

June 19, 2012

TO: Members of the MAG POPTAC Ad Hoc Subcommittee

FROM: Patrick Banger, Chair

SUBJECT: TRANSMITTAL OF MEETING NOTICE AND TENTATIVE AGENDA

Tuesday, June 26, 2012 – 9:00 a.m.
MAG Office, Second Floor, Chaparral Room
302 North 1st Avenue, Phoenix

A meeting of the MAG Population Technical Advisory Committee (POPTAC) Ad Hoc Subcommittee will be held at the time and place noted above.

Members of the subcommittee may attend either in person or by telephone conference call. If you are attending via audio conference please contact Steve Gross at (602) 254-6300 at least one day prior to the meeting.

Pursuant to Title II of the Americans with Disabilities Act (ADA), MAG does not discriminate on the basis of disability in admissions to or participation in its public meetings. Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting Anubhav Bagley at the MAG office. Requests should be made as early as possible to allow time to arrange the accommodation.

Please be advised that under procedures approved by the MAG Regional Council on June 26, 1996, all MAG committees need to have a quorum to conduct business. A quorum is a simple majority of the membership or 4 people for the MAG POPTAC Ad Hoc Subcommittee. If you are unable to attend the meeting, please make arrangements for a proxy from your jurisdiction to represent you. If you have any questions or need additional information, please contact Anubhav Bagley at (602) 254-6300.

TENTATIVE AGENDA
MAG Population Technical Advisory Committee
June 26, 2012

1. Call to Order

2. Call to the Audience

An opportunity will be provided to members of the public to address the MAG POPTAC on items not scheduled on the agenda that fall under the jurisdiction of MAG, or on items on the agenda for discussion but not for action. Members of the public will be requested to limit their comments to three minutes. A total of 15 minutes will be provided for this agenda item, unless the Chair of the POPTAC provides for an exception to this limit. Those wishing to comment on action agenda items will be given an opportunity at the time the item is heard.

3. Approval of Meeting Minutes of November 1, 2011.

4. Assumptions for MAG Socioeconomic Projections

The MAG Socioeconomic projections are based on model assumptions. These assumptions and methods are essential to the AZ-SMART model system and include, but are not limited to: geography used, base and build out housing, population, and employment, occupancy rates and persons per household, multiple use land use, single family/multi-family splits, work-at-home, floor area ratios and employment density, and residential development density, cluster size and velocity curves. The MAG POPTAC Ad Hoc Subcommittee will be requested to recommend approval of the assumptions to the MAG POPTAC. Please see Attachment One.

2. For information.

3. For information, discussion and approval of the minutes of November 1, 2011.

4. For information, discussion and possible recommendation to MAG POPTAC to approve the assumptions for the preparation of the 2012 MAG Socioeconomic Projections.

MINUTES OF THE
MARICOPA ASSOCIATION OF GOVERNMENTS
POPULATION TECHNICAL ADVISORY COMMITTEE AD HOC SUBCOMMITTEE

November 1, 2011
MAG Offices, Ironwood Room
302 N. 1st Ave, Phoenix

MEMBERS IN ATTENDANCE

Charlie McClendon, Avondale, Chair
Wahid Alam, Mesa
* Lisa Collins, Tempe
A-David de la Torre, Chandler
* Eddie Lamperez, Scottsdale

Thomas Ritz, Glendale
* Matt Holm, Maricopa County
Chris DePerro, Phoenix

**Those members neither present nor represented by proxy.
A - Participated via audioconference*

OTHERS IN ATTENDANCE

Max Enterline, Phoenix
Eric Morgan, Avondale
Jami Garrison, MAG
Scott Bridwell, MAG

A-Anubhav Bagley, MAG
Jesse Ayers, MAG
Scott Wilken, MAG
Stacey Bridge-Denzak, Avondale

1. Call to Order

Chair Charlie McClendon called the meeting to order at 9:33 a.m.

2. Call to the Audience

There were no requests from the audience to address the MAG POPTAC Ad Hoc Subcommittee.

3. Approval of Minutes of March 22, 2011

It was moved by Thomas Ritz, seconded by Chris DePerro and unanimously recommended to approve the meeting minutes of June 28, 2011.

4. Approval of Draft July 1, 2011 Maricopa County and Municipality Resident Population Updates and Methodology

Scott Bridwell presented the Draft July 1, 2011 Maricopa County Municipality Resident Population Updates and Methodology. He said that the methodology at the jurisdiction level is similar to that used in the past, with the one difference being the treatment of annexations. He said that in the past, using the Housing Unit Method (HUM), annexations were included by adding the number of households, and multiplying by the persons per household and the vacancy rate. For this update, annexations were added by giving the population based on the census block that they intersect. He said that the population numbers were controlled to the state demographer's office control total for Maricopa County, which is based on the composite method. He said that, because vacancy rates are so volatile, the state now recommends using the composite method. He said that the composite method divides the population into four age cohorts, and applies different metrics to each, such as births and deaths, school enrollment, and driver's licenses.

Thomas Ritz asked on the state composite method inputs, if the 2010 data is based on the census count. Scott Bridwell said that the inputs are based on the 2010 census. Thomas Ritz asked if the non-censual ratios are maintained for the following year. Scott Bridwell said that they were maintained for this year.

Thomas Ritz said that he knows that there has been some dissatisfaction with the HUM method after the census results came out, and asked why MAG is still using the HUM method. Anubhav Bagley said MAG staff is looking at the HUM method to see if there is a better method available, and that staff will keep POPTAC updated on the progress of formulating this new methodology.

Chris DePerro asked how the Balance of County number was calculated, given that the control total was found using the composite method and municipality numbers were found using the HUM method. Anubhav Bagley said that the HUM method was used for all the municipalities and the unincorporated county, which ended up slightly lower than the state control total for the county. He said that, because of this, the populations for all jurisdictions were scaled up to match the control total. So the Balance of County number was derived using the HUM method, scaled to match the control total.

Chris DePerro asked, when he looks at the update and sees 3.840 million population for the county, where that number comes from. Anubhav Bagley said that comes from the composite method. Chris DePerro asked if he subtracted all the jurisdictions' populations from that county total, he would get the Balance of County number. Scott Bridwell said that he would. Chris DePerro asked where the scaling began. Scott Bridwell said it is scaled at the household population.

