



**DRAFT Project Report**  
**Socioeconomic Analysis for Whittier Main**  
**Oil Development Project**

Prepared for  
**Marine Research Specialists**  
**Ventura, CA**

Submitted by  
**AECOM Technical Services, Inc (AECOM)**

**August 6, 2010**

**ERA Project No. 10842745.01**

**Table of Contents**

---

- I. Executive Summary ..... 5**
- II. Socioeconomic Overview..... 10**
  - Historic Data ..... 10
  - Projections..... 20
- III. Residential Housing Trends..... 24**
  - Historic Residential Building Data ..... 24
  - Historic Residential Sales Data..... 25
  - Home Purchase Motivations and Key Age Cohorts ..... 27
- IV. Case Studies on Potential Price Depreciation..... 34**
  - National Literature Review ..... 34
  - Local Case Studies ..... 40
  - Potential Effect on Residential Real Estate Values ..... 46
- V. Fiscal Analysis ..... 52**
  - Historic Taxes..... 52
  - Potential Level of Price Depreciation and Fiscal Consequence..... 54
  - Potential Level of Project Fiscal Benefit..... 62
  - Conclusions ..... 65

## Index of Tables/Figures

---

Tables

Table 1: Historic Household and Housing Unit Growth in Whittier..... 10

Table 2: Housing Tenure ..... 13

Table 3: Sex and Age Profile ..... 14

Table 4: Ethnic Change (Census) ..... 15

Table 5: Income and Benefits ..... 17

Table 6: 2009 Ten Largest Employers in Whittier ..... 18

Table 7: Whittier Employment Profile (In-Place and Resident Employment)..... 19

Table 8: Near-Term Projections (2009 – 2014)..... 21

Table 9: Whittier Population Projections ..... 21

Table 10: Whittier Employment (In-Place) Projections..... 23

Table 11: Housing Units by Units in Structure (2000)..... 25

Table 12: Buying Preference by Age Cohort..... 30

Table 13: Year Whittier Householder Moved In (Owner and Renter) ..... 33

Table 14: Summary of Major Findings ..... 35

Table 15: 2009 Assessed Values (Residential Properties Only) ..... 59

Table 16: Estimate of Potential Price Depreciation (2009 Dollars)..... 61

Table 17: Potential Annual Fiscal Benefit to the City from Oil Production ..... 63

Table 18: Potential Annual Fiscal Benefit to the City from Gas Production..... 64

Table 19: Potential Annual Fiscal Benefit to the City from Gas and Oil Production ..... 64

Figures

Figure 1: Historic Household and Housing Unit Growth Comparison with County .....	11
Figure 2: Historic Persons per Household Growth Comparison with County .....	12
Figure 3: Age Profile Comparison with County .....	15
Figure 4: Ethnic Change (ESRI) .....	16
Figure 5: Income and Benefits Comparison with County .....	18
Figure 6: Unemployment Rate Comparison with County .....	20
Figure 7: Population Projection Comparison with County .....	22
Figure 8: Long Term Population by Age (County) .....	22
Figure 9: Whittier Employment (In-Place) Projections Comparison with County .....	23
Figure 10: Building Permit Data and Comparison with County .....	24
Figure 11: Sales Comparison with County .....	26
Figure 12: Historic Median Sales Price Comparison with County in 2009 Dollars .....	26
Figure 13: Sales Price Per Square Foot Comparison with County in 2009 Dollars .....	27
Figure 14: Key Factors Influencing Home Purchase Decision .....	29
Figure 15: Key Factors Influencing Home Sales Decision .....	30
Figure 16: Average Annual Percent of People Buying/Selling Homes by Age Group .....	31
Figure 17: Population Change in Whittier by Buying/Selling Age Cohorts .....	31
Figure 18: Population Change in County by Buying/Selling Age Cohorts .....	32
Figure 19: Tenure in Previous Home (Owners) .....	32
Figure 20: Complaints by Type .....	41
Figure 21: Complaints by Year .....	41
Figure 22: Location of Complaints Lodged against Matrix Oil Corporation .....	42
Figure 23: Distribution of Complaints Lodged against Matrix Oil Corporation .....	43
Figure 24: Distance of Complaints Lodged from Oil Rig Site .....	44
Figure 25: Sycamore Site Home Sales (Constant 2009 Dollars) .....	47
Figure 26: Honolulu Terrace Matrix Site Homes Sales (Constant 2009 Dollars) .....	48
Figure 27: La Habra Site Home Sales (Constant 2009 Dollars) .....	49
Figure 28: Median Sales Price per Square Foot for all Sites and County (Constant 2009 Dollars) .....	50
Figure 29: Median Sales Price per Square Foot for Matrix, Sycamore, and City (Constant 2009 Dollars) .....	51
Figure 30: Historic Tax Trends in Whittier .....	53
Figure 31: Historic Taxable Sales per Capita .....	53
Figure 32: Sales Tax Index (Retail and Motor Vehicle) .....	54
Figure 33: Noise Impact Area (Drilling and Operations) .....	56
Figure 34: Visual Impact Area (View Shed) .....	57
Figure 35: Impact Areas in Comparison to City .....	58



## General & Limiting Conditions

Every reasonable effort has been made to ensure that the data contained in this report are accurate as of the date of this study; however, factors exist that are outside the control of AECOM and that may affect the estimates and/or projections noted herein. This study is based on estimates, assumptions and other information developed by AECOM from its independent research effort, general knowledge of the industry, and information provided by and consultations with the client and the client's representatives. No responsibility is assumed for inaccuracies in reporting by the client, the client's agent and representatives, or any other data source used in preparing or presenting this study.

This report is based on information that was current as of August 2010 and AECOM has not undertaken any update of its research effort since such date.

Because future events and circumstances, many of which are not known as of the date of this study, may affect the estimates contained therein, no warranty or representation is made by AECOM that any of the projected values or results contained in this study will actually be achieved.

Possession of this study does not carry with it the right of publication thereof or to use the name of "AECOM" or "Economics Research Associates" in any manner without first obtaining the prior written consent of AECOM. No abstracting, excerpting or summarization of this study may be made without first obtaining the prior written consent of AECOM. Further, AECOM has served solely in the capacity of consultant and has not rendered any expert opinions. This report is not to be used in conjunction with any public or private offering of securities, debt, equity, or other similar purpose where it may be relied upon to any degree by any person other than the client, nor is any third party entitled to rely upon this report, without first obtaining the prior written consent of AECOM. This study may not be used for purposes other than that for which it is prepared or for which prior written consent has first been obtained from AECOM. Any changes made to the study, or any use of the study not specifically prescribed under agreement between the parties or otherwise expressly approved by AECOM, shall be at the sole risk of the party making such changes or adopting such use.

This study is qualified in its entirety by, and should be considered in light of, these limitations, conditions and considerations.

## I. Executive Summary

Based on information provided by Marine Research Specialists (MRS), the proposed project (Project) could have ongoing operations associated with drilling wells and oil and gas extraction for the next 20 plus years. The purpose of this analysis is to determine if the level of proposed operations could adversely affect local property values and if such impacts would outweigh potential benefits realized by the City of Whittier (City). A number of important indicators were examined to determine the potential effect of Project operations on residential home values.

First, the City is mostly built out. Examining historic and projected population and housing unit growth the City has had and is projected to have slow growth during the next two decades. As such, the resale of existing homes (or new infill development) will drive future demographic change in the City. Second, the population is slightly older than the County of Los Angeles (County) average. Consequently, in the next two decades many of these individuals may be forced to sell their homes due to old age or changes in their housing product preference (e.g. move down from house to condo). Third, based on population forecasts for the region (largely driven by the baby boomer generation) there will be mismatch in age groups typically associated with buying and selling homes in the City. This will place additional pressures on the housing market as supply will likely outweigh demand in the future.

The aforementioned key factors will play an important role shaping the future identity of the City. While the ultimate effect of the Project is unknown, the City should consider if the Project has the potential to change the overall perception of the City. The addition of a significant negative external factor could make the City less competitive to attract future residents (new home buyers) and thus hurt the marketability of residential properties. In an attempt to determine the potential effect of the Project on residential home values (and thus the relative impact on the City), AECOM:

- Reviewed variety of national academic studies that isolated the effect of undesirable external nuisances on various housing markets;
- Interviewed local residential real estate realtors regarding their impression of potential price depreciation for the selected comparable operations; and
- Examined sales data within a determined influence area of existing oil and gas extraction operations in the City and one operation located in neighboring La Habra Heights.

The most applicable academic research suggests a minimal effect on residential home values within a variety of distances (relatively close proximity) of the analyzed nuisance (odor, visual, and general health concerns). Noise nuisances, above acceptable norms, were also found to have an adverse impact on housing values on a per decibel basis, ranging from 0.4 to 0.6 percent decline per decibel

increase. National academic research suggests even in extreme circumstances it is unlikely that the depreciation would exceed eight percent from the assumed market value of the home (without the various nuisance factors that include odor, visual, general health concerns and noise being present).

Our interviews with local realtors suggest that home values most affected by the existing oil operations in the area could be depressed by approximately 10 percent compared to other similar products in the same market. A couple interviewees suggested that these same homes typically took longer to sell. In general, those brokers we interviewed also noted that since oil drilling is pervasive throughout Southern California potential buyers are typically accustomed to and not concerned with oil facility aesthetics as long as they are not immediately adjacent to them. However, nuisances such as noise, visual or health concerns do affect potential buyers' decisions making and are thus important considerations when determining the overall marketability of a home. It is important to note that no analytic research was conducted by the interviewees<sup>1</sup>.

Using residential home transaction data from 2000 to 2010, AECOM estimated potential price depreciation within 1,000 feet of the three selected oil and gas extraction operations (Matrix Honolulu Terrace operation, Matrix Sycamore Canyon operations and La Habra Heights oil operation). Two market areas, one within 500 feet the other between 500 and 1,000 feet, were created based on actual complaint data filed for the Matrix operations located on Honolulu Terrace using Geographical Information System (GIS) software. Between 2005 and 2009, 93 complaints were issued by 11 residential addresses. The vast majority of these complaints were in response to the noise of the ongoing operations and almost half of all complaints were filed by one address.

Due to the unique characteristics of each facility's operations, the natural topography, and relative noise contours, the actual distance from each comparable (case study) site affecting neighboring residential properties are likely to differ from our analysis. As such, our findings should be tempered by this limitation and because we could not isolate inherent differences in each home that will affect the sales price (beyond total square feet). However, we found no adverse effect on home values within the determined influence areas and there does not appear to be any notable negative impact to home values in comparison to the larger City and County trends.

---

<sup>1</sup> Our research, using nationally based hedonic pricing studies (a "hedonic model" identifies price factors according to the premise that price is determined both by internal characteristics of the good being sold and external factors affecting it; please see Section III for a more detailed discussion as it relates to this analysis), indicates that a comparable visual and noise impact would yield 6.87 percent depreciation for those residential homes most impacted by operations. These homes would be within direct proximity to the proposed operations. Using transactional data from 2000, the agent's claims were not verified as there was no noticeable depreciation for sales within 500 and 1,000 feet of operations in comparison to larger market trends.

One interesting finding from the data is the lack of transactions within 500 feet of operations after 2006. An argument has been made that any home price discount associated with an external nuisance factor (e.g. noise, odor, visual, etc.) could be affected by the general housing market conditions for that particular area. For example, the presence of a strong demand for housing in a “hot” market can compensate for the general acceptability of a particular nuisance. Similarly, now that the housing market has “cooled” buyers are more sensitive to any external factors that might adversely affect future resale value of their home.

Based on our research, AECOM believes that it is likely that some properties most affected by the various impacts, as defined in the Draft Environmental Impact Report (Draft EIR), will have some level of home depreciation and depending on market conditions a more difficult time reselling their property. To estimate the potential range of residential home depreciation in the City AECOM followed the following methodology:

- Based on research conducted by MRS, we defined the area impacted by the Project under the mitigated impact scenario as noted in the Draft EIR;
- Using 2009 data from the Los Angeles County Assessor, we calculated the total assessed value of those residential properties located within the area impacted by the Project; and
- In order to apply a potential range of depreciation, we have used findings reported in our analysis of potential impacts of external nuisances on the residential real estate market.

Using this methodology, we have estimated a range of potential impacts to the City. In total, our estimates suggest that approximately 95 homes would be affected by noise impacts and 70 homes would be affected by visual impacts. The average price per home, using 2009 assessed values, for homes within the noise contour is approximately \$381,000. The average price per home for homes within the visual shed is approximately \$331,000. The total assessed value of homes affected by the potential noise and visual impacts project is approximately \$59 million.

In both the high and low impact scenario, the fiscal consequence (from the City’s perspective) would be minimal. The high impact scenario suggests a potential decrease of \$2.2 million in assessed value, which is approximately 0.04 percent of the total assessed value for residential properties in the City. The low scenario suggests a decrease of \$1.2 million in assessed value, which represents 0.01 percent of the total assessed value for residential properties in the City. Converting the assessed value to property tax received by the City, our analysis suggests a range of between approximately \$4,400 and \$2,300 in lost fiscal revenue per year. It is important to note that this is largely theoretical because it assumes that each of the homes was reassessed and that their current assessed value reflects their current market value.

However, this analysis does not take into account specific property value loss and the subsequent financial impact on individual property owners in the City<sup>2</sup>. This analysis presents an average estimate for all residential properties' depreciation throughout the affected areas. Actual impacts will not likely be borne uniformly as illustrated in this study. However, these scenarios should provide the City with an order of magnitude impact estimate that it can use to evaluate the Project's potential benefits to the City.

The potential range of royalty payments paid to the City from Matrix Oil will vary greatly based on actual production and the future market value of a barrel of oil (bbl). In this analysis, AECOM has used a production provided by Matrix and used future oil price projections provided by the US Energy Information Administration<sup>3</sup>. The US Energy Information Administration's two scenarios assumed price per bbl varies dramatically. For example, in 2035 under the low scenario the assumed price is \$42 per bbl, while under the high scenario the price is \$200 per bbl (2008 dollars). The uncertainty associated with oil futures makes the accuracy of predicting the royalty payments extremely difficult.

The fiscal consequence of the Project as determined by a loss of potential property taxes is minimal compared to the potential new tax source to the City. From the City's fiscal perspective, the benefits of the Project outweigh any potential loss in property value associated with the Project. Using the illustrative average royalties paid to the City until 2030, the new revenue source in the high and low price scenarios with assumed high levels of production are estimated to average between approximately \$115.4 million and \$7.5 million in new revenues<sup>4</sup> per year. To put this figure in perspective, assuming these revenues were collected in fiscal year 2009, they would represent 2.6 times all taxes collected or 17 percent of all taxes collected, respectively<sup>5</sup>.

Finally, based on examining historic tax revenue trends between 2003 and 2009 a couple key conclusions can be drawn. First, while property tax revenue has generally increased, sales tax revenue has decreased. The recent decrease in sales tax is potentially a significant concern for the

---

<sup>2</sup> Based on Project after noise and visual mitigation has taken place, we have estimated a range of potential depreciation range from 6.87 percent to 3 percent. It is important to note that not all homes within these areas will be impacted by the proposed Project.

<sup>3</sup> Please see Table 17 Potential Oil Royalty Payment.

<sup>4</sup> All assumptions regarding future royalty payments made to the City are based on the executed "Oil, Gas and Mineral Lease" between the City and Matrix Oil. AECOM did not project additional revenues provided based on, lease payments, Habitat Authority payments, business license tax, property taxes or any other benefit directly attributable to the Project. As such, the actual fiscal impacts less any costs to the City may be greater.

<sup>5</sup> Total based on comparison to reported 2009 total tax collection of \$43.4 million (Property, Sales, Franchise, Utility, Motor Vehicle in Lieu, Transit, and Other Taxes).

City. The decline in sales tax between 2007 and 2008 came largely as a result of the closure of five of the City's largest auto dealers. With sales taxes currently representing approximately 19 percent of total taxes and due to limited potential for future population growth in the City, the ability to significantly increase sales tax revenues will likely be challenging. Future sales tax revenue will be based on the City's ability to attract new retailers that draw residents from outside the City to purchase goods. The Project represents a significant revenue source that could mitigate some of the long-term uncertainty with relying on new retail sales revenue.

In conclusion, the fiscal consequence of the Project as determined by a loss of potential property taxes is minimal compared to the potential new tax source to the City. From the City's fiscal perspective, the benefits of the Project outweigh any potential loss in property value associated with the Project. From the perspective of individual home owners, the effect of the Project will vary due to the unique characteristics of their property in relation to any perceived negative impacts from normal Project operations. Academic studies on various external nuisances suggest an upward bound of eight percent in total property depreciation under extreme circumstances. While local real estate agents seem to support this estimate, after examining residential sales transactions within close proximity to comparable operations, we did not find any evidence to support this conclusion. As noted, this is not to suggest that the Project will not adversely affect some properties' value. However, the proposed measures to mitigate noise and visual impacts of the Project, value of the adjacent Preserve (open space), reputation of the City, as well as other factors is likely to mitigate any adverse effects of normal operations on residential home values for most residents within the areas where noise and visual impacts are present.

## II. Socioeconomic Overview

The following data provides a historic overview of change within the City compared to the County as well as existing socioeconomic conditions. This information will help provide context for later discussion related to the potential effects of the proposed Project.

