 ANTIOCH RD	574	128
1966 BROKEN ARROW SCHOOL	Q107	5901 ALDEN ST	492	109
1967 BENTWOOD SCHOOL	N415	13000 BOND ST	528	117
1968 BLUE VALLEY MIDDLE SCHOOL	N613	5001 W 163RD TER	828	138
1970 BROADMOOR CENTER	N116	6701 W 83RD ST	408	91
1971 COUNTRYSIDE SCHOOL	D404	15800 W 124TH TER	653	145
1972 DE SOTO UNITED METHODIST CHURCH	A002	8760 KILL CREEK RD	543	60
1973 FAITH LUTHERAN CHURCH	O102	4805 W 67TH ST	1073	119
1975 HERITAGE UNITED METHODIST CHURCH	N413	12850 QUIVIRA RD	695	77
1978 INDIAN WOODS MIDDLE SCHOOL	N222	9700 WOODSON ST	459	102
1979 KNOX UNITED PRESBYTERIAN CHURCH	N302	9595 W 95TH ST	1045	70
1982 MILL CREEK SCHOOL	I306	13951 W 79TH ST	467	104
1983 OVERLAND PARK FIRE DEPT TRAINING CENTER	N512	12401 HEMLOCK ST	770	128

POLLING PLACES ALPHABETICAL

PPID DESCRIPTION	CWP	ADDRESS	ETV %	CAP
1999 ADVENT LUTHERAN CHURCH	D305	11800 W 151ST ST	839	93
2354 AMERICAN LEGION POST 153 OF OLATHE	D101	410 E DENNIS AVE	664	44
2329 AMERICAN LEGION POST 370 OF OVERLAND PARK	N105	7500 W 75TH ST	533	71
2248 AMF KING LOUIE WEST	N207	8788 METCALF AVE	641	142
2336 AMLI AT LEXINGTON FARMS	N515	8500 W 131ST PL	500	167
2122 AMOS ACTIVITY CENTER	I401	10111 LENEXA DR	630	42
2374 ANTIOCH CHURCH	N101	5201 ANTIOCH	552	31
2186 ANTIOCH CHURCH OF THE NAZARENE	N108	7600 ANTIOCH RD	647	43
1965 ANTIOCH JUSTICE CENTER	N113	8500 ANTIOCH RD	574	128
1998 ANTIOCH MIDDLE SCHOOL	N104	8200 W 71ST ST	494	110
2120 APACHE SCHOOL	N205	8910 GODDARD ST	555	185
2030 ASBURY METHODIST CHURCH	O203	5400 W 75TH ST	863	58
2124 ATONEMENT LUTHERAN CHURCH	N308	9948 METCALF AVE	874	117
2271 ATRIUMS RETIREMENT APARTMENTS	N312	7300 W 107TH ST	421	94
2363 BAILEY ANN OKUN ACTIVITY CENTER	Q309	20200 JOHNSON DR	818	55
2279 BELINDER ELEMENTARY SCHOOL	O302	7230 BELINDER RD	496	83
2431 BENNINGHOVEN ELEMENTARY SCHOOL	Q206	6720 CAENEN	432	72
1967 BENTWOOD SCHOOL	N415	13000 BOND ST	528	117
2215 BETHANY LUTHERAN CHURCH	N203	9101 LAMAR AVE	372	62
2282 BISHOP MIEGE NORTH CAMPUS	P202	4901 REINHARDT ST	681	57
2073 BLACK BOB SCHOOL	D310	14701 S BROUGHAM DR	685	152
2415 BLUE RIVER ELEMENTARY SCHOOL	N613	5101 W 163RD TER	360	60
2191 BLUE VALLEY CHRISTIAN CHURCH	N513	12251 LAMAR AVE	617	103
2153 BLUE VALLEY HIGH SCHOOL	7002	6001 W 159TH ST	760	127
1968 BLUE VALLEY MIDDLE SCHOOL	N613	5001 W 163RD TER	828	138
2190 BLUE VALLEY NORTH HIGH SCHOOL	N510	12200 LAMAR AVE	599	100

Table1. Polling place identification with projected election day voters and percent of rated building capacity.