

# APPENDICES: TABLE OF CONTENTS

## Appendix A

<b>Baseline Population Characteristics</b> .....	<b>A1</b>
Table A-1 Demographic characteristics .....	A2
Figure A-1 Median age by census tract.....	A3
Community Health Profile.....	A4

## Appendix B

<b>Maps</b> .....	<b>B1</b>
Figure B-1 City of Pasadena geographic boundaries .....	B2
Figure B-2 Population density .....	B3
Figure B-3 Percentage of population without health insurance coverage .....	B4
Figure B-4 Median household income .....	B5
Figure B-5 Percentage of population below the Federal Poverty Level .....	B6
Figure B-6 Percentage of households with one vehicle or less .....	B7
Figure B-7 Land use .....	B8
Figure B-8 Map of vacant lots at least 0.22 acres large .....	B9
Figure B-9 Map of multifamily 20+ units with 1000 ft. buffer .....	B10
Figure B-10 Map of multifamily 20+ units with 2500 ft. buffer .....	B11
Figure B-11 Highway buffers for vacant lots and multifamily units.....	B12
Figure B-12 EPA Superfund sites.....	B13

## Appendix C

<b>Superfund Sites and Health</b> .....	<b>C1</b>
Table C-1 Health effects associated with Superfund sites.....	C2

## Appendix D

<b>Supporting Documents Used in Scoping</b> .....	<b>D1</b>
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Key informant interview sample questionnaire .....D2

## Appendix E

**Methods** ..... E1

Methods used in this HIA..... E2

## Clickable Links

[City of Pasadena Texas](#)

[PasadenaTexas.com](#)

[Healthy Living Matters Built Environment and Food Access Assessment](#)

[HLM-Pasadena](#)

[BUILD Health Challenge-Pasadena](#)

## **Appendix A: Baseline Population Characteristics**

**Table A-1. Demographic Characteristics in Pasadena, TX, 2010-14<sup>a</sup>**

	n <sup>b</sup> (%)
<b>Sex</b>	
Female	75,898 (50.3)
Male	74,887 (49.7)
<b>Age group (years)</b>	
<5	12,568 (8.3)
5-19	38,894 (25.7)
20-44	52,971 (35.1)
45-64	33,379 (22.1)
65-84	11,427 (7.6)
85+	1,546 (1.0)
<b>Race</b>	
White	113,870 (75.5)
Black or African American	4,252 (2.8)
American Indian/Alaska Native	1,757 (1.2)
Asian	3,326 (2.2)
Hawaiian/Pacific Islander	25 (0.0)
Other	24,737 (16.4)
Two or more races	2,818 (1.9)
Hispanic or Latino	95,041 (63.0)
Not Hispanic or Latino	55,744 (37.0)
<b>Employment Status (includes ages 16+ years)</b>	
<b>In Labor Force</b>	
Employed	62,516 (57.1)
Unemployed	7,578 (6.9)
<b>Not in Labor Force</b>	
	39,444 (36.0)
<b>Income</b>	
< 10,000	3,578 (7.6)
10,000- 24,999	9,064 (19.1)
25,000-49,999	12,652 (26.7)
50,000-99,999	14,060 (29.7)
100,000-199,999	6,721 (14.1)
200,000+	1,312 (2.8)
<b>Median Income</b>	46,058
<b>Mean Income</b>	60,941

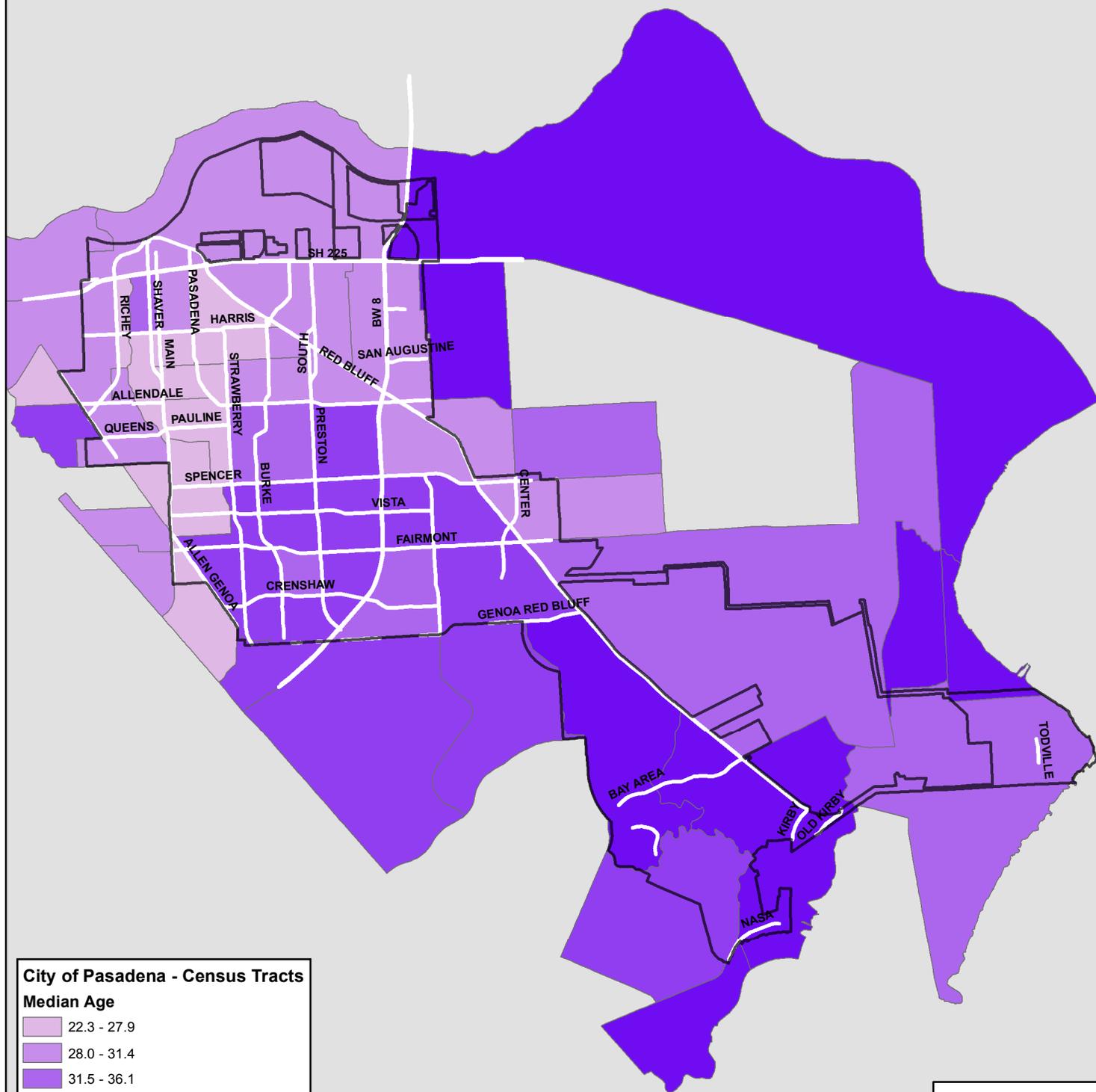
<b>Commute to Work</b>	
Car, Van or Truck	57,252 (93.3)
Public Transportation	358 (0.6)
Walked	843 (1.4)
Other <sup>c</sup>	1,530 (2.5)
Work at Home	1,401 (2.3)
Mean travel time (min)	25.0
<b>Education Status</b>	
Less than 9th grade	13,336 (15.2)
High school (no diploma)	12,351 (14.1)
High school graduate	26,911 (30.7)
Some college	18,639 (21.3)
Associate's degree	4,520 (5.2)
Bachelor's degree	8,196 (9.4)
Graduate/Professional degree	3,571 (4.1)
<b>Persons with Disability</b>	16,405 (10.9)
<b>United States Native</b>	113,331 (75.2)
<b>Foreign Born</b>	37,454 (24.8)
Naturalized U.S. citizen	10,428 (27.8)
Not a U.S. citizen	27,026 (72.2)
<b>Occupied Housing Units</b>	
Owner-Occupied	26,888 (56.7)
Renter-Occupied	20,499 (43.3)
<b>Persons in Poverty (%)</b>	(21.8)
<b>Health Insurance Coverage</b>	
With Health Insurance	102,466 (68.3)
No Health Insurance	47,622 (31.7)
<b>Total Population</b>	<b>150,785 (100)</b>

<sup>a</sup>2010-14 American Community Survey 5 – Year Estimates.

<sup>b</sup>n is the frequency or number of decedents specified in each column; excludes missing, therefore categories may not total to 100%.

<sup>c</sup>"Other" refers to other means of travel.

Figure A-1. Median Age by Census Tract  
City of Pasadena

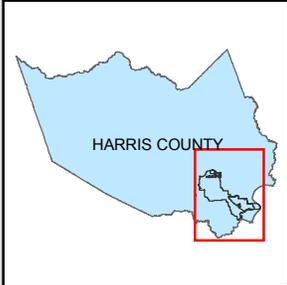


**City of Pasadena - Census Tracts**  
**Median Age**

- 22.3 - 27.9
- 28.0 - 31.4
- 31.5 - 36.1
- 36.2 - 41.2
- 41.3 - 45.0
- City of Pasadena Boundary



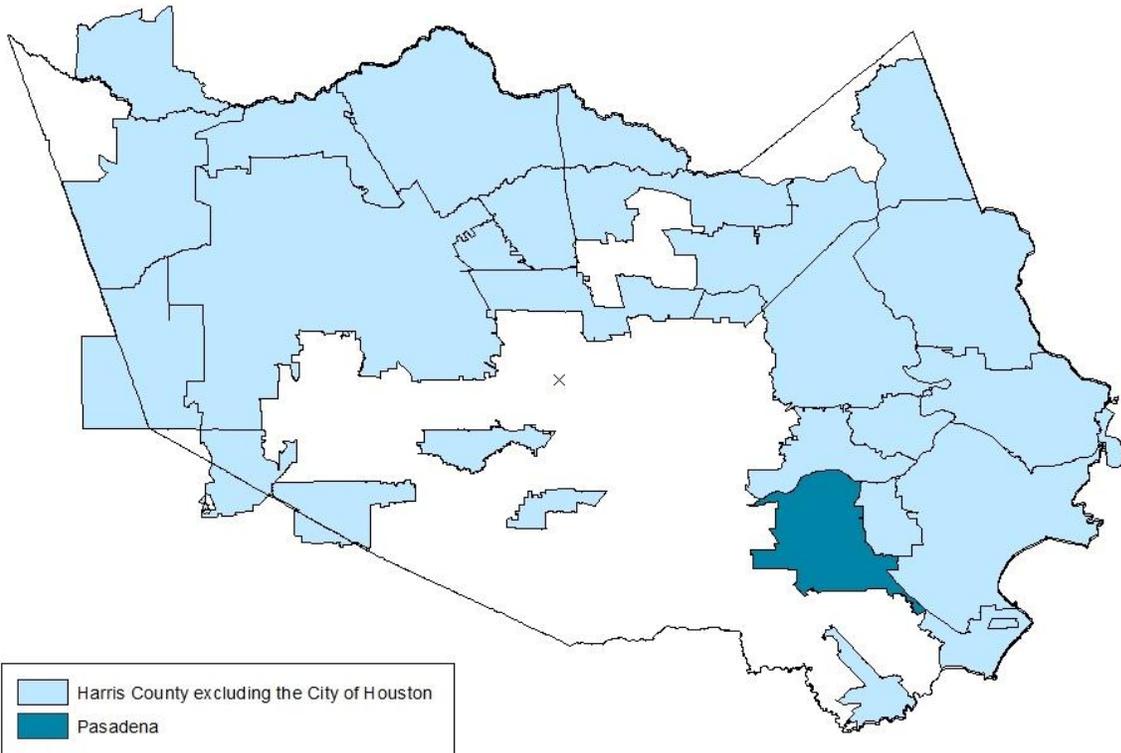
Harris County  
**Public Health**  
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**Public Health**  
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# COMMUNITY HEALTH PROFILE



2016

Pasadena

## Pasadena at a Glance

Harris County Public Health (HCPH) developed 22 community-specific health profiles to describe and monitor the health of residents in Harris County. As part of this HIA, the Pasadena profile was updated to reflect the most recent data available.

The following community profile provides an overview of housing related health status for the Pasadena area in Harris County, Texas. The profile identifies opportunities for health improvement by comparing the health indicators of the Pasadena area with those in Texas, Harris County (excluding the City of Houston, labeled as "HCxH"), and the City of Houston.

