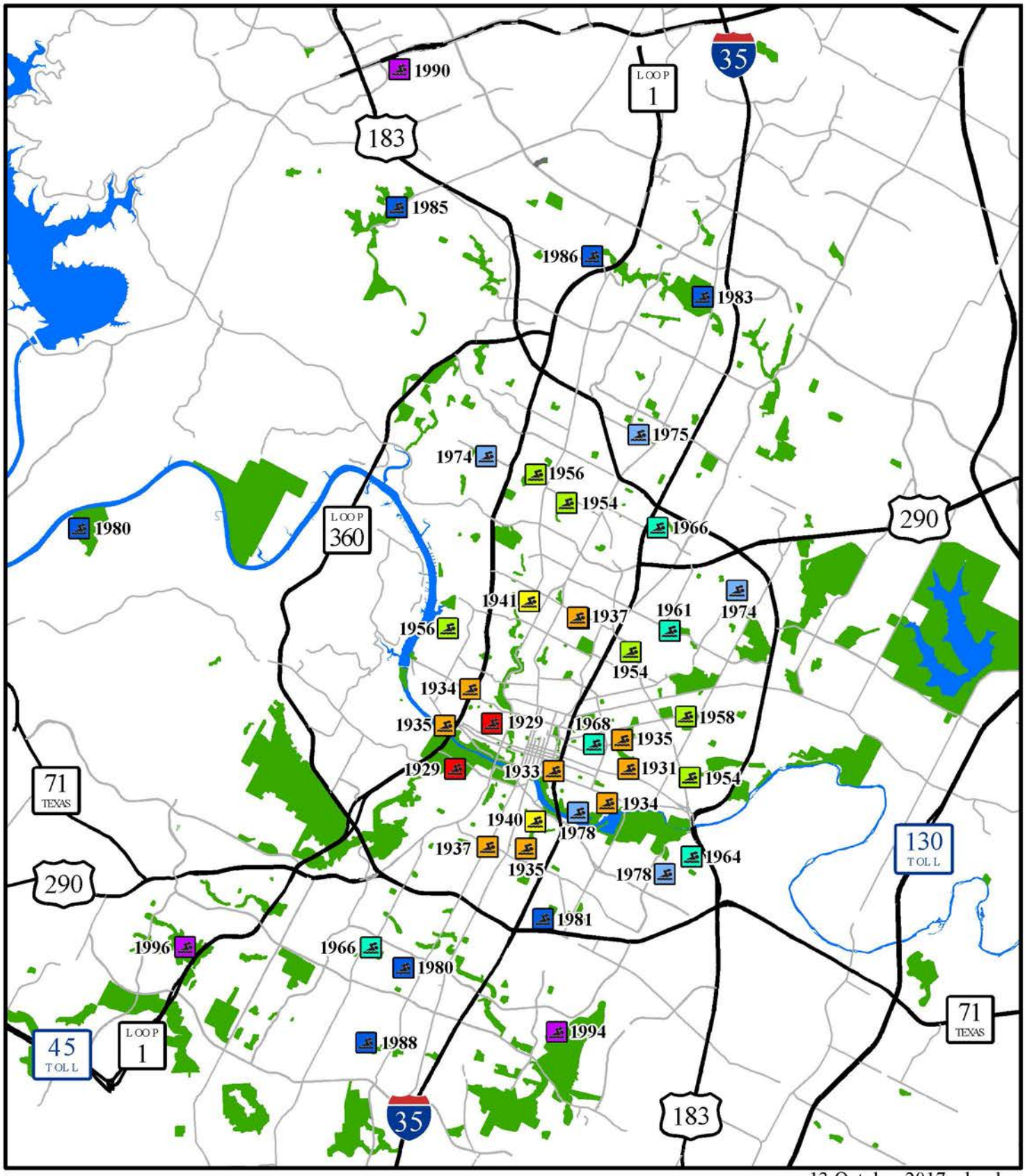
Appendix B2

Geography and Population



PARD Pools:

Locations and Dates

Legend

- 1920'S
- 1930'S
- 1940'S
- 1950'S
- 1960'S
- 1970'S
- 1980's
- 1990's
- City of Austin Parks
- Lakes

