

WHERE SHALL WE BUILD?

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GEOGRAPHIC INFO SYSTEM
GSAPP FALL 2024

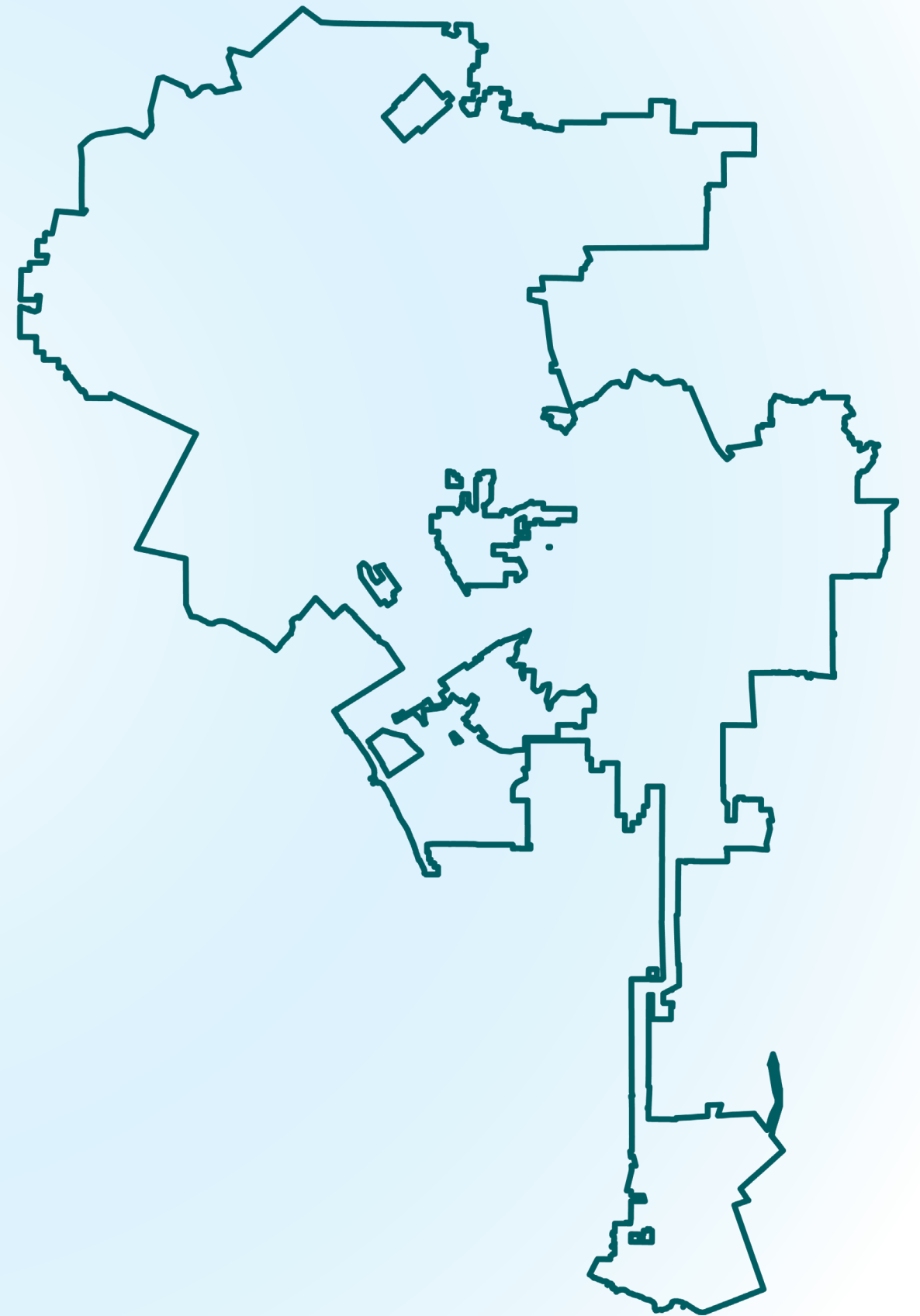
ENABLING HOUSING & TODs IN LOS ANGELES, CALIFORNIA



COLUMBIA
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OVERVIEW

Los Angeles, home to 3.8 million residents, is the second-largest city in the United States and is set to host the 2028 Summer Olympics. While this global event presents opportunities to showcase the city's vibrancy and infrastructure, Los Angeles is simultaneously grappling with two urgent and interconnected challenges: a severe housing shortage and an inadequate public transit system. These crises are undermining the quality of life for many Angelenos, particularly those who are economically disadvantaged, leaving them unhoused or stranded with limited mobility options.

Addressing these critical issues requires forward-thinking, progressive solutions that extend well beyond the 2028 horizon. However, in the immediate term, leveraging both existing transit infrastructure and ongoing transit projects offers a practical and impactful approach. By prioritizing the development of dense Transit-Oriented Developments (TODs), Los Angeles can maximize land use, increase housing supply, and enhance mobility in a sustainable manner.

This research seeks to identify the most strategic opportunities for TOD implementation and aims to answer a central question: **WHERE SHALL WE BUILD?**



DATA

This project uses a systematic approach to identify transit-oriented development (TOD) opportunities and assess housing affordability in relation to transit accessibility. By integrating multiple datasets, performing geospatial analyses, and synthesizing results into a Multi-Criteria Decision Analysis (MCDA), the methodology provides a nuanced understanding of TOD potential in Los Angeles.

DATA SOURCES AND ORGANIZATION

The methodology is structured into three categories: Affordability Factors, Transit-Oriented Development Context, and Development Potential. Each category relies on key datasets and processes that inform specific map outputs.

Affordability Factors:

- **Property Value Data (Zillow):** Property value change over time highlights long-term trends in the study area. (Map 3)
- **Income Data (ACS, LA Almanac):** Combined with property values to calculate the Affordability Index, showing cost burden relative to income. (Map 8)

Transit-Oriented Development Context:

- **Transit Station Buffers:** 0.5-mile buffers around built and under-construction stations visualize accessibility through Kernel Density Analysis. (Map 5)

- **Roads Centerline Data:** Weighted by road classifications to reflect travel conditions, incorporated into the final weighted overlay. (Map 8)

Development Potential:

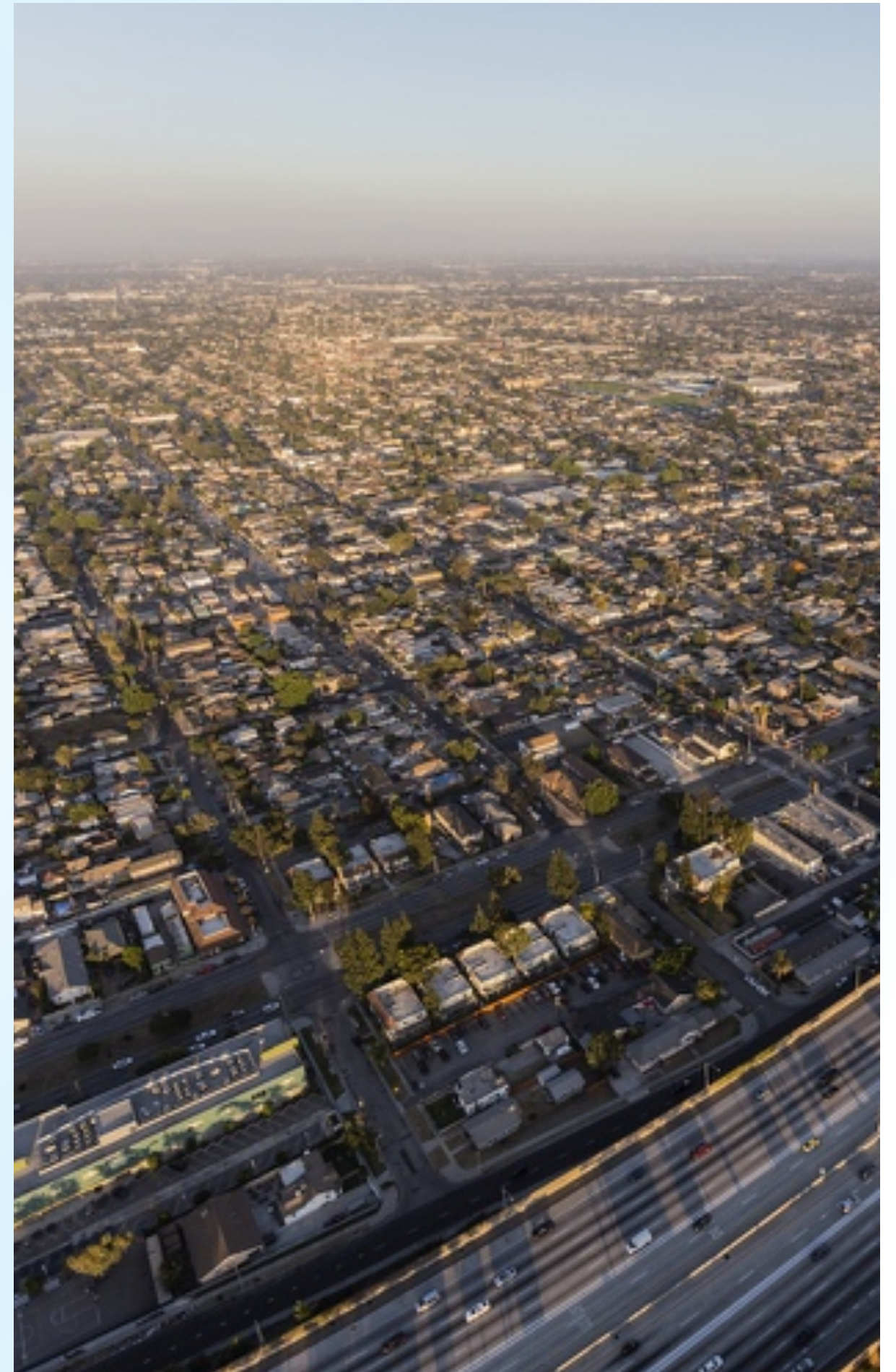
- **Underutilized Parcels (Zoning Data):** Highlights areas with zoning mismatches or low land utilization via Kernel Density Analysis. (Map 6)
- **Construction Permit Data:** Maps the spatial distribution of recent construction activity within TOD zones. (Map 7)

MULTI-CRITERIA DECISION ANALYSIS (MCDA)

The MCDA combines outputs from affordability, TOD proximity, underutilized parcels, and development trends into a Weighted Overlay Analysis. Each raster was reclassified on a scale of 1–5, with weights adjusted to emphasize balanced housing responsibility. The result, Map 8, identifies high-priority zones where TOD investments can maximize equity and development potential.

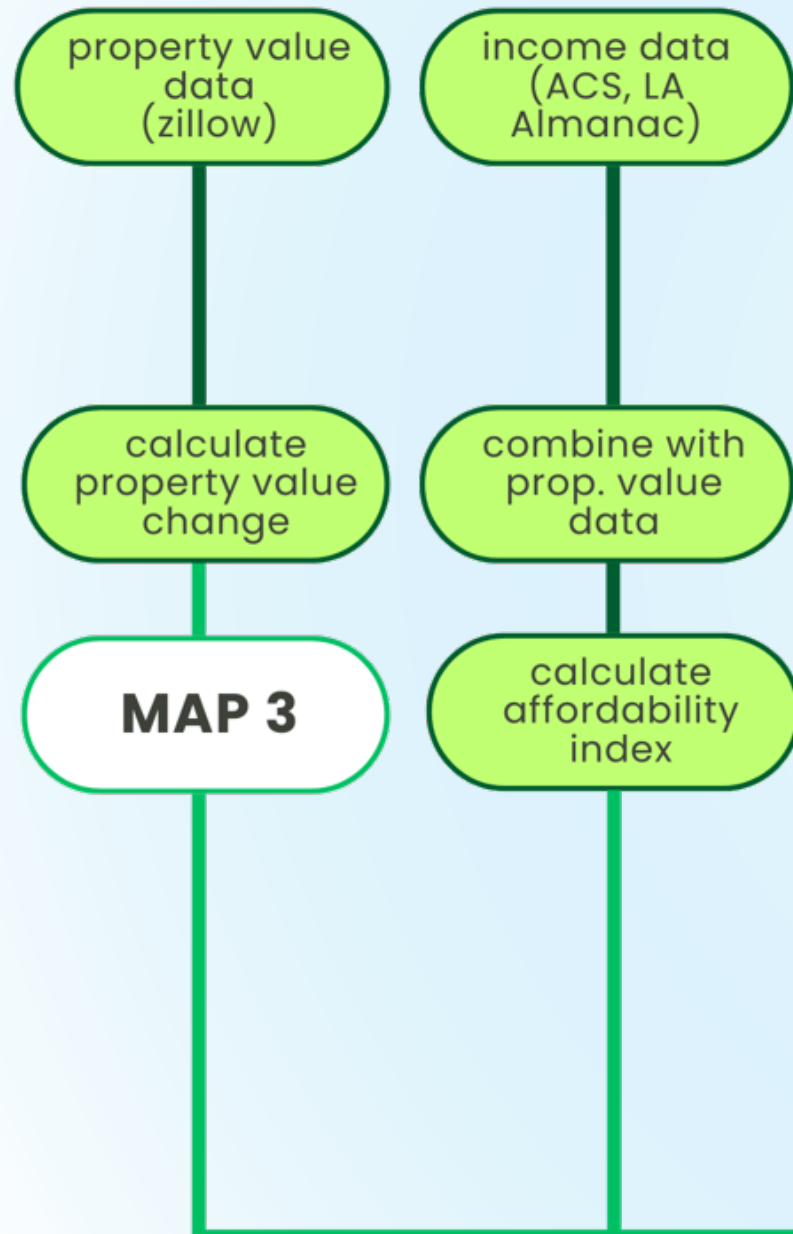
KEY TAKEAWAYS

By integrating affordability, accessibility, and development potential, this methodology provides a comprehensive framework for identifying opportunities to advance equitable and sustainable TOD.