Wahid Alam asked for a better explanation of where the numbers came from when presented to the full POPTAC, since this is the first time this method was used. Chris DePerro said that additional footnotes further explaining the two methods and the scaling would be helpful. Thomas Ritz pointed out that only the state has changed their methodology, and MAG's methodology is still the same. Anubhav Bagley confirmed that the MAG methodology at the municipality level has stayed the same.

Wahid Alam made a motion to recommend to the MAG POPTAC to approve the July 1, 2011 Maricopa County and MAG Municipality Resident Population Updates provided the Maricopa County control total is within one percent of the final control total. Thomas Ritz seconded the motion. The motion passed unanimously.

5. Intercensal Estimates: 2000-2010

Scott Bridwell gave an update on the Intercensal Estimates 2000-2010. He said that there are two sets of data using different methodology: one developed by the state demographer's office and one developed by MAG staff and controlled to the Census Bureau's Intercensal Estimates. He described the methodology used to adjust the population estimates that were made between the two census counts to have each year match the overall trends between counts.

Thomas Ritz asked for confirmation that the methodology hasn't changed, since the numbers never reach the 2005 census survey. Chris DePerro said that there are two different sets, one that reaches a peak in 2005 and one that has more of a bow with an overall upward trend. He asked why there are the two methods, one by the state and one by MAG. He asked if MAG is preparing a method to replace the state's, and what exactly is the committee being asked to look at. Anubhav Bagley said that this item is not for approval at this time, and is only for discussion. He said that the important point is that the numbers MAG has developed are in line with the Census Bureau Intercensal Estimates, which are for the county as a whole. He said that staff wanted to get a recommendation from the committee on whether they should use the state numbers or develop their own method and numbers. Chris DePerro asked what the Intercensal Estimates will be used for. Anubhav Bagley said that the numbers will be used primarily for research purposes and to see how we got to where we are.

Thomas Ritz asked, if MAG is not using the state's methodology or the 2005 census survey as background, MAG will proportionally divide the Census Bureau's Intercensal Estimates for each year among the jurisdictions. Anubhav Bagley said that MAG would control to the Census Bureau's Intercensal Estimate. Thomas Ritz asked if the MAG methodology is the same as that used by the Census Bureau to derive the county count. Anubhav Bagley said there are differences and similarities between the two methods.

Anubhav Bagley suggested that the rest of this discussion be postponed to the next meeting, in order to start the full POPTAC meeting. Thomas Ritz suggested continuing during the agenda item at POPTAC.

The meeting adjourned at 10:05 am.

Assumptions and Methods of MAG Socioeconomic Projections 2012

Part I

Introduction

The purpose of this document is to detail, the methodologies, assumptions, analyses, data collection activities, and data sources to be used in developing a base year database, build-out analysis, and housing, population, and employment projections. This year MAG staff will make use of a brand new model system specifically developed for the MAG region: Arizona's Socioeconomic Modeling Analysis and Reporting Toolbox, hereinafter referred to by its acronym, AZ-SMART. AZ-SMART is a complex model system that requires many more data inputs and assumptions.

This document is organized into 9 topics, each briefly summarized below:

1. MAG Socioeconomic Projection Geographies

This section describes the various geographies (e.g. TAZ, RAZ, and MPA) to which AZ-SMART data can be aggregated, and how those geographies were delineated. This will be for information and discussion only.

2. Base July 1, 2010 Population and Housing Variables

This section describes how the population, households, and dwelling unit data were compiled for the base year target date of July 1, 2010. In brief, Census 2010, American Community Survey (ACS) 2006-2010 Public Use Microdata (PUMS), Maricopa County Assessor's Data, and various special MAG databases (e.g. Group Quarters, Mobile Homes, Apartments, etc.) all served as inputs to a sophisticated data synthesis process to produce the detailed microdata that AZ-SMART requires. It is requested that POPTAC Ad Hoc recommend approval of these methodologies.

3. Base July 1, 2010 Employment by Land Use Sector and NAICS codes

This section describes how the employment and non-residential built space databases were utilized to synthesize base year jobs and built space for AZ-SMART for July 1, 2010. Bureau of Labor Statistics (BLS) data, Quarterly Census of Employment and Wages (QCEW), military sources, and Census ACS sources were all compiled and synthesized to produce the detailed microdata on employment that AZ-SMART requires. It is requested that POPTAC Ad Hoc recommend approval of these methodologies.

4. Population and Employment Control Totals

AZ-SMART requires annual, exogenous employment and population totals at the County level to allocate to lower levels of geography. The source of the population and group quarters control totals is the State Demographer's office, and the source of the employment control totals is derived from Moody's Economy.com. It is requested that POPTAC Ad Hoc recommend approval of these methodologies.

Assumptions and Methods of MAG Socioeconomic Projections 2012

5. AZ-SMART Classifications/Subcategories

This section documents the various classification schemes employed throughout the AZ-SMART model system. This includes land use, building types, employment, amongst others. This will be for information and discussion only.

6. Land Use

In order to create base year databases for AZ-SMART various land use datasets are maintained by MAG staff. These include Existing Land Use (EXLU), General Plan Land Use (GPLU), and the future developments databases. The EXLU is created for POPTAC review annually, while the GP and developments databases are maintained on an on-going basis and reviewed by POPTAC annually. This will be for information and discussion only.

7. Methods and Factors for developing housing, households, and population projections

AZ-SMART requires a wide variety of data to produce detailed housing, population, and land use projections. These include current and projected vacancy rates by built space type, assumptions about persons per household (PPHH), analysis of gross to net densities of developments, the rate at which developments build-out, and so forth. The methodologies used in creating the required data tables for AZ-SMART are also described here. It is requested that POPTAC Ad Hoc recommend approval of these methodologies.

8. Methods and Factors for developing non-residential built space and employment projections

Similar to section number 7, this section describes the methodologies and assumptions employed to develop the necessary datasets for AZ-SMART to produce detailed projections of employment and related land uses. This section discusses items such as floor to area ratios (FAR), employment density, and development sizes. It is requested that POPTAC Ad Hoc recommend approval of these methodologies.