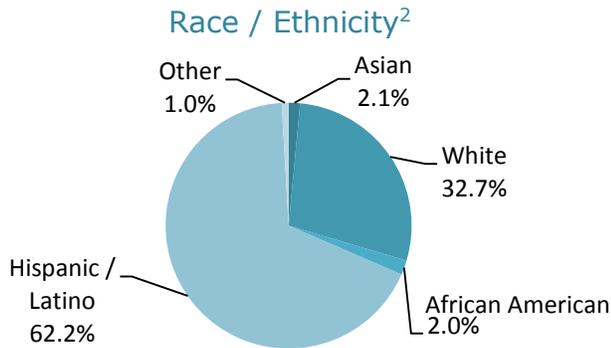
- Pasadena has a higher percent of adults without health insurance than HCxH. It is also known as a health professional shortage area, as defined by the Health Resources & Services Administration.
- The Pasadena area has a higher rate of adult self-reported fair or poor health than HCxH and Texas.
- Adults in the Pasadena area are less likely to consume the recommended amount of fruits and vegetables, more likely to be obese, more likely to smoke, and less likely to engage in binge drinking than those in HCxH.
- 44% of house units in Pasadena are renter occupied, and over 50% spend 30% or more of their income on rent.

This profile provides important information about the health of Pasadena residents, however, it does not address all health issues and their causes.

# Community Profile: Pasadena Area

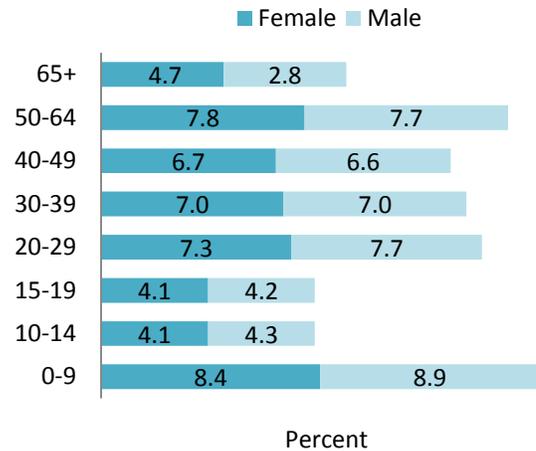
## Demographics

The Pasadena area includes the zip codes 77502, 77503, 77504, 77505, 77506, and 77587,<sup>1</sup> which account for a total population of 153,036 individuals.<sup>2</sup> The Median Household Income is \$46,585, compared to \$53,822 for Harris County excluding the City of Houston (HCxH).<sup>3,4</sup>



### Gender by Age

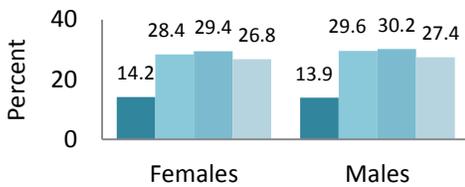
Percent of females and males by age group<sup>4</sup>



## Social Determinants

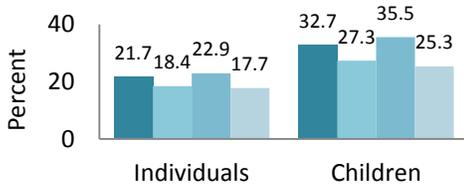
### Education

Percent of population age 25+ with four year college degree or higher<sup>3</sup>



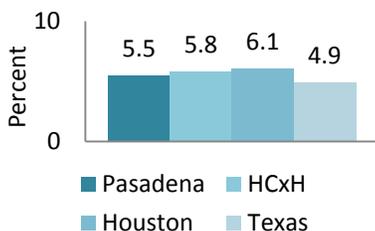
### Poverty

Percent of individuals (all ages) and children (<18) living below the poverty line<sup>3</sup>



### Unemployment

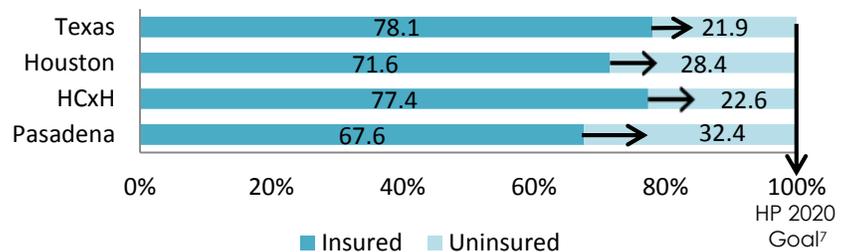
Percent of population age 16+ unemployed but seeking work<sup>3</sup>



## Access to Care

### Insurance Status

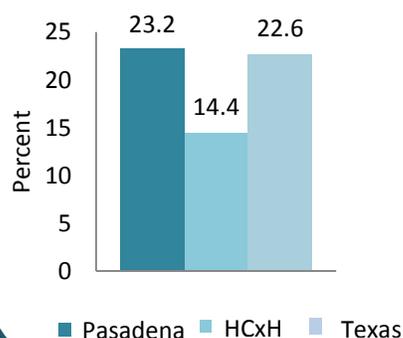
Percent of individuals (18+) with and without insurance coverage.<sup>5</sup> The Pasadena community is a health professional shortage area.<sup>6</sup>



## Overall Health

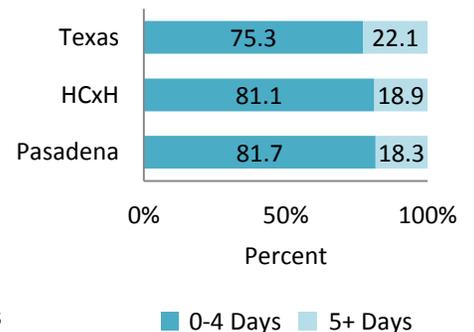
### Self-Reported Health Status

Percent of adults (18+) reporting fair or poor health<sup>8</sup>

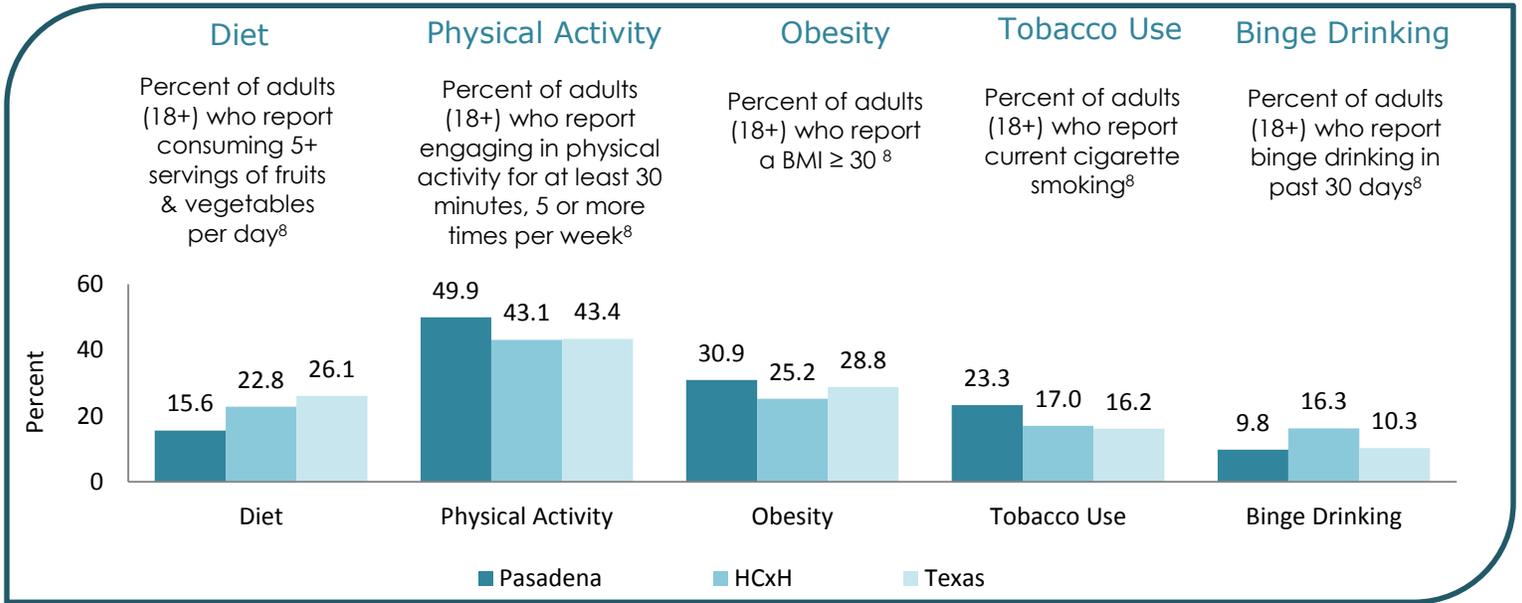


### Physically Healthy Days

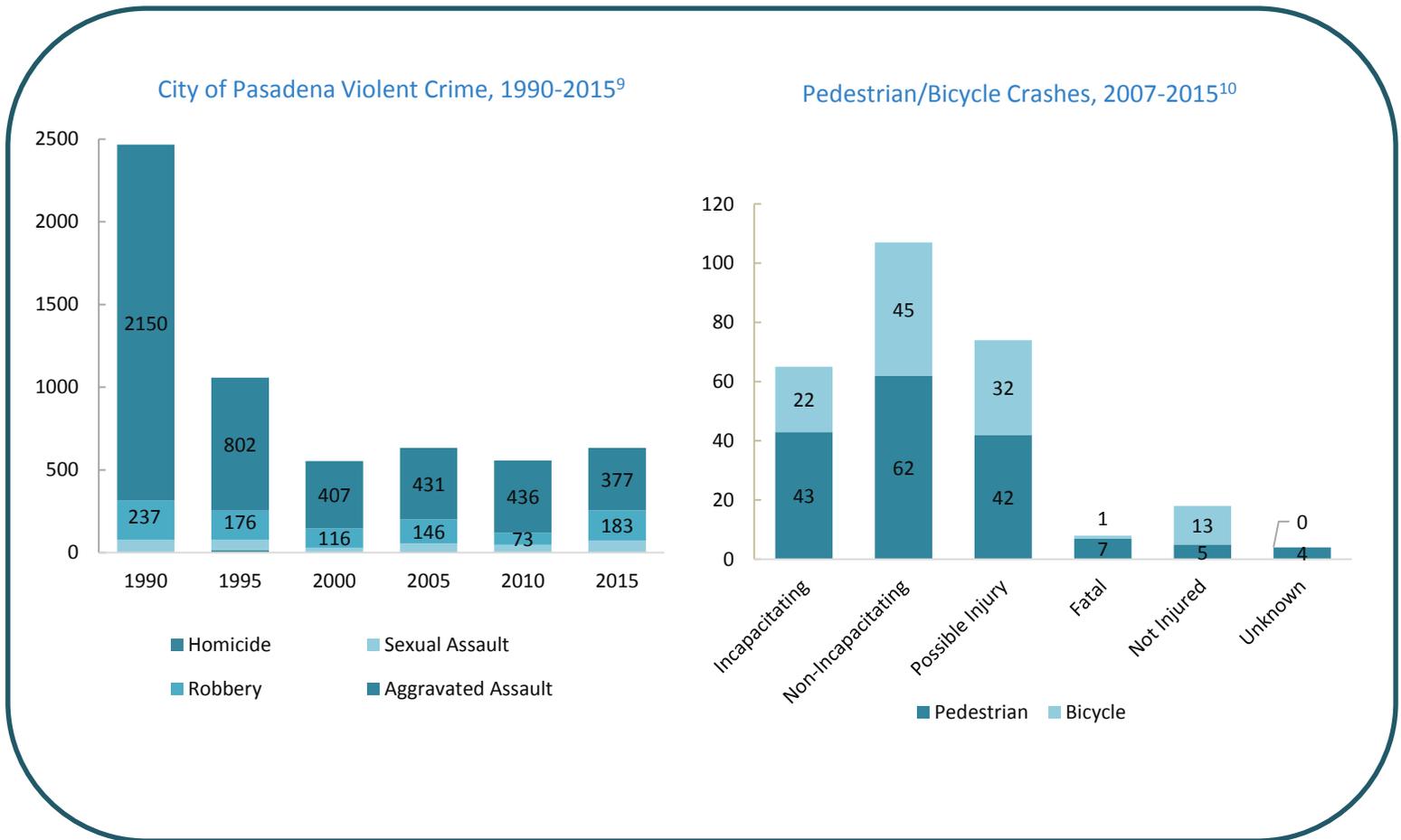
Percent of adults (18+) reporting poor physical health 0 to 4 or 5+ days per month<sup>8</sup>



