December 02, 2016

ADAMS COUNTY
COLORADO

Complete Streets Evaluation

2016 Planning Partners Conference

WILSON & COMPANY

discipline | intensity | collaboration | shared ownership | solutions

Topics Covered in this Presentation

- **What is a Complete Street?**
- **Benefits and Challenges of Complete Streets**
- **What is MMLOS?**
- **Importance of Multimodal Evaluations**
- **Methods of Evaluating MMLOS**
- **Making Connections in Adams County**

What is a Complete Street?

Complete Streets are streets for everyone.

They are designed and operated to enable safe access for **all users**, including pedestrians, bicyclists, motorists and transit riders of **all ages and abilities**. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations.

-National Complete Streets Coalition

What is a Complete Street?

Charlie Gandy – Livable Communities Inc.

- Maximized auto capacity
- Limited left-turn access
- Limited pedestrian space
- Long crossing distances for pedestrians
- No clear cycling space

What is a Complete Street?

Charlie Gandy – Livable Communities Inc.

- Reduced auto capacity
- Dedicated cycling space
- Increased left-turn access
- Limited pedestrian space
- Long crossing distances for pedestrians

What is a Complete Street?

Charlie Gandy – Livable Communities Inc.

- Reduced auto capacity
- Dedicated cycling space
- Increased left-turn access
- Limited pedestrian space
- Increased treatments for safe pedestrian crossings

Benefits of Complete Streets

Economic development

Roadway safety

Shifting preferences for urban environments

Economic Benefits of Complete Streets

Indianapolis Cultural Trail

Property Values:

- Properties values along the Indianapolis Cultural Trail **increased 148% after construction**

Indiana University Public Policy Institute

Economic Benefits of Complete Streets

Property Values:

- A **one-point increase** in WalkScore.com rating is associated with a **$700 to $3,000 increase in property values**