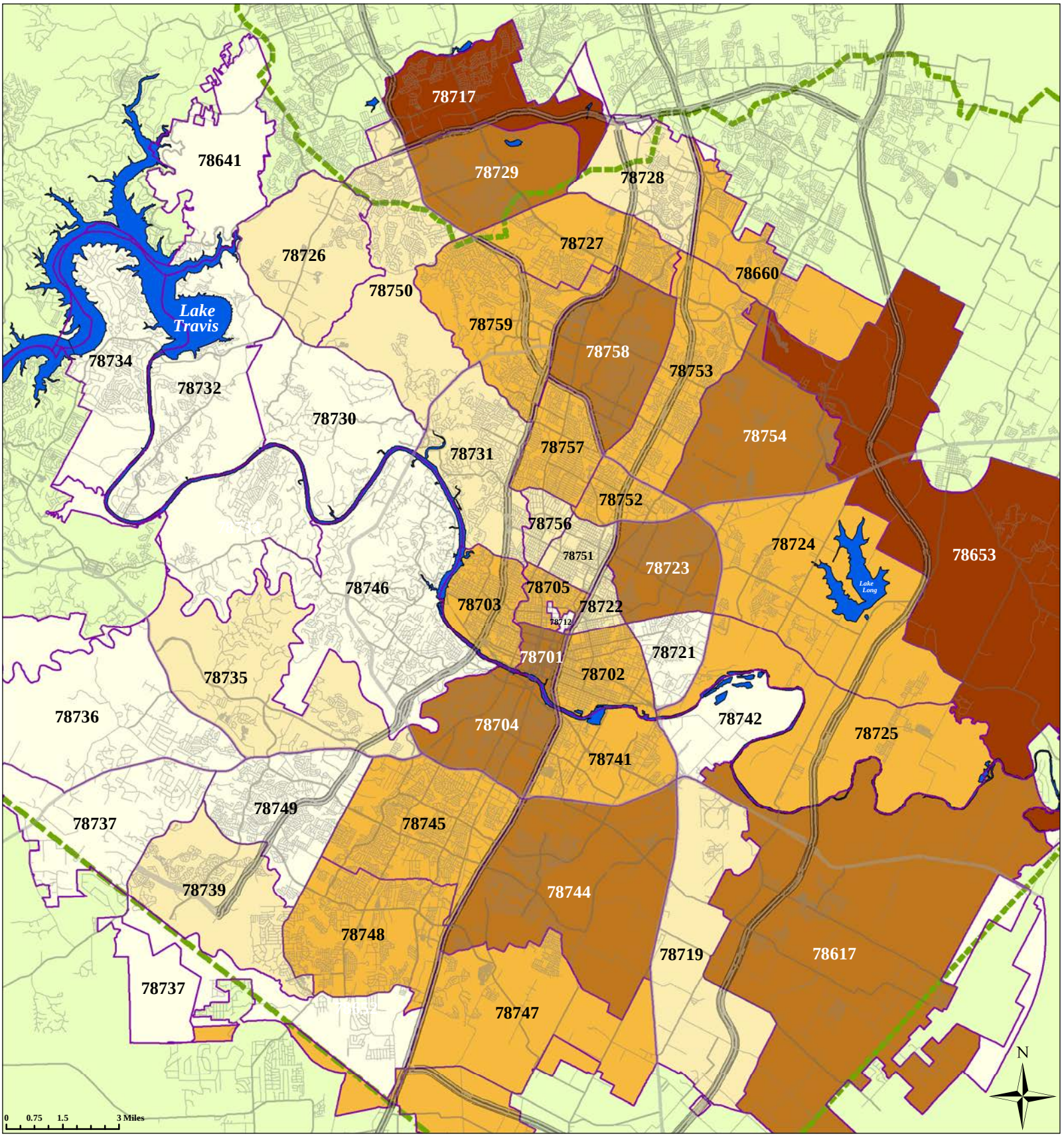
13 October 2017 hardya

This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. This product has been produced by the Parks and Recreation Department for the sole purpose of geographic reference. No warranty is made by the City of Austin regarding specific accuracy or completeness.

0 0.5 1
Miles

N

AUSTIN PARKS & RECREATION
Cultural Places, Natural Spaces



Total Population Change: 2010 to 2040 Forecast

ZIP Codes, Austin, Texas

counties

ZIP Codes

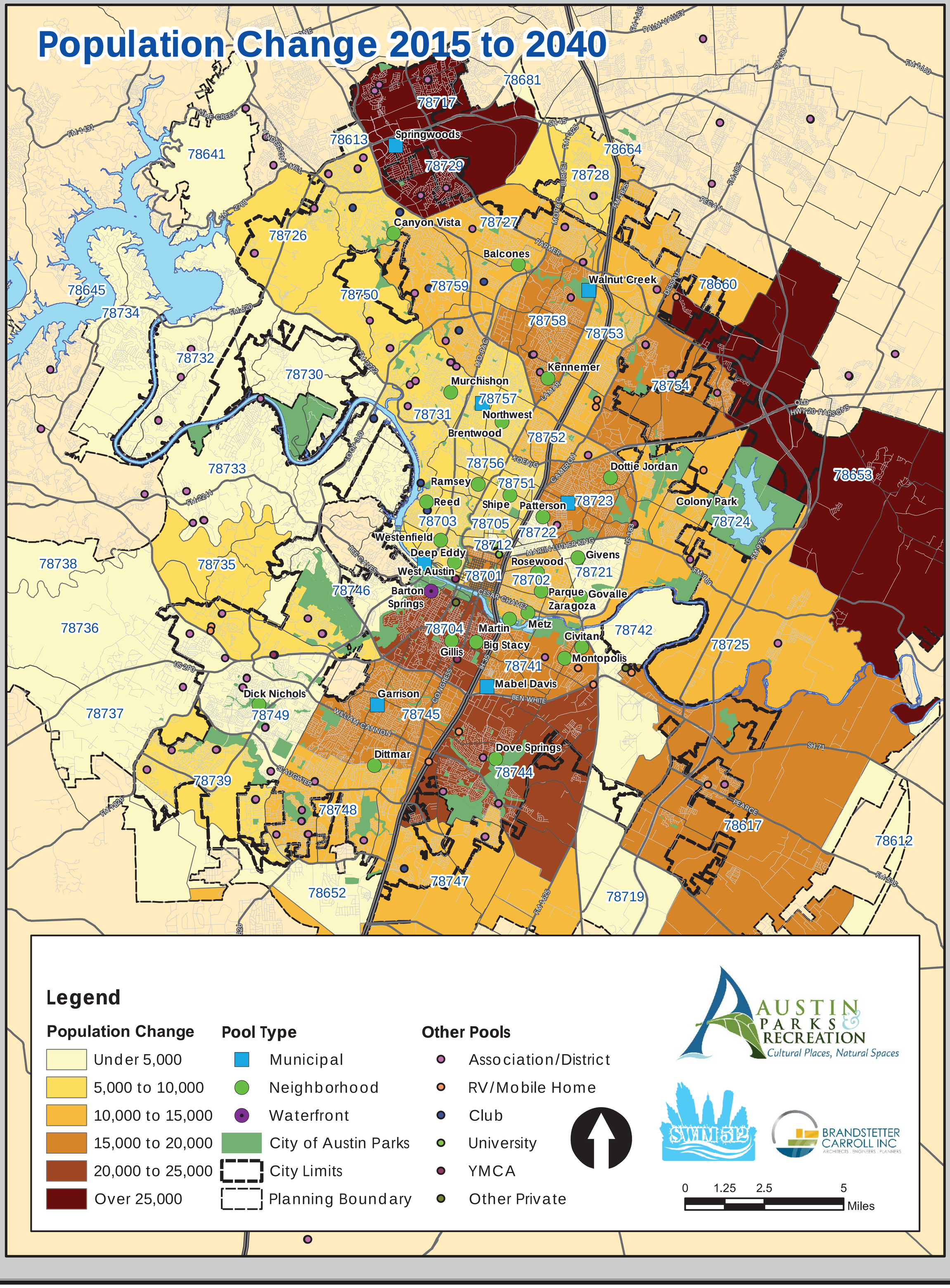
Population Change: 2010 to 2040

- Fewer than 5,000
- 5,000 to 10,000
- 10,000 to 20,000
- 20,000 to 30,000
- 30,000 to 40,000
- 40,000 Plus

a DTI2040 FORECAST==> Product

Map produced by: Ryan Robinson, City Demographer, Department of Planning, City of Austin. September 2014

