Final Research Report (Contract No.: 20-079-C01)

Accessory Dwelling Unit (ADU) Potential in the SCAG Region

Primary Investigator:
Do Kim, Ph.D.
Professor, Department of Urban and Regional Planning
California State Polytechnic University, Pomona
dohyungkim@cpp.edu

Co-primary Investigators:
So-Ra Baek, Ph.D.
Assistant Professor, Department of Urban and Regional Planning
California State Polytechnic University, Pomona
sbaek@cpp.edu

Brian Garcia, Ph.D.
Assistant Professor, Department of Urban and Regional Planning
California State Polytechnic University, Pomona
bpgarcia@cpp.edu

Prepared for Southern California Association of Governments

SCAG

Table of Contents

List of Appendices

List of Tables

List of Figures

Executive Summary

The housing shortage is a major urban challenge of our time. Between the years 2000 and 2015, 23 states in the United States underproduced by 7.3 million housing units or approximately 5.4 percent of the total national housing stock (Baron et al., 2018). This is especially significant in Southern California where at least 1.3 million new homes are needed in within the next decade (Housing and Community Development [HCD], 2020). Lack of housing disproportionately impacts renters and low-income families while increasing average housing costs (HCD, 2020). The accessory dwelling unit (ADU) has emerged as a policy alternative to increase housing stock and provides an affordable option for areas with a housing shortage. An ADU refers to a completely independent living facility on a lot with an existing, or proposed, primary dwelling unit. ADUs are small, easily built and do not include new land acquisition costs making them an opportunity for affordable housing supply in Southern California.

In September of 2016, the California legislature passed Assembly Bill 2299 in coordination with Senate Bill 1069. It significantly eases restrictions on building secondary units, potentially opening up more than eight million single-family lots for ADU development (Bennett et al., 2019). Since then, the state of California has introduced legislation that further eases requirements for ADU development. More recent changes made in 2019 and 2020 State ADU laws have reflected concerns and aim to further address barriers, including streamlining approval processing, and to promote the creation of ADUs for rental purposes.

While these efforts promise to unlock some of the potential of ADUs in California, there are still challenges for the full realization of ADUs. ADUs have been resisted by single-family residents concerned that ADUs will lower property values, potential noise associated with increased density, and parking scarcity that may arise from additional units in their neighborhood. ADU development has also been challenged by exclusionary land-use regulations and strict parking requirements. ADU construction is further complicated by existing non-conforming ADUs and a lack of feasible financing options.

This research comprehensively examines the capacity of ADU development regarding ADU implementation in the Southern California Association of Governments (SCAG) region by conducting a series of analyses at the local and regional levels. This research focuses on the eligibility of parcels for developing detached ADU and excludes Junior ADU (JADU), garage conversions, and non-conforming ADUs. For the remainder of this document, ADU refers to detached ADUs only.

1. Local Analysis

The local level analysis measures the ADU implementation efforts of local governments in the SCAG region. This analysis includes archiving and analyzing the local governments' ADU ordinances, reviewing best ADU practices, and developing the prototypes of ADU floor plans by place type and lot size types. The summary of the findings from the analysis at a local level is described below.

1.1. An analysis of ADU ordinances

An analysis of ADU ordinances across the SCAG found several reasonable opportunities to expand ADU construction, including an expansion to other land use zones, removal of parking space requirements, a reduction of height limitations, a redetermination of setback restrictions, and increasing the unit sizes or unit amounts on sufficient parcels.

1.2. A review of best ADU practices

From a review of best practices of current cases of ADUs the research team found key avenues for increasing ADU delivery, including financial tools and loans targeted to these small and short-term projects, an increase in city planning education efforts, streamlined building permit delivery, and urban design implementation opportunities for this housing type.

1.3. The prototypes of ADU floor plans

Designs of 19 floor plans based on examples from the field are included in this report and offer homeowners a plan to gauge where on their lot an ADU might fit, can be used to solicit construction bids or adapted on a site plan to comply with the homeowner's local jurisdiction's requirements for plan submittal.

Additionally, the research team examined how the City of Los Angeles' new ADU ordinance examines the relationship between the contributing factors and ADU development by constructing two multilevel logistic regression models that test the relationships before and after the implementation of the ordinance. The models indicate that the physical features of the property are more significant determinants of ADU development than neighborhood characteristics. Before the new ordinance was adopted, ADU development likely occurred in small-size parcels with smaller, older housing in areas with low population density and homogeneous land use patterns. The models also suggest that ADU developments in the City of Los Angeles have been spread across diverse types of properties and areas since the adoption of the new ADU ordinance. The processing time of ADU applications in the city has been significantly reduced after the adoption of the ordinance. This analysis can be found in Appendix H.

2. Regional Analysis

The regional level analysis includes a database of potential ADU amounts by estimating the number of parcels with potential for ADU construction in the SCAG region. By employing multi-level geospatial analysis, this analysis measures the number of ADU eligible parcels according to the State ADU law as well as several policy scenarios that promote ADU development. This analysis takes a comprehensive approach to the analysis of the State ADU law and capacity in the SCAG region. This this analysis only includes the physical conditions of parcels that can be queried and calculated in the Geographic Information System (GIS). The regional level analysis determined the following results.

2.1. The identification of ADU-eligible parcels by the State ADU law

Interpreting the State ADU law, this analysis filters parcels by their location (e.g., outside fire hazard severity areas, within urbanized areas, and outside high traffic zones) and land use codes (e.g., within residential and mixed uses). Then, the analysis determined the eligibility of a parcel by computing the available area of each filtered parcel for a detached ADU. The available area is acquired by subtracting the required square foot area for a detached ADU (e.g., with setback and parking requirements, existing building footprint, and minimum unit size of a detached ADU) from the total square foot area of a parcel.

From this base methodology, the research team developed three analysis approaches that address the complexities associated with residential parcels under subdivision development and the discrepancy of land-use code definitions between SCAG and the County Assessor.

- Approach 1: This approach employed SCAG's 2019 land-use codes excluding parcels with no buildings from potential ADU parcels.
- Approach 2: It screened out residential parcels solely according to County Accessor Land Use Codes.
- Approach 3: This approach screened out residential parcels based on the combination of SCAG's land-use codes in 2019 and general plan codes.

While these analytical approaches returned slightly different results, they suggest that there are approximately three million parcels eligible to construct detached ADUs in the SCAG region. The ADU eligible parcels by county are summarized in the table below.

Eligible ADU Parcels by County

		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Approach 1	Count	1,599,632	441,088	338,925	433,967	21,709	108,800	**2,944,121**
Approach 2	Count	1,350,199	446,895	339,346	429,565	22,179	111,626	**2,699,810**
Approach 3	Count	1,602,768	446,410	339,494	433,921	21,774	112,031	**2,956,398**
Difference	Count	-249,433	5807	421	-4,402	470	2,826	**-244,311**
b/w 1 and 2	%	-15.6%	1.3%	0.1%	-1.0%	2.2%	2.6%	**-8.3%**
Difference	Count	3,136	5,322	569	-46	65	3,231	**12,277**
b/w 1 and 3	%	0.2%	1.2%	0.2%	0.0%	0.3%	3.0%	**0.4%**
Difference	Count	252,569	-485	148	4,356	-405	405	**256,588**
b/w 2 and 3	%	18.7%	-0.1%	0.0%	1.0%	-1.8%	0.4%	**9.5%**

2.2. The identification of ADU eligible parcels by Local Policy Scenarios

Using the ADU eligible parcels according to the State ADU law, this analysis developed lenient policy scenarios that would further promote ADU development. They include the permission of ADUs within fire hazard severity areas or outside of urbanized areas on the condition that a fire

truck may access a reduction of setback requirements, a more lenient height limit, and a waiver of parking requirements. With these scenario options that local governments could consider, it is possible to examine 64 different combinations of policy scenarios. It is observed that some scenarios, such as the alleviation of ADU development in fire hazard areas and outside of the areas with the adequacy of water and sewer services, are most influential on the promotion of ADU development. It is noteworthy that these scenarios have commonality, which would bring some of the parcels previously excluded back to the eligible pool for ADU development. By adopting the scenarios, it was calculated that the ADU eligible parcels in the SCAG region can increase to approximately 3.2 million. The changes of ADU eligible parcels by scenario and by county are illustrated in the figure below.
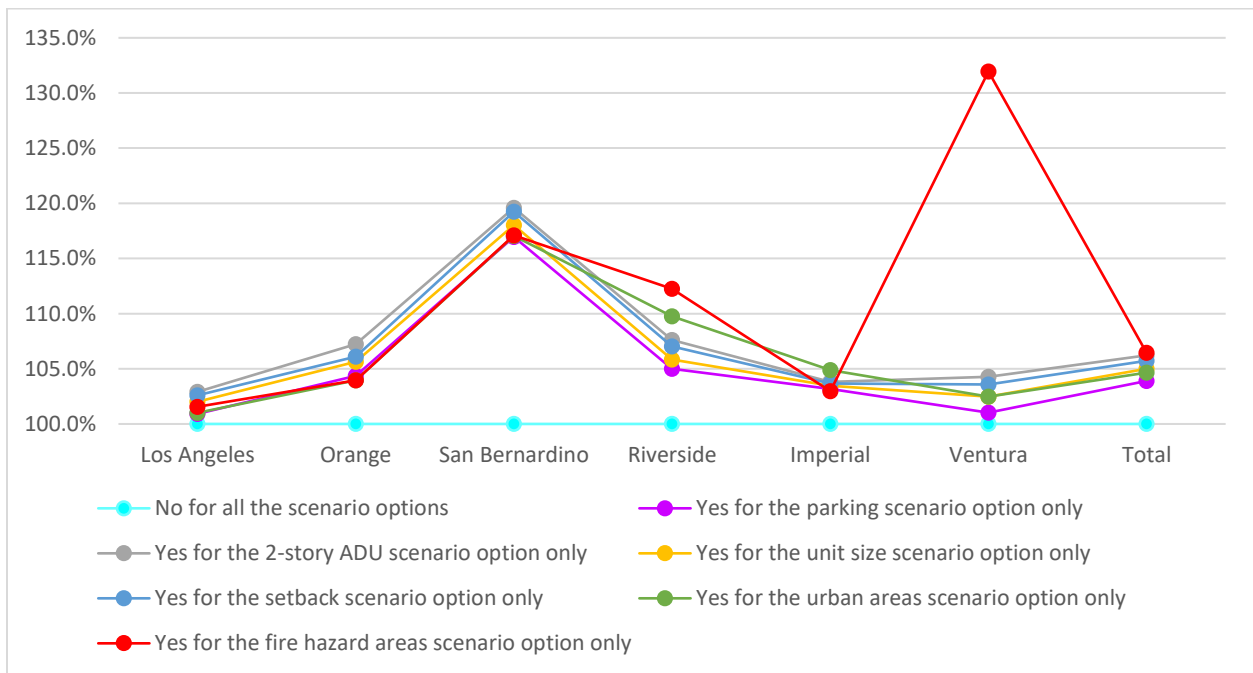
This research supports the potential of ADU to increase affordable housing options in the SCAG region. Although it does not necessarily mean that ADUs will be built in all the eligible parcels identified by this research, the ADU eligible parcels can indeed be a viable alternative to the shortage of housing in Southern California. Therefore, it is important for local governments to switch their planning paradigm in a way that further accommodates and promotes ADU development. While most local governments follow the State ADU law very closely, a few cities from the local level analysis adopted more lenient or permissive requirements for ADU development than the State ADU law. This is a positive finding for a further expansion of ADU permissibility.

Although this research presents a systemic, comprehensive approach to examine ADU capacity in the SCAG region, this research has limitations that need to be addressed by future studies. This analysis measures the eligibility strictly according to the zoning and physical conditions of parcels. Many other factors that affect property owners' decisions to build ADUs on their

properties are not considered. The number of eligible parcels for ADU construction we found does not necessarily mean that all these ADUs will be built. However, these estimates serve as a base for future studies, including for example, a survey that assesses property owners' perception of ADUs and their willingness to build ADUs. The quality of spatial data is another limitation of this research. Although the research team was able to employ the latest parcel data, the data is not detailed enough to elaborate on many characteristics of parcels associated with ADU eligibility. As the Los Angeles County case study indicates, the count of ADU-eligible parcels varies by the data and spatial analysis method employed. Future studies may consider a smaller scale analysis (e.g., at a county level) with more spatial data.

1. Introduction

The lack of housing has become a major crisis in the United States. Between the years 2000 and 2015, 23 states in the U.S. under-produced 7.3 million housing units in total, equivalent to 5.4 percent of the total housing stock of the country (Baron et al., 2018). The lack of housing that meets people's needs impacts renters and low-income families especially by reducing the availability of affordable housing and increasing average housing costs (Housing and Community Development [HCD], 2020). The housing shortage is one of the most important urban planning topics in the State of California, especially in Southern California. Southern California requires at least 1.3 million new homes within the next decade (Southern California Association of Governments [SCAG], 2020).

The accessory dwelling unit (ADU) has emerged as a policy alternative to increase housing stock and provide affordable housing for places impacted by housing shortages. An ADU is a smaller, independent residential dwelling unit located on the same lot as a principal single-family home. ADUs have previously been known as granny flats, in-law units, backyard cottages, and secondary units over the past several decades (HCD, 2020). ADUs can be constructed in various ways including by converting portions of existing homes, constructing additions to new or existing homes, by converting portions of existing stand-alone accessory structures, or by building new stand-alone accessory structures. ADUs are a flexible infill housing type that can provide many more housing units across Southern California to increase housing affordability, create a wider range of housing options within the community, enable seniors to stay near family as they age, and facilitate better use of the existing housing fabric in established neighborhoods. For these reasons, ADUs can become a viable housing option in Southern California, where lack of housing supply and affordable housing has become a serious social problem.

As the state passed Assembly Bill 2299 in coordination with Senate Bill 1069, the state of California significantly eases restrictions on building ADUs (Bennett et al., 2019). In Government Code Section 65852.150, the California Legislature declared that ADUs are allowed in single-family, multifamily, or mixed-use zones. The latest changes to the State ADU law is effective January 1, 2021, and the purpose of the changes is to further address barriers, streamline approval processes, and expand potential capacity for ADUs. Since local governments should not unduly constrain ADU development according to the state ADU law, the law is the statutory minimum requirement and local governments could only go beyond the minimum to provide more ADU development (CAHDC, 2020). Reflecting these changes, many local governments in Southern California have adopted zoning regulations that permit ADUs in residential areas, especially low-density residential areas.

Given the State ADU law and related political movements in local governments, it is reasonable to hypothesize that ADU production in Southern California will expedite and increase. However, it is not straightforward to estimate the potential impacts of the State ADU law on the housing market at regional and local levels. The number of eligible parcels in the region that could have

an ADU remains unknown. Since the state ADU law should be reflected in local governments' zoning and ADU ordinances, how local governments respond to the state law is also critical for the promotion of ADU production. Therefore, it is important to understand local governments' responses to the state ADU law and the implementation of ADU ordinances at the local level.

2. Scope of the Project

The purpose of this research is to comprehensively examine the capacity of ADU development and the current practices and trends of ADU policies in the SCAG region by conducting analyses at the local and regional levels. The local level analysis scrutinizes how the local governments in the SCAG region follow the state ADU law. By archiving and analyzing the local governments' ADU ordinances, this analysis shows how the local governments reflect the state's new laws to their zoning and ADU ordinances. Based on the ordinance review, the research team selected and summarized best practices in the promotion of ADU development in the SCAG region as well as the exemplary practices outside of the region. With the City of Los Angeles as the most populous city and is at the forefront of ADU proliferation, the research team conducted a case study that measures the changes that the city's new ADU ordinance has made. We also developed and propose the prototypes of ADU floor plans by place type/lot sizes that fit into the SCAG region's geographical context.

The regional level analysis focuses on the development of an ADU inventory database by estimating the number of ADU eligible parcels in the SCAG region. Applying the rules and regulations defined by the State ADU law, this analysis estimates the number of parcels eligible for ADU development. This analysis developed several policy scenarios that local governments can consider to further promote ADU development beyond the state ADU law. For each scenario, the research team estimated the number of ADU eligible parcels respectively. By developing visualization and simulation tools for these estimations, the research may facilitate local governments to explore their varying capacity for ADU development with less restrictive local ordinances.

Although this research takes a comprehensive approach to the analysis of ADU policies and capacity in the SCAG region, the scope and approach of this research has limitations. First, this research solely focuses on the eligibility of parcels for the development of detached ADUs. Other types ADUs such as Junior ADU (JADU), garage conversion, and existing non-conforming ADUs are not in the scope of the research. Although JADU is a type of an ADU, the regulations and physical conditions to build a JADU are fairly different from those of ADUs because a JADU less than 500 square foot is typically the product of a garage conversion. Therefore, ADUs in this document hereafter refers to detached ADUs only, excluding any other variant of the detached form.

Second, the analysis at a regional level identified ADU-eligible parcels by zoning, location, and some physical conditions of the parcels. This analysis determines whether a parcel has physically

enough space to build an ADU. This analysis does not estimate the number of ADU units that could be developed in ADU eligible parcels. Although single-family residential parcels are eligible for the creation of one ADU per lot, the construction of multiple ADUs is allowed in multifamily residential parcels. For this reason, the number of eligible parcels is not necessarily equal to the total number of ADUs that could be built. It is impossible to count the total number of ADUs possible in those multifamily zones given the complexity of their ownership and geometry of common spaces and facilities located within multifamily zones. Thus, this analysis is limited to estimate the number of ADU-eligible parcels.

Thirdly, this analysis accounted for the physical conditions of parcels that can be queried and manipulated in the Geographic Information System (GIS). Many other factors in addition to the physical conditions of parcels influence the parcel's eligibility for ADU including the property owners' interest, access to financial and social resources, and other factors that influence the decision to construct of an ADU. These factors typically include financing options, concerns with privacy, owners' socio-demographic characteristics, local governments' planning and permitting processes, and so on. Therefore, in addition to the estimation of the eligibility, a large-scale qualitative survey that collects property owners' perception, resources, and willingness to build an ADU needs to be conducted to estimate the potential ADUs that are likely to be built in the near future. This research screened single-family, multi-family and mixed-used zoned parcels, to determine which are physically eligible to build at least one ADU according to the recent state ADU law. By providing a database of the screened parcels and tools that would work under different local ADU ordinance scenarios that are more lenient than the State ADU law, this research intends to support local governments' exploration of their ADU potential and varying capacity based on local conditions and contexts.

3. Summary of the State ADU Law

Changes in the state ADU law in recent years have incrementally addressed barriers to ADU development and broadened implementation for ADUs. Provisions for local government adoption of ADUs, called second unit ordinances, were first adopted in 1982 in California. Since then, numerous state legislative bills have been enacted, especially between the years 2016 – 2020. These focused on reducing local land-use barriers to ADU development and prompting local governments to conform with statutory changes.

Government Code Section 65852.150 established legislative intent that provisions of an ADU ordinance "are not so arbitrary, excessive, or burdensome so as to unreasonably restrict the ability of homeowners to create accessory dwelling units." Local governments, if they elect to adopt a local ADU ordinance, are obligated to ministerially permit ADUs consistent with at least the minimum standards set forth in Government Code Sections 65852.2 and 65852.22, to get the ordinance reviewed by HCD, and to report ADU permits to HCD in their Annual Progress Reports (APRs) due on April 1st annually.

The recent history of the amendments made to the state ADU law is provided here with the summary of the bills enacted since 2016.

- 2016: The California legislature passed Assembly Bill (AB) 2299, AB 2406 in coordination with Senate Bill (SB) 1069. They significantly eased restrictions on building secondary units, opening up a potential eight million single-family lots for ADU construction (Bennett et al., 2019). The bills included provisions, such as reducing parking requirements to one space per bedroom or unit, allowing parking in tandem or setbacks, permitting ADUs up to 1,200 square foot, and allowing local governments to permit JADUs.
- 2017: SB 229 and AB 494 clarified areas of the previous bills, including allowing new single-family (SF) home construction to include an ADU, permitting new ADUs in all zoning districts that allow SF uses, reducing fees from utilities to be proportional to the size of ADU, and further reducing the parking required to just one space.
- 2018: SB 1226 included a provision for legalizing ADUs built without a building permit, only requiring them to comply with building standards in effect at the time of the ADU construction.
- 2019: SB 13, AB 68, AB 881, AB 587, AB 670, and AB 671 further addressed barriers to the development of ADUs and JADUs. The amendments included prohibiting local governments from having minimum lot size and maximum unit size for ADUs (Gov. Code, § 65852.2, subd. (a)(1)(B)(i), Gov. Code, § 65852.2, subd. (c)(2)(B) & (C)), from having owner-occupancy requirements (Gov. Code, § 65852.2, subd. (a)(6)), and reducing ADU application review time to 60 days (Gov. Code, § 65852.2, subd. (a)(3) and (b)). Also, provisions created a path for ADUs to be sold separately from the primary dwelling under certain conditions.
- 2020: AB 3182 further streamlined review and permit processes. The provisions included an ADU application being deemed approved after 60 days of submission without any act by the local government and easing renting or leasing of an ADU unit in a common interest development.

With these recent changes, local ADU ordinances should not unduly constrain the ADU production that is set by the state ADU law. Localities should either use the state ADU law as a minimum requirement in the absence of a compliant local ordinance or go beyond the minimum requirement or create their own more lenient rules for ADU construction, to further ADU production. To satisfy Regional Housing Needs Allocation (RHNA) housing needs in housing element updates, local governments are required to estimate ADU capacity and include housing element programs to incentivize and promote ADUs that can be offered at affordable rents for very low to moderate-income households. Robust projections for ADU potential become critical for ADU implementation, particularly in cases of little prior ADU development.

Table 1. Key Provisions of State ADU Law relevant to this Research's Method

Category	Description
Externalities	- Not within severe fire hazard areas (impact on public safety) - Within the areas with the adequacy of water and sewer services - Within the areas with fewer impacts on traffic flow (i.e. less car ownership rates)
Zoning	Within single-family residential, multifamily residential, or mixed-use zone
Lot size	No minimum lot size requirement
Setbacks	- Maximum Four feet side and rear yard setbacks - Extra setbacks can be imposed on parcels in the coastal zone
Number of units allowed	- Single-family residential: one unit - Multi-family residential: up to 25 percent of existing multifamily structures or two units (detached with the setback requirements)
Unit size	- No minimum / maximum size requirements, a height limitation of 16 feet - Statewide Exemption ADU: up to 800 square feet ADU with a height limitation of 16 feet and four feet side and rear yard setbacks
Accessory structures	Any accessory structures can be convertible to ADUs without other limitations (e.g. setbacks)
Parking requirements	- One parking space per unit is allowed - When a garage, carport, or covered parking structure is demolished in conjunction with the construction of an ADU, or converted to an ADU, replacement of off-street parking spaces not required
Parking exemptions	When a parcel is located within one-half miles of a transit stop, located within a historic district, located within one block from a car share vehicle, or located in a permit parking area where on-street parking permits are required, but not offered to the occupant(s) of the ADU
Impact Fees	- No fees for ADUs less than 750 square feet - Proportional fees in relation to the square footage of the ADU to the square footage of the primary dwelling unit (for single-family residential) - No school district impact fees for ADUs less than 500 square feet
Others	- Deemed approved if the locality has not acted on within 60 days of a completed application. - Require ministerial approval for applications for one ADU and one JADU per lot within the proposed/existing single-family dwelling - Provides for the rental or leasing of a separate interest ADU/JADU in a common interest development, but not less than 25 percent of the separate interest units as rental/leasable units. - Eliminate owner-occupancy requirements (when ADU approved in 2020-2024) - Delay enforcement against a qualifying substandard ADU for 5 years to allow the owner to correct the violation - Authorizes HCD to notify the local agency if their ADU ordinance is not in compliance with state law - ADUs or JADUs may be included in local Housing Element site inventories to accommodate the Regional Housing Needs Allocation (RHNA)

Including and beyond the summary provided above, the State ADU law addresses various aspects of ADU development and the key provisions listed in Table 1 are the basis for developing spatial analysis using GIS for this study that will be discussed in more detail in later sections of the report.

4. Literature Review

ADUs have the potential to increase the housing stock and provide affordable housing for areas impacted by housing shortages. They can function as low-maintenance housing for the elderly, provide a source of homeowner income, or affordable housing which can address Housing Element needs and other state laws (HCD, 2020; Ramsey-Musolf, 2018). Even though California has introduced legislation that further eased requirements for ADU development as described in the previous chapter, there are still barriers and challenges to the full realization of ADU potential at the local level. This literature review cites research findings or projections on conditions prior to the recent changes in the State ADU law and gauges whether some of the issues are still representative circumstances in light of the amendments to the current state ADU laws.

Single-family residents have expressed concerns that ADUs will lower property values, increase noise, and cause parking issues from additional units in their neighborhood. ADU development had been challenged by exclusionary land-use regulations and parking requirements; the process was further complicated by existing non-conforming ADUs and a lack of feasible financing options. The literature review presents the key discussions and data in ADU phenomenon in detail based on scholarly journal articles and policy reports published around California and lays out the context for best practices and recommendations.

4.1. Local Reaction to the Statewide Mandate and Restrictive Local ADU Ordinances

Land-use regulations play a major role in potential ADU development and widely differ across states, regions, and cities. Not only do land-use regulations impose compliance costs, but they also limit the supply of land available for development, thus increasing the price of the available supply (Brinig and Garnett, 2013). In the case of ADUs, the most contentious issue preventing development is "upzoning" which is defined as zoning changes that increase permissible residential density (Gabbe, 2019). The most difficult land use type to penetrate are single-family residential (SFR) zones with many residents echoing a fear of decreased property values if ADUs become widespread in their communities. Some critics of traditional land use regulations assert that current zoning exacerbates the disproportionately negative effects impacting historically marginalized communities who are usually renters and tend to be priced out of homes in SFR zones. Traditional regulations are tied to environmental and social equity outcomes, increased economic segregation (Lens and Monkkonen, 2016; Rothwell and Massey, 2009), and racial segregation (Gabbe, 2019). The draconian approach some cities have taken in response to the

previous statewide mandate has made scholars wonder if these requirements perpetuate exclusionary zoning practices that have equity implications. For SFR homeowners, the fear of increased density and decreased on-street parking spaces that may lead to lower property values are major factors to oppose ADU development; the pushback vocalized by residents could sway local officials to create strict guidelines (Brinig and Garnett, 2013). However, these fears are often not borne out in reality.

Although many cities developed local ADU ordinances, some might have come with hidden challenges embedded in the framework, making it nearly impossible for homeowners to secure building permits. The result is sometimes far from the intended purposes of the state mandate's attempt to lower housing costs. For example, the City of Los Angeles had problematic height limits, Inland Empire jurisdictions tended to have high minimum lot sizes, low height limits, and restrictive setback and parking requirements, and Orange County jurisdictions had high minimum lot sizes that hindered the creation of ADUs (Chapple et al., 2020b).

The results of a survey by Mukhija et al. from 2014 found that council members from the City of Los Angeles were most concerned that ADUs would adversely affect parking, density and to a less extent crime. Council members advocated for restrictions on ADUs included restrictive design standards, limiting ADUs to large lots only, requiring the consent of adjacent property owners and on-site parking (Mukhija et al., 2014).

Ramsey-Musolf (2018) then examined the zoning from 87 suburban cities in Los Angeles County to survey ADU zoning restrictions and reported that 61 suburbs (70 percent) required on-site parking, 42 suburbs (48 percent) stipulated a minimum lot-size, and 27 suburbs (31 percent) required covered parking. The details provided from these two studies are just one example of the restrictive standards most homeowners have faced with ADU development prior to 2016.

The local atmosphere and regulations affected the number of ADU applications and permits issued. Pfeiffer (2019) found that local governments adopting ADU ordinances with less restrictive regulations received more frequent ADU applications. The ADU scorecard report also found a positive correlation (r=0.25) between a jurisdiction's grade in terms of ADU adoptability and the number of ADU permits in 2018 (Chapple et al. 2020a). Although some cities' ADU ordinances are less restrictive than others, the study reveals that the recent amendments to the state law would make a real difference in the creation of ADUs by the elimination of some of the development requirements, streamlined processing, and ministerial review of ADU applications.