### Historic Data

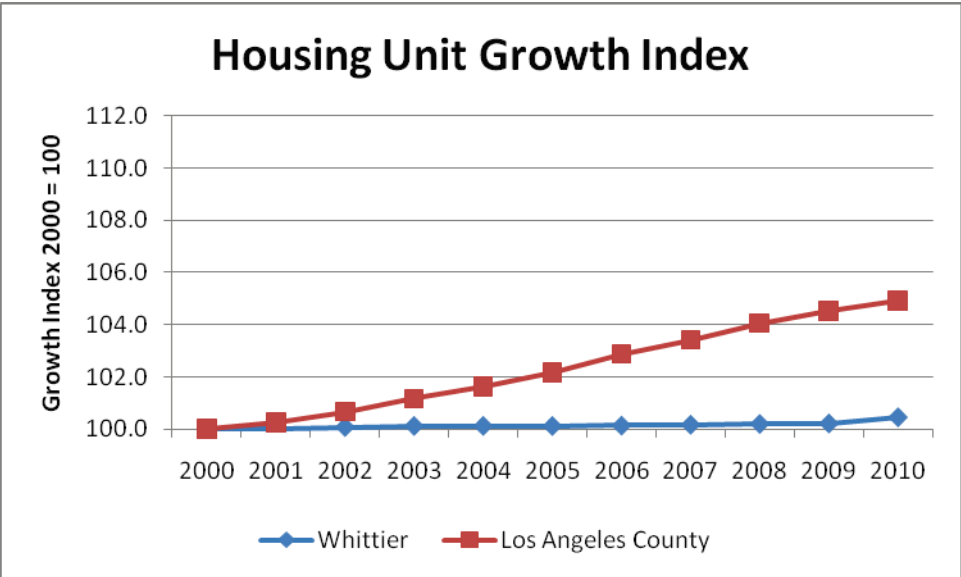
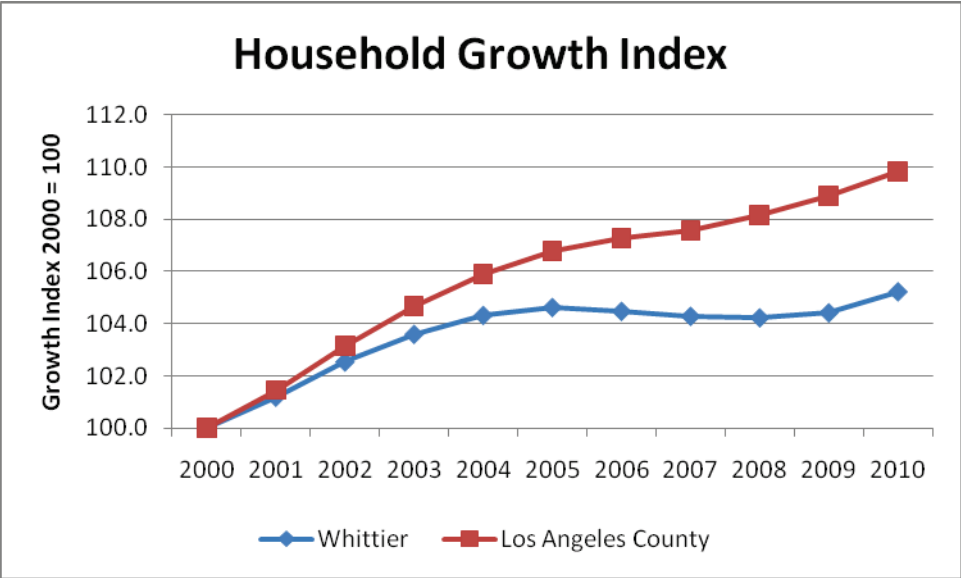
The City has experienced low growth, as illustrated by the increase in the household population (household population does not include institutional or student bodies). In absolute terms, the City has added approximately 4,250 new residents since the last Census. This equals approximately 425 new residents per year. During the same time period, the City has only added 129 total housing units, which suggest approximately 13 new housing units per year since 2000. As noted below, this household and housing unit growth rate is substantially slower than the countywide rate during the same time period. This is because the City is relatively built-out with little available land for housing development.

**Table 1: Historic Household and Housing Unit Growth in Whittier**

	Households	HH Growth	% Growth	Housing Units	HU Growth	% Growth
2000	81,291			28,958		
2001	82,258	967	1.2%	28,956	-2	0.0%
2002	83,354	1,096	1.3%	28,981	25	0.1%
2003	84,212	858	1.0%	28,993	12	0.0%
2004	84,802	590	0.7%	28,993	0	0.0%
2005	85,049	247	0.3%	28,992	-1	0.0%
2006	84,928	-121	-0.1%	28,996	4	0.0%
2007	84,773	-155	-0.2%	29,006	10	0.0%
2008	84,727	-46	-0.1%	29,014	8	0.0%
2009	84,882	155	0.2%	29,019	5	0.0%
2010	<u>85,538</u>	<u>656</u>	<u>0.8%</u>	<u>29,087</u>	<u>68</u>	<u>0.2%</u>
Change	4,247	4,247	5.2%	129	129	0.4%
Average		425	0.5%		13	0.04%

Source: California Department of Finance

**Figure 1: Historic Household and Housing Unit Growth Comparison with County**

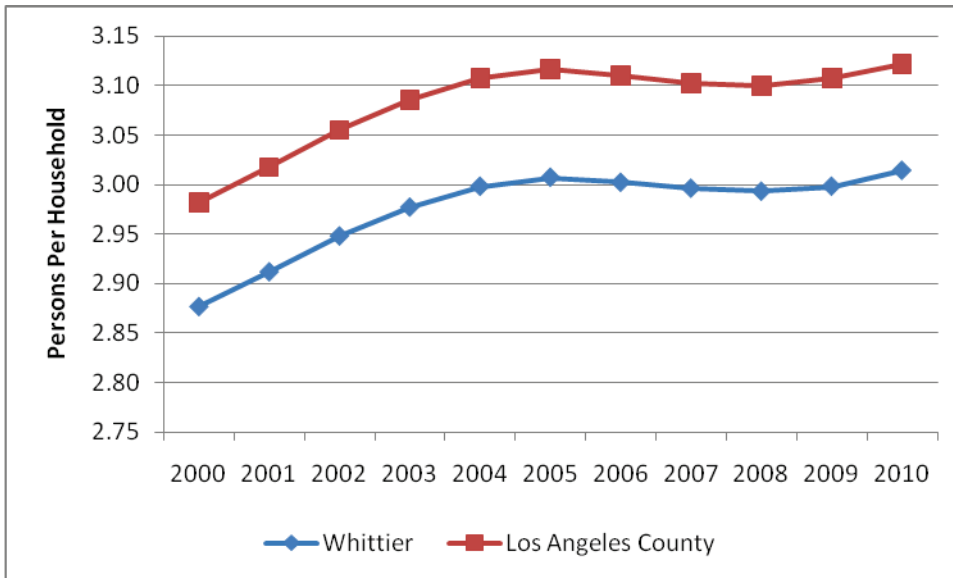


Source: California Department of Finance

As shown in the next figure, the increase in the persons per household has corresponded to larger County trends. While the City has a lower number of people per household, like the County, it has increased by 0.14 people between 2000 and 2010.



**Figure 2: Historic Persons per Household Growth Comparison with County**



Source: California Department of Finance

The housing tenure of occupied units is primarily owner occupied in the City. The American Fact Finder from the US Census estimates that the average rate of homeownership between 2006 and 2008 was 60 percent. This is approximately 20 percent higher than the County average of 49 percent.

The City's resident population is older than the County with the median resident estimated to be just over 35 years of age. Examining age-cohorts, the City has a significantly higher percent of its population in the age groups above 75 years in comparison to the County. In general, however, the City is relatively consistent with countywide trends. One notable exception is the relatively low percent of the City's population within the 25 to 34 year old age demographic.

The City appears to have undergone and may be in the process of some ethnic changes within its population base. According to the 2000 Census, approximately 56 percent of the population classified themselves as Latino. While not directly comparable due to data gathering processes, the 2006-2008 American Fact Finder suggests that that number has grown to approximately 65 percent. The most significant declines in ethnic groups (in both absolute and relative terms) are within those individuals who classify themselves as White. Based on the data it is impossible to know what is fueling the change (e.g. natural increase or net migration). Data taken from ESRI, a secondary data source, suggests somewhat comparable trends.

**Table 2: Housing Tenure**

	Whittier		LA County		Index: Whittier to LA County
	Total	Percent	Total	Percent	
Occupied housing units	28,577		3,174,611		
Owner-occupied	17,068	60%	1,551,802	49%	122.2
Renter-occupied	11,509	40%	1,622,809	51%	78.8
Average household size of owner-occupied unit	3.19		3.22		99.1
Average household size of renter-occupied unit	2.81		2.86		98.3

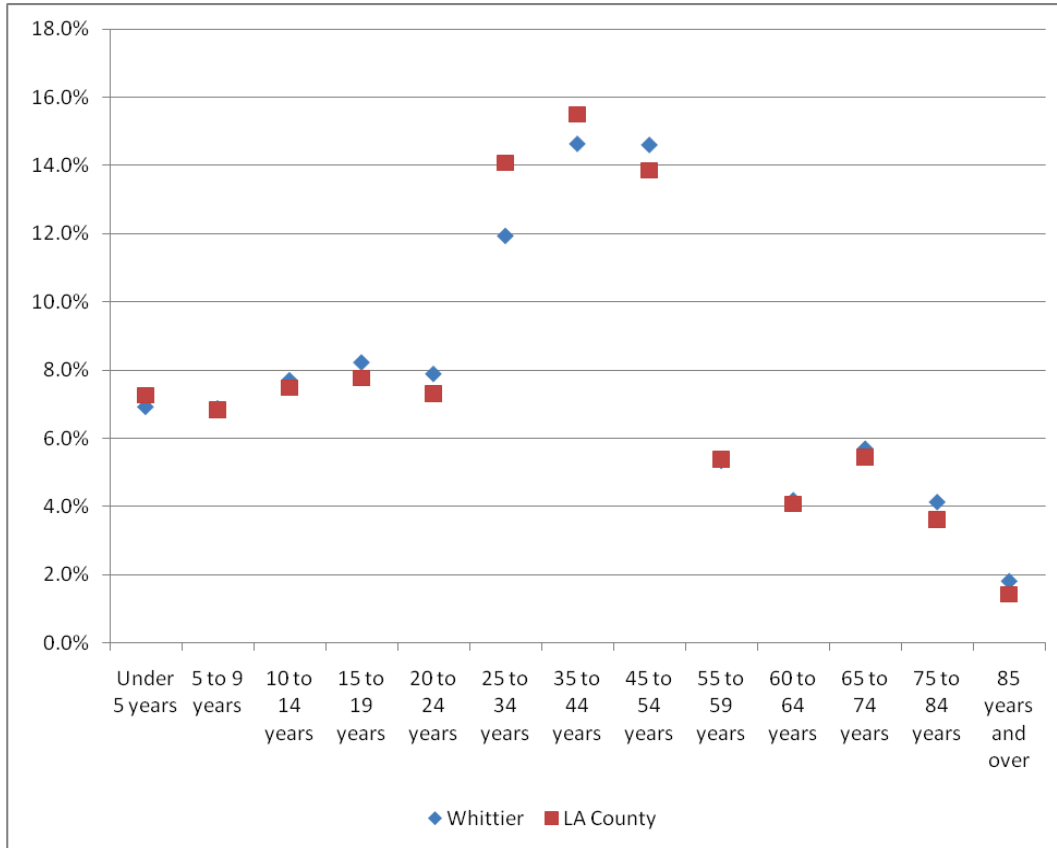
Source: US Census (American Fact Finder 2006 - 2008)

**Table 3: Sex and Age Profile**

	Whittier		LA County		Index: Whittier to LA County
	Total	Percent	Total	Percent	
Total population	88,207		9,832,137		
Male	42,920	48.7%	4,869,282	50%	98.3
Female	45,287	51.3%	4,962,855	50%	101.7
Under 5 years	6,109	6.9%	714,077	7.3%	95.4
5 to 9 years	6,071	6.9%	671,338	6.8%	100.8
10 to 14 years	6,797	7.7%	735,766	7.5%	103.0
15 to 19 years	7,259	8.2%	763,087	7.8%	106.0
20 to 24 years	6,961	7.9%	718,699	7.3%	108.0
25 to 34 years	10,535	11.9%	1,384,366	14.1%	84.8
35 to 44 years	12,917	14.6%	1,523,795	15.5%	94.5
45 to 54 years	12,890	14.6%	1,362,041	13.9%	105.5
55 to 59 years	4,709	5.3%	528,418	5.4%	99.3
60 to 64 years	3,692	4.2%	399,971	4.1%	102.9
65 to 74 years	5,027	5.7%	535,324	5.4%	104.7
75 to 84 years	3,644	4.1%	354,958	3.6%	114.4
85 years and over	1,596	1.8%	140,297	1.4%	126.8
Median age (years)	35.3		34.5		102.3

Source: US Census (American Fact Finder 2006 - 2008)

**Figure 3: Age Profile Comparison with County**



Source: US Census (American Fact Finder 2006 - 2008)

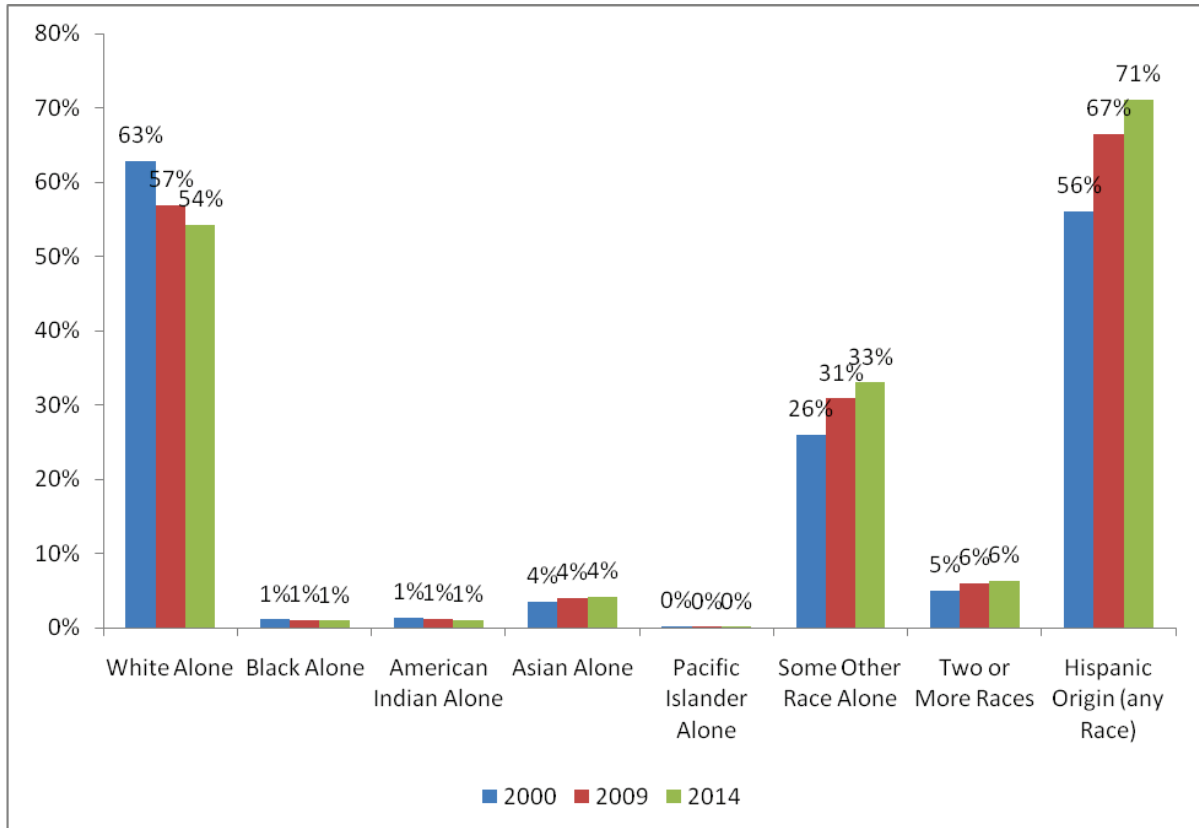
**Table 4: Ethnic Change (Census)**

	2000		2006 -2008	
	Number	Percent	Number	Percent
Hispanic or Latino (of any race)	46,765	55.9%	57,242	64.9%
White alone	31,475	37.6%	27,047	30.7%
Black or African American alone	1,019	1.2%	535	0.6%
Asian alone	2,770	3.3%	2,372	2.7%
Other	<u>1,651</u>	<u>2.0%</u>	<u>1,011</u>	<u>1.1%</u>
Total	83,680	100%	88,207	100.0%

Note: Two time periods not comparable.

Source: 2000 US Census; American Fact Finder (2006 - 2008)

**Figure 4: Ethnic Change (ESRI)**



Source: ESRI

The City has a median household income approximately 16 percent higher than the County. The average household income, however, is just slightly above the County. This suggests that there is a skewed distribution of lower income households in the City. The City has a high proportion of the households within some of the higher income brackets (\$100,000 to \$200,000) and more households in the \$50,000 to \$75,000 income bracket than the County.

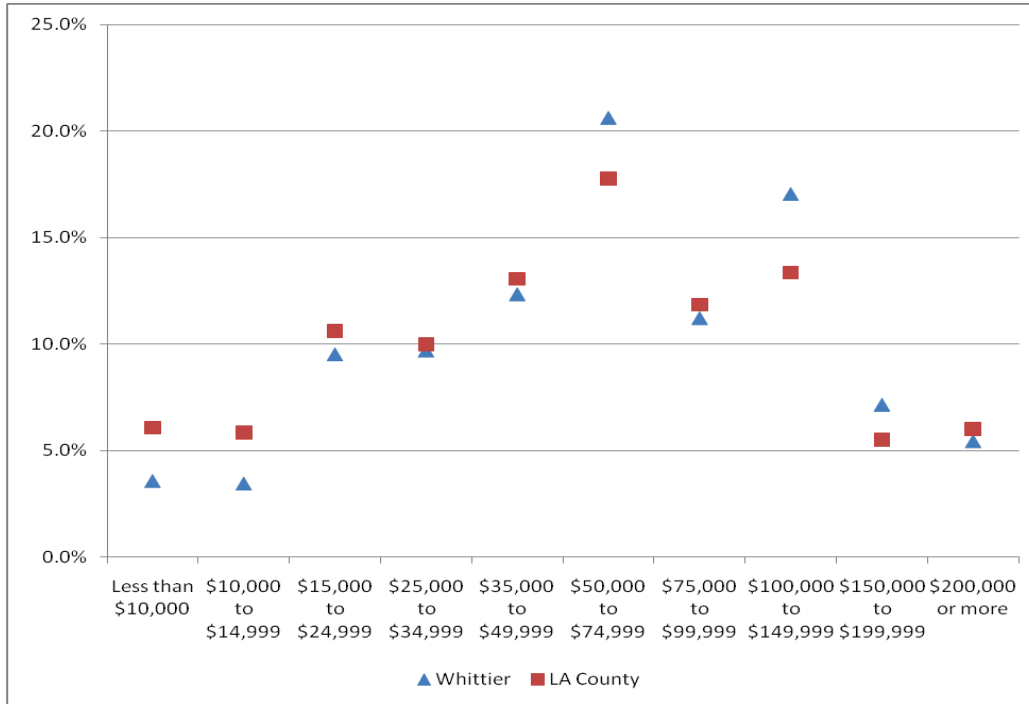
Based on information provided by the US Census Bureau there are approximately 28,550 “in-place” jobs located within the City. Approximately 41,400 jobs are held by the City’s residents. The location of some of these jobs may be within the City, but a larger number of them will be located throughout the region. Top employers in the City include a number of healthcare related industries, educational facilities, and the City itself. Examining trends since 2000, the City has maintained a lower unemployment rate than the County, but moved in along with similar macroeconomic employment trends.