Population Change 2015 to 2040



DTI 2040 Population and Employment Forecast
Introduction, Methodology, and Discussion

Introduction

The City of Austin's "**DTI 2040 Population and Employment Forecast**" is a long-range, small-polygon-based population and employment forecast produced by the City Demographer in conjunction with other City departments, most notably Austin Water. The close collaboration between the City's Planning Department and the City's Water Utility spans many decades and is responsible for the production of several accurate population and employment forecasts over the years.

DTI is an acronym, standing for **D**elphi, **T**rends and **I**magine Austin, and 2040 refers to the final year of the forecast, also known as the forecast horizon. The specific influences exerted on the overall forecast by the components of Delphi, Trends, and Imagine Austin are discussed in detail in the methodology sections of this document. DTI 2040 is the first long-range, small-polygon-based forecast to be collectively and collaboratively created by City departments for Austin following the release of Census 2010 data. The fundamental purpose of the forecast is to predict the future total population and employment within each polygon in the study area, for the year 2020 and the horizon year 2040.

Population Forecast Methodology

STEP ONE: Establish the Baseline
To establish a 2010 population baseline, Census 2010 block-level population data were aggregated into 227 proprietary polygons within the DTI 2040 study area (please see map) which is basically the City of Austin's Full and Limited Purpose jurisdictions plus the City's Extra-Territorial jurisdiction. In most cases, census blocks fit neatly within the study area's polygons, thereby creating a solid baseline.

STEP TWO: Determine future population totals for the study area as a whole
A population control total for the DTI 2040 study area for 2020 and 2040 was generated from the long-range population projection for the City of Austin, using an assumed ratio relationship between the study area and the City as a whole. The ratio relationship between the study area and the City has proven to be extremely stable over time. It is considered a viable method of determining what the total population within the study area will be in the future, assuming that the City's forecasted future total populations are closely aligned to the actual trajectory of growth that is realized over the forecast period.

STEP THREE: Disaggregating the 2040 population control total into polygons
Each polygon within the study area was assigned a portion of the projected increment of overall population growth for the entire study area. Estimating each polygon's portion of overall population growth was accomplished by initially assigning a "growth factor" to each polygon. Growth factors determine each polygon's potential population growth from 2010 to 2040. Essentially, the growth factor for each polygon is the result of accuracy calibrations originating from the City's Smart Growth forecast, a previously produced regional forecast. The calibrated growth factors were used only as initial starting points from which corrections and modifications were made.

STEP FOUR: Adjustments from the "Delphi Team"
The preliminary future populations for 2040 for each polygon—determined by applying the growth factor for each polygon—within the study area were reviewed by the "Delphi Team." This refers to the "Delphi Method," which is an interactive forecasting method that relies on a panel of experts. [1],[2] Each person on the Delphi Team requires a deep knowledge of the study area, knowledge of emerging developments, and the potential for future development within the study area.
The Delphi Team included demographers, engineers, geographers, and planners and represented decades of experience within the greater Austin area.

STEP FIVE: Input data influencing Delphi Team decisions

- Emerging residential and mixed-use developments;
- Position of the polygon within the overall study area, a factor which takes into account roadway accessibility and proximity to other developments;
- Momentum of population growth within the polygon from 2000 to 2010;
- Approved and applied for Water Utility Service Extension Agreements;
- Adjacency to Imagine Austin Activity Centers and Corridors, assessing the viability of growth ranges assigned to these centers and corridors;
- Construction activity and delivered product from 2010 to 2013; and
- Aerial photography and numerous Geographic Information Systems (GIS) land use and environmental constraint layers to determine future potential for development and redevelopment.

It is important not to underestimate the level of analysis and methodological rigor applied to each individual DTI 2040 polygon in terms of the intensity of examination delivered from the Delphi Team. This collaborative, comprehensive and in-depth analysis of each individual polygon on the part of the Delphi Team is what makes the Delphi Method so valuable, basically bringing the complexities and nuances of population and employment forecasting out from within an opaque black box and into the transparent open. Experts debating, persuading and compromising with an end result being superior to a result generated by the blind heavy-hand of an algorithm.

STEP SIX: Create "market timers" for each polygon to determine year 2020 population totals
A default value of 33% was set as a market timer for each polygon, meaning that each polygon will gain roughly 1/3 of the total population increment expected between 2010 and 2040 by 2020. The Delphi Team then reviewed each individual polygon's 2020 predicted total population and made adjustments based on the overall consensus of the team.

Employment Forecast Methodology

STEP ONE: Establish the Baseline
To establish a 2010 employment baseline, address-specific total employment data were aggregated into the DTI 2040 study area's 227 polygons. The 2010 base employment data were provided by CAMPO (metropolitan Austin's Municipal Planning Organization). Analysts at CAMPO spent an enormous amount of time and energy scrubbing and perfecting the employment data, working through issues such as all school district employees being assigned to the district central office rather being correctly assigned and distributed to the hundreds of various work sites and schools across the district. Without the valuable efforts from CAMPO staff, the City's DTI 2040 could not have been produced.

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[1] Woudenberg, Fred, "An Evaluation of Delphi," *Technological Forecasting and Social Change*, Sept. 1991.
[2] Gordon, Theodore J., "The Delphi Method," *The Millennium Project, Future Research Methodology—V3.0*, 1999.

