

Broward *Complete Streets* Initiative

Safer, Healthier Streets for ALL Users



Complete Streets TOUCH Initiative

Technical Advisory Committee

MMLOS National Scan

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Alternative LOS Methodologies

Purpose

- The Broward Complete Streets Guidelines emphasize the limitations of the traditional level of service (LOS) tool
 - Considers quality of service for only a limited number of users
- Identify a tool that:
 - Is appropriate for Broward County
 - Reflects all users





Alternative LOS Methodologies

- Pedestrian
- Bicycle
- Transit
- Automobile





Alternative LOS Methodologies

- Three primary methodologies reviewed



NCHRP
REPORT 616

NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM

Multimodal Level of Service
Analysis for Urban Streets

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

HCM2010
HIGHWAY CAPACITY MANUAL

Broward Complete Streets Initiative

Safer, Healthier Streets for ALL Users



Alternative LOS Methodologies

- Seven software tools and packages

Auto LOS

Segment	Flow Rate	LOS	Control	Left Turn	Average	Segment
1	100	D	F	0.00	15	F
2	200	D	F	0.00	15	F
3	300	D	F	0.00	15	F
4	400	D	F	0.00	15	F
5	500	D	F	0.00	15	F

Bicycle, Pedestrian & Bus LOS

Segment	Flow Rate	LOS	Control	Left Turn	Average	Segment
1	100	D	F	0.00	15	F
2	200	D	F	0.00	15	F
3	300	D	F	0.00	15	F
4	400	D	F	0.00	15	F
5	500	D	F	0.00	15	F

WALKABILITY INDEX DATA SHEET

Street Name: **LAKE AVE**

Segment: **LAKE AVE**

Category	Score	Weight	Score	Weight	Score	Weight	Score	Weight
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

WALKABILITY INDEX DATA SHEET

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Segment: **LAKE AVE**

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1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Walk Score®

Get Your Score: Type a neighborhood, city or place

Walk Score: **59** Somewhat Walkable

About Fort Lauderdale: Fort Lauderdale has an average Walk Score of 59 and is rated Somewhat Walkable.

Best Fort Lauderdale neighborhoods for walkability are **Downtown**, **Beverly Heights** and **Esplanade Heights**.

Fort Lauderdale
Walk Score: 59
Population: 165,521

WALKABLE IS YOUR STREET, NEIGHBOURHOOD OR CITY?

postcode: 5 miles

Lombard St, San Francisco
3.1 (1)

OVER 600,000 STREETS RATED SO FAR

Segment Output Data

Segment	Movement	EBL	EBT	EBR	WBL	WBT
1	Shared Lane Spillback Time, h	never	never	never	never	never
1	Base Free-Flow Speed, mph	40.78	40.78	40.78	40.78	40.78
1	Running Time, s	33.53	33.53	33.53	33.53	33.53
1	Running Speed, mph	36.31	36.31	36.31	36.31	36.31
1	Through Delay, s/veh	13.54	13.54	13.54	13.54	13.54
1	Travel Speed, mph	28.04	28.04	28.04	28.04	28.04
1	Stop Rate, stops/veh	0.37	0.37	0.37	0.37	0.37
1	Spatial Stop Rate, stops/mi	1.00	1.00	1.00	1.00	1.00
1	Through vehicle Ratio	0.97	0.97	0.97	0.97	0.97
1	Percent of Base FFS	63.66	63.66	63.66	63.66	63.66
1	Level of Service	C	C	C	C	C
1	Auto Traveler Perception Score	2.45	2.45	2.45	2.45	2.45

Multimodal Results (Segment)

Mode	LOS Score	LOS	Facility	
1	3.33	C	3.26	C
1	3.48	C	3.42	C
1	6.47	F	6.47	F

Facility Output Data

Facility	Travel Time, s	Travel Speed, mph	Stop Rate, stops/veh	Spatial Stop Rate, stops/mi	Through vehicle Ratio	Percent of Base FFS	Level of Service	Auto Traveler Perception Score
1	47.17	71.77	0.37	1.00	0.97	63.66	C	2.45
1	28.04	71.77	0.37	1.00	0.97	63.66	C	2.45
1	42.73	71.77	0.37	1.00	0.97	63.66	C	2.45
1	41.96	71.77	0.37	1.00	0.97	63.66	C	2.45
1	41.96	71.77	0.37	1.00	0.97	63.66	C	2.45