9. Build-out methodology

The final section of the document describes the process by which MAG staff produced the build-out analysis. This analysis employed a wide variety of datasets provided by member agencies along with various assumptions and methodologies relating to employment and residential densities, PPHH, and vacancy rates. It is requested that POPTAC Ad Hoc recommend approval of these methodologies.

Assumptions and Methods of MAG Socioeconomic Projections 2012

I. MAG Socioeconomic Projection Geographies

- Maricopa County is subdivided into 29 Municipal Planning Areas (MPAs), 153 Regional Analysis Zones (RAZs), 2294 Traffic Analysis Zones (TAZs).
- The RAZ and TAZ geographies may be modified through comments by MAG member agencies and by MAG transportation planning/modeling staff.
- Each municipality has its own Municipal Planning Area (MPA), which delineates the area of planning concern for each jurisdiction. The following process is followed to define MPA boundaries:
 - Prior to the development of a new set of socioeconomic projections, MAG reviews the MPA boundaries with each member agency through the MAG Population Technical Advisory Committee (POPTAC). Maps were distributed showing the MPA boundaries from the last set of projections and input is requested.
 - Any area that has been annexed by a jurisdiction which falls outside the current MPA is automatically added to the MPA. Areas which have been de-annexed are removed.
 - Where a jurisdiction requests a change to its MPA, MAG sets up a meeting with the parties involved. Normally this meeting would include the jurisdiction requesting the MPA boundary enlargement, and affected other member agencies if involved and possibly adjoining jurisdictions. The County is always invited to participate.
 - If there are no objections from the other entities involved, the change to the MPA is made.
 - If there are objections to the expansion of the MPA, and no consensus compromise is reached by the jurisdictions, MAG will leave the MPA boundaries as they existed in the last set of projections. Ultimately, whichever jurisdiction annexes the territory, will have it included in its MPA.
 - A jurisdiction is responsible for reviewing and providing input on land use, base data, surveys, assumptions and draft socioeconomic projections for the entire MPA.
- Traffic Analysis Zones (TAZs) are required for transportation planning with input from the MAG POPTAC.
- TAZs are modified as expected growth in a 30-year horizon expands geographically or densities in existing TAZs warrant TAZ splits.
- TAZ boundaries are delineated utilizing existing and future highway corridors, transit network, major arterials, waterways/canals, and other natural features like mountains.
- TAZs and Regional Analysis Zones (RAZs) fall completely within only one MPA, as TAZs add up to RAZs, and RAZs add up to MPAs.
- TAZs used for the 2012 projections will be identified as TAZ2012

POPTAC Ad-Hoc Recommendation Requested: For information and discussion only.

Assumptions and Methods of MAG Socioeconomic Projections 2012

2. Base July 1, 2010 Population and Housing Variables

AZ-SMART and MAG transportation models require a July 1, 2010 base population, housing, and household total by TAZ2012 along with a detailed synthesized population and housing dataset from which to begin the modeling process.

The following data are available to produce the base July 1, 2010 population and housing variables:

- 2010 Census data by Block, Block Group, Tract, Place and County for April 1, 2010 housing units by type, occupied housing units by type, population, households, and group quarters population
- American Community Survey (ACS) 2006-2010 household and person level characteristics by 2010 Census Block Group
- Arizona Department of Economic Security July 1, 2010 Population Update by 2010 Census Place approved by MAG Regional Council.
- MAG Built Space Database developed by combining and cross checking data from the Maricopa County Assessor's Office Database, US Census Bureau Housing Data, MAG's Residential Completions Database, MAG's Major Group Quarters, Apartment, and Mobile Home/RV Park Database

All data sources are developed and maintained for July 1, 2010, but it is necessary to adjust and reconcile different data sources. MAG staff proposes to use the following methodology to allocate and reconcile the totals to the TAZ 2012 geography:

- The MAG housing inventory is reviewed and adjusted to match Census 2010 dwelling unit counts at the Census Block Group geography. This review was done in conjunction with the Maricopa County Assessor's Department data.
- Arizona State University's SimTRAVEL Research Group has developed an innovative micro-population synthesizer called PopGen (<http://urbanmodel.asu.edu/popgen.html>). PopGen is used to synthesize individually linked household and person records from the Census Public Use Microdata Sample (PUMS) sample records to match modified Census 2010 totals (modification described in the next bullet point) at a specially created geography called "Pseudo-Block Groups." Pseudo-Block Groups are Census Block Groups combined with the Census Place geography. This allows PopGen to use household and person level aggregations from the 2006-2010 5 year average American Community Survey (ACS) at the Block Group geography while synthesizing the output to match the population at the Census Place geography simultaneously.
- It is necessary to adjust the aggregations from Census 2010, which are only available at the Census Block Group level, to both a slightly different geography (Pseudo-Block Group) and timeframe (July 1, 2010). The totals will be updated proportionally based on a ratio of total households and population from April 1, 2010 to July 1, 2010 at the Block Group geography.
- Once the Census 2010 totals are adjusted for both space and time, PopGen can produce individual household and person records at the Pseudo-Block Group geography. This data is then input into AZ-SMART to match the individual household and person records to the MAG housing inventory at the Assessor Parcel geography. Households and persons are matched by comparing and ranking attributes from the PUMS record (e.g. dwelling unit size, household income, etc.) to similar attributes obtained

Assumptions and Methods of MAG Socioeconomic Projections 2012

from the MAG housing inventory (e.g. dwelling unit size, dwelling unit value per square foot, etc.). The end result of this process is a very detailed parcel level database of land, built space, and individual households and person records matching Census totals. While the data are very detailed, it is a synthetic or hypothetical representation of real households that reflects their characteristics.

- The resulting database is then aggregated to the TAZ 2012 geography for review by POPTAC members.

Another segment of the base population that needs to be properly accounted for is Group Quarters population. Group Quarters populations are split into 5 categories based on the living facilities: dorms, prisons, nursing homes, military, and other. It is proposed to use the following methodology to estimate the control totals and allocate to the parcel level database:

- Military totals are obtained by calling and confirming the total by directly contacting the individual agencies (e.g. Luke AFB).
- The allocation will begin by comparing the MAG Major Group Quarters inventory with the MAG built space database. New built space records are added to the built space inventory as needed to accommodate Group Quarters population.
- When the 2010 Census Block Group contains Group Quarters population, and there is one or more built space record of Group Quarters type to accommodate the population, the Group Quarters population is assigned there.
- When the 2010 Census indicates there is Group Quarters population in a Block Group where the built space inventory does not have an appropriate record for allocation, allocate the total to vacant housing units from the housing inventory. It is expected that these records indicate the presence of small group homes

The resulting database of Group Quarters at the parcel level is then aggregated to the 2012 TAZ geography.

