UNIVERSITY OF SOUTHERN CALIFORNIA - USA

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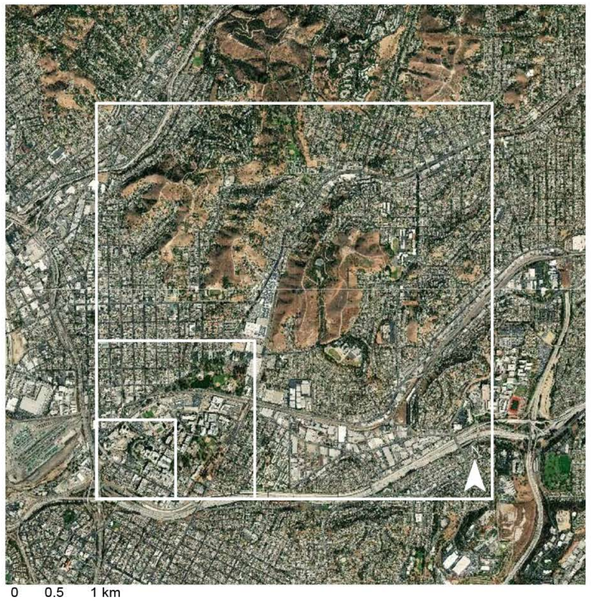


NE Los Angeles Climate Change Adaptation

In order to address the pressing challenges posed by climate change in our study area in Northeast Los Angeles, our team developed specific, targeted intervention typologies.

The legend was slightly modified to accommodate these multiple typologies and portray a diversified landscape. While original IGC colors were maintained, each color was adapted to correspond to a specific intervention typology within the general IGC use category. For example, "Green Infrastructure" as given by the IGC became Highway Buffer Park, Sustainability Pilot Areas, and Superblocks. The legend uses a hatched symbology to indicate co-existing uses (i.e. urban agriculture and windmill power generation).

Legend

- Study Area Boundaries

Existing Zoning
- Commercial
- Industrial
- Institutional
- Recreational
- Residential

Non-adapter Consequences (Map 6)
- Gentrified Commercial
- Gentrified Residential
- General Institutional

Water
- Stormwater Park (Map 3)

Energy
- Wind Power Generation

Green Infrastructure (Maps 2,3)
- Highway Buffer Park
- Sustainability Pilot Areas
- Superblocks

Industry and Commerce (Map 3)
- Innovation Zones

Transportation
- Complete Streets (Maps 2,3,
- Bike Lanes (Maps 2-5
- Electric Scooter Stations

Agriculture (Maps 2,3)
- Urban Farms

Residential
- Medium Density Housing (Maps 2-5)
- Mixed-Use Corridors (Maps 2-5)

Study Area Background

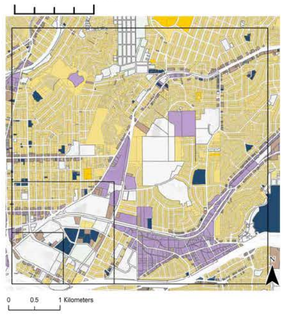
- Considered "the land of sometimes water." by the Tongva people
- Once called the "Ellis Island of Los Angeles" as immigrants located near jobs in rail yards and industrial areas
- Lincoln Heights was the earliest developed section of the study area owing to an early streetcar linkage to downtown.
- Home to a significant working class population
- Population consists of a majority of Mexican heritage
- New and growing Vietnamese population
- Contains the University of Southern California Health Sciences campus
- Housing stock includes historic Victorian, art deco, and modern homes

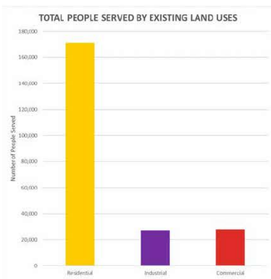
MAJOR REQUIREMENTS BY 2050

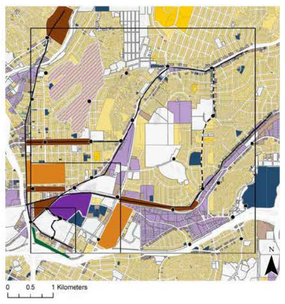
- The study area must accommodate severe predicted temperature increases due to climate change
- Anticipated water shortages and prolonged drought require mitigation
- The area must support at least 2,000 new residents by 2050, and gentrification may attract more
- New development attracts demographic shift, such as an increase in (white) young professionals
- The danger of a continued trend in gentrification requires policy mitigation
- Planned expansion of the University of Southern California Health Sciences Campus
- Los Angeles County plans to invest significantly in the area to prepare for the Olympics