Smart Growth America

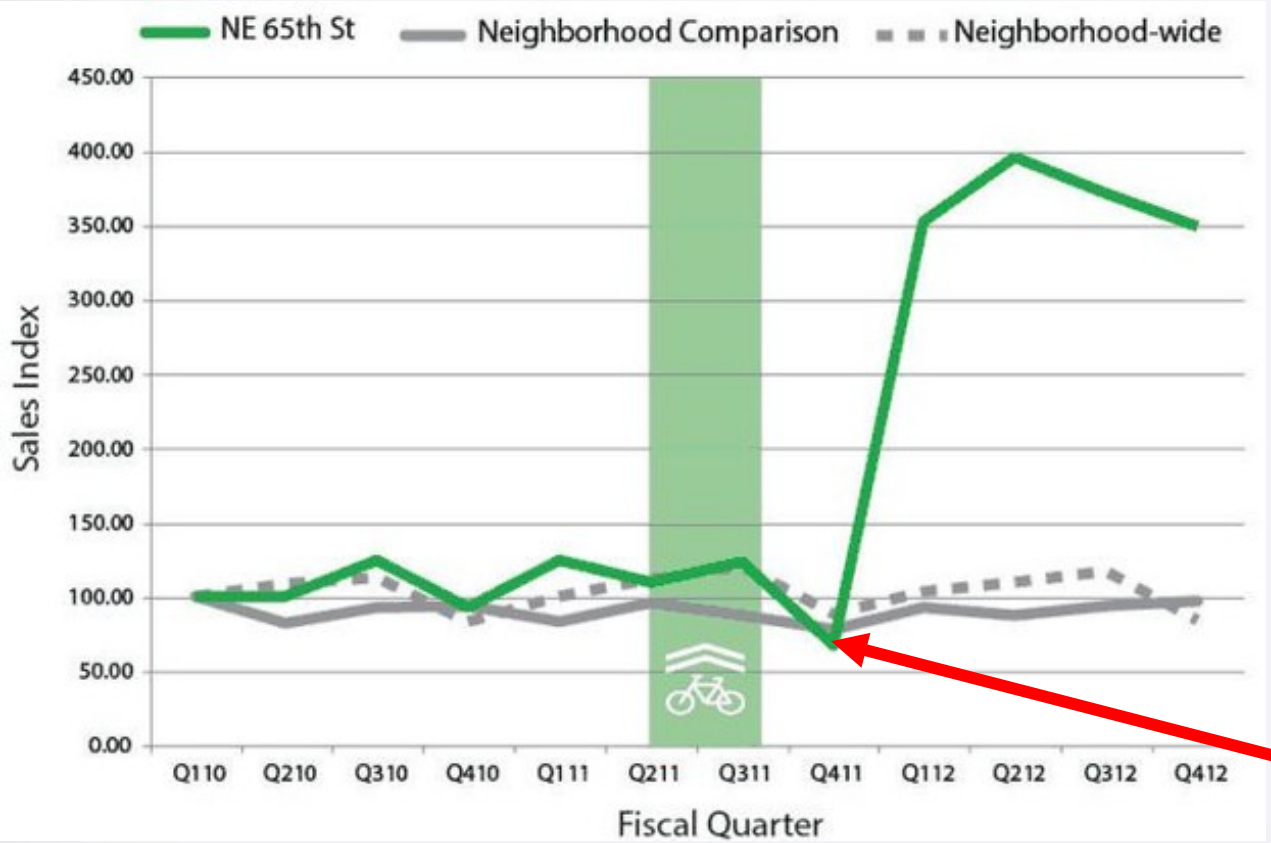
Economic Benefits of Complete Streets

Retail Sales:

- A study based on 78 businesses in Portland found that **non-drivers spend similar amounts or more than drivers.**

  CityLab

Economic Benefits of Complete Streets



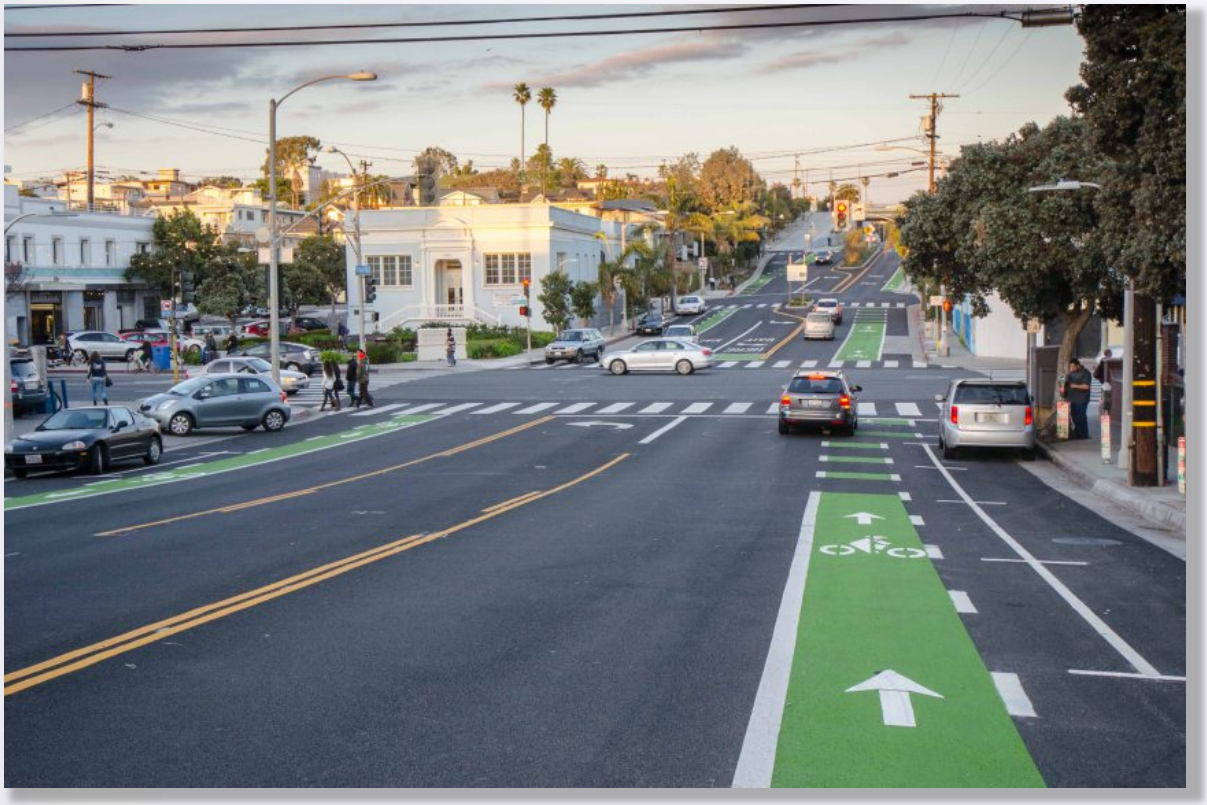
Retail Sales:

- **Bike lane** installations on 65th Street in Seattle was related to **gains in local sales revenue**

  Kyle Rowe, University of Washington via CityLab

Mode Shift
Travelers adjusting behavior

Safety Benefits of Complete Streets



Ocean Boulevard, Santa Monica

- **Reconfiguring** Ocean Boulevard in Santa Monica **reduced collisions by 65%**
- Collisions resulting in **injury** were **reduced by 60%**

  Smart Growth America

Safety Benefits of Complete Streets

Austin, Texas

- **Intersection and median redesign** has been shown to **reduce pedestrian risk by 28%**

  Smart Growth America

Shifting Preferences for Urban Environments

- Changing demographics
- Growth in foreign-born population
- Two largest generations (Baby Boomers and Millennials) favor transportation choice/options

Millennials' Living Preferences

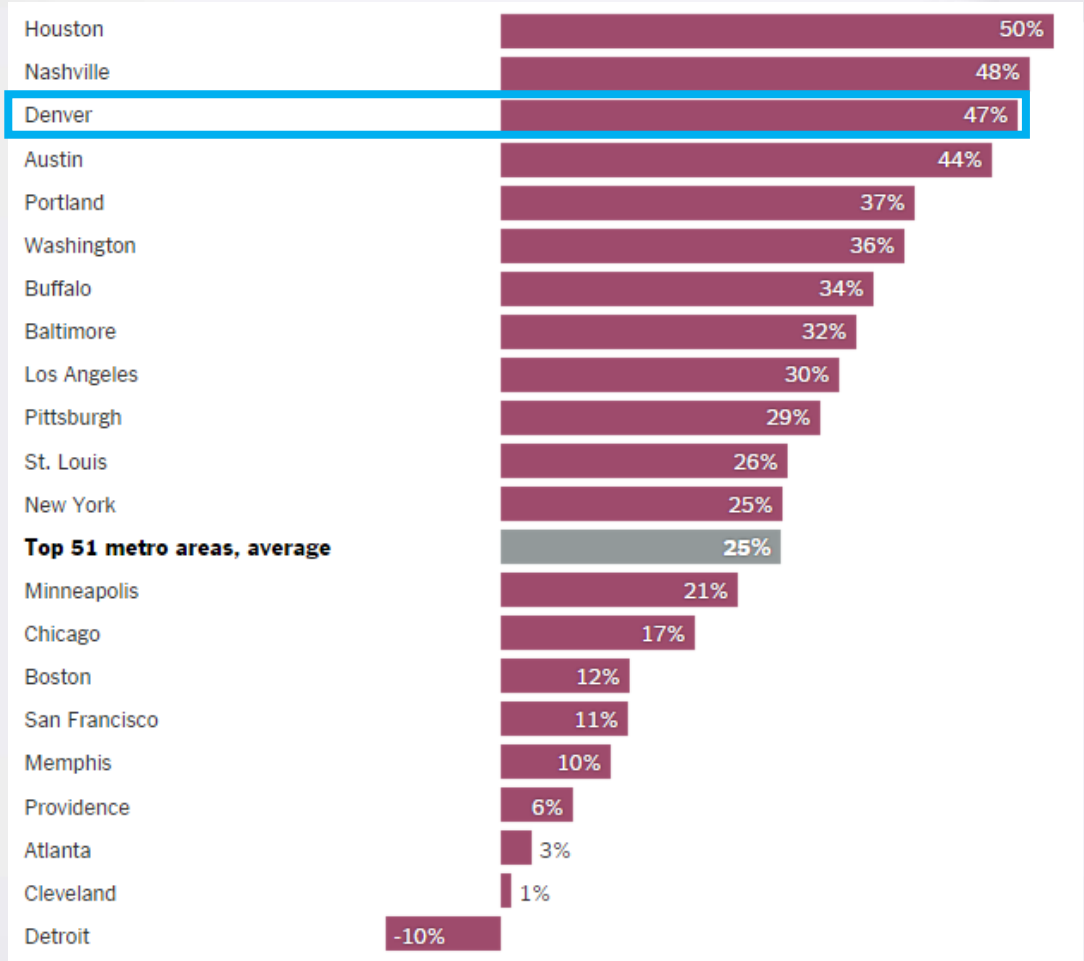
"…young people are drawn to city amenities in addition to jobs."

