Future Proofing the Suburbs: Lessons Learned from Smart Suburbs

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SEPTEMBER 20, 2019
Future Proofing the Suburbs

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SEPTEMBER 20, 2019
Back in 2010...

- Walking: 3%
- Biking: 1%
- Cars: 76%
- Ubers & Lyft: 10%
- <1%
- 3%
- 3%

The mode share was different.

In 2016...

- Walking: 3%
- Biking: 1%
- Cars: 75%
- Ubers & Lyft: 10%
- <1%
- ???%
- 2%
- 3%

Technology impacted mode share.

1ACS, Table S0801
2APTA Fact Book, 2016
States That Drive Less Have Better Economies

Figure 7. Per capita GDP and VMT for US States (2008)

Mixed Use Neighborhoods

A majority of people across age groups prefer mixed-use neighborhoods.

Ideal neighborhood types
People under 30 years old

Ideal neighborhood types
People 30-60 years old

Ideal neighborhood types
People aged 60+

Sources: Transportation for America survey of Millennials; "Who's On Board," TransitCenter, September 2014.
Mixed Use Neighborhoods

Public
Fixed-Route (HOV)

Personal
Point-to-Point (SOV)

Peer-to-Peer \ Private
Point-to-Point (SOV/HOV)

Public-Private-Partnership
Point-to-Point
Commodification of Trips

- Commodifying trips: outputs (trips) purchased and sold, instead of users owning means of production (vehicles)

- Functionality dominates while form, brand, and identity lose importance.
Potential AV Rideshare Mode Shift

Current and Projected Modal Share

All cities, especially lower-density metros, have the potential to reduce car dependency and congestion.
Potential AV Rideshare Mode Shift

Los Angeles – Long Beach – Anaheim, CA MSA
Could experience a shift of 36% to 44% (1.8 million to 2.2 million) from personal vehicles to share Avs.

Total People Commuting by Personal Vehicle

- 1.1M
- 3.1M
- 520K
- 120K
- 60K

Reduction in Personal Vehicle Ownership

- -425K-525K
- -1.1M-1.4M
- -190K-230K
- -45K-55K
- -22K-27K

Housing Units per Acre

- 0-3
- 3-10
- 10-20
- 20-30
- 30-150+
Potential AV Rideshare Mode Shift

Credit: Toyota

https://youtu.be/bniK9Egnw4
What’s At Risk?

- High vehicle ownership
- Amplified congestion
- Increased Vehicle Miles Traveled
- Diminished transit ridership
- Greater demand for parking
- Growing disparity for job and transportation access
Policy Priorities

1. Promote Equitable Access to New Jobs and Services
2. Plan for Mixed-Use, Car-Light Neighborhoods
3. Leverage Technology to Enhance Mobility
4. Prioritize & Modernize Public Transit
5. Encourage Adaptable Parking
6. Implement Dynamic Pricing and Governance
Transit and Shared Mobility

Shared mobility services may complement or compete with public transit depending on public policy or lack thereof.
ONE GAJILLION NEW STOPS.

DOWNLOAD & RIDE
Shuttle Service Within Bishop Ranch
Dublin-Pleasanton BART Shuttle
Innovative Mobility Hubs

Credit: Hamburg

Credit: City of Montreal
LADOT Strategic Implementation Plan

Business Model:
1. Build a solid data foundation.
2. Leverage technology + design for a better transportation experience.
3. Create partnerships for more shared services.
4. Establish feedback loops for services + infrastructure.
5. Prepare for an automated future.

Policy + Implementation + Pilots

Platform for Mobility Innovation
Data as a Service + Mobility as a Service + Infrastructure as a Service

Technology Platform

Risk Management
Existing Projects
Equity
20th Century

**Public Policy**
- Encourage private vehicle ownership
- Provide mass transit
- Regulate taxi industry
- Protect public safety

**Private Industry**
- Operate taxis
- Build vehicles

**Consumer**
- Publicly-provided transportation
- Owned vehicles (SOV)

21st Century

**Private Industry**
- Technology-enabled
- Low barrier to entry
- Sharing economy / peer-to-peer

**Consumer**
- Choice of mobility is expanded
- Responds and adopts new products

**Public Policy**
- Govern ROW for emerging forms of shared mobility
- ?
Mobility Hubs Identification
Arcadis mobility toolkit pilot for Minneapolis and St. Paul

YUAN SHI
GLOBAL SOLUTION LEADER FOR NEW MOBILITY
ARCADIS
SEPTEMBER 20, 2019
Methodology

Mobility Hub sites were identified by combining 32 different layers. Layers were grouped into five different layer groups:

(A) Physical;
(B) Economic;
(C) Demographic;
(D) Access;
(E) Behavior

Siting was considered in terms of City priorities and planning scenarios: each aggregated layer was multiplied by a given weight, which determined the output for the scenario at hand. The three Twin Cities planning scenarios were as follows:

(1) Equal focus;
(2) commute focus;
(3) equity focus

Hotspots identified for each scenario are considered candidates for mobility hub sites. The Twin Cities metropolitan area was spatially divided into tiles for the purposes of analysis: 1st and 2nd tiered hubs are suggested based on tile scores.
Table 1. All 32 individual layers used according to layer group.