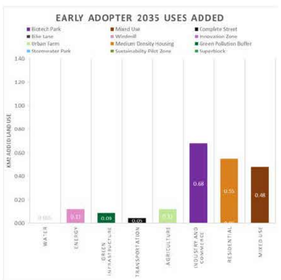
MAJOR ASSUMPTIONS AND INNOVATIONS ADOPTED

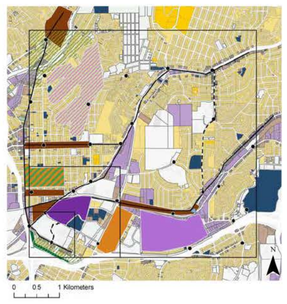
WAT 2035/2050 SEVERE WATER SHORTAGE --> REUSE
AGR 2035/2050 EXTREME HEAT --> RENEWABLES, MICROGRIDS
TRA 2035/2050 COMPLETE STREETS
IND/COM 2035/2050 INNOVATION DISTRICTS
MIX 2035 CROSS LAMINATED TIMBER CONSTRUCTION
INST 2035 USC HEALTH SCIENCES CAMPUS EXPANSION
PPL OF PL 2035/2050 GENTRIFICATION REQUIRES MITIGATION
RES 2050 SUPERBLOCKS, INCREASED DENSITY
ENE 2035/2050 RENEWABLE NEW DEVELOPMENT, MICROGRIDS
GRN 2035/2050 SUSTAINABILITY PILOT ZONES

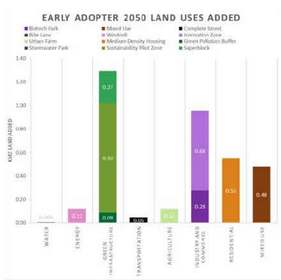


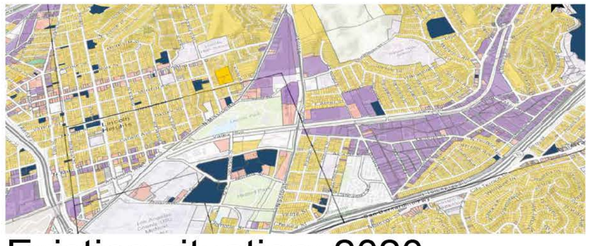












Existing situation: 2020

Early adopter: 2035

Early adopter: 2050

Early Adopter Scenario

EARLY ADOPTER PROFILE

Developers and urban planners who have the resources and drive to initiate large-scale changes that address the challenges posed by climate change

CHANGES MADE BY 2050

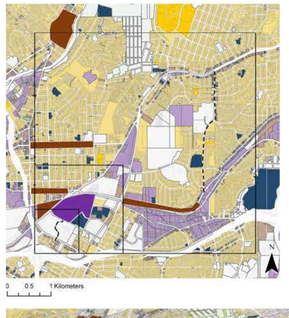
- Combined agricultural and windmill area generates food and energy
- Superblocks upgrade some housing to medium density and provide green space
- Complete streets create multi-modal pedestrian friendly transportation networks
- Concentrated, energy efficient mixed-use corridors built with cross-laminated timber
- Electric scooter stations provide first-last mile transit options
- Sustainability pilot area allows for innovative scientific collaboration to reduce effects of freeway pollution
- Innovation district creates green jobs and encourages technological advancement
- Stormwater park provides public space and filters stormwater pollutants

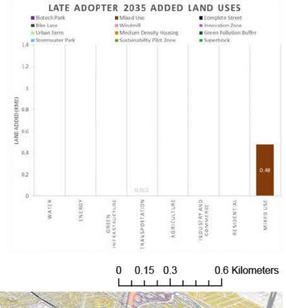
GOALS OF CHANGES

- Establish green infrastructure to create resilience during increasing drought, flooding, urban heat island effect
- Provide residents with sufficient housing and commercial opportunities
- Create job growth in sustainable industries
- Discourage car traffic in favor of more sustainable transit methods
- Decrease resource consumption during construction and occupation of all new buildings
- Increased livability and quality of life
- Provide increased greenspace access

