FINAL - LAND USE ASSUMPTIONS

Prepared for:

City of Yuma, Arizona

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INTRODUCTION

As of January 1, 2012, ARS 9-463.05 will require the preparation of a Land Use Assumptions document which shows:

> "projections of changes in land uses, densities, intensities and population for a specified service area over a period of at least ten years and pursuant to the General Plan of the municipality."

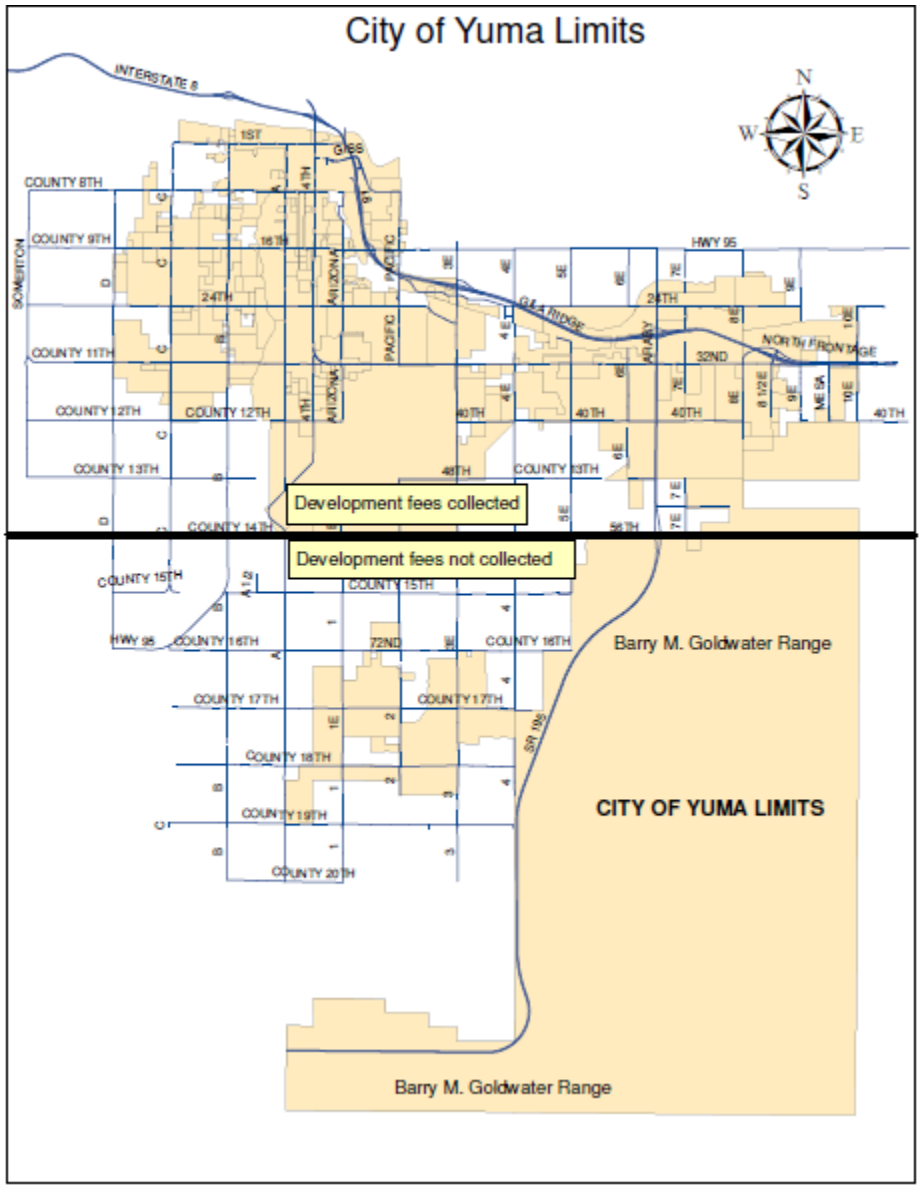
TischlerBise has prepared this Land Use Assumptions document which details current demographic *estimates* and future development *projections* for both residential and nonresidential development that will be used in the infrastructure improvement plan and calculation of the development fees. The current demographic data estimates (as of July 1, 2011) are used in calculating current levels-of-service (LOS) being provided to existing development by the current infrastructure in the City. The development projections are used for calculating the LOS to be provided to future development by planned capital projects or existing infrastructure that was oversized in anticipation of new development. The development projections are also used in forecasting the amount and cost of infrastructure required by new development that will be documented in the cash flow analysis.

A note on rounding: Calculations throughout this report are based on analysis conducted using Excel software. Results are discussed in the report using one-and two-digit places (in most cases), which represent rounded figures. However, the analysis itself uses figures carried to their ultimate decimal places; therefore, the sums and products generated in the analysis may not equal the sum or product if the reader replicates the calculation with the factors shown in the report (due to the rounding of figures shown, not due to rounding in the analysis).

SERVICE AREA

The estimates and projections of residential and nonresidential development in this Land Use Assumptions document are for the City of Yuma as defined by the boundaries shown in the map below. Generally, the City will collect development fees within the City limits north of County 14th/56th Street (also referred to as the "North Service Area") and not collect fees south of this street (also referred to as the "South Service Area"). The City currently has no land use assumptions for this area, nor has it done any infrastructure planning. The City may collect development fees in this area in the future.