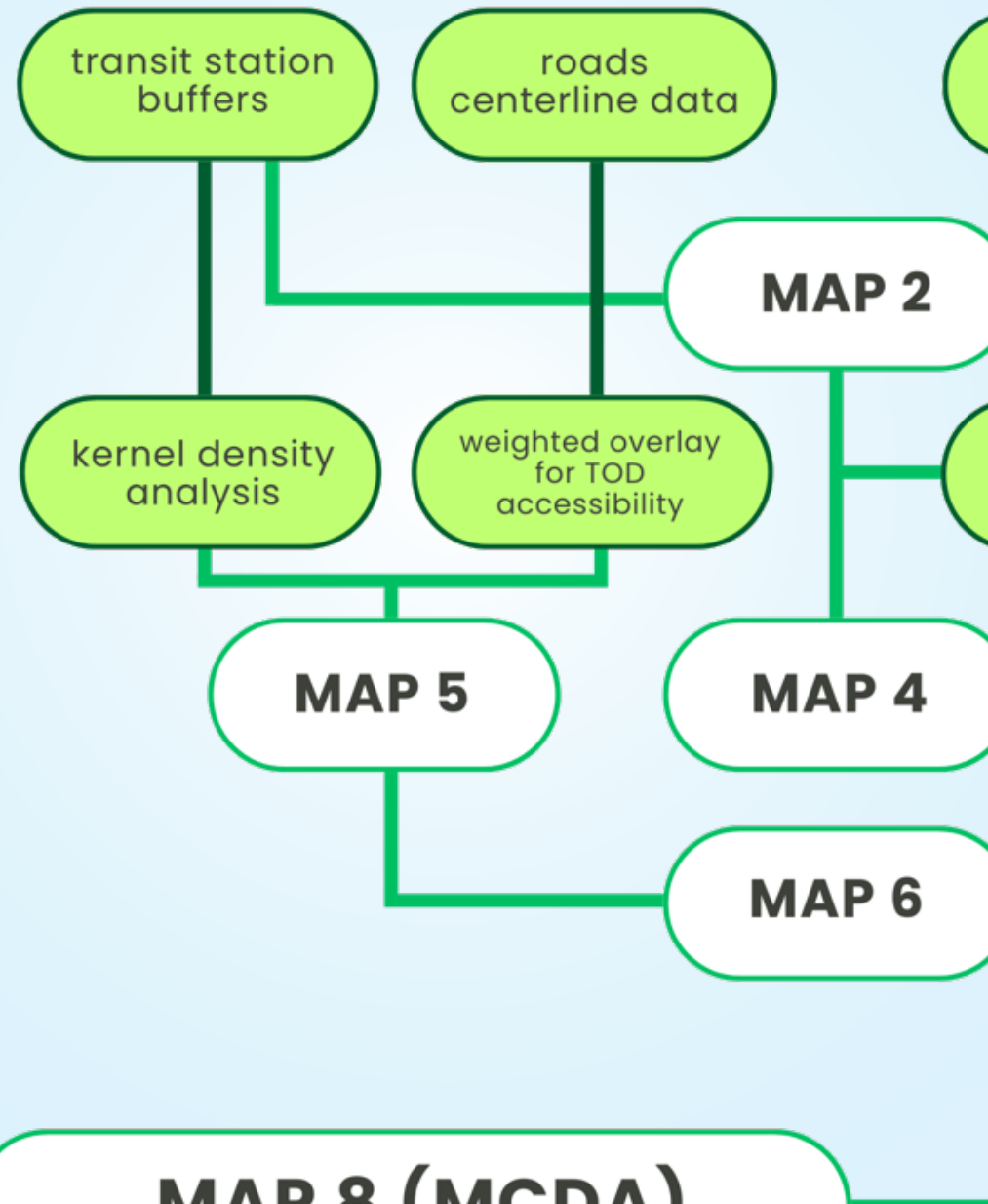


METHODOLOGY

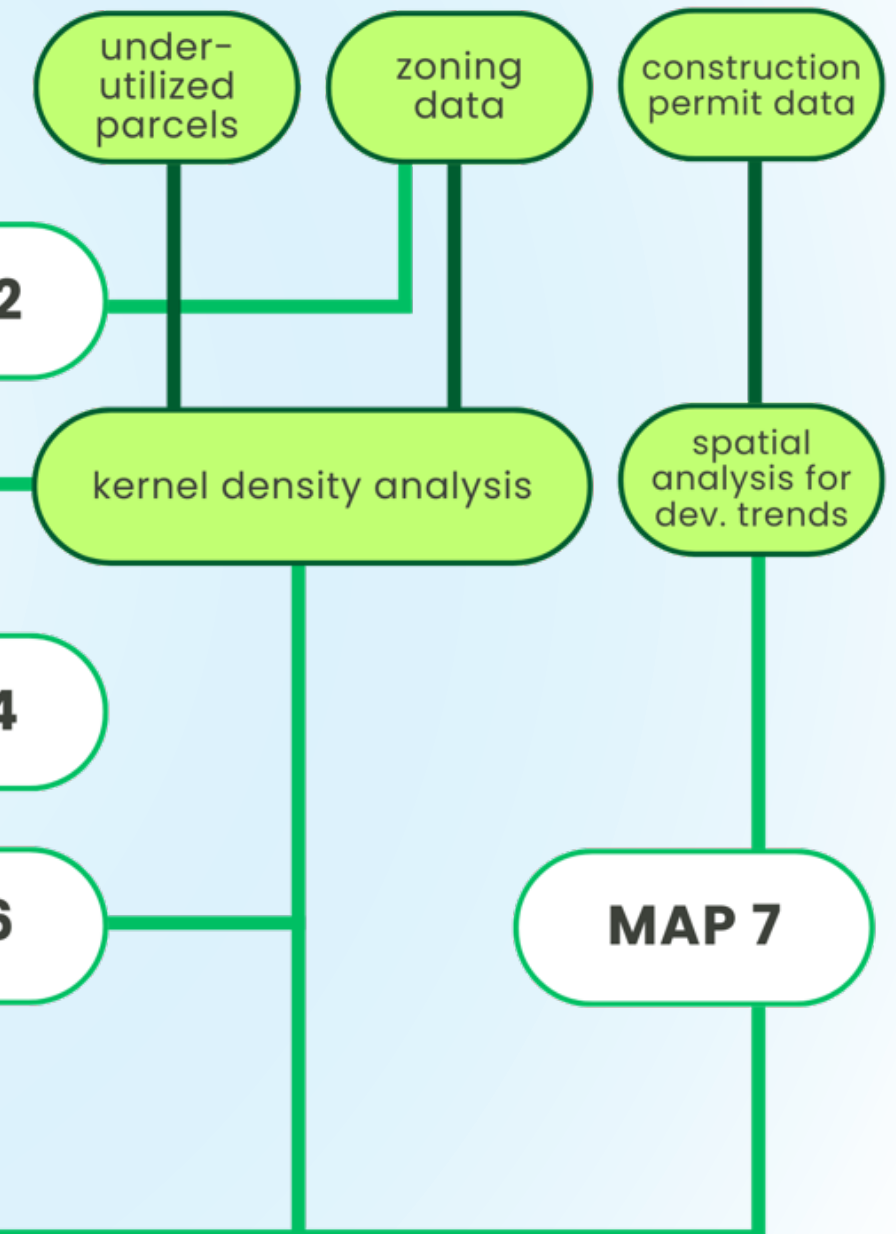
AFFORDABILITY FACTORS



TRANSIT-ORIENTED DEVELOPMENT CONTEXT



DEVELOPMENT POTENTIAL

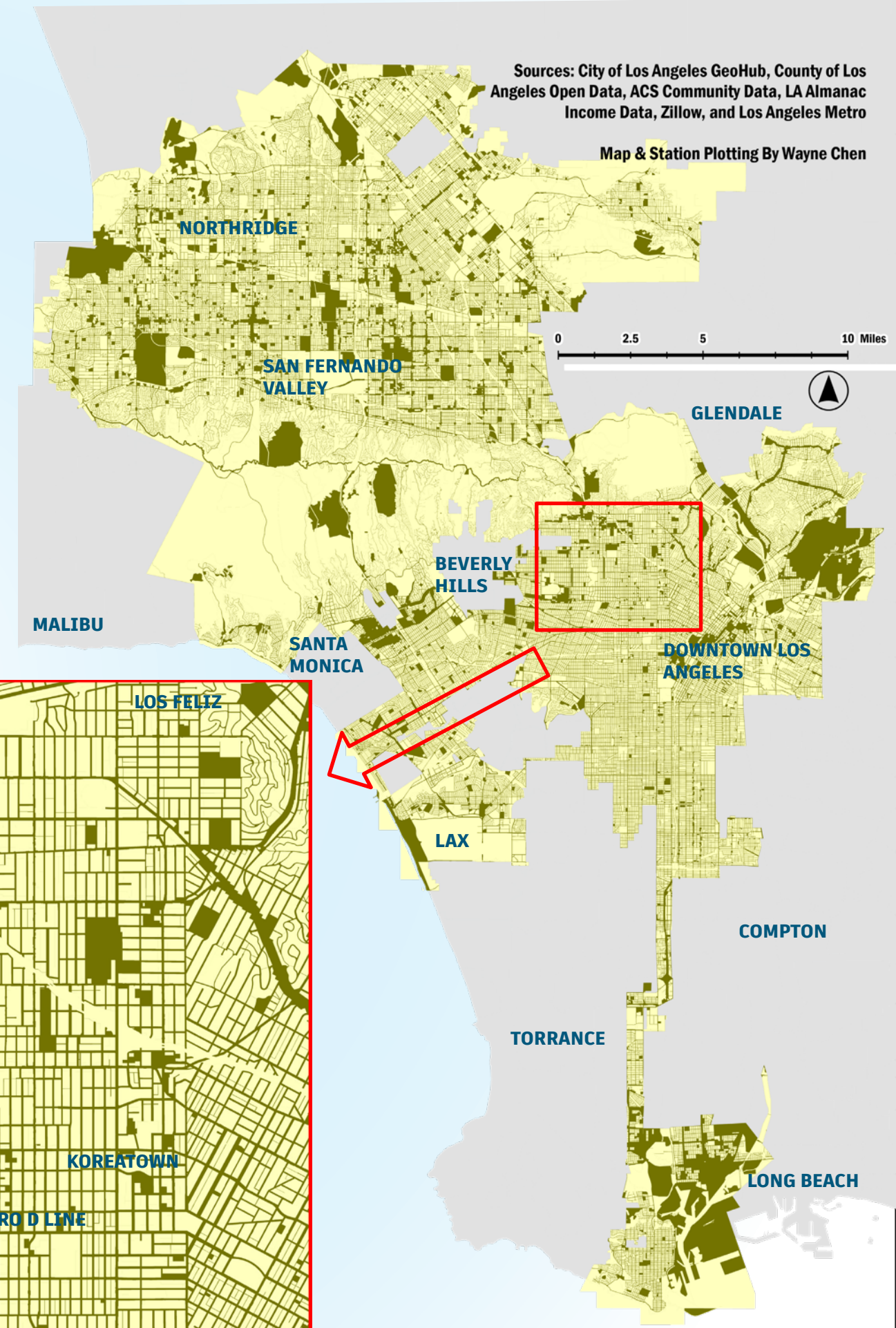
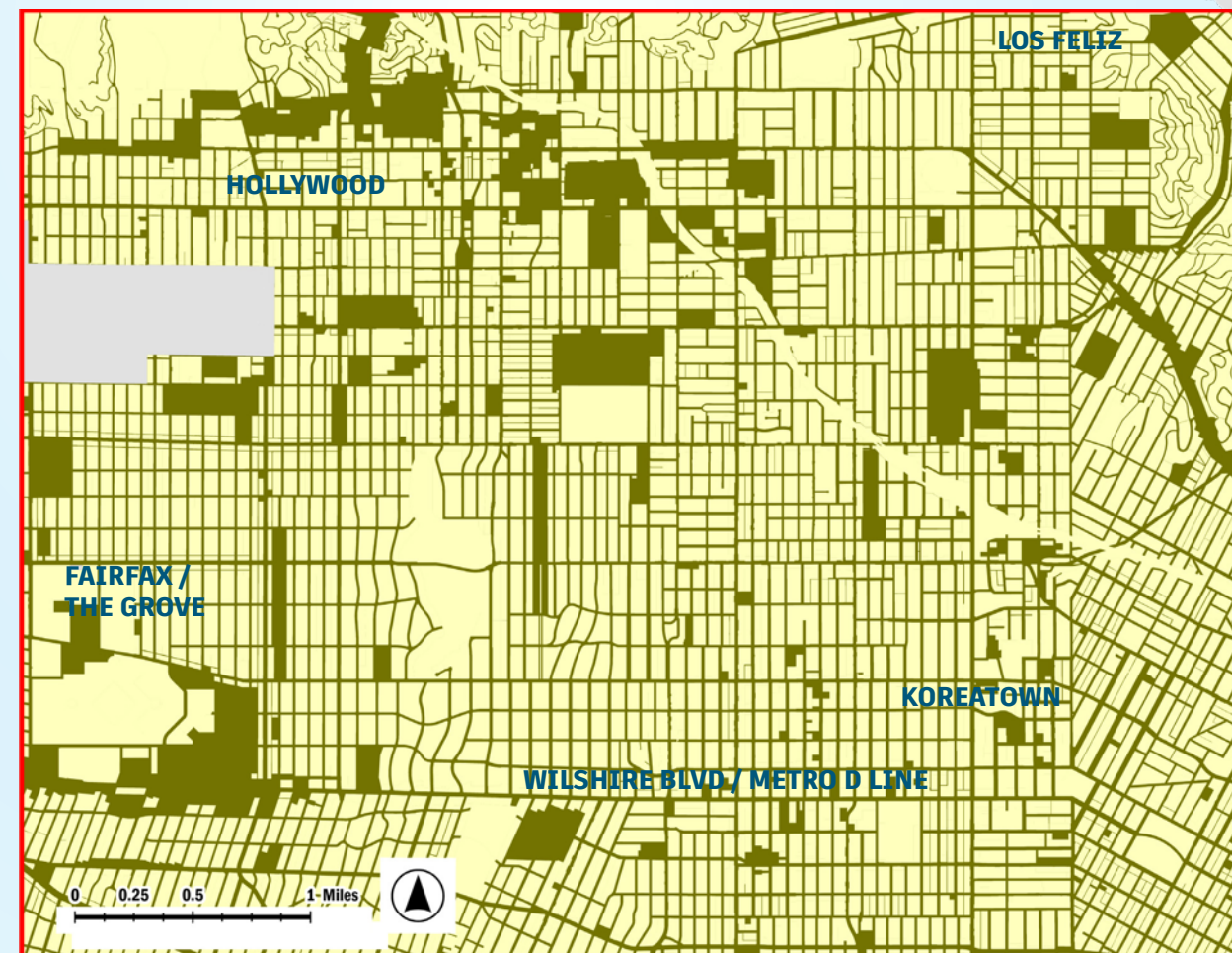