**Table 5: Income and Benefits**

	Whittier		LA County		Index: Whittier to LA County
	Total	Percent	Total	Percent	
Total households	28,577		3,174,611		
Less than \$10,000	1,021	3.6%	192,701	6.1%	58.9
\$10,000 to \$14,999	986	3.5%	185,096	5.8%	59.2
\$15,000 to \$24,999	2,719	9.5%	336,750	10.6%	89.7
\$25,000 to \$34,999	2,770	9.7%	316,692	10.0%	97.2
\$35,000 to \$49,999	3,524	12.3%	414,613	13.1%	94.4
\$50,000 to \$74,999	5,888	20.6%	564,004	17.8%	116.0
\$75,000 to \$99,999	3,204	11.2%	375,700	11.8%	94.7
\$100,000 to \$149,999	4,868	17.0%	423,874	13.4%	127.6
\$150,000 to \$199,999	2,043	7.1%	174,338	5.5%	130.2
\$200,000 or more	1,554	5.4%	190,843	6.0%	90.5
Median household income (2008 Inflation Adjusted \$)	\$63,834		\$55,192		115.7
Mean household income (2008 Inflation Adjusted \$)	\$80,256		\$80,017		100.3

Source: US Census (American Fact Finder 2006 - 2008)

**Figure 5: Income and Benefits Comparison with County**



Source: US Census (American Fact Finder 2006 - 2008)

**Table 6: 2009 Ten Largest Employers in Whittier**

Rank	Name	Number of Employees	Type
1	Interhealth Corporation	2,600	Healthcare
2	Whittier Hospital Medical Center	850	Healthcare
3	City of Whittier	702	Municipality
4	Whittier Union High School District	412	Education
5	Whittier College	325	Education
6	US Post Office	315	Postal Service
7	Bright Health Physicians	300	Healthcare
8	Johnson Controls Inc	250	Plumbing & HVAC
9	Los Angeles College of Chiropractor	220	Education
10	Whittier School District	200	Education
		6,174	

Source: ReferenceUSA.com

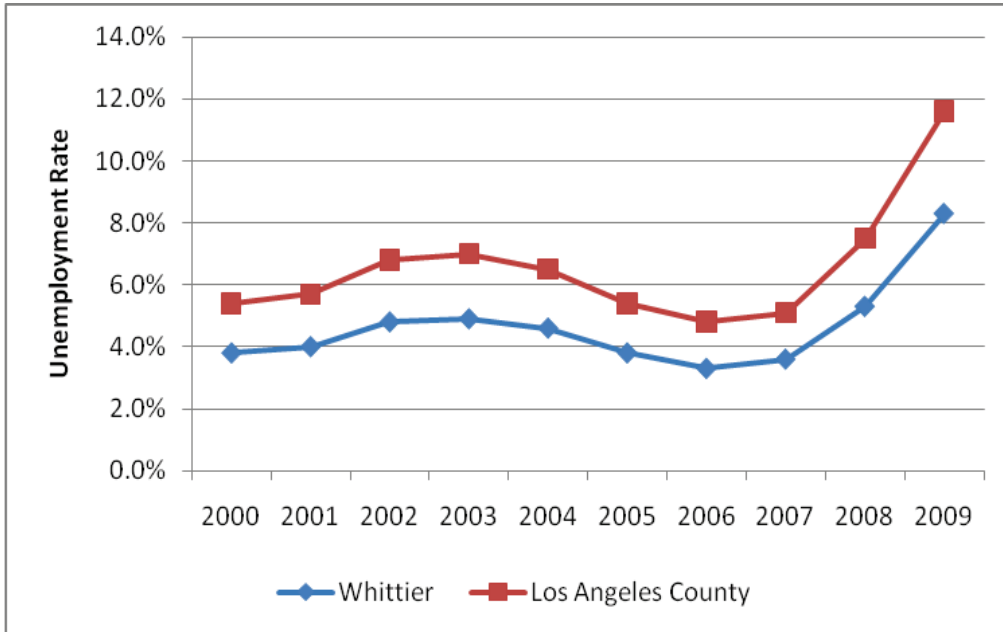
**Table 7: Whittier Employment Profile (In-Place and Resident Employment)**

Industry	Jobs Located in Whittier (2008)	Whittier Residents' Jobs (2006 - 2008)
Agriculture, forestry, fishing and hunting, and mining	18	133
Construction	889	3,203
Manufacturing	1,133	5,605
Wholesale trade	554	1,992
Retail trade	4,066	4,123
Transportation and warehousing, and utilities	362	2,777
Information	170	903
Finance and insurance, and real estate and rental and leasing	1,348	3,099
Professional, scientific, and management services	2,098	3,249
Educational services, and health care and social assistance	12,367	9,308
Arts/entertainment and accommodation/food services	3,401	2,933
Other services, except public administration	1,738	2,054
Public administration	<u>406</u>	<u>2,036</u>
Total	28,550	41,415

Source: US Census Bureau LED OnTheMap; US Census (American Fact Finder 2006 - 2008)



**Figure 6: Unemployment Rate Comparison with County**



Note: Not Seasonally Adjusted

Source: California Employment Development Department

## Projections

The following tables and figures present information regarding the potential near-term and long-term population, household, and employment growth in the City. The information was taken from three independent data sources: ESRI Business Analyst (ESRI), Southern California Council of Governments (SCAG), and California Department of Finance. In all cases, the information suggests somewhat similar growth trends for the City. As previously noted, the City has experienced slower growth than the County during the previous decade. These trends are expected to continue in the future.

In the next five years, ESRI projects that both the population growth and household growth will lag behind the County. SCAG projects that the City will add approximately 4,430 residents by 2030. However, it is important to note that these estimates have not been updated in the last couple years. As such, the long-term effects of the recent recessionary period may not be fully accounted for in the SCAG projections. In comparison to the County, the growth rate will continue to be lower largely due to the lack of developable land in the City.

While there is no long-term population estimate by age cohort for the City, general trends in the County illustrate the effects of the aging baby-boomer population. As previously noted, the City is slightly older than the countywide population so these trends will become increasingly important for the City to consider during the next 20-years. Specific implications of this aging demographic in relation to the Project will be explored in the next section of this report.

In-place employment is projected to grow in tandem with larger countywide trends during the next 20-years. In absolute terms, the City is expected to add approximately 2,660 net new jobs by 2030. This suggests a compound annual growth rate (CAGR) of 0.4 percent, which is just slightly below the Countywide CAGR.

**Table 8: Near-Term Projections (2009 – 2014)**

	Whittier	Los Angeles County
2009 - 2014		
Population Growth	0.50%	0.71%
Household Growth	0.38%	0.60%
2014 Income Estimates (2009\$)		
Median Household Income	\$64,692	\$59,377
Average Household Income	\$81,489	\$80,171
Per Capita Income	\$27,126	\$25,990

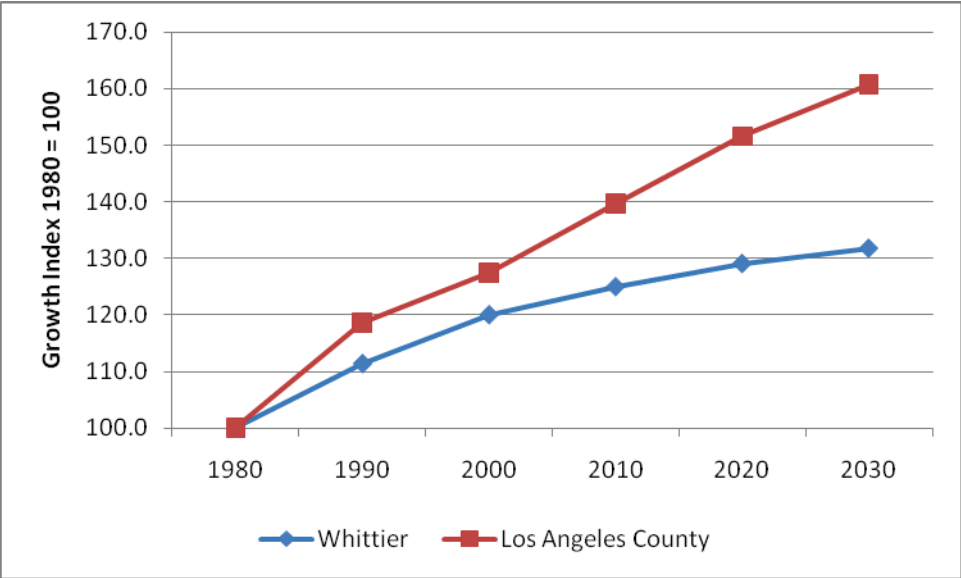
Source: ESRI Business Analyst

**Table 9: Whittier Population Projections**

Year	Population	Population Growth	% Growth
1980	69,717		
1990	77,671	7,954	11%
2000	83,680	6,009	8%
2010	87,128	3,448	4%
2020	89,982	2,854	3%
2030	<u>91,853</u>	<u>1,871</u>	<u>2%</u>
Change	22,136	22,136	32%
Average		4,427	0.6%

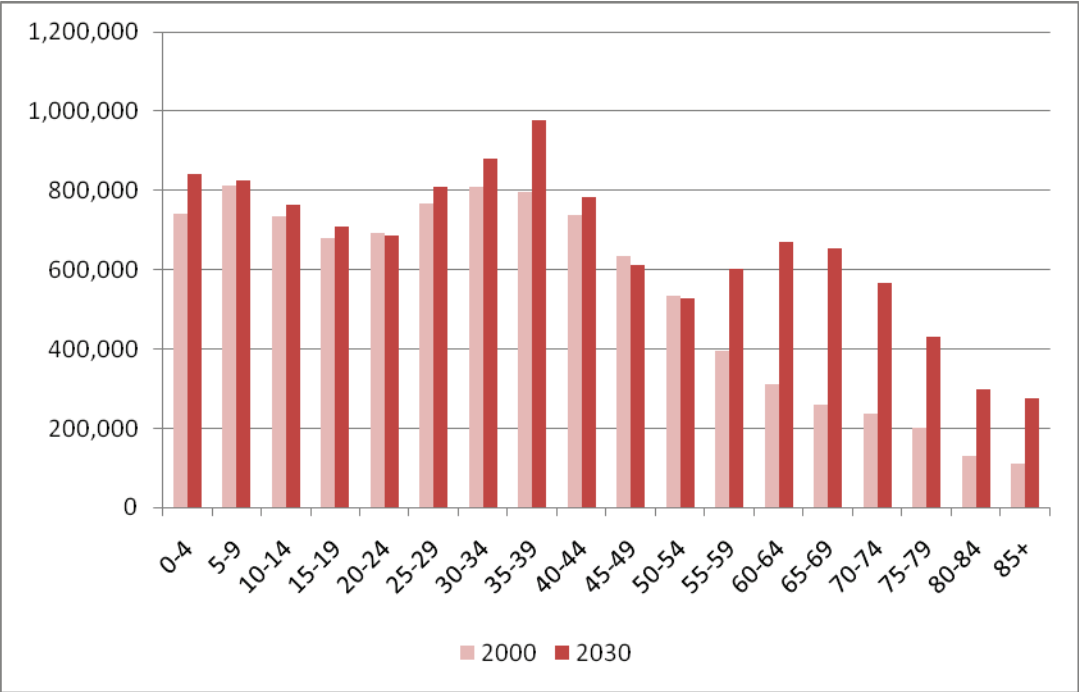
Source: US Census; SCAG

**Figure 7: Population Projection Comparison with County**



Source: US Census; SCAG

**Figure 8: Long Term Population by Age (County)**



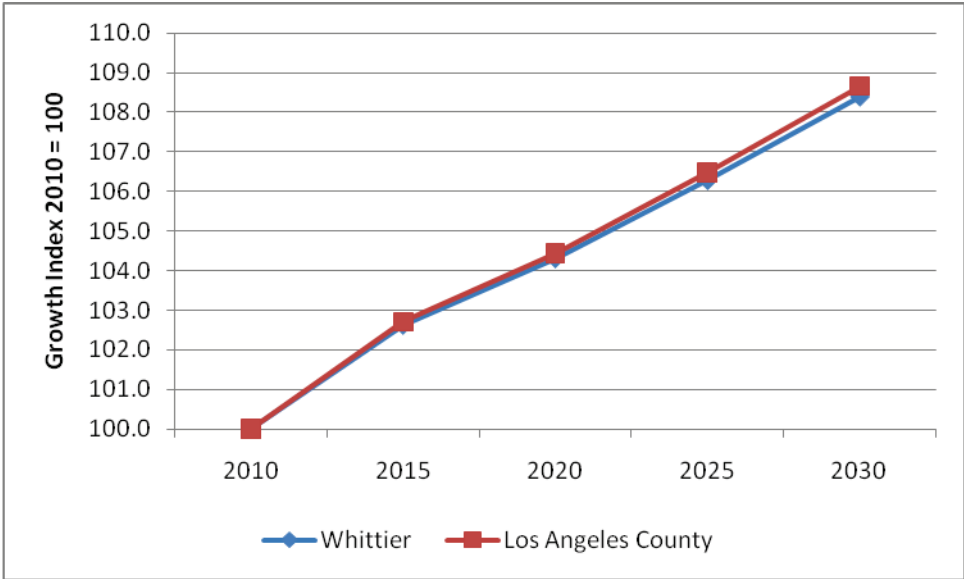
Source: California Department of Finance

**Table 10: Whittier Employment (In-Place) Projections**

Year	Employment (In-Place)	Employment Growth	% Growth
2010	31,731		
2015	32,564	833	2.6%
2020	33,096	532	1.6%
2025	33,722	626	1.9%
2030	<u>34,390</u>	<u>668</u>	<u>2.0%</u>
Change	2,659	2,659	8.4%
Average		665	0.4%

Source: SCAG

**Figure 9: Whittier Employment (In-Place) Projections Comparison with County**



Source: SCAG

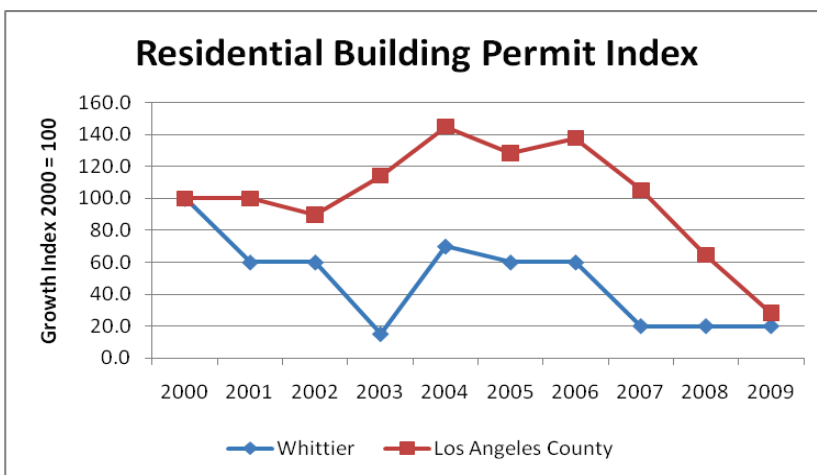
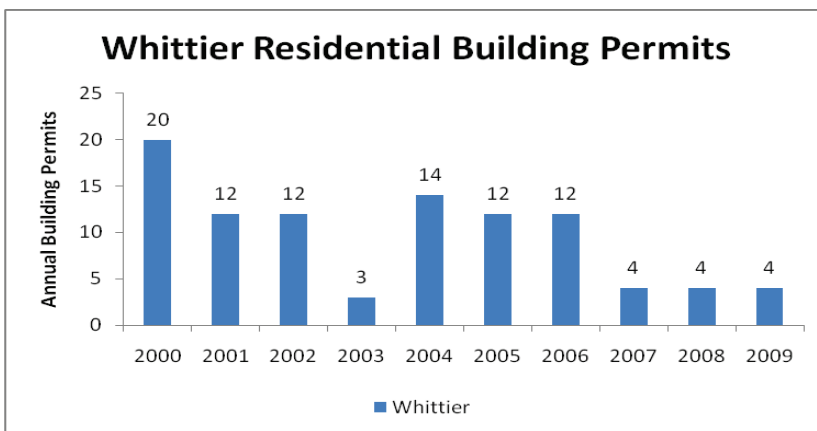
### III. Residential Housing Trends

Historic residential housing trends were analyzed to determine the potential effect of the proposed Project. AECOM evaluated historic trends to better gauge the potential long-term effects of the Project's operations.

#### Historic Residential Building Data

Over the last 10-years the City has experienced little new residential construction. Even during the housing boom years there was relatively little new housing product added to the market. As such, the majority of future housing sales will come via the resale of existing residential properties in the City. The composition of residential housing in the City consists of primarily single-family detached housing product. The percent of attached or multi-family housing product is significantly lower than the County.

**Figure 10: Building Permit Data and Comparison with County**



Source: US Census

**Table 11: Housing Units by Units in Structure (2000)**

	<b>Whittier</b>	<b>Los Angeles County</b>	<b>Index: Whittier to LA County</b>
1, Detached	66.2%	48.7%	135.9
1, Attached	5.1%	7.4%	68.9
2 Units	2.0%	2.7%	74.1
3 or 4 Units	5.1%	6.1%	83.6
5 to 9 Units	8.3%	8.2%	101.2
10 to 19 Units	4.8%	8.1%	59.3
20+ Units	7.7%	17.1%	45.0
Mobile Home	0.8%	1.6%	46.9
Other	0.1%	0.1%	50.0
Total	100.0%	100.0%	100.0
Median Year Structure Built	1957	1961	

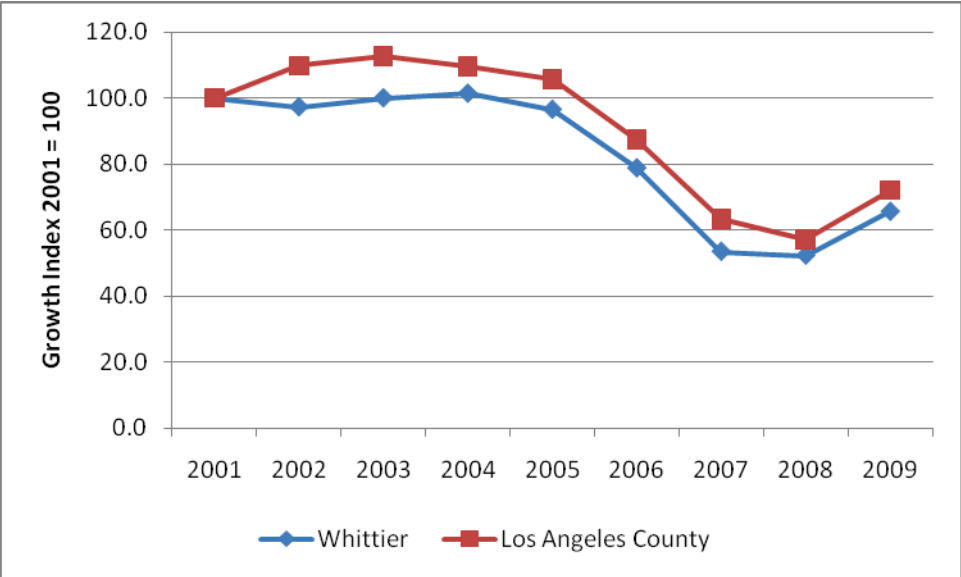
Source: US Census

### Historic Residential Sales Data

Examining sales data provided by DQNews since 2001, the City’s<sup>6</sup> sales and pricing trends have followed larger countywide trends. On average, there have been 1,700 residential transactions per year with significant declines after 2005 as the housing market began to deteriorate. Examining the median sales price, in constant 2009 dollars, the City and County are nearly identical in terms of their pricing trends since 2001. Similarly on a price per square foot basis the City and County have experienced similar increases from 2001 to 2006 and significant price declines over the last three years.