<table>
<thead>
<tr>
<th>A. Physical</th>
<th>B. Economic</th>
<th>C. Demographic</th>
<th>D. Access</th>
<th>E. Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport Facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Bus stations</td>
<td></td>
<td></td>
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<tr>
<td>2. Bus routes</td>
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<td></td>
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<tr>
<td>3. Rail stations</td>
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<td>4. Shared bike docks</td>
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<tr>
<td>5. Bike lanes</td>
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<tr>
<td>6. Major roads</td>
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<tr>
<td>7. EV chargers</td>
<td></td>
<td></td>
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<tr>
<td>8. Airport</td>
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<tr>
<td>Major public facilities</td>
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<tr>
<td>9. Public attractions</td>
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<tr>
<td>10. Schools</td>
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<tr>
<td>11. Hospitals</td>
<td></td>
<td></td>
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<tr>
<td>12. Shopping centers</td>
<td></td>
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<tr>
<td>13. Senior &amp; public housing</td>
<td></td>
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<td></td>
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<tr>
<td>14. Disability services access</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Parking lots</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Underutilized land</td>
<td></td>
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</tbody>
</table>

For analytical purposes, the city was divided into 25,587 350 ft. x 350 ft. tiles. Each layer considered is listed under its corresponding layer group in Table 1. For each layer, every tile was assigned a score ranging from 0 to 5 based on the layer value percentile, with 0 indicating low mobility hub siting suitability and 5 indicating high suitability. The 100th–95th percentiles are scored 5; 95th–75th are 4; 75th–50th are 3; 50th–25th are 2, 25th-0 are 1. Null and zero values are scored as 0. Scores were aggregated by layer group and multiplied by relevant scenario weights to calculate each tile’s ultimate value. The higher the final score, the more desirable a mobility hub in that area.
Results

By using five separate layer groups corresponding to city characteristics, our model was able to accommodate and attribute differing levels of importance to each layer. The physical layer group emphasizes current infrastructure, highlighting the density of the built environment in both city centers. The economic layer group was calculated using Local Spatial Autocorrelation and identifies areas with high job concentration. The demographics layer group highlights underprivileged populations. The access layer group shows areas that are not currently well connected to public transit. Finally, the behavior layer group emphasizes areas lacking access to transit and reveals areas where people are behaviorally incentivized to use transit and micromobility instead of driving.
Red: More existing infrastructure and demand for travel

Green: Less existing infrastructure and demand for travel
Red: Greater need for economic development support
Green: Less need for economic development support
DEMOGRAPHICS

Red: Greater need for improvements in equity
Green: Less need for improvements in equity
BEHAVIOR

Red: Greater behavioral incentive to use intermodal hubs

Green: Less behavioral incentive to use intermodal hubs
Scenario Planning

Since each layer group highlights different areas, scenario planning is necessary for prioritizing City needs and focus. There are 13 scenarios explored by this project. For each scenario, hotspots (tiles) that have higher relative aggregated values were marked as mobility hub candidates.

<table>
<thead>
<tr>
<th>1</th>
<th>Equal Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Commute Focus</td>
</tr>
<tr>
<td>3</td>
<td>Equity Focus</td>
</tr>
<tr>
<td>4</td>
<td>Physical + Economic</td>
</tr>
<tr>
<td>5</td>
<td>Physical + Demographic</td>
</tr>
<tr>
<td>6</td>
<td>Physical + Access</td>
</tr>
<tr>
<td>7</td>
<td>Physical + Behavior</td>
</tr>
<tr>
<td>8</td>
<td>Economic + Demographic</td>
</tr>
<tr>
<td>9</td>
<td>Economic + Access</td>
</tr>
<tr>
<td>10</td>
<td>Economic + Behavior</td>
</tr>
<tr>
<td>11</td>
<td>Demographic + Access</td>
</tr>
<tr>
<td>12</td>
<td>Demographic + Behavior</td>
</tr>
<tr>
<td>13</td>
<td>Access + Behavior</td>
</tr>
</tbody>
</table>
Scenario Planning 1
Equal Focus

For each scenario, all five layer groups are equally weighted.