Top 3 factors young people look for when moving to a new city:

1. High density of people with a college degree
2. Low unemployment
3. **Ability to get around without a car**

Business Insider

Millennial Growth in Denver CSA



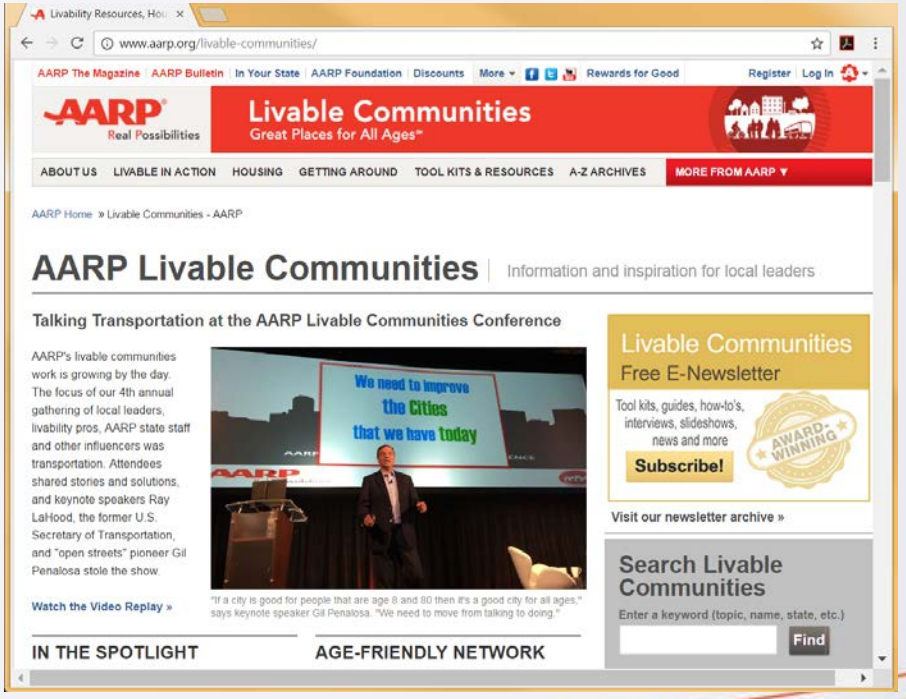
Percent Change in the Number of College Graduates Aged 25 – 34 *(2000 to 2012)*

Joe Cortright, City Observatory

- **Denver CSA: 47% Increase**

Baby Boomers' Living Preferences

- By 2025, one in four drivers will be 65+
  - 40% reported inadequate sidewalks
  - 50% cannot cross main roads safely
- A New Approach
  - Slow Down
  - Make it Easy
  - Enjoy the View
- AARP Livable Communities has numerous resources!



Baby Boomer Growth in Denver CSA

Percent Change in the Number of Adults 65+
(2000 to 2010)

John McIlwain, Housing in America

- **Denver CSA: 32% Increase**

FIGURE 24 **Change in 65-Plus Population for Cities in the Top 50 Metro Areas versus Change for Metro Area** | PERCENT CHANGE IN 65-PLUS POPULATION BY CITY AND METROPOLITAN AREA, 2000–2010

Decline			Growth		
	City	Metro region		City	Metro region
New Orleans	–34%	–5%	Raleigh	60%	60%
St. Louis	–26%	7%	Charlotte	30%	36%
Buffalo	–24%	–3%	Las Vegas	27%	50%
Pittsburgh	–23%	–5%	Austin	27%	53%
Cincinnati	–21%	11%	San Jose	24%	23%
Cleveland	–21%	1%	Jacksonville	18%	31%
Birmingham	–19%	9%	Phoenix	17%	33%
Milwaukee	–18%	4%	Houston	16%	39%
Detroit	–16%	6%	San Antonio	16%	27%
Baltimore	–15%	11%	Riverside	13%	28%
Providence	–15%	1%	Sacramento	13%	27%
Philadelphia	–13%	4%	Oklahoma City	13%	18%
Minneapolis	–13%	23	Dallas	13%	38%
Richmond	–13%	22%	Virginia Beach	11%	19%
Salt Lake City	–12%	25%	Los Angeles	10%	17%
Tampa	–8%	4%	Denver	10%	32%
Memphis	–6%	15%	San Diego	9%	12%
Chicago	–5%	9%	Columbus	7%	20%
Hartford	–4%	8%	Portland	6%	27%
Kansas City	–4%	15%	San Francisco	6%	13%
Seattle	–1%	20%	New York	6%	7%
Indianapolis	0%	18%	Orlando	6%	29%
Washington, DC	0%	29%	Miami	5%	8%
			Louisville	5%	14%
			Nashville	3%	37%
			Boston	2%	8%
			Atlanta	2%	44%

Source: U.S. Census Bureau, 2000 and 2010.