4.2. Need for Easing Parking Requirements

Parking requirements may be restrictive for homeowners looking to build an ADU as most SFR zones require homes to have a two-car garage and an additional parking space for any additional units. Off-street parking requirements can be extensively restrictive with the addition of specific parking configurations such as no tandem parking and covered parking requirements. These

conditions, in addition to zoning, have prevented many potential ADUs from being built since it was nearly impossible for most homeowners to meet the combination of all the prerequisites outlined in some local ADU ordinances across the state of California before the recent amendments (Brinig and Garnett, 2013).

Critics of ADU requirements had suggested that off-street parking requirements should be eliminated to ease implementation and increase the housing stock. Brown et al. (2020) argue that second units can reduce income segregation and population decline. However, 37 percent of new single-family units were unpermitted which comprised higher shares of new units in dense urban areas between the years 2000 and 2014. Parking reform was suggested as a pathway to legalizing garage conversions. It has been discussed frequently that removing parking requirements could drastically increase the number of residential parcels eligible for ADU development.

Before the recent changes to the state ADU law, ADUs have been discretionary rather than ministerial, which has led local governments to require ADUs to satisfy strict requirements, including costly off-street parking and minimum lot size requirements, as well as restrictions on the maximum unit size of ADUs. Other common restrictions included limits on the ability of owners to lease ADUs and design requirements, including requiring the use of expensive materials and the submission of architectural plans to a design review committee (Brinig and Garnett, 2013). Off-street parking requirements prevent affordable housing by requiring the parking to be covered in a garage or car port, but Brown et al. (2020) argue that requiring parking with housing increases the odds that a household will own a car. Households with cars, not the housing itself, increase the demand for parking. A two-step strategy that can prevent parking problems in parking districts includes, limit the number of on-street parking permits for cars registered at that address, and remove the requirement that off-street parking spaces must be covered and non-tandem (Brown et al., 2020). From this data and others, parking requirements for ADUs have been eased over time by numerous amendments to the ADU law.

4.3. Challenges with Non-Conforming ADUs

Implementation of ADU development has been further complicated by existing second units that were built without an appropriate permit before the State ADU law. Critics also pointed to unrealistic requirements of legal ADUs which tended to cause residents to build non-conforming units to bypass the restrictive ordinances. Regions in California with high numbers of ADUs tend to be near the coast and major metropolitan areas such as Los Angeles and San Francisco where the cost of housing and living tends to be higher than inland areas. Many homeowners have taken it upon themselves to create affordable housing without going through the tedious process of acquiring costly building permits through the city. Fieldwork in Los Angeles has shown that, in some neighborhoods, more than three-quarters of residential lots have non-conforming ADUs

(Bennet et al., 2019). This poses challenges for cities as they navigate the state ADU law, as they must address how to amend or retrofit non-conforming second units.

Non-conforming ADUs have proliferated in Los Angeles. Some estimates range as high as 200,000, with some of these displaying truly deplorable living conditions (Brinig and Garnett, 2013). The non-permitted nature of informal units including their small physical size, incremental construction by homeowners or by unlicensed contractors, incorporation of recycled or reclaimed materials, unofficial utility connections, and other qualities, often allows them to provide a level of affordability to their occupants that permitted construction simply cannot (Wegmann and Mawhorter, 2017). For these reasons, most non-conforming ADUs are not up to code and may be considered unsafe. Bringing the non-conforming units up to code will be a monumental task to tackle in addition to permitting new ADUs. Targeting non-conforming units to bring them up to code may result in unintended consequences that may displace thousands of people residing in them.

Brinig and Garnett (2013) and many other critics pointed to the lack of action on the local governments' part which led to many non-conforming units built. Statewide housing production has lagged far behind the United States even amid robust population and economic growth. This implies ideal conditions for informal housing (Wegmann and Mawhorter, 2017). If major metropolitan areas in California do not provide an adequate process for residents to easily build ADUs, non-conforming second units will continue to increase unplanned housing in the region. This housing burden largely affects cities like Los Angeles with large populations that are in dire need of affordable housing.

4.4. Efficacy of the ADUs for Housing Affordability

In a study done in Seattle's King County, Maaoui (2018) asserts that there is a pre-conceived notion that anticipates households with ADUs to be white, older, middle-class homeowners with a good knowledge of the regulatory tools available to them. This pre-conceived notion has even shaped the local conversation about the pros and cons of the policy. However, their models suggest that there is a positive correlation between African American and Hispanic households with ADU permits. Meanwhile, studies based on California show a much more complex picture of where ADUs are more or less restricted or have been built, as well as their associations with homeowners' socio-demographic characteristics.

Pfeiffer (2019) found that in the Los Angeles metropolitan area, communities closer to the City of Los Angeles tended to have less restrictive ADU ordinances and that those located in the outer suburbs or exurbs tended to be more stringent. It also found Inglewood, Lakewood, and Pasadena were less restrictive, meaning fewer imposing requirements compared to other localities in California. The author found three types of local approaches to ADU regulations. Local governments with the most restrictive regulations tended to have lower incomes, low

housing values, greater declines in incomes and housing values during the 2010s, higher proportions of and population growth among Latinxs, and greater rates of poverty and multigenerational households. Ironically, these are the places that could most benefit from affordable housing and housing that accommodates extended families. Localities with moderately restrictive regulations tended to be more Whites, Asians and Pacific Islanders, seniors, and those that have greater increases in income and declines in poverty. The less restrictive ADU ordinances are found in communities of whiter people with more advantages than those of most restrictive, but more racially and ethnically diverse and less advantaged. Even though this study is useful in understanding overall progress made in California, Chapple et al. (2020) found exceptions to these trends through a region-specific analysis that provided a more nuanced interpretation of how ADUs have been built. One of the interesting findings about the SCAG region is Los Angeles and Orange Counties are different from other counties in California in that most of their ADU development happened in low resource areas. Their Los Angeles County-specific logit regression model found that ADUs have more likely been built in areas with higher proportions of non-Latinx White, Latinx, or Black populations, high overcrowding, smaller lots, and more recently purchased homes.

These premises for further evidence could have relevance for local policy. They could justify the legalization of permits that provide alternative sources of income to certain minority households. If ADUs are meant to increase housing stock and provide alternative affordable housing options, the conversation around unconventional mortgage lending practices and financing options can help all types of homeowners who can potentially benefit from ADUs. The process requires some community engagement about how to streamline and possibly subsidize ADU development to reach wider communities.

The nature of ADUs is quite different from traditional SFR development and requires creative financing options to make the process more feasible without forcing homeowners into traditional long-term mortgages. Many architectural firms and community-based organizations are working to create step-by-step plans from start to finish, using prefabricated designs. Although, with no consistency in driveway layout, foundation conditions, or setbacks in the tight backyard sites, prefabricated whole units are impractical at present (Bennett et al., 2019). Due to the variability of conditions to be met on different properties, it is difficult to provide a one-size-fits-all toolkit for homeowners to follow, causing design firms challenges with streamlining attempts with prefabricated designs. Many lending practices currently available are still too risky for those without the disposable income to comfortably finance an ADU and alternative financing strategies are needed to mitigate risks for homeowners.

However, the evidence so far suggests that ADUs are not yet, a viable solution to the affordable housing crisis. According to Ramsey-Musolf (2018), 80 percent of ADUs are going for market rates and are no more or less affordable than comparable apartments in multifamily developments. Pfeiffer (2019) found from the census data that the number of ADU applications

was not associated with changes in proportions of the owner, renters paying more than 50 percent of their income on housing, and of seniors that reported living in the same house one year ago from 2010 to 2017. ADU production has not yet contributed to greater improvements in housing affordability and aging in place. These are early results but they are contradicting the claim that ADUs can provide affordable housing options. Since ADUs in California can count towards meeting local governments' fair share of regional low-income housing needs (Ramsey-Musolf, 2018), ways to maintain low costs of construction and living in ADUs must be further studied.

4.5. Current State ADU Law

Now with the State ADU law, all residential or mixed-use zones where residential uses are permitted by-right or by conditional use are allowed to build ADUs as long as local governments find them with adequate water and sewer service, less impact on traffic flow and public safety (e.g. fire hazard areas). To expand mixed-use zoning that supports multi-family development, local governments could adopt incentive programs that promote inclusionary housing such as transit-oriented development which currently eases ADU development within half of a transit stop. The transit is defined clearly in the HCD ADU handbook, "public transit is any location where an individual may access buses, trains, subways and other forms of transportation that charge set fares, run on fixed routes and are available to the general public" (HCD, 2020). Some local governments have amended their zoning laws to encourage ADUs even to the point of subsidizing them (Brinig and Garnett, 2013). The only uncertainty with or less objective component of the law that is up to local governments' interpretation and analysis is the impact of traffic and public safety. This may be used as an excuse to preclude ADUs from areas with strong opposition or not in my backyard (NIMBYism) efforts by localities.

Many of the aforementioned challenges with parking requirements are now addressed by the 2019-2020 bills. Parking requirements are exempt from many neighborhoods near transit stops or car share programs, within historic districts, or permit parking areas. Also, when ADUs are created through the conversion of a garage, carport or covered parking structure, replacement of off-street parking spaces cannot be required by local governments. It is also clearly stated in the ADU handbook that replaced parking spaces may be provided as tandem parking on a driveway (HCD, 2020). The areas that already experience parking shortages or tensions around on-street parking among residents could be identified by local governments and then excluded from residential parcels eligible for ADU development. With these changes, a complete elimination of parking requirements for ADUs is not at all an idealistic suggestion for local governments to consider.

Regarding non-conforming ADUs, now the owners of them would have five years to correct the violation, unless there is a health and safety issue present. Beyond this state mandate, local

governments must consider further easing requirements for ADU development to mitigate the current housing crisis and bring up the existing substandard ADUs to the mainstream economy. (Elmendorf et al., 2019).

5. Best Practice Review

Launching from the literature review, a best practices review was performed to analyze current reports and studies on ADU delivery and proliferation in California. A search of the best architectural cases currently in existence or development was also performed. Similar to the literature review the research team found common challenges and three main avenues for ADU production, including 1) financial support, 2) city planning aid or information to educate the public on ADUs and 3) urban design considerations including setbacks and ADU site locations. Appendix A includes internet links to best practices in government agencies providing planning aid for ADU delivery, architectural best examples, links to financing resources or municipal examples of financial support, professionals in the ADU construction and delivery industry as well as informational links on ADUs. The following presents the key challenges and opportunities in the current context of ADUs.

5.1. The Current Practice of ADUs

A study from 2016 found that 50 percent of the Californian housing market cannot afford housing in their local market (Woetzel et al., 2016). In low and very low-income neighborhoods, the situation is worse with nearly none able to afford their local cost of housing (Woetzel et al., 2016). This requires broad solutions. There are also overlapping vulnerabilities to this affordability crisis. A study of San Mateo County found that 50 percent of ADUs are inhabited by a person of 60 years or older and 30 percent of these ADUs are inhabited by a person with a disability (Chapple et al., 2017a). ADU and rental markets are largely composed of low-income people (Chapple et al., 2017a).

A study of Vancouver, Seattle, and Portland found that ADUs rented for an average of $1,298 per month and did not differ substantially across these three cities (Chapple et al., 2017b). Of the Vancouver, Seattle, and Portland cases, 93 percent of ADUs consist of one or two residents and in 46 percent of cases, the resident knows the primary dwelling unit resident as a friend or family member. The majority of ADUs from this study rented for below-market rates. ADUs as short-term rentals did not play a large part in the results of this study or people's motivation for having an ADU (Chapple et al., 2017b).
Los Angeles County is a leader in accessory dwelling unit delivery (Chapple et al., 2020a). Issued ADU permits increased across California from nearly 6,000 to more than 15,000 from 2018 to 2019 (Chapple et al., 2020a). Approximately, 92 percent of ADUs are built on single-family lots in diverse transit-oriented areas with 2 percent built on lots with duplexes, triplexes, or fourplexes. Furthermore, the majority of these ADUs are built on lots where the main house has three bedrooms or more (Chapple et al. 2020a). At the time of this study, almost 9,000 ADUs

were built in 2018 and 2019. Over 3,300 ADUs have been built on lots smaller than 5,000 square feet. Los Angeles County had the highest number of ADUs permitted in 2018 and 2019 in terms of permits per 10,000 people and total permits (Chapple et al., 2020a).

ADUs have more affordable rents than multifamily, or new apartment, developments (Chapple, 2014). Meanwhile, demographics are changing with some single-family households shrinking with some people choosing to downsize or divide their space for different reasons (Bertolet, 2017). The largest share of Americans between the ages of 18 and 31 years since 1968 now live with their parents at 36 percent largely due to a lack of affordable housing options (Brown et al., 2017). Meanwhile, garages are a largely untapped supply of housing (Brown et al., 2020).

A conservative estimate notes that California could add as much as 790,000 housing units from additional units on single-family properties (McKinsey & Company, 2016). This number appears to be extrapolated from a study of properties within ½ mile of five Bay Area Rapid Transit (BART) station areas in Oakland, Berkeley, Albany, El Cerrito, and Richmond (Chapple et al. 2012). This analysis of five station areas of the BART focused on regulatory restrictions for accessory dwelling unit construction including minimum lot sizes, removal of parking requirements, and setbacks. However, this estimate is self-described as conservative and was developed from a small sample size of transit-oriented areas in the San Francisco Bay Area (Chapple et al., 2012). In reality, additional units on single-family properties could provide many more housing units than this estimate when including the varying geographical contexts of California that might be more amenable or appropriate for ADU siting. Expanding the estimate to areas outside of transit station catchment areas and greater single-family lot sizes. State Assembly Bill 2299 and Senate Bill 1069 are also promoting ADUs across California (Bennett et al., 2019).

Los Angeles County and Orange County show substantial ADU permitting and construction within lower-cost ZIP codes and in an egalitarian spread across all levels of resources (Chapple et al., 2020a). This is in contrast to the other regions of California that show most ADU construction in the higher resource areas (Chapple et al., 2020a). Lower rent and lower-income areas in Los Angeles are more likely to build ADUs. Furthermore, in Los Angeles County, neighborhoods with diversity are more likely to build ADUs including non-Latinx White, Latinx, and Black populations. These attributes of a more equal distribution of ADUs in Southern California must be preserved to provide affordable housing in affordable areas. Financial tools, including loans, must be tailored to support these types of projects in these neighborhoods to continue ADU delivery.

5.2. Financing Challenges and Opportunities

Another challenge that homeowners face with ADUs is a lack of financing options that are feasible for a small second unit. According to Brown et al. (2020), in Los Angeles, the cost of converting a two-car garage into a 400 square foot apartment ranges from $60,000 to $80,000. If the homeowner finances the conversion at 5 percent interest over fifteen years, monthly loan

payments would be between $474 and $633 per month. The average rent for a 400 to 450 square foot second unit in Los Angeles in this sample is $1,440 with the rent providing the homeowner between $602 and $793 per month in additional income, after the mortgage payment (Brown et al. 2020). The cost to build ADUs is typically less than the cost of subsidized affordable housing units and has the potential for homeowners to build income-generating property. Although many parcels are eligible to have potential ADUs, the reality is that most homeowners lack the experience and the capital to build an ADU. There is a learning curve for most to go through the proper steps and critics of ADU compliance argue that the process needs to be streamlined so that it can be more accessible to a wider audience.

Since the passing of Assembly Bill 2299 and Senate Bill 1069 ADU construction has been expanding across California (Chapple et al., 2020a). However, Southern California ADU is exceptional in some key ways. The average cost of ADU construction in Los Angeles County was $148,000 compared with $237,000 in the San Francisco Bay Area (Chapple et al., 2020a).

Demographic research has identified the likely beneficiaries of the ADU model, including older people, lower-income residents, and people with a connection to those in the primary dwelling unit (Chapple et al., 2017a, Chapple et al., 2017b, Chapple et al., 2020a). Targeted financial tools could help the people that would utilize ADUs build ADUs in the places they want to live for high occupancy and the utmost benefit of the ADU housing type.

5.2.1. Financial Challenges in ADU Practice

Lack of financial tools for ADU builders has been identified as a key barrier to their construction (Chapple et al., 2017). ADUs are still a new product and people and banks are rushing to understand their value, equity, and how best to finance them. Gaining funding for ADU construction can be complicated because not all loan providers will allow the home equity of the main dwelling to be used to support the loan for ADU construction. There is also a need for loan structures more appropriate to ADU construction including loans in amounts approximately from $50,000 – $250,000 and with shorter timelines of approximately 12 month terms (Chapple et al., 2017). Large loan amounts with 30 year terms do not apply to ADU projects.

While there is not currently enough data available on ADUs, a study of Portland, Seattle, and Vancouver found that ADU project costs were between $150 and $325 per square foot (Chapple et al., 2017b). ADUs are less expensive to construct because they are smaller units with less of the less expensive spaces such as bedrooms to bring the average square foot costs of construction down. The costs of construction for these three cities included 33 percent of the costs for labor, 34 percent construction materials, 5 percent utility connections. Architecture, engineering, and permits were a combined cost of 16 percent which can be reduced through streamlined planning, permit fee waivers, and pre-approved plans that reduce design time and money (Chapple et al., 2017b).

From the Portland, Seattle, and Vancouver study, it was found that 30 percent of ADU owners used their cash to build an ADU, 15 percent used personal credit or other resources, and 40

percent borrowed against their house. Of those that got a loan for construction, 60 percent of those received a loan from a local bank or credit union (Chapple et al., 2017b).

Local governments' financial strategies have been varied but so far have not had major impacts on ADU delivery. Santa Cruz County has an ADU forgivable loan program through a local bank that provides up to $40,000 for ADU owners that rent out the unit to low-income households at affordable rental rates for 20 years after which the loan is forgiven (Chapple et al., 2020a). San Mateo Credit Union provides an interest-only short-term ADU loan for a maximum term of 12 months. The City of San Diego has provided a subsidy fund of $300,000 for water and sewer fees. Local governments' financial strategies have so far been ineffectual, partly because the attached requirements for funding are too onerous.

Many places provide utility and other planning fee reductions. The San Francisco Bay Area offers the highest rate of fee reductions and impact fee waivers yet total permits and permits per 10,000 residents both lag behind Los Angeles County (Chapple et al., 2020a). Los Angeles County was found to have slightly below average fees and review process requirements (Chapple et al., 2020b). Furthermore, ADU delivery is still concentrated in wealthier areas in the San Francisco Bay Area, suggesting that these fee reduction strategies are not significant enough to determine a person's motivation to constructing an ADU (Chapple et al., 2020a).

5.2.2. Financial Strategies and Opportunities

The main purpose of this study and ADU ordinances continue to be a greater provision of affordable housing. ADUs are a relatively low-cost alternative to housing units because they do not require a land purchase and can be built with simple wood framing. Strategies that have been proposed to financially aid ADU construction include, allowing people to use diverse assets to qualify for loans, short-term and small-scale loans, financing that takes future rental income into account, and municipal loans that are lower interest rate (Chapple et al., 2017a). So far public assistance or loan products, including fee waivers, have had meager success as a determinant of ADU construction. Current financing options for ADU construction center around cash savings, refinancing loans for home improvement projects, renovation loans, and a home equity line of credit (Chapple et al., 2017a). However, low-income households with less home equity or cash savings would most benefit from the rental income or extra bedrooms for family members that an ADU provides (Chapple et al., 2017a).

Los Angeles City has increased its support and aid for ADU completion. Los Angeles County provides a forgivable loan of $75,000 for new ADU construction and $50,000 for rehabilitating an unpermitted ADU as long as the ADU provides housing for someone transitioning out of homelessness for at least ten years. This program reacts to the reality that there are many existing unpermitted, or incorrectly permitted, second units that could be brought up to date with an amnesty program with the added benefit of making sure these housing units are up to date for habitation (Chapple et al., 2017a; Chapple et al., 2020a).

Cities have provided rebates for environmental upgrades, including for grass removal or upfront funds for energy upgrades. Similar upfront cash from the cities with costs reimbursed by the

homeowners over time could work for ADU delivery (Chapple et al., 2017b). To ease the implementation of ADUs, localities might consider alternative financing strategies to fit the needs of ADUs since it is typically $80,000 or less to build and ADUs are usually no more than 700 square feet since ADUs are also typically cheaper to build than traditional affordable housing, localities may also want to consider subsidies to ease the burden of homeowners to make this option more feasible to increase the housing stock. For instance, Genesis LA, a community development financial institution, provided a gap loan to guarantee the cost of construction before owners transitioned to a traditional mortgage with a credit union. This hybrid approach avoids the risk and commitment associated with the long-term ground lease profit share arrangement (Bennett et al., 2019).

There is currently a lack of analysis and understanding of the added value of an ADU (Chapple et al., 2017b). A study involving real estate agents is one way to gain an understanding of the added value of an ADU from their sales and estimation experience. It may be possible to add the income from the rental of the ADU into the mortgage calculation of the primary dwelling during purchase. A homeowner could then deduct the rental income from their expenses. This would help low or moderate-income earners to secure loans for ADU construction in less wealthy areas, where the people that need ADUs could benefit.

5.3. City Planning Services and Information

Fortunately, there are many efforts within the ability and purview of city planning departments that can make a difference in ADU delivery and expansion. From a review of city planning practices, there were several strategies that city planning departments could use to streamline and increase ADU delivery including pre-approved ADU plans, informational workshops with the public, and archives of ADU expertise in the form of a website or dedicated personnel.

5.3.1. Pre-approved Building Plans

The Cities of Clovis, Encinitas, San Diego, Seaside, Stockton, and Humboldt County provide pre-approved building plans to provide certainty for builders and to reduce design costs. The City of San Jose provides a resource list of approved vendors to contact (Chapple et al., 2020a). The City of Los Angeles Department of Building and Safety has recently released 28 pre-approved plans for ADU construction. This strategy is a key recommendation across ADU literature for increasing ADU construction. Pre-approved plans save time and money in design services required to produce the drawings. These plans must still be placed on-site plan for submittal for approval but the pre-approved floor plans allow certainty, speed, and reduction of fees. The study of Portland, Seattle, and Vancouver found that 16 percent of fees were for architecture, engineering, and permits (Chapple et al., 2017b). These costs could be reduced through pre-approved plans and fee waivers. Construction costs could potentially reduce with standardized plans that include commonly available material dimensions or prefabricated components.

Even standardized plans that are not preapproved provide the opportunity for homeowners to gauge where an ADU might fit on their lot and to solicit construction bids. Floor plans usually need to be put on a site plan but a floor plan provided to a homeowner can quickly be scaled, with any additional required drawing conventions, such as dimensions, added and put on a site plan for submittal for a permit.

5.3.2. City Planning Information and Services

In addition to pre-approved floor plans, other streamlining efforts including improving guidance or information measures to make a significant difference in ADU delivery. City planners can make gains in ADU delivery through some service delivery changes including, free ADU plan reviews, increasing awareness through websites, workshops, or promotional events, and providing one-stop-shop services such as in San Mateo County (Chapple et al., 2020a).

The City of San Diego has a dedicated ADU project manager as a store of expertise. A dedicated city planner can easily answer ADU questions, provide education, assist with financing and connect builders with homeowners. Other useful archives of ADU information include city websites and city-approved manuals (Chapple et al. 2017b). The City of San Diego has a dedicated webpage with resources and has held webinars and information sessions for the ADU planning and construction process. Information events online or through in-person ADU fairs or expositions and other outreach efforts can spur interest in ADUs (Chapple et al., 2020b). The City of Berkeley has an ADU advisory task force and adapts its ordinance over time (Chapple et al., 2020a). The Berkeley task force is composed of architects, developers, real estate, and mortgage specialists (Chapple et al., 2020a).

Los Angeles City provides an informational website for the LA ADU Accelerator Program. The program pairs older adults with ADU dwellings. The City of Los Angeles provides and screens the tenants providing much of the landlord labor. These programs are new so it will take some time to see how effective they are.

Leniency in zoning and planning requirements have also been effective in spurring ADU development. A key component of the success of ADU growth includes the sidestepping of the California Environmental Quality Act (CEQA) as ADUs are infill development with little substantial new environmental impacts. The City of Sebastopol has removed the owner-occupancy requirement for the primary dwelling unit to have an ADU (Chapple et al., 2020b). From the ADU Scorecard study, homeowners and advocates would prefer an expedited planning process and increased height limits for ADUs, financing or loan solutions, removing permitting challenges, lower fees for ADUs, and the inclusion of prefabricated or mobile homes options (Chapple et al., 2020b).

Even without major funding or large changes, city planning processes can more effectively promote and produce ADUs through information and outreach sessions, through consolidating their knowledge with dedicated planners for ADUs and through online resources, and by making sure the permit process is reliable and fast. Another strategy identified is also reinforcing that the

planning approval processes run as smoothly and efficiently as possible returning permit decisions quickly (Chapple et al., 2020b). Small projects have short-term schedules and need quick permitting and dependable and quick planning permitting and approval process is even more critical.

5.3.3. Urban Design and Site Considerations

ADUs have been described as part of a "missing middle" effort in housing provision identifying the lack of duplexes, fourplexes, bungalow courts, and other low-rise high-density housing types in production. These types are being left out of the housing market that currently prioritizes large single-family homes or high-rise apartment buildings (Chapple et al., 2020a; Parolek, 2020). These middle housing models are common across Los Angeles County and to a certain extent emblematic of Los Angeles, yet their production has been low since the 1940s (Chapple et al., 2020a; Parolek, 2020). ADUs and similar housing types provide affordability through their compact size, accommodate a substantial density for pedestrian-scaled environments, and still provide green space, light, and air. Building density with ADUs is also supportive of public transport environments. ADUs themselves are adaptable to a variety of contexts, above a garage, a garage conversion, a subdivision of the main dwelling unit, basement or attic, and the newly built detached cottage model.

It has been suggested that ADUs are most feasible in flat land areas and less so in hillside areas and even less in coastal areas (Chapple et al., 2017a). High-density urban conditions are not a good fit for the ADU model, but the large suburban areas of Los Angeles are a good match for the housing type especially on lots in areas supported by transit. In Sebastopol, ADUs have been exempted from the lot coverage requirements and allow up to a height of 25 feet and two stories (Chapple et al., 2017a).

The cities of Vancouver and Clovis have an urban design approach to ADUs organizing them along alleyways and creating a pedestrian shared space environment (Chapple et al., 2017b). Alleys can be landscaped with decks and balconies overlooking the alley for a more communal pedestrian environment (Chapple et al., 2017b). Overall, ADUs are a flexible prototype for a variety of conditions and can still provide privacy, open space, and full interior living conditions.

6. Analysis of Local ADU Ordinances

To understand the context of Southern California ADU's a collection and analysis of local ADU ordinances across the metropolitan planning organization (MPO), the Southern California Association of Governments was performed. The following text details the methods and conclusions. The purpose of this collection and analysis was to understand the current case of ADUs in the SCAG region and also varying local governments' strategies that promote or discourage ADU delivery.

6.1. Collection of ADU Ordinances

A search to collect ADU ordinances from SCAG member cities was conducted by searching the member city website for the terms "ADU," "adu," "Accessory," "Dwelling," or a combination of these terms. If an ADU ordinance or handout was found it was checked to determine if it was post-2020 and post California Assembly Bill 2299 and Senate Bill 1069. The state's new requirements must be adhered to in the future and incompliant ordinances are no longer useful or accurate. The research team verified that the ordinance either had a date or referenced the new state guidance in the text to determine the ordinance is current or incompliant.

Of the 197 current SCAG jurisdictions, there were four possible categorical outcomes of this ordinance search[1]. Ordinance search results were entered as either, first-pass no or insufficient data found, outdated guidance documents or no updates, simply refer or redirects to the state, and post-2020 city document acquired where the city developed their own ADU ordinance. The most important and successful of these categories is the post-2020 city document acquired the city developed their own ADU ordinance column. The research team used these updated documents for our ADU document analysis and to develop scenarios described later in this report. These 98 members that updated ordinances were recovered and archived for later analysis.

The other categories of the spreadsheet include first-pass no or insufficient data which is defined as several attempts through the city webpage or other ordinance archive with no results at all. The outdated guidance documents or no updates included search results that returned no updated ordinances but did show an outdated ordinance hosted by the local governments' website. These outdated ADU ordinances listed were commonly dated 2017. In some cases, the local governments' website provided no ADU ordinance of their own but simply offered a text description of the state requirements or a hyperlink that redirected to state guidance. There were two other minor columns in the spreadsheet including a more restrictive than the state column to flag any ordinances that were updated but appeared to have additional requirements than the state or added some related requirements in the ordinance that might make it more difficult to build an ADU. Finally, there is a notes column for unanticipated data that might be relevant such as an upcoming update.