MAP 1

Border Context Map

The City of Los Angeles spans an expansive and irregularly shaped area, reflecting its complex historical growth and incorporation patterns. This irregularity is most evident along its borders, where Los Angeles shares its coastal edge with independent municipalities such as Santa Monica and Manhattan Beach. Additionally, enclave cities like Beverly Hills, West Hollywood, and Culver City are entirely surrounded by the city, creating pockets of distinct governance and identity within the broader urban landscape. These enclaves and bordering municipalities contribute to a fragmented urban fabric, complicating regional planning efforts and necessitating coordinated strategies for issues such as transportation, housing, and infrastructure development.

- Zoned Parcels
- Municipal Territory
- Los Angeles County



Sources: City of Los Angeles GeoHub, County of Los Angeles Open Data, ACS Community Data, LA Almanac Income Data, Zillow, and Los Angeles Metro

Map & Station Plotting By Wayne Chen





MAP 2

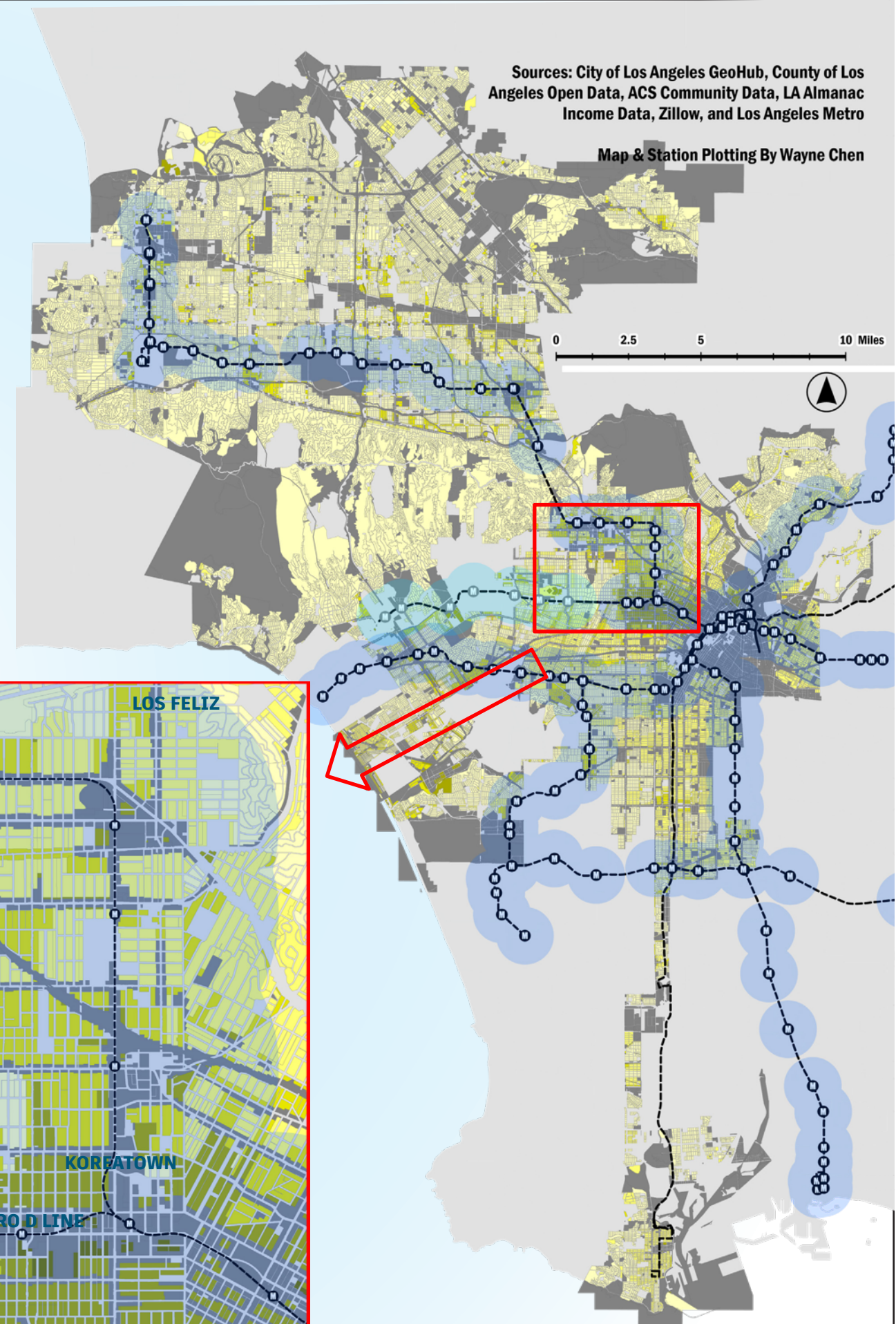
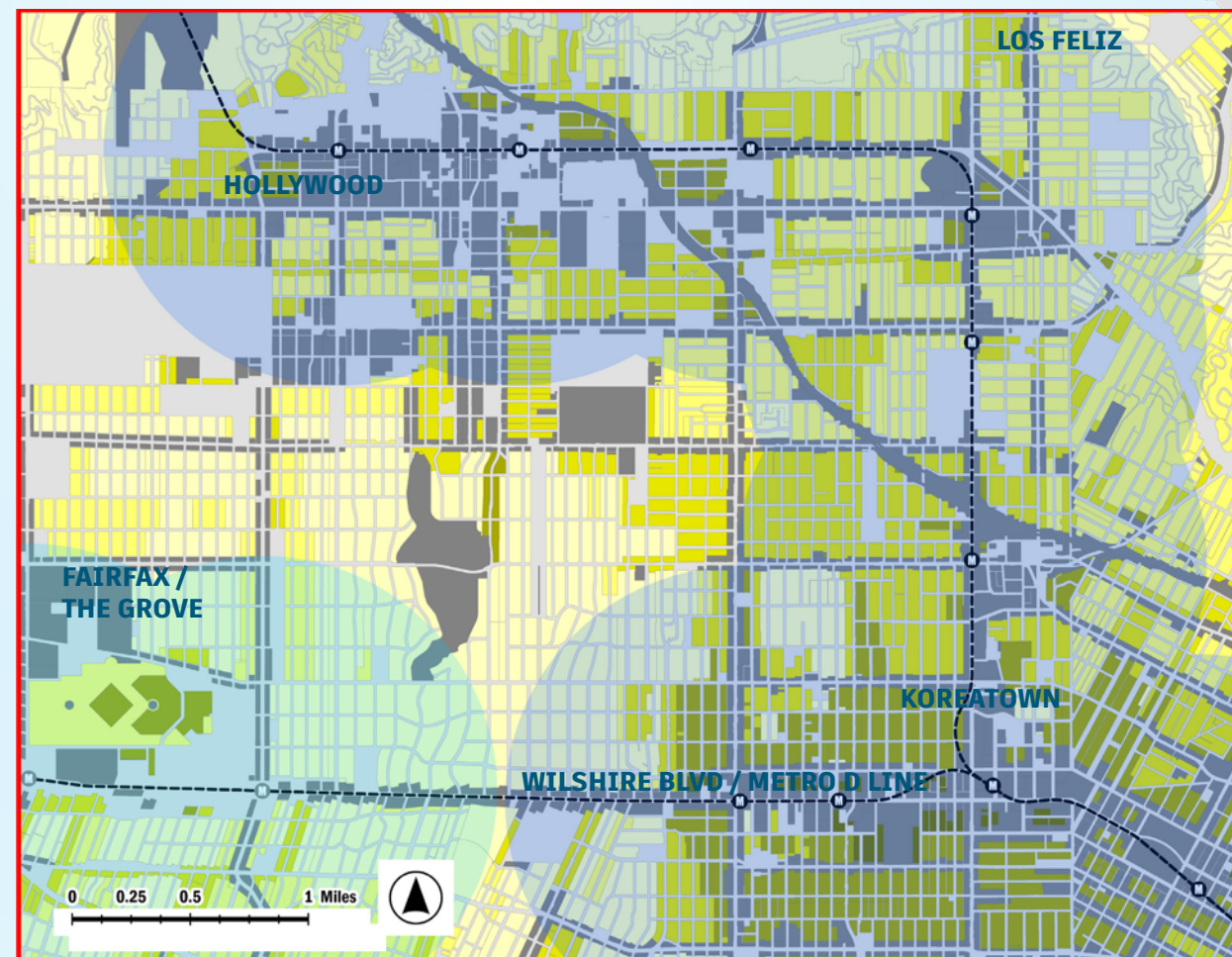
Background Orientation Map

The Background Orientation Map utilizes graduated colors to illustrate residential zoning density across greater Los Angeles, highlighting the relationship between urban development and proximity to existing transit stations. The chosen color of yellow matches conventional urban planning zoning practices as issued by the American Planning Association (APA).

Areas with higher-density residential units are concentrated within an 800-meter (approximately 2,625 feet) radius of these stations, a distance widely regarded by urban planners as indicative of a “high degree of walkability.” This metric reflects the preferred distance that encourages walking as a viable mode of transit for residents.

However, a broader radius of 1,600 meters (approximately 5,249 feet) is also recognized by urban planners as the “maximum tolerable walking distance.” This extended metric is particularly relevant to Los Angeles, where public transit coverage remains sparse, necessitating greater flexibility in defining transit-oriented development (TOD) catchment areas. Additionally, the region’s favorable climate makes walking a more practical and accessible option over longer distances compared to cities with harsher weather conditions. Incorporating the 1,600-meter buffer in analyses allows for a more realistic understanding of the potential reach and impact of transit infrastructure in Los Angeles.