Figure 1: Map of City of Yuma Service Area



RESIDENTIAL DEVELOPMENT

Current estimates and future projections of residential development are detailed in this section, including year round population, peak population, and housing units by type

CURRENT ESTIMATES OF RESIDENTIAL DEVELOPMENT

Data from the 2010 Census for the City of Yuma is shown in the figure below.

Figure 2: 2010 Census Estimates

POPULATION	
In Households	87,936
In Group Quarters	2,724
TOTAL	*90,660*
HOUSING	
Housing Units	38,626
Occupied Housing Units (households)	30,714
Vacant Housing Units	7,912
Vacancy Rate	20%
Vacant Units Used For Seasonal, Recreation, or Occasional Use	5,151
Vacancy Rate w/o Seasonal, Recreation, Occasional Use Units	7%
PERSONS PER HOUSEHOLD	2.86

The 2010 Census is dated April 1, 2010. Since then, the City has permitted an additional 276 housing units, resulting in a July 1, 2011 (beginning of Fiscal Year 2012) estimate of 38,902 housing units.

Figure 3: July 1, 2011 Estimate of Housing Units

Housing Units April 1, 2010[1]	38,626
Housing Units Permitted 4/1/10 through 6/30/11[2]	276
Housing Units July 1, 2011	***38,902***

1. 2010 Census.
2. City of Yuma, Department of Community Development.

Data from the 2010 Census on the number of housing units by type for the City will not be released until the end of 2011. To estimate the breakdown of housing units by type (single family, multi-family, and all other types of housing), TischlerBise analyzed the number of housing units by type at the time of the 2000 Census and the number and type of housing units permitted by the City between April 1, 2000 and June 30, 2011 (this is shown in yellow shading in the figure below). The breakdown of the 38,902 housing units by type is shown in the figure below.

Figure 4: July 1, 2011 Estimate of Housing Units by Type

Housing Units July 1, 2011		38,902
	Distribution [1]	
Single Family	***52.4%***	***20,395***
Multi-family	***19.0%***	***7,400***
All Other Types of Housing	***28.6%***	***11,107***
TOTAL	*100.0%*	*38,902*

1. TischlerBise analysis of housing units by type from 2000 Census and housing units permitted from 4/1/00 to 6/30/11.

As shown in Figure 2, the 2010 U.S. Census indicates that Yuma had a residential vacancy rate of 20%. This is the result of Yuma having a large number of homes for seasonal use during the winter months (5,151 units). *A peak population figure should be used in the development fee calculations since it is this peak population to which the City must provide and plan infrastructure and services.*

The first step in calculating the peak population is determining the number of peak households (occupied housing units). When the 5,151 vacant, seasonal units are factored out of the vacancy rate calculations, the vacancy rate drops to 7% resulting in an occupancy rate of 93%. This occupancy rate is applied to the current estimate of housing units by type to determine the number of peak households by type of unit.

Figure 5: July 1, 2011 Estimate of Peak Households

	Housing Units	*Peak Occ. Rates* [1]	***Peak Households***
Single Family	20,395	***93%***	***18,938***
Multi-family	7,400	***93%***	***6,871***
All Other Types of Housing	11,107	***93%***	***10,313***
TOTAL	38,902		***36,121***

1. TischlerBise analysis of 2010 Census data.

The next step in calculating the peak population is determining the number of persons per household. A differentiation by type of housing is necessary to make residential development fees proportionate and reasonably related to the demand for public facilities. Household size is an important demographic factor that helps account for variations in service demand by type of housing.

The 2010 Census shows 2.86 persons per household for all housing units (note this is also the persons per household assumption used in the City's DRAFT *2012 General Plan*). Persons per household by type of housing unit data from the 2010 Census will not be available until the end of 2011. A comparison of the number of persons per household for all types of housing units from the 2010 Census to the 2000 Census shows a 2.75% increase in the size of households. TischlerBise applied this adjustment factor to the number of persons per household from the 2000 Census to derive an estimate for 2010.

Figure 6: Persons per Household by Type of Housing Unit

	2000 Census	*Adjustment Factor*	***2010 Estimate***
Single Family	3.15	***(2.86-2.79)/2.79= 2.75%***	***3.24***
Multi-family	2.48	***(2.86-2.79)/2.79= 2.75%***	***2.55***
All Other Types of Housing	1.91	***(2.86-2.79)/2.79= 2.75%***	***1.96***
TOTAL	2.79		***2.86***

To calculate the July 1, 2011 year round population estimate, TischlerBise applied the occupancy rate from the 2010 Census to the housing units permitted by the City to derive the number of year round households. The number of persons per household is then multiplied by the number of year round households which yields an additional 632 year round persons from these new housing units. This figure is then added to the population figure from the 2010 Census. The July 1, 2011 year round population estimate is 91,292 persons.

Figure 7: July 1, 2011 Estimate Year Round Population

April 1, 2010 Year Round Population in Households[1] 87,936

Population in New Households

	Units Permitted[2]	*Occupancy Rate*[1]	*Households*	*PPH*[3]	*Persons*
Single Family	199	***80%***	158	3.24	512
Multi-family	0	***80%***	0	2.55	0
All Other Types of Housing	77	***80%***	61	1.96	120
TOTAL	276		219		632

July 1, 2011 Population in Households	*88,568*
Population in Group Quarters[1]	*2,724*
TOTAL JULY 1, 2011 YEAR-ROUND POPULATION	***91,292***

1. 2010 US Census.
2. City of Yuma, Community Development Department. For the time period April 1, 2010 to June 30, 2011.
3. Taken from Figure 6.