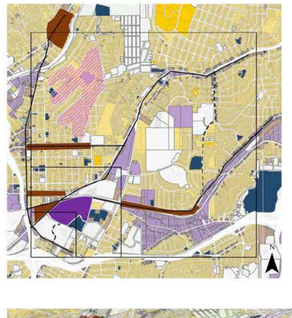
Existing Demographics

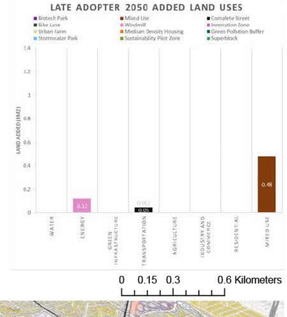
- The study area currently contains 58,983 people, which is only about 1.5% of the total population of Los Angeles
- According to general, non-adopter population growth projections, the study area will grow 60,012 people by 2023 - a 1% increase
- The current residents include 45,018 Hispanic, 23,464 White, 8,509 Asian, 1,161 African American, 742 Native American / Alaskan, 34 Hawaiian / Pacific Islander
- A total of 4,316 households within our study area fall below the federal poverty line, which amounts to around 27% of households
- Approximately 19% of the population has less than high school education
- The study area's median age is 32





Late adopter: 2035





Late adopter: 2050

Late Adopter Scenario

LATE ADOPTER PROFILE

Planners, developers, and community members who are hesitant to implement progressive sustainability agendas due to funding shortages, prioritization of short-term economic growth, and community opposition to gentrification.

CHANGES MADE BY 2035

- Bike lane creates better bike connectivity amongst major transit arterials
- Development of mixed use zones increases housing density and accessibility
- Windmill zone repurposes natural hazard area to generate renewable energy
- Planned biotech park provides green jobs and encourages innovation

CHANGES MADE BY 2050

- Complete streets create multi-modal, pedestrian-friendly transportation networks and reduce air pollution from cars and larger vehicles
- Windmill zone repurposes natural hazard area to generate renewable energy

GOALS OF CHANGES

- Provide residents with sufficient housing and commercial opportunities to accommodate population growth
- Decrease energy consumption and reliance on fossil fuels
- Increase accessibility and connectivity of alternative transit options

PROBLEMS NOT ADDRESSED

- Does not provide healthy, local food
- Does not create job growth in sustainable industries
- Does not sufficiently reduce pollution and UHI
- Does not mitigate displacement due to gentrification

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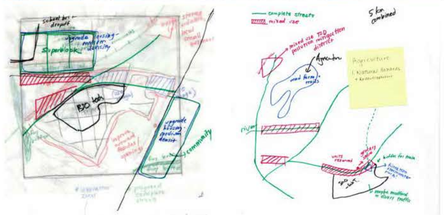
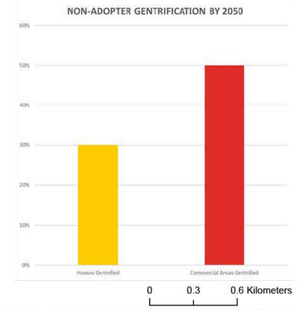
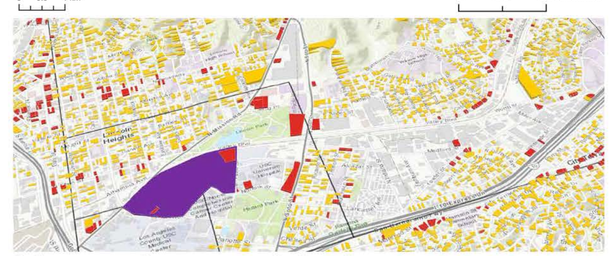


TOP: Urban planners, developers, and community members negotiating conditions for a compromise plan.
BOTTOM: (Left) Overlayed plans for all four stakeholder groups at the 2km2 scale. (Right) 5 km2 scale consensus plan. We chose create and compare stakeholder plans using trace paper and pen in order to incorporate the instinct-based, design-oriented aspect of GeoDesign into our soution. We used ArcPro to create data-infused basemaps specic to each stakeholder's goals, needs, and values. They then used this information to draw suggestion plans.