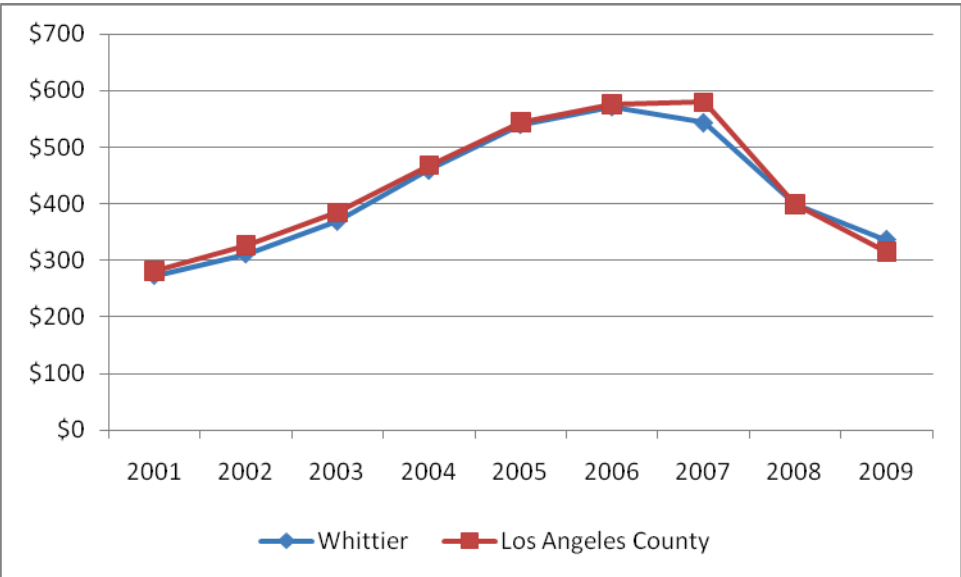
<sup>6</sup> DQ news defined Whittier as a collection of six zip codes (90601, 90602, 90603, 90604, 90605, 90606), not all of which are located within the municipal boundaries.

Figure 11: Sales Comparison with County



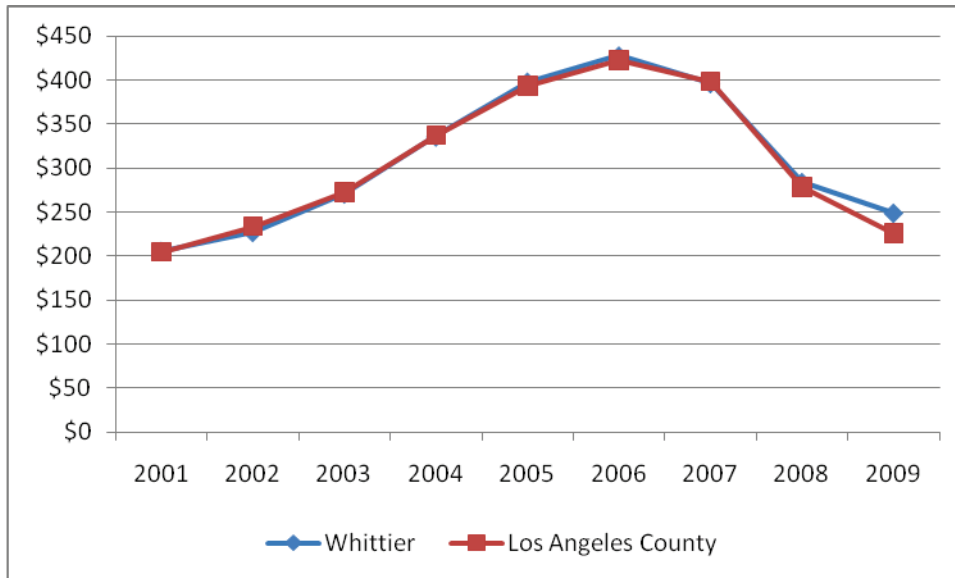
Source: DQNews

Figure 12: Historic Median Sales Price Comparison with County in 2009 Dollars



Source: DQNews

**Figure 13: Sales Price Per Square Foot Comparison with County in 2009 Dollars**



Source: DQNews

## Home Purchase Motivations and Key Age Cohorts

In order to better understand the potential effect of the proposed Project, AECOM examined data specific to factors that influence home buying decisions and key age cohorts when typically home sales occur. Both sets are important for a couple of key reasons. First, assuming some type of unmitigated Project impact, the effect of ongoing operations may influence buyers or sellers opinion regarding the value of a particular home or neighborhood. The question of “how much” will be analyzed in more detail, but getting a sense of key factors that are important in the decision making process will help place the effect of the potential nuisance in perspective. Second, since the City’s future home sales will be largely a result of the reselling of existing properties, the age and tenure of current City residents will be important due to the natural cycle of home buying and selling.

According to the most recent national home buying survey by Fannie Mae the most important factor influencing a home purchase decision is the safety of a particular neighborhood. This is followed by the quality of schools, and price of the home. A number of other factors are relatively similar in importance. For the project, a critical question to evaluate will be how its operations might affect the perception of the safety of the neighborhood and to what reach it would have (in terms of number of properties).



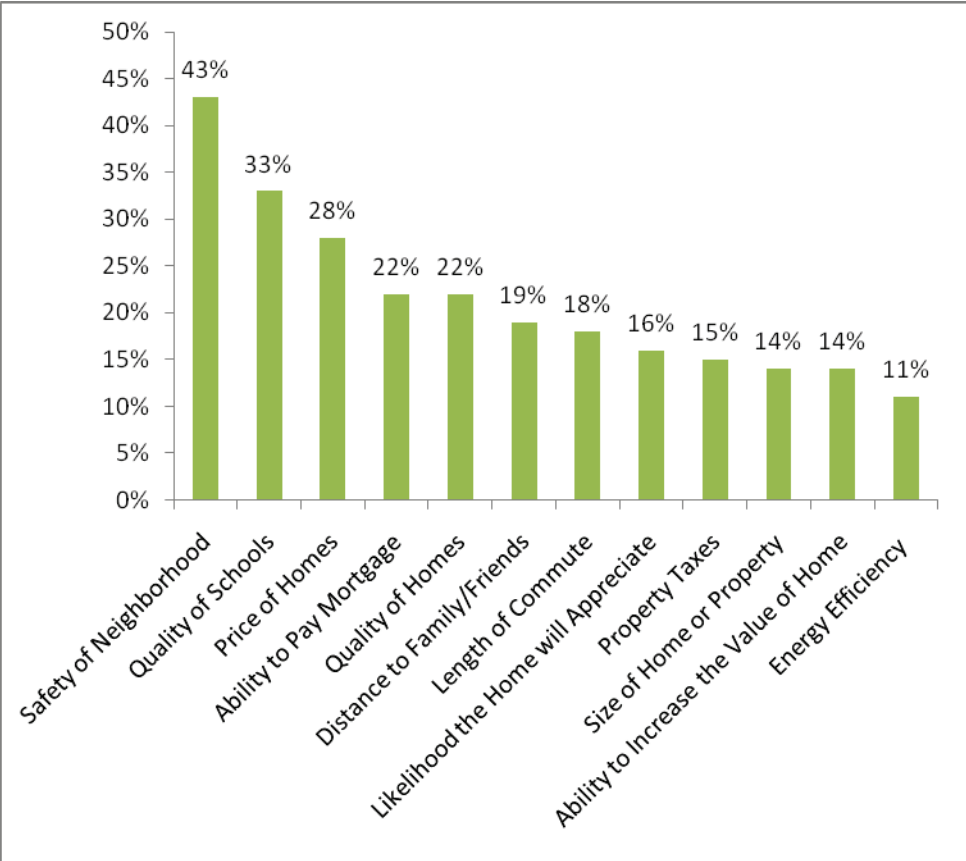
Examining data from the California Association of Realtors it is clear that many of the decisions to sell a home change based on the existing market conditions. As evidenced below, the key factors influencing home sales decision has changed significantly during the last four years. While moving to a larger home in a better or more desired location drove sales decision in 2006, in 2009 sellers were highly influenced by a variety of financial considerations such as trouble making payments, job loss, and mortgage payment re-indexing.

Another factor in buying and selling preference is dependent on the age of the buyer or seller. While there is no set course of action for individuals, the majority of people follow similar housing trajectories influencing timing of first-time housing purchases, living location, and home sizing preferences. In general, the following information presented below outlines general buying preferences by age cohort. Similarly, examining the relationship between buying and selling by age (in terms of the average annual percent of total buyers/sellers) is also informative. What becomes clear is the nexus of individuals buying and selling occurs within the 55 to 59 age group. Younger age groups consist of more people buying than selling a home while older age groups have more individuals selling than buying homes. As the population ages in the City and larger region this mismatch in buyers and sellers may influence the housing market.

Examining citywide projections for 2014, the majority of population growth (or shift) will occur in the 55 to 74 age group. These individuals will likely either retain their existing home or look to downsize into another home. In total, the number of individuals looking to buy or sell their home will be low in comparison to other age groups. Examining countywide projections a similar trend is presented. Between 2010 and 2020 there will be a large number of aging residents whom historically have not represented a significant portion of the overall residential real estate transactions.

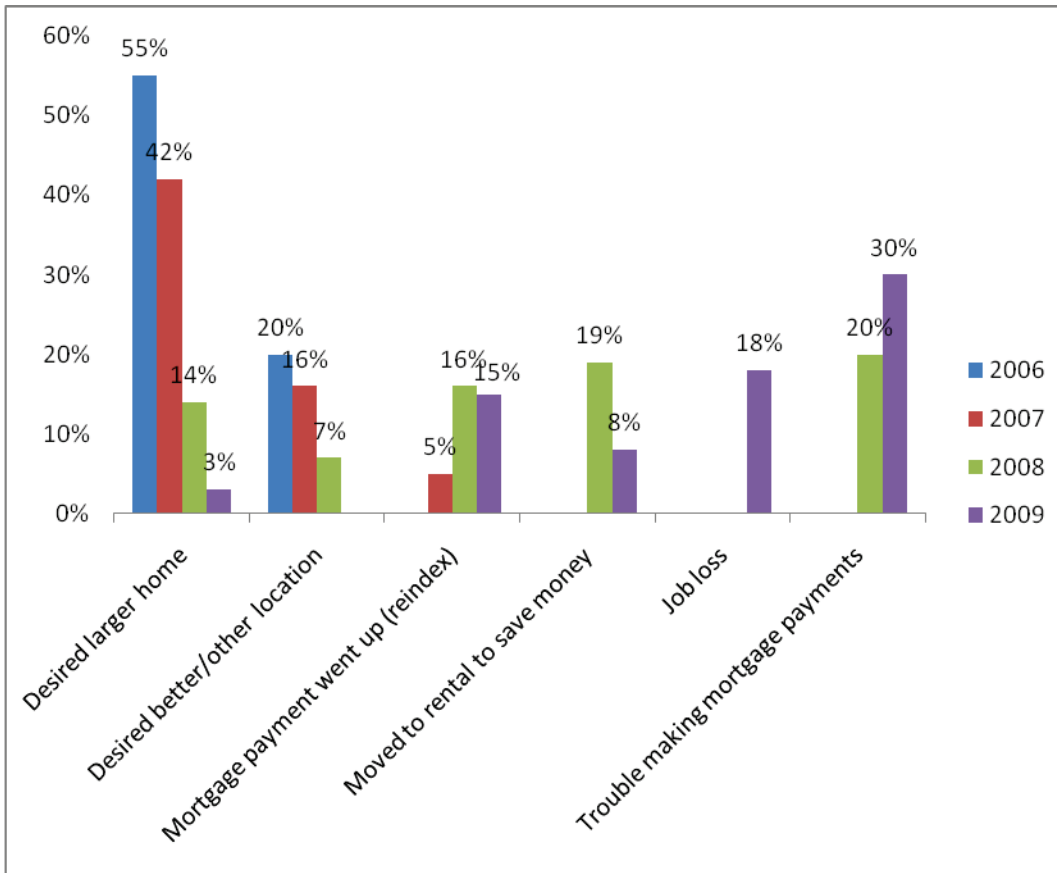
Finally, using national data from the National Association of Realtors the average duration of homeownership has been evaluated. According to the most recent data, the median home ownership tenure is seven years. The average or median tenure for homeownership for the City is unknown. However, according to the American Fact Finder for the years 2006 to 2008, 51 percent of the total household population moved into the City in 2000 or later. Approximately 26 percent of the City's population has been living locally since before 1990 and another 23 percent is believed to move in during the 1990s. This dataset accounts for both owned and rented properties, but suggests that the City has experienced some significant turnover in the last decade with a large percent of its population base staying stable over the last few decades.

Figure 14: Key Factors Influencing Home Purchase Decision



Source: Fannie Mae (2010 Survey)

**Figure 15: Key Factors Influencing Home Sales Decision**



Source: California Association of Realtors (2009 Survey of Home Sellers)

**Table 12: Buying Preference by Age Cohort**

Age Cohort	Buying Preference
20-29	Single/Roommate Rental Apartment
30-39	Entry Level Small Lot Housing/Condo
40-54	Large-Lot Suburban Living
55-69	Move-Down Product, Life-Style/Age-Targeted Product, Location Preference
70-79	Senior Living Location/Amenity & Other Preferences
80+	Assisted Living

Source: Housing in America The Next Decade (Urban Land Institute) 2010; California Department of Finance

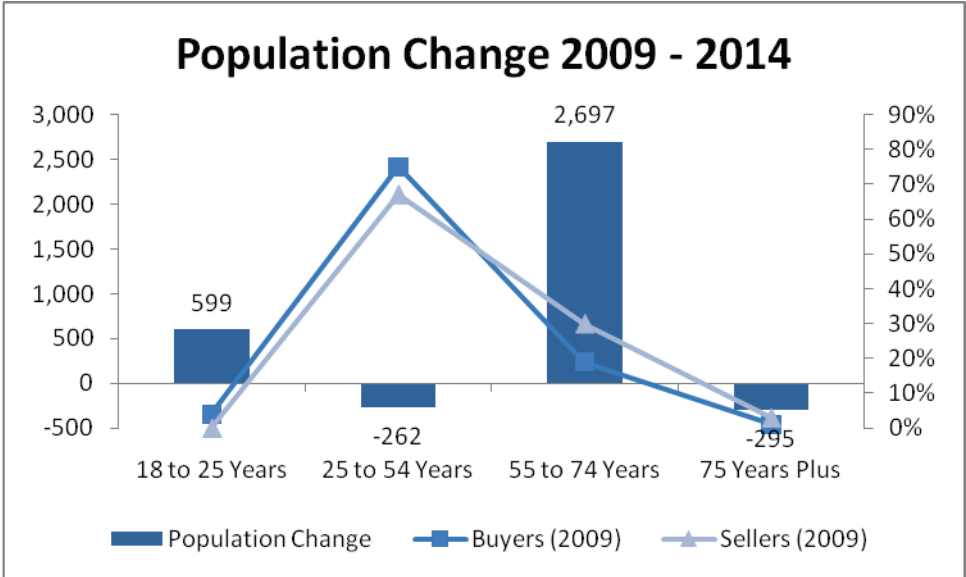
**Figure 16: Average Annual Percent of People Buying/Selling Homes by Age Group**



Note: For the United States, 1995 to 2000. On average 8.8% of persons 80 years and older sold homes each year.