Multimodal Results (Facility)

Mode	LOS Score	LOS	Facility	
1	3.33	C	3.26	C
1	3.48	C	3.42	C
1	6.47	F	6.47	F

CHOOSE ONE

Auto Trips Generated (ATG)

Bicycle Environmental Quality Index (BEQI)

Built Environmental Factors

Charlotte MLOS

Florida DOT MLOS

Fort Collins Bicycle LOS

Fort Collins Pedestrian LOS

Fort Collins Transit LOS

HCM 2010 Bicycle LOS

HCM 2010 Pedestrian LOS

HCM 2010 Transit LOS

Layered Networks

Pedestrian Environmental Quality Index (PEQI)

Person Delay



We Incorporated Your Input

- LOSPLAN is good, but...
- Need to recognize the role that land use context plays
- Some important street design factors are not included

- Adjustment factors added



Proposed Identified Tool

ARTPLAN component of LOSPLAN 2012 software

- Demonstrates the interaction between the four modes
- Shows the effects of different design features on each mode
- Utilizes the accepted State of Florida methodologies
- Available free of charge

Adjustment Factors

- Additional walkability elements added
- Urban form adjustment factors added



Walkability Adjustment Factors

Source: HPE's Walkability Index

- Pedestrian Connectivity
 - Distance between Intersections or Mid-Block Crossings
- Presence and Quality of Pedestrian Features
 - Sidewalk Surface Conditions
 - Obstacles
 - ADA Compliance
 - Shade Trees
 - Street Furniture
 - Lighting

5 Pedestrian Connectivity: Distance between intersections or mid-block crossings

300' or less	5		0
301' to 400'	4		0
401' to 500'	3		0
501' to 600'	2		0
Over 600'	0		0
Segment Total			0

6 Presence and quality of pedestrian features (good sidewalk condition; lack of obstacles; ADA compliance; shade trees; street furniture)

High quality	5		0
Moderate quality	3		0
Low quality	2		0
Poor quality or no features	0		0
Segment Total			0



Urban Form Adjustment Factors

Source: Multimodal Mobility Strategy Assessment for Northern Broward & Southwestern Palm Beach


- Building Setbacks
- Spacing Between Buildings
- Physical Barriers Between Sidewalks and Buildings
- Off-Street Parking Locations

Urban Form Rating	Bicycle/Pedestrian Adjustment Factor	Transit Adjustment Factor ¹
Good	0.80	1.2
Fair	0.95	0.95
Poor	1.2	0.80

¹ The transit adjustment factor is inverse to the bicycle and pedestrian adjustment factor due to the inverse scoring scale used in ARTPLAN.

MULTIMODAL MOBILITY STRATEGY ASSESSMENT
FOR
NORTHERN BROWARD & SOUTHWESTERN PALM BEACH

Prepared for:
FLORIDA DEPARTMENT OF TRANSPORTATION, DISTRICT 4
AND
STATE ROAD 7 COORDINATING COMMITTEE

Prepared by:
 RENAISSANCE PLANNING GROUP

August 2011
REVISED March 2012



Next Steps

- Demonstration projects on the two corridors...
- ... using identified MMLOS tool
 - “ARTPLAN” component of LOSPLAN 2012 software
 - Walkability Adjustment Factors
 - Urban Form Adjustment Factors
- The attributes of the “ARTPLAN” component of LOSPLAN 2012 software combined with the recommended adjustment factors contribute to making it the most appropriate for the Broward environment and applicable for the demonstration project purposes

Broward *Complete Streets* Initiative

Safer, Healthier Streets for ALL Users



Thank you for assisting us in Transforming Our Community's Health (TOUCH)!