What has been your experience with Complete Streets?

- Policy
- Planning
- Construction
- Design

Common Challenges of Multimodal Corridors

- Balancing the needs of **multiple modes in limited space**
- Aggressive improvements **can be costly up front investments**
- **Resistance from local** business owners and/or residents

Why are Multimodal Evaluations Important?

Understanding Trade-Offs Between Travel Modes

Pedestrians

Bicyclists

Motorists

Transit Users

Why are Multimodal Evaluations Important?

- **If you can't measure** multiple travel modes, you can't plan for them!
- Level of Service (LOS) **historically measures vehicular performance only**
- National effort to **encourage multimodal streets**
- Integrated into latest revision of **Highway Capacity Manual**

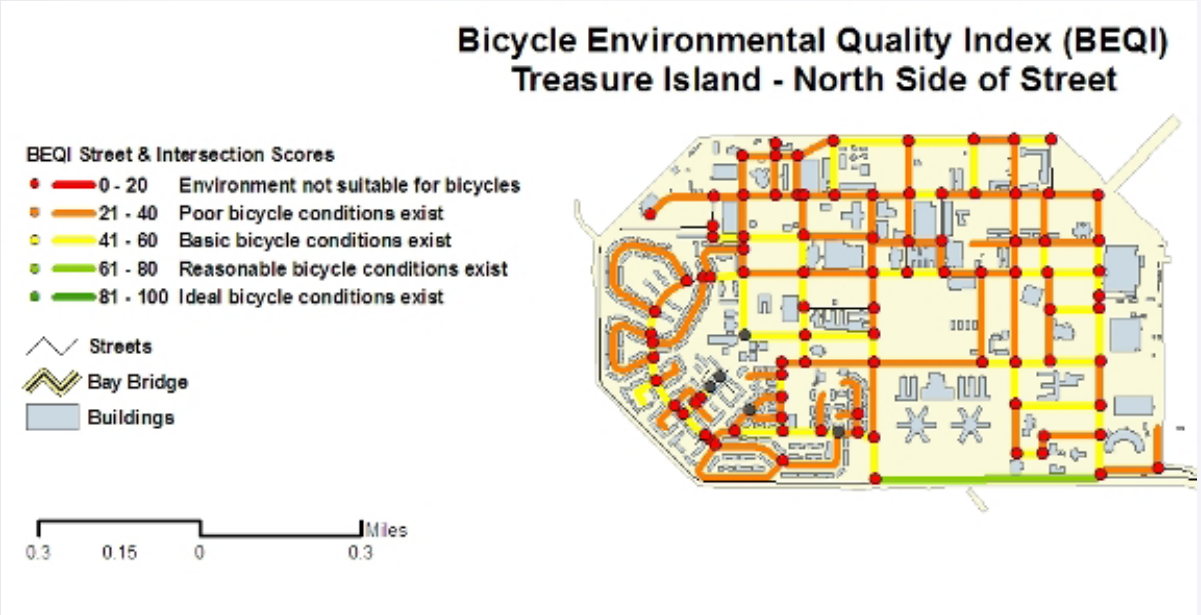
What is MMLOS?

- An index measuring user experience *(Quality of Service)* for each mode of travel along a corridor, graded A to F.
- **Four levels of service result:**
  - **Auto, Transit, Bicycle, Pedestrian**
- **Combined LOS is not calculated**
- Alternative ways of measuring:
  - HCS 2000
  - **HCS 2010**
  - Pedestrian Environmental Quality Index (PEQI)
  - Bicycle Environmental Quality Index (BEQI)

Index	LOS
≤ 2.00	A
> 2.00 - 2.75	B
> 2.75 - 3.50	C
> 3.50 - 4.25	D
> 4.25 - 5.00	E
> 5.00	F

Bicycle & Pedestrian Environmental Quality Index

The City of San Francisco Public Health Department developed both the PEQI and BEQI **tool to prioritize improvements in pedestrian and bicycle infrastructure during the planning process.**