-  Metro Stations
-  Under Construction Metro Stations
-  Low-Density Residential
-  Mid-Density Residential
-  High-Density Residential
-  1,600m Walkable Buffer
-  1,600m Walkable Buffer (D Line Extension)
-  Non-Residential Zones

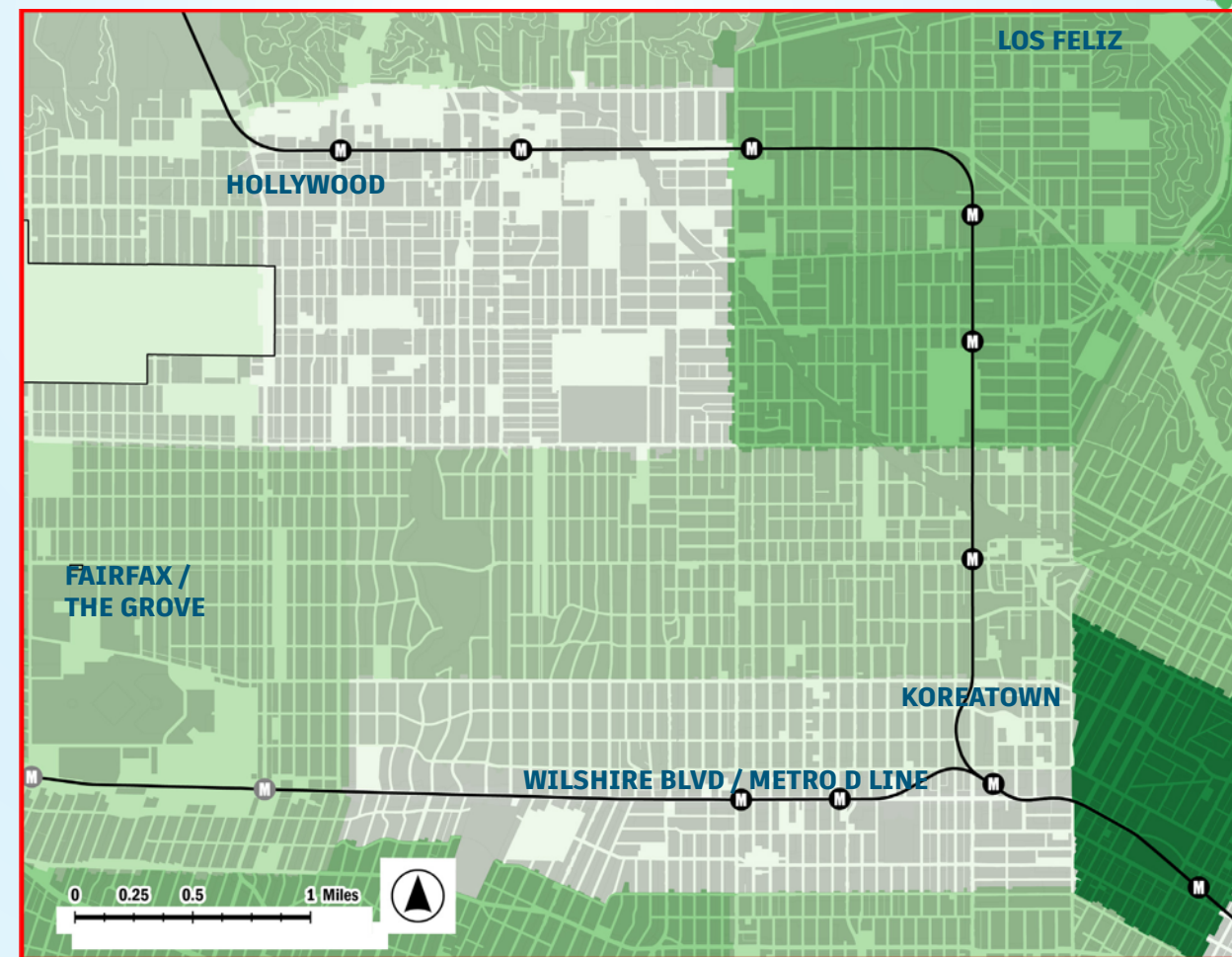
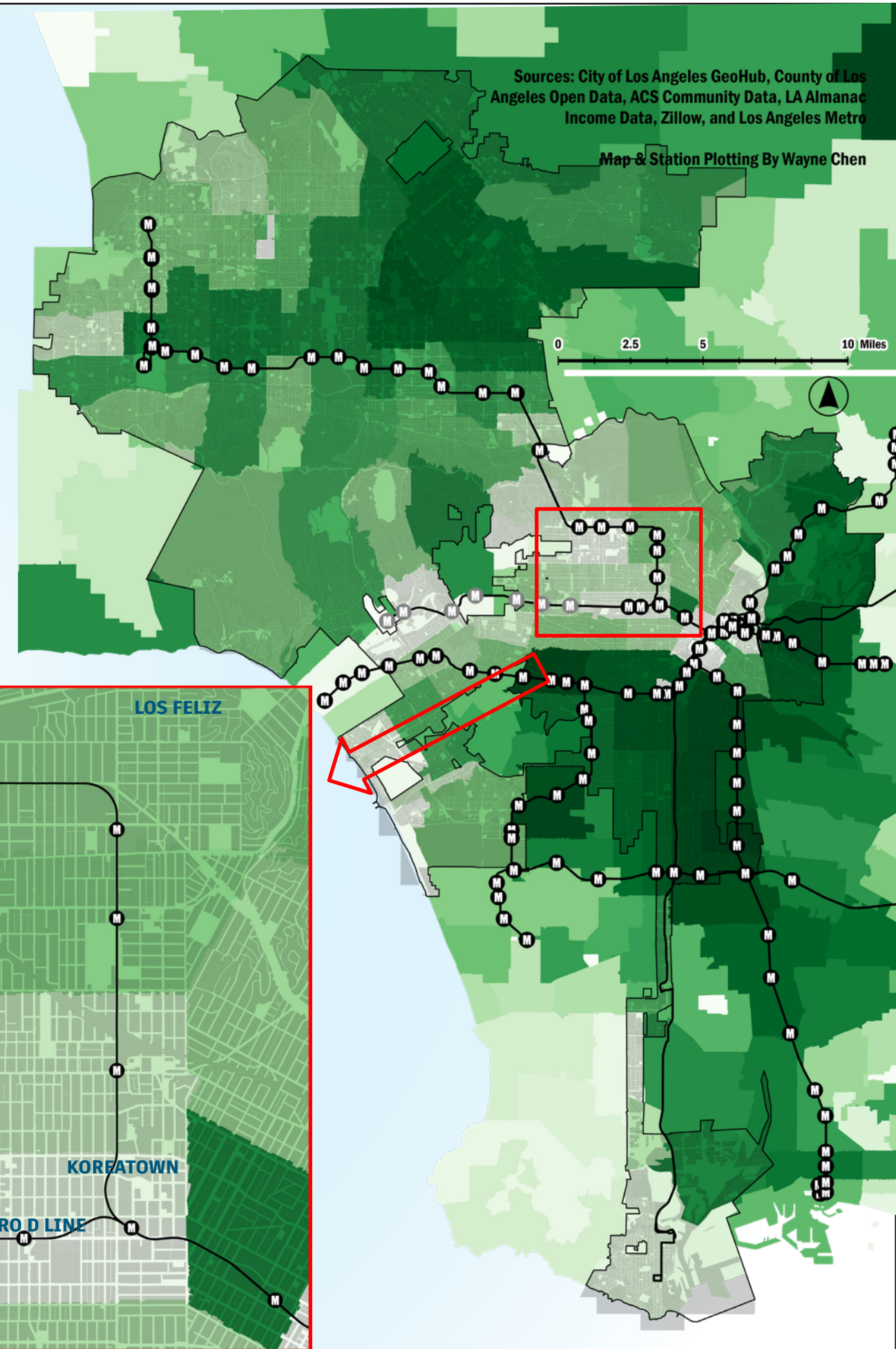
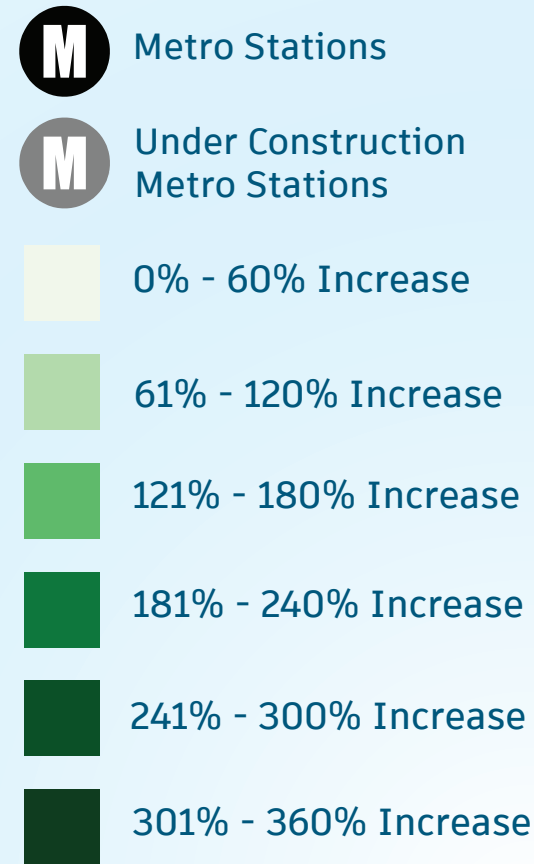


MAP 3

Property Value Changes Over Time by ZIP Code

The analysis examines the rate of property value change between January 2012 and January 2024, with a specific focus on the period before and after the announcement of the D Line's expansion along Wilshire Boulevard. To provide a nuanced understanding, property value changes have been adjusted relative to the median household income of each ZIP code. This adjustment highlights disparities in the impact of transit-oriented development on communities of varying income levels.

The findings indicate that lower-income neighborhoods experienced a significantly sharper increase in property values compared to higher-income areas. This trend suggests that the anticipation of improved transit access has disproportionately influenced real estate markets in economically vulnerable areas, potentially exacerbating issues of affordability and displacement. The data underscores the need for equitable planning measures to address the unintended consequences of transit expansions, particularly in neighborhoods at risk of gentrification.








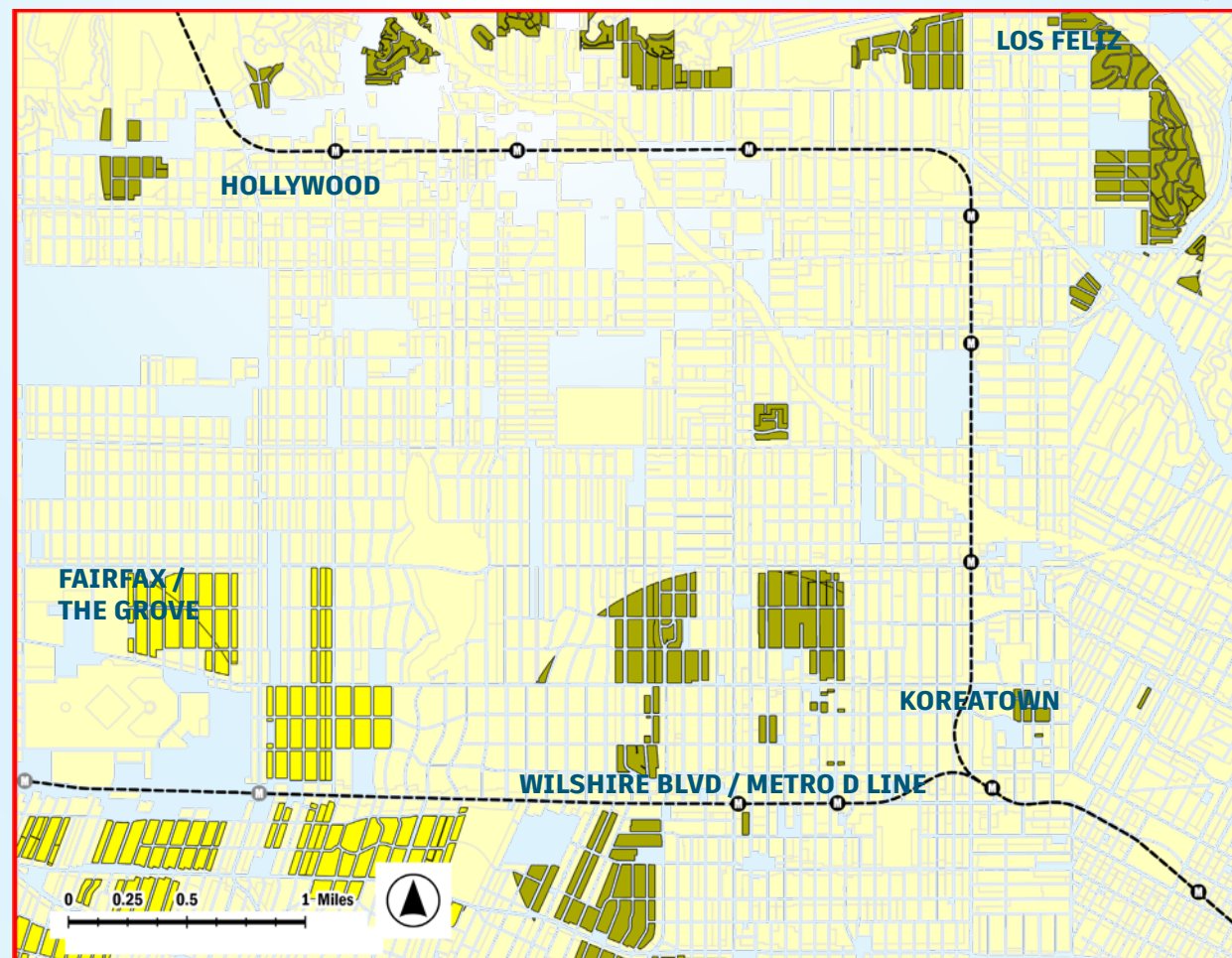
MAP 4

Identification of Underutilized Parcels

This map focuses on parcels within Single-Family Residential Zones (R1), applying a 1,600-meter buffer to evaluate their proximity to transit infrastructure. The 1,600-meter radius represents the maximum tolerable walking distance in urban planning, ensuring that these parcels fall within a reasonable catchment area for access to Metro services.