<table>
<thead>
<tr>
<th>Layer Group</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Physical</td>
<td>1</td>
</tr>
<tr>
<td>B. Economic</td>
<td>1</td>
</tr>
<tr>
<td>C. Demographic</td>
<td>1</td>
</tr>
<tr>
<td>D. Access</td>
<td>1</td>
</tr>
<tr>
<td>E. Behavior</td>
<td>1</td>
</tr>
</tbody>
</table>
Scenario Planning 2
Commute Focus

The economic layer is double-weighted. In comparison with scenario planning 1 – equal focus, there are different 2nd tiered hubs to better serve commuting.

<table>
<thead>
<tr>
<th>Layer Group</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Physical</td>
<td>1</td>
</tr>
<tr>
<td>B. Economic</td>
<td>2</td>
</tr>
<tr>
<td>C. Demographic</td>
<td>1</td>
</tr>
<tr>
<td>D. Access</td>
<td>1</td>
</tr>
<tr>
<td>E. Behavior</td>
<td>1</td>
</tr>
</tbody>
</table>
Scenario Planning 3
Equity Focus

The demographic layer is double-weighted. In comparison with scenario planning 1 – equal focus, there are different 2nd tiered hubs identified for improving equity.

<table>
<thead>
<tr>
<th>Layer Group</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Physical</td>
<td>1</td>
</tr>
<tr>
<td>B. Economic</td>
<td>1</td>
</tr>
<tr>
<td>C. Demographic</td>
<td>2</td>
</tr>
<tr>
<td>D. Access</td>
<td>1</td>
</tr>
<tr>
<td>E. Behavior</td>
<td>1</td>
</tr>
</tbody>
</table>
1st Tiered Hubs Profile Example

Image: SANDAG
Hub Profile (Minneapolis) – 1st Tiered – a
A Case Study of the Nassau Hub

JEE MEE KIM
PRINCIPAL, HR&A ADVISORS
SEPTEMBER 20, 2019
Autonomous vehicles (AVs) not only have the potential to transform transportation, but also land use, real estate, and the broader economy.

<table>
<thead>
<tr>
<th>TRANSPORTATION</th>
<th>REAL ESTATE &amp; LAND USE</th>
<th>ECONOMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Ownership</td>
<td>Land Use</td>
<td>Industries</td>
</tr>
<tr>
<td>Mobility</td>
<td>Real Estate</td>
<td>Jobs</td>
</tr>
<tr>
<td>Traffic &amp; Congestion</td>
<td>Parking</td>
<td>Equity</td>
</tr>
<tr>
<td>Safety &amp; Environmental</td>
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</tbody>
</table>
Car-free households are on the rise . . .

500,000 households went car-free across the U.S. between 2005 and 2012.

. . . but car-rich households are growing faster than the population.

8 – 11%

Increase in number of household vehicles across 20 cities (2012-2016)

5.7 billion

Miles TNCs added to major metro areas (2012-2016)

13,500

Average miles Americans drive per year

Car-Free Households in Select U.S. Cities

<table>
<thead>
<tr>
<th>City</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York City</td>
<td>54%</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>37%</td>
</tr>
<tr>
<td>Boston</td>
<td>34%</td>
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<tr>
<td>Philadelphia</td>
<td>30%</td>
</tr>
<tr>
<td>San Francisco</td>
<td>30%</td>
</tr>
<tr>
<td>U.S. Average</td>
<td>9%</td>
</tr>
</tbody>
</table>

Source: U.S. Census
“Heaven” and “hell” scenarios are both likely. Public policy will ultimately determine the net impact of AVs.
The Nassau Hub site is located ~20 miles east of New York City, in the Town of Hempstead in Long Island.
In the fall of 2015, Nassau County sought $225 million in State funding for the creation of a Biotech Park at the Nassau Coliseum site.

The plan sought to leverage the presence of nearby academic, institutional, and research institutions to create new biotech and research jobs, building off development plans at the Coliseum site.

Source: SHoP Architects, Newsday (2015)
The Gallery Shops at Westbury Plaza
Roosevelt Field Mall
Nassau Community College
Marriott Hotel
Westbury Shopping Center
Hofstra University & Medical School
Winthrop University Hospital
LIRR Station
LI Bus Transit Center
Westbury LIRR Station
Museum Row
FCRC Development / Nassau Coliseum
Planned Northwell Feinstein Institute
Planned MSK Cancer Center
Eisenhower Park
Nassau Hub Biotech Park Plan – 77 Acres

Source: Google
Locations TBC
Once the exclusive domain of suburban office parks . . .

THEN: 20th Century Research Campus

NOW: 21st Century Innovation District

. . . research and development is now increasingly occurring in mixed-use, walkable, and transit-rich innovation districts
Enhancing transit service will improve transit mobility and ridership for the Nassau Hub Innovation District and the surrounding area.