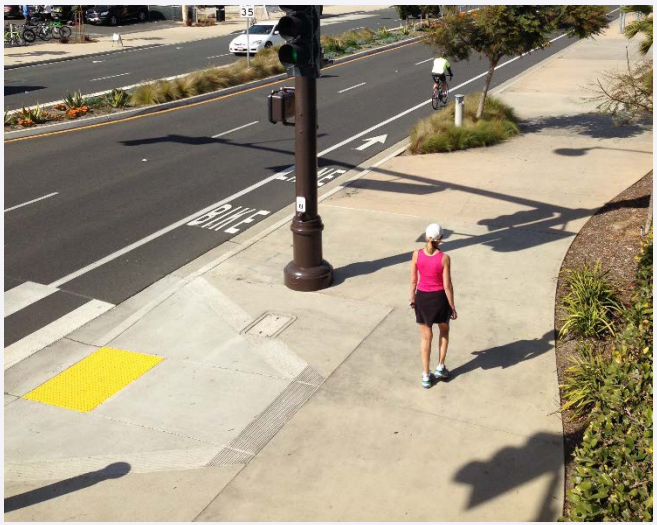


- BEQI
  - Intersection Safety
  - Vehicle Traffic
  - Street Design
  - Land Use
  - Safety/Other
- PEQI
  - Intersection Safety
  - Traffic Volume
  - Street Design
  - Land Use
  - Perceived Safety

HCM 2000 Approach to MMLOS

- **HCS 2000 Based on volume to capacity only**
- **For example:**

HCS 2000 LOS Ped LOS A

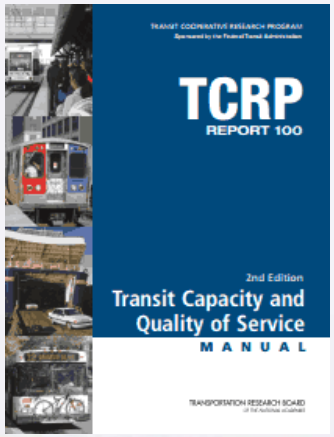


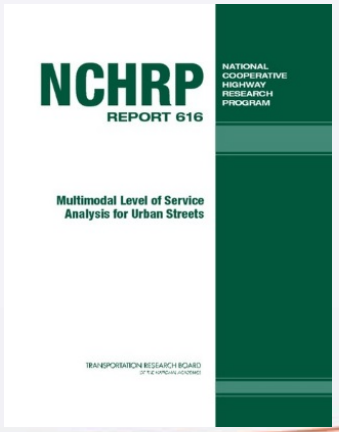
HCS 2000 LOS Ped LOS F

How to Measure MMLOS?

HCS 2010 MMLOS Approach – Quality of Service (QOS)

- Measures the **perception of how well a facility operates from the traveler's perspective**
- Based upon survey **research quantifying travelers' perceptions of roadway conditions**
- **Methods covered in HCM chapters 16, 17, 18**