To calculate the July 1, 2011 peak population estimate, TischlerBise first calculated the April 1, 2010 peak population. The number of households was added to the number of vacant housing units used for "seasonal, recreation, or occasional use". The April 1, 2010 estimate of peak households is 35,865. This figure is then multiplied by the average number of persons per household (2.86). This results in a peak population figure of 102,684 persons in households.

Next, TischlerBise followed the same formula used to calculate the year round population estimate. The notable difference is the use of the 93% occupancy rate which includes seasonal homes in calculating the number of peak households. The number of persons per household is then multiplied by the number of peak households which yields an additional 738 peak persons from these new housing units.

This figure is then added to the peak population estimate from the 2010 Census and the estimated persons in group quarters. The July 1, 2011 peak population estimate is 106,146 persons.

Figure 8: July 1, 2011 Estimate Peak Population

Households April 1, 2010[1]	30,714
Housing Units for seasonal, recreation, or occasional use[1]	5,151
Peak Households April 1, 2010	35,865
Persons per Household[1]	2.86
April 1. 2010 Peak Population in Households	102,684

Population in New Households

	Units Permitted[2]	*Peak Occ. Rate*[1]	*Peak Households*	*PPH*[3]	*Persons*
Single Family	199	***93%***	185	3.24	598
Multi-family	0	***93%***	0	2.55	0
All Other Types of Housing	77	***93%***	71	1.96	140
TOTAL	276		256		738

July 1, 2011 Peak Population in Households	*103,422*
Population in Group Quarters	*2,724*
TOTAL JULY 1, 2011 PEAK ROUND POPULATION	***106,146***

1. 2010 US Census.
2. City of Yuma, Community Development Department. For the time period April 1, 2010 to June 30, 2011.
3. Taken from Figure 6.

FUTURE PROJECTION OF RESIDENTIAL DEVELOPMENT

An annual growth rate of 0.5% is used to project future housing units. This results in an average of 205 housing units per year over the next twenty years.

Figure 9: Projected Total Housing Units

Fiscal Year	*Total Housing Units*	*Annual Increase*[1]	*Additional Housing Units Added During Year*
2012	38,902	***0.5%***	***195***
2013	39,097	***0.5%***	***195***
2014	39,292	***0.5%***	***196***
2015	39,488	***0.5%***	***197***
2016	39,686	***0.5%***	***198***
2017	39,884	***0.5%***	***199***
2018	40,084	***0.5%***	***200***
2019	40,284	***0.5%***	***201***
2020	40,486	***0.5%***	***202***
2021	40,688	***0.5%***	***203***
2022	40,891	***0.5%***	***204***
2023	41,096	***0.5%***	***205***
2024	41,301	***0.5%***	***207***
2025	41,508	***0.5%***	***208***
2026	41,715	***0.5%***	***209***
2027	41,924	***0.5%***	***210***
2028	42,134	***0.5%***	***211***
2029	42,344	***0.5%***	***212***
2030	42,556	***0.5%***	***213***
2031	42,769	***0.5%***	***214***
2032	42,983	***0.5%***	***215***

1. City of Yuma.

To project the number of new housing units by type, TischlerBise applied the housing distribution percentages from the DRAFT *2012 General Plan* to the annual increases in housing units from the above figure.

Figure 10: Projected New Housing Units by Type

Fiscal Year	*Additional Housing Units Added During Year*	*Housing Units by Type*		
		Single Family	*Multi-family*	*All Other Types of Housing*
Distribution [1] =>		*44%*	*34%*	*22%*
2012	195	***86***	***65***	***44***
2013	195	***86***	***65***	***44***
2014	196	***87***	***66***	***44***
2015	197	***87***	***66***	***44***
2016	198	***88***	***66***	***44***
2017	199	***88***	***67***	***45***
2018	200	***88***	***67***	***45***
2019	201	***89***	***67***	***45***
2020	202	***89***	***68***	***45***
2021	203	***90***	***68***	***46***
2022	204	***90***	***68***	***46***
2023	205	***91***	***69***	***46***
2024	207	***91***	***69***	***46***
2025	208	***92***	***70***	***46***
2026	209	***92***	***70***	***47***
2027	210	***92***	***70***	***47***
2028	211	***93***	***71***	***47***
2029	212	***93***	***71***	***47***
2030	213	***94***	***71***	***48***
2031	214	***94***	***72***	***48***

1. City of Yuma DRAFT 2012 General Plan.

The projected number of housing units by type is then added to the July 1, 2011 estimate of housing units by type to project the total number of housing units by type.