## Lifestyle Factors

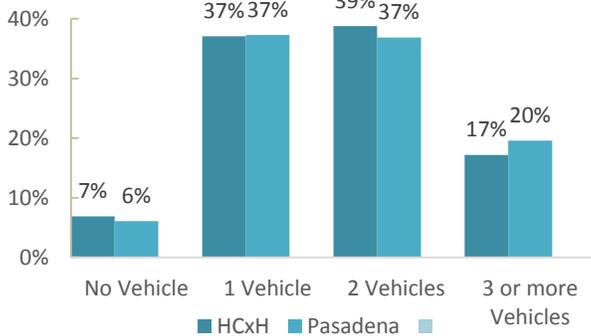


## Public Safety

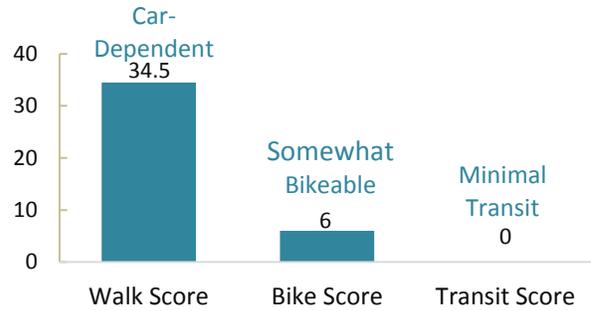


## Transportation

Cars Available in Household<sup>3</sup>

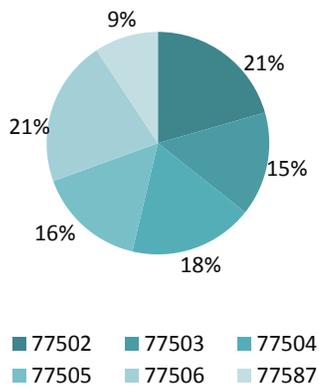


Pasadena Walk Score<sup>3</sup>

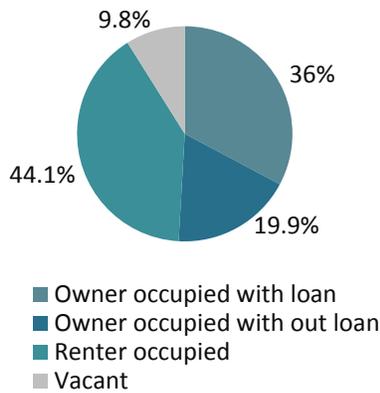


## Housing

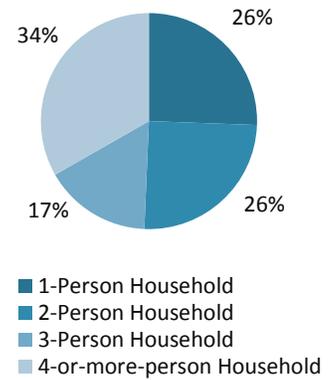
Housing Units<sup>3</sup>



House Occupancy Status<sup>3</sup>

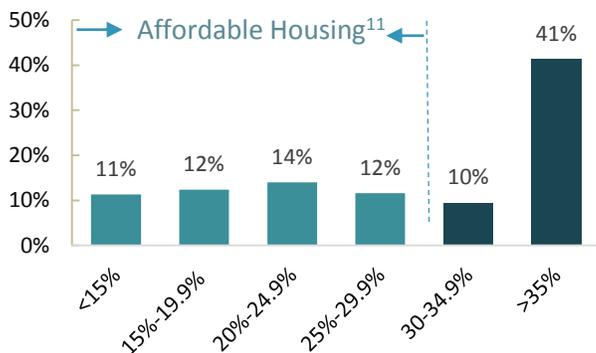


Household Size<sup>3</sup>



## Rent Housing

Gross Rent As A Percentage of Household Income<sup>3</sup>



## Ownership

Monthly Owner Costs As A Percentage of Household Income<sup>3</sup>



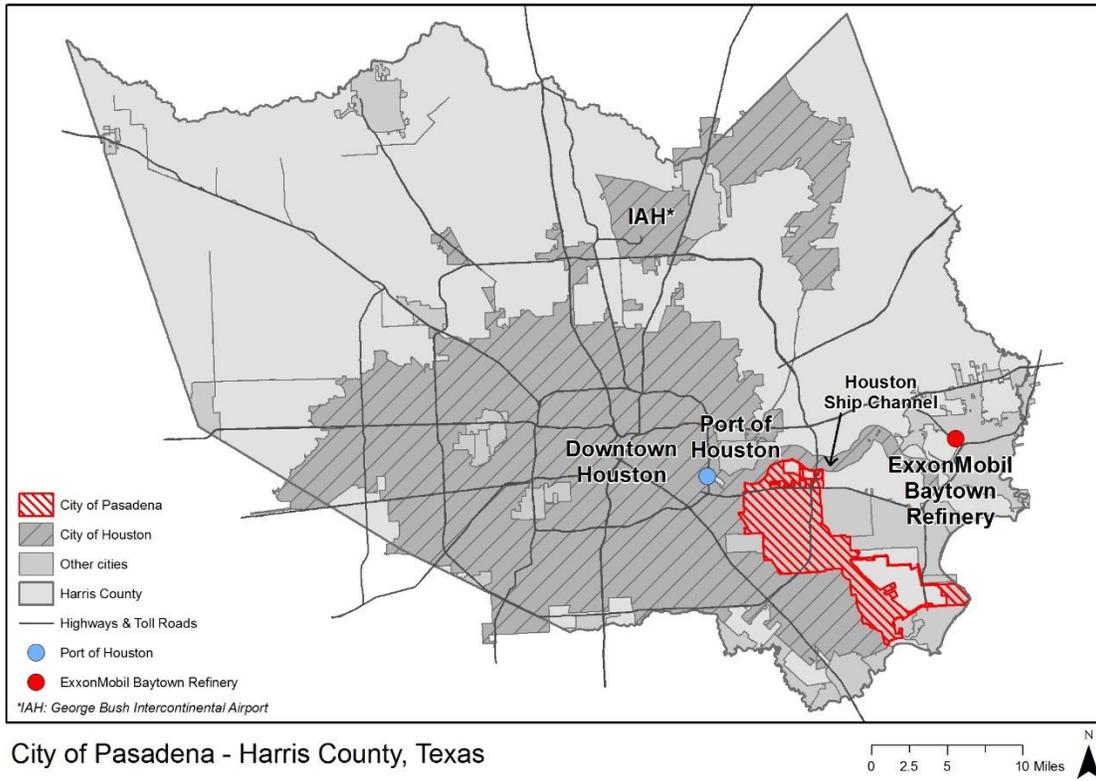
# End Notes

## Sources

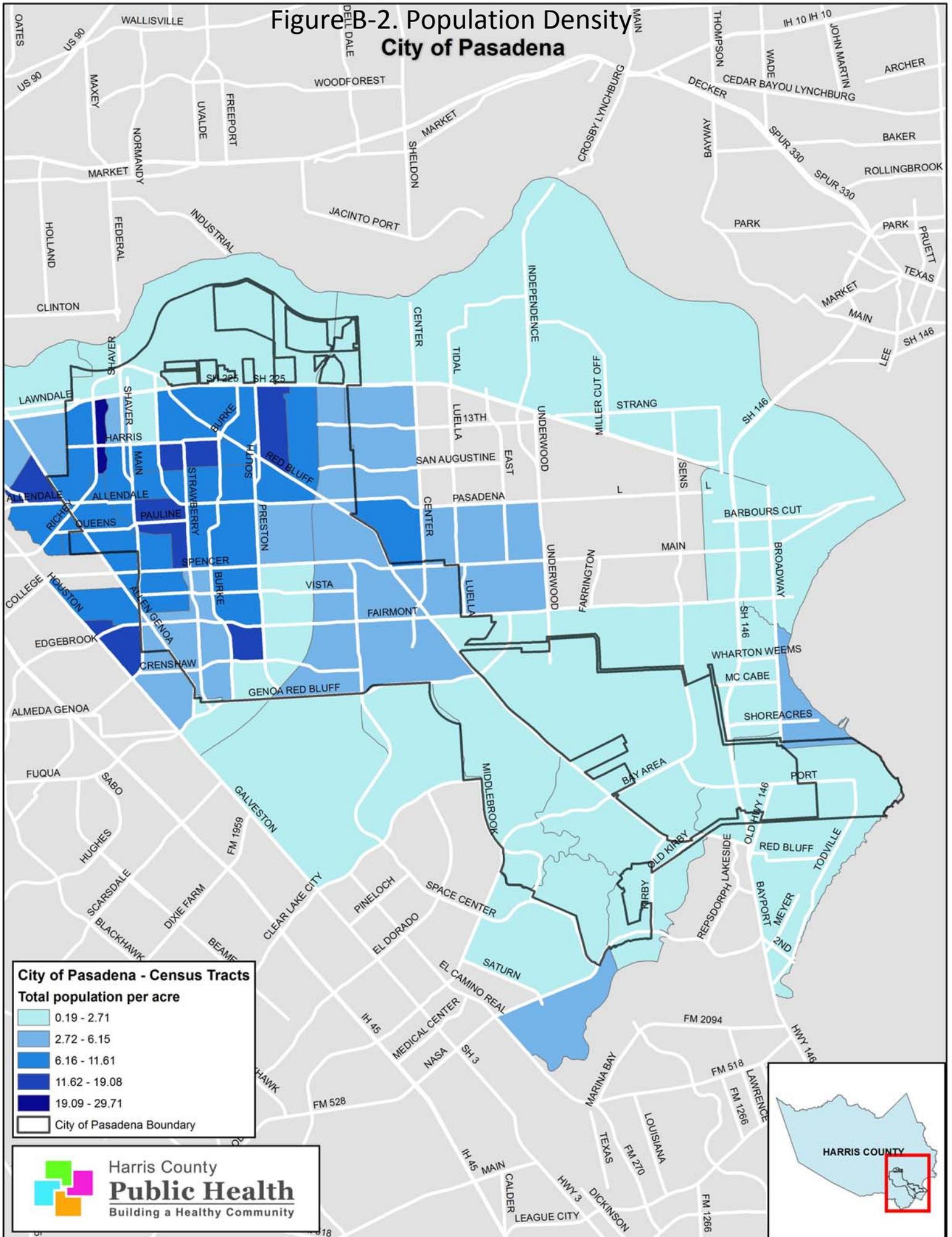
- <sup>1</sup> The community areas were developed using 59 zip codes, excluding the City of Houston. For more information, please contact the Office of Policy and Planning at [opp@hcphe.org](mailto:opp@hcphe.org).
- <sup>2</sup> United States Census Bureau. (2015). American Fact Finder. Accessed on December 28, 2016. Retrieved from [https://factfinder.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml](https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml)
- <sup>3</sup> United States Census Bureau. (2014). American Community Survey (ACS). Accessed on October 20, 2016. Retrieved from <https://www.census.gov/programs-surveys/acs/>
- <sup>4</sup> Suburban Stats. Population Demographics for Pasadena, Texas in 2016 and 2015. Accessed on December 28, 2016. Retrieved from <https://suburbanstats.org/population/texas/how-many-people-live-in-pasadena>
- <sup>5</sup> The University of Texas School of Public Health. (2010). Health of Houston Survey. Accessed on December 28, 2016. Retrieved from <https://sph.uth.edu/research/centers/ihp/health-of-houston-survey-2010/>
- <sup>6</sup> Federally designated Health Professional Shortage Areas (HPSAs) lack a sufficient ratio of primary medical care, dental or mental health providers to the population. Find further information at <http://www.hrsa.gov/shortage/>.
- <sup>7</sup> The abbreviation HP2020 stands for Healthy People 2020. Further information can be found at [www.healthypeople.gov](http://www.healthypeople.gov).
- <sup>8</sup> Texas Department of Health Services, Center for Health Statistics, Behavioral Risk Factor Surveillance System 2004-2010
- <sup>9</sup> Data Provided by Pasadena Police Department, 1990-2015.
- <sup>10</sup> TxDOT's Crash Records Information System (CRIS), 2007-2015. Further information can be found at <https://cris.dot.state.tx.us/public/Purchase/>
- <sup>11</sup> U.S. Department of Housing and Urban Development. Affordable Housing. Accessed on November 22, 2016. Retrieved from [http://portal.hud.gov/hudportal/HUD?src=/program\\_offices/comm\\_planning/affordablehousing](http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/affordablehousing)