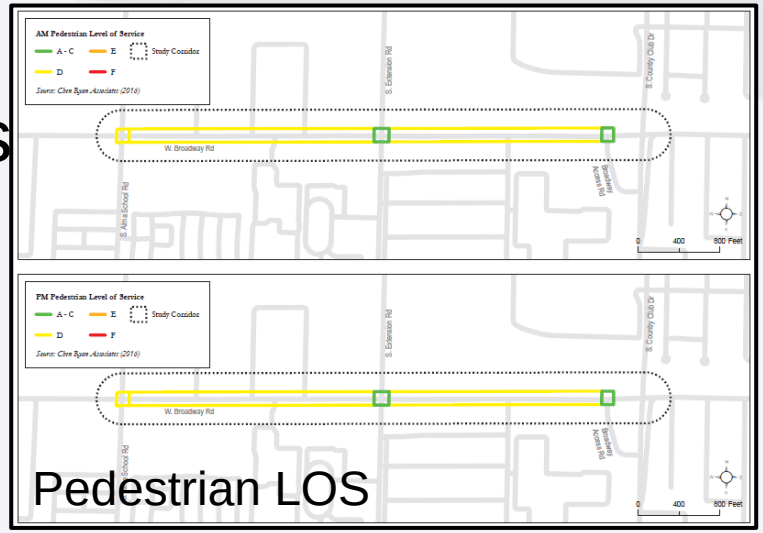




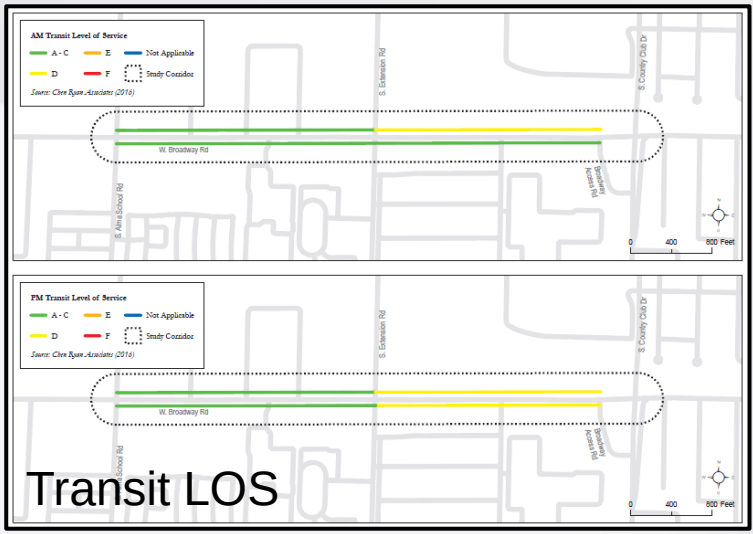
Example of HCS 2010 Output Results

Existing Conditions

City of Mesa, AZ

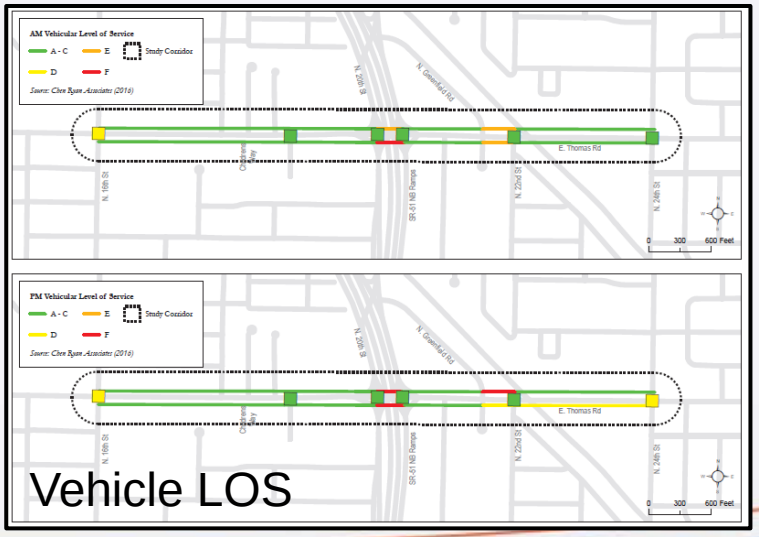


Pedestrian LOS



Transit LOS

Bike LOS



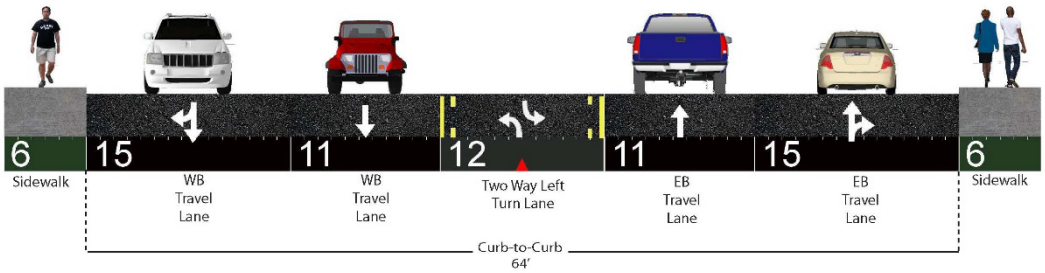
Vehicle LOS

Example of HCS 2010 Output Results

Mesa: Broadway Rd, Alma School Rd to Extension Rd *(EB, AM Peak)*

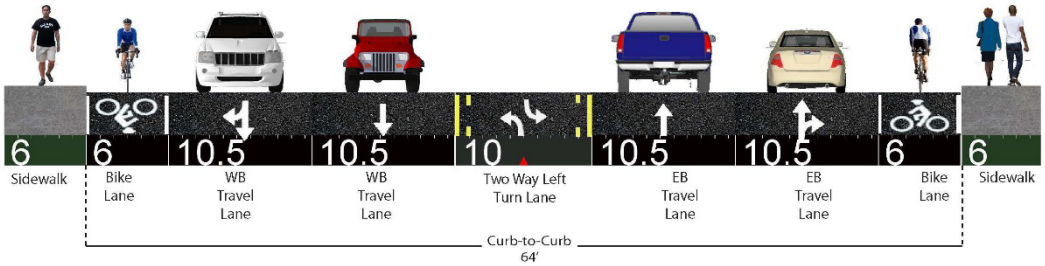
	LOS	Index		LOS	Index
Ped	D	3.76	Bus	A-C	3.37
Bike	E	4.82	Auto	A-C	2.18

