Place Types, Street Typologies, & Layered Networks
Place-Types and Context

- Evolve functional classification to typologies that address:
  - Mobility
  - Access
  - Speed
  - Development density
  - Form (height, setback)
  - Modal priority
  - Parking

Source: Duany, Plater-Zyberk & Company
Street Typologies

• New Focus on “Enhanced Networks”

• Context and Network Sensitive
  • Motor vehicle emphasis
  • Transit emphasis
  • Bicycle emphasis
  • Pedestrian emphasis
Street Typologies

- Motor vehicle emphasis
- **Transit emphasis**
- Bicycle emphasis
- Pedestrian emphasis

Source: Fehr and Peers
Street Typologies

- Motor vehicle emphasis
- Transit emphasis
- **Bicycle emphasis**
- Pedestrian emphasis
Street Typologies

- Motor vehicle emphasis
- Transit emphasis
- Bicycle emphasis
- **Pedestrian emphasis**
Layered Network

- Prioritizes a series of arterial and collector corridors for (no particular order):
  - Pedestrians
  - Transit riders
  - Bicyclists
  - Motor vehicles
- Local context is important
- *Planning Urban Roadway Systems*, an ITE Recommended Practice, recommends principles for design and performance of an entire roadway network
Layered Network

Westminster, CA

Source: Fehr & Peers
Layered Network

Westminster, CA
Layered Network

Westminster, CA
Layered Network

Westminster, CA
Countywide Multimodal Arterial Plan

Improving multimodal mobility for better economic, health and environmental outcomes

Kyle Shipley, Fehr & Peers
Essential to Alameda County:

- **Regional access** to state highway system
- **Multimodal access** within and around communities and employment centers
- Supports community’s **economic development**
COUNTYWIDE MULTIMODAL ARTERIAL PLAN

FIVE ARTERIAL PLAN GOALS

Multimodal
High Quality, Well-Maintained & Reliable

Accessible & Equitable
Complete Community

Connectivity
Connections Supportive of land-use across county & region

Resource Efficiency
ITS Technology & leverage resources

Safe, Healthy & Vibrant
Safety, air quality & community context
COUNTYWIDE MULTIMODAL ARTERIAL PLAN

TYPOLOGY FRAMEWORK

Complete Streets Network Foundation

- How streets function for all users
- Relationship between streets & buildings fronting onto them

Expands considerations

- Balances needs of all users
COUNTYWIDE MULTIMODAL ARTERIAL PLAN

KEY COMPONENTS

AUTO FUNCTION

- **Throughway**: Greater than 10,000 ADT and at least 50% of ADT travels 8+ miles
- **County Connector**: Greater than 10,000 ADT and at least 45% of ADT travels 6+ miles
- **Community Connector**: At least 50% of ADT travels 4+ miles
- **Neighborhood Connector**: At least 50% of ADT travels less than 4 miles
COUNTYWIDE MULTIMODAL ARTERIAL PLAN

KEY COMPONENTS AUTO FUNCTION

Transit
Level & Reliability of Transit

Major Corridors
BRT & Similar Corridors

Cross Town Routes
High Capacity Service

Local Routes

Bicycles
Comfort Level for People Cycling

Tier 1
Class 4
Protected Bike Lanes

Class 2
Enhanced
Buffered Bike Lns

Tier 2
Class 2
Bike Lanes

Tier 3
Class 3
Bike Routes

Parallel Routes
Class 1
Multi-Use Trails

Class 3
Enhanced Bicycle Blvds

Pedestrians
Pedestrian Activity Level

High Ped Emphasis
More Intensity & Mixed Use; High Transit Choice & Service Level; Low Auto Ownership

Medium Pedestrian Emphasis

Low Ped Emphasis
Less Intensity & Single Use; Local or No Transit; High Auto Ownership

Tier 1
Freeways & Expressways

Tier 2
Intra-County & Intercity Connectivity

Tier 3
Designated Routes for Local Pickup & Delivery

Goods Movement
Needs & Volume of Trucks

MORE EMPHASIS

LESS EMPHASIS
COUNTYWIDE MULTIMODAL ARTERIAL PLAN

MODAL PRIORITY

- Initial Modal Priorities
  - Method for balancing modes
  - Informs needs assessment & recommended improvements

- Auto Function
- Modes of Travel & Multimodal Networks
- Land Use Context
## Countywide Multimodal Arterial Plan