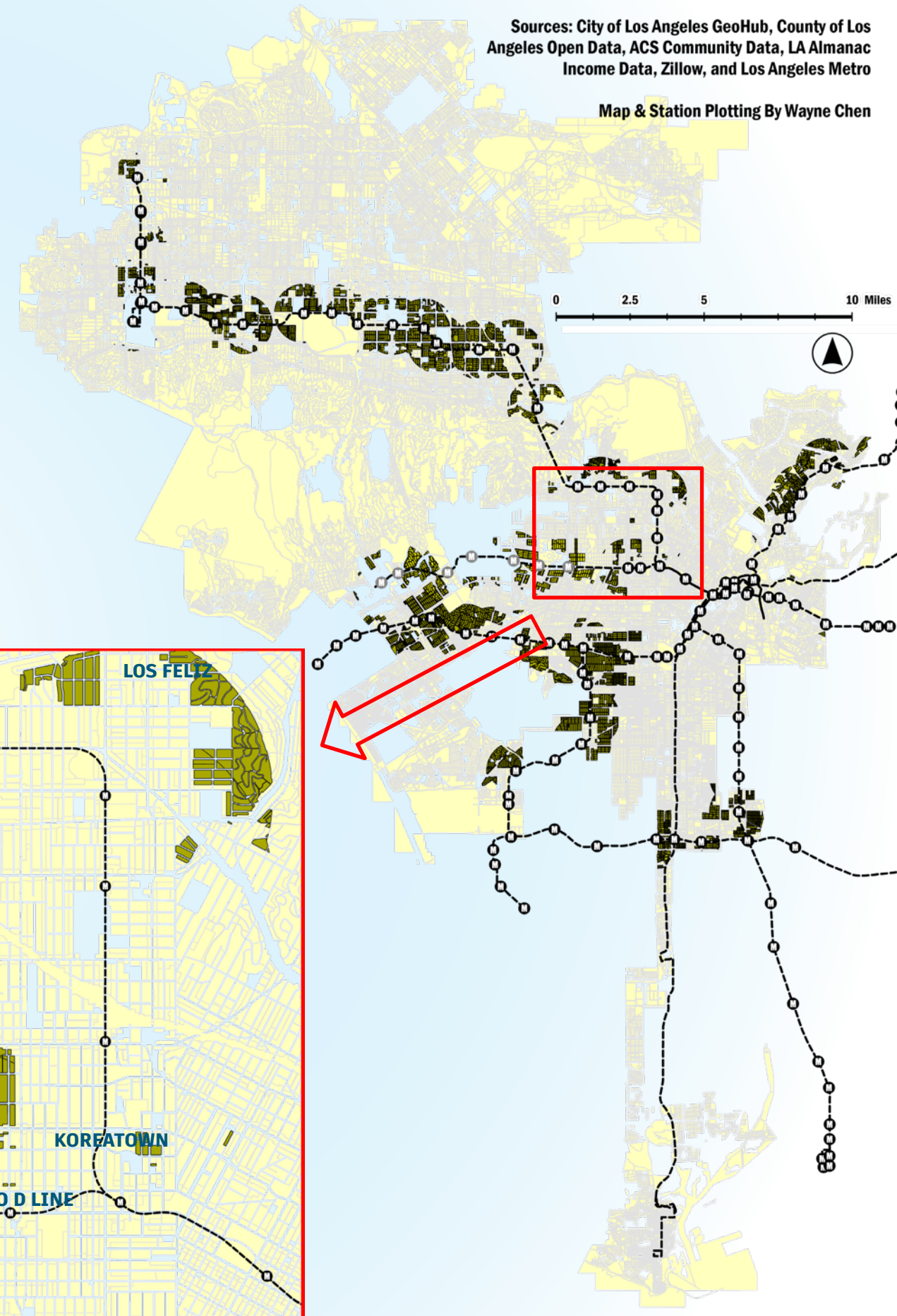
Single-family residential zones represent a significant opportunity for densification, particularly in areas served by the D Line extension. The extension has reached a greater number of R1 zones compared to earlier Metro segments, making these parcels more accessible to transit. Given their strategic location within the extended transit network, these parcels are well-suited for rezoning and redevelopment into higher-density residential projects. Such efforts could align with regional housing goals and address the pressing need for increased housing supply in Los Angeles.

-  Metro Stations
-  Under Construction Metro Stations
-  Other Residential Parcels
-  Single-Family Zones near D-Line Extension
-  Single-Family Zones near existing Metro stations



Sources: City of Los Angeles GeoHub, County of Los Angeles Open Data, ACS Community Data, LA Almanac Income Data, Zillow, and Los Angeles Metro

Map & Station Plotting By Wayne Chen








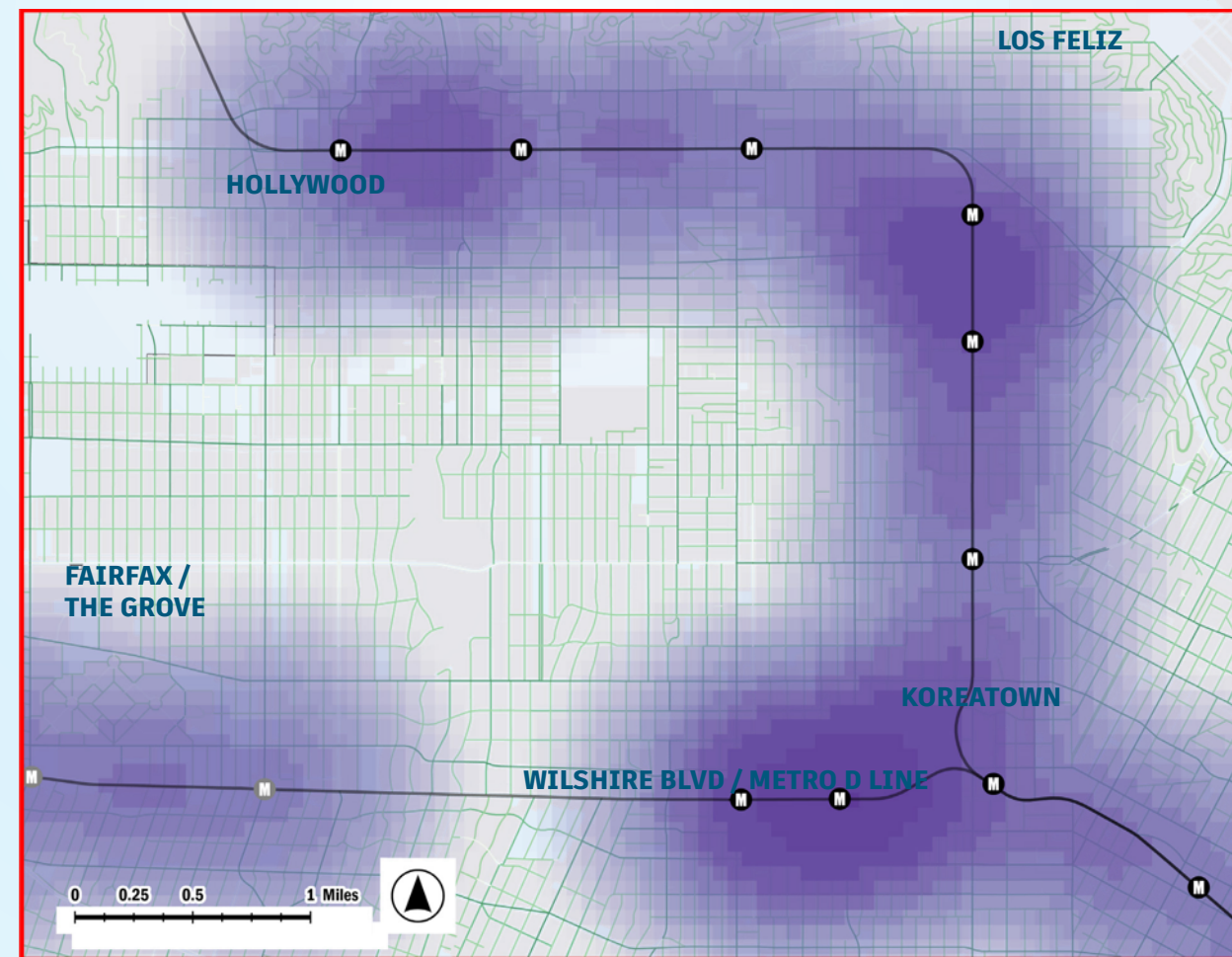
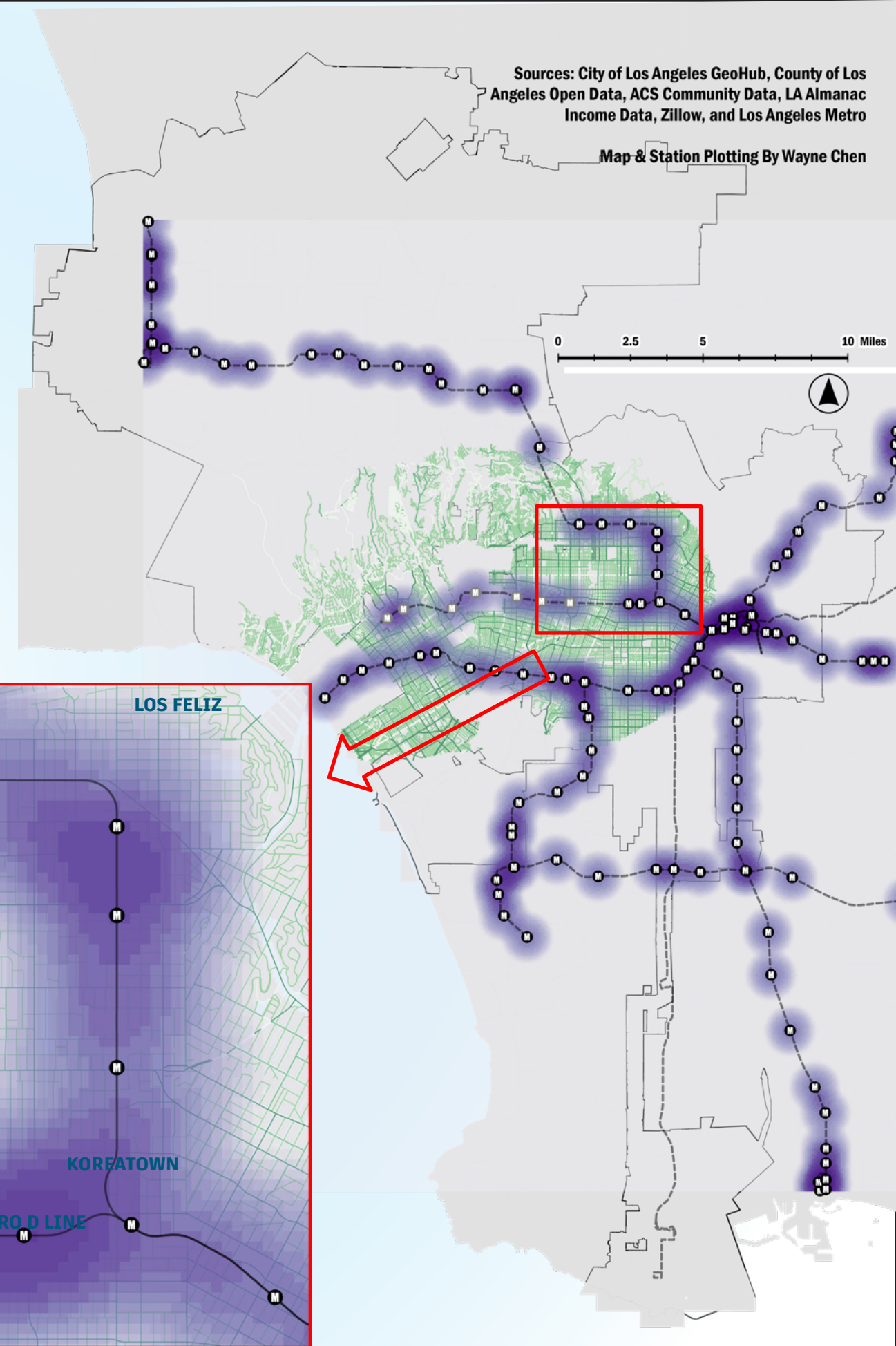
MAP 5

Transit Accessibility and Travel Time Analysis

The kernel density layer visualizes the spatial distribution of transit access by analyzing the density of Metro station points across Los Angeles. This provides a clear understanding of areas with higher concentrations of transit infrastructure and highlights potential gaps in coverage. To contextualize this analysis within the broader transportation network, the kernel density layer is overlaid with a street centerline layer.