STEP TWO: Generate an employment control total for the study area
A control total for the number of future jobs expected within the study area was generated by projecting into the future the current ratio between total population and the total number of jobs. This type of projection is standard and in this case assumes an increasing jobs-to-population ratio as the overall commuting shed of metropolitan Austin is assumed to continue to spatially expand. Put another way, in relative terms, the total number of jobs within the study area will begin to slowly approach the total population residing within the study area. In one extreme but illustrative example, the number of jobs within Manhattan greatly outnumbers the number of people living on the island.

STEP THREE: Create study area districts
To facilitate the disaggregation of the employment control total, polygon districts were created by grouping collections of contiguous study area polygons together yielding 20 larger districts, each containing 9 to 13 individual study area polygons.

STEP FOUR: Generate an initial employment growth increment for each district
Each district's share of the total number of study area jobs from the 2010 baseline was used to assume a future potential portion of total study area jobs for each district. For example, using the 2010 data, the study area district covering most of greater downtown Austin has the largest share of total jobs and was assumed to also have the largest share of total study area jobs in 2040. Some districts will experience large gains in overall share (districts in places like North Burnet-Gateway), and some districts will lose overall share (districts that currently include employment centers such as the IRS facility in southeast Austin). The resultant total number of jobs predicted by 2040 for each district was reviewed and adjusted by the Delphi Team.

STEP FIVE: Disaggregate district totals into individual polygons
The Delphi Team examined each district and disaggregated district employment totals into each individual polygon within that district using the current share and future share (relative to the district total) technique for each individual DTI 2040 polygon.

The Delphi Team used the same set of input data employed during the allocation process of population.

- Emerging commercial and mixed-use developments;
- Position of the polygon within the overall study area, a factor which takes into account roadway accessibility and proximity to other developments;
- Momentum of employment growth within the polygon from 2000 to 2010;
- Approved and applied for Water Utility Service Extension Agreements;
- Adjacency to Imagine Austin Activity Centers and Corridors, assessing the viability of growth ranges assigned to these centers and corridors;
- Construction activity and delivered product from 2010 to 2013; and
- Aerial photography and numerous Geographic Information Systems (GIS) land use and environmental constraint layers to determine future potential for development and redevelopment.

STEP SIX: Create "market timers" for each polygon to determine year 2020 population totals
A default value of 33% was set as a market timer for each polygon, meaning that each polygon will gain roughly 1/3 of the total employment increment expected between 2010 and 2040 by 2020. The Delphi Team then reviewed each individual polygon's 2020 predicted total employment and made adjustments based on the overall consensus of the team.

Discussion

All population and employment forecasts occupy a position along a continuum of modeling philosophy, with one end of the continuum representing purely policy-driven forecasts and the other end of the continuum representing purely market trends-driven forecasts. Austin's DTI 2040 forecast is positioned towards the end where purely market trends-driven forecasts reside. The DTI 2040 forecast is therefore more of a market trends forecast than a policy forecast. Elements of a policy forecast include potential population and employment growth expected to occur within Imagine Austin activity centers and along mixed-use corridors. These growth expectations were adjusted using knowledge of the trends within current development patterns and practices.

The DTI 2040 forecast incorporates an envisioned urban-centric future of growth and development for Austin and yet also accounts for widely distributed, low-density suburban development that will surely continue to occur. The DTI 2040 forecast explicitly assumes a significant amount of redevelopment within the central urban area along with continued greenfield development where possible across the study area. The DTI 2040 forecast also takes into account that Austin's future employment pattern will be one of increased "multi-nucleation," meaning that while downtown will continue to be the region's largest employment center, other significant clusters of employment will emerge regionally.

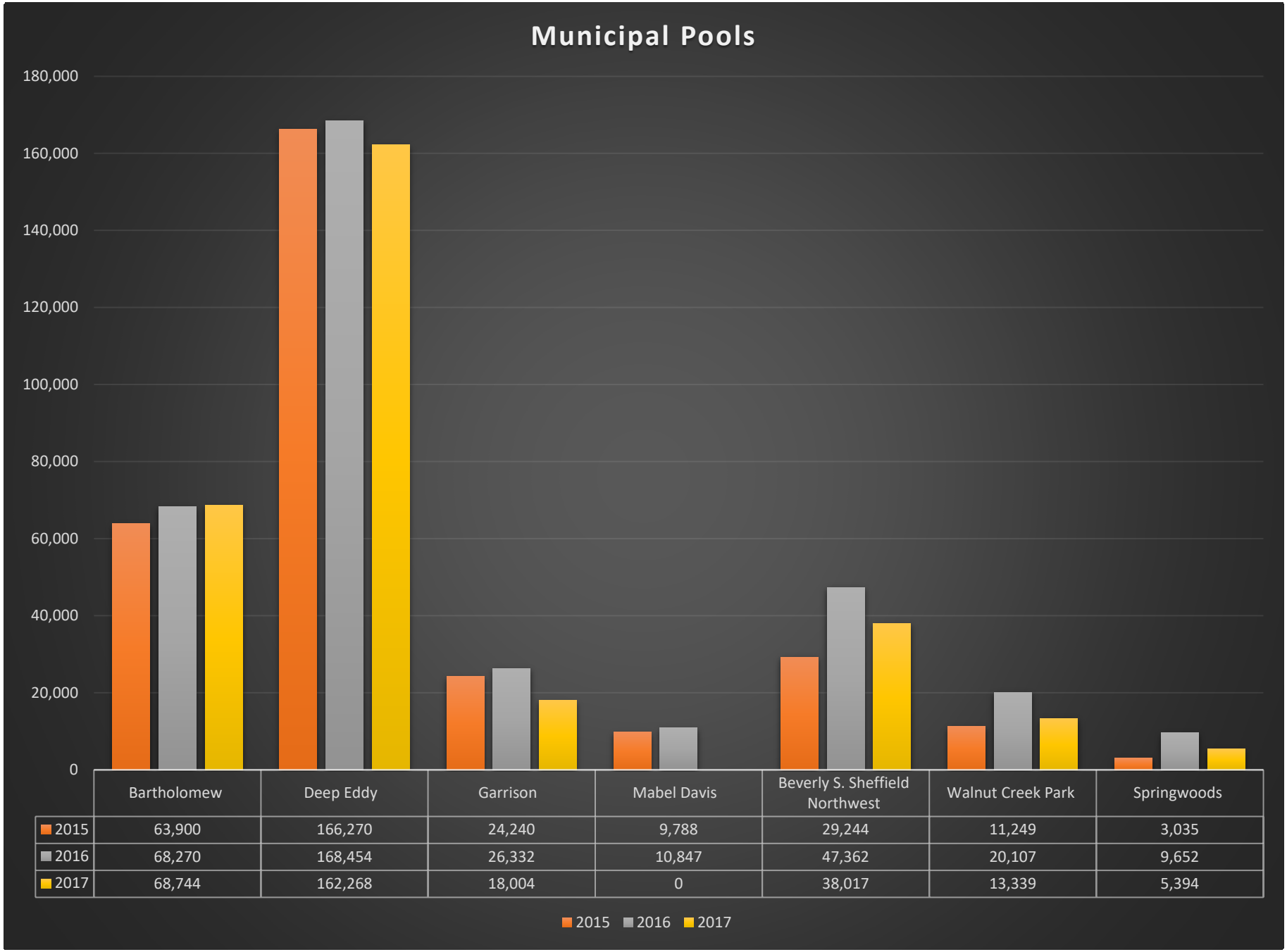
Worthy of mention is the fact that there are parallel yet inferior parcel-level forecast products currently available for the Austin area. Long-range forecasts based on parcel-level modelling notoriously suffer from what is known as aggregation bias.[3] Aggregation bias can create a forecasting situation in which the predicted land uses of individual parcels cumulatively result in a grossly over-estimated study area total. Whereas the DTI 2040 forecast utilizes a far more reliable technique of beginning with a total increment of growth for the study area, both population and employment, and then distributing these increments into all constituent study area polygons based on attributes that estimate an individual polygon's attractiveness to future growth.