The retrieved ordinances were archived into file folders according to their spreadsheet designation. Additional supporting documents or guidelines were added within those relevant categories in individual city folders.

6.2. Analysis of Collected ADU Ordinances

The collected ADU ordinances were reviewed and compared to state ADU regulations in an Excel spreadsheet. In summary, column categories were based on the state regulation composure including zoning restrictions for ADUs, minimum lot size requirements for ADUs, setback

---

[1] The archival data of this collection is separately organized in a spreadsheet, which is delivered with this report.

requirements, number of ADUs allowed for single-family homes and multi-family lots, the maximum unit sizes, height limitations, parking requirements, impact fees, and a description of the approval process. The relevant text from the individual city ordinance was paraphrased into the spreadsheet cell. The research team entered 35 percent of member ADU ordinances into the spreadsheet, with minor help from SCAG staff. The results from the ordinances reviewed were entered into each column for analysis and were organized in sheets by county. The ordinances of 27 members were input from Los Angeles County, 12 from Orange County, 11 from San Bernardino County, 2 from Imperial County, 11 from Riverside County, and 5 from Ventura County. This represents at least 25 percent of SCAG members by each SCAG county and 35 percent of the SCAG ADU ordinances overall (Figure 1).
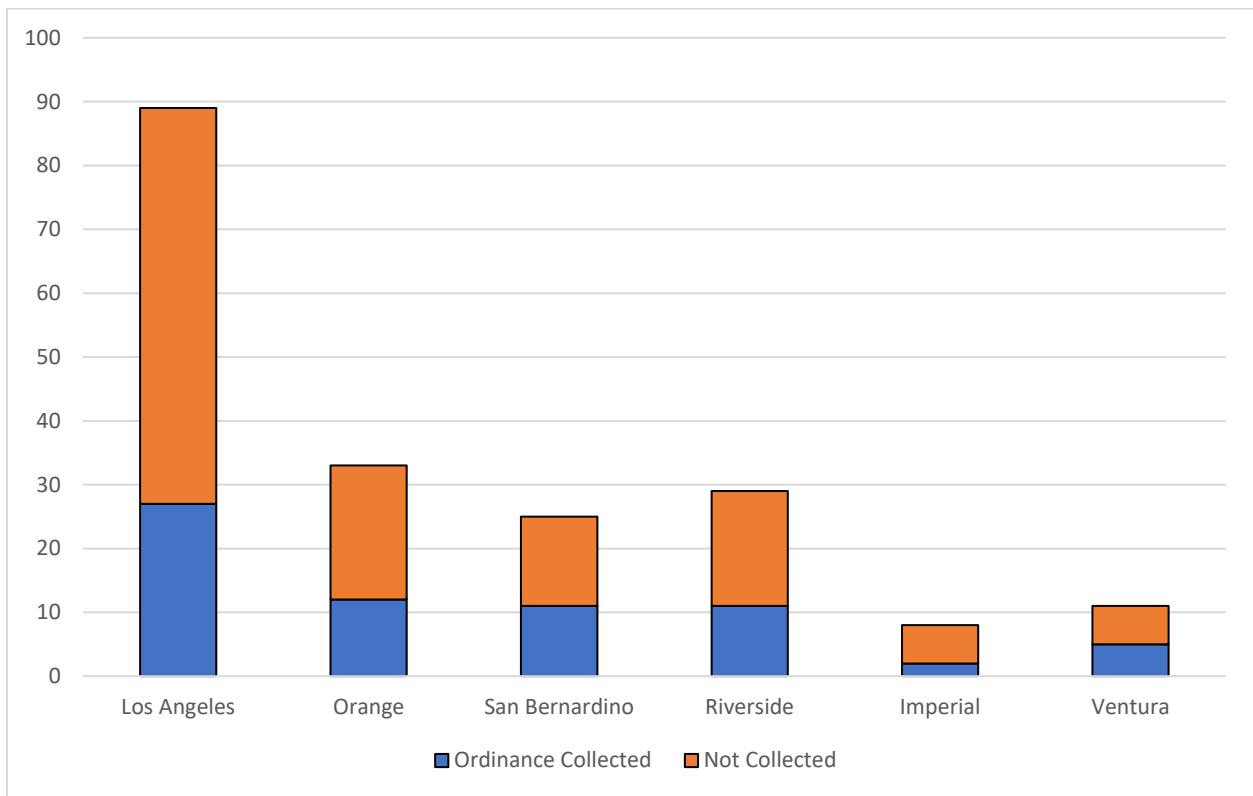
Figure 1. The Number of Jurisdictions Whose Ordinance Analyzed by County

The final composition of the spreadsheet after all the variables were input contains 68 municipal entries in addition to the state regulation entry by 14 columns for qualitative analysis. These entries were analyzed to find any exceptions to the state regulation, with the primary intention of determining results that were more lenient than the state regulation to inform a more expansive ADU ordinance strategy.

6.2.1. Identified Ordinance Expansion Opportunities

An analysis of zoning statements in the ordinances found that the City of Los Angeles allows ADUs in certain hillside and fire zones as long as the parcel is on a 20' wide road, presumably

for fire truck access, and the ADUs must have sprinklers. Many other jurisdictions prevent ADUs in hillside or fire zones however, much of Southern California dwellings are within hillside and fire zones. The City of Los Angeles, denser than most, provides a reasonable opportunity for ADUs in hillside and fire zones.

Other distinctive results from the review of zoning statements of the ADU ordinances in Pasadena and Beverly Hills are their mature tree preservation requirements. A mature tree in a space that an ADU would otherwise be able to be sited in is an added complexity. However, these mature tree preservation policies can be worked around because a mature tree can be moved or replaced by another similar mature tree. This would be an additional cost but would not preclude an ADU per se.

Current state regulation allows ADUs in single-family residential, multifamily residential, or mixed-use zones. However, many cities do not state that ADUs are allowed in mixed-use zones. This lack might prevent local homeowners from understanding that they can build an ADU in a mixed-use zone. The City of Santa Ana specifically states ADUs are allowed in mixed-use zones.

Allowing ADUs in commercial zones might be appropriate in some conditions on small commercial lots, or commercial lots adjacent to residential uses. Further analysis is needed to understand if an expansion of the ADU ordinances across certain commercial zones would be reasonable. Residential units are often currently allowed in commercial zones but they usually take the form of apartments above retail in central Los Angeles. A lower-density commercial zone may allow for a rear lot ADU in a habitable manner next to a residential zone. Other zoning specifics of note include Camarillo allowing ADUs in agricultural and rural zones and Hesperia allowing ADUs in agricultural zones.

Regarding lot coverage, all jurisdictions must allow 800 square feet for an ADU but nearly all the analyzed ordinances adhered closely to this state allowance. This required allowance could be enlarged and possibly encourage more ADU construction.

The research team found no listed setbacks less than the state requirement of four feet rear and side. There were more excessive setbacks between dwellings on the same lot, resulting in an ADU closer to a neighbor than the residents of the primary dwelling unit on its same lot. An ADU may only be approximately eight feet from the next house but 15' from the primary dwelling unit on its lot in Upland or 6' between the primary dwelling and ADU in Costa Mesa. Ten feet is required between units on the same lot in Bell Gardens and Agoura Hills. These should be determined by a scientific standard fire and life safety assessment similar to setbacks between lots. Furthermore, ADUs may be in the setback if there is no other space for 800 square feet of ADU. Garage conversions are allowed to exist in their old configuration meaning that a garage conversion could be right up to the property line according to the historic setback rule. Noting these exceptions, it is worth exploring reduced setbacks between the ADU and the primary dwelling unit or between the ADU and the lot line.

Some ADU ordinances stipulate ADUs may only be in the rear however those that don't specifically state so, may allow the possibility of a front unit, negotiating or reducing any front setbacks. The City of Burbank allows ADUs in the front as long as they follow the existing front setback.

Largely, the collected ADU ordinances state that 1 unit is allowed on a single-family lot. However, some cities fail to mention a maximum which may allow for flexibility. The City of Bell Gardens states that an ADU may have its own JADU for two additional units apart from the main dwelling unit. There is an 850 square feet maximum for this ADU and JADU combination.

The state allows ADUs in multi-family zones up to 25 percent of existing multi-family structures or two units. While not the focus of this research, the research team found that most cities stated a specific two-unit maximum. Some cities include different languages. Temple City uses the language 25 percent of existing density, West Covina uses the term units, and Culver City states no more than 25 percent of originally permitted units with a maximum of two detached units. Culver City specific stipulations are the most conservative language not allowing for any loop holes for more ADU units. Camarillo and Hesperia state up to 35 percent of multi-family which could be a new scenario for greater ADU proliferation. However, they also state a maximum of two units.

Requirements for minimum size ADUs vary. Yorba Linda, Pasadena, Claremont, Bell Gardens, and others state a minimum ADU size of 150 square feet while Calabasas, Hawthorne, and Sierra Madre state a minimum of 220 square feet. South Gate states a 240 square foot minimum. The state requires the city to automatically allow up to 800 square feet but a property owner may elect to build a smaller unit, depending on the minimum unit size requirements. Victorville takes a different approach by basing the minimum area requirements to include bedrooms, with studio units at a minimum 500 square feet, and 1 bedroom ADUs with a 600 square foot minimum, and 2 bedroom ADUs with an 800 square feet minimum size.

In terms of maximum unit ADU sizes allowed, very few cities allow up to the state's 1,200 square feet maximum area. Los Angeles and Sierra Madre allow for a 1,200 square foot maximum. Across all the ordinances analyzed, the maximum ADU area is usually 1,000 square feet. Pasadena allows 1,200 square feet units or 50 percent of the main dwelling for lots greater than 10,000 square feet If the main unit is 2,400 square feet or more there may be an opportunity for a greater ADU. Pasadena also allows up to 75 percent of the main dwelling unit square footage if the lot is in a certainly affordable housing agreement. In Whittier, if on a 20,000 square foot lot or larger the ADU may be 1,500 square feet.

Adjusting for greater height maximums may affect the ground floor footprint if it allows the ground level to be smaller with more living space on the second story. Indio allows for taller than 16' ADUs up to 18 feet or if above an existing garage ADUs may be 25 feet high. Grand Terrace allows for 20 feet high ADUs and Ojai allows 24 feet high ADUs if 2 stories. The state 16 feet height requirement makes 2 story living spaces very compact except for some sleeping loft

conditions. Jurisdictions are allowed to supersede 16 feet but they predominantly stick very tightly to the state standards.

If an ADU is the product of a garage or accessory structure conversion, an additional 150 square feet may be added for access and egress, meanwhile, this conversion can take advantage of preexisting setbacks that may be less than four feet.

The state provides for many parking exemptions for ADUs including no parking space required for an ADU within ½ mile of transit. Dana Point removed any parking requirement from their ADU ordinance because most of their residential built environment was within ½ mile of a transit stop. There are other exemptions for an ADU within a block of a car-sharing vehicle, where street permits are not offered to the ADU occupant, and when replacing a garage or covered parking spaces, those spaces do not need to be replaced. Other cities were also lenient with the parking they did require, including allowing parking in the setbacks and tandem parking.

ADUs can match the character of the neighborhood and several local ordinances require them this. ADUs as a small unit and as an infill strategy don't make for many design conflicts. Most ADUs are sited behind the primary dwelling unit and local ordinances may require that. Ordinances have restrictive height limits but even a two-story ADU may still be humbler than the main unit or the street trees. Some local ordinances require stairs to be interior to the ADU however, stairs, a porch, or a balcony can make for more interesting entry experiences and street walls. Some ordinances reviewed for this research required ADUs not to have an entry on the street presumably to keep the existing character of the street, but a new entryway could provide privacy between the main unit and the ADU.

6.2.2. Summary

From the previous analysis of a random sample of 68 SCAG member ADU ordinances, the primary scenarios for a more expansive ADU policy may include, removing or reducing rear or side yard setbacks. Setbacks are already waived for existing structure conversions and if there are no other space for 800 square feet for an ADU. Setbacks could also be reduced between the ADU and the primary dwelling unit. Parking requirements are already lenient and flexible across ADU ordinances. Further removal of parking requirements for ADUs would be reasonable.

It is also possible to consider other zones besides residential and mixed-use zones including, some commercial zone conditions, and agricultural or rural zones that currently have single-family homes. Los Angeles allows ADUs in hillside or fire hazard zones as long as there are mitigating solutions, including sprinklers and a location on a 20-foot-wide street for fire truck access. A substantial portion of Southern California is in these zones and it may be possible to significantly expand ADUs into these areas as long as there are some precautions.

Other avenues of expansion include increasing the number of allowable units on a lot above one ADU or above two units for multi-family lots. Increasing the area that cities are required to allow

for ADUs from 800 square feet to 1,000 square feet or more may also incentivize builders because they could recover more rents and more people could be housed.

7. Prototypes of ADU Configurations

Several cities now provide pre-approved floorplans for ADUs. Providing existing floor plans save fees on architecture and engineering design services with the confidence that ADU will be approved for a building permit and speeds up the total process of ADU construction. Even if cities do not have pre-approved plans for permitting, floor plan designs can still be used to shop for construction estimates and save time on design. Floor plans provided can also be put into a site plan of the homeowner's property to judge where an ADU might fit and how feasible it would be to build an ADU on their property and then submitted for a permit.

With those benefits in mind, the research team created 19 sample floor plans for ADUs after a review of built cases from life. After researching best practices and case studies from the constructed ADUs, the research team focused the floor plans predominantly around 800 square feet average. The research team found that the cases of built ADUs are more diverse than the ordinances would suggest. Links to the best cases are in Appendix A.

Unless there is an exception, an ADU must have a kitchen, full bath, and usually an interior stair for a permit. However, after a review of existing cases, the research team included a small number of exception designs without a kitchen, with a .75 bath, and with exterior stairs. Many studio units in existence do not have a kitchen or a full kitchen, small unit dwellers may not value a full bathtub, and exterior stairs can add interest to the façade, save valuable interior space in small units and provide small outdoor spaces below the stairs and at landings. Two side-by-side unit plans are included to show two-unit new ADU construction. Some cities like Burbank allow for an ADU to have its own JADU. Planning, construction costs, and effort for two units at the same time are reduced.

One aspect that the research team designed for was the 16 feet height limit. Across the plans second-story or loft levels are placed above spaces that can be shorter including car parking garages, leaving some excess for a habitable space above.

Overall, these floor plans and designs provide a range from plans nearly ready to be placed on a homeowner's site plan for permit submittal to new ideas and configurations for small unit living. The 19 plans can be found in Appendix B.

8. Identification of ADU Eligible Parcels According to the State ADU Law

In Government Code Section 65852.150, the California Legislature declared that ADUs are allowed in single-family, multifamily, and mixed-use zones. The latest changes to the State ADU laws are effective January 1, 2021. The purpose of these changes is to reduce barriers, better streamline approval processes, and expand capacity to accommodate the development of ADUs. The regulation requires local governments to not set up their ADU ordinances that are more

restrictive than the State law. Therefore, it is logical to identify potential ADU eligible parcels according to the State law and use them as a baseline for further ADU analysis.

The research team identified potential ADU eligible parcels in accordance with the HCD's ADU handbook (HCD, 2020). As emphasized in the Introduction chapter, this analysis attempts to identify ADU-eligible parcels (rather than measuring the number of buildable ADUs) strictly based on physical conditions of the parcels. The team examined the physical conditions of the parcels by analyzing the parcel data using geographic information systems (GIS). Therefore, the first step of this analysis was to interpret the State ADU law, especially the parts of the law regulating physical conditions of parcels for ADU development. Then, the research team carefully translated the law into the terminologies and conditions being operationalized for spatial analysis in GIS. After making this translation, the team conducted the spatial analysis based on the collected GIS data.

8.1. The Identification Methodology of Eligible ADU Parcels

The primary dataset for the spatial analysis is the parcel data collected from SCAG. Using this dataset, the goal of the analysis was to compute each parcel's available area for ADU development according to the state law. It is noteworthy that this analysis is a macro analysis done for multiple counties. The analysis can't reflect the detailed features of every individual parcel that slightly varies by county. Every parcel has its common characteristics indirectly or directly related to ADU development as well as unique characteristics that vary by local government. Although the given dataset is enough to describe the zoning, physical features of parcels, it cannot articulate every aspect of parcels associated with ADU development. Thus, it was inevitable to generalize the state law in a way that fits with a regional scale.

8.1.1. Parcel Screening by Externality Impacts of ADU Development

The state law defines the eligibility of ADUs by some conditions associated with public health, safety, and adequate urban services. The law defers local governments to define some areas where ADUs cannot be built within their own jurisdiction. The possible considerations include 1) within fire hazard areas; 2) within the areas with no adequate water and sewer services; or, 3) within the areas with high impacts on traffic flow. However, identification of these area is not defined and local governments may make up their own criteria to operate such considerations. Therefore, the first step of this analysis is to operate each with existing GIS datasets and exclude parcels in the areas. The research team identified the conditions by employing the methods described below and presented the areas that meet each condition (Figure 2).
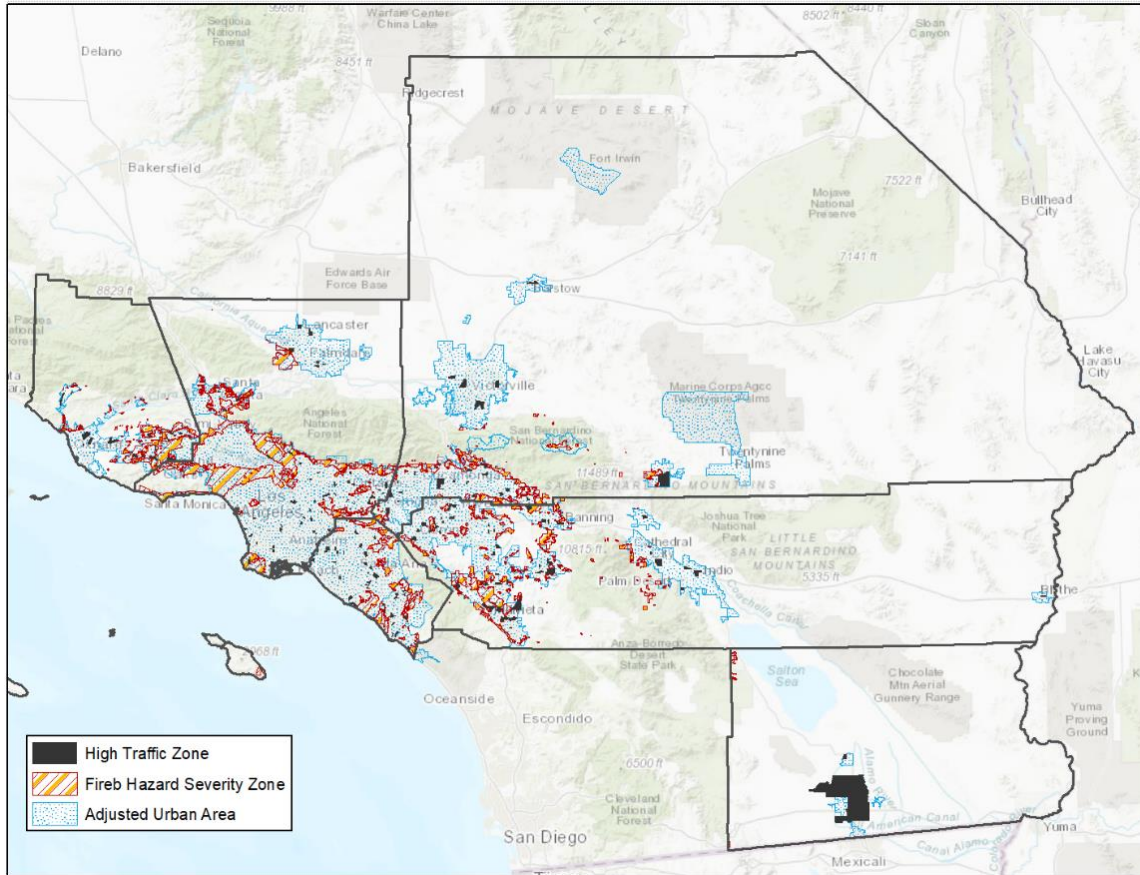
Figure 2. The Areas Ineligible for ADU Development

Fire hazard areas: The research team collected the fire hazard severity zone data from the California Department of Forestry and Fire Protection (Cal FIRE) on the SCAG Open Data Portal (https://gis.data.ca.gov/datasets/31219c833eb54598ba83d09fa0adb346). The parcels within the zone with all levels (moderate, high, and very high severity) were excluded. A Fire Hazard Severity Zone (FHSZ) is a mapped area that designates zones (based on factors such as fuel, slope, and fire weather) with varying degrees of fire hazard (i.e., moderate, high, and very high). FHSZ maps evaluate wildfire hazards, which are physical conditions that create a likelihood that an area will burn over a 30- to 50-year period. These zones do not account for modifications such as fuel reduction efforts.

While FHSZs do not predict when or where a wildfire will occur, they do identify areas where wildfire hazards could be more severe and, therefore, are of greater concern. FHSZs are meant to help limit wildfire damage to structures through planning, prevention, and mitigation activities/requirements that reduce risk. The FHSZs serve several purposes: they are used to designate areas where California's wildland-urban interface building codes apply to new buildings; they can be a factor in real estate disclosure, and local governments consider fire hazard severity in the safety elements of their general plans.

This service includes proposed Fire Hazard Severity Zones for State Responsibility Area lands and separate draft Very High Fire Hazard Severity Zones for Local Responsibility Area lands. Moderate, high, and very high FHSZs are found in areas where the State has financial responsibility for fire protection and prevention (SRA). Only very high FHSZs are found in Local Responsibility Areas (LRAs).

The areas with no adequate water and sewer services: The research team collected the adjusted urban area boundary data from the California Department of Transportation (Caltrans) (https://gisdata-caltrans.opendata.arcgis.com/datasets/ 51e54198fb68443cb0d73390ec46f364_0). These 2010 adjusted urban area boundaries were derived from the 2010 Census urban area boundaries, the preceding 2000 Caltrans urban area boundaries, and approved district and headquarters urban area adjustments. The three urban area boundaries were merged and smoothed to create the 170 adjusted urban area boundaries for California. The adjusted urban boundaries have been approved by the Federal Highway Administration (FHWA). The parcels located outside of the boundary were excluded.

The areas with high impacts on traffic flow: The research team collected an aggregate number of vehicles available by tenure (table B25046) from the U.S. Census's American Community Survey (2014-2018, 5 year-estimate). Using the data, the team computed the number of vehicles per acre by census tract. By aggregating the number by city, the team acquired the mean and standard deviation of the number by city. The census tracts whose number of vehicles are higher than one standard deviation from the mean of the city that the census tracts belong to were identified as the areas with high impacts on traffic flow. With this method, 540 census tracts were identified as the areas with high impacts on traffic flow. From these census tracts, the team excluded the census tracts within SCAG's high-quality transit area (HQTA) as ADUs that will be built within HQTA would not necessarily add more traffic on the road if the tenants used transit. Within the SCAG region, 233 census tracts remained as the final areas with high impacts on traffic flow. The parcels located within these census tracts were excluded.

The research team would acknowledge that the above-mentioned steps were the research team's interpretation of the state ADU law and operation within GIS using available datasets. If localities have their own GIS datasets for these categories (fire hazards, adequate infrastructure, and traffic impact), they should be able to upload their dataset and do the same screening using the tool that the research team developed and described in the last chapter of the report.

8.1.2. The Calculation of Each Parcel's Buildable Area

In the next step, the research team computed each parcel's area that can accommodate (a) ADU(s) as a "buildable area". This research defines a parcel as an ADU eligible parcel when the buildable area of the parcel is equal to or greater than 800 square feet assuming that the minimum size of an ADU in this analysis is 800 square feet. Based on the state's height limit of ADUs, which is 16 feet, it was assumed that ADUs will be one-story buildings.

The equations that apply to the calculation of buildable area vary depending on each parcel's land-use code and eligibility for the exemption of parking and/or setback requirements. Broadly, the calculation differs between single-family and multifamily residential codes. For this reason, the team separated single-family residential parcels from multifamily residential parcels and conducted buildable area calculations separately.

Single Family Residential Parcels: For the single-family residential parcels that are not qualified for both parking and setback exemptions, the equation that computes buildable area takes the following form:

Buildable Area = $AREA_p$ - ($AREA_b$ + 600 + ($PERIM_p \times 0.75 \times 4$) + 200)

Where $AREA_p$ = the area of a parcel (unit: sqft)

$AREA_b$ = the area of building footprints in a parcel (unit: sqft)
600^2 = the area of a driveway on average (unit: sqft)
$PERIM_p$ = the perimeter of a parcel (unit: sqft)
200 = the area of a parking stall (unit: sqft)

According to the equation, the buildable area of a parcel is equivalent to the remaining area of the parcel after subtracting the areas taken by existing buildings, driveway, setback requirement, and parking requirement from the total area of the parcel. Since the ADU Handbook requires four-foot side and rear setbacks, ($PERIM_p \times 0.75 \times 4$) represents the calculation of the setback requirement. In the same vein, 200 in the equation represents the area that fulfills the parking requirement, assuming an additional parking stall would require 200 square feet of land within the parcel.

According to the state's regulations, converting non-dwelling buildings (e.g. carports, barns, etc.) to an ADU is the most common type of ADU development. In this case, the setback requirement can be exempted. Therefore, the research team identified the parcels that have two or more buildings and computed their buildable area using the equation below.

Buildable Area = $AREA_p$ - ($AREA_b$ + 600 + 200)

---

[2] On average, the area of driveways in single family residential lots is 600 square feet. The research team acquired the available by measuring the driveway of 30 single family residential lots. The lots representing various shape and size of single-family residential parcels were selected and measured.
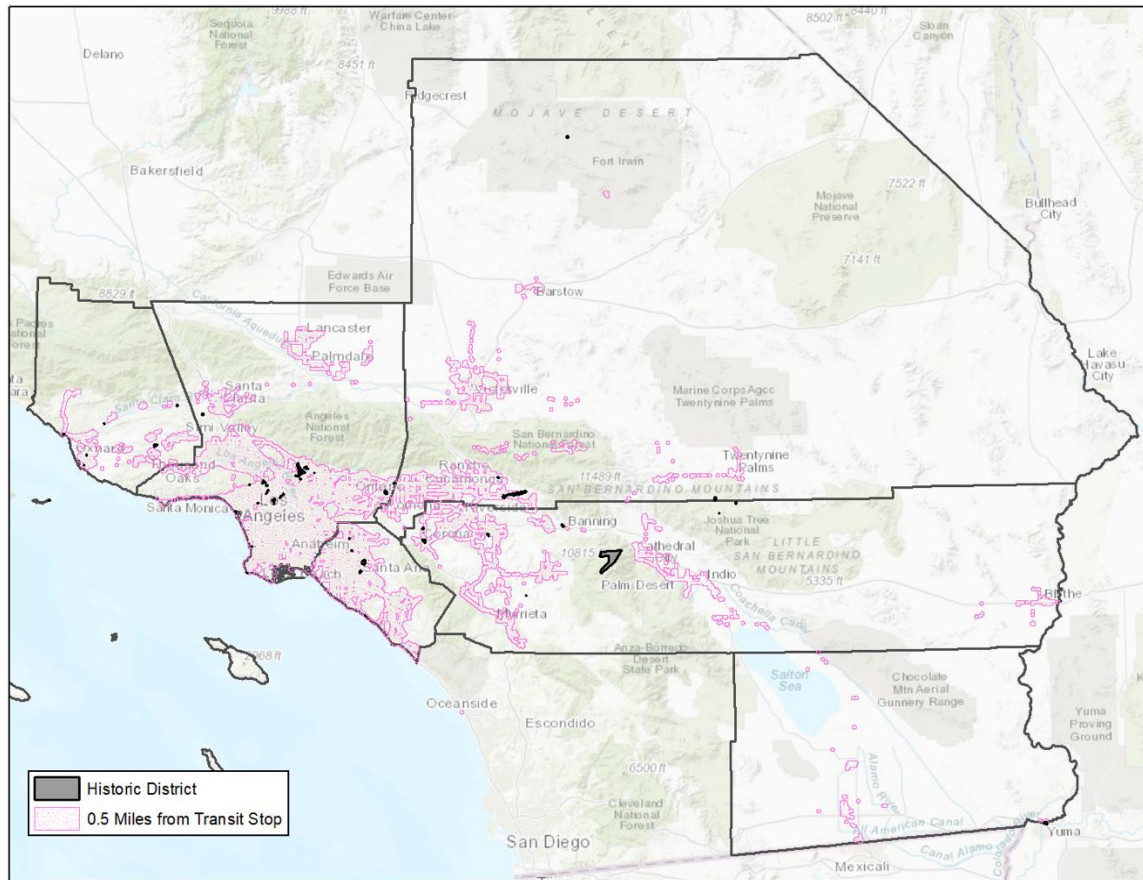
Figure 3. The Areas with Parking Requirement Exemption

The state's regulations also define various conditions that waive parking requirements. They include parcels located within one-half miles from a transit stop, located within historic districts, located within one block from a car share vehicle, or located in a permit parking area where on-street parking permits are required, but not offered to the occupant(s) of the ADU. Due to the unavailability of data, the research team was able to only reflect the first two conditions to this analysis. After collecting the transit station data, the team created a half-mile buffer from the transit stations.