Figure 11: Projected Total Housing Units by Type

Fiscal Year	*Single Family*	*Multi-family*	*All Other Types of Housing*	*TOTAL*
2012	20,395	7,400	11,107	38,902
2013	20,481	7,465	11,150	39,097
2014	20,567	7,530	11,194	39,292
2015	20,654	7,596	11,238	39,488
2016	20,741	7,662	11,282	39,686
2017	20,829	7,729	11,327	39,884
2018	20,917	7,796	11,371	40,084
2019	21,005	7,863	11,416	40,284
2020	21,094	7,930	11,461	40,486
2021	21,183	7,998	11,507	40,688
2022	21,273	8,066	11,552	40,891
2023	21,363	8,135	11,598	41,096
2024	21,454	8,204	11,644	41,301
2025	21,545	8,273	11,690	41,508
2026	21,636	8,342	11,737	41,715
2027	21,728	8,412	11,784	41,924
2028	21,821	8,482	11,831	42,134
2029	21,914	8,553	11,878	42,344
2030	22,007	8,624	11,925	42,556
2031	22,101	8,695	11,973	42,769
2032	22,195	8,767	12,021	42,983

To project the number of peak households, TischlerBise applied the 93% occupancy rate to the projected number of housing units by type from the above figure.

Figure 12: Projected Total Peak Households by Type

Fiscal Year	*Single Family*	*Multi-family*	*All Other Types of Housing*	*TOTAL*
Occupancy Rate[1] *=>*	*93%*	*93%*	*93%*	
2012	18,938	6,871	10,313	***36,121***
2013	19,017	6,931	10,353	***36,302***
2014	19,097	6,992	10,394	***36,483***
2015	19,178	7,053	10,435	***36,666***
2016	19,259	7,115	10,476	***36,849***
2017	19,340	7,176	10,517	***37,033***
2018	19,421	7,238	10,559	***37,219***
2019	19,504	7,301	10,600	***37,405***
2020	19,586	7,363	10,642	***37,592***
2021	19,669	7,426	10,684	***37,780***
2022	19,752	7,490	10,727	***37,969***
2023	19,836	7,553	10,769	***38,158***
2024	19,920	7,617	10,812	***38,349***
2025	20,005	7,681	10,855	***38,541***
2026	20,090	7,746	10,898	***38,734***
2027	20,175	7,811	10,941	***38,927***
2028	20,261	7,876	10,985	***39,122***
2029	20,347	7,942	11,029	***39,318***
2030	20,434	8,007	11,073	***39,514***
2031	20,521	8,074	11,117	***39,712***

1. TischlerBise analysis of 2010 Census.

Multiplying the number of peak households from the above figure by the current estimate of persons per household from Figure 6 yields the projections of peak population shown in Figure 13 below.

Figure 13: Projected Peak Population

Fiscal Year	TOTAL	Single Family	Multi-family	All Other Types of Housing	Subtotal
Persons per Household [1] =>		3.24	2.55	1.96	
2012	**106,146**	258	154	79	491
2013	**106,637**	259	155	80	494
2014	**107,131**	260	156	80	496
2015	**107,627**	262	157	80	499
2016	**108,126**	263	157	81	501
2017	**108,628**	264	158	81	504
2018	**109,131**	266	159	82	506
2019	**109,638**	267	160	82	509
2020	**110,147**	268	161	82	511
2021	**110,658**	270	161	83	514
2022	**111,172**	271	162	83	517
2023	**111,689**	272	163	84	519
2024	**112,208**	274	164	84	522
2025	**112,730**	275	165	85	524
2026	**113,254**	276	166	85	527
2027	**113,781**	278	166	85	530
2028	**114,311**	279	167	86	532
2029	**114,843**	281	168	86	535
2030	**115,378**	282	169	87	538
2031	**115,915**	283	170	87	540

1. Taken from Figure 6.

NONRESIDENTIAL DEVELOPMENT

Current estimates and future projections of nonresidential development are detailed in this section, including jobs by type and nonresidential square footage by type.

CURRENT ESTIMATES OF NONRESIDENTIAL DEVELOPMENT

In addition to data on residential development, the calculation of the infrastructure improvement plan and development fees requires data on nonresidential construction in Yuma. The factors shown in the figure below are derived from national data published by the Institute of Transportation Engineers (ITE) and the Urban Land Institute (ULI).

Figure 14: Trip Generation and Employee Density Factors for Nonresidential Land Uses