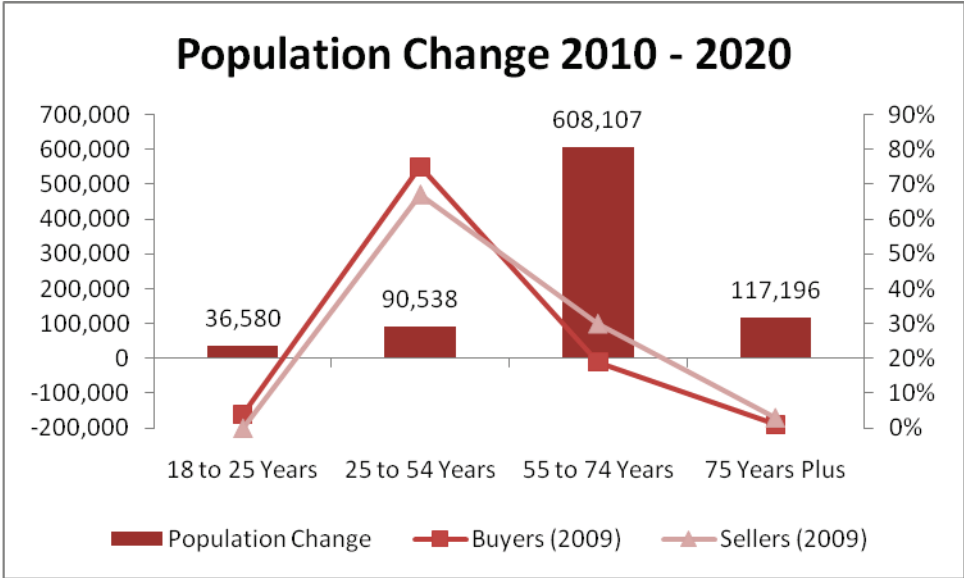
Source: Myers (2007) Immigrants and Boomers, Figure 11.1

**Figure 17: Population Change in Whittier by Buying/Selling Age Cohorts**



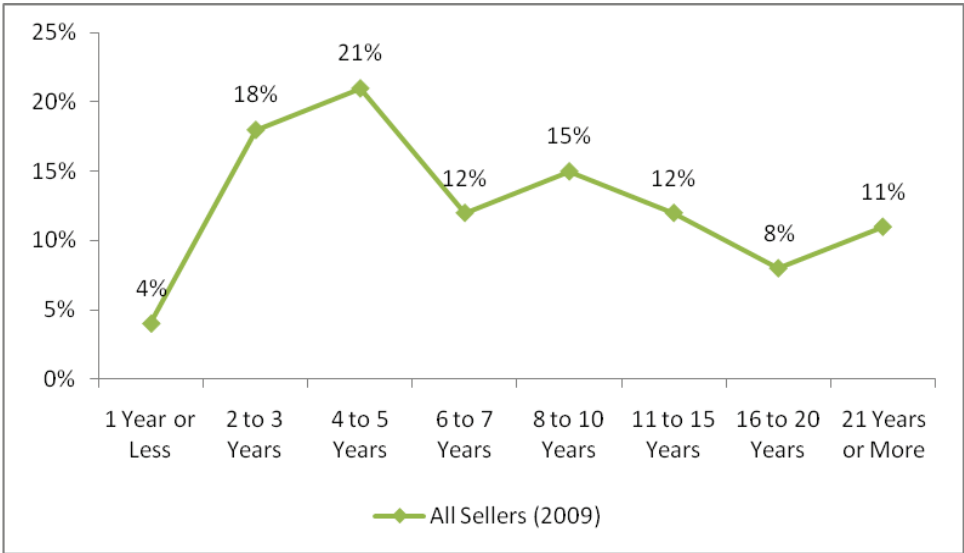
Source: ESRI Business Analyst; National Association of Realtors

Figure 18: Population Change in County by Buying/Selling Age Cohorts



Source: California Department of Finance; National Association of Realtors

Figure 19: Tenure in Previous Home (Owners)



Note: Median Tenure = 7 Years  
 Source: National Association of Realtors

**Table 13: Year Whittier Householder Moved In (Owner and Renter)**

	Occupied Housing Units	Percent
Moved in 2005 or later	6,758	24%
Moved in 2000 to 2004	7,727	27%
Moved in 1990 to 1999	6,563	23%
Moved in 1980 to 1989	3,249	11%
Moved in 1970 to 1979	2,438	9%
Moved in 1969 or earlier	<u>1,842</u>	<u>6%</u>
<b>Total</b>	<b>28,577</b>	<b>100%</b>

Source: US Census (American Fact Finder 2006 - 2008)

## **IV. Case Studies on Potential Price Depreciation**

It is important to note that the actual effect of the proposed Project on residential home values is unknown and will ultimately depend on numerous factors that will change on a parcel-by-parcel basis. However, the following literature review and local case studies will help present a realistic range of potential impacts that can be used to evaluate the proposed Project and its potential effect on local property values.

### **National Literature Review**

The following literature review presents a summary of recent academic studies that help qualify the effect of various nuisances on residential property values. The following is not a comprehensive review of all nuisance studies, but rather a select number of studies that we have chosen based on their applicability to the proposed Project. In most cases, we have tried to select the most recent study for each particular nuisance, as it often refers to and incorporates past studies to inform its analysis.

All of the selected studies use a “hedonic” pricing method to help quantify the impacts of the examined nuisances on residential property values. Hedonic price models treat each house as a number of characteristics. Hedonic pricing can be generally summarized as follows:

In order to isolate a given hedonic price from the various housing characteristics, it is necessary to statistically control for these influences on property values, such as the structural features of the housing unit (e.g., numbers of bedrooms and bathrooms, interior square footage, quality of construction, design of the house, etc.), merits of the neighborhood, quality of local schools, crime rates, governmental services, average commute time, and so forth. Some of these characteristics will vary little within a given data set, and separate measurement is not required to explain the observed variation in property values. By holding constant the impact of structural characteristics of the home as well as other neighborhood attributes, one can examine the independent influence of a particular nuisance on the sale price of the property.

Stated another way, let us assume that two residential properties are identical in all respects except that one house is located under an aircraft flight path, and the other is not. The effect of the noise nuisance associated with the flight path on the property value for the first house will result in a market value that is lower than the market value of the second house. This will occur because there will be less demand from potential buyers for the first house relative to the second house, reflecting the discounted value of the costs of the annoyance.

The selected case studies use the hedonic pricing to control a data set and adjust for the inherent differences so that each house can be statistically similar (as per the illustrative example above) and the effect of the particular nuisance can be evaluated.

**Table 14: Summary of Major Findings**

Author	Year	Key Findings	Nuisance (Origin)
Nelson	2008	Median Airport Noise Depreciation is 0.74 per dB Median Traffic Noise Depreciation is 0.54 per dB	Noise (Airport and Traffic)
Saphores & Aguilar-Benitez	2005	Property Value Depreciation of up to 3.4% within 1,320 Feet	Odor (Various)
Bond	2006	Property Value Depreciation of 2.0% within 656 Feet	Visual, Health (Cell Towers)
Chalmers	2009	Property Value Depreciation usually within 3.0%-6.0% within 300 Feet	Visual, Health (High-Voltage Transmission Lines)
Hoen, et. al	2009	No Impact	Visual (Wind Farm)
Boxall, et. al	2005	Property Value Depreciation of 4.0%-8.0% within 13,200 Feet (2.5 Miles)	Noise, Visual, Health (Oil & Gas Facilities)
Davis	2010	Property Value Depreciation of 3.0%-7.0% within 10,560 Feet (2.0 Miles)	Health/Visual (Power Plant)

Source: Cited Case Studies

### Select Case Studies

***Jon Nelson, “Hedonic Property Value Studies of Transportation Noise: Aircraft and Road Traffic,” 2008***

Nelson presents a summary review of key research regarding the effect of transportation noise (aircraft and road) on residential home values. According to Nelson by the year 2007 there were approximately 40 hedonic price studies for the effect of airports in Canada and the US on residential property values, and probably an equal number for non-North American airports. Nelson also reviewed nine empirical studies covering 14 different housing markets in Canada and the US regarding the hedonic price literature on road traffic noise.

The findings are presented in a noise depreciation index (NDI). The NDI quantifies the relative effect of the noise in respect to the depreciation of residential real estate value. For example, assuming a NDI of 0.50%, a given property located at 55 dB would sell for 10 percent less if it was located at 75 dB, all other things held constant. Stated differently, a \$200,000 house would sell for \$20,000 less, which yields a hedonic price of \$1000 per dB.



Based on Nelson's literature review of previous research, the NDI was between 0.50% and 0.70% per decibel (dB) for airport noise. In contrast, road traffic related research suggested a range between 0.40% and 0.60% per dB. NDI values reported in Nelson's analysis were combined to yield more recent estimates of noise valuations. For aircraft noise, the estimates yield an unweighted mean value of 0.92% and a median value of 0.74% per dB. For traffic noise, the estimates yield an unweighted mean value of 0.55% and a median value of 0.54% per dB.

***Jean-Daniel Saphores & Ismael Aguilar-Benitez, "Smelly Local Polluters and Residential Property Values: A Hedonic Analysis of Four Orange County (California) Cities," 2005***

The authors analyzed the micro level impacts of local smelly pollutant emissions on the price of single-family homes in four cities (Seal Beach, Huntington Beach, Costa Mesa, and Newport Beach) located in Orange County, California. Using GIS software to incorporate spatial information (complaints) into a hedonic pricing model, the report assesses the impact of polluters on housing prices. The complaints were issued by local residents in regards to organic odors emanating from several businesses, including oil firms, boat building and repairs, manufactures, auto paint shops, and metal finishing companies.

Previous research reviewed by the authors indicates that homes adjacent to landfills could see its property value reduced by approximately 12 percent, falling to 6 percent for houses approximately a mile away. Another study reported a 6 percent drop in value for houses sold one or more years after the opening of a landfill. Finally, odors originating from large-scale hog-operations result in value decrease up to 9 percent for the closest and most affected houses.

Based on the authors' research of transactional data from 7,726 residential sales they found a statistically significant decrease in value of neighboring housing up to 3.4 percent within one-quarter mile from the business responsible for the odor. The impact is higher in areas with a high concentration of polluters, and it appears to quite strong for car paint shops. Furthermore, the study suggests that the results may undervalue the true costs of smelly pollutants because the exposed population may not have full information about the potentially serious health risks of these pollutants.

***Sandy Bond, "Using GIS to Measure the Impact of Distance to Cell Phone Towers on House Prices in Florida," 2006***

The siting of cellular phone transmitting antennas, their base stations and the towers that support them is a public concern due to fears of potential health hazards from the electromagnetic fields that these devices emit. Negative media attention to the potential health hazards has fuelled the perception of uncertainty over the health effects. The unsightliness of these structures and fear of lowered property values are other regularly voiced concerns about the siting of these towers.

However, the extent to which such attitudes are reflected in lower property values affected by tower proximity is controversial.

Bond presents the results of a study carried out in Florida in 2004 (based on market transaction data of single-family homes that sold in Orange County, Florida between 1990 and 2000) to show the effect that tower proximity has on residential property prices. The study involved an analysis of residential property sales transaction data. Both GIS and multiple regression analysis in a hedonic framework were used to determine the effect of actual distance of homes to towers on residential property prices. The results showed that while a tower has a statistically significant effect on prices of property located near a tower, this effect is minimal. The price of properties within 200 meters (656 feet) decreased, on average, by just over 2%.

Bond suggests, however, that every location is unique as evidenced by the difference in results from studies in the US and abroad. These observed differences are partly due to the various factors that influence the degree of negative reaction to towers. Residents' perceptions and assessments of risk vary according to a wide range of processes including psychological, social, institutional, and cultural. In addition to the potential health, aesthetic, and property value impacts from towers, other factors that may impact on the degree of negative reaction from residents living near these structures and that may be reflected in price are listed below:

- The kinds of health and other risks residents associate with towers, and the level of risk perceived;
- The height, style, and appearance of the towers, how visible these are to residents and how they perceive such views;
- The marketability of homes near towers;
- The extent and frequency of negative media attention to towers;
- The socio-economic make-up of the resident population; and
- The distance from the towers residents feel they have to be to be free of concerns.

***James A Chalmers, "High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects" 2009***

In this study, over 1,200 home sales in 1998–2007 were aggregated into four study areas with a 345-kilovolt transmission line. Data was collected on the sale properties relative to proximity to and

visibility of transmission line towers, and the extent of encumbrance by a transmission line easement. A multiple regression model is used to test whether the sale prices are affected by line proximity, tower visibility, or property encumbrance. In both continuous distance and distance zone models, the proximity and visibility variables typically fail to be statistically significant. The only variable that appears to have any systematic effect is the encumbrance variable; however, its magnitude is generally small.

Over the past twenty-five years, a vast number of studies have been undertaken using large databases and statistical tools to investigate the effect of transmission lines on property values. Sixteen of these studies form the core of the available literature and are widely quoted and cross-referenced one to the other. The results of these studies can be generally summarized as follows:

- Over time, there is a consistent pattern with about half of the studies finding negative property value effects and half finding none;
- When effects have been found, they tend to be small; almost always less than 10% and usually in the range of 3-6 percent;
- Where effects are found, they decay rapidly as distance to the lines increases and usually disappear at about 200 feet to 300 feet (61 meters to 91 meters); and
- Two studies investigating the behavior of the effect over time find that, where there are effects, they tended to dissipate over time.

***Ben Hoen, et. al “The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis,” 2009***

In response to community concerns that wind turbines hurt property values, the Department of Energy commissioned a study to better understand the potential impacts of wind power projects on residential property values in the United States (US). The report claims to be the most comprehensive and data-rich analysis on the subject in the US or abroad.

Specifically, researchers collected data on 7,500 sales of single-family homes situated within ten miles of 24 existing wind power facilities in 9 different states, for the period between 1996 and 2007. The analysis used eight hedonic pricing models, as well as both repeat sales and sales volume models. None of the eight models uncovered any conclusive evidence of the existence of any widespread property value effects that might be present in communities surrounding wind farms. Specifically, neither the view of wind turbines nor the distance of homes to turbines was found to have any consistent, measurable or significant effect on the selling prices of the homes. As such, the

authors concluded that there is no “widespread, statistically observable” impact of wind turbines on the sale of homes in the US.

***Peter Boxall, et. al , “The impact of oil and natural gas facilities on rural residential property values: a spatial hedonic analysis,” 2005***

Despite the importance of this issue in the US and Canada there have been few studies that examine the effects of oil and gas production facilities on property prices although there are obvious potential hazard and amenity implications. Boxall’s report attempts to determine the impact of proximity to small to medium oil and gas production facilities on rural residential property values. Spatial hedonic methods were used in this analysis.

The initial sample contained information on the sale of 612 residential properties that ranged in size from 1 to 40 acres. The acreage limitation essentially ensured that the property was rural but also residential in that it did not have commercial agricultural value. The results of this analysis strongly suggest that the presence of oil and gas facilities can have significant negative impacts on the values of neighboring rural residential properties. The presence of wells, especially sour gas wells, was found to depress property values but the number of pipelines carrying sour gas variable did not have a significant coefficient. At the mean level of industry facilities within 4 kilometers, property values are estimated to be reduced between four and eight percent. It should be noted that that the applicability of this study to the Project and City is limited due to its focus on rural residential property values and difference in terms of overall operations particularly in regard to sour gas, which has significant safety implications that would not be applicable to this Project.

***Lucas Davis, “The Effect of Power Plants on Local Housing Values and Rents,” 2010***

Davis’ paper uses restricted census microdata to examine housing values and rents for neighborhoods in the United States where 92 large power plants were opened during the 1990s. Compared to neighborhoods with similar housing and demographic characteristics, neighborhoods within two miles of plants experienced 3-7 percent decreases in housing values and rents with some evidence of larger decreases within one mile and for large capacity plants. In addition, there is evidence of “taste-based sorting” with neighborhoods near plants associated with modest but statistically significant decreases in mean household income, educational attainment, and the proportion of homes that is owner occupied. Overall, however, the analysis suggests that the total local impact from power plant openings during the 1990s was relatively small because plants tended to be opened in locations where the population density is low.

## **Local Case Studies**

The following examines existing comparable operations to determine what effect they have had on local property values in the region. AECOM examined three sites, two located in the City located at 12515 Honolulu Terrace (Matrix) and directly east of the intersection of Workman Mill Road and Sycamore Canyon Road (Sycamore) and one located at 214 Canada Sombre Road in La Habra Heights (La Habra Heights).

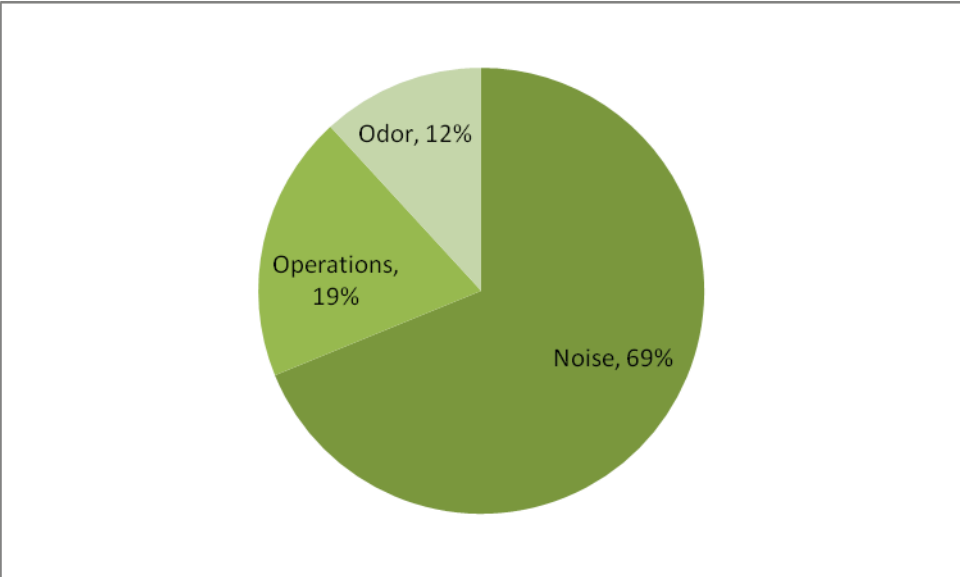
### ***Resident Complaints Regarding Matrix Oil Operations at Honolulu Terrace***

The following summarizes residential complaints for Matrix Oil operations located at 12515 Honolulu Terrace. Between August 19<sup>th</sup> 2005 and February 19<sup>th</sup> 2009 there were 93 residential complaints called in regarding operations. The complaints, however, originated from 11 unique addresses. As such, a relatively small number of people were responsible for the majority of the various complaints.

AECOM examined the complaint log to better understand the nature of the complaint, the timing of the complaints, and the relative distance the complaints in relation to the operations. Complaints were coded into three categories: noise, odor, and operations. While the complaints associated with noise and odor are very specific, operations is a catch-all category that included general complaints associated with on-going facility activity. In total, the majority (69%) of all complaints were associated with noise, while 19 percent were associated with operations, and 12 percent were associated with odor.

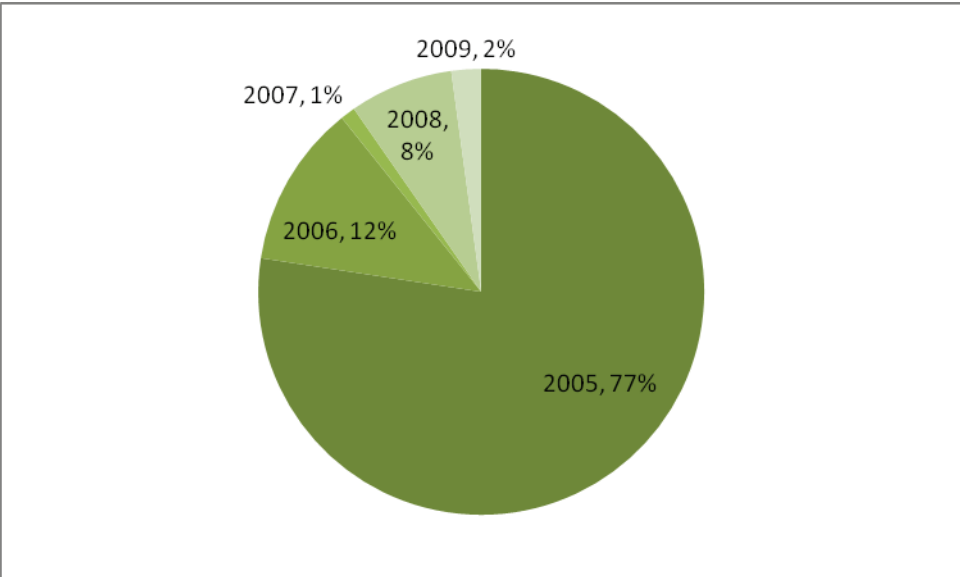
Over the examined the time period of the complaint log, the majority of complaints occurred in 2005 (77%), with fewer logged in the following years. AECOM has not reviewed the production schedule associated with operations at 12515 Honolulu Terrace, but even accounting for repeat complaints (issued by one individual), after 2005 when 72 resident complaints were logged, there were only 11 in 2006, 1 in 2007, 7 in 2008, and 2 in 2009. This suggests that complaints were highly related to the operations in 2005 or people became less aware or accustomed to the issues in subsequent years.