And finally, the Delphi Team studied a wide variety of thematic, analytic maps generated using the newly created forecast data to show overall trends and the relationships between population growth and employment growth across the study area. Qualitative, visual assessments of mapped forecast results were a critical tool in determining the overall viability of the forecast.

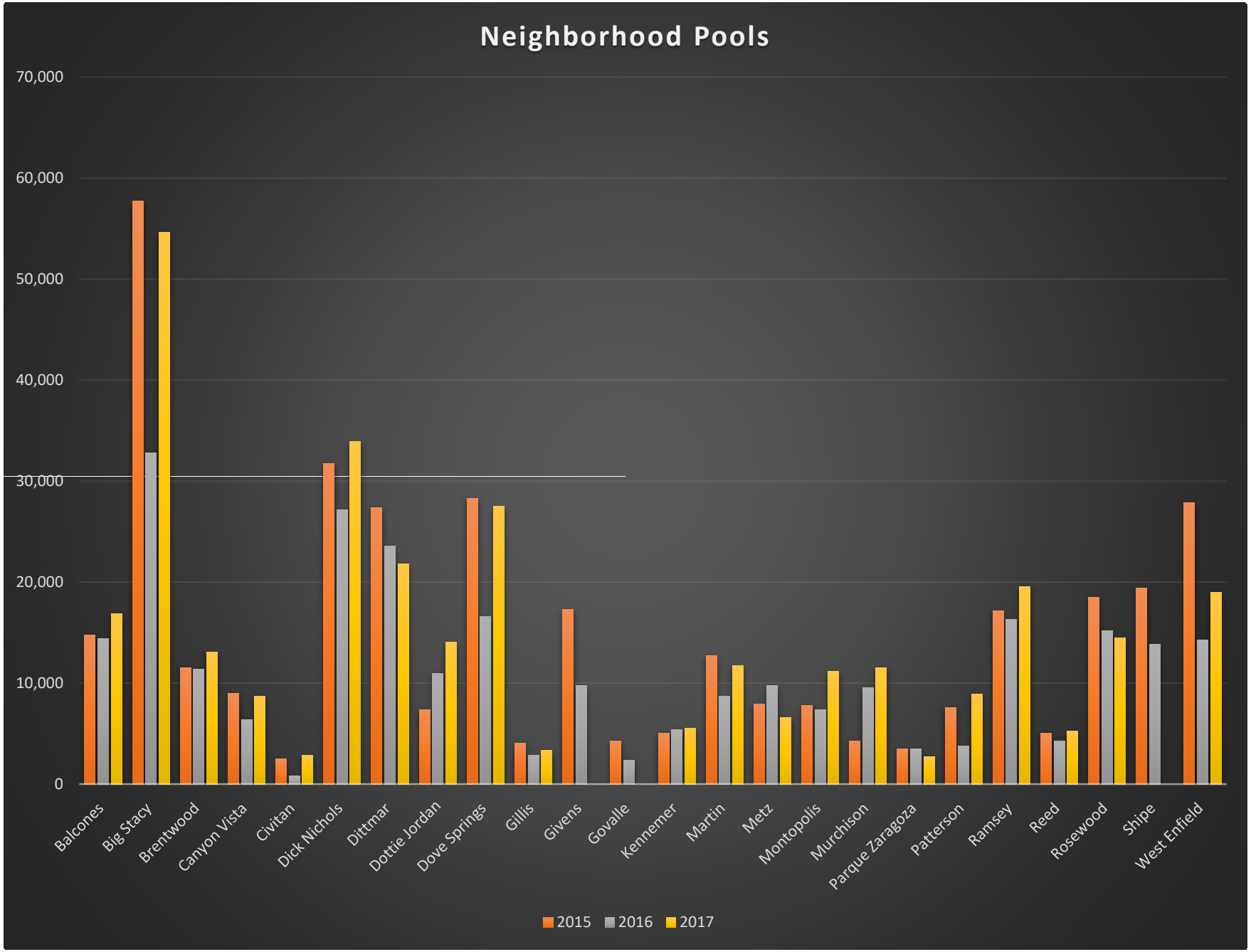
[3] Aggregation Bias in Small Area polygon-based Forecasting. Dr. Ronald Mitchelson, Professor of Geography, University of Georgia, paper presented to the Association of American Geographers Annual Conference, 1986.