**Balancing Modes**

<table>
<thead>
<tr>
<th>Associated Modal Priorities</th>
<th>Urban Land Use</th>
<th>Suburban Land Use</th>
<th>Industrial Land Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit</td>
<td>Transit</td>
<td>Transit</td>
<td>Transit</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>Auto</td>
<td>Goods Movement/Truck</td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td>Goods Movement/Truck</td>
<td>Auto</td>
<td></td>
</tr>
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<td>Bicycle</td>
<td>Bicycle</td>
<td></td>
</tr>
<tr>
<td>Goods Movement/Truck</td>
<td>Pedestrian</td>
<td>Pedestrian</td>
<td></td>
</tr>
</tbody>
</table>
## BALANCING MODES

<table>
<thead>
<tr>
<th>Urban Land Use</th>
<th>Suburban Land Use</th>
<th>Industrial Land Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit: Major Corridors</td>
<td>Transit: Major Corridors</td>
<td>Transit: Major Corridors</td>
</tr>
<tr>
<td>Pedestrian: Tier 1</td>
<td>Auto: Throughway</td>
<td>Goods Movement: Tier 2</td>
</tr>
<tr>
<td>Bicycle: Glass 1, enhanced Class 2, Enhanced Class 3, or Class 4</td>
<td>Goods Movement: Tier 2</td>
<td>Auto: Throughway</td>
</tr>
<tr>
<td>Auto: Throughway</td>
<td>Bicycle: Class 1, enhanced Class 2, Enhanced Class 3, or Class 4</td>
<td>Bicycle: Glass 1, enhanced Class 2, Enhanced Class 3, or Class 4</td>
</tr>
<tr>
<td>Goods Movement: Tier 2</td>
<td>Pedestrian: Tier 1</td>
<td>Pedestrian: Tier 1</td>
</tr>
<tr>
<td>Transit: Crosstown Routes</td>
<td>Transit: Crosstown Routes</td>
<td>Transit: Crosstown Routes</td>
</tr>
<tr>
<td>Pedestrian: Tier 2</td>
<td>Auto: County Connector</td>
<td>Goods Movement: Tier 3</td>
</tr>
<tr>
<td>Bicycle: Class 2</td>
<td>Goods Movement: Tier 3</td>
<td>Auto: County Connector</td>
</tr>
<tr>
<td>Auto: County Connector</td>
<td>Bicycle: Class 2</td>
<td>Bicycle: Class 2</td>
</tr>
<tr>
<td>Pedestrian: Tier 3</td>
<td>Pedestrian: Tier 2</td>
<td>Pedestrian: Tier 2</td>
</tr>
<tr>
<td>Bicycle: Class 3</td>
<td>Auto: Community Connector</td>
<td>Auto: Community Connector</td>
</tr>
<tr>
<td>Transit: Local Routes</td>
<td>Bicycle: Class 3</td>
<td>Bicycle: Class 3</td>
</tr>
<tr>
<td>Goods Movement: Tier 3</td>
<td>Pedestrian: Tier 3</td>
<td>Pedestrian: Tier 3</td>
</tr>
<tr>
<td>Auto: Community Connector</td>
<td>Transit: Local Routes</td>
<td>Transit: Local Routes</td>
</tr>
<tr>
<td>Auto: Neighborhood Connector</td>
<td>Auto: Neighborhood Connector</td>
<td>Auto: Neighborhood Connector</td>
</tr>
</tbody>
</table>

*Note: Jurisdictions have final say on Modal Priorities.*
MISSION BLVD TYPOLOGY EXAMPLE

Mission Blvd (Fremont City Limits-I680)

Other Mapping Overlays:
- Tier 2 Goods Movement Route
- Class 2 Bike Lanes
- Local Transit Route
## Countywide Multimodal Arterial Plan

### Modal Priority Example

**Land Use Context: Suburban**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes/No</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it a Major Transit Corridor?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is it a Throughway?</td>
<td>Yes</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Priority: Auto</td>
</tr>
<tr>
<td>Is it a Tier 2 Goods Movement Route?</td>
<td>Yes</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Priority: Goods Movement</td>
</tr>
<tr>
<td>Is it a Bicycle Enhanced Class 2, Enhanced Class 3 or Class 4?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is it a Tier 1 Pedestrian Emphasis?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is it a Transit Crosstown Route?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is it a County Connector?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is it a Tier 3 Goods Movement Route?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is it a Bicycle Class 2?</td>
<td>Yes</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Priority: Bicycle</td>
</tr>
<tr>
<td>Is it a Tier 2 Pedestrian Emphasis?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is it a Community Connector?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is it a Bicycle Class 3?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is it a Tier 3 Pedestrian Emphasis?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is it a Transit Local Route?</td>
<td>Yes</td>
<td>4&lt;sup&gt;th&lt;/sup&gt; Priority: Transit</td>
</tr>
<tr>
<td>Is it a Neighborhood Connector?</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
MISSION BLVD EXAMPLE