Figure 20: Complaints by Type



Note: N = 93 (2005 – 2009)  
Source: Matrix Oil

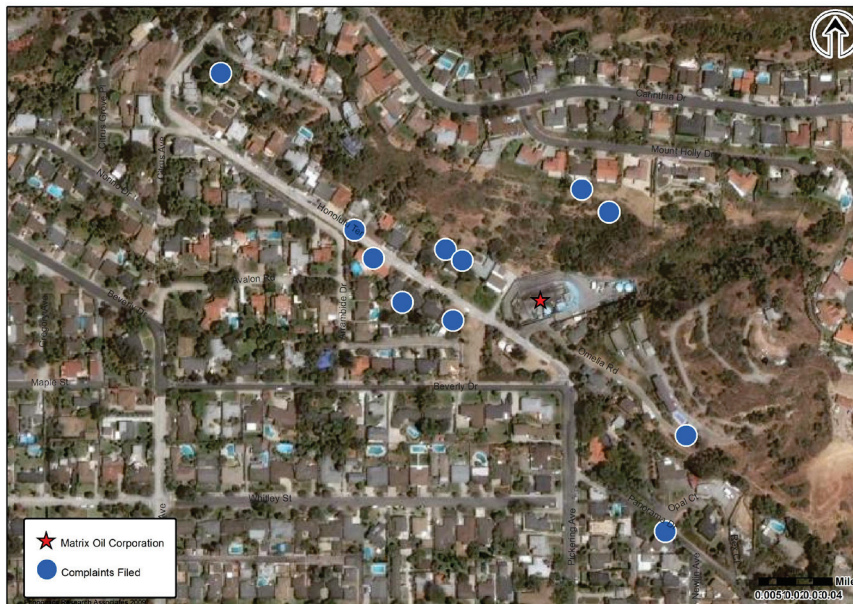
Figure 21: Complaints by Year



Note: N = 93 (2005 – 2009)  
Source: Matrix Oil

The locations of the complaints lodged against Matrix Oil Corporation from the Honolulu Terrace operation were mapped using ArcGIS. As noted above and shown on the map below, the 93 complaints filed between 2005 and 2009 originate from 11 discrete sources:

**Figure 22: Location of Complaints Lodged against Matrix Oil Corporation**

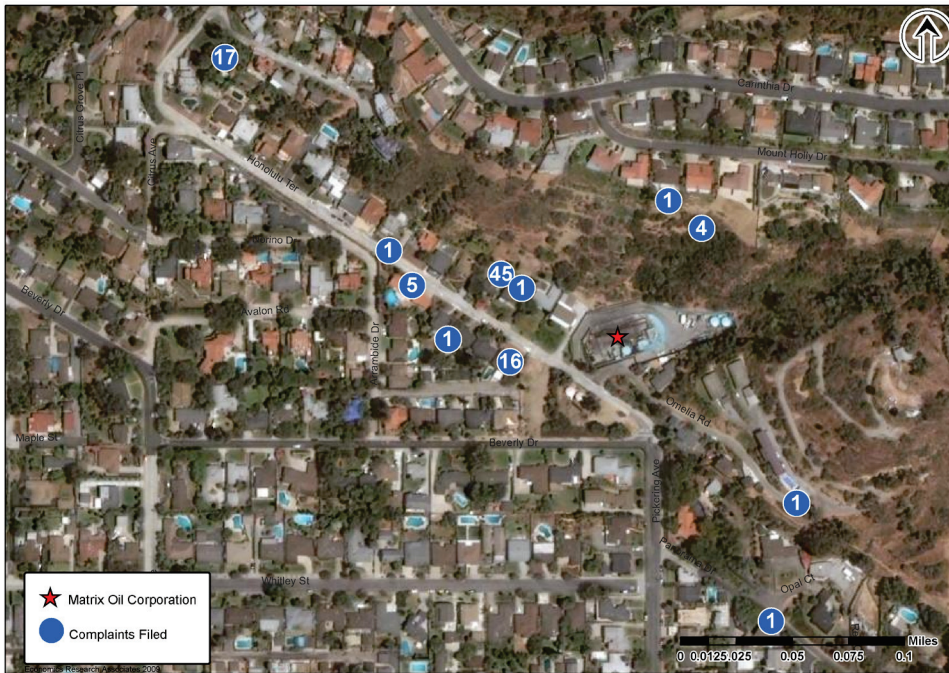


Source: Matrix Oil and ArcGIS

The distribution of complaints lodged from each location is very uneven, with nearly half of the complaints coming from a single address:



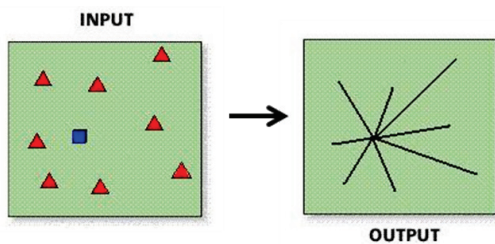
Figure 23: Distribution of Complaints Lodged against Matrix Oil Corporation



Source: Matrix Oil; AECOM; and ArcGIS

Using the “Desire Lines”<sup>7</sup> tool under Business Analyst, straight distance lines were calculated between the site of each complaint and the oil rig site. The average distance between the origin of the complaint and the oil rig site is approximately 495 feet (from the oil rig site).

<sup>7</sup> Desire lines, also known as spider diagrams, are a series of rays (lines) drawn from each complaint point to the Site. Desire lines graphically illustrate the direction of pull in the based on the frequency of the complaints. See diagram below:





**Figure 24: Distance of Complaints Lodged from Oil Rig Site**



Source: Matrix Oil; AECOM; and ArcGIS

Based on the GIS analysis of the complaints lodged, the following conclusions have been drawn. First, the location of the complaint does not directly correlate with the volume of complaints originating from that source. For example, 17 complaints were lodged from a resident who lives the furthest from the site of the oil rig. Second, most of the complaints (68 percent) are from residents who live immediately adjacent to the oil rig site. Finally, the source of the complaints appear to come from residents who are either immediately adjacent to the oil rig site or have views of the oil rig from their home, rather than from residents with homes within a specific radius of the oil rig. For example, two sources of complaints (who have lodged 1 and 4 complaints respectively) are located along Mount Holly Drive, away from the oil rig site, but have backyards with overlooks onto the site. Residents living similar distances from the site, southwest of the oil rig, who cannot see the oil rig due to other homes, have not lodged complaints.

### ***Local Real Estate Broker Interviews***

AECOM interviewed a number of local real estate agents<sup>8</sup> to better understand the effect, historically, of the selected three site locations where oil and gas operations are active in regards to near-by residential home values. It is important to note that no analytic research was conducted by the interviewees. The purpose of our discussions was to ascertain their feel for market conditions in proximity to the active oil wells under consideration. In general, those brokers we interviewed believed that home values most affected by the oil operations (in close proximity) were depressed by approximately 10 percent. A couple individuals also suggested that these same homes typically took twice as long to sell.

The number of homes or reach of the assumed price depreciation was not known. Brokers tended to believe that adjacent houses or homes that had significant view sheds obstructed by operations were most affected by the operations. Agents also noted since oil drilling is pervasive throughout Southern California potential buyers are typically accustomed to and not concerned with oil facility aesthetics as long as they are not immediately adjacent to operations. However, nuisances such as noise, visual or health concerns do affect potential buyers' decisions making and are thus important considerations when determining the overall marketability of a home.

### ***Analytical Evaluation of Local Case Studies***

Using the complaint information provided by Matrix Oil and national case studies, AECOM has analyzed real estate transaction within close proximity of each of the three subject sites. Due to the facilities operations, natural topography, housing variations, and relative noise contours the areas affecting neighboring residential properties will differ in each case study. For the purposes of this study, however, we have decided to take a 500 and 1,000 foot radius as the primary area of influence to evaluate historic real estate transaction data to determine the potential effects of the existing operations on residential home values.

---

<sup>8</sup> Four residential real estate agents were contacted on multiple occasions.

## Potential Effect on Residential Real Estate Values

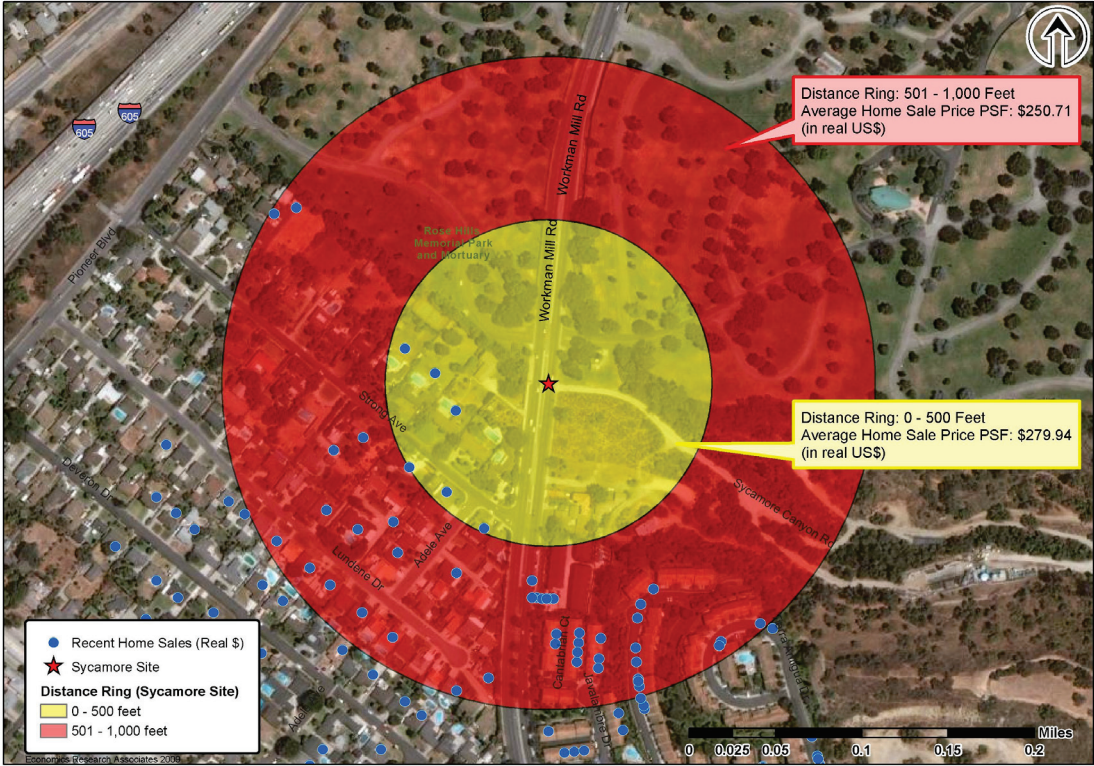
Using residential home sales data provided by CollateralDNA for transactions occurring between 2000 and 2009, we have evaluated the resale of homes within 500 and 1,000 feet of operations at the Matrix, Sycamore, and La Habra Heights sites. Homes that were in the 0 – 500 feet ring (from the rig) and 501 – 1,000 feet ring (from the rig) were isolated from the data set. We then exported the data to Excel and examined the minimum, maximum, median, and average of the home sale prices and price per SF for just those two geographies. AECOM found that that homes within 500 feet of the rig sold for a higher price per square foot than homes in the 501 – 1,000 feet ring.

Initially we thought the data points near the La Habra Height site, which has fewer data points in the rings and higher home sale prices and prices per square foot was effecting the data, but even when those home sales near the La Habra Heights site are removed the same trend holds true. As such, based on this analysis we could not determine any negative effect the three sites had on residential home prices. This is not to suggest that there are none, but the data did not reflect that conclusion based on our research.

The reliability of this information is limited because there were a limited number of homes within 500 feet of the operations, limited transaction data, and no isolation of home differences (beyond total square feet). However, based on the information presented in the following figures, beyond 500 feet there does not appear to be any notable negative impact to home values in comparison to the larger City and County trends.

One notable finding from the data is the lack of transactions within 500 feet of operations after 2006. An argument has been made that any discount associated with an external factor (e.g. noise, odor, visual, etc.) could be affected by the general housing market conditions for that particular area. For example, the presence of a strong demand for housing in a “hot” market can compensate for the general acceptability of a particular nuisance. In Southern California the development of residential housing in areas with conflicting land uses occurred regularly between 2003 and 2006. Because home values continued to appreciate at record rates the buyers were less concerned with external housing factors that could potential affect resale values. Similarly, now that the housing market has “cooled” buyers are more sensitive to any external factors that might adversely affect future resale value of their home.

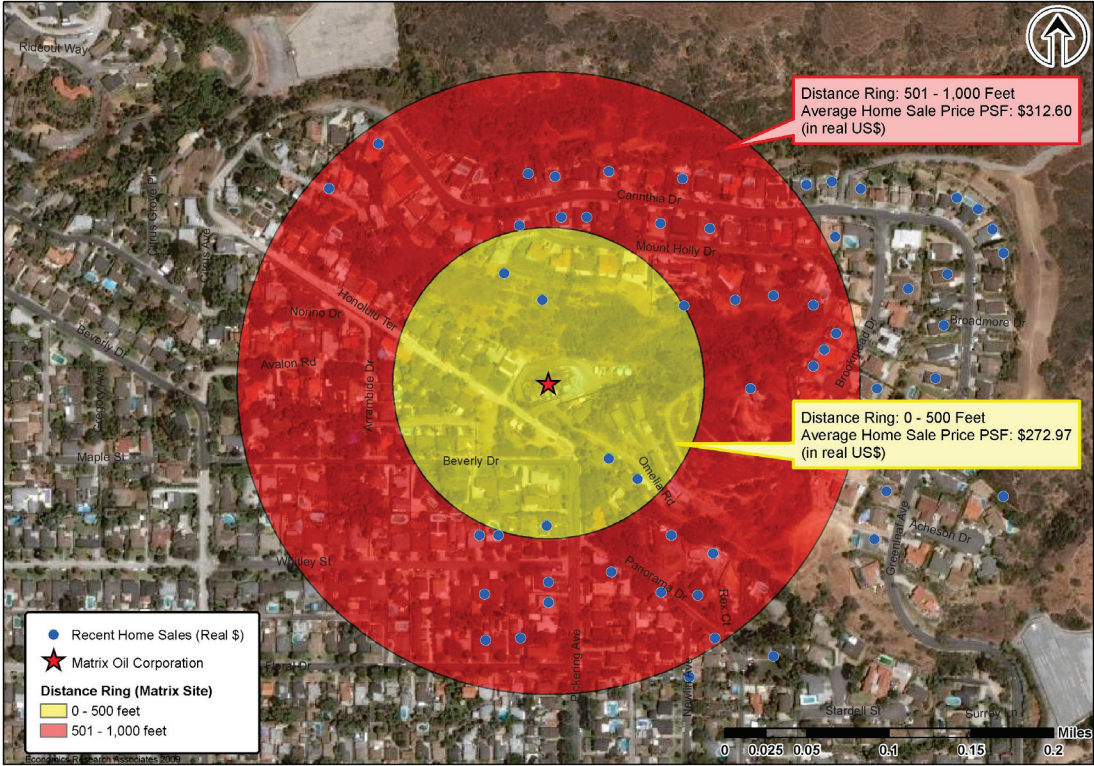
Figure 25: Sycamore Site Home Sales (Constant 2009 Dollars)



Source: CollateralDNA (Data Express); AECOM; and ArcGIS

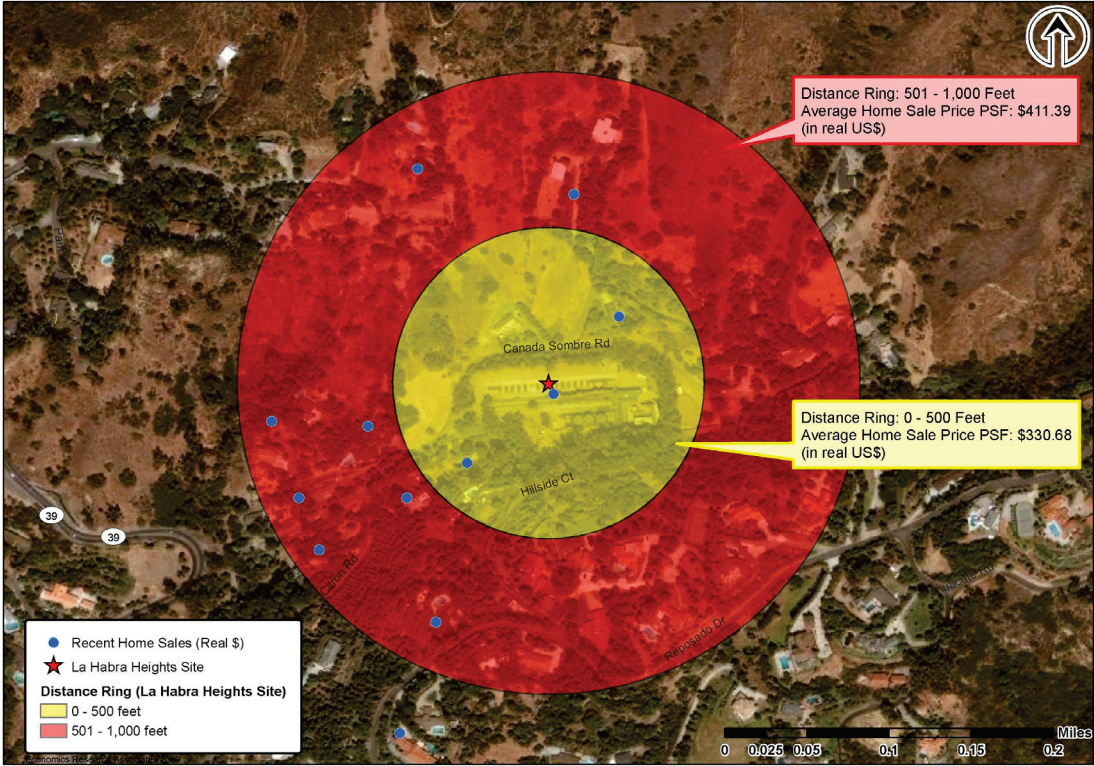


Figure 26: Honolulu Terrace Matrix Site Homes Sales (Constant 2009 Dollars)