Additionally, the team collected the national register of historic districts data from National Park Services (NPS) (Figure 3) (https://irma.nps.gov/DataStore/Reference/Profile/ 2210280). Selecting the parcels within the buffer or the historic districts, the research team applied the equation below to the buildable area calculation of the parcels. The National Register geospatial dataset is intended to be a comprehensive inventory of all cultural resources that are listed on the National Register of Historic Places. However, this dataset excludes all features deemed restricted or sensitive, including sensitive archaeological sites. This dataset provides feature geometry representations (point or polygon) and is intended to be supplemented with descriptive

attributes maintained by other external database systems such as the National Register Information System which is included in this geodatabase.

$$\text{Buildable Area} = AREA_p - (AREA_b + 600 + (PERIM_p \times 0.75 \times 4))$$

The buildable area of the parcels that are exempted from both parking and setback requirements was computed by the following equation.

$$\text{Buildable Area} = AREA_p - (AREA_b + 600)$$

Multifamily Residential Parcels: Since the exemption of setback requirements is only applicable to single-family residential parcels, the buildable area of multifamily residential parcels was computable for two types, parcels with or without parking exemption, employing the following equations.

Parcels with parking exemption:

$$\text{Buildable Area} = AREA_p - (AREA_b + (PERIM_p \times 0.75 \times 4))$$

Parcels without parking exemption:

$$\text{Buildable Area} = AREA_p - (AREA_b + 400 + (PERIM_p \times 0.75 \times 4))$$

These equations were constructed based on the assumptions that the construction of ADUs in multifamily residential parcels will be two units in minimum that two parking stalls are needed (200 X 2 = 400 sqft) and that the minimum total building area of the ADUs will be 800 square feet in two stories.

Applying the equations above, the buildable area of each parcel was computed. Comparing the buildable area to the minimum size threshold of an ADU, 800 square feet, the research team identified potential eligible parcels for ADUs. Results with a buildable area on a parcel equal to or larger than 800 square feet, these parcels were marked as a potential ADU.

8.2. ADU Eligible Parcels

Theoretically, it is possible to identify ADU-eligible parcels by applying the previous methodology to the calculation of buildable areas of residential and mixed-used parcels. However, some practical issues were detected. The first issue occurs when the residential and mixed-use parcels may have no building. ADUs require a primary dwelling unit, or a primary dwelling unit in construction but still to precede an accessory dwelling unit (ADU). Thus, it is sensible to exclude parcels with no primary building from potential ADU parcels. However, many parcels without buildings were observed in the areas that subdivision development is ongoing. This is the case that the parcels are subdivided into residential parcels, but buildings are not yet constructed or under construction. The parcels in this case will be more likely to be ADU

potential parcels in the near future (as soon as the primary building is constructed). The new state ADU law also allows new constructions with ADUs at the same time.

Another issue is associated with residential land use codes and the quality of the parcel data. The land-use codes that the research team primarily used were the 2019 land use codes defined by SCAG. However, it was observed that there are many parcels whose use code is inappropriate for ADU development although SCAG's land use defines them as residential land use. For example, multifamily residential land use codes by LU19 include parcels solely consisting of private roads or common areas within condominiums or apartment complexes (e.g. green spaces, amenities, recreational facilities, etc.). This makes it more difficult to identify eligible parcels for ADUs since they tend to be coded as residential parcels with no building. Thus, it was not easy to differentiate these parcels from ones in the areas where subdivision development is ongoing. Therefore, the research team developed three approaches that can help to overcome these issues and that can more accurately identify eligible parcels for ADUs.

Table 2. SCAG's Residential Land Use Codes

Category	Code	Land Use Description
Single Family Residential	1110	Single Family Residential
	1111	High-Density Single Family Residential (9 or more DUs/ac)
	1112	Medium Density Single Family Residential (3-8 DUs/ac)
	1113	Low-Density Single Family Residential (2 or less DUs/ac)
Multi-Family Residential	1120	Multi-Family Residential
	1121	Mixed Multi-Family Residential
	1122	Duplexes, Triplexes and 2- or 3-Unit Condominiums and Townhouses
	1123	Low-Rise Apartments, Condominiums, and Townhouses
	1124	Medium-Rise Apartments and Condominiums
	1125	High-Rise Apartments and Condominiums
Mobile Homes and Trailer Parks	1130	Mobile Homes and Trailer Parks
	1131	Trailer Parks and Mobile Home Courts, High-Density
	1132	Mobile Home Courts and Subdivisions, Low-Density
Mixed Residential	1140	Mixed Residential
	1100	Residential
Rural Residential	1150	Rural Residential
Mixed-Use	1600	Mixed Residential and Commercial
	1610	Residential-Oriented Residential/Commercial Mixed Use
	1620	Commercial-Oriented Residential/Commercial Mixed Use

Approach One

The first approach employed SCAG's 2019 land use codes excluding parcels with no buildings from potential ADU parcels (titled Approach 1). For this approach, the team selected parcels by the SCAG's residential and mixed-use codes (Table 2). The residential codes (the LU19 field in the parcel data) were retrieved based on the metadata (https://www.arcgis.com/ sharing/rest/content/items/888e4b1f8d0447b5af805a9d80559092/info/metadata/metadata.xml?fo rmat=default&output=html). The research team also compared each county's use codes to the SCAG's codes and filtered out the parcels that have no primary building. While this approach allows excluding inappropriate residential parcels (e.g. the private roadways, community pools, and common areas of condominiums or apartment complexes), it was not able to detect and add the residential parcels that buildings are not yet constructed or in construction.

Approach Two

The second approach screened out residential parcels solely according to County Accessor Land Use Codes (called Approach 2). This approach also excluded parcels with no buildings from potential ADU parcels. Since the county use codes are not general land use codes, but detailed descriptions of actual usages on parcels, it is possible to accurately distinguish residential parcels from non-residential parcels. The first step of this approach was to identify residential use descriptions out of each county's use descriptions only (the USE_DESC field in the parcel data). Subsequently, the research team created a list of each county's unique use descriptions. After careful review of the results, the team identified residential use descriptions. The team further classified the residential use descriptions into single- and multi-family residential descriptions. Using the identified residential use descriptions, the team refined eligible parcels for ADUs.

Approach Three

The last approach screened out residential parcels based on the combination of SCAG's land-use codes in 2019 and general plan codes (titled Approach 3). This approach is similar to Approach 1. After repeating the process of Approach 1, residential parcels without buildings or without buildings yet completed were identified by comparing the land-use codes in 2019 to SCAG's general plan codes. The land-use codes included in the analysis were not only residential land use and mixed-use codes, but also the non-residential land use codes that can be associated with future residential development. The non-residential land use codes include 1700, 1900, 3000, 3100, 3300, 7777, and 9999. By filtering out the non-residential land use codes with the SCAG's general plan codes for residential development, the team was able to identify the non-residential parcels that will have a residential development in the near future. By doing so, this approach also attempts to detect and count parcels with no buildings in the areas of subdivision development as potential ADU parcels.

Table 3. Comparison of ADU Eligible Parcels by the Approach

ADU Eligible Parcels		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Approach 1	Count	1,599,632	441,088	338,925	433,967	21,709	108,800	2,944,121
Approach 2	Count	1,350,199	446,895	339,346	429,565	22,179	111,626	2,699,810
Approach 3	Count	1,602,768	446,410	339,494	433,921	21,774	112,031	2,956,398
Difference b/w 1 and 2	Count	-249,433	5807	421	-4,402	470	2,826	-244,311
	%	-15.6%	1.3%	0.1%	-1.0%	2.2%	2.6%	-8.3%
Difference b/w 1 and 3	Count	3,136	5,322	569	-46	65	3,231	12,277
	%	0.2%	1.2%	0.2%	0.0%	0.3%	3.0%	0.4%
Difference b/w 2 and 3	Count	252,569	-485	148	4,356	-405	405	256,588
	%	18.7%	-0.1%	0.0%	1.0%	-1.8%	0.4%	9.5%

Overall, Approach 3 returned the largest number of ADU eligible parcels, which is 2,956,398 in total (Table 3). A table consisting of the comprehensive outputs of this identification process is located in Appendix C. This number is slightly higher than the output of Approach 1, while significantly higher than the one of Approach 2. Since the methods employed by Approach 1 and 3 are quite similar, the outputs of the approaches are close to each other. The only difference between Approaches 1 and 3 is whether categorizing the parcels that have currently no building but will have one in the near future as a potential ADU parcel or not. However, the outputs from Approach 2 are quite different from the outputs of the others since Approach 2 depends on the counties' property use descriptions rather than SCAG's land-use codes Therefore, this significant difference indicates the gap between the counties' use descriptions rather than SCAG's land use codes.

As expected, Los Angeles County, which has about 1.6 million eligible parcels, is the county that has the largest number of potential ADU parcels. Due to this reason, the variations of results by Los Angeles County across approaches are significant ranging from 18.7 to 15.6 percent. Tehe five other counties besides Los Angeles County show the minor variations of ADU eligible parcels across approaches, at 2.6 percent variation or below.

The three methods return three different outputs, but the difference among the outputs are not substantial taking into consideration of total of 5,117,625 parcels in the SCAG's jurisdiction. After many project reviews and discussions between the project management team and the research team, the research team decided to select the outputs of Approach 3 as the model of the potential number of ADU parcels in accordance with the state's ADU laws.

8.3. Additional Screening with Aerial Imagery: Case Study of Los Angeles County

The next step in the analysis used additional screening through aerial imagery. Since the previously developed method applied to all six counties in the SCAG region, the criteria used in each step were not county-specific and the assumptions used to determine ADU eligibility were

simplified for the sake of fast, consistent, and efficient data processing. With high-resolution land cover data available from Los Angeles Region Imagery Acquisition Consortium (LARIAC) program, this case study demonstrates that an additional dataset may be used for more detailed screening for parcel-specific constraints and that the initial gross estimate of potential ADU capacity obtained from the previous section could possibly be further refined.

The following steps were designed and applied to modify some of the assumptions previously mentioned to explore additional screening and scrutiny that this new data would produce a more accurate and realistic estimate of ADU eligible parcels in Los Angeles County.

- Further Screening based on Zoning and Current Land Use: In the previous method, the LU19 field (2019 existing land use) from the parcel data was used to identify single-family (SF) zones, and the research team initially considered all residential zoning codes except multi-family residential as SF. However, the research team found significant discrepancies between LU19-based SF and the current use from an aerial image. After manually checking a sample of each unique value of the USE_DESC field (Assessor's use code description), a smaller set of SF parcels that are verified as residential and single-family were identified. The total number of SF parcels reduced from 1,200,926 to 1,168,265.
- Identification of Primary Residence: The building footprint layer from LARIAC Five (2017) allowed a more accurate estimation of the primary residence footprint in a parcel. When an ADU is built, an additional existing structure (i.e. detached garage, outdoor storage building, or sheds, etc.) except the primary residence is often demolished or converted into a detached ADU. Therefore, subtracting the entire footprint including those of additional structures from the area of parcel likely produces an underestimated ADU buildable area. From LARIAC data, the largest building's footprint in each parcel (Figure 4a) was identified and replaced the total building square-foot (BF_SQFT) available from the parcel data.
- Setback created using Buffer in GIS: The research team created four-foot inner buffers and used them as the base buildable area with the setback requirement. The buffer tool in GIS was used and this inner buffer area replaced (AREA of parcel - PERIMp×0.75×4) in the original equation.
- Area covered by Tree Canopy and Paved Surfaces: LARIAC Five data provide a raster file that has land cover types in three-third feet by three-third feet grid cells. The research team assumed that tree canopy (large trees, not lawn) and other paved surfaces (driveways) would likely be preserved and that the remaining area within a parcel would be considered for ADU site (Figure 4b).
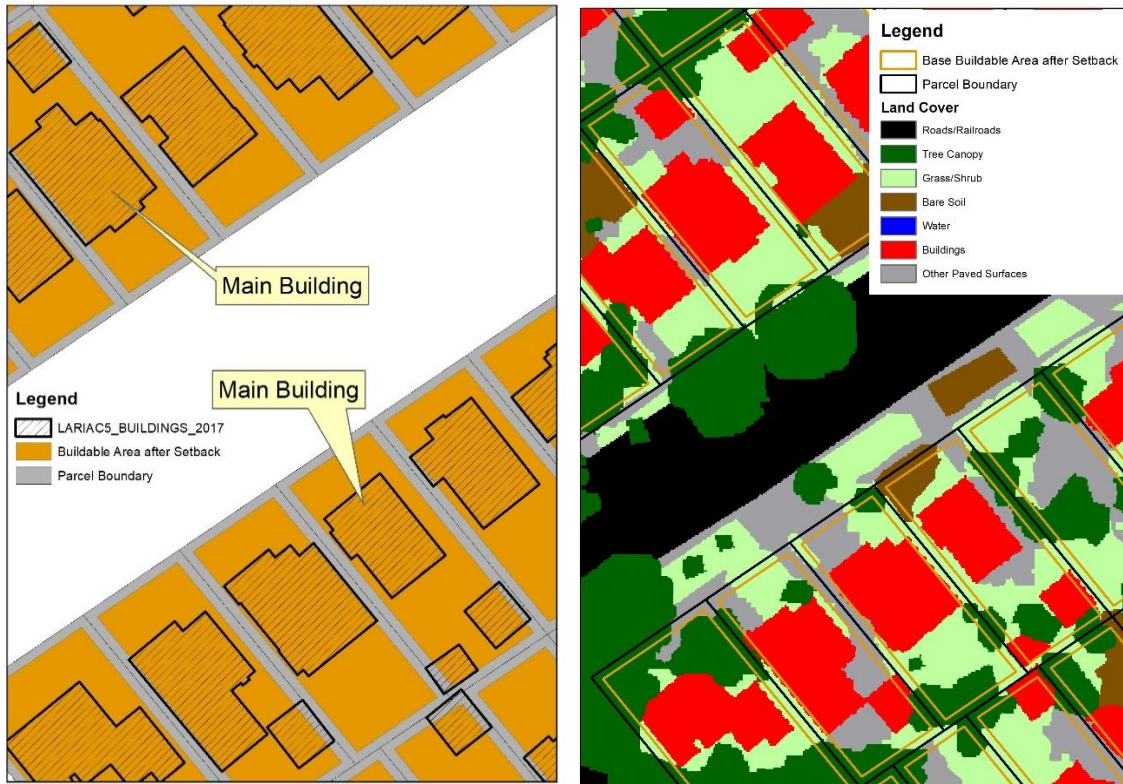
Figure 4. Overlay of the Parcel Data and LARIAC Data
(a) Primary Residence identified from building footprint, (b) Additional unbuildable land cover types (tree canopy in dark green, other paved surfaces in gray) identified from land cover data

Based on this groundwork, the team recalculated the Buildable Area and ADU potential

With the computations from the above, now the buildable area is:

$$Buildable\ Area$$
$$= AREA\ of\ Parcel\ (or\ Base\ Buildable\ Area\ after\ Setback)$$
$$- (Main\ Building\ Footprint$$
$$+ AREA\ of\ Tree\ Canopy\ and\ Other\ Paved\ Surfaces)$$

This additional screening based on available data from LARIAC Five produced a more conservative estimate of ADU eligible parcels in Los Angeles County compared to the previous method. In summary, there are 695,792 parcels in Los Angeles County that are eligible for ADU development with the abovementioned additional screening (Table 4). This result of this method shows a potential ADUs is 59.6 percent of single-family residential parcels within the eligible area of the county, excluding fire hazard areas, in high traffic impact areas, and the areas without adequate water and sewer services. This percentage is significantly lower than 96.4 percent obtained in the previous method. This demonstrates that local governments could consider additional screening like this with available local GIS layers and that there could be various approaches to estimating ADU potential.

Table 4. Comparison of the Outputs of the Regional Level and Los Angeles Analysis			
	# of SF Parcels	# of ADU Eligible Parcels	% of ADU Eligible Parcels
Regional Level Analysis	1,200,926	1,157,942	96.4%
Los Angeles Analysis	1,168,265	695,792	59.6%

8.4. Visualization Tool

The research team developed a customized tool that visualizes the potential ADU parcels. The tool is a customized tool in the platform of ArcGIS. The tool was built with the combination of Python script and ArcGIS ModelBuilder.

The tool provides a user-friendly graphical user interface (GUI) that requires the inputs of the county and city that a user wants to visualize the potential ADU parcels (Figure 5). A user will need to select the name of the county by selecting the database with the name of the county. Then, the user will need to type in the name of the city in the second box. By clicking the OK button, the tool will identify the potential ADU parcels in the city and county that the user selects. It will visualize all the parcels in the city and highlight only the ADU-eligible ones on the map.

Additionally, the tool reports the number of the highlighted parcels. The tool is associated with a Geodatabase that consists of six counties' parcel datasets. According to the method described above, the research team identified the potential ADU parcels and marked the parcels in the parcel datasets. Thus, the tool can read and pull out the potential ADU parcels from the database. The instructions of the visualization tool are available in Appendix D.
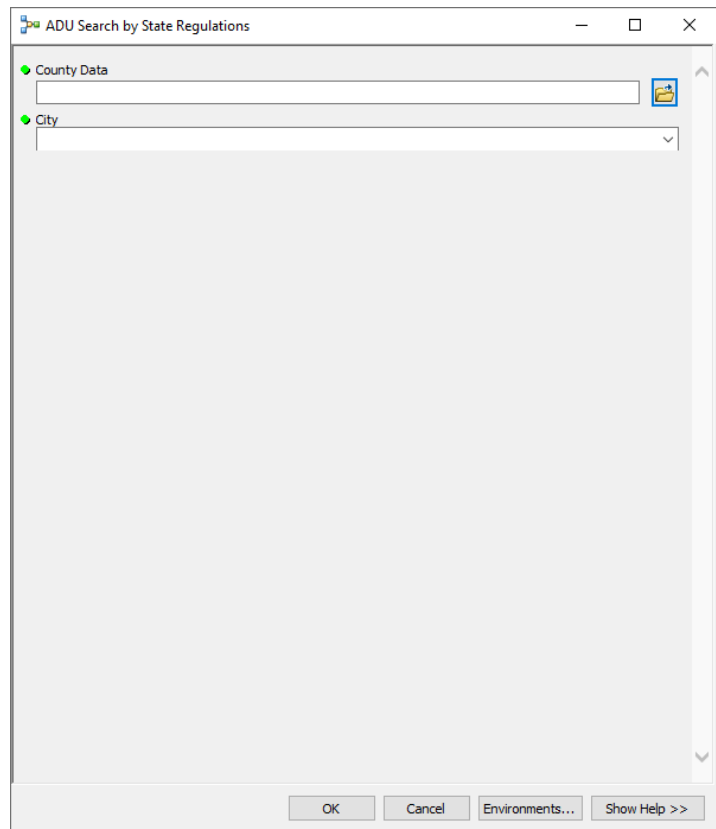
Figure 5. The Interface of the Visualization Tool

9. ADU Eligible Parcels According to Policy Scenarios

After measuring the ADU eligible parcels according to the state ADU law, the focus of the research switched to ADU scenario simulation based on local ADU ordinances. The purpose of the simulation is to support SCAG and local governments to explore policy scenarios related to ADU development and repopulate ADU eligible parcels under specific scenarios. The state ADU laws intend to promote ADU development, and there are a significant number of potential eligible ADUs in the SCAG region. At the same time, many local governments may feel that they have limited potential within all the existing parameters of the laws. The governments might be interested in promoting ADU development beyond the state law. Accordingly, the research teams developed and evaluated alternative policy scenarios offering more flexibility supporting more ADU development potential.

9.1. Scenario Development

Assuming that the local governments in the SCAG region update their local ADU ordinances complying with the state ADU law, the research team set the ADU eligible parcels according to the state ADU law as the base of the scenario simulation. In addition to the base, the team developed policy scenarios that would further promote ADU development, reflecting that local ADU policies could be more lenient than the state ADU law. The scenarios developed here would allow simulating the possible increase in the number of ADU eligible parcels by policy scenario type above the state ADU law base amount.

From literature review and a thorough review of local ADU ordinances, six possible policy scenarios were developed as a format of series of binary choices for each criterion. Thus, the scenarios can be simulated with the option of "yes" (applying the scenario) or "no" (not applying it). The scenarios include:

- Ease of ADU development within fire hazard areas,
- Ease of ADU development outside of the areas with the adequacy of water and sewer services,
- Reduction of the setback requirement,
- Accommodation of smaller ADU units,
- Allowance of two-story ADUs, and
- Removal of the parking requirement

The below is the description of the logic and methods that the team used for the development of the scenarios.

Alleviation of ADU development within fire hazard areas: The state ADU law delegates the definition of fire hazard areas to local governments. By the definition, local government can prevent ADU development in the hazard areas. However, some local governments allow ADU development in the hazard areas as far as parcels are adjacent to the major roads that a fire truck can access. Thus, the scenario, alleviation of ADU development within fire hazard areas, allow

taking consideration of the parcels within 100 feet from primary and secondary roads in the hazard areas as ADU developable parcels.

Alleviation of ADU development outside of the areas with the adequacy of water and sewer services: Like fire hazard areas, the state ADU law also allows local governments to define the areas with the adequacy of water and sewer services and thereby limit ADU development in an area. Thus, applying the idea of ADU development within fire hazard areas to the case of the areas without the adequacy of water and sewer services, this policy scenario counts the parcels within 100 feet from primary and secondary roads outside of the areas with the adequacy of water and sewer services as ADU developable parcels.

Reduction of the setback requirement: The state ADU law requires a 4 foot side and rear setback for an ADU construction. The areas designated to the setback can be a significant physical barrier for ADU development, especially for smaller parcels. The purpose of this scenario is to promote ADU development by reducing the setback requirement to two feet.

Accommodation of smaller ADU units: Although the state ADU law does not define the minimum size of an ADU, the research team set 800 square feet as the minimum ADU size for the identification of ADU eligible parcels in accordance with state ADU law that requires a 800 square foot space allowance for ADU development. This scenario is to reduce the minimum unit size to 600 square feet, which is somewhat larger than 500 square feet, the size of JADU.

Allowance of 2-story ADUs: According to the State ADU law, the height limit of ADUs is 16 feet high. Based on this regulation, the identification of ADU eligible parcels in accordance with the state ADU law was conducted assuming that ADUs developed are solely one-story buildings. However, it was found that some local governments allow the height of ADUs up to 20 feet. This height can allow the construction of two-story buildings. Thus, this policy scenario is to allow the construction of two-story ADUs.

Removal of the parking requirement: While the state ADU law requires adding one parking space per ADU, the regulations also define the conditions that local governments may exempt the parking requirement (see Chapter 5.1). Additionally, the regulations encourage local governments to ease the parking requirement by promoting street parking and tandem driveway parking. Reflecting this direction of the regulations, this policy scenario is to explore the impacts of the removal of parking requirements on ADU development.

9.2. ADU Eligible Parcels by Scenario

These six policy scenarios in a format of a binary selection create 64 different scenario combinations. By completing the development of the policy scenario options, the research team built a GIS database that supports the simulation of the scenario options by conducting a series of geo-spatial analysis. Utilizing the database, the team counted ADU-eligible parcels by the 64 combinations. While making the table consisting of the results of 64 combinations available in Appendix E, the team developed a summary figure that illustrates the impacts of each policy

scenario (Figure 6). To measure the unique impacts of each policy scenario, the team selected the scenario combinations that one policy scenario option is selected while all other options are not selected. Then, the team measured the percent changed by each scenario option to the ADU eligible parcels by the state ADU law. Regardless of the type of scenario options, San Bernardino County can significantly increase the ADU eligible parcels by adopting these scenario options. The impacts of the scenario options on the ADU eligible parcels in Los Angeles, Orange, and Ventura Counites are not extreme but are significant. The effect of alleviation of ADU development in fire hazard areas on Ventura County is striking.
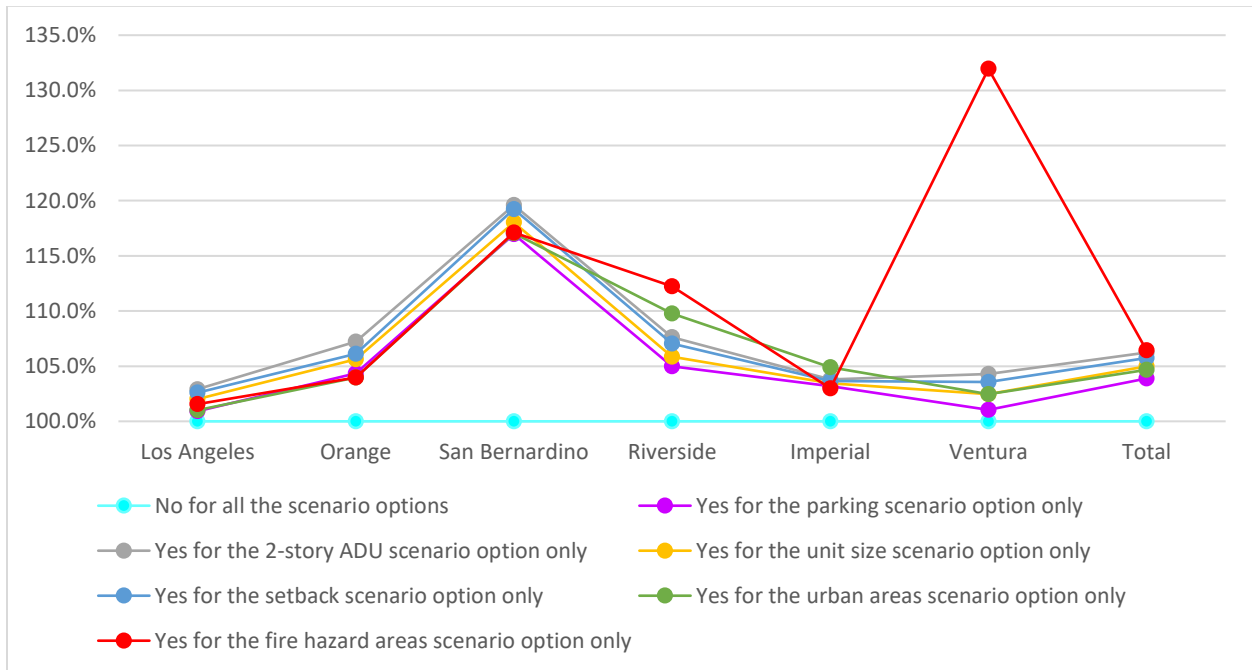
Figure 6. Summary of ADU Eligible Parcels by Scenario Option

Although there are some variations, it is observed that some scenarios, the alleviation of ADU development in fire hazard areas and outside of the areas with the adequacy of water and sewer services, are most influential on the promotion of ADU development. It is noteworthy that these scenario options have commonality, which would bring some of the parcels previously excluded back to the eligible pool for the creation of ADUs. Therefore, local governments need to have some flexibility to define the areas that ADU can be constructed as long as safety and health concerns from ADU construction are adequately addressed.

9.3. Scenario Simulation Tool

Similar to the visualization tool for the parcels eligible for ADUs according to state ADU law, the research team built a visualization tool for ADU scenario simulation. The tool was built with

the combination of Python script and ArcGIS ModelBuilder. The tool provides a user-friendly graphical user interface (GUI) that requires the inputs of the county and city that a user wants to visualize the potential ADU parcels.