ITE Code	*Land Use / Size*	*Demand Unit*	*Wkdy Trip Ends Per Dmd Unit*[1]	*Wkdy Trip Ends Per Employee*[1]	*Emp Per Dmd Unit*[2]	*Sq Ft Per Emp*[2]	*Adjust. Factor*[1]
Commercial / Shopping Center[3]							
820	10K gross leasable area	1,000 Sq Ft	152.03	na	3.33	300	12%
820	25K gross leasable area	1,000 Sq Ft	110.32	na	3.33	300	16%
820	50K gross leasable area	1,000 Sq Ft	86.56	na	2.86	350	19%
820	**100K gross leasable area**	**1,000 Sq Ft**	**67.91**	**na**	**2.50**	**400**	**21%**
820	200K gross leasable area	1,000 Sq Ft	53.28	na	2.22	450	26%
820	400K gross leasable area	1,000 Sq Ft	41.80	na	2.00	500	27%
General Office[4]							
710	10K gross floor area	1,000 Sq Ft	22.66	5.06	4.48	223	50%
710	**25K gross floor area**	**1,000 Sq Ft**	**18.35**	**4.43**	**4.14**	**241**	**50%**
710	50K gross floor area	1,000 Sq Ft	15.65	4.00	3.91	256	50%
710	100K gross floor area	1,000 Sq Ft	13.34	3.61	3.70	271	50%
710	200K gross floor area	1,000 Sq Ft	11.37	3.26	3.49	287	50%
710	Average	1,000 Sq Ft	11.01	3.32	3.32	302	50%
Other Nonresidential							
770	Business Park[5]	1,000 Sq Ft	12.76	4.04	3.16	317	50%
760	Research & Dev Center	1,000 Sq Ft	8.11	2.77	2.93	342	50%
730	Government Office Building	1,000 Sq Ft	68.93	11.95	5.77	173	50%
610	Hospital	1,000 Sq Ft	16.50	5.20	3.17	315	50%
565	Day Care	student	4.48	28.13	0.16	na	50%
550	University/College	student	2.38	9.13	0.26	na	50%
530	High School	student	1.71	19.74	0.09	na	50%
520	Elementary School	student	1.29	15.71	0.08	na	50%
520	**Elementary School**	**1,000 Sq Ft**	**15.43**	**15.71**	**0.98**	**1,018**	**50%**
320	Lodging	room	5.63	12.81	0.44	na	50%
150	Warehousing	1,000 Sq Ft	3.56	3.89	0.92	1,093	50%
140	Manufacturing	1,000 Sq Ft	3.82	2.13	1.79	558	50%
110	**Light Industrial**	**1,000 Sq Ft**	**6.97**	**3.02**	**2.31**	**433**	**50%**

1. *Trip Generation* , Institute of Transportation Engineers, 2008.
2. Employees per demand unit calculated from trip rates, except for Shopping Center data, which are derived from *Development Handbook* and *Dollars and Cents of Shopping Centers,* published by the Urban Land Institute
3. Based on data published by ITE in *Trip Generation Handbook* (2004), the best correlation between floor area and trips is a trendline with the equation ((0.65*LN(KSF)) + 5.83).
4. Based on data published by ITE in *Trip Generation Handbook* (2004), the best correlation between floor area and floor area and trips is a trendline with the equation ((0.77*LN(KSF)) + 3.65).
5. According to ITE, a Business Park is a group of flex-type buildings served by a common roadway system. The tenant space includes a variety of uses with an average mix of 20-30% office/commercial and 70-80% industrial/warehousing.

Data from the City's previous development fee study indicates a total of 15,869,576 square feet of nonresidential floor area on July 1, 2006. Since then, the City has permitted an additional 1,861,399 square feet of nonresidential development. The City must plan its infrastructure for all potential users and assumes any unoccupied development will one day be occupied. The land use assumptions and infrastructure improvements plans utilize both a peak population (to account for housing units occupied on a seasonal basis) and all permitted nonresidential development (both occupied and vacant space) in calculating levels-of-service and capital improvement project attributable to new development

The July 1, 2011 estimate of nonresidential floor area by type is shown in the figure below.

Figure 15: July 1, 2011 Estimate of Nonresidential Floor Area by Type

	Total Nonres SF July 1, 2006 [1]	*Square Feet Added FY2007-11* [2]	***Total Nonres SF July 1, 2011***
Commercial	6,150,554	244,765	***6,395,319***
Office/Institutional	6,200,104	833,598	***7,033,702***
Industrial/Flex	3,518,918	783,036	***4,301,954***
TOTAL	15,869,576	1,861,399	***17,730,975***

1. TischlerBise, *Citywide Development Fee Study*, City of Yuma.
2. City of Yuma permit data.

The total number of square feet by type of nonresidential development in Figure 15 is divided by the number of square feet per job from Figure 14 to determine the July 1, 2011 estimate of 47,632 jobs in the City.

Figure 16: July 1, 2011 Estimate of Jobs by Type

	Total Nonres SF July 1, 2011 [1]	*SF per Job* [2]	*Jobs*	*Distribution*
Commercial	6,395,319	***400***	***15,988***	***33.6%***
Office/Institutional	7,033,702	***324***	***21,709***	***45.6%***
Industrial/Flex	4,301,954	***433***	***9,935***	***20.9%***
TOTAL			***47,632***	100.0%

1. From Figure 15.
2. From Figure 14.

FUTURE PROJECTIONS OF NONRESIDENTIAL DEVELOPMENT

An annual growth rate of 1.22% is used to project future employment. This results in an average of 661 jobs per year over the next twenty years.

Figure 17: Projected Jobs

Fiscal Year	*Total Jobs*	***Annual Increase*** [1]	***Additional Jobs Added During Year***
2012	47,632	***1.22%***	***583***
2013	48,216	***1.22%***	***591***
2014	48,807	***1.22%***	***598***
2015	49,404	***1.22%***	***605***
2016	50,010	***1.22%***	***613***
2017	50,622	***1.22%***	***620***
2018	51,242	***1.22%***	***628***
2019	51,870	***1.22%***	***635***
2020	52,505	***1.22%***	***643***
2021	53,148	***1.22%***	***651***
2022	53,799	***1.22%***	***659***
2023	54,458	***1.22%***	***667***
2024	55,126	***1.22%***	***675***
2025	55,801	***1.22%***	***684***
2026	56,484	***1.22%***	***692***
2027	57,176	***1.22%***	***700***
2028	57,877	***1.22%***	***709***
2029	58,586	***1.22%***	***718***
2030	59,303	***1.22%***	***726***
2031	60,030	***1.22%***	***735***
2032	60,765	***1.22%***	***744***

1. City of Yuma.

To project the number of jobs by type, TischlerBise applied the distribution percentages from Figure 16 to the projected total number of jobs from Figure 17.