The street centerline layer is further enhanced by capacity-based visualizations, where streets with higher capacities—such as major arterials and highways—are represented with darker shading. This overlay allows for a deeper exploration of the relationship between transit accessibility and the existing road network, offering insights into how well transit infrastructure integrates with vehicular capacity and travel corridors. The combined layers provide a comprehensive view of transportation dynamics, serving as a foundation for identifying areas in need of improved multimodal connectivity.

-  Metro Stations
-  Under Construction Metro Stations
-  Transit Accessibility
-  Major Arterial Roads
-  Secondary Feeder Roads





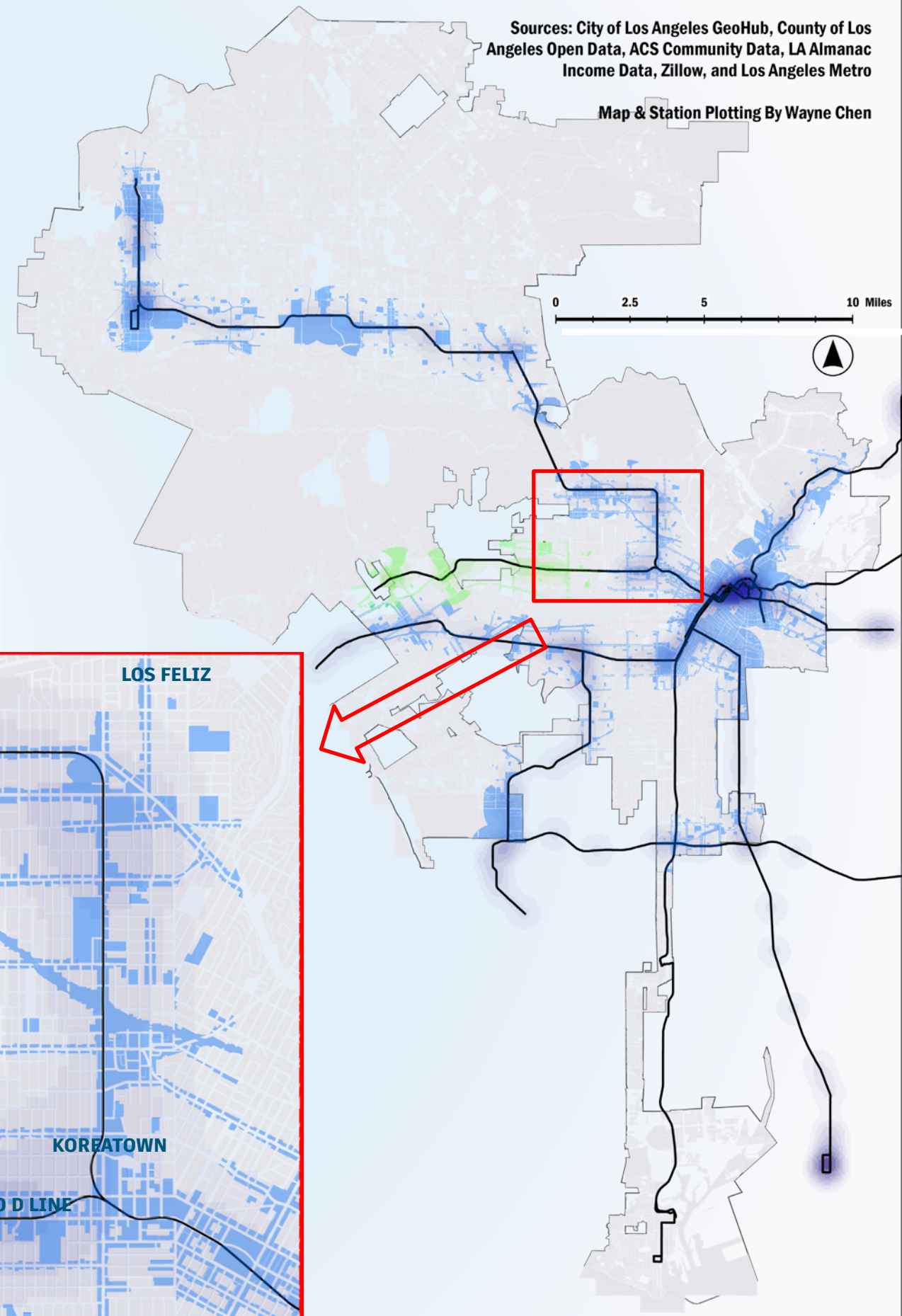
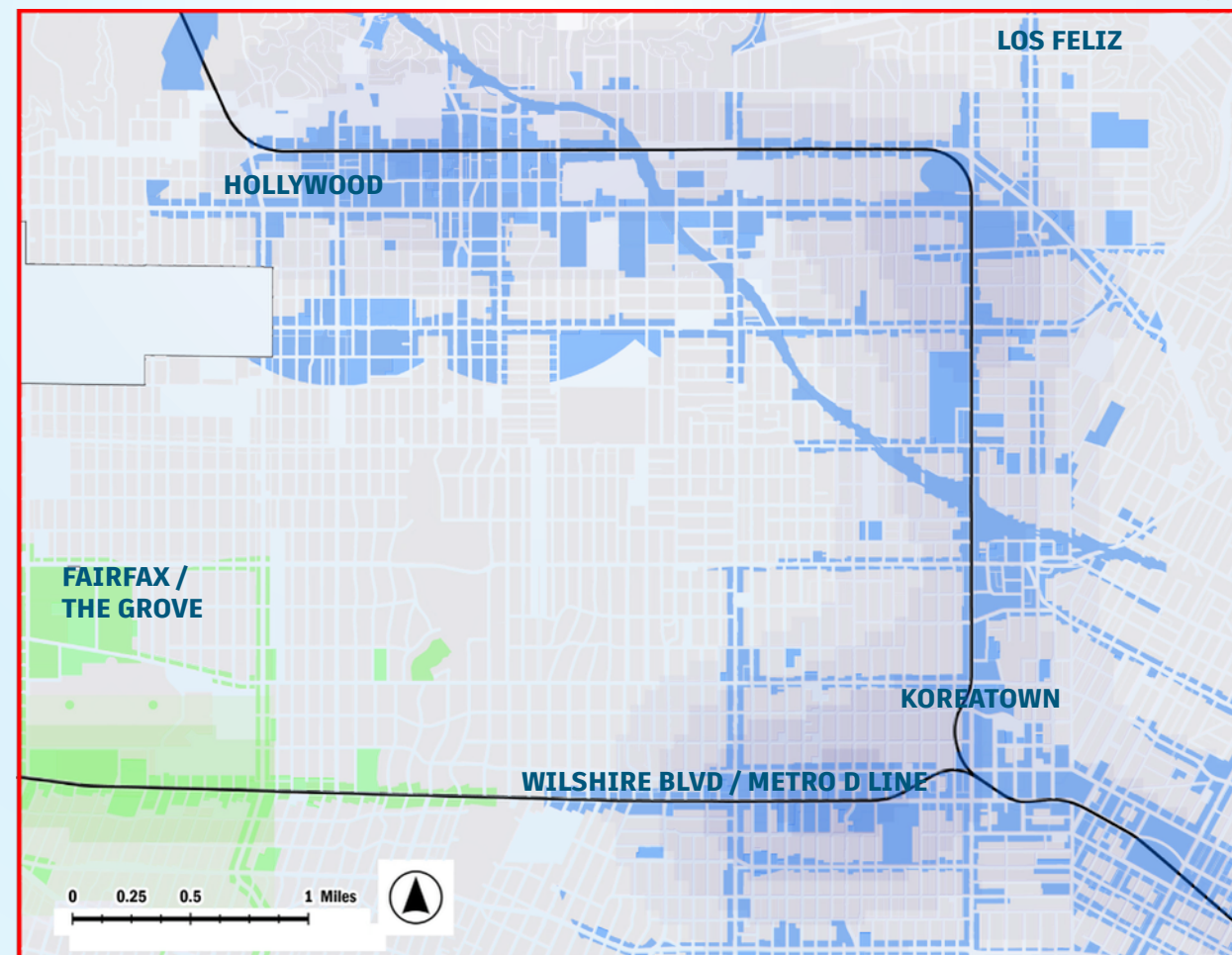
MAP 6

Mixed-Use Corridors with Upzoning Potential

In addition to exclusively residential zones, many of Los Angeles's commercial zones consist of low-rise developments, presenting significant opportunities for repurposing into mixed-use areas. These zones hold potential for redevelopment to accommodate both residential and commercial functions, which can support increased housing supply while maintaining vibrant economic activity.

The map highlights commercial corridors along the D Line extension in green and those associated with the existing metro network in blue. These visual distinctions allow for a clearer analysis of areas benefiting from current and future transit accessibility. Overlaid on the map is a kernel density layer that illustrates existing zoning height allowances, providing additional context for identifying upzoning opportunities. These corridors are particularly well-suited for mixed-use development, as their proximity to transit infrastructure aligns with transit-oriented development (TOD) principles. Encouraging higher-density mixed-use projects in these areas could advance regional goals for housing affordability and sustainable urban growth.

-  Mixed-Use Zones near D-Line Extension
-  Mixed-Use Zones near existing Metro stations



Sources: City of Los Angeles GeoHub, County of Los Angeles Open Data, ACS Community Data, LA Almanac Income Data, Zillow, and Los Angeles Metro