Additionally, the GUI requires a user to select the policy scenario options from the drop-down menu that they want to simulate (Figure 7). By selecting all options and clicking the OK button on the bottom, the tool will identify the potential ADU parcels in the city and county based on the combination of the scenario options that the user selects. It will visualize the parcels by loading them into ArcGIS and highlighting ADU-eligible parcels and the tool reports the number of the highlighted parcels. The number of the parcels can be also found from the "Result" menu under the "Geoprocessing" menu. The instructions of the visualization tool are available in Appendix D.
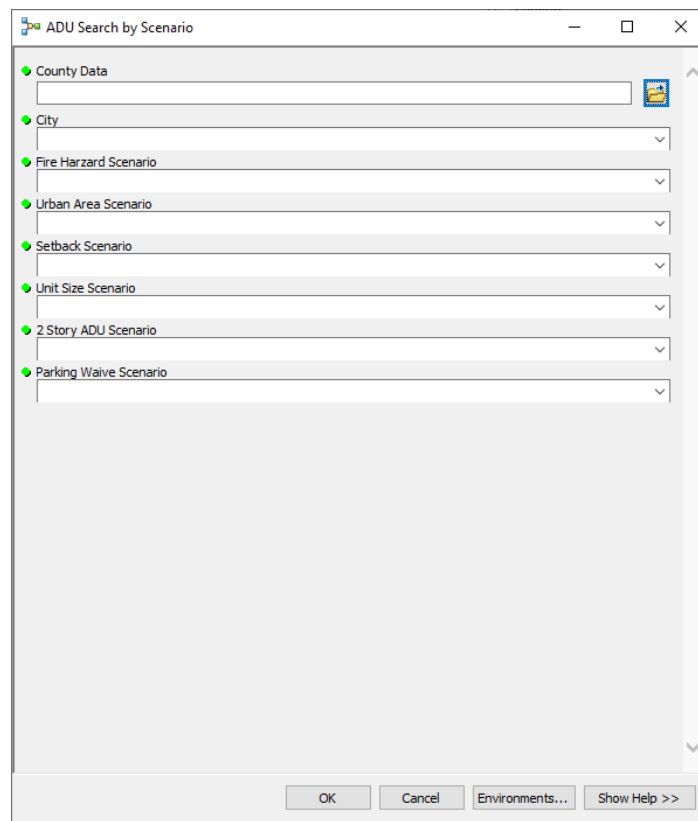
Figure 7. The Interface of the Simulation Tool

10. ADUs in SCAG's Priority Growth Areas

10.1. Eligible ADUs in the Priority Growth Areas According to the State ADU law

SCAG's priority growth areas (PGAs) including job centers, transit priority areas (TPAs), and high-quality transit areas (HQTAs) where people are more likely to access public transit, drive

fewer distances, and not acquire an automobile with additional growth (https://scag.ca.gov/read-plan-adopted-final-plan). Accordingly, increasing housing supply and options in and near PGAs is one of the important elements for sustainable urban development. This is also applicable to ADU development. The production of ADUs in and near PGAs and in other areas with multiple mobility options can be an important indicator of sustainability in association with ADU development. For this reason, the research team counted the number of ADU eligible parcels according to the state ADU law (2,956,398) located within PGAs. By overlaying the boundary PGAs with the eligible parcels for ADUs, according to the State ADU law, the team screened out the parcels within PGAs.

In total, approximately 57 percent of ADU-eligible parcels according to the State ADU law are located within PGAs (Table 5). As expected, Los Angeles County, the most completely urbanized county, presents the highest percent (74.4 percent). Interestingly, Imperial County, the most rural county, ranked second in the percent. This probably indicates that the residential areas in a rural area like Imperial County tend to be located in limited geographical areas surrounded by agricultural areas. In contrast, residential areas are spread out in suburban counties like San Bernardino, Riverside, and Ventura.

Table 5. ADU Eligible Parcels in Priority Growth Areas

Type	Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Single Family	803,571	192,312	115,639	94,759	12,813	36,404	1,255,498
Multi Family	388,584	17,546	7,774	11,552	964	3,952	430,372
Grand Total	1,192,155	209,858	123,413	106,311	13,777	40,356	1,685,870
Total ADU Eligible Parcels	1,602,768	446,410	339,494	433,921	21,774	112,031	2,956,398
% to Total ADU Eligible Parcels	74.4%	47.0%	36.4%	24.5%	63.3%	36.0%	57.0%

Additionally, the research team screened the eligible parcels for ADUs according to the state ADU law located within HQTAs (Table 6). In total, approximately 15.6 percent of eligible parcels for ADUs, according to the state ADU law, are located within HQTAs. While Los Angeles and Imperial Counties remain high performing in the percent of total ADU eligible parcels. However, their percentages show significant decreases when comparing them to the proportion of the ADU eligible parcels in PGAs. Overall, the eligible parcels in HQTAs are significantly less than the parcels in PGAs. This likely reflects the fact that the ADUs are primarily on single-family residential parcels. Single-family residential areas, which typically take large land areas with a homogeneous land use, are distanced from major transit corridors. Therefore, it is important to develop comprehensive strategies that interconnect sustainable transportation options with parcels for ADUs in single-family residential areas. The research team also counted the ADU eligible parcels in the constrained and absolute constrained areas,

but these counts are not included and discussed in this chapter. Instead, the team makes the counts available in Appendix F.

Table 6. ADU Eligible Parcels in High-Quality Transit Areas

Type	Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Single Family	560,866	141,823	84,779	52,323	8,210	20,243	868,244
Multi Family	327,334	14,163	6,005	6,755	21	2,060	356,938
Grand Total	888,200	155,986	90,784	59,078	8,831	22,303	1,225,182
Total ADU Eligible Parcels	1,602,768	446,410	339,494	433,921	21,774	112,031	2,956,398
% to Total ADU Eligible Parcels	55.4%	34.9%	26.7%	13.6%	40.6%	19.9%	41.4%
% Difference from PGAs	19.0%	12.1%	9.6%	10.9%	22.7%	16.1%	15.6%

10.2. Eligible ADUs in the Priority Growth Areas According to Scenario Simulations

The research team computed the number of ADU-eligible parcels within the PGAs by scenario option. This report summarizes the findings from this computation of the 64 scenarios. The table of the complete results is available in Appendix G. On average, approximately 54.4 percent of eligible parcels for ADU construction are within the PGAs. The team measured the unique impacts of each policy scenario by selecting the scenario combinations that one policy scenario option is selected while all other options are not selected (Figure 8).

While the significant variations of the percent by scenario option are not observed, the percent varies by county. For each scenario option, the percent was calculated by dividing the number of the ADU eligible parcels in the PGAs by the total ADU eligible parcels. Similar to the ADU eligible parcels within the PGAs according to the state ADU law, a high proportion of ADU eligible parcels within PGAs is found in Los Angeles and Imperial Counties. Regardless of the combination of the scenario options, the proportion of eligible parcels for ADUs within the PGAs by scenario option in each county is consistent.

The impacts of the scenario options on the number of ADU-eligible parcels in the PGAs present interesting patterns (Figure 9). The figure illustrates how much the selected scenario options can increase the number of ADU-eligible parcels in the PGAs. Thus, the percent was computed by dividing the number of ADU eligible parcels with no option by the number of ADU eligible parcels with each scenario option in the PGAs. Overall, three scenario options, 2-story ADU, setback, unit size, contribute to increasing ADU eligible parcels in the PGAs. This is consistent in all the counties, except Ventura County. This indicates that the three scenario options help to make relatively small parcels in urban areas eligible to accommodate an ADU. The impacts of

the parking scenario option are minimal. This is probably that many parcels in the PGAs are already exempted from the parking requirements since they are close to public transit.
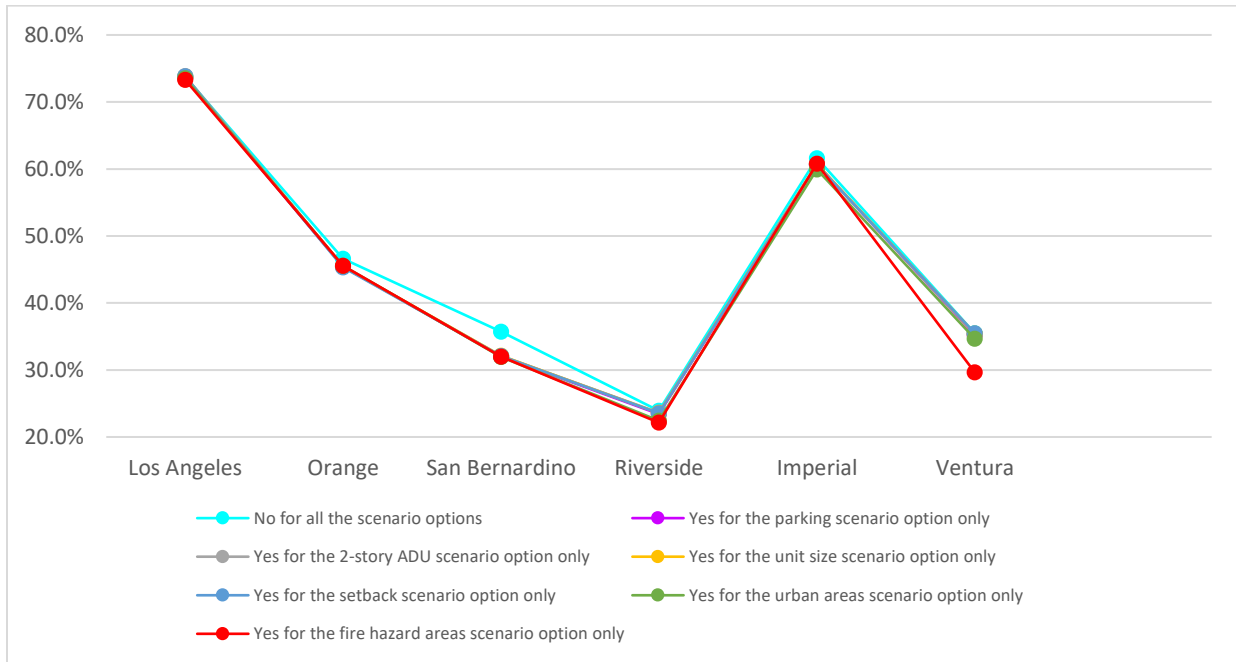
Figure 8. ADU Eligible Parcels in Priority Growth Areas by Selected Scenario Option

Figure 9. Impacts of the Selected Scenarios on ADU Eligible Parcels in Priority Growth Areas

11. Conclusion

As the state passed Assembly Bill 2299 in coordination with Senate Bill 1069, ADUs have emerged as a policy alternative to increase housing stock and provide affordable options for areas impacted by housing shortages including Southern California. ADUs can contribute to increasing housing affordability, create a wider range of housing options within the community, enable seniors to stay near their families as they age, and facilitate better land use of the existing housing fabric in established neighborhoods.

This research supports the potential of ADUs for increasing affordable housing options. Overall, there are approximately 3 million parcels eligible to construct an ADU in the SCAG region. By adopting some lenient policy options that promote ADU development, the eligible parcels can increase to about 3.2 million. SCAG estimates that Southern California requires at least 1.3 million new homes within the next decade (HCD, 2019). The number of ADU-eligible parcels does not necessarily mean the number of buildable ADUs or the number of housing units that can be supplied to the housing market in the SCAG region. However, the eligible parcels for new ADUs can indeed be a solution to compensate substantially for the lack of housing in Southern California.

Therefore, local governments need to switch their planning paradigm in a way that accommodates and promotes ADU development. Residents advocate for restrictions on ADU due to privacy, parking, density, crime, and low-income renters. Reflecting the concerns of the residents, local governments have set restrictive standards and zoning regulations that discourage homeowners from building ADUs. This local atmosphere and regulations affect the number of ADU applications and permits issued. The purpose of the new state laws is to change the local atmosphere and regulations. Thus, local governments must reflect the intentions of the new state laws to their zoning and ADU ordinances. This change of planning perspective needs to accompany local governments' efforts on making their residents have a good understanding of ADU.

A review of local ADU ordinances found that most regulations followed the state requirements very closely. Very few results from the ordinance analysis were more lenient or permissive for ADU construction than the state ADU law. For a further expansion of ADU permissibility, it may be necessary for the state and local governments to relax their regulation. The research team determined several reasonable avenues for increased ADU delivery from an analysis of SCAG member ADU ordinances. Almost no jurisdiction allowed up to the 1,200 square feet state maximum but larger unit types may allow for more housed people and more rental income. The state or a city could raise their required allowance for ADU site space from 800 square feet to 1,000 square feet allowing slightly greater height restrictions would make ground floor footprints more economical and second stories more feasible and habitable while still being sensitive to the heights of the neighborhood. Parking requirements for ADUs are already exempted many times and the research team would recommend removing parking requirements for ADUs similar to

the City of Dana Point's approach. ADUs are an infill housing strategy that would likely be located in transit-supported areas and this added density would in turn support transit. There are also setback exemptions for existing structure conversions and if there is no other space for an 800 square feet ADU. It is possible to expand or standardize these setback exemptions for greater ADU configurations. An expansion of ADUs to other land use zones is also possible with the City of Los Angeles providing an example of how to address fire hazards and hillside zones for ADU construction. This research offers opportunities for a more flexible standardization of ADU policy across the SCAG. With further more targeted research into key cities, there will likely be more opportunities found for increased ADU delivery.

Although this research presents a systemic, comprehensive approach to examine ADU capacity in the SCAG region, there are limitations that should be addressed by future studies. First, this analysis measures the eligibility strictly according to the physical conditions of parcels. The eligibility differs from the buildability of ADU. Based on many factors like financial options and owners' socio-demographic characteristics, homeowners probably decide to build (or not) an ADU on their eligible parcel. This research sheds light on this by exploring the factors that impact the construction of ADU through the case study of the City of Los Angeles (Appendix H). However, the case study is limited to one city rather than a regional scale analysis. A large-scale survey study that collects the data about property owners' perception of ADU and willingness to build an ADU will also allow understanding the buildability of ADU. Therefore, future research needs to consider conducting the survey analysis in addition to the spatial analysis to determine the probability of ADU construction.

The focus of this research is to measure the physical eligibility of parcels employing spatial analysis. For this reason, the quality of spatial data becomes one of the most important factors for this research. Although the research team was able to employ the latest parcel data, the data did not deliver all the characteristics of parcels required to accurately measure the physical conditions of the parcels. It is also noteworthy that the team simplified some analyses due to the large data consisting of more than 5 million records. This probably impacts the quality of the final outputs. As the findings from the case study of Los Angeles County indicate, the count of eligible parcels for ADU development varies by the data available and the spatial analysis employed. Therefore, it should be considered to conduct a more targeted analysis (e.g. at a county level) with more specific spatial data in subsequent research.

References

Baron M., Buchman, M., Kingsella, M., Pozdena, R., and Wilkerson, M. 2018. *Housing Underproduction in the U.S*. Washington D.C.: Up for Growth National Coalition.

Bennett, A., Cuff, D., and Wendel, G. 2019. Backyard Housing Boom: New Markets for Affordable Housing and the Role of Digital Technology. *Technology|Architecture + Design,* 3 (1): 76–88. https://doi.org/10.1080/24751448.2019.1571831.

Bertolet, Dan . 2017. *Some Neighborhoods Losing Population, Despite the Boom. Sightline Institute*. http://www.sightline.org/2017/05/04/some-neighborhoods-losing-population-despite-the-boom/.

Brinig, M. F. and Garnett, N. S. 2013. A Room of One's Own? Accessory Dwelling Unit Reforms and Local Parochialism. *The Urban Lawyer,* 45 (3): 519–69.

Brown, A., Mukhija, V., and Shoup, D. 2020. Converting Garages into Housing. *Journal of Planning Education and Research,* 40 (1): 56–68. https://doi.org/10.1177/0739456X17741965

California Department of Housing and Community Development - HCD (2021). Housing Elements. *State of California*. https://www.hcd.ca.gov/community-development/housing-element/index.shtml.

Chapple, K. 2014. *Planning Sustainable Cities and Regions: Towards More Equitable Development*. London: Routledge.

Chapple, K., Wegmann, J., Nemirow, A., and Dentel-Post, C. 2011. Yes in My Backyard: Mobilizing the Market for Secondary Units. *UC Berkeley: University of California Transportation Center*. Retrieved from https://escholarship.org/uc/item/6fz8j6gx.

Chapple, K., Abdelgany, S., Ecker, A., and Cooper, S. 2017a. *A Solution on the Ground: Assessing the Feasibility of Second Units in Unincorporated San Mateo County*. UC Berkeley. Retrieved from https://escholarship.org/uc/item/42f4r53f.

Chapple, K., Wegmann, J., Mashhood, F., and Coleman, R. 2017b. *Jumpstarting the Market for Accessory Dwelling Units: Lessons Learned from Portland, Seattle, and Vancouver*. Terner Center for Housing and Innovation U.C. Berkeley. https://ternercenter.berkeley.edu/research-and-policy/more-adus/.

Chapple, K., Lieberworth, A., Ganetsos, D., Valchius, E., Kwang, A., and Schten, R. 2020a. *ADUs in California: A Revolution in Progress*. U.C. Berkeley Center for Community Innovation. https://www.aducalifornia.org/wp-content/uploads/2020/09/ADUs-in-California-5.pdf.

Chapple, K., Lieberworth, A., Hernandez, E., Ganetsos, D., Alvarado, A., and Morgan, J. 2020b. *The ADU Scorecard: Grading ADU Ordinances in California*. U.C. Berkeley Center for Community Innovation. https://www.aducalifornia.org/research/.

Chapple, K., Garcia, D., Tucker, J. and Valchuis, E. 2020c. *Reaching California's ADU Potential: Progress to Date and the Need for ADU Finance*. Terner Center for Housing Innovation. Berkeley, CA: University of California Berkeley.

Department of Housing and Community Development (HCD). 2020. *Accessory Dwelling Unit Handbook*. Sacramento, CA: HCD.

Department of Housing and Community Development (HCD). 2019. https://scag.ca.gov/sites/main/files/file-attachments/6thcyclerhna_scagdetermination_08222019.pdf?1602190292. (Accessed April 25, 2021)

Dillion, L. 2019. *Southern California Must Plan for 1.3 Million New Homes in the Next Decade, Newsom Says*. Los Angeles Times. https://www.latimes.com/california/story/2019-08-22/southern-california-housing-growth.

Elmendorf, C. S., Biber, E., Monkkonen, P., and O'Neill, M. 2019. Making It Work: Legal Foundations for Administrative Reform of California's Housing Framework. *SSRN Electronic Journal*, https://doi.org/10.2139/ssrn.3500139.

Gabbe, C. J. 2019. Changing Residential Land Use Regulations to Address High Housing Prices. *Journal of the American Planning Association,* 85 (2): 152–68. https://doi.org/10.1080/01944363.2018.1559078.

Garcia, D. 2017. *ADU Update: Early Lessons and Impacts of California's State and Local Policy Changes*. Terner Center (U.C. Berkeley)

California Department of Housing and Community Development - HCD. (2019). Housing Elements. https://www.hcd.ca.gov/community-development/housing-element/index.shtml.

California Department of Housing and Community Development - HCD. (2020). Housing Elements. https://www.hcd.ca.gov/community-development/housing-element/index.shtml.

Lens, M. C. and Monkkonen, P. 2016. Do Strict Land Use Regulations Make Metropolitan Areas More Segregated by Income?, *Journal of the American Planning Association*, 82 (1): 6-21. https://doi.org/10.1080/01944363.2015.1111163

Maaoui, M. 2018. A Granny Flat of One's Own? The Households That Build Accessory-Dwelling Units in Seattle's King County. *Berkeley Planning Journal*, 30 (1). https://doi.org/10.5070/BP330137884

Mukhija, V., Cuff, D. and Serrano, K. 2014. *Backyard Homes & Local Concerns: How Can Local Concerns Be Better Addressed?* Los Angeles, CA: University of California Los Angeles.

Parolek, D. 2020. *Missing middle housing. Thinking big and building small to respond to today's housing crisis*. Washington D.C.: Island Press.

Pfeiffer, D. 2019. *Regulating ADUs in California: Local Approaches & Outcomes*, Terner Center for Housing and Innovation, Berkeley, CA: University of California Berkeley.

Ramsey-Musolf, D. 2018. Accessory Dwelling Units as Low-Income Housing: California's Faustian Bargain. *Urban Science*, 2 (3): 89. https://doi.org/10.3390/urbansci2030089.

Rothwell, J., and Massey, D. S. 2009. The Effect of Density Zoning on Racial Segregation in U.S. Urban Areas. *Urban Affairs Review*, 44(6), 779–806. https://doi.org/10.1177/1078087409334163

Southern California Association of Governments (SCAG). 2020. *Estimate of SCAG RHNA Allocation Based on Regional Council-Approved Final RHNA Methodology*. https://scag.ca.gov/rhna.

Wegmann, J. and Mawhorter, S. 2017. Measuring Informal Housing Production in California Cities. *Journal of the American Planning Association,* 83 (2): 119–30. https://doi.org/10.1080/01944363.2017.1288162.

Woetzel, J. Mischke, J., Peloquin, S., and Weisfield, D., 2016. *A Tool Kit to Close California's Housing Gap: 3.5 Million Homes by 2025*. New York, NY: McKinsey Global Institute.

Appendix A

Internet links to best practices in government agencies

Best Architectural Cases

City of LA ADU Pilot designed by LA-Mas

Designer: https://www.mas.la/about-us-1

Case: https://www.mas.la/adu-pilot-project

La Maida Addition

Designer: https://chughes.net/

Case: https://chughes.net/la-maida-addition

Midnight Room by Design Bitches

Designer: https://designbitches.com/

Case: https://designbitches.com/midnight-room

LightHouse ADU

Designer: https://alchemyarch.com/

Case: https://alchemyarch.com/projects/lighthouseadu/

Further Readings: https://www.dwell.com/article/lighthouse-livinghomes-plant-prefab-alchemy-architects-1011a02b

https://www.forbes.com/sites/sherikoones/2020/05/29/energy-efficient-and-beautiful-adus-now-available-by-a-unique-collaboration/?sh=20f5758449a7

https://www.treehugger.com/wee-house-and-plant-prefab-launch-new-accessory-dwelling-units-4848021

Sebastopol lightHouse ADU

Designer: https://alchemyarch.com/

Case: https://alchemyarch.com/projects/sebastopollighthouseadu/

Burdge Architects Prefabrication Sunset BUD Living

Designer: https://www.buaia.com/

Case: https://www.plantprefab.com/models/sunset-bud-livinghome

Further Readings: https://www.sunset.com/home-garden/sunset-bud-living-home-ADU

Burdge Architects Prefabrication Buhaus

Designer: https://www.buaia.com/

Case: https://buhaus.com/pages/about

Further Readings: https://www.dwell.com/article/buhaus-studio-unit-prefab-shipping-container-home-41041676

Burdge Architects Shipping Container Home

Designer: https://www.buaia.com/

Case: https://www.buaia.com/shipping-container-home-1

City That Provides Pre-Approved ADU Plans

City of LA

https://www.ladbs.org/adu/standard-plan-program/approved-standard-plans

City of Encintas

https://encinitasca.gov/pradu

City of Clovis

https://cityofclovis.com/planning-and-development/planning/cottage-home-program/cottage-plans/

City of Seaside (need to sign a liability waiver and email for the full ADU plan set)

http://www.ci.seaside.ca.us/740/ADU-Guide

City of Stockton

http://stocktonca.gov/government/departments/permitCenter/buildAdu.html

City of San Jose (provides a preapproved vendor list to contact.)

https://www.sanjoseca.gov/business/development-services-permit-center/accessory-dwelling-units-adus/adu-permit-plan-review-process/adu-single-family-master-plan-program

Humboldt County

https://humboldtgov.org/184/Accessory-Dwelling-Unit-Plans

City Planning Strategies for ADU Delivery

https://secondunitcentersmc.org/

https://www.habitatmontereybay.com/adu

https://www.aducalifornia.org/

https://www.hellohousing.org/secondunits/

https://www.cityofsantacruz.com/government/city-departments/planning-and-community-development/accessory-dwelling-units-adus

http://sccoplanning.com/ADU/FAQ.aspx

https://communitypoweredworkshop.org/the-alley-flat-initiative

https://thealleyflatinitiative.org/

Financial Resources for ADUs

https://www.selfhelpenterprises.org/buy-an-adu-in-clovis/

https://www.smcu.org/Loans/Home-Loans/ADU-Loan

www.sccoplanning.com/Portals/2/County/adu/Forgivable%20Loan%20Program.pdf

https://www.laadu.org/incentives-0

https://adu.lacity.org/

https://housing.smcgov.org/housing-innovation-fund

http://livable.org/livability-resources/127-accessory-dwelling-unit-development-program

https://www.calhfa.ca.gov/about/press/press-releases/2019/pr2019-04-15.htm

https://genesisla.org/

ADU Professionals

https://theaduguys.com/

https://alchemyarch.com/

https://www.buaia.com/

https://chughes.net/projects#/la-maida-addition/

https://www.aialosangeles.org/awards/residential-architecture-awards/residential-architecture-award-winners-2020/

https://designbitches.com/midnight-room/uy042el2w86wwqipo34ele7998wadq

https://www.plantprefab.com/models/Yves-Behar-LivingHome-1

https://www.plantprefab.com/models/sunset-bud-livinghome

https://alchemyarch.com/projects/?filter=residential

https://www.nousengineering.com/adu-pilot-backyard-homes

https://www.habitatla.org/

Further Resources

https://www.cityofsanmateo.org/3907/Accessory-Dwelling-Unit-ADU

http://www.accessorydwellings.com/

https://cityofclovis.com/planning-and-development/planning/cottage-home-program/

https://www.hcd.ca.gov/policy-research/accessorydwellingunits.shtml#adu

https://icsd.ucr.edu/case-study-adu

https://www.portland.gov/bds/adu-permits

https://www.sccoplanning.com/ADU.aspx

https://www.sightline.org/tag/adu/

https://www.cityofsantacruz.com/government/city-departments/planning-and-community-development/accessory-dwelling-units-adus

https://www.cityofvancouver.us/ced/page/accessory-dwelling-units

Appendix B

ADU Floor Plan Designs

1. 400 square foot studio with one bath and exterior stair over a two car garage.

2. 400 square foot studio with one bath over a two car garage with an exterior stair.

3. 400 square foot studio over a two car garage with one bath, an exterior stair and an expanded kitchen.

1/8" = 1'0"   0   2   4   6   8   10

4. 480 square foot studio with one bath and an exterior stair over tandem parking garage.