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Tools and Software Packages

- LOSPLAN
 - Uses adopted models from 2009 FDOT Q/LOS Handbook
 - LOS given for Auto, Bike, Ped, and Transit
 - Can show interaction between modes
 - Free download

Auto LOS

ARTPLAN 2009 - [LOS Results (Auto)]

File Edit View Tools Help

C:\My Documents\Projects\LOSPLAN Programs\Code\ARTPLAN\Version 7.0\AP_20

Peak Direction | Off-Peak Direction

Segment	Thru Mvmt Flow Rate	Adj. Sat. Flow Rate	w/c	Critical Delay	Thru Mvmt Intersection LOS	Left Turn Spillover	Average Speed	Segment LOS
1 NW 8 Ave-NW 55 St	2429	4268	1.130	89.3	F	0.00	4.0	F
2 NW 55 St-NW 57 St	2405	5359	0.897	26.6	C	0.15	11.0	E
3 NW 57 St-NW 60 Terr	3037	5359	1.130	90.5	F	0.56	5.8	F
4 NW 60 Terr-NW 62 Blvd	2426	5359	0.908	26.9	C	7.01	12.2	E
5 NW 62 Blvd-NW 66 St	2576	5359	0.961	31.8	C	0.38	12.7	E

Length (mi) 1.264 Wtd. g/C 0.50 Free Flow Delay (sec/vah) 1113.6 LOS Threshold Delay (sec/vah) 902.3 Avg. Speed (mi/h) 3.7 LOS F

<<-- Properties Intersection Segment (Auto) Segment (MM) Ped SubSegment LOS Results (Auto) LOS Results (MM) Service Volumes -->>

Bicycle, Pedestrian & Bus LOS

Peak Direction | Off-Peak Direction

Segment	Bike Score	Bike LOS	Ped LOS SubSeg (1)	Ped LOS SubSeg (2)	Ped LOS SubSeg (3)	Ped Score Segment	Ped LOS Segment	Adj. Buses	Bus LOS
1 NW 8 Ave-NW 55 St	4.41	D	D			3.77	D	0.75	F
2 NW 55 St-NW 57 St	4.41	D	D			3.78	D	0.75	F
3 NW 57 St-NW 60 Terr	4.52	E	D			4.00	D	0.75	F
4 NW 60 Terr-NW 62 Blvd	4.48	D	D			4.13	D	0.75	F
5 NW 62 Blvd-NW 66 St	4.46	D	D			3.96	D	0.75	F

Bike Score 4.47 Pedestrian Score 4.05 Adj. Buses 0.75
 Bike LOS D Pedestrian LOS D Bus LOS F

<<-- Properties Intersection Segment (Auto) Segment (MM) Ped SubSegment LOS Results (Auto) LOS Results (MM) Service Volumes -->>



Tools and Software Packages

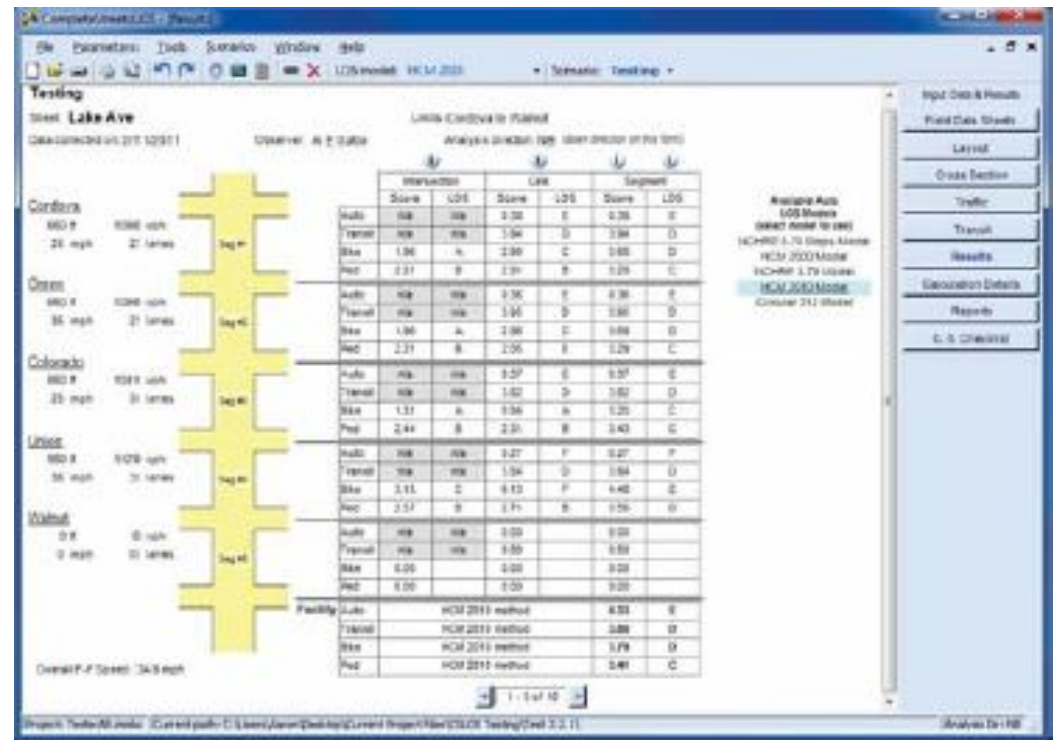
- HCS 2010
 - Uses HCM 2010 models
 - LOS given for Auto, Bike, Ped, and Transit
 - Can show interaction between modes
 - \$2000 per license