POPTAC Ad-Hoc Recommendation Requested: Approval of methodology to produce population and housing variables for July 1, 2010.

Assumptions and Methods of MAG Socioeconomic Projections 2012

3. Base July 1, 2010 Employment by Land Use Sector and NAICS codes

AZ-SMART and the current MAG transportation models require employment classified by both land use categories, including work-at-home and construction, and North American Industry Classification System (NAICS) sector based employment.

The following data sources are available for the creation of the required employment databases: Bureau of Labor Statistics (BLS) and the Quarterly Census of Employment and Wages (QCEW) annual totals by 3-digit NAICS categories, the MAG employment database (with spatial locations built from various public and private sources), the Department of Defense Statistical Information Analysis Division for military employment, and the 5 year average American Community Survey (2006-2010 ACS) data for unincorporated self-employed (USE) totals.

Detailed analysis of the MAG employer database against the build space database has indicated a presence of non-site-based jobs. These include workers that are not located at one site, examples include temporary workers, and workers involved in construction, landscape, and janitorial services. To develop Base July 1, 2010 employment control totals for Maricopa County, it is proposed to make some adjustments to the county employment totals both within NAICS categories and to split some proportion of each NAICS category to include work-at-home (WAH) employment and non-site-based (NSB) employment utilizing the following methodology:

- Compare BLS-QCEW and military county totals to the MAG employer database and adjust to a new county total based on this analysis.
- Allocate USE county total employment to NAICS categories based on estimates provided by a MAG Consultant white paper (Applied Economics, 2009).
- In 2009, MAG Consultant conducted an analysis of the employer database by NAICS categories and suggested the proportions of each sector that are work at home and non site based.
- Re-allocate some larger public employment categories to new NAICS codes to better reflect the purpose of the employment. For instance, move some large State employment (e.g. ASU) to the education category and some local employment (e.g. Maricopa Integrated Health Systems) to the appropriate medical category.
- Estimate WAH and NSB employment totals for the county by NAICS categories by analyzing the MAG employer database. Employment points falling onto parcels with a residential land use are split into WAH and NSB categories:
 - up to 2 employees on a residential land use in the NAICS code as WAH
 - additional employees beyond 2 on a residential land use as NSB

Once an adjusted total employment for Maricopa County by NAICS categories is complete it is next necessary to allocate the totals sub-regionally and convert them to land use based employment totals. MAG staff proposes to rely upon the MAG employer, existing land use, and built space databases for this spatial allocation and conversion:

Assumptions and Methods of MAG Socioeconomic Projections 2012

- Compute the difference between total employment by category in the MAG employer database and the total employment control totals by category for the county.
- Factor up (or down) this difference in employment by category utilizing the existing MAG employer database points to match the county level control totals.
- Check the number of jobs in each built space record and compute the number of square feet each job occupies. If this number falls below the number set in a previously estimated "building square foot per job" table (which specifies for each building type how much floor space each job requires) then expand the built space record's square footage and value to accommodate the number of jobs assigned to it.

After all of the employment by category is assigned to built space records at the parcel level of geography, the jobs must be summed up by land use category and TAZ 2012 for review by POPTAC members:

- Generalize MAG's 2010 existing land use database into 5 categories: Retail, Office, Industrial, Public, and Other.
- Overlay the modified employer database onto the generalized land use database and compute the total employment by the 5 land use categories and 2 additional categories of work-at-home and non-site-based.

Aggregate the land use based employment totals to the TAZ 2012 geography.

POPTAC Ad-Hoc Recommendation Requested: Approval of methodology to produce employment variables for July 1, 2010.

Assumptions and Methods of MAG Socioeconomic Projections 2012

4. Population and Employment Projections Control Totals

A. Population

- The Arizona State Demographer created a cohort-component population projection model to be consistent with the results of the 2010 Census. The cohort-component model was created with input from the Council for Technical Solutions.
- MAG develops its sub-regional resident population projections to be consistent with population control totals for Maricopa County developed by the Arizona State Demographer.
- Arizona State Demographer Population Projections have prescribed age, sex, and ethnic distributions, which affect household formation and size and labor force control totals.

B. Employment

- The Arizona State Demographer does not produce employment projections therefore it is necessary to obtain employment projections from another source.
- MAG staff, along with a consultant (Jeff Tayman from University of California, San Diego) have conducted an analysis of commercial long term socioeconomic projections for purchase.
- Based on the analysis and consultant recommendations, it is recommended that MAG purchase population and employment projections from Moody's Economy.com. These will be annual projections of employment by NAICS code for Maricopa County.
- Derive employment to population factors from the Moody's projections and adjust Moody's Economy.com employment totals to match the Arizona State Demographers forecasted population at the county level.

POPTAC Ad-Hoc Recommendation Requested: Approval of methodology to produce population and employment control totals.

Assumptions and Methods of MAG Socioeconomic Projections 2012

5. AZ-SMART Classifications/Subcategories

- AZ-SMART requires a number of classification types for data
- These AZ-SMART classifications are utilized internally for simulation purposes only
- Classifications can be modified through comments by MAG member agencies

A. Building Types

- AZ-SMART requires a classification of building types.
- The following is a list of the building types for use in the model.
 - Single Family Residential
 - Multi-Family Residential
 - Mobile Home Residential
 - Retail
 - Mini Storage
 - Warehouse
 - Industrial
 - Office
 - Medical
 - Hotel
 - Civic
 - Education
 - Group Quarters
 - Public – Federal and State
 - Public – Local
 - Agriculture
 - Transportation
 - Other/Open Space

B. Employment Sectors

- AZ-SMART requires a classification of NAICS employment sectors.
- The following is a table of the employment sectors for use in the model.