1/8" = 1'0"   0   2   4   6   8   10

5. 496 square foot two bedroom unit with covered parking and .75 bath.
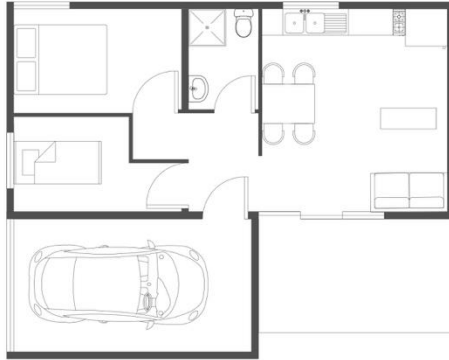
1/8" = 1'0"   0   2   4   6   8   10

6. 496 square foot two bedroom one bath unit with one car garage and patio.
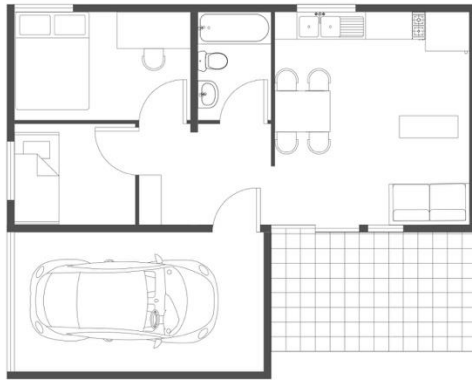
1/8" = 1'0"   0   2   4   6   8   10

7. Two 300 square foot studio one bath units side by side with individual patios. 600 square feet built space total.
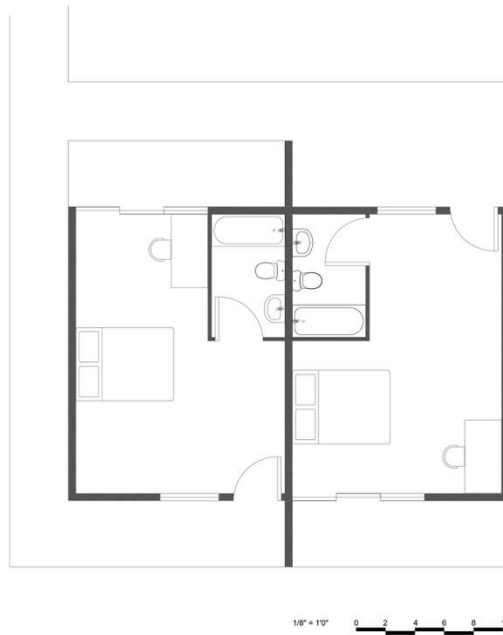
1/8" = 1'0"

8. 704 square foot .75 bath unit with a sleeping loft.
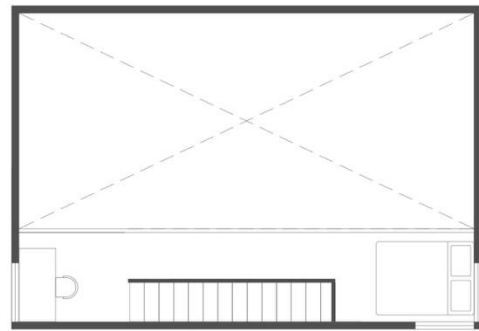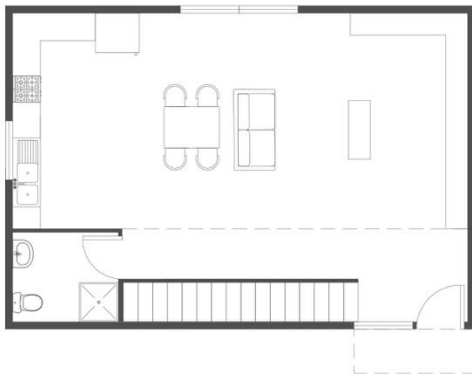
1/8" = 1'0"

9. 720 square foot unit with one bath and two bedrooms.
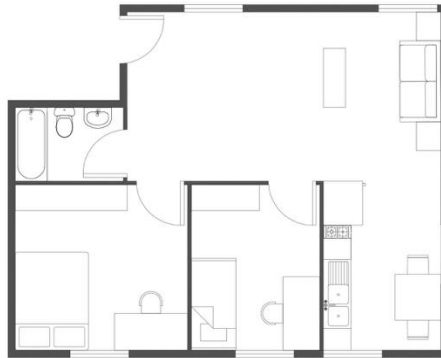
1/8" = 1'0"   0   2   4   6   8   10

10. 720 square foot unit one bath with one bedroom.
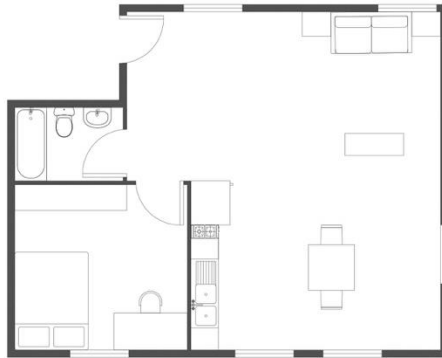
1/8" = 1'0"   0   2   4   6   8   10

11. 750 square foot unit with one bedroom and one bath over a one car garage.
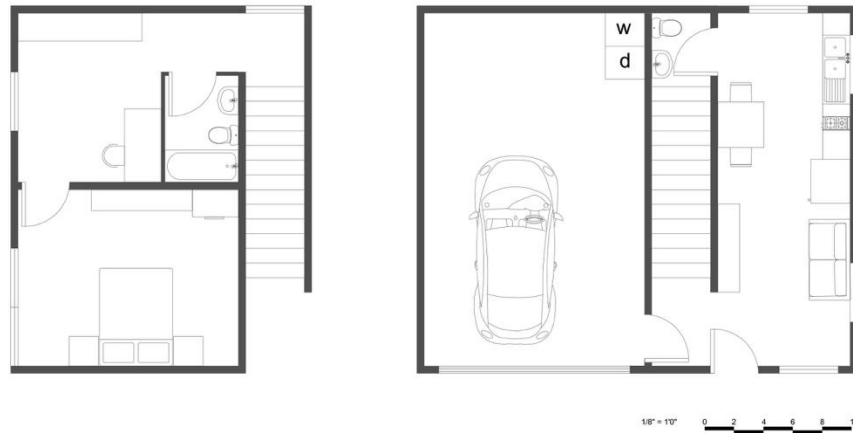
1/8" = 1'0"   0   2   4   6   8   10

12. 750 square foot two bedroom one bath unit with possible three bedroom conversion.
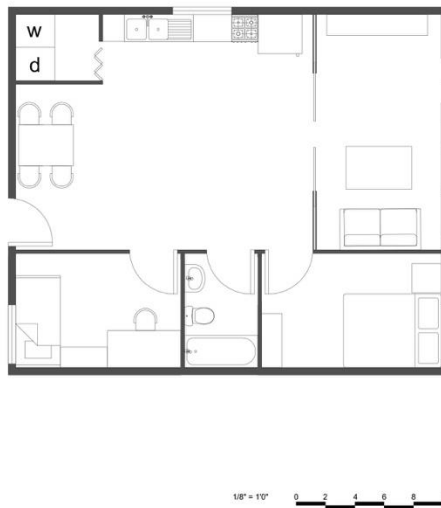
1/8" = 1'0"   0   2   4   6   8   10

13. 750 square foot two bedroom two bath.

1/8" = 1'0"   0   2   4   6   8   10

14. 756 square foot unit with two bedrooms.
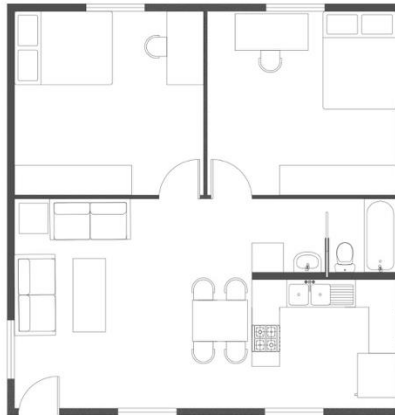
1/8" = 1'0"   0   2   4   6   8   10

15. 760 square foot side by side studios.
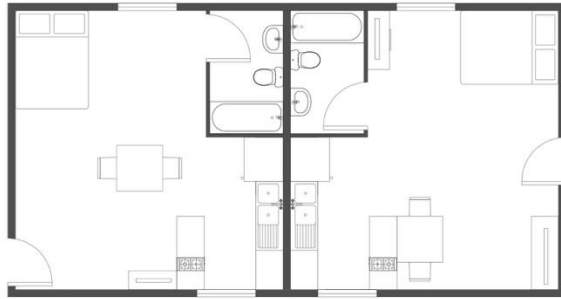
16. 800 square foot unit with three bedrooms and one bath.
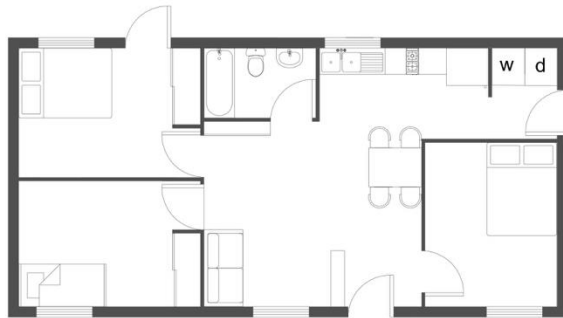
17. 1,040 square foot unit with two bedrooms and one bathroom above a two car garage.

1/8" = 1'0"   0   2   4   6   8   10

18. 1,150 square foot two or three bedroom one and one half bath with double height living room unit.

1/8" = 1'0"   0   2   4   6   8   10

19. 1,176 square foot two story two bedroom one and one half bath unit with double height living room.
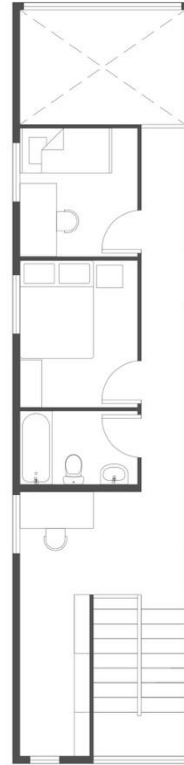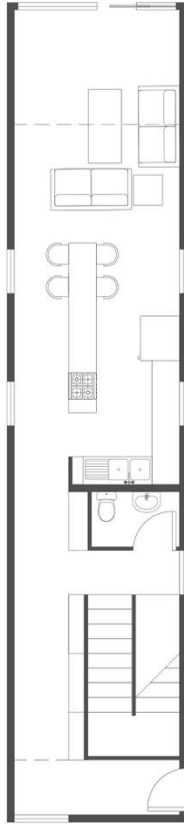
Appendix C

Comparison of ADU Eligible Parcels by Three Approaches

Land Use	Exemption	Approach 1						Total
		County						
		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	
Single-Family	Parking & Setback	682,559	203,081	56,018	103,727	7,990	29,973	1,083,348
	Parking	393,325	163,967	195,253	151,529	7,139	58,087	969,300
	Setback	19,899	25,449	13,257	56,134	1,686	6,139	122,564
	No	37,005	32,675	60,889	100,371	3,913	10,754	245,607
	Total	1,132,788	425,172	325,417	411,761	20,728	104,953	2,420,819
Multi-Family	Parking	216,684	21,266	12,783	13,819	1,315	5,807	271,674
	No	727	457	1,146	3,985	136	866	7,317
	Total	217,411	21,723	13,929	17,804	1,451	6,673	278,991
Grand Total		1,350,199	446,895	339,346	429,565	22,179	111,626	2,699,810
% to total parcels		56.1%	65.7%	41.7%	49.4%	25.5%	43.2%	52.8%
		Approach 2						
Single-Family	Parking & Setback	697,997	203,115	56,794	98,559	8,100	30,692	1,095,257
	Parking	401,678	161,426	195,897	145,693	6,949	57,659	969,302
	Setback	20,700	25,310	13,633	52,865	1,666	6,290	120,464
	No	37,567	31,123	61,053	97,769	3,869	10,706	242,087
	Total	1,157,942	420,974	327,377	394,886	20,584	105,347	2,427,110
Multi-Family	Parking	438,811	19,902	10,965	27,526	1,029	3,038	501,271
	No	2,879	212	583	11,555	96	415	15,740
	Total	441,690	20,114	11,548	39,081	1,125	3,453	517,011
Grand Total		1,599,632	441,088	338,925	433,967	21,709	108,800	2,944,121
% to total parcels		66.5%	64.8%	41.6%	49.9%	24.9%	42.1%	57.5%
		Approach 3						
Single-Family	Parking & Setback	697,738	202,944	56,707	98,383	8,099	30,667	1,094,538
	Parking	404,371	163,880	195,992	146,068	6,977	57,723	975,011
	Setback	20,695	25,283	13,629	52,770	1,664	6,275	120,316
	No	37,826	32,247	61,105	98,062	3,880	10,789	243,909
	Total	1,160,630	424,354	327,433	395,283	20,620	105,454	2,433,774
Multi-Family	Parking	439,259	21,599	11,471	27,308	1,051	5,903	506,591
	No	2,879	457	590	11,330	103	674	16,033
	Total	442,138	22,056	12,061	38,638	1,154	6,577	522,624
Grand Total		1,602,768	446,410	339,494	433,921	21,774	112,031	2,956,398
% to total parcels		66.6%	65.6%	41.7%	49.9%	25.0%	43.3%	57.8%

Appendix D

Instructions of the Visualization/Simulation Tools

Since the visualization tool is a customized tool in the platform of ArcGIS, the software, ArcGIS desktop is required to run the tool. ArcGIS Pro does not support this tool. The tool is designed to search the ADU eligible parcels in an individual city by querying the dataset created for this research. Therefore, a user needs to have the dataset along with the tool. The dataset is a format of ESRI's file geodatabase and the tool is a format of ArcToolbox tool. The tool also takes advantage of two pre-built layer files (.lyr) for mapping purposes. They are Parcel.lyr and Basemap.lyr. It is expected that the geodatabase and layer files are stored in the same folder.
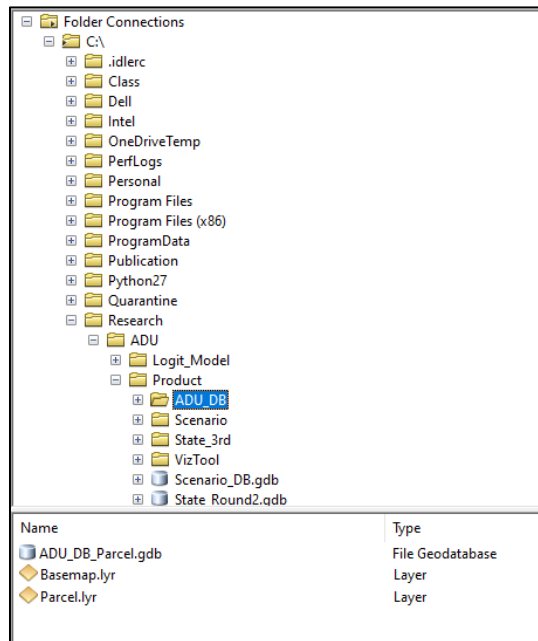
1. Open ArcMap
2. Open ArcCatalog and navigate to the folder in which the toolbox (ADU_Tool.tbx) is stored.
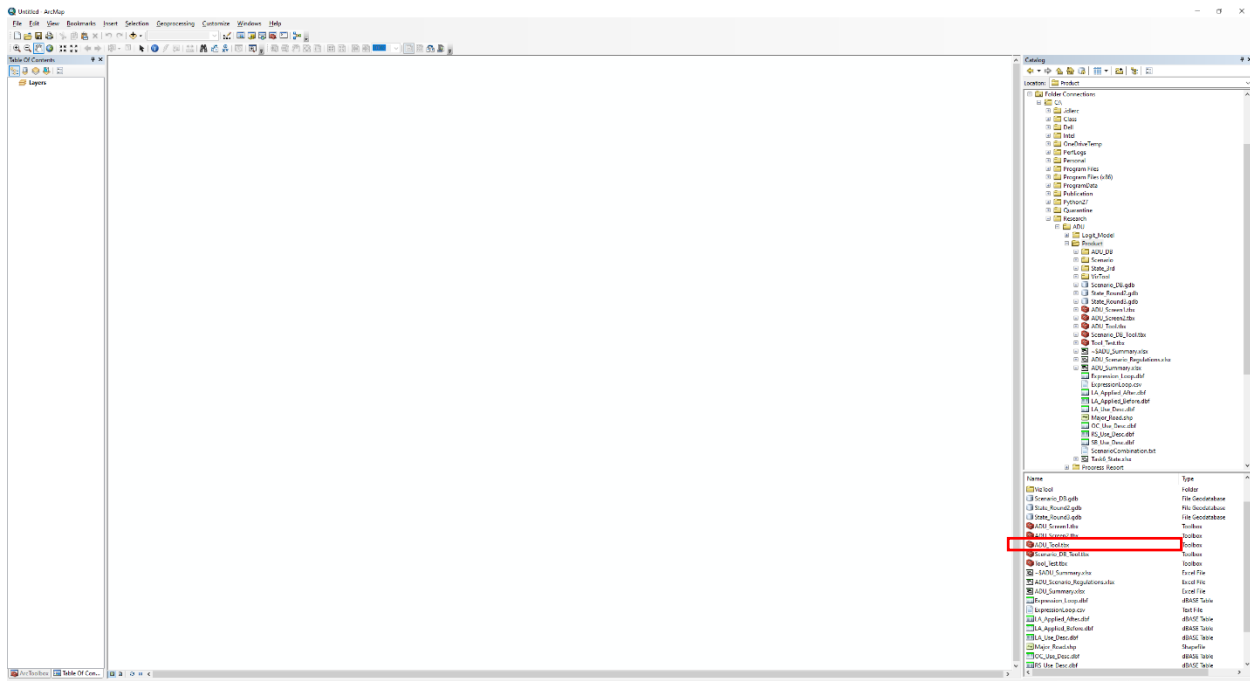
3. Expend the toolbox and find two tools available, "ADU Search by Scenario" and "ADU Search by State ADU law". "ADU Search by Scenario" is the ADU simulation tool by scenario option and "ADU Search by state ADU law" is the visualization tool for ADU

parcels by the state's regulations. The other files, AddLayer and ScenarioSearch, are python script files that support the tools.

4. If you want to visualize the ADU eligible parcels by the State ADU law, double-click the "ADU Search by State Regulations" tool. If you want to simulate the ADU eligible parcels by policy scenario options, double-click the "ADU Search by Scenario" tool. Then the interface below will open.
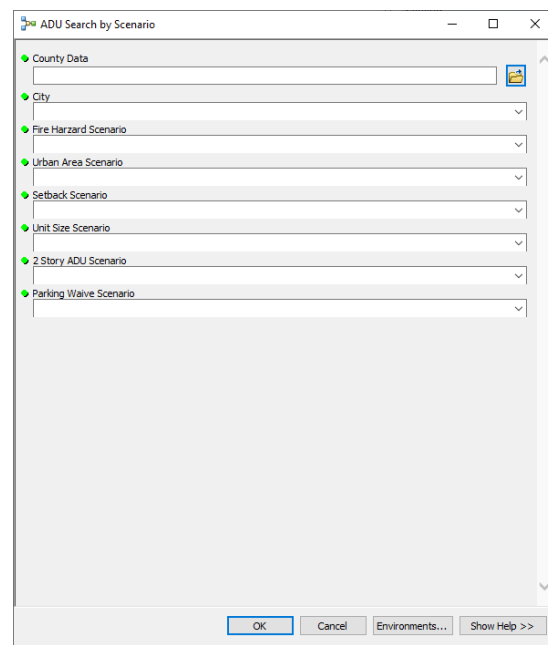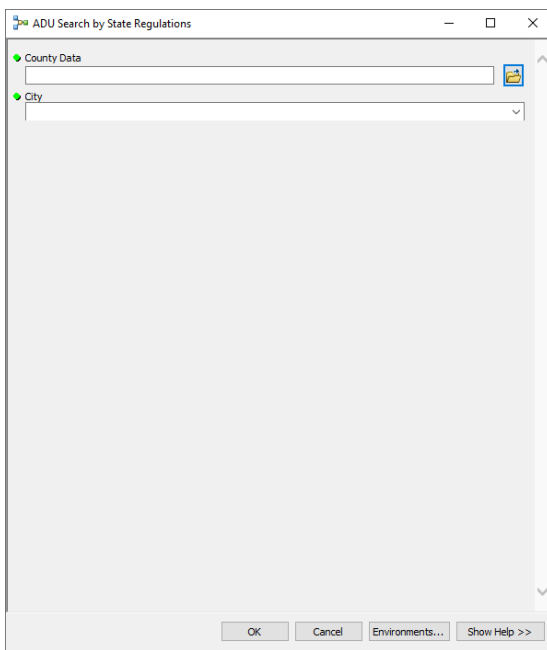
5. Click the button with the folder icon at the County Data box. Then the file navigation window will open.
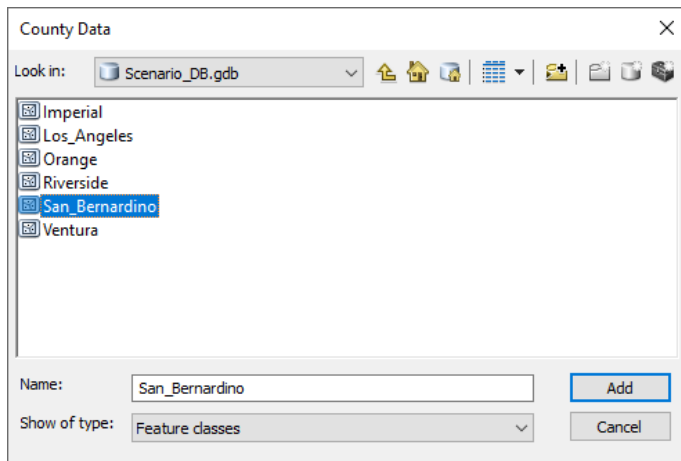
6. Navigate to the geodatabase, select the county file that you want to visualize, and click the "Add" button.
7. Select the city that you want to perform the visualization from the "City" box on the tool.
8. If you use the "ADU Search by Scenario" tool, select "Yes" or "No" for all the available policy scenario options.
9. Click the "OK" button.
10. Then, tool adds and selects the ADU eligible parcels to ArcGIS and zooms into the city that you selected. The parcels highlighted in blue are the ADU eligible parcels.
11. The tool reports the number of the ADU eligible parcels in the progress box.
12. After closing the progress box, you can turn on the Basemap layer (which is added by the tool) in the table of content for reference.
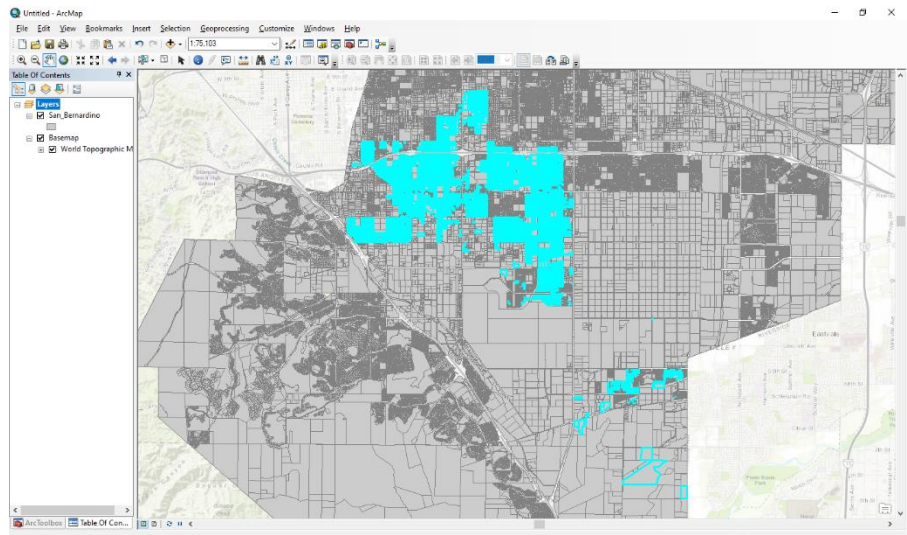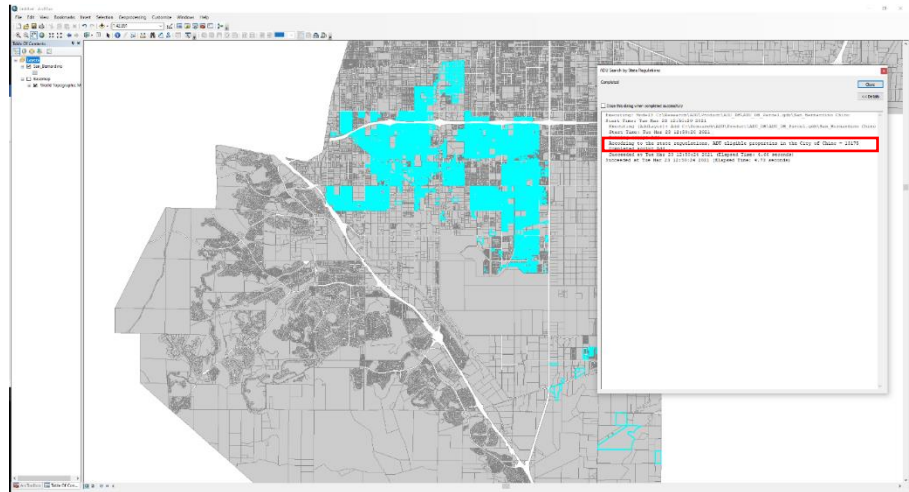
13. If you want to acquire the number of the ADU eligible parcels after closing the progress box, go to the "Geoprocessing" menu and select the "Result" option. Then, expand the "ADU Search by State Regulations" located at the top the window. Then, you will find the number from the one of the messages.
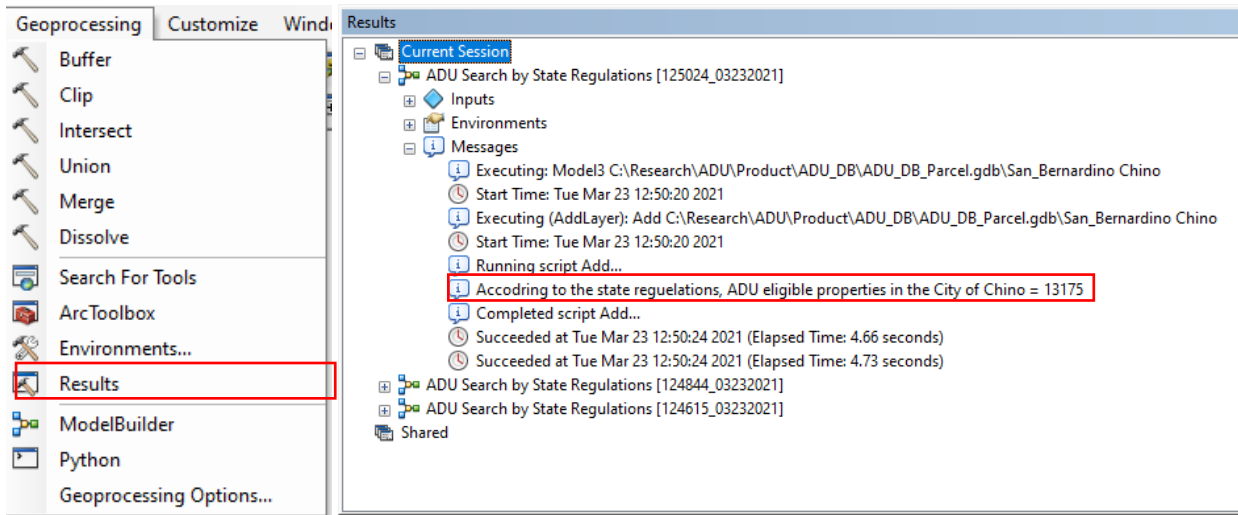
Python Script for the "ADU Search by State Regulations" Visualization Tool

```
import arcpy
import os
import sys

fc = arcpy.GetParameterAsText(0)
City = arcpy.GetParameterAsText(1)

County = os.path.basename(fc).rstrip(os.path.splitext(fc)[1])
Fpath = os.path.dirname(fc)
frt, bck = os.path.split(Fpath)
plyr = frt + r"\Parcel.lyr"

arcpy.env.workspace = Fpath
mxd = arcpy.mapping.MapDocument("CURRENT")
df = arcpy.mapping.ListDataFrames(mxd, "Layers") [0]

for lyr in arcpy.mapping.ListLayers(mxd,"",df):
    if lyr.name == "San_Bernardino":
        arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")
    elif lyr.name == "Los_Angeles":
        arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")
    elif lyr.name == "Imperial":
        arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")
    elif lyr.name == "Orange":
        arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")
    elif lyr.name == "Riverside":
```

```
      arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")
   elif lyr.name == "Ventura":
      arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")

layer = arcpy.mapping.Layer(fc)
basemp = arcpy.mapping.Layer(frt + r"\Basemap.lyr")
if layer.name not in [lyr.name for lyr in arcpy.mapping.ListLayers(mxd,"", df)]:
   arcpy.mapping.AddLayer(df, layer, "TOP")
if "Basemap" not in [lyr.name for lyr in arcpy.mapping.ListLayers(mxd,"", df)]:
   arcpy.mapping.AddLayer(df, basemp, "BOTTOM")
   basemp.visible = True
arcpy.RefreshTOC()

expression = "CITY ='"+City+"' AND STATE = 1"
ALyr = arcpy.mapping.ListLayers(mxd, County, df) [0]
Slyr = arcpy.mapping.Layer(plyr)
arcpy.mapping.UpdateLayer(df, ALyr, Slyr, True)

arcpy.SelectLayerByAttribute_management(ALyr,"NEW_SELECTION", expression)
Num = str(arcpy.GetCount_management(ALyr))

arcpy.AddMessage("Accodring to the state reguelations, ADU eligible properties in the City of
"+City+" = "+Num)

df.zoomToSelectedFeatures()
del mxd, Slyr
```