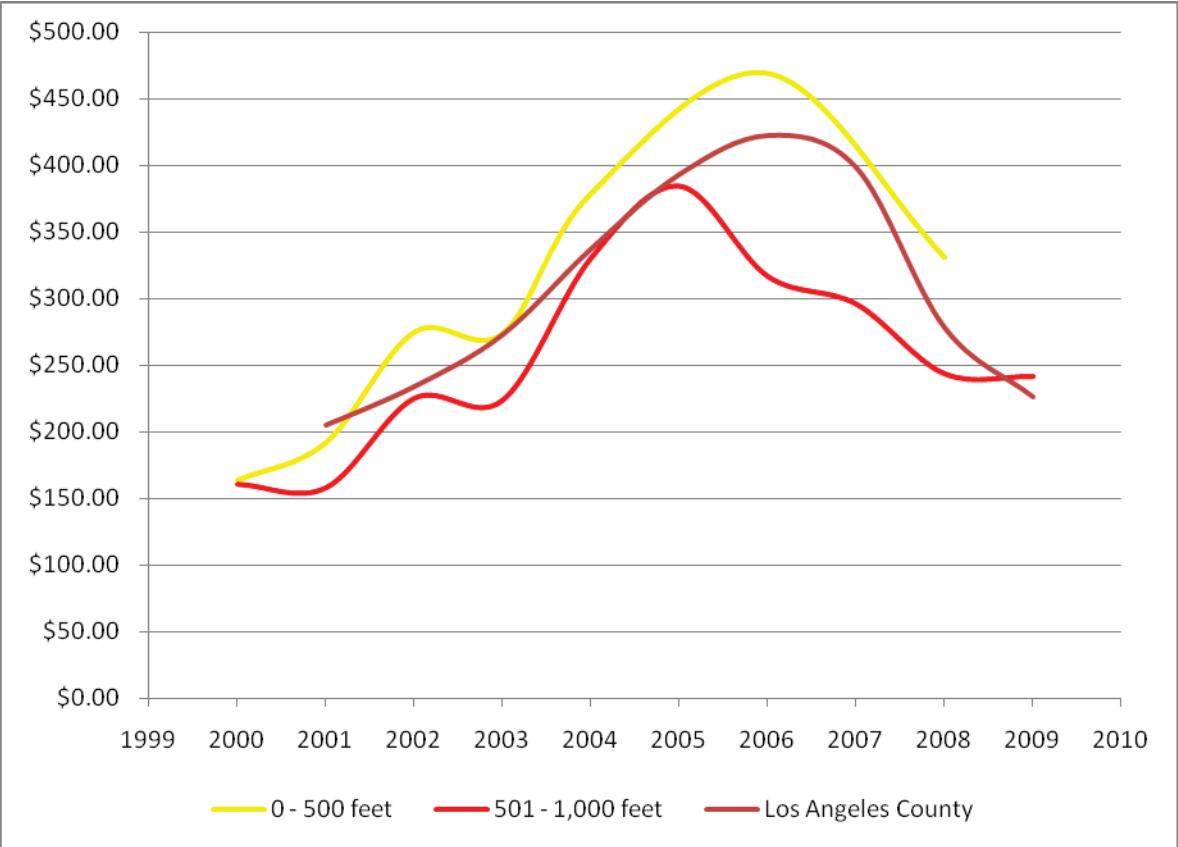
Source: CollateralDNA (Data Express); AECOM; and ArcGIS

Figure 27: La Habra Site Home Sales (Constant 2009 Dollars)



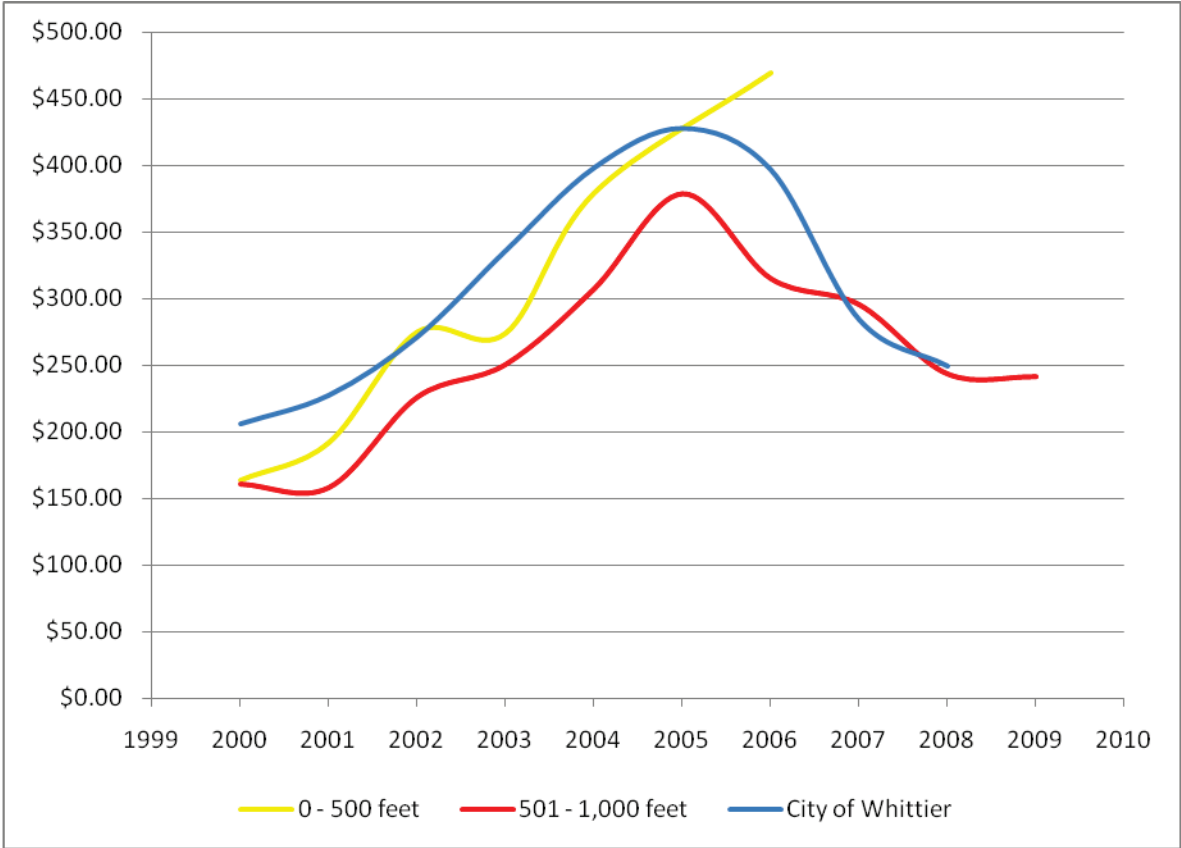
Source: CollateralDNA (Data Express); AECOM; and ArcGIS

Figure 28: Median Sales Price per Square Foot for all Sites and County (Constant 2009 Dollars)



Source: CollateralDNA (Data Express); AECOM; and ArcGIS

Figure 29: Median Sales Price per Square Foot for Matrix, Sycamore, and City (Constant 2009 Dollars)



Source: CollateralDNA (Data Express); AECOM; and ArcGIS



## V. Fiscal Analysis

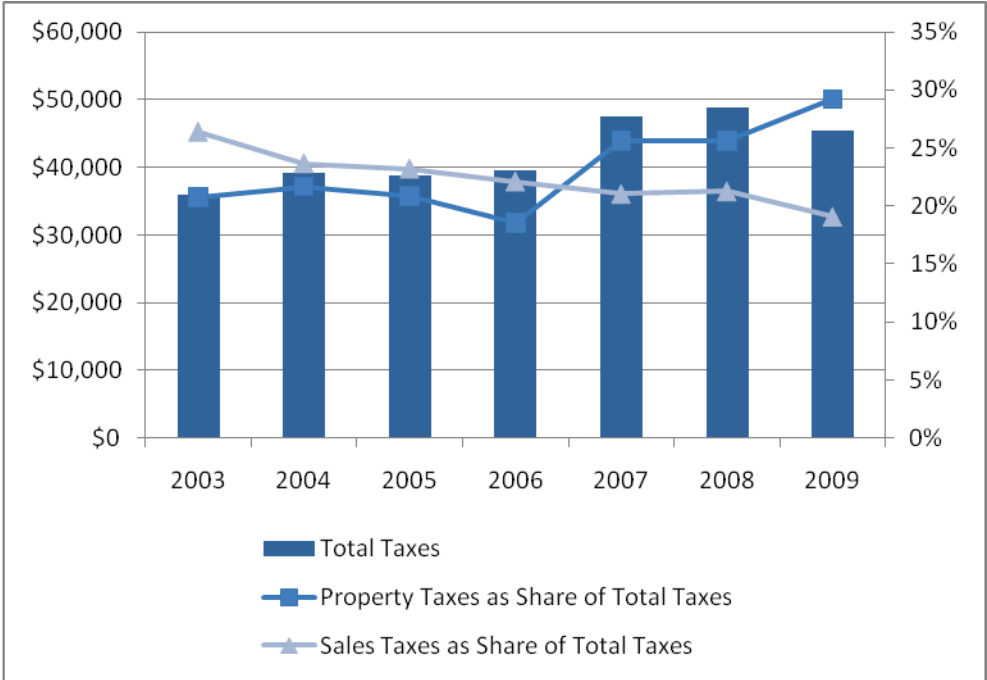
The following section examines some key historic trends related to tax revenues collected by the City. This information is followed by AECOM's estimate of a range of potential price depreciation to homes within the Project's area of mitigated impact for visual and noise nuisances. Finally, using information provided by Matrix Oil regarding potential production, we have created a production schedule and applied oil price projections from the US Energy Information Administration to estimate potential revenues paid to the City.

### Historic Taxes

Between 2003 and 2009, not adjusted for inflation, total tax revenues have increased by approximately four percent annually. Since 2003 property tax revenue generally increased, while sales tax revenue decreased. The recent decrease in sales tax is potentially a significant concern for the City. The following figures explore the City's revenue sources in more detail.

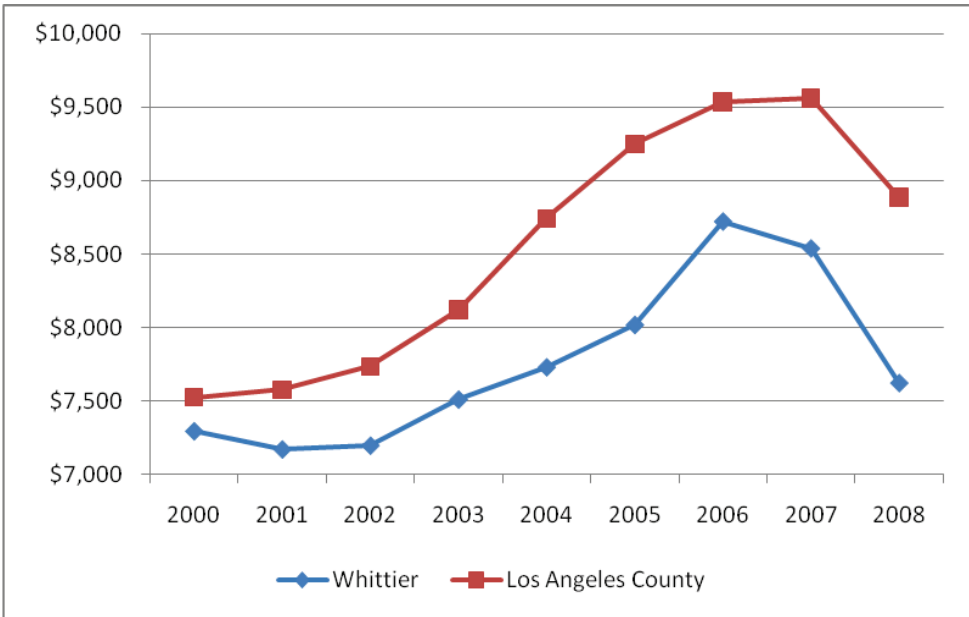
The taxable sales per capita in the City compared to the County are below the County average. Since 2000, the City grew at a slightly faster rate than the County until 2008. The decline in sales tax between 2007 and 2008 came largely as a result of the closure of five of the City's largest auto dealers. With sales taxes currently representing approximately 19 percent of total taxes and due to limited potential for future population growth in the City, the ability to significantly increase sales tax revenues will likely be challenging. Future sales tax revenue will be based on the City's ability to attract retailers that draw residents from outside the City to purchase goods. As a result, the City's ability to maximize and protect existing property tax revenues will be important.

Figure 30: Historic Tax Trends in Whittier



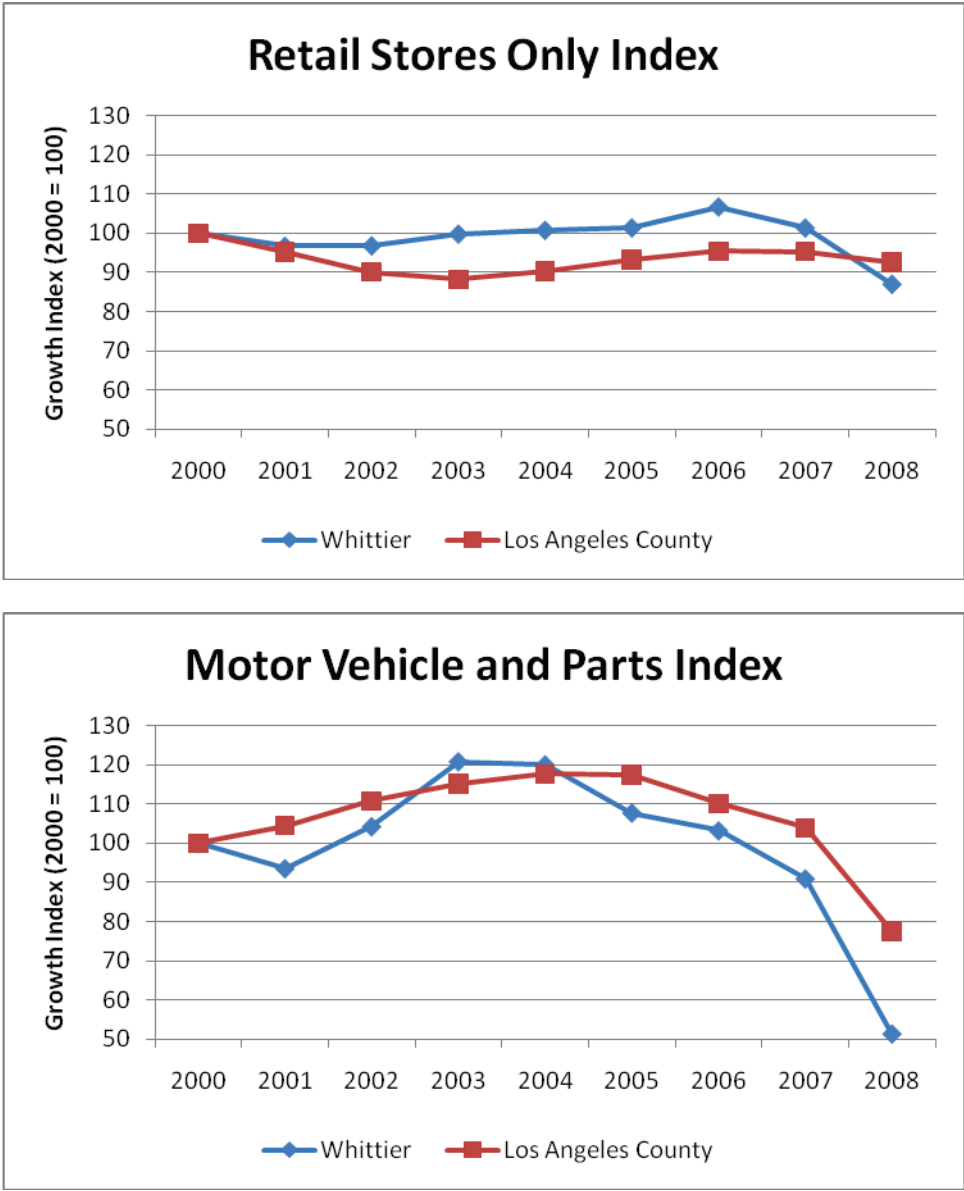
Source: City of Whittier Comprehensive Annual Financial Report (June 30, 2009)

Figure 31: Historic Taxable Sales per Capita



Source: State Board of Equalization and Department of Finance

Figure 32: Sales Tax Index (Retail and Motor Vehicle)



Source: State Board of Equalization

**Potential Level of Price Depreciation and Fiscal Consequence**

AECOM estimated the range of potential residential home depreciation using the following methodology:

- Based on research conducted by MRS, we have defined the area impacted by the Project based on the effects of the Project once sound and visual impacts have been mitigated as noted in the Draft Project EIR;
- Using 2009 data from the Los Angeles County Assessor, we calculated the total assessed value of those residential properties located within the area impacted by the Project; and
- In order to apply a potential range of depreciation, we have used findings reported in Section IV of this report.

Based on the information provided in the Draft EIR, the Project will create noise and visual nuisances to some residents within the City. The following noise contour and visual view sheds shape files were provided by MRS and imported into our GIS. The noise contour represents both the ongoing operation noise impacts as well as the temporary (but ongoing) drilling impacts. In some instances this may be overestimating the actual noise impact, but we have faulted on the side of being over inclusive. The view shed represents the visual impact of the rig assuming that the area was cleared of all existing vegetation. The actual number of properties affected by the rig will be significantly smaller. In order to provide a general estimate of the potential number of properties affected by the visual impact, AECOM has assumed that 25 percent of the properties within the noise contour and 5 percent of those properties located outside the noise contour will be impacted visually by the rig. The ability to establish a more scientific assessment of the impacts on a property-by-property basis was outside the scope of this study. However, based on field work conducted by MRS we believe this estimate is reasonable.

AECOM relied on GIS to gather assessed valuation data based on those properties affected by the noise and visual impacts of the Project. It is important to note that Proposition 13 limits property taxes to a total maximum rate of one percent based upon the assessed value of the property being taxed. Each year, the assessed value of property may be increased by an inflation factor (limited to a maximum increase of two percent). With few exceptions, property is only re-assessed at the time that it is sold to a new owner. At that point, the new assessed value is reassessed at the purchase price of the property sold. The assessed valuation data provided below represents the only data available with respect to the actual market value of taxable property and is subject to the limitations described above. In other words, the actual market value will likely be higher than the values provided herein. However, even a potential decline in market value caused by the Project could yield a net increase in the assessed value of the property after it is sold and reassessed.