Figure 18: Projected Jobs by Type of Employment

		Jobs by Type		
	Total Jobs	Commercial	Office/ Institutional	Industrial/ Flex
Distribution of Jobs[1] =>		**33.6%**	**45.6%**	**20.9%**
2012	47,632	**15,988**	**21,709**	**9,935**
2013	48,216	**16,184**	**21,975**	**10,057**
2014	48,807	**16,382**	**22,244**	**10,180**
2015	49,404	**16,583**	**22,517**	**10,305**
2016	50,010	**16,786**	**22,792**	**10,431**
2017	50,622	**16,992**	**23,072**	**10,559**
2018	51,242	**17,200**	**23,354**	**10,688**
2019	51,870	**17,411**	**23,640**	**10,819**
2020	52,505	**17,624**	**23,930**	**10,952**
2021	53,148	**17,840**	**24,223**	**11,086**
2022	53,799	**18,058**	**24,520**	**11,222**
2023	54,458	**18,280**	**24,820**	**11,359**
2024	55,126	**18,503**	**25,124**	**11,498**
2025	55,801	**18,730**	**25,432**	**11,639**
2026	56,484	**18,960**	**25,743**	**11,782**
2027	57,176	**19,192**	**26,059**	**11,926**
2028	57,877	**19,427**	**26,378**	**12,072**
2029	58,586	**19,665**	**26,701**	**12,220**
2030	59,303	**19,906**	**27,028**	**12,370**
2031	60,030	**20,150**	**27,359**	**12,521**
2032	60,765	**20,396**	**27,694**	**12,674**

1. From Figure 16.

To project the amount of new nonresidential floor area by type of employment, TischlerBise applied the employee density figures for commercial, office/institutional, and industrial/flex from Figure 14 to the new jobs by type from Figure 18. Figure 19 shows the projected amount of new nonresidential floor area by type of employment.

Figure 19: Projected New Nonresidential Floor Area by Type of Employment

	Commercial	*Office/ Institutional*	*Industrial/ Flex*	*Total Added During Year*
SF per Job [1] ***=>***	***400***	***324***	***433***	
2012	78,338	106,368	52,696	***237,402***
2013	79,298	107,671	53,341	***240,310***
2014	80,269	108,990	53,995	***243,254***
2015	81,252	110,325	54,656	***246,233***
2016	82,248	111,676	55,326	***249,249***
2017	83,255	113,044	56,003	***252,303***
2018	84,275	114,429	56,689	***255,393***
2019	85,307	115,830	57,384	***258,521***
2020	86,352	117,249	58,087	***261,688***
2021	87,410	118,685	58,798	***264,894***
2022	88,481	120,139	59,518	***268,138***
2023	89,564	121,611	60,248	***271,423***
2024	90,662	123,101	60,986	***274,748***
2025	91,772	124,608	61,733	***278,113***
2026	92,896	126,135	62,489	***281,520***
2027	94,034	127,680	63,254	***284,968***
2028	95,186	129,244	64,029	***288,459***
2029	96,352	130,827	64,813	***291,992***
2030	97,532	132,430	65,607	***295,569***
2031	98,727	134,052	66,411	***299,190***
2032	99,936	135,694	67,224	***302,854***

1. Taken from Figure 14.

To project the total number of square feet of nonresidential floor area by type of employment, TischlerBise added the projected square footage from Figure 19 to the current estimate from Figure 16.

Figure 20: Projected Total Nonresidential Floor Area by Type of Employment

	Commercial	*Office/ Institutional*	*Industrial/ Flex*	***Total Square Feet***
SF per Job [1] ***=>***	***400***	***324***	***433***	
2012	6,395,319	7,033,702	4,301,954	***17,730,975***
2013	6,473,657	7,140,070	4,354,650	***17,968,377***
2014	6,552,955	7,247,741	4,407,991	***18,208,687***
2015	6,633,224	7,356,730	4,461,986	***18,451,940***
2016	6,714,476	7,467,055	4,516,642	***18,698,174***
2017	6,796,724	7,578,731	4,571,968	***18,947,423***
2018	6,879,979	7,691,775	4,627,971	***19,199,726***
2019	6,964,254	7,806,204	4,684,661	***19,455,119***
2020	7,049,561	7,922,034	4,742,045	***19,713,640***
2021	7,135,914	8,039,283	4,800,131	***19,975,328***
2022	7,223,323	8,157,969	4,858,930	***20,240,222***
2023	7,311,804	8,278,108	4,918,448	***20,508,360***
2024	7,401,369	8,399,719	4,978,696	***20,779,783***
2025	7,492,030	8,522,820	5,039,681	***21,054,531***
2026	7,583,802	8,647,428	5,101,414	***21,332,644***
2027	7,676,699	8,773,563	5,163,903	***21,614,164***
2028	7,770,733	8,901,243	5,227,157	***21,899,132***
2029	7,865,919	9,030,487	5,291,186	***22,187,591***
2030	7,962,271	9,161,314	5,355,999	***22,479,584***
2031	8,059,803	9,293,743	5,421,606	***22,775,153***
2032	8,158,530	9,427,795	5,488,017	***23,074,342***

1. Taken from Figure 12.

CURRENT ESTIMATES AND FUTURE PROJECTIONS OF VEHICLE TRIP ENDS

Average weekday vehicle trip ends for residential and nonresidential development are from the reference book, *Trip Generation*, published by the Institute of Transportation Engineers in 2008. A "trip end" represents a vehicle either entering or exiting a development (as if a traffic counter were placed across a driveway). Trip ends are calculated based on the number of units for residential development and per thousand square feet for nonresidential development.