Pool Name	Balcones	Bartholomew	Big Stacy	Brentwood	Canyon Vista	Civitan	Deep Eddy	Dick Nichols	Dittmar	Dottie Jordan	Dove Springs	Garrison	Gillis	Givens	Govalle	Kennemer	Little Stacy	Mabel Davis	Martin	Metz	Montopolis	Murchison	Northwest	Parque Zaragoza	Patterson	Ramsey	Reed	Rosewood	Shipe	Springwoods	Walnut Creek	Westenfield	West Austin
Balcones	0	10.2	14.5	6.8	4.6	16.1	10.9	19.3	20.3	21	19.5	16.6	14.1	13.1	15.2	4.8	11.9	16.2	14	12.9	16.4	6.2	5.3	14	10.4	8.5	9.7	13.4	9.5	7	3.6	10	11
Bartholomew	10	0	7.1	4	12.8	6.7	6.8	16.9	15.3	2.3	11.4	11.9	7.4	2.4	3.7	5.4	6.6	8	5.3	5.3	5.7	6.4	4.9	3.9	1.8	3.4	6.1	3.2	2.7	14	8.3	5.9	5.6
Big Stacy	12.3	6.9	0	9.5	20.7	4.7	4.1	10.8	6.6	9.3	4.5	4.8	1	6.2	4.9	10.6	0.6	1.7	2.7	3.3	4	10	9.8	4.2	6.1	7.5	6.3	4.4	6.3	20	8.3	4.6	3.7
Brentwood	6.4	4.1	9.5	0	9.9	8.5	6.5	15	16.7	5	14.1	12.3	9.8	6.3	6.9	3.2	8.9	14.4	7.8	8	8.9	3.5	1.3	7.6	4.1	2.3	5.1	7.1	3	14	6.1	5.6	5.7
Canyon Vista	5.1	13.2	17.4	9.9	0	17.9	13.2	20.9	21.7	13.1	22.5	18.3	17.1	15.6	16.2	8.6	16.9	19.2	17	17.3	18.2	6.7	9.1	16.9	13.4	11.3	11.8	16.4	12.5	5.5	8.7	12.3	13.2
Civitan	14.8	5.6	4.7	8.4	17.3	0	6.5	15	11.8	6.4	5.3	9.5	8.1	3	1.8	10.2	4.8	4.9	3.7	2.7	0.8	14.4	9.7	2.7	4.8	7.1	8.3	3.2	5.8	19.9	13.1	6.6	6.3
Deep Eddy	11.5	7.2	4.1	7.4	14	6.4	0	8.9	9.5	10	9.3	6.3	3.8	6	5.7	9.4	3.5	5.9	3.7	4	6.6	6.9	6.6	4.1	5.6	4.2	2.2	4.5	5.5	17	13.2	1.1	1.3
Dick Nichols	19.5	15.5	9.7	15.3	20.5	14.6	9.2	0	5.5	19	8.9	4.9	8.9	14.4	14	18.4	10	9.6	12	12.3	12.8	14.9	14.8	12.7	14.1	13	11.5	13	14	24.9	22	9.5	9.7
Dittmar	20.3	12.6	6.6	15.3	22.7	10.7	10	5.5	0	15.9	5.6	3.3	6	11.7	11.9	16.3	7	6.6	9.7	9.8	9.6	14.6	15.8	9.9	11.6	13.2	12.3	10.3	12.5	25.7	19.8	10.4	9.2
Dottie Jordan	9.1	2.3	9.3	5.5	12.5	6.4	8.6	19.8	15.7	0	11.5	13.7	10	3.3	4.5	5.4	9.2	9.8	7	6	7.1	7.9	6.4	5.1	3.4	5.5	8.4	4.8	5	15.6	7.9	7.7	7.5
Dove Springs	19	10.7	4.5	13.4	21.5	5.5	8.9	9.3	5.7	12.3	0	4.7	5.4	8.1	6.8	14.4	5.6	3.1	5.9	6.9	4.6	14.5	15.7	7.8	9.5	11.2	11	8.3	10	24.5	17.5	9.3	9.1
Garrison	16.7	11.8	4.8	12.6	17.7	10	6.5	4.9	3.3	14.6	4.7	0	4.1	12.4	9.8	15.5	5.5	4.8	7.2	8.3	7.9	12.1	12	9.1	10.8	8.7	8.8	9.4	11.2	22.2	18.6	6.9	6
Gillis	14.2	7.9	1	10	16.7	5.3	4	8.8	6	10	5.3	4.1	0	7	5.9	11.7	1.6	2.4	3.3	4.3	4.6	9.7	9.3	4.5	6.7	6.3	6.1	4.5	7	19.7	14.7	4.3	3.4
Givens	12.5	2.4	6.2	6.2	15	3	5.9	14.4	12.4	3.3	9.5	10.9	6.1	0	1.4	7.9	5.7	7.1	3.6	2.7	3.4	10	7.2	1.9	2.5	4.9	6.5	1.7	3.6	18	11	5	4.6
Govalle	13	3.7	4.9	6.8	15.6	1.8	5.7	15	12.9	4.5	6.7	9.8	5.9	5.9	0	8.5	4.6	5.1	3	2	2.2	9.1	7.8	1.4	3.1	5.5	7	1.8	4.2	18.6	11.6	5.6	5.2
Kennemer	4.8	5.4	10.3	3.2	8.6	10.2	9.4	18.5	18	5.5	15	15.4	11.6	7.6	8.2	0	10	11.6	9.4	9.7	10.6	4.6	2.9	8.8	5.8	4.8	7.3	7.7	4.8	11.1	3.6	7.3	7.8
Little Stacy	14.4	6.3	0.6	8.4	16.8	4.6	4	9.9	7.4	8.7	5.3	5.2	1.5	5.4	4.3	10	0	2.4	1.8	2.8	3.8	9.8	9.4	3.5	5.1	6.2	6.1	3.7	5.8	19.8	13.4	4.4	3.3
Mabel Davis	16.2	8	1.7	14.4	19.2	4.9	5.9	9.6	6.6	10.6	3.1	4.8	2.4	7.1	5.1	11.5	2.6	0	3.7	3.7	3.8	11.6	11.6	4.4	7	8.5	8	5.1	7.3	21.6	14.6	6.2	5.4
Martin	14	5.6	2.7	7.9	16.4	3.6	3.7	12.2	9.1	6.9	7.3	7.2	3.7	3.6	2.9	9.4	2.4	3.7	0	1	4	9.5	9.2	1.7	3.9	5.5	5.7	1.8	4.8	19.4	12.4	4.1	3.3
Metz	14.2	5	3.3	8.3	16.7	2.6	4	12.5	9.6	6	6.7	8.5	4.3	2.9	1.9	9.3	2.9	3.7	1	0	3	9.8	8.5	0.8	3.6	5.7	6.1	1.5	5	19.8	12.7	4.4	3.7
Montopolis	14.2	5.8	4	8.9	18.9	0.8	6.6	12.8	9.6	6.8	4.7	7.9	4.6	3.5	2.1	10.6	4.1	3.8	4	2.6	0	12.4	10.1	3.1	5.2	7.6	8.7	3.8	6.3	21.9	14.6	7.1	6.1
Murchison	6.1	6.4	10	3.9	6.8	14.2	6.4	14.8	15.1	7.7	15.1	12.1	9.7	9.1	9.1	4.3	9.4	11.6	9.6	9.8	14.6	0	2.9	9.7	6.3	3.9	4.5	9	4.7	11.5	8.4	5.1	6.5
Northwest	5.3	4.9	9.8	1.3	9.1	10	6.6	15.3	16.6	6.4	14.8	12.6	9.3	7.2	7.8	2.9	9.6	11.4	9.2	8.5	10.4	2.9	0	9.2	4.9	2.8	5.4	7.1	3.6	11.7	7.1	5.7	6.3
Parque Zaragoza	13.8	4.2	4.2	8.2	16.3	2.6	4	13	10.5	5.5	7.7	9.2	4.5	1.9	1.4	8.8	3.9	4.4	1.7	0.8	3	9.6	9.2	0	2.9	5.1	5.6	0.7	4.3	19.4	11.9	4.2	3.7
Patterson	10	1.6	6.1	3.9	12.7	4.6	5.8	14.3	12.3	4.3	9.8	10.8	6.9	2.4	2.9	5.3	5.6	7	4.8	3.9	5	6.1	4.9	3.2	0	2.6	4.9	1.9	1.3	15.8	8.2	4.9	4.5
Ramsey	8.5	3.4	7.5	2.3	10.9	7	4	13	13.7	5.3	11.9	8.7	6.3	4.9	5.5	4.8	7	8.5	5.5	6.1	7.6	3.9	2.8	5	2.6	0	2.8	4.8	1.3	14	7.5	3.3	3.3
Reed	8.2	5.7	6.6	5.7	8.7	9.8	2.2	11.4	11.8	8.1	11.5	8.5	6	6.3	6.9	7.7	6	7.9	5.9	6.2	8.6	4.4	4.9	5.9	4.9	2.6	0	5	3.6	15.2	11.4	1.7	2.5
Rosewood	13.3	3.7	4.2	6.4	15.8	3.3	4.3	13	11	4.8	9	9.5	5.4	1.8	1.8	7.6	4.3	5.1	2.1	1.7	3.7	8.2	8.4	1	1.9	4	5	0	3.5	18.9	11.8	3.7	3
Shipe	9.4	2.7	6.3	3	11.8	5.8	5.5	14	12.5	5	10	11.1	7	3.6	4.2	4.8	5.8	7.3	4.8	5	6.3	4.7	3.6	4.3	1.3	1.3	3.8	3.4	0	14.9	7.8	4.3	4
Springswood	7.6	15.6	20.7	13.2	5.5	21.4	16.3	24.7	26.1	15.6	25	22.1	21.6	18	18.6	11.1	20	21.6	19.5	19.7	22.1	11.6	11.8	19.3	15.8	16	15.1	18.9	16.3	0	9.1	15.4	16.4
Walnut Creek	3.6	8.3	8.3	6.1	8.7	13.2	13.4	22	19	8.6	18	18.1	14.2	10.7	11.2	3.6	13	14.6	12.5	12.7	13.6	8.4	6.3	12.3	8.2	7.5	12.3	11.9	9.3	9.1	0	12.5	10.8
Westenfield	10.1	5.9	4.6	5.6	12.5	6.6	1.1	9.5	9.7	7.7	9.8	6.9	4.3	5	5.6	7.3	3.9	6.2	4.1	4.4	7.1	5.1	5.7	4.2	4.9	3.3	1.7	3.4	4.1	15.6	12.6	0	1
West Austin	10.9	5.6	3.7	5.7	13.3	6.3	1.3	9.7	9.2	7.5	9.1	6	4.3	4.6	5.2	7.8	3.1	5.4	3.3	3.7	6.1	6.5	6.3	3.2	4.5	3.3	2.5	3.3	4.3	16.4	12.2	1	0