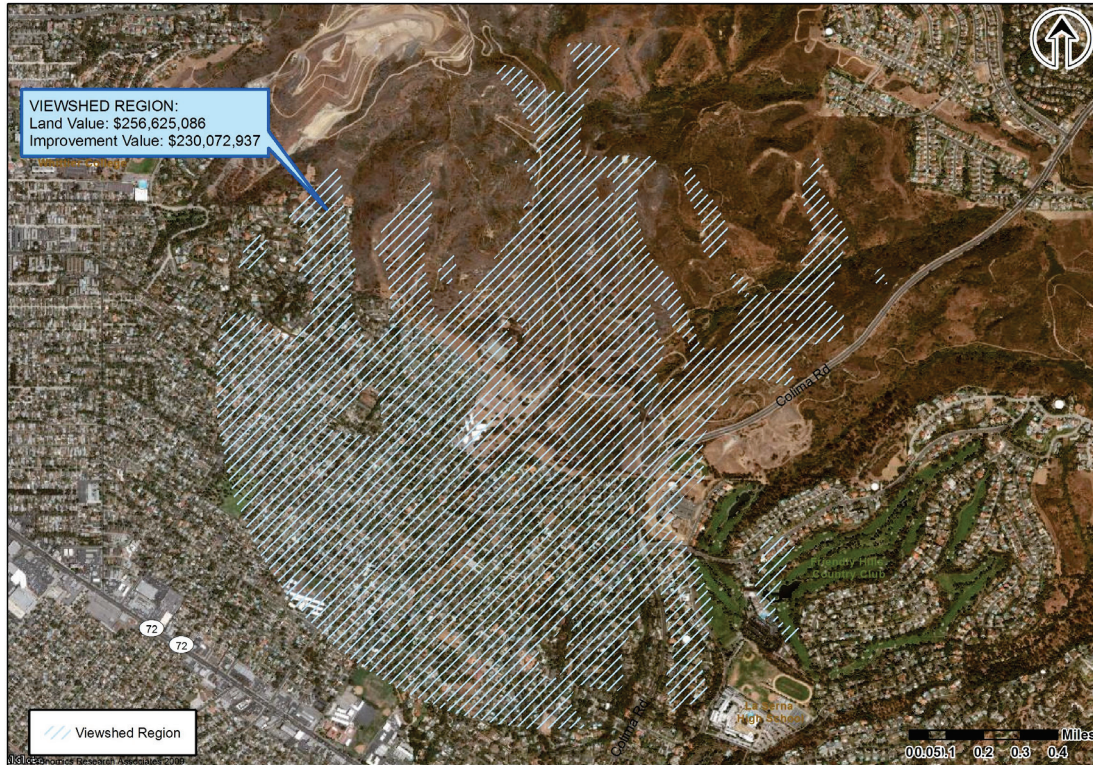
Figure 33: Noise Impact Area (Drilling and Operations)



Note: AV = Residential Properties Only.  
Source: MRS; Los Angeles County Assessor Parcel Data (2009)



**Figure 34: Visual Impact Area (View Shed)**

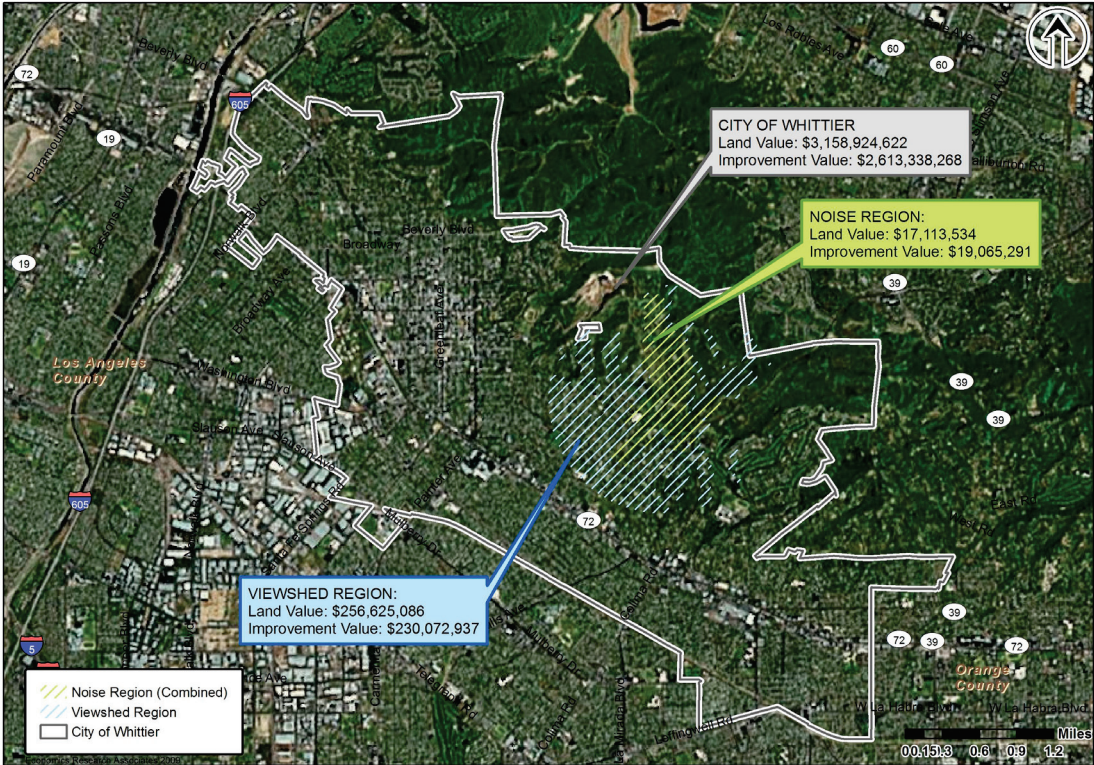


Note: AV = Residential Properties Only; Not all homes will be visually impacted. As such, figure misrepresents total visual impact<sup>9</sup>.

Source: MRS; Los Angeles County Assessor Parcel Data (2009)

<sup>9</sup> Beyond the area near the site, we have estimated that five percent of homes will be visually impacted by the rig. Please refer to Section 4.6 Aesthetic and Visual Resources for a more detailed discussion of actual impacts by specific location. Chart above assumes that there are no barriers (natural or otherwise) to the view shed.

Figure 35: Impact Areas in Comparison to City



Note: AV = Residential Properties Only  
Source: MRS; Los Angeles County Assessor Parcel Data (2009)



**Table 15: 2009 Assessed Values (Residential Properties Only)**

	Land Value	Improvement Value	Taxable Assessed Value <sup>1</sup>
Noise Region (Combined)	\$17,113,534	\$19,065,291	\$36,178,825
<i>Noise Drill Mitigation Area</i>	\$13,130,418	\$14,440,886	\$27,571,304
<i>Noise Operations Mitigation Area</i>	\$9,723,896	\$12,750,246	\$22,474,142
Viewshed Oil Rig Region	\$256,625,086	\$230,072,937	\$486,698,023
<b>City of Whittier</b>	<b>\$3,158,924,622</b>	<b>\$2,613,338,268</b>	<b>\$5,772,262,890</b>

<sup>1</sup> Does not Include Homeowners Exempt Value

Source: MRS; Los Angeles County Assessor Parcel Data (2009); AECOM

According to hedonic price studies for noise, comparable impacts would likely be 0.6 percent for each one dB increase in noise (most closely analogous to that of the drilling and operations). According to MRS, the average noise increase for the total area impacted would yield an increase of 1.25 dB peak hour combined during drilling. Ongoing work, which would occur more frequently, would yield an increase of only 0.95 dB peak hour combined during operations. AECOM has used this higher noise increase because it represents the high-end of potential impacts. Based on the minimal noise increase, estimated value depreciation would range from 0.87 to 0.58 percent in the high and low scenario, respectively.<sup>10</sup>

The visual impact of the rig is assumed to have an impact of a six percent to three percent value decrease for residential home values. As noted, local eucalyptus trees, topography, and other features will limit this impact to a relative small number of homes. Most literature suggests that visual impacts are not severe unless you are taking away an existing vista. Furthermore, this impact is only present when the rig is active. As a result, after the initial five year period this impact would only be present during specific months during the year.

<sup>10</sup> As noted in the EIR “On the decibel scale, an increase of 10 dB in sound level represents a perceived doubling of loudness. Conversely, a decrease of 10 dB in sound level is perceived as being half as loud. It is widely accepted that a change of 3 dBA is barely perceptible to most people, while most people would readily perceive an increase or decrease of 5 to 6 dBA in noise level.” As such, the increase of 1.25 dB would generally not be perceptible to anyone. However, it is important to remember this is an average increase over the area and those closer to the Site would experience higher dB increases than those farther away.



Using the aforementioned methodology, we have estimated a range of potential impacts to the City. In both cases, the fiscal consequence (from the City's perspective) would be minimal. The high impact scenario suggests a potential decrease of \$2.2 million in assessed value, which is approximately 0.04 percent of the total assessed value for residential properties in the City. The low scenario suggests a decrease of \$1.2 million in assessed value, which represents 0.01 percent of the total assessed value for residential properties in the City. Converting the assessed value to property tax received by the City, our analysis suggests a range of between approximately \$4,400 and \$2,300 in lost fiscal revenue per year. It is important to note that this is largely theoretical because it assumes that each of the homes was reassessed and that their current assessed value reflects their current market value.

However, this analysis does not take into account specific property value loss and the subsequent financial impact on individual property owners in the City. This analysis presents an average estimate for all residential properties' depreciation throughout the affected areas. Actual impacts will not likely be borne uniformly as illustrated in this study. However, the high and low scenario should provide the City with an order of magnitude impact estimate that it can use to evaluate the Project's potential benefit to the City.

**Table 16: Estimate of Potential Price Depreciation (2009 Dollars)**

	High Scenario	Low Scenario
Noise Region	\$36,178,825	\$36,178,825
Assumed Noise Noise Impact <sup>1</sup>	100%	100%
Noise Impacted Assessed Value	\$36,178,825	\$36,178,825
Noise Assumed Price Depreciation <sup>2</sup>	-2.4%	-1.3%
Noise Value Depreciation	(\$857,438)	(\$481,178)
Property Tax (1%)	(\$8,574)	(\$4,812)
City Share (20%) <sup>3</sup>	(\$1,715)	(\$962)
Viewshed Oil Rig Region (Outside Noise Region)	\$450,519,198	\$450,519,198
Assumed Visual Impact <sup>4</sup>	5%	5%
Visual Impacted Assessed Value	\$22,525,960	\$22,525,960
Visual Assumed Price Depreciation <sup>5</sup>	-6.0%	-3.0%
Visual Value Depreciation	(\$1,351,558)	(\$675,779)
Property Tax (1%)	(\$13,516)	(\$6,758)
City Share (20%)	(\$2,703)	(\$1,352)
Total Potential AV Decrease (Rounded)	(\$2,209,000)	(\$1,157,000)
Percent of 2009 AV Decrease	-0.04%	-0.01%
Total Potential Loss of Property Tax(Rounded)	(\$4,400)	(\$2,300)
Property Taxes in 2009 (Total)	\$13,252,000	\$13,252,000
Percent of 2009 Property Taxes	-0.03%	-0.02%

1 AECOM has assumed that 25% of homes will also have a visual impact of the Rig that is included in the assumed value depreciation

2 Both scenarios assumes that 25% of homes will have a visual impact and noise impact; impacts based on literature review

3 Estimate based on six year average as reported in the Comprehensive Annual Financial Report (2009)

4 Estimate based on discussions with MRS

5 Scenarios visual impact based literature review

6 Impacts are not cumulative

Source: Cited Case Studies; MRS; Los Angeles County Assessor Parcel Data (2009); AECOM

## Potential Level of Project Fiscal Benefit

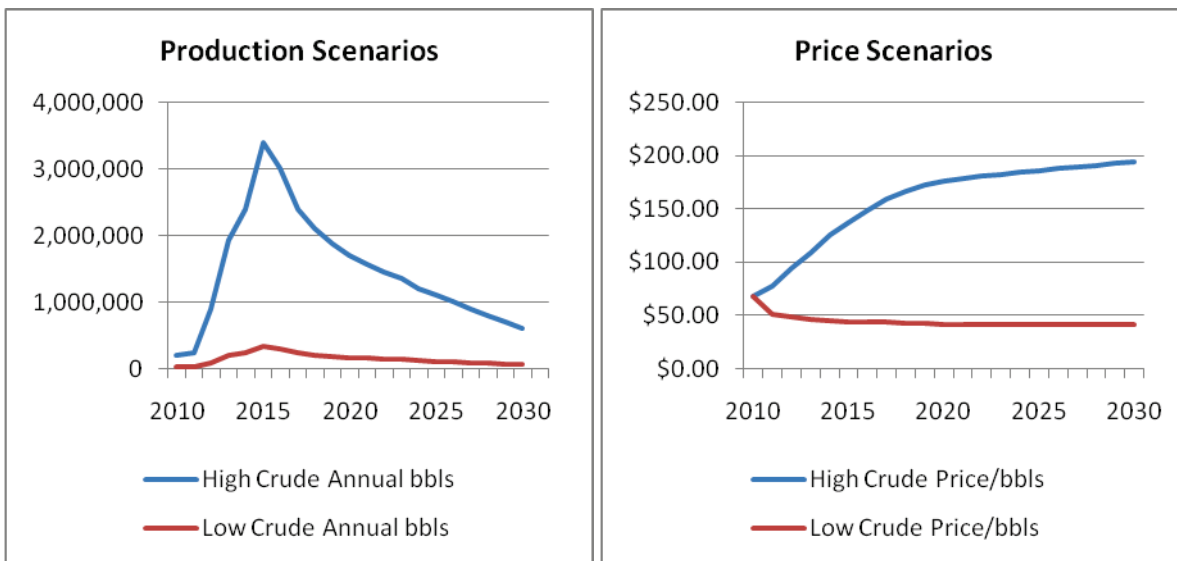
The potential range of royalty payments paid to the City from Matrix oil will vary greatly based on actual production and the future market value of a barrel of oil (bbl). In this analysis, AECOM has relied on a production curve based on information provided by Matrix that varies from 1,000 to 10,000 barrels per day in year six with production will then declining modestly (less than 10%) throughout the remaining life of the project.

To estimate the price per bbl, AECOM relied on current data provided by the US Energy Information Administration. The agency presents two scenarios, a high and low, that present the price per bbl (for imported crude oil) in constant dollars. The range of price assumptions varies dramatically. In the low scenario, the agency projects that oil prices will decline from 2010 prices of approximately \$67 dollars per bbl to \$42 per bbl in 2035. This represents an average annual decline of approximately 2.9 percent. In contrast, the high scenario has prices appreciating by an average of 2.9 percent a year, reaching approximately \$200 per bbl in 2035. The uncertainty associated with oil futures makes the accuracy of predicting the royalty payments extremely difficult. MRS provided guidance on these estimates and established estimates for a low and high scenario for gas.

All assumptions regarding future royalty payments made to the City are based on the executed "Oil, Gas and Mineral Lease" between the City and Matrix Oil. Section 7.1 was relied on to make the estimates. AECOM did not project additional revenues provided based on lease payments, Habitat Authority payments, business license tax, property taxes or any other benefit directly attributable to the Project. As such, the actual fiscal impacts less any costs to the City may be greater.

**Table 17: Potential Annual Fiscal Benefit to the City from Oil Production**

Scenario	Price Range (2008 Dollars)	Annual Average over 30 years Fiscal Benefit (millions of 2009 Dollars)	
		High Crude Case, 10,000 bpd	Low Crude Case, 1,000 bpd
Low Price Case	\$67 - \$42	\$25.4	\$2.0
High Price Case	\$67 - \$194	\$112.3	\$7.2



Notes:

- (1) Oil production provided by Matrix Oil.
- (2) Estimate of royalty payments is based on the Oil, Gas, and Mineral Lease dated October 28<sup>th</sup>, 2008 between the City and Matrix Oil and future oil prices provided by the US Energy Information Administration in constant 2008 dollars, adjusted to 2009 dollars using the consumer price index provided by the US Department of Labor.
- (3) Bpd = Barrels per day

Source: BLS; US Energy Information Administration; Matrix Oil; City of Whittier; AECOM

**Table 18: Potential Annual Fiscal Benefit to the City from Gas Production**

Scenario	Price Range (2008 Dollars)	Annual Average Fiscal Benefit (millions of 2009 Dollars)	
		High Gas Case, 6 mmscfd	Low Gas Case, 0.6 mmscfd
Low Price Case	\$6.87 - \$8.69	\$2.8	\$0.3
High Price Case	\$6.87 - \$10.69	\$3.0	\$0.3

Note: Mmscfd = Million standard cubic feet per day  
 Source: BLS; US Energy Information Administration; Matrix Oil; MRS

**Table 19: Potential Annual Fiscal Benefit to the City from Gas and Oil Production**

Scenario	Annual Average Fiscal Benefit (millions of 2009 Dollars)	
Low Price Case	\$28.2	\$2.3
High Price Case	\$115.4	\$7.5

Source: BLS; US Energy Information Administration; Matrix Oil; City of Whittier; MRS; AECOM

As noted above, the fiscal consequence of the Project as determined by a loss of potential property taxes is minimal compared to the potential new tax source to the City. From the City's fiscal perspective, the benefits of the Project outweigh any potential loss in property value associated with the Project. Using the illustrative average revenues paid to the City, the new revenue source in the high scenario of \$115.4 million (high price/ high production) and low scenario of \$7.5 million (low price/high production) would be equal to approximately 266 percent or 17 percent of total revenues, respectively, of all taxes collected in fiscal year 2009<sup>11</sup>. It is important to note that all real estate related impacts were evaluated based on high scenario production assumptions, as such, if the lower scenario production did occur then the real estate impacts would be less. As noted, AECOM did not project additional revenues provided based on lease payments, Habitat Authority payments, business license tax, property taxes or any other benefit directly attributable to the Project. As such, the actual fiscal benefits to the City may be greater.

<sup>11</sup> Total based on comparison to reported 2009 total tax collection of \$43.4 million (Property, Sales, Franchise, Utility, Motor Vehicle in Lieu, Transit, and Other Taxes).

## Conclusions

In conclusion, the fiscal consequence of the Project as determined by a loss of potential property taxes is minimal compared to the potential new tax source to the City. From the City's fiscal perspective, the benefits of the Project outweigh any potential loss in property value associated with the Project. From the perspective of individual home owners, the effect of the Project will vary due to the unique characteristics of their property in relation to any perceived negative impacts from normal Project operations. Academic studies on various external nuisances suggest an upward bound of eight percent in total property depreciation under extreme circumstances. While local real estate agents seem to support this estimate, after examining residential sales transactions within close proximity to comparable operations, we did not find any evidence to support this conclusion. As noted, this is not to suggest that the Project will not adversely affect some properties' value. However, the proposed measures to mitigate noise and visual impacts of the Project, value of the adjacent Preserve (open space), reputation of the City, as well as other factors is likely to mitigate any adverse effects of normal operations on residential home values for most residents within the areas where noise and visual impacts are present.