Trip rates are adjusted to avoid over-estimating the number of actual trips because one vehicle trip is counted in the trip rates of both the origination and destination points. A factor of 57% is used for residential development to account for commuting patterns in the City. A simple factor of 50% has been applied to the office/institutional and industrial/flex categories.

The commercial category has a trip factor of less than 50% due to two characteristics of this land use. First, commercial development attracts vehicles as they pass-by on arterial and collector roads ("pass-by" trips). For example, when someone stops at a convenience store on their way home from work, the convenience store is not their primary destination.

A second adjustment for diverted linked trips is made to the commercial category. Diverted linked trips are trips that are attracted from the traffic volume on roads in the vicinity of commercial development but require a diversion from one road to another road to gain access to the commercial development. These trips add traffic to streets adjacent to the development, but do not add trips to a community's transportation network.

Using a 100,000 square foot shopping center as an example, pass-by trips account for 34% of total trips while diverted link trip account for an additional 24% of total trips. The remaining 42% of primary trips (100%-34%-24% = 42%) is adjusted by 50% to avoid over-estimating the number of actual trips because one vehicle trip is counted in the trip rates of both the origination and destination points. The total commercial trip adjustment factor for a 100,000 square foot shopping center is 21% (42% x 50% = 21%).

Figure 21 summarizes the commercial trip adjustments for pass-by trips and diverted linked trips.

Figure 21: Trip Adjustment Factors for Commercial Land Uses

Floor Area in thousands (KSF)	All Commercial Trips (a)	Comm. Pass-by Trips (b)*	Comm. Diverted-Link Trips (c)**	Primary Comm. Trips (d=(a-(b+c))	Origin - Destination Adj. Factor (e)***	***Commercial Trip Adj Factor (d x e)***
10	100%	52%	24%	24%	50%	***12%***
25	100%	45%	24%	31%	50%	***16%***
50	100%	39%	24%	37%	50%	***19%***
100	100%	34%	24%	42%	50%	***21%***
328	100%	25%	24%	51%	50%	***26%***
400	100%	23%	24%	53%	50%	***27%***
800	100%	18%	24%	58%	50%	***29%***

* Based on data published by ITE in *Trip Generation Handbook* (2004), the best trendline correlation between pass-by trips and floor area is a logarithmic curve with the equation ((-7.6967*LN(KSF)) + 69.448).
** Based on data published by ITE in *Trip Generation Handbook* (2004).
*** To account for the origin-destination relationship of a trip, an adjustment factor of 50% is applied to the primary trips to account for only the trip destinations, i.e. the trips attracted to a land use.

Using the current estimates of housing units by type and nonresidential square footage by type, TischlerBise applied the trip end estimates and adjustment factors to calculate the average weekday trip ends for residential and nonresidential development. TischlerBise estimates there are 341,633 vehicle trip ends attributable to development in the City of Yuma. Residential development accounts for 170,902 trips with nonresidential development accounting for 170,731 trips.

Figure 22: Current Estimate of Vehicle Trips Ends from Development in Yuma

Residential Vehicle Trips on an Average Weekday

Residential Units	Assumptions	
Single Family	20,395	
Multi-family	7,400	
All Other Residential	11,107	
Average Weekday Vehicle Trip Ends per Unit*	***Trip Rate*** [1]	***Adj. Factor***
Single Family	***9.57***	***57%***
Multi-family	***6.65***	***57%***
All Other Residential	***4.99***	***57%***
Residential Vehicle Trip Ends of an Average Weekday		
Single Family	111,260	
Multi-family	28,050	
All Other Residential	31,592	
Total Residential Trips	***170,902***	

Nonresidential Vehicle Trips on an Average Weekday

Nonresidential Gross Floor Area (1,000 sq. ft.)*	Assumptions	
Commercial	6,395	
Office/Institutional	7,034	
Industrial/Flex	4,302	
Average Weekday Vehicle Trips Ends per 1,000 Sq. Ft.	***Trip Rate*** [1]	***Adj. Factor*** [2]
Commercial	***67.91***	***21%***
Office/Institutional	***18.35***	***50%***
Industrial/Flex	***6.97***	***50%***
Nonresidential Vehicle Trips on an Average Weekday		
Commercial	91,204	
Office/Institutional	64,534	
Industrial/Flex	14,992	
Total Nonresidential Trips	***170,731***	

TOTAL TRIPS	***341,633***

1. Institute of Transportation Engineers(ITE), *Trip Generation* (2008).
2. Taken from Figure 19.

Future projections of vehicle trips ends are shown in the figure below. Trip generation rates and adjustment factors are applied to projections of housing units by type from Figure 11 and nonresidential square footage by type of employment from Figure 20.