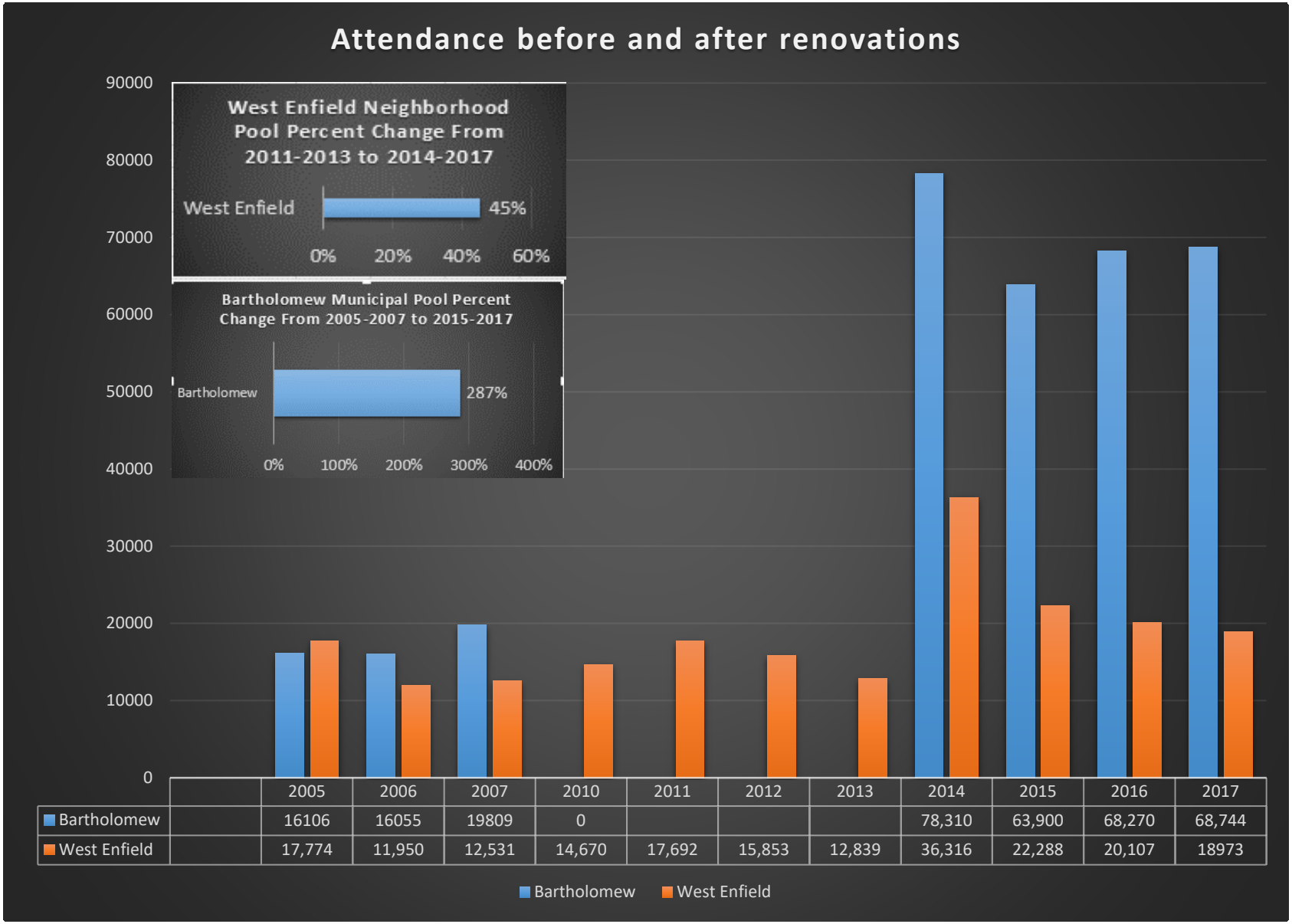
Pools that are less than or equal to 1	Pools 5 or less miles away	Pools 10 or less miles away	Greater than 10 miles