Python Script for the "ADU Search by Scenario" Visualization Tool

```
import arcpy
import os
fc = arcpy.GetParameterAsText(0)
City = arcpy.GetParameterAsText(1)
Fire = arcpy.GetParameterAsText(2)
Urban = arcpy.GetParameterAsText(3)
Setback = arcpy.GetParameterAsText(4)
Unit = arcpy.GetParameterAsText(5)
Story = arcpy.GetParameterAsText(6)
Park = arcpy.GetParameterAsText(7)

County = os.path.basename(fc).rstrip(os.path.splitext(fc)[1])
Fpath = os.path.dirname(fc)
frt, bck = os.path.split(Fpath)
plyr = frt + r"\Parcel.lyr"

arcpy.env.workspace = Fpath
mxd = arcpy.mapping.MapDocument("CURRENT")
df = arcpy.mapping.ListDataFrames(mxd, "Layers") [0]

for lyr in arcpy.mapping.ListLayers(mxd,"",df):
```

```
    if lyr.name == "San_Bernardino":
        arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")
    elif lyr.name == "Los_Angeles":
        arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")
    elif lyr.name == "Imperial":
        arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")
    elif lyr.name == "Orange":
        arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")
    elif lyr.name == "Riverside":
        arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")
    elif lyr.name == "Ventura":
        arcpy.SelectLayerByAttribute_management(lyr,"CLEAR_SELECTION")

layer = arcpy.mapping.Layer(fc)
basemp = arcpy.mapping.Layer(frt + r"\Basemap.lyr")
if layer.name not in [lyr.name for lyr in arcpy.mapping.ListLayers(mxd,"", df)]:
        arcpy.mapping.AddLayer(df, layer, "TOP")
if "Basemap" not in [lyr.name for lyr in arcpy.mapping.ListLayers(mxd,"", df)]:
    arcpy.mapping.AddLayer(df, basemp, "BOTTOM")
arcpy.RefreshTOC()


ALyr = arcpy.mapping.ListLayers(mxd, County, df) [0]
Slyr = arcpy.mapping.Layer(plyr)
arcpy.mapping.UpdateLayer(df, ALyr, Slyr, True)


Scenario = Fire+Urban+Setback+Unit+Story+Park
if Scenario == "NoNoNoNoNoNo":
        expression = "CITY ='"+City+"' AND STATE = 1"
elif Scenario == "NoNoNoNoNoYes":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
((PARK_EXMP =1 AND BUILDABLE >800) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >800))))"
elif Scenario == "NoNoNoNoYesNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
BUILDABLE >400))"
elif Scenario == "NoNoNoNoYesYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
((PARK_EXMP =1 AND BUILDABLE >400) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >400))))"
elif Scenario == "NoNoNoYesNoNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
BUILDABLE >600))"
elif Scenario == "NoNoNoYesNoYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
((PARK_EXMP =1 AND BUILDABLE >600) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >600))))"
elif Scenario == "NoNoNoYesYesNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
BUILDABLE >300))"
elif Scenario == "NoNoNoYesYesYes":
```

```
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
((PARK_EXMP =1 AND BUILDABLE >300) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >300))))"
elif Scenario == "NoNoYesNoNoNo":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
BuildY > 800))"
elif Scenario == "NoNoYesNoNoYes":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
((PARK_EXMP =1 AND BuildY >800) OR (PARK_EXMP IS NULL AND BuildY+200 >800))))"
elif Scenario == "NoNoYesNoYesNo":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
BuildY > 400))"
elif Scenario == "NoNoYesNoYesYes":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
((PARK_EXMP =1 AND BuildY >400) OR (PARK_EXMP IS NULL AND BuildY+200 >400))))"
elif Scenario == "NoNoYesYesNoNo":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
BuildY > 600))"
elif Scenario == "NoNoYesYesNoYes":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
((PARK_EXMP =1 AND BuildY >600) OR (PARK_EXMP IS NULL AND BuildY+200 >600))))"
elif Scenario == "NoNoYesYesYesNo":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
BuildY > 300))"
elif Scenario == "NoNoYesYesYesYes":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA = 'N' AND
((PARK_EXMP =1 AND BuildY >300) OR (PARK_EXMP IS NULL AND BuildY+200 >300))))"
elif Scenario == "NoYesNoNoNoNo":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND BUILDABLE > 800))"
elif Scenario == "NoYesNoNoNoYes":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND ((PARK_EXMP =1 AND BUILDABLE >800) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >800))))"
elif Scenario == "NoYesNoNoYesNo":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND BUILDABLE > 400))"
elif Scenario == "NoYesNoNoYesYes":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND ((PARK_EXMP =1 AND BUILDABLE >400) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >400))))"
elif Scenario == "NoYesNoYesNoNo":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND BUILDABLE > 600))"
elif Scenario == "NoYesNoYesNoYes":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND ((PARK_EXMP =1 AND BUILDABLE >600) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >600))))"
elif Scenario == "NoYesNoYesYesNo":
        expression = "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND BUILDABLE > 300))"
```

```python
elif Scenario == "NoYesNoYesYesYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND ((PARK_EXMP =1 AND BUILDABLE >300) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >300))))"
elif Scenario == "NoYesYesNoNoNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND BuildY > 800))"
elif Scenario == "NoYesYesNoNoYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND ((PARK_EXMP =1 AND BuildY >800) OR (PARK_EXMP IS NULL AND BuildY+200
>800))))"
elif Scenario == "NoYesYesNoYesNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND BuildY > 400))"
elif Scenario == "NoYesYesNoYesYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND ((PARK_EXMP =1 AND BuildY >400) OR (PARK_EXMP IS NULL AND BuildY+200
>400))))"
elif Scenario == "NoYesYesYesNoNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND BuildY > 600))"
elif Scenario == "NoYesYesYesNoYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND ((PARK_EXMP =1 AND BuildY >600) OR (PARK_EXMP IS NULL AND BuildY+200
>600))))"
elif Scenario == "NoYesYesYesYesNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND BuildY > 300))"
elif Scenario == "NoYesYesYesYesYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ = 'N' AND UrbanA IS NOT
NULL AND ((PARK_EXMP =1 AND BuildY >300) OR (PARK_EXMP IS NULL AND BuildY+200
>300))))"
elif Scenario == "YesNoNoNoNoNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N' AND BUILDABLE > 800))"
elif Scenario == "YesNoNoNoNoYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND ((PARK_EXMP =1 AND BUILDABLE >800) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >800))))"
elif Scenario == "YesNoNoNoYesNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND BUILDABLE > 400))"
elif Scenario == "YesNoNoNoYesYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND ((PARK_EXMP =1 AND BUILDABLE >400) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >400))))"
elif Scenario == "YesNoNoYesNoNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND BUILDABLE > 600))"
elif Scenario == "YesNoNoYesNoYes":
```

```
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND ((PARK_EXMP =1 AND BUILDABLE >600) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >600))))"
elif Scenario == "YesNoNoYesYesNo":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND BUILDABLE > 300))"
elif Scenario == "YesNoNoYesYesYes":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND ((PARK_EXMP =1 AND BUILDABLE >300) OR (PARK_EXMP IS NULL AND
BUILDABLE+200 >300))))"
elif Scenario == "YesNoYesNoNoNo":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND BuildY > 800))"
elif Scenario == "YesNoYesNoNoYes":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND ((PARK_EXMP =1 AND BuildY >800) OR (PARK_EXMP IS NULL AND BuildY+200
>800))))"
elif Scenario == "YesNoYesNoYesNo":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND BuildY > 400))"
elif Scenario == "YesNoYesNoYesYes":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND ((PARK_EXMP =1 AND BuildY >400) OR (PARK_EXMP IS NULL AND BuildY+200
>400))))"
elif Scenario == "YesNoYesYesNoNo":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND BuildY > 600))"
elif Scenario == "YesNoYesYesNoYes":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND ((PARK_EXMP =1 AND BuildY >600) OR (PARK_EXMP IS NULL AND BuildY+200
>600))))"
elif Scenario == "YesNoYesYesYesNo":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND BuildY > 300))"
elif Scenario == "YesNoYesYesYesYes":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
= 'N'  AND ((PARK_EXMP =1 AND BuildY >300) OR (PARK_EXMP IS NULL AND BuildY+200
>300))))"
elif Scenario == "YesYesNoNoNoNo":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND BUILDABLE > 800))"
elif Scenario == "YesYesNoNoNoYes":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND ((PARK_EXMP =1 AND BUILDABLE >800) OR (PARK_EXMP IS NULL
AND BUILDABLE+200 >800))))"
elif Scenario == "YesYesNoNoYesNo":
        expression =  "CITY ="'+City+'" AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND BUILDABLE > 400))"
elif Scenario == "YesYesNoNoYesYes":
```

```
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND ((PARK_EXMP =1 AND BUILDABLE >400) OR (PARK_EXMP IS NULL
AND BUILDABLE+200 >400))))"
elif Scenario == "YesYesNoYesNoNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND BUILDABLE > 600))"
elif Scenario == "YesYesNoYesNoYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND ((PARK_EXMP =1 AND BUILDABLE >600) OR (PARK_EXMP IS NULL
AND BUILDABLE+200 >600))))"
elif Scenario == "YesYesNoYesYesNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND BUILDABLE > 300))"
elif Scenario == "YesYesNoYesYesYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND ((PARK_EXMP =1 AND BUILDABLE >300) OR (PARK_EXMP IS NULL
AND BUILDABLE+200 >300))))"
elif Scenario == "YesYesYesNoNoNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND BuildY > 800))"
elif Scenario == "YesYesYesNoNoYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND ((PARK_EXMP =1 AND BuildY >800) OR (PARK_EXMP IS NULL AND
BuildY+200 >800))))"
elif Scenario == "YesYesYesNoYesNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND BuildY > 400))"
elif Scenario == "YesYesYesNoYesYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND ((PARK_EXMP =1 AND BuildY >400) OR (PARK_EXMP IS NULL AND
BuildY+200 >400))))"
elif Scenario == "YesYesYesYesNoNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND BuildY > 600))"
elif Scenario == "YesYesYesYesNoYes":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND ((PARK_EXMP =1 AND BuildY >600) OR (PARK_EXMP IS NULL AND
BuildY+200 >600))))"
elif Scenario == "YesYesYesYesYesNo":
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND BuildY > 300))"
else:
        expression =  "CITY ='"+City+"' AND (STATE = 1 OR (FireZ IS NOT NULL AND UrbanA
IS NOT NULL AND ((PARK_EXMP =1 AND BuildY >300) OR (PARK_EXMP IS NULL AND
BuildY+200 >300))))"

arcpy.SelectLayerByAttribute_management(ALyr,"NEW_SELECTION", expression)
Num = str(arcpy.GetCount_management(ALyr))

arcpy.AddMessage("Accodring to the selected scenario, ADU eligible properties in the City of
"+City+" = "+Num)
```

```
df.zoomToSelectedFeatures()
del mxd, Slyr
```

Appendix E

ADU Eligible Parcels by Policy Scenario

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
No	No	No	No	No	No	#	1602768	446410	339494	433921	21774	112031	2956398
						%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
No	No	No	No	No	Yes	#	1617425	465884	397056	455571	22468	113193	3071597
						%	100.9%	104.4%	117.0%	105.0%	103.2%	101.0%	103.9%
No	No	No	No	Yes	No	#	1649451	478640	406010	466983	22601	116831	3140516
						%	102.9%	107.2%	119.6%	107.6%	103.8%	104.3%	106.2%
No	No	No	No	Yes	Yes	#	1649615	479942	406606	470166	22631	117599	3146559
						%	102.9%	107.5%	119.8%	108.4%	103.9%	105.0%	106.4%
No	No	No	Yes	No	No	#	1635067	471570	400690	459275	22527	114793	3103922
						%	102.0%	105.6%	118.0%	105.8%	103.5%	102.5%	105.0%
No	No	No	Yes	No	Yes	#	1635328	473100	401592	462754	22567	115460	3110801
						%	102.0%	106.0%	118.3%	106.6%	103.6%	103.1%	105.2%
No	No	No	Yes	Yes	No	#	1655841	482142	407830	471362	22631	117849	3157655
						%	103.3%	108.0%	120.1%	108.6%	103.9%	105.2%	106.8%
No	No	No	Yes	Yes	Yes	#	1656011	483174	408294	474705	22659	118662	3163505
						%	103.3%	108.2%	120.3%	109.4%	104.1%	105.9%	107.0%
No	No	Yes	No	No	No	#	1644368	473692	404798	464455	22572	116032	3125917
						%	102.6%	106.1%	119.2%	107.0%	103.7%	103.6%	105.7%
No	No	Yes	No	No	Yes	#	1644542	475192	405408	467027	22604	116656	3131429
						%	102.6%	106.4%	119.4%	107.6%	103.8%	104.1%	105.9%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
No	No	Yes	No	Yes	No	#	1667512	486420	410680	479097	22678	119674	3186061
						%	104.0%	109.0%	121.0%	110.4%	104.2%	106.8%	107.8%
No	No	Yes	No	Yes	Yes	#	1667691	487297	411679	481557	22679	120369	3191272
						%	104.1%	109.2%	121.3%	111.0%	104.2%	107.4%	107.9%
No	No	Yes	Yes	No	No	#	1656336	480486	407280	471725	22644	117893	3156364
						%	103.3%	107.6%	120.0%	108.7%	104.0%	105.2%	106.8%
No	No	Yes	Yes	No	Yes	#	1656464	481354	407714	474369	22656	118555	3161112
						%	103.4%	107.8%	120.1%	109.3%	104.1%	105.8%	106.9%
No	No	Yes	Yes	Yes	No	#	1672940	489556	413276	483972	22693	120574	3203011
						%	104.4%	109.7%	121.7%	111.5%	104.2%	107.6%	108.3%
No	No	Yes	Yes	Yes	Yes	#	1673120	490590	414281	486062	22695	121330	3208078
						%	104.4%	109.9%	122.0%	112.0%	104.2%	108.3%	108.5%
No	Yes	No	No	No	No	#	1618984	464083	397359	476306	22839	114798	3094369
						%	101.0%	104.0%	117.0%	109.8%	104.9%	102.5%	104.7%
No	Yes	No	No	No	Yes	#	1619268	465890	398576	479448	22885	115433	3101500
						%	101.0%	104.4%	117.4%	110.5%	105.1%	103.0%	104.9%
No	Yes	No	No	Yes	No	#	1651302	478646	407548	490895	23018	119103	3170512
						%	103.0%	107.2%	120.0%	113.1%	105.7%	106.3%	107.2%
No	Yes	No	No	Yes	Yes	#	1651468	479948	408145	494240	23048	119891	3176740
						%	103.0%	107.5%	120.2%	113.9%	105.9%	107.0%	107.5%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
No	Yes	No	Yes	No	No	#	1636910	471576	402218	483155	22944	117033	3133836
						%	102.1%	105.6%	118.5%	111.3%	105.4%	104.5%	106.0%
No	Yes	No	Yes	No	Yes	#	1637179	473106	403123	486666	22984	117730	3140788
						%	102.1%	106.0%	118.7%	112.2%	105.6%	105.1%	106.2%
No	Yes	No	Yes	Yes	No	#	1657693	482148	409368	495417	23048	120133	3187807
						%	103.4%	108.0%	120.6%	114.2%	105.9%	107.2%	107.8%
No	Yes	No	Yes	Yes	Yes	#	1657865	483180	409833	498793	23076	120957	3193704
						%	103.4%	108.2%	120.7%	115.0%	106.0%	108.0%	108.0%
No	Yes	Yes	No	No	No	#	1646215	473698	406334	488351	22989	118287	3155874
						%	102.7%	106.1%	119.7%	112.5%	105.6%	105.6%	106.7%
No	Yes	Yes	No	No	Yes	#	1646392	475198	406945	491048	23021	118932	3161536
						%	102.7%	106.4%	119.9%	113.2%	105.7%	106.2%	106.9%
No	Yes	Yes	No	Yes	No	#	1669366	486426	412219	503181	23095	121970	3216257
						%	104.2%	109.0%	121.4%	116.0%	106.1%	108.9%	108.8%
No	Yes	Yes	No	Yes	Yes	#	1669547	487303	413218	505665	23096	122686	3221515
						%	104.2%	109.2%	121.7%	116.5%	106.1%	109.5%	109.0%
No	Yes	Yes	Yes	No	No	#	1658186	480492	408818	495746	23061	120169	3186472
						%	103.5%	107.6%	120.4%	114.2%	105.9%	107.3%	107.8%
No	Yes	Yes	Yes	No	Yes	#	1658318	481360	409253	498453	23073	120851	3191308
						%	103.5%	107.8%	120.5%	114.9%	106.0%	107.9%	107.9%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
No	Yes	Yes	Yes	Yes	No	#	1674795	489562	414815	508067	23110	122881	3233230
						%	104.5%	109.7%	122.2%	117.1%	106.1%	109.7%	109.4%
No	Yes	Yes	Yes	Yes	Yes	#	1674977	490596	415820	510202	23112	123657	3238364
						%	104.5%	109.9%	122.5%	117.6%	106.1%	110.4%	109.5%
Yes	No	No	No	No	No	#	1627756	464077	397580	487039	22422	147825	3146699
						%	101.6%	104.0%	117.1%	112.2%	103.0%	132.0%	106.4%
Yes	No	No	No	No	Yes	#	1628056	465884	398798	490186	22468	148715	3154107
						%	101.6%	104.4%	117.5%	113.0%	103.2%	132.7%	106.7%
Yes	No	No	No	Yes	No	#	1660247	478640	407795	502024	22601	153041	3224348
						%	103.6%	107.2%	120.1%	115.7%	103.8%	136.6%	109.1%
Yes	No	No	No	Yes	Yes	#	1660425	479942	408393	505330	22631	153998	3230719
						%	103.6%	107.5%	120.3%	116.5%	103.9%	137.5%	109.3%
Yes	No	No	Yes	No	No	#	1645774	471570	402463	494054	22527	150531	3186919
						%	102.7%	105.6%	118.5%	113.9%	103.5%	134.4%	107.8%
Yes	No	No	Yes	No	Yes	#	1646057	473100	403365	497701	22567	151431	3194221
						%	102.7%	106.0%	118.8%	114.7%	103.6%	135.2%	108.0%
Yes	No	No	Yes	Yes	No	#	1666671	482142	409619	506527	22631	154305	3241895
						%	104.0%	108.0%	120.7%	116.7%	103.9%	137.7%	109.7%
Yes	No	No	Yes	Yes	Yes	#	1666852	483174	410084	510003	22659	155279	3248051
						%	104.0%	108.2%	120.8%	117.5%	104.1%	138.6%	109.9%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Yes	No	Yes	No	No	No	#	1655122	473692	406581	499401	22572	152016	3209384
						%	103.3%	106.1%	119.8%	115.1%	103.7%	135.7%	108.6%
Yes	No	Yes	No	No	Yes	#	1655318	475192	407193	502098	22604	152842	3215247
						%	103.3%	106.4%	119.9%	115.7%	103.8%	136.4%	108.8%
Yes	No	Yes	No	Yes	No	#	1678397	486420	412477	514504	22678	156610	3271086
						%	104.7%	109.0%	121.5%	118.6%	104.2%	139.8%	110.6%
Yes	No	Yes	No	Yes	Yes	#	1678588	487297	413481	517120	22679	157462	3276627
						%	104.7%	109.2%	121.8%	119.2%	104.2%	140.6%	110.8%
Yes	No	Yes	Yes	No	No	#	1667162	480486	409070	506906	22644	154326	3240594
						%	104.0%	107.6%	120.5%	116.8%	104.0%	137.8%	109.6%
Yes	No	Yes	Yes	No	Yes	#	1667306	481354	409505	509666	22656	155145	3245632
						%	104.0%	107.8%	120.6%	117.5%	104.1%	138.5%	109.8%
Yes	No	Yes	Yes	Yes	No	#	1683859	489556	415088	519670	22693	157809	3288675
						%	105.1%	109.7%	122.3%	119.8%	104.2%	140.9%	111.2%
Yes	No	Yes	Yes	Yes	Yes	#	1684043	490590	416098	521876	22695	158699	3294001
						%	105.1%	109.9%	122.6%	120.3%	104.2%	141.7%	111.4%
Yes	Yes	No	No	No	No	#	1629699	464083	399100	511043	22839	150295	3177059
						%	101.7%	104.0%	117.6%	117.8%	104.9%	134.2%	107.5%
Yes	Yes	No	No	No	Yes	#	1630004	465890	400319	514353	22885	151219	3184670
						%	101.7%	104.4%	117.9%	118.5%	105.1%	135.0%	107.7%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Yes	Yes	No	No	Yes	No	#	1662203	478646	409334	526226	23018	155596	3255023
						%	103.7%	107.2%	120.6%	121.3%	105.7%	138.9%	110.1%
Yes	Yes	No	No	Yes	Yes	#	1662383	479948	409933	529694	23048	156591	3261597
						%	103.7%	107.5%	120.7%	122.1%	105.9%	139.8%	110.3%
Yes	Yes	No	Yes	No	No	#	1647722	471576	403992	518224	22944	153035	3217493
						%	102.8%	105.6%	119.0%	119.4%	105.4%	136.6%	108.8%
Yes	Yes	No	Yes	No	Yes	#	1648013	473106	404897	521903	22984	153984	3224887
						%	102.8%	106.0%	119.3%	120.3%	105.6%	137.4%	109.1%
Yes	Yes	No	Yes	Yes	No	#	1668628	482148	411158	530872	23048	156881	3272735
						%	104.1%	108.0%	121.1%	122.3%	105.9%	140.0%	110.7%
Yes	Yes	No	Yes	Yes	Yes	#	1668811	483180	411624	534381	23076	157881	3278953
						%	104.1%	108.2%	121.2%	123.2%	106.0%	140.9%	110.9%
Yes	Yes	Yes	No	No	No	#	1657074	473698	408118	523587	22989	154544	3240010
						%	103.4%	106.1%	120.2%	120.7%	105.6%	137.9%	109.6%
Yes	Yes	Yes	No	No	Yes	#	1657273	475198	408731	526409	23021	155413	3246045
						%	103.4%	106.4%	120.4%	121.3%	105.7%	138.7%	109.8%
Yes	Yes	Yes	No	Yes	No	#	1680356	486426	414017	538878	23095	159210	3301982
						%	104.8%	109.0%	122.0%	124.2%	106.1%	142.1%	111.7%
Yes	Yes	Yes	No	Yes	Yes	#	1680549	487303	415021	541518	23096	160092	3307579
						%	104.9%	109.2%	122.2%	124.8%	106.1%	142.9%	111.9%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Yes	Yes	Yes	Yes	No	No	#	1669117	480492	410609	531217	23061	156897	3271393
						%	104.1%	107.6%	120.9%	122.4%	105.9%	140.0%	110.7%
Yes	Yes	Yes	Yes	No	Yes	#	1669265	481360	411045	534040	23073	157745	3276528
						%	104.1%	107.8%	121.1%	123.1%	106.0%	140.8%	110.8%
Yes	Yes	Yes	Yes	Yes	No	#	1685819	489562	416628	544055	23110	160426	3319600
						%	105.2%	109.7%	122.7%	125.4%	106.1%	143.2%	112.3%
Yes	Yes	Yes	Yes	Yes	Yes	#	1686005	490596	417638	546306	23112	161342	3324999
						%	105.2%	109.9%	123.0%	125.9%	106.1%	144.0%	112.5%

Note: The percent (%) indicates that the percent to ADU eligible parcels by the State ADU law.

Appendix F

ADU Eligible Parcels in The Constrained and Absolute Constrained Areas

	ADU Eligible Parcels in the Constrained Areas							
Type	Exemption	Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Single Family	Parking & Setback	216,704	136,701	19,051	55,685	184	22,182	450,507
	Parking	150,387	99,381	88,203	94,517	160	43,329	475,977
	Setback	15,972	13,386	11,020	38,159	50	4,820	83,407
	No	30,185	17,968	48,544	68,057	69	8,280	173,103
	Total	413,248	267,436	166,818	256,418	463	78,611	1,182,994
Multi Family	Parking	101,874	12,771	4,477	20,109	22	4,054	143,307
	No	1,932	190	287	9,359	6	314	12,088
	Total	103,806	12,961	4,764	29,468	28	4,368	155,395
Grand Total		517,054	280,397	171,582	285,886	491	82,979	1,338,389
Total ADU Eligible Parcels		1,602,768	446,410	339,494	433,921	21,774	112,031	2,956,398
% to Total ADU Eligible Parcels		32.3%	62.8%	50.5%	65.9%	2.3%	74.1%	45.3%
	ADU Eligible Parcels in the Absolute Constrained Areas							
Type	Exemption	Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Single Family	Parking & Setback	4,555	15,166	3,228	4,481	32	1,039	28,501
	Parking	5,309	15,152	14,596	8,573	59	2,005	45,694
	Setback	479	4,196	1,506	5,624	37	1,485	13,327
	No	1,225	6,981	8,701	9,608	68	1,532	28,115
	Total	11,568	41,495	28,031	28,286	196	6,061	115,637
Multi Family	Parking	11,719	976	666	1,787	9	184	15,341
	No	262	199	109	1,556	6	100	2,232
	Total	11,981	1,175	775	3,343	15	284	17,573
Grand Total		23,549	42,670	28,806	31,629	211	6,345	133,210
Total ADU Eligible Parcels		1,602,768	446,410	339,494	433,921	21,774	112,031	2,956,398
% to Total ADU Eligible Parcels		1.5%	9.6%	8.5%	7.3%	1.0%	5.7%	4.5%