Map & Station Plotting By Wayne Chen

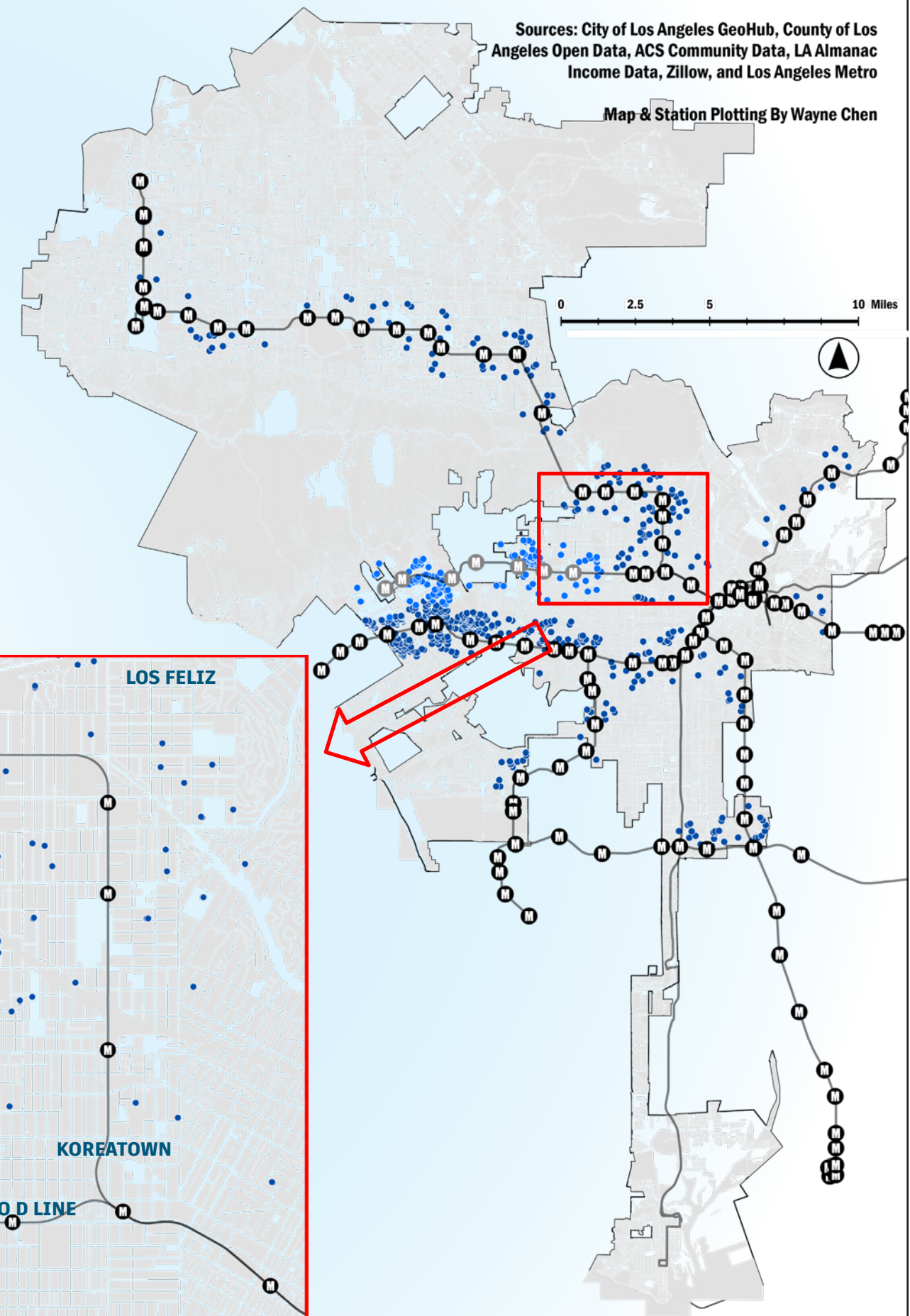
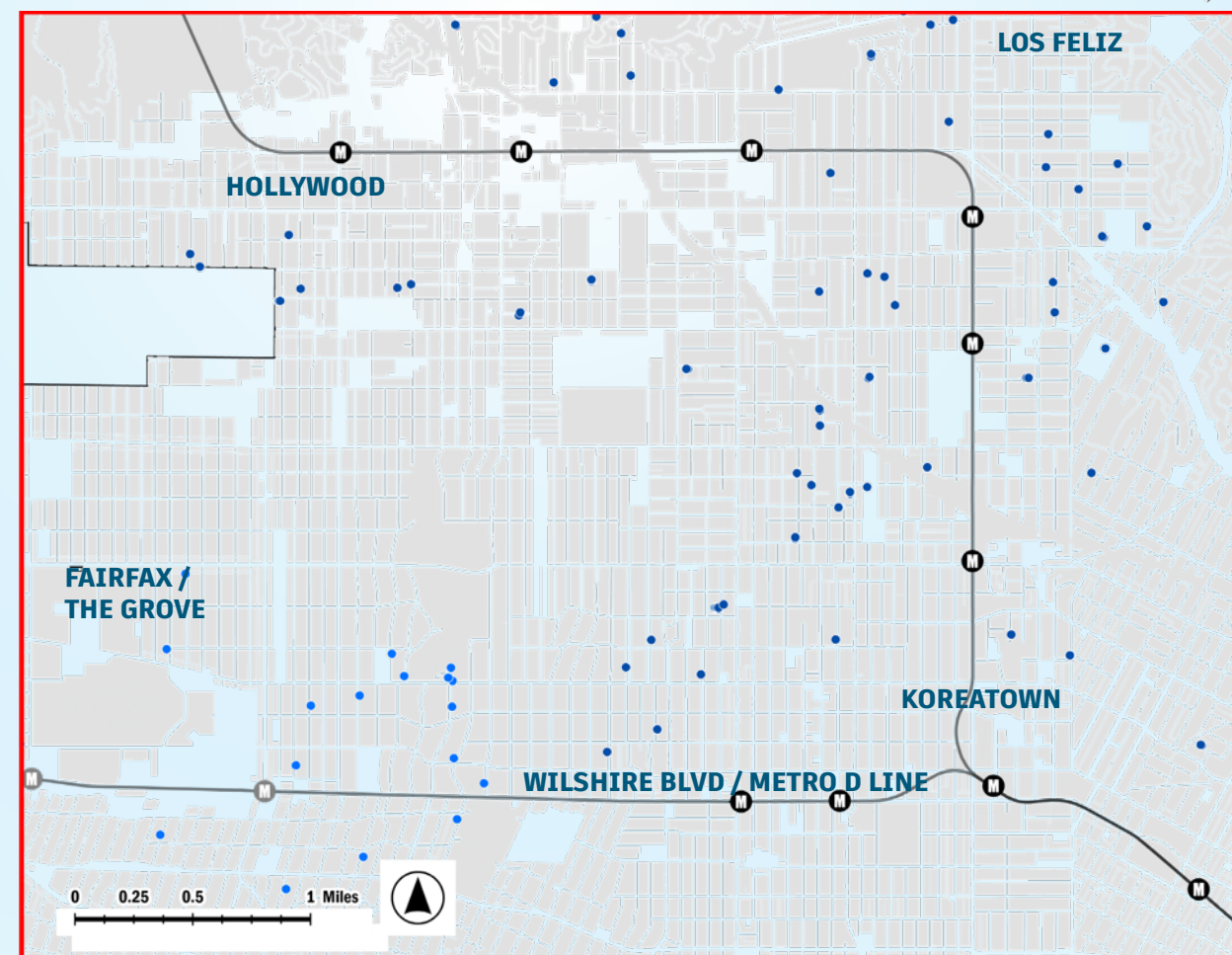
MAP 7

Real-Estate Development Trends near TODs

This map highlights clusters of blue points representing locations where new construction or significant renovations have been approved in Los Angeles since 2015. These approvals reflect both new development projects and substantial renovation activities that require permitting. However, it is important to note that the issuance of a permit does not necessarily guarantee that a project has been completed or even initiated.

The spatial distribution of these clusters provides insight into real estate activity near transit-oriented developments (TODs), particularly along corridors served by existing and planned Metro lines. Areas with concentrated clusters of approved permits suggest heightened development interest, likely driven by proximity to transit infrastructure and evolving market demands. This analysis underscores the role of TODs in stimulating investment and urban renewal while also pointing to the potential for gaps between permitted projects and actual construction outcomes. Monitoring these trends is essential for understanding development dynamics and addressing challenges such as housing production delays and land-use inefficiencies.

-  Metro Stations
-  Under Construction Metro Stations
-  Construction Approvals near existing Metro
-  Construction Approvals near D Line Extension



Sources: City of Los Angeles GeoHub, County of Los Angeles Open Data, ACS Community Data, LA Almanac Income Data, Zillow, and Los Angeles Metro

Map & Station Plotting By Wayne Chen

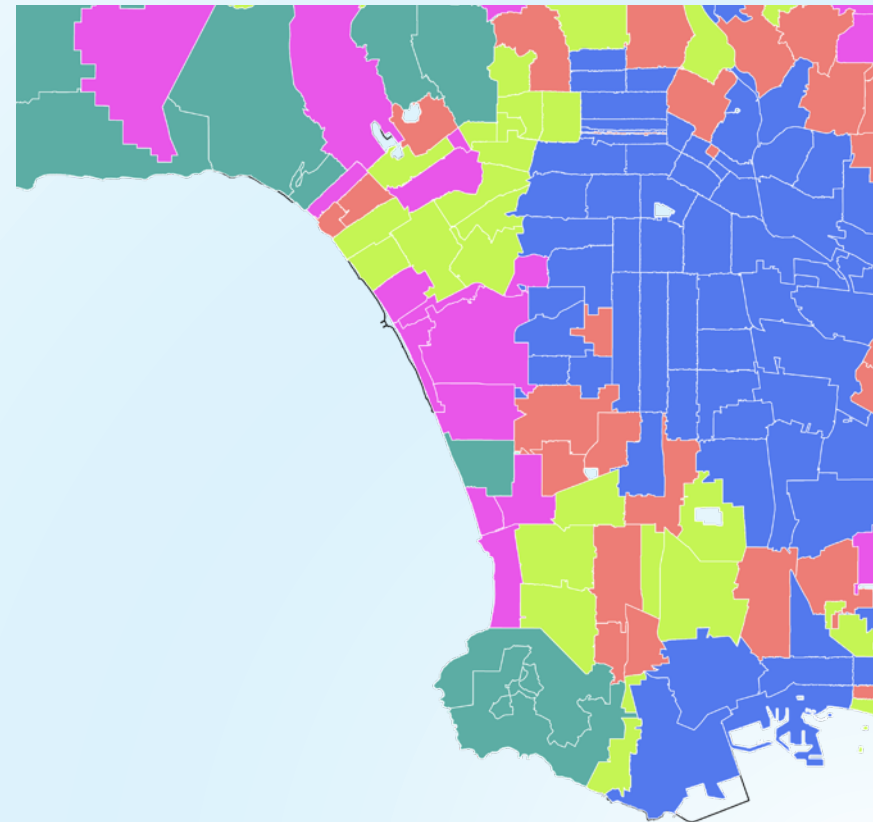
MAP 8

MCDA

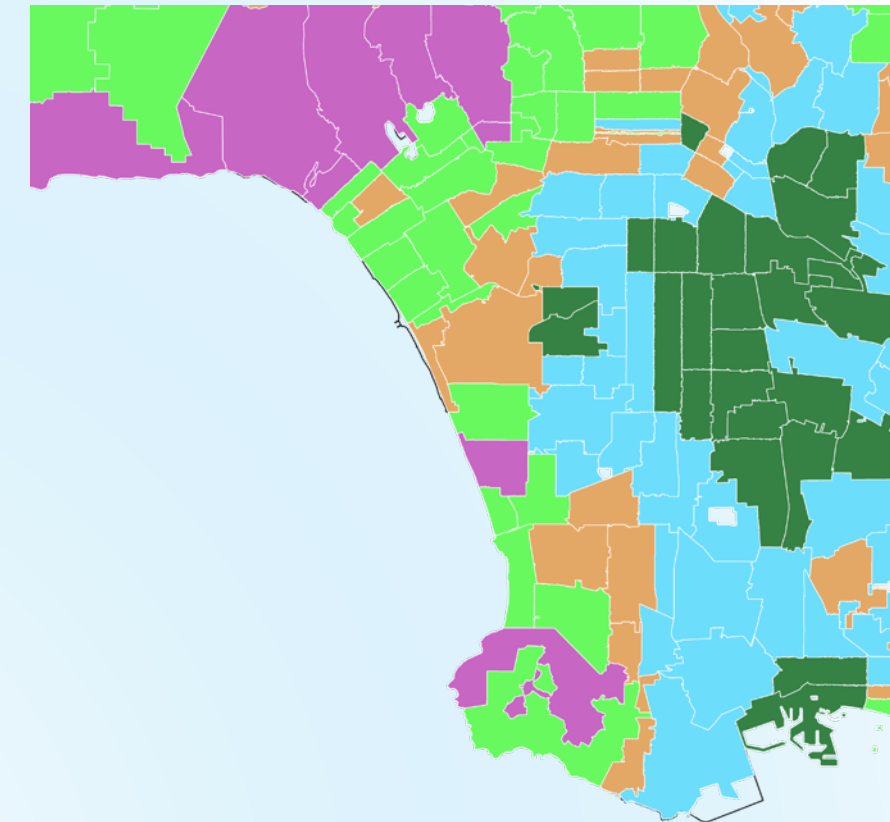
Of all maps and metrics measured so far, it is most reasonable to extrapolate from four of them:

- Average Income per Census Tract
- Average Property Value per Census Tract
- Proximity to Metro Station
- Single Family Zoned areas with up-zoning potential

While income and property values highlight regional disparities, the urgency of Los Angeles's housing crisis requires contributions from all neighborhoods. For this MCDA, Proximity to Metro Stations is weighted at 45%, reflecting the importance of transit accessibility, while Single-Family Zoned Districts are weighted at 40% for their redevelopment potential. These priorities ensure the final output map identifies areas best suited for Transit-Oriented Development (TOD) while addressing housing equity citywide.