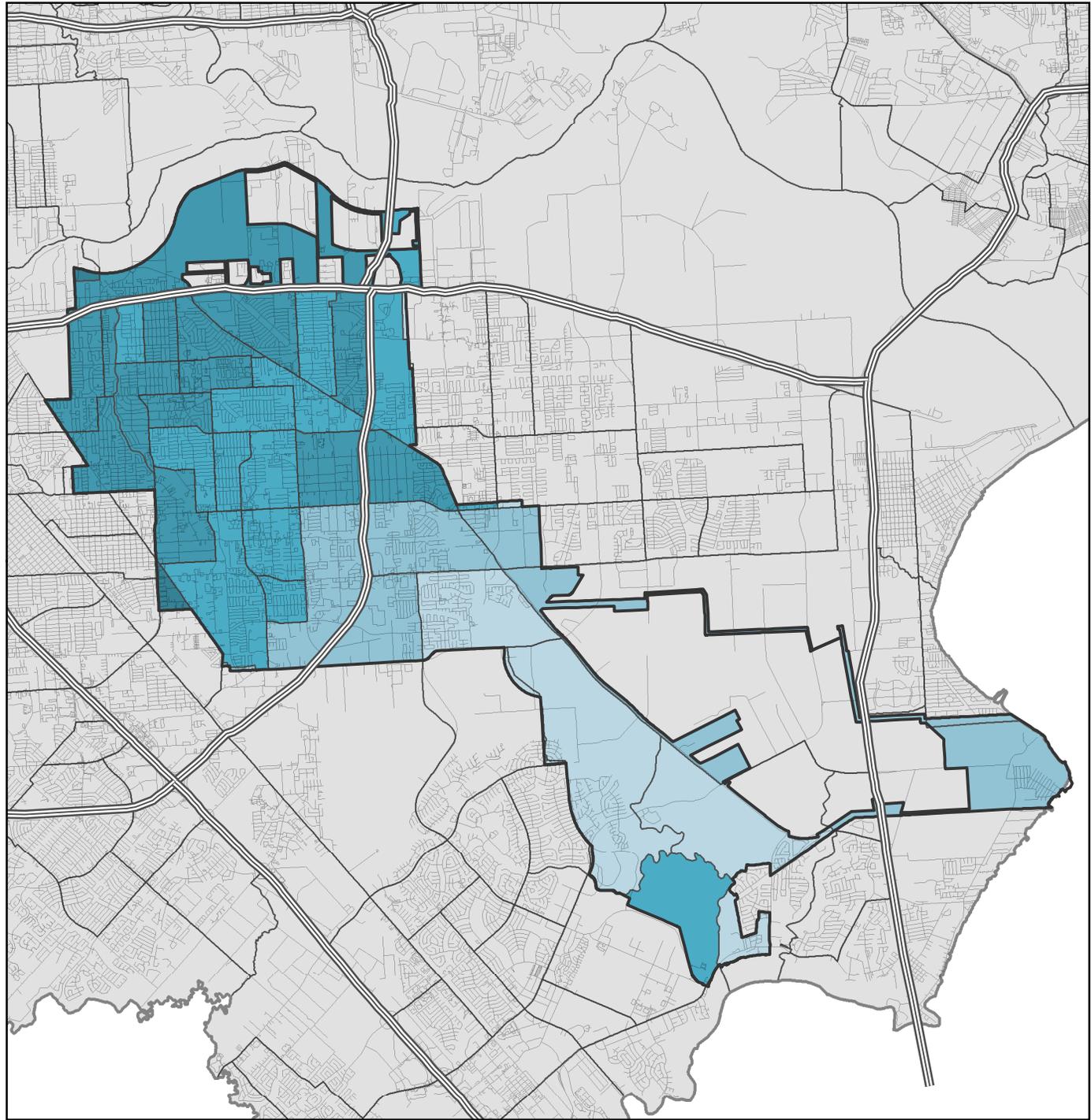
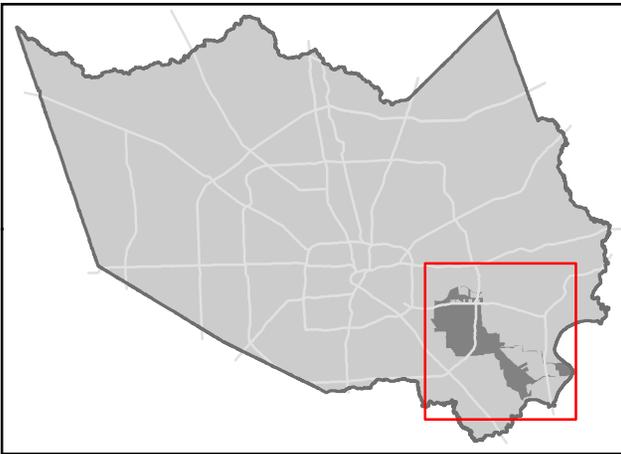
## Appendix B: Maps

Figure B-1. City of Pasadena Geographic Boundaries, Harris County, Texas 2015-16



**Figure B-2. Population Density  
City of Pasadena**



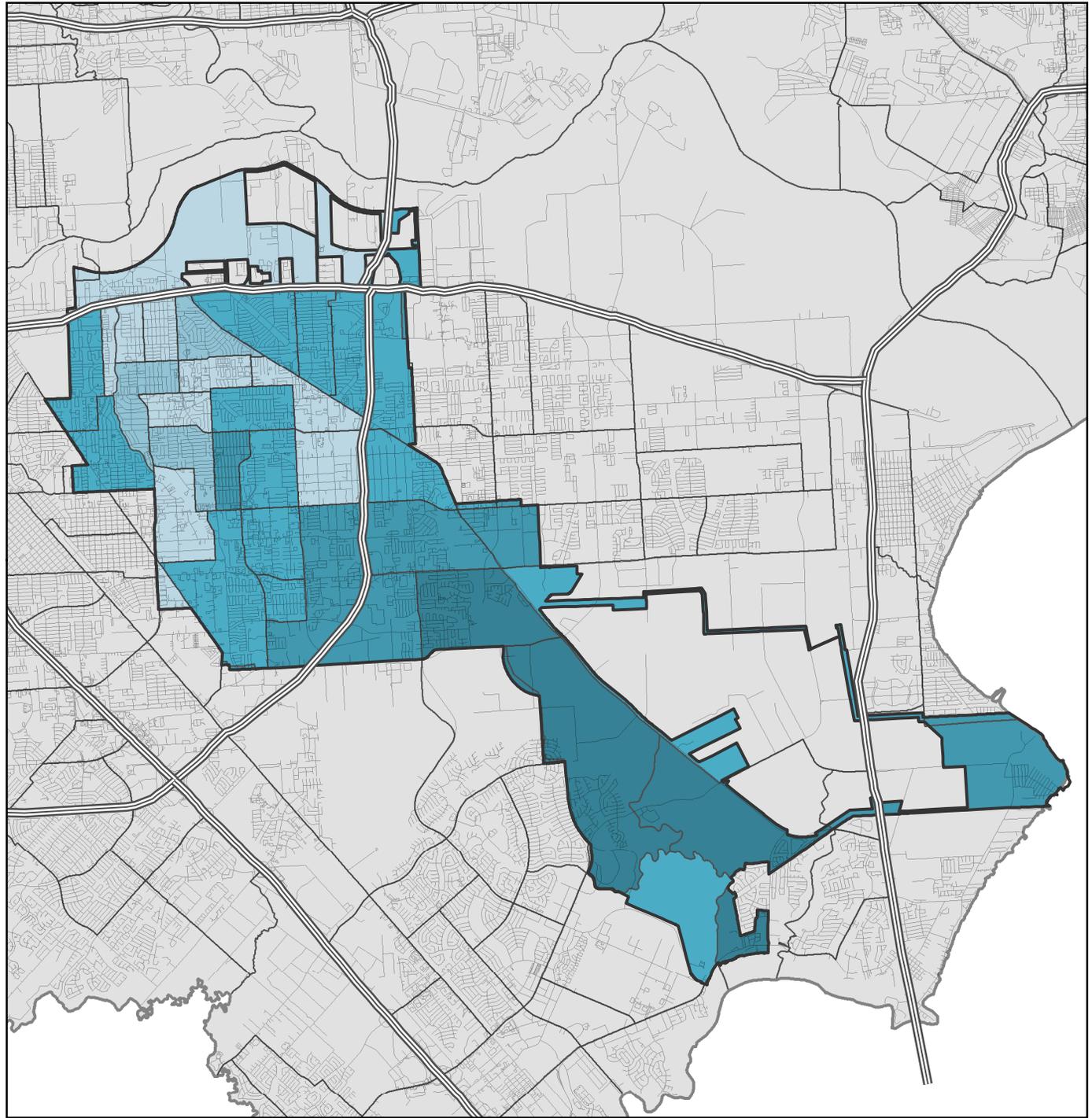
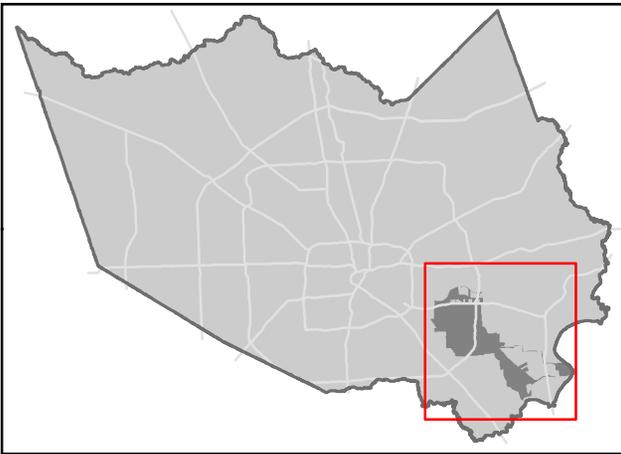


-  Highways & Toll Roads
-  Streets & Roads
-  City of Pasadena Boundary
-  Harris County Boundary
-  Harris County Census Tracts
- % of population w/o health insurance**
-  3.7% - 13%
-  13.01% - 22.2%
-  22.21% - 33.3%
-  33.31% - 42.6%
-  42.61% - 54.7%

**City of Pasadena Existing Conditions**

Source: 2014 American Community Survey (5-year estimates)

Figure B-3. *Percentage of population without health insurance coverage*



-  Highways & Toll Roads
-  Streets & Roads
-  City of Pasadena Boundary
-  Harris County Boundary
-  Harris County Census Tracts

**Median household income (in dollars)**

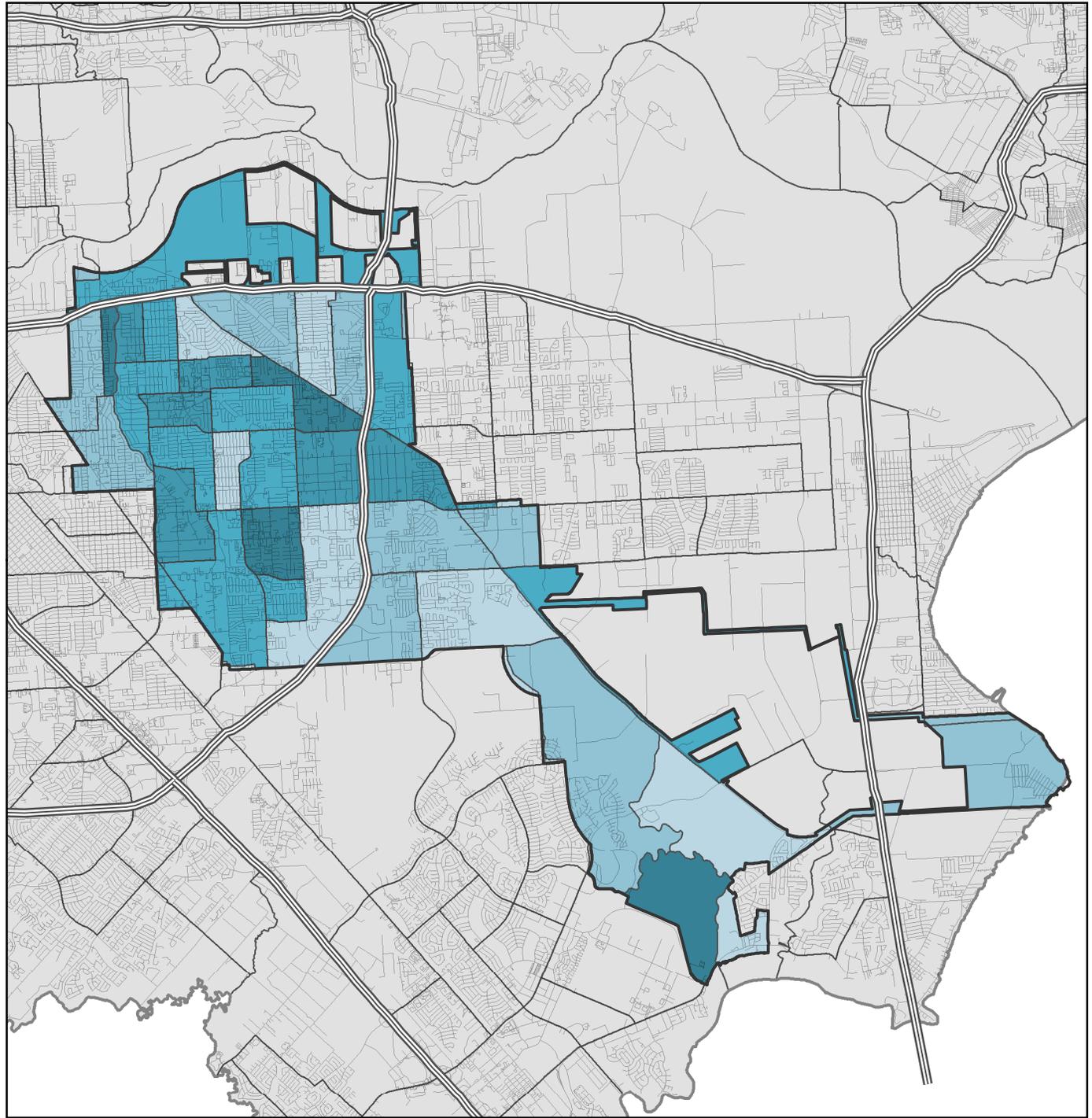
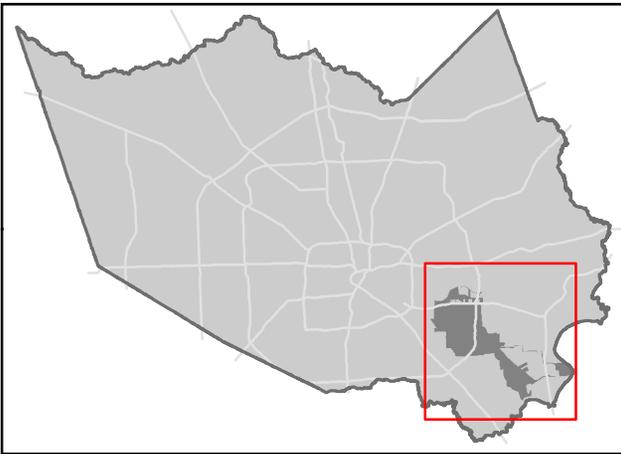
-  23,381 - 30,615
-  30,616 - 36,630
-  36,631 - 57,857
-  57,858 - 87,333
-  87,334 - 142,647