### Baseline Conditions

- Transit Reliability: 0.53
- Congested Speed: 11
  - VC Ratio: 1.44
- Infrastructure Index: Very Good
  - Congested Speed: 12
- Bicycle Comfort Index: Poor
- Pedestrian Comfort Index: Fair
- Truck Accommodation Index: Very Good

### Proposed Improvements

- Infrastructure Index: Very Good
  - Congested Speed: 13
    - VC Ratio: 2.88
- Bicycle Comfort Index: Very Good
- Pedestrian Comfort Index: Fair
- Truck Accommodation Index: Very Good
- Transit Reliability: 0.9
COUNTYWIDE MULTIMODAL ARTERIAL PLAN

GIS TOOL

• Assess multimodal performance
• Perform needs assessment evaluation
• Quantify available right-of-way that could be repurposed for improvements
• Identify multimodal improvements
• Integrates with CityEngine 3-D visualization software
Social and behavioral trends scenario – anticipates lower per capita auto ownership and VMT rates, based on recent trends. Assumes 5 to 10% decrease in traffic volumes compared to standard forecasting approach.

Next generation vehicle scenario – anticipates an increase in roadway capacity as a result of autonomous and connected vehicles. Assumes 20% increase in arterial capacity.
Transit Network Improvements

Considered Improvements

- Dedicated Transit Lane Improvements
- Rapid Bus Improvements
- Enhanced Bus Improvements
Considered Improvements:

- Sidewalk Enhancements
- Crosswalk Enhancements
- Curb Bulbouts
- Pedestrian Scale Lighting
- Streetscape Enhancements
Considered Improvements:

- Class 2 Bicycle Lanes
- Class 2 Enhanced Buffered Bicycle Lanes
- Class 3 Bicycle Routes
- Class 3 Enhanced Bicycle Boulevards
- Class 4 Protected Bicycle Lanes
Considered ITS Improvements:

- **Low Level of ITS Infrastructure** - Field-to-center communications with ability to remotely monitor and manage traffic signals.
- **Medium Level of ITS Infrastructure** - Low Level plus CCTV cameras, time-of-day signal timing, adaptive signal control, transit signal priority.
- **High Level of ITS Infrastructure** - Medium Level plus changeable message signs, trailblazer signs, connected vehicle technologies.
COUNTYWIDE MULTIMODAL ARTERIAL PLAN

GOODS MOVEMENT NETWORK IMPROVEMENTS

Considered Goods Movement Improvements:

- Curb lane widening to 12 ft or greater along Goods Movement routes
COUNTYWIDE MULTIMODAL ARTERIAL PLAN

ARTERIAL NETWORK
Performance Objective Results

24% transit ridership increase estimated along transit improvement corridors

150% increase in bicycle riders estimated as a result of implementing proposed bicycle network improvements
<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>Miles Without Proposed Improvements</th>
<th>Miles With Proposed Improvements</th>
<th>Miles Net Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit Travel Speed</td>
<td>21</td>
<td>45</td>
<td>+24 (+214%)</td>
</tr>
<tr>
<td>Transit Reliability</td>
<td>56</td>
<td>112</td>
<td>+56 (+200%)</td>
</tr>
<tr>
<td>Transit Infrastructure Index</td>
<td>27</td>
<td>127</td>
<td>+100 (+470%)</td>
</tr>
<tr>
<td>Pedestrian Comfort Index</td>
<td>133</td>
<td>188</td>
<td>+55 (+141%)</td>
</tr>
<tr>
<td>Bicycle Comfort Index</td>
<td>35</td>
<td>146</td>
<td>+111 (+417%)</td>
</tr>
<tr>
<td>Truck Route Accommodation Index</td>
<td>83</td>
<td>105</td>
<td>+22 (+127%)</td>
</tr>
</tbody>
</table>