Assumptions and Methods of MAG Socioeconomic Projections 2012

AZ-SMART Employment Sectors

Employment Sector	NAICS Code
Agriculture, Forestry, Fishing and Hunting	11
Mining, Quarrying, and Oil and Gas Extraction	21
Utilities	22
Construction	23
Manufacturing	31-33
Wholesale Trade	42
Retail Trade	44-45
Transportation and Warehousing	48-49
Information	51
Finance and Insurance	52
Real Estate and Rental and Leasing	53
Professional, Scientific, and Technical Services	54
Management of Companies and Enterprises	55
Administrative and Support and Waste Management and Remediation Services	56
Educational Services	61
Health Care and Social Assistance	62
Arts, Entertainment, and Recreation	71
Accommodation	721
Food Services and Drinking Places	722
Other Services (except Public Administration)	81
Public - Federal and State	Part of 92
Public - Local	Part of 92

Source: US Census Bureau 2007 NAICS

POPTAC Ad-Hoc Recommendation Requested: For information and discussion only.

Assumptions and Methods of MAG Socioeconomic Projections 2012

6. Land Use

A. Existing Land Use

- The existing land use database identifies the current land use pattern in the urban area. MAG maintains more than 100 classifications of land use, which were established by MAG in concert with its member agencies. This table of MAG land use codes is updated by MAG staff periodically and approved by POPTAC members.
- The existing land use database was created by MAG staff based on an analysis of the Maricopa County Assessor Parcels, aerial photo interpretation, Arizona State Land Department data, MAG databases and input from MAG member agencies and then circulated to the agencies for review and verification. Changes were made based on comments provided.
- The existing land use dataset is important to the projections process because it establishes areas that have already been developed or are not suitable for further development. The developed areas become ineligible for the allocation of population and employment growth, except where the area is planned for redevelopment. Non-developable areas include open space or environmentally sensitive lands, or areas where the relief makes construction infeasible.

B. General Plan Land Use

- The General Plan Land Use Database is based upon the plans of MAG member agencies and identifies both the type of development that is anticipated to occur in the future and the density of that development. For example, rural residential land use allows for up to 1 unit per acre. In those areas designated rural residential, a maximum is established so that the projections model does not exceed the 1 unit per acre density authorized.
- The General Plan Land Use database uses the standard MAG land use categories that allows for a direct comparison between existing and planned land use. The difference between the existing and planned land use databases helps determine where development may take place.
- MAG tracks general plan land use data for all member agencies. Member agency land use codes are translated into a common region wide land use category system through a lookup table. The lookup table tracks minimum, target and maximum development densities for both dwelling units and employment land uses. Land use lookup values can be modified through comments by MAG member agencies.
- Selected attributes in the General Plan Land Use dataset are
 - *MPA Land Use Code* – Land use category created by jurisdiction
 - *MAG Land Use Code* – MAG land use categories create a common coding system for the region
 - *Density Range* – Derived from general plan descriptions.

Assumptions and Methods of MAG Socioeconomic Projections 2012

- *Minimum* – Least dense development allowed by land use
- *Target* – Expected development density by land use
- *Maximum* – Most dense development allowed by land use
- *Mixed Use Split* – Further definition of mixed use, defines mixed use as percentages of single land use types. For example, Business Park mixed use could be 70% industrial and 30% office.

C. Developments

- The Development Database was developed in conjunction with MAG member agencies. Information is collected on residential and non-residential developments including number of units or square footage by land use parcel. An estimated start date for the development is also determined at the same time. Member agencies review the Development Database regularly for completeness and accuracy. The Development Database includes redevelopment and age restricted projects as well.
- Major Attributes in the Developments Database are
 - *MAG Land Use Code* - MAG land use typology creates common coding system for region
 - *Age Restricted Project Flag* – Denotes a development restricted to people age 55+
 - *Redevelopment Project Flag* – Denotes a project that will replace existing development
 - *Development Status* – Defines how close a project is to completion
 - *Conceptual* – Project has not started jurisdiction review
 - *Anticipated* – Project is going through jurisdiction review
 - *Final Plat* – Project has been approved by jurisdiction. This category also includes non-residential site plans.
 - *Active* – Project is under construction
 - *Start Year* – Estimated year project will start construction
 - *End Year* – Estimated year project will be completed
 - *Total Units* – Amount of units to be built in project
 - *Mixed Use Split* - Further definition of mixed use, defines mixed use as percentages of single land use types. For example, Business Park mixed use could be 70% industrial and 30% office.

D. Multiple Use Definitions by Geographic Location

- The MAG projections are consistent with member agency General Plans and Planned Area Developments.
- Many of these plans, however, have areas defined as multiple use areas that can generate various types and densities of housing or employment.
- In order to use these designations in socioeconomic modeling, the multiple use categories must ultimately be converted to one or more of the standard land use categories.

Assumptions and Methods of MAG Socioeconomic Projections 2012

- The MAG socioeconomic models have been enhanced to accommodate such multiple use categories. The models are flexible enough to allow for each individual area to have different proportions of standard land use categories.
- In many cases MAG Member Agencies have provided the multiple use categories. In some cases MAG has estimated the multiple use categories based on descriptions in the general plan or used default multiple use categories.
- Default categories are consistent with past local multiple use development but can be modified, area by area, by member agencies.

E. Future Land Use

- Future Land Use is the combination of the Existing Land Use, General Plan Land Use and the Development Database. The Future Land Use shows what the buildout conditions will be based on current plans. Developable lands in the Existing Land Use are replaced by land uses in the General Plan and Developments. Redevelopment of existing structures is possible when a development project has been proposed for existing built structures.

POPTAC Ad-Hoc Recommendation Requested: For information and discussion only

Assumptions and Methods of MAG Socioeconomic Projections 2012

7. Methods and Factors for developing housing, households and population projections

A. Residential Density

- In developing TAZ population projections, the MAG socioeconomic models project residential dwelling units from parcels identified for residential uses in the General Plans or areas anticipated to be residential in the Development database. Households and Population by TAZ are subsequently calculated from the dwelling unit projections.
- Three General Plan Residential Density figures (dwelling units/acre) have been collected from the member agencies. These include the minimum, maximum and target residential density anticipated for each residential land use type in the General Plan. The models use Target Density as the base for new residential growth. The Maximum density set by the MPA caps the residential density. These densities may be changed, polygon-by-polygon by the member agencies if desired.
- Areas covered by the Development database have the number of dwelling units being built/planned and thus do not need to use the densities identified in the General Plan.