Segment Output Data		Eastbound			Westbound		
Segment	Movement	EBL	EBT	EBR	WBL	WBT	WBR
		5	2	12	1	6	16
.1	Bay/Lane Spillback Time, h		never		never	never	
1	Shared Lane Spillback Time, h	never		never	never		never
1	Base Free-Flow Speed, mph		40.78			40.78	
1	Running Time, s		33.83			33.83	
1	Running Speed, mph		38.31			38.31	
1	Through Delay, s/veh		13.34			37.94	
1	Travel Speed, mph		26.04			17.12	
1	Stop Rate, stops/veh		0.37			0.74	
1	Spatial Stop Rate, stops/mi		1.09			2.17	
1	Through vol/cap Ratio		0.57			0.88	
1	Percent of Base FFS		63.86			41.98	
1	Level of Service		C			D	
1	Auto Traveler Perception Score		2.45			2.63	
Multimodal Results (Segment)							
1	Pedestrian Segment LOS Score / LOS		3.33	C		3.26	C
1	Bicycle Segment LOS Score / LOS		3.48	C		3.48	C
1	Transit Segment LOS Score / LOS		6.47	F		6.47	F
Facility Output Data		Eastbound			Westbound		
	Facility Travel Time, s		47.17			71.77	
	Facility Travel Speed, mph		26.04			17.12	
	Facility Base Free Flow Speed, mph		40.78			40.78	
	Facility Percent of Base FFS		63.86			41.98	
	Facility Level of Service		C			D	
	Facility Auto Traveler Perception Score		2.45			2.63	
Multimodal Results (Facility)							
	Pedestrian Facility LOS Score / LOS		3.33	C		3.26	C
	Bicycle Facility LOS Score / LOS		3.48	C		3.48	C
	Transit Facility LOS Score / LOS		6.47	F		6.47	F



Tools and Software Packages

- CompleteStreetsLOS
 - Uses NHCRP 616 models
 - LOS given for Auto, Bike, Ped, and Transit
 - Can show interaction between modes
 - \$1850 per license





Tools and Software Packages

- MMLoS Toolkit
 - Includes applicability, advantages, shortcomings, and data/software requirements for 16 LOS methods
 - Not an actual computing tool





Tools and Software Packages

- HPE's Walkability Index
 - Walkability score sheet used to calculate pedestrian score and LOS
 - Based on ten walkability criteria relating to the roadway's geometry, motor vehicle speeds, land use mix, pedestrian features, etc.
 - Does not assess other modes
 - Free download of score sheet

WALKABILITY INDEX DATA SHEET:

Street Name: _____

Date: _____

Begin Time: _____ A.M. / P.M. (Circle One)

Completed by: _____

Segmenting: _____

Project Name of Street/Block: _____

Traverse Zone (Circle One): T3 T4 T5 T6

Street Segment: _____

Block Face: _____

Score Side A: _____

Score Side B: _____

Total Score: _____

WALKABILITY MEASURE

STREET DESIGN (MAXIMUM SCORE 30 POINTS)

1. Non-pavement Free Flow Speed (Vehicle not hindered by stop signal or other obstructions)

Criterion	Value	Score Side A	Score Side B	Total Score
10 mph	10			
20 mph	8			
30 mph	4			
Over 30 mph	0			
Segment Total				

2. Pavement Width— curb face to curb face—of Pedestrian Crossing

Criterion	Value	Score Side A	Score Side B	Total Score
37' or less	10			
37' - 42'	8			
42' to 54'	6			
55 to 66'	4			
Over 66'	0			
Segment Total				