**City of Pasadena Existing Conditions**

*Source: 2014 American Community Survey (5-year estimates)*

**Figure B-4. Median household income (in dollars)**





-  Highways & Toll Roads
-  Streets & Roads
-  City of Pasadena Boundary
-  Harris County Boundary
-  Harris County Census Tracts
- % of households w/ 1 vehicle or less**
-  6.14% - 14.68%
-  14.69% - 22.38%
-  22.39% - 32.11%
-  32.12% - 48.25%
-  48.26% - 61.16%

**City of Pasadena Existing Conditions**

Source: 2014 American Community Survey (5-year estimates)

Figure B-6. *Percentage of households with 1 vehicle or less*

# City of Pasadena Figure B-7. Land Use

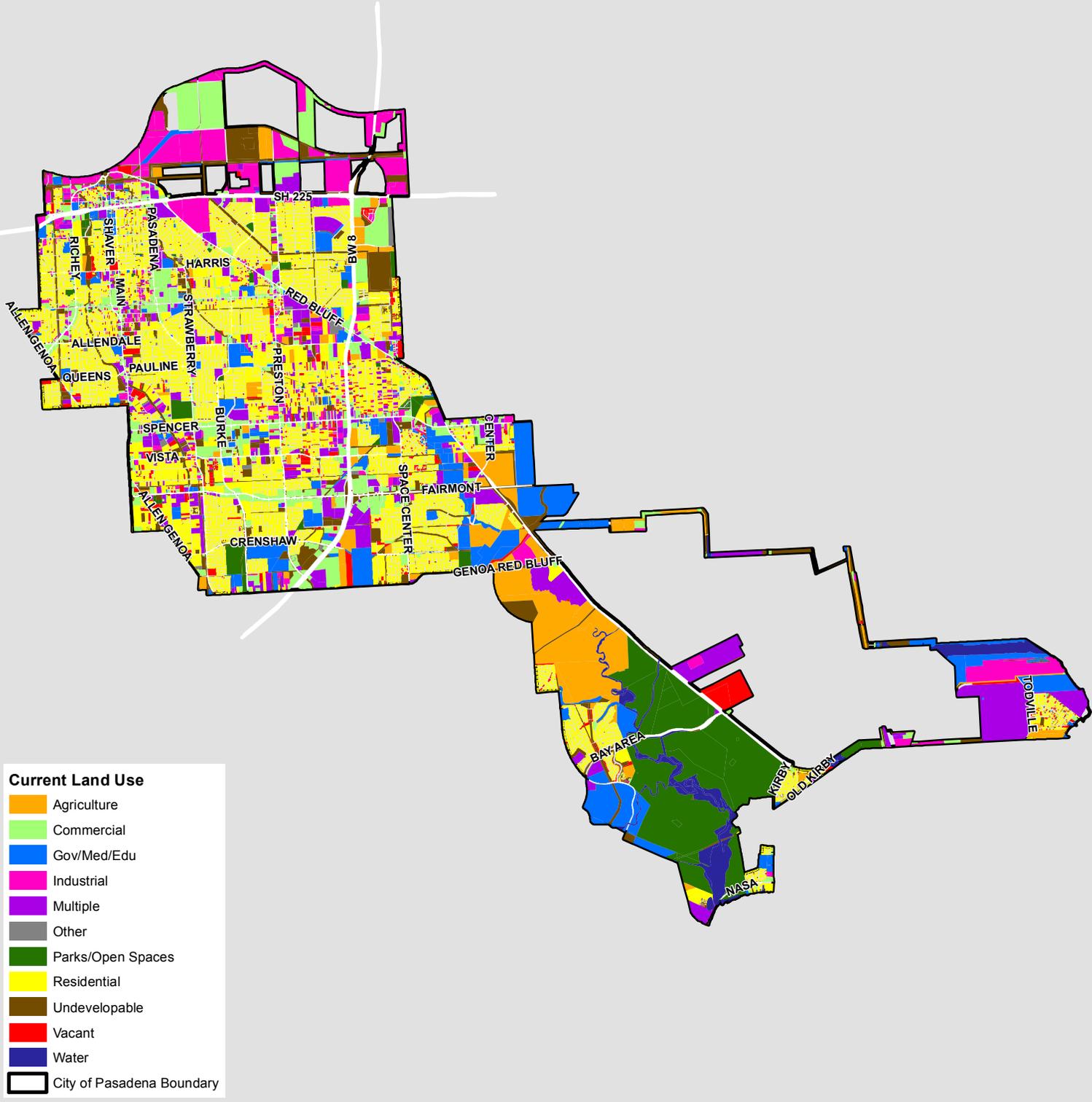
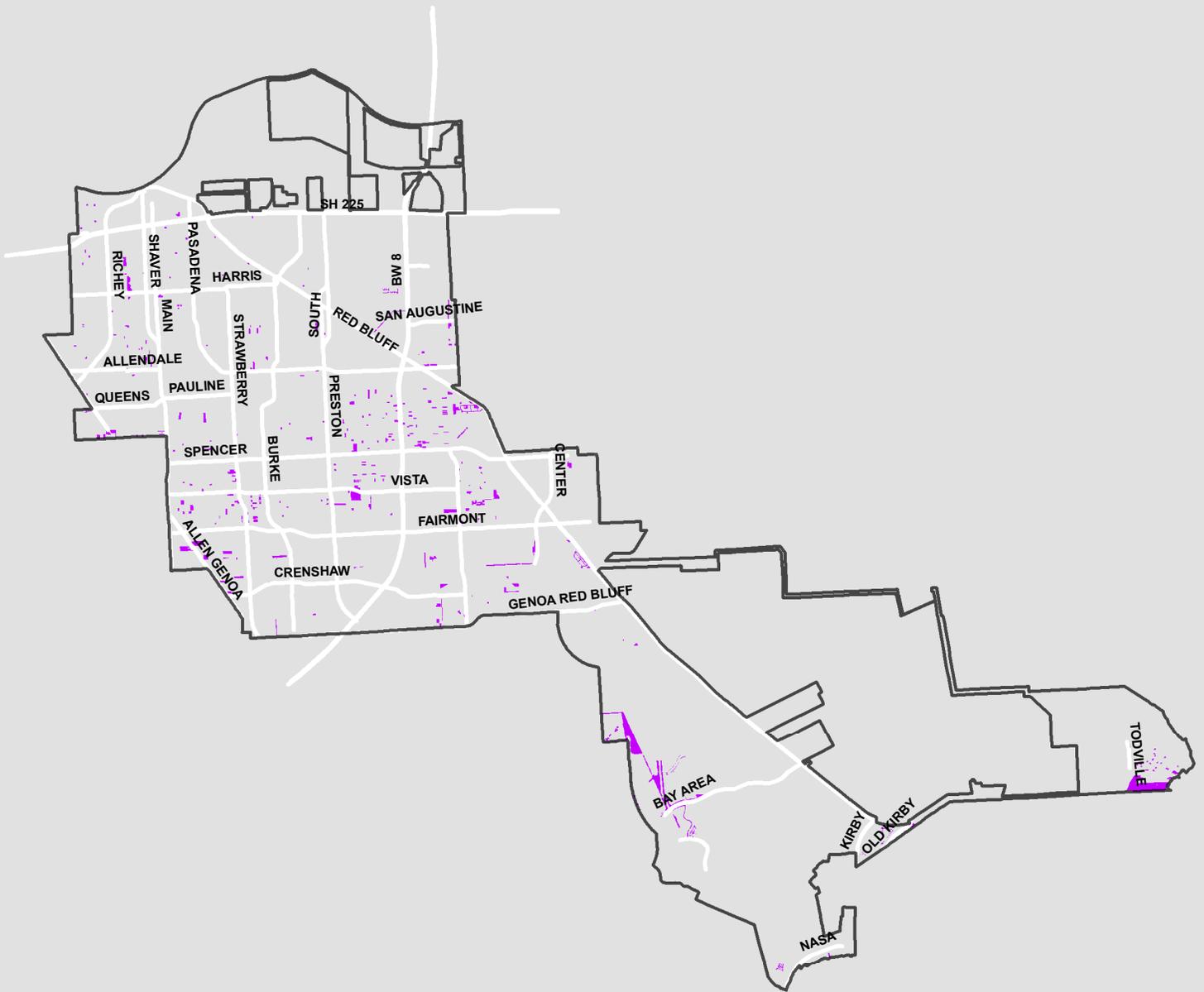