B. Gross to Net Density

AZ-SMART residential modeling assumes the use of net residential density. Net density means that land area has been taken out for transportation, right of way, and open space areas as part of the density given in the general plan document. An analysis of gross acres and net acres by different residential land use types has been conducted. The results are the basis for converting gross residential density to net residential density as needed.

Net Residential Density				
LUCODE	Land Use	Description	Gross Acres	Net Acres
110	Rural Residential	<= 1/5 du per acre	50	50
120	Estate Residential	1/5 du per acre to 1 du per acre	50	50
130	Large Lot Residential (SF)	1 du per acre to 2 du per acre	50	50
140	Medium Lot Residential (SF)	2-4 du per acre	50	38
150	Small Lot Residential (SF)	4-6 du per acre	50	37.5
160	Very Small Lot Residential (SF)	>6 du per acre (includes mobile home parks)	50	37.5
170	Medium Density Residential (MF)	5-10 du per acre	50	38.5
180	High Density Residential (MF)	10-15 du per acre	50	41
190	Very High Density Residential (MF)	> 15 du per acre	50	36

Source: Arizona State University, 2001

MAG GIS and Database Enhancement Project (Scaled values to a common 50 Gross Acres)

Assumptions and Methods of MAG Socioeconomic Projections 2012

C. Persons per household (PPHH):

Persons per household was derived from the 2010 Census by dividing the population in households by the number of occupied housing units. Total housing units, total occupied housing units and population in households was identified by Census block. These variables were then allocated to the TAZ 2012 geography using the data from Census 2010. PPHH is derived at the lowest level of geography possible then refined at the TAZ 2012 level. This refinement is important since figures resulting from a sparsely developed TAZ may not adequately reflect future trends in the TAZ. The PPHH refinement is as follows:

- For TAZs where existing development in 2010 is less than 50% of the buildout number, PPHH from the Regional Analysis Zone (RAZ) will be used instead.
- Similarly, for RAZs where the existing development in 2010 is less than 50% of the buildout number, PPHH from the Municipal Planning Area (MPA) will be used.
- A maximum PPHH at buildout will be set at 5.0.

D. Vacancy Rates:

Vacancy rates are used in the buildout analysis and in the simulation model. An analysis of vacancy rates by Census Place was conducted and used to make a determination about the long-term or "structural" vacancy rate due to the normal migration and relocation of population within the region. This structural vacancy rate (roughly 5% for single-family and ranging up to approximately 9% for larger multi-family developments) is used as a target that drives new residential development in the simulation model. For buildout analysis, the vacancy rates were calculated at the Census Block geography for Single Family (SF) and Multi Family (MF) residential types. A Census Block to TAZ2012 lookup file was created to re-calculate the vacancy rates by TAZ2012. Vacancy rates were then applied to buildout dwelling units as follows:

- For TAZs where existing development in 2010 is less than 50% of the buildout number, use a 5% vacancy rate for this TAZ. The reasoning is that at the present time we do not know how this TAZ is going to look, so we assume a longer term average vacancy rate of 5%.
- For TAZs where existing development in 2010 is greater than 50% of the buildout number, use the minimum of either 5% or the current vacancy rate minus the percentage of the current DUs that are considered seasonal use only (from the 2010 Census) then adding the percentage seasonal units back to arrive at a final vacancy rate. The reasoning here is that since the TAZ is mostly built out already, we have a good idea of how many seasonal units there will be in the TAZ and we want to maintain that in the calculation of vacancy rate.

E. County-wide Single Family / Multi-family Proportions

- An analysis of Future Land Use shows that approximately 71% of residential lands at buildout will be single family.

Assumptions and Methods of MAG Socioeconomic Projections 2012

- An analysis of Census data from 1960 to 2010 shows the single family / multi-family split in Maricopa County remaining relatively stable.

MARICOPA COUNTY HOUSING UNITS TYPE PERCENTAGE			
Census Year	Single Family Unit Percentage	Multi-Family Unit Percentage	Mobile Home Unit Percentage
1960	88%	12%	N/A
1970	73%	20%	7%
1980	67%	25%	8%
1985	66%	26%	9%
1990	65%	27%	8%
1995	68%	27%	6%
2000	68%	26%	6%
2010	72%	23%	5%

Sources

1960, 1970, 1980, 1990, 2000 - U.S. Census Bureau - Decennial Census

1985, 1995 - MAG Special Census

2010 - U.S. Census Bureau - American Community Survey 3 year average 2008-2010

MAG Residential Completions Database

MAG Future Land Use Database

F. Age Restricted Communities

- MAG transportation models require TAZs to have identifiers for Age Restricted Areas.
- A survey of the existing age restricted communities was conducted and a GIS dataset of the communities was created.
- All developments are reviewed with member agencies to identify additional age restricted communities.
- TAZs with fifty percent or more of their residential land area under communities with deed restrictions on age of residents are flagged as Age Restricted TAZs.
- These age-restricted flags are utilized only as an input for the transportation model and do not impact the projection series.

POPTAC Ad-Hoc Recommendation Requested: Approval of methodology for developing housing, households and population.

Assumptions and Methods of MAG Socioeconomic Projections 2012

8. Methods and Factors for developing non-residential built space and employment projections

- **Employment Density and Floor Area Ratios (FAR)**
 - FAR represents the ratio of the square footage of the building to the square footage of the parcel of land.
 - Employment Density represents the floor space required by employees. This is calculated as building floor space per employee.
 - The MAG models convert a parcel of land to the square feet of employment space and then to the number of employees on that parcel. This requires an understanding of average employment areas.
 - FAR and Employment Density differ for each non-residential land use type.
 - An analysis of employment density ranges by land use type was conducted by analyzing data in the MAG built space database and the MAG employer database. Jobs by land use type were compared to building square footage by land use type.
 - This analysis was compared to employment density ranges used in the 2003 and 2007 Socioeconomic Projections and found to be in line with employment density data ranges from those projections series.
 - This analysis expands employment density ranges for more land use types as required by AZ-SMART and reflects the most current data available for the MAG region.
 - The following table shows the results of this analysis.