Infrastructure

• Explore **improvements to existing bus service.**

• Conduct feasibility study to explore **transit service along the Mineola Spur and the Secondary.**

• Enhance pedestrian and bike access with **streetscape improvements.**

• Develop **transportation demand management measures.**
The Nassau Hub Innovation District requires zoning changes to allow for a mix of uses and denser development.

Regulatory Process

- **Amend zoning to accommodate multifamily housing** and increased density.

- **Revise the proposed mix of uses** to increase residential and office development.

- **Modify parking requirements.**
Easing parking requirements can enhance development feasibility.

Easing parking requirements may **reduce construction costs by as much as 20%** and enhance the feasibility of new development.

Currently 65% of New York State’s $131 M contribution is dedicated for **3,400 parking spaces**, to comply with local zoning.
Existing parking facilities can become more efficient. Some may be reused and repurposed over time.

1. **Narrower Ailes**
   - Perfect alignment and customized spacing through parking technology

2. **Stall Stacks**
   - Flexible re-configuration of parking space – tight parking scenarios are conceivable.

3. **Smaller Stalls**
   - The required parking footprint per car can shrink to a minimum.

**AVs may reduce the number of spaces needed and the size of individual spaces.**

**Some excess parking spaces may be redeveloped.** Parking can be transitioned into new residential, retail, office, or open space.

*Image Credit: Audi*
The County and developers have since proposed a master plan that includes a vibrant mix of uses, walkable streets with multi-modal connectivity, and public amenities.
Urban Design Strategies

WILLIAM KENWORTHHEY
PRINCIPAL | REGIONAL LEADER OF PLANNING

SEPTEMBER 20 2019
Autonomous Vehicle Study
What if retail and commerce replaced parked cars and car lanes? outdoor seating for restaurants in a fresh air and quiet environment was plentiful? if there were as many people outside as inside and streets felt safe
What if...
...air was fresh and good for your immune system? phytoncides
...the street wasn’t a heatsink, but lush, shaded, soft and comfortable
...it was quiet and conversations where easily heard? 45 db
...streets were dimmer, cars don’t need light, a circadian city for humans and wildlife
...streets and blocks cleaned water?
What if

... the street catered to walkers, runners, and bicycles
... kids could play in the street again, risk and scaffolding play
... streets contributed to a decrease in diabetes, lower blood pressure
... streets contributed to an increase in physical and mental well-being?

fit + active
Miracle Mile + Giralda Ave. Case Study
Coral Gables, FL

- Valet Station
- Off-street Parking

Diagram showing Miracle Mile and Giralda Ave. with parking and valet stations.
Existing Miracle Mile Cross Section
Proposed Cross Section Miracle Mile
Parallel Parking with a Shared Bike/Car Lane
Proposed Cross Section Giralda Avenue: Curb-less Street w/opportunity for Closure
Corporate Tech Campus
Pleasanton, CA
Solution
Implementation

1. Maximize drop off and loading zone
2. Visible and safe access to buses and shuttles along roadway
3. Easing parking requirements:
   ▪ transit credit due to proximity to BART
   ▪ 40% compact parking
4. Increase bike parking and bike circulation routes
5. Prepare for future expansion adjacent to BART station
Future Workday HQ?
Future Proofing the District

1. SAFEWAY BUILDING
2. 5928 STONERIDGE MALL ROAD
3. SHERATON PLEASANTON
4. 6000 STONERIDGE MALL ROAD
5. BART GARAGE
6. WORKDAY DEVELOPMENT CENTER
7. DEVELOPMENT CENTER PARKING
8. STONERIDGE CORPORATE PLAZA
9. PLEASANTON CORPORATE COMMONS
10. STONERIDGE MALL
11. STONERIDGE MALL EXTENSION
12. NEW HEADQUARTER BUILDING
Increased Storage Efficiency

**TRADITIONAL**

- 8'6" (102"")
- 16' (192")

**AUTONOMOUS**

- 7'2" (86")
- 16' (192")

**15% reduction in each parking space**

With autonomous vehicles needing as little as 4" on either side of the parking strip, there can be up to 21 square foot reduction in each parking space.
Over Parked
Parking Scenarios

**Existing lot**

- 273 spaces

**Scenario 1:**
Privately owned autonomous vehicle lot
- 285 spaces (104%)

**Scenario 2:**
Privately owned autonomous vehicle lot
- 327 spaces (120%)

**Scenario 3:**
Shared autonomous vehicle lot
- 343 spaces (126%)

Narrower lot spaces + one way drive aisles

Existing lot layout + narrower lot spaces

Front to back parking