3. Presence of On-Street Parking (Parallel or Angle Parking)

Criterion	Value	Score Side A	Score Side B	Total Score
90% - 100% of Block Face	5			
51% - 70% of Block Face	4			
20% - 50% of Block Face	3			
10% - 20% of Block Face	2			
No on-street parking	0			
Segment Total				

SIDEWALK DESIGN (MAXIMUM SCORE 30 POINTS)

4. Sidewalk Width: Sidewalk width should be appropriate to the built environment (Score for appropriate transect)

Criterion	Value	Score Side A	Score Side B	Total Score
T3	10			
T4	8			
T5	6			
T6	4			
Segment Total				

5. Pedestrian Connectivity: Distance between intersections or mid-block crossings

Criterion	Value	Score Side A	Score Side B	Total Score
300' or less	5			
301' to 400'	4			
401' to 500'	3			
501' to 600'	2			
Over 600'	0			
Segment Total				

6. Presence and quality of pedestrian features (good sidewalk condition; lack of obstructions; ADA compliance; shade trees; street furniture)

Criterion	Value	Score Side A	Score Side B	Total Score
High quality	5			
Moderate quality	3			
Low quality	2			
Poor quality or no features	0			
Segment Total				

URBAN DESIGN (MAXIMUM SCORE 30 POINTS)

7. Street Enclosure: Ratio of building height to street width (building face to building face)

Criterion	Value	Score Side A	Score Side B	Total Score
1.1 to 11.0	10			
1.0 to 1.0	8			
1.0 to 1.0	6			
< 1.0	0			
Segment Total				

8. Land Use Mix: Presence of different land use types, e.g. retail, eating and drinking establishments, hotels and residential units (Score for appropriate transect)

Criterion	Value	Score Side A	Score Side B	Total Score
T3	10			
T4	8			
T5	6			
T6	4			
Segment Total				

9. Facade Design: Presence of facade arrangements and designs that are attractive to pedestrians*

Criterion	Value	Score Side A	Score Side B	Total Score
Small units, many doors (10-14 door/block face), lots of character	5			
Small units, many doors (10-14 door/block face), many details	4			
Mix of large & small units, 6-8 door/block face, few details	3			
Large units, 6-8 door/block face, few or no details	2			
Large units, few or no doors (1-3 door/block face), uniform facade	0			
Segment Total				

*Open front Close Enclosure With Railing; Jan. Gen.; Lots; Johnson Heiler and Saving Regard

TRANSBICYCLE FEATURES (MAXIMUM SCORE 10 POINTS)

10. Shared Space Bicycle Features

Criterion	Value	Score Side A	Score Side B	Total Score
Presence of special bicycle features (e.g. bike shelter)	10			
Presence of bike racks and bicycle racks	8			
Presence of bike shops or bicycle racks only	6			
No bike shops or bicycle racks	0			
Segment Total				

Walkability Scoring

Score Range	Walkability Level
90 - 100 points	High Walkability (****)
80 - 89 points	Very Walkable (***)
60 - 79 points	Moderately Walkable (**)
40 - 59 points	Some Walkability (*)
20 - 39 points	Minimal Walkability (0)
10 points or less	Unwalkable/Infeasible for Walking (0)

TOTAL SCORE, THIS STREET SEGMENT _____

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Tools and Software Packages

- Walk Score
 - Walkability score assigned based on distance to amenities
 - Does not assess other modes
 - Free location score search online or through app

Walk Score® Cities & Neighborhoods Apartments & Rentals Why It

Get Your Score: Type a neighborhood, city or place

Walk Score **59** Somewhat Walkable Agree Disagree
Some amenities are within walking distance in Fort Lauderdale.

About Fort Lauderdale
Fort Lauderdale has an average Walk Score of 59 and is rated Somewhat Walkable.
Best Fort Lauderdale neighborhoods for walkability are [Downtown](#), [Beverly Heights](#) and [Flagler Heights](#).

Fort Lauderdale

Walk Score:	59
Population:	165,521

United States > Florida > Fort Lauderdale

The Commodore Condominium

Steven M: Perfect Seasonal Rental at The Commodore, the "Jewel o...



Tools and Software Packages

- WalkoBot by Walkonomics
 - Uses public data about a street's features to assess walkability on a score of 0-5 stars
 - Based on 8 key factors including safety, ease of crossing the street, quality of sidewalks, aesthetic quality, and crime rates
 - Does not assess other modes
 - Free location score search online or through app
 - Results not available for locations within Broward