Figure 23: Projected New Vehicle Trips Ends from New Development in Yuma

	Single Family	*Multi-family*	*All Other Types of Housing*		*Commercial*	*Office/ Institutional*	*Industrial/ Flex*		
Trip Rate per housing unit/1,000 sf[1] =>	***9.57***	***6.65***	***4.99***		***67.91***	***18.35***	***6.97***		
Trip Rate Adjustment Factors[2] =>	***57%***	***57%***	***57%***	***Residential Subtotal***	***21%***	***50%***	***50%***	***Nonresidential Subtotal***	***TOTAL***
2011	111,260	28,050	31,592	***170,902***	91,204	64,534	14,992	***170,731***	***341,633***
2012	111,728	28,297	31,716	***171,741***	92,321	65,510	15,176	***173,008***	***344,749***
2013	112,198	28,546	31,841	***172,584***	93,452	66,498	15,362	***175,312***	***347,897***
2014	112,671	28,795	31,966	***173,432***	94,597	67,498	15,550	***177,645***	***351,077***
2015	113,146	29,046	32,092	***174,283***	95,756	68,510	15,740	***180,007***	***354,290***
2016	113,623	29,298	32,218	***175,139***	96,929	69,535	15,933	***182,397***	***357,536***
2017	114,103	29,551	32,345	***175,999***	98,116	70,572	16,128	***184,817***	***360,816***
2018	114,585	29,805	32,473	***176,863***	99,318	71,622	16,326	***187,266***	***364,129***
2019	115,070	30,061	32,601	***177,732***	100,534	72,685	16,526	***189,745***	***367,477***
2020	115,557	30,318	32,730	***178,605***	101,766	73,760	16,728	***192,255***	***370,860***
2021	116,046	30,577	32,860	***179,482***	103,013	74,849	16,933	***194,795***	***374,278***
2022	116,538	30,836	32,990	***180,364***	104,274	75,952	17,141	***197,367***	***377,731***
2023	117,032	31,097	33,121	***181,250***	105,552	77,067	17,351	***199,970***	***381,220***
2024	117,529	31,359	33,253	***182,141***	106,845	78,197	17,563	***202,605***	***384,746***
2025	118,028	31,623	33,385	***183,036***	108,153	79,340	17,778	***205,272***	***388,308***
2026	118,530	31,888	33,518	***183,936***	109,478	80,497	17,996	***207,972***	***391,907***
2027	119,034	32,154	33,651	***184,840***	110,819	81,669	18,217	***210,705***	***395,544***
2028	119,541	32,422	33,785	***185,748***	112,177	82,855	18,440	***213,471***	***399,219***
2029	120,050	32,690	33,920	***186,661***	113,551	84,055	18,666	***216,271***	***402,933***
2030	120,562	32,961	34,056	***187,579***	114,942	85,270	18,894	***219,106***	***406,685***
2031	121,077	33,232	34,192	***188,501***	116,350	86,500	19,126	***221,975***	***410,477***

1. Institute of Transportation Engineers (ITE), *Trip Generation* (2008).
2. Taken from Figure 21.

SUMMARY OF CURRENT ESTIMATES AND FUTURE PROJECTIONS

Current estimates of residential and nonresidential development for Fiscal Year 2012 (starting July 1, 2011) are shown at the top of Figure 24. Future projections of residential and nonresidential development through 2031 are shown in the middle and lower portions of the figure.

Figure 24: Summary of Development Projections 2011-2031

Fiscal Year	*Peak Population*	*Housing Units*	*Jobs*	*Nonresidential Square Footage (1,000's)*	*Vehicle Trip Ends*
2012	**106,146**	**38,902**	**47,632**	**17,731**	**341,633**
2013	***106,637***	***39,097***	***48,216***	***17,968***	***344,749***
2014	***107,131***	***39,292***	***48,807***	***18,209***	***347,897***
2015	***107,627***	***39,488***	***49,404***	***18,452***	***351,077***
2016	***108,126***	***39,686***	***50,010***	***18,698***	***354,290***
2017	***108,628***	***39,884***	***50,622***	***18,947***	***357,536***
2018	***109,131***	***40,084***	***51,242***	***19,200***	***360,816***
2019	***109,638***	***40,284***	***51,870***	***19,455***	***364,129***
2020	***110,147***	***40,486***	***52,505***	***19,714***	***367,477***
2021	***110,658***	***40,688***	***53,148***	***19,975***	***370,860***
2022	***111,172***	***40,891***	***53,799***	***20,240***	***374,278***
2023	***111,689***	***41,096***	***54,458***	***20,508***	***377,731***
2024	***112,208***	***41,301***	***55,126***	***20,780***	***381,220***
2025	***112,730***	***41,508***	***55,801***	***21,055***	***384,746***
2026	***113,254***	***41,715***	***56,484***	***21,333***	***388,308***
2027	***113,781***	***41,924***	***57,176***	***21,614***	***391,907***
2028	***114,311***	***42,134***	***57,877***	***21,899***	***395,544***
2029	***114,843***	***42,344***	***58,586***	***22,188***	***399,219***
2030	***115,378***	***42,556***	***59,303***	***22,480***	***402,933***
2031	***115,915***	***42,769***	***60,030***	***22,775***	***406,685***
2032	***116,456***	***42,983***	***60,765***	***23,074***	***410,477***