Assumptions and Methods of MAG Socioeconomic Projections 2012

Employment Density - Square Feet Per Job by Building Type			
Building Type	Minimum Square Feet Per Job	Target Square Feet Per Job	Maximum Square Feet Per Job
Mobile / Manufactured Home	150	250	350
Single Family Detached Home	150	250	350
Multi Family Attached Home	4410	16,700	31,930
Retail	330	640	2,060
MiniStorage	3370	11,760	36,310
Warehouse	240	740	2,090
Industrial	300	700	1,650
Office	140	330	990
Medical	130	330	400
Hotel	420	1,470	3,560
Civic	400	1,410	3,400
Education	240	830	2,000
Group Quarters	400	1,410	3,400
Public - Federal	70	250	610
Public - State	70	250	610
Public - Local	70	250	610
Agriculture	1240	4,350	10,510
Transportation	0	0	0
Other	1240	4,350	10,510
Open Space	0	0	0

Source: MAG 2010 Built Space Database

- An analysis of FAR ranges by land use type was conducted by analyzing data in the MAG built space database by comparing building square footage to parcel square footage by land use type.
- This analysis was compared to FAR ranges used in the 2003 and 2007 Socioeconomic Projections and found to be in line with FAR data ranges from those projections series.
- This analysis expands FAR ranges for more land use types as required by AZ-SMART and reflects the most current data available for the MAG region.
- The following table shows the results of this analysis.

Assumptions and Methods of MAG Socioeconomic Projections 2012

Floor Area Ratio by MAG Land Use				
MAG Land Use	Land Use Description	Minimum FAR	Target FAR	Maximum FAR
210	Low Density Commercial	0.01	0.33	5.50
220	Greenhouse Commercial	0.01	0.07	0.71
230	Specialty Commercial	0.01	0.16	7.57
240	Neighborhood Commercial	0.01	0.29	4.91
250	Community Commercial	0.03	0.23	5.44
260	Regional Commercial	0.02	0.26	0.84
270	Super-Regional Commercial	0.08	0.64	3.49
310	Storage Facilities	0.01	0.53	3.26
320	Warehouse	0.01	0.31	1.97
330	Light Industrial	0.01	0.32	3.63
340	Heavy Industrial	0.01	0.25	1.31
410	Office Low Rise	0.01	0.35	8.26
420	Office Mid Rise	0.02	2.40	13.05
430	Office High Rise	3.43	11.12	24.00
510	Hotel/Motel	0.01	0.57	10.02
511	Resorts	0.01	0.26	0.82
520	Educational	0.07	0.26	0.95
521	Preschool / Daycare	0.01	0.20	1.00
522	Schools K-12	0.01	0.18	6.59
523	Post High School	0.01	0.28	2.35
524	ASU	0.01	0.82	3.80
525	Dorms	0.01	1.35	5.15
530	Institutional	0.01	0.26	3.87
531	Religious	0.01	0.17	1.75
532	Medical Offices	0.02	0.28	4.32
533	Hospitals / Medical Centers	0.01	0.67	5.63
534	Nursing Homes	0.01	0.25	1.18
540	Cemeteries	0.01	0.13	0.78
551	Public Offices	0.03	0.94	7.66
552	Public Services	0.01	0.34	7.27
810	Business Park	0.06	0.21	0.32
820	Mixed Use	0.04	2.13	10.35

Source: MAG 2010 Built Space Database

Assumptions and Methods of MAG Socioeconomic Projections 2012

- **Non-Residential Vacancy Rates.**

A projection of non-residential vacancy rates by building type is required for the simulation model to develop new non-residential real estate. MAG Staff obtained data on the commercial real estate market from the vendor COSTAR. COSTAR data and reports contain longitudinal data going back as far as 2001 on non-residential vacancy rates in the "Phoenix Metropolitan Area" (which includes parts of Pinal County) and the United States as a whole. COSTAR provides these rates for broad classes of non-residential building types: retail (back to 2007), office (back to 2001), industrial (back to 2001). The average for each building type in the Phoenix area was compared with the same data at the national level. Where the rates met is where it was assumed that the Phoenix market was similar to the national market, and that rate was used as the long-term structural vacancy rate for the simulation model. The rates are as follows: retail 6.5%, industrial 8%, and office 10.5%.

POPTAC Ad-Hoc Recommendation Requested: Approval of methodology for developing non-residential built space and employment.

Assumptions and Methods of MAG Socioeconomic Projections 2012

9. Buildout Methodology

A. Buildout Population and Housing Variables

The purpose of the buildout analysis is to examine the implications of each of the datasets that feed into the projections model. The buildout analysis calculates a theoretical maximum amount of housing and population implied by the existing development, the approved developments and the general land use plan datasets. Two types of buildout numbers can be calculated: net and gross buildout. Gross buildout assumes all land is filled to the maximum carrying capacity with dwelling units and each dwelling unit occupied by a household. An average persons per household assumption is applied to the households to calculate a maximum gross population. The net buildout applies a vacancy rate to the dwelling units and households so that there is not 100% occupancy. While still a theoretical exercise, it provides a more realistic vision of maximum households and population. A gross buildout has been created for this analysis.

The following datasets are available to MAG staff to prepare the population and housing buildout analysis:

- Base 2010 Population and housing variables analysis
- MAG Existing Land Use Database: current as of 2010
- MAG General Plan Database: current as of 2010
- MAG Development Database: current as of 2010 or later
- TAZ 2012 zone system
- 2010 vacancy rate analysis for single and multi-family households by TAZ 2012, RAZ 2012, and MPA 2012

MAG staff, in collaboration with a consultant, has developed several specialized data development tools within the AZ-SMART system to accept the above datasets as inputs, and along with the following assumptions will output the buildout analysis:

- Existing Development: Existing built land use is considered to be undevelopable unless it is flagged as a redevelopment property. Only agricultural and vacant lands are allowed to be converted to new developments by AZ-SMART.
- Density Assumptions: In developing TAZ buildout projections, AZ-SMART tools project residential dwelling units from parcels identified as residential in the General Plans or areas anticipated to be residential in the Development database. Households and Population by TAZ are subsequently calculated from the dwelling unit projections. Three General Plan Residential Density figures (dwelling units/acre) are collected from the member agencies, the minimum, maximum and target residential density anticipated for each residential land use type in the General Plan. Thus, three buildout scenarios may be generated for the Minimum, Target, and Maximum densities. These densities may be changed at very detailed levels by the member agencies if desired. Some areas covered by the Development database have the actual number of planned dwelling units and therefore do not need to use the densities identified in the General Plan. Additionally, some Development database projects may be identified as redevelopment projects. In these cases AZ-

Assumptions and Methods of MAG Socioeconomic Projections 2012

SMART is allowed to construct new projects as replacement for existing built structures.