	Bartholomew	Deep Eddy	Garrison	Mabel Davis	Beverly S. Sheffield Northwest	Walnut Creek Park	Springwoods
2015	63,900	166,270	24,240	9,788	29,244	11,249	3,035
2016	68,270	168,454	26,332	10,847	47,362	20,107	9,652
2017	68,744	162,268	18,004	0	38,017	13,339	5,394


Neighborhood Pools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Balcones
Big Stacy
Brentwood
Canyon Vista
Civitan
Dick Nichols
Dittmar
Dottie Jordan
Dove Springs
Gillis
Givens
Govalle
Kennemer
Martin
Metz
Montopolis
Murchison
Parque Zaragoza
Patterson
Ramsey
Reed
Rosewood
Shipe
West Enfield
2015
2016
2017

POOL		2015	2016	2017
Neighborhood Pools				
Balcones Neighborhood Pool		14,774	14392	16863
Big Stacy Neighborhood Pool		57,737	32826	54660
Brentwood Neighborhood Pool		11,533	11405	13094
Canyon Vista Neighborhood Pool		8,960	6411	8704
Civitan Neighborhood Pool		2,508	782	2,832
Dick Nichols Neighborhood Pool		31,726	27142	33901
Dittmar Neighborhood Pool		27,401	23559	21777
Dottie Jordan Neighborhood Pool		7,391	10989	14036
Dove Springs Neighborhood Pool		28,278	16578	27495
Gillis Neighborhood Pool		4,051	2861	3326
Givens Neighborhood Pool		17,267	9770	Closed
Govalle Neighborhood Pool		4,243	2,396	Closed
Kennemer Neighborhood Pool		5,059	5404	5507
Martin Neighborhood Pool		12,703	8,672	11,731
Metz Neighborhood Pool		7,939	9,756	6,618
Montopolis Neighborhood Pool		7,756	7,340	11,142
Murchison Neighborhood Pool		4,262	9,523	11,502
Parque Zaragoza Neighborhood Pool		3,497	3,464	2,748
Patterson Neighborhood Pool		7,585	3,753	8,925
Ramsey Neighborhood Pool		17,178	16,326	19,565
Reed Neighborhood Pool		5,057	4,269	5,223
Rosewood Neighborhood Pool		18,505	15,182	14,446
Shipe Neighborhood Pool		19,429	13,866	Closed
West Enfield Neighborhood Pool		27,850	14,288	18,973



	2005	2006	2007	2010	2011	2012	2013	2014	2015	2016	2017
Bartholomew	16106	16055	19809	0				78,310	63,900	68,270	68,744
West Enfield	17,774	11,950	12,531	14,670	17,692	15,853	12,839	36,316	22,288	20,107	18973