Geodesign Process

1. Identify the ten major systems on which to focus our research and solutions, and the major assumptions associated with each system
2. Research the study area's existing conditions through geographic analysis, literature reviews, and the creation of story maps depicting current conditions
3. Research pending projects that could affect the study area's trajectory
4. Anticipate major challenges faced by the study area within the next 30 years
5. Use research to make assumptions about each of the ten chosen systems
6. Understand major stakeholder values, needs, goals, and pain points:
   a. Urban planners
   b. Climate change advocates
   c. Community interests
   d. Developers
7. Determine a set of typologies and tools that stakeholders can use to address both the study area's climate challenges and their individual needs:
   a. Superblocks
   b. Mixed-use corridors
   c. Complete streets
   d. Combined windmill and agriculture
   e. Innovation zones
   f. Stormwater parks
   g. Increased residential housing density
   h. Sustainability pilot areas
8. Act as individual stakeholders to create ideal study area adaptation plans at 3 scales
9. Create stakeholder-specific maps to inform the drafting of individual stakeholder plans, which include data catered to each stakeholder's goals, needs, and values.
10. Combine individual plans and perform stakeholder negotiations to create compromise plan for 2050
11. Work backwards to create scenarios for late-adopters, non-adopters, and phasing plans for 2035 and 2050 using GIS
12. Create evaluation models to understand impacts of changes





Non-adopter: 2050

Non-adopter Scenario

NON-ADOPTER PROFILE

People do not consider long-term solutions to the environmental and social issues posed by climate change. They continue with current resource use and development patterns.

CHANGES MADE BY 2050

- Residential land will gentrify by 30% 2050
- Commercial will gentrify by 50% by 2050

CONSEQUENCES OF NON-ADOPTION

If none of these measures are adopted, the community will continue to gentrify at a similar rate to the communities around it.

- Gentrification will displace the current community
- The planned University of Southern California biotech park will cause land values to increase and new development to occur
- New residential and commercial development will maintain high resource use and lack of sustainability
- Energy will continue to come from unsustainable sources

Stakeholders

We consider stakeholder analysis to be a vital component of GeoDesign. We decided to incorporate stakeholder input into our consensus plan in order to arrive at an actionable solution that would serve the needs of all parties involved.

Stakeholder analysis provided a better understanding of the complex challenges faced by each concerned group, the pain points that could prevent the implementation of a proposed solution, and the area-specific context that could better inform our consensus plan.

We recognize that the case study involves hundreds of stakeholders. For the purpose of our negotiations, we simplified these actors into four distinct stakeholder groups.

	Goals	Pain Points
Urban Planners	• Accomodate population growth • Create jobs across economic sectors • Improve livability, quality of life • Increase public transit options • Ensure housing affordability	• Focus on automobiles • Lack of accessibility to jobs, transit • Unbridled development and gentrification • Housing and homelessness crisis
Climate Change Activists	• Reduce resource consumption • Invest in renewable energy • Ensure sustainable, progressive new development	• Unsustainable development • Complacency of policymakers and developers • Lack of policy to enforce sustainability
Community Interests	• Continue living their lives as usual • Limit displacement of current residents • Protect local businesses	• Projects that would benefit potential new community residents at the expense of current residents
Developers	• Create more value in neighborhood • Respond to demand for housing, commercial in area • Generate profit	• Legal development restrictions • Expensive upgrade requirements • Rent control

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Typologies and Innovations

INNOVATION ZONES

DESCRIPTION
Zones of opportunity designed to connect disadvantaged communities to employment centers and research institutions, diversify existing industrial land uses, and improve the interface between industrial and residential uses.

BENEFITS
- Merges commercialization with high-tech firms and creative startups
- Protects vital industrial land uses while improving walkability, accessibility, and open space qualities
- Reduces health hazards posed by industrial land uses

COMPLETE STREETS

DESCRIPTION
The redesignation of car lanes for bus and small personal vehicle lanes to increase transportation mix.

BENEFITS
- Prioritizes more sustainable transit methods over cars
- Increases bike and public transportation use
- Increases safety for all street users

PROTECTED BIKE LANES

DESCRIPTION
Bike lanes that are protected from car lanes by physical barriers.