Figure B-8. Map of Vacant Lots at Least 0.22 Acres Large  
City of Pasadena



 Vacant lots .22 acres or greater  
 City of Pasadena Boundary



Figure B-9. Map of Multifamily 20+ Units with 1000 ft. Buffer  
City of Pasadena

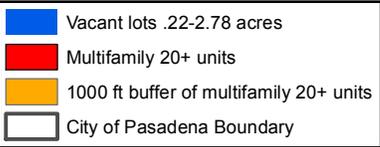
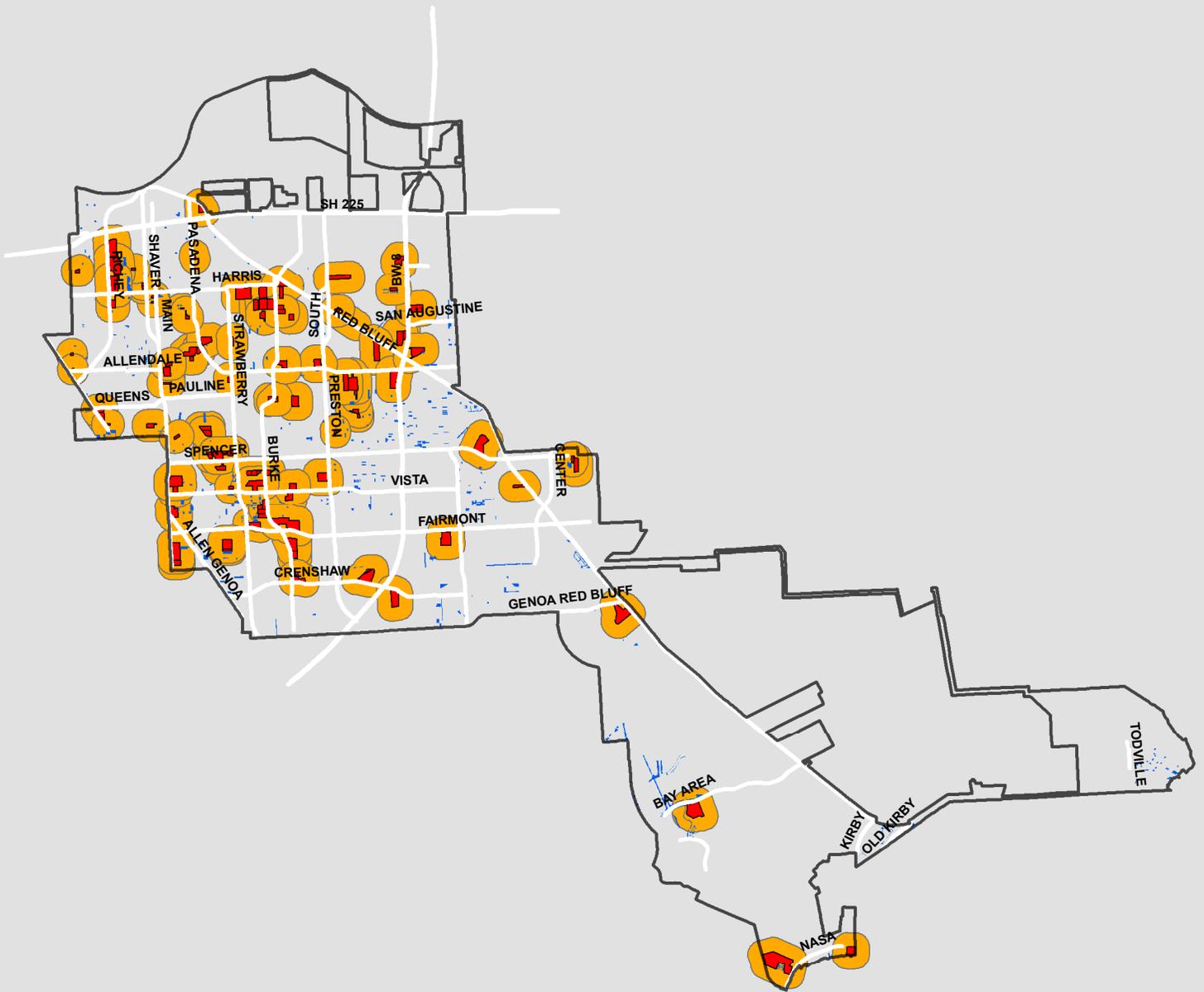
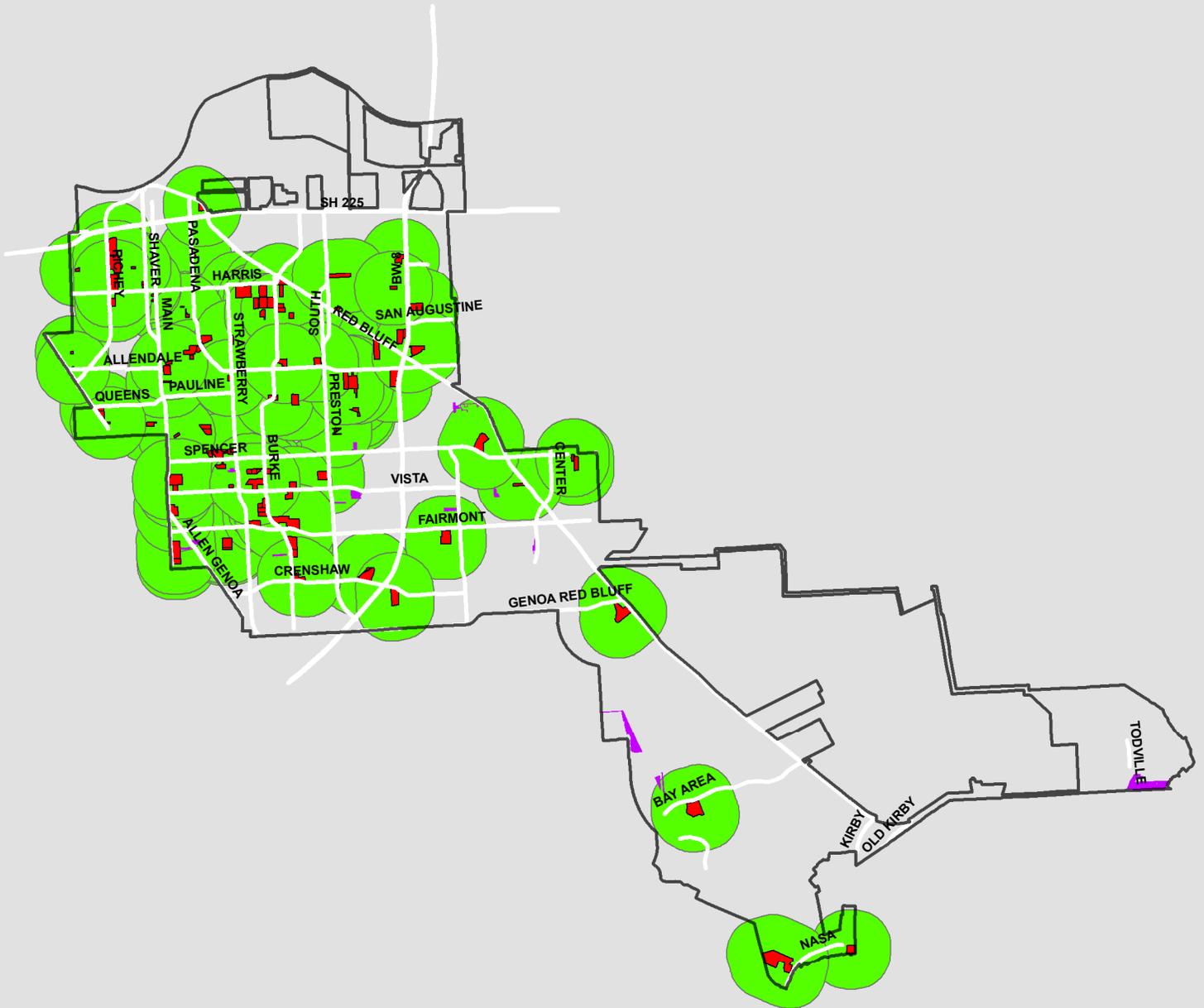


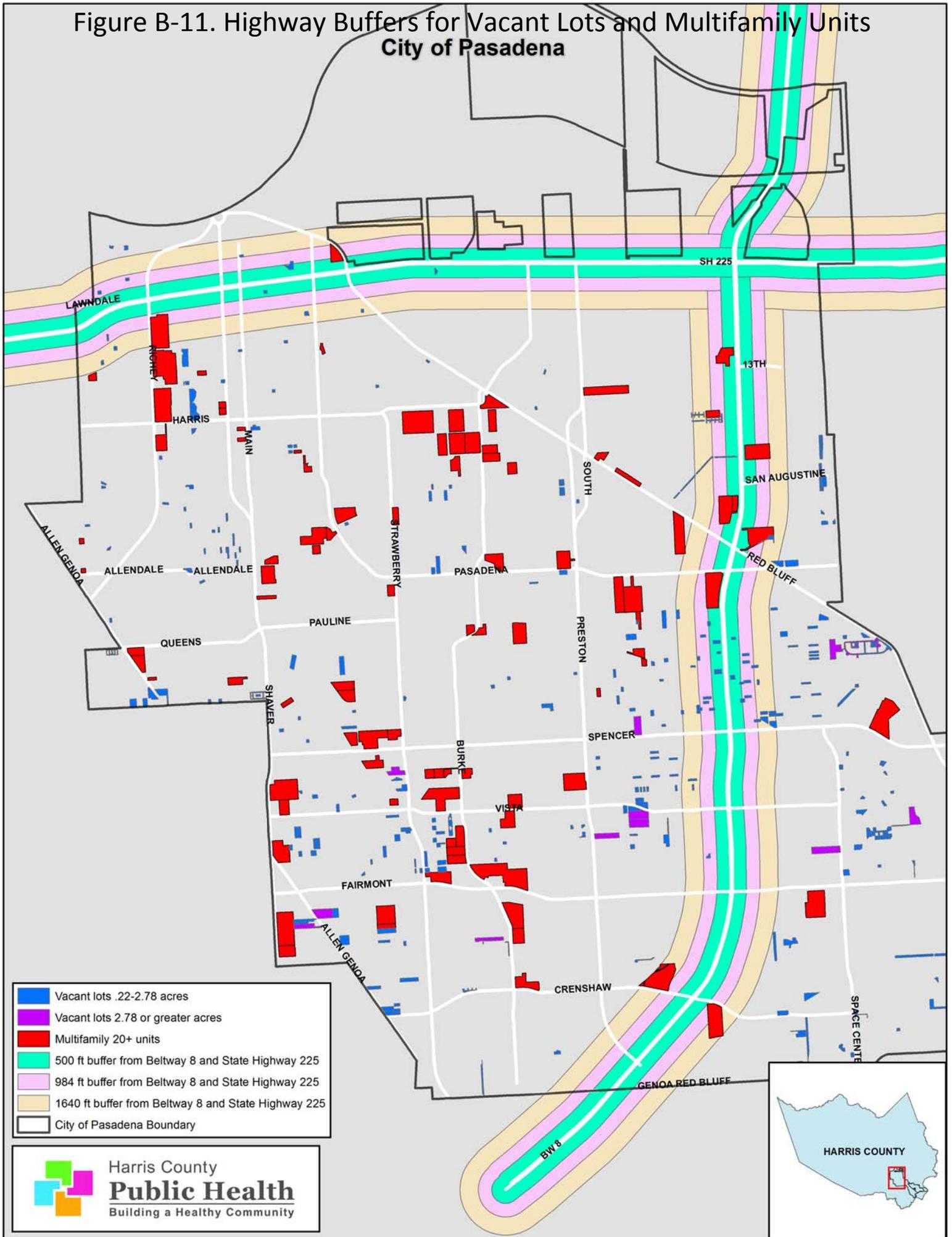
Figure B-10. Map of Multifamily 20+ Units with 2500 ft. Buffer  
City of Pasadena

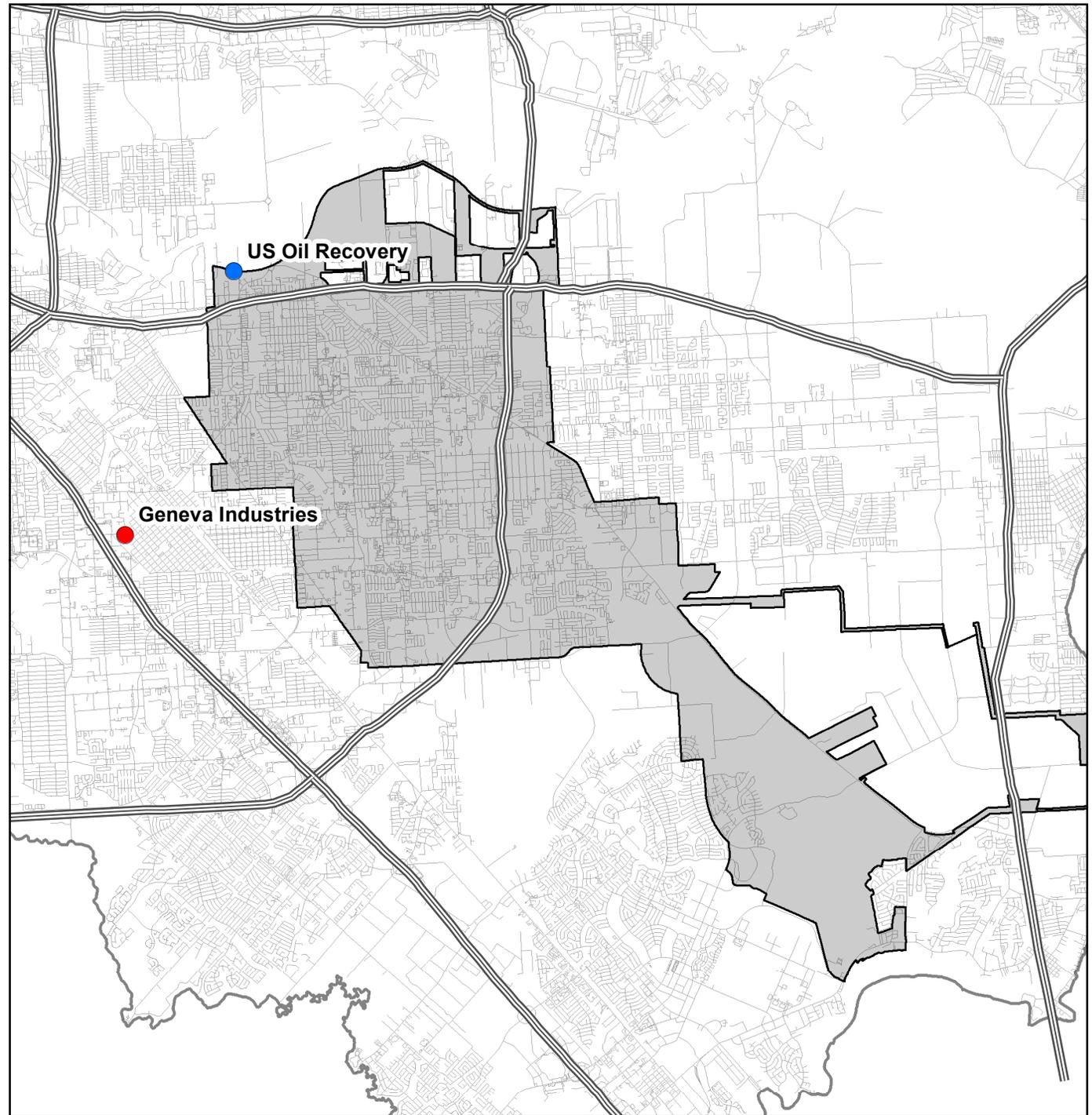
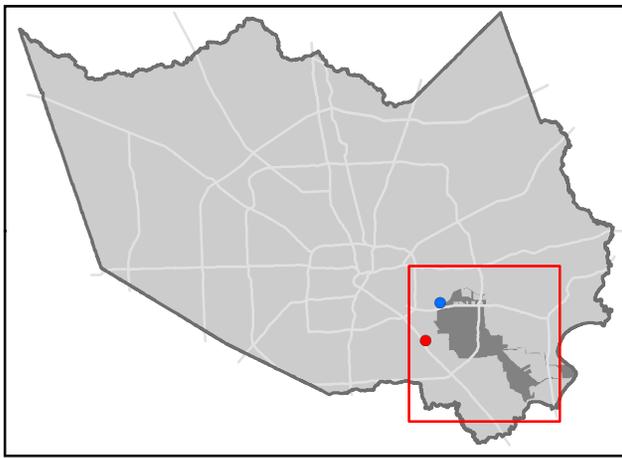