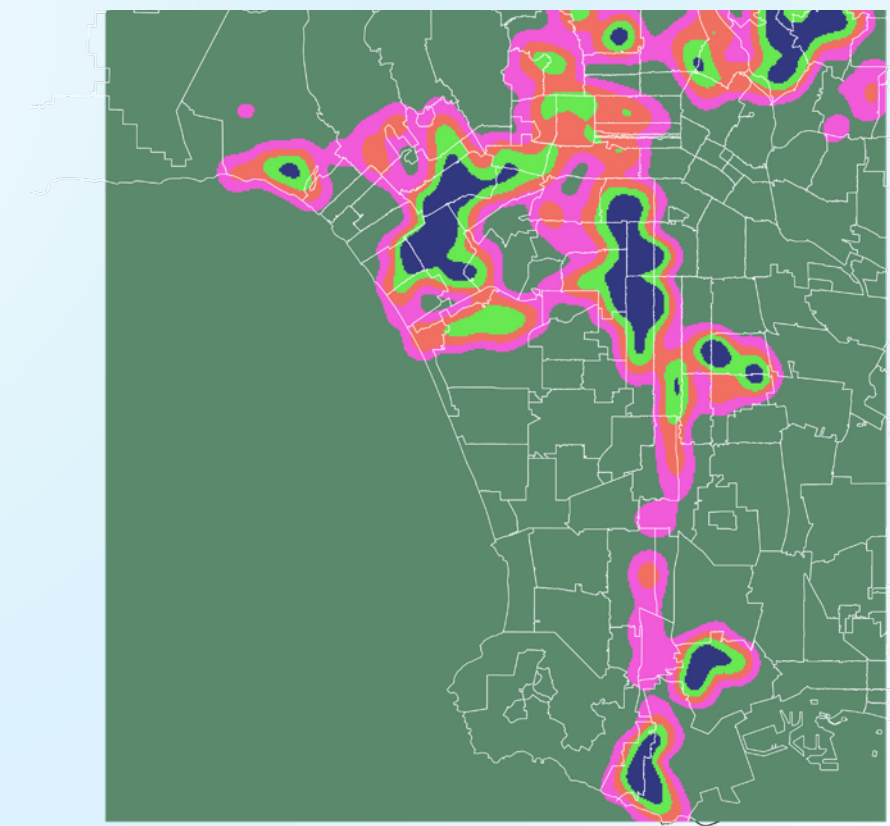
LAYER I (10%): Average Income per Census Tract, separated into five classes.



LAYER II (5%): Average Property Value per Census Tract, separated into five classes.



LAYER III (45%): Proximity to Metro Station to measure connectivity, as seen in Map 2.



LAYER IV (40%): Single family zoned districts with up-zoning potential, as seen in Map 4.

MAP 8

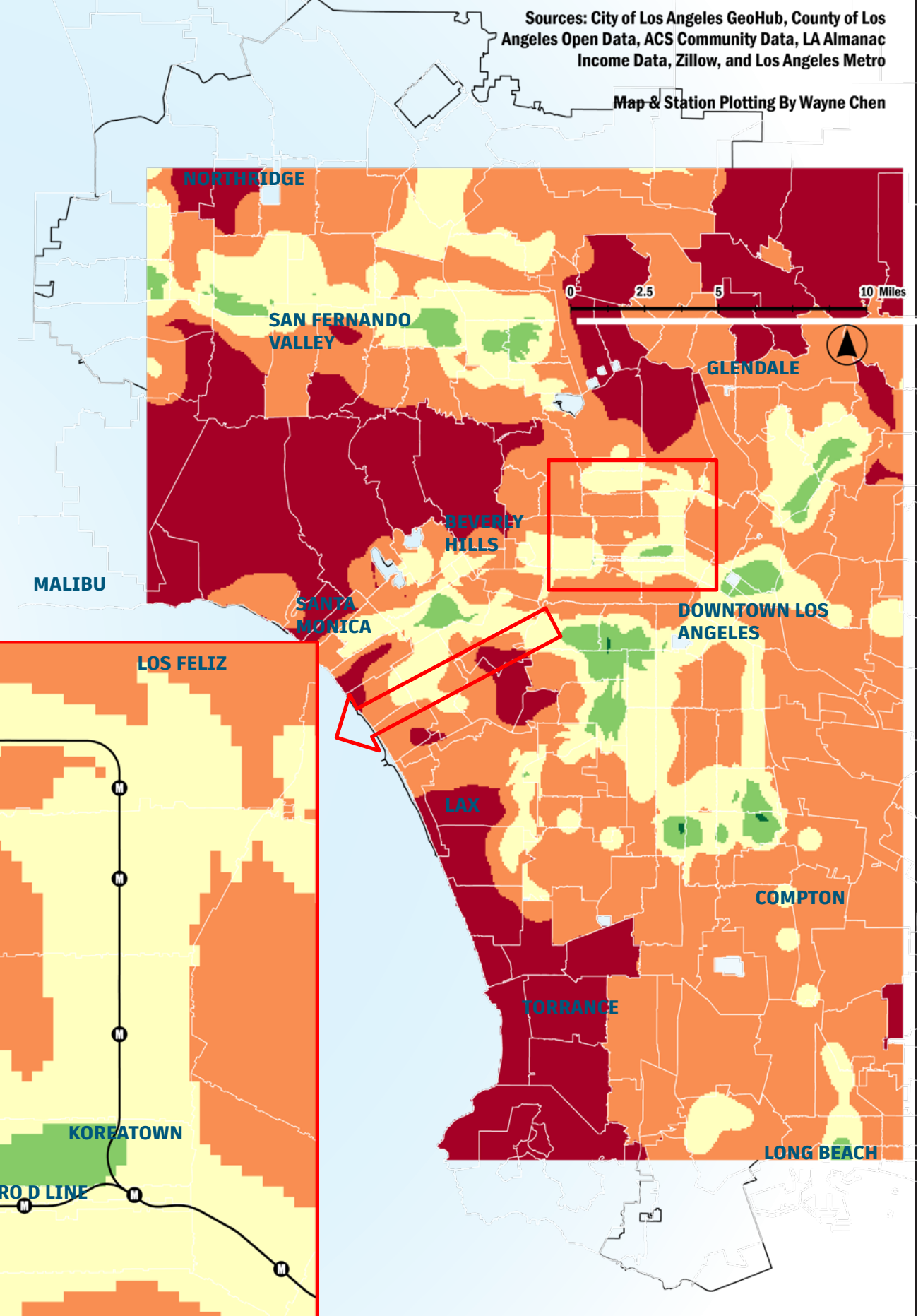
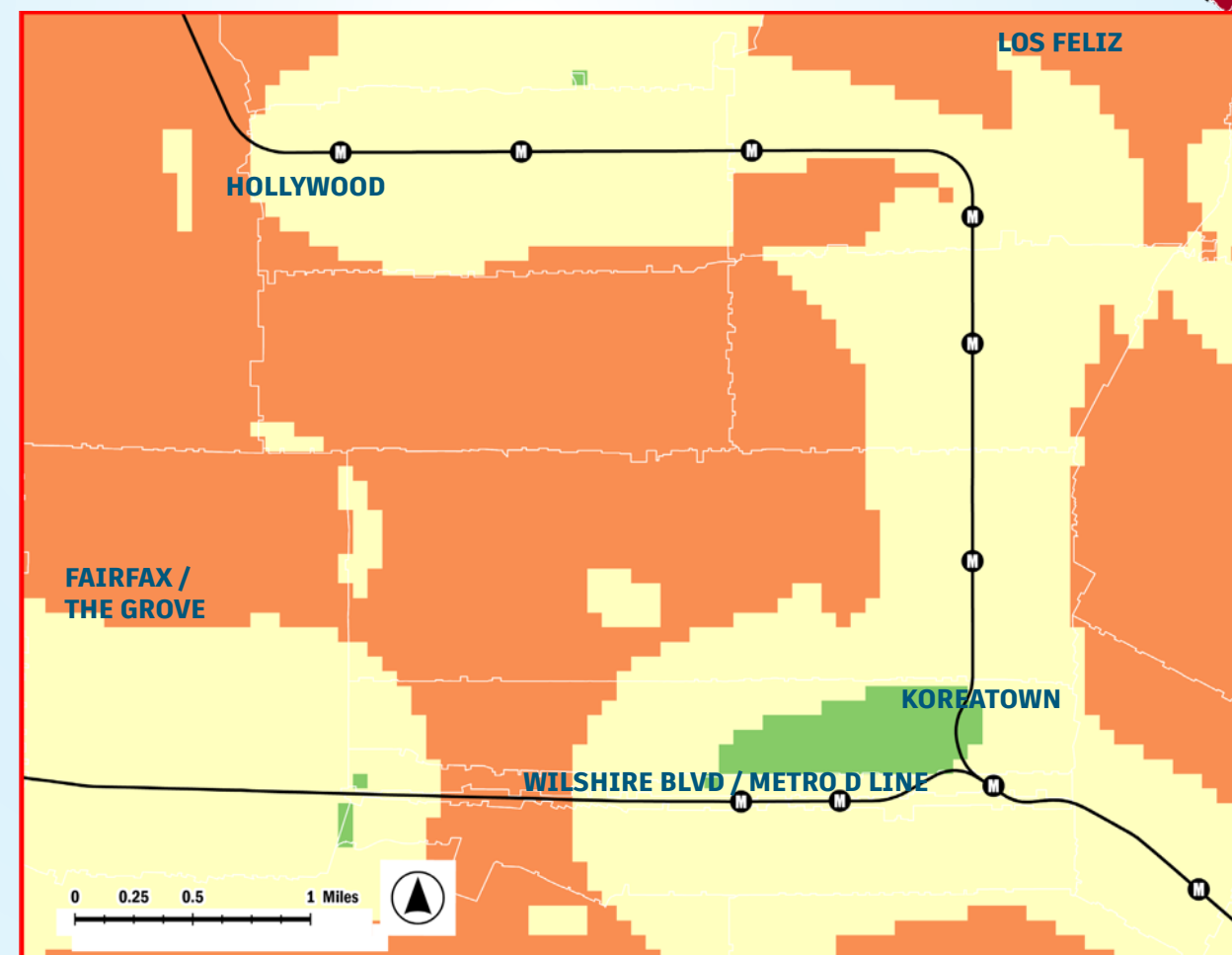
MCDA - Best Locations for TOD's in Los Angeles

Combining all analyzed factors, the final MCDA map categorizes areas into five levels of suitability for housing development, offering a more granular understanding of opportunities across Los Angeles. The highest suitability levels align strongly with existing and planned transit corridors, while parts of the Los Angeles Basin characterized by low-density, single-family developments emerge as prime opportunities for targeted intervention. Key areas include Crenshaw, Lambert Park, Montecito Heights, and the Metro G Line corridor in the San Fernando Valley.

Conversely, much of the D Line Expansion study area and Mid-Wilshire—apart from small sections of Koreatown—fall into lower suitability levels, suggesting that these neighborhoods are not the most optimal for new TOD developments at this time.

By focusing on areas with the greatest potential for upzoning and transit accessibility, Los Angeles can strategically prioritize locations best positioned to deliver immediate and impactful relief to its housing crisis. Leveraging these opportunities allows the city to balance the urgent need for increased housing supply with sustainable, transit-oriented growth.

- 1 (Least Suitable)
- 2 (Barely Suitable)
- 3 (Somewhat Suitable)
- 4 (Suitable)
- 5 (Ideal)



Sources: City of Los Angeles GeoHub, County of Los Angeles Open Data, ACS Community Data, LA Almanac Income Data, Zillow, and Los Angeles Metro
Map & Station Plotting By Wayne Chen

INTERPRETATION



The MCDA findings confirm that **transit-oriented development (TOD) corridors present significant opportunities for high density housing developments.** However, the analysis revealed that much of the D Line expansion along Wilshire Boulevard—particularly in its western segments—falls short as “optimal” zones for addressing housing affordability challenges.

This outcome may be tied to the disproportionately affluent nature of neighborhoods along the corridor, where high property values and household incomes likely skewed the results. These areas, while transit-accessible, may not be conducive to providing affordable housing options for low-income or disadvantaged populations without targeted policy interventions.

New York’s affordable housing strategies provide a compelling model, integrating below-market-rate units within high-cost developments to foster social equity and economic diversity. Although socioeconomic complexities are difficult to quantify spatially, these approaches emphasize the need for planners to look beyond purely spatial metrics when identifying equitable housing solutions.

For Los Angeles, aligning TOD opportunities with affordability objectives will require careful consideration of zoning, land use, and incentives that prioritize inclusive development. The findings underscore the importance of leveraging TOD while accounting for the nuanced economic realities of different neighborhoods.



CONCLUSION & REFERENCES

This analysis highlights the potential and limitations of transit-oriented development (TOD) in addressing housing affordability along Los Angeles' expanding D Line corridor. While TOD zones offer clear opportunities for increasing density, particularly in transit-accessible, lower-cost areas, affluent neighborhoods adjacent to Wilshire Boulevard remain underutilized in this context.

Achieving equitable housing solutions requires a multi-faceted approach. Policies that integrate affordability measures into high-cost developments, alongside zoning reforms in underutilized areas, can help balance social equity with development potential. By leveraging TOD opportunities while addressing economic disparities, planners can foster resilient, inclusive neighborhoods that meet the diverse housing needs of Los Angeles' residents.

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