- Persons per household (PPHH): Persons per household was derived from the 2010 Census by dividing the population in households by the number of occupied housing units. Total housing units, total occupied housing units and population in households were identified by Census block. These variables were then allocated to the TAZ 2012 geography using the data from Census 2010. PPHH is derived at the lowest level of geography possible then refined at the TAZ 2012 level. This refinement is important since figures resulting from a sparsely developed TAZ may not adequately reflect future trends in the TAZ. The PPHH refinement is as follows:
 - For TAZs where existing development in 2010 is less than 50% of the buildout number, PPHH from the Regional Analysis Zone (RAZ) will be used instead.
 - Similarly, for RAZs where the existing development in 2010 is less than 50% of the buildout number, PPHH from the Municipal Planning Area (MPA) will be used.
 - A maximum PPHH at buildout will be set at 5.0.
- Vacancy Rates: Vacancy rates were calculated at the Census Block geography for Single Family (SF) and Multi Family (MF) residential types. A Census Block to TAZ2012 lookup file was created to re-calculate the vacancy rates by TAZ2012. Vacancy rates were then applied to buildout dwelling units as follows:
 - For TAZs where existing development in 2010 is less than 50% of the buildout number, use a 5% vacancy rate for this TAZ.

For TAZs where existing development in 2010 is greater than 50% of the buildout number, use the minimum of either 5% or the current vacancy rate minus the percentage of the current DUs that are considered seasonal use only (from the 2010 Census) then adding the percentage seasonal units back to arrive at a final vacancy rate. The reasoning here is that since the TAZ is mostly built out already, we have a good idea of how many seasonal units there will be in the TAZ and we want to maintain that in the calculation of vacancy rate.

Methodology: AZ-SMART's buildout tool uses the following methodology to produce the output:

1. Use the TAZ allocation of housing units and population for July 1, 2010 as the base (existing) data.
2. If the land is not identified as a planned development from the Developments database, determine additional housing units and population from the General Plan. Calculate developable residential acres by land use category (land use codes 100 – 199, 820, 821, 830 and 840) by TAZ. For this scenario, acreage is considered developable residential if it meets all of the following criteria:
 - a. The 2010 land use was either agriculture or vacant.
 - b. The General Plan land use was residential or mixed use - land use codes 100-199, 820-840. In the case of mixed use, apply the percentages identified previously.

Assumptions and Methods of MAG Socioeconomic Projections 2012

3. Calculate additional housing units by land use category as developable residential acres * net density (minimum/target/maximum) for the residential category. Sum categorized residential housing units to obtain total additional housing units by SAZ.
4. If the area is identified as a Planned Development, then allocate the new residential units from the development database to the parcel. Apply the mixed-use proportions in cases where the development is mixed use. Sum categorized residential housing units to obtain total additional housing units by TAZ.
5. Using TAZ persons per household from the 2010 Census, calculate additional population by TAZ as total additional housing units * TAZ occupancy rate (1 - vacancy rate) * TAZ persons per household.
6. Add additional housing units and population to the 2010 base housing units and population to obtain total buildout figures.

B. Buildout Employment Variables

The purpose of the buildout analysis is to examine the implications of each of the datasets that feed into the projections model. The buildout analysis calculates a theoretical maximum amount of employment implied by the approved developments and the general land use plan datasets. The buildout analysis will produce the maximum amount of employment by land use type implied by the approved developments and the general land use plan datasets. In contrast to the case of population and housing buildout, less information is available to assume vacancy rates for non-residential land use types, so a single vacancy rate is applied to the gross buildout number to provide a theoretical net buildout for employment. The following datasets are available to MAG staff to prepare the employment buildout analysis:

- Base 2010 Employment by land use analysis
- MAG Existing Land Use Database: current as of 2010
- MAG General Plan Database: current as of 2010
- MAG Development Database: current as of 2010 or later
- TAZ 2012 zone system
- MAG analysis of employees per square foot and floor to area ratios

MAG staff, in collaboration with a consultant, has developed several specialized data development tools within the AZ-SMART system to accept the above datasets as inputs, and along with the following assumptions will output the buildout analysis.

Employment Densities: In developing TAZ buildout projections, the MAG socioeconomic models project employment from parcels identified as employment-based in the General Plans or areas anticipated to be non-residential in the Development database. As part of the buildout analysis, Floor Area Ratios (FAR) and Employment Density (employees per square foot by built space type) factors were developed internally by MAG staff. Thus:

Total square feet of employment space = FAR * Area of polygon in square feet

Number of employees = Total square feet of employment space * Employees per square foot of building type in question

Assumptions and Methods of MAG Socioeconomic Projections 2012

Generally, areas covered by the Development database have the square feet of employment areas being built or planned. Thus to derive the employment only the Employees per square feet value need to be used. In cases where the planned square footage was not available, the FAR factors for the particular land use is used.

Methodology: AZ-SMART's buildout tool uses the following methodology to produce the output:

1. Use the TAZ allocation of July 1, 2010 employment by land use sector as the base (existing) data.
2. Determine additional employment from the General Plan and Development database. Calculate developable employment-based acres by land use category (land use codes 200 - 850) by TAZ. For these scenarios, acreage is considered developable for employment if it meets all of the following criteria:
 - a. The 2010 land use was either agriculture or vacant.
 - b. The General Plan land use was employment use or mixed use - land use codes 200 – 850. In the case of mixed use, apply the percentages identified previously.
3. Calculate additional employment by land use category as developable employment use acres * Floor Area Ratio * Building square feet per employee for the appropriate employment land use. Sum employment by sector by TAZ.

Add additional employment by sector to the 2010 base employment by sector to obtain total buildout figures.

POPTAC Ad-Hoc Recommendation Requested: Approval of methodology for producing Buildout Population and Employment Variables.