Appendix G

ADU Eligible Parcels in The Priority Growth Areas by Policy Scenario

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
No	No	No	No	No	No	#	1182180	208001	121300	103764	13416	39723	1668384
						%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
No	No	No	No	No	Yes	#	1190651	211606	127131	106710	13634	39881	1689613
						%	100.7%	101.7%	104.8%	102.8%	101.6%	100.4%	101.3%
No	No	No	No	Yes	No	#	1218308	217495	130297	110347	13719	41350	1731516
						%	103.1%	104.6%	107.4%	106.3%	102.3%	104.1%	103.8%
No	No	No	No	Yes	Yes	#	1218332	217711	130340	110494	13722	41400	1731999
						%	103.1%	104.7%	107.5%	106.5%	102.3%	104.2%	103.8%
No	No	No	Yes	No	No	#	1205872	214383	128847	108217	13685	40681	1711685
						%	102.0%	103.1%	106.2%	104.3%	102.0%	102.4%	102.6%
No	No	No	Yes	No	Yes	#	1205890	214565	128897	108465	13686	40744	1712247
						%	102.0%	103.2%	106.3%	104.5%	102.0%	102.6%	102.6%
No	No	No	Yes	Yes	No	#	1223874	219232	131124	111758	13736	41673	1741397
						%	103.5%	105.4%	108.1%	107.7%	102.4%	104.9%	104.4%
No	No	No	Yes	Yes	Yes	#	1223890	219430	131138	111942	13740	41703	1741843
						%	103.5%	105.5%	108.1%	107.9%	102.4%	105.0%	104.4%
No	No	Yes	No	No	No	#	1213702	214642	129869	109381	13693	41161	1722448
						%	102.7%	103.2%	107.1%	105.4%	102.1%	103.6%	103.2%
No	No	Yes	No	No	Yes	#	1213712	214907	129913	109574	13697	41215	1723018
						%	102.7%	103.3%	107.1%	105.6%	102.1%	103.8%	103.3%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
No	No	Yes	No	Yes	No	#	1234066	220931	132433	114141	13753	42326	1757650
						%	104.4%	106.2%	109.2%	110.0%	102.5%	106.6%	105.4%
No	No	Yes	No	Yes	Yes	#	1234089	221126	132759	114345	13754	42366	1758439
						%	104.4%	106.3%	109.4%	110.2%	102.5%	106.7%	105.4%
No	No	Yes	Yes	No	No	#	1224109	217811	130811	111736	13731	41769	1739967
						%	103.5%	104.7%	107.8%	107.7%	102.3%	105.2%	104.3%
No	No	Yes	Yes	No	Yes	#	1224127	217935	130824	111884	13733	41807	1740310
						%	103.5%	104.8%	107.9%	107.8%	102.4%	105.2%	104.3%
No	No	Yes	Yes	Yes	No	#	1238833	222608	133780	115686	13766	42601	1767274
						%	104.8%	107.0%	110.3%	111.5%	102.6%	107.2%	105.9%
No	No	Yes	Yes	Yes	Yes	#	1238854	222833	134113	115826	13767	42659	1768052
						%	104.8%	107.1%	110.6%	111.6%	102.6%	107.4%	106.0%
No	Yes	No	No	No	No	#	1190662	211361	126883	106871	13688	39810	1689275
						%	100.7%	101.6%	104.6%	103.0%	102.0%	100.2%	101.3%
No	Yes	No	No	No	Yes	#	1190681	211606	127144	107043	13689	39881	1690044
						%	100.7%	101.7%	104.8%	103.2%	102.0%	100.4%	101.3%
No	Yes	No	No	Yes	No	#	1218338	217495	130310	110681	13774	41350	1731948
						%	103.1%	104.6%	107.4%	106.7%	102.7%	104.1%	103.8%
No	Yes	No	No	Yes	Yes	#	1218362	217711	130353	110828	13777	41400	1732431
						%	103.1%	104.7%	107.5%	106.8%	102.7%	104.2%	103.8%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
No	Yes	No	Yes	No	No	#	1205902	214383	128860	108550	13740	40681	1712116
						%	102.0%	103.1%	106.2%	104.6%	102.4%	102.4%	102.6%
No	Yes	No	Yes	No	Yes	#	1205920	214565	128910	108799	13741	40744	1712679
						%	102.0%	103.2%	106.3%	104.9%	102.4%	102.6%	102.7%
No	Yes	No	Yes	Yes	No	#	1223904	219232	131137	112092	13791	41673	1741829
						%	103.5%	105.4%	108.1%	108.0%	102.8%	104.9%	104.4%
No	Yes	No	Yes	Yes	Yes	#	1223920	219430	131151	112276	13795	41703	1742275
						%	103.5%	105.5%	108.1%	108.2%	102.8%	105.0%	104.4%
No	Yes	Yes	No	No	No	#	1213732	214642	129882	109714	13748	41161	1722879
						%	102.7%	103.2%	107.1%	105.7%	102.5%	103.6%	103.3%
No	Yes	Yes	No	No	Yes	#	1213742	214907	129926	109908	13752	41215	1723450
						%	102.7%	103.3%	107.1%	105.9%	102.5%	103.8%	103.3%
No	Yes	Yes	No	Yes	No	#	1234096	220931	132446	114475	13808	42326	1758082
						%	104.4%	106.2%	109.2%	110.3%	102.9%	106.6%	105.4%
No	Yes	Yes	No	Yes	Yes	#	1234119	221126	132772	114679	13809	42366	1758871
						%	104.4%	106.3%	109.5%	110.5%	102.9%	106.7%	105.4%
No	Yes	Yes	Yes	No	No	#	1224139	217811	130824	112070	13786	41769	1740399
						%	103.5%	104.7%	107.9%	108.0%	102.8%	105.2%	104.3%
No	Yes	Yes	Yes	No	Yes	#	1224157	217935	130837	112218	13788	41807	1740742
						%	103.6%	104.8%	107.9%	108.1%	102.8%	105.2%	104.3%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
No	Yes	Yes	Yes	Yes	No	#	1238863	222608	133793	116020	13821	42601	1767706
						%	104.8%	107.0%	110.3%	111.8%	103.0%	107.2%	106.0%
No	Yes	Yes	Yes	Yes	Yes	#	1238884	222833	134126	116160	13822	42659	1768484
						%	104.8%	107.1%	110.6%	111.9%	103.0%	107.4%	106.0%
Yes	No	No	No	No	No	#	1192978	211361	127161	107814	13633	43865	1696812
						%	100.9%	101.6%	104.8%	103.9%	101.6%	110.4%	101.7%
Yes	No	No	No	No	Yes	#	1192997	211606	127423	107986	13634	43940	1697586
						%	100.9%	101.7%	105.0%	104.1%	101.6%	110.6%	101.8%
Yes	No	No	No	Yes	No	#	1220740	217495	130630	111661	13719	45480	1739725
						%	103.3%	104.6%	107.7%	107.6%	102.3%	114.5%	104.3%
Yes	No	No	No	Yes	Yes	#	1220764	217711	130673	111808	13722	45530	1740208
						%	103.3%	104.7%	107.7%	107.8%	102.3%	114.6%	104.3%
Yes	No	No	Yes	No	No	#	1208262	214383	129170	109513	13685	44784	1719797
						%	102.2%	103.1%	106.5%	105.5%	102.0%	112.7%	103.1%
Yes	No	No	Yes	No	Yes	#	1208280	214565	129220	109761	13686	44848	1720360
						%	102.2%	103.2%	106.5%	105.8%	102.0%	112.9%	103.1%
Yes	No	No	Yes	Yes	No	#	1226321	219232	131458	113078	13736	45819	1749644
						%	103.7%	105.4%	108.4%	109.0%	102.4%	115.3%	104.9%
Yes	No	No	Yes	Yes	Yes	#	1226337	219430	131472	113288	13740	45852	1750119
						%	103.7%	105.5%	108.4%	109.2%	102.4%	115.4%	104.9%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Yes	No	Yes	No	No	No	#	1216114	214642	130200	110688	13693	45282	1730619
						%	102.9%	103.2%	107.3%	106.7%	102.1%	114.0%	103.7%
Yes	No	Yes	No	No	Yes	#	1216124	214907	130244	110881	13697	45336	1731189
						%	102.9%	103.3%	107.4%	106.9%	102.1%	114.1%	103.8%
Yes	No	Yes	No	Yes	No	#	1236541	220931	132768	115469	13753	46512	1765974
						%	104.6%	106.2%	109.5%	111.3%	102.5%	117.1%	105.8%
Yes	No	Yes	No	Yes	Yes	#	1236564	221126	133094	115726	13754	46559	1766823
						%	104.6%	106.3%	109.7%	111.5%	102.5%	117.2%	105.9%
Yes	No	Yes	Yes	No	No	#	1226554	217811	131145	113052	13731	45923	1748216
						%	103.8%	104.7%	108.1%	109.0%	102.3%	115.6%	104.8%
Yes	No	Yes	Yes	No	Yes	#	1226572	217935	131158	113200	13733	45966	1748564
						%	103.8%	104.8%	108.1%	109.1%	102.4%	115.7%	104.8%
Yes	No	Yes	Yes	Yes	No	#	1241323	222608	134128	117042	13766	46811	1775678
						%	105.0%	107.0%	110.6%	112.8%	102.6%	117.8%	106.4%
Yes	No	Yes	Yes	Yes	Yes	#	1241344	222833	134461	117210	13767	46870	1776485
						%	105.0%	107.1%	110.8%	113.0%	102.6%	118.0%	106.5%
Yes	Yes	No	No	No	No	#	1193008	211361	127174	108147	13688	43865	1697243
						%	100.9%	101.6%	104.8%	104.2%	102.0%	110.4%	101.7%
Yes	Yes	No	No	No	Yes	#	1193027	211606	127436	108319	13689	43940	1698017
						%	100.9%	101.7%	105.1%	104.4%	102.0%	110.6%	101.8%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Yes	Yes	No	No	Yes	No	#	1220770	217495	130643	111995	13774	45480	1740157
						%	103.3%	104.6%	107.7%	107.9%	102.7%	114.5%	104.3%
Yes	Yes	No	No	Yes	Yes	#	1220794	217711	130686	112142	13777	45530	1740640
						%	103.3%	104.7%	107.7%	108.1%	102.7%	114.6%	104.3%
Yes	Yes	No	Yes	No	No	#	1208292	214383	129183	109846	13740	44784	1720228
						%	102.2%	103.1%	106.5%	105.9%	102.4%	112.7%	103.1%
Yes	Yes	No	Yes	No	Yes	#	1208310	214565	129233	110095	13741	44848	1720792
						%	102.2%	103.2%	106.5%	106.1%	102.4%	112.9%	103.1%
Yes	Yes	No	Yes	Yes	No	#	1226351	219232	131471	113412	13791	45819	1750076
						%	103.7%	105.4%	108.4%	109.3%	102.8%	115.3%	104.9%
Yes	Yes	No	Yes	Yes	Yes	#	1226367	219430	131485	113622	13795	45852	1750551
						%	103.7%	105.5%	108.4%	109.5%	102.8%	115.4%	104.9%
Yes	Yes	Yes	No	No	No	#	1216144	214642	130213	111021	13748	45282	1731050
						%	102.9%	103.2%	107.3%	107.0%	102.5%	114.0%	103.8%
Yes	Yes	Yes	No	No	Yes	#	1216154	214907	130257	111215	13752	45336	1731621
						%	102.9%	103.3%	107.4%	107.2%	102.5%	114.1%	103.8%
Yes	Yes	Yes	No	Yes	No	#	1236571	220931	132781	115803	13808	46512	1766406
						%	104.6%	106.2%	109.5%	111.6%	102.9%	117.1%	105.9%
Yes	Yes	Yes	No	Yes	Yes	#	1236594	221126	133107	116060	13809	46559	1767255
						%	104.6%	106.3%	109.7%	111.8%	102.9%	117.2%	105.9%

Policy Scenario Options							ADU Eligible Parcels by Scenario						
Fire Hazard Area	Urban Area	Set-back	Unit Size	2 Story	Park-ing		Los Angeles	Orange	San Bernardino	Riverside	Imperial	Ventura	Total
Yes	Yes	Yes	Yes	No	No	#	1226584	217811	131158	113386	13786	45923	1748648
						%	103.8%	104.7%	108.1%	109.3%	102.8%	115.6%	104.8%
Yes	Yes	Yes	Yes	No	Yes	#	1226602	217935	131171	113534	13788	45966	1748996
						%	103.8%	104.8%	108.1%	109.4%	102.8%	115.7%	104.8%
Yes	Yes	Yes	Yes	Yes	No	#	1241353	222608	134141	117376	13821	46811	1776110
						%	105.0%	107.0%	110.6%	113.1%	103.0%	117.8%	106.5%
Yes	Yes	Yes	Yes	Yes	Yes	#	1241374	222833	134474	117544	13822	46870	1776917
						%	105.0%	107.1%	110.9%	113.3%	103.0%	118.0%	106.5%

Note: The percent (%) indicates that the percent to all the ADU eligible parcels by each scenario.

Appendix H

Best Practice Case Study: The City of Los Angeles

The purpose of this case study is to measure the impacts of the new ADU policy on ADU development at a city level. The research team selected the City of Los Angeles as the best practice case because it is one of the cities that produced the largest number of ADUs in the SCAG region. The City of Los Angeles adopted the new ADU ordinance on December 11, 2019, and the ordinance was effective on December 19, 2019. To measure the changes that the new ADU ordinance has made regarding ADU development in the city, the research team conducted two analyses: the identification of contributing factors to ADU development and ADU application processing time.

Contributing Factors to ADU Development

A parcel eligible for ADU construction does not mean that an ADU will be built on the parcel. A property owner's decision on actual ADU construction is much more complex than the eligibility. It is reasonable to hypothesize that the decision depends on not only the characteristics of the owner of the property but also the built environment and land use conditions of the neighborhood that the property is located. However, the contributing factors to ADU development remain unknown. Thus, the research team employs multilevel logistic regression that tests the likelihood of a parcel to construct an ADU due to the hierarchical structure of the data. The contributing factors to the ADU development of each parcel varies. Some of them are the unique characteristics of each parcel (e.g. year built), while some are the conditions of the neighborhood at which a parcel is located (e.g. land use diversity). The neighborhood conditions are the factors shared by multiple parcels. In other words, the parcel-neighborhood relationships are nested within a neighborhood. Because of the nested data structure, a standard regression violates the independence assumption, and as a result, underestimates standard errors of regression coefficients. Multilevel models can partition variance among the neighborhood level (Level 1) and the parcel level (Level 2) and uses level-specific variables to explain the variance at each level.

The research team constructed two multilevel logistic regression models that explore the impacts of the City's ADU ordinance adoption on ADU development in the city. Since the city adopted the new ADU ordinance on December 11, 2019, and the ordinance was effective on December 19, 2019, the research team constructed two models; one for ADU development before the new ordinance (Before Model) and one for ADU development after the new ordinance (After Model). It is noteworthy that the time-period of After Model, which measures changes from the new ordinance is much shorter than the multi-year period represented by Before Model due to the recent adoption of the ordinance.

ADU Data

The City's ADU development data was retrieved from the city's building permit data. The research team screened building permits that issued a certificate of occupancy to ADU from January 1, 2018, to December 11, 2020. With this screening process, 11,869 ADU permits were identified. Of 11,869 ADUs, a certificate of occupancy was issued to 9,999 ADU permits before the effective date of the new ordinance, while 1,870 ADU permits were approved after the effective date.

Dependent Variable

The dependent variable of the models is nominal, whether or not a parcel has an ADU permit (ADU development) coded with a dummy variable, 0 and 1. The parcels that had an ADU permit were identified by the data screening process described above. The parcels were coded with 1. Additionally, the research team selected 12,421 parcels that did not experience ADU development by employing a spatial random selection method. The selection method randomly picks samples by taking into consideration of samples' spatial even distribution. These parcels were coded with 0 and served as a reference group in the models (Figure below).
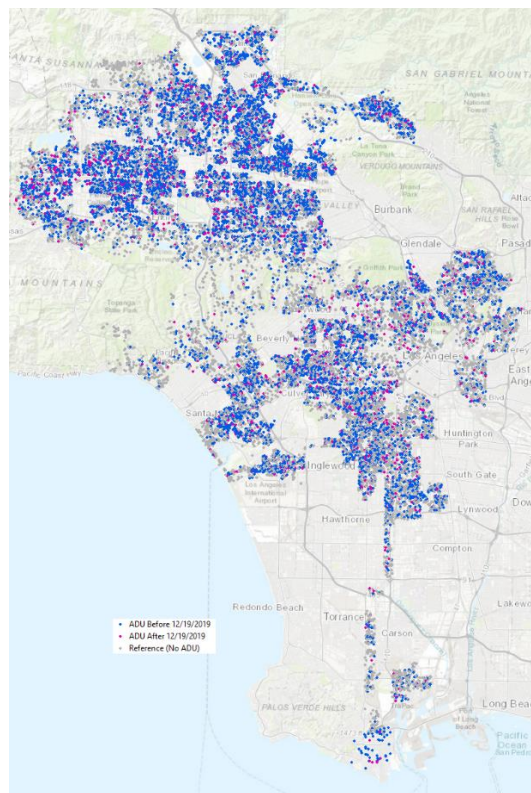
The location of ADU and reference parcels

Independent Variable

Using the 24,290 parcels as the unit of analysis, the research team computed independent variables. Independent variables are regarded as drivers affecting ADU development. In general, the literature suggests variables on physical conditions of parcel (e.g. slope and altitude), neighborhood characteristics (e.g. income and ethnicity), geographical location (e.g. distance from CBD), and transportation accessibility (e.g. highway accessibility and public transit accessibility).

<div align="center">The Description of Independent Variables</div>

Level	Category	Name	Description
Neighborhood Level (Level 1)	Socio-demographic Characteristics	Pop_Den	Population density
		Med_Inc	Median household income
		Med_Rent	Median gross rent
		Med_Val	Median owner-occupied home value
		Ethcty	Proportion of non-Latino White
	Housing and Land Use	Vac_Rate	Housing vacancy rate
		Rent_Per	Proportion of renter-occupied housing units
		Land_Dvrs	Land use diversity (Land use entropy)
Parcel Level (Level 2)	Characteristics of Parcel	Area	Lot Size
		Yr_Built	Year built
		Bldg_Area	The area of (an) existing building(s)
		Far	Floor area ratio (FAR) of a parcel
		A_Val	Parcel value (appraisal value)
		Elev	Elevation from the sea level
		Slope	The average slope of a parcel
	Transportation Accessibility	Hwy_Acc	Highway accessibility (distance to the nearest highway ramp)
		Bus_Trnst	Bus transit accessibility (bus stop density) within the pedestrian catchment
		Rail_Trnst	Rail transit accessibility (Dummy, if a rail transit exists within 0.5 miles, 1. Otherwise, 0)
	Accessibility to Amenities	Shop_Acc	Distances to the nearest shopping center
		Park_Acc	Distance to the nearest urban park
		Cbd_Acc	Distance to the central business district (CBD) of Los Angeles
		Sub_Cnt	Distance to the nearest sub-centers
	SCAG's Policy Growth Areas	Grw_Area	Dummy (if the parcel is within SCAG's Priority Growth Areas, then 1. Otherwise, 0)
		Cnst_Area	Dummy (if the parcel is within SCAG's Priority Constraint Areas, then 1. Otherwise, 0)

Based on the suggestions in the literature, the research team selected 24 independent variables (Table above). Of the independent variables, eight variables represent sociodemographic characteristics and housing/land use conditions at a neighborhood level (Level 1). Thus, parcels in the same neighborhood share the same value of the variables. The neighborhood was defined with census block-group. All the variables were extracted from U.S. Census' American Community Survey 2018 (5 year-estimated), except Land-Dvrs. The variable, Land-Dvrs, to land use entropy, reflects the uniformity of land use mixtures. Aggregating the land use codes into eight categories (residential, office, commercial and services, industrial, mixed-use, facilities and educations, open space and recreation, and others), the variable is computed as suggested in the following equation:

$$Land\_Dvrs = \sum \frac{P_j \times LN(P_j)}{LN(j)}$$

where Pj = proportion of land-use category j within the buffer,

j = number of land-use categories, and
LN = the natural logarithm of a number

The 16 variables under the category of the parcel level (Level 2) represent unique characteristics of each individual parcel. The variables include the physical conditions, accessibility to transportation infrastructure, accessibility to urban amenities of the parcels. Additionally, the research team included two independent variables, SCAG's Priority Growth Areas (Grw_Area) and Constraint Areas (Cnst_Area). A series of geo-spatial analysis was employed to measure the variables. For the analysis, this research team collected a variety of GIS data from SCAG and other agencies. The geo-spatial analysis is broadly classified into three types; distance analysis, density analysis, and others. The distance analysis refers to the measurement between a parcel and a variety of urban amenities or facilities. The analysis measures Euclidian distance between them. The density analysis returns the number of facilities within a certain distance from a parcel. For the density analysis, the research team employed a 0.25 mile buffer as a pedestrian catchment. Since the area of the catchment is consistent, the analysis did not normalize the counts by the area. Instead, it returned raw count values.

Overall, the multilevel logistic models generated reasonably reliable results. However, the smaller Information Criterions and -2 Log Likelihood (-2LL) of the After Model presents a stronger model fit than the Before Model (Table below). This indicates that the explanation power of the After Model on the ADU development increases by the city's adoption of the new ADU ordinance. In other words, the relationship between the independent and dependent variables becomes tighter as the city adopts the new ordinance. Taking into consideration the fact that the short time-period reflected in After Model, this change is significant enough to be recognized as a positive impact on the promotion of ADU development.

The Comparison of the Model Outputs

Category	Name	Before Model			After Model		
		Coef.	Sig.	Exp (Coef.)	Coef.	Sig.	Exp (Coef.)
	Intercept	26.303	***0.000	2.649E+11	19.687	***0.000	3.548E+08
Level 1 (Neighborhood Level)							
Socio-demographic Characteristics	Pop_Den	-0.012	***0.000	0.988	-0.017	***0.001	0.983
	Med_Inc	-3.116E-06	***0.001	1.000	-7.577E-07	0.699	1.000
	Med_Rent	-2.920E-05	0.280	1.000	-6.096E-05	0.254	1.000
	Med_Val	-4.817E-08	0.614	1.000	-2.107E-07	0.248	1.000
	Ethcty	0.170	0.152	1.185	-0.216	0.352	0.806
Housing and Land Use	Vac_Rate	-0.397	0.298	0.673	-0.746	0.339	0.474
	Rent_Per	0.084	0.564	1.087	0.572	*0.054	1.771
	Land_Dvrs	-0.407	***0.001	0.666	-0.260	0.292	0.771
Level 2 (Parcel Level)							
Characteristics of Parcel	Area	-0.985	***0.000	0.373	-1.610	***0.000	0.200
	Yr_Built	-0.013	***0.000	0.987	-0.010	***0.000	0.990
	Bldg_Area	-0.000	***0.000	1.000	8.238E-06	0.541	1.000
	Far	-3.776	***0.000	0.023	-0.949	***0.001	0.387
	A_Val	4.465E-07	***0.000	1.000	3.859E-07	***0.000	1.000
	Elev	0.001	***0.000	1.001	0.000	**0.025	1.000
	Slope	-0.103	***0.000	0.902	-0.106	***0.000	0.900
Transportation Accessibility	Hwy_Acc	-7.363E-06	0.675	1.000	3.223E-05	0.356	1.000
	Bus_Trnst	-0.002	**0.029	0.998	-0.003	0.144	0.997
	Rail_Trnst (Ref. =0)	-0.095	0.244	0.909	-0.053	0.766	0.948
Accessibility to Amenities	Shop_Acc	-0.000	***0.000	1.000	-0.000	***0.000	1.000
	Park_Acc	-2.308E-05	0.566	1.000	2.341E-05	0.777	1.000
	Cbd_Acc	6.647E-06	*0.060	1.000	1.678E-05	0.024	1.000
	Sub_Cnt	9.091E-06	0.294	1.000	-3.602E-05	***0.050	1.000
SCAG's Policy Growth Areas	Grw_Area (Ref. =0)	0.190	***0.002	1.209	0.058	0.654	1.059
	Cnst_Area (Ref. =0)	-0.113	**0.028	0.893	-0.197	**0.067	0.821
Akaike Information Criterion (AIC)		3,700,879.647			15,177.080		
Bayesian Information Criterion (BIC)		72,408.038			15,183.214		
-2 Log Likelihood (-2LL)		72,369.490			15,175.079		

Note: *, **, *** Correlations are significant at the 0.1, 0.05, and 0.01 levels, respectively (2 tails).
The orange and green highlights indicate a negative and positive correlation, respectively.
The reference category is parcels with no ADU development.

Before Model Results

According to the outputs of the Before Model, of the 24 independent variables, 15 variables present a correlation with the dependent variable, the likelihood of parcel having an ADU permit, at a statistically significant level. Overall, the variables representing the characteristics of a parcel significantly influence ADU development. All the variables in the category of parcel characteristics correlate with the dependent variable at a statistically significant level in the Before Model. Additionally, three variables, bus transit accessibility, shopping center accessibility, and distance to downtown Los Angeles present a correlation with the dependent variable in the Before Model. The impacts of the variables at the neighborhood level are less significant than ones at the parcel level. Three variables, population density, median household income, and land use diversity, present a statistically significant correlation with the dependent variable. In general, the outputs indicate that ADU development likely occurred in the parcels, which are smaller in size with a smaller and older building before the new ordinance was adopted. The outputs also suggest that ADU development tended to occur in areas, which have lower population density and more homogeneous land use patterns (probably e.g. single-family residential).

After Model Results

The outputs of the After Model indicate that 11 out of 24 independent variables correlate with the dependent variable at a statistical significance level. In the comparison of the Before and After Model, the decreased number of the independent variables correlated with the dependent variable is a prominent point. The significant features of the parcels in the Before Model become not significant in the After Model. This indicates that the unique characteristics that the ADU parcels show before the new ordinance are diminished. This suggests that the new ADU ordinance contributes to ADU development being spread to diverse types of parcels rather than parcels with specific conditions in limited geographical areas. Thus, this can be a positive sign for promoting ADU development.

Another positive sign for promoting ADU development is the bus transit accessibility variable whose correlation with the dependent variable changes from a negative correlation in the Before Model to no correlation in the After Model. According to the outputs, ADU development likely occurred in the areas that have fewer bus stops before the new ordinance was adopted. However, this relationship is not significant after the adoption of the new ordinance. This likely indicates that the city's new ordinance waiving parking requirements from the parcels adjacent to transit stops attracts ADU developments in the areas with high accessibility to bus stops. Although the correlation between bus accessibility and the likelihood of ADU development is not positive yet, changing the direction of the correlation is positive progress considering the short term after the adoption of the new ordinance.

Processing Time of ADU Applications

This analysis is to test the change in the term from application to approval of ADU developments by the city's new ADU ordinance adoption. It is reasonable to hypothesize that the term shortens after the adoption of the new ordinance since the new ordinance intends to promote ADU developments. However, there has been no clear data or analysis that attempts to test this hypothesis. This analysis fills this research gap by analyzing the ADU applications submitted to the city from February 1, 2016, to December 10, 2020. During this period, 12,144 ADU applications in total were submitted to the city. Of the applications, 10,194 and 1,950 were submitted before and after the city's new ADU ordinance was effective, respectively. The research team detected the review and approval process of the applications by identifying three important, sequential dates of the applications. They include the application date, issued date, and the date of the certificate of occupancy (CofO). The application date refers to the date that an ADU development application is submitted to the city. The issued date means the date that construction for the development can start as a building permit is issued. The date of CofO indicates the date that the city allows residents to occupy the ADU that passes building inspection.

ADU Applications by Type and Status

Application Status	Adoption	Building Addition		Building Alter/Repair		Building New		Building Relocation		Total	
		Count	%	Count	%	Count	%	Count	%	Count	%
CofO Corrected	Before	18	0.5	22	0.5	6	0.3	0	0.0	46	0.5
	After	1	0.2	0	0.0	0	0.0	0	0.0	1	0.1
CofO in Progress	Before	247	6.6	236	5.3	94	4.8	0	0.0	577	5.7
	After	23	4.3	48	4.0	1	0.5	0	0.0	72	3.7
CofO Issued	Before	1842	49.0	2590	57.6	930	47.9	1	100.0	5363	52.6
	After	59	11.0	160	13.3	10	4.7	0	0.0	229	11.7
Issued	Before	1588	42.2	1500	33.4	872	44.9	0	0.0	3960	38.8
	After	447	83.7	965	80.1	200	94.3	0	0.0	1612	82.7
Others	Before	64	1.7	146	3.2	38	2.0	0	0.0	248	2.4
	After	4	0.7	31	2.6	1	0.5	0	0.0	36	1.8
Total	Before	3759	100	4494	100	1940	100	1	100	10194	100
	After	534	100	1204	100	212	100	0	0	1950	100

As expected, overall, the term between the application date and the issued data decreases after the adoption of the new ordinance. On average, the terms before and after the adoption were 129 and 94 days, respectively. This means that the term reduced about 27 percent after the adoption. To investigate the details of the time taken for the process of review/approval, the research team classified the ADU application by their type and status (Table above). This classification also

interesting progress of the review/approval after the adoption. Although the proportion of the applications at the stages of CofO (including CofO corrected, CofO in progress, and CofO issued) after the adoption is lower than the percent before the adoption, this gap is primarily due to the time gap of before (1,461 days) and after (367 days) periods represented by this dataset.

The Review/Approval Time by Application Type and Status

Application Status	Adoption	Count	From application to issued date	From issued to CofO date	From application to CofO date
By Application Status					
CofO Issued	Before	5363	93.8 days	343.4 days	437.2 days
	After	229	41.2 days	165.9 days	207.1 days
	Difference		52.6 days (56.1%)	177.4 days (51.7%)	230.6 days (52.6%)
Issued	Before	3960	181.1 days	N/A	N/A
	After	1612	109.3 days	N/A	N/A
	Difference		71.8 days (39.7%)	N/A	N/A
By Application Type					
Building Addition	Before	3759	142.0 days	N/A	N/A
	After	534	115.9 days	N/A	N/A
	Difference		26.1 days (18.4%)	N/A	N/A
Building Alter/Repair	Before	4494	85.0 days	N/A	N/A
	After	1204	79.0 days	N/A	N/A
	Difference		6.0 days (7.1%)	N/A	N/A
Building New	Before	1940	205.0 days	N/A	N/A
	After	212	161.3 days	N/A	N/A
	Difference		46.7 days (21.3%)	N/A	N/A

In order to make a fair comparison, the research team measured the terms between the three dates by application type and status (Table above). Overall, the review and approval times after the adoption of the new ordinance significantly shorten. Especially, the entire processing time (from application date to CofO dates) of the completed ADU developments is reduced from 437.2 days (approximately one year and two months) to 207.1 days (approximately six months). The reduction of the time was identified regardless of the type of applications including new building construction, building addition, and building repair. This indicates the city's efforts on the promotion of ADU development, not only by adopting the new ordinance that widens the potential applicants to ADU development but also by reducing the city's review/approval time.