- Vacant lots 2.78 or greater acres
- Multifamily 20+ units
- 2500 ft buffer of multifamily 20+ units
- City of Pasadena Boundary


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Figure B-11. Highway Buffers for Vacant Lots and Multifamily Units  
City of Pasadena





-  Highways & Toll Roads
-  Streets & Roads
-  City of Pasadena Boundary
-  Harris County Boundary

**EPA Superfund Sites**

-  Geneva Industries (9334 Canniff St)
-  US Oil Recovery (400 N Richey St)

Figure B-12. EPA Superfund Sites

Source: Environmental Protection Agency (EPA)

## **Appendix C: Superfund Sites and Health**

**Table C-1. Health Effects Associated with Superfund Sites**

Superfund site	Contaminants	Health effects
Geneva Industries/ Fuhrmann Energy	Benzene <sup>1</sup>	<p><u>Acute Effects:</u></p> <ul style="list-style-type: none"> <li>• Neurological symptoms of inhalation exposure to benzene include drowsiness, dizziness, headaches, and unconsciousness in humans.</li> <li>• Exposure to liquid and vapor may irritate the skin, eyes, and upper respiratory tract in humans.</li> </ul> <p><u>Chronic Effects (Non-cancer):</u></p> <ul style="list-style-type: none"> <li>• Benzene causes both structural and numerical chromosomal aberrations in humans</li> <li>• Benzene specifically affects bone marrow. Aplastic anemia, excessive bleeding, and damage to the immune system may develop</li> </ul> <p><u>Cancer Risk:</u></p> <ul style="list-style-type: none"> <li>• EPA has classified benzene as a Group A, known human carcinogen</li> <li>• EPA calculated a range of 2.2 x 10<sup>-6</sup> to 7.8 x 10<sup>-6</sup> as the increase in the lifetime risk of an individual who is continuously exposed to 1 µg/m<sup>3</sup> of benzene in the air over their lifetime.</li> </ul>
	Polychlorinated biphenyls (PCBs) <sup>2</sup>	<p><u>Acute Effects:</u></p> <ul style="list-style-type: none"> <li>• Eye-irritation and corneal involvement</li> <li>• Irritates Skin</li> </ul> <p><u>Chronic Effects (Non-Cancer):</u></p> <ul style="list-style-type: none"> <li>• Immune system, the reproductive system, the nervous system and the endocrine system</li> <li>• PCBs are associated with cognitive</li> <li>• Problems and a reduction in the ability to learn and remember</li> <li>• Elevations in blood pressure, serum triglyceride, and serum cholesterol</li> </ul>
	Trichloroethylene <sup>3</sup>	<p><u>Acute Effects:</u></p> <ul style="list-style-type: none"> <li>• Central nervous system effects are the primary effects noted from acute inhalation exposure to trichloroethylene in humans, with symptoms including sleepiness, fatigue, headache, confusion, and feelings of euphoria</li> </ul> <p><u>Chronic Effects (Non-cancer):</u></p> <ul style="list-style-type: none"> <li>• Case reports of intermediate and chronic occupational exposures included effects such as dizziness, headache, sleepiness, nausea, confusion, blurred vision, facial numbness, and weakness.</li> </ul>

<sup>1</sup> <https://www3.epa.gov/airtoxics/hlthef/benzene.html>

<sup>2</sup> <http://www.toxipedia.org/display/toxipedia/PCBs#PCBs-EPA-HealthEffectsofPCBs>

<sup>3</sup> <https://www3.epa.gov/airtoxics/hlthef/tri-ethy.html>

		<ul style="list-style-type: none"> <li>• Effects to the liver, kidneys, and immune and endocrine systems have also been seen in humans exposed to trichloroethylene occupationally or from contaminated drinking water.</li> </ul> <p><u>Cancer Risk:</u></p> <ul style="list-style-type: none"> <li>• EPA has calculated a provisional inhalation unit risk estimate of <math>1.7 \times 10^{-6}</math> (<math>\mu\text{g}/\text{m}^3</math>)</li> <li>• EPA has also calculated a provisional oral cancer slope factor of 0.011 (<math>\text{mg}/\text{kg}/\text{d}</math>)-1.</li> </ul>
	Polycyclic aromatic hydrocarbons (PAHs) <sup>4</sup>	<p><u>Acute Effects:</u></p> <ul style="list-style-type: none"> <li>• Headache, nausea, respiratory and dermal irritation</li> </ul> <p><u>Chronic Effects (Non-Cancer):</u></p> <ul style="list-style-type: none"> <li>• Chronic bronchitis</li> <li>• Chronic cough irritation</li> <li>• Dermatitis</li> </ul>
	Dioxins <sup>5</sup>	<p><u>Acute Effects:</u></p> <ul style="list-style-type: none"> <li>• Skin lesions, such as chloracne and patchy darkening of the skin, and altered liver function</li> </ul> <p><u>Chronic Effects (Non-Cancer):</u></p> <ul style="list-style-type: none"> <li>• Impairment of the immune system, the developing nervous system, the endocrine system and reproductive functions.</li> </ul>
<b>US Oil Recovery</b>	Polychlorinated biphenyls (PCBs) <sup>6</sup>	<p><u>Acute Effects:</u></p> <ul style="list-style-type: none"> <li>• Eye-irritation and corneal involvement</li> <li>• Irritates Skin</li> </ul> <p><u>Chronic Effects (Non-Cancer):</u></p> <ul style="list-style-type: none"> <li>• Immune system, the reproductive system, the nervous system and the endocrine system</li> <li>• PCBs are associated with cognitive</li> <li>• Problems and a reduction in the ability to learn and remember</li> <li>• Elevations in blood pressure, serum triglyceride, and serum cholesterol</li> </ul>
	Organochlorine pesticides <sup>7</sup>	<p><u>Acute Effects:</u></p> <ul style="list-style-type: none"> <li>• Increased salivation and perspiration</li> <li>• Narrowing of the pupils</li> <li>• Nausea</li> <li>• Diarrhea</li> <li>• Decrease in blood pressure</li> <li>• Muscle weakness and fatigue</li> </ul> <p><u>Cancer:</u></p> <ul style="list-style-type: none"> <li>• Exposure to DDT has been linked to pancreatic cancer and non-Hodgkin's lymphoma.</li> <li>• Exposure to DDT early in life is associated with an increased breast cancer risk later in life.</li> </ul>

<sup>4</sup> <http://www.atsdr.cdc.gov/phs/phs.asp?id=120&tid=25>

<sup>5</sup> <http://www.who.int/mediacentre/factsheets/fs225/en/>

<sup>6</sup> <http://www.toxipedia.org/display/toxipedia/PCBs#PCBs-EPA-HealthEffectsofPCBs>

<sup>7</sup> <http://www.cdc.gov/nceh/clusters/Fallon/pesticidesfaq.htm>

	<p>Heavy metals (Arsenic, barium, cobalt, and other heavy metals)<sup>8</sup></p>	<p>Acute Effects:</p> <ul style="list-style-type: none"> <li>• Sudden, severe cramping and/or convulsions</li> <li>• Nausea</li> <li>• Vomiting</li> <li>• Headache</li> <li>• Difficulty breathing</li> <li>• Impaired cognitive skills</li> </ul> <p>Chronic Effects:</p> <ul style="list-style-type: none"> <li>• Fatigue</li> <li>• Aching joints</li> <li>• Depression</li> <li>• Impaired blood sugar regulation</li> <li>• Female reproductive problems such as menstrual difficulties, infertility, miscarriage, pre-eclampsia, pregnancy-induced hypertension and premature birth</li> </ul>
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<sup>8</sup><https://public.health.oregon.gov/HealthyEnvironments/HealthyNeighborhoods/LeadPoisoning/MedicalProvidersLaboratories/Documents/HeavyMetals.pdf>

## **Appendix D: Supporting Documents Used in Scoping**

## **Key Informant Interview Sample Questionnaire**

### **Version 1: Content and Community Experts**

#### **Part 1: Describe work/role**

1. Think about the populations with which you and your organization work most closely.
  - a. How many people are you responsible for serving or have jurisdiction over?
    - i. What is the geographical extent of your service area?
  - b. Tell me about the people you serve (e.g., age, race/ethnicity).

#### **Part 2: Identify Major Health & Safety Concerns and State of Built Environment**

1. With this population in mind, in your opinion, what are the most important health and safety issues that need to be addressed? *[Note taker lists out each issue as interviewee talks and interviewer gives back to interviewee to examine and categorize/group if necessary (if there is a lot of overlap and many listed).]*

#### **For each issue, ask about main contributing factors (root cause).**

- a. Of the issues you listed, which one would you prioritize to be solved first? Which would you solve next? Next? *(Prioritize top 5).*

*Before moving on, reread each issue to confirm order.*

2. [Define access]. Consider access<sup>1</sup> within your community and the different types of transportation services available such as bus lines, roadways, cycling lanes, and trails. What populations do you believe would be most impacted by changes to these types of infrastructure or services? *[Prompt: Consider response to Part 1, Q1b community profile and sociodemographics]*

3. How safe is EAD for pedestrians and cyclists? (1-10)

Why do you say that?

4. [If not addressed in Q3] How accessible is EAD for pedestrians and cyclists? (1-10)

Why do you say that?

#### **Part 3: Attitudes/Awareness**

1. [Define healthy design standards] Do you think it would be feasible to integrate healthy design standards<sup>2</sup> into the neighborhood?
  - a. Why/why not?
2. To what extent is the community in [East Aldine/Pasadena/Harris County] involved in the development of plans and other initiatives impacting the built environment? [This may asked/answered in two ways: how the interviewee has incorporated community and how the interviewee's community has been incorporated.]
  - a. Follow up if applicable: what are better ways to incorporate community members into the decision making process?

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<sup>1</sup> Please refer to the term 'access' in the Terminology Section.

<sup>2</sup> Please refer to the healthy design standards from CDC.

3. [Frame in response to question 2] Do you think health is a priority for decision makers in your community? If it is, can you give an example?

**Part 4: Current built environment and/or healthy community design strategies, policies, etc.**

1. When you are considering a new project, plan, or policy, what do you/your organization prioritize during the decision making process? Why?
2. [If not discussed in Q1] When considering implementing a new initiative, does your organization have a process for considering potential impact on health outcomes?
  - a. *If yes, how is this done?*
  - b. And to what extent? [lengthy vs. short-process]
3. Tell me about any current strategies/policies you and your organization are implementing to improve the overall health or health outcomes through changes to the built environment<sup>3</sup>? [*Cover as few as just one strategy and as many as 5 depending on breadth of programs. Ask for any supporting documentation of policies / programs / practices.*] (*Note taker fills out chart.*)
  - i. Why were these policies / strategies chosen?
  - ii. [*Don't ask*] *Who do these policies/strategies target/impact?*
  - iii. What has been the level of implementation/institutionalization/compliance/adherence of these policies or strategies?
  - iv. What has been the impact of these policies or strategies?
  - v. [*Don't ask*] *Where there other approaches considered?*
  - vi. What barriers have you or your organization faced in implementing these healthy design policies or strategies?

**Part 5a: Future opportunities and barriers for implementation (for non-public sector)**

1. What are opportunities in your community to improve *health and safety* through changes to neighborhood design or the built environment?
  - a. Follow up: make sure both health and safety are addressed.
2. Who do we need to have “on board” to make these changes?
3. What opposition within the community do you foresee? (*From community members? From community leaders?*)
  - a. How might these barriers be overcome?
4. What other barriers might you or your organization face (or may face) if you were to consider advocating for or implementing strategies that consider health in a systematic way?
5. Would you be able to include assessment of the health outcomes of a new project proposal during the decision-making process? [*probe: design standards, permitting processes to include health impact*]

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<sup>3</sup> Consider examples listed in the CDC healthy communities.