BENEFITS
- Protects bikers from cars
- Encourages bike use
- Improves community health and safety

ELECTRIC SCOOTER CHARGING STATIONS

DESCRIPTION
Provides docking and charging locations for new personal electric scooters

BENEFITS
- Incentivises the use of personal electric vehicles, thus reducing fossil fuel consumption and car use
- Creates more harmony between the new technology and the community
-

COMPONENTS AND INNOVATIONS
- Charging infrastructure
- Area demarcations to indicate where scooters may be parked

SUSTAINABILITY PILOT AREAS

DESCRIPTION
Areas designated for the testing of new sustainability interventions through public-private partnerships with local research universities, such as USC, and technology companies in the area's innovation zones.

BENEFITS
- Policy exceptions and lower permitting requirements for innovative, sustainable projects
- Creates a collaborative, public-private partnership to encourage a culture of involved sustainability
- Lowers urban heat island effect, lowers fossil fuel consumption
- Mitigates pollution and poor air quality
- Increases sustainable energy production

COMPONENTS AND INNOVATIONS
- Cool pavement coating
- Increased tree cover
- Solar streets
- *more inventions to be developed and tested through partnerships with local neighborhoods

STORMWATER PARK

DESCRIPTION
A multipurpose space that provides critical ecosystem services through permeable functional green space.

BENEFITS
- Filters stormwater pollutants from roadway runoff
- Allows for groundwater recharge
- Provides flood protection in event of heavy rainfall
- Creates additional public space

COMPONENTS AND INNOVATIONS
- Recreational and open space
- Bioswales
- Community gardens

SUPERBLOCKS

DESCRIPTION
A planning scheme that increases community space and restricts car access by transforming public streets into parks, greenspace, and community gardens.

BENEFITS
- Prioritizes walking and biking over vehicular traffic
- Provides more greenspace and community space
- Limits viability, use of personal cars

COMPONENTS AND INNOVATIONS
- Public furniture in greenspaces
- Water recapture parks

COMBINED WINDMILL AND AGRICULTURAL AREAS

DESCRIPTION
Areas that repurpose otherwise unusable landslide zones to generate wind energy and produce food for the community. This includes windmills with agriculture at ground level.

BENEFITS
- Generates renewable energy to reduce fossil fuel consumption
- Provides agriculture and maintenance jobs for the community
- Produces healthy, local produce for the community

COMPONENTS AND INNOVATIONS
- Windmills
- Terraced fruit and vegetable planter boxes

MEDIUM DENSITY HOUSING

DESCRIPTION
Duplex and townhouse style housing that utilizes technology to lower its environmental footprint, increases density, and preserves residential neighborhood character..

BENEFITS
- Increases housing stock through densification
- Utilizes sustainable design practices
- Provides a new type of housing for the growing community

COMPONENTS AND INNOVATIONS
- Stormwater capture
- Solar panels

CROSS LAMINATED TIMBER

DESCRIPTION
A sustainable, fire-resistant building material made out of sawed, perpendicularly layered, glued wood. The material significantly reduces construction time, pollution, and resource use.

BENEFITS
- Renewable resource - few fossil fuels are required for its production
- Strength, fire resistance, and earthquake resistance comparable to concrete and steel
- Often sourced from sustainably managed forests
- Prefabrication of detailing during manufacturing dramatically reduces construction time and material waste

MIXED-USE CORRIDOR

DESCRIPTION
Pedestrian-friendly development that blends residential, commercial, cultural, institutional, and/or industrial uses.

BENEFITS
- Increases density accessibility
- Accommodates population growth without requiring more land
- Increases housing stock diversity
- Promotes walking and biking

COMPONENTS AND INNOVATIONS
- Buildings constructed out of cross laminated timber
- Solar panels
- Efficient water infrastructure, capture
- 30% of new housing needs must be priced at 30% of the median household income of the current community

Participant Team Credits

Completed by Grace Corsi, Benjamin Friedman, Julia Fruithandler, Rebekkah Castellanos, Felix Goldwasser, and Emily Ly. With contributions from Dr. John Wilson, Dr. Jennifer Swift, and Beau MacDonald