Existing Conditions



	LOS	Index		LOS	Index
Ped	**D**	**3.67**	**Bus**	**A-C**	**3.33**
Bike	**E**	**4.52**	Auto	A-C	2.18

Striping Alternative



***** Bold = Improved LOS under the Striping Alternative***

Our Recent MMLOS Findings

- Conducted regional study with Maricopa Association of Governments (MAG)
- Nine participating local jurisdictions
- Evaluation of nine one-mile corridors under three scenarios:
  - Existing Conditions
  - Restriping Alternative
  - Customized Alternative

Our Recent MMLOS Findings

Advantages

- Provides a **better understanding of quality of travel for all modes**
- Provides both a **quantitative and a qualitative analysis** of travel conditions
- Easy to **weigh** impacts and benefits across the different modes **- trade offs**
- **Focuses on factors within the public right-of-way**, which can be addressed through planning and engineering.

Disadvantages

- MMLOS software is **still adapting**
- The **formulas are complex and interrelated** – i.e. Transit LOS heavily relies on Pedestrian LOS
- **Extensive amount of data** is required for model inputs

Findings: Software Limitations

- Software does not include evaluation of all facility types
- Required work around solutions for multi-use paths and shared bus/bike lanes

Findings: Sensitivity Testing

- Highly sensitive features in the equations include:
  - Number/frequency of commercial driveways
  - Speed limit
  - Traffic volume
  - Vertical and horizontal separations
    - i.e. landscaping, bollards, barriers, buffers, etc.
  - Transit scores are heavily influenced by service frequency and pedestrian conditions
- It is very challenging to get a good bicycle and pedestrian score on arterial roadways without these tradeoffs.

Findings: Data Collection

- Draws from a **wide variety of street data**
- Cities with **existing data** collection efforts were **easier** to calculate results
- Data collection categories include:
  - Right-of-way & Geometrics
  - Traffic Data
  - Signal Timing
  - Transit Inputs
  - Pedestrian Inputs
  - Bicycle Inputs

Right-of-way & Geometrics

1. Curb-to-curb width
2. Lane widths
3. Paved shoulder width
4. Median type
5. Corner radius (if available)
6. Turning Pocket Length
7. Presence of curb
8. Walkway width
9. Crosswalk width & length
10. Sidewalk presence
11. Slope / terrain (if available)
12. Distance between major intersections
13. Presence/width of sidewalk buffer
14. Downstream intersection width
15. Inside object effective width
16. Outside object effective width
17. Distance to nearest signal
18. Sidewalk length adjacent to buildings with zero setback
19. Pavement condition rating
20. Bicycle lane width
21. Street lighting

Traffic Data

1. Peak hour intersection turning movements
2. Heavy vehicle percentage
3. Parking utilization (per hour)
4. Vehicular ADT
5. 85th percentile speed
6. Posted roadway speeds
7. Permitted left-turn volume at intersections

Signal Timing

1. Signal timing plan
2. Synchro timing output

Transit Inputs

1. Number of transit stops
2. Dwell time
3. Excess wait time
4. Average passenger trip length
5. Transit frequency
6. Passenger load factor
7. Boardings and alightings
8. Proportion of stops with shelters/benches
9. Re-entry delay
10. Base travel time rate
11. Number of buses per hour

Pedestrian Inputs

1. Two-way pedestrian volume along roadway segment
2. Pedestrian waiting delay per second
3. Pedestrians per hour at intersection
4. Incoming / outgoing pedestrian volume

Bicycle Inputs

1. Bicycle volume per hour
2. Bicycle running speed
3. Bicycle and pedestrian collision data

Complete Streets: Making Connections in Adams County

- **Create Policy**
  - Complete Street Policy Considerations
  - Complete Street Policy Components
- **Create Standards**
  - Component Parts of a Street
  - Travel Mode Priority
  - Maintenance and Low-Impact Design Solutions (LID)
  - Crime Prevention Through Environmental Design (CPTED)
- **Build Upon Complementary Networks**
  - Sidewalk Program
  - Parks and Trail Improvements
  - Street Connectivity Ratio

Questions?

Thank you

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