**Part 5b: Future opportunities and barriers for implementation (for public sector)**

1. What are opportunities to implement new policies or strategies to improve the built environment for health?
  - a. Who does this impact? (Community? Developers? Government? Other? Special population within the community?)
  - b. Who is in charge of implementing this initiative or policy?
  - c. How would the policy be enforced? What would be the way to ensure compliance/adherence?
  - d. Why do you think this is an opportune area to pursue?
  - e. What are the potential positive health outcomes?
  - f. Tell me about who may be supportive, who you need to be supportive, and what barriers may pose an issue.
  - g.

***Only if interviewee is on the implementation-side:***

1. How feasible do you think it would be to implement a policy/strategy that strengthened or set healthy design standards for your projects?
  - a. How might such a policy affect your organization and your work?
  - b. How easy or difficult do you think it would be to manage and enforce this policy?
2. Where would an assessment fit into the design/development process? Would you take the time needed to complete an HIA?
  - a. If so, what would you need (e.g. data, tools, technical assistance, funding...) to conduct an assessment evaluating the health impact of a new project or policy? Who would conduct it?

## **Appendix E: Methods**

## Methods Used in this HIA

The Health Impact Assessment (HIA) process was guided by the National Research Council's *Improving Health in the United States: The Role of Health Impact Assessment*<sup>1</sup>, the *Minimum Elements of HIA Practice*<sup>2</sup>, and *Health Impact Assessment: A Guide for Practice*<sup>3</sup>. Below is a review of the approach and methods utilized for the assessment phase of the HIA.

The HIA Team utilized a mixed methods approach to evaluate the potential health impacts of the proposed subdivision ordinance updates for the City of Pasadena (COP). The assessment consisted of the following components: (1) a systematic literature review; (2) analysis of existing built environment and health conditions; (3) consultation with experts and stakeholders; (4) analysis of existing land use features and vacant properties.

### Systematic Literature Review

A systematic literature review was conducted to examine the existing evidence base for associations of interest related to health outcomes and decreasing the number of vacant properties and increasing residential density. PubMed and ScienceDirect were used to search for peer-reviewed journal articles that studied vacant lots and their association with health, safety, walkability, and access. Information on the association between density and transportation walking, respiratory health, and mental health were gathered from an evidence review commissioned by the National Heart Foundation of Australia. Lastly, the association between density and concentration of poverty was based on findings from a systematic review of HIAs related to housing decisions conducted by the National Center for Healthy Housing and the National Housing Conference.

Due to a shortage of published scientific literature on the health and societal effects of middle housing, non-peer reviewed reports, practice-based literature, and web-based articles were used to gather information on this association.

### Existing Built Environment and Health Conditions

#### *Texas Behavioral Risk Factor Surveillance System*

The Texas Behavioral Risk Factor Surveillance System (BRFSS)<sup>4</sup> is a federally supported landline and cellular telephone survey that gathers data about Texas residents concerning their health-risk behaviors, chronic health conditions, and use of preventive services. Texas BRFSS is an important tool for decision-making throughout the state and the public health community. Indicators utilized from BRFSS included diet, physical activity, self-reported health status, physically healthy days, obesity, tobacco use, and binge drinking. The HIA Team utilized data for the years 2004-2010 for the City of Pasadena and compared it with Harris County excluding the City of Houston (HCxH), and Texas. HCxH was the

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<sup>1</sup> National Research Council. (2011). *Improving Health in the United States: The Role of Health Impact Assessment*. Washington, D.C.: The National Academies Press.

<sup>2</sup> Bhatia, R., Farhang L., Heller J., et al. (2014). *Minimum Elements of HIA Practice*, Version 3. September, 2014. Original version published by the North American HIA Practice Standards Working Group in April 2009 and revised in November, 2010. Accessed on October 27, 2016. Retrieved from <http://advance.captus.com/planning/hia2xx/pdf/Minimum%20Elements%20and%20Practice%20Standards%20for%20HIA%203.0.pdf>

<sup>3</sup> Bhatia, R. (2011). *Health Impact Assessment: A Guide for Practice*. Oakland, CA: Human Impact Partners.

<sup>4</sup> Retrieved from <https://www.dshs.texas.gov/chs/brfss/> on July 21, 2016.

geographical extent utilized as the regional comparison to reflect the region outside of Houston as this is the principle region within the jurisdiction of Harris County Public Health.

#### *Pedestrian- and Bicycle-Vehicle Collision Data*

The Texas Department of Transportation's (TxDOT) Crash Records Information System (CRIS) includes information about pedestrian- and bicycle-vehicle collisions that occurred in Harris County and Pasadena from 2007-2015. Several potential sources of error, including accidental misstatement of events by law enforcement officers at the scene, incorrect entry of data into the TxDOT database by staff, and errors in calling up the data could lead to measurement error (e.g., information bias). Lastly, latitudes-longitudes in the data derived by TxDOT are based on a map layer and geocoding algorithms, which may also include errors.

#### *Crime*

The data used for analysis of crime in Pasadena was obtained from the Pasadena Police Department and included numbers of homicide, sexual assault, robbery, and aggravated assault in the City of Pasadena from 1990-2015, in five-year increments. A limitation of this dataset was that it did not have data separated for each year.

#### *Air Pollution*

Validated raw air monitoring data was obtained from the Texas Commission on Environmental Quality (TCEQ) publicly available website for 5 air monitoring sites near Pasadena, given the absence of any sites located within the geographical boundaries for the city. The compounds of interest were 1,3-butadiene, benzene, ethylbenzene, toluene, p-xylene + m-xylene, o-xylene, styrene, ozone and PM<sub>2.5</sub>. These compounds are linked to several adverse public health outcomes, including acute respiratory distress and odor. Hourly or daily measurements were averaged across all validated data available for 2015 for each site and the minimum and maximum values identified. The data presented in this HIA summarizes the annual average measurement and the range of 1-hour average measurements for each compound at each monitoring site as well as the reference effects screening level (ESL) established by TCEQ. With the exception of PM 2.5 which was measured in  $\mu\text{g}/\text{m}^3$ , the remaining of the compounds were measured in parts-per billion (ppb).

### **Consultation with Experts and Stakeholders**

The HIA Team worked with assembled community stakeholders and COP staff to review the content and progress of the HIA throughout the assessment phase. Additional content and methodological experts were utilized to provide expertise on components of the assessment phase as needed (e.g., urban planner for vacant lot assessment). Additional input was solicited from the Healthy Living Matters (HLM) Pasadena Task Force. The HLM-Pasadena Task Force is dedicated to increasing active living and healthy eating opportunities that aim to reduce childhood obesity in Pasadena. The HIA Team worked to include and invite members of the public and participating stakeholders in advance, when presentations were scheduled.

Through the stakeholder engagement process, the HIA Team utilized key informant interviews, community mapping, and other opportunities (e.g., one-on-one meetings, committee meetings) to incorporate local knowledge and expert opinions into the HIA process.

### *Key Informant Interviews*

Key informant interviews served to inform existing health and safety issues and to better understand the primary infrastructure and service issues within Pasadena. Interview participants were identified with help from the Director of Planning for the City of Pasadena and included health and safety experts familiar with the area, along with key community experts. A total of seven semi-structured interviews were conducted from September to November, 2015. Participants were asked a number of questions related to health, safety, access, and transportation in Pasadena. The interview tool is available upon request; please email [builtenvironment@hcpbes.org](mailto:builtenvironment@hcpbes.org). Two note takers accompanied the interviewer. After the interview, the notes were compared and compiled into one document for analysis. Themes were extracted from the content of the interviews using QSR International's NVivo 10 qualitative data analysis software.

### *Community Mapping*

In November 2015, the HIA Team, along with Neighborhood Centers, Inc. (NCI) and Air Alliance Houston held three, half-day community mapping sessions with 14 Pasadena community members. Each session sought exchanges of information with community members and were based in the appreciative inquiry model to navigate self-determined community change<sup>5</sup>. These sessions were focused on identifying community 'treasures' (i.e., assets) and 'desires' (i.e., challenges). Participants used maps to locate assets and challenges based on pre-determined and agreed upon categories:

Assets: education, health, economic opportunity, places of worship, places for play, and housing

Challenges: pollutants (air, water, noise), traffic/congestion, and unsafe pedestrian access

Given the process of updating ordinances is internal to Pasadena's Planning Department and Planning Commission, community engagement for the HIA relied upon the opportunity to engage community alongside NCI and Air Alliance; therefore, the sessions focused more on goals set by the partner organizations (e.g., air quality and community development).

The results of the community mapping sessions were helpful in the scoping phase but were also utilized to ground information related to the built environment, health, and community development-related issues addressed in this HIA. To see an example facilitators guide of one of the sessions please email [builtenvironment@hcpbes.org](mailto:builtenvironment@hcpbes.org).

### **Land Use**

Land use data were obtained from the Houston-Galveston Area Council (H-GAC) through their Regional Land Use Information System web-based mapping application. The current land use descriptions were reclassified into one of the following land use categories: agriculture, commercial, government/medical/education, industrial, multiple, other, parks/open spaces, residential, undevelopable, vacant, and water. Vacant developable (includes farming) was split into separate vacant or agriculture land use categories. Unknown land use was grouped together into the 'other' land use category. All other land use categories remained classified as listed.

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<sup>5</sup> Read more about appreciative inquiry model at the Appreciative Inquiry Commons: <https://appreciativeinquiry.case.edu/intro/whatisai.cfm>

The data were summarized by the current land use categories and calculated the total acreage in each category. Parcels designated as water were excluded from subsequent land use analysis. One limitation to this analysis is the separation of lots with multiple land uses into their own category. Thus, any residential housing sharing a lot with a commercial site was not included in the total residential land calculation.

### **Vacant Lot Analysis**

The vacant lot analysis examined the number of developable and undevelopable vacant residential parcels in Pasadena, Texas using ArcGIS. Three classification codes were examined: (1) B1, real, residential, multi-family; (2) C1, real, vacant lots/tracts (in city); and (3) C3, real, vacant lots/tracts (not in city). The information was obtained from Harris County Appraisal District (HCAD), an open data platform readily available to the public; the 'real.acct.txt' (real account) table from HCAD was utilized for the analysis. The real account table includes the legal descriptions of the property, site address, property values, owner's name, and mailing address. The table was joined to the parcel shapefile using ArcGIS. The categories examined for vacant lots included: (1) C1, real, vacant lots/tracts (in city); and (2) C3, real, vacant lots/tracts (not in city). There are 1,491 vacant lots that fall into the city boundary of Pasadena.

The 1,491 vacant lots included in the vacant lot analysis cover 518.53 acres. This comprises 1.72% of all the land in the City of Pasadena (30,172.55 acres). Within the 1,491 vacant lots, 351 lots are between 0.16-0.26 acres, and 529 lots are between 0.15-0.52 acres. In accordance with the building code for Pasadena, the maximum units per acre is 18 (or 0.056 acres per unit). There are 190 vacant lots that are between 0.28-0.67 acres and therefore, qualify for the 5- to 12-unit middle housing. Four hundred and ten vacant lots are between 0.22-2.79 acres and 21 vacant lots are larger than 2.79 acres and can therefore be used for the 4- to 50-unit buildings and 50+ multi-family unit buildings, respectively.

Next, by running a data query, the B1, real, residential, multi-family classification were identified. There are 199 existing multi-family units in total. Information for each unit was not available for all existing multi-family structures, therefore, a sample of existing multi-family units built after 1993 (n=10) was selected to research the total unit information for each in order to calculate the average number of units per acre (18.37 units per acre). Based on the information from the sample, the minimum acreage for existing 20+ unit multi-family structures was determined to be 1.09 acres.

The City of Pasadena building code also requires that any new 4- to 50-unit multi-family structures built be 1,000 feet away from existing 20+ unit multi-family structures (the existing multi-family acreage is larger than 1.09 acres), and the 50+ unit structures are required to be 2,500 feet away from existing 20+ unit multi-family structures. After excluding the vacant lots that fall into the 1,000 feet or 2,500 feet buffer zone by GIS analysis, there were 283 vacant lots that are qualified for 4- to 50-unit multi-family structures and seven vacant lots that are qualified for 50+ unit multi-family structures. For typical middle housing (5-12 units), there are 361 vacant lots available in Pasadena that are 0.16-0.52 acres. Taking into account the unit per acre restrictions in Pasadena, only 137 out of the 361 vacant lots would be available for 5- to 12-unit middle housing structures.

One limitation was that when the HIA Team mapped the 1,000 foot buffer zone for existing 20+ and 50+ multi-family units, only land acreage was known, not the actual unit number for all multi-family structures in the City of Pasadena. The Team therefore extrapolated a threshold land acreage (1.09 acres) from 10 samples out of those multi-family buildings. Thus, there could be measurement error for

the actual 20+ and 50+ unit multi-family housing list. Additionally, the vacant land use category may be underestimated since it does not include lots that could be redeveloped and therefore, this assessment only reflects the potential to impact vacant lots and not abandoned properties or otherwise properties that could be redeveloped.